

Form 731
Wind System Installation Checklist
 Small Wind Program



To be completed by Verifier

Project Information		
Verifier Name	Date of Verification:	Initial Meter Reading =
System Owner Name	Project Name (if different from System Owner name)	
Installation Address		
Trade Ally Name	Wind Turbine mfg., model	

A.	General Requirements
<input type="checkbox"/>	Site receives service from PGE or Pacific Power [verify on meter or customer bill, fatal]
<input type="checkbox"/>	System meets net metering requirements [verification that net-metering agreement in process or complete in Manual, correction]
<input type="checkbox"/>	Installation is of workmanlike quality [visual inspection using judgment, comment/correction]
<input type="checkbox"/>	System is properly permitted and has approved final inspections [verify if present & approved, correction] Permit Type & Approval Date: Permit Type & Approval Date: Other Permit:
B.	Materials
<input type="checkbox"/>	Materials used outdoors are sunlight/UV-resistant and listed for outdoor locations [visual inspection of materials using judgment, correction]
<input type="checkbox"/>	Materials used are designed to withstand the max/min temperatures to which they are exposed [visual inspection using judgment, comment/correction]
<input type="checkbox"/>	Dissimilar metals that have galvanic action (such as aluminum and steel) are isolated from one another [visual inspection using judgment, correction]
<input type="checkbox"/>	Aluminum is not in direct contact with concrete materials [visual verification of contact, correction]
<input type="checkbox"/>	High-quality fasteners appropriate for the environment have been used [visual inspection using judgment, comment/correction]
C.	Wind System Equipment and Installation
<input type="checkbox"/>	Wind turbine and inverter are as specified on the Energy Trust incentive application [verification with application in Manual, correction to records/fatal]
<input type="checkbox"/>	All components are new [visual inspection using judgment, comment/correction]
<input type="checkbox"/>	Inverter, turbine and tower have 5 year manufacturer warranties [verify in customer manual, correction/fatal]
<input type="checkbox"/>	Bottom of the turbine rotor appears to be 30 feet or more above any obstacles within 400 feet of the System [visual inspection using judgment, comment/correction]
<input type="checkbox"/>	System appears to be set back from all power lines, property lines (unless a signed Turbine Consent and Release has been signed) and habitable buildings a distance equal to or greater than the hub height plus the rotor radius [visual inspection using judgment, correction/fatal]

Wind System Installation Checklist

Small Wind Program

To be completed by Verifier

<input type="checkbox"/>	Wind turbine is not mounted on a pre-existing structure [visual verification, fatal]
<input type="checkbox"/>	Equipment includes lightning protection and surge suppression [visual verification using judgment, correction]
<input type="checkbox"/>	Raceway on the tower is of equipment grounding type. If conductors are run directly inside the tower or leg, the tower is certified as a raceway. [visual inspection, comment/correction]
<input type="checkbox"/>	Wire size and type appear to comply with manufacturer requirements [visual inspection using judgment, correction/fatal]
<input type="checkbox"/>	Tower has been engineered to accommodate the wind turbine at the site [visual inspection of tower documentation, fatal]
<input type="checkbox"/>	Foundation has been engineered to accommodate the load of the wind turbine and tower given the site's soil conditions [visual inspection of foundation design, fatal]
<input type="checkbox"/>	Tower is a minimum of 70 feet tall [visual inspection, fatal]
<input type="checkbox"/>	Guyed tower turnbuckles are secured by lacing with the guywire or a cable no smaller than the guywire [visual verification, correction]
<input type="checkbox"/>	Lay-down area for tilt-up tower is clear of permanent vegetation or structures [visual inspection of site, comment]
<input type="checkbox"/>	Tower appears to be straight and plumb [visual inspection using judgment, correction]
<input type="checkbox"/>	Permanent safety signage is posted on the tower indicating that the tower is a risk [visual inspection for sign, comment/correction]
<input type="checkbox"/>	Junction boxes are listed and suitable for the environment [visual inspection using judgment, comment/correction]
<input type="checkbox"/>	Permanent labels are applied to components as required by code [visual verification of labels, comment/correction]
<input type="checkbox"/>	Disconnect switch coverplates are secured closed in a way that requires a tool to open [verification of security, comment/correction]
<input type="checkbox"/>	Hardware and structural members for non-tower elements are either hot-dip galvanized steel, coated or painted steel (not ok for coastal sites), corrosion-resistant aluminum or stainless steel [visual inspection of materials, comment/correction]
<input type="checkbox"/>	Clearances for all equipment are per manufacturer specifications [verify with installation manual, comment/correction]
<input type="checkbox"/>	Diversion load(s) are clearly identified as a heat source by a permanent label [visual verification of label, correction]
<input type="checkbox"/>	Components are mounted securely [physical inspection for movement, comment/correction]
<input type="checkbox"/>	Equipment has not been modified so that the listing or warranty is voided [visual inspection using judgment, comment/correction]
<input type="checkbox"/>	AC/DC disconnects have been installed so that the inverter and output circuits can be safely isolated and removed. If the disconnection means is not within sight from the utility meter, the location is identified on the utility meter. [verification of disconnects, correction]
<input type="checkbox"/>	Disconnection means used can be switched under load without an arcing hazard. Pull-out style disconnecting means have not been used [visual verification of equipment, correction]
<input type="checkbox"/>	Electrical terminations are torqued to spec, secured, and strain-relieved appropriately. Wire ends have been coated with anti-corrosive compound prior to termination. [visual & physical inspection for security and coating, comment/correction]

Return completed form to:

Small Wind Program ♦ Energy Trust of Oregon, Inc.

421 SW Oak Street, #300 ♦ Portland, Oregon 97204

1.866.368.7878 ♦ Fax 503.546.6862

energytrust.org

Wind System Installation Checklist

Small Wind Program

To be completed by Verifier

<input type="checkbox"/>	Cables, raceway, exposed conductors, and electrical boxes are secured and supported according to code and in accordance with their performance ratings. Those on the tower are supported for a vibration environment. [visual inspection of security and movement using judgment, comment/correction]
<input type="checkbox"/>	Twist-on wire connectors have not been used on DC conductors or ground wires, or any conductors on the tower. Wire connections have been made with mechanical wire splicing devices. If outdoors or exposed to moisture, wire connectors are listed for wet locations and mounted to prevent moisture from being trapped in the connector. [visual inspection of connections, correction]
<input type="checkbox"/>	Revenue quality electric meter is installed on the AC output side of the inverter(s) or controller and appears to be properly installed and operating correctly [visual inspection of meter, correction]
<input type="checkbox"/>	Meter(s) are identified with a permanent label as " <i>Wind Turbine Output.</i> " If located outdoors, this label is UV-resistant. [visual inspection of meter(s), correction]
C2.	Battery-based System (if applicable)
<input type="checkbox"/>	Batteries are located in a secure enclosure that meets seismic requirements and is weatherproof, as needed [visual inspection of enclosure, correction]
<input type="checkbox"/>	Access to live battery terminals has been limited per Oregon Electrical Specialty Code [visual inspection that enclosure requires tool to open, correction]
<input type="checkbox"/>	If used, flooded lead acid batteries are housed in an enclosure with adequate spill containment and vented to the outdoors, with a nearby, clearly marked safety kit [visual inspection of enclosure and safety kit, correction]
<input type="checkbox"/>	Battery connections and inverter cables appear to be properly sized, with secured crimps and lugs on ends [visual inspection of connections, correction]
<input type="checkbox"/>	Components for which a temperature compensation option is available appear to have been installed per manufacturer instructions to control battery charge properly [visual inspection of settings and manufacturer instructions, correction]
<input type="checkbox"/>	If the turbine may produce voltages that could damage the System in the absence of grid power, controller(s) and diversion load(s) have been installed and properly adjusted per Oregon Electrical Specialty Code [visual inspection of diversion equipment, correction]
<input type="checkbox"/>	AC output meter appears to be of the 5-jaw type, and correctly wired to meter power flows to both utility and AC loads [visual inspection of meter, correction]
D.	Wind Monitoring Equipment and Installation (if applicable)
<input type="checkbox"/>	Monitoring equipment has at least a one-year warranty [verify warranty in customer manual, correction]
<input type="checkbox"/>	Data logger is mounted to allow convenient data recovery or is connected to internet [visual inspection using judgment, correction]
<input type="checkbox"/>	If located outside or in a wet environment, the data logger is mounted in a weather-tight enclosure [visual inspection using judgment, correction]
<input type="checkbox"/>	Wind monitor appears to be mounted one rotor diameter below the turbine hub and at least three feet away from any point of the tower. The sensor is neither directly upwind nor directly downwind of the turbine tower. [visual inspection of location, comment/correction]
E.	System Operation and Performance
<input type="checkbox"/>	Turbine and components appear to be operating properly. There are no movements or sounds that seem unusual or inappropriate. [visual & auditory inspection using judgment, comment/correction]

Wind System Installation Checklist

Small Wind Program

To be completed by Verifier

F.	Customer Manual
<input type="checkbox"/>	Customer manual is present and includes each of the following sections [visual inspection of manual, comment/correction]
	Section 1 — System Design and Operation
<input type="checkbox"/>	System Overview Page: <i>Form 721: Small Wind System Overview</i> or an equivalent overview page summarizes the System's operating conditions and provides emergency information.
<input type="checkbox"/>	Operation & Maintenance Instructions: Installer's written instructions for System start-up and shut-down procedure, troubleshooting guidelines and recommended routine maintenance schedule. For battery-based systems, includes operation, maintenance and safety procedures for batteries and charge controller.
<input type="checkbox"/>	Electrical As-built Diagram: Schematic diagram that accurately depicts all electrical components installed, including: <ul style="list-style-type: none"> • Major components, with specifications listed • Power conductor and equipment ground wire types and sizes • Raceway types and sizes • Length of wire runs • Applicable subpanel(s), main service panel and utility connection • AC and DC overcurrent protection device types and sizes • Any planned or existing generation inputs (e.g. wind, solar, micro-hydro)
<input type="checkbox"/>	Site Plan: Diagram showing layout, including indication of lay-down area for tilt-down tower.
<input type="checkbox"/>	Mechanical Design: Description of wind turbine and tower, including engineering specifications of structural elements, foundation blueprints and manufacturer installation instructions.
<input type="checkbox"/>	Upgrades, Modifications, Repairs & Service: Documentation and/or area for future documentation of all field modified settings, software upgrades, repairs, performed maintenance and other System changes.
	Section 2 — Warranties and Installation Documentation
<input type="checkbox"/>	Contractor Warranty: Program trade ally's 2-year minimum full System warranty covering labor, workmanship and materials.
<input type="checkbox"/>	Manufacturers' Warranties: Written warranties and product registration instructions for wind turbine, inverter(s) and other primary components. Inverter, turbine and tower must have 5 year manufacturer warranties.
<input type="checkbox"/>	Incentive Application: Final version of the signed form showing incentive and System configuration approved by Energy Trust.
<input type="checkbox"/>	Permit(s): Copy of approved electrical and building permits and final inspection reports for the System.
<input type="checkbox"/>	Utility Net Metering Agreement: Copy of the agreement between the utility customer and the utility.
	Section 3 — Manuals and Data Sheets
<input type="checkbox"/>	Parts and Source List: If not documented elsewhere, bill of material listing all System components including part numbers. If feasible, inverter and wind turbine serial numbers shall be recorded to facilitate replacement in the case of product recall or recovery in the case of theft.
<input type="checkbox"/>	Inverter Owner's Manual: Documentation from inverter manufacturer.
<input type="checkbox"/>	Wind Turbine Owner's Manual: Documentation from turbine manufacturer.

Form 731
Wind System Installation Checklist
 Small Wind Program



To be completed by Verifier

<input type="checkbox"/>	Tower & Foundation Documentation: Documentation of tower and foundation from tower manufacturer.
<input type="checkbox"/>	Wind Monitoring System Owner's Manual (if applicable): Documentation from wind monitoring System manufacturer.
<input type="checkbox"/>	Manufacturer Data Sheets or Manuals for Major Components: Including but not limited to: charge controller, controller, diversion load, batteries, disconnect switches, ground fault protection equipment, lubricants, and lightning arrestors, unless covered in the manuals listed above.
G.	Owner Education
<input type="checkbox"/>	Owner understands basic system operation [interview using judgment, comment]
<input type="checkbox"/>	Owner can accurately read meter [interview using judgment, comment]
<input type="checkbox"/>	Owner understands potential performance impacts of objects within 300 feet of turbine [interview using judgment, comment]
<input type="checkbox"/>	Owner understands required inspections and maintenance [interview using judgment, comment]
<input type="checkbox"/>	Owner knows whom to call in the case of an emergency [interview using judgment, comment]
<input type="checkbox"/>	Owner understands proper electrical and mechanical shut-down and start-up procedure [interview using judgment, comment]
<input type="checkbox"/>	Owner understands how to operate and collect data from the wind monitoring equipment [interview using judgment, comment]

Guide to bracketed items:

Notes in brackets explain how the inspector determines if a requirement has been met, and the action required by the trade ally to pass inspection if the requirement hasn't been met. [means of inspection, result]

Comment — Improvements are recommended for future installations.

Correction — Correction is required before incentive can be issued.

Fatal — A fatal flaw with the project that is believe to be un-correctable. Project is unlikely to be eligible for incentives.

Notes: