

**DISTRIBUTED GENERATION
MENU OF SERVICES
12/19/02 Draft**

I. FROM UTILITY TO CUSTOMER

A. INTERCONNECT SERVICES

1. Engineering/Design Studies
 - a) Customer System – Professional engineering services done under contract for customer to determine equipment necessary for interconnect to utility system.
 - b) Customer System – Review of interconnect design and specifications to ensure compliance with the interconnection standards.
 - c) Utility System – Engineering study to determine potential impact of DG on utility system.

2. Utility System Upgrades
 - a) Metering
 - b) Transformer Capacity
 - c) Service Capacity
 - d) Distribution Primary Line Capacity and Associated Equipment
 - e) Protective/Coordination System Changes
 - f) Monitoring
 - g) Transmission Line Capacity and Associated Equipment

3. Testing
 - a) Functional Test – Field-testing individual protective systems. A functional test is a complete test of the entire protective system including the CT's and PT's, protective relay and the breaker. This test ensures that the entire protective relaying system was wired and installed correctly and is "functional" so if you inject current into the relay and the breaker trips, at the expected level of current, then the system functions correctly.
 - b) Commissioning Test – Field testing entire installation. The Commissioning test involves running the generation control system through it paces ("A test drive"). While the Functional test checks out the protective elements, this test

confirms that the generation control system is working correctly. On a larger and more complex system the Commissioning test will involve a very complex set of test steps to confirm that all of the independent control systems are working together properly. One may introduce reasonable failures into the system, to then prove that the control system properly responds to the failure and operates or shuts down the generation as necessary.

- c) Periodic Interconnection Test – Periodically the protective system must be functionally tested to ensure that the equipment remains in compliance with the interconnection standards.
- d) Operating Services (Optional)
 - (1) Generator Periodic Run Testing
 - (2) Technical Support
 - (3) Maintenance agreement - Utility
 - (4) Maintenance agreement - 3rd party
 - (5) Monitoring

B. SUPPLY SERVICES

- 1. Backup Services (Standby Service)
 - a) Scheduled Maintenance – Energy or energy and capacity reserved by the customer or supplied by the utility during scheduled maintenance of the customer's non-utility source of electric energy supply.
 - b) Unscheduled Outages – Energy or energy and capacity reserved by the customer or supplied by the utility during unscheduled outages of the customer's non-utility source of electric energy supply.
- 2. Supplemental Service – Energy or energy and capacity reserved by the customer or supplied by the utility to supplement the variable output characteristics of the customer's non-utility source of electric energy supply. This is intended to provide energy or energy and capacity to complete the customer's energy production needs during normal operation and is not intended to be the energy or energy and capacity that is needed by the customer's non-utility source of electric energy supply during full or partial scheduled or unscheduled outage periods.

3. Economic Dispatch Service – Capacity and energy reserved by the customer or supplied by the utility to the customer’s non-utility source of electric energy supply operating in an economic dispatch mode.
4. Station Power - Energy consumed by a generation facility (or by equipment or facilities located at the site of such generation facility) and used in the operation, maintenance, or repair of such generation facility, regardless of whether the facility is operating when the station power is consumed.
 - a) Net Metering of Station Power is permitted for any size facility and over a “reasonable” time period (FERC Order in Dockets ER00-3513-000, EL99-86-000 & EL00-113-000). FERC approved use of one month as a reasonable time period in Docket EL-01-50-000.
 - b) Wheeling of Station Power is permitted when a generator “is self-supplying station use power from ... remote generating resources, since in those circumstances, there is no energy sale” even though the end use load may at times be considered retail (lights, fans, motors, heat, etc.) in nature.
 - c) When a generator is not supplying itself either from on-site or remote generating resources, the FERC is “unconvinced that the third-party supply of Station Power is something other than sale for end use [retail supply]”. Thus if a generator can not supply themselves and is for some reason unable to meet a reasonable net metering time period, the supply of Station Power falls under state retail requirements (service territory and rates of Backup Supply).
5. Residual Retail Service - Capacity and energy reserved by the customer or supplied by the utility to a customer site that is above the capability of the customer’s non-utility source of electric energy supply.
6. Net Metering - The process by which a generator may net its on-site power requirements against the generating facility’s gross output whenever the generating facility’s gross output exceeds or equals its on-site power

requirements, that is, when the generator is self-supplying its on-site power requirements.

- a) Many State Commissions have allowed retail load to be Net Metered for small generation facilities.
- b) Recent FERC orders permit Net Metering for any size facility for Station Power.
- c) The challenge for Net Metering issues is to separate Station Power for which FERC treatment applies from on-site retail power requirements for which State treatment applies.

C. DELIVERY SERVICES

- 1. Transmission Service – Reservation and delivery of capacity and energy on either a firm or non-firm basis over Transmission Providers' Transmission System.
- 2. Distribution Service – Reservation and delivery of capacity and energy on either a firm or non-firm basis over Company's Distribution System.
- 3. Indirect Services – Allocated support services or expenses including operation and maintenance, customer accounts, customer service and information, administrative and general, depreciation, interest and taxes.
- 4. Ancillary Services – Those services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of Transmission Provider's Transmission System in accordance with Good Utility Practice. (Note: Includes only FERC recognized ancillary services.)
 - a) Scheduling, System Control and Dispatch Service – Service required to schedule the movement of power through, out of, within, or into a Control Area.
 - b) Reactive Supply and Voltage Control from Generation Sources Service – Service required to maintain transmission voltages on Transmission Provider's transmission facilities within acceptable limits. Generation facilities (in the Control Area where Transmission Provider's transmission facilities are located) are operated to produce (or

absorb) reactive power. Thus, Reactive Supply and Voltage Control from Generation Sources Service must be provided for each transaction on Transmission Provider's transmission facilities. The amount of Reactive Supply and Voltage Control from Generation Sources Service that must be supplied with respect to Customer's transaction will be determined based on the reactive power support necessary to maintain transmission voltages within limits that are generally accepted in the region and consistently adhered to by Transmission Provider.

- c) Regulation and Frequency Response Service – Service necessary to provide for the continuous balancing of resources (generation and interchange) with load and for maintaining scheduled Interconnection frequency at sixty cycles per second (60 Hz). Regulation and Frequency Response Service is accomplished by committing on-line generation whose output is raised or lowered (predominantly through the use of automatic generating control equipment) as necessary to follow the moment-by-moment changes in load.
- d) Generator Imbalance Service – Service provided when a difference occurs between the scheduled and the actual delivery of energy over a single hour by a generator into a Control Area.
- e) Operating Reserve – Spinning Reserve – Service needed to serve load immediately in the event of a system contingency. Generating units that are on-line and loaded at less than maximum output may provide spinning Reserve Service.
- f) Operating Reserve – Supplemental Reserve Service – Service needed to serve load in the event of a system contingency; however, it is not available immediately to serve load but rather within a short period of time. Supplemental Reserve Service may be provided by generating units that are on-line but unloaded, by quick-start generation or by interruptible load.

II. FROM CUSTOMER TO UTILITY

A. Generation Credit: Energy and capacity, firm and non-firm

Credit for not having to add generation capacity. We see five potential options to assign value to generation:

1. Demand Charge Unbundled: Unbundling the Demand Charge into generation, transmission, and distribution, and provide capacity credit for the generation portion.
2. Plant Build Proxy: Credits based on cost to add new Peaking and baseload plant in MAPP.
3. Market related value (market bids)
4. Reduce System reserves requirements
5. Environmental (emission credits, societal value)

B. Transmission credit:

Utilities will provide credits to DG customers for use of freed up or avoided transmission capacity. Value should be based on FERC approved rates.

C. Distribution credit:

Distribution should be viewed as two distinct parts:

1. Local Distribution: Including wires, equipment, and connections of individual site to the utility system. We believe some of these are fixed costs where credits may be minimal.
2. Bulk Distribution: Includes terminals, substations, and other equipment used to move power into the distribution grid. We believe that DG installations relieve the load capacity at that level and should result in a credit to DG operator.

D. Diversity credit for generation, transmission, and distribution:

Diversity levels represent a statistical assumption that a certain percentage of standby load will be utilizing transmission and distribution service at a particular time. Reliable distributed generation will place less demand on the system. As additional distributed generation units are located on the transmission and distribution system, the diversity of these units will lead to a lower amount of additional standby capacity needed to serve standby loads. A diversity factor adjustment based on system wide averages should be reflected in rates.

E. Physical assurance credit:

Physical Assurance is the application of devices that interrupt DG customer's grid load instantaneously when an unscheduled stoppage occurs to the DG system. DG customer agrees to provide physical control to remove load if its DG system is not operating. The utility does not need to build either facilities related or peak demand related distribution infrastructure to serve that customer, thus avoiding fixed standby distribution costs. The concept is somewhat similar to controllable and firm demand establishment under electric utilities' existing peak interruptible tariffs.

If a customer is willing to provide physical assurance to the utility, that customer should not have to pay for any facilities or peak demand related costs associated with distribution service and should have the ability to opt out of standby services entirely or elect to take maintenance or interruptible services. In this scenario, customer should be able to enter into a contract to specify the capacity for which it will provide physical assurance not requiring elected services.

F. Distribution/transmission line loss credit:

DG relieves utilities of having to supply the additional generation capacity associated with line losses to serve the DG customer. Energy and Capacity are lost during the generation, transmission and distribution of electricity to customers. DG is generation that is closer to where electricity is being used. Therefore, DG eliminates line losses that occur during transmission and distribution of electricity. A credit for line loss avoided should be given to DG customers. Ideally the credit should be based on the actual line loss savings realized by a DG project.

G. Credit on services provided to the customer taking third party (unbundled) service:

1. Reactive Supply and Voltage control:
Supply of reactive current increases voltage regulation and reduces system losses.
2. Regulation and frequency response:
Service necessary to provide for the continuous balancing of resources (generation and interchange) with load and for maintaining schedule interconnection frequency at 60 Hz.
3. Operating reserve:
Operating Reserve – Spinning: This service may be provided by generation units that are on-line and loaded at less than maximum output, ready to serve additional demand which can be fully applied in ten minutes.

Operating Reserve – Supplemental: This service may be provided by generating units that are on-line but unloaded which can be fully applied 10 minutes, by quick-start generation capable of serving demand within 10 minutes, or by interruptible load that can be removed within 10 minutes.
4. Black start service:
DG can be used to re-energize the transmission system following a system-wide blackout.