UNIVERSITY of Prince Edward ISLAND

Academic Planning and Curriculum Committee
August 7, 2024

NEW OR REVISED PROGRAM

School: Graduate Studies

Faculty: Graduate Studies

Department: Graduate Studies/Cleantech

MOTION: That a new program entitled "Master of Cleantech Leadership and Transformation" be approved as proposed by the Faculty of Graduate Studies.

Checklist of Required Attachments for APCC Consideration:

x☐ MPHEC Requirements for a New or Modified Program

x☐ List of all Appendices included in the proposal. MPHEC provides guidelines in the proposal form on what appendices should be included.

Required Appendices Include:

x☐Detailed course descriptions for each compulsory and required elective courses
x☐ Draft calendar entry
x☐Letters of support from potential admitting institutions, employers, and relevant professional organizations **(Please see Appendix F in Appendices of MPHEC)**
☐Faculty CV's in MPHEC format **(Please note that CVs are not needed as part of the new MPHEC Proposal format.)**

*Note: Budget for the program is also included as an Appendix to the New or Revised Program form. It was not needed for the new MPHEC Proposal format.

Authorization	***Date:***
Departmental Approval:	
Faculty/School Approval:	
Faculty Dean's Approval: Dr. Marva Sweeney-Nixon	February 3, 2025
Graduate Studies Dean's Approval: Dr. Marva Sweeney-Nixon	February 3, 2025
Registrar's Office Approval: Darcy McCardle	.
Vice-President Academic Approval: Dr. Greg Naterer	

Form Version: SEPTEMBER 2023

MPHEC
Maritime Provinces
Higher Education
Commission

CESPM
Commission de
l'enseignement supérieur
des Provinces maritimes

January 30, 2025 ***[Mailed Electronically]***

Dr. Wendy Rogers
President and Vice-Chancellor
University of Prince Edward Island
550 University Avenue
Charlottetown, PE C1A 4P3

Dear Dr. Rogers:

Subject: Proposed Master of Cleantech Leadership and Transformation, University of Prince Edward Island

I am writing to inform you that your institution's proposal for the above-noted program has successfully undergone a Stage I Assessment and is therefore **approved, with the following conditions:**

1. That prior to program implementation (i.e., **by June 30, 2025**), evidence be provided that the two planned tenure track hires have been made. The Academic Director should also be identified at this time. CVs of the successful candidates should be provided along with a list of the courses each is expected to teach in the program.

2. That **by March 31, 2026**, UPEI provide:
   A. evidence to confirm the planned third tenure track hire has been made. The CV of the successful candidate should be provided along with a list of the courses they are expected to teach in the program.
   B. an update on the status of the Cleantech Park and the Cleantech Innovation Centre.

3. As per the Commission's policy on quality assurance, all new programs are expected to undergo an external review after one or two cohorts have graduated. For the Master of Cleantech Leadership and Transformation, which is a 16-month degree, this review would be expected to occur in 2028. Given this, UPEI is to provide the results of the external review (the external reviewers' report[1] and UPEI response) **by January 31, 2029**,

…2

[1] When an external review is undertaken, we ask that universities also provide written confirmation from the consultant(s) that, in carrying out the external review, they are not in a conflict or perceived conflict of interest situation. The MPHEC's definition can be found in the *Guidelines for the Selection of External Program Assessors.* CVs for the external reviewer(s) should also be submitted.

demonstrating that the program continues to meet the Commission's assessment standards, including sufficient and appropriate faculty resources to deliver the program (i.e., including faculty with technical expertise, such as those drawn from other departments, the establishment of the possible Cleantech Research Chairs in Engineering, or both, as discussed during the assessment process).

Students enrolled in this program should be reported using the following PSIS codes:

Name of Program	**CIP***	**Program Type**	**Credential Type**	**Program Category**
Master of Cleantech Leadership and Transformation	03.0209 - Energy and environmental policy / environmental energy policy	59 – Graduate program (second cycle)	04 – Degree	00140 – Technology

* Classification of Instructional Program (CIP) codes

In closing, I wish you and your colleagues the very best in the implementation of this program.

Yours sincerely,

Catherine Stewart
Chief Executive Officer

CS/rl

cc: Greg Naterer, Vice-President, Academic and Research
Andrea Trowbridge, Interim Registrar

Outlook

Re: UPEI - Master of Cleantech Leadership and Transformation

From Rachel Hasan <rahasan@upei.ca>
Date Wed 12/11/2024 11:07 AM
To Andy Thompson <thompsona@mphec.ca>
Cc Proposals/Programmes <proposals@mphec.ca>; Greg Naterer <gnaterer@upei.ca>; Marva Sweeney-Nixon <msweeney@upei.ca>; Susie Zavala <szavala@upei.ca>

Hi Andy

I hope my email finds you well. Below please find a detailed response to your queries for Master of Cleantech Leadership and Transformation by the program team:

1. Use of the term "Cleantech" in the program name is unique to the field. Can a definition of "cleantech" be provided?

Cleantech or clean technology (sometimes also called 'climate-tech') encompasses 'green' technological innovations and much more. It is broad, interdisciplinary, and spans all economic sectors. The Government of Canada defines it as "any good or service designed with the primary purpose of contributing to remediating or preventing any type of environmental damage" and "any good or service that is less polluting or more resource efficient than equivalent normal products that furnish a similar utility" (Government of Canada, 2024).

In simple terms, we are defining Cleantech in our program as: any technology, product, service or action that mitigates environmental harm and moves us towards 'net zero' through improved energy efficiencies, sustainable use of resources, and environmental protection. We define net zero simply as a balancing of greenhouse gas emissions and capturing.

Below are examples of cleantech sectors, solutions and foci in our program, and more broadly at UPEI (e.g., Faculty of Sustainable Design Engineering, School of Climate Change and Adaptation, Environmental Studies [see below]):

- Renewable and non-emitting energy supply
- Smart grids and energy storage, community energy projects
- Green transportation
- Green housing
- Biofuels, bioenergy, and by-products
- Precision agriculture
- Biodiversity, forestry
- Water conservation and wastewater
- Clean air remediation
- Waste and recycling

Government of Canada. (2024, November 7). *Clean Technology Data Strategy*. https://ised-isde.canada.ca/site/clean-growth-hub/en/clean-technology-data-strategy

2. Given that the admission criteria for the program is so broad, how will you ensure that students with different academic backgrounds can be successful in the program? Is there a particular educational or professional background that the program is targeted toward?

We intend to enable applicants from various academic and professional backgrounds to fully participate and succeed in the program. That said, we may target applicants who are currently working and wish to upskill or pivot into roles within cleantech. We plan to ensure the success of students from diverse backgrounds by:

- Developing resources such as online modules covering foundational knowledge for students to access prior to arriving on campus, ensuring that they begin the program with an appropriate footing regardless of their background.
- Offering a clearly communicated orientation to the program and providing on-going support services for students.
- Emphasizing a collaborative learning environment through team projects and activities throughout the courses. Student and faculty teams will be interdisciplinary which can leverage diverse skillsets, helping individuals to learn from one another.
- Providing workshops, tutorials and extra-help sessions in the curriculum, and academic support from the program coordinator [see below].
- Providing peer and industry mentoring and networking opportunities through the university's graduate student community and through local industry events.

3. The proposal states that a Program Manager/Coordinator will be hired who will provide student advising and will assist with recruitment and retention of students. Who will be responsible for on-going program and course development, review, and assessment?

This program is an Interdisciplinary Academic Program – there are a few of these at UPEI, e.g., Environmental Studies. The UPEIFA Collective agreement describes how Interdisciplinary Academic Programs such as this are administered. A **faculty member will be hired as the Academic Director**. The Director plays a similar role to the Chair of a Department. As such, the Director, with input from the Dean of Graduate Studies and the Manager, will be responsible for program review and assessment. A curriculum committee (called a 'coordinating committee' of the interdisciplinary program) will be established to monitor the program.

4. In the proposal there are three contract faculty members listed as teaching within the program. The proposal also states that three new faculty hires will be made to support the program. Regarding these hires:

1. **Is in the intention of UPEI to hire the faculty members current on contract into the new faculty positions?**
2. **What will be the rank and status of the new positions (e.g., tenure-track professor)?**
3. **What is the timeline for hiring the new faculty members? Will they be in place prior to program implementation or after?**
4. **The external reviewer noted a lack of redundancy regarding technology expertise in the program. What are the plans for ensuring there are more faculty with technology expertise associated with the program?**

In the Proposal (section 6.3), we indicated that we expect to hire tenure-track or term faculty members. In the Proposal (section 6.2.2; also Table page 41), we indicated that we expect to recruit 3 faculty members as well as sessional instructors. We have now (September 2024) submitted our budget request to the Government. There, we have requested funds for **3 new tenure-track faculty members** (Assistant or Associate Professors), 2 of which will be hired prior to the start of the program (searches expected to commence February 2025). These 2 faculty members will teach courses in Fall

2025 and Winter 2026, and one will be the Academic Director. The third faculty member will be hired during Fall 2025 and will be in place to teach during Summer and Fall 2026. **These 3 faculty members will deliver 8 or 9 of the courses in the program. The 4-5 remaining courses will be delivered by contract faculty** (**sessionals**) **who will be hired or by tenure-track faculty who are already at UPEI.** Several of the existing UPEI faculty who are part of the Curriculum Working Group have expressed interest in teaching in the program. All hiring will follow the UPEIFA Collective Agreement with no specific intentions regarding whether the faculty hires will be external or internal.

The external reviewers noted there should be **more technology expertise in the program**. There was only one faculty member from Engineering on our Curriculum Working Group – similarly, there was only one faculty member from each relevant unit, with the exception of Climate Change and Adaptation, where some of our members have cross-appointments. To ensure there are more faculty with technology expertise associate with the program, the intention is to recruit 1 or 2 Cleantech Research Chairs in Engineering. We are already in confidential conversations with a potential private sector donor (and Innovation PEI) for one Industry Cleantech Research Chair. This individual will be housed at the Cleantech Innovation Centre in Georgetown, the home of the program where it is planned will be a convergence of innovation, research, and commerce of the PEI Cleantech initiative. This 'collision space' will create an environment where industry, community, government, and academia work closely to find solutions to real-life challenges. There are at least 6 other faculty members at UPEI with technological experience in Cleantech, located in Engineering and the School of Climate Change and Adaptation (listed below, with their expertise). We have every expectation that they will interact with our Masters program in some manner.

Faculty members at UPEI with technological experience in Cleantech who could potentially contribute to program:

- Gaoling Fang, onboard EV chargers.
- Aitazaz Farooque, precision agriculture technologies/AI.
- Kuljeet Grewal, sustainable neighborhood and energy design, planning of clean energy resources.
- Amy Hsiao, characterization of materials for sustainable applications; applied Materials Science research in renewable energy innovations.
- Yulin Hu, establishing the Atlantic Zero-Emission Energy System Laboratory
- Stephanie Shaw, materials science, environmental engineering; renewable energy, sustainable building materials.
- Andrew Swingler, renewable energy systems; intelligent grid spectrum from the optimal design of high-performance off-grid PV-hybrid power systems.
- Xander Wang, climate modeling and impact assessment, Urban flood modeling and risk assessment, Big data analytics and decision support systems.

5. On a related note, the external reviewer noted that gaining additional faculty hires may be difficult as the program will be housed with the Faculty of Graduate Studies. Can more information be provided as to how the program will ensure that faculty resources are maintained and increased as the program grows?

UPEI has a defined process for budget requests, including asking for new faculty and maintaining existing budgets and faculty complements. Briefly, this involves bi-annual requests from the relevant Dean(s) to the Vice-President Academic & Research. So, this process will be followed with the Dean of Graduate Studies in collaboration with the Dean of the home unit. A coordinating committee will make the initial assessments.

6. The proposal mentions that the non-elective courses will be "team-taught". Can more information be provided about this approach, in particular can you describe what the student experience will be

like in these courses?

The vision is that each core course will have a single faculty member assigned as coordinator, and they will be the main subject matter expert and ultimately responsible for final assessment. That said, these courses will be utilizing both team-teaching and an inquiry-based approach:

- **Team-teaching** is a collaborative approach to teaching, where 2 or more instructors work together. Our vision is that typically 1 and no more than 2 additional faculty members will join the course coordinator in the planning and delivery for a total of three team-teaching faculty in each core course (see example below). Workshops, training, and support will be offered for faculty to develop their team-teaching philosophies.
- **Inquiry-based learning** (IBL) in higher education, rooted in John Dewey's philosophy that education begins with the learner's curiosity, is an active, student-centered approach that places the responsibility for learning on students, encouraging them to ask questions, think critically and creatively, solve problems, reflective deeply on what and how they are learning, and arrive at their own understanding of concepts. Our vision is to engage students in investigations of complex or "wicked" interdisciplinary questions and problems, often without a single definitive answer, thereby promoting real-world connections through exploration and high-level question resolution, deeper understanding and lifelong learning skills. Workshops, training, and support will be offered for faculty to develop their IBL skills.
- "Wicked questions" will initially be **co-created by the faculty team**. The group of faculty will review what outcomes could be reached in order to answer the problem and how it directly relates to their own course curriculum. They will then co-plan and schedule at what times throughout the semester they will gather together along with students where each faculty member offers their expertise in order to advance and gain insight to approach the wicked question. Students are gaining expertise from all faculty members and engaged with active participation in these joint sessions.

This approach can be illustrated through an example from Economic and Policy Analysis of Cleantech, where the course coordinator (an economist) and a political scientist collaborate throughout the semester. When examining cleantech implementation strategies, students learn how market incentives and policy frameworks shape adoption. The economist provides notable training on cost-benefit implications and market barriers, while the political scientist helps understand institutional contexts and implementation pathways across different levels of government. Together, the two faculty members guide students through questions like "How can PEI effectively structure incentives and policies to accelerate cleantech adoption?"

This specific collaborative approach helps students:

- Integrate economic and policy analysis frameworks
- Understand how market and institutional factors shape implementation
- Learn to evaluate both financial and political feasibility
- Develop the cross-disciplinary thinking needed for cleantech leadership

This course is offered concurrently with Cleantech Fundamentals II (clean energy) and Indigenous ways of knowing. The inquiry-based structure encourages students to learn about energy grids and clean energy while engaging with real policy challenges and considering indigenous world views.

Student Experience and Benefits: Students will have a single faculty member who is ultimately responsible for the course. This is their 'point person'. The other faculty bring their unique expertise, viewpoints and teaching styles. This exposes students to a deeper and more nuanced view of the subject matter, provides a broader scope, and models true collaboration. Having different approaches to a single wicked problem may encourage the students to be more engaged. IBL in particular encourages learners to take responsibility for their learning journey, fostering skills such as self-directed learning and

collaboration. Implementing IBL can enhance student engagement, academic achievement, and the development of higher-order cognitive skills, preparing students for the complexities of the modern world.

7. The proposal mentions that for the capstone project, "students will work closely with faculty advisors and liaisons from industry and community" (p. 3); however the proposal also states that "No academic supervisors will be assigned to students in this program. However, in the case of Capstone Projects, supervisors from industry and/or community will be assigned and chosen for their specialized knowledge in the relevant field aligned with each Capstone Project and reviewed on a case-by-case basis" (p. 22). Normally, we would expect to see faculty members primarily responsible for the supervision and assessment of capstone projects, even when there are industry or community partners involved. Can you confirm that a faculty member will be assigned to each capstone project and will be responsible for student supervision and assessment? If this is not the case, can a rationale be provided as to why not?

Yes. We confirm that a UPEI faculty member will be assigned to oversee Capstone teaching, mentoring and assessing all Capstone Projects, playing a vital role in the students' final semesters in the program. Capstone projects will be proposed by industry and community partners; accepted projects will be assigned to interdisciplinary teams based on academic relevance and feasibility, with a **co-supervisor** from industry/community based on subject matter expertise.

In the proposal (p. 3), we describe that there will be 2 Capstone courses.

- The first Capstone course will be delivered exclusively by a faculty member, with the objectives being that students/teams will: develop a project proposal, generate research questions, conduct a literature review, environmental scan and needs assessment, review research ethics guidelines, and develop the project's research methodology. This faculty member will mentor the students and monitor the progress of each Capstone project, offering their advice, feedback and mentorship on research questions, literature review, methodologies, tools, and resources. In this regard, we consider this as 'teaching a capstone-prep course'.
- The second Capstone course (p. 3 of the proposal) "will focus on the … completion of the team project and culminate in a final … analysis of findings and recommendations for the community or industry partner". This course will be assigned to a UPEI faculty member who will provide regular guidance and feedback, assisting student teams in troubleshooting challenges during the Capstone project. In this regard, we consider this as mentorship not supervision per se, though that may be semantics.

Thus, in addition to the UPEI faculty member (course coordinator and mentor), there will be a co-supervisor within the industry or community who will be a secondary resource for the student team. While the industry or community partner will be given a performance evaluation to complete, the faculty member will be responsible for the final evaluation and grade/assessment.

8. Given the varied nature of the cleantech industry, the diversity of the community and industry partners listed, and the open admission requirements, the QA team is unsure of what a typical capstone project would be. Can some examples of projects be provided?

The field of cleantech is broad and often interdisciplinary which enables capstone projects to be proposed by businesses, nonprofits, municipalities, hospitals, etc. in a variety of sectors. Organizations who propose a capstone project with a challenge to be solved will be considered Cleantech Capstone Project Partners. Each proposed capstone project will be reviewed by UPEI faculty based on its academic relevance and feasibility. Once accepted, a capstone project will be assigned by the coordinating faculty member to an interdisciplinary student team (see # 7 above). The interdisciplinary structure of the

student team will help students capitalize on each other's strengths and skillsets creating a collaborative community who learn from one another. Within a capstone project, there could be students whose past experiences focused on environmental science, engineering, business, and policy.

Five examples of potential capstone projects are below:

Project Topic: Watershed Resilience and Restoration
Industry/Community Partner: South Shore Watershed Association
Objective: To develop innovative and sustainable solutions to enhance the health and resilience of a local watershed.

Key Elements:

- Assess ecosystem health and propose restoration techniques
- Analyze data and create decision-support models
- Engage stakeholders and evaluate community impact
- Provide governance and sustainability recommendations based on current policies

Final Product:

- Report which includes findings and proposed solutions
- Potential working models of solutions
- Presentation to stakeholders

Project Topic: Export Plan for Efficient Marine Motors
Industry/Community Partner: a local marine motor developer
Objective: To develop a specific plan for export of recently developed marine motors with a particular consideration of region-specific regulations and competitive landscapes.

Key Elements:

- Assess the technology in the context of available alternatives
- Analyze distribution channels available in various markets
- Understand purchase decision criteria of prospective customers
- Develop decision criteria, timelines, budgets for pursuit of exports into specific markets

Final Product:

- Report which includes findings and proposed solutions
- Presentation to stakeholders

Project Topic: PEI's Strategic Investments and Regulations in Cleantech
Industry/Community Partner: provincial government
Objective: To recommend paths forward for PEI's support of cleantech in the context of other regional competitors worldwide.

Key Elements:

- Assess the state of PEI's strategic investments and regulations in cleantech
- Assess the state of other relevant region's strategic investments and regulations in cleantech
- Define stakeholder's objectives and constraints in this context
- Develop decision criteria and possible timelines for pursuit of improvements in this context

Final Product:

- Report which includes findings and proposed solutions
- Presentation to stakeholders

Project Topic: Agricultural Climate Action Implementation
Industry/Community Partner: PEI Federation of Agriculture and Agri-Watershed
Objective: To develop implementation strategies for the Pathway to 2040 plan that accelerate adoption of climate-smart agricultural practices while maintaining farm economic viability.

Key Elements:

- Evaluate barriers to adoption of best management practices
- Analyze effectiveness of current funding programs
- Design collaborative approaches between farmers and watershed groups
- Create metrics for measuring practice adoption and impact
- Develop knowledge-sharing frameworks for successful implementations

Final Product:

- Implementation strategy aligned with Pathway to 2040
- Funding program recommendations
- Stakeholder engagement framework
- Presentation to agriculture and watershed partners

In addition, capstone projects may integrate with ongoing faculty research initiatives. For example:

Project Topic: Community Net Zero Engagement Analysis
Industry/Community Partner: Cities of Summerside and Charlottetown Sustainability Department / Climate Action Officer
Objective: To analyze how different community segments engage with municipal sustainability initiatives and develop enhanced strategies for program adoption.

Key Elements:

- Map information flow through community networks
- Analyze awareness levels across demographic groups
- Assess effectiveness of current engagement strategies
- Evaluate barriers to program participation
- Develop recommendations for improving outreach

Final Product:

- Report including findings and recommendations
- Analysis of engagement patterns
- Presentation to municipal partners

I hope these responses bring more clarity to the proposal. Please feel free to reach out if you have any questions.

Thanks,
Rachel

Rachel A. Hasan, PhD (she/her)
Quality Assurance & Planning Officer
Office of the Vice President Academic & Research
Room 225, Kelley Memorial Building
550 University Avenue, Charlottetown, PE, C1A 4P3
+1-902-620-5384 | rahasan@upei.ca

The University of Prince Edward Island is located on the unceded and ancestral lands of the Mi'kmaq people, known to them as Epekwitk, a traditional district in the territory of Mi'kma'ki.

From: Andy Thompson <thompsona@mphec.ca>
Sent: Tuesday, November 12, 2024 11:17 AM
To: Rachel Hasan <rahasan@upei.ca>
Cc: Proposals/Programmes <proposals@mphec.ca>
Subject: UPEI - Master of Cleantech Leadership and Transformation

CAUTION: This email originated from outside of UPEI. Do not click links or open attachments unless you recognize the sender and know the content is safe. If you are uncertain, please use the Report Message button in Outlook and delete this email.

Dear Rachael,
It was nice to speak with you today. As I mentioned over the phone, I am the lead analyst for the UPEI Master of Cleantech Leadership and Transformation. The QA Team recently met to review the proposal, and have a few questions that we hope you can answer to aid our analysis:

1. Use of the term “Cleantech” in the program name is unique to the field. Can a definition of “cleantech” be provided?

2. Given that the admission criteria for the program is so broad, how will you ensure that students with different academic backgrounds can be successful in the program? Is there a particular educational or professional background that the program is targeted toward?

3. The proposal states that a Program Manager/Coordinator will be hired who will provide student advising and will assist with recruitment and retention of students. Who will be responsible for on-going program and course development, review, and assessment?

4. In the proposal there are three contract faculty members listed as teaching within the program. The proposal also states that three new faculty hires will be made to support the program. Regarding these hires:
    a. Is in the intention of UPEI to hire the faculty members current on contract into the new faculty positions?
    b. What will be the rank and status of the new positions (e.g., tenure-track professor)?
    c. What is the timeline for hiring the new faculty members? Will they be in place prior to program implementation or after?
    d. The external reviewer noted a lack of redundancy regarding technology expertise in the program. What are the plans for ensuring there are more faculty with technology expertise associated with the program?

5. On a related note, the external reviewer noted that gaining additional faculty hires may be difficult as the program will be housed with the Faculty of Graduate Studies. Can more information be

provided as to how the program will ensure that faculty resources are maintained and increased as the program grows?

6. The proposal mentions that the non-elective courses will be “team-taught”. Can more information be provided about this approach, in particular can you describe what the student experience will be like in these courses?

7. The proposal mentions that for the capstone project, “students will work closely with faculty advisors and liaisons from industry and community” (p. 3); however the proposal also states that “No academic supervisors will be assigned to students in this program. However, in the case of Capstone Projects, supervisors from industry and/or community will be assigned and chosen for their specialized knowledge in the relevant field aligned with each Capstone Project and reviewed on a case-by-case basis” (p. 22). Normally, we would expect to see faculty members primarily responsible for the supervision and assessment of capstone projects, even when there are industry or community partners involved. Can you confirm that a faculty member will be assigned to each capstone project and will be responsible for student supervision and assessment? If this is not the case, can a rationale be provided as to why not?

8. Given the varied nature of the cleantech industry, the diversity of the community and industry partners listed, and the open admission requirements, the QA team is unsure of what a typical capstone project would be. Can some examples of projects be provided?

Thank you in advance for your response to these questions. We would like to receive a response within 30 days, however just let me know if you require more time. I am also happy to answer any questions via phone or email.

Best wishes,
Andy

Andy Thompson, PhD (she/her) Policy and Research Analyst
Maritime Provinces Higher Education Commission
Office (506) 444-5066
thompsona@mphec.ca

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Maritime Provinces Higher Education Commission
New Graduate Degree Program Proposal

University of Prince Edward Island
Faculty of Graduate Studies
Master of Cleantech Leadership and Transformation
September 2024

UNIVERSITY of Prince Edward ISLAND | Faculty of GRADUATE STUDIES

Table of Contents

Note from MPHEC: The MPHEC has developed "tips" intended to assist university when completing this form. These are provided at the end of this document (beginning on page 31).

Program Information

a) Submitting Institution(s): **University of Prince Edward Island (UPEI)**
b) Faculty / School / Department: **Faculty of Graduate Studies**
c) Credential(s) Granted (as it will appear on the transcript; for collaborative programs, note which institution will award each credential): **Master of Cleantech Leadership and Transformation**
d) Program Name: **Master of Cleantech Leadership and Transformation**
e) Level of Study (undergraduate, post-baccalaureate, graduate): **Graduate**
f) Program Duration

☐ Full-Time	# years _1.5__	# terms _4___
☐ Part-Time	# years _NA__	# terms _NA__

g) Current / Proposed Classification of Instructional Program (CIP) Code: **CLT 6XXX and CLT 7XXX**
h) Proposed Start Date for New Program: **September 2025**
i) Contact Person (should MPHEC staff require additional information during the assessment process)
Name & Job Title: **Dr. Greg Naterer, Vice-President, Academic & Research**
Email: gnaterer@upei.ca
Phone Number: (902) 566-0561
j) Provide a brief description of the program (approximately 250 words). This description may wish to touch on any of the following:

- The aims and/or goals of the program.
- Program strengths and/or innovations.
- Potential areas/sectors of employment for graduates and/or opportunities for further study.
- Student populations that might be served by the program.

This program description will be made publicly available on the MPHEC's website.

The Master of Cleantech Leadership and Transformation at the University of Prince Edward Island (UPEI) is a 16-month inter-disciplinary professional master's degree that aims to produce a talent pool of leaders and innovators to assist governments, industries, and communities to adopt and create sustainable solutions that transform the planet towards 'net zero'. Sustainable Development Technology Canada defines 'cleantech' as technologies that improve business performance, while using resources more responsibly, and reducing negative environmental impact. We recognize that 'cleantech' is an emerging field, so we will define it more broadly to include processes, regulations, and policies that enable organizations to move towards net zero. The program combines environmental science and technology with a study of cleantech policy and regulations, with equity and indigenous ways of knowing infused throughout. It will also include leadership courses and culminate with a capstone project where student teams work alongside partners to solve real-world sustainable challenges.

The path to reaching net zero requires knowledge, skills, innovation, collaboration, leadership, and initiative. This program will attract recent graduates and professionals with bachelor's degrees from a variety of backgrounds such as environmental studies, engineering and business. The ideal students are advocates, change agents, solution- and action-oriented, self-motivated, collaborative, passionate about people, community, and planet—and their interconnectedness—who can think critically about systems and solutions and bring a global perspective.

The program is timely in Atlantic Canada and is necessary to build a talent pool to innovate, leading the transformation towards net zero. UPEI provides students with a distinctive environment in that the Island itself is a 'living lab' presenting unique experiences for students to create innovative solutions for a more sustainable future. The Royal Bank of Canada estimates that the transition to net zero could create up to 400,000 new jobs in Canada by 2030. Several countries have set specific net zero targets, so job creation in the cleantech sector will increase globally.

DRAFT

1. Program Content and Structure

1.1. Use the table provided in Appendix 1 to list all program requirements and provide a hypothetical student progression through the first cohort of the program. (Tip)

In lieu of Appendix 1, see Appendix 1A and Appendix 1B.

1.2. Describe how the program requirements listed in Appendix 1 will work together to form a cohesive program of study (maximum 250 words). This description may address as applicable (Tip)

- the role of key courses
- relationships between courses
- program milestones
- course sequencing
- the scaffolding of knowledge throughout the curriculum

To reach net zero, the cleantech sector requires innovation, collaboration, leadership, and change agents from various academic and professional disciplines. So, this program has identified key areas across multiple disciplines to produce well-rounded, transformative leaders.

1) Science Fundamentals: All students take two sequential cleantech fundamental science and technology courses (starting in the first semester) which build on each other to provide knowledge of environmental issues and clean, sustainable solutions broadly.

2) Policy: Two core courses on governance, policy, and regulations will be delivered sequentially, early in the program and then an elective for advanced exploration will be offered in the final semester.

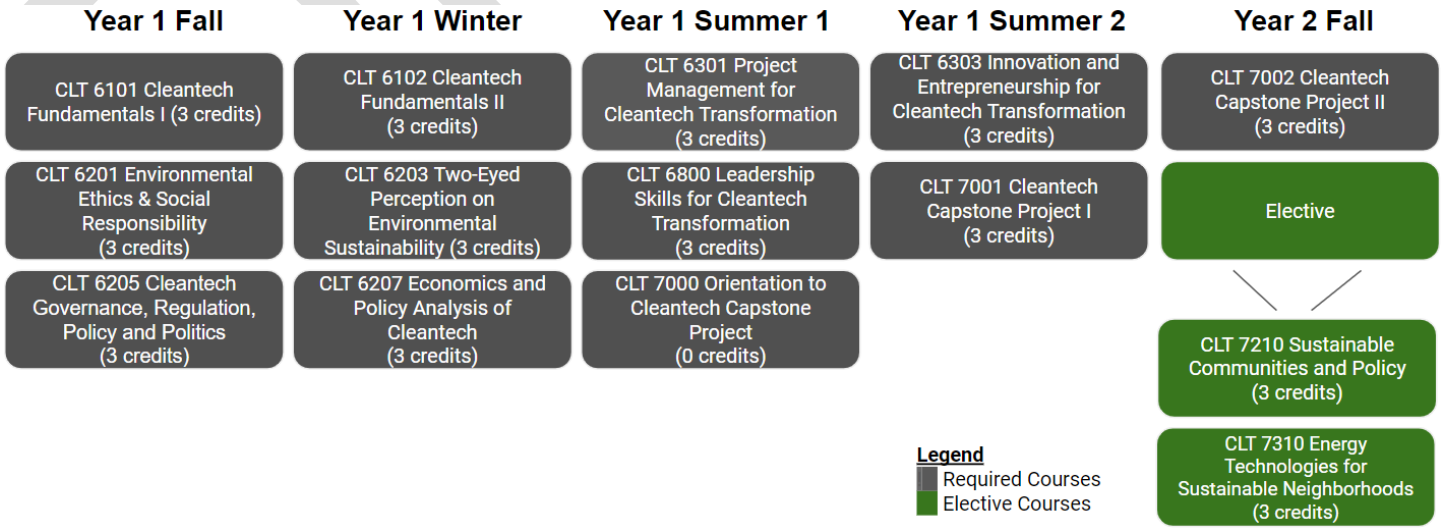
3) Environmental justice and equity delivered in the first semester encourages students early in the program to consider the ethical terrain within which sustainable technology and policy are implemented.

4) Indigenous approaches to sustainability will be taught as an independent course but will permeate the curriculum.

5) Innovation and Entrepreneurship: Two core courses will be offered midway through the program starting with project management and continuing into innovation and entrepreneurship. This will be followed by offering an elective for advanced critical thinking and problem-solving in this key area of cleantech.

6) Leadership: A leadership course will be delivered during the third semester followed by two capstone project courses, where collaboration, leadership and communication are ingrained. Capstone project courses will begin midway through the program, where student teams collaborate with industry and community partners to provide solutions to sustainable challenges, culminating in a report and presentation with recommendations and viable solutions.

Master of Cleantech Leadership and Transformation Course Map



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1.3. In Appendix 2, provide the academic calendar course descriptions for each required course and select elective. These descriptions should identify any prerequisites and/or co-requisites. (Tip)

See Appendix 2.

1.4. Use the table provided in Appendix 1 to outline a hypothetical student progression through the first cohort of the program.

In lieu of Appendix 1, see Appendix 1A and Appendix 1B.

1.5. Describe the implementation plan for the program, including as applicable

- when new or modified courses will be introduced
- planned rotation for select electives
- whether multiple sections of courses will be required.

The program will be implemented starting during the Fall semester, with a full cohort taking 3 required foundational courses as a single section. Then during the following Winter semester, the full cohort will take 3 more core courses together, and 3 additional foundational courses during Summer 1 semester, one of which will be a zero-credit orientation to the Cleantech Capstone Project. Then, during the Summer Session 2 semester, the full cohort will take 2 foundational courses, followed by their last Fall semester where they will take one foundational course and we will introduce 2 electives (1 per category), where students select an elective:

Governance, Policy, and Regulations elective course

- CLT 7210 Sustainability Policy: Prioritizing Communities

Innovation, Technology, & Business elective course

- CLT 7310 Energy Technologies for Sustainable Neighborhoods

To start the program rollout, both electives are proposed to be offered yearly and not rotated. Given that the area of cleantech is new and dynamic, it will be necessary to review the program after the first cohort to identify if new courses should be introduced or current courses should be modified to reflect the most up-to-date information available in cleantech. This will be supported by faculty, library resources and industry and community consultations via a program advisory committee.

1.6. Describe any special requirements within the program (e.g. thesis, dissertation, capstone project, comprehensive exams, work-integrated learning), including as applicable

- supervision (e.g., who will supervise, when supervisors will be assigned)
- timelines, checkpoints or milestones
- deliverables
- student evaluation

A capstone project will be required of students enrolled in the program which will begin midway through the program starting with a zero-credit orientation module in Summer Semester 1 followed by Capstone Project I and II courses in Summer 2 and Fall semesters. Students will work closely with faculty advisors and liaisons from industry and community to apply their knowledge and skills to real-world sustainability challenges, culminating in a comprehensive final project offering timely solutions. The orientation will be up to a full day designed to prepare students for their capstone project experience and will provide insights from industry and community leaders in cleantech, guidance on how to best prepare for the Capstone Project courses, and networking opportunities. The Capstone Project I course in Summer Semester 2 will focus on the initial stages which include developing a project proposal, generating research questions, conducting a literature review, environmental scan and needs assessment, reviewing research ethics guidelines, and developing the project's research methodology. The Capstone Project II course in their final Fall semester will focus on the development and completion of the team project and culminate in a final report and presentation, with an analysis of findings and recommendations for the community or industry partner. In addition to the Capstone Project, students will individually write a leadership development portfolio reflecting on how course workshops and seminars have informed their knowledge, skills, attitudes, and identity as a leader. This course will be supported by workshops and seminars focusing on teamwork skills, stakeholder engagement, community entry practices, and communication skills, while also providing a discussion forum for students to learn from and engage with leaders in cleantech. Additional support will be given by the Cleantech Alliance and Cleantech Academy, specifically the Outreach and Engagement Coordinator who will work closely with industry, community, and government organizations to secure relevant Capstone Projects which will be matched according to student interests. Working with industry partners, the Cleantech Alliance will also help attract new businesses, provide access to

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cutting-edge technologies, and collaborate with governments to champion the industry's growth. The Cleantech Alliance and Cleantech Academy Outreach and Engagement Coordinator will be introduced during the Orientation to the Cleantech Capstone Project and be in regular contact with faculty and students to ensure projects are appropriately challenging and engaging.

1.7. In addition to the above, for interdisciplinary programs, describe how integration of knowledge will typically occur and be demonstrated throughout the program (e.g., new required courses specific to the field, cohort-specific sections of courses, participation in a senior seminar, capstone). (Tip)

The program's interdisciplinary nature allows students and future leaders to develop the skills and knowledge necessary to succeed in cleantech across various sectors such as transportation, agriculture, construction, health, education, etc. To achieve integration of understanding across the three disciplines (clean innovation/technology/entrepreneurship; policy/regulations; justice/equity), and to ensure that Indigenous two-eyed perception permeates the curriculum, we have a few formal pedagogies built into our delivery.

1) The first 6 core classes will be team-taught in an interdisciplinary manner. Students will be introduced to the methodology of interdisciplinary learning in each of their 3 courses each semester, which will be modeled by instructors and practiced during tutorials and seminars. A single 'wicked question/problem' will be posed at the beginning of the semester and must be addressed in each of the courses using interdisciplinary thinking. This approach will demonstrate the importance of integrating insights and approaches from multiple disciplines to form a framework of analysis that will lead to a rich understanding of complex questions. The output will be demonstrated in a portfolio (or other file) that students manage throughout their program, a valuable tool in the development of a learner.

2) The core course in leadership and capstone projects will incorporate critical reflections. Reflection is an evidence-based examination of sources of and gaps in knowledge/practice with the intent to improve on both. Critical reflection is the link between thinking and doing and has the potential to be transformative – it drives curiosity by helping students articulate questions, contrast theory with practice, and it fosters critical evaluation. There are several pedagogical approaches to critical reflections that we will implement, e.g., 'personal meaning mapping' or 'DEAL (describe, examine, articulate learning)' or producing 'critical incident reports'. Through discussions with classmates, or through other resources that represent different disciplinary points of view, students will integrate their approaches to solving cleantech problems. Students will continue to manage their e-portfolios during their leadership and capstone courses – an intentional instructional approach that encourages reflection to deepen learning.

3) The final half of the program will culminate in a capstone project where student teams will collaborate with industry and community partners to provide solutions to sustainable challenges. Their leadership development portfolios will be completed, and final reflections will show the progression of interdisciplinary learning.

1.8. In addition to the above, for programs that feature work-integrated learning (e.g. clinical practice, work placements, co-operative [co-op] programs), describe (Tip)

1.8.1. The type(s) of work experience students will have through work-integrated learning. This could include a sample of organizations that have already agreed to provide placement opportunities and/or plans for expanding these opportunities.

1.8.2. Procedures for securing a work placement (e.g., how placements are found, who approves them, and what the requirements and responsibilities are for qualifying organizations).

1.8.3. The number of work terms and the duration of each work term (i.e., total number of hours worked, and number of hours worked per week).

1.8.4. Student supervision and evaluation.

Not applicable; there will not be a work-integrated learning component in this program though students may secure internships/positions with industry and community partners through the networking and exposure offered throughout the program or continue their previous employment.

1.9. If a **graduate program** relies on cross-level courses, specify how the content, assignments, and learning outcomes will be more advanced in the graduate course. (Tip)

Not applicable; there will be no cross-level courses in this program.

1.10. Identify any related existing programs at your institution (undergraduate or graduate). (Tip)

This interdisciplinary program will be administered in the Faculty of Graduate Studies but will be delivered by collaborating with five other Faculties, building upon existing expertise and resources of several programs.

Faculty of Arts

Master of Arts in Island Studies

UPEI is recognized as a world leader in delivering a quality Island Studies education, successfully offering a thesis- and course-based Master of Arts in Island Studies program. Course-based students can specialize in different streams: Island Tourism; Sustainable Island Communities; and International Relations (Island Studies) and Island Public Policy

Bachelor of Arts in Political Science (also Minor in Political Science)

The UPEI Political Science Department offers courses covering four fields in political studies: Canadian Politics, Political Theory, Comparative Politics, and International Politics. Students can complete coursework toward either a major (42 semester hours/14 courses) or a minor (21 semester hours/7 courses) in Political Science.

Bachelor of Arts in Economics (also Minor in Economics)

Building upon microeconomic and macroeconomic theory, students complete coursework toward a major (54 semester hours/18 courses) or a minor (21 semester hours/7 courses) in Economics.

Faculty of Sustainable Design Engineering

The UPEI Faculty of Sustainable Design Engineering is devoted to developing engineers with exceptional design and professional skills combined with a global perspective—engineers who are broadly capable, globally and socially aware, creative, communicative, and entrepreneurial. The Faculty offers an undergraduate program and two graduate programs.

Bachelor of Sustainable Design Engineering

UPEI's Bachelor of Science in Sustainable Design Engineering program focuses on engineering design as an engineering discipline in itself. Sustainable design engineers are problem solvers. They use design skills, engineering knowledge, math and science to deliver innovative and sustainable solutions to modern-day problems. A sustainable solution is one in which all factors and stakeholders are considered. It goes beyond just providing an efficient, attractive, on-time, and on-budget solution. It also cares about how such goals are achieved and about its impact on people, the environment and society.

Our program provides students with a solid technical foundation which supports the development of their design skills. Just as important, though, the program also provides the professional skills necessary to succeed as a professional engineer. To achieve this, we have created a unique and innovative design clinic model that is integrated throughout all years of the program. In the design clinics, students are immersed in hands-on, experiential learning while working on real projects for a wide range of external partners from the community, municipalities, government, industry and others. Focus areas include: Mechatronics; Bioresources; Sustainable energy.

Master of Science in Sustainable Design Engineering

The Faculty of Sustainable Design Engineering offers a Master of Science in Sustainable Design Engineering program which aims to train graduates who have in-depth expertise in applying principles of sustainable design engineering to interdisciplinary and transdisciplinary research challenges. The MSc-SDE degree program is research-intensive and requires the students to work on their thesis under the supervision of an FSDE faculty member. Additionally, students are required to complete at least two (2) graduate-level courses. The current research themes in the FSDE include agriculture, bioresources, clean and renewable energy systems, sustainable neighbourhood design, and circular economies. Most of the current research projects involve collaborators in other faculties, and are defined, sponsored and completed in close collaboration with industry and government organizations.

Doctorate in Sustainable Design Engineering

Independent research is the major focus of the doctorate degree. Students will identify a research topic (as described above in Master of SSDE) and conduct an extensive body of original research in their field, making a true contribution exemplifying the student's depth of knowledge, creativity, innovation and proven ability to make significant scientific research contributions.

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McDougall Faculty of Business

The McDougall Faculty of Business offers programs and courses that challenge students' abilities, expand their horizons, and allow them to venture into a wide range of career paths. With innovative and flexible programs and an emphasis on enterprise and entrepreneurship, graduates leave with knowledge and skills that give them the flexibility and know-how to compete, and be successful in any environment.

Bachelor of Business Administration (BBA; Honours option) (also Minor in Business)

The Bachelor of Business Administration (BBA) degree is a four-year degree consisting of 120 semester hours. In addition to the 23 required courses, students must take 17 elective courses. At least three electives must be business courses and at least eight electives must be non-business courses. The other six electives ("free electives") may be either business or non-business courses. Specializations include: Accounting; Entrepreneurship; Finance; International Business; Marketing; Organizational Management; and Tourism and Hospitality

Master in Business Administration (MBA) in Global Leadership

This program is an intensive and cohort-model program that can be completed in either 12 or 24 months. The degree curriculum and courses are designed to develop students' skills to enable them to succeed in today's complex and dynamic international business environment. Students enrolled in the MBA in Global Leadership must complete a total of 42 credit hours/14 courses. The components of the degree program include the MBA Skills Orientation Module (0 credit hours), eleven core courses (33 credit hours), and three elective courses (9 credit hours). Students must complete all required courses within two years of being admitted to the program.

Faculty of Indigenous Knowledge, Education, Research, and Applied Studies

UPEI's Faculty of Indigenous Knowledge, Education, Research, and Applied Studies (IKERAS) is unique in the region. It brings Indigenous knowledge and ways of doing to the forefront of the University, positioning UPEI as the role model for all universities to achieve decolonization and benefit from Indigenous knowledge. The design of this Faculty will ensure that the University upholds the 2007 United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and meets the 2015 Truth and Reconciliation of Canada's Final Report and 94 Calls to Action, and the 2019 Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls and 231 Calls for Justice.

Minor in Indigenous Studies

The Minor in Indigenous Studies is a cross-disciplinary program to provide a better understanding of the place and importance of the Indigenous history, culture, and knowledge system and complete 21 semester hours/7 courses.

Faculty of Science

Undergraduate programs: Bachelor of Environmental Studies; Bachelor of Science in Applied Climate Change and Adaptation; Bachelor of Science in Biology (Environmental Biology specialization); also minors in all 3 areas.

These programs provide students with the opportunity to explore the urgent and immediate challenges of the worldwide climate crisis and find solutions of this global issue. Environmental issues typically do not respect traditional academic boundaries and require scientific, technical, human and social perspectives to address. As an interdisciplinary liberal arts and science program, the **Bachelor of Environmental Studies** provides students with the opportunity to integrate knowledge across faculties of Arts, Science, and Business. Students are required to choose one of three specializations: Environmental Thought and Practice; Island Environments and Sustainability; or Environmental Innovation and Change Management. The **Bachelor of Science in Applied Climate Change and Adaptation** provides students with specialized knowledge in adjusting practices, structures, and ways of knowing to better cope with or create benefits from the changing climate. These processes can range from a farmer planting more drought-resistant crops, to a coastal community evaluating how best to protect its infrastructure from rising sea level. The

Bachelor of Science in Biology (Environmental specialization) provides students with specialized knowledge in various ecosystems, biodiversity and conservation biology, examining the ways organisms and communities influence, and are impacted by the environment.

Master of Science and PhD in Environmental Sciences

The Master of Science (**MSc**) in Environmental Sciences is one of three designated areas of specialization. The MSc degree of the University of Prince Edward Island requires the demonstration of a reasonable mastery of a concentrated field of study. The latter is attested by the achieving of satisfactory standings in the minimum number of graduate courses, the completion of a research project under the supervision of outstanding researchers in the **School of Climate Change and Adaptation**, **School of Mathematics & Computational Sciences,** or one of the **Departments (Biology, Chemistry, Physics**) and the defense of a written thesis based upon the research. There is considerable

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interaction and co-operation among the departments/faculties to provide courses and research facilities to meet the needs of individual students and their research projects.

Traditional elements of **PhD** program include the development of a research dissertation in a field of interest in the environmental sciences, under the supervision of outstanding researchers in the **School of Climate Change and Adaptation**, **School of Mathematics & Computational Sciences,** or one of the **Departments (Biology, Chemistry, Physics**), the completion and approval of a candidacy examination, and a final oral defense. Unique to this program are three environmentally oriented courses that provide students with expertise in environmental communication strategies: Communication Strategies; Current Issues in Environmental Impact Assessment (EIA); and Practical Issues Surrounding Environmental Management.

1.11. Compare the proposed program to 3-5 other relevant programs offered elsewhere in the Maritimes, Canada, or internationally. Comment on similarities as well as differences. (Tip)

MARITIMES

Cape Breton University, Master of Education in Sustainability, Creativity and Innovation
Overview – The program is built to equip students to be empowered leaders in sustainability education and contribute to individual, community, and global well-being. Student's teaching skills are enhanced through real-world connections and integrated learning.

Similarities
- Professional program
- Empower students to lead in sustainability

Differences
- Approximately 2-4 years to complete the program
- Online delivery only
- Interdisciplinary background interested in teaching license and professional development

CANADA

University of Calgary, Master of Science in Sustainable Energy Development
Overview – The program is built for students wishing to move from a technical background to an interdisciplinary professional program focused on leadership. It provides studies with a holistic approach to energy and environmental management.

Similarities
- Interdisciplinary
- 16-month program
- Culminates in capstone project working with industry
- Students are exposed to the foundational concepts of sustainability and managing sustainability projects that benefit society

Differences
- Energy focused program
- Students are introduced to the concept of environmental impact analysis through the life-cycle assessment (LCA) course
- All students are required to complete capstone projects that anchor on energy and the environment
- Capstone projects are completed individually rather than in teams
- Admissions requires CV, two reference letter, and two years of work experience

University of British Columbia, Master of Engineering Leadership in Clean Energy Engineering
Overview – The program is designed for students in engineering and technical professions interested in the clean energy sector. It allows students to integrate their technical expertise in energy generation with a strategic business perspective of energy utilization and management to spearhead organizational change.

Similarities

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- Sustainable systems will be taught, including courses in leadership, energy policies, project management, and innovation
- Students are trained to be leaders in sustainability

Differences
- Not interdisciplinary; students require a technical background
- Technical and business integrated program
- Work experience required for admission
- 12-month program

University of Waterloo, School Environment, Enterprise, and Development, Master of Environment and Business

Overview – The program is designed for business sustainability professionals. It equips students with the knowledge and skills to practically integrate the environment with business.

Similarities
- Course-based
- Capstone project
- Students are taught sustainability issues and strategies on how to solve them

Differences
- Full or part-time (1-3 years)
- 10 online courses (Term 0: 1 course, a 2-week orientation residency in Aug; Term 1: 3 courses; Term 2: 3 courses; Term 3: 3 courses which include capstone project that has a 2-day residency for presentation in June)
- 2 multi-day professional or scholarly conferences

Carleton University, Master of Public Policy in Sustainable Energy and the Environment

Overview – The program is designed for interdisciplinary professionals to equip students with the skills to interpret and respond to emerging technologies and new policies in the energy sector. It is focused on the technical and policy dimensions of energy systems and decision-making.

Similarities
- Prepares students for employment in various sectors

Differences
- Two years to complete
- Combines engineering and policy
- Work placement
- Technical skills such as energy evaluation and assessment

INTERNATIONAL

Arizona State University, Master of Sustainable Leadership

Overview – The program prepares the students to gain organizational leadership skills in sustainability strategy and communication. It equips students with skills like communication, leadership, and strategies to address sustainability issues.

Similarities
- Sustainability pathway and leadership is taught
- Inter-disciplinary

Differences
- Online only
- Program also offers executive master's program
- 12 months to complete
- For professionals and executives
- Work experience is required for admission

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1.12. Identify any consultation undertaken during program development (Tip). This could include:

- Instructional Designers
- Program advisory committees
- Government departments
- Prospective employers
- Other post-secondary institutions
- Professional associations
- Regulatory agencies and/or accrediting bodies
- Graduates of the program or related programs
- The Nova Scotia Department of Education and Early Childhood Development (EECD) (required for education programs in Nova Scotia)
- Atlantic Advisory Committee on Health Human Resources (AACHHR)(required for health and health-related programs)
- Other relevant stakeholders

If applicable, in Appendix X, provide a copy of any written assessment or comments to the proposal. As relevant, provide a summary of your institution's response, describing any changes to the program design or content made in response to the assessment.

Environmental Scan:
An environmental scan (Appendix A) was completed by Cambridge Professional Development Limited in October 2022, funded by the Government of PEI through the Ministry of Environment, Energy and Climate Action. The purpose of the scan was to research available resources to guide the development of a new Certificate program at Holland College, and a new Master's program at UPEI, Prince Edward Island's post-secondary institutions. The scan consulted with several governmental, nonprofit, and industry organizations such as AKA Energy Systems (formerly Aspin Kemp Associates), Innovation PEI, and Lennox Island First Nation. For a full list of key informants interviewed, please see page 9 of Appendix A. The scan identified that existing academic programs are strong in the science and engineering aspects of climate change but less so in business, leadership, and deployment of net zero technologies. In addition, there are skills gaps that include energy, business, and societal content such as leadership and entrepreneurship. The scan also recommended emphasizing experiential learning, adopting a hybrid mode of delivery, and involving a broad spectrum of industries. Potential career pathways were identified to sustainability officers, directors, and policy analysts, etc. Interviews of representatives of local, regional and national government, business, academic and environmental interests were also conducted. This document has guided the proposed program.

Joint Working Group (JWG):
The JWG is a collaborative group made up of representatives from UPEI and Holland College to represent the interest of both post-secondary institutions overseeing the environmental scan and creation of the Cleantech Academy, a collaborative initiative between the Government of PEI, Holland College, and UPEI. The JWG also consulted on architectural design for the Academy building, called the Cleantech Innovation Centre, and recruited the Academy Director. The JWG attended an invitation-only stakeholder session – *Energy Positive Island: Samsø to PEI* hosted by The Government of PEI's Office of Net Zero on February 6, 2023 (**link**). This was a solution-oriented event featuring internationally renowned experts in local energy transitions, Søren Hermansen (CEO and Director of the Samsø Energy Academy) and Anna Demeo (CPO for Fermata Energy, the leader in vehicle-to-everything (V2X) charging systems). This aided the JWG in the development of Cleantech leadership programs at both secondary institutions on Prince Edward Island: Holland College and UPEI. The JWG will eventually be morphed into what will be called the "Collaborations Team" which will operationalize the program starting in mid-2024. The JWG had several follow-up consultations with Søren Hermansen and Anna Demeo.

Program Advisory Committee (PAC):
The PAC is an established group of industry leaders, created to advise on program development such as providing feedback on drafted program learning outcomes and job titles. The following are members of the PAC organized alphabetically by organization name:

- AKA Energy Systems, Jason Aspin, CEO; Evan Willemsen, Director of Business Development
- Cavendish Farms, John MacQuarrie, Director of Environmental Sustainability
- City of Charlottetown, Nick Walker, Acting Manager, Environment and Sustainability
- City of Summerside, Mike Thususka, Director of Economic Development
- Clean Foundation, Ramona Doyle, Director of Program Development
- Douglas McNeill, Andrew Matthews, Regional Manager for Atlantic Canada
- Fermata Energy, Anna Demeo, Chief Product Officer
- Innovation PEI, Stephanie Corbett, Chief Executive Officer

- Office of Net Zero – PEI, Derek Ellis, Director, Sustainability Division
- Parks Canada, Garrett Mombourquette, Strategic Advisor, Office of the Executive Director

University and Community Consultation:
On September 28, 2023, approximately 30 people attended UPEI's first campus-wide information session for the community to learn more about the Cleantech Academy and the master's program. Attendees included faculty, staff, and students who had positive feedback to share regarding the involvement of industry and community for capstone projects and the creation of a workforce with new skills to support cleantech. Given that cleantech is a new industry, faculty wants to ensure that the program is continually innovating curriculum and guarantee that students have an understanding of the foundations of cleantech.

Prospective Employers:
UPEI along with the Cleantech Academy met with community, industry, and government partners to obtain feedback on the program and its curriculum. The program was met with positive feedback indicating that it is meeting industry and community employer needs. Below is a list of organizations we consulted with at various stages of program development, some of which have provided letters of support for our program in Appendix E.

- AKA Energy Systems
- Atlantica Centre for Energy
- Cavendish Farms
- City of Charlottetown, Department of Environment and Sustainability
- City of Summerside
- Efficiency Canada
- Efficiency PEI (Prince Edward Island)
- Government of PEI, Office of Net Zero
- Innovation PEI
- Lennox Island First Nation
- Mi'kmaq Confederacy of PEI
- Parks Canada
- PEI Energy Corporation
- STEAM (Science, Technology, Engineering, Art and Math) PEI
- Summerside Xchange
- Wind Energy Institute of Canada

Indigenous Inclusivity:
Consultations with Mi'kmaq Confederacy of PEI and Lennox Island First Nation were conducted to understand and consider the potential impacts to Indigenous groups. General suggestions for our graduate program were to consider holding seats for Indigenous students, integrate experiential learning, include Indigenous knowledge and concepts such as Two-Eyed Seeing, and have students of the master's program visit Indigenous spaces such as Lennox Island.

Curriculum Working Group:
UPEI created an internal Curriculum Working Group consisting of 11 faculty members and an Academic Librarian, chaired by the Associate Vice-President Research & Dean of Graduate Studies (Dr. Sweeney-Nixon), managed by Program Manager Susie Zavala, and administratively supported by Alicia MacEachern. This group was tasked with creating the program's curriculum and met bi-weekly from July 2023 to March 2024. We also recruited the expertise of an instructional designer, Joel MacDonald, from UPEI's Teaching and Learning Centre (TLC). The TLC works in partnership with faculty members, instructional staff, graduate students, and academic and service units to continuously build the UPEI learning environment through a commitment to the scholarship of teaching and learning, and by keeping pace with innovative and integrative technologies that support teaching, research, and scholarship. Faculty, students, and staff of the master's program will have continued access to instructional designers and the TLC throughout the program. Below is a list of members in alphabetical order, some of whom are cross-listed in two faculties. See Appendix B for biographies and publications (if applicable).

- Dr. Patrick Augustine, Assistant Professor: Faculty of Indigenous Knowledge, Education, Research, and Applied Studies; Faculty of Science, School of Climate Change and Adaptation
- Dr. Pamela Courtenay-Hall, Associate Professor: Faculty of Arts, Department of Philosophy
- Dr. Don Desserud, Professor: Faculty of Arts, Department of Political Science
- Dr. Reuben Domike, Associate Professor: McDougall Faculty of Business
- Dr. Kuljeet Grewal, Assistant Professor: Faculty of Sustainable Design Engineering; Cross-appointment with the Faculty of Science, School of Climate Change and Adaptation

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- Andrew Halliday (PhDc), Sessional Instructor: Faculty of Arts, Institute of Island Studies
- Dr. Justin Kakeu, Associate Professor: Faculty of Arts, Department of Economics
- Mr. Courtney Matthews, Systems Librarian: Robertson Library, Digital Initiatives and Systems
- Mr. Joel MacDonald, Instructional Designer: Teaching and Learning Centre
- Dr. Nicholas Mercer, Assistant Professor: Faculty of Arts, Institute of Island Studies; Cross-appointment with the Faculty of Science, Environmental Studies unit
- Dr. Yuliya Rashchupkina, Assistant Professor: Faculty of Arts, Department of Political Science; Cross-appointment with the Faculty of Science, School of Climate Change and Adaptation
- Dr. Tina Saksida, Associate Dean and Associate Professor: McDougall Faculty of Business
- Dr. Marva Sweeney-Nixon, Associate Vice-President of Research and Dean of Graduate Studies (chair)
- Dr. Charlene Vanleeuwen, Manager, Teaching and Learning Centre; Sessional Lecturer, Faculty of Education

1.13. The final version of a proposal for a new graduate degree must have been assessed by an expert external to the institution prior to submission to the Commission. Identify the name, title, and institution of the external consultant(s) who reviewed the proposed program, as well as the date of the site visit.

Append a copy of the consultant's report and your institution's response to the consultant's report in Appendix X. (Tip)

Please see Appendix H:

H.1: Biographies of External Review Consultants
H.2: On-site Visit Agenda for External Review Consultants
H.3: External Review Consultants' Report
H.4: Summary and Response to External Review Consultants' Report

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2. Delivery Method

Note from MPHEC: This section of the information requirements was drafted prior to the development of the *Guidelines for Institutional Frameworks for Online and Technology-Supported Learning*. It will be updated, where necessary, following the release of the *Guidelines*.

2.1. In which delivery methods will the program be offered and advertised as being offered? (check all that apply)

- □ 100% in person
- □ 100% online
- ■ Hybrid: (provide details)

Though the goal of the program is to offer all courses in person, based on the technology readily available, the program can be offered as a hybrid delivery model, combining both in-person and online components. This approach provides students with flexibility while also fostering opportunities for face-to-face interaction and hands-on learning experiences.

The hybrid model will include a combination of in-person classes for certain courses or components, supplemented by online coursework and activities. In-person sessions may be scheduled for select lectures, workshops, labs, or experiential learning opportunities where direct engagement with instructors, peers, and physical resources is beneficial. Online components will encompass asynchronous and synchronous learning activities, allowing students to access course materials, participate in discussions e.g. 'wicked problem', and complete assignments remotely. This approach accommodates students who may have scheduling conflicts or travel limitations.

By offering a hybrid delivery method, the program aims to provide a balance between the benefits of traditional on-site instruction and the flexibility of online learning, catering to the diverse needs and preferences of students while maintaining the program's academic rigor and quality.

2.2. List the delivery methods to be used in this program (e.g., classroom teaching, experiential learning, labs, synchronous or asynchronous online learning).

Classroom Teaching: Traditional face-to-face instruction will be a cornerstone of the program, allowing for direct interaction between instructors and students. This method fosters discussion, engagement, and in-depth understanding of course materials while also fostering a community of graduate students and future leaders in cleantech. As part of Prince Edward Island's cleantech ecosystem within the Cleantech Academy, face-to-face instruction in the Cleantech Innovation Centre will also give students access to industry and community partners in cleantech allowing them to explore their interest and expand their network.

Experiential Learning: Practical, hands-on experiences will be integrated into the curriculum to provide students with real-world applications of sustainability principles. This may include fieldwork, case studies, simulations, or informational sessions with industry and community partners.

Labs: Wet and dry laboratories will be available if needed to complement theoretical knowledge with practical skills development. These labs may be used for experiments, data analysis, modeling exercises, or software simulations related to energy, climate, policy, and other relevant topics.

Synchronous Online Learning: Some courses will be delivered synchronously online, allowing for real-time interaction between instructors and students. This method accommodates learners who may not be able to attend in-person classes and facilitates dynamic discussions and collaborative activities through video conferencing or virtual classrooms.

Asynchronous Online Learning: Certain components of the program will be delivered asynchronously online, providing flexibility for students to engage with course materials at their own pace. This may include pre-recorded lectures, online discussions, interactive modules, and self-assessment quizzes accessible through a learning management system.

Capstone Projects: The capstone project experience will integrate multiple delivery methods, including independent research, project-based learning, and mentorship. Students will work closely with faculty advisors and liaisons from industry and community to apply their knowledge and skills to real-world sustainability challenges, culminating in a comprehensive final project.

Lecture Series: Collaborative lectures or seminars featuring guest speakers from academia, industry, government, and non-profit organizations will be organized to provide diverse perspectives on issues and trends in cleantech. These sessions may be delivered in-person or virtually, enhancing students' exposure to interdisciplinary approaches and professional networking opportunities in cleantech and sustainability.

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This demonstrates a comprehensive approach to engaging students in diverse learning experiences that align with the objectives of the program and cater to the needs of a diverse student population.

2.3. Describe the training and support available to faculty and staff regarding the technical and pedagogical aspects of these delivery methods.

Technical Training:
Instructors and staff will receive comprehensive technical training to effectively utilize the learning management system (LMS) and other online tools utilized in course delivery. Training sessions will cover topics such as creating and managing online course materials, conducting synchronous online sessions, facilitating discussions, and administering assessments through the LMS. Technical support resources, including tutorials, user guides, and helpdesk services, will be provided to assist faculty and staff in troubleshooting technical issues and optimizing their use of digital tools.

Pedagogical Training:
Faculty development programs will be offered to enhance pedagogical skills for online and hybrid teaching environments. These programs include workshops, seminars, self-paced asynchronous courses and peer mentoring opportunities focused on effective online course design, learner engagement strategies, and assessment methods tailored to virtual learning contexts.

Faculty will have access to instructional designers and educational technicians who can provide personalized support and guidance in designing engaging and interactive online learning experiences. These experts can assist faculty in incorporating best practices for interdisciplinary teaching and online pedagogy, such as active learning techniques, multimedia integration, and inclusive course design.

Ongoing professional development opportunities will be available to faculty and staff to stay knowledgeable of emerging trends and innovations in online education. This may include participation in conferences, webinars, and communities of practice dedicated to advancing online teaching and learning.

Collaborative Communities:
Faculty and staff will have opportunities to collaborate and share expertise through interdisciplinary working groups, faculty communities, and peer learning networks focused on online and hybrid education. Cross-departmental collaborations and knowledge sharing will be encouraged to leverage diverse perspectives and experiences in refining instructional approaches and supporting continuous improvement in program delivery. Mentoring whereby experienced faculty are paired with newcomers to online teaching, facilitating knowledge transfer and professional growth within the academic community. By providing robust training and support in both technical and pedagogical aspects, the program ensures that faculty and staff are equipped with the knowledge, skills, and resources needed to deliver high-quality instruction and support student success in diverse learning environments.

2.4. Describe any orientation available to students that provides information or expectations regarding delivery methods and/or technological assistance, as applicable.

Orientation Sessions:
Prior to the start of the program, all incoming students will participate in comprehensive orientation sessions designed to familiarize them with the program structure, curriculum, academic supports and delivery methods. These orientation sessions will include dedicated modules or workshops focused on explaining and (as needed) familiarizing students with the various delivery methods utilized in the program, including in-person, online synchronous, online asynchronous, and hybrid formats.

Information will be provided to students regarding the expectations and requirements associated with each delivery method, and technological prerequisites. In addition to providing information about delivery methods and technological assistance, our orientation sessions are also geared towards fostering a sense of community and belonging among incoming students. We understand that a supportive community plays a crucial role in student retention and success. Throughout the orientation, activities and discussions aimed at building connections among students and faculty members will be incorporated. These sessions provide opportunities for students to get to know their peers and instructors, collaborate on projects, and engage in group discussions. By creating a welcoming and inclusive environment from the very beginning, we aim to instill a sense of belonging and support that extends throughout the duration of the program.

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By integrating community building initiatives into our orientation program, we strive to not only inform students about course delivery methods, technological assistance and academic supports, but also to cultivate a supportive network that enhances their overall learning experience and contributes to their long-term success.

Technological Assistance:
During orientation, students will receive guidance and support regarding the technological tools and platforms used for online learning, such as the learning management system (LMS), video conferencing software, and digital collaboration tools. Informational resources, tutorials, and user guides will be made available to help students navigate the online learning environment, access course materials, participate in discussions, submit assignments, and engage with instructors and peers virtually. Technical support services will be introduced to students, including helpdesk contacts and troubleshooting procedures, to assist them in resolving any issues or challenges they may encounter with technology throughout their academic journey.

Clear Communication of Expectations:
Orientation sessions will emphasize the importance of proactive communication and adherence to expectations related to course delivery methods and technological requirements. Instructors will be encouraged to include relevant information in the course syllabi and on the LMS. Students will be informed of the communication channels available for seeking assistance or clarification regarding delivery methods, technological tools, or any related concerns. Faculty and staff will be accessible to address student questions and provide ongoing support throughout the orientation process and beyond.

Feedback Mechanisms:
Orientation sessions will also introduce students to feedback mechanisms through which they can provide input on their learning experiences, including satisfaction surveys, course evaluations, and opportunities for constructive feedback on delivery methods and technological support services. By actively soliciting and incorporating student feedback, the program aims to continuously improve the orientation process and enhance the overall student experience in navigating delivery methods and accessing technological assistance effectively. Through comprehensive orientation sessions and ongoing support mechanisms, the program ensures that students are well-informed, prepared, and supported in navigating the diverse delivery methods and technological aspects of their academic journey.

2.5. Describe how these delivery methods will enable the following:

- 2.5.1. student-student interaction
- 2.5.2. faculty-student interaction
- 2.5.3. faculty availability outside of instruction time.

2.5.1 Student-Student Interaction:
On-site components in hybrid delivery methods, including in-person meetings, study groups, guest lecture, or networking events, will provide additional avenues for face-to-face interaction, allowing students to establish connections and build relationships beyond the virtual classroom.

Online discussion forums, group projects, and collaborative assignments will be integral components of the curriculum, facilitating peer-to-peer interaction and knowledge sharing among students, regardless of their physical location. Synchronous online sessions, such as virtual lectures, seminars, and workshops, will offer real-time opportunities for engagement and discussion among students, enabling active participation and collaboration irrespective of geographical barriers.

Social media platforms or online communities dedicated to the program will be leveraged to foster informal communication, peer support, and community building among students, enhancing the overall learning experience and sense of belonging.

2.5.2 Faculty-Student Interaction:
In-person or virtual student hours will be scheduled regularly to provide dedicated time for one-on-one or small group discussions between faculty and students. Virtual sessions can be conducted via video conferencing, chat platforms, or email.

Discussion boards, email communication, and online messaging systems can be used to facilitate ongoing communication and feedback between faculty and students outside of scheduled class sessions.

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Instructors will actively engage with students during synchronous online sessions and on-site classroom, or tutorial sessions, encouraging participation, addressing questions, and providing clarification on course content and assignments.

Hybrid delivery methods may involve in-person meetings, on-site office visits, or field experiences where students can interact directly with faculty members in a face-to-face setting.

2.5.3 Faculty Availability Outside of Instruction Time:
Faculty members will establish clear communication channels and share expectations for response times for addressing student inquiries, concerns, and requests for assistance outside of scheduled instruction time. Virtual office hours, email communication, and appointment scheduling systems will be utilized to ensure that students have access to faculty support and guidance beyond regular class hours. Faculty will be encouraged to maintain an open-door policy and respond promptly to student messages, inquiries, and requests for academic support or mentoring.

Additional support resources, such as teaching assistants, academic advisors, and departmental staff, may be available to assist students in accessing faculty support and resources outside of instruction time. By leveraging a combination of on-site, online, hybrid, and asynchronous delivery methods, the program ensures that students have ample opportunities to interact with their peers, engage with faculty members, and access support services and resources outside of traditional instruction time, fostering a collaborative and supportive learning environment conducive to student success.

2.6. Describe how the delivery methods take into account or accommodate a diversified student body (e.g., through inclusive assessment design) and the target clientele.

Inclusive Assessment Design:
Assessment methods will be designed to accommodate diverse learning preferences, and backgrounds, ensuring equitable opportunities for all students to demonstrate their knowledge and skills. Varied assessment formats, such as written assignments, group projects, presentations, exams, and practical demonstrations, will be utilized to cater to different strengths and abilities and offer authentic assessment experiences related to the field.

Universal design principles, flexible deadlines, alternative assessment options, and accommodations for students with disabilities or specific needs will be provided to ensure fair and inclusive evaluation practices. Assessment criteria and rubrics will be transparently communicated to students, clarifying expectations and facilitating self-assessment and goal setting.

To facilitate communication between instructors and coordinate the use of a diverse range of assessment methods, several processes can be put in place within the program:

Assessment Coordination Meetings: Regular meetings or workshops can be organized for instructors to discuss assessment strategies, share ideas, and coordinate assessment plans for upcoming semesters. These meetings provide an opportunity for instructors to align assessment methods with learning objectives and ensure variety across courses.

Assessment Repository: A centralized repository or database can be established to catalog and share examples of assessment methods used in different courses within the program. Instructors can access this repository to explore a range of assessment options and adapt or incorporate them into their own courses.

Assessment Guidelines and Best Practices: The program can develop guidelines and best practices for assessment design, highlighting the benefits of using diverse assessment methods and providing examples of effective practices. These guidelines can serve as a reference for instructors when designing assessments and promote consistency in assessment quality across courses.

Cross-Course Collaboration: Core courses will be team-taught with a course coordinator being the lead, while electives will likely have a single instructor. Instructors can collaborate across courses to design interdisciplinary or complementary assessments that encourage students to apply knowledge and skills across multiple subject areas. Collaborative projects or assignments can provide students with holistic learning experiences and demonstrate the interconnectedness of different course topics. As mentioned above, we will design single wicked questions/problems that will form a cohesive focus during each semester.

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Peer Review and Feedback: Instructors can engage in peer review processes where they review and provide feedback on each other's assessment plans and rubrics. This feedback mechanism helps ensure that assessments are fair, rigorous, and aligned with course objectives while also fostering a culture of continuous improvement among instructors.

Assessment Mapping: The program can develop assessment mapping tools or matrices that outline the distribution of assessment methods across courses and identify any gaps or redundancies. This mapping process helps ensure that students are exposed to a balanced and varied assessment experience throughout their program of study.

Accessible Learning Materials:
Universal design for learning will be embedded into the overall program and feature training for instructors during orientation. Instructors will be encouraged to incorporate principles of universal design in the development of new materials and supported in modifying existing materials to make them more accessible. Course materials will be provided in multiple formats, including text-based resources, multimedia content, audio recordings, and accessible documents, to accommodate diverse learning preferences and accessibility needs. Captioning, transcripts, and alternative text descriptions will be provided for audiovisual materials to ensure accessibility for students with hearing or visual impairments. Learning management systems will be optimized for accessibility, with features such as screen reader compatibility, keyboard navigation, and adjustable font sizes and color contrasts.

Support for English Language Learners:
Additional support resources, such as language assistance programs, writing centers, and English language proficiency workshops, will be available to support English language learners in developing their academic language skills and succeeding in their coursework. Faculty and instructional staff will be trained in culturally responsive teaching practices and strategies for supporting English language learners, including clear communication, scaffolding of tasks, and providing constructive feedback.

Cultural Sensitivity and Diversity Awareness:
Course content and instructional materials will be designed to reflect diverse perspectives, experiences, and cultural contexts, promoting inclusivity and equity in the learning environment. Faculty and staff will receive training in cultural sensitivity, diversity awareness, and inclusive teaching practices to create a welcoming and respectful classroom climate for students from diverse backgrounds. Opportunities for cross-cultural exchange, dialogue, and reflection will be integrated into the curriculum to foster mutual understanding, empathy, and appreciation for geographic and politico-cultural diversity among students and faculty.

Flexible Learning Options:
The combination of on-site, hybrid and online delivery methods provide flexibility for students with diverse scheduling constraints, or personal responsibilities, enabling them to access education without sacrificing other commitments. Asynchronous learning opportunities allow students to engage with course materials and complete assignments at their own pace, accommodating different learning rhythms and preferences. Personalised learning pathways and elective course options enable students to tailor their academic experiences to their individual interests, goals, and career aspirations.

By considering the needs, preferences, and backgrounds of a diversified student body and target clientele, the program ensures that delivery methods are inclusive, accessible, and responsive to the diverse range of learners and stakeholders it serves.

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3. Program Name & Credential

3.1. Provide a rationale for the proposed program name and credentials(s) that does the following. (Tip)

- Explain how the proposed program name and credential(s) accurately capture the program content and level of study as outlined within the *Maritime Degree Level Qualifications Framework*.
- Provide any other information to demonstrate that the program name and credential(s) will reasonably allow learning and graduate outcomes to be understood by prospective students, employers, other post-secondary institutions, professional and licensing bodies, and other stakeholders as relevant (i.e., that it facilitates truth in advertising).
- Explain the decision-making process used when selecting the name, including any alternatives considered.

The proposed name is Master of Cleantech Leadership and Transformation. Students in the program will take 12, 3-credit courses, of which two are fundamental courses in cleantech and another is a leadership course (one-third of the curriculum). The inter-disciplinary courses in policy, equity, justice and two-eyed seeing and the capstone project courses are all designed to produce transformative change-makers, and the electives are geared towards cleantech, while the aim of the program is to produce leaders that get us to net zero. Thus, we feel as if the title is reflective of content.

In March 2023, we conducted a survey of current UPEI undergraduate and graduate students regarding the program title (see Appendix C). After the survey data were evaluated, we consulted with the UPEI Marketing Department. We ascertained from a purely marketing perspective that 'Leadership in Cleantech Transformation' made the most sense. However, this is not to say that if we chose 'Leadership in Cleantech and Sustainability' that it would be an issue. We agreed that the 'Environmental Justice' option sounded great, but it's not a core part of the curriculum and would be misleading. Some of our findings were the following:

- Consider students as the main stakeholders since they will be the ones applying to and in the program; the most favorable option based on students' responses is 'Leadership in Cleantech Transformation'.
- Ranging from job advantages to people who will follow-up and apply, to memorability, 'Transformation' reels in students.
- Business students liked 'Transformation' more, which could be because these students understand 'transformation' in the business sense – the best type of leader is a transformational leader.
- In using the word 'Transformation', there is an understanding that students in this program will be leaders in the cleantech industry and 'transform' it. As well as an understanding that it is not focused on engineering or science (which sustainability could imply); 'transformation' implies interdisciplinary.
- 'Sustainability' is a buzz word from the early 2000s and has lost a lot meaning. Also, we considered that 'sustainability' has become identified with engineering and design here on the Island (i.e., Faculty of Sustainable Design Engineering). Finally, when there is a sustainability department (or position) in an industry or community organization, people who are typically in these departments/positions are engineers; and our program does not want to solely attract engineers. The word "sustainability" could attract a lot more engineers/science folks then we would like in an inter-disciplinary program. However, if 'Sustainability' was chosen in the name, we would have to consider this in the marketing plan.
- In industry/community meetings that the UPEI Marketing Department has been involved in, everyone talks about 'transforming' the industry.
- 'Transformation' as a word will stand the test of time and will always have a lot of weight versus 'Sustainability'.

The final result was the program name: Cleantech Leadership and Transformation.

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4. Admission, Promotion, & Graduation Requirements (Tip)

4.1. Describe the program's target clientele. (I.e., Who is this program designed for? Are there particular groups of students the university is hoping to attract?)

The professional master's program target clientele are prospective students or professionals with bachelor's degrees from various academic and professional backgrounds and disciplines. We wish to attract students who are advocates, change agents, solution- and action-oriented, self-motivated, collaborative, passionate about people, community, and planet—and their interconnectedness—, can think critically about systems and solutions, and bring a global perspective. Our goal is to produce a talent pool of leaders and innovators to help industries and communities adopt and create sustainable solutions.

4.2. Using the table in Appendix 3, provide a four-year projection of new and cumulative enrolment.

See Appendix 3.

4.3. Describe the program's standard admission requirements below (indicate where not applicable).

4.3.1. Prior education requirements, including

4.3.1.1. Level of prior study (e.g., high school diploma, undergraduate degree, master's degree) (Tip):

An undergraduate degree is required.

4.3.1.2. Credential / area of study (e.g., bachelor's degree in Engineering, Science, or Math; MA in History):

Applicants are required to have a Bachelor's degree from an accredited university recognized by UPEI

Applicants would have graduated with a minimum average of 75% or a Grade Point Average (GPA) of 3.0 (B) in the last 20 courses of a bachelor's program

4.3.1.3. Prerequisite courses (e.g., students must have completed introductory statistics and pre-calculus):

There are no prerequisite courses.

4.3.1.4. Minimum grade in prerequisite courses (e.g., students must have a final mark of 65% or higher in select courses, students must have a B or higher in all Biology courses):

Not Applicable.

4.3.1.5. Minimum average (e.g., a cumulative GPA of 3.0 or higher, a minimum average of 70% in their last 60 credits of study):

The minimum requirement for admission to graduate studies is a Bachelor's degree, or equivalent, in an honors or majors' program or equivalent from a recognized university or college. The applicant will ordinarily be expected to have achieved an average of at least second class ("B", i.e., 70% to 79.9%) standing in the work of the last four semesters or the last two undergraduate years.

4.3.2. Minimum language proficiency requirements (e.g., at least two 1000-level Spanish courses, minimum IELTS or TOEFL score, completion of secondary education in the language of study):

English Proficiency – Applicants whose undergraduate degree is in a language other than English must complete an English as an Additional Language assessment. Detailed information on these requirements is provided at: https://www.upei.ca/admission-requirements/english-language-proficiency-requirements/graduate-programs

4.3.3. Prior work experience (e.g., years of experience, type of work):

No prior work experience required. However, UPEI's goal is to attract the highest quality of candidates with an established commitment to sustainable solutions as well as personal and professional development. Students with related work experience and the knowledge and competencies required to contribute to long-term environmentally sustainable transformations will be considered an asset.

4.3.4. Other admission requirements not captured above (e.g., MCAT, GMAT, portfolio, audition):

No other admission requirements.

4.3.5. Describe any alternative admission pathways (e.g., bridging options; advanced standing; Equity, Diversity and Inclusion considerations).

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UPEI is committed to Equity, Diversity and Inclusion (EDI) in our admissions processes and is open to considering bridging options for admissions. We will work with our Admissions Team to consider possibilities.

For graduate student applicants where English is an additional language, and who score 6 on the IELTS, UPEI offers a Conditional Acceptance and provides an in-house program to support language skill development of graduate students via the Graduate English Academic Preparation (GEAP) program. Students can be admitted, become part of our UPEI community, and receive training to support their success in transitioning to their graduate level studies.

One of the issues facing bridging programs is the lack of consensus on definitions, features and criteria for this. Bridging is especially difficult for entry into graduate programs as these require applicants to have an undergraduate degree.

4.4. Identify the promotion and graduation requirements for the program, including (indicate where not applicable)

4.4.1. Minimum grade in some or all courses (e.g. all courses in the major must be completed with a minimum of B):

A graduate student who receives a grade of less than 60% in any graduate level course is deemed to have failed the course. The candidate must maintain a cumulative average grade of at least 75% to maintain registration in the program.

Students who fail to complete all components of a course, such as assignments, and examinations due to circumstances beyond their control (such as illness) may, with the permission of the Professor, Chair, and Dean, be granted an amount of time deemed reasonable for the completion of said components.

4.4.2. Minimum grade point average:

The candidate must maintain a cumulative average grade of at least 75%.

4.4.3. Comprehensive / qualifying examinations:

Not Applicable.

4.4.4. Language requirements (e.g., intermediate-level proficiency in a particular language, successful completion of participatory exam):

Students are expected to be proficient in the use of English, both written and oral, when they begin their studies at the University of Prince Edward Island. Please review the English Language Requirements for graduate programs within the Academic Calendar.

4.4.5. Residency requirements:

International applicants must have a valid study permit. All applicants must be able to physically attend courses.

4.4.6. Participation in other scholarly or preparatory activities (e.g., non-credit seminars, required orientation/training session, teaching assistantships, submission to academic publications, participation in conferences):

Students must attend an orientation session prior to the start of the first semester.

4.4.7. Other promotion or graduation requirements (list):

Candidates for degrees, diplomas, and certificates must make a formal application to graduate by the published deadline date for each eligible semester. It is students' responsibility to monitor their program standing by reviewing their degree requirements and academic progress throughout their studies, and well in advance of submitting an application to graduate.

4.5. Describe and/or append any relevant policies related to academic standing, remediation and sanctions.

Please refer to the Graduate Academic Regulations within the UPEI Academic Calendar.

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5. Program Outcomes

5.1. Describe the program objectives, including but not limited to (Tip)

- what the program seeks to accomplish
- the program's broad areas of focus and/or the range of learning opportunities that the program will offer
- how the program is situated within the context of the discipline as a whole
- goals beyond the university (e.g., external need/demand for the program, relevance or responsiveness to current affairs, ties to the labour market).

This 16-month professional master's degree is timely in Atlantic Canada and necessary to build a talent pool of leaders to assist local, national, and global governments, industries, and communities transition towards more sustainable energy sources. The program's broad areas of interdisciplinary focus include Cleantech Science, Innovation, Technology, and Business; Governance, Policy, and Regulations; Environmental Justice and Equity; Leadership; Critical Thinking and Problem Solving; and Collaboration and Communication will produce a talent pool of leaders to help industries and communities adopt and create clean solutions, supporting Prince Edward Island's (PEI) and other's path to net zero and beyond.

The Royal Bank of Canada estimates that the transition to net zero could create up to 400,000 new jobs in Canada by 2030. In addition to Canada, countries around the world have set specific net zero targets, so we can expect job creation in the cleantech sector to increase globally. Graduates of the program will be hired into our organization and in our industry in leadership positions such as Sustainability Directors, Policy Analysts, and Environmental Regulatory Advisors. As the world transitions toward more sustainable energy sources, a skilled and knowledgeable workforce who can lead and develop solutions is essential for the successful implementation and growth of this industry.

The development of this program has been part of the Province of Prince Edward Island's cleantech ecosystem within the Cleantech Academy, a collaborative initiative between the Government of Prince Edward Island, and PEI's post-secondary institutions: UPEI and Holland College. The mission of the Academy is to inspire and advance leaders and change-makers to accelerate the path to net zero from interdisciplinary perspectives. In addition, the development of PEI's Cleantech Alliance will work with industry partners to help attract new businesses, provide access to cutting-edge technologies, and collaborate with governments to champion the industry's growth. The Cleantech Academy, Cleantech Alliance, and UPEI's master's program will be housed in the Cleantech Innovation Centre which will be in the Cleantech Park, a 60-acre business park offering a collaborative environment for cleantech companies at all stages of development, all located in Georgetown, Prince Edward Island.

5.2. Using the table in Appendix 4, identify the student learning outcomes and how they will be achieved. Learning outcomes can include (Tip)

- general transdisciplinary knowledge, skills, abilities and competencies
- knowledge, skills, abilities and competencies specific to this program or discipline
- knowledge, skills, abilities and competencies related to the program's special requirements (e.g., work-integrated learning, capstones, theses).

See Appendix 4.

5.3. List the graduate outcomes.

5.3.1. If a stated graduate outcome is to pursue further study in a specific discipline(s), identify potential programs and include evidence to confirm that graduates will satisfy their admission requirements. (Tip)

Not Applicable.

5.3.2. If a stated graduate outcome is to pursue employment in specific fields, identify the fields and potential positions/job titles in those fields, and include evidence to confirm that the outcome is achievable. (Tip)

Given that the area of cleantech is broad and interdisciplinary, graduates of the program are expected to enter a variety of fields. Cleantech is a new and upcoming field where most jobs have not even been created though the Royal Bank of Canada estimates that the transition to net zero could create up to 400,000 new jobs in Canada alone by 2030. The goal of the program is to produce a talent pool of leaders, innovators, and change makers who could potentially be in the following positions. Please note that because cleantech is such an innovative, new

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area, current jobs have defaulted to include the word ‘sustainability’ in the job title. We expect future job titles to include the word ‘cleantech’.

- Sustainability and Environmental Stewardship Director
- Chief Sustainability Officer
- Chief Sustainability Director
- Sustainability Programs Director
- Cleantech Influencer
- Environmental Regulatory Advisor
- Sustainability Business and Finance Consultant
- Environmental and Sustainable Policy Developer (Advisor/Analyst)
- Corporate Social Responsibility Officer
- Cleantech Product Manager
- Environmental and Sustainable Investment Advisor
- Sustainable Business Development Director
- Sustainability Educator
- Sustainability Policymaker
- Sustainability Policy Analyst
- Community Developer
- Sustainable Development Project Manager
- Cleantech Advisor
- Sustainable Planning and Development Officer

5.3.3. If a stated graduate outcome is to pursue employment within an occupation that is subject to government regulations or professional designation, (Tip)

5.3.3.1. Identify the type of professional license, certification, or designation students will be pursuing:

5.3.3.2. Describe the designation requirements and explain how graduates will satisfy these requirements through completion of the program:

Not applicable.

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6. Human Resources

6.1. Using the table in Appendix 5 as a template, identify all of the faculty members expected to teach required courses and select electives in the program. (Tip)

See Appendix 5.

6.2. If new faculty hires are required to support the program,

6.2.1. In the table in Appendix 5, provide the same information requested for existing faculty to the extent possible (e.g. status, desired areas of expertise, list of courses expected to be taught), in addition to the anticipated hire date.

See Appendix 5.

6.2.2. Describe the hiring plan, including (where relevant) hiring timelines, faculty deployment, transition plans, cross-appointments, whether new positions are dependent upon enrolment, contingency plans for resource shortfalls, and any additional context that you may wish to provide:

The Government of PEI has committed to supporting this program, initially with special funding and as such, resource shortfalls are not expected. It is hoped that within three to five years that enrolments will be able to support the program wholly or mostly. We plan to recruit three new faculty members and part-time teachers (sessional instructors) to teach the majority of this program, or to 'backfill' the teaching of full-time faculty members listed in Appendix 5. Teaching load and student supervision, and other faculty responsibilities is governed by the UPEI/UPEIFA Collective Agreement. Faculty members at UPEI teach five courses/year, with the option of course releases for student supervision and research funding. Thus, we estimate that three new hires can contribute to nine courses in this program as well as six courses in their home units. Hiring will begin before the first cohort.

This program will be coordinated through the Faculty of Graduate Studies due to its interdisciplinary nature and the cross-section of faculty involved in delivering the program. However, since the Faculty of Graduate Studies does not hire faculty members per se, these hires are expected to belong to 1) Science (Environmental Studies or Climate Change); 2) Arts (Policy/Island Studies); and 3) Business (to teach Leadership and Innovation) and develop the relationship to collaborate with the Government of PEI and the Cleantech Academy.

Other human resource needs will include a full-time program manager/coordinator and administrative assistant (staff positions). Sessional Instructors will be hired as needed.

6.3. Describe how contract or overload faculty will be used in the delivery of this program (e.g. to replace sabbatical leaves, provide added breadth). (Tip)

We expect to hire tenure-track or term contract faculty members. Teaching load, mentoring, supervision, and other faculty responsibilities will be developed in accordance with the UPEI/UPEIFA Collective Agreement.

6.4. As applicable, describe the minimum academic/professional credentials required of faculty who (Tip)

6.4.1. teach in the program: Master's degree

6.4.2. act as supervisors in the program: No academic supervisors will be assigned to students in this program. However, in the case of Capstone Projects, supervisors from industry and/or community will be assigned and chosen for their specialized knowledge in the relevant field aligned with each Capstone Project and reviewed on a case-by-case basis.

6.4.3. participate on supervisory or defense/examination committees: Not applicable

6.5. To help us better understand expectations around faculty workload and resources, provide a brief description of

6.5.1. the maximum allowable annual course load for

According to H1.4.1 in the UPEI Faculty Association Collective Agreement, "Within the Faculties of Arts, Business, Education, IKERAS, Nursing, Science, and Sustainable Design Engineering, and the Schools of Business and Nursing the normal teaching workload shall be five (5) courses (15 contact hours) per academic year and three (3) courses (9 contact hours) per semester for term contracts no longer than ten (10) months. The actual teaching

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workload for Members in any Department/Faculty/School may be reduced through the mechanisms outlined in this Article and elsewhere in this Collective Agreement or by agreement between the Member and the University."

6.5.1.1. full-time faculty: Five (5) courses (15 contact hours) per academic year

6.5.1.2. contract faculty: Three (3) courses (9 contact hours) per semester for term contracts no longer than ten (10) months

6.5.2. the maximum number of courses taught on overload:

Teaching load, mentoring, supervision, and other faculty responsibilities will be developed in accordance with the UPEI/UPEIFA Collective Agreement.

6.5.3. anticipated and/or maximum number of students to be supervised by a single faculty at any given time:

Teaching load, mentoring, supervision, and other faculty responsibilities will be developed in accordance with the UPEI/UPEIFA Collective Agreement.

6.5.4. source(s) and number of supervisors who may participate in the program, but are not listed Appendix 5 (i.e., who do not teach as core faculty within the program): Not Applicable

6.6. Identify any administrative positions devoted to the program (e.g. coordinator, director, advisor), and explain who is expected to fill each of the positions and whether course releases are associated with any of these positions.

6.6.1. In the case of interdisciplinary programs, identify the program coordinator (or equivalent) who will be responsible for overseeing the program delivery and/or providing student advising.

The Program Manager/Coordinator will be a staff member who will manage the day-to-day operations and lead all non-academic aspects of the master's program. This position will develop and grow the master's program offered through the Faculty of Graduate Studies, including the implementation of a marketing strategy and the recruitment and retention of students. They will also advise perspective and current students and ensure the program provides an excellent student experience. In addition to the management of the program and marketing strategy implementation, additional activities will include event planning, application process, admission review, student support, budget, and staff supervision of an administrative assistant.

6.6.2. In the case of graduate programs, if there is no Office of Graduate Studies or equivalent, identify the person or office responsible for coordinating and overseeing the program.

Not applicable. The program will be housed in the Faculty of Graduate Studies.

6.6.3. In the case of collaborative programs, identify the inter-institutional coordinating mechanism that bridges the two or more institutions (i.e., program coordinator at each institution and/or a coordinating committee) that, at minimum, ensures a seamless transition between institutions as part of the program design, facilitates student transfer, and ensures appropriate student advising. The interinstitutional coordinating mechanism considers the program holistically, and on a regular basis[1], to identify and address challenges and to monitor and facilitate student and program success.

Not Applicable

6.7. Identify any other human resources not mentioned above that will be drawn upon to support the program (e.g., lab technicians/instructors, mentors, industry advisors, elders, artists-in-residence).

During the Capstone Project courses students will work closely with faculty advisors and liaisons from industry and community to apply their knowledge and skills to real-world sustainability challenges, culminating in a comprehensive final project. The Cleantech Academy has an Outreach and Engagement Coordinator who will work to secure community and industry partners for these projects. Additional support will be given by the Cleantech Alliance and Cleantech Academy, specifically the Outreach and Engagement Coordinator who will work closely with industry, community, and government organizations to secure relevant Capstone Projects which will be matched according to student interests. Working with industry partners, the Cleantech Alliance will also help attract new businesses, provide access to cutting-edge technologies, and collaborate with governments to champion the industry's growth. The Cleantech Alliance and Cleantech Academy Outreach and Engagement Coordinator will be introduced during the Capstone Project Orientation and be in regular contact with faculty and students to ensure projects are appropriately challenging and engaging. The Cleantech Academy Outreach and Engagement Coordinator will also work with UPEI's Experiential Education Department and other relevant

[1] Usually greater in frequency to begin, such as each term, and then a revised schedule after the first one or two cohorts have graduated.

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departments on campus to strategically collaborate on industry and community partnerships for Capstone Projects and other student events. Students may also build community with Elders-in-Residence at UPEI.

6.8. If any of these resources are not yet in place, provide a plan demonstrating how and when they are expected to be acquired.

Not applicable.

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7. Other Resources

7.1. Below, describe the physical and learning resources that will be integral to the program as applicable. If not yet in place, provide a plan demonstrating how and when the resources are expected to be acquired.

7.1.1. Facilities (e.g. classrooms, workshops, laboratories, studios, computing labs):

The program will be housed at the Cleantech Innovation Centre located in Georgetown, Prince Edward Island. Should the Innovation Centre not be ready, the program will be housed in either the UPEI St. Peters or Charlottetown campus.

Cleantech Innovation Centre within the Cleantech Park

The Cleantech Park is a 60-acre business park that will be developed in phases and located in Georgetown, Prince Edward Island. The first building in the Park will be the Cleantech Innovation Centre, home of the Cleantech Academy. The Government of Prince Edward Island will fully fund this center. It will house PEI Government offices (PEI Energy Corp), the Cleantech Academy, and the Cleantech Alliance. The Cleantech Academy is a collaboration between the Government of PEI, the University of Prince Edward Island, and Holland College to provide a Professional Master's and Post-Graduate certificate program respectively. The center will be a convergence of innovation, research, and commerce of the Cleantech initiative. This collision space will create an environment where industry, community, government, and academia work closely to find solutions to real-life challenges.

The facility will offer 4 classrooms, Wet and Dry Labs, 2 Graduate Pods, 6 Breakout Rooms, 2 Training Aids and Storage Rooms, 11 Cleantech Academy Offices (for staff and faculty); and 2 multi-purpose rooms.

UPEI St. Peters Campus (Potential Facility)

The Canadian Center for Climate Change and Adaptation (CCA), located in the St Peter's Bay area of Prince Edward Island, houses state-of-the-art research centers, and the School of Climate Change and Adaptation offers the Bachelor of Science in Applied Climate Change and Adaptation program. The center is a 45,000-square-foot research facility jointly funded by the Government of Canada, the Government of Prince Edward Island, and UPEI. The campus environment is surrounded by a significant topography that offers students a unique learning experience.

UPEI Charlottetown Campus (Potential Facility)

The Charlottetown campus provides a state-of-the-art facility to help students find their place in the world and is the main campus of UPEI, comprising 11 faculties. Three of these faculties are a possible location for the Master of Leadership in Cleantech program should the Cleantech Innovation Centre not be move-in ready: the Faculty of Sustainable Design Engineering (FSDE), the Faculty of Science, and the McDougall Faculty of Business.

The FSDE offers undergraduate and graduate programs creating an environment of creativity, innovation, entrepreneurship, and global and social awareness. The facility offers classrooms and laboratories, including computing labs.

The Faculty of Science offers undergraduate and graduate programs and establishes a classroom teaching and laboratory research environment.

The McDougall Faculty of Business offers undergraduate, graduate, and professional certificate programs that blend classroom learning and business world experience.

7.1.2. Equipment and technology (e.g. microscopes, recording equipment, specialized software):

See Appendix D for a full list of software available to students in this program if needed.

7.1.3. Library resources:

See Appendix E for the Library Resources Report.

7.1.4. Other (please specify):

If helpful, attach any relevant reports letters of support (e.g., library reports, in-kind contributions) as Appendix X.

Additional Appendices F-G:
F.1 - F.5: Letters of Support
F.1. Government of Prince Edward Island: Honorable Stephen Myers, Minister of Environment, Energy and Climate Action Environment, Energy and Climate Action
F.2. Cleantech Academy: Sandra Moore, Director
F.3. Holland College: Dr. Alexander (Sandy) MacDonald, President

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F.4. Lennox Island First Nation: Drew Bernard, Energy Lead
F.5. Efficiency Canada: Abhilash Kantamneni, Director of Action Research

G: Financial Support Information
G.1: Letter of Financial Support from Government of Prince Edward Island: Honorable Stephen Myers, Minister of Environment, Energy and Climate Action Environment, Energy and Climate Action
G.2: Sub-Agreement – PEI Cleantech Academy – Phase I
G.3: Sub-Agreement – PEI Cleantech Academy – Phase I, Phase II and Phase III

8. Collaborative Programs

Not Applicable.

8.1. Describe below and/or append (referring to relevant sections) the signed inter-institutional agreement(s) that are in place to assure the quality and overall management of the proposed program. At minimum, this agreement **must** speak to the following.

8.1.1. The units responsible at each participating institution for the academic leadership of the program, and their duties, including at minimum

- overall management and delivery of the program and its component parts, and
- communications within and outside the institutions.

8.1.2. The units responsible at each participating institution for administrative functions for the program and their duties, including

- registration,
- reporting enrolments and credentials granted,
- student advising/services, and
- decisions relating to student progress, assessment and appeals.

8.1.3. The program evaluation process following the implementation of the program, including

- who will be responsible for the quality assurance monitoring and program review at each institution, (which includes QA procedures and assessment criteria),
- next anticipated date of review, and
- the frequency of the program review.

8.1.4. Procedures for resolving any differences that might arise between the parties to this agreement.

8.1.5. Procedures for the protection of students should the arrangement be terminated.

9. Additional Information

9.1. Provide any other information not covered above that will assist the MPHEC in its understanding and assessment of the proposed program.

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Note from the MPHEC: The Commission has developed tables to help universities demonstrate program requirements and show the hypothetical student progression (i.e., a pathway for one student from the first cohort could take through the program). Two types of these tables have been developed: a combined option, where institutions identify the program requirements and hypothetical student progression in one table (as shown in Appendix 1); or an option with two separate tables, one for program requirements (as shown in Alternative Appendix 1A) and one for student progression (as shown in Alternate Appendix 1B). **As you review these tables, you are invited to provide your feedback and indicate which of these options that you prefer, one combined table or two separate tables, in addition to any other feedback you wish to provide.**
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Appendix 1 Program Requirements & Student Progression

	Course Number & Title[2]	Credit Value[3]	Type of Course[4] *required, select elective, special requirement, other degree/distribution requirement*	Status *new, modified, existing*	Primary Method of Delivery *in person, online, either*	Faculty Mem Expected to Tea Course[5]
YEAR 1						
Fall						
Winter						
Spring/Summer						
	Total Credits					
YEAR 2						
Fall						
Winter						
Spring/Summer						
	Total Credits					
YEAR 3						
Fall						
Winter						
Spring/Summer						
	Total Credits					
YEAR 4						
Fall						
Winter						
Spring/Summer						
	Total Credits					

[2] For cross-level courses, provide both undergraduate and graduate course numbers and titles, e.g., PSYC 4015/6005 Advanced Research Methods.
[3] If non-credit, indicate 0 for credit value.
[4] **Required courses** that contribute directly to the program's focus and credit total, and will be identified within the academic calendar as such. E.g., For a major in a 4-year undergraduate degree, list subject-area courses that every student enrolled in the proposed major must take, and that count toward the credit total for that major. **Select electives** are courses chosen from a predetermined list of courses either in the same discipline or in a discipline that directly contributes to the program's focus. Lists can be included in the table or in an attachment if necessary. Select electives can be listed in the table, or listed underneath and referenced with a placeholder in the table (e.g., Course from Group A). **Special requirements** may include a thesis, capstone, work-integrated learning, etc. **Other requirements** outside of the subject area. E.g. For a major in a 4-year undergraduate degree, include all other breadth or distribution requirements needed for graduation that fall outside of the program's focus. Do not list all possible general or open electives; instead, describe the source of the elective (e.g., Humanities courses at the 1000-2000 level - 18 credits).
[5] Provide hypothetical teaching assignments only for those faculty listed in Table X, i.e. those faculty who directly support the program. List "part-time instructor," "New Hire 1," etc. where applicable.

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ALTERNATIVE Appendix 1A Program Requirements (Back to document)

Using the following table, identify all of the program requirements. Note: Not all sections may apply.

	Course Number[6] & Title	Credit Value[7]	Status *new, modified, existing*	Primary Method of Delivery *in person, online, either*	Institution *collaborative programs only*
Required Courses[8]	CLT 6101 Cleantech Fundamentals I	3	New	In Person	NA
	CLT 6102 Cleantech Fundamentals II	3	New	In Person	NA
	CLT 6205 Cleantech Governance, Regulation, Policy and Politics	3	New	In Person	NA
	CLT 6207 Economics and Policy Analysis of Cleantech	3	New	In Person	NA
	CLT 6201 Environmental Ethics and Social Responsibility	3	New	In Person	NA
	CLT 6303 Innovation and Entrepreneurship for Cleantech Transformation	3	New	In Person	NA
	CLT 6800 Leadership Skills for Cleantech Transformation	3	New	In Person	NA
	CLT 6203 Two-Eyed Perception on Environmental Sustainability	3	New	In Person	NA
	CLT 6301 Project Management for Cleantech Transformation	3	New	In Person	NA
Select Electives[9]	CLT 7310 Energy Technologies for Sustainable Neighborhoods	3	New	In Person	NA
	CLT 7210 Sustainability Policy: Prioritizing Communities	(3)	New	In Person	NA
Special	CLT 7000 Orientation to Cleantech Capstone Project	0	New	In Person	NA
	CLT 7001 Cleantech Capstone Project I	3	New	In Person	NA
Requirements[10]	CLT 7002 Cleantech Capstone Project II	3	New	In Person	NA
	Total Credits	36			
Other Requirements					
	TOTAL PROGRAM CREDITS	36			

[6] For cross-level courses, provide both undergraduate and graduate course numbers and titles, e.g., PSYC 4015/6005 Advanced Research Methods.
[7] If non-credit, indicate 0 for credit value.
[8] Required courses that contribute directly to the program's focus and credit total, and will be identified within the academic calendar as such. E.g., For a major in a 4-year undergraduate degree, list subject-area courses that every student enrolled in the proposed major must take, and that count toward the credit total for that major.
[9] Select electives are courses chosen from a predetermined list of courses either in the same discipline or in a discipline that directly contributes to the program's focus. Lists can be included in the table or in an attachment if necessary.
[10] Special requirements may include a thesis, capstone, work-integrated learning, etc.

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ALTERNATIVE Appendix 1B Student Progression (Back to document)

Using the provided table as a template, provide a hypothetical progression for one student from the first cohort of the program.

	Course Number & Title[11]	Credit Value[12]	Type of Course[13] *required, select elective, special requirement, other degree/distribution requirement*	Faculty Member Expected to Teach the Course[14]
YEAR 1				
Fall	CLT 6101 Cleantech Fundamentals I	3	Required	Team-taught by New hire in Environmental Studies (Course coordinator); with Kuljeet Grewal and/or Andrew Halliday and/or Nick Mercer and/or Aadesh Gokul
	CLT 6201 Environmental Ethics and Social Responsibility	3	Required	Pamela Courtenay-Hall (Course coordinator); Team-taught by New hire in Environmental Studies
	CLT 6205 Cleantech Governance, Regulation, Policy, and Politics	3	Required	Team-taught by New hire in Faculty of Arts/Island Studies/Policy Institute (Course coordinator); with Andrew Halliday and/or Nick Mercer
Winter	CLT 6102 Cleantech Fundamentals II	3	Required	New hire in Environmental Studies (Course coordinator); team-taught by with Kuljeet Grewal and/or Andrew Halliday and/or Nick Mercer and/or Aadesh Gokul
	CLT 6203 Two-Eyed Perception on Environmental Sustainability	3	Required	Patrick Augustine (Course coordinator); team-taught by Pamela Courtenay-Hall and New hire in Environmental Studies
	CLT 6207 Economics and Policy Analysis of Cleantech	3	Required	Don Desserud (Course coordinator); team-taught by Justin Kakeu, Andrew Halliday, Nick Mercer et al.
Summer 1	CLT 6800 Leadership Skills for Cleantech Transformation	3	Required	New hire
	CLT 6301 Project Management	3	Required	Reuben Domike, Aadesh Gokul
	CLT 7000 Orientation to Cleantech Capstone Project	0	Required	New hire (Course coordinator); team may include Andrew Halliday, Charlene VanLeeuwen, Aadesh Gokul

[11] For cross-level courses, provide both undergraduate and graduate course numbers and titles, e.g., PSYC 4015/6005 Advanced Research Methods.
[12] If non-credit, indicate 0 for credit value.
[13] **Required courses** that contribute directly to the program's focus and credit total, and will be identified within the academic calendar as such. E.g., For a major in a 4-year undergraduate degree, list subject-area courses that every student enrolled in the proposed major must take, and that count toward the credit total for that major. **Select electives** are courses chosen from a predetermined list of courses either in the same discipline or in a discipline that directly contributes to the program's focus. Lists can be included in the table or in an attachment if necessary. **Special requirements** may include a thesis, capstone, work-integrated learning, etc. **Other requirements** outside of the subject area. E.g. For a major in a 4-year undergraduate degree, include all other breadth or distribution requirements needed for graduation that fall outside of the program's focus. Do not list all possible general or open electives; instead, describe the source of the elective (e.g., Humanities courses at the 1000-2000 level - 18 credits).
[14] Provide hypothetical teaching assignments only for those faculty listed in Table X, i.e. those faculty who directly support the program. List "part-time instructor," "New Hire 1," etc. where applicable.

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Summer 2	CLT 6303 Innovation and Entrepreneurship for Cleantech Transformation	3	Required	Reuben Domike, Aadesh Gokul
	CLT 7001 Cleantech Capstone Project I	3	Required	New hire (Course coordinator); team may include Andrew Halliday, Charlene VanLeeuwen, Aadesh Gokul
	Total Credits	30		
YEAR 2				
Fall	CLT 7002 Cleantech Capstone Project II	3	Required	New hire (Course coordinator); team may include Andrew Halliday, Charlene VanLeeuwen, Aadesh Gokul
	CLT 7310 Energy Technologies for Sustainable Neighborhoods	3	Elective	Kuljeet Grewal, Nick Mercer
Winter	NA			
Spring/Summer	NA			
	Total Credits	6		
YEAR 3				
Fall	NA			
Winter	NA			
Spring/Summer	NA			
	Total Credits	0		
YEAR 4				
Fall	NA			
Winter	NA			
Spring/Summer	NA			
	Total Credits	0		
	TOTAL PROGRAM CREDITS	36		

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Appendix 2: Academic Calendar Course Descriptions (for each required course and select elective) Including Prerequisites and/or Co-requisites

Course Name	Course Description	Prerequisites and/or Co-requisites
CLT 6101 Cleantech Fundamentals I (required)	This course examines fundamental concepts of climate change science, bringing students from different backgrounds onto the same page. Topics include ecosystems, biogeochemistry cycles, and greenhouse gases. The major environmental issues that need to be addressed to achieve net zero Emissions will be discussed. Students will develop a solid understanding of the cleantech path to net zero, and develop hopeful messaging around this.	Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
CLT 6102 Cleantech Fundamentals II (required)	This course builds on Cleantech Fundamentals I by examining the path to net zero energy. Students will first gain a solid understanding of energy systems, major energy technologies underlying energy supply and consumption, their applications, and their integration with the electric grid. This course also introduces some emerging clean energy technologies and policies impacting the development, deployment, and utilization of these technologies to address environmental issues. The role of big data, AI tech innovations, and other hot topics in the net zero energy path and energy security will be discussed.	CLT 6101 Cleantech Fundamentals I
CLT 7310 Energy Technologies for Sustainable Neighborhoods (elective)	This course offers a comprehensive exploration of sustainable community planning and renewable energy integration. Students will delve into historical perspectives and contemporary challenges, analyzing urban sprawl and sustainable built environment forms, with an emphasis on clean energy and nature-based solutions. The curriculum covers the integration of diverse renewable sources, microgrids, and energy storage technologies, enhancing grid reliability and resiliency. Through a collaborative approach, students will learn to integrate renewable energy into existing Canadian buildings and neighborhoods. By combining planning, renewable energy, and healthy community principles, this course provides a holistic perspective on sustainable communities and energy systems.	CLT 7310 Cleantech Fundamentals II
CLT 6205 Cleantech Governance, Regulation, Policy and Politics (required)	This course offers an introduction to clean technology governance, regulation, policy and politics. The first half focuses on Canada, as students examine the role that various levels of government currently play in an area of provincial jurisdiction and in relation to existing constitutional, administrative and regulatory frameworks. Regulatory bodies and regulatory processes in different provincial jurisdictions are also explored across several energy sources. The second half employs a comparative perspective to explore case studies from several jurisdictions' settings, both developed and developing, looking at approaches of deploying cleantech projects. Students examine the ideas, policy actors and institutions involved and identify key factors which influenced the success (or failure) in each instance. By this means, we will address significant questions around efforts to support the transition towards net-zero via the creation of a policy environment which lends itself to success cleantech projects.	Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor

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	Students will undertake a detailed analysis of a cleantech project of their choice, producing a thorough and well-research policy product.	
CLT 6207 Economics and Policy Analysis of Cleantech (required)	This interdisciplinary course merges economics and political science to analyze cleantech-related issues within the framework of public policy, defined as 'anything a government chooses to do or not to do.' A primary goal is to understand the factors influencing policy decisions, particularly institutions, context, and decision-making processes. The economic aspect of the course focuses on the tension between economic activities and environmental sustainability, exploring how economic practices lead to environmental degradation and what regulatory actions can balance economic growth with environmental sustainability. Politically, the course examines the roles of different government structures in Canada in policy development, evaluating the effectiveness of policies like carbon pricing and subsidies. Students will develop skills to critically assess government policies in environmental economics, understanding the interplay between economic theories and political realities.	CLT 6205 Cleantech Governance, Regulation, Policy, and Politics
CLT 7210 Sustainability Policy: Prioritizing Communities (elective)	The course advances students' understanding of the concept of sustainable development (SD) through introducing the history of the concept and different ways of measuring sustainability. The course touches upon the main factors which influence policy decisions and outcomes regarding SD (i.e., the role of power, economic interests, expertise, public opinion, resources and technological innovation). The course will turn to 'community energy systems' [CES] as a practical strategy for advancing sustainability. CES necessitates deep public involvement in development processes, as well as a fair and localized distribution of project outcomes. The CES development paradigm will be explored as a strategy for mitigating externalities associated with all energy sources, as well as a means to achieve distributive, procedural, recognition, and other forms of energy justice.	Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
CLT 6201 Environmental Ethics and Social Responsibility (required)	This course explores the ethical terrain within which sustainable technologies and policies are developed and implemented. It begins with the diversity of perspectives on the question of whether humans have more than just prudential reasons to limit their impacts on the environment ... do we have moral obligations to the natural world too, similar to our moral obligations to other humans? Students examine perspectives that put either humans, animals, all of life, or (also) ecosystems at the center of moral consideration, the arguments that have been raised for and against each of these views, criticisms of the underlying project of "moral extensionism," and accounts of how Indigenous perspectives on human-nature relations challenge, connect to or transcend these views. The course also explores: ethical assessment of new technologies, the question of why humans have degraded their environments; the concepts of space, place, and ecological identity; different perspectives in moral epistemology (relativism, objectivism, pragmatism); basic moral theories; ethical limitations of cost-benefit analysis; professional ethics and social responsibility; environmental justice, environmental racism, and key debates in the ethics of climate change (individual, intergenerational, and international responsibilities; just transitions, geoengineering).	Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor

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CLT 6203 Two-Eyed Perception on Environmental Sustainability (required)	This Course will introduce students to a unique process of synchronizing Indigenous and Western Knowledges, and through a process of weaving, incorporate the best of both to address challenges in climate change. The objective is to acknowledge the distinctiveness of these knowledges and that they need each other to move forward in developing unique approaches that may have never been attempted or considered by one or the other.	Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
CLT 6800 Leadership Skills for Cleantech Transformation (required)	This course provides students with an overview of major leadership theories and opportunities to develop and practice their interpersonal skills in preparation for leadership in influential Cleantech roles. Topics covered include leadership styles, followership and empowerment, change management and agency, influence and persuasion, effective communication, and conflict management. Students will reflect on their own leadership style and hone their leadership and interpersonal skills through interactive case discussions, role plays, and presentations. Key areas of skill development include self-awareness, critical thinking, adaptability, persuasion, conflict management, and communication.	Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
CLT 6303 Innovation and Entrepreneurship for Cleantech Transformation (required)	This course looks at efforts of innovation and entrepreneurship in cleantech. These efforts are described and assessed in the context of innovation management and entrepreneurial ecosystems. The role of entrepreneurial thinking, innovative organizational culture, portfolio management, engagement of stakeholders, collaboration with partners, mitigation of technological risks, and interactions with investors are taught both in theory and using case studies relevant to cleantech. The course utilizes real-world learning techniques such as case studies, guest speakers, and project/venture plans.	Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
CLT 6301 Project Management for Cleantech Transformation (required)	This course will introduce students to project management knowledge, tools and techniques to effectively manage projects within the rapidly evolving landscape of sustainable and clean technologies. Throughout the course, students will be exposed to sustainable environmental, social and governance (ESG) principles and practices using lectures, case studies and facilitated discussion. Students will develop a comprehensive understanding of project management principles while integrating ESG frameworks into project planning, stakeholder analysis and engagement, execution and evaluation by focusing on various project management concepts, guidelines and practices for the leaders of sustainable and clean technology initiatives.	Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
CLT 7000 Orientation to Cleantech Capstone Project (required)	The orientation module is an engaging and informative overview designed to prepare students for their Capstone Project experience. It will provide insights from industry and community leaders in cleantech, guidance on how to best prepare for the Capstone Project courses, and networking opportunities. The course grade will be on a pass/fail basis.	Students are expected to have completed all Master of Cleantech Leadership and Transformation program requirements to this point
CLT 7001 Cleantech Capstone Project I (required)	This course is the first of a two-part Capstone Project series where students will have the opportunity to begin their teamwork on a real-life project with a community or industry partner. Students will focus on the initial stages of the Capstone Project which include developing a project proposal, generating research questions, conducting a literature review, environmental scan, and needs assessment, reviewing research ethics guidelines, and developing the project's research methodology. Supported by a series of workshops and seminars on topics like proposal writing, literature searching and	Students are expected to have completed all Master of Cleantech Leadership and Transformation program requirements to this point

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	citation, time management, and peer workshopping and feedback, this course will also emphasize partnership development and engagement.	
CLT 7002 Cleantech Capstone Project II (required)	This course is the second of a two-part Capstone Project series focusing on the development and completion of the team project which will culminate in a final report and presentation, with an analysis of findings and recommendations for the community or industry partner. In addition to the Capstone Project, students will individually write a leadership development portfolio reflecting on how course workshops and seminars have informed their knowledge, skills, attitudes, and identity as a leader. Supported by workshops and seminars focusing on teamwork skills, stakeholder engagement, community entry practices, and communication skills, while also providing a discussion forum for students to learn from and engage with leaders in cleantech.	CLT 7001 Cleantech Capstone Project I

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Appendix 3: Student Enrolment (Back to document)

Provide a four-year projection of new and cumulative enrolment for the program.

	Year 1		Year 2		Year 3		Year 4	
	FT	**PT**	**FT**	**PT**	**FT**	**PT**	**FT**	**PT**
New Domestic	6	NA	8	NA	10	NA	10	NA
New International	10	NA	12	NA	14	NA	14	NA
Continuing Domestic	NA	NA	6	NA	7	NA	8	NA
Continuing International	NA	NA	8	NA	11	NA	13	NA
Total Student Enrolment Overall	16	NA	34	NA	42	NA	46	NA

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Appendix 4: Student Learning Outcomes Table

Student Learning Outcomes	Related Courses and Program Components	How Students Will Achieve / Demonstrate These Outcomes
Critical Thinking and Problem Solving • Apply an interdisciplinary approach to problem-solving. • Competency in using quantitative and qualitative theoretical frameworks to analyze environmental problems and understand policy interventions' effectiveness. • think critically and creatively as they systematically address complex and unpredictable issues using evidence-based approaches. • Equip students to analyze and synthesize information to evaluate alternatives. • Critically evaluate the rapidly changing cleantech landscape and the disruptive nature of these technologies. • Critically evaluate the rigor and validity of research, practice, and policy	Incorporate data analysis, writing etc. into orientation, modules, all relevant courses, permeating the curriculum IBL approach to the first 6 courses, wicked question • Cleantech Fundamentals I and II • Environmental Ethics and Social Responsibility • Cleantech Governance, Regulation, Policy and Politics • Two-Eyed Perception of Environmental Sustainability • Leadership Skills for Cleantech Transformation • Economic and Policy Analysis of Cleantech • Innovation and Entrepreneurship for Cleantech Transformation • Cleantech Capstone Project I & II • Project Management for Cleantech Transformation • Energy Technologies for Sustainable Neighborhoods • Sustainability Policy: Prioritizing Communities	Courses will be team-taught in an interdisciplinary manner. Assessments will be designed so that students can demonstrate critical thinking and problem-solving abilities: class discussions, presentations, papers, portfolios, reflections, research projects, real-life case studies. Demonstrating critical thinking and problem-solving skills involves actively engaging with course content, applying knowledge to real-world situations, and effectively communicating ideas and solutions. A wicked question/problem will be presented each semester. Also, all students will work on a capstone project with an external partner.
Collaboration and Communication • Oral and written communication of natural and social science concepts. • Effectively communicate with stakeholders. • Effectively collaborate with community industry and government on innovative sustainable solutions. • Public decision-making and behavior change.	Most courses, however, prominently featured in: • Leadership Skills for Cleantech Transformation • Orientation to Cleantech Capstone Project • Cleantech Capstone Project I • Cleantech Capstone Project II • Project Management for Cleantech Transformation	Class Discussions and Group Projects: Working together on group projects requires students to collaborate effectively. They need to communicate their ideas, delegate tasks, and coordinate efforts to achieve a common goal. Engaging in class discussions provides students with the opportunity to share their perspectives, actively listen to others, and build upon each other's ideas through respectful communication. Utilizing online platforms and tools for group projects or discussions can enhance collaboration among students. The capstone project will require teamwork and written and verbal communication. By engaging in these activities, students not only demonstrate their ability to collaborate and communicate effectively but also develop these

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		essential skills that are valuable in both academic and professional settings.
Leadership • Taking the initiative when planning and implementing projects. • Lead with social responsibility. • Develop responsible strategic thinking and leadership through personal reflection and analysis of values and behavior. • Resilience to uncertainty and change. • Recognize the need and impact of change on individuals, teams, organizations, and societies. • Maximize organizational resources.	• Environmental Ethics and Social Responsibility • Cleantech Governance, Regulation, Policy and Politics • Economic and Policy Analysis of Cleantech • Leadership Skills for Cleantech Transformation • Innovation and Entrepreneurship for Cleantech Transformation • Orientation to Cleantech Capstone Project • Cleantech Capstone Project I • Capstone Project II • Project Management for Cleantech Transformation	Students will be introduced to the foundation of leadership tactics that will mold them into their own individual leaders. They will also learn change management, conflict management, persuasion, influence, and effective communication tactics. Students will build their leadership skills through case study evaluation and learning from industry leader's experiences. Students will be introduced to the foundation of regulatory and policy development. Through case studies, they will be able to explore how to deploy cleantech projects in different jurisdictional settings. Students will be introduced to project management tools and techniques to manage cleantech projects effectively.
Environmental Justice and Equity • Consistent consideration of vulnerable communities, citizens, and society in decision-making. • Advocacy and promotion of ethical, equitable, inclusive, and diverse practices that support social responsibility. • Incorporate Recognition, Distributive, and Procedural dimensions of Justice. • Critical awareness of individual and organizational practices on society, environment, and global business dynamics.	• Environmental Ethics and Social Responsibility • Two-Eyed Perception of Environmental Sustainability • Economic and Policy Analysis of Cleantech • Orientation to Cleantech Capstone Project • Cleantech Capstone Project I • Cleantech Capstone Project II	Through these courses, students will: • learn how to evaluate the ethical obligation in developing and implementing sustainable technologies and policies. • **l**earn about individual social responsibility and sustainability. • be able to utilize indigenous and Western sustainable knowledge to tackle climate change challenges. • be able to understand the factors that influence policy development and decision-making processes. They will be introduced to the interaction between economic activities, sustainability, and government structure in policy development in Canada. • be equipped to make informed, equitable decisions.
Cleantech Innovation, Technology, and Business • Fundamental concepts in clean/renewable energy, environmental/natural resources, sustainable and emerging technologies, and	• Cleantech Fundamentals I • Cleantech Fundamentals II • Innovation and Entrepreneurship for Cleantech Transformation • Sustainability Policy: Prioritizing Communities	In these courses students will: • learn the basics of energy systems, their conversion, and their integration with the electric grid. They will also be introduced to clean energy technologies.

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interaction of energy use and environmental impact. • Integrating advances with existing technologies for future-focused sustainability. • Assess the competitive landscape to identify gaps and gain insight into emerging opportunities and innovations. • Develop innovative strategies to implement technologies in/for real-world applications effectively. • Demonstrate critical awareness of current issues in innovation through case studies, product models, etc. • Advance cleantech projects effectively by leveraging government and industry resources	• Energy Technologies for Sustainable Neighborhoods • Leadership Skills for Cleantech Transformation • Project Management for Cleantech Transformation • Orientation to Cleantech Capstone Project • Cleantech Capstone Project I • Cleantech Capstone Project II	• learn how clean energy technologies are integrated with electric grids, and policies impacting the development and deployment of these technologies. They will also be introduced to the role of big data and AI in net zero energy pathway. • be introduced to the concept of integration of diverse renewable sources into the grid. They will also learn about energy storage and its importance. • be introduced to the concept of innovation management and entrepreneurial ecosystems in the cleantech context. They will also be able to analyze and evaluate project proposals and financial data. • have hands-on experience and be able to utilize skills taught in the classroom for a real-world project. • be introduced to project management tools and techniques to manage cleantech projects.
Governance, Policy, and Regulations • Knowledge of ethical, economic, and regulatory components of Canadian and global clean technology regulatory frameworks. • Knowledge of compliance requirements. • Design and evaluate evidence-based policy to scale. • Quantitatively and qualitatively analyze data to characterize the impacts of cleantech and environmental policies on human systems.	• Cleantech Governance, Regulation, Policy and Politics • Economic and Policy Analysis of Cleantech • Sustainability Policy: Prioritizing Communities • Orientation to Cleantech Capstone Project • Cleantech Capstone Project I • Cleantech Capstone Project II	Students will: • be able to examine the role of different governments at all levels (local, regional, national and global) in clean technology statutory, regulatory, policy, and political jurisdiction within Canada. They will also be introduced to regulatory bodies and regulatory processes. • be able to understand the factors that influence policy development and decision-making processes. They will be introduced to the interaction between economic activities, sustainability, and government structure in policy development. • be introduced to the foundation of regulatory and policy development. Through case studies, they will be able to explore how to deploy cleantech projects in different jurisdictional settings. • have hands-on experience and be able to utilize skills taught in the classroom for a real-world project. • understand how policy choices affect sustainable development. They

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		will also be introduced to existing policy.

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Appendix 5: Faculty Resource Table

Using the provided table as a template, identify all of the faculty members expected to teach required courses and select electives in the program.

Only faculty who directly support the program should be included in the table, i.e., those who teach courses directly related to the program of study. It is not required to list faculty who teach required courses that satisfy general degree requirements (i.e., "distribution" or "breadth" courses), particularly if those courses are existing and offered by departments outside of those which house this program. E.g. If students in a new in Theatre major are required to take a general survey course taken by all Bachelor of Arts students (e.g. like Arts 1000), faculty who teach that course need not be included in the table. However, an introductory chemistry course would directly contribute to the program of study for a new major in biochemistry: faculty who teach that course should therefore be included in the table. For collaborative programs, do not include faculty from non-university partners.

If new faculty hires are required to support the program, provide the same information to the extent possible (e.g. status, desired areas of expertise, list of courses expected to be taught), in addition to the anticipated hire date.

Name	**Rank**[15]	**Status** *Tenure, Tenure-Track, Contract*	**Highest Degree or Professional Designation Held**	**Areas of Expertise**	**Number of Supervisions Underway or Completed** *(specify the level of study)*	**Number of Courses Expected to be Taught in this Program Per Year**	**List of Courses Faculty Can Teach in this Program** *(course names and numbers)*	**Anticipated Hire Date** *(if applicable)*
CURRENT FACULTY								
Patrick Augustine	Assistant Professor	Tenure-Track	PhD	Indigenous knowledge; climate change and adaptation	Undergraduate: Master's: Doctoral:	1	Two-Eyed Perception on Environmental Sustainability	
Pamela Courtenay-Hall	Associate Professor	Tenure	PhD	Environmental Ethics, Ethics of Climate Change, Environmental Philosophy, Environmental Education	Undergraduate: 1 Master's: 31 at UBC; 3 at UPEI Doctoral: 14 at UBC	1	Environmental Ethics and Social Responsibility	
Donald Desserud	Professor	Tenure	PhD	Political Science	Undergraduate: NA Master's: 3 Doctoral: NA	1	(Public Policy in) Economics and Policy Analysis of Cleantech	
Rueben Domike	Associate Professor	Tenure	PhD	Innovation Management	Undergraduate: NA Master's: 6 Doctoral: NA	1	Innovation and Entrepreneurship	

[15] Rank refers to job title (e.g. professor, assistant professor, senior lecturer, instructor).

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Aadesh Gokul	Assistant Professor	Contract	PhD	Design, Agricultural Engineering, Biosystems	Undergraduate: NA Master's: NA Doctoral: NA	4	Cleantech Fundamentals I, Cleantech Fundamentals II, Innovation and Entrepreneurship, Project Management, Capstone Project	
Kuljeet Grewal	Assistant Professor	Tenure-Track	PhD and PEng	Sustainable Energy	Undergraduate: 7 completed; 2 underway Master's: 4 underway Doctoral:	1	Cleantech Fundamentals I, Cleantech Fundamentals II, Energy Technologies for Sustainable Neighborhoods	
Andrew Halliday	Sessional Instructor, Adjunct Professor	Contract	MA	Public Policy, Island Studies, Energy	Undergraduate: NA Master's: NA Doctoral: NA	3	Cleantech Fundamentals I, Cleantech Fundamentals II, Cleantech Governance, Regulation, Policy and Politics, , Sustainability Policy: Prioritizing Communities, Capstone Project Orientation Module, Capstone Project I, Capstone Project II	
Justin Johnson Kakeu	Associate Professor	Tenure	PhD	Energy and Environmental Economics	Undergraduate: 5 Master's: NA Doctoral: NA	1	Economics and Policy Analysis of Cleantech	
Nicholas Mercer	Assistant Professor	Tenure-Track	PhD	Community-based energy scholarship	Undergraduate: NA Master's: 3 Doctoral: 1	1-2	Cleantech Governance, Regulation, Policy and Politics; Economics and Policy Analysis of Cleantech, Sustainable Sustainability Policy: Prioritizing Communities	

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Yuliya Rashchupkina	Assistant Professor	Tenure-Track	PhD	Climate Change Policy and Politics, Sustainable development	Undergraduate: NA Master's: 1 Doctoral: NA	1	Sustainability Policy: Prioritizing Communities	
Charlene VanLeeuwen	Instructor, Coordinator Teaching and Learning Centre	Contract	PhD	Community-based Education	Undergraduate: 3 honors thesis committees Master's: 2 and 2 supervisory committees Doctoral: NA		Capstone Project Orientation Module, Capstone Project I, Capstone Project II	
ANTICIPATED HIRES[16] **See note below regarding anticipated hires								
	Assistant Professor	Tenure-Track	Masters or Doctorate	Environmental Studies		3	Cleantech Fundamentals I, Cleantech Fundamentals II, electives	July 2025
	Assistant Professor	Tenure-Track	Masters or Doctorate	Island Studies		3	Policy courses	July 2025
	Assistant Professor	Tenure-Track	PhD	Innovation & Leadership		3	Leadership Skills I, Capstone Project Orientation Module, Capstone Project I, Capstone Project II	July 2025

NOTE: The MPHEC reserves the right to request CVs for faculty teaching in the program.

****Note: Our intent is to provide additional information of faculty when appointments are confirmed and are seeking an approval with conditions, in this regard. We anticipate to hire at least three new faculty members into our existing faculties at UPEI in the areas of Environmental Studies, Island Studies, and Business or Engineering.**

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[16] Label as needed "New Hire 1, New Hire 2," etc. here and in the Student Progression table.

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Tip 1.1. - **Baccalaureate degree programs** must require students to complete sufficient upper-level courses (i.e., courses at the 3000-4000 level) to meet the anticipated learning outcomes and upper-level credit requirements outlined in the *Maritime Degree Level Qualifications Framework*. Choice among upper-level courses (i.e., options for select electives*) is normally provided.

For **major / double major / advanced major programs**:

- In a three-year degree, at least six courses (18ch) are required in the discipline or in a cognate discipline that contributes directly to the major, with at least four courses (12ch) at the 3000-4000 level.
- In a four-year degree, at least twelve courses (36ch) are required in the discipline or in a cognate discipline that contributes directly to the major, with at least six courses (18ch) at the 3000-4000 level.

For **honours programs**:

- At least sixteen courses (48ch) are required in the discipline or in a cognate discipline that contributes directly to the honours, with at least ten (30ch) beyond the second year of study, including at least two courses (6ch) at the 4000 level.
- In addition, the program is expected to require students to prepare, under supervision of a qualified faculty member, a terminal research paper, thesis, project, exhibition, or other research-based or performance-based exercise that demonstrates methodological competence and capacity for independent intellectual/creative work.

* Select electives are courses chosen from a predetermined list of courses either in the same discipline or in a discipline that directly contributes to the program's focus. Lists can be included in the table or in an attachment if necessary.

Master's degree programs must include sufficient graduate-level courses (i.e., courses normally at the 6000-8000 level) to meet the anticipated learning outcomes and provide students with choice among their courses (i.e., options for select electives).

Research-focused masters degree programs are normally expected to require a compulsory graduate-level research methods course or experimental lab that will provide students with the requisite knowledge and skills to competently carry out original research in the field of study. In cases where one of these is not required, provide evidence of how students will obtain equivalent research methods knowledge and skills through other program components.

Tip 1.2. - For **collaborative programs**, describe the main components each institution brings to the program (e.g. disciplinary expertise, practical experience), and how these separate components will be brought together to form a coherent program.

Tip 1.3. - Note: MPHEC reserves the right to request detailed course outlines/syllabi as needed.

Tip 1.7. - **Interdisciplinary programs** must formally integrate knowledge and skills from each of the primary subject areas that comprise the program.

Tip 1.8. - Any **work-integrated learning** experience should

- be appropriate to the field of the program
- be supervised by both an institutional representative with relevant academic credentials and a representative from the host organization who collaborate to evaluate the student performance
- provide opportunities and structure for student reflection on program learning outcomes in relationship to work-integrated learning experiences.

Co-operative (co-op) education programs are expected to meet the following standards established by Co-operative Education and Work-Integrated Learning (CEWIL), Canada.

- Work terms, including the number of weeks and hours, comply with the CEWIL Accreditation Program Matrix Length. The CEWIL Accreditation Program Matrix Length can be found at the following link: https://cewilcanada.ca/common/Uploaded%20files/Public%20Resources/Accreditation/Alternating%20Work%20Term%20program%20length%20document%20-%20updated%20may%202021%20-%20final.pdf
- The program must start and end on an academic term.

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- Length of each work term is approximately equal to the length of each academic study term.
- Both work and study terms are full-time.
- For programs of two or more work terms, work experience is not limited to one season unless it can be demonstrated that work in a specific career is purely of a seasonal nature.

Visit the CEWIL website for the full Co-Operative Education Accreditation Standards and Rationale https://www.cewilcanada.ca/

Other work integrated and experiential learning programs that do not meet these standards are encouraged by the MPHEC to use alternative titles (e.g., work placement, internship).

Tip 1.9. - **Cross-level course** refers to offering two courses, one undergraduate and one graduate, in the same time and place, with the same instructor. For cross-level courses, only the classroom experience is shared (whether in-person, online or a combination of the two) is shared; the graduate course is expected to have distinct content, assignments, and learning outcomes that are more advanced than the undergraduate course and identified in a separate syllabus.

Graduate programs that use cross-level courses must meet the parameters for cross-level courses outlined in Criteria 4.E. If an exception to these parameters is being proposed, the proposal will automatically proceed to Stage II assessment, where the proposal will be considered on a case-by-case basis by the AAU-MPHEC Quality Assurance Committee.

Tip 1.10. - E.g., A new undergraduate honours program likely builds on an existing major in the same discipline. Graduate programs typically build on existing undergraduate offerings in the same discipline or in cognate disciplines; they may also complement other existing graduate programs. E.g., A new MBA program may be building on an existing BBA program; it may also be offered alongside existing Master of Finance and Master of Applied Economics programs.

Tip 1.11. - E.g., Where there are differences, speak to unique features that distinguish this program from others like it. Where there are similarities, speak to how this program may follow established practices in the discipline.

Tip 1.12. - For new or innovative programs, these types of letters can be particularly helpful as evidence that the program as designed will meet the intended outcomes. Health-related programs and education programs in Nova Scotia require confirmation of approval from AACHR and EECD, respectively.

Tip 1.13. - Proposals for new graduate-level degrees submitted to the MPHEC without an external assessment will be returned.

The expert is to be selected according to established standards (see Appendix 4A) and the review conducted in accordance with, at a minimum, the elements highlighted in the MPHEC's Generic Terms of Reference for External Consultants (see Appendix 4B).

Tip 3.1. - E.g., In order to show that the credential will be recognizable, identify existing programs with similar names/credentials, explain how the program name reflects accepted terminology or current trends within the discipline, and/or provide letters from admitting universities.
If the credential is unusual in Canada, provide a rationale for choosing it, explaining why it is more appropriate than the alternatives or why a new credential is needed.
A program must meet the CEWIL standards referenced on page 3 of this document in order for "cooperative (co-op) education" to be listed in the program name or advertising.

Tip 4. - For **collaborative programs**, be sure to include the standards for student admission, progression and graduation at both/all institutions. Mention block transfers of credit if applicable.

Tip 4.3.1.1. - Admission to an **undergraduate program** normally requires, at a minimum, completion of a secondary school diploma, or equivalent.

Admission to a **post-baccalaureate program** requires completion of an undergraduate degree or equivalent prior to enrolling. The prior degree could be in the discipline, a cognate discipline, or not, depending on the goals of the program.

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Admission to a **master's program** normally requires completion of an undergraduate degree or equivalent, often in the discipline or a cognate discipline. In some instances, a significant amount of professional experience may be accepted in lieu of this.

Admission to a **doctoral program** normally requires completion of a master's degree or equivalent in the discipline or a cognate discipline. In some instances, students may be admitted with a bachelor's degree through an accelerated pathway.

Tip 5.1. - Program objectives describe what the program aims to do or accomplish. They are usually broader in scope than student learning outcomes, but they do inform those outcomes (i.e., the program objectives are realized through students' achievement of the learning outcomes).

E.g. Support engagement in social justice on campus and in the community.

E.g. Promote original research in the areas of applied health, including health promotion and education, policy formation, and program development and assessment, and health.

E.g. This program will deliver foundational knowledge of criminological theories and methods necessary for success in graduate school or criminological-related professions (e.g. law enforcement, corrections, criminal justice reform).

E.g. This program explores the reciprocal relationship of how the brain affects behavior and how behaviour and the environment affect the brain. This knowledge will be contextualized from a physiological, ecological, genetic, and evolutionary standpoint.

E.g. This program will provide both theoretical and practical education on language development, plurilingualism, and second language acquisition.

E.g. The curriculum promotes the acquisition of visual and material literacy, which is the ability to proficiently interpret images and objects and understand their significance in various cultural and historical contexts.

Tip 5.2. - Learning outcomes describe the knowledge, skills, abilities and competencies that successful students should have acquired by the end of the program. They are usually more specific than program objectives, though not as precise as course-level learning outcomes. Achievement of learning outcomes is usually demonstrated through successful completion of **several** courses or program components.

E.g. Identify the determinants of health, compare healthcare delivery models used locally/internationally, and explain ethical dimensions of health issues.

E.g. Identify potential safety risks as it pertains to outdoor activity, teaching location, and grade level.

E.g. Design treatment programs that recognize the various psychosocial lifestyle factors that impact physical activity and exercise.

E.g. Deploy concepts concerning discrete and continuous univariate random variables (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, gamma, normal, and mixed) to solve problems.

E.g. Learn to recognize the intersectionality of privilege and oppression rooted in race, class, age, ability, sexuality, ethnicity, nationality and post-coloniality.

E.g. Communicate effectively through written and spoken mediums.

E.g. Distinguish and conduct various types of research synthesis approaches and the differences among them, including rapid evidence assessments (REAs), systematic reviews, meta-analysis, and meta-synthesis.

E.g. Students will have foundational programming knowledge and ability to design relevant algorithms.

E.g. Students will be able to conduct independent research at an advanced level.

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Tip 5.3.1. - Students should qualify for admission to programs offered at other institutions: opportunities for further study should not be limited to programs at the originating university.

Evidence could include admissions requirements from relevant program websites, or letters of confirmation from admitting bodies (registrars, program chairs, admissions committees).

> E.g. Graduates of the program will be eligible to pursue master's programs in Economics, which typically require completion of an undergraduate degree in Economics that includes courses in advanced microeconomics and macroeconomics, econometrics, statistics and calculus (all of which are covered in our curriculum). See excerpts below from program websites on admissions requirements to master's programs at Dalhousie, Windsor, and UBC.
>
> E.g. Appendix 3.4 includes letters of support from UBC and McGill University indicating that graduates of the program would be appropriately prepared for admission to their respective PhD programs in Art Education and Educational Studies.

Tip 5.3.2. - Evidence could include confirmation from prospective employers that graduates will have the requisite knowledge and skills to work in the field, relevant job ads, etc.

> E.g. The hands-on experience provided through the practica in this program will prepare graduates for employment as arts administrators or consultants at non-profits, educational and cultural facilities, and community organizations.
>
> E.g. See attached letters from the Department of Public Safety, the Department of Health, and the John Howard Society concerning the need for trained program evaluators in the human services sector, and the value this program will provide in that regard.
>
> E.g. The worldwide cybersecurity market is large and growing, with a market size to reach $170 billion in 2020. It is predicted that the global cybersecurity workforce will fall short by 1.8 million workers by 2022. The university has already developed close collaborations with many firms and stakeholders including IBM Security Systems Division, Bullet Proof, Bell, TD, McCain, JDI, and local and federal government departments. All these collaborators are likely able to offer internships to the students and participate in capstone projects, which may lead to full-time jobs as entry-level IT security analysts for some of the students upon graduation. See letters of interest in Appendix X.

Tip 5.3.3. - It may be useful to provide a mapping of the curriculum to accreditation standards, i.e., chart or table, and either link to or attach the current standards and requirements of the regulatory body.

> E.g. Graduates will have completed the essential Validation by Educational Experience requirements and will be prepared for the first two professional exams of the Society of Actuaries (SOA). See https://www.casact.org/exams-admissions/validation-educational-experience
>
> E.g. The Canadian Engineering Accreditation Board (CEAB) accredits undergraduate engineering programs like ours which provide the academic requirements for licensure as a professional engineer in Canada (PEng). The revised program will satisfy all CEAB requirements through the Common Core. The two Technical Electives contribute Accreditation Units beyond the CEAB requirements. See table below for a break-down of CEAB requirements.
>
> E.g. Table 2 shows which National Committee on Health Leadership (NCHL) competencies are covered by each course in the proposed program, as well as the level of competency students are expected to achieve (on a scale from 1-4). Appendix G contains a list and description of all NCHL Competencies for reference.

As a condition to approval, programs that require accreditation will need to provide confirmation of their accreditation status from the designating body.

Tip 6.1. - Only faculty who directly support the program should be included in the table, i.e., those who teach courses directly related to the program of study. It is not required to list faculty who teach required courses that satisfy general degree requirements (i.e., "distribution" or "breadth" courses), particularly if those courses are existing and offered by departments outside of those offering this program. E.g. If students in a new in Theatre major are required to take a general survey course taken by all Bachelor of Arts students (e.g., Arts 1000), faculty who teach that course need not be included in the

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table. However, an introductory chemistry course would directly contribute to the program of study for a new major in Biochemistry: faculty who teach that course would therefore be included in the table.

Select electives are courses chosen from a predetermined list of courses either in the same discipline or in a discipline that directly contributes to the program's focus.

Tip 6.3. - The program should be anchored by a designated complement of core faculty who are primarily responsible for its program delivery, ensuring consistency, continuity and sustainability.

For programs that rely heavily on contract and/or overload faculty, describe measures or plans in place to ensure the long-term consistency and sustainability of the program (e.g., standardized course learning outcomes, common syllabi).

Tip 6.4. - For **undergraduate programs**, faculty are normally expected to hold an academic credential at least one degree higher than that offered by the program in the field or in a cognate discipline.

For **graduate programs**, faculty are expected to hold a terminal academic degree credential in the discipline in which they are teaching, or in a cognate discipline.

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Appendices

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Appendix B – Curriculum Working Group Biographies

Appendix C – Program Name Research

Appendix D – Section 7.1.2 Software

Appendix E – Library Resources Report

Appendix F – Letters of Support
- F.1: Government of Prince Edward Island: Honorable Stephen Myers, Minister of Environment, Energy and Climate Action Environment, Energy and Climate Action
- F.2: Cleantech Academy: Sandra Moore, Director
- F.3: Holland College: Dr. Alexander (Sandy) MacDonald, President
- F.4: Lennox Island First Nation: Drew Bernard, Energy Lead
- F.5: Efficiency Canada: Abhilash Kantamneni, Director of Action Research

Appendix G – Financial Support Information
- G.1: Letter of Financial Support from Government of Prince Edward Island: Honorable Stephen Myers, Minister of Environment, Energy and Climate Action Environment, Energy and Climate Action
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- H.1: Biographies of External Review Consultants
- H.2: On-site Visit Agenda for External Review Consultants
- H.3: External Review Consultants' Report
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Appendix A – Environmental Scan

Cambridge
Professional
Development

Cleantech Academy – Environmental Scan

HOLLAND COLLEGE

UNIVERSITY of Prince Edward ISLAND

FINAL REPORT

October 14, 2022

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EXECUTIVE SUMMARY

1. Introduction. The purpose of this Environmental Scan was to research available materials to guide the development of new Certificate and Masters programs at the new CleanTech Academy. The methodology included key informant interviews, desk research on other programs, and review of existing Holland College and UPEI courses. The findings from these various sources were analyzed to assemble recommendations which were presented to the Joint Working Group (JWG).

2. Data Collection

Interviews. 44 interviews were conducted by CamProf and the JWG covering government, business, academic and environmental interests using a common interview guide. These interviews were analyzed and summarized into nine themes:

- What is it?
- Happening Now
- Allies
- Pre
- Post
- Reality
- Energy
- Business
- Communication

Desk research – what the world is doing. 10 countries were selected for analysis based on agreed criteria. Available data was collected on 34 certificate programs and 66 Masters programs.

- Canada
- United States
- United Kingdom
- Finland
- Denmark
- Sweden
- Norway
- Japan
- South Korea
- Iceland

4. Analysis and synthesis. The findings from the interviews and desk research were analyzed to prepare recommendations on the content and delivery of the new programs. These include the importance of foundational (soft) skills, experiential learning, and employer engagement. A key finding was that existing programs were generally strong on the science and engineering aspects of climate change, but less strong on the business, leadership and deployment of net zero technologies.

Using data supplied by the College and the University on existing relevant courses, CamProf considered how these might be adapted, contextualized or augmented for cleantech.

5. Discussion and reporting. CamProf presented its findings at a workshop with the JWG, including a view of suggested program contents covering energy, business and societal topics. The final report was prepared and presented at a Stakeholder Event in October 2022.

6. Recommendations. Based on the extensive research and analysis, our key recommendations as expanded on the next page are:

- Develop a clear and realistic vision
- Involve employers from the outset
- Include energy, business, societal content
- Include leadership and entrepreneurship
- Emphasize experiential learning
- Adopt a hybrid mode of delivery
- Focus on sector application of cleantech
- Seek appropriate accreditation and networking
- Explore CPD certification
- Articulate an identity, branding, objectives

SUMMARY OF RECOMMENDATIONS

R1 Develop a clear and realistic vision

The very first theme emerging from the interview program was the key question: “What is it?" To support the development, marketing and recruitment for the programs, we recommend that the College and University adopt and communicate a shared vision for the pair of programs.

R2 Involve employers from the outset

We emphasize employer engagement from the outset. This includes participation in management committees and curricula development, provision of case studies, materials and guest lecturers.

R3 Include energy, business and societal content

Whilst most of the 100 programs we studied are strong on the science and engineering aspects of Net Zero, many are not so strong on the business aspects. Because of the focus on leadership and deployment, we consider it essential that all three components are covered.

R4 Include leadership and entrepreneurship

Leadership and entrepreneurship are other differentiating features and clearly vital to the aims of the program. Despite the difficulties of teaching and learning, we recommend inclusion in both programs.

R5 Emphasize experiential learning

We emphasize the importance of experiential learning, for example by workplace visits, secondments, project work and team work generally. This was not strong in most of the programs we reviewed, but it was well supported in the interviews.

R6 Adopt a hybrid mode of delivery

Although traditional classroom lectures have been dominant in the past, practices have been forced to adapt by Covid. Remote learning, both online and offline, has some advantages in cost and convenience. We recommend inclusion of remote learning, but still with a mainly traditional format, at least 60%.

R7 Focus on relevant sector applications of cleantech

Programs we analyzed were weak on manufacturing, e.g. for solar panels, batteries, electronics etc. In fact, they were weak on specific sectors generally. This presents a golden opportunity for the program to focus on those economic sectors relevant to PEI, and by extension to rural and coastal areas generally.

R8 Seek appropriate accreditation and networking

Program recognition by an appropriate authority can improve its attraction to potential students and its perception generally. Partnerships with external bodies can be helpful in exchanging best practices, building influence, and in student exchange, e.g. International Cleantech Network, Clean Growth Hub.

R9 Explore Continuing Professional Development certification

CPD certification is a growing requirement from many professional institutions. We recommend exploring CPD opportunities, e.g. through the CPD Certification Service.

R10 Clearly articulate an identity, branding, and objectives

Our final recommendation addresses the first interview theme – what is it? - indicating that there is still uncertainty. The program includes all the fundamentals of cleantech plus the critical business aspects, with strong employer involvement. It will have many distinguishing, even unique, features, most notably the sector approach.

Proposed program content

Energy components	

• The main sources of energy for PEI and Canada
  o Hydroelectric
  o Nuclear
  o Coal, oil and gas
  o Wind
  o Solar
• The main sources of greenhouse gas emission for PEI and Canada
  o Production of electricity
  o Agriculture
  o Transport
  o Industry
  o Domestic and other heating
	• Emerging technologies
	  o Carbon capture (CCUS)
	  o Hydrogen
	  o Energy storage, eg batteries and thermal energy storage
	  o Energy management, eg smart and micro-grids
	  o Transformation of energy infrastructure
	• Decommissioning or re-purposing of existing energy assets
	• Improved waste management
	• Conversion of waste into an energy source

Business components	

• Commercial law
  o Legal entities
  o Commercial law
  o Intellectual Property laws
  o Regulations
  o Standards
• Carbon taxation
• Financial literacy
  o Understanding Accounts: P&L, Balance sheet
  o Cash flow
  o Sources of capital
	• Entrepreneurship
	• Marketing
	  o Customer communications
	  o Closing a sale
	  o Customer service
	• Project, process, and change management
	• Communications and digital skills
	• Leadership, influencing behaviour
	• Sector specific content

Environmental, social and governance components	
• Awareness of Environmental Impact • Environmental Policy • Climate Fundamentals	• Social Responsibility • Basics of Sustainability

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Separate reports available

- Key Informant Interviews – Summary Report
- Desk Research Report
- Program data spreadsheet

1 INTRODUCTION

1.1 Holland College and University of Prince Edward Island Joint Initiative

The Government of Prince Edward Island (PEI) is developing a CleanTech Park that includes a CleanTech Academy and a CleanTech Learning & Innovation Centre. The overall project aims to establish an industry-led cluster and destination that attracts and facilitates the growth of companies, entrepreneurs and talent focused on advances in technologies, processes and knowledge that contribute to clean growth[1]. Located in Georgetown, the Park will bring together many provincial priorities such as education, economy and environment to help create a new sector for growth in PEI.

The CleanTech Academy will offer a post-graduate Certificate and a Masters Degree in Leadership in CleanTech Deployment through a joint initiative of Holland College (HC) and the University of Prince Edward Island (UPEI). There will be graduate pods and incubation spaces as well as collaborative areas allowing students to connect and learn from industry.

"*The Clean Tech Learning and Innovation Centre will be PEI's future home for CleanTech innovation, business, energy and education,*" said Steven Myers, Minister of Environment, Energy and Climate Action.

"*Supporting the next generation to find new solutions to today's challenges will ensure we reach our ambitious net-zero targets. CleanTech Academy will offer a Certificate and a Masters Degree in CleanTech Leadership through a joint initiative of Holland College and the University of Prince Edward Island*"[2].

The joint initiative will design, develop and implement a Certificate program and a Masters degree program in leadership and deployment of technologies that accelerate greenhouse gas (GHG) emission reductions. The new programming will complement and leverage the strengths of existing programs of both well-established institutions. This exciting initiative presents a new era of collaboration between the College and the University and will include strong collaboration with the government, industry, and other stakeholders.

1.2 Funding

Funding for this project has been provided by the Government of PEI through the Ministry of Environment, Energy and Climate Action.

1.3 Purpose and Scope of Environmental Scan

This Environmental Scan will guide the future work of the joint HC/UPEI initiative to develop unique post-secondary education programming to train the next generation of leaders and innovators to contribute to a clean growth sector in PEI.

[1] https://www.princeedwardisland.ca/en/news/new-clean-tech-park-to-bolster-new-industry-and-opportunities-on-pei

[2] https://www.upei.ca/communications/news/2022/02/upei-collaborates-peis-clean-tech-park-and-clean-tech-academy

1.4 Methodology

A Joint Working Group (JWG) of HC and UPEI has been overseeing the Environmental Scan. International consultants Cambridge Professional Development Limited (CamProf) were selected to lead. CamProf is based in UK and has 10 years of experience in Canada through a subsidiary registered in Nova Scotia.

The project commenced in May 2022 and continued for five months to September 2022. It was structured in five main activities as illustrated in Figure 1, starting with two major data collection phases, namely:

- Desk Research covering ten countries, 34 certificate programs from 32 institutions, and 66 masters programs from 45 institutions
- 44 key informant interviews conducted by CamProf and the JWG covering government, academic, business and environment sectors
- This was followed by the Analysis & Synthesis activity, culminating in a workshop with the JWG
- Then production of this Final Report and including a Stakeholder Event to present the findings to interested parties
- An overall project management activity co-ordinated and reported progress, ensuring timely delivery, and maintaining communications with the College and University through the JWG and client project manager.

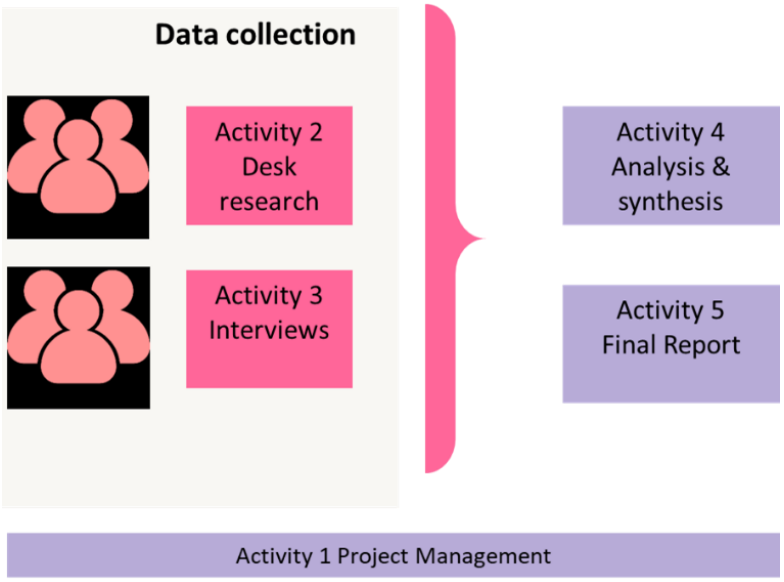


Figure 1: The five main activities

2 WHAT THE INTERVIEWS SAID

Figure 2: Key Informants Interview Summary Report

Note: The following points are a summarised version of the material presented in the full interview report. For those wishing a more thorough treatment of the material, including additional context and sector commentary, please consult the full document.

2.1 Thematic analysis

Responses were collected and analyzed, with key insights identified and common themes established. The selection of insights and development of themes was based on a hybrid quantitative/qualitative model whereby responses that were shared by more informants (typically 1/3 or higher) as well as by more informant sectors were considered for inclusion as insights. In addition to these criteria, the researchers also noted informant time spent on particular insights, word choice, prioritization relative to other items, as well as the relative knowledge of informants regarding the subject matter related to the insight.

Once the insights were identified from the informant interview reports, a series of themes was identified to group common subject areas and to assist readers in comprehending the material presented. The following table summarises the nine themes and provides a key takeaway for each:

Theme	Key Takeaway
What is it?	Need to quickly develop an identity, narrative and scope
Happening Now	Program must respond to PEI's "Already/Not Yet" cleantech industry
Allies	Many potential allies in Business, Government and Research sectors
Pre	Informants recognize tight timelines and high program objectives, propose innovation and non-traditional delivery activities as solution
Post	Maximize opportunities for cleantech networking and promotion
Reality	Industry wants truly work ready graduates, willing to help make it happen
Energy	Knowing/using energy science drives cleantech leadership & success
Business	Core business skills needed for entrepreneurs, managers, consultants
Communication	Communications and influence are key to current global cleantech efforts and will support all cleantech futures: policy, business, research and leadership

Table 1: Takeaway from each theme

2.2 Theme Highlights

2.2.1 Theme 1 - What is it?

One of the key points that came up during the informant interviews was statements indicating that the informants were uncertain about the exact nature and scope of the project, or how it differed from existing academic offerings by the institutions. As these concerns were addressed, the informants became more comfortable and willing to share on other topics in the interview.

Main Insights:

- Lack of clarity about whether the program is science, technology or business
- Questions about which applied skills for which type of energy would be learnt from the programs
- Concerns that one year would not be sufficient
- Some informants disagreed with the "greenness" of some examples (ex. Samsø Island and biomass, nuclear, blue hydrogen with carbon capture) while others considered them to fit clearly within their understanding of “green,” showing disagreement and diversity among key informants about the meaning of terms and their scope
- Significant variation among the prioritization of energies and technologies

Key Takeaway: Need to quickly develop an identity, narrative and scope

2.2.2 Theme 2 - Happening Now

This theme was a collection of the insights provided by informants related to what was currently taking place. This included projects, cleantech firms, initiatives, resources, academic programs, funding sources, start-up experiences and other items. These produced a clear picture of an emerging sector that has opportunities for growth, but also questions to answer and decisions to make.

Main Insights:

- Maturing cleantech education sector: fewer pilots, more innovation in terms of industry partnerships, collaboration with business faculties that are built on program models with past success
- Strong alliance with industry and stakeholders brings program success
- PEI: converging on a collaborative approach amid growing public support for Net Zero and cleantech
- Risk mitigation currently strongest tool to encourage testing and adoption of solutions
- Regulation, business opportunities and financial/productivity advantages are drivers of cleantech adoption, venture capital and other financing also more widely available to new firms and traditional firms transitioning to other energy or technology choices
- With maturity, these initial cleantech drivers will be overtaken by traditional factors (reputation, financial, market opportunity, etc.) in buyers’ selection of firms and technology solutions

Key Takeaway: Program must respond to PEI's "Already/Not Yet" cleantech industry

2.2.3 Theme 3 - Allies

This theme captured all the informant insights related to supporting and assisting with the proposed programs. Informants were very positive about the new programs and indicated a strong willingness to contribute from many sectors. They also indicated a desire for enhanced collaboration with the institutions going beyond current models and for consideration of their timelines and busy seasons when requests are being made. There was also a strong message of "Don't reinvent the wheel, make use of existing resources," whether people, technology, organizations, or academic content.

Main Insights:

- Many informants used a variety of word choices to communicate that the program development should proceed using a "gap analysis" type of approach to identify needs that are currently unmet by the institutions' resources but could be addressed by using others' existing resources rather than creating new resources unnecessarily.
- Several informants voiced their perception of shortcomings within the current institutional mechanisms for gathering feedback. This feedback included individual points that are captured in more detail in the Interview Report.
- Industry informants in some cases displayed little awareness of the difference in time between doing a process in the workplace, and the amount of time that would be spent teaching the process plus any related concepts or content, as well as the additional time repeating the steps to develop competency and for evaluation of the process performance to further improve competency.
- Potential allies after receiving clearer explanation about the program identified resources belonging to them or other allies that might be available to support the program.
- Organizations willing to help promote programs (internally and externally).

Key Takeaway: Many potential allies in Business, Government and Research sectors

2.2.4 Theme 4 - Pre

Given the one-year duration of each program, many informants felt that it would be difficult to achieve all the objectives that had been identified. This led to their proposing various suggestions of innovative time usage prior to the program starts. These suggestions were varied with little consensus among informants but have been captured in the full interview report.

Main Insights:

Attempting to group a variety of informant responses, there were three primary headings under which their ideas could be classified:

- Ideas related to admissions
- Ideas related to pre-program learning and networking
- Ideas related to HC/UPEI activities prior to program launches

Key Takeaway: Informants recognize tight timelines and high program objectives, propose innovation and non-traditional delivery activities as solution

2.2.5 Theme 5 - Post

In the same way that some informants suggested innovative ways to use the time before the start of the programs, suggestions were also given for making the most of opportunities post-graduation. There was more consensus on these innovations as seen below.

Main Insights:

- Informants envisioned a future for the programs where all sectors (Government, Academic, Business, and NGO) are collaborating to produce a cleantech network or industry in PEI
- Ongoing learning opportunities for graduates and others
- Access to incubator/accelerator/funding support, HC/UPEI or external
- Program graduates as mentors to future cohorts

Key Takeaway: Maximize opportunities for cleantech networking and promotion

2.2.6 Theme 6 - Reality

Informants indicated very strongly that they want work-ready graduates, with significant autonomy and the ability to navigate the uncertainty and change of real-world work. They were also strong in their recommendation of experiential learning activities (although not all used the phrase) to make this happen. Beyond these areas of consensus, there was significant diversity regarding the form of these activities and how they should be assessed, which is captured in the full interview report.

Main Insights:

- Informants indicated that their hiring of learners was often strongly influenced by their accomplishments during the experiential parts of their academic programs. These accomplishments demonstrated their ability to perform activities at a work-ready level. Informants were also influenced by the real-world outcomes of those activities and their degree of success.
- Experiential activities build contacts/professional networks that contribute to greater odds of graduate success.
- Organizations are open to collaborate with the institutions on students' experiences, if their timelines are respected.
- Consultancy style of course - researching a problem or opportunity using business analysis – some informants who suggested this type of course also suggested that identifying an organization and problem to work on during their studies could be made into an admissions requirement.

Key Takeaway: Industry wants truly work ready graduates and are willing to help make it happen

2.2.7 Theme 7 - Energy

Informants (especially those in the Academic sector, with support from some in Business and Government as well) highlighted a need for learners to thoroughly understand energy at a big picture level. This broad understanding was identified as making possible much of the diagnostic and problem-solving competencies that were desired in graduates. Linkages to related technologies and applied mathematics were also highly recommended.

Main Insights:

- Learners need to understand all types of energy, not just "green"
- Next steps include understanding:
    - energy-related technologies
    - technologies associated with electricity, storage, transmission grids, etc.
    - how energy and related technology work in: buildings, vehicles, factory production, electronics, etc.
- See energy at work, do the math, learn how to self-learn
- Flip the telescope (narrow focus to broad)

Key Takeaway: Knowing/using energy science drives cleantech leadership and success

2.2.8 Theme 8 - Business

Business skills were also strongly recommended by informants, with an emphasis on those supportive of entrepreneurship and start-up success, rather than traditional business offerings. Topics were prioritized on the basis of how important it was that the graduate perform the related tasks versus delegating or contracting them out. Again, the emphasis on real-world application was highlighted.

Main Insights:

- Most sector start-ups fail due to lack of business skill
- Common solutions to this problem:
    - two-person leadership team, technical and business skills.
    - Introvert/extrovert balance
- Program content must reflect real-world conditions, thinking and doing
- Graduates must learn to facilitate between final customers and funding sources
- Informants clearly indicated a discomfort with a focus on teaching "soft skills" to learners, such as interpersonal relations, emotional intelligence, etc. Their belief was that these sorts of skills were much better developed by the creation of opportunities to practice, with a measure of risk for the learners
- Keep the cleantech efforts on a business footing

Key Takeaway: Core business skills needed for entrepreneurs, managers, consultants

2.2.9 Theme 9 - Communication

Communication skills were the third curriculum topic area highlighted by informants, which must be applied with the content learned in both energy and business in order to successfully apply all the program content. There was a strong emphasis on being able to communicate upon arrival and using every learning opportunity to improve communication abilities, with as much real-world application as possible. Informants also highlighted the possibilities for promoting the programs and the PEI Cleantech Alliance and developing sector in general through the learners' communications efforts.

Main Insights:

- Students must arrive digitally literate
- Foundational communications theory and planning skills should form the majority of communications content being taught
- Support and assess learners' use of communications technologies
- Have learners communicate energy education (What, How)
- Digital communications channels for the programs would be a key part of building and sharing each program's brand identity as well as supporting the Academy in becoming a leader in the PEI cleantech sector and community of practice as they grow and develop.
- Intercultural and multicultural communication need to be part of the programs, given the global imperative on cleantech and GHG reduction
- The program should ensure frequent and rigorous assessment of communications skills for continual improvement given the short duration.

Key Takeaway: Communications and influence are key to current global cleantech efforts and will support all cleantech futures: policy, business, research and leadership

2.3 Interview Conclusion

The 47 key informants provided valuable insights and demonstrated a willingness to collaborate with the institutions on making the programs a success. They also shared their experiences, successes and failures, as well as insights learned from those experiences. They demonstrated a level of consensus not often found among informants and this gives CamProf confidence in encouraging the use of their insights in the development, promotion and implementation of the programs.

We look forward to seeing the results of future collaboration between the institutions and the allies both on the program creation, as well as supporting the growth of program graduates and their start-ups, initiatives and other efforts.

List of Key Informants Interviewed

Informant(s)	Organization
01-Waheed Afzal	University of Aberdeen (UK)
02-Jason Aspin	Aspin Kemp Associates
03-Drew Bernand	Lennox Island
04-Tyson Bradley	PEI Energy Corporation
05-Allan Campbell	Atlantic Canada Aerospace and Defence
06-Brad Colwill	PEI Ministry of Environment, Energy and Climate Action
07-Stefanie Corbett	Innovation PEI
08-Mike Currie	Ameresco
09-Derek Ellis	PEI Ministry of Environment, Energy and Climate Action
10-Aitazaz Farooque	UPEI School of Climate Change and Adaptation
11-Anna Demeo	UPEI Faculty of Sustainable Design Engineering
12-Rory Francis	PEI BioAlliance
13-Greg Gaudet	City of Summerside
14-Christopher Gillis	PEI Executive Council Office
15-Tyler Hamilton	MaRS
16-Scott Harper	Wind Energy Institute of Canada (WEICAN)
17-Phil Hollander	Amsted/Baltimore Aircoil Company
18-Jae-Weon Jeong	Hanyang University (South Korea)
19, 20-Ron Keefe, Katie Arsenault	Island Capital Partners
21-Donald Killorn	PEI Federation of Agriculture
22-Athanasios Kolios	University of Strathclyde (UK)
23, 24-Sandra Lamb, Lynn Adams	Atlantic Canada Opportunities Agency
25-Laurie Loane	PEI Agriculture Sector Council
26-Sheryl MacAuley	Start-up Zone
27-Doug MacDonald	Innovation PEI
28-John MacQuarrie	Cavendish Farms
29-Erin McGrath-Gaudet	PEI Ministry of Economic Growth, Tourism and Culture
30-Andrew Matthews	Fortescue Future Industries (H2)
31-Garrett Mombourquette	Parks Canada
32-Steven Myers	PEI Ministry of Environment, Energy and Climate Action
33-Kevin Neilson	EcoCanada
34, 35-Amber Nicholson, Kristine O'Rielly	Delphi Group
36-Kirk Nicholson	Tourism Association of PEI
37-Atila Novoselac	University of Texas at Austin (USA)
38-Angus Orford	Maritime Electric
39-Brian Oulton	Trucking Sector Council
40-Paul Paterson	Red Rock (Vdot)
41-Francesco Reda	VTT Technical Research Centre (Finland)
42-Michelle Robichaud	Atlantica Centre for Energy
43-Trevor Spinney	Charlottetown Metal Products
44-Dan van der Horst	University of Edinburgh (UK)
45-Roy Vandermaar	Greenfoot
46-Peter Warris	PEI Aquaculture Alliance
47-Tricia Williams	Future Skills Canada

Table 2: List of Key Informants Interviewed

3 WHAT THE WORLD IS DOING

The objective of CamProf's desk research was to assemble a set of data that could be used to:

a) Develop a framework to evaluate the countries, their institutions and the institutions' certificate and/or masters programs to identify those with the most potential to inform the development of the Cleantech Academy
b) Apply the framework to all of these institutions and programs to select those which would receive additional review and investigation
c) Use the results of this additional research to compile program and course characteristics that could then be used with the interviews to identify findings useful to the development of the programs, and
d) Provide recommendations on key topics and courses in conjunction with a comparison to the existing courses available at the two institutions

Figure 3: Desk Research Report

The desk research included research on various related government and sector initiatives in a variety of geographical areas and at multiple levels of government, as well as the involvement of post-secondary institutions in these initiatives and their local labour markets through their program offerings.

3.1 Initiatives and Reports

3.1.1 How were the reports selected and reviewed?

- **International reports** – The key intergovernmental organizations (IGO) leading the net-zero transition were identified and the key reports reviewed. The main challenges and key initiatives were identified and summarized.
- **Regional reports** – The key reports on the federal-level initiatives for clean energy technology were identified and analyzed. Furthermore, relevant research institutes, think tanks, net-zero reports, and the labour market were studied.
- **PEI** – Articles, reports and news of the Cleantech Park were studied, and key initiatives were analyzed.

The full list of documentation reviewed and further information can be found in the Desk Research Report.

3.1.2 International Initiatives

Humans are causing rapid climate change, increasing the usage of oil, gas, and coal in homes, industry, and transportation. Governments and companies are increasingly committing to climate action. Yet significant challenges stand in the way, not least of which is the scale of economic transformation that a net-zero transition would entail and the difficulty of balancing the substantial short-term risks of poorly prepared or uncoordinated action with the longer-term risks of insufficient or delayed action.

Organization	Highlights
United Nations (UN)	United Nations Industrial Development Organization (UNIDO) ● Global Cleantech Innovation Programme (GCIP)

International Energy Agency (IEA)	Clean Energy Transitions Programme (CETP) • IEA's unique energy expertise across all fuels and technologies to accelerate global clean energy transitions, particularly in major emerging economies How Governments Support Clean Energy Start-ups ● Insights from selected approaches around the world
The World Bank	Clean Technology Fund (CTF) ● Designing an Innovative Financing Model for Early-Stage Clean Technology Companies
European Commission	European Institute of Innovation & Technology (EIT) ● EIT Climate Launchpad ● EIT Climate-KIC Accelerator
International Renewable Energy Agency (IRENA)	● World Energy Transitions Outlook: 1.5°C Pathway ● Clean Energy Corridors

Table 3: International Initiatives Summary

3.1.3 Labour Market

Worldwide capital spending on physical assets for energy and land-use systems in the net-zero transition between 2021 and 2050 would amount to about $275 trillion, or $9.2 trillion per year on average, an annual increase of as much as $3.5 trillion from today[3]. The transition could result in a gain of about 200 million and a loss of about 185 million direct and indirect jobs globally by 2050. While the transition would create opportunities, sectors with high-emissions products or operations—which generate about 20 percent of global GDP—would face substantial effects on demand, production costs, and employment.

Between 2015 and 2019, jobs in the environment and clean technology (ECT) sector in Canada increased from 313,250 to 338,695 (average annual growth rate of 2%), making up approximately 1.8% of all jobs in the country[4]. Out of these, the largest chunk (22%) of these jobs was in the utilities sector, predominantly in electric power generation, transmission, and distribution. This was followed by the engineering construction sector with 19% of jobs, the services sector with 15% of jobs, and the manufacturing sector with 12% of jobs[5].

In 2020, environmental and clean technology activity generated 322,972 employee jobs in the Canadian economy, down 5% from the previous year, reflecting the economic difficulties caused by the COVID-19 pandemic[6]. The ECT sector represented almost 2% of all jobs in Canada in 2020. A survey on the

[3] https://www.mckinsey.com/business-functions/sustainability/our-insights/the-net-zero-transition-what-it-would-cost-what-it-could-bring

[4] https://www150.statcan.gc.ca/n1/daily-quotidien/210326/dq210326e-eng.htm

[5] https://doi.org/10.25318/1410002301-eng

[6] https://www150.statcan.gc.ca/n1/daily-quotidien/220428/dq220428f-eng.htm

investment in Canada's Clean Technology Sector[7] suggests investment conditions for cleantech are perceived mainly as being favourable, notably for nuclear power generation and hydrogen, but less so for energy storage and renewable power. Energy companies active in cleantech as well as in oil, gas, pipelines, and electricity tend to regard investment conditions for cleantech more positively than companies involved only in cleantech. The level of investment by surveyed companies is likely to change over the next three years in the industries and jurisdictions.

Recent data indicates PEI labour costs are among the lowest in Canada and more than 60% of the Island workforce has a post-secondary degree or diploma[8].

3.1.4 National Initiatives

Canada is accelerating its transition to net-zero, renewable energy and clean technology. The Canadian Net-Zero Emissions Accountability Act, which became law on June 29, 2021, enshrines in legislation Canada's commitment to achieve net-zero emissions by 2050. The Act ensures transparency and accountability as the government works to deliver on its targets. The country gets 67% of its electricity and 16.3% of its energy supply from renewable sources compared to the world's 13.4% average. The supply of electricity is 82% from non-GHG[9] emitting sources such as hydro, nuclear power, wind, and solar. Canada is also the world's third largest producer of hydroelectricity.

Building on this commitment, in December 2020, the Government of Canada released its comprehensive plan to combat climate change, *A Healthy Environment and a Healthy Economy*. The new climate plan is based on five pillars:

1. Cutting energy waste
2. Making clean transportation and power affordable and accessible
3. Putting a price on carbon pollution
4. Building a clean industrial advantage
5. Adopting nature-based solutions

The Climate Plan[10] includes 64 new policies and programs and $15 billion in investment on top of the Canada Infrastructure Bank's $6 billion in financing for clean infrastructure (Environment and Climate Change Canada, 2020). Leveraging some of this momentum, in July 2021, the federal government committed to the even more ambitious target of cutting Canada's emissions by 40 to 45% of 2005 levels by 2030.

[7] https://www.ivey.uwo.ca/media/3795329/iveyenergycentre_cleantechreport_june232021_final.pdf
[8] https://www.princeedwardisland.ca/en/publication/pei-monthly-labour-force-survey-lfs-report
[9] https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2021/towards-net-zero.html
[10] https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/healthy-environment-healthy-economy.html

Cleantech has been a key focus for Export Development Canada (EDC), which has supported over $20 billion in exports in the rapidly expanding sector over the past decade. For EDC-supported companies, the top five cleantech sectors by customers served in 2021 were:

1. Power Generation
2. Extractive and Industrial Materials
3. Recycling and Recovery
4. Transportation and Sustainable Mobility
5. Energy Efficiency and Green Buildings

3.1.5 PEI Provincial Initiatives

"*Accelerating our transition to a clean, sustainable economy*," Prince Edward Island's 2040 Net Zero Framework, lays out the strategy for achieving the goals and targets required to become Canada's first Net Zero Province. The government of Prince Edward Island aims to develop an industry-led cluster and a destination that attracts and fosters the growth of companies, entrepreneurs, and talent focused on innovations in technologies, processes, and know-how that contribute to clean growth.

Provincial objectives:

- Develop an emerging sector cluster and economic opportunity in cleantech
- Help companies adapt and adopt green technologies and clean energy
- Accelerate PEI's path to net zero greenhouse gas emissions by 2040

Provincial commitments:

- Building a cleantech sector
- Fund for new/existing businesses to invest in clean technology solutions
- Tax-free development zones
- R&D fund to support innovation
- Create talent pool; more than 2000 jobs in PEI in cleantech sector by 2030
- New PEI Cleantech Park
    - PEI Energy Corporation (government)
    - PEI Cleantech Alliance (industry body)
    - PEI Cleantech Academy (academic programming)
    - Collaborative initiative among Government, Industry and Academia

3.2 Current Post-secondary Programs

CamProf developed a rigorous methodology to gather information on post-secondary institutions and programs, based on a series of indices and the results of the initial desk research efforts. This methodology led to the creation of a selection framework as well as an analysis plan, to ensure consistent comparison of institutions and programs. Specifics of the methodology and analysis efforts are provided in the pertinent subsections.

3.2.1 How were the countries selected for program analysis?

The countries to be analyzed were selected based on the Global Cleantech Innovation Index (GCII) and using the Global Energy Innovation Index (GEII). The combined list was then filtered using the following criteria:

1. Countries ranked in the top 20 in the GCII 2017 and GEII 2021 index. The GCII 2021 report emphasizes more on the countries delivering sustainable innovation without sufficient ranking, therefore, the GCII 2017 was used.
2. Excluding countries with a different climate classification from PEI.
3. Countries that are currently known for cleantech innovation were added.

Figure 4: Desk Research Spreadsheet

The full list of analyzed programs details that were analyzed can be found in the accompanying spreadsheet.

The selected countries were: Finland, Denmark, Sweden, United Kingdom, Canada, Norway, Japan, South Korea, United States and Iceland. NetZero programs and start-ups incubated by universities are discussed. Additional criteria for selecting colleges and universities were also agreed:

- Atlantic Canada
- Unique or leading
- A different perspective
- Strong connections to industry

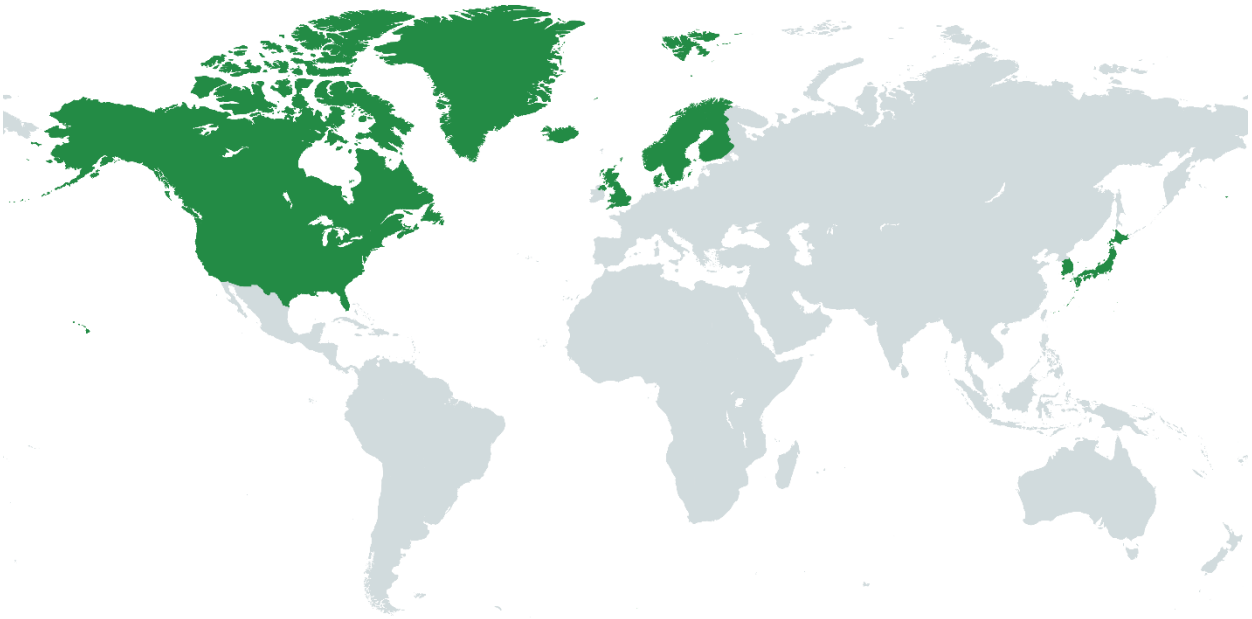


Figure 5 - Countries selected for analysis

3.2.2 Certificate Programs

Thirty-four (34) certificate programs from thirty-two (32) different institutions were identified as relevant for this environmental scan and analyzed. The words used in those program titles are illustrated in Figure 6 as a word cloud. Table 4 provides a summary table of the identified relevant certificate programs classified in terms of country and institution. Those programs related to Leadership are in bold, and programs of high interest are indicated by ⓪.

Figure 6: Certificate program titles word cloud

Country	Institution	Certificate Programs
USA	Stanford University	Energy Innovation and Emerging Technologies Program **Technology Entrepreneurship**
	Yale University	Financing and Deploying Clean Energy Certificate Program ①
	Boston University Metropolitan College	Applied Sustainability Graduate Certificate
	MIT Sloan School of Management	**Sustainability Course**
	Georgia Institute of Technology	Certificate of Sustainable Energy and Environmental Management
	Chicago Booth - The University of Chicago Booth School of Business	**Various Certifications – Entrepreneurship through acquisition program – POLSKY Science Innovation Fellows Program**
	University of Wisconsin-Madison	**Local Government Leadership Academy**
	Harvard Extension School	Sustainability Graduate Certificate
UK	Imperial College Business School	**Imperial Sustainability Leadership Programme ②**
	Institute for Management Development	**Winning Sustainability Strategies**
	Imperial College Business School	Climate Innovation: Accelerating to Net Zero Emissions
	University of Cambridge	**Business Sustainability Management**
	University of Oxford	Sustainability Themes ③
	London Business School	**Sustainability Leadership and Corporate Responsibility**
	Centre for Energy Transition-University of Aberdeen	Various Modules - Renewable Energy Integration to Grid
	Robert Gordon University	Energy Management Energy Transitions and Sustainability
	University of East Anglia	Environmental Studies
Canada	Northern Alberta Institute of Technology	Alternative Energy Technology

	Indigenous Clean Energy Social Enterprise	**The 20/20 Catalysts Program**
	Seneca College	**Sustainable Business Management**
	Humber College	Sustainability Stream
	Conestoga College	Applied Energy Management - Renewable Energy Stream④
	Algonquin College	**Energy Management**
	Dalhousie University	**RBC Sustainability Leadership Certificate**
	University of Prince Edward Island	ClimateSense Training & Professional Development Program
	Nova Scotia Community College	Energy Sustainability Engineering Technology (ESET)
	New Brunswick Community College	**Applied Energy Management**
	Memorial University	**Certificate in Sustainable Rural Communities**
Finland	UniPID	Various- Global Sustainable Development
Iceland	Bifröst University	**Sustainable Leadership in the 21st Century ⑤**
Korea	Pohang University of Science and Technology (POSTECH)	Computer Science & Engineering
	Korea University	**Global Program - Global Leadership Education**

Table 4: Certificate Programs Evaluation Summary (bolded programs are related to Leadership)

Some programs of particularly high interest to our research were selected for the following reasons:

① *Financing and Deploying Clean Energy Certificate Program* at Yale University is a unique programme, designed for working professionals who are passionate about clean energy and want to advance their careers by gaining new skills in finance, technology, and policy, and mitigate climate change.

② *Imperial College Business Schoo*l is among just one per cent of business schools worldwide to have been accredited by the three largest and most influential business school accreditation associations: AACSB, AMBA and EQUIS.

③ *The Smith School of Enterprise and the Environment* is housed in the University of Oxford's School of Geography and the Environment, which is ranked number 1 globally in the QS World University subject rankings. The School aims to bring public and private enterprises together with world-leading research to achieve global net-zero emissions and sustainable development.

④ *Conestoga* is ranked among the top 20 research colleges in Canada. High-impact research is carried out in climate change and renewable technologies[11].

⑤ The *Sustainable Leadership in the 21st Century at Bifröst University* explores emerging leadership ideas and provides practical leadership training. It is designed as an experience-based learning program that includes lectures, a personal journey with self-reflection, group work, and field trips too, followed by a planned after-course activity.

[11] https://www-assets.conestogac.on.ca/documents/www/strategic-plan/conestoga-strategic-plan-2021-24.pdf

3.2.3 Masters Programs

Sixty-six (66) Masters programs from forty-five (45) different institutions were identified and analyzed as relevant for this environmental scan. The words used in those program titles are illustrated in Figure 7 as a word cloud. Furthermore, Table 5 provides a summary table of the identified relevant Masters programs classified in terms of country and institution. Those programs related to Leadership are in bold, and programs of high interest are indicated by ❶.

Figure 7: Masters program titles word cloud

Country	Institution	Masters Programs
USA	Boston University	**MS, Energy & Environment**
	John Hopkins University	**Master of Science in Energy Policy and Climate**
	Georgia Tech	**Master of Sustainable Energy and Environmental Management**
	Harvard Extension School	**Sustainability Graduate Program ❶**
	Chicago Booth - The University of Chicago Booth School of Business	**MBA: Accounting, Economics, Psychology, Sociology, Statistics**
UK	University of Manchester	MSc Renewable Energy and Clean Technology Renewable Energy and Clean Technology with Extended Research (Taught)
	University of Oxford	**MSc in Sustainability, Enterprise and the Environment**
	University of Bath	**MSc Sustainability and Management**
	Keele University	**MSc Environmental Sustainability and Green Technology**
	University of Southampton	Sustainable Energy Technologies
	Institute for Management Development (IMD)	**Master of Science in Sustainable Management and Technology**
	University of Aberdeen	Energy Transition Systems and Technologies, MSc
	University of Strathclyde	Sustainable Engineering: Renewable Energy Systems & the Environment
	Robert Gordon University	MSc Energy Management MSc Energy Transitions and Sustainability MSc Energy Management (with Placement) **MSc Energy Transitions and Sustainability (with Placement)**
	University of East Anglia	MSc Environmental Sciences MSc Applied Ecology and Conservation **MSc Environmental Assessment and Management** **MSc Climate Change** **MSc Climate Change and International Development ❷** **MSc Environment and International Development**

Canada	École de Technologie Supérieure	Renewable Energies and Energy Efficiency
	Carleton University	Sustainable and Renewable Energy Engineering
	University of British Columbia	**Sustainability❸**
	University of Waterloo	**Sustainability Management** **Climate Change**
	Simon Fraser University	Sustainable Energy Engineering
	University of Saskatchewan	**Environment and Sustainability** **Sustainability: Energy Security**
	Queen's University	**Applied Sustainability**
	Cape Breton University	**Master of Education in Sustainability, Creativity and Innovation**
Finland	Häme University of Applied Sciences	Sustainable Technologies
	LUT University	Sustainable ICT Solutions of Tomorrow❹
	Alto University	Advanced Energy Solutions - Energy Conversion Processes
	University of Oulu	Environmental Engineering
	EIT InnoEnergy Master School	Sustainable Energy Systems
	University of Helsinki	**Masters in Environmental Change and Global Sustainability**
	Tampere University of Applied Sciences	Environmental Engineering
Norway	Østfold University College	Master in Green Energy Technology
	University of South-Eastern Norway (USN)	MSc Energy and Environmental Technology
	Western Norway University of Applied Sciences	**Master in Climate Change Management**
Sweden	Malmö University	**MA Leadership for Sustainability**
	Södertörn University	**Leadership for Sustainable Development**
Denmark	Technical University of Denmark	**Master in Sustainable Leadership**
	Copenhagen Business School	**Master of Business Administration**
Iceland	University of Iceland	Environment and Natural Resources
		Environmental Engineering
		Renewable Energy
	Reykjavik University	MSc Sustainable Energy Engineering
Korea	Hallym University	MSc Computer Science **Advanced Management Manager Program (AMP)** **Master of Business Administration (MBA)**
	Korea University	**Global MBA** **Global Masters in Management** **Korea MBA, Executive MBA❺** **Finance MBA** **S3 Asia MBA**

	Korea Advanced Institute of Science & Technology (KAIST)	**Master of Entrepreneurship and Innovation❻**
Japan	Tohoku University	**International Environmental Leadership Program (MSc)** **Graduate Program in Global Governance and Sustainable Development (MSc)**
	The University of Tokyo	**International Technology Management Program in the Department of Technology Management for Innovation (TMI)** **Graduate Program in Sustainability Science – Global Leadership Initiative (GPSS-GLI)**
	Keio University	**MBA❼**

Table 5: Masters Programs Evaluation Summary (bolded programs are related to Leadership)

The programs have been selected for the following reasons:

❶ The *Sustainability Graduate Program at Harvard Extension School* is highly recognized for the online and distance learning courses in sustainability. Harvard Extension School (HES) is the extension school of Harvard University.

❷ The program at *University of East Anglia* has several initiatives driven by the research on climate change, such as UEA Climate, the Norwich Institute of Sustainable Development and the establishment of an Observatory for Climate Recovery. More than 100 patents (spinouts) have been filed for inventions developed from UEA research.

❸ The *Masters in Sustainability* is unique as University of British Columbia is ranked second in Canada overall and 13th globally out of more than 1,115 participating institutions from 94 countries[12], based on its contributions through research, outreach and stewardship. The University of British Columbia has unique programmes in climate and environment.

❹ The *Sustainable ICT Solutions of Tomorrow at LUT University* is arguably the most prestigious university according to the Times Higher Education, and its Impact Rankings rate universities based on how well they promote the UN's Sustainable Development Goals. LUT University ranks ninth in the world in climate action[13].

❺ *Executive MBA at Korea University* is of high interest as the only identified program specifically tailored to company executives, incorporating specific delivery patterns and flexibility to fit busy schedules of their target attendees.

❻ *KAIST Master of Entrepreneurship and Innovation* is of high interest due to several unique elements to promote entrepreneurship, resulting in successful track record of hundreds of start-ups.

❼ *MBA at Keio University* is of high interest due its prestigious membership within international initiatives of leading business schools in the world, e.g. Council on Business and Society, and tradition of international cooperation for the benefit of their students.

[12] https://www.ubc.ca/about/institutional-rankings.html

[13] https://www.timeshighereducation.com/student/best-universities/top-universities-climate-action

3.3 Networks, Accreditation Bodies and Certifications

Currently there are several cleantech networks that act as a platform to promote cleantech initiatives, and various accreditation bodies that aim to ensure that colleges, universities and training providers offer high-quality education, facilities, and a great learning experience for students.

Professional Engineers Ontario is introducing mandatory CPD in January 2023, and this process is expected to be adopted by other professional bodies in Canada. Many chartered institutions worldwide use a similar approach to ensure their members are up to date with the new developments in their area of practice.

The relevant networks and accreditation bodies are:

Networks

- **The International Cleantech Network (ICN)** - is an exclusive network of cleantech clusters in the world's leading cleantech regions, aiming to create value for companies, knowledge institutions, and local governments.
- **Clean Growth Hub** - is Canada's primary source of information, resources, and guidance on federal funding for clean technologies.

Accreditation Bodies and Certifications

- **Institute of Corporate Directors (ICD)** - is the voice of Canadian directors and their boards that offers highly regarded professional development programs that provide value-added director education and learning opportunities.
- **Chartered Managers Canada (CIM)** - provides management certification, accreditation, and professional development with internationally recognized professional designations, Certified in Management (C.I.M.®) and Chartered Manager (C.Mgr®).
- **Project Management Institute (PMI)** - is a leading professional association for project management and the authority for a growing global community of millions of project professionals and individuals who use project management skills.
- **Canadian Society of Association Executives (CSAE)** - offers networking and learning opportunities, both online and in person, including an educational program leading to the Certified Association Executive (CAE®) designation.
- **Engineers Canada** - Canadian Engineering Accreditation Board, CEAB, is responsible for accrediting undergraduate engineering programs and facilitating and fostering working relationships between and among the regulators.
- **Engineering Institute of Canada (EIC)** - accredits/recognizes quality providers of engineering continuing education by assessing their learning development and delivery by either "EIC-accredited CEUs" or "EIC-accredited PDHs". The EIC has a local branch at PEI called Engineers PEI.
- **Renewable Energy Institute (REI)** - promotes best practices and knowledge-sharing in renewable energy and energy efficiency topics by working with leading universities and the United Nations Environment Program (UNEP) to deliver a range of educational opportunities. An internationally recognized Galileo Master Certificate (GMC) is awarded upon successful completion of an REI approved training course, including the Accredited Master in Renewable Energy Award.

- **DNV (Det Norske Veritas)** - an independent accredited certification service that offers accreditation and verifies the certification body/registrar's competence.
- **Continuing Professional Development (CPD)** Certification Service - is intended to maintain a regulated professional's knowledge, skills, competence and professionalism commensurate with safeguarding the public interest concerning the professional's practice activities.
- **National Academy of Engineering (NAE) Grand Challenges Scholars Program** - offers additional certification from a renowned engineering institution for student research that addresses some of the 14 Grand Challenges and meets the 5 declared competencies.

A close link to the International Cleantech Network and Clean Growth Hub (the first two listed above) will act as a source of information about on-going developments in the sector for both programs.

In this desk research, it has been identified that the Galileo Master Certificate (GMC) awarded upon successful completion of a Renewable Energy Institute (REI) approved program can be useful for students from science and engineering backgrounds. Moreover, the Chartered Managers Canada (CIM) and Canadian Society of Association Executives (CSAE) are suitable for students aiming for managerial positions. Therefore, the program's appropriate accreditation body should be determined based on the specific program structure and content.

3.4 Summary of Desk Research

As noted at the beginning of section 3, this material was gathered and organized to be analyzed jointly with the informant interview results to develop findings and recommendations for the desired PEI certificate and masters programs. The information on the individual institutions provided in the Excel spreadsheet can also be used to note program characteristics of many types, which could also provide some insights for decision-making related to the new programs.

The main findings from the desk research are:

F1. It seems easier to raise funds for initial stage innovations in Finland and Sweden compared to UK and USA
F2. Entrepreneurship is not always a formal education process. Many successful entrepreneurs did not study entrepreneurship.
F3. Formal education of start-up founders doesn't necessarily have direct correlation to the idea or start-up
F4. Certificate programs are less than one year in Europe compared to North America where they are greater than one year
F5. Certificates' focus is to enhance practical skills in Europe (e.g. UK) rather than academic skills (e.g. Canada)
F6. Most masters are 2 years in duration
F7. Some countries provide flexible global programs for leaders (e.g. Japan and South Korea)
F8. In some countries, placements are optional (e.g. USA, Japan and South Korea)
F9. Most programs offer a choice of courses except in the UK

4 FINDINGS

In this section, we assemble and analyse the results from the informant interviews and the desk research which combined with the experience of the CamProf team enable us to formulate initial views on key topics concerning design of the new programs.

The findings include key topics and skills, supported by validation using leading global and Canadian skills inventories.

We recognize that a number of internal factors need to be considered by the College and University in their decision-making. We elaborate further in the Recommendations section.

4.1 Keyword Frequency

This section concerns the findings of the most frequent keywords in *program* titles and individual *course* titles *(separately*) of the 32 institutions with certificate programs and 45 institutions with masters' programs in the selected 10 countries.

Figure 8: Certificate program titles – keyword count

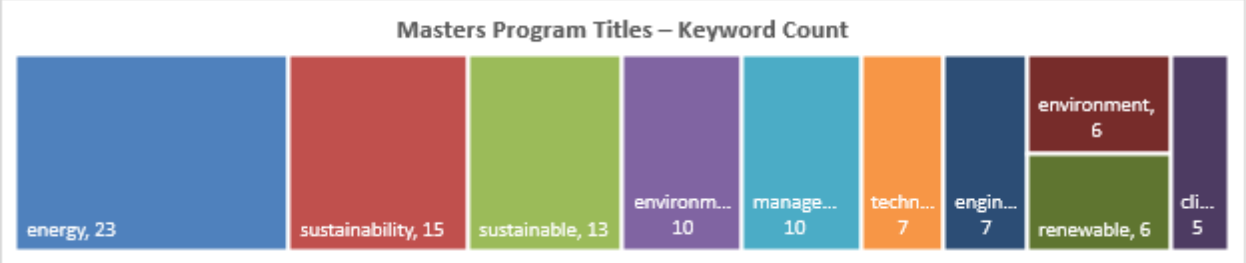


Figure 9: Masters program titles – keyword count

Such keywords indicate or reflect the weight or the importance of that topic in these programs and courses. These words were grouped in two categories, strong points representing keywords with high frequency and the not so strong points for keywords with low frequency (see Table 6). For example, the keyword energy has occurred 10 times in the certificate *program* titles and 23 times in the masters' *program* titles (see charts *above*).

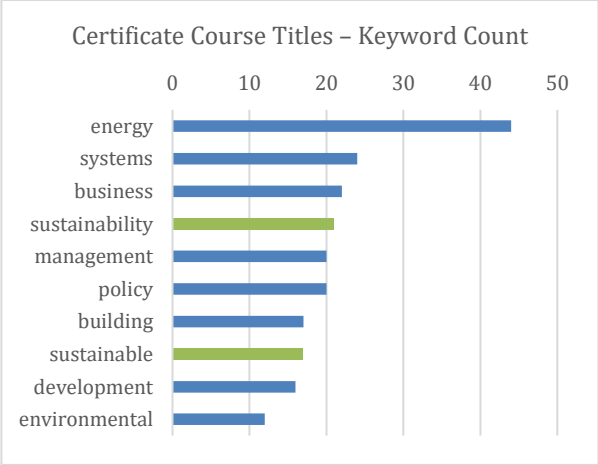


Figure 10: Certificate course titles – keyword count

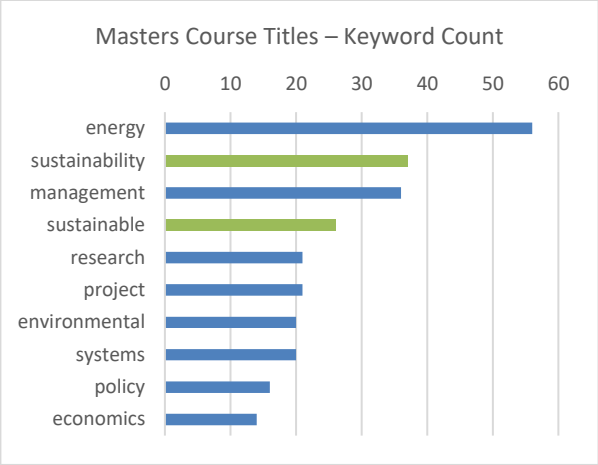


Figure 11: Masters course titles – keyword count

In the *course* titles, energy occurred 44 times in the certificate programs and 56 times in the masters' degree programs. Similarly, the keywords "sustainable" and "sustainability" occurred 13 times in the certificate *program* titles and 28 times in the masters' *program* titles. In the *course* titles, they occurred 38 times in the certificate programs and 63 times in the masters' degree program. The not so strong points mean that the key words scored low count (e.g. climate change) or are mentioned in one program but not in the other (e.g. leadership) or not been mentioned at all (e.g. entrepreneurship, manufacturing).

Strong key words	Not so strong key works
• Energy • Sustainable, sustainability • Engineering, technology • Environmental, environment • Obtaining funding – but for research • Business	• Funding for start-ups • Entrepreneurship • Climate change • Leadership • Marketing, Customer services • Manufacturing

Table 6 – Strong and not so strong points

4.2 Foundational Skills

In addition to the skills-related topics identified in the desk research, many interviewees noted the importance of this topic, although they described it in many ways. There are many models or frameworks in existence, but no generally accepted terminology. Key skills, core skills, essential skills, 21st century skills, non-cognitive competencies, and most commonly "soft skills" are all in use. We are using the term "foundational skills" because it is understood in Canada and is used in the two recent frameworks we discuss below, McKinsey and ESDC.

4.2.1 McKinsey Global Institute

Firstly, we have selected McKinsey Global Institute as a well-known leading international consultancy in business and economics, and because its work is based on very extensive international research (June 2021). McKinsey has identified 56 foundational skills that will help citizens thrive in the future job market.

These have been grouped into four broad skill categories namely: cognitive, interpersonal, self-leadership and digital (see Figure 12).

- Cognitive skills are the core skills your brain uses to think, read, learn and remember.
- Interpersonal skills are the ability to communicate and build relationships with others.
- Self-leadership skills mean recognizing, exercising and improving your own leadership.
- As for digital skills, they are the ability to use digital technologies and software therefore conducting the work effectively.

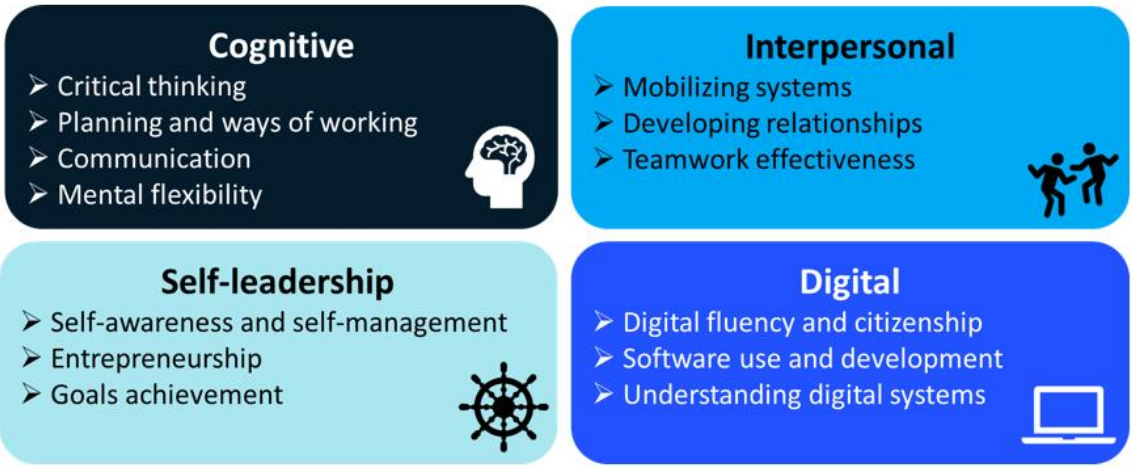


Figure 12: McKinsey Foundational Skills

This framework demonstrates to international learners that the skills taught in the programs would be relevant to their home country.

4.2.2 Employment and Social Development Canada (ESDC)

Even more recently, and again through extensive research, the Government of Canada has identified and validated nine Skills for Success. These skills are a set of foundational and transferable skills needed to participate and thrive in learning, work and life (see Table 7).

Skill	Related Program Content
Adaptability	Experiential learning and internship, project-based learning
Collaboration	Group work, virtual classes and teamwork, leadership, experiential learning and internship
Communication	Leadership, presentations, marketing, communications and persuasion
Creativity/Innovation	Entrepreneurship, leadership, experiential learning and internship, presentations, marketing
Digital	E-learning, virtual classes and teamwork, data analysis, presentations

Numeracy	Statistics, energy calculations, budgets and estimates, financial management
Problem solving	Problem-based learning, experiential learning and Internship,
Reading	Research papers, technical documents, contracts, funding agreements
Writing	Policy work, marketing materials, proposal development, reports

Table 7: ESDC Skills for Success

Similarly, this framework demonstrates to PEI learners as well as those throughout Canada that the skills taught in the programs would be relevant here.

4.2.3 Conclusions

It can be seen that there is strong correlation between the McKinsey skills shown in Figure 12 and the ESDC skills shown in Table 7. For example, the adaptability, collaboration, communications in the ESDC list are in line with the interpersonal skills presented by the McKinsey. Numeracy, problem solving, reading and writing are in line with the cognitive skills in McKinsey while creativity and innovation are in line with the self-leadership. Also, it is clear that digital skills are clearly present in both ESDC and McKinsey foundational skills. Therefore, we conclude that our work has identified the right skills that need to be strengthened in the proposed programs in order to produce graduates with the required skills for success in future jobs. Particularly, the nine skills identified by the ESDC as essential for success should be taken into consideration.

4.3 Experiential Learning

Based on the interviews (see section 2.2.6) and the foundational skills identified by both ESDC and McKinsey, it is clear that experiential learning is essential for achieving the skills necessary for success. In the reviewed programs, it was found that experiential learning was included as optional modules and took many formats such as placements, teamwork, projects and workshops. Although it was perceived that it may be difficult to accommodate such experiences in one-year programs, this may not always be the case since it will depend on the format i.e. long-term placement is difficult but workshops, industrial projects could be accommodated. However, it is recommended that the introduction of mandatory experiential learning activities needs to be considered.

4.4 Employer Engagement

Employer engagement is essential for the successful implementation of experiential learning and it can take many forms:

- Apprenticeships
- Internships
- Scholarships
- Student (and staff) visits to employers
- Case studies
- Materials

- Use of facilities, laboratories
- Student competitions, prizes

Similarly, it is essential to engage the employers to facilitate the experiential learning through any of the following forms:

- Member of academic institution governing body
- Member of departmental program committee
- Curricula panels
- External examiners
- Guest lecturers

4.5 Modes of program delivery

The modes of program delivery can take the following forms:

- Traditional (classrooms, lectures, tutorials and seminars)
- Online (synchronous) as carried out during COVID time
- E-learning (asynchronous)
- Hybrid/ Blended learning

From experience during the COVID-19 lockdowns, it was concluded that the online mode of delivery offers some advantages, therefore this can be exploited in future programs. Also, the hybrid delivery mode seems to be most effective mode of delivery as it allows candidates flexibility to learn in their own time as well as benefiting from traditional face to face teaching. Therefore, hybrid delivery is recommended (Section 6.6), with the proportion of e-learning and traditional depending on circumstances of the particular program, candidates, and staff. Ideally the traditional mode should not be less than 60%, based on our experience.

5 What Holland and UPEI are doing already – Gap Analysis

The gap analysis phase was designed to take preliminary findings from the analysis work and compare them with existing College and University content. By identifying what may be useful in its current state, useful with rework or addition of content, and what requires full development, the College and University can prioritise efforts and allocate time and resources to achieve the most benefit.

We look first at what the College and University are currently offering using information provided, comparing it generally with our findings and analysis. Next, we prepare general notes on the existing content and categorize it in a format that aligns with our recommendations.

This produces a table of proposed program content which when combined with the general notes and grouping of existing content creates a roadmap of student flows through the program, supported by detailed sample program learning outcomes in the Appendix.

We develop many of the points identified here for the Recommendations.

5.1 What Holland College is currently doing

The College has provided data on its existing relevant programs as shown in Table 8:

Existing programs with relevant courses
• Environmental Applied Science Tech • Energy Systems Engineering Tech • Heritage Retrofit Carpentry • Wildlife Conservation Technology • Architectural Technology • Sport and Recreation Management • International Hospitality Management • Tourism and Travel • Culinary Arts • Plumbing, Carpentry, Electrical, HVAC • Automotive Technology • Wind Turbine Technology

Table 8: Existing programs relevant to clean technologies

Also, the College has identified programs that can be repurposed and identified new programs that might be established in the future as shown in Table 9:

Programs that can be repurposed	New programs for consideration
• Business Administration + others • Open Academic Studies • Environmental Applied Science Tech • Energy Systems Engineering Tech • Journalism and Communications	• Environmental Policy • Climate Fundamentals • Social Responsibility • Basics of Sustainability • Awareness of Environmental Impact

• Project Management • Data Analytics	• Environment, Social, Governance

Table 9: Other existing and potential programs

5.2 What UPEI is currently doing

There is a very wide range of courses including Bachelors, Masters, and Doctorate levels. Here are some examples:

- Business
  - Various business modules
  - Strong on finance and accounting
- Education
  - Several leadership courses in education modules
- Climate Sense
  - Workplace – one month
- Science
  - Environmental Studies
  - Applied Climate Change & Adaptation
  - Environmental Science
  - Renewable Energy
  - Advanced Climate Change
  - Canadian Climate Change
- Sustainable Design Engineering

Although many of these courses touch on cleantech, they may need to be adapted to become more suitable for the required program.

5.3 Gap Analysis

It can be seen from the above that there are many courses that relate to cleantech already available at the College and University. But many of these courses are likely to need context change or repurposing. Specifically, we think that some of these courses need strengthening in the following areas:

- Energy
- Start-ups
- Raising capital
- Entrepreneurship
- (Business) Leadership
- Need more experiential learning

Furthermore, the College has suggested the following courses that could be developed:

- Environmental Policy
- Climate Fundamentals
- Social Responsibility

- Basics of Sustainability
- Awareness of Environmental Impact
- Environment, Social, Governance

As previously noted, many of the external programs we analyzed focused on the scientific and engineering knowledge but less so on the public policy, economic, business and societal aspects. Furthermore, any sector specific focus was entirely missing across all the programs we reviewed.

5.4 Proposed program content

The CamProf team reviewed all our research materials in a series of brain-storming discussions during August and September. We were assisted by the workshop discussions with the JWG too. Many ideas were discussed leading to a CamProf consensus view below.

In order to develop a program that fits with the project objectives, it is recommended that three main areas of topics need to be included in the proposed program content. The three areas are energy related components, business components, as well as environmental, social and governance components with details shown in Table 10.

We emphasize that only the fundamentals of energy and related technologies need to be covered, namely the relative advantages, disadvantages, costs and GHG emissions of the main energy sources. Program graduates must be able to understand and communicate such matters to prospective customers and policy makers.

Energy components	
• The main sources of energy for PEI and Canada ➢ Hydro-electric ➢ Nuclear ➢ Coal, oil and gas ➢ Wind ➢ Solar • The main sources of greenhouse gas emission for PEI and Canada ➢ Production of electricity ➢ Agriculture ➢ Transport ➢ Industry ➢ Domestic and other heating	• Emerging technologies ➢ Carbon capture (CCUS) ➢ Hydrogen ➢ Energy storage, e.g., batteries and thermal energy storage ➢ Energy management, e.g., smart and micro-grids ➢ Transformation of energy infrastructure • Decommissioning or re-purposing of existing energy assets • Improved waste management • Conversion of waste into an energy source

Business components	
• Commercial law ➢ Legal entities ➢ Commercial law ➢ Intellectual Property laws ➢ Regulations	• Entrepreneurship • Marketing ➢ Customer communications ➢ Closing a sale ➢ Customer service

➢ Standards • Carbon taxation • Financial literacy ➢ Understanding Accounts: P&L, Balance sheet ➢ Cash flow ➢ Sources of capital	• Project, process, and change management • Communications • Digital skills • Leadership, influencing behaviour • Sector specific content

Environmental, social and governance components	
• Awareness of Environmental Impact • Environmental Policy • Climate Fundamentals	• Social Responsibility • Basics of Sustainability

Table 10: Proposed program content

5.5 How it fits together

Although clearly distinct and at different educational levels, we suggest that there is mutual support if the two programs are presented as a coherent pair with clear differentiation. We show in the Appendix some generic examples of program learning outcomes at both Certificate and Masters levels, using a graphical variant of Bloom's Taxonomy.

The flowchart below shows the flows into and through both programs. It provides a blueprint or roadmap leading to the creation of a program specification. It shows how the overall programs could look based on our recommendations. It may serve as a guide to potential students and program developers.

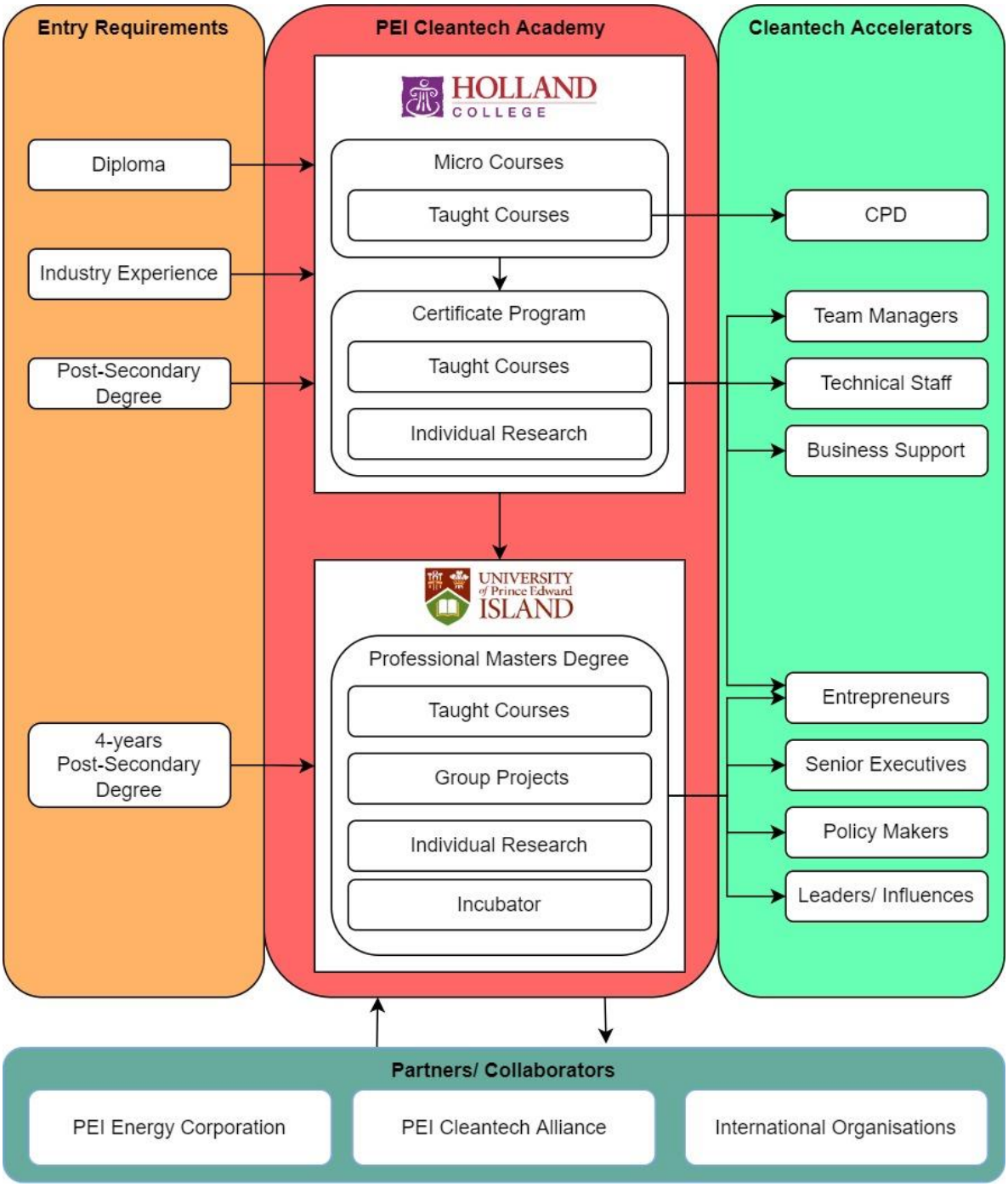


Figure 13 - Program Flowchart

6 RECOMMENDATIONS

Based on the extensive interviews, desk research and analysis of existing academic programs, as well as our experience of university-based energy start-ups, our team has drawn the following 10 recommendations.

6.1 Develop a clear and realistic vision

The very first theme emerging from the informant interviews was the key question: "*What is it*?" To support the development, marketing and recruitment for the programs, we recommend that the College and University adopt and communicate a shared vision for the pair of programs. This needs to appeal to multiple audiences and we propose a vision statement along the lines of these bullets:

- Providing education for leaders and innovators for a new clean growth sector
- Helping PEI to achieve its Net Zero targets
- Helping local industries to adapt and grow
- Serving PEI and Atlantic Canada
- Attracting Canadian and international students too
- Attracting immigrants
- Contributing to the economic and social development of PEI
- Showing the way to others

6.2 Involve employers from the outset

We emphasize employer engagement from the outset. This includes participation in management committees and curricula development, provision of case studies, materials and guest lecturers.

6.3 Include energy, business, and societal content

We have commented earlier that whilst most of the 100 programs we studied are strong on the science and engineering aspects of Net Zero, many are not so strong on the business aspects. Because of the focus on leadership and deployment, we consider it essential that all three components are covered. This too will improve differentiation. We have presented lists of the proposed content at the end of the previous section.

6.4 Include leadership and entrepreneurship

Leadership and entrepreneurship are other differentiating features and clearly vital to the aims of the programs. Despite the difficulties of teaching and learning, we recommend inclusion in both programs.

6.5 Emphasize experiential learning

We emphasize the importance of experiential learning, for example by workplace visits, secondments, project work and team work generally. This was not strong in most of the programs we reviewed, but it was well supported in the interviews.

6.6 Adopt a hybrid mode of delivery

Although traditional classroom lectures have been dominant in the past, practices have been forced to adapt by Covid. Remote learning, both online and offline, has some advantages in cost and convenience. We recommend inclusion of some remote learning, but with a mainly traditional format, at least 60%.

6.7 Focus on relevant sector applications of cleantech

Section 4.1 shows that programs we had analyzed were weak on manufacturing, (thinking originally of the manufacture of energy equipment such as solar panels, batteries, electronics etc). In fact, they are weak on specific sectors generally. This presents a golden opportunity for the program to focus on those economic sectors relevant to PEI, and by extension to rural and coastal areas generally.

CleanTech for ...

- Agriculture
- Food manufacture
- Fisheries
- Tourism
- Aerospace
- Public administration
- Waste management

We suggest that this would give context to the phrase "leadership and deployment", it will help attract industrial partners, it will include business, social and economic aspects, and so may appeal to the Government.

6.8 Seek appropriate accreditation and networking

Recognition of a program by an appropriate authority can improve its attraction to potential students and its perception generally. Affiliating to the National Academy of Engineering (NAE) Grand Challenges Scholars Program and/or Renewable Energy Institute Galileo Master Certification will create the possibility of achieving an additional accreditation and recognition from these institutions. Master's program accreditation is highly dependent on program route and how the delivery contents align to the accrediting institution(s) specifications. Partnerships with external networks can be helpful in exchanging best practices, building influence, and in student exchange. Recommended networks are International Cleantech Network and Clean Growth Hub in Canada.

6.9 Explore Continuing Professional Development certification

Since mandatory CPD is anticipated to be adopted by many professional institutions in the coming years, accredited CPD courses and micro-courses by the CPD Certification Service will be beneficial.

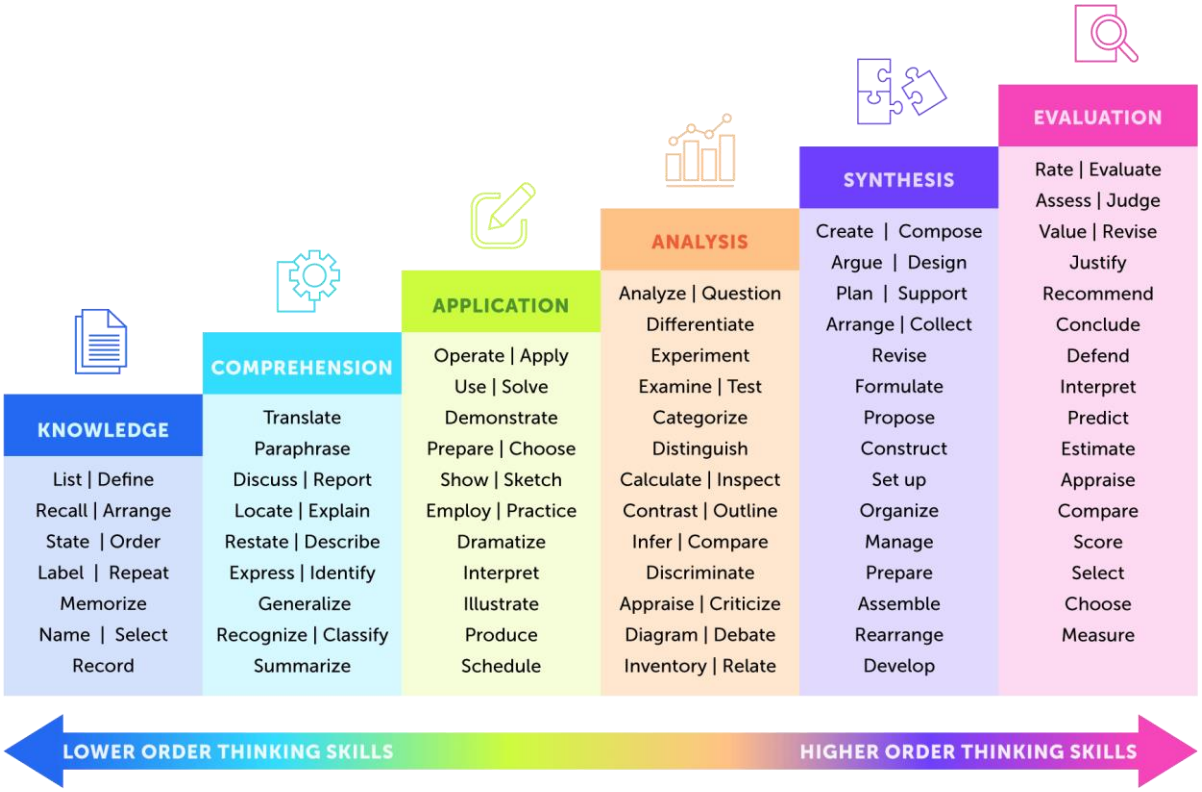
6.10 Clearly articulate an identity, branding, and objectives

Our final recommendation concerns the communication and promotion of the program. It addresses the first interview theme – what is it? (Section 2.2.1) - indicating that there is still uncertainty. The program includes all the fundamentals of cleantech plus the critical business aspects, with strong employer involvement. It will be delivered wherever practical in a "hands-on" manner. It will have many distinguishing, even unique, features, most notably the sector approach.

APPENDIX: GENERIC SAMPLE OF PROGRAM OUTCOMES

1. Graphical presentation of Bloom's Taxonomy

Bloom's Taxonomy is a well-established dictionary of verbs ranked in a series of increasing "levels" of educational objectives. It was first developed in the 1950s by a team of educational psychologists led by Prof Benjamin Bloom. It remains in common use today for defining learning outcomes and in competence and qualifications frameworks generally. We show here a simplified graphical presentation.



2. Certificate Program Sample with Learning Outcomes

Certificate in Leadership in Cleantech Deployment

Core Module: Research Methods and Project

Optional Modules:

Sustainability

- Communication for Effective Energy Management
- Health and Safety Legislation in cleantech
- Introduction to Project Management for cleantech
- Economics of cleantech
- Leadership for the Future

Energy

- Renewable Energy Concepts and Practices

- Energy, Storage and Management
- Grid Design and Management
- Photovoltaic and Wind Off-Grid
- Renewable Technologies
- Technology, Policy and Law
- Low Carbon Transition

Information Technology

- Assets Management and Climate Resiliency
- Geographical Information System and Environmental Analysis
- MATLAB Simulink: Energy Integration
- Technology Transition

Learning Outcomes	
Self-leadership Skills	
SL1	Incorporate personal responsibility in developing professional skills based on feedback and proactive analysis of your performance.
SL2	Manage and plan workload effectively with respect to personal capabilities identified by critical evaluation. Select appropriate methods for specified stages and goals.
SL3	Present and elucidate your own/team work efficiently and convincingly to specified audience types using appropriate tools and presentation skills.
SL4	Cooperate effectively and proactively within a team in various roles and negotiate modifications necessary for the successful progress of the task under consideration. Develop skills to mitigate conflicts and defend team's decisions.
SL5	Participate professionally in complex problem-solving tasks utilizing your knowledge base and experience regarding the key concepts and principles of Computing.
SL6	Evaluate, select and judge the appropriateness and significance of techniques, tools and methods for particular applications and aims.
SL7	Critically analyze and evaluate facts, verify and research information, and conduct an effective communication with clients and/or peers in order to find relevant answers with respect to the situation and context.
SL8	Investigate and critically evaluate resources with respect to their validity and credibility, and assess critically their relevance in the given context.
Cognitive Skills	
CS1	Critically evaluate and justify the appropriateness of software/ hardware components and services for a computer-based system based on the characteristics of its intended use scope.
CS2	Critically evaluate and analyze the extent of compliance of the product with established requirements or business objectives including judgment regarding contradictory user requirements or feedback.
Digital Skills	

DS1	Use efficiently and judge critically the appropriateness of industry-standard algorithms, data structures, patterns, protocols, languages, frameworks, platforms and tools used in the design and development of software applications or computer-based systems.
DS2	Identify, critically evaluate, and effectively apply established software development patterns and/or design methods in order to develop software or computer-based systems in accordance with professional practice.
DS3	Critically evaluate and analyze data related to development tools, techniques or software requirements and draw valid conclusions for your work.
DS4	Analyze, develop and justify methods for solving unfamiliar software or information technology related problems in a cogent and professionally rigorous manner.
Interpersonal Skills	
IS1	Plan and develop efficiently a complex project to deliver a solution complying with initial requirements and scope.
IS2	Evaluate and critically judge your own performance, the appropriateness of selection of methodological patterns and design techniques and time management issues with regard to a developed solution or product.
IS3	Identify and use critically recognized professional practices during problem solving processes, paying appropriate attention to requirements and feedback from communication and/or negotiation with a client.
IS4	Identify, analyze and draw correct conclusions from specified requirements and/or communications with the client.

3. Masters Program Sample

MSc in Leadership in Cleantech Deployment

Courses

Core
Research Project/ Thesis

Options (choose any route)

Leadership
- Managing Innovations
- Science and policy
- Economics for Leaders
- Sustainability and Global Development
- Science, society, and sustainability
- Leadership in Green projects

Technology
- Software design and development
- Green technologies
- ICT solutions aligned with the UN's Sustainable Development Goals
- Data Analytics and Business Modelling
- Digital Transition to Sustainability

Energy
- Energy and climate change
- Statistics and modelling
- Ecological and environmental change
- Theory of environmental Assessment

Sustainability
- Sustainability measurement and management
- Culture and climate change
- Sustainable consumption

➢ Paleoclimatology ➢ Energy management	➢ Sustainable food systems ➢ Critical Analysis of Environmental Systems ➢ Natural resources and environmental economics

Learning Outcomes	
Self-leadership	
SL1	Use personal reflection to analyze own values and behaviours in order to develop as a responsible strategic leader and thinker.
SL2	Integrate new learning and knowledge with prior business and apply to all organizations for prolonged business continuity.
SL3	Be self-directed and able to act autonomously in planning and implementing projects.
SL4	Lead with a strong sense of social responsibility
SL5	Be resilient through periods of uncertainty and change.
SL6	Maximize organizational resources for the benefit of the team, the organization and society.
Cognitive Skills	
CS1	Demonstrate a systematic understanding of the Sustainable innovation concepts
CS2	Demonstrate a critical awareness of the contemporary issues in innovation
CS3	Critically evaluate the rigour and validity of published business and management research to identify new or revised approaches to practice.
CS4	Demonstrate a critical awareness of the appropriate techniques to enable detailed investigation into relevant business and management issues in Innovation
CS5	Plan and conduct research into innovation models
CS6	Critically evaluate the significance of research findings and put forward informed recommendations for improvements in organizational performance.
CS7	Demonstrate a critical awareness of the impact of individual and organizational practices on society, environment and global business dynamics
Digital Skills	
DS1	Collect appropriate information from a range of internal and external data sources and analyze and synthesize this information in order to evaluate decision alternatives.
DS2	Think critically and creatively and make informed decisions based on an appropriate range of data sources.
DS3	Critically evaluate the importance of rapidly changing digital landscape and the impact of the disruptive nature of technology in the innovation management.
Interpersonal Skills	
IS1	Identify appropriate communication options to effectively communicate to a range of organizational stakeholders.

IS2	Be adaptable and demonstrate originality, insight and reflective abilities to problem solve and make decisions in complex and unpredictable situations.
IS3	Be proactive in recognizing the need for change and be able to lead change effectively understanding the impact of change on individuals, the team and the organization.

Appendix B – Curriculum Working Group Biographies

Appendix B – Curriculum Working Group Biographies and Publications

Curriculum Working Group Biographies and Publications (if applicable)

Patrick Augustine, Assistant Professor: Faculty of Indigenous Knowledge, Education, Research, and Applied Studies; Faculty of Science, School of Climate Change and Adaptation

Biography

Assistant Professor (Elder)

PhD (Carleton)

I am Mikmaw from Elsipogtog First Nation. My doctoral research was on the dispossession of the Mi'kmaq from their traditional district of Sikniktuk, often called Chignecto. I wrote about my First Nation's relationship to their traditional lands as a determinant of health. My maternal ancestry – Simon, Levi, and Augustine Families – are from the Sikniktuk district in Southeastern New Brunswick. My paternal ancestry – Augustine, Thomas, Bernard, and Paul Families – are also from the Sikniktuk and Epikwitk aq Piktuk districts of Prince Edward Island and the Northern Shore of Nova Scotia.

My academic research centers on the supplementary texts to treaty negotiations examining the spirit and intent of the Maritime Treaties between the Wabanaki and the British Crown.

Recent Publications

- Reporting evidence on the environmental and health impacts of climate change on Indigenous Peoples of Atlantic Canada: A systematic review. *Environmental Research: Climate, 2023*

Pamela Courtenay-Hall, Associate Professor: Faculty of Arts, Philosophy

Biography

Chair, Philosophy; Associate Professor; Teaching Associate in Environmental Studies

BA, BEd, MA (Windsor); MA (Notre Dame); PhD (Toronto)

Pamela began her university studies in Mechanical Engineering and teaching career 40 years ago as a math and physics teacher. Before coming to PEI, she taught environmental education and philosophy of education as a tenured professor at UBC (1992-2002). Her research is focused on identifying the cultural roots and present state of the interrelated problems of environmental degradation, social inequality, and community decline … and the educational and social-economic policy reforms that can help ameliorate these problems.

Recent Publication

- The role of philosophy in a climate-changing world. *Environmental Studies Association of Canada (ESAC), 2020*
- "Collaborative teaching of UPEI's first "Indigenous philosophies" course with Indigenous co-instructors and guest lecturers. *Western Canadian Philosophy Association, 2019*
- Whose Land? The pedagogical power and philosophical limits of "connecting to nature." *Canadian Philosophy Association (CPA), 2019*
- Connecting to whose nature? The synergies and tensions in settler education and environmental education. *Canadian Society for Environmental Philosophy (CSEP), 2019*
- Can interdisciplinarity be taught? Reflections from environmental studies. *International Federation of National Teaching Fellows (IFNTF) World Summit 2018, 2018*

Appendix B – Curriculum Working Group Biographies and Publications

Don Desserud, Professor: Faculty of Arts, Department of Political Science

Biography

Acting Chair, Political Science; Professor

BA, MA (Dalhousie); MA (UNB); PhD (Western)

Prior to coming to UPEI as Dean of Arts in 2011, Dr. Desserud was an associate dean of Graduate Studies at UNBSJ. He is currently a professor in UPEI's political science department.

Originally from Bathurst, New Brunswick, Dr. Desserud has a BA and MA from Dalhousie University and a PhD in Political Science from the University of Western Ontario. He also has an MA in English and Creative Writing from UNB. His research interests include parliaments and legislative assemblies. He frequently comments on political issues in local and national media.

Recent Publication

- 'He shall be resident in the Province': The Senate residency requirement and the Canadian constitution. *Journal of Parliamentary and Political Law, 2017*
- Is it still simple, secure, and reasonably quick? *Informed citizens' guide to elections, 2016*
- The 2015 provincial election in Prince Edward Island. *Canadian Political Science Review, 2016*
- The political economy of New Brunswick. *Transforming provincial politics: The political economy of Canada's provinces and territories in the Neoliberal Era, 2015*
- The New Brunswick general election of September 22, 2014. *The informed citizens' guide to elections: Electioneering based on the rule of law / Le guide du citoyen averti aux élections: Faire campagne selon la règle de droit, 2015*

Reuben Domike, Associate Professor: Faculty of Business

Biography

Associate Professor

Dr. Reuben Domike is an Associate Professor in the Faculty of Business at the University of Prince Edward Island (UPEI). He teaches entrepreneurship/innovation and operations management and is the business case competition team coach. Prior to re-joining UPEI in 2022, Reuben was a Teaching Professor of Technology and Information Management (T.I.M.) at the University of California Santa Cruz (UCSC). He holds a PhD in Chemical Engineering Practice (joint engineering and management) from the Massachusetts Institute of Technology (MIT), which he was awarded in 2004, and an MBA from the Sloan School of Management at MIT. Before joining UCSC, he was an associate professor at Brigham Young University and an associate professor at the University of Prince Edward Island (UPEI) in the Faculty of Business, where he was the founding director of the university-wide Hostetter Centre for Enterprise and Entrepreneurship. Prior to joining UPEI in 2009, Dr. Domike was the founding director of a university-wide Center for Entrepreneurship at the College of Wooster in Ohio (funded by the Ewing Marion Kauffman Foundation).

Over the past twenty years, Dr. Domike has been involved in developing start-up companies in software, management consulting, industrial water filters, and essential oil extraction. He has worked with dozens of small businesses and aspiring entrepreneurs at PEI to advance their plans and operations. His current research activities are primarily in collaboration with the US Food and Drug Administration (FDA) and the Center for Biomedical Innovation (CBI) in the MIT Engineering Systems Division, focused on quantitative assessment of new pharmaceutical products and manufacturing technologies.

Recent Publication

- MIT CAACB risk assessment case study: Assessing virus cross-contamination risk between two simultaneous processes in an open biomanufacturing facility. *PDA Journal of Pharmaceutical Science and Technology, 2022*
- Analysis of a closed-loop digital twin using discrete event simulation. *The International Journal of Advanced Manufacturing Technology, 2022*
- Atlantic Canada entrepreneurs' information-seeking connections. *Atlantic Schools of Business Annual Meeting, 2022*
- A comparison of egg white and egg yolk in gluten-free bread. *Food Chemistry Advances, 2022*
- 21st century quality at sun pharma: Analytical methods. *International Forum for Process Analysis & Control Annual Meeting, 2022*

Kuljeet Grewal, Assistant Professor: Faculty of Sustainable Design Engineering; Faculty of Science, School of Climate Change and Adaptation

Biography

Assistant Professor

BEng (Mech Eng.), MEng (Thermal Eng.) (Thapar Institute of Engineering and Technology (TIET), India); PhD (Indian Institute of Technology (IIT) Ropar, India)

Dr. Kuljeet S. Grewal is currently working as an Assistant Professor in the Faculty of Sustainable Design Engineering at the University of Prince Edward Island (UPEI). Before joining UPEI, he worked as an Instructor and Postdoctoral Researcher at the School of Architecture, Planning, and Landscape (SAPL), University of Calgary, from 2018 to 2021. Dr. Grewal graduated from Thapar Institute of Engineering and Technology (TIET), India (B.Eng. Mech Eng. – 2010 and M.Eng. Thermal Eng. – 2014). In 2018, he earned his Doctorate from the Indian Institute of Technology (IIT) Ropar, India, in Mechanical Engineering (Thermo-Fluids).

Currently, his transdisciplinary research focus is on sustainable neighborhoods and energy design, which also involves planning clean energy resources. Upon joining UPEI in September 2021, he established Future Urban Energy Lab for Sustainability (FUEL-S). The area of work involves energy-efficient urban design and energy resources, including their planning and optimization, promoting long-term sustainability, and technological, economic, and environmental adaption. The scope of work varies from the energy modeling of buildings/neighborhoods and energy resources to establishing their optimal planning and operational methodologies yielding sustainability, fuel-stream diversification, GHG emission mitigation, and economic benefits.

Dr. Grewal is contributing as a Design Expert in Task 63: Solar Neighborhood Planning of the International Energy Agency (IEA). He is also acting as Guest Editor for two special issues on Advances in Energy-Efficient Buildings and Clean Energy Systems in Energies Journal. To date, he has several highly reputed peer-reviewed journal and conference articles.

Recent Publication

- Techno-economic-environmental analysis of tri-generation system in vertical farm applications. *Annual General Meeting of Canadian Society for Bioengineering (CSBE-SCGAB), 2022*
- Precision irrigation scheduling for the major crops of Prince Edward Island, Canada. *Annual General Meeting of Canadian Society for Bioengineering (CSBE-SCGAB), 2022*
- Energy systems and energy sharing in traditional and sustainable archetypes of urban developments. *Sustainability, 2022*
- Optimization of energy resources in various building cluster archetypes. *Renewable and Sustainable Energy Reviews, 2022*

- Novel methodology of urban energy simulations integrating open-source platforms. *Energy and Buildings, 2022*

Andrew Halliday, Sessional Instructor: Faculty of Arts, Institute of Island Studies

Biography

Andrew Halliday is the Director of Policy and Planning for the Prince Edward Island (PEI) Energy Corporation, a crown utility of the Government of Prince Edward Island aligned with the provincial Department of Environment, Energy and Climate Action. He brings extensive experience in public policy, government affairs and research at both the national level with the Government of Canada, and the provincial level with the Government of PEI and Government of Alberta, together with provincial legislative affairs experience in both provinces. Andrew is a native Prince Edward Islander and alongside his civil service responsibilities he lectures in UPEI's master's program in Island Studies. He is also in the midst of completing his doctorate in interdisciplinary studies from the University of New Brunswick where his research focuses on island constructs and policymaking during the covid pandemic. He is a member of the Canadian Political Science Association, the International Small Islands Studies Association and is past chair of the PEI Policy Hackathon.

Recent Publication

Book Chapters

Halliday, A. "Sustainable Blue Economy and International Cooperation in Island Countries and Regions – a focus on financing"; In J. Telesford (Ed.) Annual Report on Global Islands 2022. Islands Economic Cooperation Forum, Island Studies Press/Foreign Affairs Office of Hainan Province, P.R. China. 2023.

Brinklow, L, Campbell, L, Halliday, A & MacDougall, I. "Beyond 'The Atlantic Bubble': Considering archipelagic tourism on Canada's east coast"; In G. Baldacchino (Ed.). Archipelagic Tourism, Second Edition. (forthcoming)

Journal Articles

Halliday, A. "The Disease Dilemma: Neoclassical realism and Palau's border policy governance challenges during the COVID-19 pandemic." Small States & Territories. Vol 7(2), November 2024. (forthcoming)

Desserud, D., Halliday, A., Collins, J. "The 2023 Provincial Election in Prince Edward Island." (submitted to *Canadian Political Science Review*)

Book Reviews

Halliday, A. "Pandemics, Disasters, Sustainability, Tourism: An Examination of Impact on and Resilience in Caribbean Small Island Developing States" edited by Bethell-Bennett, I., Rolle, S., Minnis, J. & Okumus, F., reviewed in *International Journal of Island Research*, Vol. 4: Iss. 1, Article 3. https://doi.org/10.21427/CDY3-6T28. October 2023.

Halliday, A. "The Challenges of Island Studies" edited by Ayano Ginoza, reviewed in *Island Studies Journal*, Vol 18, May 2023.

Halliday, A. "Geography of Small Islands, outposts of globalisation" by Beate Ratter, reviewed in *Small States and Territories Journal*, Vol 5, No. 1, May 2022.

Web-Based Publications
Halliday, A. "The Vanishing Island: covid-islands, covid-archipelagos and the experience of Canada's 'Atlantic Bubble'." Regional Studies Association. RSA Blog. August 2022

Justin Kakeu, Associate Professor: Faculty of Arts, Department of Economics

Biography

Associate Professor

BMath, Masters in Applied Mathematics and Mechanics (Cameroon); Masters in Statistics and Economics (Ivory Coast); PhD (Montreal)

Dr. Justin Johnson Kakeu is an Associate Professor of Economics at the University of Prince Edward Island (UPEI) in Canada. He holds a Ph.D. in Economics from the University of Montreal (Canada), a master's in Statistics and Economics, and a master's in Applied Mathematics and Mechanics. Before joining the University of Prince Edward Island, he taught at the Georgia Institute of Technology and Morehouse College in the USA.

His research interests include Energy and Environmental Economics, Dynamic Macroeconomics, Sustainable Finance and Investing, Uncertainty in Resources, and Climate Change Policies.

He has published papers in Energy Economics, the B.E. Journal of Macroeconomics, Environmental and Resource Economics, The Journal of Sustainable Finance & Investment, Dynamic Games and Applications, the Handbook of Energy Finance, Theoretical Economics Letters, etc.

From a technical point of view, his research uses various economic and econometric techniques, including dynamic programming, deterministic and stochastic control, dynamic structural econometric models, reduced-form econometrics, differential games, Bayesian Games, and dynamic factor analysis. He enjoys working on projects that are technically sound, innovative, and challenging and that are of interest to academics, business practitioners, and policy-makers. While using cutting-edge techniques, he also provides policy-making recommendations through user-friendly written economic analysis outputs for a broader audience.

His work has been presented at several national and international venues including Stanford University, Georgia Institute of Technology, New York University, Goethe University, the Federal Reserve Bank, the World Congress of Environmental and Resource Economists, the American Economic Association Conference (AEA), the Canadian Economics Association (CEA), the International Symposium on Energy and Finance Issues, the Montréal Natural Resources and Environmental Economics Workshop, the Conference on Behavioral Aspects of Macroeconomics and Finance, the Southern Economic Association (SEA) Conference, the Western Economic International Conference (WEAI), the Canadian Resource and Environmental Economics Conference, the International Atlantic Economic Conference, the CU Environmental and Resource Economics Workshop, the AERE Summer Conference, etc.

Recent Publication

- Estimating sentiment and risk in a consumption model: a factor analysis approach. *Macroeconomic Dynamics, 2023*
- The forest behind the tree: Heterogeneity in how the U.S. Governor's Party affects black workers. *The Review of Black Political Economy, 2022*

- Comparing non-renewable resources stocks and capital goods. *The Oxford Handbook of Economy of Cameroon, 2022*
- International transfer to reduce global inequality and transboundary pollution. *Energy Economics, 2022*
- Concerns for long-run risks and natural resource policy. *Environmental and Resource Economics, 2022*

Joel MacDonald, Instructional Designer: Teaching and Learning Centre

Biography

Joel has been involved in the world of instruction for over 30 years. His specialties and interests include online course design/re-design, faculty training and development, interactive content design, and ecological dynamics theory applied to teaching and learning. Joel has a Bachelor of Human Kinetics Degree and a Bachelor of Education Degree from the University of New Brunswick, a Master of Coaching Sciences Degree from the University of British Columbia and a Certificate in Adult Education and Instructional Design from St. Francis Xavier University.

In addition to his work as an instructional designer at UPEI, Joel has taught both at the public school and college level, worked in youth soccer as a coach and technical director, and has facilitated hundreds of sports coaching courses and workshops.

Courtney Matthews, Systems Librarian: Robertson Library, Digital Initiatives and Systems

Biography

Matthews holds an American Library Association certified Master of Library and Information Studies from Dalhousie University.

He has 14 years of experience working in academic libraries in Canada and the United States. His work has been on the development, operation, and communication of open source technologies and their related tools and services to librarians, researchers, and students. This work has also included advocating for the integral role of academic libraries and librarians as crucial actors in the research data and scholarly communication life-cycles.

Nicholas Mercer, Assistant Professor: Faculty of Arts, Institute of Island Studies; Faculty of Science, Environmental Studies

Biography

Assistant Professor

PhD (Waterloo)

Nicholas (Nick) Mercer is an Assistant Professor in Island Studies and Environmental Studies at the University of Prince Edward Island. Nick holds a PhD (Geography) from the University of Waterloo, as well as a Master of Arts (Environmental Policy) and Bachelor of Arts (Environmental Studies), from Grenfell Campus: Memorial University. Research areas include supporting energy sovereignty, resilience and local priorities via community-based participatory action research, A settler researcher, Nick is interested in equitable, participatory, and diverse energy transitions.

Appendix B – Curriculum Working Group Biographies and Publications

Yuliya Rashchupkina, Assistant Professor: Faculty of Arts, Department of Political Science; Faculty of Science, School of Climate Change and Adaptation

Biography

Assistant Professor (Political Science Department and the School of Climate Change and Adaptation)

BA (Ukraine); MA (Nebraska at Omaha); PhD (Massachusetts)

She received her PhD in Global Governance and Human Security from the University of Massachusetts Boston (USA). Her scholarly work focuses on different aspects of the political economy of decarbonization, climate change and environmental governance, global governance, international security, and international liberal order. She published numerous articles in various international peer-reviewed journals (e.g., American Journal of International Law, Peace, and Change: A Journal of Peace Research, Canadian Foreign Policy Journal, Studia Polityczne, Palgrave Communications, and Contemporary Politics) and presented scientific papers worldwide. She has significant teaching experience from several universities, including Babson College, the University of Massachusetts Boston, and Suffolk University.

Recent Publication

Canadian foreign politics: is there any chance of making headway in preserving the liberal international order? *Canadian Foreign Policy Journal, 2022*

Separatism and Jihadism: Interaction in the context of terrorist activity. *Studia Polityczne, 2022*

Scaling-up peacebuilding and social justice work: A conceptual model. *Peace & Change, 2019*

European Union's role in networks on removal of fossil fuel subsidies and disclosure of climate change information. *European Union's Engagement with Transnational Policy Networks, 2018*

Public goods, common pool resources, and international law. *American Journal of International Law, 2017*

Tina Saksida, Associate Professor: Faculty of Business

Biography

Associate Professor of Management

BSc (Hons), PhD (Toronto)

Dr. Tina Saksida is an Associate Professor of Management at the UPEI Faculty of Business. She obtained her Honors Bachelor of Science (Psychology) and Ph.D. (Industrial Relations and Human Resources) from the University of Toronto. Her research interests include gender and leadership, age and generational diversity at work, gender representation in business education, digitalization of work, and management in the non-profit sector; her work has appeared in such outlets as Applied Psychology: An International Review, the British Journal of Industrial Relations, Human Resource Management, and the International Journal of Human Resource Management. At UPEI, Dr. Saksida primarily teaches courses in research methods, evidence-based management, and negotiation at the undergraduate and MBA levels.

Recent Publication

- Practice what you preach. *Industrial Relations: A Journal of Economy and Society, 2021*
- Applications of an evidence-based approach to case competition. *Canadian Psychological Association 80th Annual Convention, Halifax, NS, 31 May-2 June 2019, 2019*

- Hero or villain? A time-lag study of how Millennials' attitudes towards unions compare to those of previous generations. *79th Annual Meeting of the Academy of Management, Boston, MA, 9-13 August 2019, 2019*
- Skill development in reverse mentoring: Motivational processes of mentors and learners. *Human Resource Management, 2018*
- Practice what you preach: Gender (in)equality in labor union leadership. *55th Annual Conference of the Canadian Industrial Relations Association, Montreal, QC, 2-4 May 2018, 2018*

Marva Sweeney-Nixon, Associate Vice President of Research and Dean of Graduate Studies

Biography

Associate Vice-President (Research) and Dean of Graduate Studies; Professor

BSc (Mount Allison); MSc, PhD (Dalhousie)

Dr. Sweeney-Nixon joined UPEI in 1997 and is currently a Professor of Biology. She served as Department Chair of Biology from 2012 to 2019. As Chair, she led the Department's strategic plan, development of new programs (Biotechnology, Paramedicine), and a seven-year MPHEC Quality Assurance review of academic programs in Biology. In 2011, she received the UPEI Hessian Merit Award for Excellence in Teaching. From 2005 to 2008, she held the Jeanne and J.-Louis Lévesque Research Professorship in Nutrisciences and Health.

Her research interests include cardiovascular and neurodegenerative diseases, antioxidants, and diabetes, including over 50 journal articles and book chapters in these fields, with over $1.8 million of research funding. Dr. Sweeney-Nixon has contributed to supervising eight MSc students and seven Research Assistants and has served on numerous other MSc and PhD supervisory committees.

Recent Publication

- The effect of berry consumption on oxidative stress Biomarkers. *antioxidants, 2023*
- The effects of berry polyphenols on the gut microbiota and blood pressure. *Nutrients, 2022*
- Blueberry consumption improves glycemic control, triglycerides, and liver enzymes in US veterans with type 2 diabetes. *Current Developments in Nutrition, 2019*
- Postprandial effects of blueberry (Vaccinium angustifolium) consumption on glucose metabolism, gastrointestinal hormone response, and perceived appetite in healthy adults: A randomized, placebo-controlled crossover trial. *Nutrients, 2019*
- The effects of 100% wild blueberry (Vaccinium angustifolium) juice consumption on cardiometablic biomarkers. *BMC Nutrition, 2017*

Charlene Vanleeuwen, Manager, Teaching and Learning Centre: Sessional Lecturer / Faculty Member, Faculty of Education

Biography

Sessional Lecturer; Program Coordinator of the Teaching and Learning Centre

BASc (Guelph); BEd (Ottawa); MEd, PhD (UPEI)

Charlene VanLeeuwen obtained her Bachelor of Applied Science from the University of Guelph. She has also completed education degrees from the University of Ottawa (BEd) and the University of Prince Edward Island (MEd) and her PhD, which is also from UPEI. Her experience as an undergraduate student in a Family Studies Co-op program stands her in good stead in her work as a Field Placement Coordinator. In

this capacity, she arranges and supports the third- and fourth-year field placements for students in the Family Science and Child and Family Studies programs. She has been a Certified Family Life Educator through the National Council on Family Relations since 2008. She teaches a variety of family science courses online and in-person classes, including Dynamics of Family Living, Professional Practice with Children and Families, and Field Placement I and II. Her current research interests involve: 1) collaboration with colleagues in Canada and Kenya, where they are looking at evidence-based approaches to enhance student preparation for field placement experiences, and 2) the scholarship of online teaching and learning (SoTL) in Family Science. Charlene is an active member of the Family Science Association and is presently serving the association as the website manager.

Recent Publication

- High turnover in clinical dietetics. *BMC Health Services Research, 2021*
- High turnover in clinical dietetics. *Food & Nutrition Conference & Expo - FNCE, 2020*
- Understanding the context of community-based learning in Kenya. *International Journal of Research on Service-Learning and Community Engagement, 2020*
- Critical pedagogy of discomfort in community-based learning: Kenyan students' experiences. *Comparative and International Education = Éducation Comparee et Internationale, 2019*
- Expectations of Field Supervisors in Kenya. *Gateways, 2018*

Appendix C – Program Name Research

Program Title Name Results Summary and Analysis
April 2024

Program Title Options of Randomized Survey:

Master's of...

- Leadership in Cleantech and Sustainability (CS)
- Leadership in Cleantech Transformation (Transform)
- Leadership in Cleantech and Environmental Justice (EJ)

Summary of Participants:

Total Ps analyzed = 272

Gender breakdown:

- 103 men
- 162 women
- 4 nonbinary
- 1 please specify (no elaboration)
- 2 missing

University program breakdown:

- 85 Business
- 47 Arts
- 14 Education
- 29 Nursing
- 29 Science
- 16 FSDE
- 7 Veterinary medicine
- 14 computer science
- 23 graduate studies
- 6 other
- 2 missing

Summary of Results:

- All three names are generally quite favorable on a 1–7-point scale (higher scores are more favorable). However, **Leadership in Cleantech and Environmental Justice** received the highest overall quality perceptions, favorable attitudes, and evaluation means scores.
- All names received consistent mean scores regarding perceived job advantages and perceptions of acquired skill sets. **Leadership in Cleantech Transformation** edged out the highest mean scores overall on these measures.

- **Leadership in Cleantech Transformation** evoked the greatest behavioral intentions to follow up (significant intentions to request a flyer and consider registering).
- **Leadership in Cleantech Transformation** and **Leadership in Cleantech and Environmental Justice** were significantly more memorable than Leadership in Cleantech and Sustainability, but they are not significantly more memorable than each other. Based on the means, **Leadership in Cleantech and Environmental Justice** is the most memorable.
- **Leadership in Cleantech Transformation** gives a significantly greater impression of being an interdisciplinary program than the other two program names ($F(2, 269) = 3.487$, $p = .032$).
- Regarding if results were skewed due to a higher number of respondents in Business, Arts, Nursing, and Science, there was a marginal interaction on Overall Evaluation/Impression ($F(17, 241) = 1.65$, $p = .054$), and a significant interaction on Memorableness ($F(17, 241) = 1.76$, $p = .035$). **The significant interaction means that Department affects the Memorableness of the brand name, but only in Business** ($F(2, 241) = 4.43$, $p = .013$), **Arts** ($F(2, 241) = 11.32$, $p < .001$), and **Nursing** ($F(2, 241) = 3.81$, $p = .024$).

Overall, all three program names are viable, and an argument can be made for each. Should we move forward with the title of Master's of Leadership in Cleantech and Sustainability, we can use the information gathered in this survey for our marketing strategy with students and ensure that we communicate that it is: 1) an interdisciplinary program; and 2) a science or engineering background is not needed (though we also want to ensure that we do not exclude students who are already in these fields of study). Below are the mean charts and additional comments.

MEAN CHARTS:

PERCEIVED QUALITY OF PROGRAM NAMES

Descriptive Statistics

Dependent Variable: Quality_comp

Name	Mean	Std. Deviation	N
CS	4.7748	1.41118	85
EJ	4.9650	1.26402	98
Transform	4.9077	1.26252	89
Total	4.8868	1.30883	272

No significant difference on perceived quality ($F(2, 269) = .496$, $p = .610$). Consistent quality perceptions. Based on the means, Environmental Justice is highest quality.

OVERALL EVALUATION/IMPRESSION BASED ON PROGRAM NAMES

Descriptive Statistics

Dependent Variable: eval

Name	Mean	Std. Deviation	N
CS	4.1815	1.47582	85
EJ	4.5306	1.38064	98
Transform	4.4853	1.29623	89
Total	4.4067	1.38798	272

No significant difference on evaluation (F(2, 269) = 1.66, p = .192). Based on the means, Environmental Justice receives best evaluation.

ATTITUDES TOWARDS PROGRAM NAMES

Descriptive Statistics

Dependent Variable: att

Name	Mean	Std. Deviation	N
CS	4.4471	1.72779	85
EJ	4.8418	1.40846	98
Transform	4.7135	1.49267	89
Total	4.6765	1.54458	272

No significant difference on attitudes (F(2, 269) = 1.53, p = .218). Based on the means, Environmental Justice receives most favorable attitudes.

PERCEIVED JOB ADVANTAGES AND SKILLS AQUIRED POST-GRADUATION BASED PROGRAM NAMES

Descriptive Statistics

Dependent Variable: Job_advantage_comp

Name	Mean	Std. Deviation	N
CS	4.5318	1.29488	85
EJ	4.5755	1.25781	98
Transform	4.5978	1.25426	89
Total	4.5691	1.26395	272

Descriptive Statistics

Dependent Variable: Skills_advantage_comp

Name	Mean	Std. Deviation	N
CS	4.9271	1.21414	85
EJ	5.0306	1.16277	98
Transform	5.0449	1.19002	89
Total	5.0029	1.18465	272

No significant difference on perceived job advantages. Names evoke consistent perceptions on marketability after graduation. ($F(2, 269) = .061$, $p = .941$). The same is true on perceived skills advantages. Names evoke consistent perceptions of acquired skill-set ($F(2, 269) = .256$, $p = .775$).

INTENTIONS TO TAKE ACTION AND APPLY BASED ON PROGRAM NAMES

Descriptive Statistics

Dependent Variable: Beh_intensions

Name	Mean	Std. Deviation	N
CS	4.0608	1.73279	85
EJ	4.2585	1.42151	98
Transform	4.4345	1.50538	89
Total	4.2543	1.55314	272

No significant difference on Behavioural intentions ($F(2, 269) = 1.261$, $p = .285$). Based on the means, transformation receives the most likely behavioural follow-through.

MEMORABILITY OF PROGRAM NAMES

Descriptive Statistics

Dependent Variable: Memorable

Name	Mean	Std. Deviation	N
CS	3.8857	1.16158	85
EJ	4.3644	1.06196	98
Transform	4.5217	.93730	89
Total	4.2663	1.08512	272

There is a significant difference on memorability ($F(2, 269) = 8.544$, $p < .001$).

A breakdown of the means suggest that Transform and EJ are more memorable than CS, but they are not statistically more memorable than each other (4.52 vs.4.36, $F(1, 269) = 1.034$, $p = .310$). Transform seems to be the most memorable of the three names.

PERCEIVED VALUE OF PRICE AND TIME BASED ON PROGRAM NAMES

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
will be worth the price	CS	85	4.11	1.655	.179	3.75	4.46	1	7
	EJ	98	4.51	1.480	.150	4.21	4.81	1	7
	Transform	89	4.37	1.619	.172	4.03	4.71	1	7
	Total	272	4.34	1.585	.096	4.15	4.53	1	7
will be worth the time (16 months to complete)	CS	85	4.48	1.540	.167	4.15	4.81	1	7
	EJ	98	4.88	1.594	.161	4.56	5.20	1	7
	Transform	89	4.64	1.667	.177	4.29	4.99	1	7
	Total	272	4.68	1.604	.097	4.48	4.87	1	7

No significant difference on being worth the price ($F(2, 269) = 1.51$, $p = .222$) or the time ($F(2, 269) = 1.419$, $p = .244$).

IMPRESSIONS OF TYPE OF PROGRAM BASED ON PROGRAM NAMES

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
gives the impression of an interdisciplinary program	CS	85	4.45	1.622	.176	4.10	4.80	1	7
	EJ	98	4.41	1.617	.163	4.08	4.73	1	7
	Transform	89	4.96	1.405	.149	4.66	5.25	1	7
	Total	272	4.60	1.567	.095	4.41	4.79	1	7
gives the impression that applicants need a science background	CS	85	4.80	1.710	.185	4.43	5.17	1	7
	EJ	98	4.81	1.584	.160	4.49	5.12	1	7
	Transform	89	4.72	1.784	.189	4.34	5.09	1	7
	Total	272	4.78	1.685	.102	4.57	4.98	1	7
gives the impression that applicants need an engineering background	CS	85	4.47	1.817	.197	4.08	4.86	1	7
	EJ	98	3.99	1.767	.179	3.64	4.34	1	7
	Transform	89	4.19	1.894	.201	3.79	4.59	1	7
	Total	272	4.21	1.829	.111	3.99	4.42	1	7
gives the impression that applicants can come from many educational backgrounds	CS	85	4.56	1.644	.178	4.21	4.92	1	7
	EJ	98	4.71	1.764	.178	4.36	5.07	1	7
	Transform	89	4.54	1.631	.173	4.20	4.88	1	7
	Total	272	4.61	1.680	.102	4.41	4.81	1	7

The name of the program significantly impacts impressions of an inter-disciplinary program ($F(2, 269) = 3.487$, $p = .032$). Transform gives a significantly greater impression of being an inter-disciplinary program than the other two names.

The name of the program does not significantly impact impressions of the need for a science background($F(2, 269) = .075$, $p = .928$), an engineering background ($F(2, 269) = 1.584$, $p = .207$), or many educational backgrounds ($F(2, 269) = .297$, $p = .743$).

Were the survey results in any way skewed due to the higher number of participants in any one faculty (i.e., Faculty of Business Behaviorial Lab students)?

There were main effects of recruitment - people who participated through the Behavioral Lab reported more positive reactions in general. But this did not interact with the brand name, which means the preferences for brand names did not differ by how participants were recruited.

There are large differences in sample size for each program, so Suzanne Rath checked if the assumptions of homogeneity of variance are upheld (meaning that we can reasonability interpret ANOVA results). The only dependent variable where the assumption is violated is behavioural intention so ANOVA would not be appropriate.

Rath then ran a two-way AVONA with Brand name and Department to check for an interaction. There was a marginal interaction on Evaluation ($F(17, 241) = 1.65$, $p = .054$), and a significant interaction on Memorableness ($F(17, 241) = 1.76$, $p = .035$). **The significant interaction means that Department affects the Memorableness of the brand name, but only in Business** ($F(2, 241) = 4.43$, $p = .013$), **Arts** ($F(2, 241) = 11.32$, $p < .001$), and **Nursing** ($F(2, 241) = 3.81$, $p = .024$).

As you can see below:

- Transformation was significantly more memorable than Sustainability but not EJ among business students
- EJ was significantly more memorable than Sustainability and marginally more so than Transformation among arts students
- Transformation was significantly more memorable than EJ and marginally more so than Sustainability among nursing students

That being said, Business, Arts, Nursing, and Science did receive the greatest number of respondents.

Estimates

Dependent Variable: Memorable

What university program or faculty are you currently registered in? - Selected Choice	Name	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Business	CS	4.048	.177	3.699	4.397
	EJ	4.512	.208	4.103	4.921
	Transform	4.816	.192	4.437	5.195
Arts	CS	3.092	.272	2.556	3.628
	EJ	4.779	.228	4.330	5.227

	Transform	4.110	.282	3.554	4.666
Education	CS	3.810	.588	2.652	4.967
	EJ	3.449	.385	2.691	4.207
	Transform	4.429	.509	3.426	5.431
Nursing	CS	4.071	.294	3.493	4.650
	EJ	3.556	.339	2.887	4.224
	Transform	4.911	.360	4.202	5.619
Science	CS	4.600	.455	3.703	5.497
	EJ	4.051	.272	3.515	4.587
	Transform	4.171	.322	3.537	4.805
FSDE	CS	3.893	.509	2.891	4.895
	EJ	4.686	.455	3.789	5.582
	Transform	4.469	.385	3.712	5.227
Veterinary Medicine	CS	4.000	.720	2.582	5.418
	EJ	4.393	.509	3.391	5.395
	Transform	4.286	1.018	2.281	6.290
Computer Science	CS	3.810	.415	2.991	4.628
	EJ	4.048	.588	2.890	5.205
	Transform	3.971	.455	3.075	4.868
Graduate Studies	CS	4.607	.509	3.605	5.609
	EJ	4.688	.307	4.084	5.293
	Transform	4.821	.360	4.113	5.530
Other	CS	2.643	.720	1.225	4.060
	EJ	.[a]	.	.	.
	Transform	4.357	.509	3.355	5.359

a. This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

Cleantech Brand Name Survey_GenPOP

Start of Block: LOI

LOI/Consent Title of the Study: Soliciting Student Feedback on UPEI Master's Program Title

Researchers: Susie Zavala and Suzanne Rath

Introduction: We invite you to participate in a research study that will help decide the title of a new master's program being developed at UPEI. The faculty creating this program is interested in receiving student feedback and will use the information gathered in this study to help determine the program title.

Purpose: The purpose of this research is to receive student feedback on the title of a new UPEI master's program that will launch in September 2025 to help determine the program's name.

Risks: There are no risks associated with this study.

Compensation: People who complete the survey will be entered into a draw to win a prize (one of three $50 gift certificates). There is a 1 in 30 chance of winning a $50 gift card.

Withdrawal Procedures: Participation is completely voluntary. You do not have to say yes to participate, and you are free to stop participating at any time without penalty by just exiting the survey before the end. You do not have to answer any questions that you don't want to answer. Choosing to stop or withdraw will not affect you in any way and the data will be deleted. Once you submit your answers, however, they cannot be withdrawn.

Once you complete the study, you will be redirected to a different page to provide your email address so you can be entered into a prize draw. All your responses will be stored confidentially as identifying information will be separated from your responses. Data will be stored on a password-protected computer in a locked office. If you choose to stop before the study is complete, simply close the study window before the end and your responses will be deleted.

Contact information: If you have any questions about the survey, you can email either Susie Zavala (szavala@upei.ca) or Suzanne Rath (srath@upei.ca). If you have any ethics questions or concerns, you may contact UPEI Research Ethics Board at (902)-602-5104, or by email at researchcompliance@upei.ca. This project (6012455) has been reviewed by the UPEI Research Ethics Board and it complies with Tri-Council guidelines for research involving human participants.

Thank you very much for your interest in participating in this research study!

Consent If you consent to participate in this study, click “Yes.” Otherwise, you may exit the study.

I have read the above statements and consent to participate in this research. This letter informs me that up until the point that I have submitted my answers, I have the freedom to withdraw at any time. No waiver of rights is sought. I understand that I can keep a copy of the consent form. I understand that the information will be kept confidential within the limits of the law. I have the freedom to not answer any question(s).

- ○ Yes - Continue with the survey (1)
- ○ No - Exit the survey (2)

Skip To: End of Survey If If you consent to participate in this study, click “Yes.” Otherwise, you may exit the study. I ha... = No - Exit the survey

End of Block: LOI

Start of Block: Sustainability

Sustainability We would like to find out your thoughts about the name of a new master's program. Please rate the following program title by answering the questions in this survey.

CS "Leadership in Cleantech and Sustainability"

End of Block: Sustainability

Start of Block: Quality_CS

Quality_CS Use the following scale to rate the extent to which you agree or disagree with the following statements.

${CS/QuestionText}

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
sounds like a high-quality program (1)	○	○	○	○	○	○	○
sounds like a valuable program (2)	○	○	○	○	○	○	○
sounds like a worthwhile program (3)	○	○	○	○	○	○	○
sounds like a beneficial program (4)	○	○	○	○	○	○	○
sounds like an impressive program (5)	○	○	○	○	○	○	○
sounds like an innovative program (6)	○	○	○	○	○	○	○
sounds like a comprehensive program (7)	○	○	○	○	○	○	○

End of Block: Quality_CS

Start of Block: Memorable_CS

Memorable_CS Use the following scale to rate the extent to which you agree or disagree with the following statements.

${CS/QuestionText}

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
The program's name is memorable (1)	○	○	○	○	○	○	○
The program's name is interesting (2)	○	○	○	○	○	○	○
The program's name is catchy (3)	○	○	○	○	○	○	○
The program's name is unique (4)	○	○	○	○	○	○	○
The program's name is easy to remember (5)	○	○	○	○	○	○	○
The program's name is boring (6)	○	○	○	○	○	○	○
The program's name is dull (7)	○	○	○	○	○	○	○

End of Block: Memorable_CS

Start of Block: Evaluation_CS

Eval_CS Thinking about the name of the Master's program, ${CS/QuestionText}, please use the scales to rate the program.

	Not at all (1)	(2)	(3)	(4)	(5)	(6)	Extremely (7)
The name left a favorable impression (1)	○	○	○	○	○	○	○
The name is likeable (2)	○	○	○	○	○	○	○
The name is appealing (3)	○	○	○	○	○	○	○
The name is desirable (4)	○	○	○	○	○	○	○
The program is of good quality (5)	○	○	○	○	○	○	○
The program is a high performance program (6)	○	○	○	○	○	○	○
I am interested in learning more about the program (7)	○	○	○	○	○	○	○

End of Block: Evaluation_CS

Start of Block: Attitude_CS

Att_CS Use the following scale to rate how you feel about the program name.

${CS/QuestionText}

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Bad	○	○	○	○	○	○	○	Good
Unfavorable	○	○	○	○	○	○	○	Favorable
Negative	○	○	○	○	○	○	○	Positive
Unappealing	○	○	○	○	○	○	○	Appealing

End of Block: Attitude_CS

Start of Block: FutureJob_CS

Job_CS Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Job prospects for people with a Master's of Leadership in Cleantech and Sustainability are favorable (1)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Sustainability are likely to get a job when they graduate (2)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Sustainability will have desirable skills when they graduate (3)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Sustainability will benefit on the job market (4)	○	○	○	○	○	○	○

A Master's of Leadership in Cleantech and Sustainability will be marketable when looking for a job (5)	○	○	○	○	○	○	○

Skills_CS Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
People with a Master's of Leadership in Cleantech and Sustainability will gain the communication skills required for a good job (2)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Sustainability will gain the problem-solving skills required for a good job (3)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Sustainability will gain the critical-thinking skills required for a good job (4)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Sustainability will gain an understanding of the problems to be solved with cleantech (6)	○	○	○	○	○	○	○

People with a Master's of Leadership in Cleantech and Sustainability will gain the skills required to lead stakeholders to reduce carbon emissions while considering the social, environmental, and economic implications (7)	○	○	○	○	○	○	○

End of Block: FutureJob_CS

Start of Block: Costs_CS

Costs_CS Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Getting a Master's of Leadership in Cleantech and Sustainability will be worth the price (1)	○	○	○	○	○	○	○
Getting a Master's of Leadership in Cleantech and Sustainability will be worth the time (16 months to complete) (2)	○	○	○	○	○	○	○

End of Block: Costs_CS

Start of Block: Intentions_CS

Int_CS Thinking about the name of the Master's program, please use the scales to rate your behavioural intentions.

${CS/QuestionText}

	Not at all (1)	(2)	(3)	(4)	(5)	(6)	Extremely (7)
I would consider registering in the program (1)	○	○	○	○	○	○	○
I would want to learn more about the program (2)	○	○	○	○	○	○	○
I would be willing to check out the program's website (3)	○	○	○	○	○	○	○
I would call or chat with a program representative to get more information (4)	○	○	○	○	○	○	○
I would request a flyer about the program (5)	○	○	○	○	○	○	○
I would search for more information about the program (6)	○	○	○	○	○	○	○

End of Block: Intentions_CS

Start of Block: NameImpression_CS

inter_CS A masters degree of ${CS/QuestionText} gives the impression of an interdisciplinary program

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

sci_CS A masters degree of ${CS/QuestionText} gives the impression that applicants need a science background

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

eng_CS A masters degree of ${CS/QuestionText} gives the impression that applicants need an engineering background

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

NS_CS A masters degree of ${CS/QuestionText} gives the impression that applicants can come from many educational backgrounds

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

End of Block: NameImpression_CS

Start of Block: Transformation

Transformation We would like to find out your thoughts about the name of a new master's program. Please rate the following program title by answering the questions in this survey.

Transform "Leadership in Cleantech Transformation"

End of Block: Transformation

Start of Block: Quality_transform

Quality_T Use the following scale to rate the extent to which you agree or disagree with the following statements.

${Transform/QuestionText}

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
sounds like a high-quality program (1)	○	○	○	○	○	○	○
sounds like a valuable program (2)	○	○	○	○	○	○	○
sounds like a worthwhile program (3)	○	○	○	○	○	○	○
sounds like a beneficial program (4)	○	○	○	○	○	○	○
sounds like an impressive program (5)	○	○	○	○	○	○	○
sounds like an innovative program (6)	○	○	○	○	○	○	○
sounds like a comprehensive program (7)	○	○	○	○	○	○	○

End of Block: Quality_transform

Start of Block: Memorable_Transform

Memorable_trans Use the following scale to rate the extent to which you agree or disagree with the following statements.

${Transform/QuestionText}

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
The program's name is memorable (1)	○	○	○	○	○	○	○
The program's name is interesting (2)	○	○	○	○	○	○	○
The program's name is catchy (3)	○	○	○	○	○	○	○
The program's name is unique (4)	○	○	○	○	○	○	○
The program's name is easy to remember (5)	○	○	○	○	○	○	○
The program's name is boring (6)	○	○	○	○	○	○	○
The program's name is dull (7)	○	○	○	○	○	○	○

End of Block: Memorable_Transform

Start of Block: Evaluation_Transform

Eval_Trans Thinking about the name of the Master's program,${Transform/QuestionText}, please use the scales to rate the program.

	Not at all (1)	(2)	(3)	(4)	(5)	(6)	Extremely (7)
The name left a favorable impression (1)	○	○	○	○	○	○	○
The name is likeable (2)	○	○	○	○	○	○	○
The name is appealing (3)	○	○	○	○	○	○	○
The name is desirable (4)	○	○	○	○	○	○	○
The program is of good quality (5)	○	○	○	○	○	○	○
The program is a high performance program (6)	○	○	○	○	○	○	○
I am interested in learning more about the program (7)	○	○	○	○	○	○	○

End of Block: Evaluation_Transform

Start of Block: Attitude_Transform

Att_trans Use the following scale to rate how you feel about the program name.

${Transform/QuestionText}

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Bad	○	○	○	○	○	○	○	Good
Unfavorable	○	○	○	○	○	○	○	Favorable
Negative	○	○	○	○	○	○	○	Positive
Unappealing	○	○	○	○	○	○	○	Appealing

End of Block: Attitude_Transform

Start of Block: FutureJob_T

Job_T Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Job prospects for people with a Master's of Leadership in Cleantech Transformation are favorable (1)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech Transformation are likely to get a job when they graduate (2)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech Transformation will have desirable skills when they graduate (3)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech Transformation will benefit on the job market (4)	○	○	○	○	○	○	○
A Master's of Leadership in Cleantech Transformation will be marketable when looking for a job (5)	○	○	○	○	○	○	○

Skills_T Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
People with a Master's of Leadership in Cleantech Transformation will gain the communication skills required for a good job (2)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech Transformation will gain the problem-solving skills required for a good job (3)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech Transformation will gain the critical-thinking skills required for a good job (4)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech Transformation will gain an understanding of the problems to be solved with cleantech (6)	○	○	○	○	○	○	○

People with a Master's of Leadership in Cleantech Transformation will gain the skills required to lead stakeholders to reduce carbon emissions while considering the social, environmental, and economic implications (7)	○	○	○	○	○	○	○

End of Block: FutureJob_T

Start of Block: Costs_Trans

Costs_Trans Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Getting a Master's of Leadership in Cleantech Transformation will be worth the price (1)	○	○	○	○	○	○	○
Getting a Master's of Leadership in Cleantech Transformation will be worth the time (16 months to complete) (2)	○	○	○	○	○	○	○

End of Block: Costs_Trans

Start of Block: Intentions_T

Int_T Thinking about the name of the Master's program, please use the scales to rate your behavioural intentions

${Transform/QuestionText}

	Not at all (1)	(2)	(3)	(4)	(5)	(6)	Extremely (7)
I would consider registering in the program (1)	○	○	○	○	○	○	○
I would want to learn more about the program (2)	○	○	○	○	○	○	○
I would be willing to check out the program's website (3)	○	○	○	○	○	○	○
I would call or chat with a program representative to get more information (4)	○	○	○	○	○	○	○
I would request a flyer about the program (5)	○	○	○	○	○	○	○
I would search for more information about the program (6)	○	○	○	○	○	○	○

End of Block: Intentions_T

Start of Block: NameImpression_T

int_T A masters degree of ${Transform/QuestionText} gives the impression of an interdisciplinary program

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

sci_T A masters degree of ${Transform/QuestionText} gives the impression that applicants need a science background

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

eng_T A masters degree of ${Transform/QuestionText} gives the impression that applicants need an engineering background

- ○ Strongly disagree (1)
- ○ Disagree (2)
- ○ Somewhat disagree (3)
- ○ Neither agree nor disagree (4)
- ○ Somewhat agree (5)
- ○ Agree (6)
- ○ Strongly agree (7)

Page Break

NS_T A masters degree of ${Transform/QuestionText} gives the impression that applicants can come from many educational backgrounds

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

End of Block: NameImpression_T

Start of Block: EnvironmentalJustice

EJ We would like to find out your thoughts about the name of a new master's program. Please rate the following program title by answering the questions in this survey.

EJ "Leadership in Cleantech and Environmental Justice"

End of Block: EnvironmentalJustice

Start of Block: Quality_EJ

Quality_EJ Use the following scale to rate the extent to which you agree or disagree with the following statements.

${EJ/QuestionText}

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
sounds like a high-quality program (1)	○	○	○	○	○	○	○
sounds like a valuable program (2)	○	○	○	○	○	○	○
sounds like a worthwhile program (3)	○	○	○	○	○	○	○
sounds like a beneficial program (4)	○	○	○	○	○	○	○
sounds like an impressive program (5)	○	○	○	○	○	○	○
sounds like an innovative program (6)	○	○	○	○	○	○	○
sounds like a comprehensive program (7)	○	○	○	○	○	○	○

End of Block: Quality_EJ

Start of Block: Memborable_EJ

Memorable_EJ Use the following scale to rate the extent to which you agree or disagree with the following statements.

${EJ/QuestionText}

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
The program's name is memorable (1)	○	○	○	○	○	○	○
The program's name is interesting (2)	○	○	○	○	○	○	○
The program's name is catchy (3)	○	○	○	○	○	○	○
The program's name is unique (4)	○	○	○	○	○	○	○
The program's name is easy to remember (5)	○	○	○	○	○	○	○
The program's name is boring (6)	○	○	○	○	○	○	○
The program's name is dull (7)	○	○	○	○	○	○	○

End of Block: Memborable_EJ

Start of Block: Evaluation_EJ

Eval_EJ Thinking about the name of the Master's program, ${EJ/QuestionText}, please use the scales to rate the program.

	Not at all (1)	(2)	(3)	(4)	(5)	(6)	Extremely (7)
The name left a favorable impression (1)	○	○	○	○	○	○	○
The name is likeable (2)	○	○	○	○	○	○	○
The name is appealing (3)	○	○	○	○	○	○	○
The name is desirable (4)	○	○	○	○	○	○	○
The program is of good quality (5)	○	○	○	○	○	○	○
The program is a high performance program (6)	○	○	○	○	○	○	○
I am interested in learning more about the program (7)	○	○	○	○	○	○	○

End of Block: Evaluation_EJ

Start of Block: Attitude_EJ

Att_EJ Use the following scale to rate how you feel about the program name.

${EJ/QuestionText}

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Bad	○	○	○	○	○	○	○	Good
Unfavorable	○	○	○	○	○	○	○	Favorable
Negative	○	○	○	○	○	○	○	Positive
Unappealing	○	○	○	○	○	○	○	Appealing

End of Block: Attitude_EJ

Start of Block: FutureJob_EJ

Job_EJ Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Job prospects for people with a Master's of Leadership in Cleantech and Environmental Justice are favorable (1)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Environmental Justice are likely to get a job when they graduate (2)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Environmental Justice will have desirable skills when they graduate (3)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Environmental Justice will benefit on the job market (4)	○	○	○	○	○	○	○

A Master's of Leadership in Cleantech and Environmental Justice will be marketable when looking for a job (5)	○	○	○	○	○	○	○

Skills_EJ Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
People with a Master's of Leadership in Cleantech and Environmental Justice will gain the communication skills required for a good job (2)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Environmental Justice will gain the problem-solving skills required for a good job (3)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Environmental Justice will gain the critical-thinking skills required for a good job (4)	○	○	○	○	○	○	○

People with a Master's of Leadership in Cleantech and Environmental Justice will gain an understanding of the problems to be solved with cleantech (6)	○	○	○	○	○	○	○
People with a Master's of Leadership in Cleantech and Environmental Justice will gain the skills to lead stakeholders to reduce carbon emissions while considering the social, environmental, and economic implications (7)	○	○	○	○	○	○	○

End of Block: FutureJob_EJ

Start of Block: Costs_EJ

Costs_EJ Use the following scale to rate the extent to which you agree or disagree with the following statements.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Getting a Master's of Leadership in Cleantech and Environmental Justice will be worth the price (1)	○	○	○	○	○	○	○
Getting a Master's of Leadership in Cleantech and Environmental Justice will be worth the time (16 months to complete) (2)	○	○	○	○	○	○	○

End of Block: Costs_EJ

Start of Block: Intentions_EJ

Int_EJ Thinking about the name of the Master's program, please use the scales to rate your behavioural intentions

${EJ/QuestionText}

	Not at all (1)	(2)	(3)	(4)	(5)	(6)	Extremely (7)
I would consider registering in the program (1)	○	○	○	○	○	○	○
I would want to learn more about the program (2)	○	○	○	○	○	○	○
I would be willing to check out the program's website (3)	○	○	○	○	○	○	○
I would call or chat with a program representative to get more information (4)	○	○	○	○	○	○	○
I would request a flyer about the program (5)	○	○	○	○	○	○	○
I would search for more information about the program (6)	○	○	○	○	○	○	○

End of Block: Intentions_EJ

Start of Block: NameImpression_EJ

int_EJ A masters degree of ${EJ/QuestionText} gives the impression of an interdisciplinary program

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

sci_EJ A masters degree of ${EJ/QuestionText} gives the impression that applicants need a science background

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

eng_EJ A masters degree of ${EJ/QuestionText} gives the impression that applicants need an engineering background

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

NS_EJ A masters degree of ${EJ/QuestionText} gives the impression that applicants can come from many educational backgrounds

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

End of Block: NameImpression_EJ

Start of Block: Demographics

Intro Lastly, we would like to collect a few demographics from you.

Gender What is your gender

- Man (1)
- Woman (2)
- Nonbinary (5)
- Two Spirit (6)
- Please specify (3) _____
- Prefer not to say (4)

age What is your age (##)

_____

program of study What university program or faculty are you currently registered in?

- Business (1)
- Arts (2)
- Education (3)
- Nursing (4)
- Science (5)
- FSDE (6)
- Veterinary Medicine (7)
- Computer Science (8)
- Graduate Studies (9)
- Other (10) _____

Year What year of your university program are you currently in?

- First year (1)
- Second year (2)
- Third year (3)
- Fourth year (4)
- Fifth year (5)
- Graduate program (MBA,Masters,PhD) (6)

End of Block: Demographics

Start of Block: End

End1 Thank you very much for your participation in this study! The questionnaire is complete. Please click the arrow below to submit the survey and follow the final prompts to enter the prize draw.

End2 Confirm submission of responses by clicking the button below followed by the blue arrow.

- Yes - Submit my responses (1)

End of Block: End

Appendix D – Section 7.1.2 Software

Appendix D – Section 7.1.2 Software

7.1.2 Equipment and technology (e.g., microscopes, recording equipment, specialized software):

Students of this program will have access to the following software if required during their coursework upon approval.

Microsoft Office O365
Stellarium 0.23
Open Office 4.1.14
Chrome
Firefox
Adobe Reader DC
Gimp 2.10.34
DaVinci Resolve 18.1
ACD Chemsketch 2022
Filezilla 3.64
Maple 2023
Zotero 6.0
Intelliu Community 2023.1
Topspin 3.0
Wolfram CDF Player 13.2
Flash Print 5.6
Jamovi 2.3
R Studio Desktop 2023
'R 4.3
Xvid 1.3.7
Matlab R2023a
Audacity 3.3.2
Yuja 12 (Classrooms)
Antidote 6.1 (Main)
Siemens Logo 8.1 (SSDE)
AutoCad 2024 (SSDE)
Ultramaker Cura 5.4 (SSDE)
OpenChoice Desktop (SSDE)
SciLab 2023
UCSF Chimera 1.17
WinSCP 5.21
Arduino 2.1
UCSF ChimeraX 1.6
Media Player 12
VLC 3
PASW (SPSS) 29
Minitab 21.4
M13 Ver 2.3
Turning Pont 9.0 (Classrooms)
Anaconda 2023.03 (SSDE)
Google Earth 7.3 (Classrooms/SSDE)
Skype 8.98 (Classrooms)
Fritzing 0.9 (Network)
Putty (Network)
MariePlus (Network)
Poll Everywhere 3.0 (Classrooms)
Avogado 1.2
wxMacMolPit 7.7
Praat 6.3
Boris 8.17
Ansys Granta 2023 (SSDE)
OceanArt 1.0 (SSDE)
Visual Studio 2010 (Classrooms)
AutoCad Electrical 2024 (SSDE)
TekVisa 4.1 (SSDE)
Logger Pro (Biology)
MCC DaqCD 6.74 (SSDE)
Tek Software (SSDE)
PyCharm Edu 2023.1
Pasco 2.6 (SSDE)
Schwarz Plugins 1.7 (SSDE)
SolidWorks 2023 SP3 (SSDE)
Arduino EMoRo (SSDE)
NI Labview 2023 (SSDE)
HomerPro 3.16 (SSDE)
Zoom 5.14 (Classrooms)
Qblade 0.96 (SSDE)
Inkscape 1.2
NI Labview RIO 21(SSDE)
Gamess 2022 R2
ArcGis Pro 3.1 (SSDE)
ArcGis Desktop 10.8 (SSDE)
ChimeraX 1.5
Sniffy 3
Irfanview 4.62
Python 3.11.3
Vernier 5.16 (Biology)
iOLabs 1.8 (SSDE)
MSDN
AutoCad Mech 2024 (SSDE)
Kurzweil 14 (Accessibility)

Appendix E – Library Resources Report

January 2024

Report on Library Resources

For the Master of Cleantech Leadership and Transformation
Curriculum Working Group

Submitted by Courtney Matthews, MLIS
Systems Librarian

UPEI's Robertson Library offers a broad range of resources and services for a university of its size. With 290,000 print and over 800,000 digital resources, over 100,000 streaming videos, as well as an active interlibrary loan department, we provide information for the students, instructors, and researchers at UPEI. Through research assistance, instruction, and a liaison (subject) librarian program, we offer personalized information services to assist the community in navigating a complex information landscape. And through our virtual services, including virtual research environments (VREs), the institutional repository (IslandScholar), data repository (data.upei.ca) and open textbooks hosting platform (Pressbooks), we provide ways for scholars and researchers to connect, have a virtual presence, and share their work so it is accessible from anywhere in the world.

There are currently six full-time, permanent-track librarian positions and sixteen full-time, permanent staff positions in the Library, in addition to the University Librarian. At the time of this report, there were an additional two term librarian positions, two staff backfill positions, and two casual staff positions. In addition, the Library usually hires 14 student assistants during the fall and winter semesters.

The Library is typically open and staffed for over 90 hours each week during the fall and winter semesters, with extended hours during the final exam period and reduced hours over holidays and the summer term.

Robertson Library offers an extensive range of resources and services for a small university. We are members of two academic library consortia, CRKN (Canada Research Knowledge Network) and CAAL (Council of Atlantic Academic Libraries, which itself is part of Consortia Canada), which help us to acquire digital resources at affordable prices.

Resources

The library collection focuses on academic books and peer-reviewed journals, though we also provide access to primary sources, music, and video formats (including news clips, instructional videos, theatrical productions, documentaries and feature films). We provide access to these collections through our catalogue and databases, including OneSearch, our meta-index or "discovery layer".

Discovery Layer: OneSearch

Robertson Library uses EBSCO Discovery Service, which we refer to as "OneSearch," to allow users to search a wide variety of resources at the same time. OneSearch incorporates the Library's local holdings (such as print books, eBooks, microfilm, newspapers, and other "library catalogue" items) along with indexing and full-

text searching of millions and books and articles across all academic disciplines and from all major academic journal publishers.

This means that students, faculty, and other library patrons can simultaneously discover materials that are on the physical library shelves in print, materials that are available immediately online through various Library subscriptions, and materials that are likely available from other institutions via Interlibrary Loan. (See the “Interlibrary Loan” section for more details).

Books

The Library provides access to over a million books, including over 290,000 print books and over 800,000 electronic books. These numbers include books the Library has permanently purchased as well as those made available through subscription collections. When affordable and appropriate, new titles are typically purchased as eBooks.

Please note that the Library’s ebook collection and online videos are no longer available in the catalogue. They appear in OneSearch alongside print books, articles and materials in other formats.

The following subject searches were performed in the OneSearch for books:

- Clean Energy: 739
- Clean Technology: 306
- Climate Change: 19,500
- Climate Change Adaptation: 1,585
- Climate Change Impact: 1,242
- Climate Change Mitigation: 1,730
- Decarbonization: 292
- Energy Policy: 3,229
- Energy Transition: 1,063
- Global Warming & Climate Change: 2,674
- Green Technology: 2,069
- Greenhouse gases: 2,184
- Indigenous Knowledge: 1,221
- Indigenous Knowledge and Climate Change: 77
- Net Zero: 191
- Renewable Energy: 8,544
- Renewable Energy Sources: 3,852

Given the interdisciplinary nature of this area of study, it is likely that there are many other works held by the library which may be relevant to the CleanTech Leadership program.

Databases

The Library uses a "discovery service" product provided by EBSCO Discovery Service, which is locally called "OneSearch". OneSearch indexes over 1 billion articles and 100 million books across all academic disciplines. The producer has partnerships with all major academic journal publishers to include full text searching of their publications. OneSearch also incorporates all of the Library's local holdings (i.e. the "Catalogue"), and is

updated weekly. It also integrates many of the Library's most important paid individual database subscriptions, to provide immediate full text for tens of thousands of journals.

Given the interdisciplinary nature of the CleanTech Leadership program other databases are equally important to the program and its curriculum. These databases are also integrated into OneSearch which facilitates discovery and access:

Database	Description
Academic Search Complete	A multi-disciplinary database that provides full text for more than 8,500 periodicals, including full text for over 7,300 peer-reviewed journals.
Business Source Complete	A scholarly business database providing indexing and abstracts for the most important scholarly business journals, dating back as far as 1886.
Canada Commons	Canada Commons contains over 17,000 ebooks and over 180,000 Canadian documents of other kinds, mostly in English but also over 50,000 in French. The documents are mostly from the Canadian government, but also many are from non-profit agencies and "think tanks".
Centre for Agriculture and Biosciences Abstracts	Covers the significant research and development literature in applied life sciences, including agriculture, the environment, human nutrition, applied economics, leisure/tourism, and veterinary medicine.
EconLit with Full Text (via EBSCOhost)	Foremost source of references to economic literature. Provides indexing and abstracting of 450+ international economic periodicals, books & papers.
Earth, Atmospheric & Aquatic Science Database	This indexing + full text database from Proquest contains: ● Aquatic Sciences & Fisheries Abstracts (ASFA) ● Oceanic Abstracts ● Meteorological & Geoastrophysical Abstracts (MGA) Plus hundreds of full text journals and documents relating to earth, land, and air sciences.
GeoRef	Produced by the American Geosciences Institute, this comprehensive geosciences database contains records for geosciences literature from around the world, including 3.8 million records from over 3,500 journals. Other records featured within the database include indexed books, maps, government reports, conference papers, theses and dissertations.
Gale In Context: Environmental Studies	Content that covers topics about environmental concerns, such as soil science, science and management, introduction to agronomy, food, crops & environment. Understand environmental issues that affect people globally through topic overviews, journals, news, and

	multimedia content. This database was formerly known as GREENR.
GeoScienceWorld	A collection of 49 journals covering earth sciences; includes specialized and map-based search capabilities and links to curated earth science research.
GreenFile	Covers all aspects of human impact to the environment, including global warming, green building, pollution, sustainable agriculture & renewable energy.
Google Scholar	Searches scholarly literature across many disciplines and sources, including peer-reviewed papers, theses, books, abstracts, and articles. Note: only use the proxied link when you are off-campus.
PsycINFO	Contains citations and summaries of journal articles, book chapters, books, dissertations, and technical reports in the field of psychology.
Sage Research Methods Foundations and SAGE Research Methods Video: Practical Research and Academic Skills	SAGE Research Methods Foundations is the perfect companion for novice researchers and provides bite-size, introductory overviews to all the major methods topics to help get you on your way. The entries give introductory overviews to major research methods, covering their history, development and critical debates surrounding them. This collection of over 450 streaming videos on the SAGE Research Methods platform offers support on the practical skills that you need to successfully complete your research.
Scopus	Scopus provides broad indexing and citation coverage of academic journals, books and conference proceedings published worldwide. Delivering a comprehensive overview of research output in the fields of science, engineering, medicine, social sciences, and arts and humanities, Scopus features smart tools to track, analyze and visualize research.
SocIndex with Full Text	A sociology research database providing over 2.1 million records with subject headings from a 20,000+ term sociological thesaurus.

Journals

Google Metrics provides lists of top journals by subject based on an h-index[1] impact factor. Journals owned by the library are indexed by EBSCOhost's Publication Finder tool, which classifies journals by discipline and assigns a peer-reviewed status. What follows is a partial listing of our journal holdings based on relevant subject searches in Publication Finder:

[1] Google Scholar h5-index definition: "h5-index is the h-index for articles published in the last 5 complete years. It is the largest number h such that h articles published in 2018-2022 have at least h citations each."

Our holdings currently include 7 of the top 10 journals for Clean Technology.[2]

Rank	Publication	h-index	Holdings
1	Journal of Modern Power Systems and Clean Energy	54	Directory of Open Access Journals
2	Clean Technologies and Environmental Policy	50	Springer - CRKN
3	Green Energy & Environment	48	Directory of Open Access Journals
4	International Journal of Precision Engineering and Manufacturing-Green Technology	41	Springer - CRKN
5	International Journal of Green Energy	35	No Holdings
6	Cleaner Engineering and Technology	31	Directory of Open Access Journals
7	Clean Technologies	20	Directory of Open Access Journals
8	Clean Energy	19	No Holdings
9	International Journal of Energy for a Clean Environment	16	No Holdings
10	IEEE Green Technologies Conference	15	No Holdings

Our holdings currently include access to 8 of the top 10 journals for Green Technology.[3]

Rank	Publication	h-index	Holdings
1	Environmental Science & Technology	169	American Chemical Society - CRKN
2	Environmental Technology & Innovation	70	Elsevier - CRKN
3	Environmental Science & Technology Letters	69	American Chemical Society - CRKN

[2] https://scholar.google.ca/citations?hl=en&view_op=search_venues&vq=clean+Technology&btnG=
[3] https://scholar.google.ca/citations?hl=en&view_op=search_venues&vq=green+technology&btnG=

4	Critical Reviews in Environmental Science and Technology	65	Limited holdings
5	International Journal of Environmental Science and Technology	57	Springer - CRKN
6	Environmental Science-Water Research & Technology	53	No Holdings
7	Clean Technologies and Environmental Policy	50	Springer - CRKN
8	Reviews in Environmental Science and Bio/Technology	49	Springer - CRKN
9	Environmental Technology	47	CAB Abstracts
10	International Journal of Precision Engineering and Manufacturing-Green Technology	41	Springer - CRKN

Our holdings currently include access to 8 of the top 10 journals for Green Technology.[4]

Rank	Publication	h-index	Holdings
1	Environmental Science & Technology	169	American Chemical Society - CRKN
2	Environmental Technology & Innovation	70	Elsevier - CRKN
3	Environmental Science & Technology Letters	69	American Chemical Society - CRKN
4	Critical Reviews in Environmental Science and Technology	65	Limited holdings
5	International Journal of Environmental Science and Technology	57	Springer - CRKN
6	Environmental Science-Water Research & Technology	53	No Holdings

[4] https://scholar.google.ca/citations?hl=en&view_op=search_venues&vq=green+technology&btnG=

7	Clean Technologies and Environmental Policy	50	Springer - CRKN
8	Reviews in Environmental Science and Bio/Technology	49	Springer - CRKN
9	Environmental Technology	47	CAB Abstracts
10	International Journal of Precision Engineering and Manufacturing-Green Technology	41	Springer - CRKN

Reference Materials

Reference works such as encyclopedias can be an important sources of information for students as they develop their research skills and encounter new topics. Where possible, the Library collects new reference materials in online formats; however, some significant works are only available or affordable in print, and some older materials have been retained in print as well.

Print and online reference materials can be located using OneSearch or the catalogue. In addition, the Library has added shelf blocks (placeholders that can be shelved alongside books) with call numbers and QR codes throughout the print collection which lead patrons to specific online titles of note.

The Library subscribes to three major collections of online reference works, *Oxford Reference Online* and *Credo Reference Premium*, and the *Gale Virtual Reference Library*.

Applicable resources in these collections include:

- Encyclopedias
    - Climate Change: An Encyclopedia of Science, Society, and Solutions
    - Encyclopedia of Global Change
    - The Oxford Encyclopedia of Climate Change Communication
- Handbooks, Quick Reference, Dictionaries
    - Dictionary of global climate change
    - The Atlas of Climate Change: Mapping the World’s Greatest Challenge

Multimedia

The Library subscribes to several streaming film and video collections:

- Audio Cine Films
    - Immediate access collection which offers 100s of feature films.
- Criterion-on-Demand

    - Immediate access to both feature film and small independent films.
- Curio.ca
    - CBC news and documentary videos, commercial free, streaming. Includes themes collections for Climate Change and Forest Fires and Climate Change. Keyword searching provides relevant videos:
        - clean energy: 22
        - greenhouse gas: 10
        - green technology: 52
        - renewable energy: 8
- Kanopy
    - Offers access on a "pay per use" model to this very large library of streaming films.
- NFB Campus
    - Films produced by the National Film Board of Canada. Broad classifications are not provided, but keyword searching provides relevant videos:
        - clean energy: 87
        - greenhouse gas: 25
        - climate change: 382
        - climate adaptation: 156
- Proquest Academic Videos Online (AVON)
    - clean energy: 284
    - climate change: 1711
    - greenhouse gas: 284
    - green technology: 71
- SAGE Research Methods Video: Practical Research and Academic Skills
    - Explanatory videos to assist in the development of practical skills such as project management, writing for publication, presenting work, and building networks.

Open Education Resources (OER)

The Library and the Centre for Teaching and Learning collaboratively support the use and development of open educational resources (OER) through the Open Education Resource Development Program. This program provides grants for faculty wanting to create or adapt an OER, access to an OER publishing platform called Pressbooks, and a list of OER education and resources. The program also highlights UPEI educators who've selected open textbooks/OERs for their course(s) and showcases the efforts of these educators to reduce student costs and provide equitable access to educational materials by selecting Textbook Champions. OERs are increasingly available. A keyword search of eCampusOntario's Open Library returns 86 OER relevant to the CleanTech Leadership program.[5]

[5] https://search.ecampusontario.ca/?k=climate%20change&itemTypes=6&sourceWebsiteTypes=3&sortCol=1

Library Services

Library Instruction

Liaison librarians provide class instruction on various resources, in consultation with the faculty. In addition to introductory library instructional sessions offered to all first-year students, more specialized instruction for particular courses and disciplines can be arranged through consultation between classroom faculty and the Liaison Librarian.

Research and Technical Assistance

The Library Service Desk is staffed during all library hours. In addition to loaning library materials, employees at the Service Desk are trained to provide one-on-one quick research assistance in person, by telephone, and by email. Staff and student assistants also provide help with printing, scanning, and common desktop software such as the Microsoft Office suite.

Additionally, the Library provides an online “Ask Us” chat help service. The chat is staffed by library employees and provides similar assistance to the in-person services at the Service Desk. Chat services typically begin one hour after the Library opens and end one hour before the Library closes each day.

In-depth research questions received at the Service Desk or via chat are typically referred to librarians or other expert employees.

Reserves

The Library currently offers both physical and electronic reserves for UPEI courses. This service allows faculty to provide increased access to course materials.

Print books, either in the library’s collection or the instructor’s personal collection, can be put aside for students to borrow for 1, 2, or 3 hours at a time.

Using the electronic reserves service, instructors are able to provide online access for their course readings. Library staff set up and maintain the links for the articles and books for the reading lists provided by the instructors. The Library’s reserves web page provides links to reserves at the course level (https://library.upei.ca/reserves), and then the Library staff adds links for these course pages to the corresponding Moodle course. How ťo píod"cc a píi→ıť books listʹ i→ı EG?

Interlibrary Loan

The Library absorbs the costs of interlibrary loans (books and articles) for students, faculty and staff. The Library is a member of the regional interlibrary loan consortium of academic libraries. Article requests are delivered online through an email link. Books requested from universities in the Atlantic region are delivered between universities by courier, and from outside the region by mail. Faculty and students may request a PDF

scan of an article from the Library's print collection so they do not have to retrieve it themselves. https://library.upei.ca/ill

Hours

During Fall and Winter terms, the Library is open from 8 am to 11 pm Saturday through Thursday, and from 8 am to 8 pm Friday. Summer hours are 8 am to 8 pm, Monday through Thursday, 8 am to 5 pm on Friday, and 1 pm to 8 pm on Sunday. https://library.upei.ca/hours

Moodle Library Information

Moodle is the UPEI Course Management System. Each Moodle course has a library "block" with links to the virtual reference chat box, library catalogue search, plagiarism tutorial, and library website. Links for course-specific resources can also be added such as course reserves, reference works, style guides, etc. https://moodle31.upei.ca/

Study Spaces

The Library serves as a common study and collaborative work space for students. To support a wide variety of student needs, the Library is divided into "noise zones" that provide separate spaces for group work and social conversation; quiet coworking and collaboration; and silent study. A variety of comfortable seating, large tables, and individual carrels are available throughout the Library for students to use. Where possible, power outlets have been provided.

In addition to the Library's shared spaces, students have access to both group and individual study rooms. Currently, there are 12 group study rooms (which can accommodate up to eight people) and six individual study rooms available, as well as four additional rooms that are specifically set aside for students attending online classes. Students can reserve these rooms online for a block of up to three hours.

Most of the group study rooms are equipped with a Dell computer and a whiteboard, and many also have an LCD wall-mounted panel display. The rooms for online class attendance are equipped with an iMac computer with a microphone and a webcam.

In addition to these study spaces, the Library also has a sound-proof booth (bookable in advance) and four individual study rooms that are set aside for research use (available at time of need).

https://library.upei.ca/study_rooms
https://rooms.library.upei.ca/room_reservations

Technology in the Library

Hardware

The Library has over 100 computers for student use including both Dells and Macs. On the main level, the Learning Commons includes 30 Dells, 13 iMacs, and 8 Mac Mini computers. The Collaboratory / Media Centre contains 16 MacPro workstations with a variety of multimedia authoring/editing/conversion resources. On the upper floor, there is a pod of 10 Dells in a quiet study area, and a Dell computer in most of the group study rooms.

The Library has three computer labs, two of which are available for general student use when not booked for classes. The open lab on the main floor (the Language Lab) has 20 Dell computers and can be used by students when not used for classes, and the upper floor computer lab has 15 Dells. A third computer lab is used for library instruction and has 30 Dell computers.

The Library loans 32 PC laptops and 13 chromebooks to students through the laptop-lending program. Wireless Internet access is available throughout the Library. The Library also lends phone/laptop chargers, microphones, webcams, light therapy lamps, and portable disc drives.

Software

The Dell computers in the Library offer all of the software that the campus has been able to license for student general use, including SPSS, SAS, and Minitab and the Microsoft Office suite.

The Library also subscribes to RefWorks, a citation management system from ProQuest, which is frequently used in First Year Experience classes. The Library provides online tutorials and in-person instruction about the use of RefWorks. The library also provides access to Grammarly, an automated tool to assist students to improve their writing skills.

Printing

The Library is the campus' central point for student printing. It offers multiple black and colour printers, and various options for payment and submission of print jobs, using the market-leading PaperCut system. The Library is also the home of the campus Central Printing Office, which provides faculty and students with mediated services for larger and more complex print jobs including conference posters and course packs.

Pressbooks and the Espresso Book Machine

For those faculty members wishing to create open textbooks, the Robertson Library now provides access to Pressbooks (http://pressbooks.library.upei.ca/), a simple web-based book publishing tool. Authors can add their content to Pressbooks, edit it as needed, and export the resulting book in a variety of ebook and PDF/print-on-demand formats. This initiative is part of a comprehensive effort by the University of PEI to deliver quality educational content while reducing the high costs of an undergraduate education. While ideally suited to electronic formats, the Library's Espresso Book Machine can be used to generate a perfect-bound print version of the work for those students that would prefer it.

Scanning

The Library offers multiple scanning solutions: two automatic document feeder/flatbed multi-function devices for copying and scanning, two small portable 35mm film/slide scanners, and two KIC Mini book scanners for scanning bound materials efficiently.

The Library also has an advanced digitization lab, which supports the digitization of historical and archival materials related to Prince Edward Island and UPEI.

Research Data Services & Scholarship Support

Virtual Research Environment

The Library's award-winning Virtual Research Environment (VRE) provides a collaborative, secure web-based space for research groups to share, organize, store, and access documents and data. Research projects can

present a professionally designed "public face" to their efforts. Further information about VREs is available at http://library.upei.ca/vre. Note: as of March 2021, the VRE program is on a temporary hiatus from accepting new projects due to strains on staff and resources.

Research Data Management Services

The Library, in cooperation with ITSS and UPEI Research Services, provides a suite of research data management services through https://data.upei.ca, including educational resources, a data management planning tool, and a repository for archiving/publishing final datasets.

IslandScholar

The Library has a repository for faculty and student scholarly works, called IslandScholar, that contains citations and some full text for some works (i.e., pre-print, post-print, published pdf). It contains graduate student theses and graduate projects. Users can search for individual publications or browse for publications by author or department.

Other Services Located in the Library

The Library now hosts working space for the campus Writing Centre within the Learning Commons area, providing a useful synergy for students working on papers.

The Library also hosts the Accessibility Services testing space, providing a quiet work area for students with relevant access needs, as arranged through the campus Accessibility Services office. In addition, the Centre for Teaching and Learning works closely with the Library and is located in the same building.

Appendix F – Letters of Support

F.1: Government of Prince Edward Island: Honorable Stephen Myers, Minister of Environment, Energy and Climate Action Environment, Energy and Climate Action

F.2: Cleantech Academy: Sandra Moore, Director

F.3: Holland College: Dr. Alexander (Sandy) MacDonald, President

F.4: Lennox Island First Nation: Drew Bernard, Energy Lead

F.5: Efficiency Canada: Abhilash Kantamneni, Director of Action Research

Prince Edward Island
CANADA

Environment, Energy and Climate Action

Environnement, Énergie et Action climatique

Île-du-Prince-Édouard
CANADA

Office of the Minister
PO Box 2000, Charlottetown
Prince Edward Island
Canada C1A 7N8

Bureau du ministre
C.P. 2000, Charlottetown
Île-du-Prince-Édouard
Canada C1A 7N8

April 30, 2024

Dr. Greg Keefe, DVM, MSc, MBA
Interim President and Vice-Chancellor
University of Prince Edward Island
550 University Avenue
Charlottetown, PE C1A 4P3

Dear Dr. Keefe:

RE: Letter of Support, UPEI Proposed Master of Leadership in Cleantech Program; Maritime Provinces Higher Education Commission

To Whom It May Concern:

The Government of Prince Edward Island (PEI) fully supports the University of Prince Edward Island's (UPEI) proposed Master of Leadership in Cleantech program. The Province has been creating and building a cleantech ecosystem with a solid infrastructure to support it, and UPEI's master's program is an integral part of this ecosystem which we have been financially supporting. We have a vision to establish an industry-led cluster and designation that attracts and facilitates the growth of companies, entrepreneurs, and talent focused on technological advances, processes, and know-how contributing to key growth. With the knowledge that we can do more, the Province has set a more aggressive net zero target to be reached by 2040, and a key component to make this a reality is the development of needed academic programs that can propel both recent graduates and seasoned professionals lead and transition our Province, Canada, and the world to a more sustainable future.

A key component of this vision is the establishment of the Cleantech Park in Georgetown, Prince Edward Island, which will bring together many provincial priorities such as education, economy, and environment to help create a new sector for growth in PEI. The Park will be home to the Cleantech Innovation Centre and the Cleantech Academy, the cornerstone of the Centre once completed. The Cleantech Academy is a collaborative initiative between our government and PEI's post-secondary institutions, UPEI and Holland College. The mission of the Academy is to inspire and advance leaders and change-makers to accelerate the path to net zero from interdisciplinary perspectives. The UPEI master's program will be housed in the Centre, giving their students access to a strong network of government, industry, and community members

involved in cleantech. This will enhance and add to the strong curriculum that UPEI has developed for their master's program. There is a growing list of employers on PEI, the Province included, who are ready to support and hire graduates of the program into their organizations.

The interdisciplinary program, which includes Cleantech Science Fundamentals; Governance, Policy, and Regulations; Environmental Justice and Equity; Innovation, Technology, and Business; Leadership; Critical Thinking and Problem-Solving; and Collaboration and Communication will produce a talent pool of leaders to help our industries and communities adopt and create clean solutions for a more sustainable future, supporting PEI's path to net zero.
We have no doubt that UPEI's Master's of Leadership in Cleantech will attract local, national, and global applicants given its interdisciplinary approach and the strong infrastructure we are creating on the Island to support such a program.

Sincerely,

Hon. Steven Myers,
Minister

April 29, 2024

RE: Letter of Support for Proposed Master of Leadership in Cleantech Program

To Whom It May Concern:

On behalf of the Cleantech Academy, I am writing in support of the proposed Master of Leadership in Cleantech program at the University of Prince Edward Island (UPEI). This 16-month, professional master's degree is the first of its kind in Atlantic Canada and will be a vital component of building a talent pool of leaders to assist local, national, and global governments, industries, and communities transition towards net zero futures.

Prince Edward Island is poised to be Canada's first net zero province. To do that and reach provincial targets of net-zero by 2040, we need to ensure that we have a workforce ready to navigate change and adapt to innovation. UPEI's Master of Leadership in Cleantech interdisciplinary program is focused on preparing the leaders Prince Edward Island needs to get to net-zero. Developed by an inter-disciplinary team of faculty from numerous faculties including business and engineering, this program will create leaders who are able to support industries and communities to create and/or adopt clean solutions that improve efficiency, decrease operating costs, and contribute to a just and sustainable future provincially, nationally, and internationally.

This new interdisciplinary program at UPEI will be supported by the Cleantech Academy, a unique collaboration between the Government of Prince Edward Island, Holland College, and UPEI. The mission of the Academy is to inspire and advance leaders and change-makers to accelerate the path to net zero from interdisciplinary perspectives. The Cleantech Academy will support programs at both of our post-secondary institute partners to ensure that students are placed in experiential cleantech learning opportunities across the province with businesses, communities, innovators, and researchers. The Cleantech Academy and the UPEI master's program will be housed in the Cleantech Innovation Centre which will be in Georgetown, Prince Edward Island.

I am confident that this unique, multi-disciplinary program will contribute greatly to PEI's cleantech ecosystem. This is a program that was collaboratively developed by diverse faculty in consultation with government and various cleantech stakeholders from across PEI and Canada. The Cleantech Academy will support the capstone project in this new UPEI Master's program by connecting the interests of students with the needs of municipalities, industries, government, and innovators. I applaud UPEI for creating a graduate program that supports students from diverse backgrounds to develop into the cleantech leaders needed to help PEI, Canada, and the world increase their adoption of sustainable practices and innovations to reduce emissions and negate environmental harm.

Sincerely,

Sandra Moore

Sandra Moore
Director, Cleantech Academy and Innovation Centre
Georgetown, Prince Edward Island
sandramoore@gov.pe.ca
(902) 213 - 8436

HOLLAND COLLEGE

PRESIDENT'S OFFICE
140 Weymouth Street
Charlottetown, PE
Canada C1A 4Z1

t 1.902.566.9510
f 1.902.566.9509
w hollandcollege.com

April 24, 2024

RE: Letter of Support for Proposed Master of Leadership in Cleantech Program

To Whom It May Concern,

I am writing to express my support for the proposed Master of Leadership in Cleantech program at the University of Prince Edward Island (UPEI). This 16-month professional master's degree is the first of its kind in Atlantic Canada.

The development of this program has been part of the Province of Prince Edward Island's cleantech ecosystem within the Cleantech Academy, a collaborative initiative between the Government of Prince Edward Island, and PEI's post-secondary institutions, UPEI and Holland College. This partnership aims to cultivate leaders and innovators dedicated to accelerating our journey toward net-zero emissions, drawing on a diverse range of disciplines.

The Royal Bank of Canada projects that the shift to net zero could generate up to 400,000 new jobs in Canada by 2030. Similar trends can also be seen globally as countries commit to net zero targets. In response, UPEI, in partnership with Holland College and the Province of PEI, is eager to foster a group of skilled professionals through post-secondary programs at the Cleantech Academy. These graduates will be pivotal in helping governments, industries, and communities' worldwide transition to sustainable energy solutions.

The proposed UPEI program promises to equip students with the necessary skills for success in this sector. It emphasizes an interdisciplinary approach covering areas such as Cleantech Science Fundamentals, Governance, Policy, and Regulations, Environmental Justice and Equity, and more. This breadth of training ensures that graduates are well-prepared to lead and innovate within the cleantech industry.

Furthermore, the ongoing collaboration between UPEI and Holland College enriches this initiative by having the possibility to share resources such as industry speakers, foster industry and community partners for courses and capstones, and joint projects, and mutual promotion of programs to a broad audience of prospective students and alumni.

I am confident that UPEI's innovative program will not only attract a diverse group of domestic and international students but will also significantly contribute to Prince Edward Island's and the global push towards a sustainable future. We are excited about the program's development and anticipate a productive continuation of our partnership with UPEI.

Thank you for considering this endorsement of UPEI's Master of Leadership in Cleantech program.

Sincerely,

Dr. Alexander (Sandy) MacDonald, Cert. Psych.
President

Lennox Island First Nation
2 Eagle Feather Trail
Lennox Island, PE, C0B 1J0

May 16, 2024

RE: Letter of Support for Proposed Master of Leadership in Cleantech Program

To Whom It May Concern,

I am writing in support of the proposed Master of Leadership in Cleantech program at the University of Prince Edward Island (UPEI). This 16-month, professional master's degree is the first of its kind in Atlantic Canada and necessary to build a talent pool of leaders to assist local, national, and global governments, industries, and communities transition towards more sustainable energy sources.

The program's interdisciplinary focus of: Cleantech Science Fundamentals; Governance, Policy, and Regulations; Environmental Justice and Equity; Innovation, Technology, and Business; Leadership; Critical Thinking and Problem Solving; and Collaboration and Communication will produce a talent pool of leaders to help industries and communities adopt and create clean solutions, supporting Prince Edward Island's (PEI) and other's path to net zero and beyond.

The Royal Bank of Canada estimates that the transition to net zero could create up to 400,000 new jobs in Canada by 2030. In addition to Canada, countries around the world have set specific net zero targets, so we can expect job creation in the cleantech sector to increase globally. We have already begun adding to the pool of new jobs in the cleantech industry. Examples of how we plan to support UPEI's master's program are by providing case studies and industry speakers throughout their program, as well as capstone projects for their students, the culmination of their 16-month program. We are confident that graduates of the program will be hired into our organization and in our industry in leadership positions such as Sustainability Directors, Policy Analysts, and Environmental Regulatory Advisors. As the world transitions toward more sustainable energy sources, a skilled and knowledgeable workforce who can lead and develop solutions is essential for the successful implementation and growth of this industry which I believe UPEI's master's program accomplishes. (Continued)

I am assured that UPEI has the infrastructure and human resources to support and sustain this program. In fact, the development of this program has been part of the Province of Prince Edward Island's cleantech ecosystem within the Cleantech Academy, a collaborative initiative between the Government of Prince Edward Island, and PEI's post-secondary institutions, UPEI and Holland College. The mission of the Academy is to inspire and advance leaders and change-makers to accelerate the path to net zero from interdisciplinary perspectives. The Cleantech Academy and the UPEI's master's program will be housed in the Cleantech Innovation Centre which will be in Georgetown, Prince Edward Island.

The path to reaching net zero emissions and beyond requires collaboration, innovation, leadership, knowledge, and change agents. This program will attract both domestic and international students of those backgrounds with its interdisciplinary approach and will support student success and wellbeing. We are thrilled that this program has been developed at UPEI.

Sincerely,

Drew Bernard

Energy Lead

Lennox Island First Nation

902-315-3053

Efficiency Canada
c/o Carleton University
1125 Colonel By Drive
Ottawa, ON K1S 5B6

May 14, 2023

RE: Letter of Support for Proposed Master of Leadership in Cleantech Program

To Whom It May Concern:

I am writing in support of the proposed Master of Leadership in Cleantech program at the University of Prince Edward Island (UPEI).

Efficiency Canada is the national voice for an energy efficient economy. We envision a future where Canada uses energy efficiency to its fullest potential. This means maximizing the benefits of energy efficiency resulting in a sustainable environment, a productive economy, and a just and equitable society. Efficiency Canada is housed at Carleton University's Sustainable Energy Research Centre, which is located on the traditional unceded territories of the Algonquin nation. I serve as the Director of Action Research at Efficiency Canada, specializing in research on net-zero aligned contractor business models.

In my view, this professional master's degree program – first of its kind in Atlantic Canada - is necessary to advance Canada's sustainable energy goals. A talented pool of leaders can be the cornerstone of Canada's sustainable energy future, serving their communities by assisting governments, industries, and communities in sustainable transitions.

While this program is rooted in University of PEI and surrounding communities, I firmly believe that its interdisciplinary focus will produce a talent pool of leaders that will support industries and communities across Canada (and beyond) in their path to a net-zero future. As the world transitions toward more sustainable energy sources, a skilled and knowledgeable workforce who can lead and develop solutions is essential for the successful implementation and growth of this industry which I believe UPEI's master's program accomplishes.

I have been privileged to be familiar with Province of PEI's cleantech ecosystem and its key players. I've been a visiting guest speaker at Holland College and have benefitted (and continue to benefit) from many productive conversations with their instructors and faculty on areas of mutual interest – skilled workforce training. I have also had the distinct pleasure of touring PEI's Cleantech Academy site, and meeting with the Academy's key

Efficiency Canada
c/o Carleton University
1125 Colonel By Drive
Ottawa, ON K1S 5B6

leaders, researchers, teachers, partners, and stakeholders during my tour of PEI province earlier in the year. Based on the strength of these experiences, I am confident that UPEI and its partners have the infrastructure and human resources to unlock the full potential of this program.

The path to reaching net zero emissions and beyond requires collaboration, innovation, leadership, knowledge, and change agents. As a former international student myself that made a successful transition to a career in sustainable energy, this program in my view is likely will attract both domestic and international students with diverse backgrounds and hone their skills to participate meaningfully in the clean energy transition.

I am thrilled that this program has been developed at UPEI and happy to provide this letter indicating my support.

Sincerely,

Abhilash Kantamneni
Director of Action Research
(expert on aligning home trades and skilled workforce with net-zero pathways)

Appendix G – Financial Support Information

G.1: Letter of Financial Support from Government of Prince Edward Island: Honorable Stephen Myers, Minister of Environment, Energy and Climate Action Environment, Energy and Climate Action

G.2: Sub-Agreement – PEI Cleantech Academy – Phase I

G.3: Sub-Agreement – PEI Cleantech Academy – Phase I, Phase II and Phase III

Prince Edward Island
CANADA

Environment, Energy and Climate Action

Environnement, Énergie et Action climatique

Île-du-Prince-Édouard
CANADA

Office of the Minister
PO Box 2000, Charlottetown
Prince Edward Island
Canada C1A 7N8

Bureau du ministre
C.P. 2000, Charlottetown
Île-du-Prince-Édouard
Canada C1A 7N8

July 31, 2024

Wendy Rodgers
President, University of Prince Edward Island
550 University Avenue
Charlottetown, PE C1A 4P3

Dear Wendy,

It was a pleasure to meet you recently at the Canadian Center for Climate Change and Adaptation in St. Peter's. As discussed during our time together, the Government and my department work closely with the University of Prine Edward Island on many fronts.

I am very proud of our recent work in the area of research and development. Furthermore, I have very ambitious plans to bring our province to Net Zero by 2040. I am grateful for all the support and leadership U.P.E.I has provided on this journey.

Also, I have a clear vision for Cleantech growth in our province and UPEI is an integral part of the plan. I am very pleased with the recent progress with our Cleantech Academy and our plans to build a net-zero community in Georgetown. Our educational partners will be pivotal to the success of our endeavors in the cleantech space. Therefore, I assure you that the Government of PEI will support the University of Prince Edward Island's Master of Cleantech Leadership and Transformation program. Specifically, base operational funding will be provided from 2025 to 2030, ensuring long-term success.

I look forward to further conversations and partnerships in the coming weeks and months.

Sincerely,

Hon. Steven Myers,
Minister

SUB-AGREEMENT – PEI CLEANTECH ACADEMY – PHASE I

THIS AGREEMENT made this 29 day of April, 2022.

BETWEEN: **UNIVERSITY OF PRINCE EDWARD ISLAND,** a university existing under the laws of the Province of Prince Edward Island, (hereinafter referred to as **"UPEI")**

OF THE FIRST PART

AND: **HOLLAND COLLEGE,** of 140 Weymouth Street, Charlottetown, Prince Edward Island (hereinafter referred to as **"Holland College")**

OF THE SECOND PART

WHEREAS Holland College has entered into a funding agreement with the Government of Prince Edward Island, to support Phase I and Phase II of the PEI Cleantech Academy (the "Prime Agreement"), to assist with planning and establishment of the Academy (the "Project")

AND WHEREAS Government had a vision to establish an industry-led cluster and destination that attracts and facilitates the growth of companies, entrepreneurs and talent focused on advances in technologies, processes and know-how that contribute to key growth

AND WHEREAS the Academy will offer a certificate program and master's degree in Cleantech leadership, a joint initiative of Holland College and the University of Prince Edward Island ("UPEI")

AND WHEREAS provincial government funding is necessary to support the establishment of the Academy and the annual operations.

AND WHEREAS the learning institutions have requested funding to finance costs associated with Phase I and Phase II of the PEI Cleantech Academy initiative through a funding agreement (the "Prime Agreement") with Holland College.

AND WHEREAS UPEI has agreed to collaborate with Holland College in assisting with the planning and establishment of the Academy (the "Project);

AND WHEREAS Holland College and UPEI have agreed to enter into this Agreement ("Agreement") to set out their respective responsibilities and commitments in relation to this collaboration;

THEREFORE in consideration of the mutual covenants, promises, and agreements contained in this Agreement, and other good and valuable consideration, the Parties to this Agreement agree as follows:

1. **Prime Agreement**

1.1. This Agreement is subject to the terms and conditions of the Prime Agreement, and any amendments thereto.

2. **Scope of Work**

2.1. UPEI acknowledges that as recipient of funds from Holland College it will be responsible for certain activities and financial obligations, as agreed upon by UPEI and Holland College. UPEI agrees to perform its financial and administrative duties as set out in the work plan outlined in the Prime Agreement attached hereto as Schedule "A", as may be amended by mutual written agreement of UPEI and Holland College.

3. **Schedule of Payments**

3.1. Holland College agrees that the funds under the Prime Agreement in the amount of $187,500 are to be used to support the salary, benefit and any other related operational costs of the Program Coordinator position to be situated at UPEI. Holland College shall pay funds to UPEI upon receipt of invoice and as per these instalments:

3.1.1. 90% upon signing of this agreement
3.1.2. 10% based on submission of report

4. **Progress Reporting**

4.1. UPEI shall provide to Holland College with all information relating to the Project required by Holland College to fulfill the reporting requirements set out in the Prime Agreement in a timely manner.

5. **Confidentiality**

5.1. UPEI and Holland College may disclose confidential information, which shall be clearly identified as such in writing ("Confidential Information"), one to the other to facilitate work under this Agreement. Such Confidential Information shall be safeguarded and not disclosed to anyone without a "need to know" within UPEI or Holland College. Each Party shall use its best efforts to protect such Confidential Information from disclosure to third parties.

5.2. The obligation to keep confidential shall however not apply to information which:
(a) is already known to the Party to which it is disclosed; or
(b) becomes part of the public domain without breach of this Agreement; or
(c) is obtained from third parties which have no confidentiality obligations to the contracting Parties; or

(d) is authorized for release by the disclosing Party or is required by law to be disclosed.

6. Freedom of Information and Protection of Privacy Act

The parties acknowledge that this contract is subject to the *Freedom of Information and Protection of Privacy Act*, R.S.P.E.I. 1988, c. F-15.01, and information provided in or pursuant to this contract may be subject to disclosure under the *Freedom of Information and Protection of Privacy Act*. The parties may be consulted prior to the disclosure of information in accordance with the provisions of the *Freedom of Information and Protection of Privacy Act*..

7. Term and Termination

7.1. This Agreement shall come into effect on March 1, 2022 and remain in effect until March 31, 2026.

7.2. Either Party shall be entitled to terminate this Agreement upon 90 days' written notice to the other Party.

8. Notices

Any notice or other communication by the Parties under this Agreement shall be in writing and shall be delivered personally to the other or sent by fax to the following addresses:

Holland College:
Dr. Alexander (Sandy) MacDonald
Holland College
140 Weymouth Street
Charlottetown, PE
C1A 4Z1

UPEI:
Vice-President, Administration & Finance
University of Prince Edward Island
550 University Avenue
Charlottetown, PE
C1A 4P3

9. Entire Agreement

This Agreement constitutes the entire agreement between the Parties with respect to the subject matter hereof and supersedes all prior agreements, understandings, negotiations and discussions, whether written or oral. There are no conditions, covenants, agreements, representations, warranties or other provisions, express or implied, collateral, statutory or otherwise, relating to the subject matter hereof except as herein provided.

10. Governing Law

This Agreement shall be interpreted and applied in accordance with the laws and in the Courts of the Province of Prince Edward Island.

IN WITNESS WHEREOF, the duly authorized officers of the Parties have executed this Agreement as of the day and year first written above.

HOLLAND COLLEGE

Dr. Alexander (Sandy) MacDonald
President

UNIVERSITY OF PRINCE EDWARD ISLAND

Dr. Katherine Gottschall Pass
Vice President, Academic & Research (Interim)

UNIVERSITY OF PRINCE EDWARD ISLAND

Tara Judson
Comptroller

SCHEDULE A
PRIME AGREMENT

SUB-AGREEMENT – PEI CLEANTECH ACADEMY
Phase I, Phase II and Phase III
Amendment No. 1

THIS AGREEMENT made this 17 day of October, 2023.

BETWEEN: **UNIVERSITY OF PRINCE EDWARD ISLAND,** a university existing under the laws of the Province of Prince Edward Island, (hereinafter referred to as **"UPEI"**)

OF THE FIRST PART

AND: **HOLLAND COLLEGE,** of 140 Weymouth Street, Charlottetown, Prince Edward Island (hereinafter referred to as **"Holland College"**)

OF THE SECOND PART

WHEREAS Holland College entered into a funding agreement with the Government of Prince Edward Island, to support Phase I and Phase II of the PEI Cleantech Academy, dated 29 day of March 2022 (the "Prime Agreement"), attached hereto as Schedule A.

AND WHEREAS Holland College and UPEI entered into a Sub Agreement on 29 day of April, 2022 ("Agreement") to set out their respective responsibilities and commitments in relation to this collaboration, attached hereto as Schedule B.

AND WHEREAS Holland College and UPEI jointly submitted a request to the Government of Prince Edward Island to amend Phase I and Phase I of the budget in the Prime Agreement and to include Phase III in light of significant project changes (the "Amendment"), attached hereto as Schedule C;

AND WHEREAS Government of Prince Edward Island has agreed to amend the budget and include Phase III, attached hereto as Schedule D;

AND WHEREAS Holland College and UPEI have agreed to amend the Sub-Agreement.

THEREFORE in consideration of the mutual covenants, promises, and agreements contained in this Agreement, and other good and valuable consideration. the Parties to this Agreement agree as follows:

The following amendments shall be made:

Section 3. Schedule of Payments shall be deleted and replaced with the following:

Section 3. Schedule of Payments

PART 1 Funding Breakdown

Holland College agrees that the funds under the Prime Agreement and Amending Agreement for Part I in the amount of $198,098 are to be used to support the salary, benefit and any other operational costs of the Program Manager position to be situated at UPEI. Holland College shall pay funds to UPEI upon receipt of invoice

Component	Year 1 April 2022 – March 2023	Year 2 April 2023- March 2024	Year 3 April 2024 – March 2025	Year 4 April 2025 – March 2026	Total
UPEI Program Manager $83, 024 salary, 19% benefits and 3% COLA. Y2 pro-rata salary		$93,282	$104,816		$198,098
TOTAL					**$198,098**

PART 3 Funding Request

Holland College agrees that the funds under the Amending Agreement for Part III in the amount of $185,646 are to be used to support the salary and benefits of the Administrative Assistant position, travel, UPEI Consultancy Services for curriculum development, and office and administrative expenses as outlined below. Holland College shall pay funds to UPEI upon receipt of invoice.

Component	Year 1 April 2022- March 2023	Year 2 April 2023 – March 2024	Year 3 April 2024 – March 2025	Year 4 April 2025 – March 2026	Total
UPEI Administrative Assistant - $57, 551 salary, 19% benefits and 3% COLA		$70, 540	$72,656		$143,196
UPEI - Travel		$13 450			$13 450
UPEI Consultancy Services – Curriculum Development		$15,000			$15.000
UPEI – Office & Administrative Expenses – office		$14,000			$14,000

equipment, supplies, technology					
TOTAL					**$185,646**

Total amount allocated to UPEI from Holland College is **$383,744.**

Total amount paid to UPEI under Phase I & II from Holland College is **$168,750.**

UPEI to invoice Holland College for **$214, 994.**

Section 4. Progress Reporting shall be deleted and replaced with the following:

Section 4. Progress Reporting

4.1 UPEI shall provide quarterly financial reports to Holland College with all information relating to the project to fulfill the reporting requirements set out in the Prime and Amending Agreement in a timely manner.

No other terms or conditions of the above mentioned contract shall be negated or changed as the result of this here stated amendment.

IN WITNESS WHEREOF, the duly authorized officers of the Parties have executed this Agreement as of the day and year first written above.

HOLLAND COLLEGE

Dr. Alexander (Sandy) MacDonald
President

UNIVERSITY OF PRINCE EDWARD ISLAND

Dr. Greg Naterer
Vice President, Academic & Research

UNIVERSITY OF PRINCE EDWARD ISLAND

Breanne MacInnis
Acting Comptroller

SCHEDULE A
PRIME AGREMENT

SCHEDULE A
PRIME AGREMENT

SCHEDULE "A"

FUNDING AGREEMENT – PEI CLEANTECH ACADEMY – PHASE I & PHASE II

THIS AGREEMENT made this _____ day of March, 2022.

BETWEEN: GOVERNMENT OF PRINCE EDWARD ISLAND, as represented by the Minister of ENVIRONMENT, ENERGY AND CLIMATE ACTION (hereinafter referred to as the "Government")

OF THE FIRST PART

AND: HOLLAND COLLEGE of 140 Weymouth Street, Charlottetown, Prince Edward Island (hereinafter referred to as "Holland College")

OF THE SECOND PART

WHEREAS Government has a vision to establish an industry-led cluster and destination that attracts and facilitates the growth of companies, entrepreneurs and talent focused on advances in technologies, processes and know-how that contribute to key growth;

AND WHEREAS a key component of this vision is the establishment of a Cleantech Park, which will be home to the Cleantech Learning and Innovation Centre and the PEI Cleantech Academy will be the cornerstone of the Centre.

AND WHEREAS the Academy will offer a certificate program and a master's degree in Cleantech leadership, a joint initiative of Holland College and the University of Prince Edward Island ("the University").

AND WHEREAS provincial government funding is necessary to support the establishment of the Academy and the annual operations.

AND WHEREAS the learning institutions have requested funding to finance costs associated with Phase 1 and Phase II of the PEI Cleantech Academy to assist with planning and establishment of the Academy.

AND WHEREAS the Government has agreed to provide funding to support Phase I and Phase II of the PEI Cleantech Academy initiative through a funding agreement with Holland College.

NOW THEREFORE the parties agree that the terms and conditions of their relationship are as follows:

Purpose

1. The purpose of this Agreement is to enable Holland College and the University to develop a certificate program and master's degree in Cleantech leadership and to provide funding to support establishment of the Academy and the annual operations.

Covenants of Holland College and Government

2. Holland College shall perform the services, assume all those responsibilities and diligently execute all those activities described in the attached Schedule "A" (the "Work"), in a manner satisfactory to the Government.

3. (a) Subject to the termination clause contained in the Termination section of this Agreement, the term of this Agreement shall commence on the 1st day of March 2022, and end on the 31st day of March 2026 (the "Term").

(b) Subject to the termination clause contained in the Termination section of this Agreement and notwithstanding the date of signing of this Agreement, it is acknowledged by both Parties that Holland College commenced the performance of the Work on the 1st day of March 2022. It is further agreed that the amount of $2,020,600 is the maximum amount to be paid for the Work and includes all amounts which may be owed for Work since the 1st day of March 2022

Payments, Records and Accounts

4. The Government will provide funding in support of the initiative to a maximum amount of $2,020,600, inclusive of taxes, payable as follows:

- $1,818,548 payable upon signing of this Funding Agreement; and
- $202,060 payable upon completion of the following components:
  - Phase I – environmental scan;
  - Phase I – recruitment of Project Manager and Program Coordinators; and
  - Phase I – recruitment of Academy Director.

5. Holland College agrees that funds under this Agreement in the amount of $187,500 are to be used to support the salary, benefit and any other related operational costs of the Program Coordinator position to be situated at the University of Prince Edward Island and may not be used for any other purpose.

6. Holland College shall keep proper accounts and records of the cost of the work and of all expenditures or commitments made under this agreement including the related invoices, receipts and vouchers. Such accounts, invoices, receipts and vouchers shall, at all times, be open to audit, copying, extracting information and inspective by authorized representatives of the Government. Holland College shall afford all facilities for the audits, inspections, copying, extractions and inspections and shall furnish the Government and its authorized representatives with all information that is requested from the accounts, records, invoices, receipts and vouchers.

7. Subject to statutory limitations, Holland College shall not, without the consent of the Government, dispose of the accounts, records, invoices, receipts and vouchers related to this Agreement, but shall preserve and keep the same available for audit, copying, extracting information and inspections at any time for a period seven (7) years after the completion of the project.

Conditions and Records of Employment

8. a) The parties agree that Holland College is entitled to no other benefits or payments whatsoever than those specified in Payments, Records and Accounts hereof.

b) The parties agree that entry into this agreement will not result in the appointment or employment of the employees of Holland College as an officer, clerk or employee of the Government, nor shall the Civil Service Act, R.S.P.E.I. 1988, Cap. C-8 apply.

9. a) Holland College agrees to accept sole responsibility to submit any applications, reports, payments or contributions for Sales Taxes, Income Tax, Canada Pension Plan, Employment Insurance, Workers' Compensation assessments, Goods and Services Tax or any other similar matter which the Watershed Group may be required by law to make in connection with the work to be performed under this agreement.

b) Holland College shall comply with all provincial and federal legislation affecting conditions of work and

wage rates including the Employment Standards Act R.S.P.E.I. 1988, Cap E- 6.2, the Workers Compensation Act R.S.P.E.I. 1988 Cap W-3 or any other laws that impose obligations in the nature of employers' obligations.

c) Holland College agrees to accept the full cost of doing those things required under subparagraphs 9(a) through 9(b) above, and will not charge or seek reimbursement from Government in any way; such costs having been taken into consideration and included in the rates of payment stipulated in Payments, Records and Accounts above.

10. Any payment under this Agreement is subject to a provincial appropriation for the payment being approved by the Legislative Assembly of Prince Edward Island for Government's fiscal year in which payment is to be made.

Public Announcements

11. Any public announcement regarding this Agreement shall be jointly prepared and agreed by both Government and Holland College prior to release.

12. Government shall be acknowledged as a funding partner in any public communications related to this Agreement and related outcomes.

Reports

13. Holland College shall provide the Government with reports as outlined below:

a) Advise Government on the successful consultant for the environmental scan and governance model & operational plan.
b) Provide Government with a draft copy of the environmental scan report and governance model & operational plan. Provide Government an opportunity to provide feedback on draft environmental scan report and governance model & operational plan prior to finalizing.
c) Provide quarterly updates/briefings to Government on the Phase II and Phase II objectives. Clearly communicate any delays or issues with meeting the objectives of Phase I and Phase II initiatives.
d) Provide Government with status reports with respect to recruitment of Academy positions.
e) Provide Government with annual Financial Statements with respect to the PEI Cleantech initiative and the Academy operations. Government will review those costs to confirm that Government's funding contributions align with the College's total agreement costs (Schedule A).

Administration

14. Government shall provide such support, direction, decisions and information to Holland College as it deems necessary or appropriate under this Agreement and may appoint a person to administer this Agreement and communicate with Holland College.

Termination of Agreement

15. Notwithstanding other provisions of this Agreement, the Government may terminate this Agreement in its entirety, or any part thereof, at any time by a notice in writing, signed by or on behalf of the Government and either delivered to the Holland College or mailed to the Holland College's address at the last-known place of business. This Agreement shall be determined to have ended upon the date of delivery, sending by electronic communications or mailing of such notice in which event the Holland College shall have no further claim against the Government, except for the following: The Holland College will be paid pursuant to and in accordance with

paragraph 3 hereof for the work performed up to the date of termination by written notice. Such payment shall include all firm commitments made by the Holland College prior to the receipt of the notice and for which the Holland College is liable for payment, less any sums paid by the Government or the Holland College on account.

16. Notice in this Agreement is deemed to have been effected on the day of delivery in person, facsimile, electronic communication, or upon mailing of the notice.

Confidentiality and Copyright

17. (a) Any and all information, knowledge or data made available by the Government to Holland College as a result of this Agreement shall be treated as confidential information.

18. (a) The parties agree that all lists, reports, information, statistics, compilations, analyses, and other data generated or collected in any way as a result of this Agreement are the exclusive property of Holland College and will be handled in accordance with all relevant Holland College policies and practices.

(b) The parties agree the Holland College owns the copyright on all aspects of the project, including all manner of data as set out in paragraph 10 (a) above. Copyright will be handled in accordance with all relevant Holland College policies and practices.

Freedom of Information and Protection of Privacy Act

19. Information contained in and collected in relation to this Agreement is subject to and is treated in accordance with the Prince Edward Island Freedom of Information and Protection of Privacy Act. For additional information see: http: www.gov.pe.ca/foipp.

Conflict of Interest

20. Holland College warrants that as at the date of this Agreement, no conflict of interest, or any circumstance that might interfere with independent and objective exercise of judgment, exists or is likely to arise in relation to execution of this Agreement or its subject matter. The Recipient shall immediately notify Government, in writing, if any such actual or potential conflict of interest should arise at any time during the Term. In the event Government discovers or is notified by Holland College of an actual or potential conflict of interest, Government, in its sole discretion, may either:

(a) allow Holland College to resolve the actual or potential conflict to the satisfaction of Government; or

(b) terminate the Agreement in accordance with the Termination section of this Agreement.

Indemnification and Assumption of Liability

21. Holland College shall indemnify and hold harmless the Government, its agents, representatives and employees from and against all claims, demands, losses, costs, damages, actions, suits or proceedings of every nature and kind whatsoever arising out of or resulting from the performance of work (herein called the "claims"), provided that any such claim is caused in whole or in part by any act, error or omission, including, but not limited to, those of negligence, of Holland College or anyone directly or indirectly employed by Holland College or anyone for whom Holland College may be liable.

22. (a) Holland College shall, without limiting its obligations or liabilities herein and at its own expense, insure its operations under a policy of Commercial General Liability Insurance in an amount not less than Two Million Dollars ($2,000,000) inclusive coverage per occurrence against bodily injury, personal injury and property damage, and

including Blanket Contractual Liability. The Government of Prince Edward Island is to be added as an additional insured under this policy.

(b) The policy required by this Agreement shall be in a form and with insurers satisfactory to the Government. The foregoing insurance shall be primary and not require the sharing of any loss by any insurer of government. A certificate of insurance shall be delivered to the Government at the time of signing of the Agreement and shall be subject to the Government's approval.

(c) All required insurance shall be endorsed to provide the Government with 60 days' advance written notice of cancellation or material change. Default of delivery or receipt by the Government shall not be construed as acknowledgment or concurrence that there has been compliance with the terms of this Agreement.

(d) Approval by the Government of any policy filed by the Holland College shall in no way relieve Holland College of its obligations to provide the insurance referred to in the Agreement, nor shall it imply that the policies are in accordance with the terms of this Agreement.

Notice

23. Any notice or correspondence to PEI Department of Environment, Energy and Climate Action, including inquiries with respect to this Agreement should be directed to:

Attn: Brad Colwill, Deputy Minister
Department of Environment, Energy & Climate Action
P.O. Box 2000, Charlottetown, PE, C1A 7N8
Email: bacolwill@gov.pe.ca
Phone: 902-620-3646

Entire Agreement

24. The parties acknowledge that Holland College will enter into an Agreement with the University of Prince Edward Island to support the salary, benefit and other related-operational costs associated with the establishment of a Program Coordinator position at UPEI and any other required arrangements resulting from this initiative, funding and Funding Agreement.

25. Subject to clause 24 above, this agreement shall not be assigned or subcontracted in whole or in part by Holland College without the prior written consent of the Government.

26. This agreement shall enure to the benefit of and be binding upon the parties hereto and, subject to above assignment and subcontracting clause, their executors, administrators, successors and assigns.

27. This agreement shall be interpreted and applied in accordance with the laws and in the Courts of the Province of Prince Edward Island.

28. This agreement, including Schedules A, B and C, constitute and express the entire agreement of the parties hereto and any amendment or addition thereto shall be in writing and signed by the respective parties.

THE REMAINDER OF THIS PAGE LEFT INTENTIONALLY BLANK

29. The headings are inserted in this Agreement for reference only and shall not form part of the Agreement.

IN WITNESS WHEREOF the parties thereto have executed this Agreement as of the day and year above written.

Signed, Sealed & Delivered
in the presence of:

Witness

Government of Prince Edward Island,
as represented by the Department of
Environment, Energy and Climate Action

Holland College

Witness

Authorized Signing Officer

SCHEDULE "A"
"THE WORK"

AGREEMENT BETWEEN THE

GOVERNMENT OF PRINCE EDWARD ISLAND

AND

HOLLAND COLLEGE

DATED THE _____ DAY OF _____, 2022

The scope of the work shall generally be as described below:

Objective / Purpose

1) **The Government has agreed to provide funding in support of Phase 1 of the PEI Cleantech Academy – specifically to support the development of a certificate program and master's degree in Cleantech leadership at Holland College and the University of Prince Island through a funding agreement with Holland College.**

   Phase I includes funding for those components as indicated below and more specifically outlined in the October 2021 Request for Funding submitted by the HC / UPEI Joint Working Group dated October 14, 2021 and attached to this Funding Agreement as Schedule B.

Component	Funding Amount
Environmental Scan Consultant	$70,000
Project Manager .	$312,500
Program Coordinator (Holland College)	$187,500
Program Coordinator (UPEI)	$187,500
Total	$757,500

2) **The Government agrees to provide funding in support of Phase II of the PEI Cleantech Academy – specifically to support the establishment of the Academy and the annual operations to March 31, 2026.**

   Phase II includes funding for those components as indicated below and more specifically outlined in the February 2022 Request for Funding as submitted by the HC / UPEI Joint Working Group dated February 25, 2022 and attached to this Funding Agreement as Schedule C.

Component	Funding Amount
Governance Model & Operational Plan	$84,000
Academy Director Recruitment	$56,000
Academy Director Salary / Benefits	$829,000
Administrative Assistant Salary / Benefits	$269,100
Office & administrative expenses	$25,000
Total	$1,263,100

3) Holland College shall provide the Government with reports as outlined in this Agreement and annual Financial Statements with respect to the PEI Cleantech Initiative and the Academy operations.

SCHEDULE "B"
"THE WORK"

AGREEMENT BETWEEN THE

GOVERNMENT OF PRINCE EDWARD ISLAND

AND

HOLLAND COLLEGE

DATED THE _____ DAY OF MARCH, 2022

[redacted]

SCHEDULE "C"
"THE WORK"

AGREEMENT BETWEEN THE

GOVERNMENT OF PRINCE EDWARD ISLAND

AND

HOLLAND COLLEGE

DATED THE _____ DAY OF MARCH, 2022

[redacted]

October 14, 2021

REQUEST FOR FUNDING FROM THE PROVINCE OF PEI FOR THE JOINT HOLLAND COLLEGE-UPEI CLEANTECH ACADEMY

October 2021

Holland College (HC) and the University of Prince Edward Island (UPEI) are jointly submitting this request for funding from the Province of PEI to assist with the planning and establishment of the Cleantech Academy, a joint initiative of HC and UPEI. This Academy will be an important asset in PEI to assist in addressing provincial net-zero greenhouse gas targets by providing leadership in the deployment of cleantech initiatives.

HC and UPEI have identified the need for initial government funding to support the following requirements during the development of this project:

- Part 1 (starting immediately; until program implementation, September 2023):
  - Environmental scan (starting immediately; anticipated completion in April 2022)
  - Project management (with recruitment process starting immediately; for a 2-year duration)
  - Academic program development (starting March 2022 (based on the key findings of the environmental scan); until program implementation, September 2023)
- Part 2 (January 2022 – September 2023)
  - Recruitment of Academy Director (starting January 2022)
  - Operational plan development (starting May 2022)
  - Additional program development support (starting April 2022)

These needs have been identified as key milestones to support the detailed planning related to the establishment of the Cleantech Academy. Having access to funding for these supports will enable HC and UPEI to build capacity and accelerate the timelines for development. HC and UPEI are seeking 100% funding support for any incremental costs, but also recognize the institutional investment of time and resources to carry out these initiatives.

The current request for funding is for Part 1 only. Additional funding requests will be made after key milestones have been reached.

PART 1 OBJECTIVES

HC and UPEI have created a Joint Working Group to support the next steps to establish the Academy. The Working Group has identified the following initial objectives (preliminary) for Part 1 of this project:

<u>Environmental Scan (Retain external consultant)</u>

Before any work is done to develop appropriate academic programming to be offered by the Academy, it is necessary to understand the current and anticipated future environments relevant to the CleanTech sector. Accordingly, the commissioning of a third-party, external consultant to carry out an environmental scan has been identified as a necessary first step in this process.

The Joint Working Group will oversee the commissioning of this environmental scan on behalf of both institutions. It will create the terms of reference, including the scope of work, and will lead the process to engage a consultant to carry out the work. The Joint Working Group will also oversee the work completed by the consultant and will approve the final environmental scan on behalf of the two institutions. The final draft environmental scan will be presented to key stakeholders, including the Minister and provincial government representatives, to ensure alignment with priorities and key directions. The approval of the environmental scan will conclude the engagement with the external consultant. The anticipated completion date is April, 2022.

Some of the key objectives of the environmental will scan include:

- gain an understanding of existing programs within Atlantic Canada, Canada and elsewhere;
- gain an understanding of the Province's overall priorities, including those related to Net Zero;
- identify opportunities for differentiation/uniqueness of the new Cleantech Academy; and
- identify priorities related to CleanTech for both government and industry stakeholders.

Project Management (Recruit/hire Project Manager)

The Joint Working Group has identified the need for a full-time Project Manager to oversee, coordinate and lead the day-to-day tasks associated with the Academy's development as defined in the master project management plan. The Project Manager will be hired ASAP and will be in place for two years to support the next phases of planning and development for the establishment of the Academy. This Project Manager would report directly to the Co-chairs of the Joint Working Group.

Some of the key responsibilities of the Project Manager include:

- provide the overall leadership, on behalf of the Joint Working Group, to implement the master project management plan;
- liaise with the environmental scan consultant to ensure the work is carried out as defined by the terms of reference and scope of work;
- act as the primary point-of-contact for the Joint Working Group in liaising with the various project stakeholders, including HC, UPEI, the Province, the PEI Energy Corporation, ACOA and industry representatives;
- provide overall coordination and support to both HC and UPEI for the development of the academic programs;
- provide overall coordination and support for the development of the operational plan; and
- liaise and coordinate with the PEI Energy Corporation and architect to ensure the building infrastructure and spaces meet the Academy's needs.

Academic Program Development (Recruit/hire two Program Coordinators)

The Academy's academic programs will be developed as per the policies and processes that currently govern academic program development for both HC and UPEI. As these policies and processes are quite different for each institution, the Joint Working Group has identified the need for separate program development support tailored to each institution's needs. Accordingly, two Program Coordinator positions—one for each institution—will be established

to support the creation and implementation of the Academy's academic programs. These positions will start in March 2022 in advance of the completion of the environmental scan and will continue until program implementation in September 2023. The two Program Coordinators will work closely with the Project Manager, the Joint Working Group and their respective institution to support alignment and the joint initiative.

PART 1 FUNDING REQUEST

Consistent with the Part 1 objectives defined above, HC and UPEI are seeking the following funding from the Province to support the work over the next 24 months that is identified in the master project management plan:

Item	Year 1	Year 2	Total
Environmental Scan Consultant	$70,000	N/A	$70,000
Project Manager [1]	$156,250	$156,250	$312,500
Program Coordinator (UPEI) [2]	$75,000	$112,500	$187,500
Program Coordinator (HC) [2]	$75,000	$112,500	$187,500
Total Funding Request	$376,250	$381,250	$757,500

1. Salary: ~$125k/year plus 25% benefits
2. Salary: ~$90K/year plus 25% benefits; prorated to 8 months in Year 1

We request that funding be disbursed to each institution separately as per the following breakdown:

- UPEI - funding for Environmental Scan Consultant, Project Manager and one Program Coordinator (Y1 $301,250; Y2 $268,750; total $570,000)
- Holland College - funding for one Program Coordinator (Y1 $75,000; Y2 $112,500; total $187,500)

Thank you in advance for your support for this exciting joint initiative between Holland College, UPEI and the Province. We also appreciate your understanding about the need to receive this support in the near future so that we can advance these priorities in a timely manner and achieve the key milestones as identified in the Master Project Management Plan.

Should you have any questions please do not hesitate to contact us.

Dr. Alexander (Sandy) MacDonald
President
Holland College
902-566-9510

Dr. Alaa Abd-El-Aziz
President and Vice-Chancellor
University of Prince Edward Island
902-566-0400

REQUEST FOR FUNDING FROM THE PROVINCE OF PEI FOR THE JOINT HOLLAND COLLEGE-UPEI CLEANTECH ACADEMY

Part 2: Establishment of Academy Director Position, and Development of the Governance Model and Operational Plan

Submitted: February 25, 2022

Holland College (HC) and the University of Prince Edward Island (UPEI) are jointly submitting this request for funding from the Province of PEI (the Province) to assist with the planning and establishment of the Cleantech Academy (the Academy), a joint initiative of HC and UPEI. This Academy will be an important asset in PEI to assist in addressing provincial net zero greenhouse gas (GHG) targets by providing leadership in the deployment of clean (and other) technologies.

HC and UPEI have identified the need for provincial government funding to support the establishment of the Academy (2021-2023) and the annual operations (beginning in the fiscal year 2023). It is important to ensure the level of commitment by the Province, in particular, as the recruitment and hiring of the Academy Director will take place over the upcoming months and this confirmation is essential to secure the right candidate for this important position.

This funding support is essential to advance these priorities:

- Part 1 request for funding was submitted in the fall of 2021 and included financial support for the development of an environmental scan, a project manager (for a dedicated period of time), and two Program Coordinators to aid in the development of the programs for the Academy. This work commenced in January of 2022 and is well underway.
- Part 2 request for funding includes a) the recruitment of the Academy Director and salaries and benefits for the first three years of employment, b) salaries and benefits for an Administration Assistant for the first three years of employment, and c) access to external expertise to support the development of a governance model and the multi-year operational plan. It is anticipated that funding will be in place by the end of March 2022 and that the implementation of these priorities will commence in April 2022. As outlined in the Master Project Management Plan, this timeline is critical to meet the requirements of the planned launch of the program. It is also critical that both institutions have confirmed support from the Province for the full amount of the operational financing for the Academy prior to the recruitment of the Academy Director position and recognizing that the full amount of the estimated operational financing requirements will not be identified until the fall of 2022 (in preparation for Funding Request Part 4 as identified below).
- Part 3 will focus on additional program development requirements (with funding in place by October 2022).
- Part 4 will focus on the five-year operational financing (with funding in place by March 2023).

These needs have been identified as key milestones to support the detailed planning related to the establishment of the Cleantech Academy. Having access to funding for these supports will enable HC and UPEI to build capacity and accelerate the timelines for development. HC and UPEI are seeking 100% funding support for these incremental costs, but also recognize the institution's in-kind investment of time and resources to carry out these initiatives.

Both Holland College and UPEI have dedicated people who are leading this initiative and form part of the Joint Working Group. Once the environmental scan has been completed and the direction of the Academy has become defined, other representatives of both institutions, from academic and

administrative areas, will become actively involved in the project and in supporting the successful establishment of the Academy.

The current request for funding is for Part 2 and recognizes the importance of the Province's commitment to the full operational financing requirements starting in April 2023. The operational model, which will be prepared in the fall of 2022, will include multi-year financial projections and identify operational financing requirements.

PHASE 2 OBJECTIVES

The HC/UPEI Joint Working Group has identified the following objectives for Part 2:

Recruitment of Academy Director (April to September 2022) and Salaries and Benefits

This funding request is in support of the following priorities:

- Engagement of third-party expertise to assist with the recruitment, selection and hiring process to secure the best candidate for the position of Academy Director (including travel-related costs for the potential candidates associated with the interview process).
- Salaries and benefits (including any associated relocation costs) for the Academy Director for the first three years of employment. A multi-year commitment to employment will be necessary to attract the highest quality candidate. It is recognized that annual salaries and benefits will become part of the operational plan (and operational financing from the Province) as of April 2023.
- Salaries and benefits for an Administrative Assistant (new position) for the first three years of employment. It is recognized that annual salaries and benefits will become part of the operational plan (and operational financing from the Province) as of April 2023.
- Office and administrative expenses for the Academy Director for the first fiscal year ending in March 2023, recognizing that the expenses thereafter will be part of the operational model and financing requirements. Note that office space will be provided in-kind by the institutions for the period of September 2022 to March 2023.

The Joint Working Group identified the need to establish the position of Academy Director at the same time as the commencement of the program development process and in advance of the development of the operational plan for the Academy. The Academy Director's leadership will be instrumental in guiding the future direction of the Academy. This will include fostering and developing relationships with the Province, industry and other stakeholders and planning for the launch of the Certificate program in September 2023. The Academy Director will work full-time at the Academy.

The Joint Working Group will oversee the recruitment, selection and hiring process. In order to access the highest quality candidates, the Joint Working Group has identified the need to engage a recruitment firm with networks and reach within and outside of PEI. This is especially important given the leadership level of the position and the nature of the role with a strong understanding of cleantech. This individual will be critical in driving the success of the Academy.

Governance Model and Operational Plan Development

The first priority, in advance of the recruitment of the Academy Director, is to define the governance model, which will be initiated in April of 2022. The initial stages of development of this model will help to define the role of the Academy Director and support the recruitment process.

Clearly defining the governance model is essential for this joint initiative. This will include how the University and College will work together, accountability and reporting structure for the Academy Director, as well as many other factors including decision making, level of authority and financial reporting. Determining the advisory structure, involving industry, government and other stakeholders, will also be part of this process.

In addition, there is a need to develop a five-year operational plan for the new Academy. This plan will be developed based on the outcomes of the environmental scan (which was developed as part of Phase 1) and the governance model.

The process for developing the operational plan will require input from the President of Holland College and Interim President of UPEI (herein referred to as 'Presidents'), the Joint Working Group, as well as several academic and administrative representatives from the University and College. This process will define what is needed to make the Academy a success and will clarify responsibilities and the working relationships between Holland College and the University.

The five-year operational plan will include vision, goals and priorities, high-level program overviews, as well as details related to marketing and operations, human resources, management and organization, financial projections (including capital costs) and other critical areas of the operations. The plan will also help to determine operational financing requirements.

The Presidents and senior administration of both institutions will be actively involved in the development and confirmation of the governance model. The Presidents will also provide guidance and direction during the planning process and approval of the final operational plan.

The Joint Working Group will engage a third-party consultant with expertise in governance, operational, and financial planning to support the Presidents with the development of the optimal governance model and support the Academy Director and team with the development of the operational plan. It is important that this process be initiated in April of 2022 and that funding be in place to support these efforts.

PART 2 FUNDING REQUEST

The HC/UPEI Joint Working Group is seeking the following funding from the Province to support key milestones beginning in April 2022. As mentioned previously, a commitment from the Province for the full amount of the operational financing for the Academy is needed prior to the recruitment of the Academy Director position (recognizing that the full amount of the estimated operational financing requirements will not be identified until the fall of 2022). The following funding request includes a multi-year commitment to the salaries and benefits for the Academy Director and the Administrative Assistant, recognizing that these expenses will become part of annual operating budget (and operating financing from the Province) as of April 2023.

Funding Request Part 2 – Beginning April 2022				
Key Milestone	**April 2022 to March 2023**	**April 2023 to March 2024**	**April 2024 to March 2025**	**April 2025 to March 2026**
Governance Model and Operational Plan – External third-party consulting expertise (to begin in April 2022)	$ 64,000	$ 0	$ 0	$ 0
Academy Director Recruitment – External third-party consulting expertise (including estimated travel-related expenses related to candidate interviews)	24,000	0	0	0
Academy Director Salary and Benefits (estimated seven months beginning in September during 2022-2023 fiscal year) Estimated salary range in first year is $180,000 – $275,000 plus 25% benefits Estimated $10,000 relocation costs 5% annual increase (rounded up)	102,500	220,200	232,205	244,000
Administrative Assistant Salary and Benefits (full-time position) (estimated seven months beginning in September during 2022-2023 fiscal year) -Estimated salary range in first year is $48,000 plus 25% benefits 2.5% annual increase (rounded up)	42,000	73,200	75,780	77,400
Office and administrative expenses for the Academy Director -Office supplies and technology (computers, phones) - $10,000 -Business development and travel - $10,000 Note: Office space will be provided in-kind for the first 7 months	20,000	To be determined as part of operational plan	To be determined as part of operational plan	To be determined as part of operational plan
Total Funding Request	$ 252,500	$ 293,200	$ 307,700	$ 321,400

Thank you in advance for your continued support for this important joint initiative between Holland College, UPEI and the Province. We also appreciate your understanding about the need to receive this support by the end of March 2022 so we can advance these priorities in a timely manner and achieve the key milestones as identified in the Master Project Management Plan.

Should you have any questions, please do not hesitate to contact us.

Sincerely,

Dr. Sandy MacDonald, Ph.D
President,
Holland College
902-566-9510

Dr. Greg Keefe, DVM, MSc, MBA
Interim President and Vice-Chancellor
University of Prince Edward Island
902-566-0400

SCHEDULE B
SUB-AGREEMENT

SUB-AGREEMENT – PEI CLEANTECH ACADEMY – PHASE I

THIS AGREEMENT made this 29 day of April, 2022.

BETWEEN: UNIVERSITY OF PRINCE EDWARD ISLAND, a university existing under the laws of the Province of Prince Edward Island, (hereinafter referred to as "UPEI")

OF THE FIRST PART

AND: HOLLAND COLLEGE, of 140 Weymouth Street, Charlottetown, Prince Edward Island (hereinafter referred to as "Holland College")

OF THE SECOND PART

WHEREAS Holland College has entered into a funding agreement with the Government of Prince Edward Island, to support Phase I and Phase II of the PEI Cleantech Academy (the "Prime Agreement"), to assist with planning and establishment of the Academy (the "Project")

AND WHEREAS Government had a vision to establish an industry-led cluster and destination that attracts and facilitates the growth of companies, entrepreneurs and talent focused on advances in technologies, processes and know-how that contribute to key growth

AND WHEREAS the Academy will offer a certificate program and master's degree in Cleantech leadership, a joint initiative of Holland College and the University of Prince Edward Island ("UPEI")

AND WHEREAS provincial government funding is necessary to support the establishment of the Academy and the annual operations.

AND WHEREAS the learning institutions have requested funding to finance costs associated with Phase I and Phase II of the PEI Cleantech Academy initiative through a funding agreement (the "Prime Agreement") with Holland College.

AND WHEREAS UPEI has agreed to collaborate with Holland College in assisting with the planning and establishment of the Academy (the "Project);

AND WHEREAS Holland College and UPEI have agreed to enter into this Agreement ("Agreement") to set out their respective responsibilities and commitments in relation to this collaboration;

THEREFORE in consideration of the mutual covenants, promises, and agreements contained in this Agreement, and other good and valuable consideration, the Parties to this Agreement agree as follows:

1. Prime Agreement

1.1. This Agreement is subject to the terms and conditions of the Prime Agreement, and any amendments thereto.

2. Scope of Work

2.1. UPEI acknowledges that as recipient of funds from Holland College it will be responsible for certain activities and financial obligations, as agreed upon by UPEI and Holland College. UPEI agrees to perform its financial and administrative duties as set out in the work plan outlined in the Prime Agreement attached hereto as Schedule "A", as may be amended by mutual written agreement of UPEI and Holland College.

3. Schedule of Payments

3.1. Holland College agrees that the funds under the Prime Agreement in the amount of $187,500 are to be used to support the salary, benefit and any other related operational costs of the Program Coordinator position to be situated at UPEI. Holland College shall pay funds to UPEI upon receipt of invoice and as per these instalments:

3.1.1. 90% upon signing of this agreement
3.1.2. 10% based on submission of report

4. Progress Reporting

4.1. UPEI shall provide to Holland College with all information relating to the Project required by Holland College to fulfill the reporting requirements set out in the Prime Agreement in a timely manner.

5. Confidentiality

5.1. UPEI and Holland College may disclose confidential information, which shall be clearly identified as such in writing ("Confidential Information"), one to the other to facilitate work under this Agreement. Such Confidential Information shall be safeguarded and not disclosed to anyone without a "need to know" within UPEI or Holland College. Each Party shall use its best efforts to protect such Confidential Information from disclosure to third parties.

5.2. The obligation to keep confidential shall however not apply to information which:
(a) is already known to the Party to which it is disclosed; or
(b) becomes part of the public domain without breach of this Agreement; or
(c) is obtained from third parties which have no confidentiality obligations to the contracting Parties; or

(d) is authorized for release by the disclosing Party or is required by law to be disclosed.

6. Freedom of Information and Protection of Privacy Act

The parties acknowledge that this contract is subject to the *Freedom of Information and Protection of Privacy Act*, R.S.P.E.I. 1988, c. F-15.01, and information provided in or pursuant to this contract may be subject to disclosure under the *Freedom of Information and Protection of Privacy Act*. The parties may be consulted prior to the disclosure of information in accordance with the provisions of the *Freedom of Information and Protection of Privacy Act*.

7. Term and Termination

7.1. This Agreement shall come into effect on March 1, 2022 and remain in effect until March 31, 2026.

7.2. Either Party shall be entitled to terminate this Agreement upon 90 days' written notice to the other Party.

8. Notices

Any notice or other communication by the Parties under this Agreement shall be in writing and shall be delivered personally to the other or sent by fax to the following addresses:

Holland College:
Dr. Alexander (Sandy) MacDonald
Holland College
140 Weymouth Street
Charlottetown, PE
C1A 4Z1

UPEI:
Vice-President, Administration & Finance
University of Prince Edward Island
550 University Avenue
Charlottetown, PE
C1A 4P3

9. Entire Agreement

This Agreement constitutes the entire agreement between the Parties with respect to the subject matter hereof and supersedes all prior agreements, understandings, negotiations and discussions, whether written or oral. There are no conditions, covenants, agreements, representations, warranties or other provisions, express or implied, collateral, statutory or otherwise, relating to the subject matter hereof except as herein provided.

10. Governing Law

This Agreement shall be interpreted and applied in accordance with the laws and in the Courts of the Province of Prince Edward Island.

IN WITNESS WHEREOF, the duly authorized officers of the Parties have executed this Agreement as of the day and year first written above.

HOLLAND COLLEGE

Dr. Alexander (Sandy) MacDonald
President

UNIVERSITY OF PRINCE EDWARD ISLAND

Dr. Katherine Gottschall Pass
Vice President, Academic & Research (Interim)

UNIVERSITY OF PRINCE EDWARD ISLAND

Tara Jodoin
Comptroller

SCHEDULE C
PART I and Part II Budget Amendment Request

PEI CLEANTECH ACADEMY – PART 1 AND PART 2 BUDGET AMENDMENT REQUEST

Holland College (HC) and the University of Prince Edward Island (UPEI) are jointly submitting this request to amend the Part 1 and Part 2 grant funding agreement in light of significant project changes agreed upon with the Province (i.e. change of the Academy launch dates and governance structure). Moreover, both institutions have identified additional project needs (Part 3) as initially indicated in Part 2 RFF.

Both institutions are still committed to all objectives outlined in Part 1 and Part 2 Requests for Funding, however, additional milestones and activities have been identified as outlined below.

Part 1, Part 2, and Part 3 – Amended Funding Overview

Part 1, Part 2, and Part 3 - Total	
Part 1	$867,966
Part 2	$454,420
Part 3	$698,214
Total	$2,020,600

Part 1, Part 2, and Part 3 – Funding Breakdown

Amended funding request – Part 1					
Component	Year 1 April 2022-March 2023	Year 2 April 2023-March 2024	Year 3 April 2024-March 2025	Year 4 April 2025-March 2026	Total
Project Manager – salary and benefits	$99,224	$120,933	$123,352		$343,509
Program Coordinator (HC 0.25 FTE Curriculum Consultant & 1 FTE Subject Matter Expert) – $96,404 salary, 20% benefits and 2% COLA. Y1 & Y3 pro-rata salaries.	$5,698	$147,498	$25,074		$178,270
Program Coordinator (UPEI Program Manager) – $83,024 salary, 19% benefits and 3% COLA. Y2 pro-rata salary.		$93,282	$104,816		$198,098
Casual Salaries	$42,380	$18,378			$60,753
Environmental Scan Consultant	$69,950				$69,950

Office & Administrative Expenses – office equipment, supplies, technology	$3,023	$12,898	$1,460		$17,381
Total					$867,966

Amended funding request – Part 2					
Component	Year 1 April 2022-March 2023	Year 2 April 2023-March 2024	Year 3 April 2024-March 2025	Year 4 April 2025-March 2026	Total
Administrative Assistant - $61,500 salary 1 FTE, 20% benefits, and 2% COLA		$73,800	$88,560	$106,272	$268,632
Academy Director Recruitment – external consultants and other interview-related expenses	$41,090	$15,602			$56,692
Governance Model & Operational Plan – external consultants supporting development of long-term financial, operational and governance plans	$16,748	$67,252			$84,000
Travel	$2,096	$18,000			$20,096
Office & Administrative Expenses – office equipment, supplies, technology		$25,000			$25,000
Total					$454,420

Funding request – Part 3					
Component	Year 1 April 2022-March 2023	Year 2 April 2023-March 2024	Year 3 April 2024-March 2025	Year 4 April 2025-March 2026	Total
Marketing, PR and printing services – third-party consultants		$142,600			$142,600
Consultancy services – for curriculum development (HC)		$17,250			$17,250
Casual Salaries		$40,000			$40,000
Travel, industry/community engagement, BD,		$41,318			$41,318

events and conferences				
Industry Liaison Officer - $74,000-84,000 salary, 20% benefits and 2% COLA. Y2 pro-rata salary, starting in the Fall 2023.		$50,400		$50,400
Curriculum purchase (HC)		$172,500		$172,500
Temporary Academy Office Rent & Equipment – rent, equipment, technology for Fall 2023 – Summer 2025		$48,500		$48,500
UPEI – Administrative Assistant - $57,551 salary, 19% benefits and 3% COLA		$70,540	$72,656	$143,196
UPEI - Travel		$13,450		$13,450
UPEI – Consultancy Services - for curriculum development		$15,000		$15,000
UPEI – Office & Administrative Expenses – office equipment, supplies, technology		$14,000		$14,000
Total				$608,046

Part 3 - Objectives

The HC/UPEI Joint Working Group has identified the following objectives for **Part 3:**

Academy branding, PR, marketing strategy and collateral

The Joint Working Group identified it will be crucial to develop a marketing strategy, **brand identity** and marketing collateral for the Academy. This is planned to be completed by Fall 2023 to be ready to promote the Academy and certificate program and start recruiting students. The Joint Working Group and the Director will engage third-party consultants to support the development of the strategy, plans and marketing materials. It is expected that these activities will be coordinated with the Province to ensure aligned branding and strategies for the Academy, Alliance and the Park.

Activities expected:

- Academy brand identity including logo
- Marketing strategy and implementation plan
- Marketing collateral
- Printing of promotional materials and items
- Program/Academy promotional video

- Webinars and information sessions for prospective students
- Advertising costs
- Academy website
- Online recruitment campaign

Industry and community engagement, BD

The Centre Director, Industry Liaison Officer, Joint Working Group, HC/UPEI Program Coordinators will all be required to engage with the community, industry, and other stakeholders. It will be key for the Director and Industry Liaison Officers to establish networks of stakeholders. External engagement will also be an essential part of promoting the Academy/Centre and developing the curriculum.

Industry Liaison Officer

The Joint Working Group identified a need for an Industry Liaison Officer who will work with and support the Director. The Industry Liaison Officer is expected to start in Fall 2023 and will be broadly responsible for:

- BD and industry relationships and building student as well as applied research opportunities pipeline.
- Exploring and connecting to funding opportunities, industry, government, stakeholders, and building partnerships, research, and student projects.
- Ensuring that all internal processes are established prior to the Academy launch (e.g. contracts management, IP,...).

Curriculum development

Both institutions identified additional requirements to fund the curriculum development. Industry and stakeholder engagement is an essential part of the curriculum development work and additional funding will allow the curriculum development team to engage with the industry, ensure the programs meet market needs, and support Province's efforts to achieve net zero targets. It is expected both Program Coordinators will be required to travel on and off-island to engage with the industry, other academic institutions, and organizations to deepen their understanding of current trends and requirements. Furthermore, as both programs are expected to be highly interdisciplinary HC and UPEI expect they will need to work with third-party consultants to develop the curriculum.

Part 3 Funding - Notes

Please note that currently, Part 3 is forecasted at $698,214. However, there might be further shifts in the budget once the governance structure is agreed on and HC, UPEI and the Province will determine who will employ the Academy staff (i.e. Administrative Assistant and Industry Liaison Officer). Holland College is planning to submit regular reports as outlined in the current funding agreement and notify Province of any significant changes in the budgets.

The following budget items will be the responsibility of UPEI:

Funding request – Part 3 – UPEI					
Component	Year 1	Year 2	Year 3	Year 4	Total

	April 2022-March 2023	April 2023-March 2024	April 2024-March 2025	April 2025-March 2026	
UPEI – Administrative Assistant - $57,551 salary, 19% benefits and 3% COLA		$70,540	$72,656		$143,196
UPEI - Travel		$13,450			$13,450
UPEI – Consultancy Services - for curriculum develo: ment		$15,000			$15,000
UPEI – Office & Administrative Expenses – office equipment, supplies, technology		$14,000			$14,000
Total					$185,646

As such, HC will transfer $185,646 (under Part 3 funding) and $198,098 (under Part 1 funding) directly to UPEI to ensure UPEI can effectively carry out their project duties and continue with the program development. HC and UPEI will amend their current sub-agreement to reflect these changes.

Part 4 – Funding Plans

Part 4 funding phase will focus on long-term operational financing of the Academy and both programs. The Joint Working Group expects to submit the Part 4 RFF by October 2023 to ensure the funds are in place by March 2024 to prepare Academy and certificate program launch. Part 4 funding is therefore expected to run from April 2024 onwards. The Joint Working Group expects the Part 4 funding request to include the following items: salaries of faculty and support staff; teaching space equipment and learning materials; office and IT equipment; rent and equipment for temporary teaching space; community and industry engagement activities; travel and BD expenses; lab equipment and other expenses that will be further identified by HC and UPEI.

The Joint Working Group recommends the part 4 funding requirements to be submitted in two stages – y1 (April 2024 – April 2025) and long term (from April 2025 onwards). This is due to the fact that the operational and financial plans and needs will be significantly different for y1 until the building is completed and both programs running.

We would like to thank you in advance for your continued support of this important joint initiative between Holland College, UPEI and the Province. We also appreciate your understanding about the need to receive your approval in the near future so that we can advance these priorities in a timely manner.

Should you have any questions, please do not hesitate to contact us.

Sincerely,

Dr. Sandy MacDonald, Ph.D
President,
Holland College
902-566-9510

Date: June 21/23.

Dr. Greg Keefe, DVM, MSc, MBA
Interim President and Vice-Chancellor
University of Prince Edward Island
902-566-0400

Date: June 28, 2023

SCHEDULE D
Prime Agreement – Amendment No. 1

AMENDMENT NO. 1

FUNDING AGREEMENT – PEI CLEANTECH ACADEMY – PHASE I, PHASE II AND PHASE III

THIS AGREEMENT made this _____ day of _____, 2023

BETWEEN: **GOVERNMENT OF PRINCE EDWARD ISLAND**, as represented by the Minister of Environment, Energy and Climate Action (hereinafter referred to as the "Government")

OF THE FIRST PART

AND: **HOLLAND COLLEGE**, of 140 Weymouth Street, Charlottetown, Province of Prince Edward Island (hereinafter referred to as "Holland College")

OF THE SECOND PART

WHEREAS the above signatories desire to implement changes to the **FUNDING AGREEMENT – PEI CLEANTECH ACADEMY – PHASE 1 & PHASE II** executed on the 29th day of March, 2022 between the above noted parties.

AND WHEREAS the Province and Holland College have entered into an Agreement regarding the establishment of the PEI Clean Tech Academy.

AND WHEREAS the Province and Holland College now agree that certain amendments are required, the particulars of which amendments are hereinafter set out.

NOW THEREFORE that for and in consideration of the mutual undertakings of the parties, the parties hereby agree as follows:

All terms and conditions, schedules and amendments of and to the Agreement shall remain the same and be an integral part of this Agreement except as follows:

1. The following Subparagraph is added to the Amending Agreement:

   AND WHEREAS Holland College and the University of Prince Edward Island have jointly submitted a request to amend the Phase I and Phase II grant funding agreement in light of significant project changes agreed upon with the Government.

2. The following Subparagraph is added to the Amending Agreement:

   AND WHEREAS due to project changes, Phase I and Phase II resulted in unspent funding in the amount of $698,214 and Holland College has requested to utilize unspent funding for Phase III to support additional project needs, milestones and activities

Initials _____
Date 07/05/23

3. The following Subparagraph be added to the Amending Agreement:

   AND WHEREAS Government has agreed to allow the unspent funding from Phase I and Phase II to be used to support Phase III.

4. Schedule D – PEI Cleantech Academy – Part 1 and Part 2 Budget Amendment Request be added to the Amending Agreement.

5. This Amending Agreement shall be effective the ____ day of _____, 2023.

6. In the event there is any conflict between this Amending Agreement and the Original Agreement or its schedules this Amending Agreement shall prevail.

IN WITNESS WHEREOF this Amending Agreement is duly executed by the authorized representatives of the parties.

IN WITNESS WHEREOF the parties thereto have executed this Amending Agreement as of the day and year above written.

SIGNED, SEALED AND DELIVERED
In the presence of:

Witness

Government of Prince Edward Island as represented by the Minister of Environment, Energy and Climate Action

Linda VanDoesburg
Witness

Holland College

Initials _____
Date 05/09/23

Appendix H – External Review Consultants' Report

H.1: Biographies of External Review Consultants
H.2: On-site Visit Agenda for External Review Consultants
H.3: External Review Consultants' Report
H.4: Summary and Response to External Review Consultants' Report

Tel: 403.220.8320
Fax: 403.282.0095
irene.herremans@haskayne.ucalgary.ca

Dr. Irene M. Herremans
Professor, CPA Managerial Accounting Faculty Fellow

Dr. Herremans holds a position as Professor, CPA Managerial Accounting Faculty Fellow at the Haskayne School of Business and also a position with the School of Public Policy in the Sustainable Energy Development (SEDV) program. She supervises students at both the master and doctorate level in the Haskayne School of Business, School of Planning, Architecture and Landscape, Geography, and SEDV at the University of Calgary and has supervisory responsibilities in other universities. She has been teaching sustainability courses to a variety of disciplines and industries both in Canada and internationally for over 20 years.

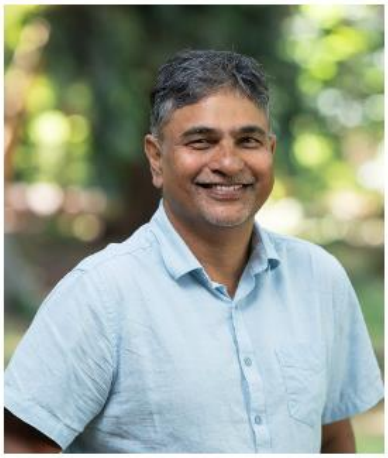
She has been a member of many teams who have implemented projects related to sustainability. To mention a few, Irene has worked on projects related to solar power hubs in Burkina Faso, Africa; reduction of single-use plastics at University of Calgary, sustainability education and call-to-actions for elementary and high schools, sustainable farming and food security, and social return on investment for Scouts Canada, and training for women entrepreneurs in the South American Amazon.. She has also offered numerous seminars and workshops on sustainability internationally, including China, Ecuador, Cuba, and the UK to professional, practitioner and academic audiences. She has developed several courses offering sustainability content both at University of Calgary and internationally.

Her research interests focus on many sustainability topics including management and environmental control systems, sustainability reporting, sustainability performance, strategies for reduction of greenhouse gas emissions, governance, and stakeholder engagement. A frequent theme of her research is investigating the harmony between the environmental and economic dimensions of sustainability, and methods to measure the intangible aspects of the social dimension. She is listed on Haskayne's website as one of the most cited professors in the School of Business for her research.

She also serves (or has served) on the board of directors of several organizations: the Petroleum Communication Foundation's Board of Directors (past), Alberta Ecotrust Board of Directors (current), Ten Peaks Innovative Alliance Inc. (current) and Nature's Ride (current). Nature's Ride creates environmental educational materials for elementary and high school children.

She has been awarded The Dean's Award for Outstanding Leadership in Teaching and Learning and nominated for Alberta's Emerald Award for her work in sustainability. She has received several Sustainability Awards from University of Calgary for her project and curriculum work. She was named Peak Scholar for her work in creating internships for SEDV students to work with young adults in Ecuador. She was named "Woman of the Year" by the American Business Women's Association and has been recognized for her overall contribution by being named one of the "Outstanding Young Women of America." She has also been listed in *Who's Who*.

THE UNIVERSITY OF BRITISH COLUMBIA



Milind Kandlikar

Professor

mkandlikar@ires.ubc.ca
604 822 5918
Liu Building 101B

AREAS OF EXPERTISE

Sustainability

About

Milind Kandlikar is Professor at the School of Public Policy and Global Affairs (SPPGA) and the Institute for Resources, Environment and Sustainability (IRES). He is the former Director of IRES and his work focuses on the intersection of technology innovation, human development and the global environment. His current projects include cross-national comparisons of regulation of agricultural biotechnology; air quality in Indian cities; risks and benefits of nanotechnology; new technologies for sustainable transportation; and development and climate change.

Publications

Journal Articles

Nawaz, S., & Kandlikar, M. (2021). Drawing Lines in the Sand? Paths Forward for Triggering Regulation of Gene-Edited Crops. Science and Public Policy, 48(2), 246-256.

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Beaudrie, Christian E. H.*, Terre Satterfield, Milind Kandlikar, and Barbara H. Harthorn. 2013. “Expert Views on Regulatory Preparedness for Managing the Risks of Nanotechnologies.” *PLoS ONE 8*, (11) (November 11): e80250.

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Agenda

MPHEC External Review Site Visit

UPEI Master of Cleantech Leadership and Transformation

Faculty of Graduate Studies

June 13 and 14, 2024

External Reviewers:

Dr. Irene Herremans Professor Emerita Haskayne School of Business, Accounting University of Calgary irene.herremans@haskayne.ucalgary.ca	**Dr. Milind Kandlikar** Professor School of Public Policy and Global Affairs & IRES University of British Columbia mkandlikar@ires.ubc.ca

Time	Location	Who	Suggested Discussion Topics
Day 1 – Thursday, June 13			
9:00-9:45 am *Coffee/Tea & snacks available	Kelley Memorial 234	• Dr. Greg Naterer, P. Eng, Vice-President Academic and Research • Dr. Marva Sweeney-Nixon, Dean of Graduate Studies; Associate Vice-President of Research	• Welcome
9:45-10:00 am		Break	
10:00 am - 12:00 pm	Main Building 310 Zoom (if needed) https://upei.zoom.us/j/61433008240?pwd=R0BvebR81wPAWnSCiuFldpqHjgsAxa.1 Meeting ID: 614 3300 8240	Curriculum Working Group and Teaching and Learning Centre	• Question and Answer regarding program development and curriculum

*Coffee/Tea & snacks available	Passcode: 008346		
12:00-1:00 pm	Kelley Memorial 234	Working Lunch for reviewers to confer. The Team is available to join if needed and answer any questions.	• Leonard's
1:00-1:30 pm *Coffee/Tea refresh	Kelley Memorial 234	• Dr. Wayne Peters, Interim Dean, Faculty of Sustainable Design Engineering	• Historical Background
1:30-2:00 pm	Kelley Memorial 234	• Sandra Moore, Director of the Cleantech Academy	• Mission and vision of Cleantech Academy • Financial agreement
2:00-3:00 pm	Kelley Memorial 234	Break - review team to confer	
3:00-3:30 pm	UPEI Charlottetown Campus	• Susie Zavala, Program Manager, Master of Cleantech Leadership and Transformation	• Campus tour: Faculty of Sustainable Design Engineering, McDougall Faculty of Business, Robertson Library, etc.
3:30-4:00 pm	Kelley Memorial 234	• Dr. Marva Sweeney-Nixon, Dean of Graduate Studies; Associate Vice President of Research • Susie Zavala, Program Manager, Master of Cleantech Leadership and Transformation • Alicia MacEachern,	• Debrief of day

		Administrative Assistant, Master of Cleantech Leadership and Transformation	
Day 2 – Friday, June 14			
9:00 am-10:30 am	Kelley Memorial 234	Curriculum Working Group and Teaching and Learning Centre (continued)	• Question and answer regarding program development and curriculum
10:30 am-11:00 am		Break and travel time to minister's office	
11:00 am-12:00 pm	Minister's Office, 4th Floor, Jones Building, 11 Kent Street, Charlottetown	• Honorable Steven Myers, Minister of Environment, Energy and Climate Action Environment, Energy and Climate Action • Norbert Carpenter, Norbert, Deputy Minister, Environment, Energy and Climate Action	• Clean growth economy in PEI • Financial support of UPEI program
12:00-1:00 pm	TBD pending External Reviewers	Lunch • TBD pending External Reviewers	

External Review of the Master of Cleantech Leadership Program at the University of Prince Edward Island

Irene Herremans, Professor Emerita
Haskayne School of Business
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Institute for Resources, Environment and Sustainability & the School of Public Policy and Global Affairs
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1. Overview

Achieving net-zero requires a multifaceted and multidisciplinary approach since economic, technological, behavioral, and social changes are integral to the transition to a low-carbon planet. The Cleantech Master's program aims to produce leaders in government, business, and non-profits to drive this transition in Prince Edward Island, the Maritimes, and Canada. The Master's program is a key element of a broader provincial cleantech initiative, which includes a Cleantech Park, a Cleantech Alliance, and Cleantech Academy, all established with provincial support. Industry partners in multiple sectors, including agriculture, buildings and infrastructure, marine and aerospace sectors, and waste remediation are expected to play an important collaborative role in this effort. The curriculum is interdisciplinary, combining science, technology, ethics, entrepreneurship, and leadership coursework with a capstone project that aims to provide 'clean-tech ready' skills. The program also emphasizes regional collaboration, particularly with other Maritime provinces, to address shared energy grid challenges. The program is uniquely designed to meet the needs of Prince Edward Island and the surrounding areas; however, it will also serve others outside these areas well. The closely linked connection among the various sectors of government, industry, non-profits, and academic institutions is an asset and makes it distinct from other similar programs.

In what follows we provide an assessment of the program along 5 key dimensions: Program content and structure (section 2); Comparison with other programs (section 4); Evaluation of resources available for program delivery (section 4); Adequacy of financial resources (section 5); and Assessment of Labor market opportunities (section 6). Within each section there are sub-sections that address issues germane to the topic. Section 2 examines the course structure and content, and includes sequential course structure (2.1), specifics of courses offered (2.2), a discussion on the potential restructuring of the course sequence (2.3) and the design and implementation of the capstone project (2.4). Section 3 offers a comparison with other similar programs across Canada, noting both similarities and unique features. Section 4 evaluates the teaching and programmatic resources necessary for the effective delivery of the program, focusing on the diversity of faculty expertise (4.1) the physical facilities available for the program (4.2), the appropriateness of the organizational environment (4.3). Section 5 provides a summary of the financial resources available. Finally, Section 6 evaluates the employment prospects for graduates within the cleantech industry.

2. Program Content and Structure

The proposed interdisciplinary curriculum aligns well with the needs of an emerging net-zero economy. It also prepares students to work on initiatives with diverse colleagues representing various professions, as the journey to net zero requires individuals from many different backgrounds and expertise. The curriculum integrates knowledge from a number of fields including climate science, energy technologies, entrepreneurship and business, ethics and Indigenous knowledge systems, and economics and policy with the aim of providing students with a holistic understanding of this critically important emerging sector. A capstone project will prepare students to apply what they learn in the classroom to 'real-world' situations. The title of the program 'Masters of Cleantech Leadership' succinctly captures the intent of the program – that of producing leaders who will be the enablers of a net-zero energy transition. The location of the Cleantech Master's program in the forthcoming Cleantech Academy building in Georgetown that seeks to enhance collaboration between industry, government, non-profits. and academia, will provide students with world-class practical experiences.

2.1 Program Structure and Content

The program's structure, featuring sequential courses that build on previous knowledge, has the potential to provide a coherent learning path. Additionally, the hybrid delivery mode will help make the program accessible to a diverse student body. The course structure is as follows:

a. Students begin by studying fundamental concepts in two courses -- *Cleantech Fundamentals I and II*, plus a course on *Cleantech Governance, Regulation, Policy, and Politics in Canada*. These introductory courses can be designed to provide the essential knowledge in science, engineering, and policy, preparing students for more advanced topics.
b. Subsequent courses, specifically *Economics and Policy Analysis of Cleantech* and *Environmental Ethics and Social Responsibility*, deepen students' understanding of specific areas where clean tech, social policy, and business intersect. A course on *Two-Eyed Seeing on Environmental Sustainability*, which foregrounds Indigenous perspectives is also a critical element of the program. Building on knowledge from courses on Cleantech Fundamentals, the students will gain an understanding of the complexity of cleantech applications.
c. Advanced courses like *Leadership Skills I and II*, *Innovation and Entrepreneurship*, and *Project Management* focus on developing practical skills and leadership abilities. The *capstone project*, integrated into various courses based on the chosen option, ensures that students apply their knowledge in real-world settings. The capstone projects require synthesizing scientific, policy, and managerial insights.
d. Electives and specialized courses, such as *Sustainable Community Planning* and *Sustainable Energy Integration and Management,* allow students to customize their education while reinforcing the program's interdisciplinary nature. A structured progression such as this provides a solid foundation both for learning and practical application in the cleantech sector.

The course descriptions provided were brief (no more than 3-4 sentences) making a full assessment of the curriculum difficult. We recommend that program faculty develop a more detailed curriculum map that (i) defines program objectives and learning goals for each course, (ii) describes how course content will achieve these goals, and (iii) explains how individual courses integrate to meet the overall objectives of the program.

The program faculty should also decide what level of competencies the students should acquire in the program and trace those back to various course materials to ensure appropriate learning resources are developed in each course, without unnecessary repetition but sufficient reinforcement to develop an integrated approach among the various disciplines. The students must recognize how the material in one discipline connects to that in another discipline, and they should not get the impression that the material in each discipline is unrelated to the others.

Level of competence can be determined through some form of scale, similar to the ones below:

A little (part of one 75-minute class
Some (in total about one class of 75 minutes)
Considerable (parts of 3-5 classes of 75 minutes)
Extensive (more than parts of 5 classes of 75 minutes)

Or

Recall
Comprehension
Application
Analysis
Synthesis
Judgement

On page 36 of the Environmental Scan, there is a list of the Learning Outcomes under leadership, cognitive, digital, and interpersonal. However, there likely should be technical skills listed as well. Review the outcomes and determine if they are comprehensive and representative of what the students should know and be able to do upon completion of the program. Then work through the curriculum mapping to determine what material in each course is designed for students to acquire and apply the competencies.

We do have specific suggestions for some required course content, and for streamlining the sequence of courses (including reimagining the combination of core and elective courses and redesigning the delivery of the capstone project). Ultimately, the directors and faculty will decide which aspects should be incorporated into the program.

2.2 Course content

While the program benefits from a wealth of interdisciplinary knowledge, there may be some potential gaps in the curriculum that need to be addressed. Since students admitted to the program can come from any disciplinary background, it is crucial that they all understand the basics needed to flourish in the program. Below we identify several critical areas that all students need be exposed to in the program. Ensuring that each student has these critical skills can be accomplished through an upgrade course, on-line modules that must be completed with an acceptable grade as a condition prior to enrolling in the course in which the skills will be used, or as a part of the subject matter of the most appropriate course. These core competencies include the following:

a. **Basic Data Skills**: Ability to work with data, including basic analysis and visualization, preliminary statistics, and simple modeling using tools like Excel.
b. **Energy Fundamentals**: Basic understanding of energy physics and systems, including concepts like units, production, use, and capacity factors, to ensure all students, regardless of background, can engage in the field.
c. **Energy Production Basics**: Familiarity with the pros and cons of different energy sources (solar, wind, nuclear, gas, fossil fuels), their costs, benefits, public acceptance, and environmental impacts.
d. **Climate Science**: Knowledge of emissions (Scope 1, 2, and 3), their social drivers (population and economy), biogeochemical cycles, the climate system, climate change impacts, and the concept of net-zero.
e. **Business and Economics tools**: Understanding basic business and project economics, including fixed and variable costs, breakeven analysis, interest rates, discounting, net present value, and internal rate of return.
f. **Tools of energy assessment:** Such as life cycle assessment, risk assessment, and cost-benefit analysis, which are crucial for comprehensive energy project evaluation.
g. **Global Climate Landscape**: Understanding the global climate landscape, including UNFCCC, climate negotiations, and national and local policies, carbon credits, carbon offsets, carbon taxes, and similar instruments.

h. **Sustainability Reporting**: Comprehending mandatory and voluntary reporting requirements. Focus can be on mandatory reporting requirements for greenhouse gas emissions in Canada, the United States, and Europe, but should include voluntary reporting standard and standard setters, such as the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), Task Force on Climate related Financial Disclosures (TCFD), International Integrated Reporting Council (now know as the Value Reporting Foundation), and the International Sustainability Standards Board (ISSB). Although the Carbon Disclosure Project (now know as the CDP) is not a standard, the database holds a wealth of information on organizations' carbon reduction plans and performance, sustainable forestry plans and performance, and water conservation and protection plans and performance. The Corporate Sustainability Reporting Directive (CSRD) out of the European Union, mandating comprehensive reporting on economic, environmental, and social dimensions, will affect many Canadian firms.

i. **Risk management and Double Materiality**: Double materiality and stakeholder engagement are major principles in the Corporate Sustainability Reporting Directive (CSRD) in Europe which will affect many Canadian companies with direct business in Europe or indirectly as a supplier of a company that does direct business in Europe. Knowledge about credible control systems that aid in data integrity is important to meet the assurance requirements under this directive as well.

j. **Implementing Sustainability at the Organization Level**. Comprehending what types of procedures, methods, structures, and activities will motivate achieving an organization's sustainability objectives. Generally, the organization starts with a policy with clear objectives, goals, and targets that is informed by stakeholder engagement to determine most material topics. Then certain systems are implemented, such as an environmental or sustainability management systems that increase the possibility of the policy being fulfilled (sustainability committee on the board, chief sustainability officer, compensation linked to fulfilling sustainability goals, meetings about the policy and how each unit can do it part, indicators that will be used to measure progress, and more).

k. **Software for Clean Tech:** Such as RetScreen and SAM. RetScreen from NRCan (https://natural-resources.canada.ca/maps-tools-and-publications/tools/modelling-tools/retscreen/7465) is available in many languages and for many applications. The process to use the software can be taught through a demonstration (a couple of hours within a course) and a workshop (full day) to learn more of its applications. A license for the entire university is available for a small fee each year. System Advisor Model (SAM, https://sam.nrel.gov) is a free software (for any use) that has been developed and maintained by the US NREL. This software can be taught as part of an appropriate course content or as part of a separate workshop. The software applications can be beneficial for capstone projects.

Some of the above core competencies (such as Climate Science, Energy Production, and Global Climate Landscape) are addressed in the existing course descriptions, but others such as Basic Data Skills, Energy Fundamentals, Business and Economics tools, and Tools of Energy Assessment, Sustainability Reporting, Risk Management and Double Materiality, Organizational Sustainability, and Software for Clean Tech are not evident (due to the conciseness of the course descriptions) and might need to be added and more fully integrated into the coursework. This will require changing existing courses to incorporate these topics or requiring students to develop these skills in other ways (e.g. adding them as modules/short courses to the current program, online courses, or Massive Open Online Courses - MOOCs). We strongly recommend integrating these topics into the program.

2.3 Streamlining the sequence of courses

During discussions with program faculty, several options for streamlining the curriculum emerged. The course maps of these three options are shown in the appendix. A key difference is how the capstone is treated across these options. In the original proposal, the capstone is a standalone 3 credit course conducted towards the end of the program (in fall of the second year) with the goal of helping students to synthesize their learning through a comprehensive, real-world project. Option A places a greater programmatic emphasis on the capstone by increasing the number of credits to 6 to be delivered in the fall of the second year. This is done by integrating one of the proposed leadership seminar courses (Leadership II) into the capstone. Additionally, in Option A the capstone project is also emphasized in a course on Project Management, as well in the course on Innovation and Entrepreneurship. Such integration allows for continuous development of the capstone project throughout the program, ensuring that students are better prepared for this critical aspect of their training. Option B is a variant of Option A with a 6-credit capstone that is spread over three terms in 2 credit chunks. There are two other differences across options as well. First, the course on Project Management is an elective in the original proposal, but in Options A and B it is part of the core. Second, both Options A and B see a reduction in elective offerings to accommodate increases in credits for the capstone, and the conversion of Project Management to a core course.

2.4 The Capstone Project

Whatever arrangement for the capstone project is chosen, following is a list of items that should be considered in the decision process.

- Consider if certain dimensions must be present in a project for it to qualify for the program, such as energy and environment or some other dimensions or certain Sustainable Development Goals.

- A process should be developed for matching students with organizations: student-led choice; organization-led choice, or a combination.

- A 3-minute presentation by the students before the proposal is finalized might help students clarify their research question and why it is important in their own minds and to a general audience. A panel of judges could be used to provide written feedback to the students.

- Sufficient time may be needed to complete ethics applications and receive approvals. A TA and samples of completed ethics applications could help students learn the process. Possibly bring in the chair of the ethics board to explain the ethics process to the students.

- Organizations may ask for legal documents such as, non-disclosure agreements (NDA) if confidential information is provided to students; research agreements to determine who holds rights to the analysis and/or rights to publish; and other clarifications needed for the project. These are normally prepared by the team in Legal, Research at the university with feedback from the organization's legal department until both are satisfied with the contents.

- The content in the capstone research course will need to include instruction on how to carry out the research and the expectations related to the content in each of five main chapters of the report, such as Introduction, Literature Review, Methods, Analysis and Findings, Conclusions, Limitations, and Future Research, and other chapters that may be required.

- Consider having the students select a separate academic supervisor with expertise on the topic of the research project of each group. This academic supervisor will guide the students through their projects regarding the technical aspects. In addition, the course instructor for the capstone research project will provide guidance on how to engage in the research, how to prepare the final report, and other important aspects of the research process. As well, the instructor should be the "go to" person for all administrative aspects of the capstone course.

- Suggest to the organization that the student team should be responsible to one person in the organization, although others in the organization can give feedback and direction, they should come through the organization supervisor.

- If organizations have not worked with student groups before, it might be worthwhile to provide some directions in a document that can be sent to the organizations explaining how to best work with student groups.

- Both academic and organization supervisors could sign off on the proposal (to ensure the direction is clear to everyone). They should sign off on the final report when both supervisors deem it as satisfactory, especially if a Pass/Fail grade is given.

- Consider if the students should prepare progress reports for a specific period (every two weeks, or once a month) to report progress against their timeline, if behind how they will catch up, and any challenges they are having. These progress reports could be posted for the capstone project instructor to give feedback; however, they should also be sent to academic and organization supervisors to keep them informed of the progress on the project.

- Consider if a team assessment is needed of the contribution of each member of the group for the capstone project and other group work in the courses. Courses prior to the capstone project should contain some group work for the students to learn to work efficiently and effectively in groups. Instruction on how to work in groups might be necessary to avoid group conflict. To ensure that the students in each team can work well together, assigning group membership to ensure interdisciplinary groups for each semester and then switching group membership for each of the following semesters will provide students with an opportunity to work with each student in the program and to understand the work styles of various backgrounds (for example, engineers vs. business backgrounds or Canadian vs. international students).

- A final presentation of findings (10-15 minutes) with a time for questions by the supervisors, other interested parties, and other students would provide an opportunity for sharing findings from the capstone project.

- Creating a database with completed capstone projects available to future cohorts would help for future cohorts to locate research on which they might want to build. Finished projects could also be made available through the university's library.

- An industry showcase shortly after completion of the degree requirements could expose the research to interested parties from industry, academe, and non-profit organizations.

3.0 Comparison with other programs

The proposed level of study (with some modification highlighted in this report) responds well to the identified needs by producing graduates capable of leading in the cleantech industry. Overall, the program content, structure, and requirements of the Cleantech Master's program are comparable to those of similar programs in Canada. While program elements are, in many ways, akin to that of other Canadian institutions (such as UBC, U of Waterloo, and U of Calgary), there are some differences. These include differences in: (i) academic background and work experiences of students admitted to the program; (ii) the technical depth of proposed curriculum; (iii) work-related learning opportunities; (iv) diversity of elective courses; and (v) funding and scholarships. As we note below it is useful to recognize the impact these differences have on the curriculum as well as student training and employment prospects, and to work towards reducing any deficits while maximizing the programs unique advantages and keeping in mind the unique characteristics of the communities and regions it is designed to serve.

The UPEI program has numerous strengths; it also has some potential shortcomings. First, the program as proposed is short on technical depth found in other programs (such as those at UBC and U of Calgary) whose curricula have a greater emphasis on energy systems. Some of this is a result of higher-level program choices. For example, the UBC program only admits students that have a background in engineering. While in-depth technical knowledge is not necessary to train future cleantech leaders, care should be taken to provide essential technical and scientific training to students. The trick will be to get the level of technical knowledge 'just right' – as highlighted in section on course content (2.2).

Additionally, there are pros and cons to the capstone research project compared to mandatory work-integrated learning components, such as internships or co-op terms. Those students with little to no experience might prefer a more structured environment such as an internship or co-op. Those students with considerable experience likely would perform better with the capstone project, which offers them more flexibility and decision-making opportunities to integrate their coursework with their own expertise. However, a group or team arrangement for the capstone project might be able to smooth over these differences in preferences. In contrast, it might create group conflict if more experienced students are working with those with no experience. Group work and the possibility for conflict will need to be monitored. For both types of students, the program's location in the Cleantech Academy should offer an environment for interacting with industrial partners, resulting in possible employment and networking opportunities.

The Cleantech program may be limited because of the small size of UPEI when compared to larger institutions, potentially impacting the depth and breadth of opportunities. Consider some of these points. For example, there is likely to be a limited selection of elective courses or elective courses would have low enrollment if they were only available to students in the Cleantech program. This could restrict students' ability to specialize in specific areas of interest within cleantech. Additionally, unlike some programs that require prior work experience (which enhances classroom learning with practical industry insights) UPEI's program does not have this requirement. This could limit peer learning opportunities from experienced professionals. Finding ways to address these differences could help the program better compete with other well-established cleantech and sustainability programs. Finally, the program's newer status and smaller institutional base may not provide the same level of global recognition, networking opportunities, or extensive alumni networks relative to established programs at larger universities. Therefore, creating close connections with industry partners would be important.

On the other hand, we recognize that UPEI program will serve a smaller provincial population. Importantly, the smaller scale of UPEI allows for a flexibility that larger (and more bureaucratic) institutions cannot offer. This means that the UPEI program could provide a more personalized education, enable closer interaction between students and faculty, and be quicker to adapt to industry needs (especially through the efforts of the Cleantech Academy). The collaboration with Holland College is also a definite advantage. However, it might be best to monitor the types of jobs that graduates from Holland College are acquiring and compare those with the jobs that the Cleantech program graduates are acquiring to ensure there is distinction in the two programs and they are not competing. Questions relating to the differences in the two programs might come from potential students as well.

4. Evaluation of Teaching and Programmatic Resources

4.1 Faculty Resources

An inter-disciplinary program such as the one proposed needs to bring together faculty from across disciplines and areas of expertise. As shown in Table 1, the faculty members who are involved in teaching the program are drawn from various faculties across UPEI, including those with expertise in sustainable energy systems, entrepreneurship, economic analysis, politics and policymaking, Indigenous knowledge, environmental sustainability, and ethics. The capstone program will be coordinated by the Teaching and Learning Center in the Faculty of Education. These experts are well suited to deliver the proposed courses. Two additional new faculty hires are proposed, one the Faculty Arts (in the Department of Island Studies) with expertise in policy courses, and one in Faculty of Business (focusing on Innovation and Leadership). The UPEI administration should be complimented for bringing together such a diverse and capable team.

Faculty Member	Rank	Department	Courses Taught
Dr. Patrick Augustine	Assistant Professor	Faculty of Indigenous Knowledge, Education, Research, and Applied Studies; Faculty of Science, School of Climate Change and Adaptation	Two-Eyed Perception on Environmental Sustainability
Dr. Pamela Courtenay-Hall	Associate Professor	Faculty of Arts, Department of Philosophy	Environmental Ethics and Social Responsibility
Don Desserud	Professor	Faculty of Arts, Department of Political Science	Economics and Policy Analysis of Cleantech
Dr. Reuben Domike	Associate Professor	Faculty of Business	Innovation and Entrepreneurship
Dr. Kuljeet Grewal	Assistant Professor	Faculty of Sustainable Design Engineering; Cross-appointment with the Faculty of Science, School of Climate Change and Adaptation	Cleantech Fundamentals I& II, Sustainable Community Planning, Sustainable Energy Integration and Management

Faculty Member	Rank	Department	Courses Taught
Andrew Halliday (PhDc)	Sessional Instructor, Adjunct Professor	Faculty of Arts, Institute of Island Studies	Cleantech Fundamentals I & II, Cleantech Governance, Regulation, Policy and Politics in Canada, Comparative Cleantech Politics and Policy, Economics and Policy Analysis of Cleantech, Sustainable Policy Development and Implementation, Capstone Project
Dr. Justin Johnson Kakeu	Associate Professor	Faculty of Arts, Department of Economics	Economics and Policy Analysis of Cleantech
Dr. Nicholas Mercer	Assistant Professor	Faculty of Arts, Institute of Island Studies; Cross-appointment with the Faculty of Science, Environmental Studies unit	Cleantech Governance, Regulation, Policy and Politics in Canada, Economics and Policy Analysis of Cleantech, Sustainable Community Planning
Dr. Yuliya Rashchupkina	Assistant Professor	Faculty of Arts, Department of Political Science; Cross-appointment with the Faculty of Science, School of Climate Change and Adaptation	Sustainable Policy Development and Implementation
Dr. Charlene Vanleeuwen	Instructor, Coordinator Teaching and Learning Centre	Faculty of Education	Capstone Project
New Hire in Environmental Studies	Assistant Professor (Tenure-Track)	Faculty of Science	Cleantech Fundamentals I, Cleantech Fundamentals II, electives
New Hire in Island Studies	Assistant Professor (Tenure-Track)	Faculty of Arts	Policy courses
New Hire in Innovation & Leadership	Assistant Professor (Tenure-Track)	Faculty of Business	Leadership Skills I, Leadership Skills II, Capstone

Table 1: Faculty members involved in the program

While the team is an impressive one there are some key issues that need to be considered. First, there is a relative absence of technical expertise in the teaching team. With the exception of Dr. Kuljeet Grewal, members of the team are not experts in the technical aspects of the clean energy transition. Dr. Grewal is a valued member of the Faculty of Sustainable Engineering, both as a teacher and as a researcher, and will likely be able to dedicate only a small portion of his

time to the program. This could leave a considerable gap in the teaching portfolio, particularly since the program may need to add additional technical content on energy fundamentals, data analysis and tools of energy assessment (as noted in section 1.2.1). We strongly recommend that the program bring in additional technical expertise either in the form of new hire(s), or by inviting other members from the UPEI science and technology community to join the teaching team. Second, each course needs to have multiple instructors capable of delivering the material (even if only a single instructor may deliver the course at any time). This is because a particular faculty member may not be unavailable due to a sabbatical or other leave/secondment, but also because it is healthy for faculty members to rotate the courses that they teach.

Based on our experience at similar programs at U of Calgary and UBC, the capstone program will need greater mentorship than currently anticipated. While the Teaching and Learning Center can do an effective job in coordinating capstone efforts, we believe that each student (or a group of students) will need a domain expert (academic supervisor) to guide them through their project(s). This is an important consideration since the capstone is a key part of the student learning experience and forms a critical bridge to future career progress and employment. We recognize that a new faculty will be hired (in business and entrepreneurship) to play such a role. However, capstone topics will likely to be too diverse to be effectively mentored by one individual. A team-based approach that involves faculty members from various disciplines addressing multiple facets of the projects might be a way to resolve this issue.

To implement a team-based approach, the capstone project instructor should converse with a number of faculty members in diverse disciplines who appear to be qualified to supervise a capstone research project based on their research and teaching. The instructor can ask them if they would be interested in supervising a project periodically. Instructors in the Cleantech program should also be willing to supervise projects related to their expertise. Then, create a spreadsheet with the list of professors, their contact information, and a short bio about their research interests. Provide this to the students as a starter. The students might also have other professors in mind who are qualified to supervise their project. With the help of the capstone project instructor, who can introduce the program to the potential academic supervisor, the student can follow up with their chosen professor to request supervision. Once the professors are familiar with the program, the student can approach the professors directly to ask for supervision. When requesting supervision, having a one-page proposal of the project helps the professors to determine if they have the expertise to supervise the project. This process is followed at U of Calgary, and it works well. At U of Calgary many professors who do not teach courses in the program but will supervise research projects if related to their research. As well, many of the professors teaching in the program are willing to supervise students. A brief description of the expectations as a supervisor should be prepared to send to the potential supervisors to help them judge if they will have sufficient time to support the students. Generally, most of the work comes to help the students write a proposal containing a clear research question, why it is important, what has already been researched on the topic, what their contribution will be, and how they will answer the research question. However, instruction should be given in the capstone research course as to how to write these sections. Then the supervisor helps the students apply the instruction to the specific project on which they are working.

4.2 Evaluation of physical resources

The location of the Cleantech Master's program in the forthcoming Cleantech Academy building in Georgetown will make it stand out among other Canadian and global degree programs. The co-location of industry, government, non-profits, and academia, encouraging

collaboration, will be a key distinguishing attribute, helping in various ways. The nearby Cleantech Industrial Park will provide students with practical experience and possible internships. Shared resources, including labs and equipment, will enrich the learning experience for students and faculty alike. Direct collaboration, including informal 'water cooler' conversations, between policymakers, researchers, and industry professionals will enhance entrepreneurship and policy development, enabling these sectors to benefit from each other's insights. Networking opportunities and exposure to policymaking processes will empower students to become future leaders in the cleantech sector. However, this 'distributed' model is not without risks. The Georgetown facility is not yet built, and this is an innovative experiment that will need to be closely monitored and adjusted to ensure the best possible outcomes. The primary risk is that Georgetown is approximately 50 km from the UPEI campus, where much of the faculty is located. The transaction costs created by this distance will need to be managed effectively. for example, by making it easy for faculty and students alike to commute across the two locations.

As befits a flagship provincial university in Canada, UPEI's Library offers a comprehensive range of resources and services, including access to a large collection of print and digital material. The library supports research and education with a robust interlibrary loan service, personalized information services, and a virtual research environment. The library is staffed with full-time, permanent-track librarians, full-time staff, and several additional term and casual staff positions, ensuring support for students and faculty. Additionally, the library is a member of academic consortia, which helps in acquiring digital resources. In conversation with the U of Calgary librarian, specifically assigned to the U of Calgary program, she recommended the following resources. However, these are only suggestions, and the UPEI librarian is the best decision maker on what should be added to complete the necessary resources for the program.

- Academic Search Complete (for interdisciplinary sources – mostly academic articles)
- Business Insights and Business Source Complete
- Canada Commons (non-profit, think tank, government sources)
- Earth, Atmospheric & Aquatic Science Database
- Federal Science Library (if the program attracts students interested in ocean sustainability)
- Gale OneFile: Agriculture/Business/Environmental Studies and Policy
- GreenFile
- Sage Research Methods
- Science Direct
- Statista
- MSCI ESG research
- IBIS

Both MSCI ESG and IBIS have detailed information on sustainability performance and industry overviews. However, Business Source Complete has some industry reports therefore IBIS may not be needed.

4.3 Appropriateness of the organizational environment

The program as currently envisioned will be administered by the Faculty of Graduate Studies. At first glance, this is a reasonable model, since the Faculty of Graduate Studies is a 'neutral space' from which to administer a program that is delivered by departments across many faculties. However, the proposed administration of the program by the Faculty of Graduate Studies may face several challenges. First, the Faculty of Graduate Studies is

primarily responsible for administrative support rather than academic oversight and program delivery, which are outside its core mandate. This means that managing the Cleantech Master's program could become an additional, secondary task for the Dean. Secondly, the Faculty of Graduate Studies does not have faculty lines, which means it lacks the authority to make decisions about faculty hiring, promotion, tenure, or teaching assignments. These responsibilities typically fall under individual academic departments, making it difficult for the Faculty of Graduate Studies to effectively oversee and manage the program's academic needs. In the long run, it may be best for the program to be housed in a traditional faculty such as the Faculty of Sustainable Design Engineering (similar to UBC's Clean Energy program) or the Faculty of Business (similar to the Sustainable Energy program at U of Calgary). However, the degree can still be under the Faculty of Graduate Studies. The program could also be jointly administered by having the dean from one of the participating faculties in the Cleantech program oversee the program as director for a specified term and then have this position change on a rotating basis.

To ensure all disciplines involved in the Cleantech program are aware of what other faculties are teaching and joint decisions are made on important decisions regarding the program, an Academic Advisory Committee could be established with one faculty member from each discipline represented on the committee with the director of the program as chair of the committee. Other members might be added, such as the Program Coordinator. An external Industry/Government Advisory Committee could also be established to ensure the program is fulfilling the needs of its customers.

As the program is new, several feedback loops should be established. Students should be asked to provide information on how well they were prepared for their capstone projects and eventually their positions upon graduation. Industry, governments, and non-profit members offering capstone projects should also be asked to provide information on the quality of the work of the students and any suggested improvements.

5. Evaluation of financial resources

The UPEI administration has demonstrated a strong commitment to the program by allocating existing faculty teaching resources and ensuring support from multiple faculties. Additionally, there are plans to hire new faculty members dedicated to the program, further solidifying institutional backing. The provincial government's focus on clean technologies as a policy priority, along with substantial investments in the Cleantech Park and Academy where the program will be housed, further emphasizes the commitment to the program's success. The Ministry of Environment, Energy and Climate Action views the program as a crucial component of the province's clean tech strategy, indicating a strong dedication to its development. With the combined support of UPEI, industry, and the province, the program's financial health is expected to be stable, as all entities are motivated to ensure its success.

6. Assessment of the Labor Market Opportunities for Graduates

The net-zero economy will be fundamentally transformative, with new sectors and opportunities emerging as the costs of producing energy locally drop, opening new ways of doing business and shaping public policy. The labor market is already responding to these needs, and graduates of sustainable energy programs are being snapped up by firms in various parts of the economy (as observed in graduates from UBC and the U of Calgary). Global markets are also increasingly demanding expertise in clean technology, providing a wider range of career opportunities for specialists in this field. The transition is just beginning, so those who specialize in clean technology innovation and use will have a head start and become leaders in

the coming years. The UPEI program is well positioned to prepare students for this emerging landscape.

The success of the program will hinge on its ability to attract excellent students, particularly in its early years when it is establishing its reputation. There is intense competition for top-quality graduate-level talent both within Canada and globally. The program aims to enroll a third of its students from Canada, with the remainder likely coming from international backgrounds. However, many Canadian programs have recently viewed international students primarily as revenue sources, which hampers their ability to attract the best global talent. To overcome this challenge, offering scholarships to the most outstanding applicants, regardless of their national origin, is crucial for drawing both domestic and international students. Monies could also be made available for students for professional development, such as to attend conferences, workshops, or other events directly related to their projects, to present at conferences once their projects are completed, to cover expenses to visit a related facility, and for other small expenses that help to ensure that their work is of high quality and is shared with others.

APPENDIX

ORIGINAL: UPEI Master of Cleantech Leadership and Transformation Course Map

Year 1 Fall	Year 1 Winter	Year 1 Spring	Year 1 Summer	Year 2 Fall
Cleantech Fundamentals I	Cleantech Fundamentals II	Leadership Skills I	Innovation and Entrepreneurship	Capstone Project
Environmental Ethics & Social Responsibility	Two-Eyed Perception on Environmental Sustainability	Comparative Cleantech Politics and Policy	Sustainable Policy Development & Implementation	Leadership Skills II
Cleantech Governance, Regulation, Policy and Politics in Canada	Economics and Policy Analysis of Cleantech	Sustainable Community Planning	Community Energy Systems	
		Sustainable Energy Integration and Management	Project Management	

Program Content

- Science fundamentals
- Policy
- Environmental justice and equity
- Indigenous approaches
- Innovation and entrepreneurship
- Leadership

Summary

- 12 courses (10 required, 2 electives)
- 16 month course-based, interdisciplinary program
- 3 faculty based in CIC (with cross appointments in the Faculties of Arts; Science; and Business to fill gaps)

Legend

- Required Courses
- Elective Courses: Governance, Policy, and Regulations
- Elective Courses: Innovation, Technology, and Business

Option A: UPEI Master of Cleantech Leadership and Transformation Course Map

Year 1 Fall	Year 1 Winter	Year 1 Spring	Year 1 Summer	Year 2 Fall
Cleantech Fundamentals I	Cleantech Fundamentals II	Leadership Skills I	Innovation and Entrepreneurship (Include Capstone)	Capstone Project (fold in Leadership Seminars) (6 credits)
Environmental Ethics & Social Responsibility	Two-Eyed Perception on Environmental Sustainability	Project Management (Include Capstone)	Comparative Cleantech Politics and Policy	
Cleantech Governance, Regulation, Policy and Politics in Canada	Economics and Policy Analysis of Cleantech		Sustainable Community Planning + Sustainable Policy Dev & Implementation	
			Community Energy Systems + Sustainable Energy Integration and Management	

Program Content

- Science fundamentals
- Policy
- Environmental justice and equity
- Indigenous approaches
- Innovation and entrepreneurship
- Leadership

Summary

- 11 courses (10 required, 1 elective)
- 16 month course-based, interdisciplinary program
- 3 faculty based in CIC (with cross appointments in the Faculties of Arts; Science; and Business to fill gaps)

Legend

- Required Courses
- Elective Courses: Governance, Policy, and Regulations
- Elective Courses: Innovation, Technology, and Business

Option B: UPEI Master of Cleantech Leadership and Transformation Course Map

Year 1 Fall	Year 1 Winter	Year 1 Spring	Year 1 Summer	Year 2 Fall
Cleantech Fundamentals I	Cleantech Fundamentals II	Leadership Skills I	Innovation and Entrepreneurship	Capstone Project (fold in Leadership Seminars?) (2 credits)
Environmental Ethics & Social Responsibility	Two-Eyed Perception on Environmental Sustainability	Project Management	Capstone Project (2 credits)	
Cleantech Governance, Regulation, Policy and Politics in Canada	Economics and Policy Analysis of Cleantech	Capstone Project (2 credits)	Comparative Cleantech Politics and Policy	
			Sustainable Community Planning + Sustainable Policy Dev & Implementation	
			Community Energy Systems + Sustainable Energy Integration and Management	

Program Content

- Science fundamentals
- Policy
- Environmental justice and equity
- Indigenous approaches
- Innovation and entrepreneurship
- Leadership

Summary

- 13 courses (12 required, 1 elective)
- 16 month course-based, interdisciplinary program
- 3 faculty based in CIC (with cross appointments in the Faculties of Arts; Science; and Business to fill gaps)

Legend

- Required Courses
- Elective Courses: Governance, Policy, and Regulations
- Elective Courses: Innovation, Technology, and Business

Summary of External Review Report

External Review Consultants Irene Herremans of the University of Calgary and Milind Kandlikar of the University of British Columbia have given their recommendation of the University of Prince Edward Island's (UPEI) Master of Cleantech Leadership and Transformation and are both excited to see the program implemented. Below are excerpts of their External Review in support of the program followed by their recommendations and then our responses.

<u>Support of UPEI's Master of Cleantech Leadership and Transformation</u>

- The program is uniquely designed to meet the needs of Prince Edward Island and the surrounding areas; however, it will also serve others outside these areas well (p. 1).
- The closely linked connection among the various sectors of government, industry, non-profits, and academic institutions is an asset and makes it distinct from other similar programs (p. 1).
- The proposed interdisciplinary curriculum aligns well with the needs of an emerging net-zero economy (p.2).
- The Master's program is a key element of a broader provincial cleantech initiative, which includes a Cleantech Park, a Cleantech Alliance, and Cleantech Academy, all established with provincial support (p. 1).
- The curriculum is interdisciplinary, combining science, technology, ethics, entrepreneurship, and leadership coursework with a capstone project that aims to provide 'clean-tech ready' skills. The program also emphasizes regional collaboration, particularly with other Maritime provinces, to address shared energy grid challenges (p. 1).
- The program's structure, featuring sequential courses that build on previous knowledge, has the potential to provide a coherent learning path (p.3).
- The proposed level of study (with some modification highlighted in this report) responds well to the identified needs by producing graduates capable of leading in the cleantech industry (p. 8).
- On the other hand, we recognize that UPEI program will serve a smaller provincial population. Importantly, the smaller scale of UPEI allows for a flexibility that larger (and more bureaucratic) institutions cannot offer. This means that the UPEI program could provide a more personalized education, enable closer interaction between students and faculty, and be quicker to adapt to industry needs (especially through the efforts of the Cleantech Academy). The collaboration with Holland College is also a definite advantage (p. 9).
- … the faculty members who are involved in teaching the program are drawn from various faculties across UPEI, including those with expertise in sustainable energy systems, entrepreneurship, economic analysis, politics and policymaking, Indigenous knowledge, environmental sustainability, and ethics… These experts are well suited to deliver the proposed courses (p. 9).
- The location of the Cleantech Master's program in the forthcoming Cleantech Academy building in Georgetown will make it stand out among other Canadian and global degree programs (p. 11).

- The co-location of industry, government, non-profits, and academia, encouraging collaboration, will be a key distinguishing attribute, helping in various ways. The nearby Cleantech Industrial Park will provide students with practical experience and possible internships. Shared resources, including labs and equipment, will enrich the learning experience for students and faculty alike. Direct collaboration, including informal 'water cooler' conversations, between policymakers, researchers, and industry professionals will enhance entrepreneurship and policy development, enabling these sectors to benefit from each other's insights. Networking opportunities and exposure to policymaking processes will empower students to become future leaders in the cleantech sector (pp. 11-12).
- As befits a flagship provincial university in Canada, UPEI's Library offers a comprehensive range of resources and services, including access to a large collection of print and digital material. The library supports research and education with a robust interlibrary loan service, personalized information services, and a virtual research environment. The library is staffed with full-time, permanent-track librarians, full-time staff, and several additional term and casual staff positions, ensuring support for students and faculty. Additionally, the library is a member of academic consortia, which helps in acquiring digital resources (p. 12).
- The UPEI administration has demonstrated a strong commitment to the program by allocating existing faculty teaching resources and ensuring support from multiple faculties. Additionally, there are plans to hire new faculty members dedicated to the program, further solidifying institutional backing. The provincial government's focus on clean technologies as a policy priority, along with substantial investments in the Cleantech Park and Academy where the program will be housed, further emphasizes the commitment to the program's success. The Ministry of Environment, Energy and Climate Action views the program as a crucial component of the province's clean tech strategy, indicating a strong dedication to its development. With the combined support of UPEI, industry, and the province, the program's financial health is expected to be stable, as all entities are motivated to ensure its success (p. 13).
- The net-zero economy will be fundamentally transformative, with new sectors and opportunities emerging as the costs of producing energy locally drop, opening new ways of doing business and shaping public policy. The labor market is already responding to these needs, and graduates of sustainable energy programs are being snapped up by firms in various parts of the economy (as observed in graduates from UBC and the U of Calgary). Global markets are also increasingly demanding expertise in clean technology, providing a wider range of career opportunities for specialists in this field. The transition is just beginning, so those who specialize in clean technology innovation and use will have a head start and become leaders in the coming years. The UPEI program is well positioned to prepare students for this emerging landscape (pp. 13-14).

Recommendations and Responses

External Review Consultant Recommendations	University of Prince Edward Island Responses
2.1 Program Structure and Content	

We recommend that program faculty develop a more detailed curriculum map that (i) defines program objectives and learning goals for each course, (ii) describes how course content will achieve these goals, and (iii) explains how individual courses integrate to meet the overall objectives of the program (p. 3).	While course objectives and learning goals for each course have been established and outlined to ensure they meet program outcomes in Appendix 4, UPEI has already begun planning for a more rigorous detailed curriculum mapping exercise to ensure that overall learning objectives are established, set and met. Recommendations have been shared with current faculty involved in developing the curriculum.
The program faculty should also decide what level of competencies the students should acquire in the program and trace those back to various course materials to ensure appropriate learning resources are developed in each course, without unnecessary repetition but sufficient reinforcement to develop an integrated approach among the various disciplines. The students must recognize how the material in one discipline connects to that in another discipline, and they should not get the impression that the material in each discipline is unrelated to the others (p.3).	In conjunction with UPEI's Teaching and Learning Centre, the faculty will evaluate the levels of competencies students need to acquire in a more detailed curriculum map. The recommendation as to how this is evaluated (i.e., form of scale) has been shared with faculty and will be considered. In addition, students will be introduced to the methodology of interdisciplinary learning in each of their three courses each semester, which will be modeled by instructors and practiced during tutorials and seminars. A single 'wicked question/problem' will be posed at the beginning of the semester and must be addressed in each of the courses using interdisciplinary thinking. This approach will demonstrate the importance of integrating insights and approaches from multiple disciplines to form a framework of analysis that will lead to a rich understanding of complex questions. The output will be demonstrated in a portfolio (or other file) that students manage throughout their program, a valuable tool in the development of a learner.
On page 36 of the Environmental Scan, there is a list of the Learning Outcomes under leadership, cognitive, digital, and interpersonal. However, there likely should be technical skills listed as well. Review the outcomes and determine if they are comprehensive and representative of what the students should know and be able to do upon completion of the program. Then work through the curriculum mapping to determine	The recommendation of adding more technical skills to the list of learning outcomes has been shared with the faculty currently involved in creating the curriculum and will be strongly considered. This will also be taken into account during UPEI's more rigorous curriculum mapping exercise.

what material in each course is designed for students to acquire and apply the competencies (p.4).	
We do have specific suggestions for some required course content, and for streamlining the sequence of courses (including reimagining the combination of core and elective courses and redesigning the delivery of the capstone project). Ultimately, the directors and faculty will decide which aspects should be incorporated into the program (p.4).	While the External Review Consultants met with UPEI's Curriculum Working Group (CWG) during their on-site visit, recommendations to streamline the sequence of courses and required course content were shared and evaluated. After in-depth discussions, the CWG implemented and agreed upon their recommendations. Some of these included streamlining four course electives to two based on overlap of learning goals for the originally proposed courses and extending the Capstone Project course over more than a semester to an orientation module, and two full semester courses.
While the program benefits from a wealth of interdisciplinary knowledge, there may be some potential gaps in the curriculum that need to be addressed… (p.4) These core competencies include the following: a. Basic Data Skills b. Energy Fundamentals c. Energy Production Basics d. Climate Science e. Business and Economic tools f. Tools of energy assessment g. Global Climate Landscape h. Sustainability Reporting i. Risk management and Double Materiality j. Implementing Sustainability at the Organization Level k. Software for Clean Tech Some of the above core competencies (such as Climate Science, Energy Production, and Global Climate Landscape) are addressed in the existing course descriptions, but others such as Basic Data Skills, Energy Fundamentals, Business and Economics tools, and Tools of Energy Assessment, Sustainability Reporting, Risk Management and Double Materiality, Organizational	As stated in the report, some of the competencies listed are already included in coursework. Basic data skills, energy fundamentals, energy production basics, climate science, and global climate landscape have been included in courses Cleantech Fundamentals I and II. In addition, sustainability reporting, risk management, and double materiality have been included in the Project Management course. Other recommendations, such as business and economic tools, tools of energy assessment, and software for cleantech, will potentially be offered to students in online modules during their orientation prior to starting their coursework or integrated into other courses. These potential gaps have been shared with the Curriculum Working Group (CWG) and the Teaching and Learning Centre and will be considered moving forward.

Sustainability, and Software for Clean Tech are not evident (due to the conciseness of the course descriptions) and might need to be added and more fully integrated into the coursework. This will require changing existing courses to incorporate these topics or requiring students to develop these skills in other ways (e.g. adding them as modules/short courses to the current program, online courses, or Massive Open Online Courses - MOOCs). We strongly recommend integrating these topics into the program (p. 5).	
2.3 Streamlining the sequence of courses	
Such integration allows for continuous development of the capstone project throughout the program, ensuring that students are better prepared for this critical aspect of their training (p.6).	As stated in section 2.2 above, while the External Review Consultants met with UPEI's Curriculum Working Group (CWG) during their on-site visit, recommendations to streamline the sequence of courses and required course content were shared and taken. After in-depth discussions, the CWG implemented and agreed upon their recommendations. Some of these included streamlining four course electives to two based on overlap of learning goals for the originally proposed courses and extending the Capstone Project course over more than a semester to an orientation module, and two full semester courses. The integration of content will also occur via the wicked question posed each semester.
2.4 The Capstone Project	
Consider if certain dimensions must be present in a project for it to qualify for the program, such as energy and environment or some other dimensions or certain Sustainable Development Goals (p. 6).	This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project course to be considered. For example, a potential requirement would be for student teams to incorporate a certain number of the 17 Sustainable Development Goals into their capstone project.
A process should be developed for matching students with organizations: student-led choice; organization-led choice, or a combination (p. 6).	This recommendation will be shared with the faculty teaching the Capstone Project courses and has been shared with the Cleantech Academy Outreach and Engagement

	Coordinator, who will be integral in securing the industry and community partners for capstone projects. A process we are considering is a ranking system completed by both industry/community partners and students.
A 3-minute presentation by the students before the proposal is finalized might help students clarify their research question and why it is important in their own minds and to a general audience. A panel of judges could be used to provide written feedback to the students (p. 6).	This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project course.
Sufficient time may be needed to complete ethics applications and receive approvals. A TA and samples of completed ethics applications could help students learn the process. Possibly bring in the chair of the ethics board to explain the ethics process to the students (p. 6).	The Capstone Project course was initially presented as a stand-alone six-unit course in the final semester. Taking into account research ethics applications in addition to other advantages, such as a longer project timeline, the Capstone Project now begins with an Orientation Module which will take place towards the end of the second semester. This will introduce students to the Capstone Project and students will review ethics guidelines in their summer semester, applying to UPEI's Research Ethics Board should the project call for it. UPEI Research Ethics staff will be invited to give a workshop during this time. Faculty, the Cleantech Academy, and the Program Manager will also work with the Research Ethics staff and the community/industry partner to coordinate timelines and ethics approvals accordingly.
Organizations may ask for legal documents such as, non-disclosure agreements (NDA) if confidential information is provided to students; research agreements to determine who holds rights to the analysis and/or rights to publish; and other clarifications needed for the project. These are normally prepared by the team in Legal, Research at the university with feedback from the organization's legal department until both are satisfied with the contents (p. 6).	This recommendation has been shared with the UPEI Research Services Team, who understand the legal importance of non-disclosure agreements (NDAs). UPEI's Research Services Department has NDA templates readily available for our program to use in this instance. In addition, the University of Calgary has also shared a sample NDA that is used for their Capstone Project in their Sustainable Energy Development master's program.

The content in the capstone research course will need to include instruction on how to carry out the research and the expectations related to the content in each of five main chapters of the report, such as Introduction, Literature Review, Methods, Analysis and Findings, Conclusions, Limitations, and Future Research, and other chapters that may be required (p. 6).	The Capstone Project I course will focus on the initial research stages of the Capstone Project, which include developing a project proposal; generating research questions; conducting a literature review, environmental scan, and needs assessment; reviewing research ethics guidelines; and developing the project's research methodology.
Consider having the students select a separate academic supervisor with expertise on the topic of the research project of each group. This academic supervisor will guide the students through their projects regarding the technical aspects. In addition, the course instructor for the capstone research project will provide guidance on how to engage in the research, how to prepare the final report, and other important aspects of the research process. As well, the instructor should be the "go to" person for all administrative aspects of the capstone course (p. 7).	This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project course. However, during the Capstone Project Orientation Module, students will be presented with how to best prepare for their Capstone Project experience and in Capstone Project I will be provided further guidance on how to engage and conduct research and prepare the final report, among other things. Additionally, all student teams will have support from multiple viewpoints which include their faculty instructor, the Cleantech Academy Outreach and Engagement Coordinator, UPEI's Teaching and Learning Centre, the Experiential Education Department, and the Program Manager.
Suggest to the organization that the student team should be responsible to one person in the organization, although others in the organization can give feedback and direction, they should come through the organization supervisor (p. 7).	This recommendation will be strongly considered to include in the industry and community expectations document for the Capstone Project. Furthermore, it has been shared with the Curriculum Working Group (CWG) and the Cleantech Academy Outreach and Engagement Coordinator and will be shared with the faculty teaching the Capstone Project courses.
If organizations have not worked with student groups before, it might be worthwhile to provide some directions in a document that can be sent to the organizations explaining how to best work with student groups (p. 7).	This recommendation will be strongly considered to include in the industry and community expectations document for the Capstone Project. Additionally, it has been shared with the Curriculum Working Group (CWG) and the Cleantech Academy

	Outreach and Engagement Coordinator and will be shared with the faculty teaching the Capstone Project courses. Additionally, we will work with UPEI's Experiential Education Department and others on campus who have developed resource materials for this type of experiential learning.
Both academic and organization supervisors could sign off on the proposal (to ensure the direction is clear to everyone). They should sign off on the final report when both supervisors deem it as satisfactory, especially if a Pass/Fail grade is given (p. 7).	This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project courses.
Consider if the students should prepare progress reports for a specific period (every two weeks, or once a month) to report progress against their timeline, if behind how they will catch up, and any challenges they are having. These progress reports could be posted for the capstone project instructor to give feedback; however, they should also be sent to academic and organization supervisors to keep them informed of the progress on the project (p. 7).	In the courses Capstone Project I and II, students will complete progress reports as well as individually write a leadership development portfolio reflecting on how course workshops and seminars have informed their knowledge, skills, attitudes, and identity as a leader and researcher.
Consider if a team assessment is needed of the contribution of each member of the group for the capstone project and other group work in the courses. Courses prior to the capstone project should contain some group work for the students to learn to work efficiently and effectively in groups. Instruction on how to work in groups might be necessary to avoid group conflict. To ensure that the students in each team can work well together, assigning group membership to ensure interdisciplinary groups for each semester and then switching group membership for each of the following semesters will provide students with an opportunity to work with each student in the program and to understand the work styles of various backgrounds (for example, engineers vs. business backgrounds or Canadian vs. international students) (p. 7).	This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with all faculty teaching in the program, including the Capstone Project courses, as the CWG understands the importance of interdisciplinary student teams. In addition, during Orientation and the Capstone Orientation Module, students will participate in team building workshops and the topic will be revisited in the Capstone Project II course.

A final presentation of findings (10-15 minutes) with a time for questions by the supervisors, other interested parties, and other students would provide an opportunity for sharing findings from the capstone project (p. 7).	This recommendation has been implemented as part of the Capstone Project II course and has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project course.
Creating a database with completed capstone projects available to future cohorts would help for future cohorts to locate research on which they might want to build. Finished projects could also be made available through the university's library (p. 7).	This recommendation has been shared with UPEI's Robertson Library Team, who assess that this would be feasible to implement.
An industry showcase shortly after completion of the degree requirements could expose the research to interested parties from industry, academe, and non-profit organizations (p. 7).	This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project course. The Cleantech Academy will gladly host and support such a showcase at the Cleantech Innovation Centre (CIC).
3.0 Comparison with other programs	
The UPEI program has numerous strengths; it also has some potential shortcomings. First, the program as proposed is short on technical depth found in other programs (such as those at UBC and U of Calgary) whose curricula have a greater emphasis on energy systems. Some of this is a result of higher-level program choices. For example, the UBC program only admits students that have a background in engineering. While in-depth technical knowledge is not necessary to train future cleantech leaders, care should be taken to provide essential technical and scientific training to students. The trick will be to get the level of technical knowledge 'just right' – as highlighted in section on course content (2.2) (p. 8).	Per the report, as this is an interdisciplinary program, we do not want to exclude students who do not come with a science, engineering, or mathematics background. Therefore, we plan to include pre-orientation and self-study recommendations to upgrade their science, engineering, and mathematics knowledge in order for them to be fully prepared for Cleantech Fundamentals I and other technical areas of the program which include engaging with industry and community partners during the Capstone Project courses.
Additionally, there are pros and cons to the capstone research project compared to mandatory work-integrated learning components, such as internships or co-op	Leadership Skills I, taught in the third semester, along with the Capstone Orientation Module will help prepare students to engage with industry and

terms. Those students with little to no experience might prefer a more structured environment such as an internship or co-op. Those students with considerable experience likely would perform better with the capstone project, which offers them more flexibility and decision-making opportunities to integrate their coursework with their own expertise. However, a group or team arrangement for the capstone project might be able to smooth over these differences in preferences. In contrast, it might create group conflict if more experienced students are working with those with no experience. Group work and the possibility for conflict will need to be monitored. For both types of students, the program's location in the Cleantech Academy should offer an environment for interacting with industrial partners, resulting in possible employment and networking opportunities (p.8).	community partners. These recommendations have been shared with the Curriculum Working Group (CWG) and will be shared with all faculty teaching in the program, including the Capstone Project courses, as faculty understand the challenges that group work can present. The Capstone Orientation Module will include a Team Building Workshop and will be revisited in the Capstone Project II course. Professional development sessions for faculty regarding industry and community engagement will also be available.
The Cleantech program may be limited because of the small size of UPEI when compared to larger institutions, potentially impacting the depth and breadth of opportunities. Consider some of these points. For example, there is likely to be a limited selection of elective courses or elective courses would have low enrollment if they were only available to students in the Cleantech program. This could restrict students' ability to specialize in specific areas of interest within cleantech (p. 8).	To start the program rollout, both electives are proposed to be offered yearly and not rotated. Given that the area of cleantech is new and dynamic, it may be necessary to review the program after the first cohort to identify if new courses should be introduced or current courses should be modified to reflect the most up-to-date information available in cleantech. This will be supported by faculty, library resources, and industry and community consultations via a program advisory committee.
Additionally, unlike some programs that require prior work experience (which enhances classroom learning with practical industry insights) UPEI's program does not have this requirement. This could limit peer learning opportunities from experienced professionals. Finding ways to address these differences could help the program better compete with other well-established cleantech and sustainability programs (p. 8).	Industry and Community leaders in cleantech will be invited during different points of the program, specifically during the program's Orientation, Leadership Skills I, Capstone Project Orientation Module, and Capstone Project I and II for students to learn from experienced professionals. Additionally, the Cleantech Academy plans to hold various networking events throughout the year and will invite students in this program to participate. These events will give an

	opportunity for students to network with industry and community professionals as well as with students from the Holland College program.
Finally, the program's newer status and smaller institutional base may not provide the same level of global recognition, networking opportunities, or extensive alumni networks relative to established programs at larger universities. Therefore, creating close connections with industry partners would be important (p. 8).	The Faculty of Graduate Studies in conjunction with the Cleantech Academy has already begun developing relationships in the cleantech industry and plans to further deepen these relationships through meetings, events, and research opportunities with our program.
However, it might be best to monitor the types of jobs that graduates from Holland College are acquiring and compare those with the jobs that the Cleantech program graduates are acquiring to ensure there is distinction in the two programs and they are not competing. Questions relating to the differences in the two programs might come from potential students as well (p. 9).	This type of data collection is planned and will be kept by the Program Manager (PM). The PM will work with the Cleantech Academy and Holland College to compare data and fully analyze.
4.1 Faculty Resources	
We strongly recommend that the program bring in additional technical expertise either in the form of new hire(s), or by inviting other members from the UPEI science and technology community to join the teaching team (p. 11).	In addition to Faculty of Sustainable Design Engineering (FSDE) member Kuljeet Grewal, we have also identified other FSDE faculty members to participate who include: Yulin Hu, Aadesh Gokul, and Stephanie Shaw, who all have the technical expertise needed. We also plan to hire two part-time teachers (sessional instructors) and are proposing a Canada Research Chair in Clean Energy.
Second, each course needs to have multiple instructors capable of delivering the material (even if only a single instructor may deliver the course at any time). This is because a particular faculty member may not be unavailable due to a sabbatical or other leave/secondment, but also because it is healthy for faculty members to rotate the courses that they teach (p. 11).	We plan to recruit three new faculty members and part-time teachers (sessional instructors) as well as engage in additional outreach to UPEI faculty members with the expertise needed. Furthermore, we plan to hire two sessional instructors and are proposing a Canada Research Chair in Clean Energy.

Based on our experience at similar programs at U of Calgary and UBC, the capstone program will need greater mentorship than currently anticipated. While the Teaching and Learning Center can do an effective job in coordinating capstone efforts, we believe that each student (or a group of students) will need a domain expert (academic supervisor) to guide them through their project(s). This is an important consideration since the capstone is a key part of the student learning experience and forms a critical bridge to future career progress and employment. We recognize that a new faculty will be hired (in business and entrepreneurship) to play such a role. However, capstone topics will likely to be too diverse to be effectively mentored by one individual. A team-based approach that involves faculty members from various disciplines addressing multiple facets of the projects might be a way to resolve this issue (p. 11).	This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project course, as well as the Teaching and Learning Centre. The Capstone Project module and courses will have the support of the Cleantech Academy Outreach and Engagement Coordinator as well as UPEI's Experiential Education Department. We plan to ask industry and community partners to identify one person from their organization to advise, guide, and mentor student teams throughout their Capstone Project.
To implement a team-based approach, the capstone project instructor should converse with a number of faculty members in diverse disciplines who appear to be qualified to supervise a capstone research project based on their research and teaching. The instructor can ask them if they would be interested in supervising a project periodically. Instructors in the Cleantech program should also be willing to supervise projects related to their expertise. Then, create a spreadsheet with the list of professors, their contact information, and a short bio about their research interests. Provide this to the students as a starter. The students might also have other professors in mind who are qualified to supervise their project. With the help of the capstone project instructor, who can introduce the program to the potential academic supervisor, the student can follow up with their chosen professor to request supervision. Once the professors are familiar with the program, the student can approach the professors directly to ask for	Such a mentorship could be piloted in the first year and be monitored for future success and feasibility. As recommended, a brief description would be prepared and shared regarding supervisory expectations. This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project courses, as well as the Teaching and Learning Centre.

supervision. When requesting supervision, having a one-page proposal of the project helps the professors to determine if they have the expertise to supervise the project. This process is followed at U of Calgary, and it works well (p. 11).	
A brief description of the expectations as a supervisor should be prepared to send to the potential supervisors to help them judge if they will have sufficient time to support the students. Generally, most of the work comes to help the students write a proposal containing a clear research question, why it is important, what has already been researched on the topic, what their contribution will be, and how they will answer the research question. However, instruction should be given in the capstone research course as to how to write these sections. Then the supervisor helps the students apply the instruction to the specific project on which they are working (p. 11).	This recommendation has been shared with the Curriculum Working Group (CWG) and will be shared with the faculty teaching the Capstone Project courses, as well as the Teaching and Learning Centre. A brief description would be prepared and shared regarding supervisory expectations whether this be for an industry/community partner or faculty mentor.
4.2 Evaluation of physical resources	
The Georgetown facility is not yet built, and this is an innovative experiment that will need to be closely monitored and adjusted to ensure the best possible outcomes. The primary risk is that Georgetown is approximately 50 km from the UPEI campus, where much of the faculty is located. The transaction costs created by this distance will need to be managed effectively. for example, by making it easy for faculty and students alike to commute across the two locations (p. 12).	As the report noted, the location of the master's program in the Cleantech Innovation Centre (CIC) in Georgetown differentiates it from other Canadian and international programs, as it will offer a collaboration space between the two post-secondary programs, government, the Cleantech Academy, and industry and community organizations that plan to be in the CIC. We understand the challenge of the planned location being approximately 50 km from the main UPEI campus in Charlottetown. Currently, *T3 Transit* (*T3*) offers transit services across the Island which already include a bus route to and from Georgetown and Charlottetown. However, UPEI will work with *T3* to create convenient bus schedules to match class hours (and vice versa), which the Government of PEI supports. In addition, the Cleantech Academy has initiated conversations to create tiny home *Living Labs* to create its own

	neighborhood in Georgetown where students can be the researchers and live in sustainable housing while in the program.
In conversation with the U of Calgary librarian, specifically assigned to the U of Calgary program, she recommended the following resources. However, these are only suggestions, and the UPEI librarian is the best decision maker on what should be added to complete the necessary resources for the program. • Academic Search Complete (for interdisciplinary sources – mostly academic articles) • Business Insights and Business Source Complete • Canada Commons (non-profit, think tank, government sources) • Earth, Atmospheric & Aquatic Science Database • Federal Science Library (if the program attracts students interested in ocean sustainability) • Gale OneFile: Agriculture/Business/Environmental Studies and Policy • GreenFile • Sage Research Methods • Science Direct • Statista • MSCI ESG research • IBIS Both MSCI ESG and IBIS have detailed information on sustainability performance and industry overviews. However, Business Source Complete has some industry reports therefore IBIS may not be needed (p. 12).	The UPEI library already subscribes to all but two of the following suggested resources: Academic Search Complete; Business Insights and Business Source Complete; Canada Commons; Earth, Atmospheric & Aquatic Science Database; Federal Science Library; Gale OneFile: Agriculture/Business/Environmental Studies and Policy; GreenFile; Sage Research Methods; Science Direct; and Statista. All UPEI students in this program will have access to these databases should it be needed for their coursework. The suggested resources of MSCI ESG research and IBIS have been shared with our librarians and faculty that will be working in the program and will be evaluated accordingly to discern if these resources should be added. (It has been noted, per the review, that since UPEI already subscribes to Business Source Complete that IBIS may not be needed.)
4.3 Appropriateness of the organizational environment	
First, the Faculty of Graduate Studies is primarily responsible for administrative support rather than academic oversight and program delivery, which are outside its core mandate. This means that managing the Cleantech Master's program could become an	Given the interdisciplinary nature of this master's program currently working across five different faculties at UPEI, the Faculty of Graduate Studies acts as a neutral space to manage aspects of the program. However, in response to this recommendation, UPEI

additional, secondary task for the Dean. Secondly, the Faculty of Graduate Studies does not have faculty lines, which means it lacks the authority to make decisions about faculty hiring, promotion, tenure, or teaching assignments. These responsibilities typically fall under individual academic departments, making it difficult for the Faculty of Graduate Studies to effectively oversee and manage the program's academic needs. In the long run, it may be best for the program to be housed in a traditional faculty such as the Faculty of Sustainable Design Engineering (similar to UBC's Clean Energy program) or the Faculty of Business (similar to the Sustainable Energy program at U of Calgary). However, the degree can still be under the Faculty of Graduate Studies. The program could also be jointly administered by having the dean from one of the participating faculties in the Cleantech program oversee the program as director for a specified term and then have this position change on a rotating basis (pp. 12-13).	proposes a Canada Research Chair in Clean Energy whose duties would include leading the master's program.
To ensure all disciplines involved in the Cleantech program are aware of what other faculties are teaching and joint decisions are made on important decisions regarding the program, an Academic Advisory Committee could be established with one faculty member from each discipline represented on the committee with the director of the program as chair of the committee. Other members might be added, such as the Program Coordinator. An external Industry/Government Advisory Committee could also be established to ensure the program is fulfilling the needs of its customers (p. 13).	UPEI supports the idea of establishing an Academic Advisory Committee and will work with the current Curriculum Working Group and the Cleantech Academy to form the most appropriate representatives for this advisory committee who could meet on a bi-semester basis to ensure that important decisions are made across all involved faculties. The Terms of Reference for this Advisory Committee will draw from other academic programs on campus with similar advisory committees.
As the program is new, several feedback loops should be established. Students should be asked to provide information on how well they were prepared for their capstone projects and eventually their positions upon graduation. Industry, governments, and non-profit	This type of data collection is planned and will be kept by the Program Manager (PM). The PM will collaborate with the faculty instructor, UPEI's Manager of Institutional Research, the Cleantech Academy, and partner organizations to collect and analyze

members offering capstone projects should also be asked to provide information on the quality of the work of the students and any suggested improvements (p. 13).	data to make any recommendations for improvement.
6. Assessment of the Labor Market Opportunities for Graduates	
However, many Canadian programs have recently viewed international students primarily as revenue sources, which hampers their ability to attract the best global talent. To overcome this challenge, offering scholarships to the most outstanding applicants, regardless of their national origin, is crucial for drawing both domestic and international students. Monies could also be made available for students for professional development, such as to attend conferences, workshops, or other events directly related to their projects, to present at conferences once their projects are completed, to cover expenses to visit a related facility, and for other small expenses that help to ensure that their work is of high quality and is shared with others (p. 14).	The Government of PEI and UPEI understand the importance of attracting the best students across the globe. During an on-site visit meeting between the Government of PEI and the Reviewers, Government representatives were in favor of offering financial support for student scholarships as well as a barrier-free professional development fund for students in this degree program. In addition, UPEI already has a 'Student Research Travel Funding Program' in place where students can receive funds to represent a paper or poster on their research activity at a national or international scholarly conference.

Appendix: Detailed course descriptions for each compulsory and required elective courses

The courses required for the MCLT are as follows:
CLT 6101 Cleantech Fundamentals I
CLT 6102 Cleantech Fundamentals II
CLT 6201 Environmental Ethics & Social Responsibility
CLT 6203 Indigenous Worldviews on Environmental Sustainability
CLT 6205 Cleantech Governance, Regulation, Policy and Politics
CLT 6207 Economics and Policy Analysis of Cleantech
CLT 6301 Project Management for Cleantech Transformation
CLT 6303 Innovation and Entrepreneurship for Cleantech Transformation
CLT 6800 Leadership Skills for Cleantech Transformation
CLT 7000 Orientation to Cleantech Capstone Project
CLT 7001 Cleantech Capstone Project I
CLT 7002 Cleantech Capstone Project II

In addition to completing all required courses, students must complete one of the following elective courses:
CLT 7210 Sustainable Communities and Policy
CLT 7310 Energy Technologies for Sustainable Neighbourhoods

CLEANTECH COURSES
CLT 6101 Cleantech Fundamentals I
This course examines fundamental concepts of climate change science, bringing students from different backgrounds onto the same page. Topics include ecosystems, biogeochemistry cycles, and greenhouse gases. The major environmental issues that need to be addressed to achieve net zero emissions will be discussed. Students will develop a solid understanding of the cleantech path to net zero and develop hopeful messaging around this.
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
HOURS OF CREDIT: 3

CLT 6102 Cleantech Fundamentals II
This course builds on Cleantech Fundamentals I by examining the path to net zero energy. Students will first gain a solid understanding of energy systems, major energy technologies underlying energy supply and consumption, their applications, and their integration with the electric grid. This course also introduces emerging clean energy technologies and policies impacting the development, deployment, and utilization of these technologies to address environmental issues. The role of big data, AI tech innovations, and other hot topics in the net zero energy path and energy security will be discussed.
PRE OR CO-REQUISITE: CLT 6101 - Cleantech Fundamentals I or permission of instructor
HOURS OF CREDIT: 3

CLT 6201 Environmental Ethics & Social Responsibility
This course explores key debates concerning: the moral significance of nature; basic moral theories; moral relativism, objectivism, and pragmatism; Indigenous perspectives on human-

nature relations, ethical assessment of new technologies including impacts on human health and behavior, biodiversity, water conservation and climate change; the question of why humans have degraded their environments, including economic and political causes; the concepts of space, place, and ecological identity; ethical limitations of economic-driven decision-making and cost-benefit analysis; professional ethics and social responsibility; environmental justice, environmental racism, Reconciliation, and key debates in the ethics of climate change (individual, intergenerational, and international responsibilities; just transitions, geoengineering).
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
HOURS OF CREDIT: 3

CLT 6203 Indigenous Worldviews on Environmental Sustainability
This graduate-level course discusses Indigenous worldview and philosophy to respond to the impacts of climate change. It explores the integration of Indigenous Knowledges with Western Knowledges to advance unique approaches to island and global environmental sustainability in the context of climate change.
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
HOURS OF CREDIT: 3

CLT 6205 Cleantech Governance, Regulation, Policy and Politics
An introduction to clean technology governance, regulation, policy and politics, the first half focuses on Canada, as students examine the role that various levels of government play in relation to existing constitutional, administrative and regulatory frameworks. The second half employs a comparative perspective exploring case studies from several jurisdictions' settings, both developed and developing, looking at approaches of deploying cleantech projects. Students examine ideas, policy actors and institutions involved. We will address significant questions around efforts to support the transition towards net zero via the creation of a policy environment which lends itself to successful cleantech projects. Students will undertake a detailed analysis of a cleantech project, producing a well-researched policy product.
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
HOURS OF CREDIT: 3

CLT 6207 Economics and Policy Analysis of Cleantech
This interdisciplinary course merges economics and political science to analyze cleantech-related issues within the framework of public policy, defined as 'anything a government chooses to do or not to do.' A primary goal is to understand the factors influencing policy decisions, particularly institutions, context, and decision-making processes. The economic aspect of the course focuses on the tension between economic activities and environmental sustainability, exploring how economic practices lead to environmental degradation and what regulatory actions can balance economic growth with environmental sustainability. Politically, the course examines the roles of different government structures in Canada in policy development, evaluating the effectiveness of policies like carbon pricing and subsidies. Students will develop skills to critically assess

government policies in environmental economics, understanding the interplay between economic theories and political realities.
PRE OR CO-REQUISITE: CLT 6205 - Cleantech Governance, Regulation, Policy, and Politics or permission of instructor
HOURS OF CREDIT: 3

CLT 6301 Project Management for Cleantech Transformation
This course will introduce students to project management knowledge, tools, and techniques to effectively manage projects within the rapidly evolving landscape of sustainable and clean technologies. Throughout the course, students will be exposed to sustainable environmental, social, and governance (ESG) principles and practices using lectures, case studies, and facilitated discussion. Students will develop a comprehensive understanding of project management principles while integrating ESG frameworks into project planning, stakeholder analysis, and engagement, execution, and evaluation by focusing on various project management concepts, guidelines, and practices for the leaders of sustainable and clean technology initiatives.
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
HOURS OF CREDIT: 3

CLT 6303 Innovation and Entrepreneurship for Cleantech Transformation
This course looks at efforts of innovation and entrepreneurship in cleantech. These efforts are described and assessed in the context of innovation management and entrepreneurial ecosystems. The role of entrepreneurial thinking, innovative organizational culture, portfolio management, engagement of stakeholders, collaboration with partners, mitigation of technological risks, and interactions with investors are taught both in theory and using case studies relevant to cleantech. The course utilizes real-world learning techniques such as case studies, guest speakers, and project/venture plans.
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
HOURS OF CREDIT: 3

CLT 6800 Leadership Skills for Cleantech Transformation
This course provides students with an overview of major leadership theories and opportunities to develop and practice their interpersonal skills in preparation for leadership in influential cleantech roles. Topics covered include leadership styles, followership and empowerment, change management and agency, influence and persuasion, effective communication, and conflict management. Students will reflect on their own leadership style and hone their leadership and interpersonal skills through interactive case discussions, role plays, and presentations. Key areas of skill development include self-awareness, critical thinking, adaptability, persuasion, conflict management, and communication.
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor
HOURS OF CREDIT: 3

CLT 7000 Orientation to Cleantech Capstone Project

The orientation module is an engaging and informative overview designed to prepare students for their Capstone Project experience. It will provide insights from industry and community leaders in cleantech, guidance on how to best prepare for the Capstone Project courses and networking opportunities. The course grade will be on a pass/fail basis.
PRE OR CO-REQUISITE: Students are expected to have completed all Master of Cleantech Leadership and Transformation program requirements to this point
HOURS OF CREDIT: 0

CLT 7001 Cleantech Capstone Project I
This course is the first of a two-part Capstone Project series where students will have the opportunity to begin their teamwork on a real-life project with a community or industry partner. Students will focus on the initial stages of the Capstone Project which include developing a project proposal, generating research questions, conducting a literature review, environmental scan, and needs assessment, reviewing research ethics guidelines, and developing the project's research methodology. Supported by a series of workshops and seminars on topics like proposal writing, literature searching and citation, time management, and peer workshopping and feedback, emphasizing partnership development and engagement.
PRE OR CO-REQUISITE: Students are expected to have completed all Master of Cleantech Leadership and Transformation program requirements to this point
HOURS OF CREDIT: 3

CLT 7002 Cleantech Capstone Project II
This course is the second of a two-part Capstone Project series focusing on the development and completion of the team project which will culminate in a final report and presentation, with an analysis of findings and recommendations for the community or industry partner. In addition to the Capstone Project, students will individually write a leadership development portfolio reflecting on how course workshops and seminars have informed their knowledge, skills, attitudes, and identity as leaders. Supported by workshops and seminars focusing on teamwork skills, stakeholder engagement, community entry practices, and communication skills, while also providing a discussion forum for students to learn from and engage with leaders in cleantech.
PRE OR CO-REQUISITE: CLT 7001 - Capstone Project I
HOURS OF CREDIT: 3

Elective Courses (1 required)

CLT 7210 Sustainable Communities and Policy
The course advances students' understanding of the concept of sustainable development (SD) by introducing the history of the concept and different ways of measuring sustainability. The course touches upon the main factors that influence policy decisions and outcomes regarding SD (i.e., the role of power, economic interests, expertise, public opinion, resources, and technological innovation). Focusing on 'community energy systems' [CES] as a practical strategy for advancing sustainability. CES necessitates deep public involvement in development processes, as well as a fair and localized distribution of project outcomes. The CES development paradigm will be explored as a strategy for mitigating externalities associated with all energy sources, as well as a means to achieve distributive, procedural, recognition, and other forms of energy justice.
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor

HOURS OF CREDIT: 3

CLT 7310 Energy Technologies for Sustainable Neighbourhoods
This course offers a comprehensive exploration of sustainable community planning and renewable energy integration. Students will delve into historical perspectives and contemporary challenges, analyzing urban sprawl and sustainable built environment forms, with an emphasis on clean energy and nature-based solutions. The curriculum covers the integration of diverse renewable sources, microgrids, and energy storage technologies, enhancing grid reliability and resiliency. Through a collaborative approach, students will learn to integrate renewable energy into existing Canadian buildings and neighborhoods. By combining planning, renewable energy, and healthy community principles, students will receive a holistic perspective on sustainable communities and energy systems.
PRE OR CO-REQUISITE: CLT 6102 - Cleantech Fundamentals II or permission of instructor
HOURS OF CREDIT: 3

UNIVERSITY of Prince Edward ISLAND

Academic Planning and Curriculum Committee
January 31, 2025

NEW CALENDAR ENTRY

Motion #

Faculty/School: **Graduate Studies**

Department/Program(s): **Master of Cleantech Leadership and Transformation**

MOTION: That a new calendar entry for Graduate Program Admissions into the Master of Cleantech Leadership and Transformation in the Faculty of Graduate Studies, be approved as proposed.

Proposed New Calendar Entry

100 Graduate Program Admissions

Master of Cleantech Leadership and Transformation (MCLT)

The Master of Cleantech Leadership and Transformation (MCLT) is a transdisciplinary program that aims to produce leaders and innovators who will assist in the adoption and creation of sustainable solutions that transform the planet towards net zero. Applicants for admission to the MCLT program should have demonstrated, or have the potential to be enthusiastic, collaborative, action-oriented advocates who can bring a global perspective to a more sustainable future through an evaluation of policy and innovation with an environmental justice lens. The basic requirements and qualifications are as follows:

1. Any Bachelor's degree of four years or a Bachelor's with honours, or equivalent professional degree, from an approved university, with a minimum GPA of 3.0 or an average of 75% or higher in the in the work of the last four semesters or the last two undergraduate years.
2. English Language Proficiency Requirement consistent with the minimum admission requirements for All Graduate Programs and for Graduate Student Status at UPEI.
3. No prior work experience is required. However, UPEI's goal is to attract candidates with an established commitment to sustainable solutions as well as personal and professional development. Students with related work experience and the knowledge and competencies required to contribute to long-term environmentally sustainable transformations will be considered an asset.

APPLICATION FOR ADMISSION

All documents pertaining to application for admission are to be submitted through the UPEI graduate application process.

APPLICATION CHECKLIST

- Graduate Studies Application Form
- All Official Transcripts

NEW CALENDAR ENTRY

Motion

Proposed New Calendar Entry
• English Language Proficiency Score (for applicants whose first language is not English) • Short video outlining why you are an ideal candidate (see website for further details) • Application Fee Complete applications with all documentation will start to be reviewed during the prior Winter semester for a Fall Semester start date. There is a limited number of seats in each cohort and so admission to the program is competitive. Early applications are highly recommended and will be reviewed on a rolling basis. All applications are assessed on a case-by-case basis and adjudicated only once. **TRANSCRIPTS** Official transcripts or certified copies of the applicant's complete undergraduate and graduate (if any) record to date are to be sent to the Office of the Registrar. Applicants from outside North America are strongly urged to attach official statements of the grades obtained and the subject matter included. If original documentation is not in English, you must also provide a notarized English translation. This does not apply to French language universities in Canada. **ENGLISH PROFICIENCY** Students are expected to be proficient in the use of English, both written and oral, when they begin their studies at the University of Prince Edward Island. The University requires that certification of such proficiency be presented by applicants whose first language is not English or whose normal language of instruction throughout their education (as recognized by UPEI) was not English. Tests of proficiency acceptable to the University, and the minimum scores that must be obtained, are listed under the Admission requirements for all Graduate Programs and for Graduate Student Status section of the Calendar. The program may extend a conditional offer of admission to an applicant who meets all admission requirements other than the English language proficiency requirement. **REFUSAL OF ADMISSION** Admission to the Master in Cleantech Leadership Program is a competitive process. Limitations of funds, space, facilities, or personnel may make it necessary for the University, at its discretion, to refuse admission to an otherwise acceptable applicant. Meeting minimum requirements does not guarantee admission to the program. To avoid disappointment, applicants are encouraged to submit their documents early.

Rationale for New Calendar Entry: This is a new program.

Effective Term: Fall 2025

NEW CALENDAR ENTRY

Motion

Implications for Other Programs: None

Impact on Students Currently Enrolled: N/A. No students are enrolled as this is a new program.

Resources Required: Three tenure-track faculty members will need to be hired into this program, as well as sessional instructors, support staff (Program Manager, Administrative Assistant). Support will be required from Graduate Admission in the Registrar's Office to handle admissions, and from Experiential Education and the Library in new course support. Special funding has been requested from the PEI Government.

Authorization	***Date:***
Departmental Approval: Click here to enter name of approver.	Click here to select approval date.
Faculty/School Approval: Click here to enter name of approver.	Click here to select approval date.
Faculty Dean's Approval: Dr. Marva Sweeney-Nixon	February 3, 2025
Graduate Studies Dean's Approval: Dr. Marva Sweeney-Nixon	February 3, 2025
Registrar's Office Approval: Darcy McCardle.	Click here to select approval date.

Form Version: SEPTEMBER 2024

NEW CALENDAR ENTRY

Motion

Faculty/School: **Graduate Studies**

Department/Program(s): **Master of Cleantech Leadership and Transformation**

MOTION: That a new calendar entry for Program Regulations - Graduate Studies, for the Master of Cleantech Leadership and Transformation program in the Faculty of Graduate Studies, be approved as proposed.

Proposed New Calendar Entry

102 Program Regulations – Graduate Studies

Master of Cleantech Leadership and Transformation

1. GLOSSARY OF TERMS

a. Master of Cleantech Leadership and Transformation (MCLT): degree granted for successful completion of the requirements for Master of Cleantech Leadership and Transformation degree as listed in the regulations.

b. Academic Director of the Cleantech Program: a Faculty Member who has administrative responsibility for the coordination of the MCLT program.

c. Cleantech Coordinating Committee: an interdisciplinary standing committee formed to oversee the MCLT program. This committee will work with the UPEI Faculty of Graduate Studies to ensure all policies and guidelines are fulfilled. The mandate of the committee may include:

i. establishing and periodically reviewing the goals and objectives of the MCLT program;
ii. reviewing applications from prospective students and recommending acceptance or rejection;
iii. making recommendations to the Dean of Graduate Studies concerning creation, deletion, or modification of graduate programs and courses;
iv. directing the coordination of graduate courses in the Cleantech program;
v. reviewing academic records of graduate students and recommending to the Dean of Graduate Studies the awarding of a degree or courses of action in the event of substandard performance, including dismissal from the program;
vi. recommending changes to the Graduate Studies Academic Calendar.

2. ENROLMENT AND REGISTRATION

Procedures

Applicants must receive formal notification from the Office of the Registrar that they have been accepted into the program before registering as graduate students in the MCLT program. See the Admissions section in the calendar that applies to the MCLT program. Students will register continually each semester in the courses outlined in their MCLT program. In exceptional

NEW CALENDAR ENTRY

Motion

Proposed New Calendar Entry
circumstances where a graduate student finds it necessary to interrupt their studies they may apply for a Leave of Absence, per Graduate Academic Regulations. A student who fails to register as required will be deemed to have withdrawn from the program. Students should refer to the Academic Calendar. **Registration Changes** Changes in student registration such as deletion or addition of courses must be approved by the Academic Director (with input as required by the MCLT Coordinating Committee) and formal approvals of the University when required. Please check the UPEI web sites for the most recent program updates. Except where credits are granted by special permission for courses outside of program, credits will only be given for courses listed on the student's registration form or authorized through an official change of registration. In exceptional cases, the MCLT Coordinating Committee and the Dean of Graduate Studies may consider flexibility in courses for applicants. This means that students deemed to have significant learning in a particular area may normally be allowed one course exemption which is to be substituted with another approved course. Appropriate documentation will be required to consider course exemption. Students should discuss course selection with the Program Manager or Academic Director. **Withdrawal from the Program** Students wishing to withdraw from the program should consult with the Academic Director. Students may withdraw from a program by notifying the Office of the Registrar using the appropriate form. Regular semester deadlines will guide this process. **Discontinuing a Course** Discontinuing a course will not occur by default. Students must discuss course discontinuations with the Academic Director. Discontinuations must be requested and processed by the published deadlines. **Incomplete Courses** A student who fails to complete all components of a course due to circumstances, such as illness, may be granted permission for incomplete (INC) status in the course. Students must submit such a request to the Academic Director before the end date for the course. The Director will seek advice from the professor concerned as to granting the incomplete status. Students should refer to the Graduate Academic Regulation that governs INC grades.

NEW CALENDAR ENTRY

Motion

Proposed New Calendar Entry

Re-registrations and Course Re-takes

Students who fail a course in the MCLT program may re-take the course once more. If the course is failed after the second attempt, the student will be dismissed from the MCLT program.

Re-enrolment in the Program

Re-enrolment in the program can occur but is subject to re-application and a statement explaining why re-admission should be permitted. The MCLT Committee will review these materials for approval. Students will be required to pay all applicable fees and any fee increases that have occurred between the time of their last enrolment and re-enrolment. Credit for courses previously completed will be re-evaluated and applied to the program requirements where appropriate.

3. PROGRAM EXPECTATIONS

The MCLT Program is a professional degree program that employs a cohort model. Students' full engagement is vital to the success of the program and the experience of other students in the class. Class attendance is expected. A student who is unable to attend, or who will be late for a class, due to an emergency or extenuating circumstance should inform the course instructor as soon as the circumstance becomes known. Unapproved absences may negatively affect a student's grade, in accordance with the policy set out in the course syllabus.

4. GRADES

Grade Requirements
A minimum grade of 60% is required to pass a course and an overall average of 75% is required to complete the program and obtain a degree.

Transcripts of Records
Official transcripts of the student's academic record are available through the Registrar's Office. Transcripts will be sent to other universities, to prospective employers, or to others outside the University only upon formal request by the student.

5. GRADUATION REQUIREMENTS

To be awarded the Master of Cleantech Leadership and Transformation degree, a graduate student must:
i. successfully complete the program of studies as set out at the time of admission into the program or as agreed to by the MCLT Coordinating Committee,
ii. complete and submit an Application for Graduation form, and

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January 31, 2025

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Motion

Proposed New Calendar Entry
iii. meet all other University regulations. In addition, students must have paid all fees owed to the University and returned all library resources.

Rationale for New Calendar Entry: This is a new program.

Effective Term: Fall 2025

Implications for Other Programs: None

Impact on Students Currently Enrolled: N/A. No students are enrolled as this is a new program.

Resources Required: Three tenure-track faculty members will need to be hired into this program, as well as sessional instructors, support staff (Program Manager, Administrative Assistant). Support will be required from Graduate Admission in the Registrar's Office to handle admissions, and from Experiential Education and the Library in new course support. Special funding has been requested from the PEI Government.

Authorization	***Date:***
Departmental Approval: Click here to enter name of approver.	Click here to select approval date.
Faculty/School Approval: Click here to enter name of approver.	Click here to select approval date.
Faculty Dean's Approval: Dr. Marva Sweeney-Nixon	February 3, 2025
Graduate Studies Dean's Approval: Dr. Marva Sweeney-Nixon	February 3, 2025
Registrar's Office Approval: Darcy McCardle.	Click here to select approval date.

Form Version: SEPTEMBER 2024

NEW CALENDAR ENTRY

Motion

Faculty/School: **Graduate Studies**

Department/Program(s): **Master of Cleantech Leadership and Transformation**

MOTION: That a new calendar entry for Graduate Programs and Courses for the Master of Cleantech Leadership and Transformation in the Faculty of Graduate Studies, be approved as proposed.

Proposed New Calendar Entry
Master of Cleantech Leadership and Transformation (MCLT) Taking an inquiry-based learning approach, this program follows a cohort-model and provides students a unique and valuable opportunity to develop the skills, knowledge, and strategic mindset, through applied learning, to bridge traditional and emerging knowledge systems and drive cleantech innovation for a sustainable future. **STRUCTURE OF PROGRAM:** Graduate students will register in the interdisciplinary MCLT program under the Dean of Graduate Studies. The program requires students to take courses in the Fall, Winter, and Summer semesters continuously. In addition to the "General Regulations for Graduate Programs," described above, the following regulations apply specifically to the Master of Cleantech Leadership and Transformation degree. **PROGRAM REQUIREMENTS:** Students enrolled in the MCLT program are required to complete a total of 36 credit hours (12 courses) including a capstone project. The components of the degree program include eleven core courses (33 credit hours), one elective course (3 credit hours), and Orientation to the Capstone Project (0 credit hours). Students have the opportunity to complete the MCLT program in sixteen months. Students must complete all required courses within three (3) years of being admitted to the program and meet graduation requirements within four (4) years of being admitted to the program. **The courses required for the MCLT are as follows:** CLT 6101 Cleantech Fundamentals I CLT 6102 Cleantech Fundamentals II CLT 6201 Environmental Ethics & Social Responsibility CLT 6203 Indigenous Worldviews on Environmental Sustainability CLT 6205 Cleantech Governance, Regulation, Policy and Politics CLT 6207 Economics and Policy Analysis of Cleantech CLT 6301 Project Management for Cleantech Transformation CLT 6303 Innovation and Entrepreneurship for Cleantech Transformation CLT 6800 Leadership Skills for Cleantech Transformation CLT 7000 Orientation to Cleantech Capstone Project

NEW CALENDAR ENTRY

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Proposed New Calendar Entry
CLT 7001 Cleantech Capstone Project I CLT 7002 Cleantech Capstone Project II **In addition to completing all required courses, students must complete one of the following elective courses:** CLT 7210 Sustainable Communities and Policy CLT 7310 Energy Technologies for Sustainable Neighbourhoods **CLEANTECH COURSES** CLT 6101 Cleantech Fundamentals I This course examines fundamental concepts of climate change science, bringing students from different backgrounds onto the same page. Topics include ecosystems, biogeochemistry cycles, and greenhouse gases. The major environmental issues that need to be addressed to achieve net zero emissions will be discussed. Students will develop a solid understanding of the cleantech path to net zero and develop hopeful messaging around this. PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor HOURS OF CREDIT: 3 CLT 6102 Cleantech Fundamentals II This course builds on Cleantech Fundamentals I by examining the path to net zero energy. Students will first gain a solid understanding of energy systems, major energy technologies underlying energy supply and consumption, their applications, and their integration with the electric grid. This course also introduces emerging clean energy technologies and policies impacting the development, deployment, and utilization of these technologies to address environmental issues. The role of big data, AI tech innovations, and other hot topics in the net zero energy path and energy security will be discussed. PRE OR CO-REQUISITE: CLT 6101 - Cleantech Fundamentals I or permission of instructor HOURS OF CREDIT: 3 CLT 6201 Environmental Ethics & Social Responsibility This course explores key debates concerning: the moral significance of nature; basic moral theories; moral relativism, objectivism, and pragmatism; Indigenous perspectives on human-nature relations, ethical assessment of new technologies including impacts on human health and behavior, biodiversity, water conservation and climate change; the question of why humans have degraded their environments, including economic and political causes; the concepts of space, place, and ecological identity; ethical limitations of economic-driven decision-making and cost-benefit analysis; professional ethics and social responsibility; environmental justice, environmental racism, Reconciliation, and key debates in the ethics of climate change (individual, intergenerational, and international responsibilities; just transitions, geoengineering). PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor

NEW CALENDAR ENTRY

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Proposed New Calendar Entry
HOURS OF CREDIT: 3 CLT 6203 Indigenous Worldviews on Environmental Sustainability This graduate-level course discusses Indigenous worldview and philosophy to respond to the impacts of climate change. It explores the integration of Indigenous Knowledges with Western Knowledges to advance unique approaches to island and global environmental sustainability in the context of climate change. PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor HOURS OF CREDIT: 3 CLT 6205 Cleantech Governance, Regulation, Policy and Politics An introduction to clean technology governance, regulation, policy and politics, the first half focuses on Canada, as students examine the role that various levels of government play in relation to existing constitutional, administrative and regulatory frameworks. The second half employs a comparative perspective exploring case studies from several jurisdictions' settings, both developed and developing, looking at approaches of deploying cleantech projects. Students examine ideas, policy actors and institutions involved. We will address significant questions around efforts to support the transition towards net zero via the creation of a policy environment which lends itself to successful cleantech projects. Students will undertake a detailed analysis of a cleantech project, producing a well-researched policy product. PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor HOURS OF CREDIT: 3 CLT 6207 Economics and Policy Analysis of Cleantech This interdisciplinary course merges economics and political science to analyze cleantech-related issues within the framework of public policy, defined as 'anything a government chooses to do or not to do.' A primary goal is to understand the factors influencing policy decisions, particularly institutions, context, and decision-making processes. The economic aspect of the course focuses on the tension between economic activities and environmental sustainability, exploring how economic practices lead to environmental degradation and what regulatory actions can balance economic growth with environmental sustainability. Politically, the course examines the roles of different government structures in Canada in policy development, evaluating the effectiveness of policies like carbon pricing and subsidies. Students will develop skills to critically assess government policies in environmental economics, understanding the interplay between economic theories and political realities. PRE OR CO-REQUISITE: CLT 6205 - Cleantech Governance, Regulation, Policy, and Politics or permission of instructor HOURS OF CREDIT: 3

NEW CALENDAR ENTRY

Motion

Proposed New Calendar Entry
CLT 6301 Project Management for Cleantech Transformation This course will introduce students to project management knowledge, tools, and techniques to effectively manage projects within the rapidly evolving landscape of sustainable and clean technologies. Throughout the course, students will be exposed to sustainable environmental, social, and governance (ESG) principles and practices using lectures, case studies, and facilitated discussion. Students will develop a comprehensive understanding of project management principles while integrating ESG frameworks into project planning, stakeholder analysis, and engagement, execution, and evaluation by focusing on various project management concepts, guidelines, and practices for the leaders of sustainable and clean technology initiatives. PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor HOURS OF CREDIT: 3 CLT 6303 Innovation and Entrepreneurship for Cleantech Transformation This course looks at efforts of innovation and entrepreneurship in cleantech. These efforts are described and assessed in the context of innovation management and entrepreneurial ecosystems. The role of entrepreneurial thinking, innovative organizational culture, portfolio management, engagement of stakeholders, collaboration with partners, mitigation of technological risks, and interactions with investors are taught both in theory and using case studies relevant to cleantech. The course utilizes real-world learning techniques such as case studies, guest speakers, and project/venture plans. PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor HOURS OF CREDIT: 3 CLT 6800 Leadership Skills for Cleantech Transformation This course provides students with an overview of major leadership theories and opportunities to develop and practice their interpersonal skills in preparation for leadership in influential cleantech roles. Topics covered include leadership styles, followership and empowerment, change management and agency, influence and persuasion, effective communication, and conflict management. Students will reflect on their own leadership style and hone their leadership and interpersonal skills through interactive case discussions, role plays, and presentations. Key areas of skill development include self-awareness, critical thinking, adaptability, persuasion, conflict management, and communication. PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor HOURS OF CREDIT: 3 CLT 7000 Orientation to Cleantech Capstone Project The orientation module is an engaging and informative overview designed to prepare students for their Capstone Project experience. It will provide insights from industry and community leaders in

NEW CALENDAR ENTRY

Motion

Proposed New Calendar Entry
cleantech, guidance on how to best prepare for the Capstone Project courses and networking opportunities. The course grade will be on a pass/fail basis. PRE OR CO-REQUISITE: Students are expected to have completed all Master of Cleantech Leadership and Transformation program requirements to this point HOURS OF CREDIT: 0 CLT 7001 Cleantech Capstone Project I This course is the first of a two-part Capstone Project series where students will have the opportunity to begin their teamwork on a real-life project with a community or industry partner. Students will focus on the initial stages of the Capstone Project which include developing a project proposal, generating research questions, conducting a literature review, environmental scan, and needs assessment, reviewing research ethics guidelines, and developing the project's research methodology. Supported by a series of workshops and seminars on topics like proposal writing, literature searching and citation, time management, and peer workshopping and feedback, emphasizing partnership development and engagement. PRE OR CO-REQUISITE: Students are expected to have completed all Master of Cleantech Leadership and Transformation program requirements to this point HOURS OF CREDIT: 3 CLT 7002 Cleantech Capstone Project II This course is the second of a two-part Capstone Project series focusing on the development and completion of the team project which will culminate in a final report and presentation, with an analysis of findings and recommendations for the community or industry partner. In addition to the Capstone Project, students will individually write a leadership development portfolio reflecting on how course workshops and seminars have informed their knowledge, skills, attitudes, and identity as leaders. Supported by workshops and seminars focusing on teamwork skills, stakeholder engagement, community entry practices, and communication skills, while also providing a discussion forum for students to learn from and engage with leaders in cleantech. PRE OR CO-REQUISITE: CLT 7001 - Capstone Project I HOURS OF CREDIT: 3 **Elective Courses (1 required)** CLT 7210 Sustainable Communities and Policy The course advances students' understanding of the concept of sustainable development (SD) by introducing the history of the concept and different ways of measuring sustainability. The course touches upon the main factors that influence policy decisions and outcomes regarding SD (i.e., the role of power, economic interests, expertise, public opinion, resources, and technological innovation). Focusing on 'community energy systems' [CES] as a practical strategy for advancing sustainability. CES necessitates deep public involvement in development processes, as well as a fair and localized distribution of project outcomes. The CES development paradigm will be explored as a strategy for mitigating externalities associated with all energy sources, as well as a means to achieve distributive, procedural, recognition, and other forms of energy justice.

UNIVERSITY of Prince Edward ISLAND

Academic Planning and Curriculum Committee
January 31, 2025

NEW CALENDAR ENTRY

Motion

Proposed New Calendar Entry
PRE OR CO-REQUISITE: Acceptance into the Master of Cleantech Leadership and Transformation Program or permission of instructor HOURS OF CREDIT: 3 CLT 7310 Energy Technologies for Sustainable Neighbourhoods This course offers a comprehensive exploration of sustainable community planning and renewable energy integration. Students will delve into historical perspectives and contemporary challenges, analyzing urban sprawl and sustainable built environment forms, with an emphasis on clean energy and nature-based solutions. The curriculum covers the integration of diverse renewable sources, microgrids, and energy storage technologies, enhancing grid reliability and resiliency. Through a collaborative approach, students will learn to integrate renewable energy into existing Canadian buildings and neighborhoods. By combining planning, renewable energy, and healthy community principles, students will receive a holistic perspective on sustainable communities and energy systems. PRE OR CO-REQUISITE: CLT 6102 - Cleantech Fundamentals II or permission of instructor HOURS OF CREDIT: 3

Rationale for New Calendar Entry: This is a new program.

Effective Term: Fall 2025

Implications for Other Programs: None

Impact on Students Currently Enrolled: N/A. No students are enrolled as this is a new program.

Resources Required: Three tenure-track faculty members will need to be hired into this program, as well as sessional instructors, support staff (Program Manager, Administrative Assistant). Support will be required from Graduate Admission in the Registrar's Office to handle admissions, and from Experiential Education and the Library in new course support. Special funding has been requested from the PEI Government.

Authorization	***Date:***
Departmental Approval: Click here to enter name of approver.	Click here to select approval date.
Faculty/School Approval: Click here to enter name of approver.	Click here to select approval date.
Faculty Dean's Approval: Dr. Marva Sweeney-Nixon	February 3, 2025
Graduate Studies Dean's Approval: Dr. Marva Sweeney-Nixon	February 3, 2025
Registrar's Office Approval: Darcy McCardle.	Click here to select approval date.

Form Version: SEPTEMBER 2024

Addendum to MPHEC Proposal – Master of Cleantech Leadership and Transformation (for University of Prince Edward Island Senate)

Budget for New Graduate Program – Master of Cleantech Leadership and Transformation

- Letter of Financial Support from Government of Prince Edward Island: Honorable Stephen Myers, Minister of Environment, Energy and Climate Action Environment, Energy and Climate Action (can also be found in Appendix G of the MPHEC Proposal for the Master of Cleantech Leadership and Transformation)
- Projected Five-year Budget (2025-2030)
- Tuition and Assumptions Made

Prince Edward Island
CANADA

Environment, Energy and Climate Action

Environnement, Énergie et Action climatique

Île-du-Prince-Édouard
CANADA

Office of the Minister
PO Box 2000, Charlottetown
Prince Edward Island
Canada C1A 7N8

Bureau du ministre
C.P. 2000, Charlottetown
Île-du-Prince-Édouard
Canada C1A 7N8

July 31, 2024

Wendy Rodgers
President, University of Prince Edward Island
550 University Avenue
Charlottetown, PE C1A 4P3

Dear Wendy,

It was a pleasure to meet you recently at the Canadian Center for Climate Change and Adaptation in St. Peter's. As discussed during our time together, the Government and my department work closely with the University of Prine Edward Island on many fronts.

I am very proud of our recent work in the area of research and development. Furthermore, I have very ambitious plans to bring our province to Net Zero by 2040. I am grateful for all the support and leadership U.P.E.I has provided on this journey.

Also, I have a clear vision for Cleantech growth in our province and UPEI is an integral part of the plan. I am very pleased with the recent progress with our Cleantech Academy and our plans to build a net-zero community in Georgetown. Our educational partners will be pivotal to the success of our endeavors in the cleantech space. Therefore, I assure you that the Government of PEI will support the University of Prince Edward Island's Master of Cleantech Leadership and Transformation program. Specifically, base operational funding will be provided from 2025 to 2030, ensuring long-term success.

I look forward to further conversations and partnerships in the coming weeks and months.

Sincerely,

Hon. Steven Myers,
Minister

A. Anticipated Enrolments										
	1st year (2025-26)		**2nd year**		**3rd year**		**4th year**		**5th year**	
	FTE (#)	$	FTE (#)	$	FTE (#)	$	FTE (#)	$	FTE (#)	$
Enrolments										
Anticipated enrolments - Year 1	16	$214,200.00	20	$278,400.00	24	$347,400.00	24	$361,300.00	24	$375,800.00
Anticipated enrolments - Year 2	0	$0.00	14	$229,200.00	18	$306,400.00	21	$371,800.00	21	$386,600.00
B. Total Costs										
Salaries & benefits										
Full-time faculty										
Current allocation										
Additional	2	$280,500.00	3	$443,400.00	3	$461,900.00	3	$475,800.00	3	$490,100.00
Part-time faculty/adjuncts/lecturers										
Current allocation										
Additional	2	$17,400.00	3	$27,000.00	3	$27,800.00	3	$28,600.00	3	$29,500.00
Teaching/research assistantships										
Current allocation										
Additional										
Administrative staff										
Current allocation										
Additional	1	$78,600.00	1	$86,400.00	1	$89,000.00	1	$91,700.00	1	$94,500.00
Program coordination/management										
Current allocation										
Additional	1	$113,800.00	1	$121,300.00	1	$124,900.00	1	$128,600.00	1	$132,500.00
Clinical/practicum/fieldwork coordination										
Current allocation				$0.00		$0.00		$0.00		$0.00
Additional		$40,000.00		$42,000.00		$44,100.00		$46,305.00		$48,620.25
Other: please specify curriculum development & training (IBL, mapping etc)										
Current allocation										
Additional		$50,000.00		$50,000.00						
Other costs										
Facilities (e.g., classroom space, laboratories, work stations)										
Current allocation	--		--		--		--		--	
Additional	--	$15,000.00	--	$10,000.00	--	$5,000.00	--	$5,000.00	--	$5,000.00
Equipment (e.g., hardware, software, instruments)										
Current allocation	--		--		--		--		--	
Additional	--	$10,000.00	--	$7,500.00	--	$5,000.00	--	$5,000.00	--	$5,000.00
Library (e.g., periodicals, texts, study space)										
Current allocation	--	$6,500.00	--	$5,000.00	--	$5,000.00	--		--	
Additional	--	$10,500.00	--	$10,815.00	--	$11,355.75	--	$11,923.54	--	$12,519.71
Support and back-up services (e.g., computer back-up, technician back-up, technical assistance)										
Current allocation	--		--		--		--		--	

	1st year (2025-26)		2nd year		3rd year		4th year		5th year	
	FTE (#)	$	FTE (#)	$	FTE (#)	$	FTE (#)	$	FTE (#)	$
Additional	--		--		--		--		--	
Student financial support (e.g., scholarships, bursaries)										
Current allocation	--		--		--		--		--	
Additional	--	$80,000.00	--	$100,000.00	--	$120,000.00	--	$120,000.00	--	$120,000.00
Other: please specify Travel										
Current allocation	--		--		--		--		--	
Additional	--	$16,000.00	--	$20,000.00	--	$25,000.00	--	$25,000.00	--	$25,000.00
Total Costs		**$718,300.00**		**$923,415.00**		**$919,055.75**		**$937,928.54**		**$962,739.96**
C. Total Revenues/Other Income										
Internal budget allocation										
Current allocation	--		--		--		--		--	
Projected	--		--		--		--		--	
Tuition fees										
Current allocation	--		--		--		--		--	
Projected	--	$214,200.00	--	$507,600.00	--	$653,800.00	--	$733,100.00	--	$762,400.00
Targeted provincial government funding										
Current allocation	--		--		--		--		--	
Projected	--	$500,000.00	--	$400,000.00	--	$300,000.00	--	$200,000.00	--	$200,000.00
specify: Funded Research Chair in Clean Energy)										
Current allocation	--		--		--		--		--	
Projected	--		--		--		--		--	
fundraising???										
Current allocation	--		--		--		--		--	
Projected	--		--		--		--		--	
Total Revenues	--	**$714,200.00**	--	**$907,600.00**	--	**$953,800.00**	--	**$933,100.00**	--	**$962,400.00**
Annual surplus (deficit)	--	**-$4,100.00**	--	**-$15,815.00**	--	**$34,744.25**	--	**-$4,828.54**	--	**-$339.96**
Cumulative surplus (deficit)	--		--	-$19,915.00	--	$14,829.25	--	$10,000.71	--	$9,660.75

Notes:

Tuition Revenue

	2025-26						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTAL**	
New September Intake	16	20	24	24	24		
Prior Year Carry-Over (10% Attrition)		14	18	21	21		
Tuition Per Course	1,706.00	1,774.00	1,845.00	1,919.00	1,996.00		4%
Tuition Non-Credit Course	678.00	705.00	733.00	762.00	792.00		
International Fee Per Course	875.00	910.00	946.00	984.00	1,023.00	-	4%
Year 1 Student Revenue	163,800.00	212,900.00	265,700.00	276,300.00	287,400.00	1,206,100	
Year 2 Student Revenue	-	154,700.00	206,800.00	251,000.00	261,000.00	873,500	
Year 1 International Fee	50,400.00	65,500.00	81,700.00	85,000.00	88,400.00	371,000	
Year 2 International Fee	-	74,500.00	99,600.00	120,800.00	125,600.00	420,500	
Total Revenue	214,200.00	507,600.00	653,800.00	733,100.00	762,400.00	2,871,100	

Assumptions

Faculty hired at Assistant 8.
Sessionals budgeted at Step 3.
Admin hired at ADS 6.
0.3 of salary Cleantech Academy Outreach and Engagement Coordinator position within Government at 5% increase per year; estimated first year.
4% tuition increases budgeted.
3% COLA budgeted.
Same tuition as MBA ($1640/course + 4%), courses based on schedule provided; Intl $875/course (841+4%)
60% international