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# About Me



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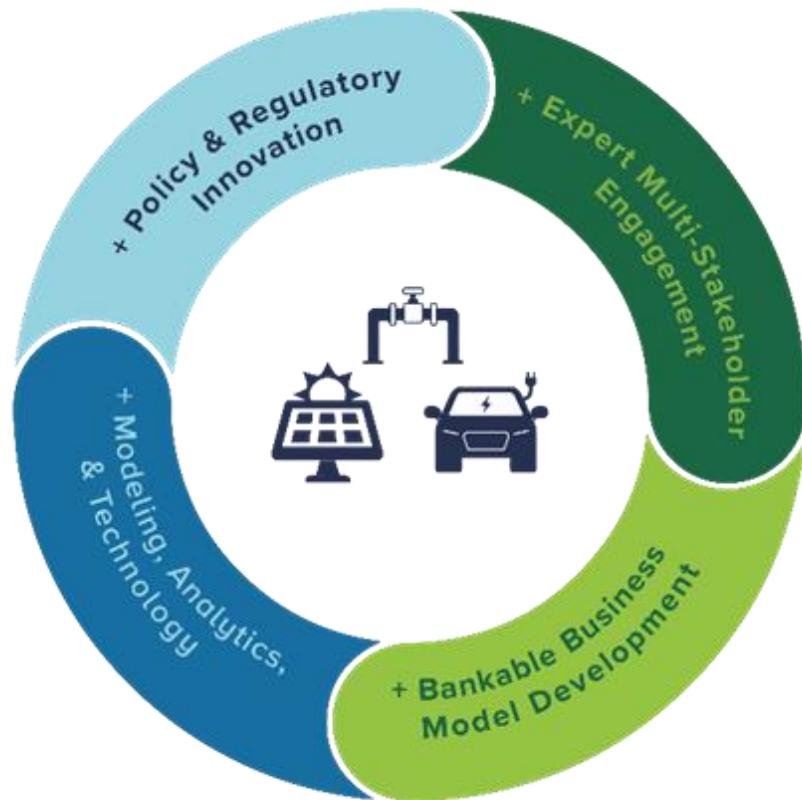
Ron is a subject matter expert in advanced rate design, cost of service studies, and DER compensation and integration.

Ron leads a team that provides expertise and expert testimony on numerous topics including multi-year utility rate plans, performance incentive mechanisms, cost of service modeling, residential and commercial rate design, renewable energy program design, DER interconnection cost allocation and recovery, DER integration.



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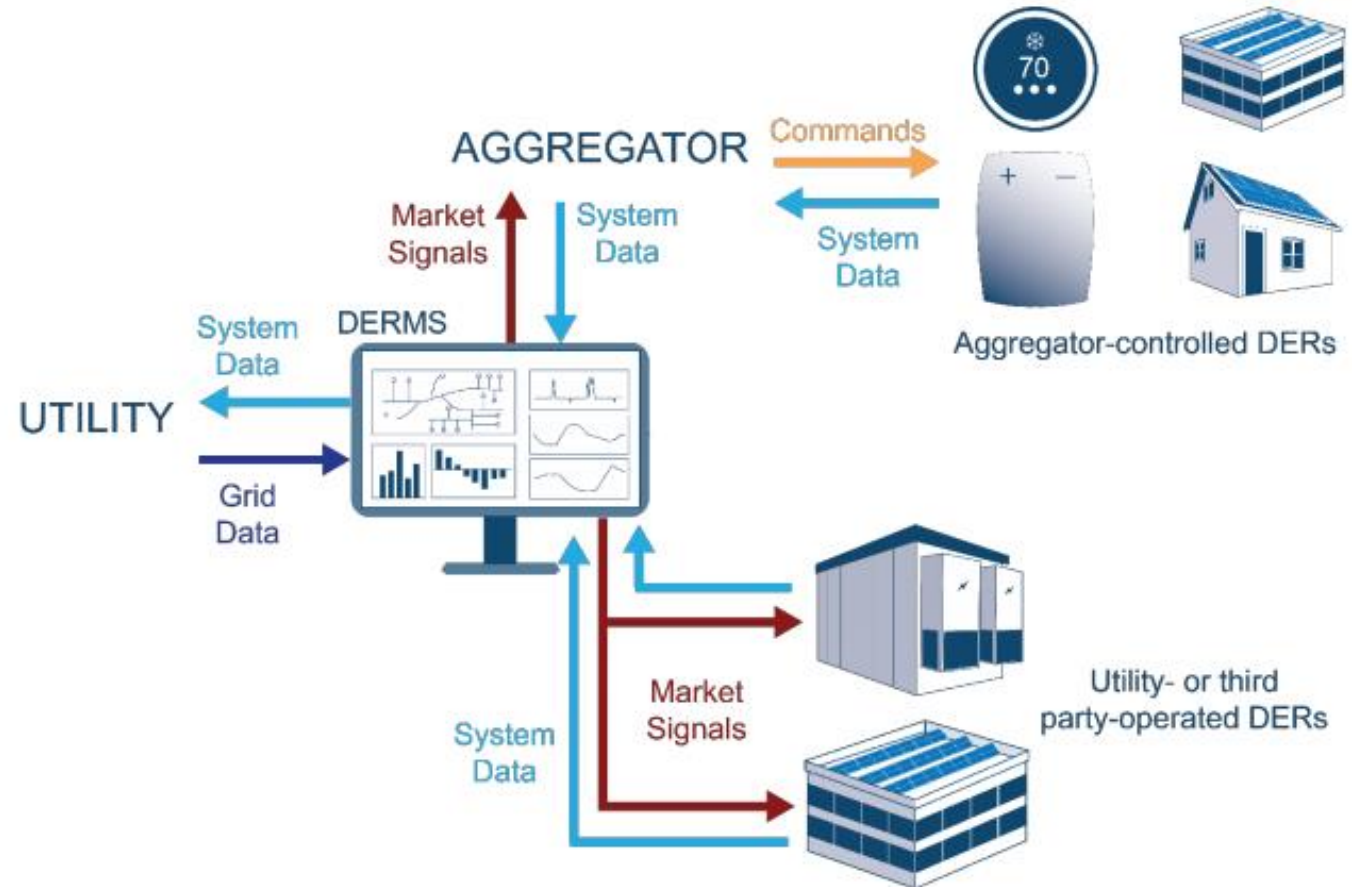
## FERC 2222: Right-Sizing Investment at the State-Level

- + Utilities may need to make system investments in order to comply with FERC 2222
- + How can regulators ensure that utilities make the appropriate level of investment?
  - What processes can be used to limit unnecessary spending?
- + For example: what level of DER monitoring and control do utilities truly need?
  - Do they need a Distributed Energy Resource Management System (DERMS)?
  - What types of monitoring and control function are needed to comply with FERC 2222?
    - If a DERMS is needed, what DERMS functions should be prioritized
  - In any case, how can the functions required be leveraged to provide customer benefits?

A primary regulatory concern will be right-sizing the necessary investments to accomplish FERC 2222

# Background: DER Management System (DERMS)

- + What is monitoring?
- + What is control?
- + Numerous foundational issues should be addressed before a DERMS investment justified
  - IEEE 1547-2018 implementation
  - Increased transparency through distribution system planning
    - How does FERC 2222 impact the current planning process?



A DERMS can take many forms

Source: <https://www.nrel.gov/docs/fy19osti/71984.pdf>

## Case Study: PPL Corp. DER Control Pilot

### + Context:

- PPL received a \$3.3 million DOE grant to test DERMS for connecting private solar installations and using them to improve grid reliability

### + PPL's proposal to the Pennsylvania PUC:

- Install smart inverters with communication capability for all DER customers so the utility can "monitor and proactively manage" each resource
  - Capability includes actively controlling customer smart inverter settings to prevent reliability problems
- PPL proposed to utilize its DERMS, a ConnectDER device, and require smart inverters

### + PPL's justification:

- Distribution system reliability concerns, such as voltage irregularities
- Safety -- remote shutoff

## Case Study: Concerns with PPL's proposal

- + The proposal confused IEEE 1547-2018 implementation with DERMS functionality
  - Monitoring and control of smart inverters was framed as a component of IEEE 1547-2018
- + The ConnectDER device would be rate based, creating an unquantifiable cost to non-participants
- + Utility control may constrain third parties from providing grid services at the wholesale or distribution level
- + Customer choice can be limited. For example, PPL's initial proposal was not compatible with BTM energy storage and excludes electric vehicles
- + Utility could not articulate ratepayer benefits clearly, nor did they have any framework to demonstrate performance/benefits over time
- + Intervenors argued that direct DER management is not necessary to provide system reliability



## Case Study: PA PUC approved a settlement agreement for PPL

- + Pilot #1: *monitoring* DERs through devices connected to inverters vs. other distribution system visibility
- + Pilot #2: *active management* of DERs vs. inverter autonomous grid support functions
- + Outstanding issues
  - Is there a size threshold that makes monitoring/controlling cost-effective and necessary?
  - The pilot structure is complex so independent analysis of the final methodology and results may be required
- + Important to remember that PPL's DERMS was largely paid for through a DOE grant, so results of the cost to benefit analysis will be utility specific

Lessons will be learned from PPL's pilots, but it will likely create more questions than answers

Source: Docket No. P-2019-3010128 Settlement Agreement. <https://www.puc.pa.gov/pdocs/1679576.pdf>



# Significant Investments May Be Unnecessary for Aggregation

Liberty Utilities	Green Mountain Power	Sunrun
<ul style="list-style-type: none"><li>+ Battery Storage Pilot</li><li>+ Liberty programs customer-sited Tesla batteries to charge off-peak and discharge to the electric grid during monthly peak demand in response to utility signal</li><li>+ Customers compensated at NEM rates</li></ul>	<ul style="list-style-type: none"><li>+ Frequency Regulation Pilot</li><li>+ Tesla coordinates 200 GMP customers with Powerwall batteries to respond to signals from ISO-NE to provide frequency regulation</li><li>+ Customers paid \$13.50 per month on their energy statements</li></ul>	<ul style="list-style-type: none"><li>+ Grid Services program</li><li>+ ISO-NE awarded Sunrun a contract to provide 20 MW of capacity</li><li>+ Sunrun will aggregate Brightbox batteries charged from rooftop solar power</li></ul>

Sources: <https://new-hampshire.libertyutilities.com/grafton/residential/smart-energy-use/electric/battery-storage.html>, <https://greenmountainpower.com/network-of-powerwall-batteries-delivers-first-in-new-england-benefit-for-customers/>, <https://solarmagazine.com/sunrun-iso-ne-home-solar-plus-storage-distributed-renewable-energy-landmark/>

## Recommendations to Consumer Advocates

- + Utilities with low DER penetrations are discussing “DERMS like” investments for FERC 2222 while providing little, to no, transparency around their planning processes
  - DER integration approaches available that largely leverage existing investment in the near-term
- + Distribution system planning is key to increasing transparency
  - Require utilities to justify investments
  - Require comparative analysis to avoid duplicative or unnecessary investments
- + IEEE 1547-2018 implementation can help ensure DER are **capable** of communication and control
- + Require utilities to specify a strategy and explain their implementation plans, associated costs
  - Extensively probe the filing and potentially utilize a contested case on key investments and/or implementation approaches
    - Note the two above steps could provide information that would negate the use of a contested case

PPL's DER Management Plan could mirror utility proposals for FERC 2222 implementation







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