ESIG Session 7B: DERs to Serve APS Bulk System and Locational Needs

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Arizona Public Service - Customer to Grid Solutions

Serves as the bridge between what APS customers want and what the grid needs by developing and delivering innovative solutions for a safe, reliable and affordable future.

EDUCATION

PROGRAMS

INCENTIVES & REBATES

Virtual Power Plant (VPP) Evolution

2017
- Arizona Corporation Commission (ACC) Approval
- Program emerged from DR and CT programs

2020
- 25,000 devices
- 70 MW
- APS Pre-enrollment begins
- Program becomes energy market resource

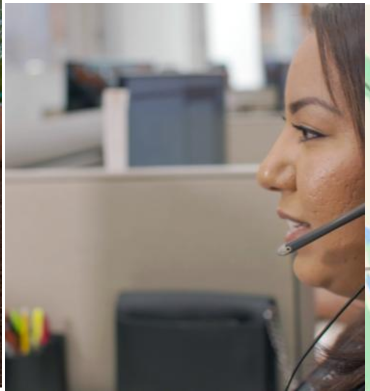
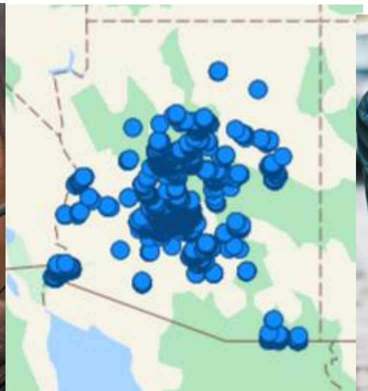
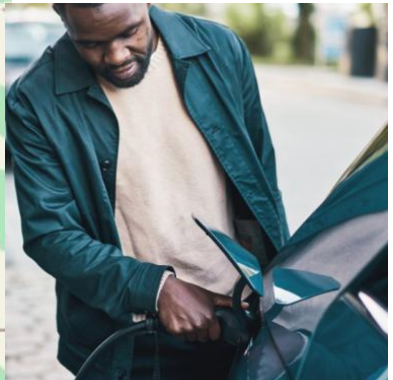
2022
- Virtual installation support for smart thermostats and complimentary in-home installation support

2024
- **Mapped connected technologies at the substation and district level dispatch**

2025
- Expanded ESS, and EV charging, and C&I DR programs with 100k+ devices
- **Identified constrained feeders**

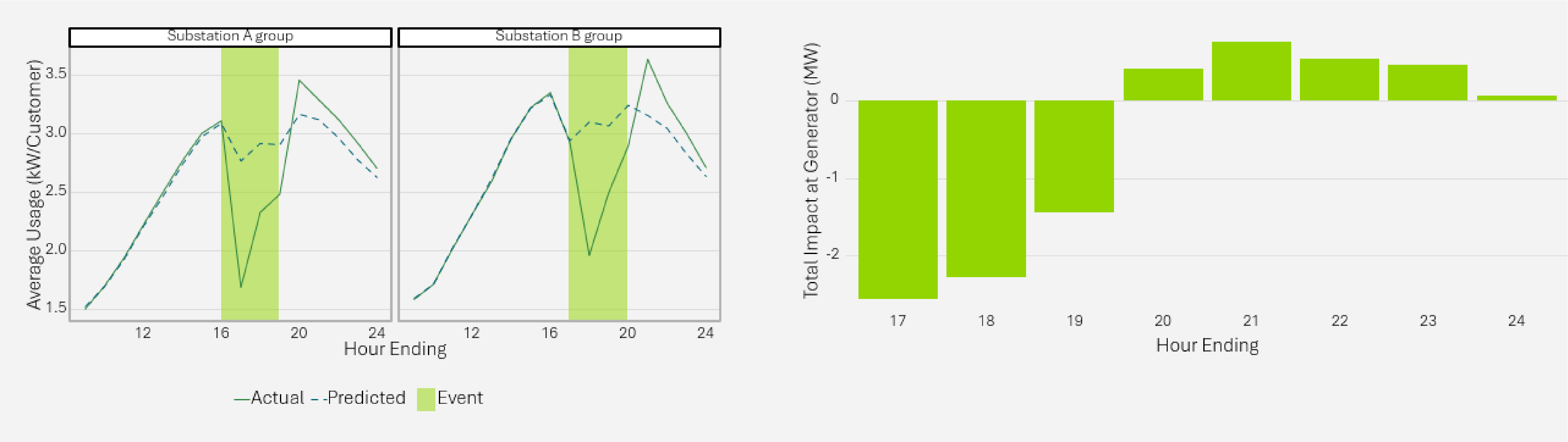
2026+
- VDER Modeling
- **Feeder level insights**
- **Operational and locational capabilities**




Summer 2024 Cool Rewards Locational Dispatch Event

- Monsoon storm related outage, working to restore service
- APS called an event for subset of customers served by targeted substations
- Dispatched different event parameters by A/B groups
- Delivered targeted load relief for these substations compared to baseline



Mapping DER Resources to Improve DER Situation Awareness

Summer 2024 Event

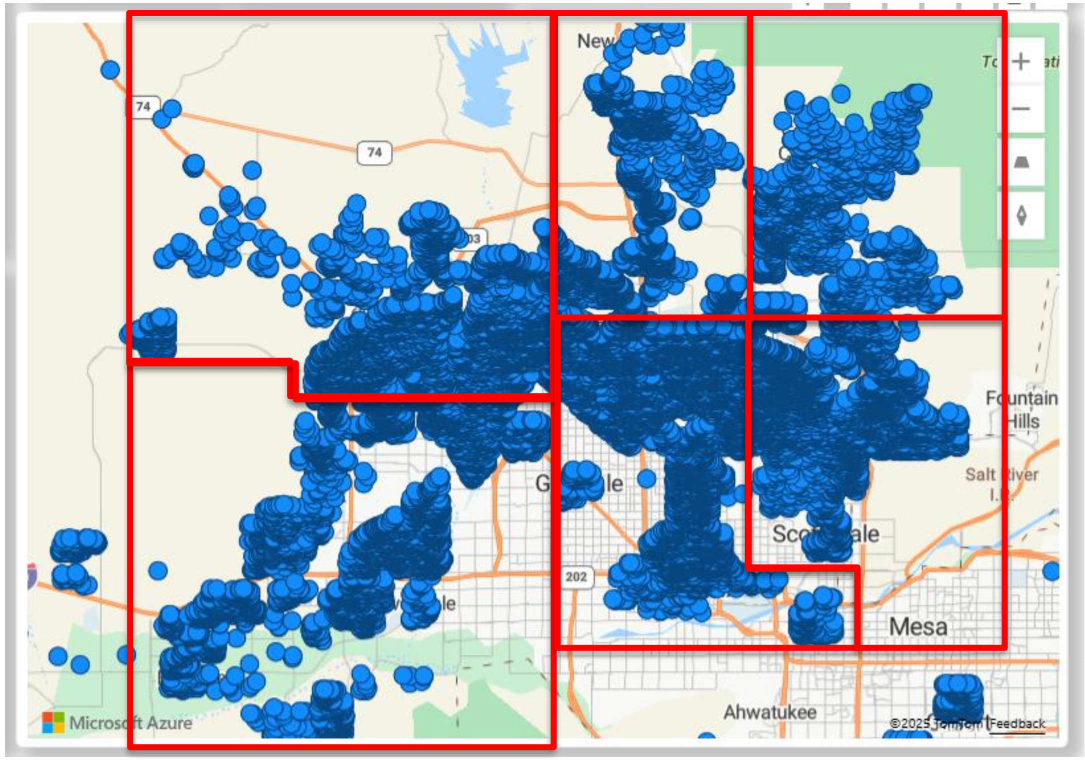
- Used dashboard to manually pull list of customers in impacted areas
- Very precise, but needed 24 hours to create groups in system

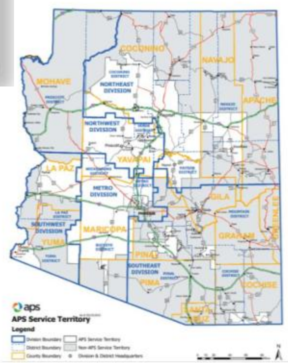
Summer 2025

- 19 preset groups
- Not as precise, but more dynamic

Summer 2026

- Thermostats flagged with substation to feeder for more precise and nimble response
- Smart Charge EVs, Storage Rewards Energy Storage, and emerging innovation





Early Locational Dispatch Learnings

- Approaching scale to bring meaningful locational capacity with enrolled DERs
- Needed better DER situational awareness
- Needed better ability to geographically subdivide the DER fleet in dispatch platforms
- Needed more agility/flexibility to dispatch locational events
- Needed to operationalize a process for identifying needs in real time and using DERs as a tool when appropriate

Early Locational Dispatch Learnings

Key objective: Save time and resources by focusing on feeders with the highest potential for success

- Can existing DSM portfolio and pilots offset forecasted peak load growth with meaningful locational reductions to potentially allow APS to defer capital projects?
- Utilize learnings to build a scalable location-specific NWA approach for all APS service territories

Category	Criteria
Load Growth	Slow, steady load growth that aligns with the observed growth rate of DSM programs
% Loading	Forecasted feeder loadings that are approaching threshold, but not at an extreme level with pending capital projects
Location	Prioritized regions, feeder types, or other locational-specific preferences
Reduction Feasibility	Realistically achievable peak kW reduction needed, on a per-premise basis
Review	Subjective review to select feeders targeted for alternative goals (strategic goals, pilot program learnings, direct requests)

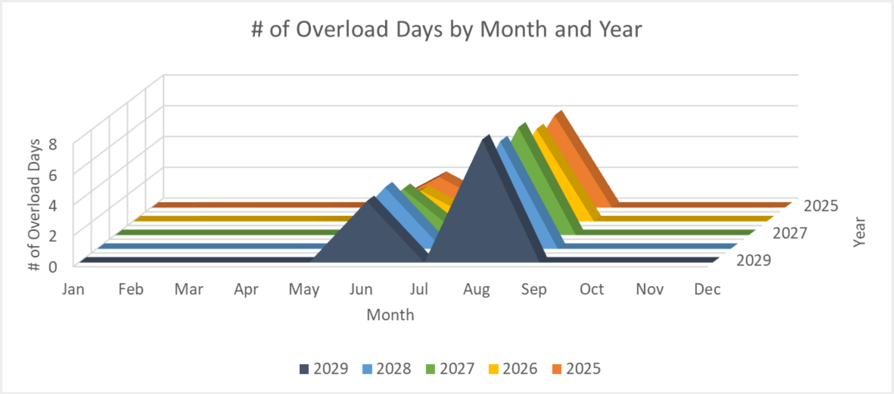
Overloading and Technical Potential Analysis

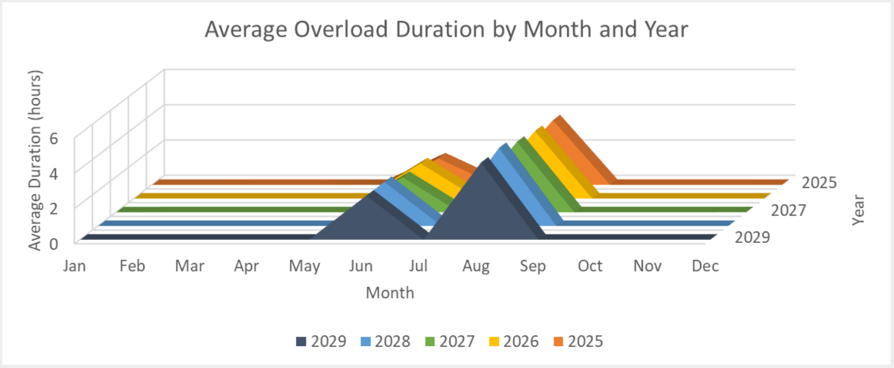
Key objectives:

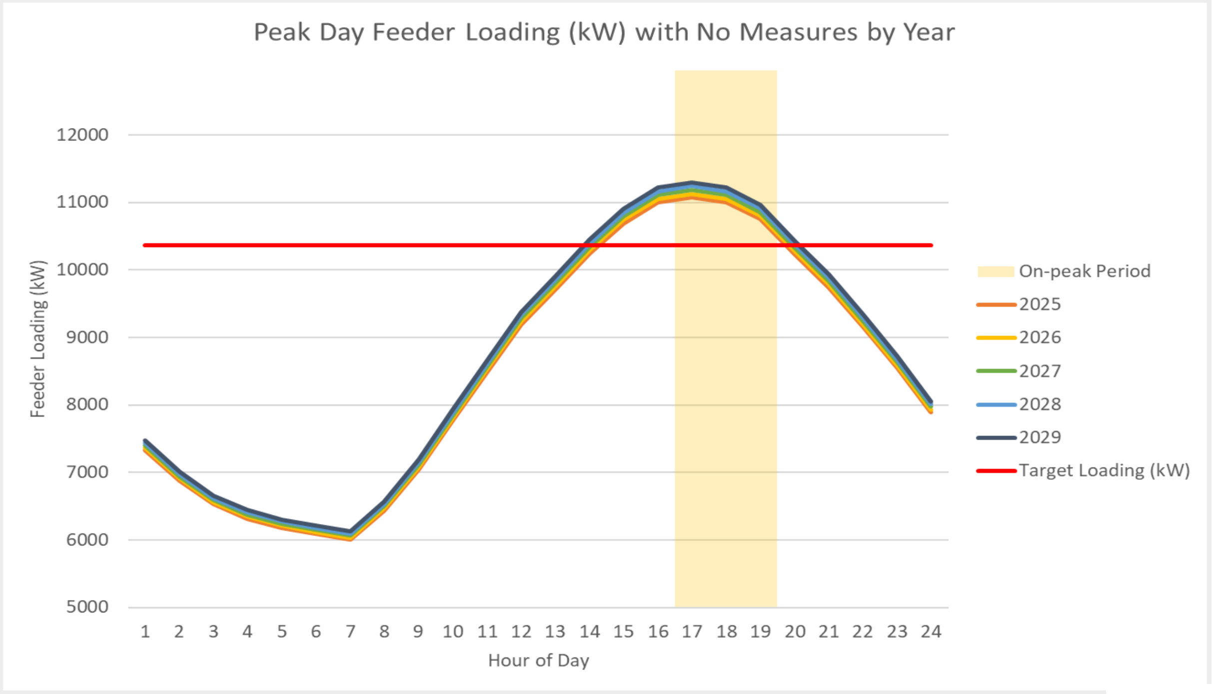
1) <u>Characterize the overloading</u> on each selected feeder using 8760 load shapes and forecasted load growth/changes

2) <u>Determine the potential demand savings</u> from residential and commercial programs on each selected feeder based on program data, premise data, and adoption curves

3) <u>Analyze the impact of the potential demand savings</u>, informing targeted marketing strategies to achieve full adoption potential







Operationalizing APS's VPPs Through Data Integration

LOCATIONAL PROJECT

- Focus: Grid Constraints
- Delivers: Priority feeders/transformers

✓ Identifies where we can deploy VPP flexibility for operational needs
✓ Pinpoints feeders/transformers where VPP may help defer future upgrades
✓ Explores how to best operationalize VPPs to meet locational use cases

ENGINEERING PROJECTS

- Focus: Data + ML intelligence
- Delivers: Generates the insights needed to operationalize locational VPP dispatch

✓ Enables transformer-level dispatch & optimization
✓ Demonstrates how we analyze and optimize flexibility

Together, these projects enable APS to scale VPPs at the feeder and transformer level creating a smarter dispatch for a more resilient grid

Operationalizing VPPs for Locational Dispatch

aps

Working with aggregators/dispatch platforms

- 19 subgroupings by geolocation in APS territory (DOC nodes)
- Separate subgroups for all targeted feeder project locations

Evolving regulatory requirements, customer agreements and DER partner capabilities

- Ability to call events with less than 2-hour notice and outside of traditional system peak times (regulatory, customer agreements)
- More granularity and agility in creating geotargeted dispatch groups (OEMs/dispatch platforms)

Creating internal processes for locational event dispatch

- Defining use cases and event parameters
- Setting operational triggers to consider event calls
- Process to confirm and execute event dispatch

Thank you

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