North American Small Wind Turbine Certification

Small Wind Certification Council

New Jersey Small Wind Working Group Meeting
August 10, 2010

New Jersey Board of Public Utilities, Office of Clean Energy

Problem

- Small turbine performance specifications are not standardized
- Agencies and utilities providing financial assistance are asking for performance assurance to increase support for incentives
- Consumers need greater certainty of function, performance, and durability
- Less than half of turbines have been tested

Why Certification?

- Allow **consumer comparison** of products
- Funding agencies will gain greater confidence that small turbines installed with public assistance **have been tested for safety, function, performance and durability** and **meet requirements of consensus standards**
- **Consumer protection** and **industry credibility**

SWCC: Small Wind Certification Council

- New independent, third-party certification body to serve North America
- Certify that small wind turbines (SWTs) meet the requirements of the new AWEA *Small Wind Turbine Performance and Safety Standard*
- Can be used as state-level eligibility

SWCC certifies **Mechanical** Strength, Durability, Function & **Performance** of turbine system to new AWEA standard

NRTLs certify **Electrical Safety** of **Turbine & Controller** (*new UL Standards in development*)

PE certifies **Tower & Foundation**

NRTLs certify **Inverter** to IEEE 1547/UL 1741

NABCEP certifies the **Installer**

Grid-tie Small Wind Turbine in the US

Wired per National Electrical Code (**NEC**) *(new article in 2011)*

What Certification….

Is:

- Is:

  An independent confirmation that the Small Wind Turbine has been tested and designed per the requirements of the AWEA Standard

Is <u>not:</u>

- An assertion that the Small Wind Turbine is durable, reliable, quiet, loud, safe, efficient, good, bad, failure-proof or perfect
- Provided **by** AWEA

SWT Manufacturer

AWEA AMERICAN WIND ENERGY ASSOCIATION

the Standard

Test Organization (field testing)

SMALL WIND SWCC CERTIFICATION COUNCIL

Certifies Compliance

SWCC Start-up Funding

- U.S. Department of Energy
- New York State Energy Research and Development Authority
- Applicant Fees
- Previous Organizational Development through Interstate Renewable Energy Council
  - Nevada State Office of Energy, NYSERDA, Energy Trust of Oregon, Wisconsin Division of Energy, CanWEA (funds from NRCan), Casper College (Wyoming), Iowa Energy Center, National Renewable Energy Laboratory

What is the AWEA Standard?

- AWEA *Small Wind Turbine Performance and Safety Standard* (AWEA Standard 9.1 – 2009)
- **Harmonized** with the BWEA Standard (some differences such as acoustics)
- Incorporates, **with modifications**, existing IEC standards for small wind turbines
- Written to **ensure the quality** of the wind turbine can be assessed while imposing only **reasonable costs and difficulty**

Equipment Eligibility

- Per the AWEA standard
  - Newly manufactured, electricity-producing wind turbines with a swept area up to 200 m^2
  - 200m^2 ~ 16m diameter rotor
    ~ 65 kW (or less)
  - Horizontal and vertical axis turbines are eligible

Equipment Eligibility

- Except as required by the AWEA standard, **towers and foundations** are not part of the scope of SWCC certification

SWCC Certification based on…

- an evaluation of:
  - Wind turbine design (Structural Analysis)
  - Field testing

Field Testing

- Power Performance
  - Power Curve
  - Energy Curve
  - Rated Annual Energy
  - Rated Power
- Acoustics
  - Sound pressure levels
  - Rated Sound Level
- Safety and Function
  - Pass/Fail
- Duration
  - Pass/Fail

Field Testing

- SWCC **Test Organization List** now has **26** test organizations that intend to participate in field testing for Certification
- 4 new NREL supported **Regional Test Centers**

To see some results/reports: NREL Independent Testing

www.nrel.gov/wind/smallwind/independent_testing.html

Qualified Testing Organizations

1. Accredited Test Organization
   - Currently only one accredited lab in North America (NREL)

2. Non-Accredited Test Organization
   - **On-site audits**

3. Manufacturer Testing
   - On-site audits plus **further scrutiny**

- Testing outside North America is acceptable

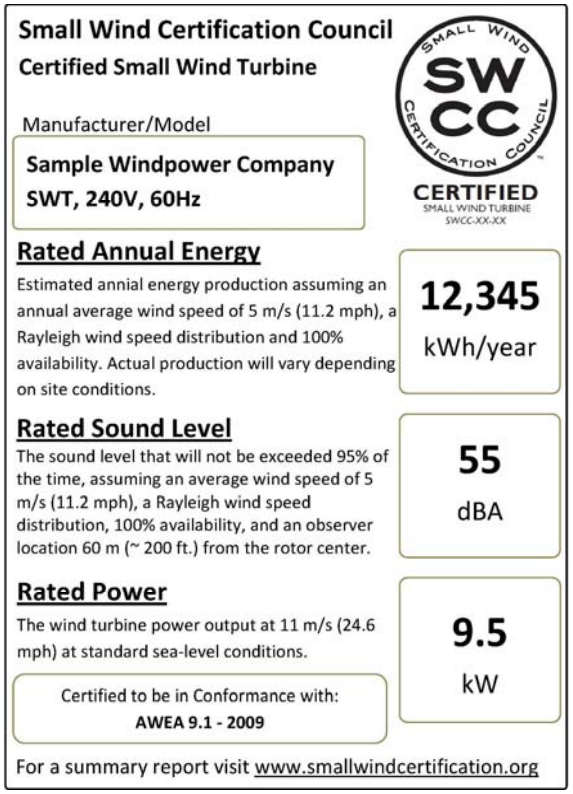
Certification Process Summary

1. Notice of Intent to Submit an Application
2. Certification Agreement
   (Can now be listed as Application Pending)
3. Field Testing and design analysis performed
   (~ min 6 months, typically one year to complete)
4. Test reports submitted with Certification Application
5. Technical review
6. Certification Decision
7. Granted; Info added to website

SWCC Certification Label

(in development)

- Rated Annual Energy (kWh)
  - @ annual average wind speed of 11.2 mph (5 m/s)
- Rated Sound Level (dBA)
  - Sound pressure level not exceeded 95% of time with average wind speed of 11.2 mph (5 m/s) at 60 meters from rotor
- Rated Power (kW)
  - @ 24.6 mph (11 m/s)



Small Wind Certification Council

Certified Small Wind Turbine

CERTIFIED
SMALL WIND TURBINE
SWCC-XX-XX

Manufacturer/Model

Sample Windpower Company
SWT, 240V, 60Hz

Rated Annual Energy

Estimated annial energy production assuming an annual average wind speed of 5 m/s (11.2 mph), a Rayleigh wind speed distribution and 100% availability. Actual production will vary depending on site conditions.

12,345 kWh/year

Rated Sound Level

The sound level that will not be exceeded 95% of the time, assuming an average wind speed of 5 m/s (11.2 mph), a Rayleigh wind speed distribution, 100% availability, and an observer location 60 m (~ 200 ft.) from the rotor center.

55 dBA

Rated Power

The wind turbine power output at 11 m/s (24.6 mph) at standard sea-level conditions.

9.5 kW

Certified to be in Conformance with:
AWEA 9.1 - 2009

For a summary report visit www.smallwindcertification.org

SWCC Program Status

- Began to Accept Notices of Intent in February 2010
- Now have 14 turbines with "Application Pending"
- Expect first certification in late 2010
- More certifications in 2011

SWCC Certification Applications Pending

Manufacturer	Turbine
American Zephyr Corporation	Airdolphin GTO
Bergey Windpower Co.	Bergey 5kW
Bergey Windpower Co.	Bergey Excel-S
Cascade Engineering	Swift Wind Turbine
Endurance Wind Power Inc.	Endurance S-343
Eveready Diversified Products	Kestrel e400i 3kW 250 V
Eveready Diversified Products	Kestrel e400i 3kW 48Vdc
Renewegy, LLC	Renewegy VP-20
Seaforth Energy	AOC 15-50
Southwest Windpower	Skystream 3.7
UrWind	UrWind O_2
Ventera Energy Corporation	Ventera VT10
Windspire Energy	Windspire – 800040
Xzeres Wind Corporation	ARE442

Pursuing...

SWCC Accreditation

- SWCC pursuing **ANSI Accreditation for Product Certification Bodies**
- Used **ISO/IEC Guide 65** as a guide for policies

Multiple Certifications

- What if the mfg intends to pursue:
  - Type certification to IEC 61400 Standards;
  - Certification to BWEA Standard for MCS in UK; **and**
  - SWCC certification for North America **?**

- **Coordinate** with Cert. Bodies and Test Organization to understand requirements when developing test plans
- **Conditional Temporary Certification** may be an SWCC option if turbine is tested to IEC or BWEA standards

State & Utility Incentives

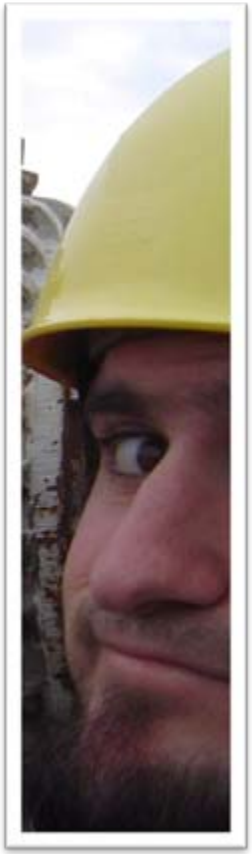
- SWCC as a means to qualify turbines for incentive eligibility
  - Energy Trust of Oregon
  - Focus on Energy (Wisconsin)
  - New York State Energy Research and Development Authority (NYSERDA)
  - Massachusetts Clean Energy Center (MassCEC)
  - California Energy Commission (CEC)
  - Colorado, Iowa, Maine, Maryland, Minnesota, Nevada, Vermont

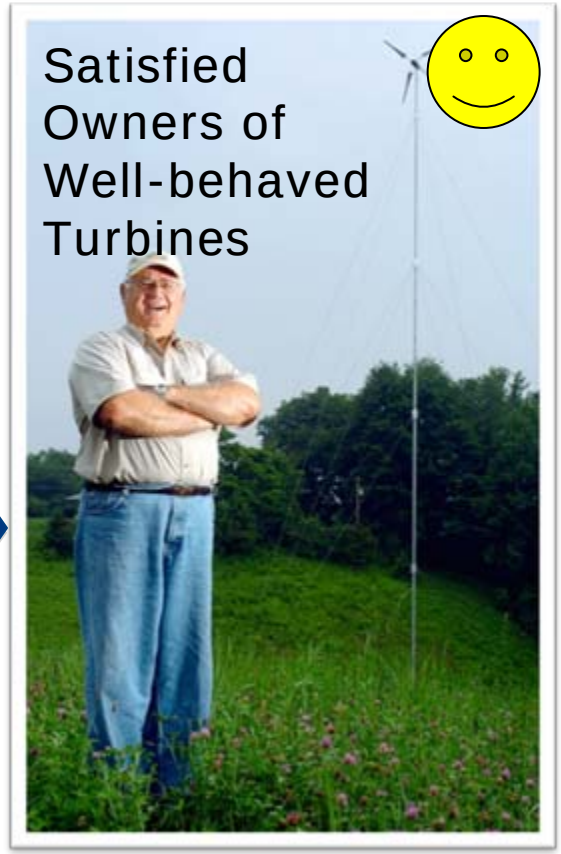
Benefits of Certification

- Certification labels ease **consumer comparison** of products
- Funding agencies and utilities will gain greater confidence that small turbines installed with public assistance **have been tested** for safety, function, performance and durability and **meet requirements of consensus standards**
- Certification can help prevent unethical marketing and false claims, thereby ensuring **consumer protection** and **industry credibility**

Why Certification?

Filter Turbines thru Testing/Certification





Stakeholder Input

Submit your comments on how we can use the SWCC data for the NJCEP.

Please forward comments to

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For More Information Regarding Small Wind Certification Council

Recommend Contacting
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Sign up for mailing list
www.smallwindcertification.org
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Thank you

www.njcleanenergy.com