

On-Farm Energy Developments in Nova Scotia



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Cover photograph: floral design at the Agricultural Campus of Dalhousie University,
Bible Hill, Nova Scotia, Canada

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Summary

The Nova Scotia Community Feed-In Tariff (COMFIT) is the world's first example of a scheme which provides financial incentive for the local generation of electricity from renewable resources (such as wind, solar, hydro and bioenergy). Energy infrastructure has, to some extent, resulted in the transformation of the agricultural landscape of this region of Atlantic Canada and there has been a rapid transition in the electricity generation mix there. The COMFIT scheme was closed in 2015 and the full extent of the impacts of its closure are poorly understood. The system of feed-in tariffs operational in the United Kingdom was placed under review soon after the General Election in 2015 and, more recently, reduced financial incentives have been announced; it is widely predicted that the scheme is likely to close altogether in the near future. It may be advantageous, therefore, to examine the views of farmers and other stakeholders in Nova Scotia in order to inform counterparts in the United Kingdom. A tendency for reluctance to be involved in co-operatives and potential barriers to effective communication about such schemes are identified as principal themes among stakeholder views.

On-Farm Energy Developments in Nova Scotia

1. Introduction

This report, *written for a general audience*, seeks to introduce the views of stakeholders interviewed about on-farm energy developments in Nova Scotia, Atlantic Canada. Project fieldwork was conducted between July and August 2016 by the holder of an Agricultural Educator Award provided by the Farmers Club Charitable Trust. This report will summarise agricultural and energy policy in the province before detailing the Nova Scotia Community Feed-In Tariff (COMFIT) which sought to incentivise renewable energy developments. The views of the subjects of stakeholder interviews will be summarised in order to present the principal themes identified. Conclusions about COMFIT and its relevance to farmers in the United Kingdom will be made before the wider dissemination of this project is summarised.

2. Agricultural and Energy Policy in Nova Scotia

The agricultural sector in Nova Scotia is characterised by mixed arable and livestock production and many products are similar to those from British farms (although blueberries and mink are local specialities); the province has a predominantly humid continental climate even though it has an Atlantic coastline and much of the land is covered by coniferous forest. Land in Nova Scotia is classified according to the Canadian Land Inventory (CLI) system: 3.1% is classified as the best arable land (CLI2); 18.1% as soils with moderately severe limitations (CLI3) and 7.6% as soils with severe limitations (CLI4) (see Figure 1). Particularly fertile regions include the Annapolis Valley in the west of the peninsula. The energy sector in Nova Scotia is dominated by fossil fuel combustion, as is common in many other developed economies. However, energy generation from renewable resources has increased in recent years and some of this energy is produced by installations on farms or other rural land, including wind turbines, solar arrays, hydroelectric turbines and technologies to exploit bioenergy such as CHP (combined heat and power) plants and anaerobic digesters.

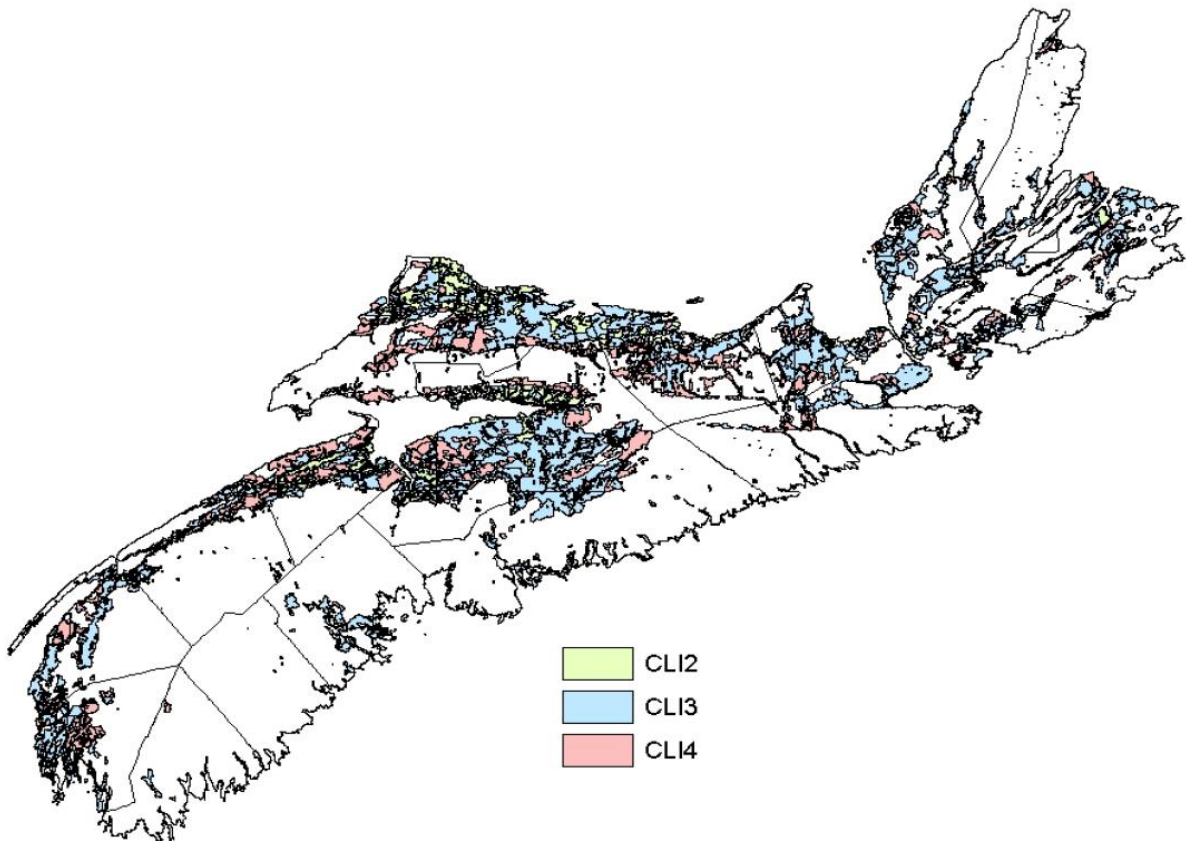


Figure 1: *Agricultural land resources in Nova Scotia (Devanney)*

Several policy measures have been introduced in Nova Scotia in recent times which have impacted upon the agricultural and/or energy sectors in the province. Since 1996, the Environmental Farm Plan programme has been delivered by the Nova Scotia Federation of Agriculture (a membership organisation) in order to educate farmers about environmental issues on their farms. The Environmental Goals and Sustainable Prosperity Act (2007) was passed by the Provincial Government in order to ‘demonstrate international leadership by having one of the cleanest and most sustainable environments in the world by the year 2020’. Among the indicators identified for the measurement of progress towards this goal was the reduction of energy produced from fossil fuel resources. More recently, in 2010, the Renewable Electricity Plan required that 25% of electricity should be supplied by renewable technologies by 2015 and 40% by 2020. In order to meet these targets, the Nova Scotia Community Feed-In Tariff (COMFIT) was introduced in 2011 (see below). The Electricity Reform Act (2013) required the government to conduct a comprehensive review the electricity system in the province in order to take into account emerging technologies, supply/demand market trends and governance structures.

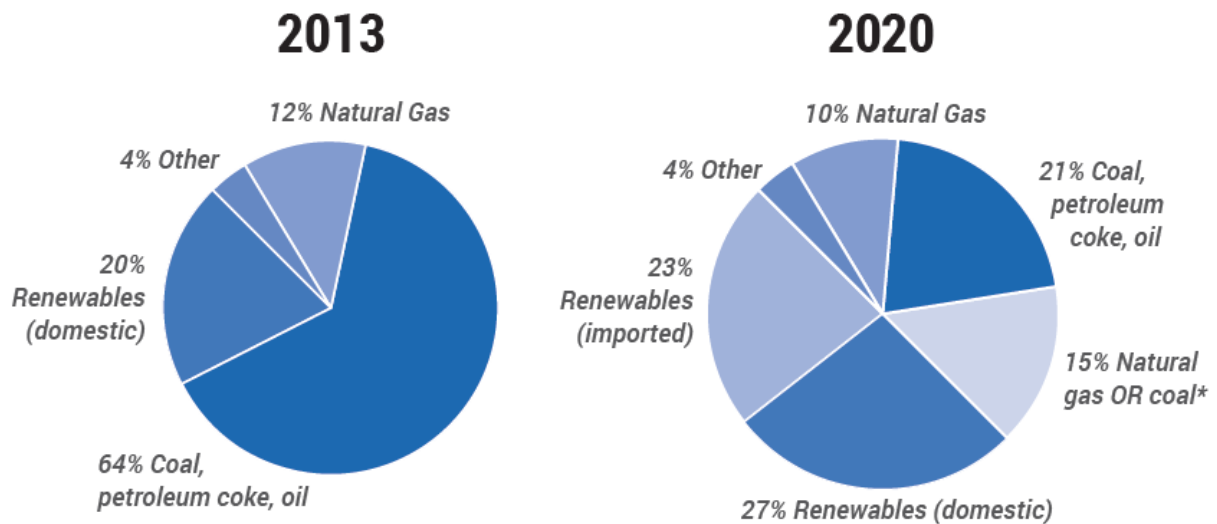


Figure 2: *Energy supply in Nova Scotia* (Nova Scotia Department of Energy)

Although Nova Scotia retains its target to supply 40% of electricity from renewable sources by 2020 and it expects to achieve this comfortably (see Figure 2), there is less emphasis on increasing the share of this supply from ‘domestic’ renewables; the term, in this context, refers to energy from within the province. The share from ‘imported’ renewables refers to energy supplied from other provinces within the Dominion of Canada; this share is projected to increase significantly from nought. This is made possible by the development of large-scale energy infrastructure, such as hydroelectric dams, in provinces such as Newfoundland and Labrador; energy from such sources can be transmitted to Nova Scotia by undersea cables.

3. The Nova Scotia Community Feed-In Tariff

The Nova Scotia Community Feed-In Tariff (COMFIT) was introduced ‘to encourage community-based, local renewable energy projects by guaranteeing a rate per kilowatt-hour for the energy the project feeds into the province’s distribution electrical grid’ (Nova Scotia Department of Energy). It was open to support renewable energy projects proposed by ‘local’ groups such as municipalities, First Nations (indigenous peoples), co-operatives, universities, community economic development investment funds and non-profit groups. Rates were payable over a twenty year period for a range of renewable developments including wind turbines, in-stream tidal generators, run-of-the-river hydroelectric installations and CHP (combined heat and power) plants (see Appendix 1); solar arrays were not included. The COMFIT

programme was of interest to farmers for two main reasons. Firstly, the co-operatives specified by the eligibility criteria could have included a number of individual farmers, or other landholders, who came together to invest in renewable energy technologies. Secondly, other 'local groups' could have included farmers in plans for investments if they had no access to land on which to site their developments other than through agreement with such a landholder. However, a limited number of developments supported by the COMFIT programme involved farmers, even though there was opportunity.

Following the Electricity Reform Act (2013) and the comprehensive review of the electricity system (see above), the COMFIT programme was closed to new entrants in August 2015. It is clear that the reasoning behind this decision was largely financially motivated, as exemplified by a statement from the Nova Scotia Department of Energy: 'evidence shows us that COMFIT renewable electricity represents 15 per cent of Nova Scotia Power's fuel cost but only five per cent of the electricity generated. Nova Scotians have been clear with us about their support for greener sources of energy, but not at any cost'.

4. Stakeholder Views

During the project fieldwork period, interviews were conducted with a range of stakeholders with interests in rural energy in Nova Scotia. Such stakeholders included representatives of the Nova Scotia Department of Agriculture and the Nova Scotia Federation of Agriculture as well as energy consultants, individual farmers who have installed renewable energy technologies and academics who are engaged in rural energy research. Interviewees were offered anonymity in line with standard ethical procedures for such research projects. Ethical approval for this project was granted by the Harper Adams University Research Ethics Committee. The following is not an attempt to present the findings of this interview-based research in an academic manner but, rather, it is a summary of the two main themes which emerged from discussions.

The first main theme which emerged from stakeholder interviews was that farmers tend to be reluctant to become involved in co-operatives for investment purposes. The reasons for this are complex and fraught with social sensitivities. However, it

may be the case that some farmers prefer not to enter such co-operative arrangements with others because they wish to run their farms as independent businesses or they do not wish to enter complex legal negotiations with multiple parties. There are likely other reasons to consider as well. This is certainly not unique to Nova Scotia. For example, although large anaerobic digesters capable of taking feedstock from a number of farms are attractive both economically and from a planning perspective, examples of such developments in the United Kingdom are limited – perhaps because some farmers are reluctant to co-invest in such schemes with neighbours.

The second main theme which emerged from stakeholder interviews was that the COMFIT programme may have been more successful if the Nova Scotia Department of Energy and the Nova Scotia Department of Agriculture had worked together more closely in promoting the scheme. Farmers and other rural landholders may be accustomed to receiving ‘official’ information of use to their businesses from one arm of the state, the provincial agricultural department in this case. The communication methods and priorities adopted by another arm, *i.e.* the provincial energy department, may have been unfamiliar, overlooked or ignored. Information specifically targeted at farmers and other rural landholders may have been more effective in eliciting their interest in investing in the renewable technology developments supported by the scheme. It should be noted, however, that the Nova Scotia Department of Energy was not represented among stakeholders interviewed although it was approached. In the United Kingdom, the system of feed-in tariffs in operation is funded by the Department for Business, Energy and Industrial Strategy (and by the Department of Energy and Climate Change until 2016). It is recommended that the details of any future energy scheme involving rural areas should be communicated to farmers and other landholders through close collaboration between the Department for Business, Energy and Industrial Strategy and the Department for Environment, Food and Rural Affairs, the latter being much more familiar to farmers.

5. Conclusions

The Nova Scotia Community Feed-In Tariff (COMFIT) is the world’s first example of a scheme which provides financial incentive for the local generation of electricity

from renewable resources. Interviews with rural energy stakeholders in the province following the closure of the scheme explored its efficacy. A tendency for reluctance to be involved in co-operatives and potential barriers to effective communication about such schemes were identified as principal themes among stakeholder views. Despite the closure of the scheme, Nova Scotia remains on target to supply 40% of electricity from renewable sources by 2020 although 'imported' energy from other provinces may be relied upon to achieve this. Farmers and other landholders in the United Kingdom with an interest in renewable energy may take note of the case of Nova Scotia when considering domestic feed-in tariffs and any future incentive schemes.

6. Dissemination

Information about this project, whilst it was in the planning phase, was disseminated in a presentation entitled: 'On-Farm Energy Generation: Enabling Innovation?' at the *12th European IFSA (International Farming Systems Association) Symposium* held at Harper Adams University, 12th–15th July 2016. The benefit to students is also significant: for example, to BSc (Hons) Agriculture students enrolled on a module entitled *Waste and Resource Management* at Harper Adams University. The series of lectures delivered by the award holder to these students includes a detailed consideration of various renewable energy technologies available and the incentives for their installation on farms. Such teaching can now be enhanced by international comparison with this case in Canada. The knowledge gained by undertaking the study is also directly applicable to enhancing the content of lectures for other specific modules such as *Sustainable Energy and the Rural Estate* at undergraduate level and *Sustainable Energy within the Countryside* at postgraduate level. Additionally, it is the intention of the award holder to use the information gathered during this study to develop a new short course on the latest developments in renewable energy incentives (such as feed-in tariffs) available to farmers and other landholders. The ability to draw comparisons with this case in Canada will enhance the course's attractiveness and practical usefulness. Such a course would be open to a general audience, principally farmers, on the basis of continuous professional development. Furthermore, it is the intention of the award holder to prepare an academic publication on the topic of this report.

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Context

The Community Feed-in Tariff (COMFIT) program is part of Nova Scotia's 2010 Renewable Electricity Plan, which sets out a detailed path to move Nova Scotia away from carbon-based electricity toward sources that are greener and closer to home.

In the past, nearly 90 percent of the province's electricity supply came from fossil fuels—most of it coal. This over-reliance on a single fuel source weakens our energy security, binds us to the volatile and upward trend of international prices, and drains wealth away from the province. It also has a negative impact on both our health and our environment.

Recognizing that we have to make a profound shift in our energy economy, the province has committed to 25% renewable electricity by 2015, and 40% renewable electricity by 2020. COMFIT is one of the ways the government will meet these targets.



Program Description

COMFIT is the world's first feed-in tariff for locally-based renewable energy projects. A "feed-in tariff" (FIT) is a rate per kilowatt hour that small-scale energy producers are guaranteed for a fixed period of time. This provides them with enough economic certainty to invest in renewable energy projects. "Feed-in" means that energy produced by these projects will be fed in to the province's electricity grid.

Small-scale producers typically cannot compete successfully against much larger developers in a competitive bidding process. More than forty-five jurisdictions around the world, including Spain, Germany, and Ontario, have established FITs that support small-scale and community ownership. These programs let newcomers participate in the renewable electricity industry, and encourage the development of projects over widely-dispersed rural areas.

The COMFIT program supports the development of local renewable energy projects by municipalities, First Nations, co-operatives, universities, community economic development investment funds (CEDIFs) and non-profit groups. Projects will be connected to the grid at the distribution level, serving the needs of local communities. The size of the projects will require technical study on a case-by-case basis, and will have to fall within the capacity of the local distribution grid. Most will be between 2 and 4 megawatts (MW). The government hopes to add 100 MW of renewable electricity capacity through COMFIT—enough to power about 100,000 homes.

The rates for each technology type have been set by the Nova Scotia Utility and Review Board after extensive public consultation. These rates include consideration of basic cost recovery, including the cost of capital, and a reasonable return on investment. Nova Scotia Power will pay these rates for a twenty-year period.

The government will review the COMFIT program in 2012 as part of a commitment to undertake an 18 month program review. It will evaluate the effectiveness of the program structure and progress in meeting the province's objectives for community-scale renewable electricity development.



Benefits of the COMFIT program

Economic

- More local benefits than imported energy
- \$1 invested = 3x multiplier within the community
- Geographic distribution of industry across the province
- Less reliance on energy imports
- More predictable costs
- Provides jobs
- Promotes Nova Scotia industry

Social

- Empowers people at the local level
- Promotes sustainability initiatives
- Encourages "socially responsible investing"
- Creates employment and spurs investment in communities
- Utilizes and develops community-based expertise

Environment and Energy

- Offsets use of fossil fuel with clean energy
- Reduces greenhouse gas emissions
- Supports cleaner technologies in Nova Scotia
- Diversifies supply of energy
- Improves electrical grid efficiency
- Potential to produce 100 MW of renewable electricity by 2020

Eligibility

COMFIT is open to community-based organizations to ensure that projects are rooted in communities and that investment returns remain there. Eligible entities include municipalities or their wholly-owned subsidiaries, community economic development investment funds (CEDIFs), co-operatives, Mi'kmaq band councils, not-for-profit organizations, universities, and combined heat and power biomass facilities.

COMFIT Rates

The following technologies are eligible for the COMFIT program:

- Wind power, 50 kilowatts (kW) or less – 49.9¢ per kWh
- Wind power, over 50 kW – 13.1¢ per kWh
- Small-scale in-stream tidal – 65.2¢ per kWh
- Run-of-the-river hydroelectricity – 14.0¢ per kWh
- Combined heat and power (CHP) biomass – 17.5¢ per kWh



Timeline

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|---------------------------|---|
| September 19, 2011 | Application process opened. |
| December 16, 2011 | First approvals announced. |
| Winter/Spring 2012 | Application processing continues; all approvals announced. |
| Spring/Fall 2012 | Proponents complete any required environmental and technical studies, conduct public consultations and raise capital. |

Timing for construction and in-service dates depends on how quickly proponents secure financing and complete environmental, technical and other requirements, which vary according to technology and project size. Smaller projects may be able to begin producing electricity early in 2012.

Further Information

For more information or to sign up for our newsletter, please visit www.nsrenewables.ca. Questions and feedback can be directed to comfit@gov.ns.ca.