

Evaluation of the Smart Grid Program (SGP) and the Emerging Renewable Power Program (ERPP)

Audit and Evaluation Branch
Natural Resources Canada
February 28, 2025

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Executive summary

This report presents the findings, conclusions, and recommendations from the Evaluation of the Smart Grid Program (SGP) and the Emerging Renewable Power Program (ERPP). This evaluation responds to a commitment to the Treasury Board (TB) and a requirement from Section 42.1 of the *Financial Administration Act*.

The SGP is a \$100 million, five-year program that provides funding to the deployment of proven smart grid integrated systems (n = 10), larger-scale demonstrations of near-commercial smart grid technologies (n = 6), and hybrid projects (n = 6) that include both demonstration and deployment components. The program's intent is to accelerate the shift to a clean growth economy by optimizing electricity assets, boosting renewable generation, and enhancing power system reliability, resiliency, and flexibility while maintaining cybersecurity.

The ERPP is a \$200 million, eight-year program that supports large deployment projects (n = 6) and studies (n = 9). Deployment projects introduce new renewable power technologies to Canada. Studies generally intend to advance knowledge and disseminate information relevant to potential emerging renewable power projects. The ERPP intends to expand the portfolio of commercially viable renewable energy sources in provinces and territories to reduce greenhouse gas (GHG) emissions from their electricity sectors by mitigating risks and challenges associated with emerging renewable energy projects in Canada.

The evaluation of the SGP and ERPP focused on: (1) the continued need for public investment in smart grids and renewable energy technologies (relevance); (2) the programs' achievement of the immediate and intermediate outcomes (effectiveness); (3) the programs' design, implementation, and capacity to operate as planned to achieve and report on the intended outcomes (efficiency); and (4) identifying key aspects from the implementation of the two programs that should be brought forward (lessons learned). The period covered by the evaluation was fiscal years 2018-19 to 2022-23. The approach and methodology used for the evaluation followed the TB *Policy on Results* (2016) and related *Standards on Evaluation*.

What the evaluation found

Overall: The evaluation found that the SGP and ERPP are relevant and will continue to be relevant as Canada works towards its climate change targets. For the most part, the programs are being delivered efficiently. While these two programs have achieved meaningful progress and achievement of many of their intended short- and medium-term outcomes, there are areas of improvement and lessons learned to ensure that the SGP and ERPP, along with similar programs, continue to make the utmost progress towards medium-term outcomes and long-term outcomes.

Relevance: The SGP and ERPP are relevant. The SGP and ERPP, or similar programming, are important to help Canada meet its climate change targets. The programs align with the Government of Canada priorities and Natural Resources Canada (NRCan) strategic outcomes related to clean energy and climate change. The programs also complement other programs and initiatives that are part of a larger ecosystem working towards a clean growth economy and clean energy in Canada. The SGP and ERPP help the utilities sector to overcome key barriers in the transition towards clean energy systems. There is evidence that the smart grid and emerging renewable energy projects were largely enabled because of the federal government support.

Effectiveness: The SGP and ERPP have been effective in achieving their immediate outcomes and some of their intermediate outcomes. However, some intermediate outcomes are still in progress (e.g., "Canadian smart grid sector growth and innovation" for the SGP and "emerging renewable projects contributing to electricity grid" for the ERPP) and related targets are unlikely to be achieved. There is also limited information to determine progress for several indicators during the evaluation period. While the programs showed some progress towards the long-term outcomes and ultimate outcome, program impact may be limited by the programs' limited scale and the extensive scope of the challenge (i.e., achieving net-zero emissions in Canada's electricity sector). A number of positive unintended outcomes and one negative unintended outcome were identified. The high level of program flexibility, professionalism of the NRCan program staff, and widespread dissemination of program information and results are key to program success. Notably, there is an interest in furthering the dissemination of program information and results. Regulatory barriers, technological issues due to innovation, and the COVID-19 pandemic experienced by projects have negatively affected program implementation and outcome achievement. There is a continued need for NRCan to provide support in examining and understanding the impact of business models and regulatory environments on project success, as projects under both programs continue to face regulatory barriers.

Efficiency: The SGP and ERPP have generally been designed efficiently. Their design reflects that used in a similar program being implemented in other countries (e.g., the United States [the US], Australia). The flexibility of the program design and NRCan program delivery staff have been key factors in the programs' success. While the SGP's "one window" approach provided the opportunity for the program to fund a greater range of projects, hybrid projects faced many administrative burdens. Although many of the program's positive elements were implemented, the programs encountered deviations from their original plans (e.g., project time extensions and supporting additional funding requests) because of the need to adapt to the changing circumstances.

Although both programs have a performance measurement approach in place, there are inconsistencies in how the programs collect performance information. The lack of a consistent approach in how data (such as job year) were reported rendered it impossible to aggregate the results, and thus accurately assess the extent to which some of the indicators have been met. Additionally, the deployment stream of the programs stopped collecting certain performance metrics (e.g., GHG emissions reductions) throughout the project duration. These metrics will only be collected in final reporting, as those responsible for program delivery only expect meaningful data to be available once solutions have been fully implemented and tested. At that time, evidence suggests it will most likely be too difficult and too late to identify weaknesses or errors, and make changes and corrections at the project- and program-level. Removing annual reporting increases the risk of poor-quality performance information. The programs recognized this and have already begun implementing related improvements.

The programs and NRCan have continuously improved their activities around Gender-based Analysis Plus (GBA+) and Equity, Diversity and Inclusion (EDI), including selection of projects with Indigenous involvement and a better integration of GBA+ and EDI considerations in the Smart Renewables and Electrification Pathways Program (a newer program that, in some way, replaces the SGP and ERPP).

Lessons learned: Evidence indicated that there are lessons learned to bring forward for the SGP, ERPP, and similar programming. These lessons learned encompassed processes, program design, and communication and engagement strategies that the programs and NRCan could consider going forward.

Recommendations and management response and action plan

| Recommendations | Management Response and Action Plan |
|---|--|
| <p>1. The Assistant Deputy Minister of the Energy Systems Sector (ADM ESS), in collaboration with the Assistant Deputy Minister of the Energy Efficiency and Technology Sector (ADM EETS), should continue to proactively work with federal, provincial, and territorial partners to develop strategies to better understand and address the impact of business models and regulatory environments on project success.</p> | <p>Management Response:</p> <p>Management agrees.</p> <p>The ADM ESS, in collaboration with ADM EETS where appropriate, will continue to proactively work with other levels of government to develop strategies to better understand and share information, lessons, and analysis on the impact of business models and regulatory environments on project success and scale up of energy technologies, in order to help inform stakeholder decision-making and recommendations.</p> <p>Ongoing collaboration with the Canadian Infrastructure Bank (CIB) is helping our programs identify additional risks within business models for potential projects. The Smart Renewables and Electrification Pathways (SREPs) program, the extension of the Smart Grid Deployment Program and the ERPP, is currently finalizing a Memorandum of Understanding with the CIB to work more closely on these issues.</p> <p>Position responsible: Director General (DG) of the Energy Resources Branch and DG of the Office of Energy Research and Development (OERD)</p> <p>Timing: September 2025</p> |

| Recommendations | Management Response and Action Plan |
|---|--|
| <p>2. The ADM ESS, in collaboration with the ADM EETS, should develop a consistent way to collect data annually on new job creation from funding recipients. This could include developing and providing a template similar to what is available for calculating GHG emissions reductions.</p> | <p>Management Response:</p> <p>Management agrees, where appropriate.</p> <p>In response to Recommendation #2, improved calculations for job creation are currently being finalized. The ERPP and SREPs program will be seeking standardized job creation information in their quarterly reporting requirements to ensure recipients are reporting on job creation in real time.</p> <p>Standardized templates are currently being updated and translated and should be ready to provide to recipients with existing agreements in the next quarterly reporting.</p> <p>To meet existing reporting commitments and targets, energy research, development, and demonstration programs will continue to collect annual data on job years of employment, as well as request the number of new jobs. Where department-wide approaches enable better and more coordinated data sharing across all sectors, the OERD will work with align with those approaches.</p> <p>These programs were intended to focus on experimentation, generating important lessons learned, rather than job creation. Going forward, ESS-REED and EETS-OERD will collaborate with NRCan's Planning, Delivery and Results Branch and Audit and Evaluation Branch to ensure that outcomes, indicators and results information focus on the intended purpose of the program(s).</p> <p>ESS and EETS agree that for any future hybrid programs or projects, sectors will better harmonize approaches to data collection, while still ensuring compliance with requirement under the Term and Conditions for each program stream.</p> <p>Position responsible: Senior Director the Renewable and Electrical Energy Division (REED) and DG OERD</p> <p>Timing: December 2024</p> |

| Recommendations | Management Response and Action Plan |
|--|--|
| <p>3. To encourage project replication and facilitate scale up, the ADM ESS, in collaboration with the ADM EETS, should increase emphasis on sharing program and project-specific results with intended audiences and the broader public.</p> | <p>Management Response:</p> <p>Management agrees.</p> <p>In response to Recommendation #3, knowledge dissemination of program and project results will be available on the program websites at the completion of the project, with the permission from the recipients. Where projects are withdrawn, programs will be unable to post project results.</p> <p>Not all information can be shared for deployment projects due to commercial sensitivities.</p> <p>Funding recipients often present at national and international conferences and panels as leaders in their fields. However, where information is not commercially sensitive, and value can be gained from broader dissemination, EETS-OERD will continue to undertake knowledge sharing activities (publications, presentations, workshops etc.) as resources permit in a timely and strategic manner to amplify and facilitate funding and non-funding supports.</p> <p>Position responsible: Senior Director REED and DG OERD</p> <p>Timing: March 2028</p> |

Introduction

This report presents the findings, conclusions, and recommendations from the evaluation of Natural Resource Canada's (NRCan's) Smart Grid Program (SGP) and Emerging Renewable Power Program (ERPP). The Audit and Evaluation Branch (AEB) conducted this evaluation as part of the NRCan Integrated Audit and Evaluation Plan 2022-27. This evaluation responds to a commitment to the Treasury Board (TB) and a requirement per Section 42.1 of the *Financial Administration Act*.



The evaluation examined the SGP and ERPP's relevance (i.e., continued need, alignment with priorities, and appropriateness of the federal role) and performance (i.e., effectiveness, efficiency, and economy), per the *Policy on Results* (2016). The evaluation aimed to add value and inform future NRCan programming.

Program profile

Program context and rationale

In 2016, Canada ratified the Paris Agreement with a commitment to reduce greenhouse gas (GHG) emissions by 30% from 2005 levels by 2030. The *Canadian Net-Zero Emissions Accountability Act*, passed into law in 2021, furthers this commitment by enshrining in legislation Canada's commitment to achieve net-zero emissions by 2050. For Canada to meet the 2030 target and net-zero GHG emissions by 2050, additional mitigation measures are required at all levels of government, as well as by the private sector and individual Canadians.

In July 2015, Premiers of Canada finalized the Canadian Energy Strategy (CES) to enable a cooperative approach to sustainable energy development in Canada. In 2016, the CES collaboration between provinces and territories grew to include the participation of the GC in some areas of CES work, including clean energy technology and innovation.

In 2016, the Government of Canada (GC) released the Pan-Canadian Framework on Clean Growth and Climate Change (PCF). Developed with provinces and territories and in consultation with Indigenous peoples, the PCF outlines strategies and steps aimed at achieving reduction in carbon pollution across all sectors of the economy, driving innovation and growth through supporting technology development and adoption and increasing Canadian competitiveness in the global low-carbon economy.

In an effort to fulfil key commitments under the PCF and the CES, NRCan received over \$800 million beginning in fiscal year 2018-19 to deliver five national programs under the Green Infrastructure (GI) envelope of the Investing in Canada Plan. The GI envelope includes the SGP (\$100 million) and ERPP (\$200 million). The SGP and ERPP focus on smart electrical grids and renewable energy sources, which are key elements to combat climate change. These technologies and infrastructure have the potential to reduce GHG emissions and assist Canada's goal of achieving 90% non-emitting electricity generation by 2030. However, the utilities sector faces unique challenges in pursuing smart grid deployments and demonstrations due to regulatory and financial constraints. Market and regulatory barriers have also prevented the commercial deployment of emerging renewable electricity technologies in Canada, although these technologies have been successfully deployed abroad.

Program descriptions

Smart Grid Program (SGP)

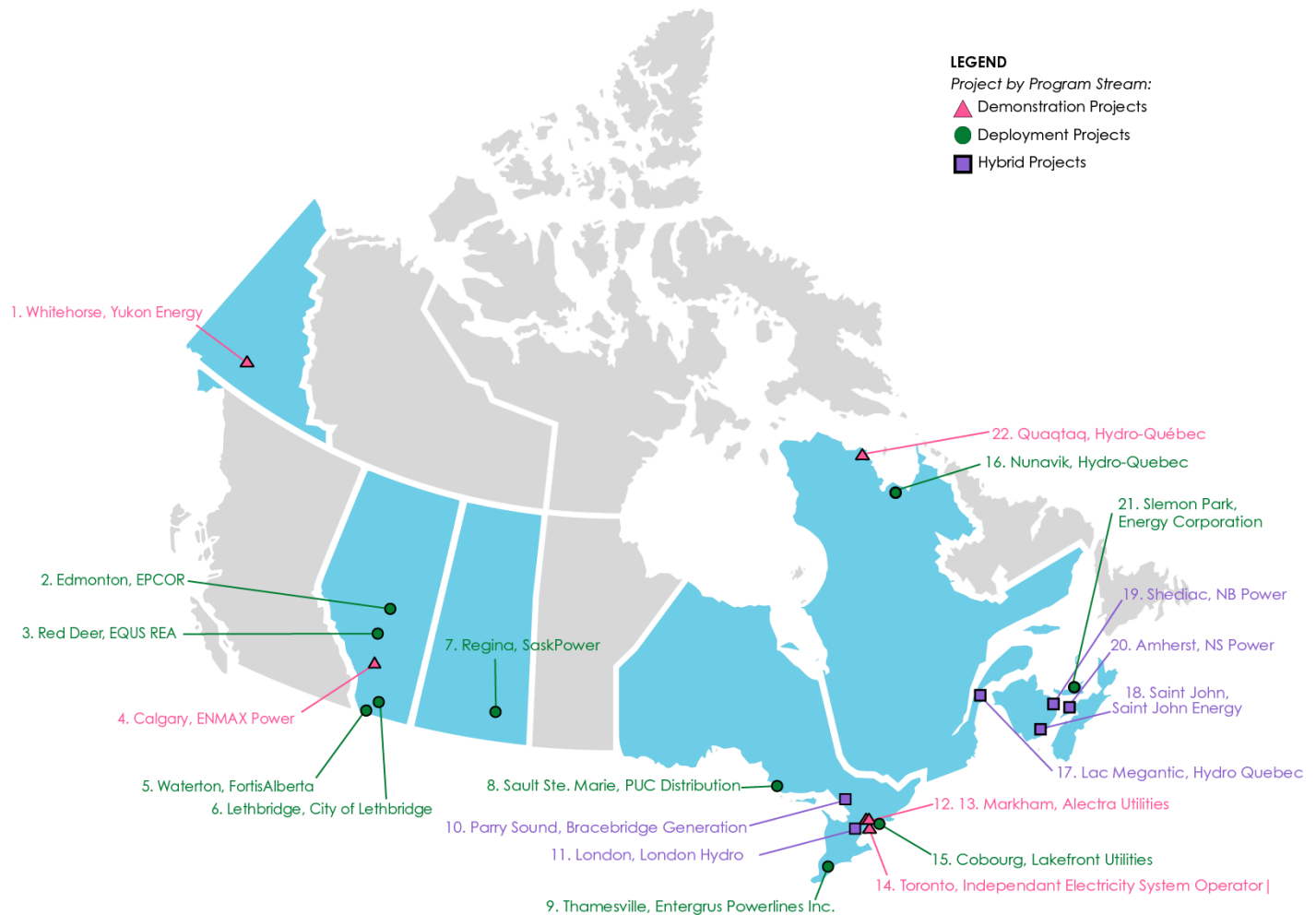
NRCan introduced the SGP to support the modernization of the electricity grid required to meet commitments made under the PCF. Up to \$100 million was invested in the five-year program under Budget 2017 to fund smart grid systems. Smart grids are intended to make better use of existing energy infrastructure, increase energy efficiency, and promote innovation (e.g., generation, transmission, and distribution assets). The ultimate objective of smart grids is to ensure more secure delivery of electricity to consumers, and thereby provide higher quality electricity service to Canadians.



Smart grids utilize digital and advanced technologies, such as smart meters, sensors, and automation, to balance electricity supply and demand. Smart grids contribute to GHG mitigation by boosting the hosting capacity of renewable energy, increasing electricity system resiliency, and improving system efficiency and conservation.

The SGP supports larger-scale demonstrations of near-commercial smart grid technologies in addition to deployment of proven smart grid integrated systems. The SGP also supports hybrid projects, which include both demonstration and deployment components. A total of 24 projects were supported, including 10 deployment projects, six demonstration projects, six hybrid projects, and two cancelled projects (see Figure 1 for the list of projects that proceeded to completion). Eligible recipients for the SGP include legal Canadian entities, electricity utilities, system operators, transmission owners and operators, and provincial, territorial, regional, and municipal governments.

Figure 1: Smart Grid Program projects (n = 22)



▼ Text version

Figure one: A map showing 22 SGP projects located in Canada.

Yukon

- One demonstration project: Whitehorse, Yukon Energy.

Alberta

- One demonstration project: Calgary, ENMAX Power.
- Four deployment projects: Edmonton, EPCOR; Red Deer, EQUUS REA; Waterton, FortisAlberta; Lethbridge, City of Lethbridge.

Saskatchewan

- One deployment project: Regina, SaskPower.

Ontario

- Three demonstration projects: Markham, Alectra Utilities; Markham, Alectra Utilities; Toronto, Independent Electricity System Operator.
- Three deployment projects: Sault Ste. Marie, PUC Distribution; Thamesville, Entergy Powerlines Inc.; Cobourg, Lakefront Utilities.
- Two hybrid projects: Parry Sound, Bracebridge Generation; London, London Hydro.

Quebec

- One demonstration project: Quataq, Hydro-Quebec.
- One deployment project: Nunavik, Hydro-Quebec.
- One hybrid project: Lac Megantic, Hydro-Quebec.

New Brunswick

- Two hybrid projects: Shediac, NB Power; Saint John, Saint John Energy.

Prince Edward Island

- One deployment project: Slemon Park, Energy Corporation.

Nova Scotia

- One hybrid project: Amherst, NS Power.

Emerging Renewable Power Program (ERPP)

In 2018, NRCan announced the launch of a \$200 million expression of interest for the ERPP, targeting the expansion of renewable energy sources to assist provinces and territories in reducing GHG emissions in the electricity sector. This eight-year funding is intended to support efforts to expand viable renewable energy technologies.

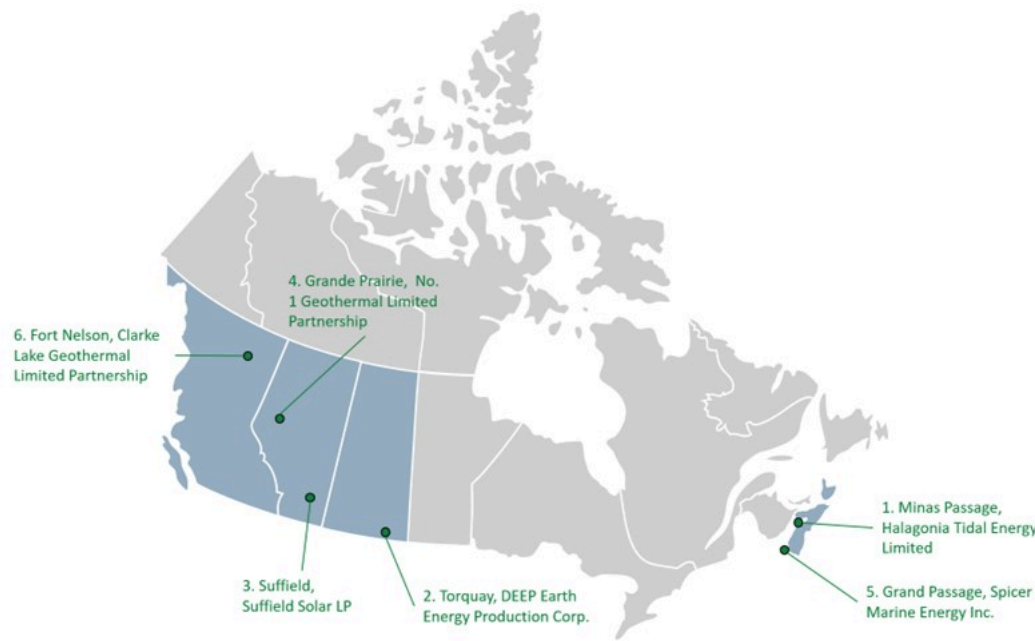


Renewable energy sources, like solar, wind, and geothermal, play a key role in mitigating GHG emissions, primarily through their low-to-zero operational emissions. Additionally, the decentralization of energy production, enabled by renewables, can lead to more resilient and efficient energy systems.

This program is designed to mitigate risks and challenges associated with emerging renewable energy projects. The anticipated outcome of the ERPP is that emerging renewable power will play a more important role in Canada's electricity supply. The ERPP funds large deployment projects and small, focused studies; a total of 15 initiatives were supported (see Figure 2 for the list of deployment projects and Table 1 for the list of studies). The deployment component supports the establishment of new industries in Canada through the introduction of renewable power technologies that are established commercially outside Canada or demonstrated but not yet deployed in Canada. The studies aim to evaluate the viability of a planned emerging renewable power project in a specific region; coordinate projects among several stakeholders; monitor environmental effects of a project; or

study the impacts of current electricity system practices in specific areas. Eligible recipients for the ERPP include legal Canadian organizations (for-profit or not-for-profit) and provincial, territorial, regional, and municipal governments.

Figure 2: Emerging Renewable Power Program (ERPP) deployment projects (n = 6) ¹



▼ Text version

Figure two: A map showing 6 ERPP deployment projects located in Canada.

Nova Scotia – two projects:

- Minas Passage, Halagonia Tidal Energy Limited
- Grand Passage, Spicer Marine Energy Inc.

Saskatchewan – one project:

- Torquay, DEEP Earth Energy Production Corp.

Alberta – two projects:

- Grande Prairie, No. 1 Geothermal Limited Partnership
- Suffield, Suffield Solar LP.

British Columbia – one project:

- Fort Nelson, Clarke Lake Geothermal Limited Partnership

Table 1: Emerging Renewable Power Program (ERPP) Studies (n = 9)

| Company | Project Name | Region |
|-------------------------------------|---|---------------------------|
| 1. Alberta Electric System Operator | AB/BC Intertie Restoration Study | Alberta-British Columbia |
| 2. Canadian Electricity Association | Electricity Sector Regulatory Efficiency Review | National (Ontario office) |

| Company | Project Name | Region |
|--|--|-------------------------------|
| 3. Saskatchewan Power Corporation | SaskPower / Manitoba Hydro Regional Coordination Study | Saskatchewan-Manitoba |
| 4. La Corporation de l'École Polytechnique de Montréal | Initiative de modélisation énergétique: apporter les outils nécessaires pour appuyer la transition énergétique du Canada | National (Québec office) |
| 5. Offshore Energy Research Association of Nova Scotia | Pathway Program | Nova Scotia |
| 6. Nova Scotia Power Incorporated | Atlantic Clean Power Roadmap Planning | Atlantic (Nova Scotia office) |
| 7. Fundy Ocean Research Center for Energy Limited | Risk Assessment Program for Tidal Stream Energy | Nova Scotia |
| 8. Government of Yukon | Geothermal resources associated with crustal-scale fault systems in Canada | Yukon |
| 9. WaterPower Canada | Guidance for Policy-Makers: Waterpower's Value and Potential in Canada | National |

Governance

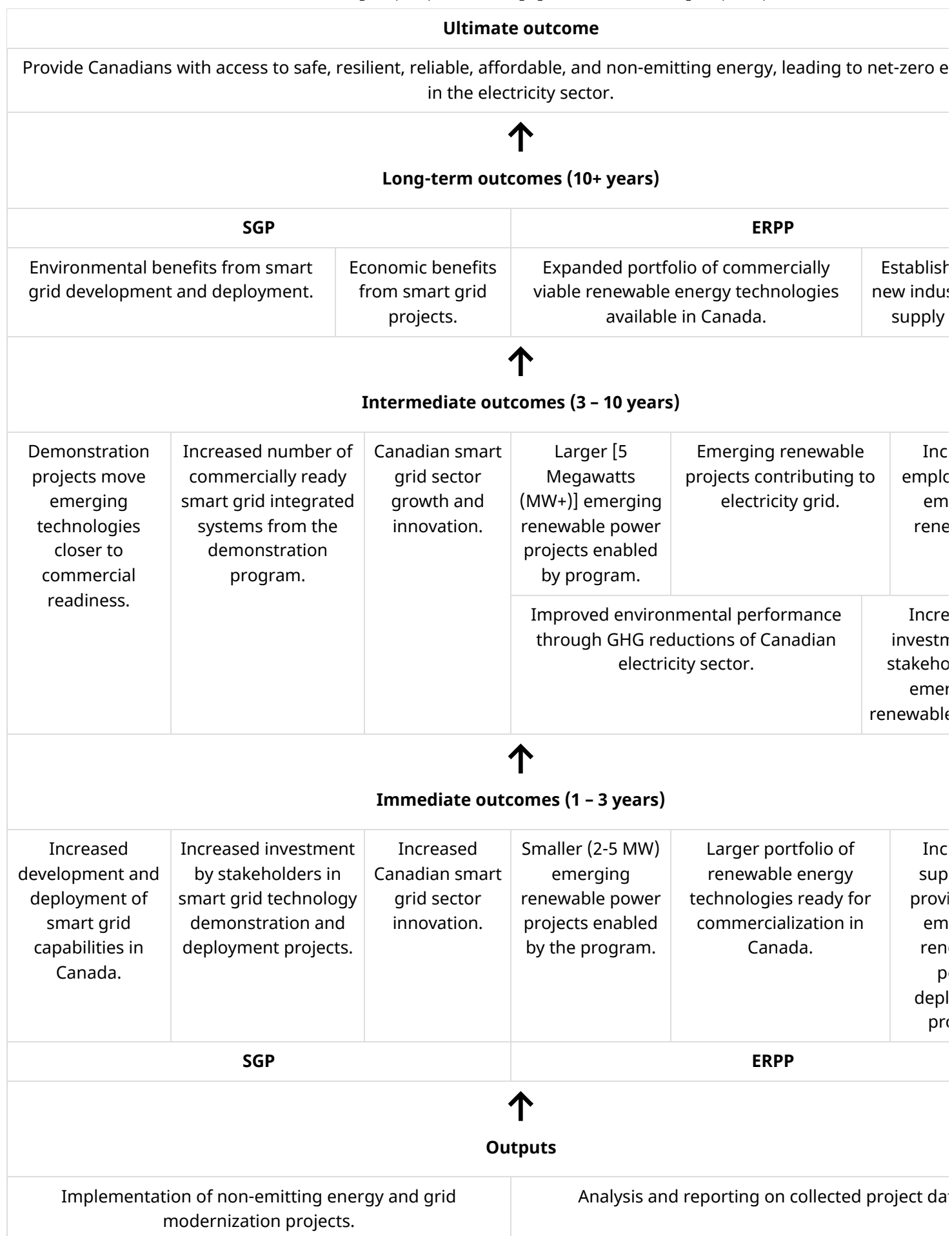
The SGP is in the purview of the Energy Systems Sector (ESS)'s Renewable and Electrical Energy Division (REED) for its deployment component and the Energy Efficiency and Technology Sector (EETS)'s Office of Energy Research and Development (OERD) for its demonstration component. The ERPP is in the purview of the ESS. The OERD and REED work jointly on the SGP hybrid projects. Each of these two NRCan sectors is led by an Assistant Deputy Minister (ADM), serving as functional leads, who are ultimately accountable for the successful delivery of the programs.

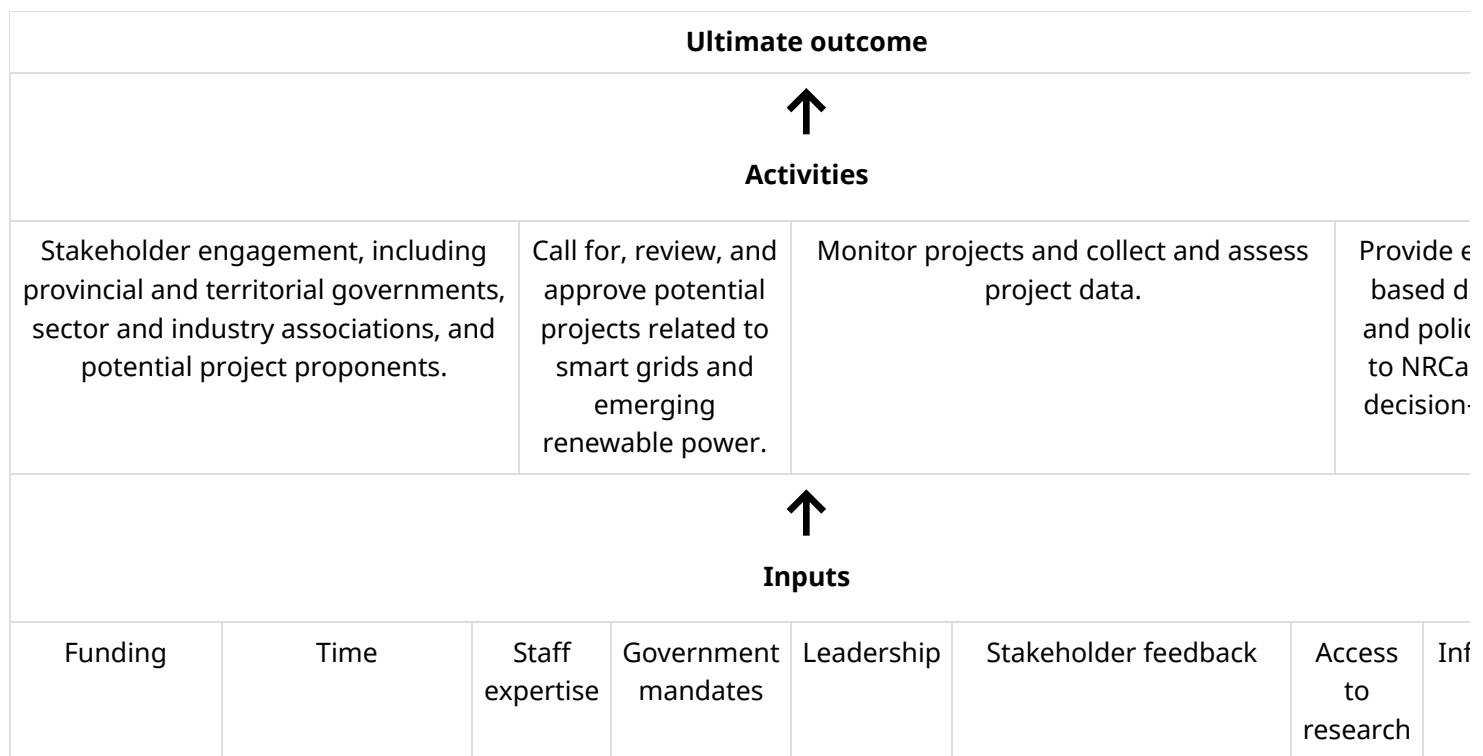
For each program, proposals are reviewed by a core team against the mandatory criteria stated in the program's Terms and Conditions. The proposals are then evaluated by a Technical Review Committee of subject-matter experts, from which a recommended list of projects is created and presented to the program Director, and then endorsed by the Director General (DG) of the Science and Technology (S&T) committee. The list of recommended projects is finalized with the ADM approval. A B-list of projects is also established to use as needed if approved projects cannot go ahead.

Programs' expected results

In NRCan's Departmental Results Framework, the SGP and ERPP fall under the: (1) Electricity Resources Program and (2) Energy Innovation and Clean Technology Program; and within the Core Responsibility 2: Innovative and Sustainable Natural Resources Development. A single SGP and ERPP logic model (Figure 3) was developed by the evaluation team as part of the evaluation planning process, leveraging material from REED and OERD. The logic model was reviewed and approved by the Evaluation Working Group (EWG).² The logic model summarizes the inputs, activities, outputs, and outcomes developed at the outset of the SGP and ERPP.

Figure 3: Smart Grid Program (SGP) and Emerging Renewable Power Program (ERPP) Logic Model





▼ Table description

Figure three: The program logic model for the SGP and ERPP illustrates the connections from inputs to activities, outputs, and outcomes.

The inputs are: Funding, time, staff expertise, government mandates, leadership, stakeholder feedback, access to research, and information.

Both programs' activities are:

- Stakeholder engagement, including provincial and territorial governments, sector and industry associations, and potential project proponents.
- Call for, review, and approve potential projects related to smart grids and emerging renewable power.
- Monitor projects and collect and assess project data.
- Provide evidence-based decisions and policy advice to NRCan senior decision-makers.

Both programs' outputs are:

- Implementation of non-emitting energy and grid modernization projects.
- Analysis and reporting on collected project data.

SGP immediate outcomes (1 to 3 years) are:

- Increased development and deployment of smart grid capabilities in Canada.
- Increased investment by stakeholders in smart grid technology demonstration and deployment projects.
- Increased Canadian smart grid sector innovation.

ERPP immediate outcomes (1 to 3 years) are:

- Smaller (2-5 MW) emerging renewable power projects enabled by the program.
- Larger portfolio of renewable energy technologies ready for commercialization in Canada.
- Increased support by provinces for emerging renewable power deployment projects.

SGP intermediate outcomes (3 to 10 years) are:

- Demonstration projects move emerging technologies closer to commercial readiness.
- Increased number of commercially ready smart grid integrated systems from the demonstration program.
- Canadian smart grid sector growth and innovation.

ERPP intermediate outcomes (3 to 10 years are):

- Larger [5 Megawatts (MW+)] emerging renewable power projects enabled by program.
- Emerging renewable projects contributing to electricity grid.
- Increased employment in emerging renewables.
- Improved environmental performance through GHG reductions of Canadian electricity sector.
- Increased investment by stakeholders in emerging renewable projects.

SGP long-term outcomes (10+ years) are:

- Environmental benefits from smart grid development and deployment.
- Economic benefits from smart grid projects.

ERPP long-term outcomes (10+ years) are:

- Expanded portfolio of commercially viable renewable energy technologies available in Canada.
- Establishment of new industries and supply chains.

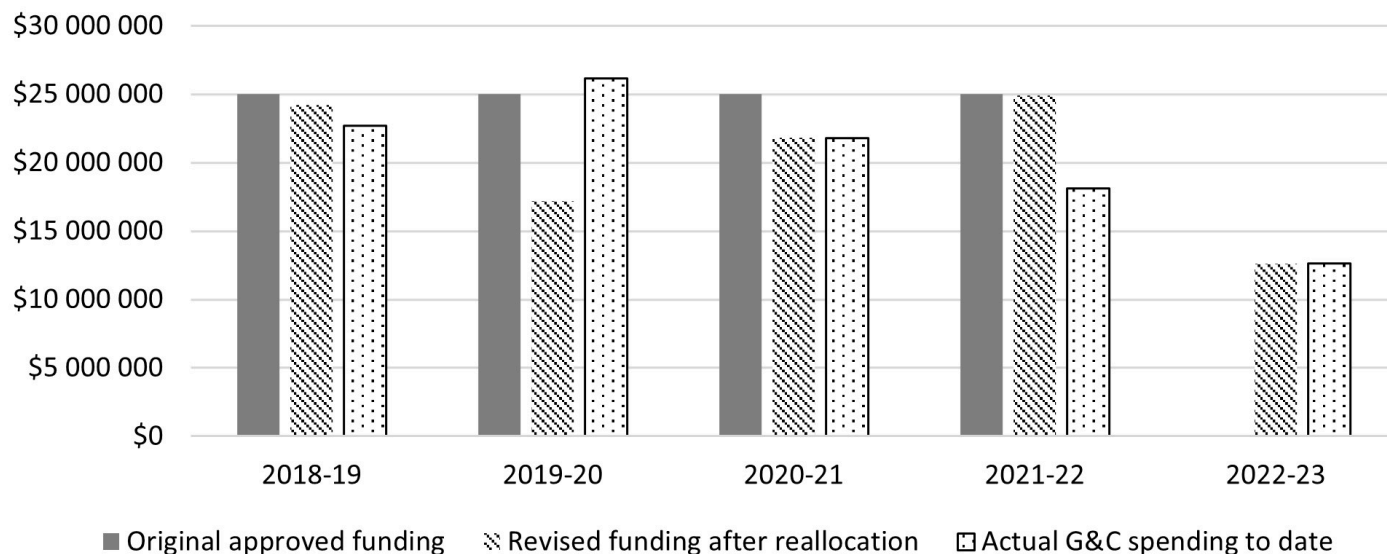
Both programs' ultimate outcomes are:

- Provide Canadians with access to safe, resilient, reliable, affordable, and non-emitting energy, leading to net-zero emissions in the electricity sector.

Program resources

The SGP was originally allocated \$100 million over four years. Due to delays related to the COVID-19 pandemic, the SGP was extended to five years (2018-19 to 2022-23). Its budget was also increased slightly, to \$101.38 M. Figure 4 shows the original and revised budgets for the SGP, as well as actual dollars spent up to fiscal year 2022-23. The amounts include all fundings (i.e., salaries, operations, and contributions). At program close in 2022-23, the SGP had spent its entire budget allocation.

Figure 4: NRCan funding for the Smart Grid Program (SGP), original, revised, and actual amounts, by fiscal year



▼ Text version

Figure four: A chart with vertical bars that provides (in Canadian dollars) the original approved funding, revised funding after reallocation, and actual G&C spending to date by fiscal year for the SGP.

| | Original approved funding |
|---------|---------------------------|
| 2018-19 | \$25.0 million |
| 2019-20 | \$25.0 million |
| 2020-21 | \$25.0 million |
| 2021-22 | \$25.0 million |
| 2022-23 | - |

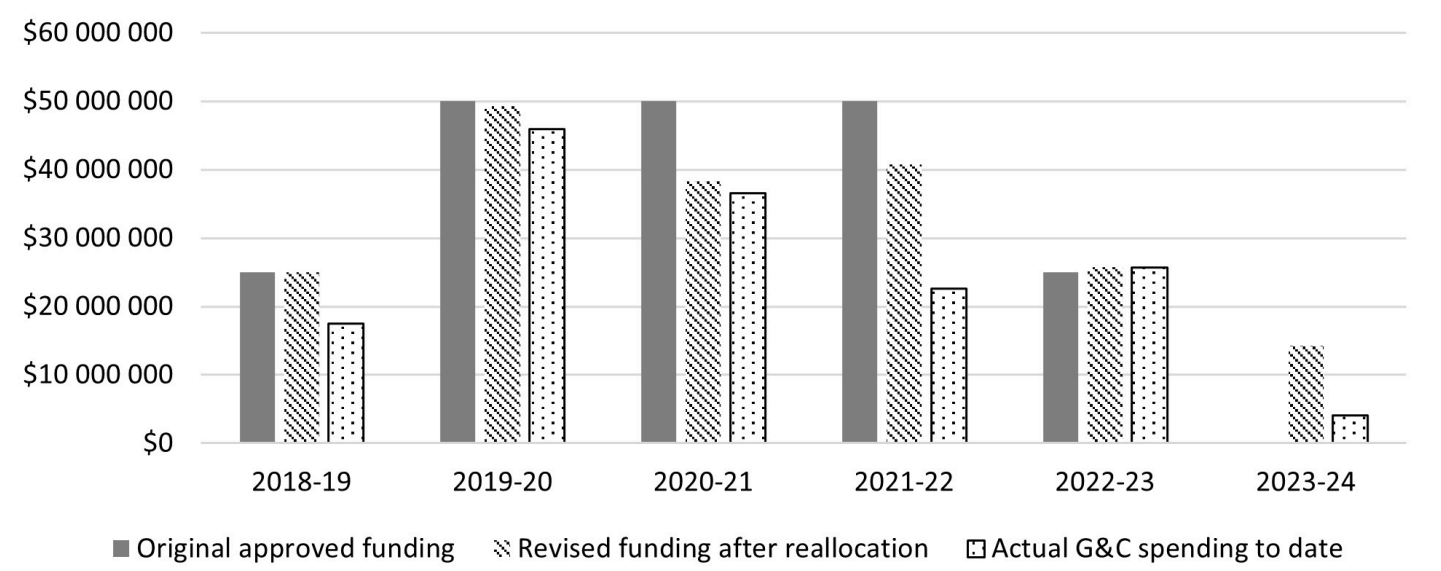
| | Revised funding after reallocation |
|---------|------------------------------------|
| 2018-19 | \$24.2 million |
| 2019-20 | \$17.2 million |
| 2020-21 | \$21.8 million |
| 2021-22 | \$24.9 million |
| 2022-23 | \$12.6 million |

| | Actual G&C spending to date |
|---------|-----------------------------|
| 2018-19 | \$22.7 million |
| 2019-20 | \$26.2 million |
| 2020-21 | \$21.8 million |
| 2021-22 | \$18.1 million |

| | |
|---------|----------------|
| 2022-23 | \$12.6 million |
|---------|----------------|

The ERPP was allocated \$200 million over five years. Due to COVID delays, it was also extended to eight years (2018-19 to 2025-26). Figures 5 shows the original and revised budgets for the ERPP, as well as actual dollars spent up to fiscal year 2023-24. The ERPP has almost \$48 million to spend in Grants and Contributions over the final two years of the program.

Figure 5: NRCan funding for the Emerging Renewable Power Program (ERPP), original, revised, and actual amounts, by fiscal year



| | |
|---|------------------------------------|
| ▼ Text version | |
| Figure five: A chart with vertical bars that provides (in Canadian dollars) the original approved funding, revised funding after reallocation, and actual G&C spending to date by fiscal year for the ERPP. | |
| | Original approved funding |
| 2018-19 | \$25.0 million |
| 2019-20 | \$50.0 million |
| 2020-21 | \$50.0 million |
| 2021-22 | \$50.0 million |
| 2022-23 | \$25.0 million |
| 2023-24 | - |
| | Revised funding after reallocation |
| 2018-19 | \$25.0 million |
| 2019-20 | \$49.2 million |
| 2020-21 | \$38.4 million |
| 2021-22 | \$40.7 million |

| | |
|----------------|----------------|
| 2022-23 | \$25.7 million |
| 2023-24 | \$14.2 million |

| | Actual G&C spending to date |
|----------------|--|
| 2018-19 | \$17.4 million |
| 2019-20 | \$46.0 million |
| 2020-21 | \$36.6 million |
| 2021-22 | \$22.6 million |
| 2022-23 | \$25.7 million |
| 2023-24 | \$4.0 million |

Table 2 shows the estimated human resources used to deliver the two programs.

Table 2: Full-Time Equivalents (FTEs) attributed to the Smart Grid Program (SGP) and Emerging Renewable Power Program (ERPP) (actuals)

| Program | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 |
|---------------------|----------------|----------------|----------------|----------------|----------------|
| SGP demonstration * | 1.23 | 2.07 | 2.28 | 1.67 | 2.07 |
| SGP deployment | 4.61 | 4.34 | 4.20 | 2.91 | 2.94 |
| ERPP | 4.96 | 7.03 | 5.89 | 2.91 | 2.00 |

| | |
|----------|---|
| * | FTE estimates for SGP demonstration do not capture FTEs from A-based salary that supported the program; therefore, the FTE estimates per fiscal year are lower than the actual figures. It was noted that actual estimates are between three and four FTEs per year, aligning more closely with SGP deployment. |
|----------|---|

Evaluation objectives, methods, and limitations





The evaluation examined the relevance and performance of the SGP and the ERPP from April 1, 2018, to March 31, 2023. The evaluation used four lines of evidence (see Figure 6) to answer the following evaluation questions:

- **Relevance:**
 - To what extent is there an ongoing and continued need for these two programs?
 - To what extent do the priorities of the two programs align with federal government priorities and NRCan strategic outcomes?
 - Is there a legitimate and appropriate role for the federal government to play in supporting smart grid and emerging renewable power?
- **Effectiveness (performance):**
 - How do the actual outputs and outcomes of the programs compared with targeted results?

- What internal and external factors impact (positively or negatively) the achievement of the intended outcomes?
- To what extent have there been unintended outcomes (positive or negative) resulting from the two programs?
- **Efficiency (performance):**
 - To what extent have the two programs been designed (e.g., governance, delivery approach) in an efficient and economic manner to produce the intended outputs and achieving the intended outcomes?
 - To what extent has each program been implemented as planned?
 - To what extent has the program design been well executed including responsiveness to changing circumstances (e.g., COVID-19)?
 - To what extent does each program collect performance information that supports the determination of effectiveness, efficiency, and economy?
 - To what extent does each program consider Gender-based Analysis Plus (GBA+) and Equity, Diversity and Inclusion (EDI) factors?
- **Lessons learned:**
 - Was the “one window” approach of the Smart Grid Program accepting deployment, demonstration, and hybrid proposals, and signing agreements with hybrid projects effective at addressing industry needs? What worked well, what did not?
 - How valuable are the Smart Grid Symposiums and other engagement products (e.g., project webpages, program website, brochure, etc.) in terms of achieving the set Canadian climate change and economic goals? What could be improved?
 - What are other key lessons learned?

The approach and methodology used for the evaluation followed the TB *Policy on Results* (2016) and related *Standards on Evaluation*. It was also presented, reviewed, and endorsed by the EWG.

Figure 6: Lines of Evidence

|  Document Review |  Literature Review |  Key Informant (KI) Interviews |  Case Studies |
|--|--|--|---|
| <p>Over 200 internal documents (e.g., planning documents, program descriptions, regulatory frameworks, financial information on all 30 projects and 9 studies) and 34 external documents (e.g., websites containing strategic plans, budgets, collaboration agreements) were examined.</p> | <p>Academic literature, publications from governmental, international, and non-governmental organizations, grey literature, and media coverage were reviewed. Additionally, a comparative review that examined similar smart grid and renewable energy programming in other jurisdictions was undertaken. Seven programs were reviewed (see Appendix A).</p> | <p>A total of 28 KI interviews with 37 individuals were conducted via video conferencing: eight NRCan program delivery personnel, 22 funding recipients, two unsuccessful proponents, and five other stakeholders (e.g., academic institutions, provincial government, non-profit organization, and think tank representatives). Interview guides were tailored to the KI category interviewed to capture a range of perspectives by program and project type.</p> | <p>Six case studies (see Appendix B) were selected in consultation with senior program representatives and with the aim of establishing a diverse sample. Specific criteria included program, type of project, completion status, geographical region, completed or advance projects. For the case studies, key documents were reviewed (e.g., project descriptions, contribution agreements, progress and final reporting) and 12 additional KIs were interviewed (i.e., nine funding recipients, two program delivery personnel, one external stakeholder).</p> |

Evaluation limitations

Although the evaluation was designed to collect data using multiple lines of evidence to enhance the reliability of results and validity of findings, the following limitations should be considered when reviewing the evaluation findings.

- Although available documents provided varying degrees of information that could be used to inform the evaluation, internal documents and documents provided by funding recipients had some **gaps in actual outcomes and results**. The evaluation team also observed that **some outcome information is not captured in a consistent manner** across projects. In particular, the evaluation team could not determine the progress of both programs towards the number of job years created due to inconsistent reporting and the discontinuing of annual reporting during the life of the projects for the ERPP and SGP deployment component. Therefore, the evaluation team could not “roll up” the information to report on the overall success of the projects in achieving the intended outcomes. This limitation was mitigated to the extent possible using other lines of evidence.
- The **time available to assess the long-term outcomes of the SGP and ERPP was limited** since contribution agreements were signed in 2018 or later. Therefore, the evaluation team ensured that the evaluation was properly focused on the programs’ achievement of the intended outputs, short-term outcomes, and medium-term outcomes.
- There was a **challenge in securing interviews with unsuccessful proponents, academic institution representatives, provincial government representatives, and other stakeholders** (e.g., non-profit organization and think tank representatives). Although the timeline for the interview period was extended,

fewer than the originally desired number of interviews with these groups (n = 18) was completed (n = 7). This impacted the interpretation of some of the evaluation findings.

Relevance

Programs like the Smart Grid Program (SGP) and Emerging Renewable Power Program (ERPP) ERPP continue to be relevant, emphasizing the ongoing need for public investments in smart grids and emerging renewable energy projects

There is a continued need for public investments in demonstration and deployment of smart grids and deployment of emerging renewable energy projects. There is widespread agreement in the literature that transitioning to low-carbon energy is essential for meeting both global and national-level climate commitments, with investments in smart grids and renewable energy sources playing a key role in this transition. Furthermore, smart grid opportunities establish a business case for smart grid investments by demonstrating a high rate of return. While investments in renewable power are increasing around the world, the literature emphasizes the need for ongoing and increased investment in both well established and emerging renewable electricity sources. The importance of smart grids for managing the challenges associated with a higher reliance on variable and intermittent renewable energy sources is also widely recognized.

The SGP's innovative approach in engaging electricity utilities as key adopters makes the SGP unique among programs geared towards power grid modernization in Canada. NRCan program delivery personnel highlighted that the SGP targets utilities and provides them the ability to innovate and experiment. This opportunity is not otherwise possible since utilities are almost entirely funded through the customer rate base and are economically regulated toward least-cost solutions which biases against innovation and grid modernization. NRCan program delivery personnel noted that as a result, increases in customer rates to finance innovation projects or projects targeting GHG outcomes are rarely approved by regulators, unless they also happen to be the least-cost solutions for ensuring safety and reliability. Therefore, the SGP is providing an opportunity to utilities to modernize electricity distribution and transmission to make grids more flexible and allow renewable energy to be connected to the grid that would otherwise not be prioritized or financed. One of the benefits for the utilities is the expected long-term cost reduction due to smart grids.

NRCan program delivery personnel also agreed that the ERPP served a unique purpose of funding emerging renewable energy technologies (e.g., geothermal, offshore wind, tidal) not yet proven in Canada that needed upfront capital funding. They further noted that the upfront capital funding de-risks these projects and makes them more viable for organizations to undertake. Previous NRCan renewable energy programs (e.g., ecoENERGY for Renewable Power) did not provide upfront funding, and therefore, did not focus on funding emerging renewable projects. This is not to imply that previous NRCan renewable energy programs were unsuccessful; they were just not designed to support emerging renewable projects.

Both the SGP and ERPP will not be renewed in their current form. However, the demonstration component of the SGP was renewed in Budget 2023 and rolled into the Energy Innovation Program, following the period of this review. The Smart Renewables and Electrification Pathways Program (SREPs), now in place, extended and replaced aspects of the deployment component of the SGP and ERPP.



The SREPs is a GI program that provides up to \$1.56 billion over eight years for projects centred on smart renewable energy and electrical grid modernization projects. The program aims to reduce GHG emissions by encouraging the

replacement of fossil fuel-generated electricity with renewables that can provide essential grid services while supporting Canada's equitable transition to an electrified economy.

Despite the SGP and ERPP's conclusion in their original program forms, the federal government's role in funding similar initiatives remains pertinent. The literature states that the GC plays a key role in supporting energy system transformation overall, as well as development and deployment of specific renewable and smart grid technologies. These technologies often require substantial upfront investments and long-term planning. Additionally, smart grid development and renewable energy deployment entail addressing complex regulatory, technical, and market challenges that necessitate government intervention and coordination. The GC involvement ensures that energy transition efforts prioritize environmental sustainability, energy security, and equitable access to clean energy resources, aligning with broader public interests and key commitments outlined in Canada's evolving climate plans since 2015, including:

- The PCF, Canada's first national climate plan developed in 2016;
- Canada's strengthened climate plan, A Healthy Environment and a Healthy Economy, developed in 2020;
- The provincial and territorial governments' CES established in 2015; and
- The 2022-2026 Federal Sustainable Development Strategy, which includes the goal of increasing Canadians' access to clean energy.

Several non-governmental organizations, including Climate Institute Canada, the Canadian Electricity Association, the Pembina Institute, and the Institute for Sustainable Development, are calling on the Canadian government to increase direct funding of renewable energy infrastructure and smart grid innovation. Other countries (e.g., the United States [the US], Australia) have similarly recognized the role of the federal government in supporting and enabling grid modernization and energy system transformation.

NRCan program delivery personnel, funding recipients, and other stakeholders noted the importance of the continued role for the GC in supporting smart grid and emerging renewable power projects. For instance, it was indicated that if the GC continues to have clean energy and zero emissions goals, the GC should be providing support for these technologies and infrastructure for the country to meet those goals. Most funding recipients from both programs agreed that the NRCan funding was necessary for their projects to proceed. Finally, the NRCan program delivery personnel highlighted the strong uptake of NRCan's more recently introduced SREPs as an indication of the continued need for smart grid and emerging renewable energy programming.

Other available programs complement the Smart Grid Program (SGP) and Emerging Renewable Power Program (ERPP)

With multiple sources calling for increased investment in renewable energy and smart grid capabilities and identifying a role for the GC in making these investments, literature indicates that duplication does not appear to be an identified concern or issue. The literature provided more of an indication of the potential for complementarity rather than duplication, considering the substantial size of overall investment estimated to be needed for the transition to a low-carbon energy system and the extent to which the SGP and ERPP currently work with other federal and provincial and territorial partners (e.g., by directly supporting provincial and territorial government initiatives). Even with its substantive investment, the SGP was only intended to benefit a relatively small number of stakeholders within the utilities sector. For example, it was noted that although the SGP received 86 proposals (of which 74 were deemed eligible) showing high interest in the program, the 22 funded SGP projects

touched only a minimal number of the hundreds of utilities across Canada. To that end, interviewees noted a number of other federal and provincial programs that provide this complementary, additional, and needed funding support for SGP and ERPP projects, as well as funding programs that fund renewable energy projects that differ from those funded by the SGP and ERPP (e.g., projects at different stages of deployment). The programs highlighted were mainly federal government and provincial government programs (see [Appendix C](#) for the list of complementary programs reported by interviewees). Funding recipients have been able to pool funding from the SGP and ERPP and other sources together to support projects.

The programs align with federal government priorities and NRCan strategic outcomes related to clean energy and climate change, but less so with those related to advancing reconciliation and Equity, Diversity and Inclusion (EDI) goals

The SGP and ERPP harmonize with other initiatives in the larger Canadian ecosystem that intend to enhance smart grids and energy from renewable sources in Canada. The federal government has continued to make the transition to a clean growth economy and clean energy systems in Canada a priority. Furthermore, the synergy between renewable energy and smart grids enhances energy infrastructure resilience, a critical component for climate change adaptation. Renewable energy sources decrease GHG emissions while smart grids improve grid reliability and adaptability, effectively mitigating climate change impacts (e.g., extreme weather events). The SGP and ERPP, along with other similar programs and initiatives, are needed to support smart grids and renewable energy in Canada's large and geographically diverse landscape.

As indicated in Figure 7, NRCan program delivery personnel and other stakeholders agreed that the SGP and ERPP are aligned with current federal government priorities and NRCan strategic outcomes related to clean energy and climate change. However, NRCan program delivery personnel held mixed views regarding the SGP and ERPP's alignment with current federal government priorities and NRCan strategic outcomes related to advancing reconciliation with Indigenous Peoples and meeting EDI goals. They noted that the programs did not prioritize EDI goals upon their inception, primarily because EDI was not a clearly defined policy at that time with no standard on how to implement it. While examples of Indigenous involvement in certain projects were provided (e.g., the Tu Deh-Kah Geothermal project is Indigenous owned), it was noted that Indigenous reconciliation and EDI are an area that needs improvement for future programs. Interviewees highlighted that SREPs is better focused on these priorities. The Energy Innovation Program (into which the Smart Grid Program Demonstration Renewal was integrated) has also increased and enhanced EDI criteria into its program calls.

Figure 7: Alignment with federal government priorities and NRCan strategic outcomes

The programs align with federal government priorities of:

- Increasing Canadians' access to clean energy
- Taking action on climate change and its impacts

The programs align less with federal government priorities of:

- Advancing reconciliation with Indigenous Peoples and taking action to reduce inequality

The programs align with NRCan strategic priorities of:

- Accelerate development and adoption of clean technology to build a more resilient economy and transition to net-zero by 2050
- Create and maintain market access while improving competitiveness for Canada’s resource sectors
- Protect Canadians from the impacts of natural and human-induced hazards while supporting and advancing climate change adaptation

The programs align less with NRCan strategic priorities of:

- Advance reconciliation, strengthen relationships, increase engagement, and share economic benefits with Indigenous Peoples
- Promote, build, and foster equity, diversity and inclusion while supporting resource communities to thrive in a net-zero carbon economy

Effectiveness

Both programs have met all their immediate outcomes and some of their intermediate outcomes

Table 3 provides evidence that the SGP has met all its immediate outcomes. The first three outcomes were developed at the outset of the SGP, including the targets that were subsequently adjusted through amendments due to COVID-19- and regulatory decision-related delays. The last three immediate outcomes were expected outcomes of the SGP projects as stated in their Applicant Guide. No targets were set for these goals.

Table 3: Smart Grid Program (SGP) Achievement of Immediate Outcomes

| Outcome | Indicator | Target | Status |
|---------|-----------|--------|--------|
|---------|-----------|--------|--------|

| Outcome | Indicator | Target | Status |
|---|---|---|---|
| ✓ Increased development and deployment of smart grid capabilities in Canada | Number of new or emerging smart grid integrated systems demonstrated or deployed | Two new or emerging smart grid integrated systems demonstrated or deployed by Q4 2022/23 | Achieved <ul style="list-style-type: none"> 22 projects were demonstrated and/or deployed. |
| ✓ Increased investment by stakeholders in smart grid technology demonstration and deployment projects | Ratio of investments made by stakeholders (e.g., provinces and industry), as compared to investments made by NRCan, in selected projects | Demonstration – Project funding leveraged at an average of at least 1:1 Deployment – Project funding leveraged at an average of at least 1:3 | Achieved <ul style="list-style-type: none"> The ratio of investments made by NRCan to provinces/municipalities/other on average was 1:1.4 for demonstration projects, 1:3.1 for deployment projects, and 1:1.8 for hybrid projects. These ratios were calculated based on original commitments made in the contribution agreements. |
| ✓ Increased Canadian smart grid sector innovation | Number of utilities leading projects as a measure of the electricity sector's capacity to implement innovative solutions with smart grid systems | 10 utilities supported through projects by Q4 2022/23 | Achieved <ul style="list-style-type: none"> 21 of the 22 funded SGP projects were led by utilities, and the other was led by a municipality with a utility managing the project. |
| | Number of new business models tested | Two new business models tested by Q4 2022/23 | Achieved <ul style="list-style-type: none"> At least two SGP projects tested new business models. |
| ✓ Increase electricity system reliability and resiliency, with maintained or enhanced cyber security | Achieved <ul style="list-style-type: none"> The SGP funded self-healing grids that respond to adverse effects, such as weather effects, thus improving the reliability and resiliency of the grids. All projects resulted in increased electricity reliability and resiliency. Evidence regarding the projects addressing cyber security was limited, and NRCan program delivery personnel noted this was not a focus of the program. | | |
| ✓ Increase electricity system flexibility and increase renewable energy penetration | Achieved <ul style="list-style-type: none"> Examples of how projects increased electricity system flexibility and renewable energy penetration included allowing customers to produce power and connect to Distributed Energy Resources (DERs) through a project; the installation of solar panels and connecting them to a grid; and making more efficient use of existing facilities, including hydro, which reduces reliance on diesel generators. | | |

| Outcome | Indicator | Target | Status |
|--|---|--------|--------|
| ✓ Increase electricity system efficiency and use of existing electricity assets | Achieved <ul style="list-style-type: none"> Examples of projects that resulted in increased electricity system efficiency and use of existing electricity assets, such as one project which enabled the ability to increase voltage when needed by the utilities, and using DERs allows utilities to use existing infrastructure versus building new wires. | | |

Table 4 shows that two intermediate outcomes related to the smaller demonstration component of the program have been achieved. Overall, at the time of writing, the broader intermediate outcome for both deployment and demonstration has not yet been achieved.

Table 4: Smart Grid Program (SGP) achievement of intermediate outcomes

| Outcome | Indicator | Target | Status |
|--|---|--|--|
| ✓ Demonstration projects move emerging technologies closer to commercial readiness | Levels advanced based on Technology Readiness Level (TRL) scale | Average TRL advanced by one level by Q4 2022/23 | Achieved <ul style="list-style-type: none"> Average TRL advanced by one level, per the SGP metric reporting summary and update of March 2020. |
| ✓ Increased number of commercially ready smart grid integrated systems from the demonstration program | Progress towards number of replications per technologies used in demonstration projects | At least one replication per technology demonstrated by 2026 | Achieved <ul style="list-style-type: none"> By March 2020, the replication factor reported in the SGP metric reporting summary and update was one. |

| Outcome | Indicator | Target | Status |
|---|---|--|---|
| × Canadian smart grid sector growth and innovation | Progress towards number of job years of employment generated by projects | 4,500 direct and indirect job years of employment during the outcome period [from 2018/19 to 2028/29] from deployment projects and 700 direct and indirect job years of employment during the outcome period from demonstration projects | In progress, but this target will not be achieved based on the data currently available. <ul style="list-style-type: none"> Interviewees also indicated that this target likely will not be achieved. |
| | Number of new business cases established for regulatory approval | Two new business cases established for regulatory approval of future projects by Q4 2022/23 | Not achieved <ul style="list-style-type: none"> No evidence of business cases established. |
| | Progress towards two new protocols, policies, codes, or standards developed with data from projects by 2028 | Two new protocols, policies, codes, or standards developed with data from projects by 2028 | Achieved <ul style="list-style-type: none"> By March 2020, two projects had targeted two new/modified internal standards. One of these projects also targeted a new policy, and the other project targeted two new codes. |

KI interviews and the case studies provided additional information for most of the intermediate outcomes:

- Funding recipients provided examples of how the technologies developed and used in their projects could be **replicated and scaled up**, but this has not happened yet in most cases. Some funding recipients are also sharing the knowledge of their projects with other interested entities; other funding recipients noted barriers to scaling up, such as regulatory barriers.
- Direct evidence of the **number of job years** of employment generated by projects to date was limited and reported inconsistently, so a total for all projects cannot be established. Furthermore, while funding recipients were required to report on the number of job years created in their annual reports, annual reports were stopped for deployment projects after the fiscal year 2020-21 based on a recommendation made in the interest of reducing the reporting burden for funding recipients. It was noted by NRCan program delivery personnel that job information collected during the projects through the annual reports were only estimates, and that actuals are collected in their final reports at the end of projects. NRCan program delivery personnel also noted that their initial estimates were too high, and a more realistic target should have been set.
- According to NRCan program delivery personnel and funding recipients, many projects have demonstrated **new business models**, tested them successfully, **and developed business cases for regulatory approval**, but no evidence on the specific number of business cases established for regulatory approval was available. However, an example of a project testing a new business model and establishing a case for regulatory approval was the GridExchange project that tested a new compensation model for customers by providing reward tokens based on the value they provided to the energy grid. The reward tokens could then be redeemed at local

businesses in exchange for goods and services. Getting regulatory approval continues to be a barrier to scaling-up projects.

- NRCan program delivery personnel and funding recipients highlighted that funding recipients have developed new knowledge from their projects and are more than willing to share that knowledge and the results from their projects with others directly and through industry events. In addition, each SGP case study project resulted in new knowledge being generated that informed the **development of policies and protocols**. For example, the Slemon Park project is the only example in PEI of renewable electricity generation being connected to a distribution circuit at a substation level. As such, PEI Energy Corporation is in the process of developing related operating protocols, codes, and standards.

Table 5 shows that the ERPP has achieved all immediate outcomes developed at the outset of the program.

Table 5: Emerging Renewable Power Program (ERPP) achievement of immediate outcomes

| Outcome | Indicator | Target | Status |
|--|--|--|--|
| ✓ Smaller (2-5 MW) emerging renewable power projects enabled by the program | Number of contribution agreements signed | Two contribution agreements signed by the end of 2019-20 | Achieved <ul style="list-style-type: none"> • Three ERPP projects started between May 2019 and April 2020. |
| | Number of Regional Environmental Assessments (REAs) and Regional Energy Resource Assessments (RERAs) completed | Two REAs and/or RERAs completed and released to the public by the end of 2019-20 | Achieved <ul style="list-style-type: none"> • Two out of nine ERPP studies were completed by the end of 2019-20. |
| ✓ Larger portfolio of renewable energy technologies ready for commercialization in Canada | Number of different new emerging technologies with commercial-scale projects under development | Projects using at least two different technologies (one technology per project) are supported by the program by the end of 2019-20 | Achieved <ul style="list-style-type: none"> • By the end of 2019-20, the ERPP supported three projects using at least two different technologies. |
| ✓ Increased support by provinces for emerging renewable power deployment projects | Number of provincial support mechanisms put into place to complement the ERPP | Two provincially led support mechanisms (e.g., regulatory frameworks, power purchase agreements) enacted by the end of 2019-20 | Achieved <ul style="list-style-type: none"> • Two provincial support mechanisms (i.e., Power Purchase Agreement in Nova Scotia and regulatory changes in Alberta) were put in place in 2020. |

Table 6 indicates two out of five ERPP intermediate outcomes have been achieved to date. It is important to note that the set date for these targets is in the future (i.e., 2025-26). The intermediate outcomes were developed at the outset of the ERPP, including the targets that were adjusted through amendments due to COVID-19- and regulatory decision-related delays.

Table 6: Emerging Renewable Power Program (ERPP) achievement of intermediate outcomes

| Outcome | Indicator | Target | Status |
|--|--|--|---|
| ✓ Larger (5 MW+) emerging renewable power projects enabled by the program | Number of contribution agreements signed | Four contribution agreements signed by the end of 2021-22 | Achieved <ul style="list-style-type: none"> All six ERPP deployment projects had contribution agreements signed before March 31, 2021, and were expected to have 5 MW of energy generation capacity or more. |
| → Emerging renewable projects contributing to electricity grid | Progress towards number of projects commissioned | Four projects by the end of 2025-26 | In progress but a lot of uncertainty regarding the likelihood of meeting this target. <ul style="list-style-type: none"> As of the end of 2022-23, one ERPP deployment project has been commissioned (Suffield Solar). The five other ERPP-funded deployment projects have the potential of being commissioned by 2025-26. However, two projects continue to face many provincial and federal regulatory barriers. |
| | Progress towards increased renewable capacity from emerging renewable power projects | 150 megawatts (MW) of new electricity capacity supported by the end of 2025-26 | In progress, but will not be achieved based on existing data. <ul style="list-style-type: none"> It is expected that if all six ERPP projects meet their maximum targets, 71 MW of new electricity capacity will be supported by March 2026. |
| | Progress towards increased electricity generation from emerging renewable projects | No target | Uncertain <ul style="list-style-type: none"> With no target, it is not possible to determine if this outcome will be met. Noted that the outcome is tied to projects being commissioned and installed renewable capacity; at the time of this report, only one project had been commissioned. |
| → Improved environmental performance through GHG reductions of Canadian electricity sector | Progress towards GHG emissions reductions attributable to emerging renewable power sources | One megatonne (MT) of direct GHG reductions annually by the end of 2026 | In progress, but will not be achieved based on existing data. <ul style="list-style-type: none"> The expected reduction from all ERPP projects is 0.2 MT of CO₂ emissions per year. |

| Outcome | Indicator | Target | Status |
|---|--|---|--|
| → Increased employment in emerging renewables | Progress towards number of direct employment years associated with projects | A total of 12,000 direct job years by the end of 2025-26 | In progress, but will not be achieved based on existing data. <ul style="list-style-type: none"> Interviewees indicated that this target likely will not be achieved. |
| ✓ Increased investment by stakeholders in emerging renewable projects | Progress towards ratio of investments made by stakeholders (e.g., provinces and industry), as compared to investments made by NRCan in selected projects | 1:1 to 1:3 (\$193 M from NRCan : \$193 M to \$579 M from other stakeholders), total from 2018-19 to 2025-26 | Achieved <ul style="list-style-type: none"> For the six ERPP deployment projects, the ratio of investments made by NRCan to provinces/municipalities/others was 1:1.9 (ranges from 1:1.0 to 1:3.0 per project). For the nine ERPP studies, the ratio of investments made by NRCan to provinces/municipalities/others was 1:0.4 (ranges from 1:0.1 to 1:1.2 per study). These ratios were calculated based on original commitments made in the contribution agreements. |

KI interviews and the case studies provided additional information for most of the intermediate outcomes:

- The Deep Earth Energy Production (DEEP) geothermal project in Saskatchewan is expected to be the next **project to be commissioned** (after Suffield Solar), with two other geothermal and two tidal projects ongoing. It is projected that these projects will be commissioned by March 2026. However, some projects are facing many provincial and federal regulatory barriers. NRCan program delivery personnel noted that discovering barriers and reducing and overcoming those barriers has been a common theme and has resulted in delays.
- The expected **renewable capacity generated** from the six ERPP projects is 71 MW, of which Suffield Solar is the biggest contributor at 23 MW (the only project commissioned thus far). The 71 MW will be below the estimated target of 150 MW to be generated for this outcome. The 150 MW target was established because the program was expected to fund another project that would result in 100 MW of renewable energy generation. However, barriers and a lack of interest from the provinces prevented the project from materializing.
- All deployment projects are expected to result in **GHG emissions reductions** by offsetting the use of fossil fuel energy with renewable energy. The expected reduction from all ERPP projects is 0.2 MT of CO₂ emissions per year versus the target of 1.0 MT of CO₂ emissions per year set at the start of the program.
- Direct evidence of the **number of job years** of employment created by ERPP projects to date was limited and reported inconsistently. Similar to SGP deployment, ERPP job data collected was inconsistent among projects and could not be rolled up, and annual reports stopped being required for ERPP projects after the fiscal year 2020-21. It was noted by NRCan program delivery personnel that job information collected during the projects through the annual reports were only estimates, and that actuals are collected in their final reports at the end of projects. The program has recently recognized this challenge, and started to modify its process, to improve collection of job data.

Both Smart Grid Program (SGP) and Emerging Renewable Power Program (ERPP) appear to be on track to partially achieve their long-term outcomes

Both programs have some intermediate outcomes that have not been achieved to date and are facing barriers that may limit their ability to fully achieve their long-term outcomes and related targets. For the SGP, regulatory barriers are the main challenge the program is facing in achieving its long-term outcomes of **“Environmental benefits from smart grid development and deployment”** and **“Economic benefits from smart grid projects.”** NRCAN program delivery personnel and funding recipients expected the SGP projects to yield economic benefits in the form of cost-saving opportunities for customers. The modernized grids provide more reliable services for residential and industrial customers, reducing both the frequency and duration of disruptions. This leads to lower rates and other opportunities for additional savings from DERs, solar panel installations, smart hot water heater installations, and so forth. Other expected socio-economic benefits include increased tourism in communities with these technologies; improved connections between utilities and communities (fostering spinoff opportunities such as downtown revitalization); and workforce development through staff and student training via the projects. However, the regulatory barriers will limit or delay additional and expanded smart grid projects. The SGP has not fully achieved its intermediate outcome of **“Canadian smart grid sector growth and innovation”** as the program has experienced challenges with establishing new business cases for regulatory approval. Furthermore, it remains unclear to what extent the program has generated employment. However, there are a number of SGP projects that have been successful and will likely contribute to the long-term outcomes.

The barriers faced by some projects suggests that the program is not going to meet a number of its intermediate outcomes (e.g., **“Emerging Renewable projects contributing to electricity grid”** and **“Improved environmental performance through GHG reductions of Canadian electricity sector”**) and related targets. This will limit the ERPP’s achievement of its long-term outcomes of **“Expanded portfolio of commercially viable renewable energy technologies available in Canada”** and **“Establishment of new industries and supply chains”** and related targets.

Furthermore, it remains unclear to what extent the program has generated employment. Regardless, according to NRCAN delivery personnel and funding recipients, the ERPP projects are expected to bring socio-economic benefits to the communities in which they are built, including enhanced electricity generation security and plant construction; facilitated worker repurposing (e.g., transitioning oil and gas workers to the geothermal industry); utilization of existing equipment (e.g., repurposing fishing boats for deploying instrumentation buoys in tidal projects); future spinoff projects for the funded organizations; lithium extraction from geothermal projects; brine salt for road maintenance; and expansion of the local service industry (e.g., through increased patronage of local restaurants and hotels by project staff and their families). Additionally, the ERPP studies are expected to yield direct and indirect long-term socio-economic benefits through knowledge dissemination, such as findings to benefit other groups (e.g., providing fishers with the fish atlas developed from the tidal study); creation of new toolkits for policy-makers; and development of new inventories of expertise and dialogue in specific areas and communities. While long-term outcomes remain positive for certain projects, others are encountering challenges.

Due to the aforementioned limitations and various external factors, both programs may not meet their targets in contributing to the ultimate outcome of **“Provide Canadians with access to safe, resilient, reliable, affordable, and non-emitting energy, leading to net-zero emissions in the electricity sector”**. However, it is important to note that the SGP and ERPP are just two of many programs and initiatives contributing to the ultimate outcome.

A number of positive unintended outcomes were identified

Positive unintended outcomes of the programs were mainly technological or project-specific. For both programs, some projects were able to go beyond initial expectations and result in the positive unintended outcomes depicted in Figure 8.

Figure 8: Positive unintended outcomes from case study projects

SGP

- Awards and recognition
- International investment
- Higher than expected customer engagement/interest
- Applying the learnings from the projects to other areas of the organization

ERPP

- Additional research opportunities
- Supporting EDI and EDI hiring practices

The high level of program flexibility, professionalism of NRCan program staff, and dissemination of program information and results are key to success

The **high level of flexibility in the program design and NRCan program staff** in adapting to changing circumstances are key positive factors. NRCan program delivery personnel and funding recipients complimented the ability of the SGP and ERPP to be flexible (within allowable parameters) regarding payments and project timelines in the face of changing circumstances. These features allow the redirection of funding and/or non-repayable contributions. For example, program documentation showed that the ERPP allows both non-repayable contribution agreements for ongoing projects, which were originally subject to repayable agreements within the first five years of operation and front-end loading of allocated funds for projects that face technical or regulatory risks. The SGP offers flexible funding for some types of eligible expenditures (e.g., overhead expenditures and travel expenditures). Other miscellaneous expenditures, such as printing services and laboratory and field supplies, may be eligible for flexibility measures where funding may be redirected in response to changing or unanticipated circumstances surrounding the project. Further, the programs are able to accommodate additional flexibility measures requested by Indigenous proponents. Funding recipients also highlighted the professionalism of the staff at NRCan in working with them to ensure project success by being flexible and heavily involved in the projects when needed. Similar future programming could benefit from implementation of these program features.

The evaluation found the **widespread sharing of program information and results** to intended audiences and the broader public is a factor that has positively influenced the programs.

- Funding recipients highlighted numerous benefits of NRCan's Smart Grid Symposium (see text box), including sharing and giving their projects visibility, gaining insight into broader developments across Canada, and understanding the different challenges and barriers projects are facing. The funding recipients were keen on the Smart Grid Symposium continuing for the continuous sharing of knowledge and ideas. Funding recipients suggested inviting regulators to the annual Smart Grid Symposium to allow participants to engage regulators and help them learn about the projects, expected outcomes, and what they need to be able to scale up. Funding

recipients emphasized that engaging regulators earlier would shorten lead times for the project and facilitate regulatory change to enable project scaling up.



The Smart Grid Symposium held in October 2019 was the culmination of a series of stakeholder engagement activities whose main objective was to shape the new SGP that was announced in Budget 2017. The symposium displayed projects that had been selected to be part of the SGP, promoted knowledge sharing across the electricity industry, and ultimately contributed to NRCan's capacity to design and manage its future programs. The 117 attendees were primarily stakeholders from utility companies. The Smart Grid Symposium has been held annually starting in 2020, the symposiums were held virtually until the most recent in April 2024.

- Interested stakeholders and others can access updated information on the SGP webpage, including information on background and rationale for smart grids and a list of currently funded projects with accompanying links to project websites. The program brochure can also be accessed from the SGP webpage, as well as more detailed documents and reports such as the most recent (2020-21) Smart Grid in Canada report.
- Stakeholders with an interest in emerging renewable power can access the ERPP webpage, which provides a description and rationale for the program, regularly updated project announcements, and a detailed frequently asked question page for funding applicants. Other communications, including emerging renewable power issue updates and industry perspectives reports and presentations (such as a November 2021 Geothermal overview presentation which included industry perspectives), have contributed to knowledge sharing among stakeholders and potential program funding applicants. In addition to these engagement products, NRCan program delivery personnel and funding recipients referred to the public announcements for projects funded by the ERPP, highlighting the DEEP project in Saskatchewan where the Prime Minister made the announcement.
- Other communications, such as industry perspectives reports, have also contributed to raising stakeholder awareness of both programs and current issues in smart grid technology in Canada or abroad.

NRCan program delivery personnel noted wanting to do more for sharing and showcasing project results across funding recipients, within government, to other interested stakeholders, and with the public through case studies and other things of that nature. However, they also noted the need for additional support to be able to undertake such activities. The importance of widespread sharing of program information and results was also supported by the review of programs from other jurisdictions (e.g., US Department of Energy's Smart Grid Grants (SGG), Grid Modernization Initiative). In particular, the widespread public sharing of program information is expected to reduce investment uncertainty for decision-makers and guide future investments in grid modernization.

Interviews and internal NRCan documentation also provided additional factors that have positively influenced both programs:

- **Program funding** – Funding recipients from both programs highlighted the importance of the SGP and ERPP funding to de-risk their projects and ultimately allowed them to proceed.
- **Partnerships/engagement from stakeholders and communities in projects** – NRCan program delivery personnel and funding recipients from both programs highlighted the importance of buy-in and engagement of stakeholders from various levels for the success of individual projects and the programs. This included buy-in from senior management within NRCan and the GC to support renewable energy projects (including attending

announcements), senior management and leadership within the funded organizations, and project partners (e.g., other federal departments, and provincial governments) helping support the project and engage with relevant stakeholders. However, this was also noted as a challenge by some funding recipients as getting everyone “on board” for some of the projects resulted in project delays.

- **Policy landscape in Canada and increased public interest and investments in smart grids and renewable energy** – Given the GC and the world’s increased commitments and interest in addressing climate change, an NRCan program delivery personnel and funding recipients indicated there is increased interest and uptake of similar programs. A stakeholder also noted the increased public interest in these programs due to energy insecurity related to world events, such as global price fluctuations.

The environmental scan completed as part of the literature review also identified factors that positively impact programs with similar design. Mainly, the final report for the US Department of Energy’s SGG identified program elements contributing to success that apply to the SGP (and less directly, the ERPP):

- The program’s **50% cost-share requirement** led to successful leveraging of investment from private or local sources to supplement or add to the investment of public funds.
- The program’s **focus on new technologies** (i.e., supporting utilities in implementing them) was credited with helping to mature the smart grid vendor marketplace, with positive impacts on job creation.

Regulatory-, technological-, and COVID-19-related issues experienced by projects have negatively influenced both program implementation and outcome achievement

Regulatory barriers have been identified as a key negative factor that influenced both programs. Federal and provincial regulations pose significant constraints on the progression of projects, even extending to post-completion stages, especially for SGP projects. For example, the GridExchange project was described as being “stuck” after the pilot stage and unable to secure funding to scale-up and achieve regulatory support. Likewise, the need to obtain regulatory approvals given potential risks to the environment are limiting the progress of some projects supported by the ERPP. Profits on some ERPP projects can be further delayed due to regulatory risks, leading to financial difficulties for funding recipients. While some KIs highlighted the involvement of the provincial government in projects as a positive, it was noted that some provincial goals and priorities do not align with federal goals and priorities. This resulted in organizations facing challenges in scaling up projects following receipt of federal funding, as well as project delays or cancellation. Conflicting federal and provincial priorities can create tensions that undermine the objectives of the programs, potentially diminishing their impact on Canada's progress towards its climate targets.

NRCan program delivery personnel, funding recipients, and other stakeholders suggested that NRCan could provide more support in examining the impact of a regulatory environment on possible business models and constraints that can impose on applying or scaling new technologies. For instance, funding recipients suggested that funding is needed to continue to move projects past the next level of barriers to scale, including past the barriers imposed by regulation. Indeed, the programs have taken action to reduce the negative impact of regulatory barriers on projects, including front-loading of allocated funds for emerging renewable power projects that face higher levels of regulatory risks, the creation of the 2023 Tidal Energy Task Force and the OERD’s Innovation and Electricity Regulatory Initiative, and the introduction of SREPs. However, further and continued work on the regulatory and provincial and federal government barriers that are impacting projects during their lifecycle is needed as several projects still face unexpected regulatory barriers. NRCan program delivery personnel should and intend to continue to ensure mechanisms are in place so that these issues are addressed as early as possible.



Example: An SGP hybrid project encountered challenges that were a function of the fact that smart grid is still an emerging industry, characterized by the presence of many small and medium enterprises. When one of the funding recipients' vendors experienced bankruptcy, the funding recipient had to select another manufacturer, adding complexity and cost to the project implementation.

Interviews and internal NRCan documentation also provided additional factors that have negatively influenced both programs:

- **Challenges related to the innovative nature of projects (technological issues)** – KIs noted that the SGP and ERPP projects are using innovative and emerging technologies; therefore, the projects run into issues and challenges with the technologies themselves. These have generally resulted in project delays and the need to shift projects accordingly. There are only two examples of projects stopping after the program had already contributed funds.
- **The COVID-19 pandemic** – For the SGP, NRCan program delivery personnel and funding recipients noted supply chain issues, changes in operating capacity (e.g., the inability to access communities and customers' homes), withdrawals of secured funding from some partners, staff layoffs, and impacts on staff hours during the pandemic. For the ERPP, one funding recipient and NRCan program delivery personnel indicated disruptions to project fieldwork and planned engagement activities, supply chain issues, difficulty in getting investors, and equipment challenges during the pandemic. An NRCan program delivery personnel noted that some projects had to reduce their planned activities due to increased costs, despite their funding remaining unchanged.
- **Supply chain issues** – KIs from the SGP and ERPP noted project delays and overall project cost increases due to supply chain issues. The supply chain issues were attributed to overall higher demand for the technologies resulting from the growing interest in them around the world, as well as the COVID-19 pandemic.

Efficiency

For the most part, the Smart Grid Program (SGP) and Emerging Renewable Power Program (ERPP) were designed to be efficient in achieving the expected results

In general, NRCan program delivery personnel indicated that the SGP and ERPP are being delivered efficiently. Funding recipients noted positive experiences with the respective programs and NRCan staff during the implementation of the projects. Funding recipients characterized NRCan staff as accessible, helpful, and responsive throughout the lifecycle of their projects. One funding recipient appreciated NRCan's practice of having the same team members oversee projects from start to finish. NRCan program delivery personnel noted that NRCan has established teams for program delivery and has common practices in place for all renewable energy programs. They also noted that templates, trackers, and reporting requirements are all managed by the same team for all renewable energy programs, which allows for consistency and reduces risk in case of employee absences or processing errors. They stated that the overall governance of the programs was good.

One suggestion to improve the design of the ERPP made by an NRCan program delivery personnel was to consider formalizing and facilitating the ERPP's ability to leverage expertise from staff in the EETS. The EETS often gets involved to help ERPP projects with technological breakthrough expertise, even though they are not demonstration

projects. Another suggestion was to implement a mid-project review where there is an opportunity to review the project to date and adjust it going forward accordingly. Working the mid-point review into the contribution agreement would provide this opportunity for all projects.

A jurisdictional scan of relevant programs in other countries (see [Appendix A](#)) identified programs analogous to the SGP and ERPP in terms of scope and objectives (i.e., to promote the development and integration of smart grid technologies and renewable energy production). Three programs from the US and Australia also have similar upfront, direct, cost-shared funding delivery approaches. This seems to be an important design feature to reduce the risk to companies to implement smart grid and renewable energy technologies, as confirmed through other lines of evidence. Conversely, four programs within the United Kingdom, Australia, and France have taken different delivery approaches to fulfil objectives similar to the SGP and ERPP, such as a top-up mechanism to allow developers to receive expected revenues (thereby minimizing the pandemic's financial effects on developers); continuous, open applications; providing assistance at different stages of a project lifetime; and utilizing production-based financial assistance. It was difficult to conclude if one design and delivery method is superior to another in terms of achieving the intended outcomes of the programs due to limited publicly available program information.

For the most part, there is satisfaction with the application process for both programs

Funding recipients said that the overall application and review process for both programs was good and not overly onerous. The following examples of support during the application process were highlighted by funding applicants and were noted as typical and part of the formal application process by NRCan program delivery personnel:

- Regarding the SGP, one funding recipient highlighted the **staged approach** of submitting a high-level proposal, receiving feedback, and then proceeding with the full proposal so as to not waste time with a full application if the project did not have a chance of being accepted.
- Another funding recipient noted attending a **webinar** during the application process which they found valuable.



A webinar was offered in January 2018 prior to the launch of the SGP to introduce the program to potential funding applicants. The webinar described the new program's objectives, expected outcomes, and guided participants through the program proposal and application process and the subsequent reporting procedures that would be required over the course of the projects.

- An ERPP funding recipient also highlighted going through the **due diligence interview**, which is part of the formal proposal process, as positive because it makes them think through their project.
- Finally, some unsuccessful proponents reported that the **feedback provided** from the SGP application process helped inform them about the state of their projects.

One suggestion for improvement to the application process mentioned by funding recipients and NRCan program delivery personnel was that review times for applications should be faster. It was noted that NRCan did not meet their own timelines for decisions, which made it difficult for their organization to plan. An additional suggestion was for clearer criteria of how proposals for the programs are scored. There was confusion as to why some projects were approved and others were not. Knowledge of the basis of NRCan criteria may change how potential

funding recipients propose their project methodologies, the amount of funding needed, and so forth. Lastly, once approved, SGP and ERPP funding recipients noted the need for funding to be provided faster at the start of projects to expedite the start of project work.

The “one window” approach with hybrid projects allowed the program to address industry needs but faced many administrative burdens

NRCan program delivery personnel agreed that the SGP’s ability to fund deployment, demonstration, and hybrid projects was a positive. They indicated that it allowed for a greater range of projects and more innovative ones. They also noted that it was an advantage for industry to be able to apply for deployment or demonstration projects (or both) and allowed the program to better respond to industry needs. However, the main issue highlighted by NRCan program delivery personnel for hybrid projects was that demonstration and deployment projects had their own separate processes; therefore, hybrid projects had to deal with both of these processes. In particular, hybrid projects required separate contribution agreements, amendments, reporting, and so forth that led to seeming duplication of tasks and misalignment at times following amendments (e.g., total costs of the project in one sector not aligning following an amendment by the other sector). The NRCan program delivery personnel indicated that they attempted to harmonize the processes between the deployment and demonstration sectors, such as joint contribution agreements and reporting templates, but that only the claims template was harmonized for hybrid projects; otherwise these attempts failed. The NRCan program delivery personnel were unsure of what efficiencies regarding hybrid projects could be implemented in the future as they do not believe it will be possible to harmonize the delivery of hybrid projects. It was suggested that the only option may be to avoid hybrid projects going forward, and that SREPs not include hybrid projects.

To some extent, programs deviated from their initial implementation plans due to the necessity of adjusting to changing circumstances

The programs had to adjust and adapt to meet evolving needs (e.g., technological-, regulatory-, and COVID-19-related issues). Due to the pandemic, the SGP was extended by one year and the ERPP was extended by three years. Some other notable changes to programme implementation and delivery included:

- **Allowing non-repayable agreements for certain types of funding recipients (e.g., Indigenous-owned organizations, non-profits) for the SGP and ERPP** – Justification for the amendment to the Terms and Conditions included improving the ability of projects to move forward with internal approvals and financing, including Indigenous-led projects that were stalling because Indigenous recipients do not have the financial resources to repay.
- **Increasing the allowable funding percentage to 75% of projects costs from 50% for the ERPP** – Justification for the amendment was to allow funds committed in future years to better support the projects with (1) current financial challenges dealing with regulatory issues; and (2) increased project costs caused by the COVID-19 pandemic.
- **Providing project time extensions and additional funding** – Justification for the amendment was to sustain project operations and completion. For example, six SGP projects received extensions and additional funds related to pandemic disruptions, with additional top-ups ranging from 9% to 52% over the original funding allocation. Another three SGP projects received additional funds related to pandemic disruptions but did not request extensions. Program personnel indicated that the programs adhered to an established amendment process to successfully modify contribution agreements.

The programs have numerous reporting requirements to collect information from funding recipients, but some metrics are not collected consistently during the lives of the projects

According to available documentation, the SGP and ERPP collect a variety of performance information. For instance, annual reporting for both programs is required on the following metrics: total number of jobs to date, additional jobs in future (estimate), jobs created for women (to date), jobs created for youth (to date), Indigenous jobs created (to date), number of Indigenous communities involved, expected installed capacity (MW), expected capacity factor (%), GHG emissions reductions (MtCO₂e/year), and other socio-economic benefits achieved. Figure 9 shows the reporting requirements. In addition, funding recipients meet monthly with NRCan program delivery staff to discuss the progress of the projects. The information collected is used internally to report up as required and to inform other programming such as SREPs.

Figure 9: Smart Grid Program (SGP) and Emerging Renewable Power Program (ERPP) reporting requirements

ERPP and SGP Deployment

- Quarterly expense reports and cash flow statements
- Annual report of project activities and performance indicators (stopped March 31, 2021)
- Final report (report on metrics and other indicators required by the program)
- Commissioning report (confirmation that all project components are operational)
- Post-commissioning performance report
- Post-completion outcomes reports for five years

SGP Demonstration

- Quarterly expense reports and cash flow statements
- Annual report of project activities and performance indicators
- Final report (reports did not follow a similar template or format to deployment)
- Post-completion outcomes reports for five years

While the programs gather performance information, certain metrics are not consistently collected. This limitation was evident in all six case studies such that jobs-to-date information was being collected inconsistently across projects. For instance, some case study projects reported new job years created, some reported number of people or FTEs employed, and some reported number of new jobs without specifying whether they are full-time or part-time equivalents. Furthermore, annual reporting was removed as a requirement for ERPP and SGP deployment

projects following March 31, 2021. The annual reporting for the ERPP and SGP deployment stream was removed from the Terms and Conditions of the programs to reduce the administrative burden on funding recipients. This was based on a recommendation from the Centre of Expertise on Grants and Contributions at the sector level. However, NRCan program delivery personnel and funding recipients generally believed that the initial reporting requirements were reasonable and not burdensome given the funding received. The SGP demonstration stream continues to require annual reports from their funding recipients. Initially, NRCan program delivery personnel did not perceive the removal of annual reporting for ERPP and the SGP deployment stream as having a negative impact on their internal reporting and data collection. Data on jobs created and GHG emissions reductions are no longer being collected and/or estimated for the ERPP and SGP deployment stream during the projects because they are not captured in the quarterly reporting and will only be collected at the end of projects in the final report. NRCan program delivery personnel noted that, while these metrics are targets that the programs must report on to TB of Canada Secretariat, results reported generally were not changing from report to report throughout the life of projects because they were estimates. The NRCan program delivery personnel indicated that actuals for these metrics are now only collected at the end of projects and the estimates are used for reporting purposes prior to the completion of projects.

However, a consequence of not requiring annual reporting is an increased risk of poor-quality performance information. As the implicated metrics will only be known once all final reports are submitted, it will be difficult to require funding recipients to address any data errors so that they can be aggregated and used to assess program performance. Another potential consequence of not requiring annual reporting is a diminished capacity to monitor project and program performance over time. While there is some evidence of monitoring against project schedules and financial forecasting, this does not replace performance data. NRCan program delivery personnel also noted that SGP and ERPP expected results and outcomes do not align with the standardized metrics of NRCan programs, including the generation of knowledge products, technological readiness, and jobs created. These limitations in the programs' performance information negatively impact the assessment of the program impact against its stated intended outcomes. NRCan is consequently losing important performance information. The evaluation had difficulty reporting on several outcomes of the programs to date because of how performance information is currently being collected. The evaluation concludes that the program output "analysis and reporting on collected project data" is unmet. During the evaluation, the programs acknowledged the importance of collecting these metrics (including job data) annually, such as in the quarterly report for the last quarter. The programs (through the REED organization) started to revise the quarterly report templates for its five national programs to allow a better collection of quality information.

Additional suggestions to improve performance reporting

Funding recipients and NRCan program delivery personnel had numerous suggestions for how to potentially improve reporting for the SGP and ERPP. The following could be considered by NRCan going forward for future funding programs:

- **Improving templates and upfront training about metrics** – Challenges with regard to the GHG template were identified by funding recipients. In fact, funding recipients required several consultations with NRCan to use the template correctly. A more generic reporting template was suggested by the same funding recipients to collect performance information across multiple areas that would be easier to understand. Furthermore, this evidence suggests more upfront training and discussions about the metrics to ensure funding recipients are reporting on the metrics accurately is warranted.

- **Additional metrics** – It was noted that GHG reductions are not a good metric to use to measure the success of smart grid projects. Smart grid technologies facilitate affordability and reduce the cost of a net-zero transition; focusing on GHG reduction metrics misses the opportunity to capture cost-saving information which is the real value of these projects. System reliability was also noted as an important metric to capture for SGP projects. For ERPP projects, it was suggested that NRCan consider requiring funding recipients to report on the amount of atmospheric carbon that projects sequester. It was noted that this is cost-effective to implement (e.g., through soil health improvements) and easy to measure.
- **Eliminating overlapping reporting requirements** – High-risk projects supported by NRCan are subject to more extensive reporting to regulators, beyond what is required by NRCan. It could be beneficial to explore how NRCan can reduce duplication in reporting and gain access to the more detailed data that funding recipients are required to submit to regulators.
- **Live demonstrations** – It was suggested that NRCan attend live demonstrations at project sites to complement standardized reporting, as funding recipients have “a lot to showcase.”
- **Annual report reminders** – As funding recipients move into the post-project reporting stage, a reminder from NRCan about when annual reports are due during the five-year post-completion was suggested.
- **Streamline reporting for hybrid projects** – Hybrid projects resulted in greater administrative burden for funding recipients since the deployment and demonstration streams each required separate agreements, and therefore had separate reporting requirements. The suggestion was to find a way for the two streams to collaborate to ease the burden on funding recipients.

NRCan program delivery personnel indicated that the program has a reporting tracker for repayment reports where the total project costs in the final report and the total project costs identified in the repayment report are compared. For one case study, the evaluation team noted a discrepancy in the repayment report (see text box). According to NRCan program delivery personnel, once flagged by the evaluation team, a follow-up action was taken, and ultimately the errors were corrected (i.e., the lower amount in the final report was correct). However, the evaluation has identified this as a possible area for improvement that warrants closer attention from the programs as such an increase in project costs diminishes the likelihood of repayment (i.e., the organization reporting a profit during the five-year period after NRCan funding ended).



An ERPP deployment project showed an increase in total project costs of over \$10 million (from about \$48.7 million to \$59.1 million) between the final report and the first and second repayment reports. NRCan staff looked into the potential issue, reached out to the funding recipient, and the total project costs in the repayment reports have now been lowered to match the final report. The increase in total costs of the project in the repayment reports was an error in accounting by the funding recipient related to the project being transferred to a new company.

Ongoing NRCan activities have improved integration of Gender-based Analysis Plus (GBA+) and Equity, Diversity and Inclusion (EDI)

NRCan program delivery personnel noted that GBA+ and EDI factors were not a focus of the programs when they were launched, as the policy framework that supports the GC's current approach to GBA+ was still being defined. However, the evaluation found that GBA+ and EDI were included in the program designs. For instance, a GBA+

analysis was conducted at the outset of the programs. The programs also had application forms with questions regarding Indigenous involvement and project proposals that could demonstrate inclusiveness, balanced hiring, and Indigenous leadership received additional consideration.



The **ERPP Applicant Guide** indicated a preference for projects with a higher degree of Indigenous involvement, confirmed through letters of support, the percentage of Indigenous ownership, and Indigenous consultation processes. The **SGP Applicant Guide** indicated that proposals would receive a greater weight if a project is proposed by an Indigenous community or is to the direct socio-economic benefits of an Indigenous community.

NRCan program delivery personnel also highlighted that the ERPP implemented the Community Employment Benefits initiative, which provides employment and procurement opportunities for women, youth, and Indigenous Peoples. The program therefore encouraged job creation for these groups during initial program design through the Applicant Guide and the proposal evaluation and approval stages. This resulted in the selection of Indigenous and female-led projects. Previously, the annual reporting for both programs required reporting on jobs created for women, youth, and Indigenous Peoples through the projects. However, this information is no longer being captured by SGP and ERPP deployment projects during the life of projects since the annual reporting ceased being required in 2021.

Funding recipients from both programs noted that GBA+ and EDI factors were not explicitly considered in their projects when it came to hires and participants, but that in many cases, they ended up with diverse representation within their projects anyway. Some funding recipients noted that GBA+ and EDI factors are already considered in their organization and hiring policies, which were also implemented for the project. Others noted that they already had diverse teams within their organization prior to receiving funding. NRCan program delivery personnel also highlighted different activities the programs have undertaken related to GBA+ and EDI during the delivery of the SGP and ERPP.

- During the contribution agreement stage, ERPP funding recipients were encouraged to participate in the Equal by 30 Campaign, which works to accelerate gender equality and diversity in clean energy transitions and close the gender gap by 2030). Four ERPP funding recipients signed on to that public commitment.



The Equal by 30 Campaign is a component of the Equality in Energy Transitions Initiative, striving to expedite gender equality and diversity in clean energy transitions and bridging the gender gap by 2030. This initiative stands as a collaborative effort between the Clean Energy Ministerial and International Energy Agency. Equal by 30 calls upon organizations, companies, and governments to endorse guiding principles and take concrete actions to close the gender gap.

- During the delivery of the SGP, the OERD's Inclusion, Diversity, Equity and Accessibility (IDEA) team conducted activities to improve their programs' (including the SGP) responsiveness to GBA+ and EDI considerations. These activities included the development of a GBA+ Framework for Programs with an accompanying workshop; DG briefings on EDI; analyses of GBA+ data on clean energy jobs in Canada; and the collection of statistics and data

to develop a clean energy GBA+ data repository. In 2022, NRCan collaborated with Electricity Human Resources Canada to deliver a workshop to programme participants on IDEA. It led to the report *Advancing Inclusion, Diversity, Equity and Accessibility in the Future Electricity Sector*, subsequently published on the program’s website (NRCan, 2022c). NRCan program delivery personnel indicated that the work of the OERD IDEA team is ongoing and more comprehensive analysis documents and frameworks are being developed.

There is indication that some lessons learned, and improvements related to GBA+ and EDI have already been implemented in follow-on programs. NRCan program delivery personnel pointed to the new SREPs as a model for incorporating GBA+ and EDI factors in renewable energy programming. They highlighted that SREPs has an NRCan EDI expert as part of the program. The inclusion of an EDI expert in SREPs aligns with the suggestion from one stakeholder to have experts on gender and inclusion to help develop, review, and evaluate the extent that GBA+ and EDI factors are included and considered. SREPs requires funding recipients to either have an EDI plan or participate in a public EDI commitment. Funding recipients need to show how they will meet at least three activities of the plan: for example, reporting on progress, gathering relevant data, promoting the renewable and energy sector as a post-secondary option, and promoting workforce diversity and inclusion through collaboration. SREPs also provides additional funding incentives for projects that are over 50% Indigenous owned.

Suggestions for further incorporating Gender-based Analysis Plus (GBA+) and Equity, Diversity and Inclusion (EDI) factors into programming

Funding recipients and NRCan program delivery personnel had numerous suggestions for how to potentially incorporate GBA+ and EDI factors into the SGP, ERPP, and similar programming going forward:

- **Determine how smart grid projects can benefit low-income people** – Smart grid technologies directly benefit the more affluent and low-income households may only see the benefits in the long run through, for example, reduced energy costs for everyone in an area.
- **Consistency across federal government departments** – Have consistency across federal government departments regarding GBA+ and EDI requirements as they differ by program and project application, which makes it difficult for funding recipients to prepare.
- **Have clear GBA+ and EDI metrics that can be shared with the public** – There was uncertainty with the metrics the programs were using to measure GBA+ and EDI. It was noted that the metrics should be clear and shared with the public.

Lessons learned

There were lessons learned from the programs for continuous improvement

Program documentation and interviews with NRCan program delivery personnel and funding recipients identified lessons learned. Some of the more commonly mentioned and applicable for both programs appear in Table 7.

Table 7: Lessons Learned from the Implementation of the SGP and ERPP

| Processes | Program design | Communication and engagement |
|--------------|----------------|------------------------------|
| Continue to: | | |

| Processes | Program design | Communication and engagement |
|---|---|--|
| <ul style="list-style-type: none"> • Recognize internal enablers of success. While demonstration projects were expected to have challenges and setbacks, there were several factors that contribute to the ability of projects and funding recipients to mitigate the impact of any challenges encountered. Strong and dedicated internal leadership, smaller teams, flexibility, determination, and “honest communication” were identified as factors that allowed projects to overcome setbacks and continue with implementation. | <ul style="list-style-type: none"> • Allow programs and NRCan program delivery staff to have a certain level of flexibility. The flexibility and autonomy afforded to the programs and the NRCan staff are important features of the SGP and ERPP that should be carried forward into any future program. • Ensure there is more focus on EDI and employment equity plans. This has been incorporated into SREPs. | <ul style="list-style-type: none"> • Have continual and effective involvement of NRCan staff in projects. Regular communication program staff had with funding recipients allowed NRCan to be aware of the challenges the projects were facing and to be able to get involved when needed in terms of contacting regulators, utilities, and the province to keep projects moving forward. • Have an innovative approach in engaging electricity utilities as key adopters. This makes the SGP unique among programs geared towards power grid modernization in Canada. • Share program and project information. This allows proponents to promote their projects, get a sense of what else is happening in Canada, and foster knowledge about successes, challenges, and barriers. |
| Need to: | | |
| <ul style="list-style-type: none"> • Ensure appropriate permits and regulatory approval are in hand before a project is approved for deployment funding. SGP and ERPP projects experienced delays from not having these in place. This includes assurances that federal and provincial governments and regulators are aligned regarding projects. | <ul style="list-style-type: none"> • Ensure transparency between funding recipients and NRCan program delivery staff. When challenges are encountered, rather than worrying about the potential impact on future funding of disclosing such information, funding recipients should realize that NRCan program delivery personnel are there to support funding recipients and help solve problems. | <ul style="list-style-type: none"> • Ensure more effective communication and engagement with team members, partners, and other stakeholders. There is a need to ensure everyone is on board with, aware of, and involved in the project. This can include government to identify potential barriers at an earlier stage of the project. • Improve external communications. Improve preparation in advance of external communications, especially presentations, and minimize the use of acronyms in communications. |

Conclusion

Relevance: The evaluation concludes that support for renewables and smart grids remains relevant. Evidence supports that these technologies depend on continued investments by the federal government and other stakeholders. The advancement of smart grids and emerging renewable energy sources may face setbacks without such support. Although NRCan has made efforts to address these barriers, regulatory challenges and a misalignment of priorities with other levels of government continue to limit the overall efficacy of the projects and programs. Therefore, ongoing and perhaps different efforts are needed to address these barriers and increase the success of similar programming going forward.

Performance: The evaluation notes the overall effectiveness of the SGP and ERPP in the short- and medium-term, successfully attaining their immediate outcomes and some of their intermediate outcomes. While progressing towards the long-term outcomes and ultimate outcome, the impact of the programs is constrained by regulatory barriers and underachievement of some of the targets contributing to intermediate outcomes. Recognizing the inherent challenges in programs having direct influence over long-term outcomes in general, it is still imperative for the SGP and ERPP to achieve their short-term and medium-term outcomes, laying a foundation for sustained long-term success in the future. As such, it is essential for the programs to continually focus on implementing effective strategies that promote consistent and ongoing progress towards the fulfilment of the long-term expected benefits. A continued and more involved effort to share program information and results is needed to ensure the continued recognition and success of programs like the SGP and ERPP. The flexibility of the program design and delivery staff has played a crucial role in the programs' ongoing success. Although the programs have not been implemented as planned due to the need to adapt to changing circumstances, the evaluation also notes that the programs demonstrate some efficiency. In relation to opportunities for improvement, the programs should implement a performance measurement and reporting approach that ensures consistent data collection (such as for job creation), enabling effective progress tracking over time and conclusive assessments of success at both the project and program level.

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Appendix A: Funding and support programs in other countries

The three programs with similar delivery methods to the SGP and the ERPP were the **SGG Program**, **Grid Modernization Initiative (GMI)**, and **Advancing Renewables Program (ARP)**.

- The **SGG Program (US)** is a program administered by the Grid Deployment Office of the US Department of Energy (DOE) and aims to promote the development and integration of smart grid devices within the US. In order to be funded, proposed projects must demonstrate a feasible plan to market adoption. Successful projects are funded up to 50% of total project costs, which is provided in advance to all eligible entities except for for-profit entities, who must receive funds via reimbursement. The SGG Program is a renewed and expanded iteration of the previous Smart Grid Investment Grant Program that was first funded in 2009.
- The **GMI (US)** is a cross-cutting and broadly designed program that concentrates on research and development of new energy grid technologies to fulfil the vision of “resilient, reliable, flexible, secure, sustainable, and affordable electricity to consumers where they want it, when they want it, how they want it” (U.S. Department of Energy, 2015). The GMI also includes a regional demonstration component that requires funded projects to demonstrate the performance of the technology or tools in real-world grid conditions. Activities are supported through two main methods: national laboratory projects and partnerships funding via lab calls under the Grid Modernization Laboratory Consortium (GMLC), and through “traditional” funding mechanisms of the DOE, which take the form of funding opportunity announcements made by offices of the DOE. Funding for projects approved under funding opportunity announcements from the DOE are cost-shared and are disbursed via advanced payment for project costs to all non-federal entities except for for-profit entities who must receive funds via reimbursement of eligible.
- The **ARP (AU)** provides direct, up-front funding of, usually, a maximum of 50% of total project costs. The ARP is an open program and is open to applications for funding at any time. Funding for projects is expected to be between AUD\$100,000 and AUD\$50 million, with projects over AUD\$50 million requiring approval from the minister. Eligible projects must use renewable energy technology to achieve project outcomes related to renewable energy, which include the reduction in cost of renewable energy; the increase in value of renewable energy produced; the improvement of technological and commercial readiness of renewable energy; the reduction of barriers to renewable energy; and the increase of skills, capacity, and knowledge related to renewable energy (however, the project cannot be primarily related to research, education, or training).

The four programs identified with different delivery methods to promote the development or integration of smart grid and renewable energy production are the **Smart Metering Implementation Programme**, **Contracts for Difference (CfD) Scheme**, **Renewable Energy Target (RET) Scheme**, and **Programme d’investissements d’avenir (PIA)**.

- The **Smart Metering Implementation Programme (UK)** is a joint program between the UK Department of Business, Energy and Industrial Strategy, and the UK Office of Gas and Electricity Markets (Ofgem). This program leverages the regulatory power of Ofgem to require energy suppliers in the UK to establish and fulfil smart meter installation commitments. It provides no funding to suppliers, but may impose financial penalties on suppliers who fail to hit annual installation targets.
- The **CfD Scheme (UK)** uses indirect financial compensation to help renewable energy production investors manage risk. Participants may apply for this program with a proposal for the creation of a new renewable energy generation site or the expansion of an existing one. Once completed, energy sales from that site will be covered under the contract for difference and ensure that the producer receives a flat rate for energy sold, with the difference being made up by Low Carbon Contracts Company if the market price falls below the determined

flat rate. Additionally, the program also protects consumers from high energy prices by requiring the producer to pay the difference to the Low Carbon Contracts Company if the market price rises above the flat rate.

- The **RET Scheme (AU)** uses a financial scheme involving energy retailers and other liable entities and energy producers to provide financial assistance to renewable energy producers. Under regulation, liable entities in Australia are required to purchase renewable energy certificates in order to meet renewable energy obligations established by the Clean Energy Regulator. Accredited renewable energy producers are awarded one certificate for every MW hour produced, which they may then sell on the Renewable Energy Certificate Market. These certificates are not linked to the generated energy from which they were awarded and may be held, sold, or purchased by any entity registered on the market.
- The **PIA (FRA)** is unique among all other programs in that it is specifically designed to allow for multiple approaches and delivery methods to be used, which differ from traditional delivery methods used for the majority of government investments. It is not subject to conventional Government of France administrative policies, and its program funding to departments is approved directly by the Prime Minister. Funding is limited to both research and demonstration projects, but the means by which projects are approved and funded may vary. Rather than departmental or program administration approving projects, an external expert jury may review and approve projects. Additionally, the PIA utilizes several funding mechanisms and projects may be funded through grants, subsidies, and/or reimbursements.

The three programs from the United Kingdom and Australia do not provide direct, upfront cost shared funding to programme participants, but rather leverage regulatory and other financial mechanisms to promote program objectives. The PIA from France utilizes a variety of measures and is not limited to one approach.

Appendix B: Case Studies

Case study projects for the Evaluation of the SGP and ERPP

| Organization | Project Name | Type | Region |
|--|---|---------------|----------------------|
| SGP projects | | | |
| Alectra Utilities Corporation | The Transactive Grid – Enabling an End-To-End Market Services Framework Using Blockchain | Demonstration | ON |
| The Power Commission of the City of Saint John (now Saint John Energy) | Smart Grid - Integrated Dispatchable Resource Network for Local Electric Distribution Utility | Hybrid | NB |
| PEI Energy Corporation | Slemon Park Microgrid Project | Deployment | PE |
| ERPP projects | | | |
| Suffield Solar LP | Suffield Bifacial Solar Project | Deployment | AB |
| Clarke Lake Geothermal Limited Partnership | Tu Deh-Kah Geothermal Project | Deployment | BC |
| La Corporation de l'École Polytechnique de Montréal | Energy Modelling Initiative: Bringing the tools to support Canada's energy transition | Study | National (QC office) |

Appendix C: Other Funding Programs in Canada

Descriptions of other funding programs

| Provincial, territorial, or municipal programs | |
|--|---|
| Alberta Smart Grid Consortium (ASGC) | <ul style="list-style-type: none"> ASGC falls under Alberta Innovates Renewable and Alternative Energy Program, which to support “Alberta’s transition to a low-carbon economy by investing in renewable and low-carbon electricity. The program focuses on grid modernization, energy storage, and electricity generation” (Alberta Innovates, 2023). |
| Emissions Reductions Alberta (ERA) | <p>ERA has two funding streams:</p> <ul style="list-style-type: none"> (1) Technology Funding with focus on the following industrial operations: carbon sequestration, future fuels, energy efficiency, and industrial transformation. (2) Energy Savings for Business, which helps Alberta businesses improve their efficiency and reduce emissions by supplying funding for commercial cost and energy-saving technologies. |
| Green Municipal Fund (GMF) | <ul style="list-style-type: none"> GMF supports municipalities through capacity building and funding in five priority sectors: energy, waste, transportation, land use, and water. Partnership organizations with municipal governments are also eligible for support (private-sector entities; Indigenous communities; municipally owned corporations; provincial or territorial organization delivering municipal services; non-governmental organizations; not-for-profit organizations; and research institutions). |
| Grid Innovation Fund (GIF) | <ul style="list-style-type: none"> Facilitated by the Independent Electricity System Operator, the GIF “Supports innovation with the potential to achieve significant electricity bill savings for Ontario ratepayers – either by enabling greater competition in Ontario’s electricity markets or by helping customers better manage their energy consumption” (Independent Electricity System Operator, 2023). Eligible funding applicants include local hydro companies, technology companies, consulting firms, industry associations, educational institutions, public sector organizations. |
| Ontario Energy Board (OEB) Innovation Sandbox | <ul style="list-style-type: none"> The OEB Innovation Sandbox “supports pilot projects testing new activities, services and business models in Ontario’s electricity and natural gas sectors. [...] it has provided information and guidance to dozens of proponents” since 2019 (Ontario Energy Board, n.d.). Project eligibility criteria include support for consumer value and protection, enhancing the resilience of electricity or natural gas systems, recognize carbon pricing and net zero mandates, have potential for scalability and economic validity. |
| Ontario Ministry of Energy – Smart Grid Fund | <ul style="list-style-type: none"> “The fund supports innovators to develop cutting-edge technologies that will make [Ontario] systems run better and give customers more choice and control over their power use” (Government of Ontario, 2023). This fund was delivered under “a previous government”. |

| | |
|--|--|
| Prairies Economic Development Canada (PrairiesCan) | <ul style="list-style-type: none"> • PrairiesCan supports business, innovation, and community economic development unique to Alberta, Saskatchewan, and Manitoba. • PrairiesCan acts as an investor, convener, advisor, and pathfinder in economic policy, programs, and projects that focus on creating new value and competitiveness to accelerate economic growth; that enable future success in a net-zero emission green economy; and that foster a more equitable and inclusive economy by supporting participation of marginalized populations. |
| Saskatchewan Advantage Innovation Fund (SAIF) | <ul style="list-style-type: none"> • SAIF is an R&D funding program that provides non-repayable grants through Innovation Saskatchewan to projects related to mining, energy, manufacturing and processing, and healthcare. • Intakes are held twice per year, and projects must: (1) be active private sector partners, (2) technological innovations must solve a specific industry challenge, (3) technology solutions must be novel and innovative, (4) have a feasible path to commercialization, (5) industry partners must provide 50% or more of the project's budget. |
| Federal programs | |
| CIB | <ul style="list-style-type: none"> • The CIB is a federal Crown corporation that supports and invests in infrastructure projects in collaboration with federal, provincial, territorial, municipal, Indigenous, and private investor partners. • CIB priority sectors include Public Transit, Green Infrastructure, Trade and Transport, Broadband, and Clean Power. • In Budget 2022, the Government provided CIB with authorities to invest in private sector-led projects that enabled the Bank to consider investments in: small modular reactors; hydrogen and clean fuel production; transportation and distribution; and carbon capture, utilization, and storage. |
| Clean Energy for Rural and Remote Communities (CERRC) | <ul style="list-style-type: none"> • Led by Natural Resources Canada (NRCan), the CERRC program provides funding for renewable energy and capacity-building projects and related energy efficiency measures in Indigenous, rural, and remote communities across Canada. • Launched in 2018, the CERRC program was allocated \$220 million over eight years to reduce diesel reliance for heat and power in Indigenous and remote communities. The program has supported 111 projects nationally, including capacity-building initiatives, large capital projects, innovation projects, and bioheat projects. |
| Investing in Canada Infrastructure Program (ICIP) | <ul style="list-style-type: none"> • The ICIP provides long-term, stable funding delivered by Infrastructure Canada to help communities reduce air and water pollution, provide clean water, increase resilience to climate change, and create a clean-growth economy. • Investments in infrastructure are made through four targeted funding streams: (1) Public Transit, (2) Green Infrastructure, (3) Community, Culture and Recreation Infrastructure, (4) Rural and Northern Communities Infrastructure. |

| | |
|--|--|
| Northern Responsible Energy Approach for Community Heat and Electricity (Northern REACHE) | <ul style="list-style-type: none"> • Led by Crown-Indigenous Relations and Northern Affairs Canada, this program funds renewable energy and energy efficiency projects, and related capacity building and planning in Northern and Indigenous communities. • The program's objective is to reduce the reliance on diesel for heating and electricity in Northern communities. • In Budget 2021, REACHE provided \$40.4 million to support the feasibility and planning stages of hydroelectricity and grid interconnection projects in the North. |
| SREPs | <ul style="list-style-type: none"> • Led by NRCan, SREPs provides up to \$1.56 billion in funding over eight years for smart renewable energy and electrical grid modernization projects across three streams: (1) Generation and Storage, (2) Grid Modernization, and (3) Capacity Building. • Eligible projects must use market-ready technologies and apply workplace EDI components. • Understanding that First Nations, Inuit, and Métis partners experience unique barriers to participating in the energy transition, SREPs aims to enable and encourage their participation by providing greater funding percentages, as well as supporting smaller sized projects. |
| Strategic Innovation Fund (SIF) | <ul style="list-style-type: none"> • Managed by Innovation, Science and Economic Development Canada, the SIF provides support for innovative projects through simplified application process, and responsive, results-oriented assistance. • The minimum SIF contribution is \$10 million for projects with total costs of at least \$20 million. • SIF funded projects must satisfy either: (1) activities related to R&D and commercialization of innovative products or services, (2) support the expansion or material improvement of existing industrial or technological facilities, (3) support new investments in R&D mandates, (4) relate to the development of national networks, (5) support the development and demonstration of pre-commercial technologies with a high degree of collaboration between academia and/or research bodies. |
| Sustainable Development Technologies Canada (SDTC) | <ul style="list-style-type: none"> • SDTC supports Canadian companies by funding the development and demonstration of new environmental technologies; fostering and encouraging collaborations in the private and not-for-profit sectors, academia, and others; and promotes the diffusion of new technologies across key economic sectors. |

Appendix D: Evaluation Team

From NRCan:

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The evaluation team would like to acknowledge those individuals who contributed to this project, particularly program representatives and members of the EWG from REED and the Electricity, Transportation and Buildings Innovation group of the OERD, as well as the KIs, who provided insights and comments as part of the evaluation.

Footnotes

- 1 ERPP Project 5 was cancelled following the proponent's insolvency in August 2023, after the period covered by the evaluation that ended March 31, 2023.
 - 2 The EWG included representatives from OERD and REED; they were involved at key points of the evaluation to review, comment on, and validate key items of the evaluation, such as the logic model, data collection instruments, and this evaluation report.
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Date modified:

2025-06-20