

ADVANCING ENERGY TECHNOLOGY AND INNOVATION: ENHANCED STRATEGIC COLLABORATION BETWEEN FEDERAL, PROVINCIAL, AND TERRITORIAL GOVERNMENTS

Energy Technology Working Group



ENERGY AND MINES MINISTERS' CONFERENCE

CRANBROOK, BRITISH COLUMBIA

JULY 15-17, 2019

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Context

The Energy and Mines Ministers' Conference (EMMC) is an annual gathering of federal, provincial and territorial (FPT) ministers responsible for energy and mining portfolios to discuss how to support a responsible and competitive industry that contributes to the sustainable development of local communities and Canada as a whole. At these meetings, ministers discuss shared priorities for collaborative action to advance energy and mining development across the country.

Collaboration on research, development, and demonstrations (RD&D) in energy technologies plays a significant role in advancing innovation in Canada's energy sector. Energy technology innovation in Canada is advanced by technology demonstration, collaborative projects on energy innovation, and intergovernmental trusted partnerships. Collaboration on energy technology innovation is needed to accelerate the transition to a lower-carbon economy, reduce greenhouse gas emissions (GHGs), and to enhance the competitiveness of Canada's energy sector.

The Pan-Canadian Framework on Clean Growth and Climate Change (PCF) further strengthens the shared interest among governments in working together to transition to a sustainable, low-carbon economy. The PCF is a collective plan developed by the Government of Canada and provinces and territories that outlines the ways in which FPT governments will collaborate to support clean growth and address climate change, including in the area of energy technology and innovation. Building on the Paris Agreement from COP21, the PCF is both a commitment to the world that Canada will do its part on climate change and a plan to meet the needs of Canadians.

The EMMC's Energy Technology Working Group (ETWG) supports the advancement of energy technology and innovation through collaboration on energy technology RD&D. In previous EMMC's, the ETWG has also enabled collaboration amongst jurisdictions, for example through collaborative clusters that brought together jurisdictions and experts with a common interest in working together on a specific energy technology area. The ETWG developed reports for energy and mining ministers on FPT collaboration, including challenges to collaboration and best practices and lessons-learned to advance collaboration among jurisdictions.

Federal, Provincial and Territorial Governments have developed strategic collaboration initiatives on energy technology and innovation inspired by these best practices and lessons-learned. Leveraging the relationships that were established through the ETWG, many of these initiatives have been pursued with co-funding from Natural Resources Canada (NRCan), which provides notable support for energy technology and innovation.

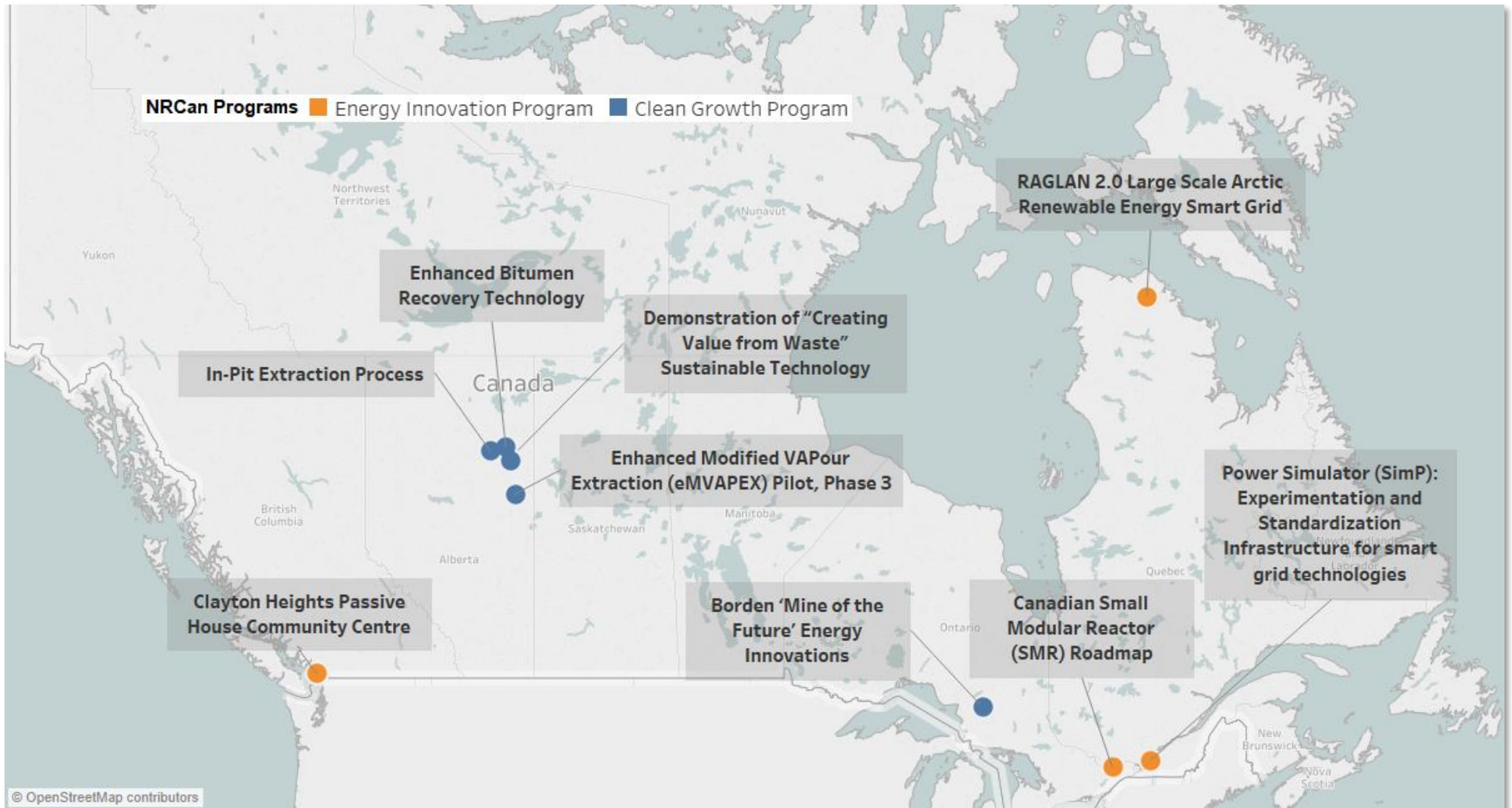
This report will profile some of the ongoing strategic FPT collaborations in co-funding innovation and technology demonstration, as well as intergovernmental and international partnerships promoting energy technology. It is intended to showcase new and ongoing forms of collaboration in innovation to inspire further collaborative activities involving FPT governments and other stakeholders going forward.

Collaborative Initiatives

The following initiatives are examples of recent energy technology and innovation collaborations between Natural Resources Canada (NRCan), provincial and territorial governments, and in some instances, other federal departments and partners across jurisdictions. These examples provide insight into effective mechanisms for collaboration that FPT governments can pursue going forward.



Energy Innovation Projects through NRCan Programs



An interactive map profile of intergovernmental collaborative projects on energy RD&D is available for sharing on [Tableau Public](#).

<http://bit.ly/FPTinnovEMMC2019>

Trusted Partnerships for Energy Innovation



The Clean Growth Program (CGP), which was launched by NRCan on November 20, 2017, provides \$155M/4 years for the co-funding of clean technology RD&D projects with provinces and territories, in Canada’s energy, mining and forestry sectors. Overall, the program aims to advance clean technologies so that natural resource operations can better reduce their environmental impacts on air, land, and water.

The CGP also puts into action the Government of Canada’s collaborative approach of doing business by leveraging investments in publicly funded research, research centres and provincial and territorial funding programs to better mobilize clean technologies.

The program will advance emerging clean technologies toward commercial readiness so that natural resource operations can better reduce their impacts on air, land, and water, while enhancing competitiveness and creating jobs. Emerging technologies includes those innovations that aim to reduce the energy impact of natural resource sector industries by making use of clean energy technology that improves the environmental performance of their operations.

The CGP relies on the establishment of “trusted partnerships” with key provincial/territorial partners and funding associations.

Trusted Partnerships are established through the signing of Memorandums of Understanding and Non-Disclosure Agreements to enable efficient collaboration via the sharing of information, leveraging of respective funding processes and the possible establishment of parallel calls for proposals.

Trusted Partnerships are an effective means to lessen the burden of co-funding projects by reducing barriers and streamlining the proposal review processes at both levels of government, facilitating the sharing of information and expertise, and can be used to leverage respective calls for proposals

Trusted Partnerships are not tied to specific programs and can be leveraged by other NRCan programs as mutually beneficial opportunities arise with provincial and territorial partners. To date, NRCan has established seven partnerships:

- Emissions Reductions Alberta (ERA)
- B.C. Innovation Council (BCIC)
- Innovation Saskatchewan (IS)
- Natural Gas Innovation Fund (NGIF)
- Offshore Energy Research Association (OERA)
- Ontario Centre of Excellence (OCE)
- Alberta Innovates (AI)



Enhanced Bitumen Recovery Technology

Project Description	Partners
<p>Location: near Fort McKay, Alberta</p> <p>Project Value: \$224 Million</p> <p>Co-Funding: \$15M total (Contribution Agreement \$5M from NRCan; \$10M from ERA via <i>Clean Growth Program Trusted Partnership</i>).</p>	Natural Resources Canada (NRCan); Emissions Reduction Alberta (ERA); Imperial Oil Resources Limited.

Enhanced Bitumen Recovery Technology (EBRT) demonstration pilot consists of a field trial of a newly developed heavy oil and bitumen recovery technology for production. This technology can reduce GHG emissions on an intensity basis by up to 59% compared to a steam-assisted gravity drainage (SAGD) baseline. This project will be piloted at Imperial Oil’s Muskeg Lease, located near Fort McKay, Alberta.

EBRT can be applied at both existing and new build sites in place of conventional in-situ facilities. The technology operates at lower pressures and may enable recovery from reservoirs not previously considered viable. It is also expected to reduce initial capital and operating costs by approximately 50%.

This is one of the several projects fast tracked through a *Trusted Partnership* established with provinces, territories, and other funding associations to enable sharing of information, leveraging of respective funding call processes and establishment of parallel calls for proposals.

Anticipated Results

- Significant transformational technology potential in terms of GHG reductions and reduced water use.

- Likely to achieve substantial and long-term economic and cost competitiveness enhancements.
- Potential to unlock currently inaccessible shallow reserves.

Environmental Benefits

EBRT technology demonstrated through this pilot project has the potential to reduce GHG emissions by up to 50-60% vs. conventional SAGD operation (i.e., 400-500 kt-CO₂/year for a typical 30,000 bpd facility emitting 820 kt-CO₂/year).



In-Pit Extraction Process

Project Description	Partners
<p>Location: Wood Buffalo, Alberta</p> <p>Project Value: \$45.8 Million</p> <p>Co-Funding: Up to \$10.6M total (Contribution Agreement up to \$5M from NRCan; \$5.6M from ERA via Clean Growth Program Trusted Partnership).</p>	<p>Natural Resources Canada (NRCan); Emissions Reduction Alberta (ERA); Canadian Natural Resources Limited.</p>

The In-Pit Extraction Process (IPEP) is an alternate bitumen extraction process that separates oil sands ore into coarse solids, fine solids, bitumen and water. The process takes place at the oil sands mine (in-pit) requiring fewer diesel trucks and auxiliary equipment, and thus reducing energy needs. The IPEP technology involves a relocatable, modular extraction plant that can be moved as the mine face advances. The bitumen and water are transported from the extraction site for further processing, while the remaining solids are recombined into stackable tailings.

Canadian Natural Resources Limited (CNRL) estimates that the IPEP technology could reduce GHG emissions in bitumen production, compared to typical oil sands surface mining and extraction processes.

The IPEP system would also enable expansion of mining operations without constructing new central ore processing facilities. CNRL has committed to make this technology available to oil sands mining companies through COSIA for more rapid industry-wide adoption.

This project will be demonstrated at CNRL's Horizon oil sands mine in Alberta. This is one of the several projects fast tracked through a Trusted Partnership established with PTs and other funding associations to enable sharing of information, leveraging of respective funding call processes and establishment of parallel calls for proposals.

Anticipated Results

- Potential to significantly reduce tailings generation and enable faster remediation of mine faces through a progressive mining and reclamation strategy.
- Results to date have shown a \$2/bbl potential production cost reduction
- Ability to be retrofitted to current mining operations and potential wide spread application.

Environmental Benefits

The IPEP bitumen extraction process has the potential to reduce GHG emissions by reducing the number of diesel engine powered haul trucks by 50%; potential to reduce reclamation timelines and reduce water usage.



Enhanced Modified VAPour Extraction (eMVAPEX) Pilot, Phase 3

Project Description	Partners
<p>Location: Conklin, Alberta</p> <p>Project Value: \$105 Million</p> <p>Co-Funding: Up to \$15M total (Contribution Agreement up to \$5M from NRCan; \$10M from ERA via <i>Clean Growth Program Trusted Partnership</i>).</p>	<p>Natural Resources Canada (NRCan); Emissions Reduction Alberta (ERA); MEG Energy Corporation.</p>

Steam generation is the main contributor to GHG emissions, water consumption and the capital/operating costs of bitumen production. The concept eMVAPEX (enhanced Modified VAPour Extraction) involves the application of infill wells and the injection of a condensable gas (ex. propane) in lieu of steam after initial steam-assisted gravity drainage (SAGD) operation.

The eMVAPEX process can reduce the company's steam-oil-ratio (SOR), thereby freeing up steam to apply to new wells and increase overall production. For example, an industry standard SAGD asset with an operating SOR of 3.0 could increase bitumen production by up to 76% with the same steam assets by employing eMVAPEX. The resulting overall GHG emission intensity could be reduced by as much as 40%. In addition, the overall recovery from the reservoir is expected to improve.

To date, the company has implemented the technology on three well pairs and their associated infill wells with encouraging results. MEG's 2018 capital program allows for the conversion to eMVAPEX of up to several additional well pairs and associated infills, and the construction of a propane recycling facility to test the commerciality and scalability of the technology.

Anticipated Results

- Significant potential for GHG emission reductions (up to 40%) from industry average SAGD (steam-assisted gravity drainage) production.
- Recycling facility allows propane to be reused in process.
- Likely to achieve substantial and long-term economic and cost competitiveness enhancements.
- Capacity to drive rapid commercialization.

Environmental Benefits

This eMVAPEX Pilot has the potential to reduce GHG emissions up to 40% lower vs. conventional SAGD (steam-assisted gravity drainage) operation (i.e. 300 kt-CO₂e/year for a typical 30,000 bpd facility emitting 820 kt-CO₂e/year). Potential to significantly reduce water use.

Demonstration of “Creating Value from Waste” Sustainable Technology

Project Description	Partners
<p>Location: Fort McMurray, Alberta</p> <p>Project Value: \$280 Million</p> <p>Co-Funding: Up to \$55M total (Contribution Agreement up to \$5M from NRCan; \$40M from ECCC Low Carbon Economy Fund; \$10M from ERA via <i>Clean Growth Program Trusted Partnership</i>).</p>	<p>Natural Resources Canada (NRCan); Environment and Climate Change Canada (ECCC); Emissions Reduction Alberta (ERA); Titanium Corporation Inc.; Canadian Natural Resources Ltd.</p>

Titanium Corporation’s “Creating Value from Waste” (CVM) Horizon project is a commercial-scale prototype demonstration of a first-of-kind sustainable technology designed to remediate oil sands froth treatment tailings. The project will be jointly conducted and implemented with Titanium Corporation’s industry partner, Canadian Natural Resources Limited, at their Horizon oil sands site (250,000 bpd) near Fort McMurray, Alberta.

CVW is a clean technology that remediates oil sands froth treatment tailings, recovering contained hydrocarbons (bitumen, diluent) and preventing their release into tailings ponds and the atmosphere. The release of these hydrocarbons into ponds causes methane formation, a major source of fugitive emissions in the oil sands industry. The recovery of diluent from froth treatment tailings will avoid methane formation of up to 10% of site-wide CO₂e and provide environmental benefits including significant VOC emissions reductions and enhanced tailings management.

Additional benefits include valuable minerals recovery (zircon and titanium-bearing minerals) creating a new minerals industry and significant economic diversification and export markets for Canada. The project encompasses engineering design and construction to be executed by Canadian engineering firms for a full scale

commercial installation of Titanium’s CVW at Canadian Natural’s Horizon oil sands site.

Anticipated Results

- Provide land-use and reclamation environmental benefits including reductions in tailings and fugitive GHG emissions. By removing bitumen, conventional tailings management operations work more efficiently to deliver ‘ready-to-reclaim’ (AB’s Directive 85) solids depositions.
- Potentially create a new high-value minerals industry for western Canada as an offshoot from oil and gas industry by recovering valuable hydrocarbons and minerals (zircon and titanium) from oil sands waste tailings.
- Partnership with CNRL provides potential pathway for the adoption of the CVW technology by the larger oil sands mining sector through Canada’s Oil Sands Innovation Alliance (COSIA).
- Inclusion of Indigenous groups in the project implementation. Capacity to drive rapid commercialization.

Environmental Benefits

4 years after this project begins operations, GHG emission reductions are expected to stabilize at approximately 765 kt CO₂ per year.

Borden ‘Mine of the Future’ Energy Innovations

Project Description	Partners
<p>Location: near Chapleau, Ontario</p> <p>Project Value: \$32.8 Million</p> <p>Co-Funding: Up to \$10M total (Contribution Agreement up to \$5M from NRCan; \$5M from OCE via <i>Clean Growth Program Trusted Partnership</i>).</p>	<p>Natural Resources Canada (NRCan); Ontario Centre of Excellence (OCE); MacLean Engineering; Sandvik; Independent Electricity System Operator; Ontario Ministry of Energy, Northern Development and Mines; MagLab; Drager.</p>

Goldcorp will demonstrate the technical and economic feasibilities of several energy innovations in the mining sector including:

- A fleet of large and small Battery Electric Vehicles (BEVs);
- A fully automated Ventilation On Demand (VOD) system; and
- An underground mine without a surface compressor plant.

This collaborative investment will make it Canada’s first all battery electric underground mine.

The elimination of diesel mining equipment combined with the application of leading-edge ventilation and air compression technology has dubbed this project the Borden “Mine of the Future”.

This project brings significant environmental benefits by reducing GHG emissions and will create approximately 250 jobs for local and Indigenous communities.

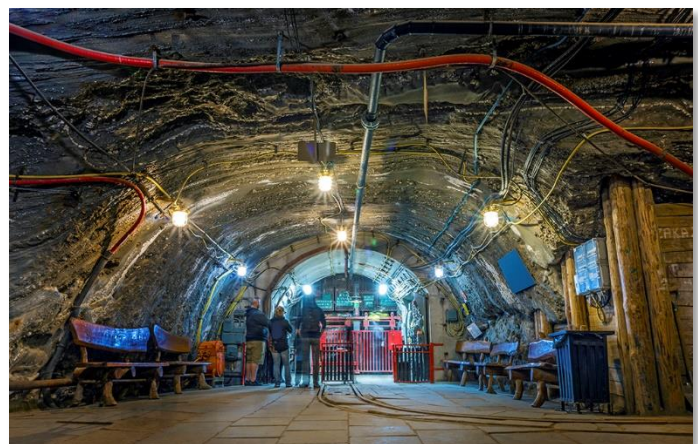
This is one of the several projects fast tracked through a Trusted Partnership established with PTs and other funding associations to enable sharing of information, leveraging of respective funding call processes and establishment of parallel calls for proposals.

Anticipated Results

- Significant environmental benefits for mining sites.
- Economic opportunities for local communities (jobs) and for four First Nations partners (Michipicoten FN, Chapleau Ojibwe FN, Chapleau Cree FN, and Brunswick House FN) and the Metis.
- The project will be the first underground mine in Canada to replace all diesel mobile equipment, with BEVs.

Environmental Benefits

The energy innovations to be developed for the “Mine of the Future” will lead to GHG Reductions of 6,600 tonnes of CO₂ annually (or 70% annually) at the Borden Mine project. Electrification will also lead to the elimination or, at least, a significant reduction of diesel particulate matter and other air pollutants (NO_x and SO_x).



Intergovernmental Collaboration for Energy Innovation



Advancing energy technology in Canada requires strong partnerships between federal, provincial, and territorial governments. FPT governments can work together through several forms of strategic collaboration such as co-funding projects, joint calls, and trusted partnerships. Federal interdepartmental initiatives such as the *Clean Growth Hub* and international leadership through *Mission Innovation* enable deeper intergovernmental collaboration for accelerating energy innovation.

The objective of NRCan's **Energy Innovation Program (EIP)** is to support the competitiveness of Canada's natural resource sectors through a comprehensive suite of research, development, demonstration, and RSA (Related Scientific Activities) projects leading to advances in technology, increased knowledge and collaboration, input into codes, standards and associated policies and regulations, and ultimately improved environmental and economic performance.

Through the Federal Budget 2016, the program committed to \$82.5 million over two years (fiscal 2016-2017; 2017-2018) to support energy innovation through federal labs, co-funded projects with provincial and territorial entities, and private sector partnerships. Since 2018, the ongoing program provides \$52.9 million for these initiatives on an annual basis.

EIP projects focus on addressing innovation gaps and opportunities to significantly reduce GHG emissions, in areas such as electricity, oil and gas, renewable energy, energy efficient buildings and homes, transportation, and industry, while supporting economic growth and creating jobs. There is great potential for intergovernmental collaboration on energy innovation through the EIP.

RAGLAN 2.0 Large Scale Arctic Renewable Energy Smart Grid

Project Description	Partners
<p>Location: Glencore Raglan Mine, Nunavik, Québec Co-Funding: \$3.9M from NRCAN via <i>Energy Innovation Program</i>.</p>	<p>Natural Resources Canada (NRCAN); Enercon; Glencore RAGLAN Mine; HATCH Ltd.; Moreau Electricque; Tugliq Energy; Québec Ministry of Energy and Natural Resources.</p>

RAGLAN 2.0, builds on a prior landmark project, RAGLAN 1.0, which conclusively demonstrated the technical and operational capabilities of industrial-scale renewable energy at Northern sites, under harsh industrial and climatic conditions.

The project aims to build on steps taken toward achieving 60% to 90% diesel displacement at a Northern mine, and to accelerate momentum towards sustainability for the mining industry in Canada.

RAGLAN 2.0 will modify the operating philosophy of the mine’s main power plant, from integrating the current heat recovery system to larger-scale variable renewable energy, larger-scale energy storage, and together with a revamped spinning-reserve strategy of more than 11 diesel engines, while maintaining larger-scale smart grid stability and volt ampere reactive (VAR) management under highly cyclical industrial loads. Such coordination among thermal, storage, fluctuating wind, and diesel generation, has not been demonstrated before at this scale in Canada.

Anticipated Results

A key achievement of RAGLAN 2.0 will be to demonstrate the complete and persistent shutdown of at least one of RAGLAN’s largest diesel engines from the spinning reserve array, a generation capacity that is on-line but unloaded, and can respond to increased demand within a short period. Heat that can no longer be recovered from that significant offline engine will

have to be replaced by a complex management of the balance of the thermal energy loop supplying the heating load and process drying requirements. The development and implementation of such capability is crucial for the deployment of the next wave of renewable energy in similar mines and many communities worldwide.

RAGLAN 2.0 will expand Nunavik’s first renewable-energy production and storage center, for the regional benefits and capacity building for 16 mining operations and Inuit communities in this Arctic region, as well as other mining operations abroad. Tugliq Energy hopes to demonstrate that a high penetration level of renewable energy can be reliably integrated into complex grids, while addressing very strict operating constraints such as that of a mining flagship operation.

The RAGLAN flagship initiative continues to be a close and proud collaboration among federal, provincial and regional stakeholders, in search of long-term solutions to reducing and eliminating air pollutants from energy production and use in Northern remote mines and communities.



Clayton Heights Passive House Community Centre

Project Description	Partners
<p>Location: Surrey, British Columbia</p> <p>Project Value: \$43.5 Million</p> <p>Co-Funding: \$1.3M from NRCan via <i>Energy Innovation Program</i>.</p>	<p>Natural Resources Canada (NRCan); City of Surrey; British Columbia Ministry of Energy and Mines; BC Hydro; HCMA Architecture and Design; Passive House Canada.</p>

With support from NRCan and the BC Ministry of Energy and Mines, the City of Surrey will build the largest Passive House community centre in the world, and the first in North America. Passive House is a leading standard in energy efficient construction, with buildings constructed to this standard achieving excellent indoor air quality, improved comfort, simplified operation and little to no direct GHG emissions.

This facility is anticipated to reduce energy use by 87% and reduce GHG emissions by 98% compared to similar currently operating facilities in the City of Surrey.

Designing and constructing this facility to the Passive House standard provides benefits and opportunities including: substantial reductions in operational energy demand and GHG emissions; simplified building operation; improved comfort and wellbeing for building occupants; and support for local and Canadian net zero building market transformation by demonstrating innovative design and construction techniques for high-performance buildings of this type.

Anticipated Results

This project is anticipated to help transition the Canadian market towards net zero and net zero ready new buildings. With recent commitments from the Province of British Columbia and Canadian government to achieve net zero buildings in the next 10-15 years, this project will act as an important demonstration of the design and construction technique required to achieve highly energy efficient multi-use buildings.

This project will also help support new training opportunities for professional and trades workers seeking certification to deliver the type of low energy buildings that benefit Canadians in the future.



Power Simulator (SimP): Experimentation and Standardization Infrastructure for smart grid technologies

Project Description	Partners
<p>Location: Varennes, Québec</p> <p>Project Value: \$2.1 Million</p> <p>Co-Funding: \$949 000 from NRCan via <i>Energy Innovation Program</i>.</p>	<p>Natural Resources Canada (NRCan); Hydro-Québec Research Institute (IREQ); OPAL-RT Technologies Inc.</p>

The Power Simulator (SimP): is an experimentation and standardization infrastructure for smart grid technologies. The objective of this project is to design, develop and put into service a new generation of “Power Hardware in the Loop” test and experimentation capability. This will allow development, testing and in-situ validation of experimental and commercial power system control, storage and smart grid products and equipment that will be part of future community micro-grids.

The cutting-edge research infrastructure would be open and available to all players in the Canadian green-energy industry, including academic and industry interests.

The goal of the project is to develop and implement technology to integrate new sources of clean energy without compromising the stability and reliability of our grids.

Natural Resource Canada provided funding for the project led by Hydro-Québec’s research institute (IREQ) through the NRCan *Energy Innovation Program*, which supports initiatives to accelerate clean technology development. IREQ is partnering with OPAL-RT Technologies to develop this technology.

Anticipated Results

Having this new infrastructure will encourage and facilitate the rapid and wide scale adoption of new renewable energy by assuring from the conception and design phase of green technologies that their integration will not adversely impact stability and reliability of the grid, even with increasing renewable energy resources as part of the generation mix. It will provide researchers the ability to complete rigorous system tests in simulation and also complete compelling demonstrations required to establish confidence in new technologies and provide necessary data to advance new standards.



Canadian Small Modular Reactor (SMR) Roadmap

Project Description	Partners
<p>Location: Ottawa, Ontario</p> <p>Project Value: \$520 000</p> <p>Co-Funding: \$224 408 from NRCan via <i>Energy Innovation Program</i>.</p>	<p>Natural Resources Canada (NRCan); Ontario Power Generation; Bruce Power; SaskPower; NB Power; Qulliq Energy Corporation; Alberta Innovates; New Brunswick Department of Energy and Resource Development; Northwest Territories Department of Infrastructure; Ontario Ministry of Energy, Northern Development and Mines; Atomic Energy of Canada Limited; Canadian Nuclear Association.</p>

The Canadian Small Modular Reactor (SMR) Roadmap arose out of the Generation Energy consultation process — the largest national conversation about energy in Canada’s history — which identified a potential opportunity for Canadian leadership in SMRs; an emerging area of nuclear energy innovation.

Taking a pan-Canadian approach, the SMR Roadmap was driven by provincial and territorial governments and power utilities from provinces, territories and energy utilities across four provinces and two territories. Stakeholders and partners in the project provided input and insight during application-focused workshops, guided and contributed to expert analysis undertaken by working groups, and directed the content of the SMR Roadmap report.

Anticipated Results

The SMR Roadmap report is the result of a 10-month engagement process with the industry and potential end-users, including Indigenous and northern communities and heavy industry. It includes over 50 recommendations in areas such as waste management, regulatory readiness and international engagement. It also highlights the need for ongoing engagement with civil society, northern and Indigenous communities and environmental organizations.

The results of this initiative will help drive SMR development and deployment in Canada, and will position Canada to make the most of our ongoing transition to a low-carbon economy.

Some of the outcomes of the Roadmap include:

- Clarity on needs and priorities of stakeholders and Canadians;
- Understanding of the value proposition of different SMR technologies;
- Identification of key issues related to regulatory readiness, waste management and transportation policy;
- Appreciation of risks and challenges; and
- Identification of policy levers that may impact SMR feasibility in Canada.

In addition, the Roadmap process has prepared a way forward to position Canada for success domestically and for best advantage in the emerging global SMR market.

The Government of Canada welcomed the Canadian SMR Roadmap and is moving forward with concrete action in several priority areas, including:

- Ongoing Indigenous engagement;
- Focused engagement with prospective end-users in the mining sector to build partnerships; and
- SMR demonstration project evaluations.

Clean Growth Hub

Description	Partners
<p>The Clean Growth Hub is a whole-of-government focal point for clean technology focused on supporting companies and projects, coordinating programs and tracking results. The Hub also advances the Clean Technology and Innovation pillar of the Pan-Canadian Framework on Clean Growth and Climate Change, and is part of the Innovation and Skills Plan.</p> <p>The Clean Growth Hub is a new service model that provides access to representatives of a number of federal departments and agencies with policies or programs that support clean technology. They are co-located together in Ottawa but serve all of Canada. This model leverages existing knowledge, expertise and working relationships while providing an easy, single point of contact for clean technology users and producers.</p> <p>The Clean Growth Hub helps stakeholders access to funding dedicated to clean technology, as well as other existing Government of Canada funding.</p>	<p>Government of Canada (various GoC Departments).</p> <p>Participating departments and organizations include:</p> <ul style="list-style-type: none"> • Natural Resources Canada (Co-Chair) • Innovation, Science and Economic Development Canada (Co-Chair) • Agriculture and Agri-Food Canada • Business Development Bank of Canada • Canadian Commercial Corporation • Crown-Indigenous Relations and Northern Affairs Canada • Environment and Climate Change Canada • Export Development Canada • Fisheries and Oceans Canada • Global Affairs Canada (Trade Commissioner Service) • Indigenous Services Canada • National Research Council Canada • Standards Council of Canada • Sustainable Development Technology Canada • Transport Canada • Treasury Board of Canada Secretariat (Centre for Greening Government)
<p>Opportunity for Collaboration</p> <p>While the Clean Growth Hub services will initially focus on connecting proponents to federal investments, it has begun gradually expanding its network, by signing a pilot MOU with BC. This will enable the Hub to connect proponents to relevant provincial resources, whenever possible, and enhance co-ordination.</p>	

International Collaboration through Mission Innovation

Project Description



Mission Innovation (MI), a global initiative of 24 countries and the European Commission, works to increase the availability of advanced technologies that will define a future global energy mix that is clean, affordable, and reliable.

MI governments are seeking to double their spending on clean energy technology RD&D to increase the rate at which new clean energy solutions are ready to be taken up by the private sector.

Here in Canada, we have pledged to double annual federal investments in clean energy innovation from a baseline of C\$387 million in 2014/15 to C\$775 million by 2020.

Collaboration

On May 27-29, 2019, Canada hosted the 10th Clean Energy Ministerial and the 4th Mission Innovation Ministerial in Vancouver, Canada.

This annual event provides an important opportunity for MI Ministers to take stock of progress and impact to date, and to strengthen partnerships and raise ambition for the coming year.

Not only is MI focused on collaboration between members, it also encourages work with private industry.

Partners

Government of Canada (Natural Resources Canada); MI Member Governments; Breakthrough Energy Coalition; International Energy Agency; International Renewable Energy Agency; World Economic Forum.

Five MI governments, including Canada, announced a partnership with the Breakthrough Energy Coalition (BEC), an independent and parallel initiative led by Bill Gates that includes over 30 influential investors from around the world.

NRCan, Canada's lead on MI, has engaged with Provinces and Territories through the EMMC to engage with MI. An EMMC Deputy Ministers' meeting was held alongside the Ministerial and Ministers from the provinces and territories were also encouraged to attend.

FPT governments working together in international fora, such as MI, is key to enhancing the partnerships and collaborations that can help open new markets and position Canada as a global energy leader.



Key Observations

Trusted Partnerships are key drivers of collaborative innovation in energy technology across Canada. Ongoing collaborative initiatives in RD&D are strengthening Canada's energy technology sector. Investment in technology demonstrations through trusted partnerships and other collaborative programs help to scale-up clean energy solutions, bring new tech to the commercial stage, and apply to industry to reduce emissions.

Strategic collaboration for advancing energy technology in Canada is already driving our innovation in this sector, but there is an appetite for stronger partnerships. Trends towards more intergovernmental agreements and the ongoing collaboration energy technology RD&D projects indicate a desire for enhanced strategic collaboration between FPT governments to meet Canada's climate change commitments and supporting clean growth.

Strategic collaboration initiatives are an effective approach to advancing shared interests. Collaboration through joint calls and co-funding initiatives allow for FPT governments, as well as industry partners, to leverage each other's resources and expertise to address common priorities in climate change and clean growth. Shared initiatives can be identified more specifically and collaboration can be strengthened through trusted partnership agreements between governments.

Stronger FPT collaboration strengthens Canada's economic advantage in energy technology. As the world seeks technology solutions to reduce emissions and achieve economic growth, this creates opportunities for Canada on the world stage to attract investment in further RD&D and commercialization of innovation developed at home. Stronger FPT collaboration on RD&D can also make Canada a leading exporter of energy technology.

FPT governments are encouraged to seek opportunities to collaborate on energy technology and innovation. It is important to note that strategic collaborations extend beyond formal mechanisms such as trusted partnerships and co-funding, and that other forms of strategic collaboration for advancing energy technology RD&D are encouraged such as information sharing, joint research, and improving investment opportunities in new technology to accelerate development. The examples of mechanisms for strategic collaboration in this report aims to spur interest and lead to increased collaboration initiatives between federal, provincial and territorial governments going forward.