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Financial Considerations for Wind Energy

Above Photo: Dalhousie Mountain, Nova Scotia
SOURCE: COMMUNICATIONS NS

What financial issues are raised by wind energy?

Municipalities that become more sustainable through domestic renewable energy production reap direct and indirect economic benefits; for example, from taxes (per the Wind Turbine Facilities Municipal Taxation Act[1]) and sometimes from land leased directly to the project. Additional benefits include potential jobs and contracts, primarily during construction, and land leased to a project by community members.

If a municipality owns some or all of the wind energy project, the net profits are direct. Project planning, including siting, is key to ensuring the project's financial viability. Each project has unique financial considerations based on number and size of turbines, wind speeds, construction and land costs, interconnection details, and necessary studies and consultation programs. The cost of studies, construction and ongoing operation is compensated by the sale of electricity produced, which is why wind resource studies, desktop and in the field, are essential.

Renewable energy like wind offsets combustion of fossil fuels which produce gases and other air emissions leading to climate and health risks. Nova Scotia's Integrated Community Sustainability Plans and Municipal Climate Change Action Plans show the real cost implications of climate change for municipalities. Adaptation to rising sea level and extreme weather leads to costs for roads and infrastructure. A 2011 report on adaptation to climate change in Canada forecasts a cost of $5 billion by 2020, much of which may fall to local municipal governments.[2]

Electricity produced with local renewable resources creates more stable long-term electricity rates and reduces dependence on imported fossil fuels with unstable markets, as well as possible future health costs from air quality-related illnesses. Local renewable electricity projects often sign long-term agreements, like a 20-year power purchase agreement, which lock in costs. Energy cost security benefits a municipality, its businesses, institutions and residents.

1 *http://nslegislature.ca/legc/statutes/windturb.htm*

2 *http://www.fcm.ca/Documents/reports/PCP/paying_the_price_EN.pdf*

What are the cost implications of different sources of electricity?

Every electricity source has different economic considerations. Brief descriptions of each, based on a Canadian Electricity Association[3] power generation study, appear below. They do not include extended financial benefits, like those from local development, or indirect costs like health or climate. Long-range pricing forecasts for electricity generation show increases for fossil fuels and decreases for nuclear and most renewable energy sources.

Coal

Coal has the largest share of thermal generation in Nova Scotia, partly because its current costs are well within the range of wholesale electricity generation cost. Long-range risks may include additional costs of greenhouse gas emissions and volatility of the international market.

Natural Gas

Costs for natural gas remain higher and more volatile than coal, but its lower emissions may reduce risk of future costs due to regulatory changes. Current costs are slightly higher than wholesale electricity generation cost.

Nuclear

Current costs of nuclear are comparable to natural gas electricity generation, but expected to decrease in the long term.

Oil

Oil-fired generation is a very small source of generation in Nova Scotia and can be very expensive. Costs are typically above wholesale electricity generation cost.

Biomass

Costs of feedstock are critical in costing of biomass for electricity generation; as a result, costs can vary substantially.

Hydro

Run-of-river projects produce some of the cheapest electricity, with reservoir hydro a close second; costs are site-specific.

Solar

Although some applications are cost-effective, photovoltaic solar remains much more expensive than other technologies. Costs are projected to decrease significantly in the coming decade.

Wave & Tidal

Wave and tidal power are considered emerging technologies in Canada. Costs vary significantly and are expected to decrease for efficient future applications.

Wind

Costs of wind energy vary with project specifics, but at their most efficient are well within wholesale electricity generation cost. Cost tends to be higher for smaller projects, which is reflected in existing Community Feed-in-Tariff (COMFIT) Program rates.

3 *http://www.electricity.ca/media/pdfs/EnvironmentallyPreferrablePower/2-powergenerationincanada.pdf*

Can wind be cost-competitive with other sources of electricity in Nova Scotia?

Even as recently as ten years ago, wind was considered by many to be too expensive. Since then, more efficient technology and more local experience constructing and operating wind turbines have made wind energy cost-competitive. Nova Scotia's feed-in-tariff rate for wind turbines with a capacity above 50 kW is 13.1¢ per kWh, locked in for a 20-year period. In 2014, Nova Scotia Power's domestic service energy charge was 14.251¢ per kWh; electricity rates are expected to increase over the next 20 years. Wind energy costs are competitive, and will become more so as the cost of fossil fuels increases.

In 2014, Nova Scotia Power completed its Integrated Resource Plan for long-term operation of the electricity system, including necessary capital investments.[4] The study concluded that the cost of integrating wind energy rises sharply above 600 MW of installed wind generation; as a non-dispatchable source of electricity, it requires capital investment for upgrades to ensure reliable system operation.

Operational costs for non-renewables are expected to rise due to the increasing cost of fossil fuels, possible future carbon pricing, and the cost of complying with future air quality regulations or renewable targets. These levelized cost estimates of different sources of electricity, meaning capital and operating cost over a lifetime, are highly sensitive to assumptions.

How can we estimate the indirect cost of burning fossil fuels?

Beyond direct capital and operating costs of generating and distributing electricity, the burning of fossil fuels, particularly coal, has real ecological and social costs associated with greenhouse gases and other air emissions, like particulate matter.

In a joint report, the Pembina Institute, Asthma Society of Canada, Canadian Association of Physicians for the Environment and the Lung Association[5] estimated the true cost of coal as a source of electricity in Alberta. Using coal to generate 60% of the province's electricity would result in indirect costs for health and climate risks equivalent to additional consumer charges of 3.6¢ to 13.7¢ per kWh.

The Nova Scotia Department of Energy has committed to making health and environmental factors part of future studies that examine the potential costs associated with different electricity generation technologies and fuel sources[6]. Full cost accounting is vital to understanding the true financial implications of all sources of electricity generation.

The real cost of environmental and health effects is often seen at the municipal level, such as damage to municipal infrastructure from extreme weather events, or exacerbated health problems from burning fossil fuels.

4 *http://tomorrowspower.ca/irp*

5 *http://asthma.ca/pdf/costly-diagnosis.pdf*

6 *http://energy.novascotia.ca/sites/default/files/files/Electricity-Review-What-We-Heard-Scope-of-Work.pdf*

SOURCE: HTTP://WWW.MUNICIPALITY.GUYSBOROUGH.NS.CA

Guysborough, Nova Scotia

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Guysborough, Nova Scotia

Case Study Basic Stats

Location:

Goldboro & Melford and Sable Wind

Output:

250 kW and 13.8 MW

No. of Turbines:

11 (5 small and 6 large)

Case Study: DISTRICT OF GUYSBOROUGH

The Municipality of the District of Guysborough has invested in five AOC 15 – 50 (50 kWh) turbines (three in Goldboro and two in Melford) and six Enercon E-82 (2.3 MW) turbines at Sable Wind (near Canso, Hazel Hill and Little Dover communities). Guysborough was the first municipality in Nova Scotia to own and operate multiple small turbines through the COMFIT program and also the first to be the majority owner / operator of a large wind energy project. The small wind turbines represent a $2 million investment and the large wind energy project an investment of over $27 million[7]. Both projects will provide a recurring source of revenue to the Municipality for at least 20 years.

The Municipality will receive direct revenue from selling electricity from the projects it owns, jobs and other economic opportunities during construction and operation, and increased tax revenue from these wind energy projects. Service upgrades associated with these wind developments have also improved system reliability for local customers.

7 *http://www.municipality.guysborough.ns.ca/sable-wind*