Open Discussion Forum

Understanding DERMS

Applications, Deployment Strategies, Research Needs

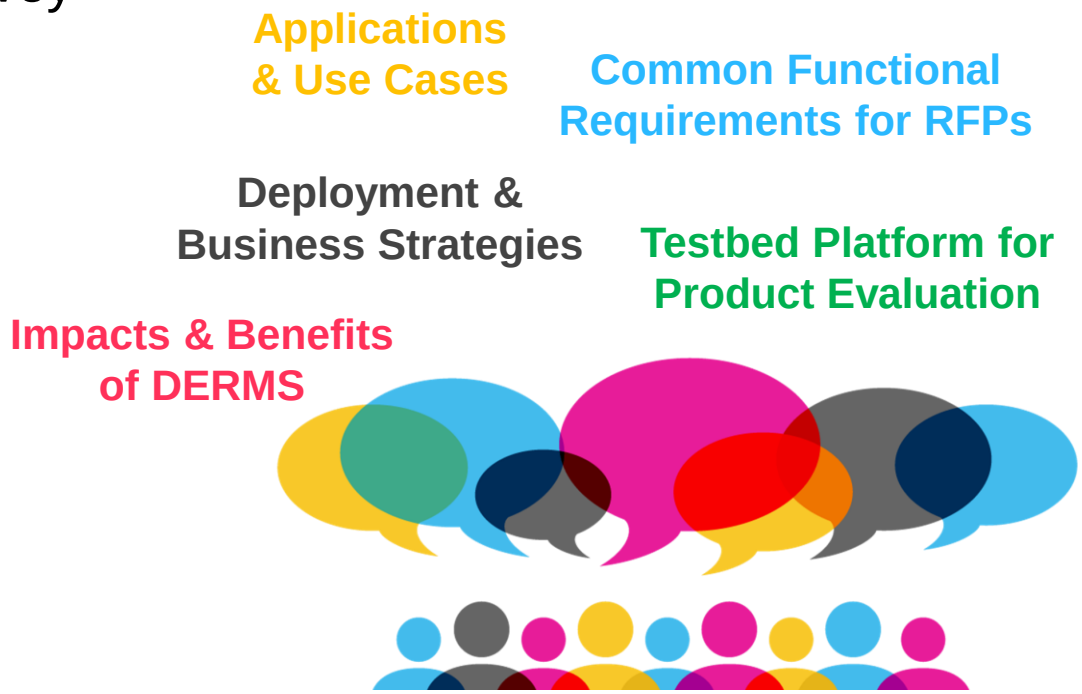
2018 PV Symposium

Wednesday, May 2nd, 2018

Today's Discussion is an **Open Forum!**

Share Insights – **Raise** Questions – **Seed** Future Research on **DERMS**

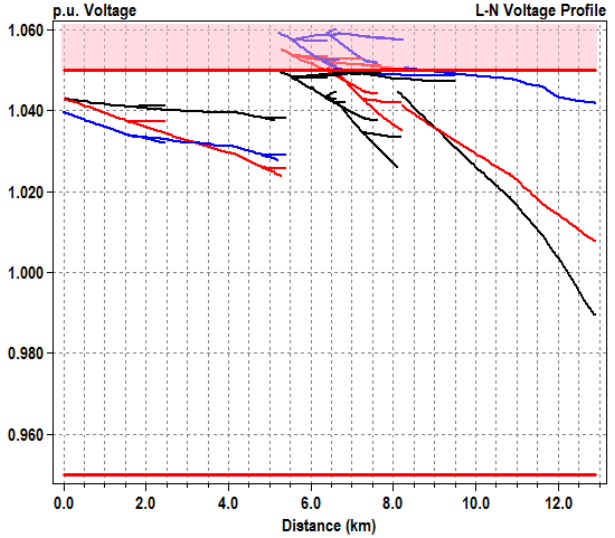
- **Topical focus**
  - Session topics intended to be distinct, but also convey connection with one another to aid holistic thinking
- **Format**
  - Short introductory vignettes
  - Open dialog
  - Interactive polling
- **Discourse & Idea Exchange**
  - Comments, questions, interruptions encouraged
    - ✓Please speak up!



Open Discussion Forum: Understanding DERMS

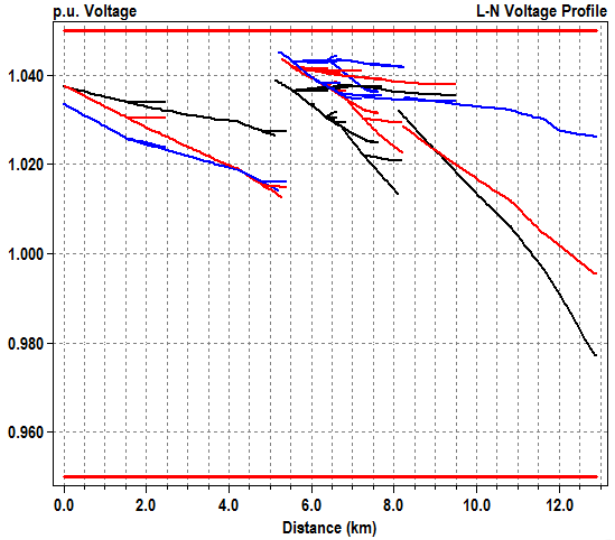
DER can provide benefits…
… along with potential adverse impacts

- Voltage fluctuations and excursions
- Lack of controllability & forecast
- Load masking (negatively impacts restoration)
- Reliability risk (simultaneous tripping, etc.)

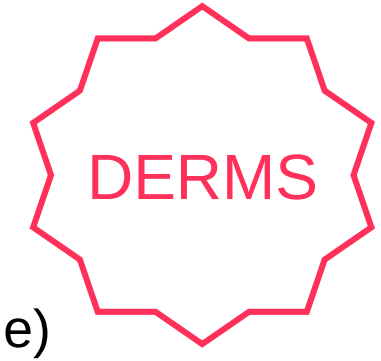


DER Management with device-level functions

- Development of common inverter functions
- Comparison of grid impacts for different functions
- Methods to select optimal function settings
- Evaluation of commercial inverter products



Open Discussion Forum: Understanding DERMS



Device-level management

- Offline analysis
- “Set-and-forget”
- “One-size-fit-all”
- Autonomous control

>>>

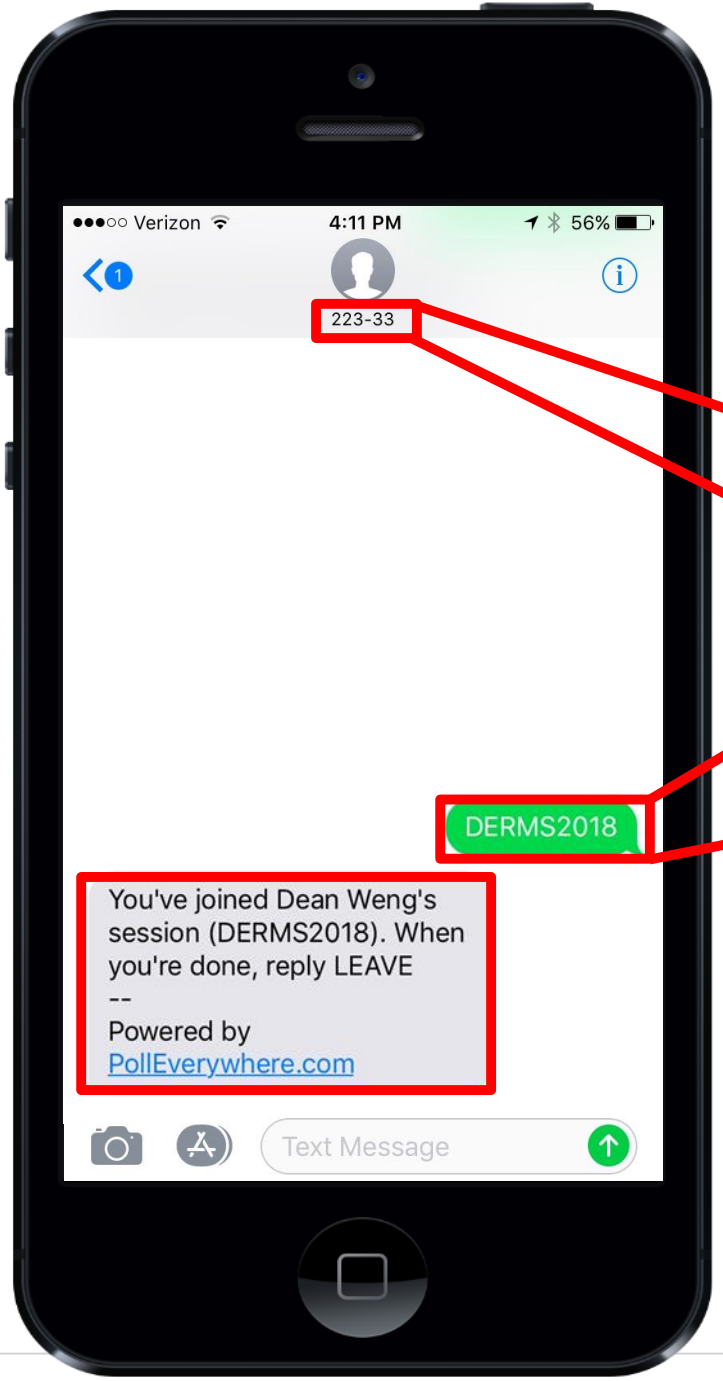
DER fleet management

- Event-driven (forecast, real time)
- Time-differentiated control
- Location specific
- Combine system and local controls

The DERMS Promises: Myth or Reality?

- Mitigate adverse distribution impacts
- Increase DER hosting capacity
- Enable decentralized, yet coordinated grid
- Facilitate development of Non-Wire Alternatives
- Capture new economic opportunities
- Support utility<>aggregators interactions

How to Participate in Interactive Polls



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You've joined Dean Weng's session (DERMS2018). When your done, reply LEAVE
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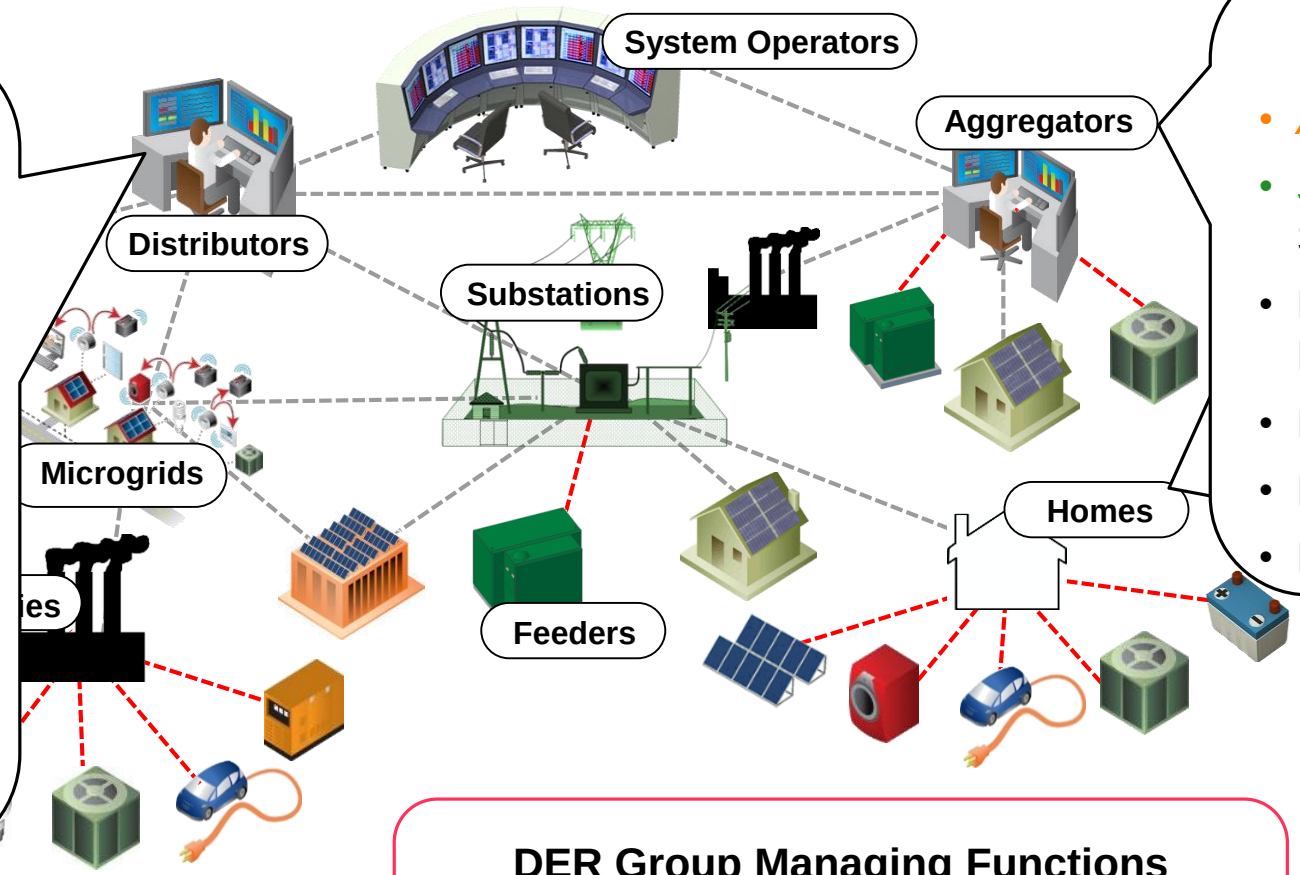
Framing the discussion: DERMS Functionality at Multiple Levels

Utility's DER Managing Entity

- *Aggregate* DER
- *Simplify* Grid Supportive Services
- Local *Optimization* of DER Dispatch
- DER *Gateway*
- Load and DER Forecasting
- DER Scheduling
- DER Registry
- DER Health Management

- Asset Health Management



Aggregator's Fleet Manager

- *Aggregate* DER
- *Simplify* Grid Supportive Services
- Local *Optimization* of DER Dispatch
- DER *Gateway*
- DER Registry
- NOC

DER Group Managing Functions

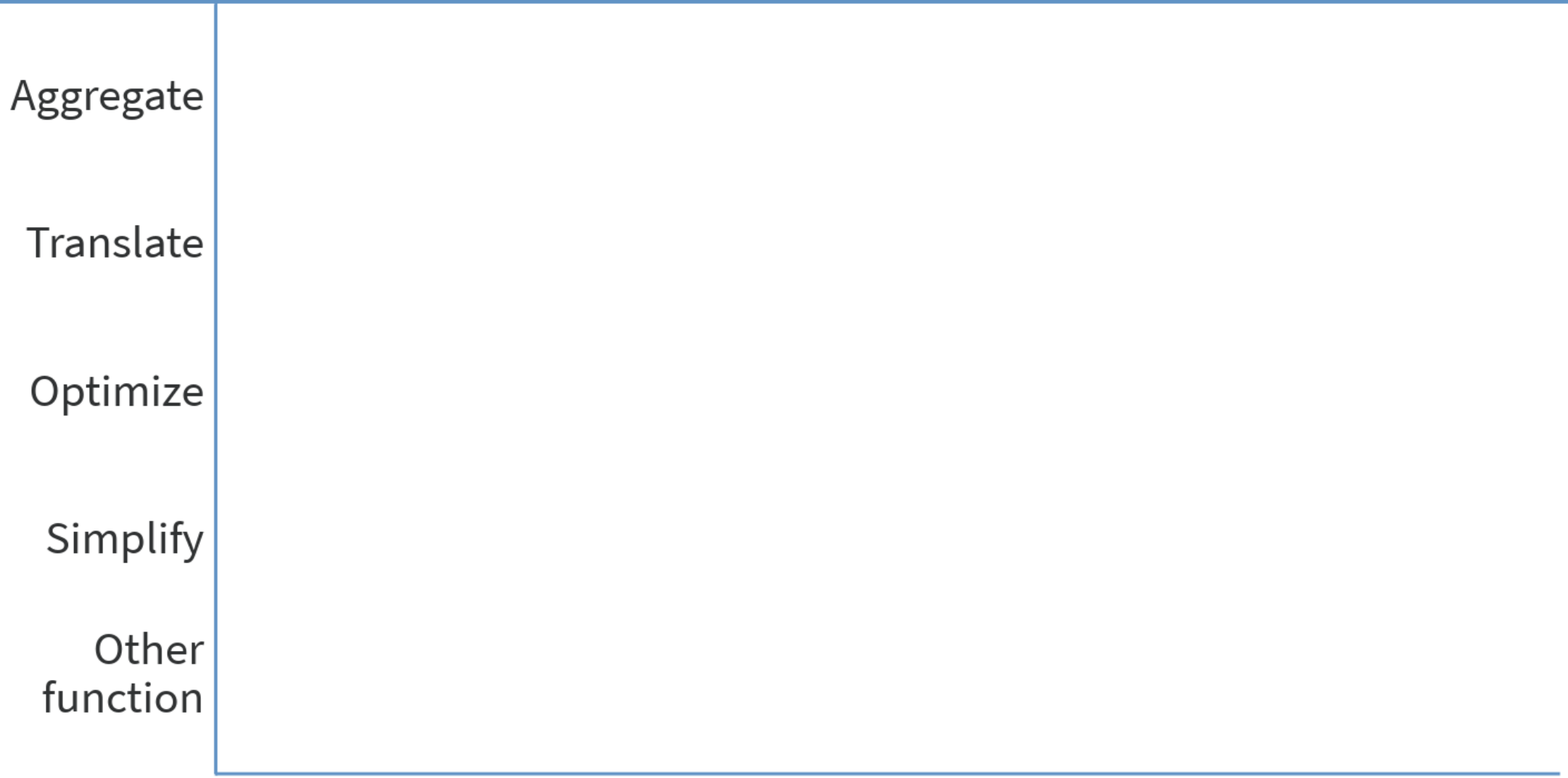
Aggregate *Optimize*

Simplify *Translate*

The discussion today will focus on u s to the grid

EPRI ELECTRIC POWER RESEARCH INSTITUTE

Which DERMS function do you perceive as the most important?



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Open Forum – Understanding DERMS

Discussion Kickstarter

- What are your organization's motivations for using DERMS?
  - How is your organization thinking of DERMS for providing grid services?
- Is your organization's thinking aligned with EPRI's Aggregate-Simplify-Optimize-Translate functions?
- Are there any key functions missing ?

Deep-dive: Drivers for DERMS Adoption

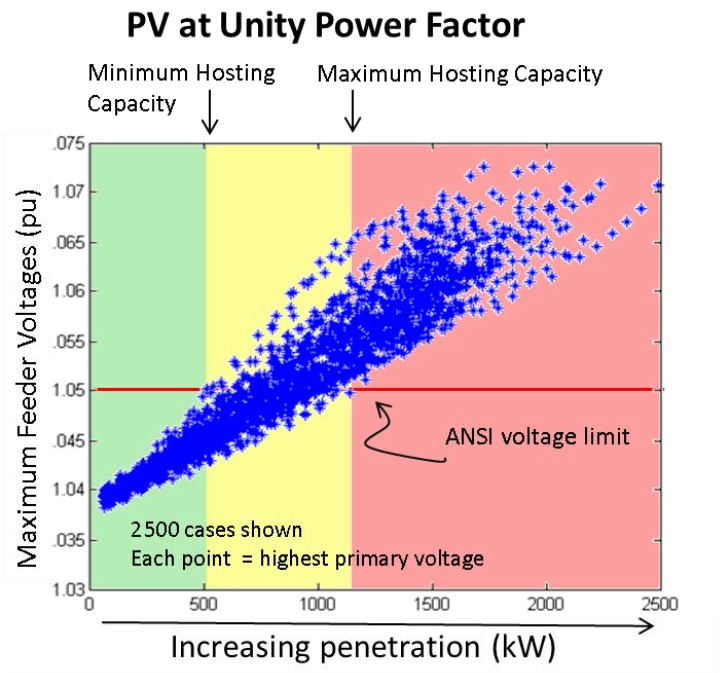
Example: Enabling Non-Wires Alternative

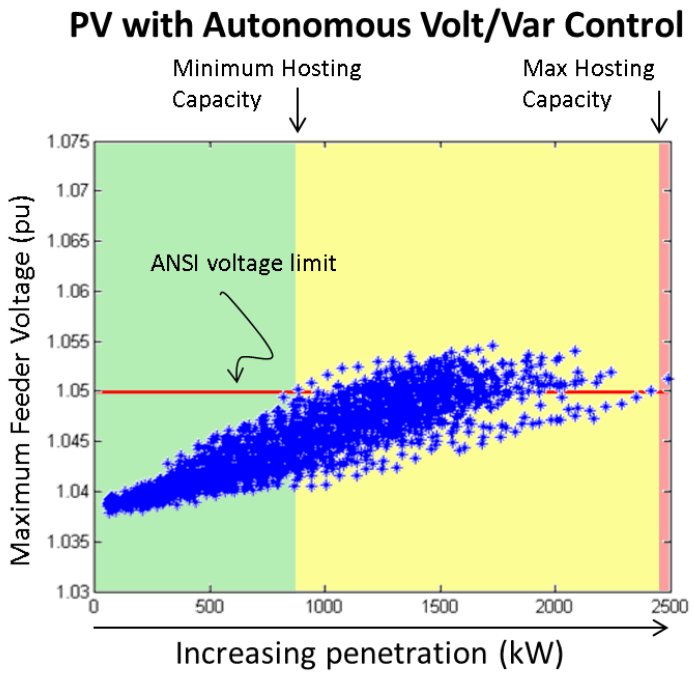
Functions	"Traditional Wires"	"Non- Wires"
Distribution Capacity	Sectionalizers; Transformers; Conductors; Isolating devices	Utility DERMS; Utility DERMS; Utility DERMS; Utility DERMS
Voltage Support	Tap-changing Transformer; Capacitors; Regulators; Smart Inverters	
Reliability (Back-tie)	Isolating devices; Relays; SCADA; FLISR; Sectionalizers	

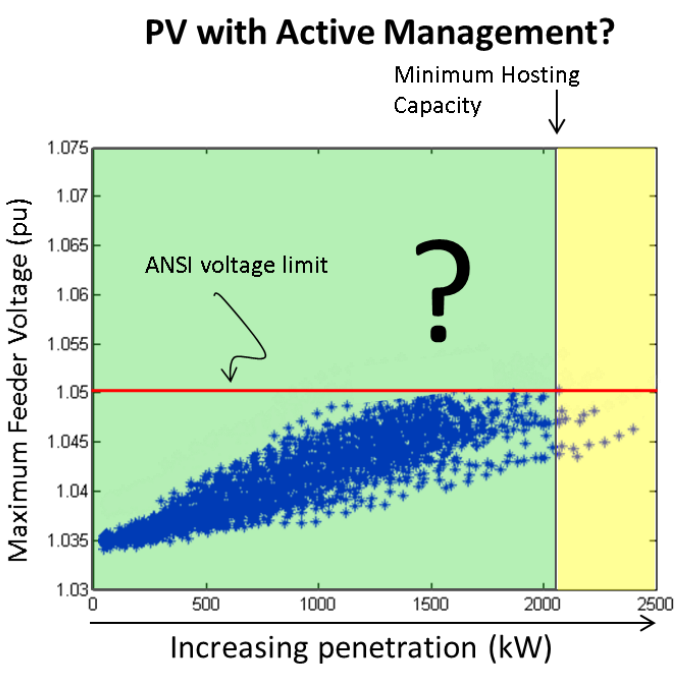
DERMS enables new business models for utilities and third parties to unlock the potential of DER and the grid services they provide

Deep-dive: Drivers for DERMS Adoption

Example: Increasing Hosting Capacity







DERMS control systems bring complexity and cost. Whether or not it is worth it depends on the <u>incremental benefits</u> that can be achieved over autonomous functionality.

Deep-dive: Drivers for DERMS Adoption

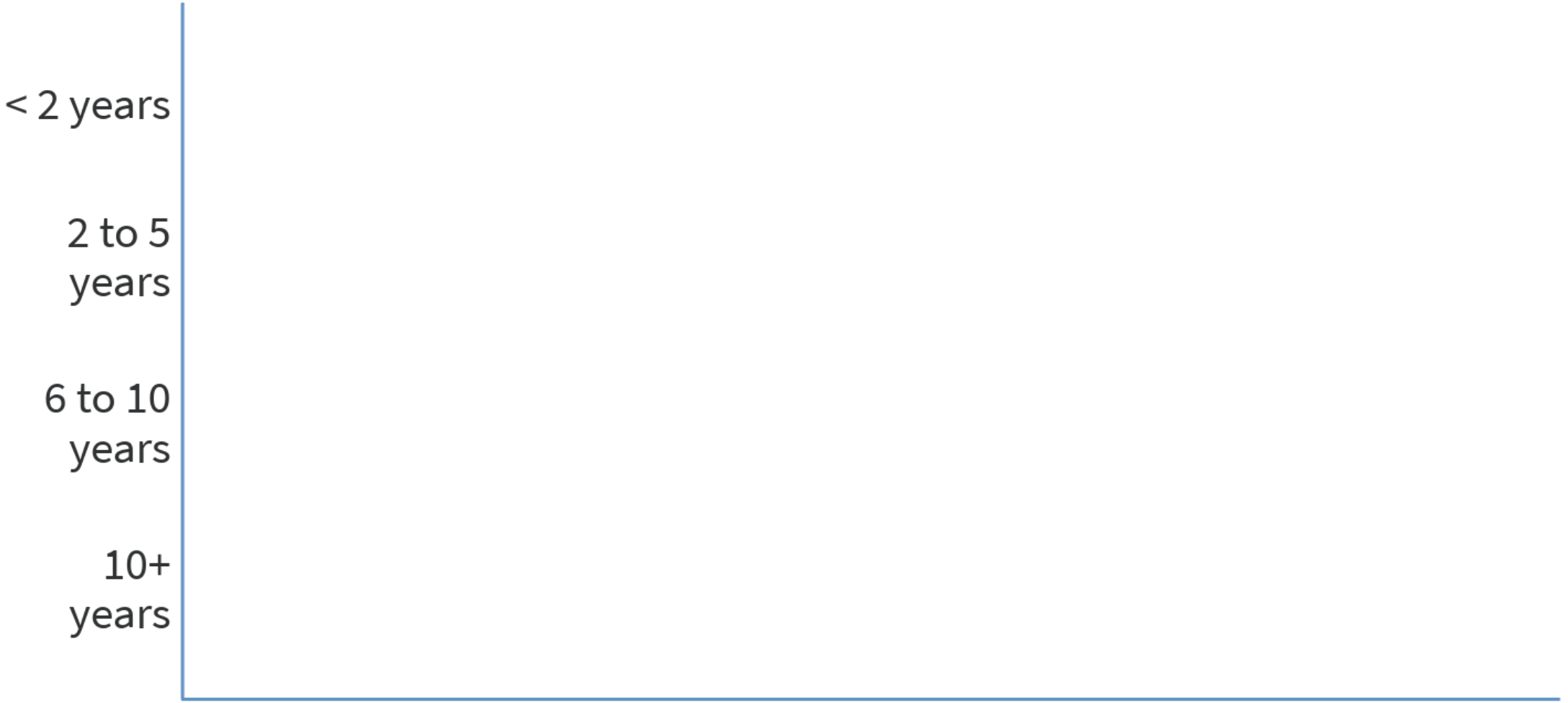
Discussion Kickstarter

What are the key factors driving interest in DERMS at your organization?

- New Business Opportunities
- Regulatory Requirements (e.g. grid codes)
- Providing/Enabling Non-Wires Alternatives
- Increasing Hosting Capacity
- Policy Mandates & Goals for DER
- Other Factors

When will DERMS start actively managing DER assets to provide grid services?

When poll is active, respond at **PollEv.com/derms2018** Text **DERMS2018** to **22333** once to join



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Deep-dive: DERMS Landscape

- **DERMS Products Today…**
  - ***DERMS Add-on to Utility DMS***: situational awareness for DER, incorporate DER control options
  - ***Edge DERMS***: extend visibility and controls beyond traditional DMS/SCADA
  - ***Fleet DERMS***: dispatch of heterogeneous DER groups for economic or reliability purposes

- **DERMS Products Tomorrow…**

Discussion Kickstarter

- Will DERMS remain isolated systems or will there be interactions between different DERMS?

Deep-dive: Deployment & Business Strategies for DERMS

Key Deployment Approaches

Direct Control by Utility

DERMS —*sold to*→ Utility —*who enrolls and manages*→ DER Assets

Control Through 3rd Parties

DER Assets —*sold and/or enrolled by*→ Third Parties using DERMS —*to sell services to*→ Utilities, Markets

Discussion Kickstarter

- DERMS-controlled DER portfolio: Utility programs vs. 3rd-party aggregators?
- How is SCALE influencing business arrangements for DERMS?

Concluding Thoughts on DERMS…

Together…Shaping the Future of Electricity