CARLETON UNIVERSITY COMMITTEE ON QUALITY ASSURANCE
Cyclical Review of the undergraduate program
in Sustainable and Renewable Energy Engineering (streams A and B)
Executive Summary and Final Assessment Report

This Executive Summary and Final Assessment Report of the cyclical review of Carleton's undergraduate program in Sustainable and Renewable Energy Engineering (streams A and B) in the Department of Electronics and the Department of Mechanical and Aerospace Engineering is provided pursuant to the provincial Quality Assurance Framework and Carleton's Institutional Quality Assurance Process (IQAP).

EXECUTIVE SUMMARY

The undergraduate program in Sustainable and Renewable Energy Engineering (streams A and B) resides in the Department of Electronics and the Department of Mechanical and Aerospace Engineering, units administered by the Faculty of Engineering and Design.

As a consequence of the review, the program was categorized by Carleton University's Senate Quality Assurance and Planning Committee (SQAPC) as being of good quality. (Carleton's IQAP 7.2.13-7.2.14).

The External Reviewers' report offered a very positive assessment of the program. Within the context of this positive assessment, the report nonetheless made a number of recommendations for the continuing enhancement of the program. These recommendations were productively addressed by the Chairs of the Department of Electronics and the Department of Mechanical and Aerospace Engineering, and the Dean of the Faculty of Engineering and Design in a response to the External Reviewers' report and Implementation Plan that was submitted to SQAPC on November 10, 2022.

UNIT RESPONSE AND IMPLEMENTATION PLAN **Programs Being Reviewed:** Sustainable and Renewable Energy Engineering **Prepared by (name/position/unit):** *The Department of Electronics and the Department of Mechanical and Aerospace Engineering*					
External Reviewer Recommendation & Categorization	**Unit Response (choose only one for each recommendation):** **1- Agreed to unconditionally** **2- Agreed to if additional resources permit (describe resources)** **3- Agreed to in principle** **4- Not agreed to** **Rationales are required for categories 2, 3 & 4**	**Action Item**	**Owner**	**Timeline**	**Will the action described require calendar changes? (Y or N)**
1. Ensure the programs are properly resourced to ensure their perennity in current form and their possible growth, both in terms of faculty numbers and teaching space. (Concern)	*1- Agreed to unconditionally*	*The program is managed by both the Department of Electronics (DOE) and the Department of Mechanical and Aerospace Engineering (MAAE). Faculty numbers and teaching space have been made available to support the program.* *Two new faculty members were hired in MAAE in the area (Prof. Kristen Schell and Prof. Ahmed Abdulla) on top of Prof. Jean Duquette. Another CRC position will be advertised soon. One new faculty member (Prof. Himavarsha Dhulipati) in a related area will join DOE in 2022.* *Additional space for the program will become available in 2022 (EDC, Engineering Design Centre, Building) and 2025 (SRC, Sustainable Research Centre, Building).*	*Chairs*	*2022-2025*	*N*

2. Promote and increase the visibility of the programs and its graduates to potential students an employers- highlight the skills and know how it graduates to showcase their value to employers in the sustainable and renewable energy sector. (Concern)	*2- Agreed to if additional resources permit (describe resources)*	*Engage with upper administration regarding advertisement (radio, cinemas, magazines, digital advertising, updating SREE website, etc.) and outreach (high schools in Ottawa and GTA, Fall high school outreach event at Carleton, and annual Ontario university outreach event) more proactively. Profs. Ahmed Abdulla, Kristen Schell, and Jean Duquette are currently developing an updated interactive slide presentation for these events (to be used for in-person events and posted online with text or narration). Another possibility is to target engaging sustainable energy speakers (outside of Carleton, e.g., professional contacts or alumni) for the general 1st year ECOR 1055 course. To increase the visibility of the program to employers, we have engaged the MAE Industrial Advisory Board. The IAB includes Andrew Penner, a director at BGIS and active member of the BEIC (https://beic.ca/), Charles Zaloum,* Engineering Supervisor, Conservation and Demand Management, Hydro Ottawa Ltd and Paula Murthy, Senior Associate and Discipline Lead for the Mechanical Team – Stantec Ottawa Buildings. These contacts and their network will be an important resource in connecting with employers. no additional resources are required - we are engaging existing resources, such as the FED outreach are recruitment team and our IAB.	*Chairs SREEB Curriculum Chair SREEA Curriculum Chair*	*2022/2023*	*N*

3. Work to provide more interdisciplinary sustainable energy capstone project opportunities for SREE students, especially externally sponsored. (Concern)	*1- Agreed to unconditionally*	*There are already sustainable energy capstone project opportunities.* *Strive to create a new combined sustainable energy capstone project ECOR4907.*	*Chairs* *MAAE Capstone Project Coordinator*	*2022/2023*	*Y*
4. Integrate SREE related Advisory Board members to help with curriculum development and strategic governance of the programs. (Opportunity)	*1- Agreed to unconditionally*	*Make sure that during the meetings with Advisory Board members, curriculum and strategic governance of the programs are discussed.*	*Chairs*	*2022*	*N*
5. Development of more SREE targeted final year electives. (Opportunity)	*2- Agreed to if additional resources permit (describe resources)*	*Department Chairs to discuss the possible implementation of additional 4th-year elective courses.* -This will happen as a result of recent hires in both MAE and DOE who are related to the sustainable energy area. They are developing elective courses that will be suitable for SREE students (as well as students in other programs in MAE and DOE).	*Chairs*	*2022*	*N*
6. Introduce elements of data science to me revolution seen in the industry. (Opportunity)	*3- Agreed to in principle*	*The SREEB curriculum committee agrees that introducing data science elements into the program would be a valuable addition. This can be achieved in the following ways:* *- implementation of a new Capstone project (e.g., learning and applying new Python models related to sustainable energy).* *- Providing a new course in data science at the department level.* *Introduce and apply data science analysis methods in existing SREE courses (as students would need to learn these tools,*	*SREEB Curriculum Chair* *SREEA Curriculum Chair*	*2022/2023*	*Y*

		each course could only include a couple of methods at most). ** Prof. Kristen Schell has expressed interest in the first two bullet points (i.e., new capstone and new course) due to her relevant background.*			
7. Stream A only - Review the sequencing of electromechanical energy conversion courses. (Opportunity)	*1- Agreed to unconditionally*	*Content of courses in the context of the program will be reviewed by Department curriculum committee and reported to the SREE program governance committee with calendar changes, if necessary, prepared for submission in fall 2022.*	*Chair*	*2022*	*Y*