

School of Environment and Sustainability Master of Sustainability: Energy Security



UNIVERSITY OF SASKATCHEWAN
School of Environment
and Sustainability
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PROGRAM OVERVIEW

The mission of the Energy Security stream is to empower a network of northern, Indigenous, remote, and career professionals through distance education and purpose-driven practical experience to lead sustainable community energy development. Students graduating from this program will have workforce-ready skills to lead renewable energy development projects in communities across the world. Taught by faculty who work directly in the industry, the Energy Security program is the only one of its kind in North America, with opportunities for both domestic and international internships. Career prospects include job titles such as Community Energy Planner, Clean Energy Researcher, Sustainability Educator, and Renewable Energy Developer.

See brochure for additional information.

DEGREE REQUIREMENTS

- [GPS 960.0](#) Introduction to Ethics and Integrity
- [GPS 961.0](#) Ethics and Integrity in Human Research, if research involves human subjects
- [GPS 962.0](#) Ethics and Integrity in Animal Research, if research involves animal subjects

All M.Ss. students must complete a total of **30 credit units**, including 9 credit units of core courses:

Core Courses (9 credit units)

Required Courses:

- [ENVS 818.1](#) Introduction to Sustainability
- [ENVS 834.2](#) The Art and Practice of Negotiations
- [ENVS 850.1](#) Systems Thinking for Sustainability
- [ENVS 882.2](#) Foundations of Governance for Sustainability
- [ENVS 884.1](#) Fundamentals of Environmental Policy and Law OR [ENVS 885.1](#) Practical Law for Project Development
- [ENVS 886.2](#) Building Understanding in the Age of Reconciliation
- [ENVS 990.0](#) Seminar in Environment and Sustainability

Students must complete **21 credit units** within their chosen field of study.

Energy Security (21 credit units)

The Energy Security field of study is offered as a project-based program of study. Students must take the following:

1. 15 credit units of required courses and
2. a 6-credit unit project.

1) Required Courses (15 credit units)

- [ENVS 840.3](#) Renewable Energy and Energy Transitions
- [ENVS 841.3](#) Renewable Energy Systems
- [ENVS 842.3](#) Community Economic Analysis and Renewable Energy
- [ENVS 843.3](#) Energy Project Finance
- [ENVS 844.3](#) Community Energy Planning

2) Project (6 credit units)

- [ENVS 992.6](#) Project in Environment and Sustainability

COURSE DESCRIPTIONS

CORE Courses

ENVS 818 *Introduction to Sustainability*

This course explains the evolution of sustainability, including the United Nations Sustainable Development Goals, and introduces students to threshold concepts relevant to the science and practice of sustainability.

ENVS 834 *The Art and Practice of Negotiations*

Negotiations and consultations are central to managing relations among the multiple actors in sustainable development initiatives including Indigenous and non-Indigenous governments and organizations; non-governmental organizations; and the private sector. This course introduces students to key issues in consultation and negotiations and offers practice through a negotiation simulation exercise.

ENVS 850 *Systems Thinking for Sustainability*

The purpose of this class is to provide foundational knowledge of the concepts, components, and dynamics of complex systems. Emphasis will be placed on the interaction feedback mechanisms and emergence across systems of interacting elements. Graphical representations will be used to illustrate the value of systems thinking in sustainability problem-solving.

ENVS 882 *Foundations of Governance for Sustainability*

This course explains institutions and processes of governance and policy making in Canada and internationally relevant to sustainability transitions, including branches of government, federalism, policy communities and policy networks, and roles of key actors at multiple scales.

ENVS 884 *Fundamentals of Environmental Law*

This intensive, one-credit-unit graduate-level course is an introduction to the fundamental concepts of environmental law and policy in the Anthropocene.

OR

ENVS 885 *Practical Law for Project Development*

This course introduces students to Canadian law and its practical application as it applies to developing community-led sustainability projects, including renewable energy development. Topics include contracts, power-purchase-agreements, and dispute resolution.

ENVS 886 Building Understanding in the Age of Reconciliation

This introduction to the importance of reconciliation and renewing relationships with Indigenous peoples includes a special emphasis on the importance of recognition of rights, respect, cooperation and partnership. Success stories, challenges and lessons learned will be explored in understanding the pathway toward reconciliation and what this means for sustainability.

ENERGY SECURITY Courses

ENVS 840 Renewable Energy and Energy Transitions

This course provides an introduction to global energy transitions and the role of renewable energy. The course includes an examination of socio-technical transition theory and its alternatives, the value proposition of renewable energy, comparative social science methodology, and case studies drawn from Canada, Alaska, Scandinavia, and remote and Indigenous communities.

ENVS 841 Renewable Energy Systems

This course introduces tools to assess renewable energy generation, site-specific application, and project development using in-depth case studies that require multi-disciplinary perspectives.

ENVS 842 Community Economic Analysis and Renewable Energy

This course introduces basic principles of community economic analysis and methods of measuring social and economic impact of renewable energy projects in Northern, remote and Indigenous communities.

ENVS 843 Energy Project Finance

This introductory course provides basic knowledge of tools to organize, assess and monitor financial aspects of energy projects: project management, design, construction and timeline planning, financing options and regulatory requirements. Case studies will be used to understand the complex multi-disciplinary perspectives of energy projects while developing an individual course project.

ENVS 844 Community Energy Planning

This course introduces systems and best practices for holistic community energy project development, with emphasis on northern, remote, and Indigenous communities. Learning from case studies, students will develop an individual community energy plan.

Project

ENVS 992 Project in Environment and Sustainability

Project in Environment and Sustainability is intended to permit students to build upon skills gained through the course component of their program. The project gives students an opportunity to further investigate an aspect of environment and sustainability of particular interest and in a manner that contributes to their professional development.

TUITION AND STUDENT FEE COSTS

Tuition rates have not been finalized for 2021–2022. However, we anticipate that the tuition for domestic students will be approx. \$11,340. The tuition is charged on a per-course basis. Please note these are estimates only and may be subject to minor change. We expect that the rates will be set by the University of Saskatchewan in late April.

CONTACT INFORMATION

For program information, please contact program co-director, Dr. Andrea Kraj (a.kraj@usask.ca). For admissions procedures and information, please contact placement coordinator Susan Prpich (sens.admissions@usask.ca)

INSTRUCTOR PROFILES



Andrea Kraj is an Assistant Professor in the School of Environment and Sustainability at the University of Saskatchewan and a practicing professional engineer. She is leading the development of the curriculum in the specialty stream of Energy Security under the Master of Sustainability program and teaches ENVS 841 Renewable Energy Systems, ENVS 843 Energy Project Finance, and ENVS 844 Community Energy Planning. She completed her Ph.D. (2015), M.Sc. (2007) and B.Sc. (2003) in Mechanical and Manufacturing Engineering with Aerospace Specialization and is a pioneering leader in developing sophisticated computer modeling and simulation of advanced energy systems, supporting the design, operation, and optimization of multi-renewable energy systems with storage for micro-grid networks. Andrea strives to empower communities through electrification and autonomy from fossil fuel dependence for Northern, rural, First Nation, and island nations.



Guy Lonechild (White Bear First Nations- Treaty #4) is a well-known advocate in creating new economic opportunities and serves as President and CEO of First Nations Power Authority connecting both Indigenous and Industry leaders in renewable and alternative energy development. As a first of its kind organization, Mr. Lonechild heads the organization as our strategic leader and serves the FNPA Board and provides leadership direction to the FNPA Team.

Guy served as Vice-Chief and Chief of the Federation of Saskatchewan Indian Nations (1999-2008 and 2009-2011), where he oversaw the 25-year Economic Development Strategy highlighting important work in Alternative Energy, Oil and Gas, Agriculture, Tourism, Gaming, Housing and Community Infrastructure, Education, Health and Social Development.

Before entering politics, Guy served in various capacities as band administrator and private consultant to First Nations in Business and Community Development. He holds a Masters of Business Administration in Strategic Leadership from Cape Breton University and an Associates Degree in Golf Complex Operations Management. He and his wife Leah have one child, Darian Lonechild and enjoy quality time with friends and extended family.

Gary Merasty is Senior Advisor, Indigenous and External Relations in the School of Environment and Sustainability (SENS). He is a member of the Peter Ballantyne Cree Nation within Treaty 6 territory. Gary leads the delivery of two courses in the program: ENVS 886.2 Building Understanding in the Age of Reconciliation and ENVS 834 The Art and Practice of Negotiations. Gary has extensive national and international experience in negotiations for Indigenous peoples and organizations and for industry in Canada, Australia, and elsewhere. He is the Chief Development Officer and Executive Vice President at The North West Company and is the former president and CEO of the Des Nedhe Development Group. Gary is a former MP for the federal riding of Desnethe Missinippi Churchill River and, previously, was the Grand Chief of Prince Albert Grand Council. In the energy sector, Gary has co-chaired the modernization of the National Energy Board Act and he served as Vice President: Social Responsibility, Communications & Government Relations at Cameco. In 2007, he was recognized as one of the top 100 USask Alumni of Influence. He holds an M.Ed. from the University of Saskatchewan.



Greg Poelzer is a Professor in the School of Environment and Sustainability (SENS) at the University of Saskatchewan. Greg teaches ENVS 840: Renewable Energy and Energy Transitions. He is the Co-Lead of the Fulbright Arctic Initiative III program. Greg is the Co-Director of the Community Appropriate Sustainable Energy Security (CASES) Project, which spans 17 Indigenous and Northern communities across Canada, Alaska, Norway, and Sweden. Greg also leads the Renewable Energy in Remote and Indigenous Communities Flagship Initiative at the University of Saskatchewan and leads the UArctic Thematic Network on Renewable Energy. For over twenty-five years, he has engaged in research focused on comparative politics and policy as it relates to Indigenous-relations; energy and resource development; capacity-building in the North. Outside of his academic position, Greg serves as a negotiator and advisor for SaskPower on an agreement with a First Nation in Northern Saskatchewan.



Dave Schneider is a Professor in the School of Environment and Sustainability at the University of Saskatchewan where he teaches ENVS 850 (Systems Thinking for Sustainability), ENVS 805 (Data Driven Solutions for Sustainability). Dave, originally trained in biochemistry and chemical physics, has a lifelong interest in the structure and dynamics of systems involving interacting or “competing” processes. He has over 35 years of extensive experience developing mathematical, statistical and computational models for such systems arising in a variety of contexts including biology, chemistry, physics and engineering. His current research interests include the application of model-based data analytics, network theory, spatial statistics, and risk analysis to energy systems.



Oscar Zapata holds the Centennial Chair in Community Energy Development at the Assistant Professor level in the School of Environment and Sustainability (SENS) at the University of Saskatchewan. Oscar teaches courses in the Economics of Community Energy Development (ENVS 842: Community Economic Analysis and Renewable Energy) and in Economic Valuation of Environmental Sustainability. His work focuses on understanding the broad socio-economic impacts of energy development and the value proposition for rural and remote communities, where the energy component becomes a pivotal element to promoting social change and improving living conditions. Oscar employs quantitative methodologies including statistical analysis, econometrics, economic modelling and experimental design. He has vast experience working with indigenous communities in the Amazon and the Andes of South America, and more recently with First Nations communities in Canada. Oscar holds a PhD and master’s degree in Economics (University of Calgary) and a master’s degree in Sustainable International Development (Brandeis University).