

# Monroe City

## Diversified Energy and Generation Policy - 2017

### 1. PURPOSE

We all use energy every day, from the food that we eat, to energy for cooking, cleaning, heating and cooling, transportation and communications, and for work and play. It is always in our best interest, to seek an ever increasing understanding of our energy needs, and to discover the many diverse resources available for supplying those needs. Having more options from which to choose, can provide choices that may benefit each of us.

Monroe City encourages its citizens and power customers to seek a greater understanding of our energy needs and to learn how they can be more efficiently utilized. Although Monroe City is in the business of energy distribution, we do not oppose our customers seeking or acquiring alternative sources of energy for their use. We will even try to provide helpful information as to available options and choices. Some energy resources may even integrate with the electric system. The purpose of this policy is to maximize customer energy options, while minimizing any conditions that may be detrimental to the electric system.

### 2. DEFINITIONS

A fundamental requirement of an energy policy which includes managing electric power generation and consumption, is to include a basic understanding of energy, electricity, and the electric system with its various components and functions. Here we have included terms with simplified definitions that we hope will provide sufficient information for you to understand Monroe City's energy policy decisions.

#### 2.1 ENERGY:

Energy is defined as the ability to do work. It provides the power to change things, as well as to change the environment around them. Energy is an unseen phenomenon which reveals its presence as it is released as heat, light, or motion. The beginnings of energy comes through displacement, where it is then collected and stored as a source of energy for future use. Energy has a natural inclination to move from source back to a sink where it originated from.

There are various theories as to the creation of our universe, but the simple fact exists, that energy has been displaced and stored in our solar system within the concentrated fiery mass of the Sun. Solar energy naturally radiates outward through space, some is temporarily absorbed and used within planetary environs on its journey back to great black holes, the ultimate sinks of the universe. The journey of the flow of solar energy is an essential element in powering the hydrological and biological processes necessary for supporting and sustaining life on earth.

It appears that for millennia, the energy from the sun has been powering the processes of the earth, as well as being temporarily "sequestered" or stored within various systems such as in the chemical composition of plant matter found in coal and natural gas. Coal and gas can be burned to release the sequestered solar energy which can then be converted into electric power.

Solar energy is also absorbed by water molecules on the surface of the oceans, and with evaporation, these molecules rise into the atmosphere, condense and fall as rain or snow on higher elevations. There it can flow downstream where it too can be harnessed to release its sequestered solar energy to generate electric power. There are numerous ways and means within our environment of capturing and utilizing stored solar energy for our use.

Whether extracted from hydro, wind, pv solar, bio-mass, natural gas, or many other means, all energy ultimately originated from the same Universal Source, therefore all energy is CLEAN. Energy is not sullied or degraded by the means by which it has been stored or transferred, so there is no such thing as "Green Energy versus Dirty Energy". And since all energy naturally flows from source to sink, there is no such thing as "Renewable Energy", just a perpetually continuing flow of replaceable energy that can be used now, or it can be captured and stored for future use.

As a caution, please be aware that there are various agenda-driven groups in our society that seek to control our energy choices by manipulating our perceptions of them. They already devalue and demonize some energy resources, while at the same time grossly exaggerate the value of others. Many advertisements and internet search sites contain false or misleading information, so, before investing in a new energy resource, or before criticizing old ones, please research thoroughly and avoid the deceptions.

## 2.2 ELECTRICITY:

Electricity, even today, remains a mystery as to what it is and how it works. It exists in an unseen sub-atomic dimension that is described only in theory. In spite of our ignorance, we have successfully harnessed its miraculous ability to manage the collection, transfer, and utilization of

energy. Electricity is not a source of energy, nor is it capable of storing useful energy, it is just a tool for conveying energy from one location to another.

An electric system consists of three basic components; a generator (an energy collector), a grid (for energy transfer), and a load (a venue for energy utilization).

### 2.3 GENERATOR:

A typical generator is an electro-mechanical device that is coupled to a rotating driver that performs two functions. It first creates a charged electron grid with a specifically designed voltage, frequency, and wave form (VFW), which is then used to establish a link or connection to potential load.

Secondly, when energy is required (demanded) by an electric device or appliance, the generator functions to provide a nearly instantaneous transfer of energy (power) to the load through the voltage grid.

Non typical generators such as chemical, therm-o-couple, or photo voltaic devices, create a DC voltage for energy transfer.

Interconnecting DC generation with AC systems and devices requires an inverter which changes the DC voltage output into an electronically simulated alternating wave form.

### 2.4 ELECTRIC GRID:

The electric distribution grid system can be compared to a railroad system, where the *grid infrastructure* (conductors) is as the train tracks and the *energized voltage grid* is like the train. The tracks may determine where the train can go, but it is the train that performs the work and provides the service from which revenue can be collected.

A customer may own the wire grid infrastructure within their own premises, but the local Electric Utility has jurisdiction over the voltage grid that extends beyond the electric meter, and into whatever circuit the customer allows.

Although the energized voltage grid is not visible, its presence can be detected and measured. When energy is conveyed using the grid, it too can be accurately measured and recorded.

The grid its-self cannot store any useful energy, although there are electric devices or systems that can be connected to the grid which can collect and store energy by various means.

Once a small micro-grid system (such as with a customer owned generation system), parallels with the local Electric Utility's grid system, it no longer functions independently as an "island", but becomes an integral part of the utility electric power system, with its voltage, frequency, and wave form (VFD) controlled by the utilities voltage grid.

When a customer parallels or *interconnects* with the local Electric Power System, they employ the utility's voltage grid for transferring energy from their own generator for in-home electric devices and appliances, and then enjoy the seamless transition back to utility energy resources when internal generation is inadequate.

The local Electric Utility, being the "authority having jurisdiction" (AHJ) over the voltage grid, has the right to meter grid interconnected generation and to assess a fee for using this convenient and reliable grid service, as well as any other grid services.

Customers who do not want to pay a grid use fee, may disconnect their whole facility, or even a portion of their circuits, from the Utility Grid and create their own isolated micro-grid from which they can independently generate their own power needs.

### 3. CUSTOMER OWNED GENERATION:

Monroe City encourages its citizens and utility customers to acquire adequate energy resources for their personal needs including a temporary generator for emergency situations. Home generators may also come in handy for camping, for remote power needs, or for helping a neighbor in need. We recommend that adequate training and precautions be taken for the safe and proper use of this equipment.

Although temporary electrical generation is great for independent off-grid use, it is prohibited from being interconnected to, or paralleled with, the utility electric grid without a permit. Establishing or maintaining a grid interconnection without a permit is illegal and such activities are subject to punishment according to provisions of the law.

Non-interconnected generators do not require Monroe City permitting or oversight.

### 3.1 GENERATOR INTERCONNECT PERMIT

Monroe City offers a permit to interconnect customer-owned electrical generation with the utility voltage grid. Applications for permits will be managed on a first come, first served basis.

*An interconnect permit will be issued after the completion of the application process and certification of adherence to all interconnection standards and requirements.*

*A yearly extension of the permit shall be required, and can be accomplished as set forth in section 3.5.*

Generating systems that are unable to comply with these standards will NOT be permitted to be connected with the utility grid. Before you sign a contract, or invest money in a generating system, research thoroughly the credentials and reputations of equipment manufacturers, sellers, and installers, to avoid unrealized expectations. Monroe City will not be responsible for unsatisfactory installations, or for verifying reputable vendors.

### 3.2 LIMITS ON PERMITS:

Because of the unreliability, instability, and off peak timing of some distributed generation, each power utility has been advised to limit grid-tied wind and pv solar distributed generation to less than two percent (2%) of the Electric Power Systems yearly peak KW load. Monroe City's maximum total limit on wind and pv solar generation shall be one percent (1%). Each power customer shall be limited to one grid-tied wind or pv solar power generating system with a nameplate rating of six (6) kilowatts or less.

*Continuous or reliable system peak generating resources are not subject to this limitation.*

### 3.3 PURPOSE FOR INTERCONNECTION STANDARDS:

Because grid paralleled generation not only provides power delivery to personal load, it gives direct access to the utility voltage grid with the ability to alter the electrical properties of the grid.

Because of the detrimental influence interconnected generation may have on the Utility Grid, interconnection requirements regarding safety, quality and control will be enforced in order to protect the integrity of the electric grid system and to provide safety features for line workers.

These standards may be used to also protect customers from purchasing from unqualified vendors.

### 3.4 INTERCONNECTION EQUIPMENT STANDARDS:

The "IEEE 1547 Standards for Interconnecting Distributed Resources with Electric Power Systems" shall be used for all customer-owned generating systems being designed for grid interconnection.

A printable version of these Industry Standards are available online. (search: ieee 1547 standard <http://fglongatt.org/OLD/Archivos/Archivos/SistGD/IEEE1547.pdf>)

In addition to compliance with the Industry's IEEE 1547 standards, Monroe City shall require:

- (a) Formal documentation of equipment manufacturer design certification and production testing as required in sections 4 and 5 of the IEEE 1547 standards, to be included with the permit application.
- (b) Proof of home-owner insurance coverage for interconnection liability.
- (c) Proof of county building permit approval for generator project construction.
- (d) A readily accessible, lockable, visible-break isolation device as part of the interconnect equipment.
- (e) A hybrid dual meter interconnect (HDMI) for production and load metering to be installed as directed by the Monroe City Power Department. The location of the disconnect equipment and generator production metering shall be outside the building structure and adjacent to the main service panel. Single meter "Net Metering" shall be prohibited for customer-owned grid interconnected generation.
- (f) Power factor settings to be managed by the Monroe City Power Department.

### 3.5 INTERCONNECTION CUSTOMER AGREEMENT:

Customer agrees:

- (a) to apply for a yearly renewal of the interconnect permit by: #1- providing documentation of yearly re-testing of the general safety functions and voltage quality of interconnect equipment as required in the IEEE1547 Standards (section 5.5). The customer shall hire an independent licensed contractor for this test; and #2 – provide proof of continuing home-owner insurance coverage for interconnection liability.
- (b) to pay for any labor or materials provided by the City to complete the generation interconnect, and for any customer initiated services.
- (c) to allow the monitoring and metering of interconnected generation and to pay a monthly grid use fee. This fee is referenced to generator production and at a rate equivalent to the revenue component of the residential KWH charge. Any other identifiable grid services may also be assessed a use fee.
- (d) to allow Monroe City employees to enter the customers premises to inspect, read meters, or to test interconnect equipment.
- (e) to use the grid interconnection for energy purposes only.
- (f) that all generated energy output is to be utilized primarily within the customers premises. Any excess energy produced will not be accounted as a credit unless an excess power sales contract (EPSC) is negotiated and approved with Monroe City.
- (g) that Monroe city Power may interrupt or cause the customer to cease or limit production when necessary for construction, maintenance, or upgrades to power infrastructure, or for power quality control. To the extent possible, Monroe City Power will give notice of interruption.
- (h) that once in generation, no changes or modifications in the equipment, wiring, or control settings of the generating system may be made without prior written approval by Monroe City.
- (i) to maintain electric interconnection facilities in a safe and prudent manner, and in conformance with IEEE 1547 Interconnection Standards, and all applicable laws and regulations.

(j) to retain sole ownership of the generation facilities with no third party partnerships.

(k) that if generating system includes pv solar panels, the generator owner shall dispose of the solar panels at their end of life cycle according to State and Federal Toxic Waste Laws. Solar cells are made from materials such as silicon, cadmium sulfide, or copper indium gallium selenide, which, if inhaled or ingested, can cause *lung disease, cancer, or inheritable mutations (genotoxic)*.

### 3.6 TERMINATION OF PERMIT:

The termination of a generator interconnect permit shall be cause for disconnect. An interconnect permit shall remain in effect unless terminated by either party on thirty (30) days' written notice. The customers permit may also be revoked if, in Monroe City's sole judgment, the customers generating facility is considered unsafe, is creating an adverse impact on existing customers, or for non-compliance with the interconnection customer agreement.

## Monroe City

APPROVED AND ADOPTED THIS 11 DAY OF October, 2017

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**R. Kirt Nilsson, Mayor**

**Attest:**

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**Emalee H. Curtis, Recorder**

Link to IEEE 1547

\*<http://fglongatt.org/OLD/Archivos/Archivos/SistGD/IEEE1547.pdf>