

Environment and Sustainability Standing Committee
April 5, 2012

TO: Chair and Members of Environment and Sustainability Standing Committee

SUBMITTED BY:



Phillip Townsend, Director, Planning and Infrastructure

DATE: February 8, 2012

SUBJECT: ComFIT: Small Wind Turbine Municipal Opportunities

INFORMATION REPORT

ORIGIN

February 2, 2012: Environment and Sustainability Standing Committee (ESSC), Motion: ComFIT

BACKGROUND

7.1.1 Councillor Sloane - Request for Report re: ComFIT Program

MOVED by Councillor Barkhouse, seconded by Councillor Fisher that the Environment and Sustainability Standing Committee direct staff to:

1. Provide a summary report respecting municipal investment opportunity for small wind turbines (50kW and under); and
2. Include an overview of the ComFIT program and eligibility requirements.

During the discussion, Councillor Watts asked that the report identify whether ComFIT is asking for further public consultation over and above what is outlined in HRM's By-Law for wind turbines.

DISCUSSION

In April 2010, The Nova Scotia Department of Energy released the Renewable Electricity Plan.

This plan lays out a clear legal requirement: 25% renewable electricity supply by 2015 and using only made-in-Nova-Scotia sources. A further target of 40% by 2020 has also been established. The plan involves the use of a combination of sources like hydro, wind, solar, biomass, and tidal.

The pay-offs are significant: reduced emissions, price stability, and many new jobs. In fact, the plan is expected to generate roughly \$1.5 billion in investments and 5,000 to 7,500 person-years of employment. Many of these jobs have already begun and opportunities will continue to emerge.

The plan is available at: <http://nsrenewables.ca/sites/default/files/renewable-electricity-plan2.pdf>

As part of this Plan, the Province introduced a Community Feed-In Tariff (ComFIT). 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 these entities 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. A FIT program provides standardized rules and contracts as well as stable and predictable prices.

ComFIT is open to community-based organizations to ensure that projects are rooted in communities and that investment returns remain there. Regulations have established specific requirements to ensure all program applicants are truly community-based. 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 are available for the following technologies:

- 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; and
- Combined heat and power (CHP) biomass - 17.5¢ per kWh.

An interesting component of the ComFIT program is the requirement to identify sustainable uses of the revenue. It is the understanding of staff that for an application to be considered, revenue from a ComFIT project could not be used to offset the tax rate, but would be used to provide for a community benefit or programming that the municipality is not currently providing. A potential example might be of installing a unit at a Community Centre and the revenue coming in to help pay for programming or infrastructure.

The Benefits of the Community Feed-In Tariff Program



Economic

- 5-10x the local benefits
- \$1 invested = 3x multiplier within community
- Geographic distribution of industry
- Less reliant on energy imports
- More predictable energy costs
- Promotes NS industry
- Provides jobs



Social

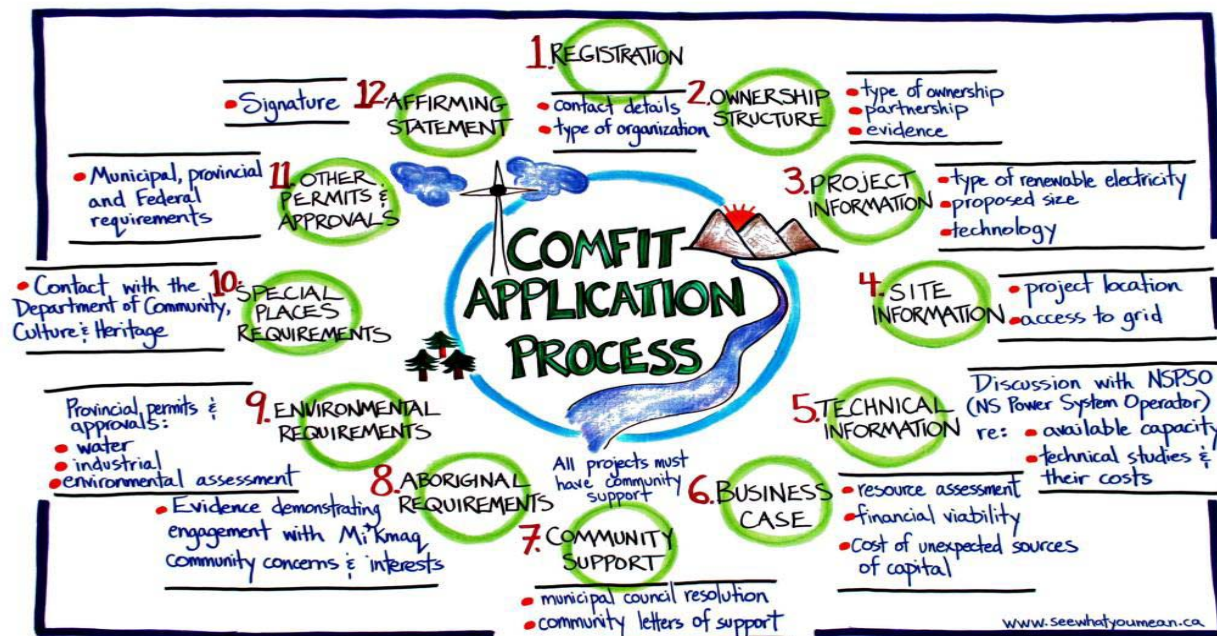
- Empowers the local level
- Promotes sustainability initiatives
- Encourages "Socially Responsible Investing"
- Employment and investment in communities
- Spur more local investment
- Utilize community-based expertise



Environmental

- Offset use of fossil fuels, including coal
- Reduce GHG emissions
- Cleaner technologies implemented in NS
- Diversified supply of energy
- Electrical grid efficiency
- Potential to produce 100MW of renewable electricity by 2020

ComFIT Project Development



50 kW or Less Wind Power

A key advantage of the smaller wind projects is that they do not require a Meteorological Tower (MET) data tower or Interconnection Request to Nova Scotia Power. This dramatically reduces project development costs. As demonstrated in the recent Halifax Water report to ESSC and Regional Council, larger wind ComFIT development costs are in excess of several hundred thousand dollars and substantial effort.

HRM Wind Energy Map

Attachment 1 shows where in the municipality 50kW or less turbines may be situated, with an overlay on the Halifax Regional Municipality (HRM) owned property.

Examples of 50kW Turbines

Attachment 2 includes a brochure of the SeaForth AOC 15/50. It is the understanding of staff that the only currently approved offering for ComFIT for under 50kW turbines is the SeaForth turbine.

Attachment 3 shows an unsolicited draft financial model of a project provided by SeaForth. These figures should be used for rough order magnitude purposes. HRM staff has not included additional municipal costs that would be involved. This model is approved by the Utility and Review Board (UARB) for the small wind ComFIT program.

A simple summary of the model:	=	approximately \$350,000 (Staff recommends another
Installation costs		\$25,000 to \$50,000 for development costs for rough order
		magnitude budget purposes, bringing the installation cost to
		\$400,000)

Annual Maintenance Costs	=	approximately \$6,500
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Energy Price for 20 years	=	\$499/MWh (this is fixed through the ComFIT
		program)

Output		Based on the Wind Atlas Map showing sites between 6.5
		and 7.5 meters per second and assuming a conservative 6
		meters per second. That wind speed equates to a 23%
		capacity factor which will provide 101 MegaWatt hours of
		electricity per year.

Annual Revenue		101 MegaWatt hours x \$499 (price) = \$50,399
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For reference, when contemplating such a project it is reasonable to start with an assumption that a \$400,000 capital project, which would have an approximate \$126,000 borrowing cost (3% at 20 years), will yield an annual net income of between \$11,900 in year 1 (gradually rising as borrowing costs decline) to approximately \$18,400 in year 20, for use in community benefitting projects. Once the debt is retired after 20 years, annual net income would increase significantly, assuming maintenance costs do not rise to offset it. Attachment 4 shows a projected Cash Flow.

Note Regarding Public Consultation

During the moving of the motion at ESSC, committee further commented questions regarding community consultation for these projects. A large factor in the ComFIT program is the need for a demonstrable community benefit from the purposed income. Simplified, a community that is inconvenienced by a wind turbine will receive the benefit from the income. To give an example, HRM has parkland that is undeveloped that provides nature experience to residents and visitors. That parkland system has infrastructure pressures on it that the municipality and the province cannot meet. Perhaps as a solution to a specific park area, a community group would support the installation of a wind turbine in an Industrial Park in their community under the premise that the \$11,900 to \$18,400 per year in net income would go towards the benefit of the parkland within their community (for example, infrastructure or land acquisition or water protection/ stewardship).

HRM By-Law

Setbacks and Separation Distances from Wind Turbines

Turbine Type (<i>max. height/ kilowatt limit</i>)	Prop. Lines	Adj. Habitable Buildings
Micro (<i>23 metres/ 0-10 Kilowatts</i>)	1.0 x ht.	3.0 x ht.
Small (<i>35 metres/ 10-30 Kilowatts</i>)	1.0 x ht.	180 m
Medium (<i>60 metres/ 30-300 Kilowatts</i>)	1.0 x ht.	250 m
Large (<i>60 metres+ / 300 kW +</i>)	1.0 x ht.	1000 m

BUDGET IMPLICATIONS

There are no budget implications to this report.

ComFIT projects have capital and operating costs which appear to be entirely offset by the revenue they generate. However, the net income available to the community may be relatively small until the capital debt is retired.

Should staff be directed to develop a 50 kW or less ComFIT project and subsequent application, it is anticipated that \$10,000 to \$25,000 of consultant costs would be required in addition to approximately 50 to 100 staff hours. Currently, Staff does not have any identified budget or Human Resource capacity to develop a project.

In terms of investment, investments in Energy Efficiency have proven to provide greater returns on investment.

This sort of project would be a capability project in the Capital/Project budget. That means that doing this \$400,000 project would need to displace another planned capital project.

FINANCIAL MANAGEMENT POLICIES/BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Project and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Project and Operating reserves, as well as any relevant legislation.

COMMUNITY ENGAGEMENT

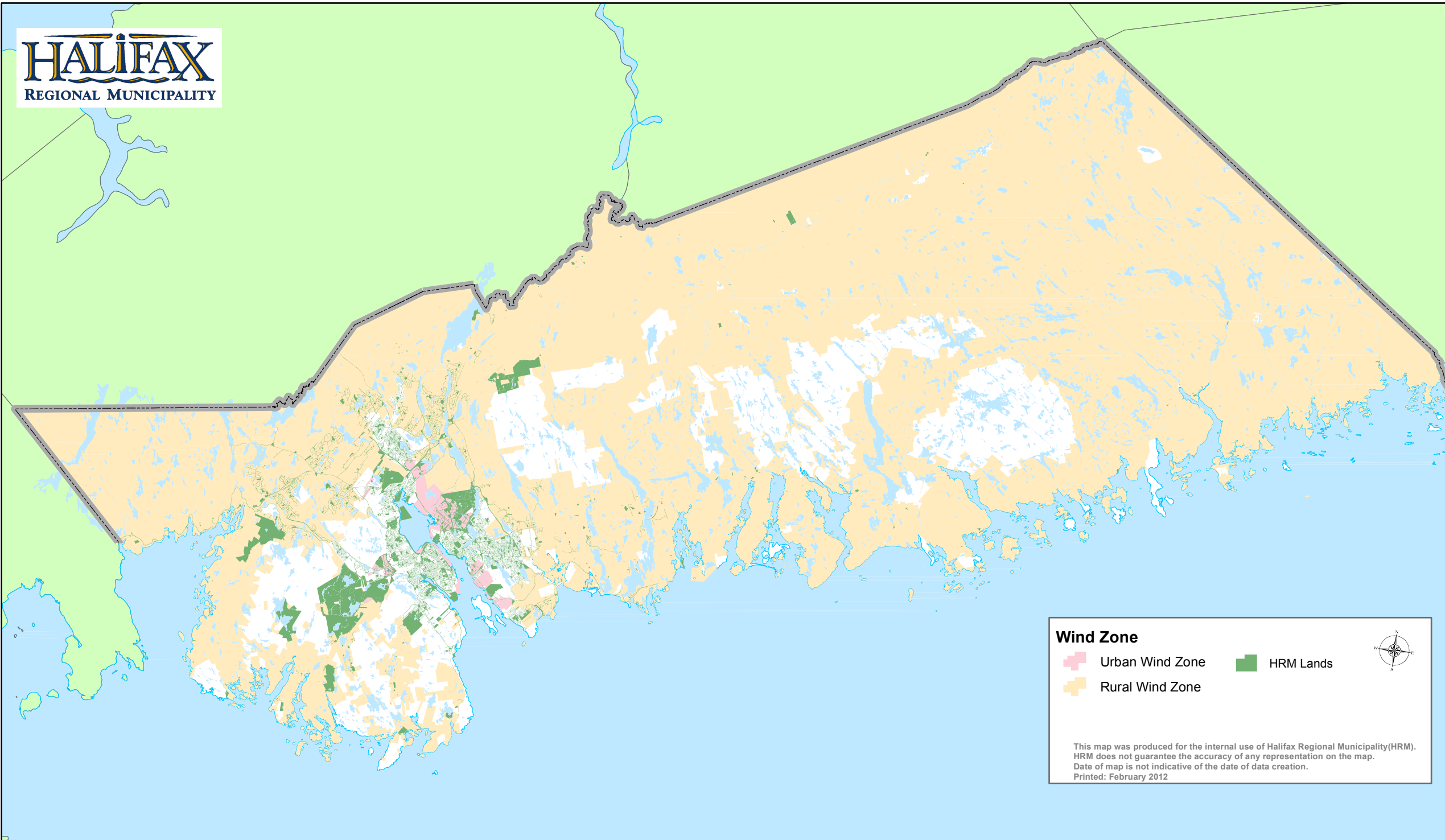
There was no community engagement for this Report. ComFIT projects require demonstration of a Community Engagement component.

ATTACHMENTS

Attachment 1:	Map showing HRM Property and potential wind sites
Attachment 2:	SeaForth AOC 15/50 brochure (sample 50 kW or under turbine)
Attachment 3:	UARB Financial Model
Attachment 4:	Cash Flow Projection

A copy of this report can be obtained online at <http://www.halifax.ca/commcoun/cc.html> then choose the appropriate Community Council and meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Richard MacLellan, Manager, Energy and Environment, 490-6056



Wind Zone

- Urban Wind Zone
- Rural Wind Zone

HRM Lands



This map was produced for the internal use of Halifax Regional Municipality (HRM).
HRM does not guarantee the accuracy of any representation on the map.
Date of map is not indicative of the date of data creation.
Printed: February 2012

A tall, white, three-bladed wind turbine stands prominently in a grassy field under a bright blue sky with scattered white clouds. The turbine's blades are positioned at different angles, suggesting it is in operation. In the background, a line of trees and a distant horizon are visible.

**OUTSTANDING PERFORMANCE
PROVEN RELIABILITY**





PRODUCT OVERVIEW

Seaforth Energy manufactures and markets the worlds leading and most reliable 50kw wind turbine. The use of robust technology is the key to successful installation of wind turbines in remote climate locations. This turbine is the evolution of a design that has been field tested around the world for more than 20 years.

Assuming 100% availability of wind and average wind speeds of 7 m/s (15.7 mph), our 60hz model (made for the North American market) is calculated to produce approximately 165,000 kwh per year. Our 50hz model (made for the overseas market) is calculated to produce approximately 155,000 kwh per year.



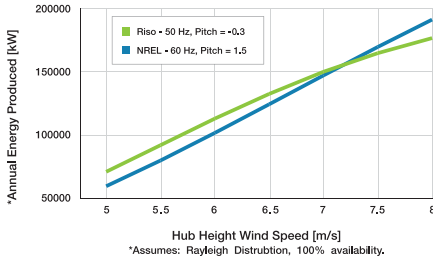
IDEAL USES

The AOC 15/50 wind turbine is ideally suited for remote, diesel-based utilities and grid connected locations to offset electricity costs for agriculture, commercial and industrial facilities, resorts, municipalities and community centres.

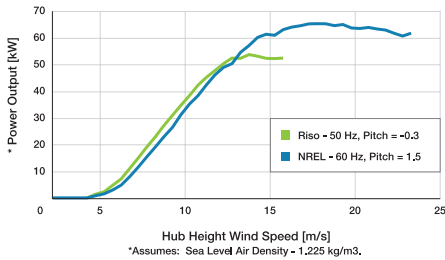
WORLDWIDE INSTALLATIONS

AOC 15/50 wind turbines are presently being used in Canada, United States, Morocco, Russia, Ireland, the Caribbean, England, Scotland and India.

ANNUAL ENERGY OUTPUT



POWER CURVES



BENEFITS

- Proven reliability and durability
- Outstanding performance in extreme conditions and remote locations
- Flexible for net metering and off grid applications for better managed energy costs
- Tilt up installation available
- Design simplicity with minimal maintenance
- Machining and assembly drivetrain ISO 9001 certified

Technical Specifications

Rate of Capacity

Produces 3phase, 480VAC power

Weight

2420 kg / 5340 lbs

Hub Height

30m, 37m, 43m

Rotor Diameter

15m

Blades

GRE Composite

Cut in Wind

4.6 m/s (10.2 mph)

Shut Down

(high wind) 22.4 m/s (50 mph)

Peak Survival

59.5 m/s (133 mph)

Yaw Control

Downwind Passive

Breaking Systems

Tip brakes, dynamic brake, parking brake and stall regulated blades

Control System

PLC based Remote Monitoring

Warranty

3 year limited warranty with extended warranties available

The AOC 15/50 has proven reliability and durability combined with outstanding performance, and has a simple design that requires minimal maintenance.



to learn more, visit:

www.seaforthenergy.com

11 Acadia Street
Dartmouth, NS B2Y 2N1
P: 902.406.4400
TF: 1.888.801.9321



Nova Scotia Utility & Review Board FIT Model		Small Wind (50 kW and smaller)
Assumptions		Notes:
General Inflation Factor (revenue and expenses)	1.92%	From NSPI 2009 IRP Update
Capital Costs (Uses of Funds)		
Development	\$0	
Equipment & Installation	\$268,000	
Interconnection	\$21,550	
Reserves		
Up-Front Maintenance	\$2,250	(Half of year-one O&M)
Working Capital	\$3,255	(Half of year-one expenses)
Debt Service Reserve	\$12,369	(Half of year-one debt service.)
Financing		
Debt Closing Costs & Fees	\$9,960	(Summed from below)
Equity Closing Costs & Fees	\$6,424	(Estimated as 4% of equity)
Interest During Construction	\$9,652	
Total Project Cost	\$333,460	
Total Project Cost (\$/kW)	\$6,669	
Initial Reserve Account Sizing		
Upfront Maintenance (months of Year 1 O&M)	6	
Working Capital (months of Year 1 OPEX)	6	
Debt Service Reserve (months of P&I)	6	
Capital Structure (Sources of Funds)		
Amount (\$)		
Grants (net value)	0	
Debt	166,730	
Equity	166,730	
Total Sources of Funds	333,460	
Amount (%)		
Grants	0.0%	
Debt	50.00%	
Equity	50.00%	
Total Sources of Funds	100.0%	
Grants:		
State and Federal Incentives	0	
State/Provincial Tax 1	0	
State/Provincial Tax 2	0	
Federal tax	0	
Net Value of Grants	0	
Debt Terms		
Amount	166,000	(Based on target debt/equity ratio)
Amortization period	10	
Interest Rate	8.00%	
Up-Front Fee (%)	1.00%	
Up-Front Fee (\$)	1,660	
Closing Costs	8,300	(5% of loan value)
Tax Depreciation Allocation		
% of Total Project Cost		
30% Double Declining	0.0%	95% of installed cost
50% Double Declining	76.4%	
20-yr SL	0.0%	
40-yr SL	0.0%	
Other	0.0%	
Non-Depreciable	23.65%	
Total	100.0%	
Amount Allocated		
30% Double Declining	0	
50% Double Declining	254,600	
20-yr SL	0	
40-yr SL	0	
Other	0	
Non-Depreciable	78,860	

Assumptions:		Notes:
Operating Inputs		
Net Generator Capacity (MW)	0.05	
Energy Production:		
Net Capacity Factor	23%	Net of plant availability and other loss factors
Net Output in MWhs	101	
Annual Operating Expenses		
Annual Fuel Cost		
Fuel Required per Year (mmBtu)	0	
Initial year Fuel Price (\$/mmBtu)	0	
Routine O&M (expensed)	4,500	Escalates at inflation.
Site Maintenance	0	Escalates at inflation.
General & Administrative	0	Escalates at inflation.
Insurance	2,010	Escalates at inflation.
Land Lease	0	Escalates at inflation.
Other	0	Escalates at inflation.
Property Tax		
Project hard costs less interconnection	268,000	
Assessed Value (%)	0.00%	
Assessed Value (\$)	0	
Annual Decline in Assessed Value	0.00%	
Assessed Value Minimum %	0.00%	
Property Tax Rate	0.00%	Based on Wind Turbine Facilities Municipal Taxation Act
Revenue Assumptions		
Levelized Energy Price (\$/MWh)	499.00	
% of Levelized Rate Escalating @ Infl.	0.0%	
Other Revenues (increases with inflation)	0	
Return Metrics		
20-year Equity IRR		
Pre-Tax	13.56%	
After-Tax	13.56%	
Average Debt Service Coverage Ratio	1.76	
Minimum Debt Service Coverage Ratio	1.73	
Minimum Annual After-Tax Equity Net Benefits	18,294	Includes tax benefit/(liability)
Tax Rates:		
Federal Income Tax	0.0%	
State/Provincial Income Tax		
Small Business Tax Rate		
Applicable Income (less than X)	400,000	
Small Business Tax Rate	0.0%	
Corporate rate (income greater than X)	0.0%	
Major Maintenance		
Replacement Occurs Every X Years	5	
Cost of Replacement (Year 0 Dollars)	0	Included in the cost of Routine O&M.
	50% Double	
	Declining	
Tax Depreciation Classification of Spending	30-yr SL	
Book Depreciation Classification of Spending		
Residual Value		
Residual Value (Net Book Value)	-0	
Book Depreciation Classifications		
20-yr SL	100.0%	
30-yr SL	0.0%	
37-yr SL	0.0%	
40-yr SL	0.0%	
Non-Depreciable	0.00%	
Total	100.0%	
Amount Allocated		
20-yr SL	333,460	
30-yr SL	0	
37-yr SL	0	
40-yr SL	0	

Nova Scotia Utility & Review Board FIT Model

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Nova Scotia Utility & Review Board FIT Model

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ComFIT: Small Wind Turbine Municipal Opportunities

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