



OMS Forecasting Workshop

Utility Initiatives

PJ Martin – Director, Resource Planning
Xcel Energy

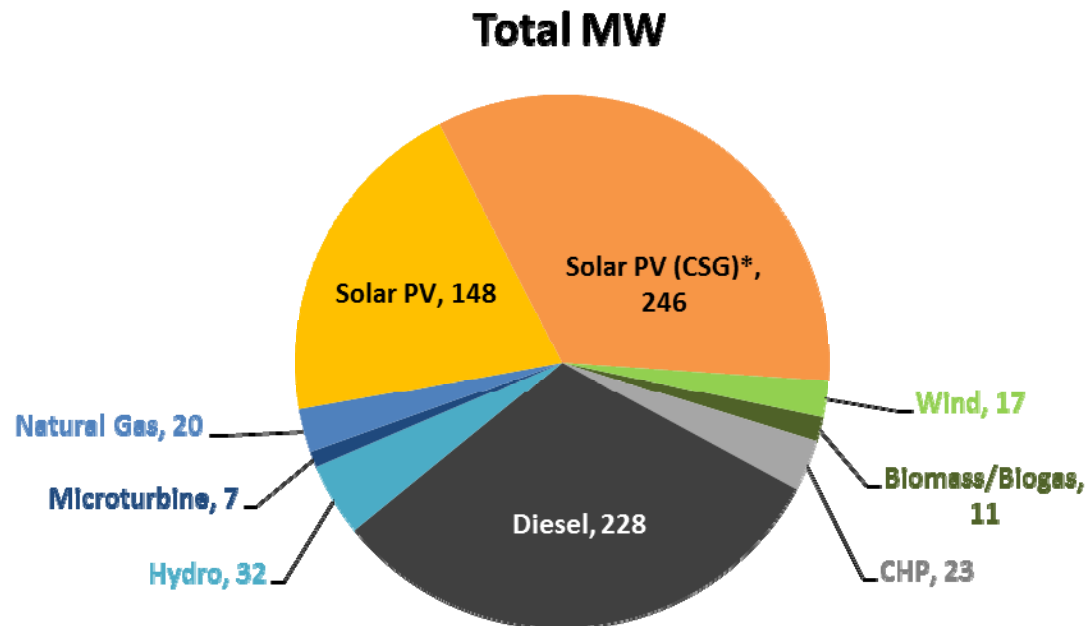
May 2018



Agenda

- Xcel Upper Midwest DER Current State
- Walk, Jog, Run
- Integrated Distribution Planning Framework
- Xcel Planning Tools

Xcel Upper Midwest DER Current State



Data as of 12/31/2017

- 731 MW of DER Resources
- 96% C&I, 4% Residential
- 97% in MN, 3% in WI
- ~4300+ Installations
- 90% of Installations < 1 MW

**Community Solar Gardens data reflect completed number of interconnections rather than number of project installations. One "project" may include multiple interconnection points.*

Minnesota Solar*Rewards Community®

Status Report | May 2018

PROJECT STATUS

- New Applications (2018) = 31
- Total No. of Applications under the VOS = 88

May 2, 2018	Project Sites	MW
Active Applications	294	447
Completed Projects	100	358
↓ PROGRESS SUMMARY ↓		
Application Stage	29	27
Study Phase	84	98
In process	61	64
Interconnection Agreement Issued	23	36
Design & Construction Phase	181	322

PROJECT SITES BY STAGE



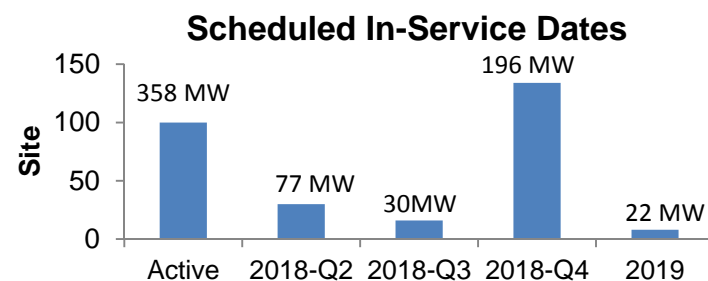
■ Application Stage ■ Study Phase ■ Design & Construction ■ Commercial Operation

PROGRAM UPDATE

- 23 MW at 8 sites came online during April 2018.
- Acceptance testing requirements are being adjusted to reflect real world scenarios and garden operators have been notified to prepare
- New IE disputes are under discussion and we are working to resolve if possible ahead of formal reviews

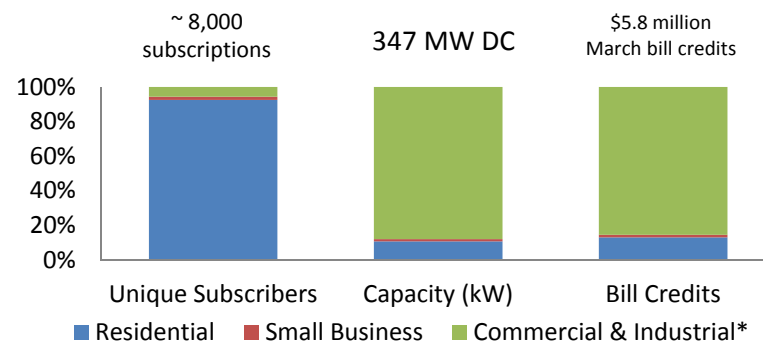
SOLAR GARDENS IN DESIGN & CONSTRUCTION

- 322 MW in Design & Construction at 181 sites



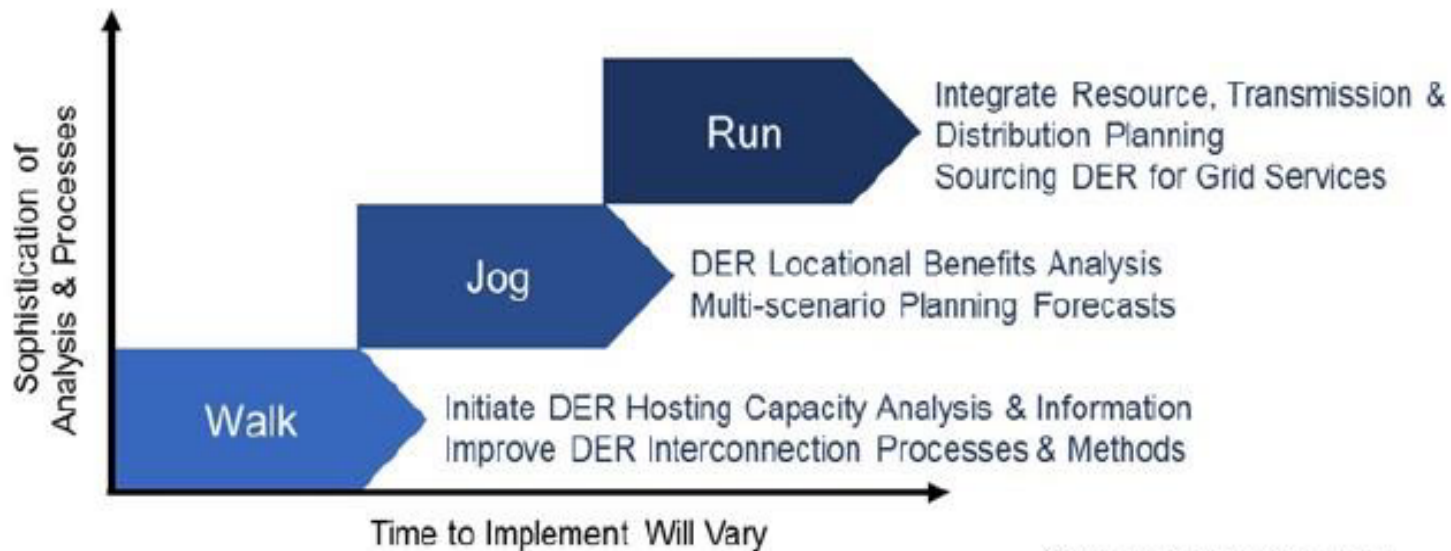
ACTIVE SOLAR GARDENS

- 81 projects received bill credits in March



Walk, Jog, Run Approach

Illustration of Sequence to Achieve Systematic Implementation

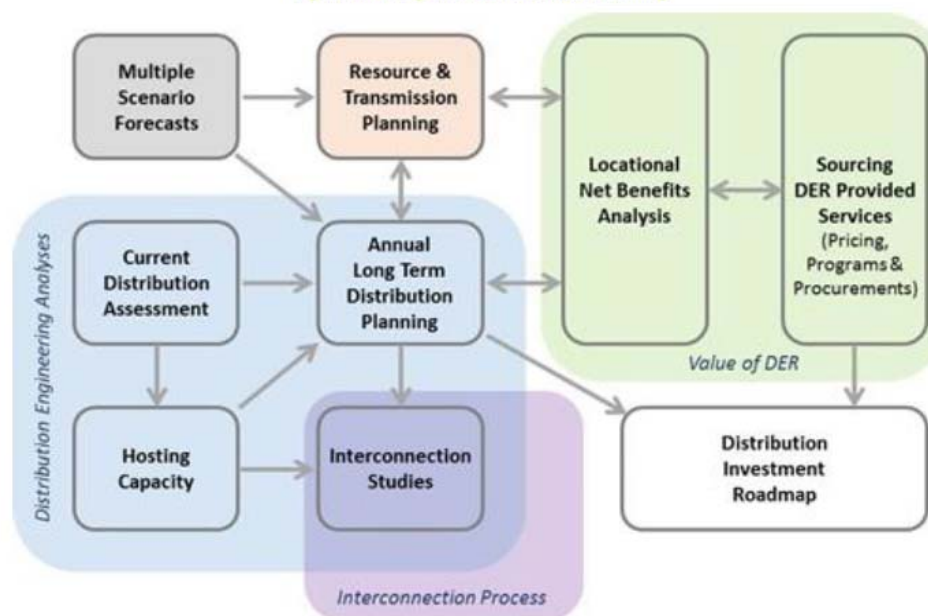


Source: MoreThanSmart.org

Integrated Distribution Planning

What is the ideal framework?

Figure 1: Integrated Distribution Planning



Source: <https://www.edockets.state.mn.us/Efiling/edockets/searchDocuments.do?method=showPoup&documentId=%7BBCE52F21-2497-4F2D-A70D-02614957A012%7D&documentTitle=20169-124836-01>

Xcel Planning Tools

	Tools	Current Process Steps					Future Planning Actions				
		Forecast	Risk Analytics	Mitigation Plans	Budget Create	Design & Construct / EDP Memo	Long Range Plans	Interconnection Processing*	Scenario Planning	Integrated Resource Planning	Locational Net Benefit Analysis
Current Tools	Synergi Electric		X	X			X	X			X
	Distribution Asset Analysis*	X	X								
	MS Excel		X		X		X				
	CYMCAP		X								
	GIS			X			X	X	X		X
	SCADA	X									X
	Workbook (internal)		X	X	X	X					X
	DRIVE***		X	X				X			
Expanded Tools	New Forecasting Tool*	X					X	X	X	X	X
	ADMS	X							X		
	SAP					X					

*New Forecasting Tool proposed to replace DAA and add more functionality

**Planning has larger role in interconnection process

***Hosting Capacity becomes integrated into planning process

Walk Jog Run