Professional Certificate in Measurement and Evaluation of Low-Carbon Energy Programs
May 13 to May 16, 2013, Carleton University

Course Description and Module Contents

Introduction to the Course

Systematic measurement and evaluation are critical steps in assessing the strengths and weaknesses of the design, delivery, and outcomes of programs and policies. Accurate measurement and evaluation is necessary to demonstrate value to the public. Stakeholders at all levels need to know whether their investments in programs or policies are yielding results. This professional development course addresses a need to strengthen competency in this area in Canada.

Knowledge Areas

With a focus on low-carbon energy programs, this four-day course will familiarize participants with emerging low-carbon technologies, describe recent programs designed to foster a transition to a greener economy, and equip participants with new knowledge and skills which will enable them to systematically measure and evaluate the performance of program initiatives. Participants will be better equipped to design an evaluation program which will provide insights on whether energy-related programs have achieved their anticipated output and outcomes, and provide useful tools to improve the effectiveness of programs in the future through use of systematic evaluation practices from the outset.

Content

Taught by Carleton research faculty and an expert in the energy field, this intense course will provide practical knowledge in program evaluation through online pre-reading, in-class instruction and practicums, and open discussion. Participants will learn to apply the logic model to low-carbon energy programs, develop performance indicators, develop and evaluate outputs and outcomes, and learn through networking. A closing session on putting the lessons learned to use in the workplace will equip participants with the answers they need to make effective use of measurement and evaluation techniques back in the office.

Measurement and Evaluation of Low-Carbon Energy Programs
Organization of the Course

- **Course flow ...**

TECHNOLOGIES,
LOW-CARBON PROGRAMS → EVALUATION TOOLS → DESIGN AND
APPLICATION

- *Daily Feedback* – on content, faculty and practicums, global feedback on Day 4

Time	Monday, May13 Modules 1 and 2	Tuesday, May 14 Modules 3 and 4	Wednesday, May 15 Module 5	Thursday, May 16 Module 6
Morning (8:30 to noon)	Introduction to course "Roadmap" Module 1: Emerging Trends in Low-Carbon Technologies *Feedback*	Module 3: Measurement and Verification	Module 5: Cost-Benefit Analysis	Module 6: Advanced Evaluation Design and Implementation
Afternoon (12:45 to 6:00)	Module 2: Low-Carbon Programs in Ontario's Electricity Market *Feedback*	Module 4: M &V Applications to Energy Efficiency Programs *Feedback*	*Feedback*	Application in the Workplace *Global Feedback*
Evening	"Evaluation Discussions"		"Evaluation Discussions"	

Technologies, Low Carbon Programs

Module 1: **Emerging Trends in Low–Carbon Electricity Generation Technologies and the Role of Renewables**

Faculty: Dr. Metin Yaras
Professor and Chair, Mechanical and Aerospace Engineering
Chair of the Sustainable Energy Graduate Program
Mechanical and Aerospace Engineering
Faculty of Engineering and Design
Carleton University

Content: Many new renewable energy technologies are gradually penetrating the electricity generation mix in many jurisdictions across the globe. Wind, solar, small–scale hydroelectricity, tidal and geothermal technologies are typically deployed in widely distributed manner; they now supplement electricity generation from large–scale centralized facilities in many jurisdictions. Each new technology has its own operating characteristics, hourly availability, infrastructure requirements, and costs.

This module will describe the characteristics and features of the most popular generation technologies, and will describe issues related to their role in diversifying Ontario's electricity generation mix.

Module 2:   **Low-Carbon Programs in Ontario's Electricity Market**

Faculty: Graham Campbell
Executive Director
Carleton Sustainable Energy Research Centre
Faculty of Engineering and Design, School of Public Policy and Administration
Carleton University

Content: The Ontario Green Energy and Green Economy Act (GEA) was implemented in 2009 to achieve the policy objective of transforming Ontario's energy sector. Main focal points were on new generation from renewable energy sources, in part to replace coal-fired generation by 2014, enhancing the Ontario economy through green energy jobs, and supporting the province's long-standing campaign to improve energy conservation. A succession of electricity-related programs has been implemented in Ontario, including the RESOP (pre-GEA), the FIT and MicroFIT programs, and new energy conservation initiatives.

This module will review the recent suite of green energy programs, describe how the electricity market has influenced the impact of these programs, and review recent publicly available evaluation reports which have assessed the impacts and effectiveness of selected programs. The content of this module will serve as a point of reference for the modules which follow.

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Evaluation Tools

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Module 3:   **Measurement and Verification of Low-Carbon Programs**

Faculty: John Cowan
President, Environmental Interface Limited
Toronto, Ontario

Content: The adage which states that ''what gets measured gets managed'' is as relevant for any low-carbon energy program as it is for any other investment. Measurement and verification (M&V) is the process of using measurements to reliably determine results of a defined action, for example, the actual savings created within an individual facility by an energy management program. Although simple in concept, there are many aspects of M&V which require careful attention. These include: the definition of the ''boundary'' of the measurement exercise, any adjustments which need to be made to

isolate the parameters to ensure ''apples to apples'' comparisons, and using methodology and reporting which conform to international M&V standards.

This module will provide instruction on the basic methodologies and issues related to the use of M&V, including the key steps involved in doing a successful M&V, making the required adjustments, defining the measurement boundary, balancing M&V cost with needs for accuracy, and structuring M&V reports which adhere to a recognized standard. Participants will learn about a range of M&V design issues arising in real world energy efficiency projects, and assemble an M&V Plan and Savings Report that adheres to the International Performance Measurement and Verification Protocol (IPMVP).

Module 4: **M &V Applications to Energy Efficiency Programs** (Note: Module 3 is a prerequisite for Module 4)

Faculty: John Cowan
President, Environmental Interface Limited
Toronto, Ontario

Content: Building on the information provided in Module 3, this module will focus on applying M&V techniques to measuring the results of energy efficiency initiatives. Participants will perform basic M&V computations and find solutions to the key issues raised in the preceding module, including defining the measurement boundary, making adjustments, and addressing challenges in real–world situations.

Module 5: **Cost Benefit Analysis**

Faculty: Dr. Stephan Schott
Assistant Professor
School of Public Policy and Administration, Faculty of Public Affairs
Carleton University

Content: Cost Benefit Analysis (CBA) is a commonly–used approach for the evaluation of alternative policy choices, regulatory changes, and the performance of programs. Modern CBA relies on thorough quantitative and qualitative analysis that can significantly improve the transparency of policy decisions when it is properly carried out.

The methodology relies on economic principles and the proper quantification and monetization of benefits and costs. Doing a CBA requires careful attention to define what is being considered, to the weights attached to specific costs and benefits, and how to discount present versus future benefits and cost.

This module will provide an introduction to CBA methodologies, the stages of a CBA, the preparation of an accounting statement, valuing benefits and costs in energy markets, shadow pricing and discounting, valuation (market, and non-market) of ecosystem goods and services, how CBA can assist with decision-making under uncertainty, and, how cost effectiveness tests can be developed and applied in the energy sector.

Evaluation Design and Application

<u>**Module 6:**</u>   **Advanced Evaluation Design (Results-Based Management)**

Faculty: Dr. Robert P. Shepherd
Associate Professor
School of Public Policy and Administration
Carleton University

Content: Building on the lessons learned from previous modules about low-carbon technologies and programs, measurement techniques, and analytical tools, this module examines the strategic thought process involved in designing an evaluation program to assess the effectiveness of initiatives within an organizational context. The Results-Based Management (RBM) technique uses the standard Logic Model as the basis for setting up an evaluation framework.

This module will develop the basic theories and methodologies underpinning RBM, the lessons learned from experiences with RBM to date, followed by key steps in managing to achieve desired results and reporting evaluation results. An approach will be described for developing recommendations from the evaluation results and reporting on the findings and conclusions, with an emphasis on how key messages can be communicated effectively.

<u>**Module 6:**</u>   **Application in the Workplace**

Faculty: Dr. Robert P. Shepherd
Associate Professor
School of Public Policy and Administration
Carleton University

Content: Each participant in the course is familiar with their organization's experiences with evaluating in-house programs and with their needs for sizing up whether initiatives and investments have produced the results expected and good value for money and effort. Each participant knows about upcoming initiatives and the opportunity to embed systematic measurement and evaluation into new program initiatives. Developing a better understanding of past successes and failures, and finding ways to put the lessons learned from this course into practice back in the office, through

dialogue with the faculty member and the course participants are the primary objectives of this module.

This module is an opportunity for a dialogue with Dr. Shepherd in an open Q and A format. Participants will be invited to describe and learn from their experiences with evaluations to date, and to raise questions about how to systematically embed performance measurement and evaluation into future program initiatives in their organizations.

For each module, the faculty will provide pre-course reading material on the CU On-Line Learning facility ten days in advance of the course. Participants will be informed when the material has been posted and they expected to digest the pre-course material in advance.

Practicums will be done by the participants at the end of each module as a means to illustrate the key points and to provide an opportunity to apply the lessons learned to real-world