

Residential Grid-Interactive Building Programs in the Southwest

Justin Brant

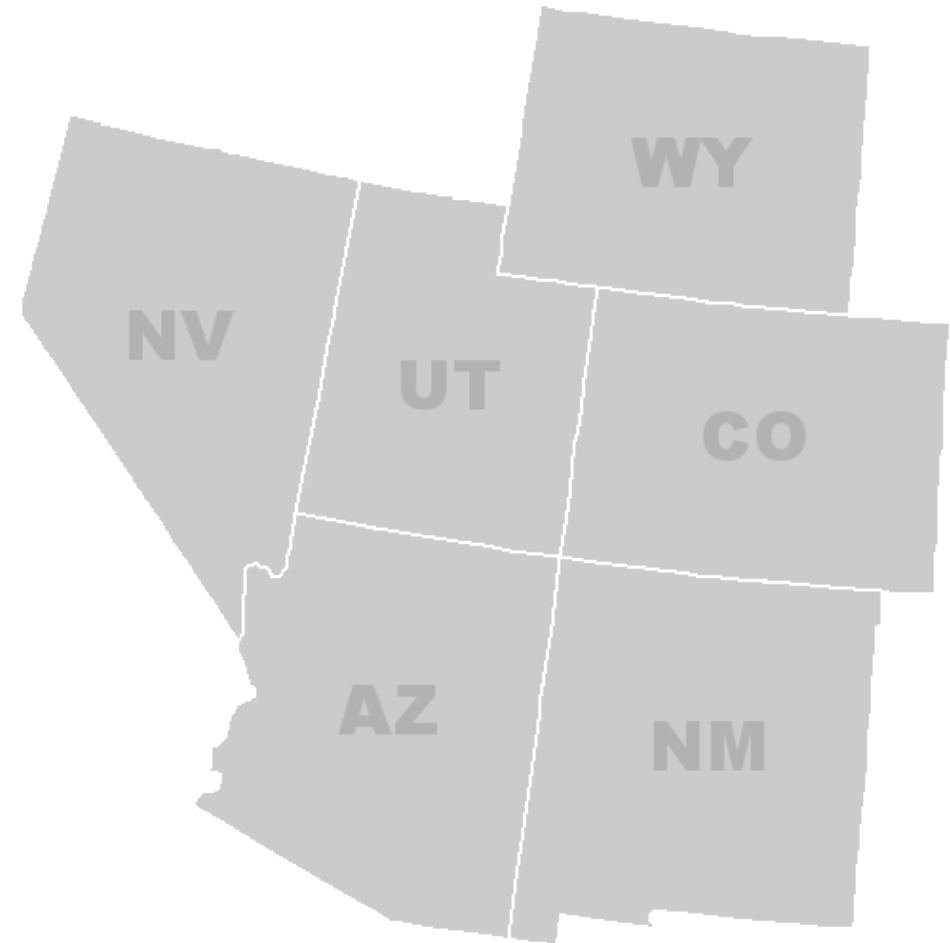


2019 National Conference on Energy Efficiency as a
Resource

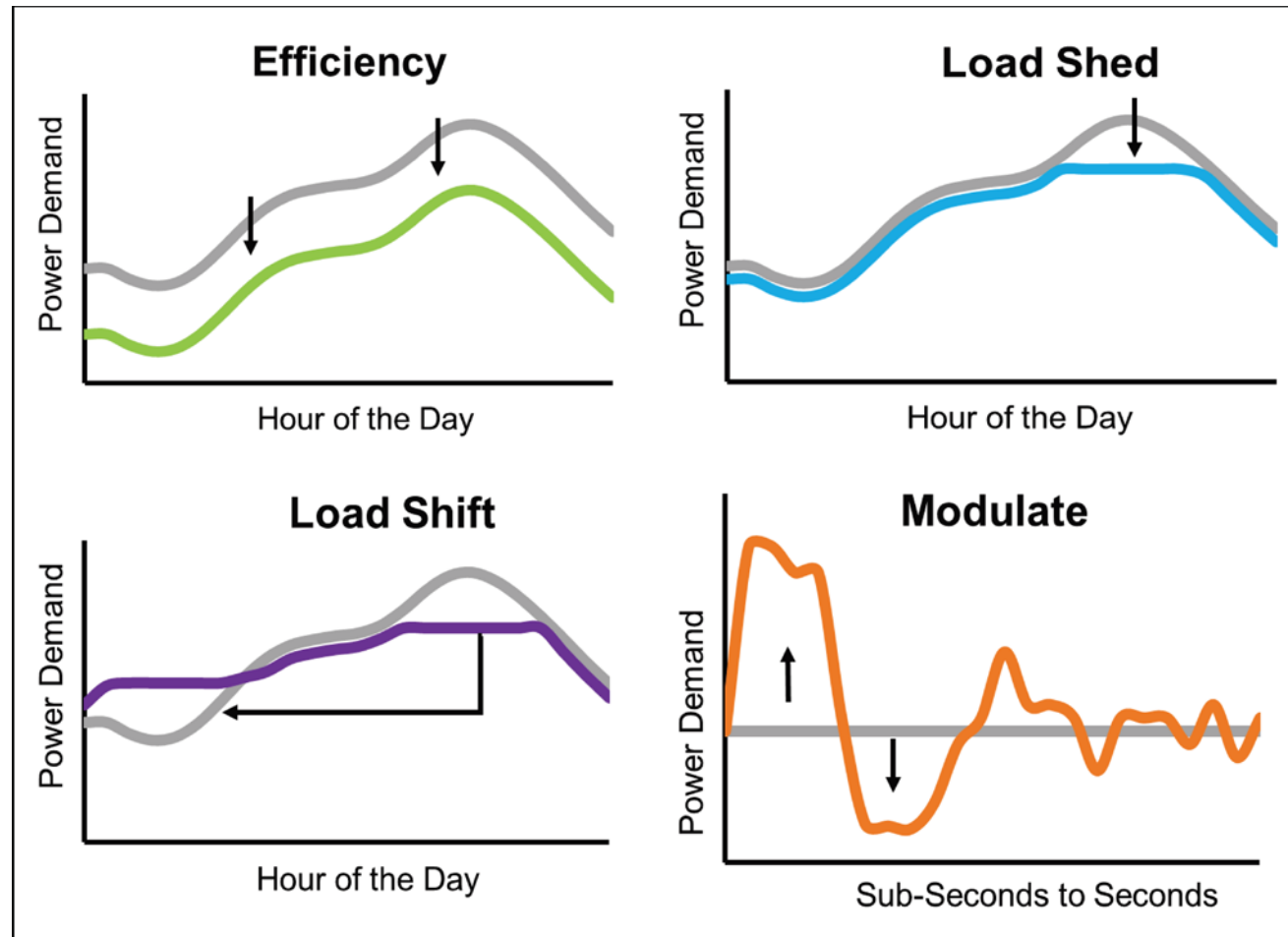
October 17, 2019

Southwest Energy Efficiency Project (SWEEP)

- Public interest organization promoting greater energy efficiency and clean transportation
- Learn more:
 - www.swenergy.org
 - @SouthwestEE

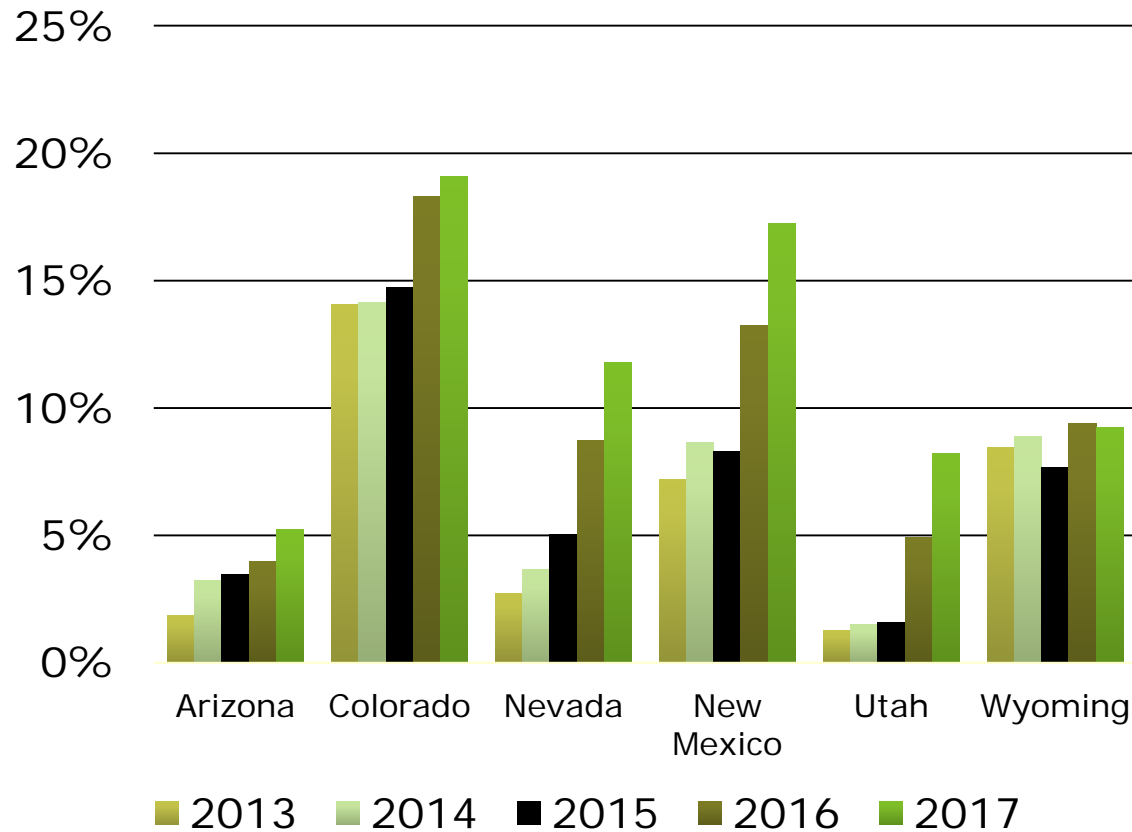


Demand Flexibility in Buildings



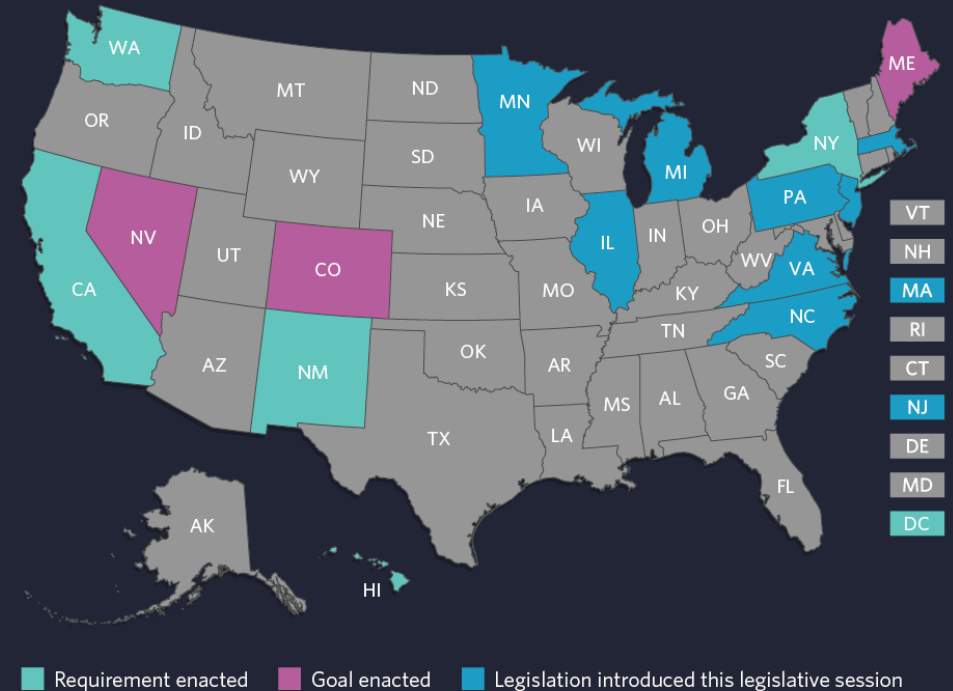
100% Renewable Energy Goals

Percentage of Total Electricity Generation from Wind and Solar



States Embrace Renewable Electricity

Five states and the District of Columbia have directed their utilities to switch to 100% renewable or zero-carbon sources by 2050 or earlier.



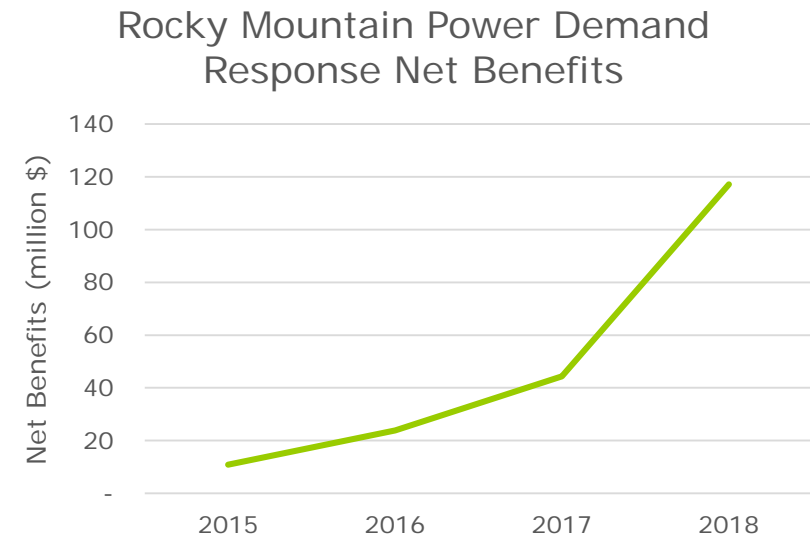
Source: EQ Research

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Case Study: Rocky Mountain Power (Utah)

- Cool Keeper program
 - 108,000 AC switches
- In 2018 began to provide contingency reserves and frequency response
 - No event lasted more than 36 minutes
 - Significant increase in benefits from program

Date	Event	Event Times	Estimated Load Reduction - Utah at Gen (MW)
June 4, 2018	1	5:33PM-5:45PM	144
June 6, 2018	2	2:24PM-2:29PM	71
June 27, 2018	3	3:58PM-4:28PM	142
June 27, 2018	4	4:47PM-4:53PM	66
June 28, 2018	5	2:53PM- 3:29PM	159
July 18, 2018	6	5:09PM-5:14PM	192
July 18, 2018	7	6:30PM-6:35PM	201



Case Study: Fort Collins Utilities (CO)

- ❑ Peak Partner program
 - 1,500 smart thermostats
 - 2,000 connected water heaters
- ❑ Daily load shifting for water heaters based on consumer preference
- ❑ 2-4 hour thermostat peak reduction events
- ❑ In 2018 began to call 10-15 minute events when renewable energy quickly drops off system
 - Currently manual process, but automating
 - Estimate 60 events in 2018



**A sustainable step forward for you.
An important step forward for our community.**

- Save money and energy automatically
- Manage your home energy use anytime, anywhere
- Help avert power outages
- Help keep our air clean and our environment healthy

Case Study: NV Energy (Nevada)

- Residential and Small Commercial HVAC program
 - Smart thermostats, AC switches, demand limiting devices
- 2 hour average events phased across fleet, with precooling
- 4 degree setback during event

2018 Residential Program Highlights

Connected Devices	125,188
Capacity Reduction	183.4 MW
Energy Savings	22,193 MWh
Number of Events	43

Arizona Public Service (AZ)

- Cool Rewards: BYOT program
 - 2 New daily load shift programs
 - Customers must be on TOU rate or rate with demand charge
 - Target feeders with high solar penetration
 - Daily load shift, shift energy from evening ramp and peak times to mid-day
-
- | | |
|--|--|
| <ul style="list-style-type: none">□ Storage Rewards<ul style="list-style-type: none">■ 40 behind-the-meter batteries owned and operated by APS | <ul style="list-style-type: none">□ Reserve Rewards<ul style="list-style-type: none">■ 200 heat pump water heaters installed at no cost to customers |
|--|--|

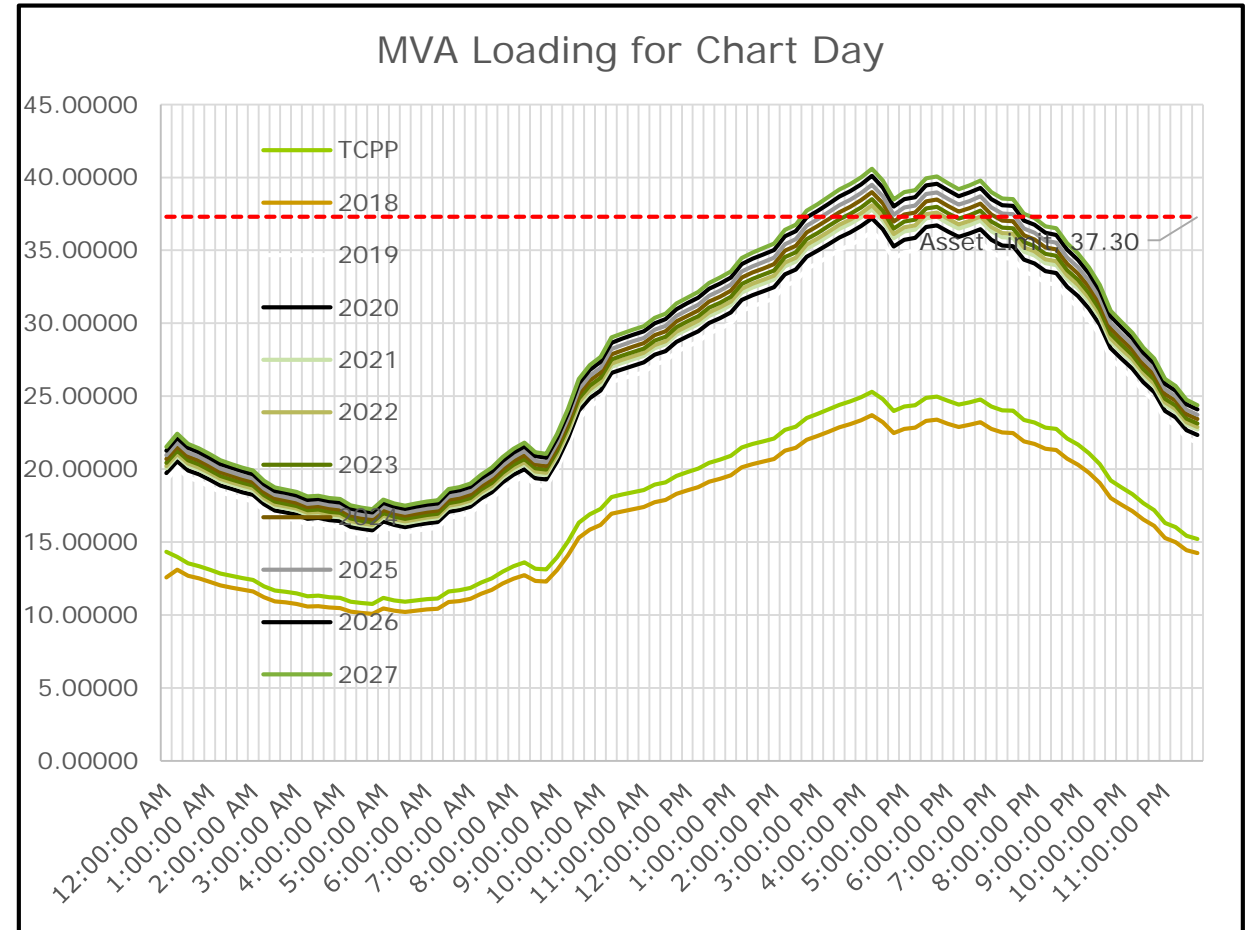
Mandalay Homes (AZ)



- “Ion Series” Homes
 - All electric
 - Home Energy Rating Score in low 40s
 - 2-kw PV system with 10 kwh battery and HEMs
 - Home powered by solar during the day
 - Fully utilizes battery from 3-8 p.m.
 - Cost of system \$5,000
 - Special utility rate if avoid using grid energy during peak hours

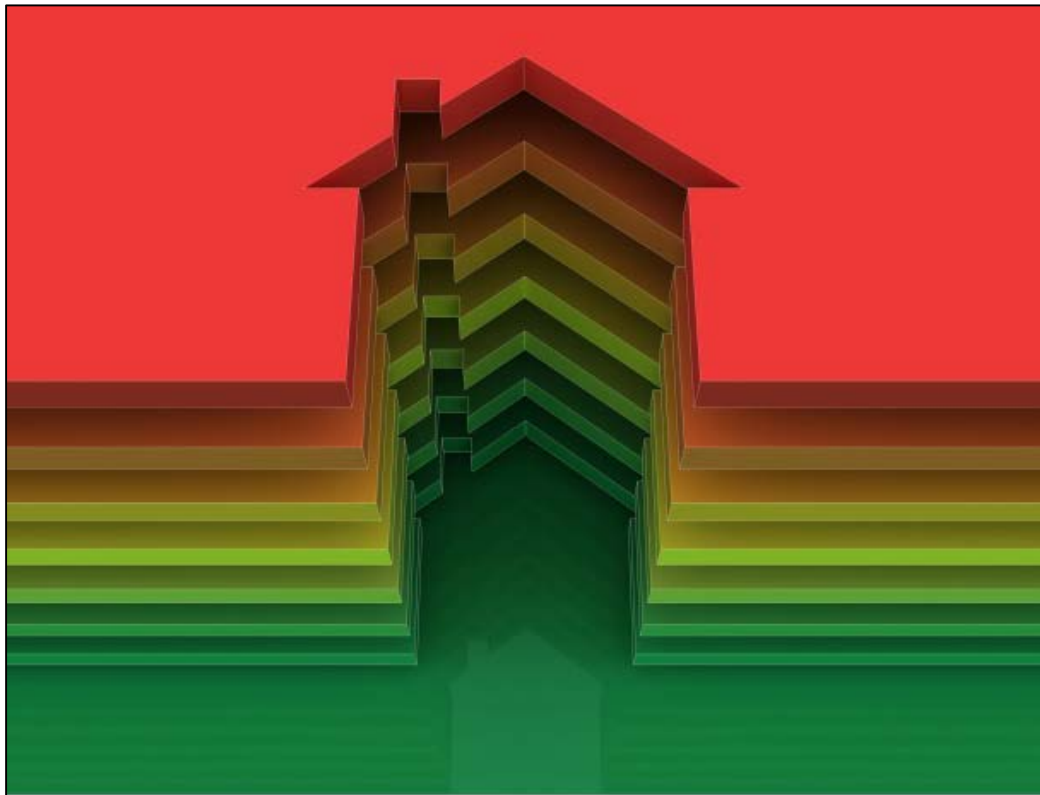
Geo-Targeting

- Targeted load reductions to defer upgrades on specific feeders
- Xcel Colorado and NV Energy currently running pilots
 - First utilizing existing HVAC load shifting resources on feeders



Conclusions

- ❑ Utilities in the Southwest face specific challenges from high renewable energy penetration
- ❑ Utility DSM programs are evolving to utilize GEBs to provide grid services in addition to capacity
- ❑ Potential for significant expansion of GEBs programs to help region meet renewable energy and environmental goals at low cost



Grid-Interactive Efficient Buildings:
Providing Energy Demand Flexibility for Utilities in the Southwest

August 2019



CONVENIENCE AND CONTROL FOR CONSUMERS
PEAK REDUCTION AND RENEWABLES INTEGRATION FOR UTILITIES
ATTRACTIVE COMMUNITIES FOR HOME BUYERS

Photo Courtesy: Mandalay Homes

**SMART-TECH HOUSING
DEVELOPMENTS IN THE
SOUTHWEST:**

GRID-INTEGRATED AND ENERGY EFFICIENT

Available at swenergy.org/publications

SWEEP:

Dedicated to More Efficient Energy Use in the Southwest

Resources available online at:

www.swenergy.org

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