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BEHIND THE METER GENERATION

SUMMARY

This white paper discusses the treatment within an RTO system of behind the meter generation. Behind the meter generation or customer generation has been and must continue to be recognized as a benefit to the system both because of the benefits to the customer in reducing and controlling load, and because it promotes system reliability. Behind the meter generation is different than a utility generator or merchant generator designed to serve a utility grid. Customer generation is designed to meet the integrated thermal and electric needs of a specific customer. The purpose of this paper is to address the specific needs of these customer generators, as distinguished from utility and merchant generators, so that they can be appropriately encouraged to integrate with the utility system in the same way they have since their development over the last 20 years.

Services to a customer with behind the meter generation should be provided on a "net" basis. After serving its load behind the meter, such a customer either imports the remainder of its energy needs from the grid, or exports its surplus generation to the grid. In either case, the customer is only held responsible for its actual use of the grid, just as any other end-use customer.

Any net surplus exported to the grid would be treated like the output of any other generator selling to the grid. However, the net export of a cogenerator which must also serve a internal thermal host must be treated as a must-take resource pursuant to existing law and regulation.

DEFINING BEHIND THE METER GENERATION

Behind the Meter Generation includes: 1) any generation that is constructed and operated wholly or in part to serve retail end-use customer load over privately funded, or dedicated utility facilities; or 2) any cogeneration that is constructed or operated wholly or in part to serve thermal demands of an end-use customer. Both the customer's load and generation are located behind its site boundary meter. *Behind the Meter Generation* can include Qualifying Facilities. The customer will use its generation output to satisfy its own load and/or that of a neighboring customer using private lines. If the customer's generation is insufficient to fully meet its load, the customer will purchase energy and utilize the grid to the extent necessary to serve its "net load." Such a customer would be a "net importer." If the customer's generation exceeds its load, the customer may decide to sell the "net generation" output as allowed by law, utilizing the

transmission grid to which the customer is interconnected. Such a customer would be a “net exporter.” As a net exporter, the customer would utilize the grid to the extent necessary to transmit its "net generation."

THE BASIC ISSUE FOR RESOLUTION

The basic issue is whether the RTO will provide services to the customer based on the customer's "net load" as measured at its site boundary meter or based on its "gross load" and "gross generation."

THE SOLUTION

RTO services will be provided based on the customer’s net withdrawals or injections of power to the grid measured at the point of interconnection and the customer’s site boundary meter.

Behind the meter generators selling energy to third parties using the grid will install such metering or telemetry as necessary to verify deliveries to the grid.

WHY SHOULD THE RTO BE CONCERNED ABOUT BEHIND THE METER GENERATION?

Behind the Meter Generation Benefits the Grid

Behind the meter generation increases the reliability of the transmission grid through a diversification of generation resources and in many cases by freeing up capacity on the constrained transmission grid for others to use.

All other things being equal, a system comprised of many small generating units is more reliable than a system with fewer large generating units. The following illustration calculates the relative probability of losing 1,000 MW between two sets of generators. Five 200 MW units at a 5% forced outage rate produces a probability of 3.125 times 10 (-7), while two 500 MW units at a 5% force outage rate equals 2.5 times 10 (-3). The smaller unit system is 10,000 times less likely to lose 1,000 MW of capacity simultaneously.

Federal and State Regulations Encourage Behind the Meter Generation

Section 210 of PURPA requires that FERC establish:

> *. . . such rules as it determines necessary to* ***encourage cogeneration and small power production*** *. . . .*

WHAT ARE THE DIFFERENCES BETWEEN GROSS METERING AND NET METERING?

Gross and net metering are two different approaches to measuring the generation produced and the energy consumed at an integrated generation and load operation; for example, a cogeneration and industrial process site. *Net load* is that portion of customer load served by the utility or RTO resources. *Net generation* is power exported to the grid in excess of the generation required to serve on-site load. Net load or generation is measured at the boundary of the customer site. *Gross load* is the total consumption by an end-use facility, including load served by customer generation and grid resources. *Gross generation* is total generation, whether serving on-site load or exported to the grid. Gross generation is metered at the point of generation; gross load is measured at the point of consumption.

UDC customers that purchase standby service and rely on behind the meter generation to supply their entire site load are typically metered with bi-directional meters located at the site boundary that record separately the flow of power into the customers site (*i.e*., standby service purchases) and power out of the site (*i.e*., QF sales to the UDC).

WHY SHOULD THE RTO RECOMMEND "NET" METERING OVER "GROSS" METERING?

Use of net metering reflects the true amount of megawatts being injected or withdrawn from a utility's transmission or distribution grid. Use of net telemetry results in non-discriminatory treatment of generation auxiliary load, behind the meter load and other retail standby load. Use of net metering is also consistent with existing state tariffs. Net metering encourages self-generation and distributed generation which is endorsed by many states and FERC. Continued use of net metering will avoid the costly installation of gross metering and telemetry equipment and the imposition of other unnecessary costs upon behind the meter generation.

NERC Does Not Include Behind the Meter Load as Part of Firm Load Responsibility

WECC defines load responsibility as:

> *A control area's **firm load** demand plus those firm sales minus those firm purchases for which reserve capacity is provided by the supplier.*

Since the behind the meter load for retail customer-owned generation operations is relying on standby service, the load is not firm. The load is served when an outage occurs. In addition, on-site consumption of electric energy served by

generation behind the point of common coupling is not "load" as defined by NERC. NERC defines "load" as follows:

> ***Load.*** *The amount of electric power delivered or required at any specified point or points on a system.*
>
> ***System.*** *A combination of generation, transmission, and distribution components comprising an electric utility, or group of utilities.*

A retail customer with generation is not an electric utility. (PURPA § 210(e).) Moreover, no power is "delivered" or "required" at any point on the utility "system" when a retail customer satisfies its electric energy requirements with its own generation "behind the meter." The customer's electric energy requirements are served by private, non-utility distribution facilities that are not a dedicated part of the utility's transmission and distribution network.

The WECC and NERC definitions clarify that a control area's "firm load" is load delivered and metered at the customer's site boundary net of a customer's integrated generation and load (*i.e.*, the specific point or points of interconnection with the electric utility system). The control area's "firm load" does not include behind the meter generation serving energy consumption "behind the customer site boundary meter."

Net Metering Provides the Same Nondiscriminatory Treatment to Behind the Meter Generation as is Provided to Other Industrial Customers and to Station Auxiliary Load

Compare two industrial customers: the first with an industrial process that consumes 100 MW and a generator that supplies 100 MW, and the second with an industrial process that consumes 100 MW but which is idle with no generator. Each customer currently places no load on the system. Each could place 100 MW on the system: the first if its generator tripped off and the second if it starts its industrial process. To be treated equally and in a nondiscriminatory fashion, both customers should schedule the same amount and be assessed the same charges. Under their original conditions, neither customer places any net demand on the grid and so neither should be required to schedule anything, or be assessed any charges. From the perspective of a system operator, the customer whose 100 MW generator trips off and the customer who starts up a 100 MW industrial process have the same effects on reliability. This treatment would also be consistent with the treatment of station auxiliary load. Currently, station auxiliary load is netted, and the generating unit schedules its net output only.

Metering and Billing on a Gross Load Basis Results in Significant and Unnecessary Costs

Metering and billing on a gross load basis requires the separate metering of all load points and all generators in the end-use customer's system. This scheme creates the fiction that (a) all load from the customer site is using the transmission grid, ignoring the use of on-site generation and (b) generation is delivered to and is using the transmission grid. These fictions add nothing but costs to the integrated generation and load, discouraging cogeneration, and with no apparent benefit whatsoever.

Metering and billing on a gross load basis would require all behind the meter generation to schedule all on-site energy consumption and generation. In other words, an end-use customer that installs 15 MW of generation to supply 15 MW of on-site electric energy consumption will be required pursuant to a gross load proposal to schedule the 15 MW of generation to serve the 15 MW of on-site electric energy consumption, even though no power ever flows onto or off of the end-use customer's site. The cogeneration facility, while never using the distribution and transmission system or any of the RTO's facilities will be required to pay a scheduling coordinator for scheduling the on-site generation and electric energy consumption with the RTO, even though the RTO-controlled grid will never be used.

In addition to these charges, imposition of the following charges would be forthcoming under a gross load proposal:

(1) Transmission access charges (charges for the transmission of a customer's own generation to the customer's own load);

(2) Ancillary service charges (reserves for load not on the system and based on non-coincident peak);

(3) Grid management charges (reflecting use of the system even when there is no load placed on the grid);

(4) Imbalance charges (for deliveries of the customer's own generation), and

(5) Metering and telemetry charges (behind the site boundary meter and alleged to be for reliability purposes when there is no question on reliability and no need for the data given behind the meter generation's use of state jurisdictional standby service) as if the on-site electric energy consumption supplied by behind the meter generation fully utilized the transmission system for the supply of the on-site electric energy consumption.

Requiring system operators to procure reserves based on gross generation would cause overprocurement of reserves at significant cost.

Currently, system operators procure reserves based on the actual load on the system. If operators were required to include behind the meter generation and station auxiliary load in calculating their load responsibility, they would have to procure a significantly greater amount of reserves. One UDC has estimated this would add at least 5,000 MW to the total load calculations in the WECC. It would also significantly increase costs. Given that the interconnected systems are operating reliably today, such additional reserve procurement is unnecessary.

Basing reserves on gross generation assumes simultaneous outage of all behind the meter generation.

Requiring a customer with behind the meter generation to procure reserves based on its gross generation implicitly assumes that that generator will suffer an outage every hour of the year. Requiring each such customer to do so simultaneously assumes that all customer generation will simultaneously fail. This assumption is prohibited by federal law.[1] More importantly, it is contrary to reality – cogenerators as a class are among the most reliable generating resources.

Basing reserve calculations on gross generation ignores the services provided by standby service.

The customer with on-site generation may purchase standby service from its local utility. Assume a customer has 100 MW of load and of generation, and that it purchases 100 MW of standby service. The customer should schedule 0 MW. The utility will schedule the amount of generation and transmission necessary to satisfy the requirements of the customer's standby service. If the generator trips, the generation resources scheduled by the utility will provide the RTO as control area operator with sufficient resources to satisfy the customer's 100 MW load.

The imposition of these charges is unreasonable to the extent the loads and generation do not actually withdraw power from or deliver power to the RTO-controlled grid, because in transmitting energy over privately owned or dedicated wires, *i.e.*, behind the site boundary meter transactions, the energy does not flow on to the RTO controlled grid. Rather, the generation, transmission and consumption of electric energy occurs behind the point of interface with the grid.

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[1] *See,* 18 CFR §292.305(c) (Commission regulations prohibit rates for sales to QFs that are *"based upon an assumption (unless supported by factual data) that forced outages or other reductions in electric output by all qualifying facilities on an electric utility's system will occur simultaneously, or during the system peak, or both."*)

The Result of Gross Metering and Billing will be a Less Reliable Transmission Grid

The logical reaction to a gross load policy is that end-use customers will have a great economic incentive not to employ grid-connected self-generation. End-use customers employing self-generation may be forced to isolate, where possible, the self-generation from the interconnected system (*i.e.,* "island" from the RTO controlled grid) in order to avoid the excessive charges associated with a gross load policy. In addition, new cogeneration projects may never come on-line. The potential consequences of being assessed ancillary services when the transmission or distribution system is never used, will have chilling effects on new QFs. Consequently, there could be a reduction in the reliability of the RTO electric system that could be reflected in lost production cost due to curtailment of services or due to rolling blackouts.

HOW SHOULD THE RTO IMPLEMENT NET METERING?

Implementation of net metering will require that the provisions of the RTO Tariff be conformed to ensure the consistent net treatment of behind the meter generation and load. Primary implementation will take place through the proper definitions of the terms "load," "system," and "customer generation" and through the appropriate establishment of control area grid responsibilities and jurisdiction. It is also important to recognize the unique characteristics of a cogeneration system and provide adequate safeguards in the tariffs.

Load: The amount of electric power delivered or required at any specific point on the System.

System: The combination of generation, transmission or distribution components comprising an electric utility or group of utilities. The System does not include facilities that serve customer load with Customer Generation.

Customer Generation: Any type of generation that is constructed and operated wholly or in part to serve retail end-use customer load over privately funded or dedicated utility delivery facilities.

In determining "load responsibility" for the purpose of calculating reserve requirements, the RTO must determine the amount of load that is reasonably likely to occur, considering the diversity of loads and resources. Such load shall be determined at the point of interconnection with the grid. The RTO shall not assume that all non-coincident load will occur simultaneously.

In establishing the tariff protocols for generation integration and dispatch it is important to recognize the differences between merchant generation and behind the meter generation. Merchant plants can generally increase or decrease their production to accommodate the need for more or less electrical power on short notice. Moreover, changes to a merchant plant's scheduled maintenance outages solely impact when the production of electrical power is produced.

Conversely, behind the meter generation is designed to produce both process steam and electrical power through a sequential process that ties the steam and electrical production together. The development of a cogeneration operation is driven by the need for thermal energy, not to produce and sell electricity into the market. Producing electricity is secondary function. Accordingly, the cogenerator's steam obligations constrain the ability of the plant to change that portion of the electrical power generation that is tied to the steam production. Consequently, cogeneration units cannot be subject to dispatch by the system operator, except in cases of true system emergency. Also, the cogenerator's maintenance outage may be directly tied to the time when the equipment using the steam process is scheduled for maintenance.

In short, behind the meter generation is not a typical power generation facility as traditionally operated by a generation utility or in the new market by merchant generating plants. These distinctions are important to recognize. If the distinctions are ignored, behind the meter generation would lose its ability to operate the industrial site in an integrated manner to optimize thermal and electric energy supply. Reducing the site's control over the curtailment and dispatch of behind the meter generation could lead to process, safety and health problems on the site. Treating behind the meter generation like other generation ultimately will negate the traditional cost savings of installing behind the meter generation.