MRES® Municipal Power
LEARNING ACADEMY

Distributed Energy Resources

Derek Bertsch

Senior Regulatory & Contracts Counsel

MISSOURI RIVER® ENERGY SERVICES

Agenda



- What is a Distributed Energy Resource (DER)?
- MRES and Members' DER responsibilities
- DER Workbook and resources
- Metering and billing arrangements

What is a Distributed Energy Resource?



Distributed Energy Resources

- **Distributed generation: Small-scale technologies used to produce electricity close to the end-user of power**
- **Energy storage**
- **Interconnected to electric distribution system**



Roof-top solar



Plug-in solar



Community solar



MRES and Members' DER Responsibilities



<table>
<tr><td colspan="4">PURPA Cogeneration QF (No Limit)
(18 CFR 292.205)</td></tr>
<tr><td colspan="3">PURPA Small Power Production QF (80 MW)
(18 CFR 292.204 (a)(1))</td><td></td></tr>
<tr><td colspan="3">Termination of Obligation to Purchase from QF (5 MW)
(18 CFR 292.309 (3)(e))</td><td></td></tr>
<tr><td colspan="2">Minnesota Standard Interconnection Process (10 MW)
(Minn. Statute 216B.1611, Subd. 2)</td><td colspan="2"></td></tr>
<tr><td colspan="2">Standard Offer Rate (1 MW)
(Public Utilities, Minn Stat. 2168.164)</td><td colspan="2">QF negotiates contract with utility based on avoided cost (5MW)</td></tr>
<tr><td colspan="2">Simultaneous Purchase & Sales or Time of Use Rates (1 MW)
(Public Utilities, Minn. Rules. 7835.4014-4015)</td><td colspan="2"></td></tr>
<tr><td colspan="2">Standard Offer Rate (100kW)
(Coops/Munis, Minn. Rules 7835.3200)</td><td colspan="2">QF negotiates contract with utility based on avoided cost (5MW)</td></tr>
<tr><td>Simultaneous Purchase & Sale Rate
(Minn. Rules 7835.3400)</td><td>Time of Use Rate
(Coops/Munis, (Minn. Rules 7835.3500))</td><td colspan="2"></td></tr>
<tr><td></td><td>kWh Banking Credit (<40kW - < 1 MW)
(Minn. Stat. 216B.164, Subd. 3a)</td><td colspan="2"></td></tr>
<tr><td colspan="2">kWh Banking Credit (<40kW)
(Minn. Stat. 216B.164, Subd. 3f)</td><td colspan="2"></td></tr>
<tr><td colspan="2">Net Metering (<40 kW)
Average Retail Utility Energy Rate
(All Utilities, Minn. Stat. 216B.164
& Minn. Rules Chapter 7835)</td><td colspan="2"></td></tr>
</table>

Source: Minnesota Public Utilities Commission

Public Utility Regulatory Policies Act of 1978 (PURPA)

Requires any local utility to interconnect, buy and sell power to any Qualifying Facility (QF) under reasonable terms and conditions Second level

What is a QF?

a) A small power production (SPP) facility fueled by solar, wind, hydro, biomass, waste or geothermal

b) Co-generation facility

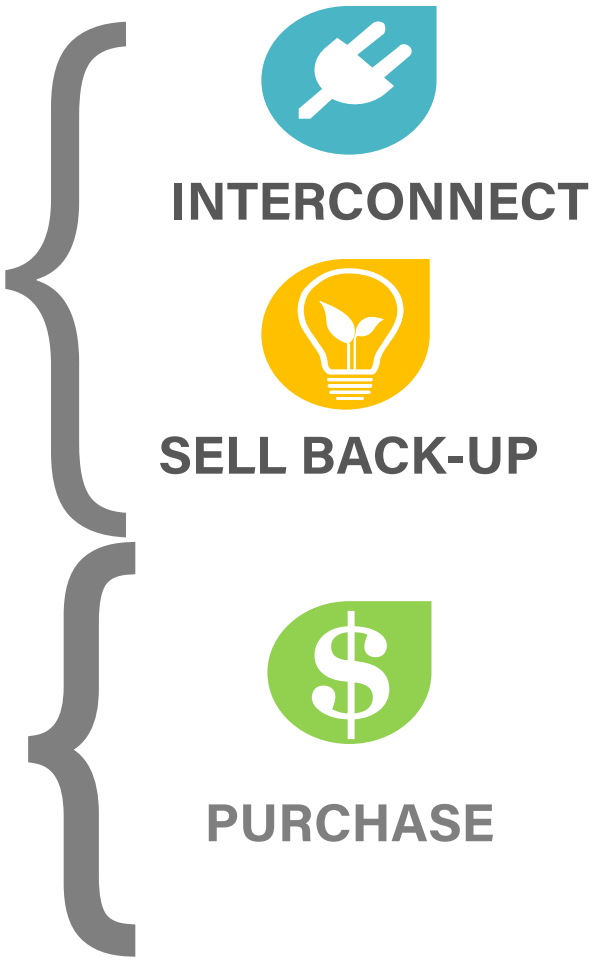
Responsibilities of Member and MRES

Member:

- Allow the QF to interconnect and operate in parallel
- Provide power to QF
- Show credit on customer bills for excess generation received by member
- Report to MRES excess generation received by member

MRES:

- Purchase from QF
- Provide QF with avoided cost and rate information



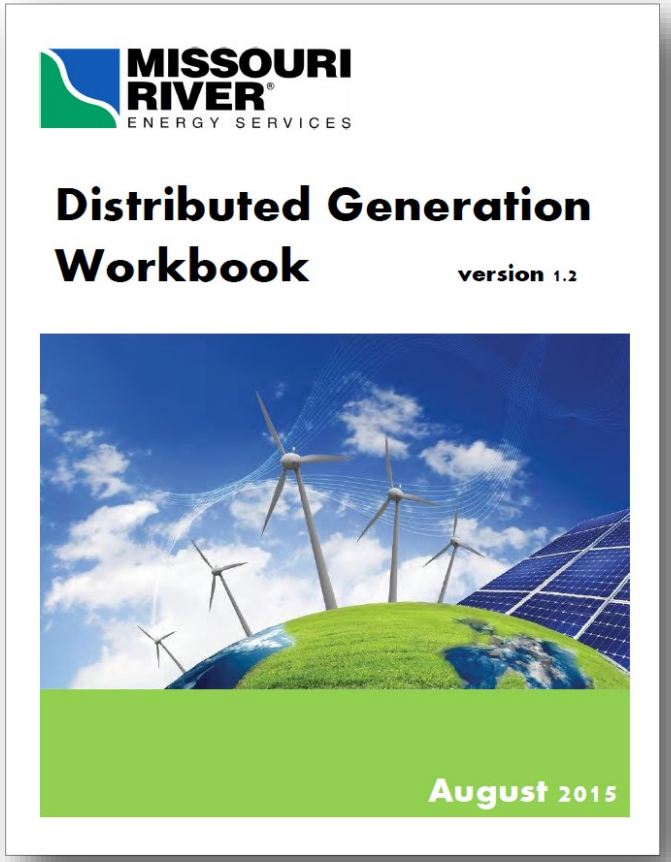
DER Workbook

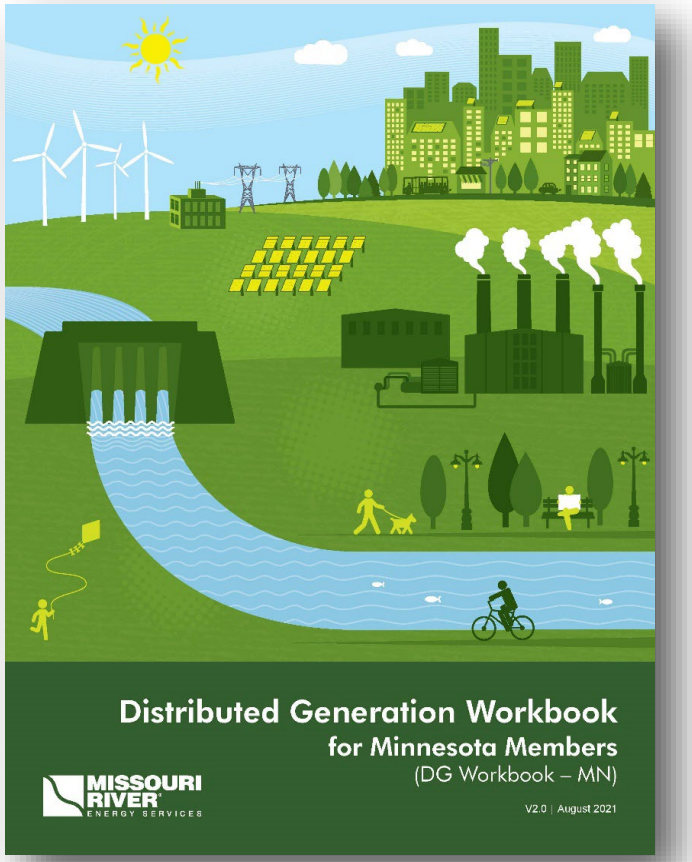


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DER Workbook





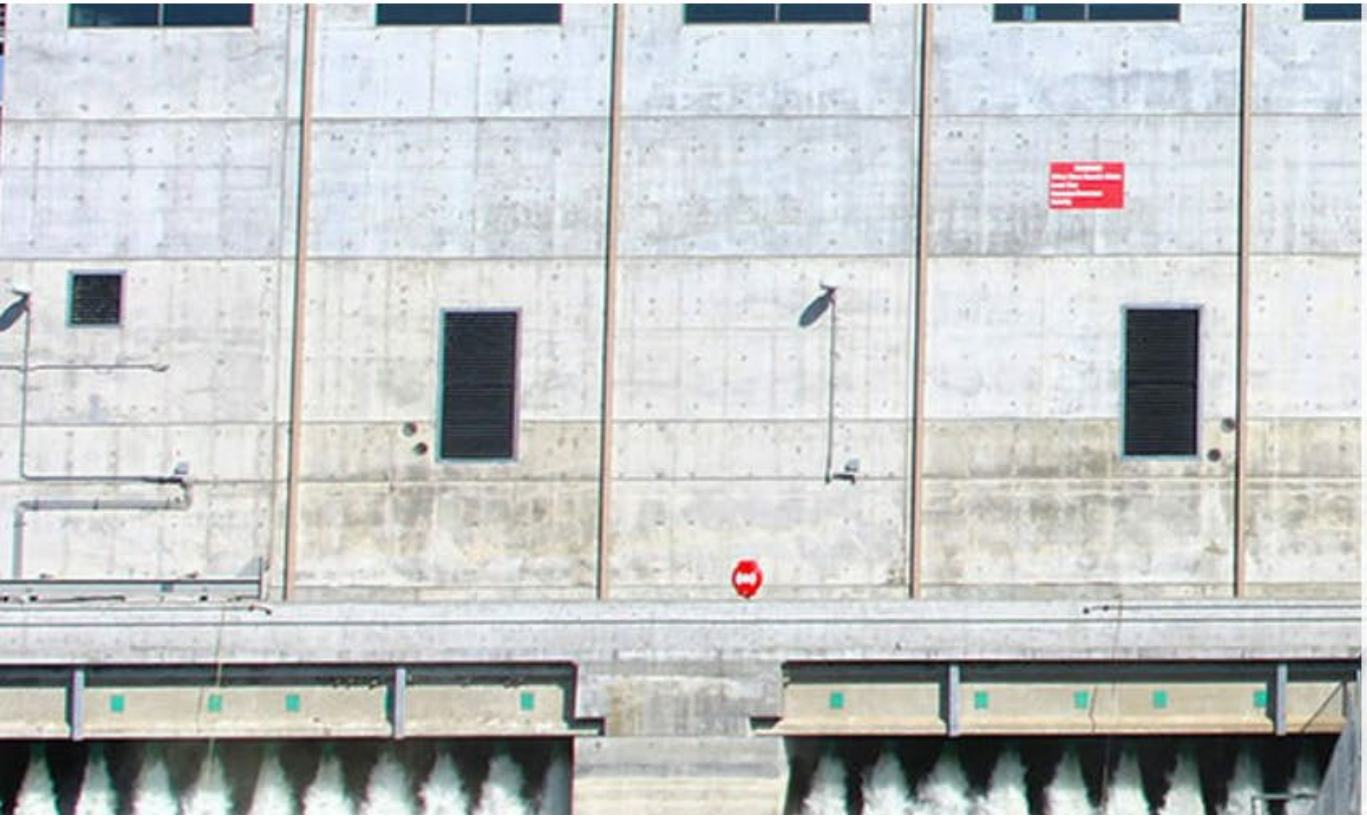
DER Workbook

- Explains the relationship between MRES, member and customer
- Recommends guidelines for compliance
- Simplified process, fast-track process and study process
- Accessible through members-only section on MRES website

Contact Us | Corporate Portal | Member Login | Search

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Our Mission

To enhance the value of member utilities to their communities by supplying reliable, cost-effective, long-term energy and energy services in a fiscally responsible and environmentally sensitive manner.

- **Resources**
  - Ambassador Program
  - Bright Energy Solutions
  - Community Sponsorship Guidelines
  - Community Solar
  - Crisis Communications
  - Distributed Generation

grant-writing best practices, application guidance and announcements, grant compliance and post-award management, and links to state and federal websites for more specific information.

- **Learn more about grant opportunities for your utility!**

MRES webinar on energy emergencies



Stay informed about energy emergencies so you can better assess and manage risks associated with power supply disruptions. This awareness enables proactive measures to be taken to mitigate potential losses or disruptions to operations. Tune in to the MRES

- Questions / Staff Directory
- Value of Public Power

Distributed Generation

Questions about Distributed Generation? Give us a call at 800-678-4042 or email us!

Email Us!

Click here for the **MRES Distributed Generation Workbook** or the **Minnesota DG Workbook**.

Sections of the *MRES Distributed Generation Workbook* are listed below. **Please note that these documents work best in Google Chrome.**

DG WORKBOOK IN SECTIONS +

MINNESOTA DG WORKBOOK IN SECTIONS +

DG WORKBOOK IN SECTIONS

- Preface to DG Workbook
- DG Table of Contents
- Section 1 - Introduction to DG
- Section 2 - FERC Orders
- Section 3 - Guidelines for Implementation
- Section 4 - Example Resolution
- Section 5 - Avoided Costs and Capacity Plans
- Section 6 - Introduction to DG Procedure
- Section 6 - Exhibit A: Distributed Generation Screening
- Section 7 - Small Renewable Procedures
- Section 7 - Appendix A: Small Renewable Procedures Flowchart
- Section 7 - Appendix B: Small Renewable Application
- Section 8 - Small Renewable Requirements
- Section 8 - Appendix A: Inverter Diagram Example
- Section 8 - Appendix B: Non-Minnesota Agreement Example
- Section 9 - Distributed Generation Procedures
- Section 9 - Appendix A: Distributed Generation Procedure Flowchart
- Section 9 - Appendix B: Distributed Generation Application
- Section 9 - Appendix C: Engineering Data Submittal
- Section 9 - Appendix D: Engineering Studies
- Section 10 - Distributed Generation Requirement
- Section 10 - Appendix A: Extended Parallel Diagram
- Section 10 - Appendix B: Interconnection Agreement

MINNESOTA DG WORKBOOK IN SECTIONS

Chapter 1: Introduction to DG

Chapter 2: FERC Rules for Compliance

Chapter 3: Avoided Costs and Capacity Plans 2021

Chapter 4: Interconnection Process Overview

Chapter 5: Interconnection Process - Simplified

Chapter 5, Exh A: Simplified Process Interconnection Application

Chapter 5, Exh B: Simplified Process Certificate of Completion

Chapter 5, Exh C: MN Standard Agreement

Chapter 6: Interconnection Process - Fast Track

Chapter 6, Exh A: MN Interconnection Application

Chapter 6, Exh B: MN Standard Agreement

Chapter 6, Exh C: MN Interconnection Agreement

Chapter 7: Interconnection Process - Study

Chapter 7, Exh A: MN Interconnection Application

Chapter 7, Exh B: MN Interconnection Agreement

Chapter 7, Exh C: Study Process Supplemental Review Offer

Chapter 7, Exh D: MN System Impact Study Agreement

Chapter 7, Exh E: MN Facilities Study Agreement

Chapter 7, Exh F: MN Transmission System Impact Study Agreement

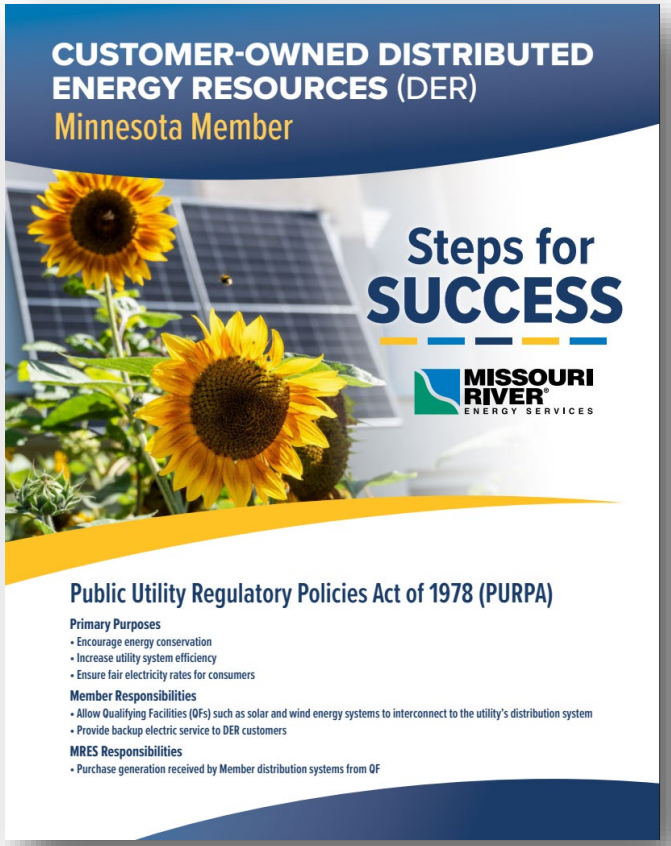
Chapter 8: Technical Specifications Manual

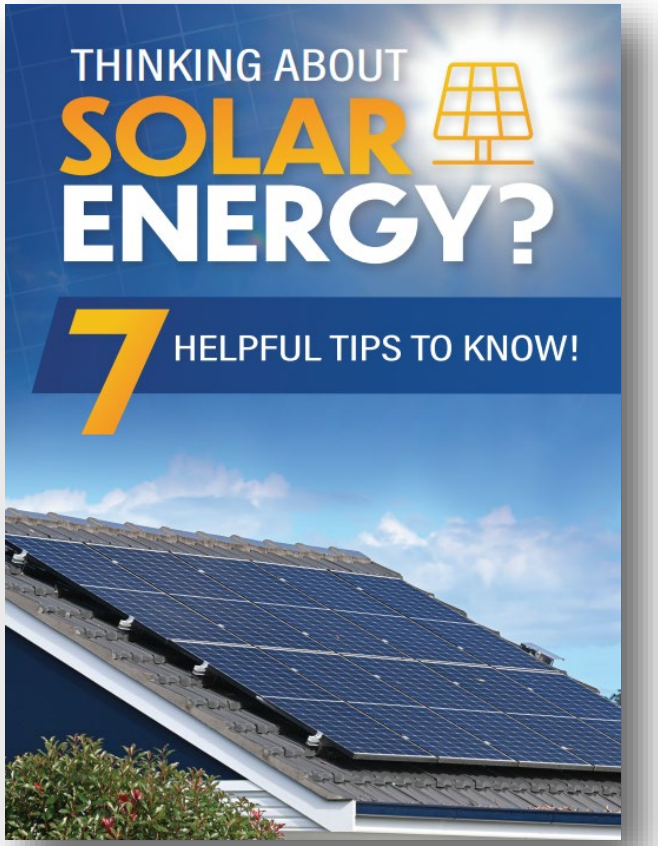
Chapter 9, Exh A: Example Resolution

Chapter 9, Exh B: Pre-Application Report Template

Chapter 9, Exh C: Storage Application

DER Resources

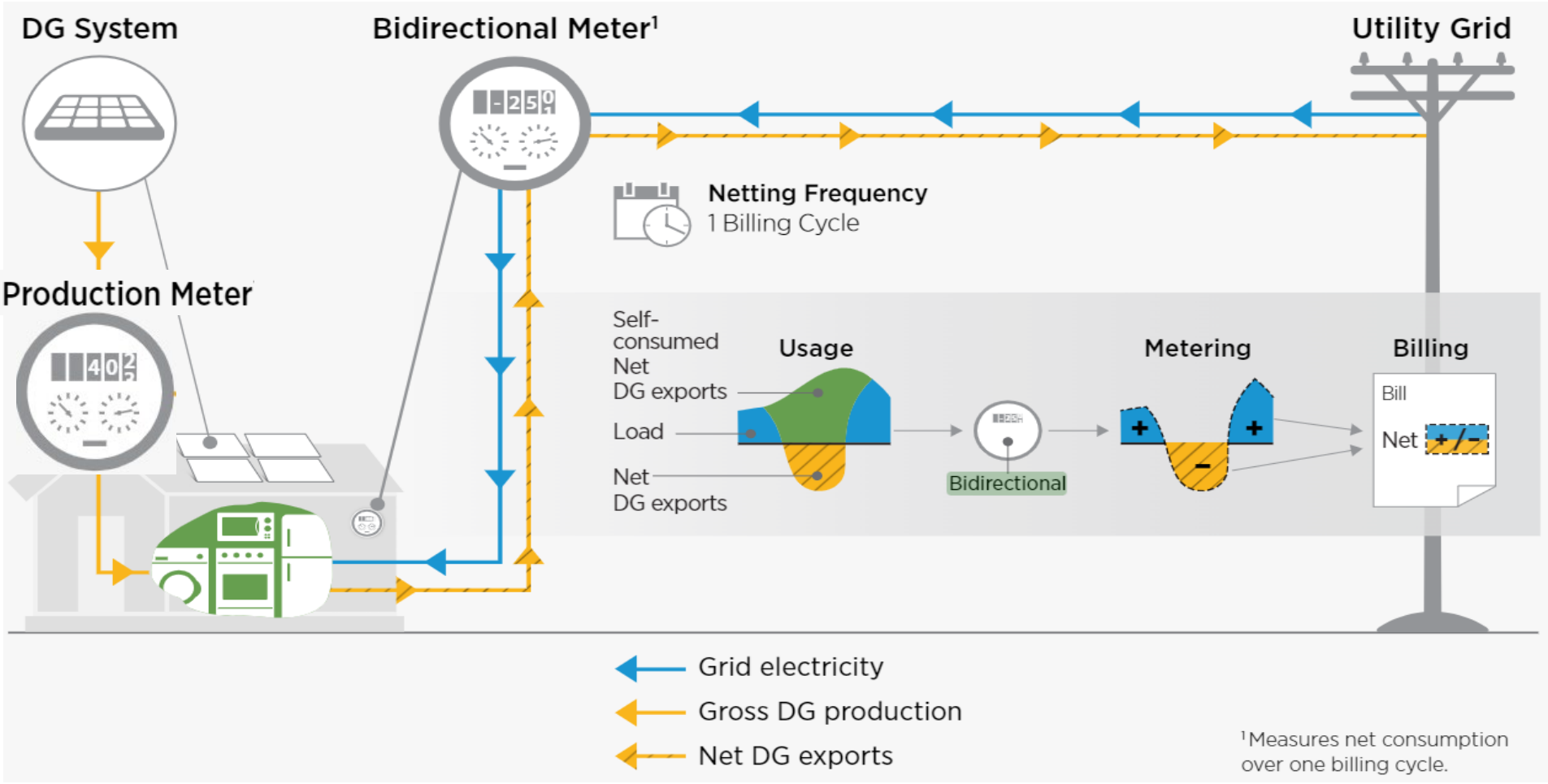




Metering and Billing Arrangements for DERs

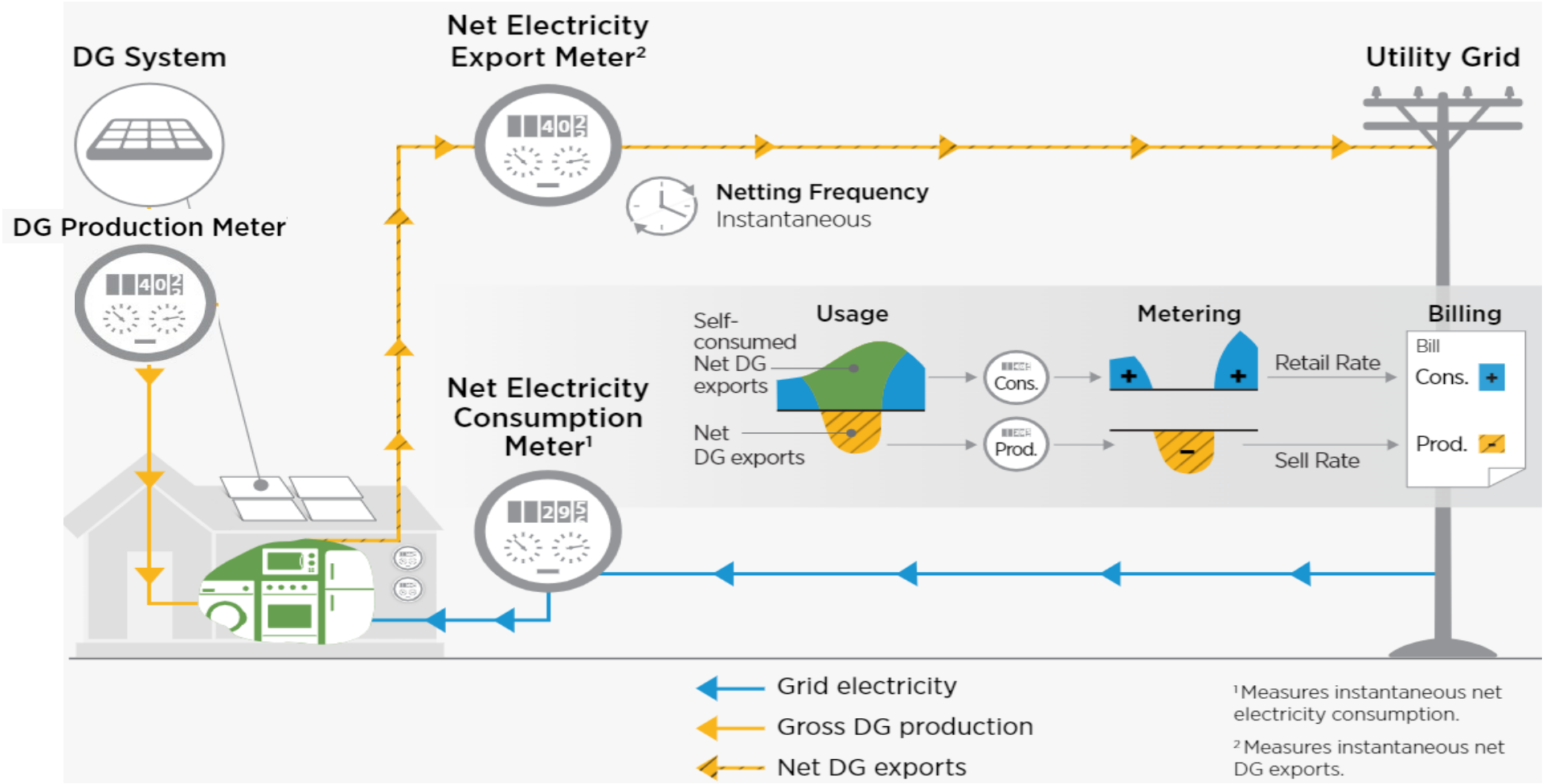


Net Metering



Source: National Renewable Energy Laboratory

Dual Metering



Source: National Renewable Energy Laboratory

Example 1: Utility delivers more power than it receives

Dual Metering (IA, ND, SD)

	kWh	Retail Rate	PURPA Rate	Amount billed
Power Delivered to Customer	1,000	$0.10		$100.00
Power Received from Customer	100		$0.044	$(4.40)
			Customer Cost	**$95.60**

Net Metering (MN <40kW)

	kWh	Retail Rate	Amount Billed
Power Delivered to Customer	1,000		
Power Received from Customer	(100)		
Net Power Delivered to Customer	900	$0.10	**$90.00**

Example 2: Utility receives more power than it delivers

Dual Metering (IA, ND, SD)

	kWh	Retail Rate	PURPA Rate	Amount Billed
Power Delivered to Customer	200	$0.10		$20.00
Power Received from Customer	400		$0.044	$(17.60)
			Customer Cost	**$2.40**

Net Metering (MN <40kW)

	kWh	PURPA Rate	Amount Billed
Power Delivered to Customer	200		
Power Received from Customer	(400)		
Net Power Delivered to Customer	(200)	$0.044	**$ (8.80)**

Tips to handle DER inquiries

- **Have a designated DER contact within your utility**
- **Review the DER Workbook Interconnection Process Overview**
- **Be patient**

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Questions?

Derek Bertsch

Senior Regulatory & Contracts Counsel

derek.bertsch@mrenergy.com

605-330-4890

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