
**Rider WP-DG – Wholesale Power Service Distributed Generation Rider for
Carbon-Free Power and Energy**

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AVAILABILITY:

This Rider is applicable to wholesale customers purchasing Wholesale Full Requirements Service from GRDA pursuant to GRDA Schedule WP, and in accordance with the terms of a current Power Purchase and Sale Agreement (“Customers”).

INTENT:

GRDA’s wholesale Power Purchase and Sale Agreements requires Customers to purchase all of their electrical power and energy from GRDA. This contractual requirement is necessary for GRDA to secure long-term financing for generation and transmission facilities, satisfy its resource adequacy requirements, achieve adequate credit rating and long-term rate stability, and limit customer cross-subsidization. Nevertheless, without action by GRDA, this contractual requirement would prevent Customers from purchasing the electrical energy produced from customer-owned Distributed Generation Facilities that are interconnected with Customers’ distribution systems.

GRDA is dedicated not only to a clean energy future, but also to the long-term success of our Customers. Therefore, this Rider is intended to authorize Customers to interconnect end-use customer-owned Distributed Generation to the Customers’ distribution systems, in a manner that will not unreasonably burden GRDA’s other Customers.

DEFINITIONS:

1. “Distributed Generation” means: (a) End-Use Retail Customer-owned generation; (b) that is designed to supply electric service to the End-Use Retail Customer’s facilities; (c) that is interconnected to a Customer’s distribution system; and (d) that generates zero-emission electrical power and energy.
2. “End-Use Retail Customer” means an end-use retail customer of the Customer, but specifically excludes electrical power suppliers, electric cooperatives, investor-owned utilities, and other entities engaged in the supply of electrical power and energy, or long-term leases that result in the supply of electrical power and energy.
3. “Make-Whole Demand Adjustment” (“MWDA”) means the calculation of the amount of fixed costs that GRDA is unable to recover from a Customer due to the reduction in demand that results from the Customer’s interconnection of Unqualified Distributed Generation.

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4. “Make-Whole Energy Adjustment” (“MWEA”) means the calculation of the amount of fixed costs that GRDA is unable to recover from a Customer due to the reduction in energy that results from the Customer’s interconnection of Unqualified Distributed Generation.
5. “Qualified Distributed Generation” means that amount of Distributed Generation that:
 - a. Totals to less than 1,000 kW nameplate capacity in the aggregate for any Customer; and
 - b. Does not include any individual Distributed Generation with a nameplate capacity rating of 100 kW or more.
6. “Revenue-Grade Metering” means metering sufficient to measure the metered output and peak production (both in hourly intervals) from Unqualified Distributed Generation, as determined by GRDA, in GRDA’s sole discretion.
7. “Unqualified Distributed Generation” means Distributed Generation that does not meet the definition of Qualified Distributed Generation.

DISTRIBUTED GENERATION AND BILLING:

Qualified Distributed Generation. A Customer that has interconnected Qualified Distributed Generation in accordance with this Rider will not be required to reconstitute its Capacity Billing Demand, Delivery Billing Demand, and Billing Energy to account for the production of the Qualified Distributed Generation.

Unqualified Distributed Generation. A Customer that has interconnected Unqualified Distributed Generation in accordance with this Rider will be required to reconstitute its Capacity Billing Demand, Delivery Billing Demand, and Billing Energy to account for the production of the Unqualified Distributed Generation via the MWDA and MWEA, as calculated by this Rider.

Example 1 – Pure Qualified Distributed Generation. Customer X has 200 End-Use Retail Customers that have each installed 5 kW nameplate capacity of rooftop solar Distributed Generation, for an aggregate total of 1,000 kW nameplate capacity Distributed Generation. No End-Use Retail Customer has installed individual Distributed Generation larger than 100 kW. Therefore, all of Customer X’s installed Distributed Generation is Qualified Distributed Generation. See *Appendix 2* for more details.

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Example 2 – A Combination of Qualified and Unqualified Distributed Generation. Customer X has 500 End-Use Retail Customers that have each installed 5 kW nameplate capacity of rooftop solar Distributed Generation, for an aggregate total of 2,500 kW nameplate capacity Distributed Generation. No End-Use Retail Customer has installed individual Distributed Generation larger than 100 kW. Therefore, the Customer has 1,000 kW of Qualified Distributed Generation, and 1,500 kW of Unqualified Distributed Generation. Customer X will have a MWDA and MWEA for the Unqualified Distributed Generation. See *Appendix 2* for more details.

Example 3 – A Combination of Qualified and Unqualified Distributed Generation. Customer X has 10 End-Use Retail Customers. Nine of those End-Use Retail Customers have each installed 5 kW nameplate capacity of rooftop solar Distributed Generation (for an aggregate total of 45 kW), but one has installed 500 kW nameplate capacity of solar Distributed Generation. The 500 kW facility would be Unqualified Distributed Generation, but the other nine End-Use Retail Customers' Facilities would be Qualified Distributed Generation. Customer X will have a MWDA and MWEA for the Unqualified Distributed Generation. See *Appendix 2* for more details.

INTERCONNECTION, SAFETY, AND PLANNING REQUIREMENTS:

1. Interconnection and Planning Requirements. GRDA may, in GRDA's discretion, establish interconnection and planning requirements that are applicable to any Unqualified Distributed Generation. Any applicable requirements identified by GRDA (including the construction of any necessary transmission or distribution system facilities) must be satisfied before any Unqualified Distributed Generation may be interconnected to the Customer's distribution system. GRDA may, in GRDA's discretion, require End-Use Retail Customers interconnecting Unqualified Distributed Generation to enter into three-party agreements between the End-Use Retail Customer, the Customer, and GRDA.
2. Adverse System Conditions. Customer may not allow any Distributed Generation to be interconnected to Customer's system if that Distributed Generation causes or contributes to undesirable operating conditions on any GRDA asset, and all Distributed Generation must comply with all applicable safety provisions and engineering standards.
3. Engineering and Safety Standards. **It is extremely important that Distributed Generation systems are installed and configured safely. Failure to safely install and configure Distribution Systems could lead to serious injury and/or death.**

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- a. Customer must verify that each Distributed Generation system has been: (i) designed and installed under the direction of a licensed professional electrical engineer (for Distributed Generation greater than 15 kW) or a licensed electrician (for Distributed Generation less than 15 kW); and (ii) that the Distributed Generation system is configured with appropriate disconnecting equipment required to protect both the user's property and the GRDA system from faults, back-feeds, under and over voltages, under and over frequency events, inadvertent energization, and/or other electrical system abnormalities that may result in dangerous or hazardous operation.
 - b. For individual Unqualified Distributed Generation with greater than 100 kW nameplate capacity, the Customer must provide GRDA with evidence that the facility complies with the requirements of paragraph 3(a). GRDA will review the data submitted, and will either approve the proposed facility, or require amendments to the proposed design of the interconnection, within 30 days. Customer will not authorize the facility to interconnect to the Customer's distribution system until: (i) GRDA has approved the interconnection; and (ii) GRDA, Customer, and the End-Use Retail Customer have executed a three-party interconnection agreement.
8. SPP Study Costs and Requirements. To the extent an SPP study is required relative to a Distributed Generation interconnection, GRDA will attempt to minimize SPP study costs. However, a Customer must reimburse GRDA for any SPP study costs that GRDA incurs as a result of the Customer's Distributed Generation interconnection. Upon request, any such Customer will provide GRDA the data reasonably necessary to allow GRDA to comply with SPP studies, agreements, or other requirements.
9. Distributed Generation Liability. By authorizing Distributed Generation to interconnect to Customer's distribution system, Customer (and not GRDA) will have the responsibility to determine whether the Distribution System is properly configured and designed. GRDA will have no liability whatsoever for any claims arising from or related to Distributed Generation, and any assessments performed by GRDA pursuant to this Rider will be solely for the benefit of GRDA, and not for the benefit of any third party beneficiaries.

METERING, BILLING AND CALCULATIONS:

1. Revenue-Grade Metering Requirement.
 - a. Unqualified Distributed Generation between 100 kW and 2,000 kW must be interval metered, and the interval data must be provided to GRDA by the end of each month.
 - b. Unqualified Distributed Generation greater than 2,000 kW must be telemetered to GRDA.

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- c. Customer may elect to configure Revenue-Grade Metering for Qualified Distributed Generation for purposes of calculating the MWDA and MWEA.
- d. Other renewable Distributed Generation systems (i.e. wind, hybrid) must be metered with Revenue-Grade Metering.

2. MWDA Calculation.

- a. If Revenue-Grade Metering data is available, the MWDA will be calculated based upon the Revenue-Grade Metering data as follows:

MWDA = the maximum amount of Unqualified Distributed Generation output occurring in the hourly interval in which the Customer's Capacity Billing Demand is calculated (measured in kW).

- b. If Revenue-Grade Metering Data is unavailable, GRDA will calculate the MWDA in accordance with the following formula, using the data included in Appendix 1:

$$\text{MWDA} = (\text{EkW} * \text{Pi})$$

Where:

EkW is the total aggregate nameplate capacity of Unqualified Distributed Generation;

Pi is the point of intersection of Ph and Pm in the chart on Appendix 1;

Ph is the hourly interval in which the Customer's Peak occurs (vertical axis); and

Pm is the month for which billing is being calculated (horizontal axis).

If EkW is less than or equal to zero, MDWA shall be equal to zero.

3. MWEA Calculation.

- a. If Revenue-Grade Metering data is available, the MWEA will be calculated based upon the Revenue-Grade Metering data as follows:

MWEA = the measured amount of Unqualified Distributed Generation output occurring in the month (measured in kWh).

- b. If Revenue-Grade Metering Data is unavailable, GRDA will calculate the MWEA as a 20% capacity factor in accordance with the following formula:

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$$\text{MWEA} = (\text{EkW} * \text{Hours in Month} * 0.20)$$

Where:

EkW is the total aggregate nameplate capacity of Unqualified Distributed Generation;

If EkW is less than or equal to zero, MDEA shall be equal to zero.

REPORTING:

As a condition of participating in this Rider, Customers must submit annual reports to GRDA as more particularly described herein.

At least annually, Customer must submit to GRDA a report detailing the Distributed Generation interconnected to Customer's system. Such report must be delivered to GRDA on or before the last day of the calendar year, and must include, at a minimum:

1. a copy of the Customer's current policies regarding the interconnection of Distributed Generation to customer's distribution system;
2. a list of Distributed Generation currently interconnected to Customer's system; and
3. the nameplate capacity of each interconnected Distributed Generation facility.

AVAILABILITY:

This Rider will become available on the Effective Date, and may be terminated or amended at any time by GRDA (including, but not limited to, amendments to the thresholds in this Rider as necessary for GRDA to comply with the SPP Open-Access Transmission Tariff). Provided, if any Customer interconnects an aggregate of 900 kW nameplate capacity Qualified Distributed Generation, GRDA will determine whether the thresholds for Qualified Distributed Generation remain reasonable under the circumstances, or should be further modified.



Approved: October 14, 2020
Effective: January 1, 2021

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**Appendix 1
Solar Factor Array**

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Solar Factors												
HE	1	2	3	4	5	6	7	8	9	10	11	12
1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	0%	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%
7	0%	0%	1%	2%	5%	5%	4%	2%	2%	1%	0%	0%
8	1%	3%	8%	13%	16%	15%	13%	13%	12%	12%	7%	3%
9	14%	15%	22%	28%	28%	28%	27%	28%	26%	29%	23%	16%
10	28%	31%	36%	42%	41%	41%	42%	42%	39%	45%	37%	31%
11	40%	42%	49%	52%	50%	50%	52%	51%	44%	55%	47%	41%
12	44%	48%	59%	58%	55%	53%	55%	56%	48%	59%	48%	47%
13	50%	54%	63%	64%	56%	57%	60%	58%	48%	62%	52%	48%
14	53%	53%	60%	63%	54%	55%	57%	57%	51%	60%	46%	44%
15	46%	47%	51%	55%	47%	47%	49%	50%	48%	47%	39%	36%
16	35%	37%	40%	44%	39%	39%	40%	40%	35%	35%	28%	25%
17	17%	22%	25%	29%	26%	25%	27%	27%	21%	18%	10%	10%
18	2%	6%	9%	11%	11%	11%	14%	12%	7%	3%	0%	0%
19	0%	0%	1%	1%	3%	4%	3%	2%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%
21	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
22	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
23	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
24	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Based on Average annual solar production in TULSA, OK for a Standard Fixed (open rack) 1 KW Unit. Irradiance data from NREL and compiled by UFS

The Solar Factor used for determining the MWDA for the current month billing is determined from the time of the peak for the same month from the previous year.

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**Appendix 2
Distributed Generation Settlement Examples**

Example 1

Example Billing Prior to addition of Distributed Generation

Basic Meter	1	\$500.00	\$500.00
Capacity	60,000	7.25	\$435,000.00
Delivery	60,000	3.86	\$231,600.00
On-Peak Energy	15,000,000	0.01042	\$156,300.00
Off-Peak Energy	15,000,000	0.00371	\$55,650.00
PCA	30,000,000	0.01888	\$566,400.00
			\$1,445,450.00
69%			\$0.0482

Example Billing After addition of Distributed Generation

Basic Meter	1	\$	500.00	\$500.00
Capacity		59,700	7.25	\$432,825.00
Delivery		59,700	3.86	\$230,442.00
MWDA - Capacity		-	7.25	\$0.00
MWDA - Delivery		-	3.86	\$0.00
On-Peak Energy		14,856,000	0.01042	\$154,799.52
Off-Peak Energy		15,000,000	0.00371	\$55,650.00
MWEA		-	0.01042	\$0.00
PCA		29,856,000	0.01888	\$563,681.28
				\$1,437,897.80
				\$0.0482

Difference (\$7,552.20)

*Peak Hour results in MWDA at 30%

- 1,000 200 EU of 5 kW each
- 24 hours
- 30 days
- 20% Assumed Solar Plant Factor
- 144,000 Monthly Energy Production
- 300 Impact to Customer Demand



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Example 2

Example Billing Prior to addition of Distributed Generation

Basic Meter	1	\$500.00	\$500.00
Capacity	60,000	7.25	\$435,000.00
Delivery	60,000	3.86	\$231,600.00
On-Peak Energy	15,000,000	0.01042	\$156,300.00
Off-Peak Energy	15,000,000	0.00371	\$55,650.00
PCA	30,000,000	0.01888	\$566,400.00
			\$1,445,450.00
	69%		\$0.0482

Example Billing After addition of Distributed Generation

Basic Meter	1	\$	500.00	\$500.00
Capacity	59,250		7.25	\$429,562.50
Delivery	59,250		3.86	\$228,705.00
MWDA - Capacity	450		7.25	\$3,262.50
MWDA - Delivery	450		3.86	\$1,737.00
On-Peak Energy	14,640,000		0.01042	\$152,548.80
Off-Peak Energy	15,000,000		0.00371	\$55,650.00
MWEA	216,000		0.01042	\$2,250.72
PCA	29,640,000		0.01888	\$559,603.20
				\$1,433,819.72
				\$0.0484

Difference (\$11,630.28)

*Peak Hour results in MWDA at 30%

- 2,500 500 EU of 5 kW each
- 24 hours
- 30 days
- 20% Assumed Solar Plant Factor
- 360,000 Monthly Energy Production
- 750 Impact to Customer Demand
- 1,000 Qualified Distributed Generation
- 1,500 Unqualified Distributed Generation
- 450 MWDA
- 216,000 MWEA



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Example 3

Example Billing Prior to addition of Distributed Generation

Basic Meter	1	\$ 500.00	\$500.00
Capacity	60,000	7.25	\$435,000.00
Delivery	60,000	3.86	\$231,600.00
On-Peak Energy	15,000,000	0.01042	\$156,300.00
Off-Peak Energy	15,000,000	0.00371	\$55,650.00
PCA	30,000,000	0.01888	\$566,400.00
			\$1,445,450.00
69%			\$0.0482

Example Billing After addition of Distributed Generation

Basic Meter	1	\$ 500.00	\$500.00
Capacity	59,837	7.25	\$433,814.63
Delivery	59,837	3.86	\$230,968.89
MWDA - Capacity	150	7.25	\$1,087.50
MWDA - Delivery	150	3.86	\$579.00
On-Peak Energy	14,921,520	0.01042	\$155,482.24
Off-Peak Energy	15,000,000	0.00371	\$55,650.00
MWEA	72,000	0.01042	\$750.24
PCA	29,921,520	0.01888	\$564,918.30
			\$1,443,750.79
			\$0.0483

Difference **(\$1,699.21)**

*Peak Hour results in MWDA at 30%

- 545 9 EU of 5 kW each and 1 EU of 500 kW
- 24 hours
- 30 days
- 20% Assumed Solar Plant Factor
- 78,480 Monthly Energy Production
- 164 Impact to Customer Demand

- 45 Qualified Distributed Generation
- 500 Unqualified Distributed Generation

- 150 MWDA
- 72,000 MWEA