

Arizona DEReaming: APS' Early Efforts and Lessons Around Distributed Energy Resources

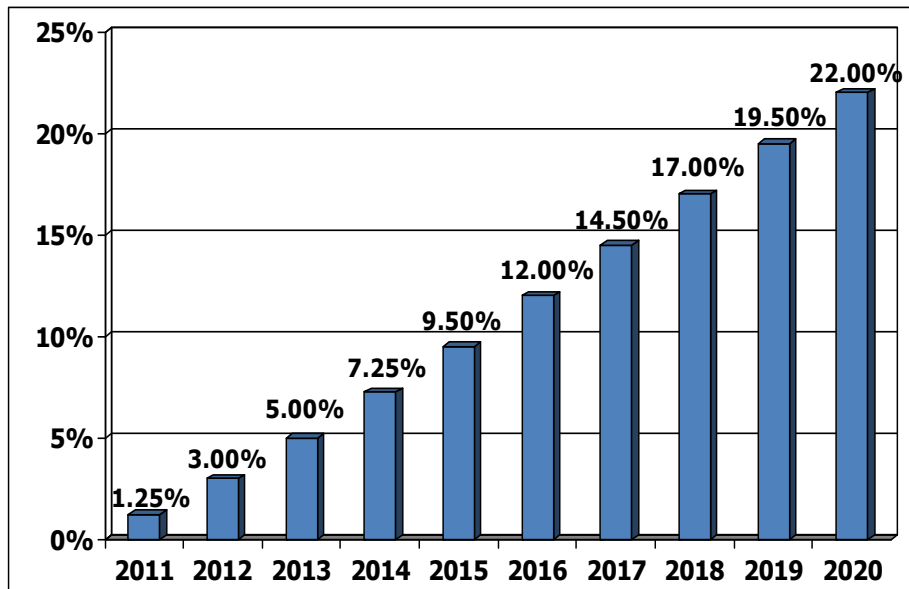


Tom Hines, Arizona Public Service

April 5th, 2017

Energy Efficiency Standard in AZ

Arizona Energy Efficiency Standard



Energy Efficiency Rules (Decision #71436):

"An affected utility shall, through cost-effective DSM energy efficiency programs, achieve cumulative annual energy savings equivalent to at least 22% of the affected utility's retail electric energy sales for the prior calendar year (2019)."

- ✓ Effective 2011-2020
- ✓ Based on annual MWhs
- ✓ DR credit is capped at 2%

Best Laid Plans... The 'Crawl, Walk, Run' Strategy

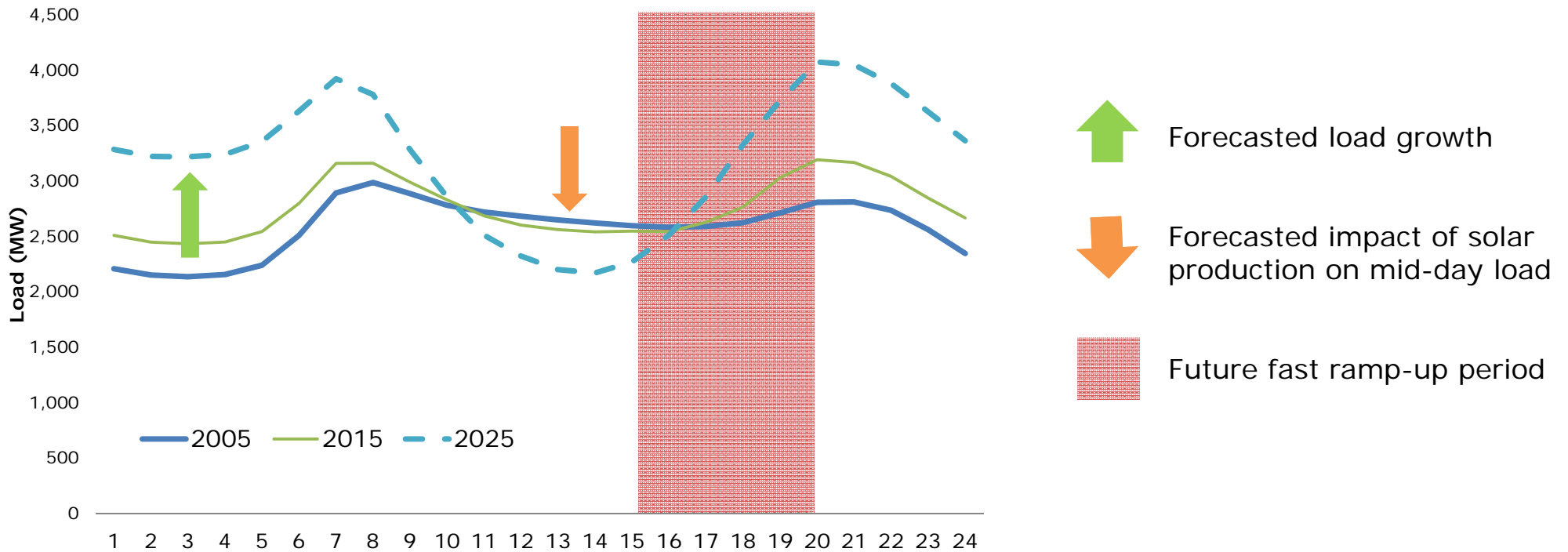
APS 2016 DSM Plan

- Added smart T-stats as an EE measure
 - Residential and Commercial
 - Cost effective annual EE savings
 - \$75 rebate for qualifying smart T-stats
 - BYOT program design
- Future plan to activate DR
 - Concerned about 'stranding' DER assets
 - RFP for DR capabilities within EE smart T-stat programs
 - Contemplated starting DR in 2018 or later...



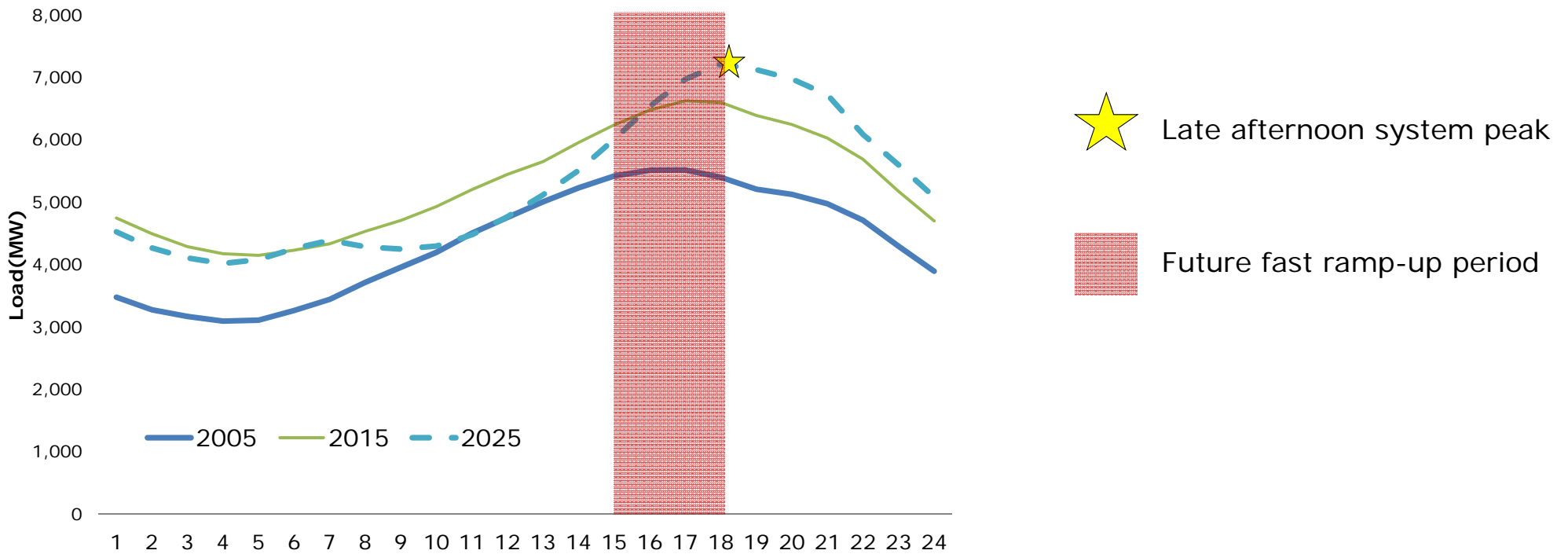
Evolving Load Shape Challenges

Typical March Weekday



Evolving Load Shape Challenges

Typical August Weekday



No Time to Crawl! – ‘DRESLM’ Program

- Amendment to APS DSM Plan (Aug. 2016)
- Ordered APS to develop and propose:

“... a residential DR or load management program with a budget of up to \$4 million, that facilitates energy storage technology....”

- APS filed the residential Demand Response, Energy Storage and Load Management (‘**DRESLM**’) Program (Dec. 2016)

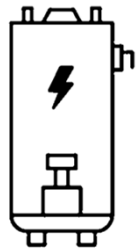


DRESLM Program Scope



6000

Smart Thermostats

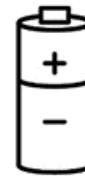


450

80-gallon Water Heaters

+

On Targeted feeders

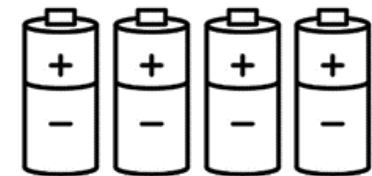


90

5 kW Residential Batteries

+

On Targeted feeders



4

100-200 kW Intermediate Batteries

+

On Targeted feeders


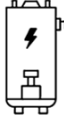

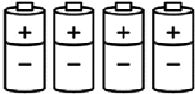
Slide 7

HT1

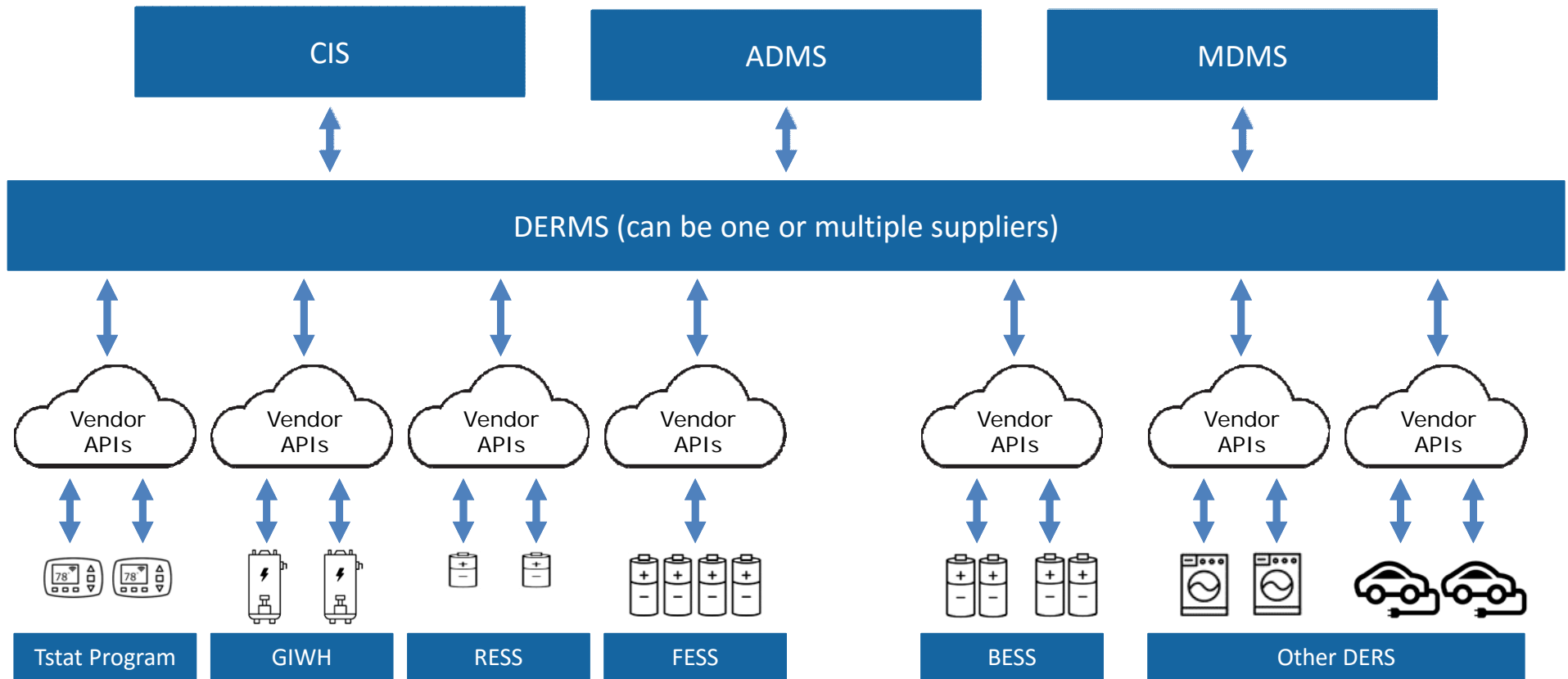
Recreate this slide. I like the layout and graphics. I want to change some of the text and the font etc.

Hines, Tom, 3/28/2017

DRESLM Use Cases

Use Cases	 T-Stat DR	 GIWH	 RESS	 FESS
Reduce system peak via demand response events	✓			
Reduce system peak via daily scheduled load shift / Provide feeder congestion relief	✓	✓	✓	
Solar sponging / duck curve management		✓	✓	
Customer peak demand charge management	✓		✓	
Voltage support				✓

Preserving Future 'DERMS' Flexibility



Where Are We Now?

- 'DRESLM' awaiting review by ACC
- Issuing RFIs to gather info on key tech
- Getting prepared to implement in 2017
 - Feeder targeting
 - Recruitment/customer enrollment
 - Customer offers/terms
 - Implementation and program delivery logistics
 - DER control, communications, and integration
- Developing future DERMS roadmap

Other Pilots & Programs

Program	Description	Source
1. Energy & Demand Mgmt. Education Pilot	<ul style="list-style-type: none"> • Feedback on energy use • Info on savings opportunities • Custom videos 	2017 DSM Plan
2. Load Management Pilot	<ul style="list-style-type: none"> • Res and Non-Res • Load shifting • Ex: load control & thermal storage 	2017 DSM Plan
3. Locational DSM Pilot	<ul style="list-style-type: none"> • Res and non-Res • Targeted DSM to constrained feeders • Defer distribution costs 	2017 DSM Plan
4. R-Tech Pilot Rate	<ul style="list-style-type: none"> • Res only • Battery storage • Demand response w/ smart t-stats • Grid interactive water heating 	Rate Review Settlement
5. Rates Education	<ul style="list-style-type: none"> • Understanding rate options • Assist w/rate migration 	Rate Review Settlement

Thank You

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