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Energy Industry Update

The Distance

Webinar | December 4, 2024

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Kevin Hernandez

Partner

Kevin Hernandez is a partner with ScottMadden where he specializes in grid transformation, energy storage, and transportation electrification. Since joining the firm in 2012, he has consulted with a variety of utility and industry clients on issues ranging from fleet electrification to EV infrastructure planning. Kevin earned a B.A. from the University of Tennessee, Knoxville, an M.A. from the U.S. Navy War College in Newport, Rhode Island, and an M.B.A. from the Fuqua School of Business at Duke University. He is also an eight-year veteran of the United States Navy.

Energy Is Who We Are

ScottMadden is a management consulting firm with more than 40 years of deep, hands-on experience. We deliver a broad array of consulting services—from strategic planning through implementation—across the energy utility ecosystem.

Our energy practice covers the following areas:

GENERATION

RATES & REGULATORY

TRANSMISSION & DISTRIBUTION

NATURAL GAS

GRID EDGE

ENERGY CORPORATE SERVICES

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TOPIC #1

Low-Income Energy Affordability

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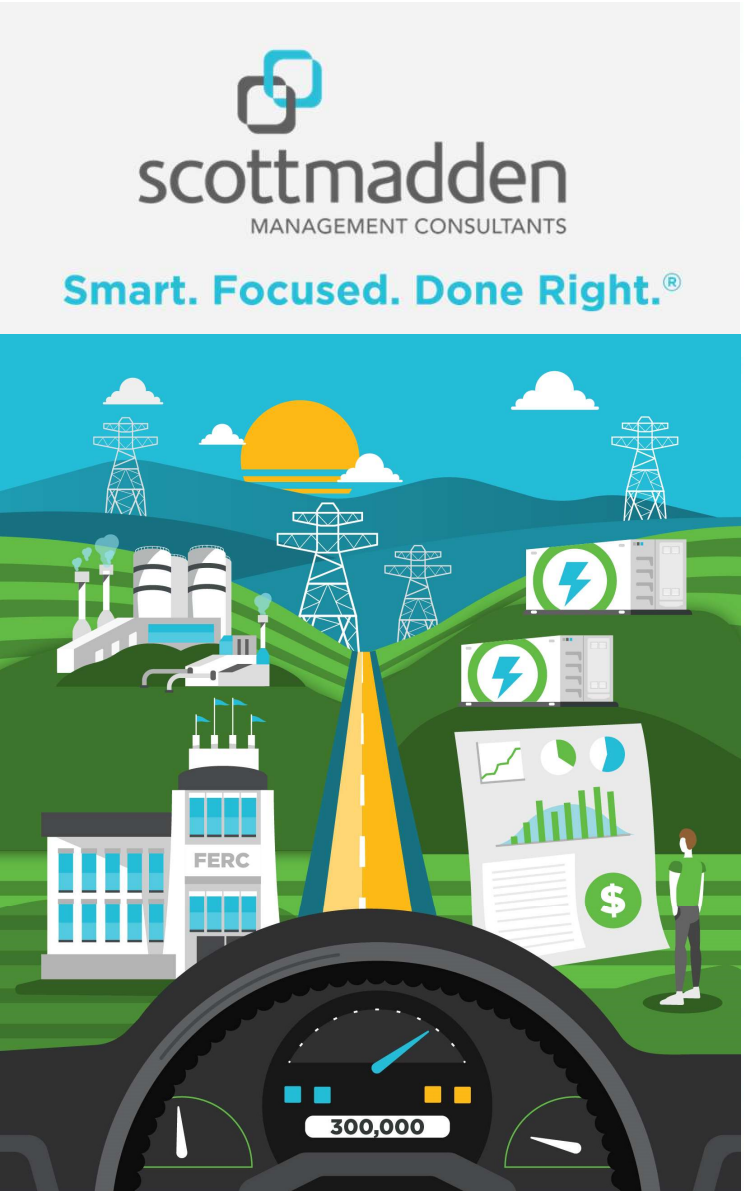


Jon Nichols

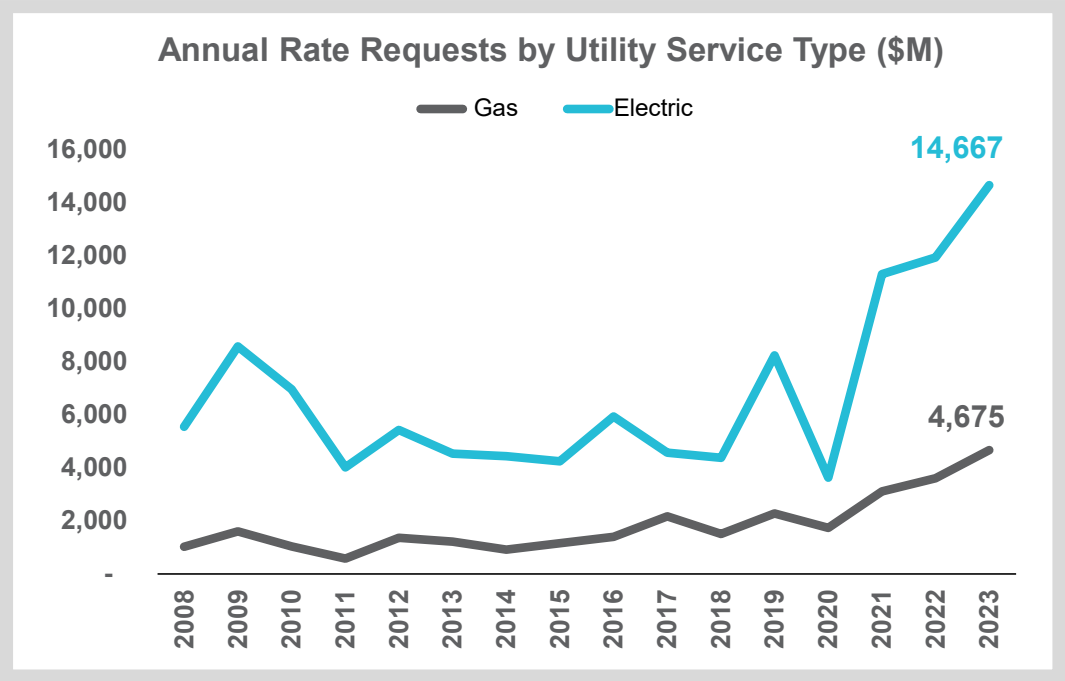
Senior Associate

Jon Nichols joined ScottMadden in August 2022. Much of his experience with the firm is grounded in providing regulatory policy and strategy support to North American gas and electric utilities in response to decarbonization mandates and changing business conditions. Prior to joining ScottMadden, he spent one summer as an M.B.A. intern at Duke Energy on the rate design and strategy team, where his work included analyzing residential rate class cross-subsidies, on-tariff financing models, and net-metering tariffs and four years as an energy engineer at Lilker Energy Solutions where he performed energy auditing and commissioning services for commercial and multi-family buildings. Jon earned an M.B.A., with concentrations in corporate finance and energy, at the University of North Carolina Kenan-Flagler Business School and a B.S from James Madison University.

Affordability in the Changing Energy Landscape

Ongoing transformation in the energy industry necessitates substantial investments and related costs to support an increasingly decarbonized, decentralized, and digitalized electric grid.

- **Expanded Policy Objectives**
- **New Technologies**
- **Shifting Customer Expectations**



Increased investment translates to increased rates, impacting affordability across all customer segments

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Rising Costs Disproportionately Impact Low-Income Households

Regulators increasingly recognize the need for affordable energy access for low-income customers through supportive rate structures and programs.

"Ensuring a more in-depth understanding of energy burdens has become essential."

Massachusetts D.P.U. 22-22, Final Order

"Advancement of energy affordability for low-income households is imperative for the Commission."

New York PSC Case No. 14-M-0565, Order

"Work must continue to reach [low-income] customers and provide meaningful support … to those customers when they are in need of bill assistance."

North Carolina Docket. E-2, Sub 1300, Order

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Rate Design Solutions for Energy Affordability

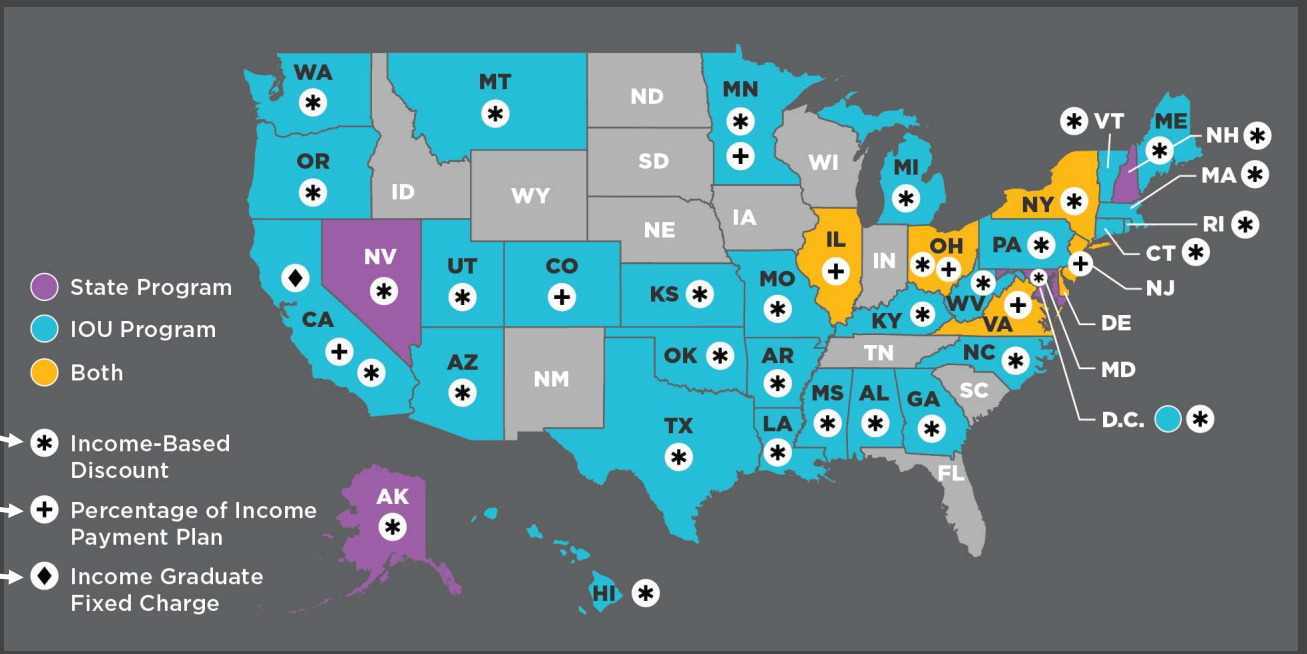
States and utilities have embarked on rate design solutions aimed at mitigating the financial burdens of low-income households.

Low-Income Household Electric Rate Discount Programs

May include flat or tiered discounts

Caps bill payments at a predetermined percentage of income

Apply varying levels of fixed charges to all ratepayers based on their incomes



Note: As of June 2024; does not include LIHEAP, medical-based discounts, late fee exemptions, "pay-later" programs, shutoff exemptions, or charitable assistance programs.

Source: NC Clean Energy Technology Center

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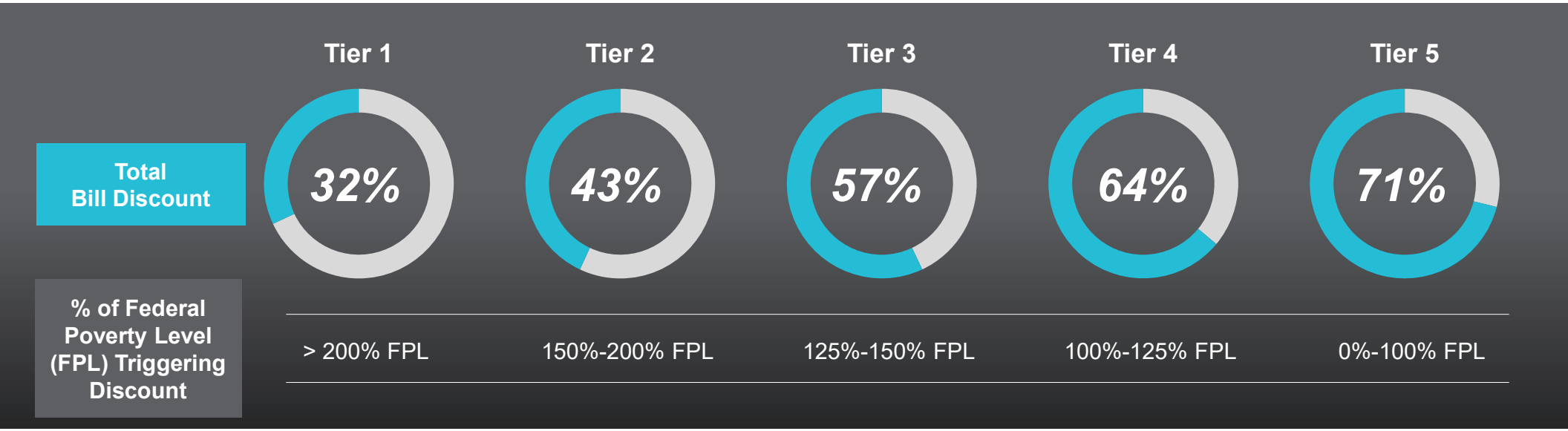
KH0

Case Study: Tiered Discount Rates in Massachusetts

In September 2024, the Massachusetts Department of Public Utilities (DPU) approved a five-tier, low-income discount rate structure proposed by National Grid shown below:



The tiered rates are designed to keep energy burden for eligible low-income customers at approximately 3.1%

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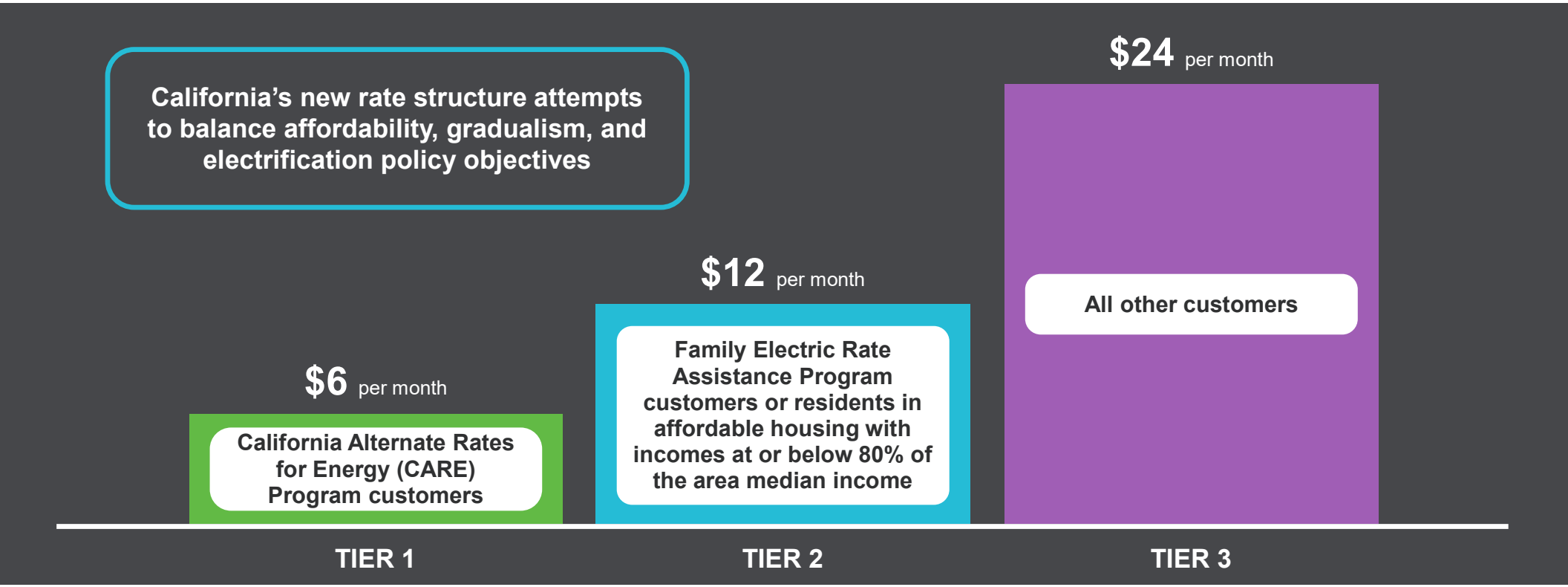
Slide 9

KH0 Be prepared to speak to what energy burden in MA currently is for LI customers
Kevin Hernandez, 2024-11-18T15:53:12.717

Case Study: Income Graduate Fixed Charges in California

In May 2024, the California Public Utilities Commission (CPUC) unanimously adopted the following fixed charges:



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Case Study: Energy Affordability Guarantee Pilot in New York

In August 2024, the New York State Public Service Commission approved the Energy Affordability Guarantee pilot, which will provide ~1,000 households with "tailored bill assistance" to reduce electricity costs to no more than 6% of annual household income.

KEY OBJECTIVES

Mitigate Cost Increases	Expand Heat Pump Access	Provide Targeted Relief
Mitigate the potential for an increase in household energy burdens because of converting to a heat pump for space and water heating	Create insights to drive a broader strategy for creating affordable access to heat pump solutions for lower-income households	Understand the options for determining customer-specific energy burdens and providing tailored bill discounts to customers to achieve energy burden reduction goals

The Energy Affordability Guarantee Pilot sits at the intersection of energy affordability and clean energy objectives

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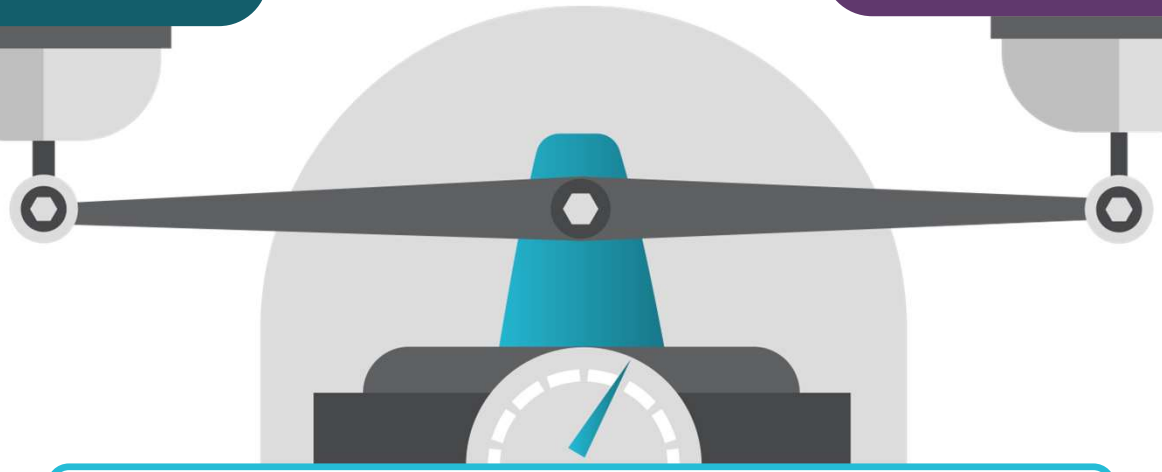
Rate Design Can Address Affordability But Must Balance Objectives

Policy Objectives

- Clean Energy
- Safe and Reliable Service
- Resiliency
- Affordability and Equity

Traditional Ratemaking Objectives

- Fairness / “Just and Reasonable”
- Revenue Sufficiency
- Efficient Price Signals
- Simplicity



The complexity of balancing these objectives highlights the need for innovative and equitable rate design solutions

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Key Takeaways

As higher bills disproportionately impact low-income households, the energy industry is exploring rate design solutions that balance affordability and equity concerns with policy objectives and established ratemaking principles.

Energy affordability is an increasingly important topic

- Energy burden remains a significant challenge for low-income households
- Low-income customers are disproportionately impacted by rate increases

Rate design is a key tool to address affordability

- States are implementing diverse rate designs to enhance affordability
- Low-income rate designs include income-based discounts, percentage of income payment plans, and income-graduated fixed charges

Rate design can address affordability but must balance objectives

- Designing rates to address affordability concerns entails a balance among competing rate design principles, including fairness, simplicity, economic efficiency, and promotion of policy objectives
- The complexity of balancing policy and traditional ratemaking objectives highlights the need for innovative and equitable rate design solutions

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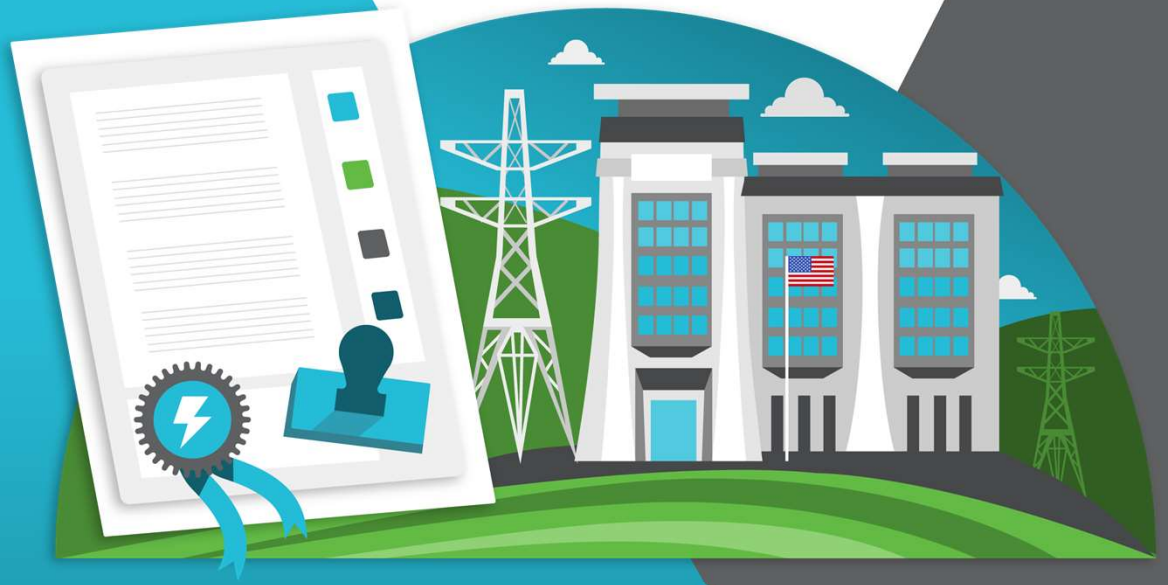

TOPIC #2

FERC Expands Planning Horizons

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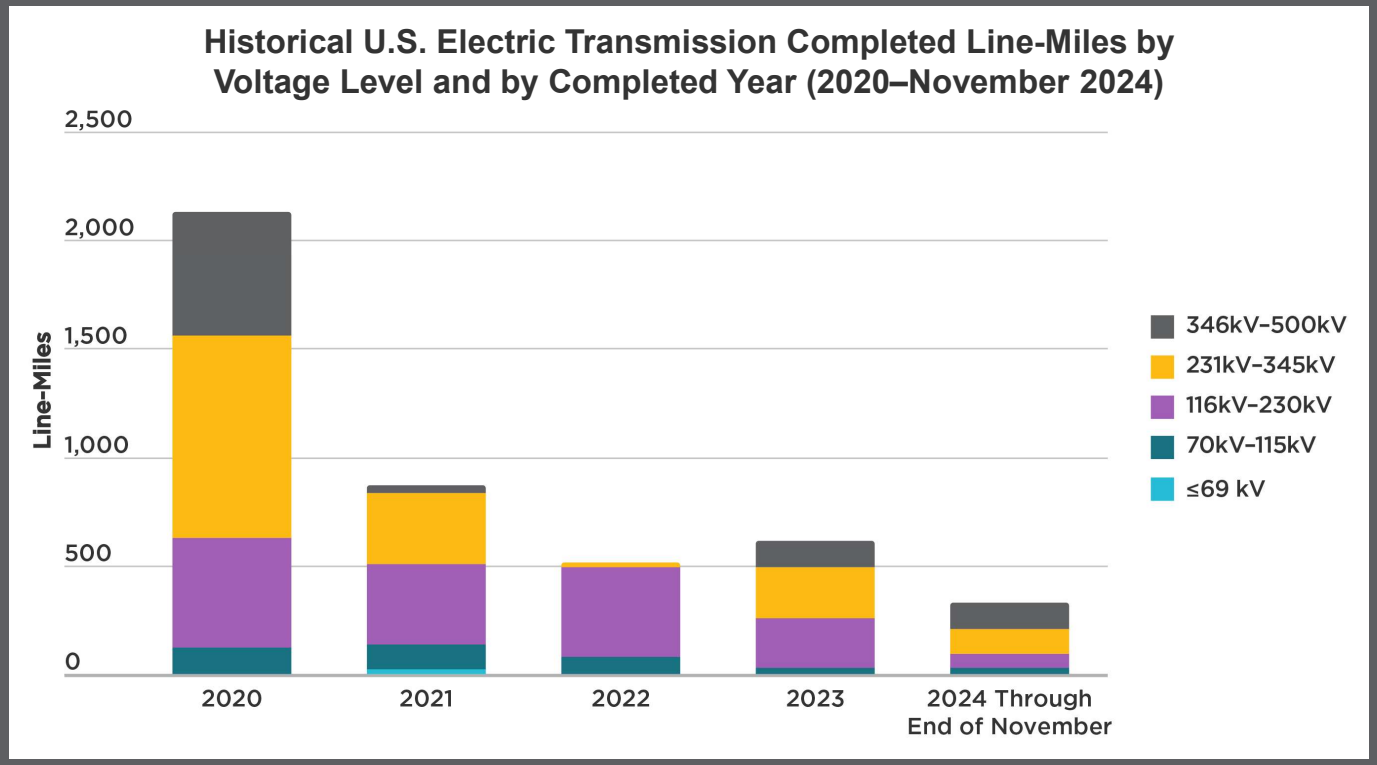
Tony Gonzalez

Partner

Tony Gonzalez is a partner with ScottMadden and leads the firm's transmission and distribution community of practice. He joined ScottMadden in 2016 after 14 years in the utility energy industry with Georgia Power. He worked in Georgia Power's distribution and transmission departments where he gained experience in grid engineering design, construction project management, and control center operations. His areas of expertise include governance and process improvement, program and project management, organizational design, business planning, and distribution and transmission engineering, operations, and maintenance. Tony earned a B.S. in electrical engineering from Georgia Institute of Technology and an M.B.A. from the Robinson School of Business at Georgia State University. Tony is fluent in Spanish.

Historical Transmission Build and a Stagnant Trend



New transmission line construction, especially higher voltages, has been anemic in the past several years in comparison with resource and demand growth

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FERC Order 1920: Addressing the Transmission Build Gap

In response to the urgent need for more efficient and forward-looking transmission planning, FERC has taken significant steps to reform and modernize the electric grid infrastructure.

Background	***In April 2022,*** *FERC initiated a docket titled "Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection" to* ***address slow progress in transmission development and generator interconnection****.*
FERC Concerns	▪ Existing transmission planning was **not sufficiently long-term** or forward-looking ▪ Resulted in **piecemeal expansion**, **inefficient investments**, and potentially higher costs for customers
FERC Issued Order 1920 (May 2024)	▪ Identify long-term transmission needs ▪ Account for determinants ▪ Consider a broader set of benefits

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FERC Aims to Mandate Long-Range Planning

Order 1920 Requires Long-Range Planning

Mandates regional planning using best available data, projecting at least 20 years ahead

- **Planning Frequency**
  - At least every five years
  - Transmission facilities must be selected within three years
- **Existing RTO Practices**
  - Midcontinent ISO, PJM, and ISO New England already conduct long-term studies
- **Scenario Analysis**
  - Must include three scenarios
  - Each must account for high-impact, low-frequency events
- **Incorporation of Factors**
  - Scenarios must consider seven categories of factors (at right)

1. Laws and regulations impacting resource mix and demand
2. Laws and regulations on decarbonization and electrification
3. State-approved resource plans and supply obligations for load-serving entities
4. Trends in fuel costs, generation, storage, and electrification technologies
5. Unannounced retirements, considering facility age, costs, revenues, emissions, and laws
6. Generator interconnection requests and withdrawals (filtered)
7. Utility and corporate commitments and policy goals affecting long-term transmission needs

Not To Be Discounted **May Be Weighed**

Source: Order 1920

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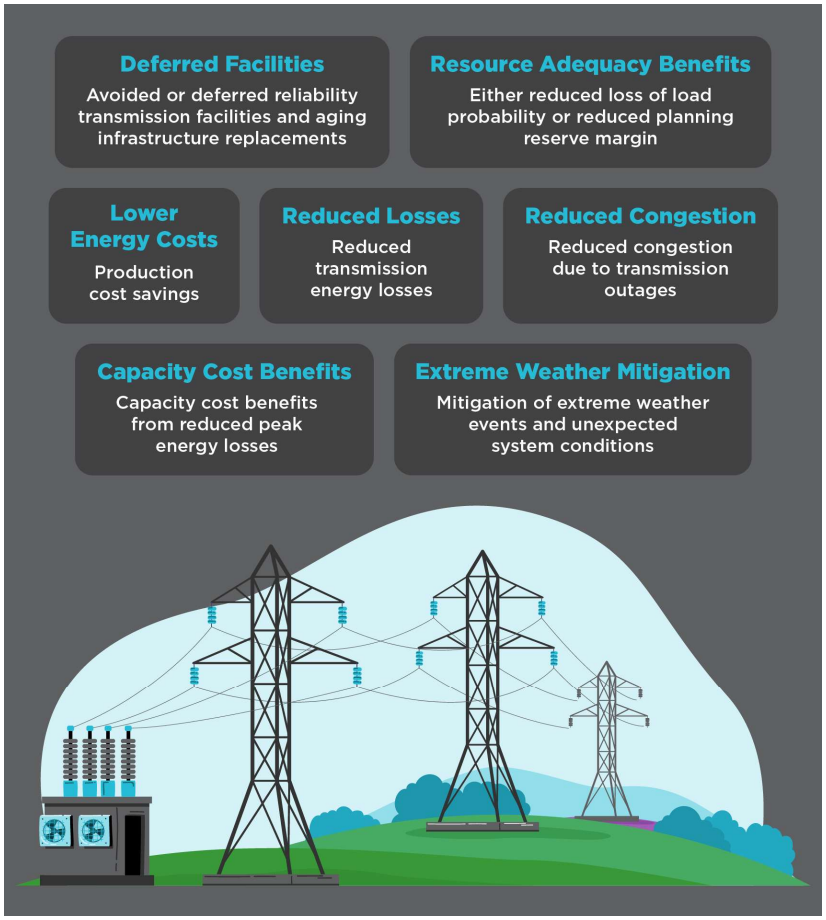
Planners Asked to Develop Structured Evaluation and Selection Process

Order 1920 outlines a clear and transparent evaluation process for selecting long-term transmission facilities

- **Evaluation Development**
  - Develop evaluation processes and selection criteria for facilities
  - Include efforts to engage state authorities and seek their support
- **Key Requirements**
  - Evaluate at least seven specific economic and reliability benefits (at right)
  - Ensure processes are clear, non-discriminatory, and aim to maximize benefits without overbuilding
- **Decision-Making Points**
  - Specify when facility proposals will be accepted, including from non-incumbents
  - Estimate costs and benefits of proposed facilities
  - Designate a point to decide on long-term facilities with explanations



Source: Order 1920

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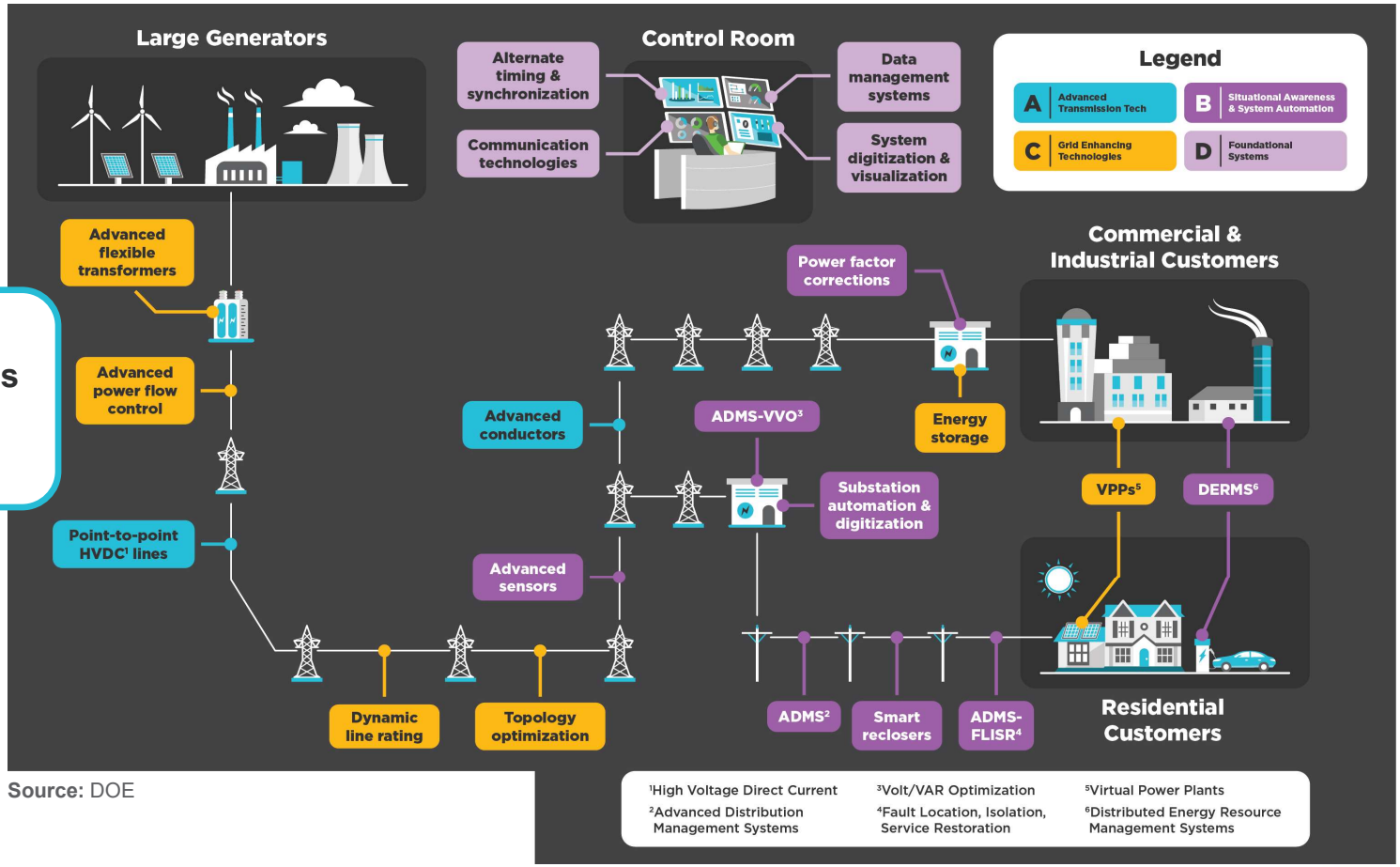
KH0

How Will Grid-Enhancing Technologies Play a Role?

Illustrative Overview of Advanced Grid Technologies
(Including Grid-Enhancing Technologies)



Source: DOE

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Slide 20

KH0 You may not need the call out box on the left. Those statements can be spoken to as part of your remarks
Kevin Hernandez, 2024-11-18T15:56:11.892

TG0 0 That works for me. It is part of my planned talking points.
Tony Gonzalez, 2024-11-20T14:50:02.860

Key Implications of Order 1920 on Cost Allocation

Order 1920 will not mandate state agreements on cost allocation for regional transmission facilities.

KEY OBJECTIVES

Key Provisions

- **Engagement Period**
  - One-time, six-month period
  - Ensure meaningful participation
- **Ex-Ante Cost-Allocation Methods**
  - Providers must offer long-term regional cost-allocation methods
  - To act as default solutions if state agreements are not reached
- **FERC's Role**
  - Oversees state involvement; can intervene if agreements are unreasonable or discriminatory
  - The ex-ante method serves as a "backstop"

Exceptions to Order 1000 Principles

- **Project Type Restrictions**
  - Costs cannot be allocated based on project type
- **Regional Cost Socialization**
  - There are concerns about spreading individual state policy costs across the region
- **Benefit-Based State Allocations**
  - State agreement allocations must align with estimated benefits

Industry Reactions

- **Proponents**
  - Pushes a "recalcitrant" industry to do more, especially in interregional planning
  - Addresses lack of comprehensive planning that has led to "inefficient piecemeal transmission expansion…while foregoing projects with better net benefits"
- **Critics and Opponents**
  - Unduly preferential toward certain types of generators (i.e., wind and solar)
  - Does not provide a "just and reasonable" replacement rate
  - Infringes on the authority of the states over energy resource mixes

Order 1920 encourages state collaboration but provides structured fallback mechanisms to ensure fair and efficient cost allocation for regional transmission projects

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TG0

FERC Expands Planning Horizons

Key Takeaways

Efforts for Transmission Reform

FERC commissioners have been unified in their concern about the pace of transmission development and have been actively pursuing transmission reform for several years. This has led to several important rulemakings in spring 2024.

Discussion over Order 1920's Implementation

Order 1920's transmission planning and cost allocation reforms are the first significant rules on this topic since Order 1000, but the potential friction between federal and state domains will likely lead to continued debate over the rule's implementation.

Deployment of Grid-Enhancing Technologies

The increasing deployment of grid-enhancing technologies like Dynamic Line Rating and Advanced Power Flow Control are increasingly being considered and deployed to support grid modernization, accommodate renewable energy growth, and improve long-term grid reliability and resilience.

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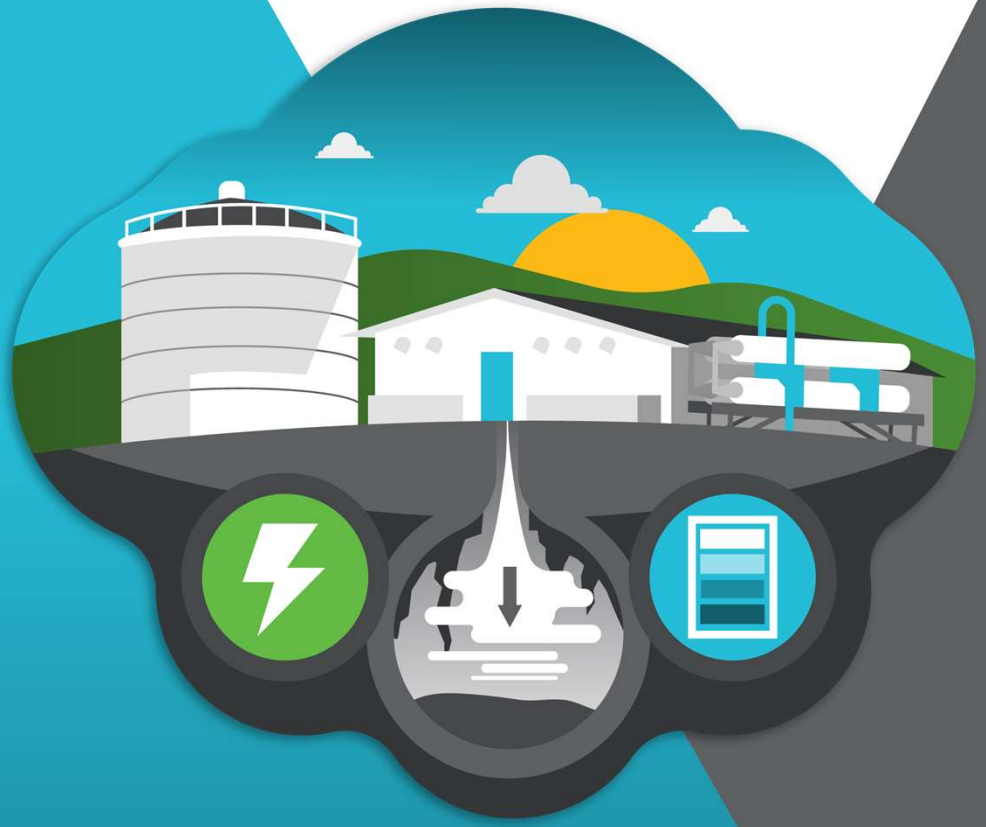
Slide 22

TG0 Change comment for GETs takeaway.
Tony Gonzalez, 2024-11-26T17:53:52.922

TG0 0 [@Erica Johansen]
Tony Gonzalez, 2024-11-26T17:57:34.484



TOPIC #3

Long-Duration Energy Storage

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Katie Davis

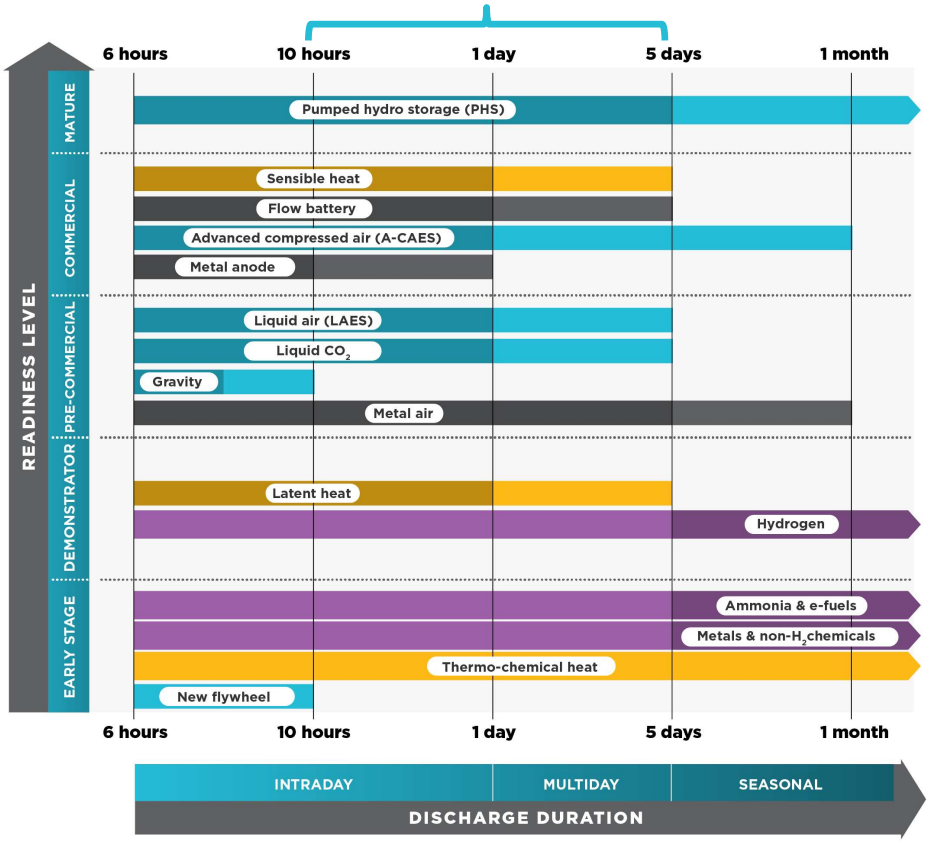
Manager

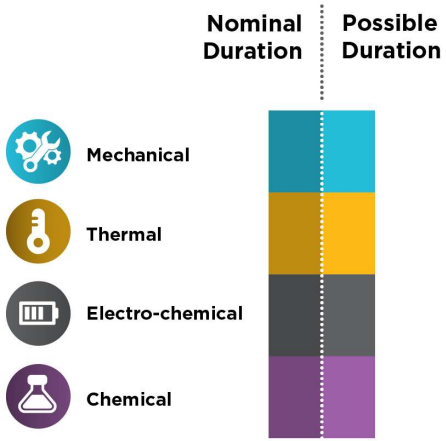
Katie Davis joined ScottMadden in 2021 after receiving both an M.B.A. and a Master of Environmental Management (M.E.M.) from the Fuqua School of Business and the Nicholas School of the Environment at Duke University. Since joining the firm, she has led and supported projects on utility operations and clean energy technologies (e.g., electric vehicles, battery energy storage). Prior to business school, Katie held various positions in the energy sector, including as an Environmental Defense Fund Climate Corp. Fellow for the U.S. Department of the Navy, a project manager for Public Service Electric & Gas, and a field engineer for Schlumberger. Katie also earned a B.S. in civil engineering and engineering public policy from Carnegie Mellon University and a project management professional certification from the Project Management Institute.

Defining Long-Duration Energy Storage

Long-duration storage can be a variety of technologies capable of providing more than 10 hours of discharge.

Targeting for technologies to reach commercial readiness to attract market growth





Source: Future Cleantech Architects and Long Duration Energy Storage Council

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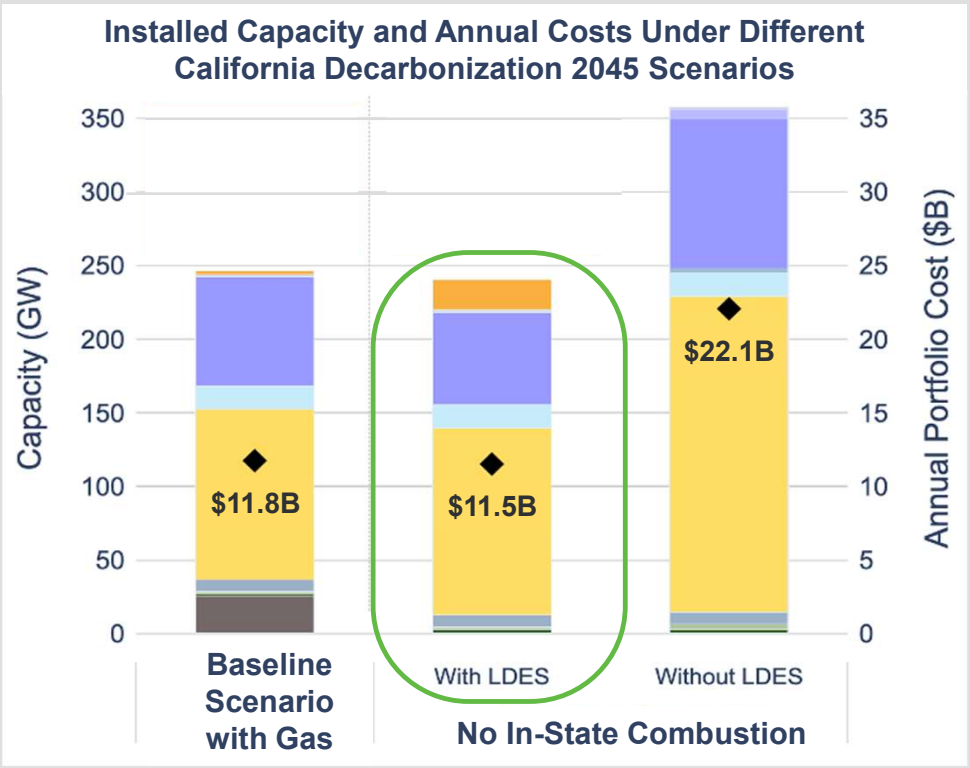
Long-Duration Energy Storage to Enable Decarbonization: CA Example

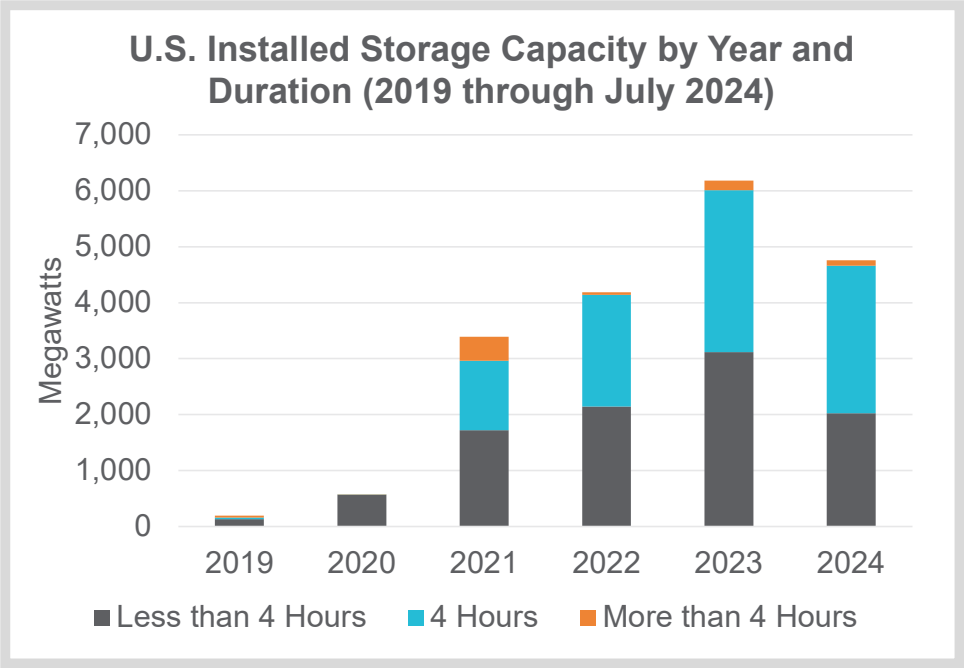
- ***Integrate higher penetration of renewables***
- ***Displace higher-capacity, fossil-fueled generation***
- ***Provide intra- and multi-day reliability***



Source: E3 and Form Energy, "Assessing the Value of Long Duration Energy Storage in California"

Catalysts for Growth in Long-Duration Energy Storage

Although long-duration storage is currently a small percentage of installed storage capacity, a convergence of innovation, investment, and regulatory commitment may drive market growth.



Innovation

Development of a diverse range of technologies

Investment

Public and private funding to accelerate breakthroughs

Regulatory Commitment

Policy and planning support for long-duration inclusion

DOE estimates the U.S. grid may need 225 to 460 GW of long-duration storage for a net-zero economy by 2050

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What's Needed for Long-Duration Energy Storage to "Liftoff"

In order to become a largely self-sustaining market, long-duration storage needs to demonstrate technology performance, secure resource adequacy compensation, and develop supply chain capabilities.

KEY OBJECTIVES

Demonstrate Technology Performance

Prove technology benefits to create visibility for scaling

Secure Resource Adequacy Compensation

Ensure long-duration storage is valued for the benefits it provides to energy markets

Develop Supply Chain Capabilities

Prepare manufacturing and workforce capable of anticipated market growth

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Key Takeaways

Capable of 10+ Hours Discharge

- Applications of long-duration storage focus on intra- to multi-day use cases
- There are a variety of storage technologies at different levels of maturity and market readiness

A Pathway to a Decarbonized Grid

- Integrating higher penetration of renewables will require longer discharge durations
- Long-duration technologies can compete with higher-capacity generation
- Opportunity for multi-day reliability and resilience

Market Interest Is Spurring Growth

- Multiple innovative start-up companies with demonstration projects entering the market
- Public and private investment are gaining traction although still nascent
- Policy support for long-duration R&D and deployment carve-outs

Opportunity to Overcome Barriers to Reach "Liftoff"

- Demonstrate commercial-scale technology performance
- Evolve valuation of long-duration storage in planning and markets to realize full value
- Prepare manufacturing and workforce capable of anticipated market growth

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Your Webinar Presenters

Kevin Hernandez
Partner

Jon Nichols
Senior Associate

Tony Gonzalez
Partner

Katie Davis
Manager

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All topics covered in our latest issue:

1. EPA Issues Power Plant GHG Rule
2. FERC Expands Planning Horizons
3. Long-Duration Energy Storage
4. Low-Income Energy Affordability
5. Geothermal Energy
6. The Energy Industry in Charts
   (focus on Clean Energy Investment)

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