

# Small Wind in Ontario's Feed-in-Tariff

## CanWEA Presentation

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CANADIAN WIND  
ENERGY ASSOCIATION

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# Presentation Outline

- **Market overview**
  - Status of small wind market
  - Incentives in Canada and the U.S.
- **Small wind applications**
  - Different categories of small wind
  - Markets, challenges and what is needed for each
- **Relevant initiatives**
  - Activities and available materials
  - CanWEA's recommendations on small wind in the FIT program
- **Summary**



# CanWEA and Small Wind

- **About CanWEA**

- CanWEA has more than 420 members, most of whom are focused on large wind
- Small wind committee guides activities, includes manufacturers, installers, service providers ...

- **How we see small wind:**

- Tremendous interest in small wind from the general public
- Small wind market is now where large wind was 20 years ago
- There is an opportunity to “not miss the boat” on manufacturing
- Small wind and large wind are linked – comfort with small wind breeds comfort with large wind



# CanWEA Small Wind Manufacturers

- Canadian-based:
  - WES Canada (80 kW, 250 kW) – Ontario-based
  - Endurance (5 kW, 35 kW, 50 kW)
  - Mamanna (50 kW)
  - ReDriven (3 kW, 5 kW, 10 kW, 20 kW, 50 kW) – Ontario-based
  - Cleanfield Energy Corp. (3 kW) – Ontario-based
  - Vbine (not yet rated)
- U.S. based:
  - Bergey (1 kW, 10 kW)
  - Northern Power Systems (100 kW, 2.2 MW)
  - Earth Turbines Inc. (2.5 kW)
  - Southwest Windpower (900 w, 1 kW, 3 kW)
  - Mariah Power (1.2 kW)



# The Canadian Small Wind Market

- **Total installations in Canada (estimates):**
  - Roughly 70 farm and business systems (>10-300 kW)
  - ~ 300 grid-connected residential systems (1-10 kW)
  - ~ 4,900 off-grid “mini” wind systems (less than 1 kW)
  - Total capacity = ~ 5.5 MW
- **Small wind market potential (with incentives):**
  - 30% growth over 20 years would see market transform into \$1.2 billion dollar industry with 9,900 FTE jobs, especially in rural areas
  - Our manufacturers export most of their product
  - US (largest market) experienced 78% growth in 2008
  - Important economic opportunity for Ontario



# Small wind support in Canada

- **Legislation**

- Net metering allowed in most provinces; many municipalities with small wind-specific zoning bylaws

- **Education**

- Some educational materials available (e.g. CanWEA Purchase Guide, model zoning bylaws, info on net metering)

- **Incentives**

- Almost none (Saskatchewan provides 35% of cost up to a maximum of \$35,000 for systems up to 100 kW).
- Farm Credit Canada provides special interest rate and no loan processing fees on the first \$500,000 for small wind



# Incentives in the U.S.

- **Comparatively strong support:**
  - US Economic Stimulus Bill provides consumers with a 30% tax credit for the purchase and installation of small wind turbines with rated capacities of 100 kilowatts or less (no cost caps)
  - Rebates and incentives are available in 41 states (see DSIRE database for complete list)
  - California and New York have very strong programs for smaller systems (direct rebates up to 40% of cost)
  - Alaska has a very strong program for remote wind diesel systems (using many Canadian turbines)
  - States provide good educational materials and consumer information



# Why Small Wind?

- **Helping to meet Ontario's green energy goals**
  - Small wind can contribute to GEA job creation targets: Ontario already has a small wind manufacturing base and regions have expressed great interest in developing the small wind supply chain
  - There are FIT price levels for solar, but not for small wind which is a comparable and compatible technology
  - Small wind can help to increase acceptance of large wind
- **Economic Benefits**
  - Manufacturing opportunities for both domestic and int'l markets
  - Installation jobs in rural areas, where economic stimulation needed
  - Medium-sized systems can significantly offset farming/commercial electricity costs and demand



# Why Small Wind?

- **Energy Conservation**

- Turbines produce power at the point of consumption
- Avoids line losses, can make the grid more secure, reducing peak demand and congestion on strained grids
- Those installing small wind will typically focus on EE first
- Incentive can be designed to further encourage conservation

- **Social Benefits**

- Opportunity for individuals to participate in reducing air pollution, energy consumption and producing clean power
- Job creation (manufacturing, installation and maintenance)
- Gateway for additional energy efficiency/conservation measures



# Types of Small Wind Systems



**Residential  
grid-tie  
(1 – 10 kW)**



**Battery  
Charging  
( $< 1$  kW)**



**Farm &  
Commercial  
(10 – 100 kW)**

**Remote &  
Wind-Diesel  
(50 – 300 kW)**



# Small-size residential systems (1 kW to 10 kW)

- **Market and prospects**

- On-grid residential, net metered system providing anywhere from 10% to 150% of house electricity
- Currently few systems in Canada (between 300 to 400)
- Buyer motivation: environmental interests, longer-term paybacks

- **Typical application**

- Roughly \$7,000 - \$8,000 per kW
- Capacity factor : 13% - 18% for a well-sited system in Ontario
- A 10 kW installation: \$70,000 providing 13 MWh per year
- A 1 kW installation: \$7,000 providing ~ 1 MWh per year



# Small-size residential systems (1 kW to 10 kW)

- **Challenges**

- No incentives from utilities or governments to recognize benefits
- Difficulty in obtaining permitting and approvals – connection costs can sometimes equal the system purchase cost
- Product performance and reliability
- Appropriate siting of turbines

- **What needs to happen**

- Need performance-based incentives that recognize benefits
- Need to ensure that connection process is streamlined
- Need qualification to ensure that turbines “perform as advertised”
- Need to ensure that turbines are installed in the right places



## Mid-sized farm systems (10 kW to 100 kW)

- **Market and prospects**
  - On-grid farm systems providing over 50% of electricity
  - Currently very few systems in Canada (under 100)
  - Buyer motivation: stable long-term cost of electricity, interest in energy independence
- **Typical application**
  - Roughly \$5,500 - \$6,500 per kW
  - Capacity factor : 15% - 20% for a well-sited system
  - A 50 kW installation: \$250,000 providing 87 MWh per year (enough for 8 average homes)



# Mid-sized farm systems (10 kW to 100 kW)

- **Challenges**

- Initial costs are very high; need to get ROI to at least 10%
- Difficulty in obtaining permitting and approvals
- Product reliability and performance

- **What needs to happen**

- Need production incentive or fixed tariff that helps to level the playing field with conventional generation
- Need qualification to ensure that turbines “perform as advertised”
- Need to streamline connections process (e.g. no requirement for a system impact assessment at a scale done for large wind)



# Large wind-diesel for remote (50 kW to 300 kW)

- **Market and prospects**

- Over 300 northern and remote communities in Canada
- Electricity prices range from \$0.25 to \$1.50 per kWh
- Diesel generation causes pollution and brings few benefits
- Significant Canadian expertise in these systems (e.g. Ramea Island, NL and Kotzebue, Alaska) puts us in a great position

- **Typical application**

- Roughly \$3,000 - \$5,000 per kW
- Capacity factor : 18% - 22% for a well-sited system
- A 250 kW installation: \$1 million – with diesel can power a community
- Payback period can be very attractive: well under 10 years



# Large wind-diesel for remote (50 kW to 300 kW)

- **Challenges**

- Utilities usually only willing to pay avoided cost of diesel – not a level playing field for wind to compete
- Need to locate where the demand is (not necessarily where the best wind is)

- **What needs to happen**

- Need production incentive suited to northern conditions
- Need to develop on-site capacity (can be as important as technical elements of project)



## Relevant initiatives

- **Small Wind Certification Council (SWCC)**
  - Certification of performance, sound and duration
  - Provides security that turbine will “perform as advertised”
  - Allows “apples to apples” comparison of turbines
  - First certified turbines will come out within a year
- **Education materials:**
  - CanWEA Small Wind Purchase Guide (2008)
  - CanWEA Small Wind Siting Guidelines
  - CanWEA website: [www.smallwindenergy.ca](http://www.smallwindenergy.ca)
- **Legislation materials:**
  - Encouraging streamlined permitting, connection and REA
  - Model Municipal Zoning Bylaws



# CanWEA recommendations for supporting small wind in Ontario

- **Program objective: “Good turbines in good places”**
- **Recommendations:**
  - **Provide incentives that recognize different applications:**
    - Grid tied residential: 1 to 10 kW
    - Farm and commercial: 11 kW to 100 kW and
    - Larger applications: 101 kW to 500 kW
    - Need qualification to ensure turbines perform as advertised
  - **Provide educational support**
    - Materials to support purchase decision
    - Materials to ensure that turbines installed in right places
  - **Provide streamlined legislation**
    - Ensure that approvals and connection process is efficient



# Element 1: Incentives

- **CanWEA recommends Feed-In Tariff (FIT) for qualifying small wind, differentiated by size**
- **Why a Feed-In Tariff?**
  - Consumers: provides certainty and a simplified process for obtaining contracts
  - Governments and utilities:
    - Only pay for energy produced (as opposed to rebates where performance is not guaranteed)
    - Ensure lower attrition rates (avoids problem with RFP and lowest cost approach) and easier contract administration
    - Certainty attracts investment, manufacturing and jobs
    - Can adjust FIT price as market evolves



# Element 1: Incentives (cont.)

- **Recommended FIT levels:**

Using same assumptions used to calculate FIT for solar PV (For 12% ROE and 70/30 debt/equity ratio):

- **101-500 kW:** 25 ¢/kWh (assuming 20% CF, \$4,500/kW) w/ adder for remote
- **11-100 kW:** 35 ¢/kWh (assuming 20% CF, \$6,000/kW)
- **1-10 kW:** 50 to 55¢/kWh (assuming 15% CF, \$7,500/kW)
- Estimates are based on pre-REA installations, and assume REA is appropriate to scale (ie: REA for a 50 kW  $\neq$  250 kW  $\neq$  1 MW)

- **Recommended Qualification:**

- To ensure customer satisfaction, incentive should only be offered to qualified, proven turbines
- Suggest starting with a qualified list (such as that used by NYSERDA\*) and then move to SWCC once program is in full swing (mid-2011)

\*<http://www.powernaturally.org/programs/wind/incentives.asp>



# Elements 2 & 3: Education & Legislation

- **Education and consumer confidence**
  - Qualification of turbines is a priority
  - Educational programs with schools can help increase acceptance of small and large wind (e.g. “KidWind” program)
  - Draw on available resources (CanWEA and US States)
- **Legislation**
  - REA should be appropriate to scale of system, and should be streamlined for systems under 500 kW (in other words, REA process should not be at same scale as for large wind)
  - Work with municipalities to adopt uniform small wind zoning bylaws (draw on CanWEA model if needed)



# What a small wind FIT would mean for Ontario

- **With appropriate incentives and reduction of barriers, the Canadian market could experience up to 43% annual growth between now and 2025**
- **Potential annual revenue from domestic sales:**
  - 10-300 kW farm/business category: \$350 million
  - 1-10 kW residential category: \$89 million
- **Potential revenue from exports:**
  - 10-300 kW farm/business category: \$1,900 million
  - 1-10 kW residential high growth scenario: \$6 million
- **Manufacturing jobs:**
  - 10-300 kW farm and business: 12,800 jobs
  - 1-10 kW residential: 520 jobs



# Summary

- **Small wind is a tremendous opportunity for Ontario:**
  - Opportunity for Ontario to be a leader in small systems, and the first province in Canada to introduce small wind FIT
  - Very strong demand from citizens, communities and manufacturers
  - Strong opportunity to develop small wind supply chain and spur associated jobs and investment
  - Opportunity to “fill the gap” in GEA by including small wind within the FIT (provide similar treatment as solar PV)
- **Recommended incentive structure :**
  - Provide different FIT levels for different sizes: 50 - 55¢/kWh for 1 to 10 kW; 35¢/kWh for 11 to 100 kW; 25 ¢/kWh for 101 to 500 kW
  - Need turbine qualification to ensure good turbines
  - Need education and legislation to ensure installation in good places

