INTERCONNECTION RULES AND REGULATIONS

FOR

NET ENERGY METERING SYTEMS

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1. PURPOSE/ SCOPE:

The Rules and Regulations herein govern and pertain to the requirements relative to the safety, reliability and power quality for net energy metering systems interconnected to the distribution system of the LITTLETON (NH) WATER AND LIGHT DEPARTMENT (LWL), 65 Lafayette Avenue, Littleton, New Hampshire, 03561

2. AUTHORITY:

N.H. Rev. Stat. Ann. § 38:2 (2010).

3. APPLICABILITY:

net energy metering shall be made available on a first-come, first-served basis within the LWL distribution service territory until such time as the total cumulative rated generation capacity of all Eligible Customer Generators (ECG) reaches two percent (2%) of the annual peak energy demand of the distribution system as determined by the LWL. Any additional ECG's thereafter requesting to connect that exceeds the maximum allowable rated output shall be approved on a case by case basis and at the sole discretion of the LWL Board of Commissioners (see Section 5 – Limitations).

4. INTENT:

The net energy metering system is located on the customer's premises, is interconnected, and operates in parallel with the electric grid. The primary intent of net energy metering and customer owned and operated electric generation facilities is to offset a portion or all of the Customer's power supply requirement. Net energy metering systems are not "wholesale Power generators." The LWL shall only give a kilowatt hour credit to eligible energy usage in accordance with these Rules and Regulations as long as the ECG is in compliance with all applicable Federal, state and local law, policy, statutes, this document or other applicable regulations that are relative to the safety, design, installation, construction and operations or any other aspect of an approved net energy metering system.

5. MAXIMUM CONNECTED GENERATION ALLOWED:

5.1 Kilowatt limits (per customer) - The Rules and Regulations herein shall apply only to net energy metering facilities/systems operating at 600 volts or less connected to the LWL distribution system. The allowable connected rated generation capacity shall not exceed those valves as shown in Table 5 - 1 below for the character of service requested.

Table 5-1

Service operating at 600 volts or less

Service Character/ Type	Maximum Net Metering Facility allowed (Kilowatts) – DC
240 volts, Single-Phase, 3 wire	7.2
120/208 volts, 3-Phase, 4 wire	10.5
120/240 volts, 3-Phase, 4 wire	12.5
277/480 volts, 3- Phase, 4 wire	50

5.2 Cumulative Generation allowed (total system) - The total cumulative rated generating capacity of the all connected ECG's that shall be allowed to connect to the LWL distribution system shall not exceed two percent (2%) of the annual peak energy demand of the distribution system as determined by the LWL.

6. DEFINITIONS:

(a) "Billing Period" – as established by the LWL on a monthly basis, typically a thirty (30) day meter reading cycle.

(b) "Distribution Utility" or "LWL" – the company that owns/or operates the distribution facilities delivering electricity to the ECG premises.

(c) "Disconnect Switch" – a customer owned and maintained manual switch that will disconnect the net metering facility from the LWL system (see technical specification herein).

(c) "Electric Utility Customer" – any residential, commercial or industrial ratepayer of a distribution utility.

(d) "Eligible Customer-Generator (ECG)" – an electric utility customer who owns and operates an electrical generating facility powered by solar, wind, farm methane, fuel cell, or hydro energy with a total peak generating capacity of not more than one hundred (100) kilowatts.

(e) "Generating Capacity" – for inverter based units, the kilowatt rating of the inverter, and for other interconnections, the kilowatt rating of the generation unit.

(f) "Impact Study" – an engineering analysis of the impact of a net energy metering facility on the safety and reliability of the LWL electric distribution system.

(g) "Islanding" – a condition in which a portion of the utility system that contains both load and dispersed generation is isolated from the remainder of the utility system.

(h) "Maximum Size Net Metering Facility" – the allowable ECG rated capacity that is allowed to connect to the LWL distribution system based on character of service (refer to Table 5-1)

(i) "Net energy metering" – measuring the difference between the electricity supplied over/ from the electric distribution system and the electricity generated by an ECG which is fed back into the electric distribution system over the billing period.

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7. INTERCONNECTION APPLICATION PROCESS:

7.1 Interconnection Application (Appendix 1): A complete application shall be submitted ninety (90) days in advance of the propose installation date by the prospective ECG for LWL review and comment. The LWL shall not approve an interconnection application until the applicable Federal, state and local permits are granted by that authority. The completed application packet must contain the following documents:

7.1.1 Applicant(s) Information – Section 1

a) Generating Facility Information
    1. Photovoltaic System (PV) – Section 2
    2. Wind System – Section 3
    3. Fuel Cell System – Section 4
    4. Farm Methane System – Section 5
    5. Hydro-electric – Section 6

b) Installation Information & Certification – Section 7

c) Mutual Indemnity Agreement Certification – Section 8

d) If Applicable – any local permits to build facility

7.2 LWL reserves the right, at its sole discretion, to deny an applicants request for interconnection if the ECG's application is incomplete or does not meet the standards and requirements contained herein. It is the responsibility of the ECG to comply with all Federal, State and local permitting applicable to the construction, installation and operating a net energy metering system.

7.3 The ECG shall notify the LWL in writing when it upgrades or makes changes in the net energy metering system especially when a key component, such as an inverter is replaced, rewired or upgraded. Failure to notify the LWL at least two weeks in advance may result in termination of interconnection with the LWL electric system.

8. TECHNICAL REQUIREMENT FOR INTERCONNECTION OF ALL UNITS:

8.1 All electrical connections to the LWL distribution shall be made by a State of New Hampshire qualified licensed electrician in accordance with the current National Electric Code (NEC), and the Institute of Electrical and Electronics Engineers (IEEE) standards.

8.2 One – Line Diagram: all net energy metering systems shall install their equipment in accordance with the LWL "Typical Hookup Diagram for Interconnection of ALL Renewable Energy Systems" (Appendix II).

8.3 Disconnect Switch: The customer generator must install and maintain a manual disconnect switch that will disconnect the connected load and isolate the net metering facility from the LWL distribution system. The disconnect switch shall be a lockable, load-break switch that plainly has a visual indicator that shows whether the switch is in the "open" or "closed" position. The disconnect switch must be readily accessible to LWL at all times.

8.3.1 Should the LWL find it necessary for safety reasons, in the case of scheduled maintenance (with notice given) or in an emergency situation, the LWL may, at its sole discretion, disconnect from the distribution system an ECG net energy metering facility that does not maintain a manual disconnect switch, that is operable by the utility, for isolation and to maintain a visual working clearance.

8.3.2 The disconnect switch must be able to disconnect the connected load and isolate the LWL distribution from the net energy metering system under full load condition and may be manually "gang" operated and pole mounted.

8.4 DC_AC Inverter: <u>An inverter is required for all net energy metering systems.</u> All inverters shall meet the following minimum design requirement of this section, and shall be design with a continuous power rating equal to the maximum designed output of the generating facility.

8.4.1 Inverter requirements for all applications – Appendix II, Table 1

8.4.2 Specific Interconnections – must meet the specific inverter requirements applicable to the generation facility design output and the character of service being installed and as shown in Table 2 – Table 5 in Appendix II.

8.5 Distribution Transformer: (ground “WYE”) The existing distribution transformer that services the customer’s generation site may be used if its use will not significantly degrade the power quality, voltage regulation or relay settings on the secondary distribution system that is delivered back into the LWL distribution system.

8.5.1 The generation system site shall be impedance grounded as necessary to achieve the effective grounding but shall not impact the distribution system ground fault relaying. The generation system site shall be impedance grounded, as describe in a manner adequate to assure that the unit does not:

a) Significantly degrade the power quality or voltage regulation on the LWL distribution system,

b) Create significant electrical safety problems. All grounding shall be connected to a common point (WYE) configuration,

c) Over voltage protection shall be used which is designed to detect a situation where the LWL has tripped due to a phase to ground fault, and the connected generator must be prevented from back-feeding the generated voltage back into the utility distribution system which presents an unsafe working conditions for utility personnel.

d) The cost of any improvements necessary to the site transformer serving the net energy metering facility shall be borne by the generating facility.

8.6 Testing: The net energy metering facility is responsible for and shall provide to the LWL test results of the net energy metering system and generating equipment in accordance with this section and as requested by the LWL. The ECG will not establish an interconnection with the LWL until their equipment has passed all safety/operations and other compliance tests as requested by the utility and the results have been reviewed by the LWL.

8.6.1 Initial Testing – after installation of the system and before the generation facility is connected to the LWL distribution system, the owner shall conduct a load break test on the generation system as describe herein;

a) Load break test – the ECG shall demonstrate that after the main disconnect switch or circuit breaker of the distribution system or building is opened, the generation units shed its load shuts down within two (2) seconds.

b) Relay and frequency synchronization – The ECG generation output (electricity) shall be interfaced and be calibrated within tolerances sufficient to maintain accurate testing and consistent with the Institute of Electrical and Electronic s Engineers (IEEE) Standard 1547 (industry standard) and as approved by the LWL.

8.6.2 Periodic Testing – the ECG shall be responsible and will test their generation equipment and net meter system in accordance with this section and as requested by the LWL for safety.

a) Annually - following the date of installation the ECG shall conduct a load break test. Results shall be provided to LWL.

b) Every four (4) years following the date of installation, the ECG shall conduct and verify that the proper calibration and protective functions of the components of the systems generation unit are operating as prescribed by the unit manufacture and within tolerance set by the LWL. The results of the tests shall be provided to the LWL.

8.6.3 Independent Testing - all testing and the results thereof in connection with this section shall be provided by a qualified independent contractor.

8.6.4 Expenses and cost incurred to comply with the testing requirements of this section shall be the responsibility of the ECG.

8.6.5 The LWL at its discretion reserves the right to terminate the ECG's interconnection and net energy metering system if the appropriate tests as describe above are not conducted, or the ECG fails to make available its records of required verification and compliance tests of its protective devices and equipment.

9. EMERGENCY and SYSTEM MAINTENACNE

9.1 The ECG shall not supply power to the electric distribution grid during outages of the distribution system that serves the ECG.

9.1.1 The ECG's generation may be operated during outages referred to in section 9.1 above only when a visual opening is maintained,

a) The ECG shall not create an islanding situation on the grid; or

b) Energize a de-energized utility circuit for any reason.

9.2 Disconnection – When an emergency situation exists and when it is necessary under other circumstances to do so as determined by the LWL, the LWL may disconnect the ECG's net energy metering system and electric service.

9.2.1 An emergency condition shall have occurred when the interconnection represents a condition which;

a) is likely to result in imminent disruption of service to other LWL customers;

b) is imminently likely to endanger life or property;

c) constitutes a hazardous condition; or

d) Reveals that a protective device in inoperable.

9.2.2 System maintenance – if testing in accordance with section 8.6 determines that a condition exists as described in this section, the LWL may at its own discretion terminate the ECG's net energy metering system and generation outputs until such a time as the conditions are made safe as determined by the LWL.

9.2.3 Non-Emergency condition exists - the LWL shall give notice to the ECGs that it is not in compliance with the LWL Rules and Regulations herein.

a) the ECG shall in seven (7) days provide LWL written evidence of their intended maintenance schedule to return their net energy metering system to a state of compliance;

b) LWL shall provide the ECG thirty (30) days from the date of notice to make the necessary repairs and provide LWL with the appropriate test results in accordance with section 8.6 above.

9.3 LWL access to Net Energy Metering System – The LWL may inspect the net energy metering system at a time mutually agreeable to the customer upon reasonable notice to the ECG.

9.3.1 The ECG shall not withhold allowing routine access to the LWL to inspect the net energy metering system, install additional controls, meters or conduct additional tests that the LWL deemed necessary at LWL expense.

10. NET METERING BILLING

10.1 Refer to Net Energy Metering Policy and NM rate schedule

10.2 All credit shall expire annually on December 31st and no compensation will be due to the customer.

10.3 Non Compliance – When a customer-generator (net energy metering system) is not in compliance with these Rules and Regulations at the time the LWL billing meter is read, no credit will be given for that billing period .

APPENDIX - I

INTERCONNECTION APPLICATION – NET ENERGY METERING

(Please print all required information clearly)

Section 1 - Applicant Information

Name_____

Billing address:_____

Town/City:_____State:_____Zip Code _____

Service Location (if different from above):_____

Town/City:_____State:_____Zip Code _____

LWL Account#: _____

Town of Littleton Building Permit Number: _____

Owner Point of Contact; (Name) _____

Daytime Phone#:_____

Proposed Start-Up date: _____

Vendors Name: _____

The system hardware is listed to Underwriters Laboratories standards to be in compliance with UL 1741:

Signed (Vendor):_____Date:_____

Name (printed):_____

Vendors Address: _____

Town/City:_____State:_____Zip Code _____

Vendors Point of Contact; (Name) _____

Daytime Phone#:_____

Note to applicant: It is the applicant's responsibility to check with local building officials in regard to whether or not a building permit or height variance (wind systems) may be required prior to building a net energy metering system. LWL will not approve a net energy metering system application for interconnection without the proper building permit(s)

Section 2 – Photovoltaic System (PV) Information

a) PV Module Manufacturer:_____

b) Module Model Number:_____

c) Number of Modules:_____

d) Power Rating per Module, (DC watts):_____

e) Total Array Output, (DC watts):_____

f) System Rated Output, (AC watts):_____

g) Inverter Manufacture:_____

h) Inverter Model Number:_____

i) Inverter's Continuous AC Rating, (AC watts):_____

j) Disconnect Switch Rating: _____

k) Disconnect Switch Manufacture: _____

l) Provide the following Engineering Plans: 1) site plan, 2) one-line installation diagram and 3) mounting structure.

Note to applicant: It is the applicant's responsibility to check with local building officials in regard to whether or not a building permit or height variance (wind systems) may be required prior to building a net energy metering system. LWL will not approve a net energy metering system application for interconnection without the proper building permit(s)

Section 3 – Wind System Information

a) Fuel Cell Manufacturer:_____

b) Fuel Cell Model Number:_____

c) Fuel Cell Rated Output, (AC watts continuous): _____

d) System Rate Output, (AC Watts): _____

e) Inverter Manufacture:_____

h) Inverter Model Number:_____

i) Inverter's Continuous AC Rating, (AC watts):_____

j) Disconnect Switch Rating: _____

k) Disconnect Switch Manufacture: _____

l) Provide the following Engineering Plans: 1) site plan, 2) one-line installation diagram and 3) mounting structure.

Note to applicant: It is the applicant's responsibility to check with local building officials in regard to whether or not a building permit or height variance (wind systems) may be required prior to building a net energy metering system. LWL will not approve a et energy metering system application for interconnection without the proper building permit(s)

Section 4 – Fuel Cell System Information

a) Wind Turbine Manufacturer:_____

b) Turbine Model Number:_____

c) Turbine Tower Height:_____

d) Power Rating per Module, (DC watts):_____

e) Total Array Output, (DC watts):_____

f) System Rated Output, (AC watts):_____

g) Inverter Manufacture:_____

h) Inverter Model Number:_____

i) Inverter's Continuous AC Rating, (AC watts):_____

j) Disconnect Switch Rating: _____

k) Disconnect Switch Manufacture: _____

l) Provide the following Engineering Plans: 1) site plan, 2) one-line installation diagram and 3) mounting structure.

Note to applicant: It is the applicant's responsibility to check with local building officials in regard to whether or not a building permit or height variance (wind systems) may be required prior to building a net energy metering system. LWL will not approve a net energy metering system application for interconnection without the proper building permit(s)

Section 5 – Farm Methane System Information

a) Methane Generator Manufacturer:_____

b) Generator Model Number:_____

c) Generator Power Output (watts):_____

d) AC Source (Circle One): Inverter / Synchronous Generator,/ Induction Generator

If using an inverter complete e – g.

e) Inverter Manufacture:_____

f) Inverter Model Number:_____

g) Inverter's Continuous AC Rating, (AC watts):_____

All AC source connection (complete the following):

h) Disconnect Switch Rating: _____

i) Disconnect Switch Manufacture: _____

j) Provide the following Engineering Plans: 1) site plan, 2) one-line installation diagram and 3) mounting structure.

Note to applicant: It is the applicant's responsibility to check with local building officials in regard to whether or not a building permit or height variance (wind systems) may be required prior to building a net energy metering system. LWL will not approve a net energy metering system application for interconnection without the proper building permit(s)

Section 6 – Hydro-electric System Information

a) Generator Manufacturer:_____

b) Model Number:_____

c) Power Output (watts):_____

d) AC Source (Circle One): Inverter / Synchronous Generator,/ Induction Generator

If using an inverter complete e – g.

e) Inverter Manufacture:_____

f) Inverter Model Number:_____

g) Inverter's Continuous AC Rating, (AC watts):_____

All AC source connection (complete the following):

h) Disconnect Switch Rating: _____

i) Disconnect Switch Manufacture: _____

j) Provide the following Engineering Plans: 1) site plan, 2) one-line installation diagram and 3) mounting structure.

Note to applicant: It is the applicant's responsibility to check with local building officials in regard to whether or not a building permit or height variance (wind systems) may be required prior to building a net energy metering system. LWL will not approve a net energy metering system application for interconnection without the proper building permit(s)

Section 7 – Installation & Certification Information (all applicants)

1. Check if owner installed _____ (connection must be validate and written documentation provide to LWL that installation was inspected by a Licensed Electrician).

Installation Date:_____Interconnection Date:_____

Installing Electrician:_____License No._____

Mail Address:_____

City:_____State:_____Zipe Code:_____

Electrician Phone Number: _____

2. The system has been installed in compliance with the local Building/Electrical Code of _____
(City/County)

Signed (Inspector):_____Date:_____

Section 8 – Mutual Indemnity Agreement (all applicants)

"Each party shall hold harmless, and indemnify the other party and its directors, officers, agents and employees against any and all loss, liability, damage, or expenses, including any direct, indirect or consequential loss, liability, damage, or expense, but not including attorney's fees unless awarded by a court of competent jurisdiction, for injury or death to persons, including employees of either Party, and damage to property, including property to either Party, arising out of or in connection with intentional, willful, wanton, reckless or negligent conduct regarding (a) the engineering, design, construction, maintenance, repair, operation, supervision, inspection, testing, protection or ownership of the Party's facilities, or (b) the making of replacements, additions, or improvements to, or reconstruction of, the party's facilities. However, neither party shall be indemnified hereunder for any loss, liability, damage, or expenses resulting from its sole negligence or willful misconduct. Notwithstanding the indemnity provisions contained herein, except for a Party's willful misconduct or sole negligence, each Party shall be responsible for damage to its own facilities resulting form electrical disturbances or faults."

For the Eligible Customer Generator:

Net Metering Customer's Name: _____

Net Metering Customer's representative: _____
(Print Name)

Net Metering Customer's representative: _____
(Signature)

Date Signed: _____

For the Distribution Utility system:

LWL representative: _____
(Print Name)

LWL representative: _____
(Signature)

Date Signed: _____

Section 9 - Authorization to Interconnect

This certifies that the applicant listed below has applied for, installed and requested to connect a Net Metering system for a Customer-Owned, Grid connected renewable energy generating facility within the service territory of the Littleton (NH) Water and Light Department (LWL), 65 Lafayette Avenue, Littleton, New Hampshire, 03561.

Having met the prescribed requirements the applicant is hereby granted permission to establish and maintain an interconnection with the LWL electric distribution system in accordance with the LWL "Interconnection Rules and Regulations for Net Metering Systems" and pursuant to the NH Code of Administrative Rules Chapter Puc 900 – "Net Metering for Customer-Owned Renewable Energy Generation Resources of 25 Kilowatt or less."
(Note: This authorization is valid only for the system applied for and is not transferable).

1. System Authorization Number: _____
2. Name of ECG: _____
3. Service Address:_____
4. Town/ City _____State:_____ Zip Code_____
5. System Inspected on:_____ by:_____
6. Load Break initial test conducted on: _____ by: _____
7. Load Break Test Results (inverter shed load within 2 seconds) PASS/ FAIL

Comments:
_____

_____

For the Littleton Water and Light Department

_____
(Signature)

_____
(Print Name)

_____
(Title)

_____
(Date)

APPENDIX - II