

You Have Options: The Many Ways to Manage Peak

Growing Grid Complexity

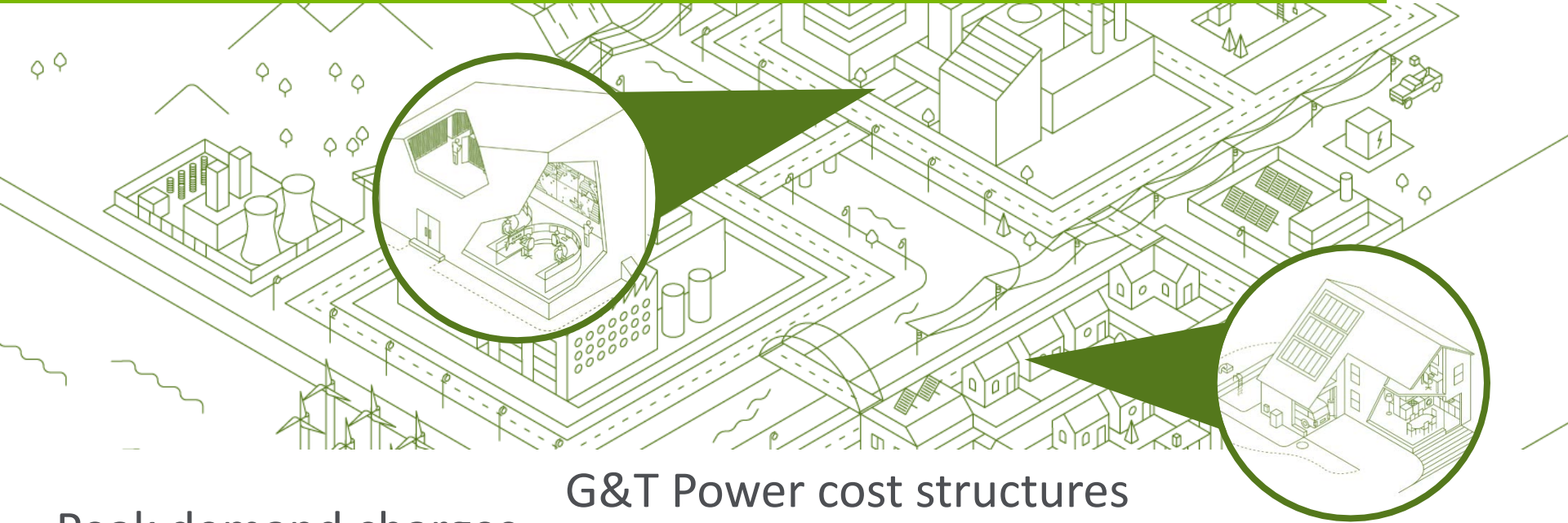
Utilities face new challenges from evolving grid complexity

- System wide events (Historically)
- Localized Peaks
- Integrating Renewables



Peaks are increasingly correlated to deployments of renewable energy.

Peaks are Expensive



G&T Power cost structures

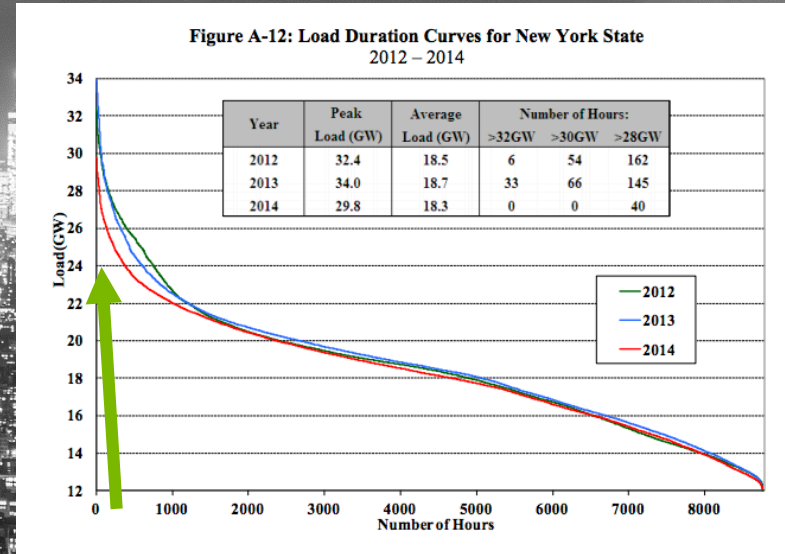
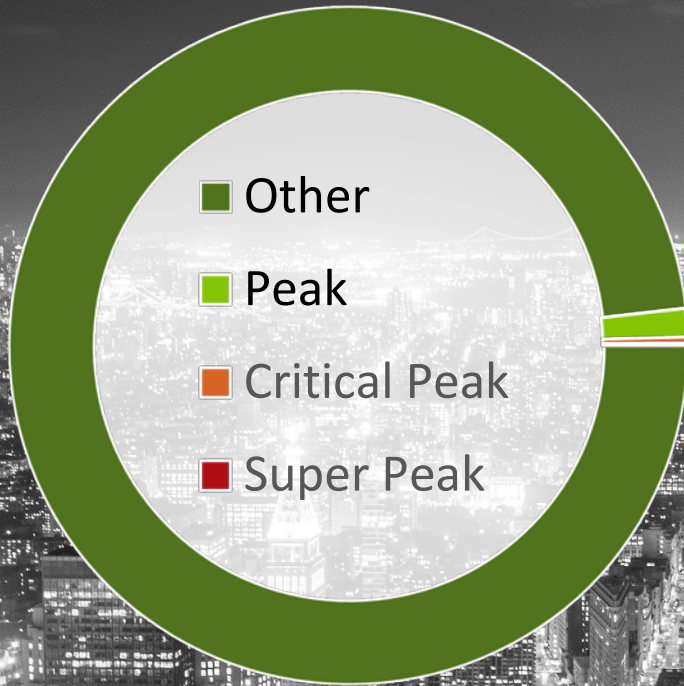
Peak demand charges

Real-time price exposure

Capital expenditures

Transmission cost allocations

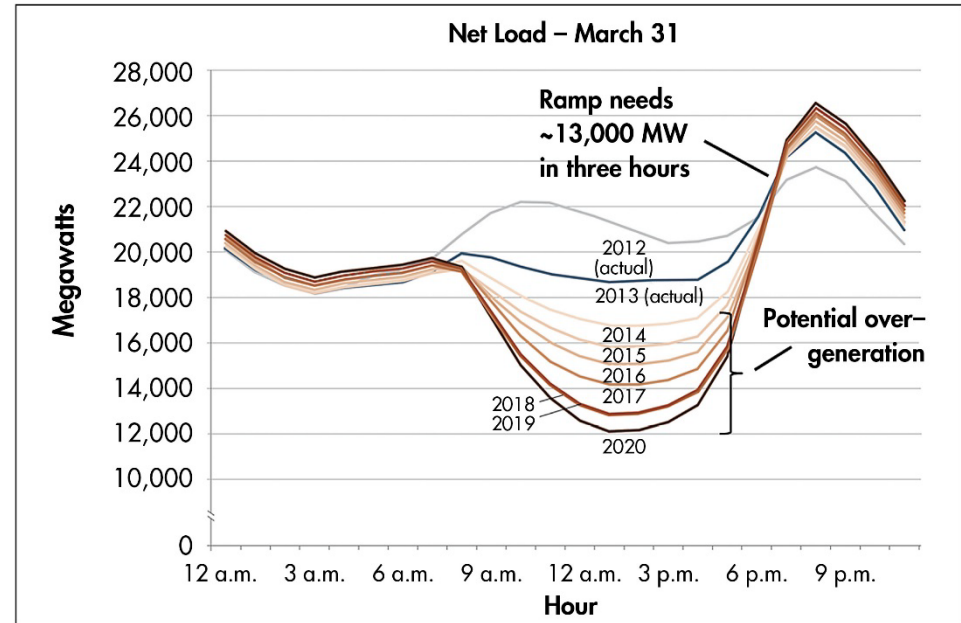
Peaks caused by few hours of load



Peak Resources required for 2% of hours in New York State.

Peaks Correlated with Renewables

CA will require **13,000 MW** of quick ramping power by 2020, when **33% of electricity** will come from renewables.



Source: CAISO



California's renewables goal is 50% by 2030



Localized Peaks Drive Infrastructure Needs

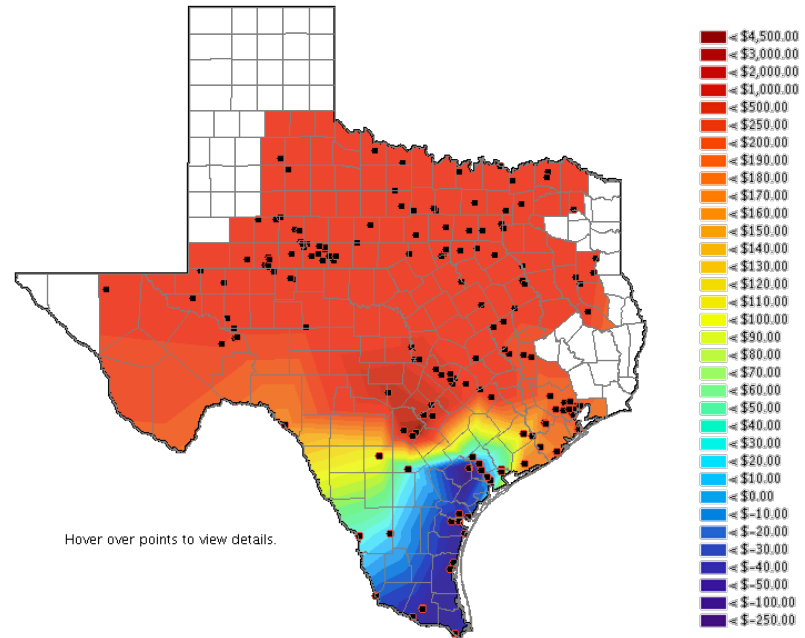
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Capital expenditure for new substations can equal tens of Millions

Real-Time Energy Prices

Real-time prices in Texas can reach up to **\$9000 per megawatt**



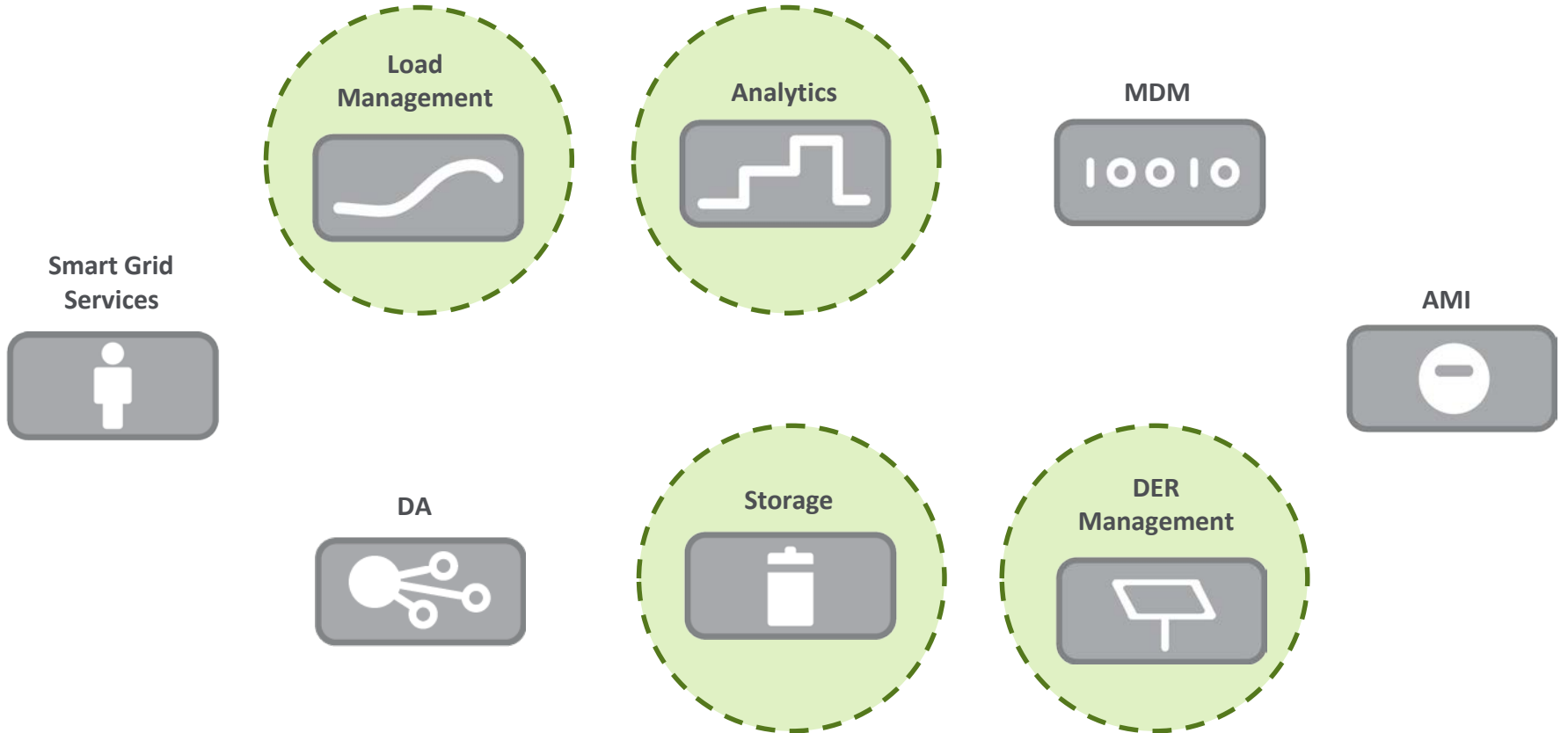
Average real-time prices: \$40.64 in 2014

Grid Modernization

Advanced demands require advanced solutions.



You Have Peak Management Options



You Have Peak Management Options

Planning with an Analytics Platform

- Identify Constraints
- Identify best participants for DR programs
- Determine impact of DERs and optimize placement
 - Performed as a service in CA



Grid
Management



You Have Peak Management Options

Load Management

- Powerful aggregation software
- Advanced 2-way control devices
- Leverages AMI network for speed and reliability



Load Management



You Have Peak Management Options

Distributed Resource Management

- Battery Storage
- Resource Dispatch Optimization
- Distributed Generator Control



**DER
Management**



You Have Peak Management Options





Operational since 2011

Utility Benefits

- Reduced Peak Costs through Coincident Peak Avoidance
- City-Wide Peak Demand Reduction Targets
- Increases customer engagement & satisfaction
- 60MW of load under control at peak



Peak Demand Management



Operational since 2011

Customer Benefits

- Up to 10% savings on HVAC costs
- Boundaries set by customer
- Opt-out anytime
- Anytime, anywhere energy management





Optimizing output from Demand Response + Solar/Battery Storage

- 1 MW Solar Array
- 1.8 MWs Battery Storage
- 900 Residential Pricing Participants
- μ EMS Controller
 - Dispatch of Battery
 - Initiates Pricing Event



Localized Peak Management: Joint Base SA



Battery Energy Storage to address localized peaks

- CPS/Joint Base SA Microgrid Demonstration
- 48kWh of storage provides 30 minutes of backup
- Demonstrates integration





Irrigation Load: Dawson, Colquitt, Southern, Cornhusker



Irrigation Pump Load

- Managing Peak Charges from G&T
- Dispatch by G&T for balancing
- High value to utility per switch: ~50-75kW
- Initial Irrigation Deployment Load Targets: 500 MW

Solution: Switches on Irrigation Pumps + Customized Software for Program Management





Objective

- Enable capital deferment
- Provide new technology and customer engagement
- Manage electric consumption by end use customer
- Leverage investment in AMI network

Solution: Targeted Thermostat Deployment



Residential Peak Management: Baldwin EMC



Residential Demand Management

Utility Goals:

- Provide new technology and customer engagement
- Leverage investment in AMI network
- 20,000 devices

Solution: Thermostats and Load Control Switches throughout service territory supporting 4 unique programs

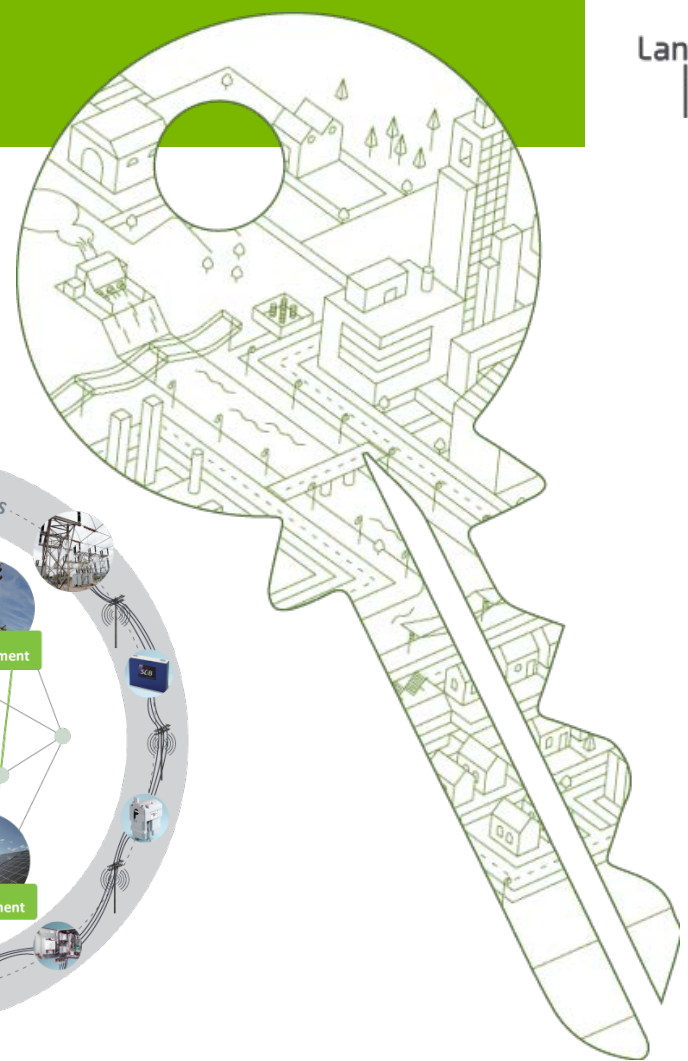
Key Takeaways

Challenges

- Increasingly Complex Grid
- Diverse Peaking Conditions
- Renewable Penetration

Landis+Gyr Can Help

- Grid Management
- Load Management
- DER Management



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Responsive.
Future-ready.

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Gridstream®
solutions from
Landis+Gyr.

