

SCE's Pathway to a Reimagined Grid

Presenters:

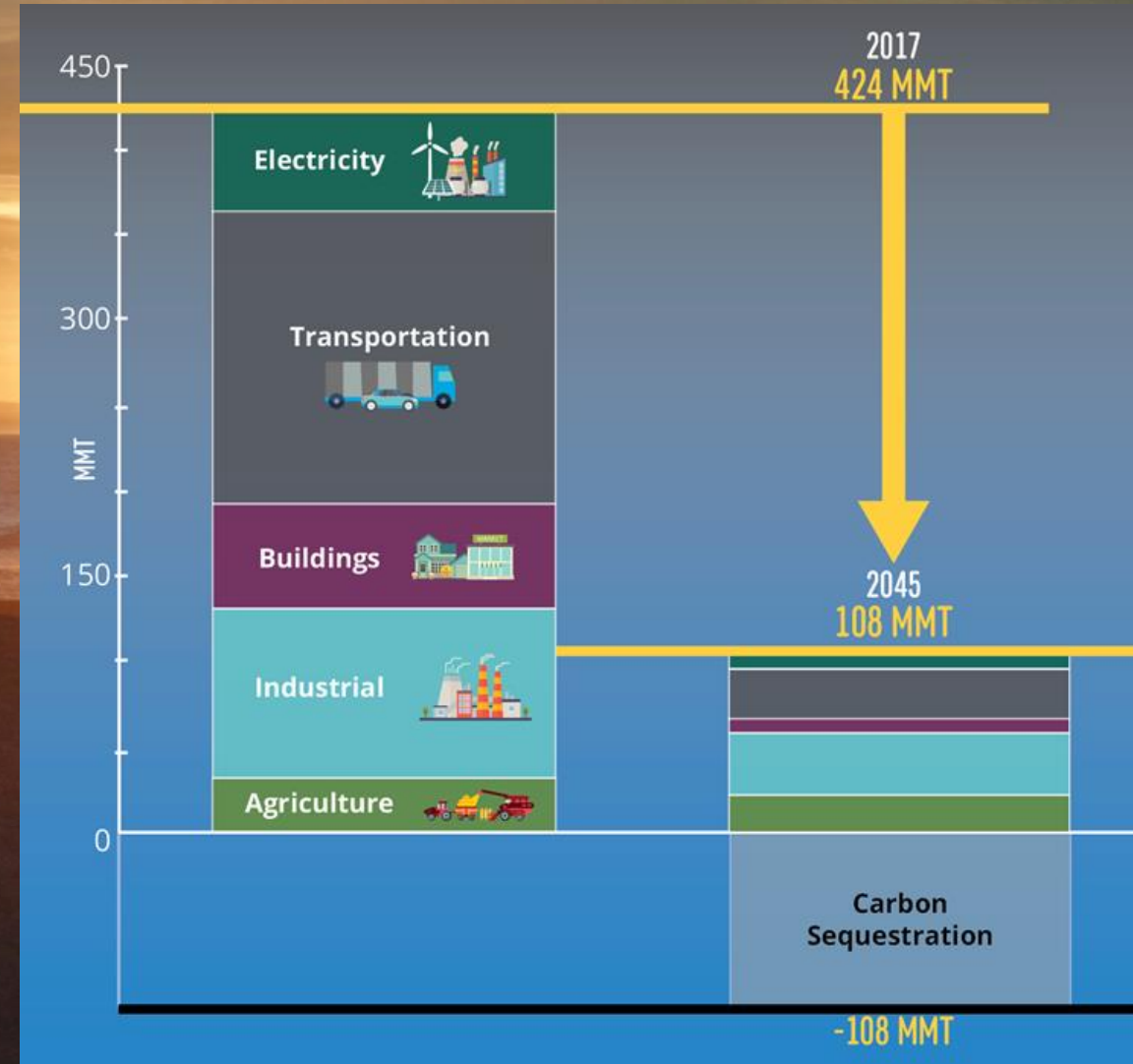
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Pathway 2045: Achieving 100% carbon neutrality

- Decarbonization of the **electric sector**
- Significant electrification of **transportation** and **buildings** and the use of **low-carbon fuels** for hard-to-electrify applications such as industrial and heavy-duty transportation
- Sequestration of remaining carbon through natural processes and engineered solutions



Our Reimagining the Grid approach

GRID CHALLENGES

Factors driving future grid uses, needs & evolution

Customer

Energy Supply

Climate Impacts

Starting point for the grid

Current SCE Grid

Physical Topology

DEVELOPMENT OF GRID OPTIONS

SCE Regions

Geographic areas with unique attributes and needs (evolving over time)

Unique needs & characteristics

Local grid challenges

Region 1

Region 2

Region 3

Evolving SCE Grid

Grid design solutions with specific capabilities and technologies

Required capabilities

New grid technologies

Specific grid architectures

ROADMAP

Future Grid Roadmap

Near term

Mid term

Long term

Grid Challenges

CUSTOMER



- Supporting **large adoption of DERs** on distribution systems
- **Higher usage and load density** largely due to electrification
- **More end-uses that are sensitive to power quality** (e.g., power electronics)
- Overall, **increased reliance on electricity**

SUPPLY



- **Integrating very high levels of renewables** (far from load centers)
- **Ensuring Resource Adequate** with an evolving mix of resources
- Maintaining grid stability and resilience under **lower levels of inertia** with conventional generation retirements

CLIMATE



- Direct impacts to **performance of grid assets** from climate risks such as extreme temperatures, wildfires, and floods
- Climate-driven changes in **customer needs and electric service continuity**

Evolving SCE's Grid

Grid **planning, design, and operations** will need to shift from a focus on systemwide standards to one that meets multiple objectives based on localized needs. Changes in practice include:

- Strengthening our “forward radar”
- Moving from a deterministic planning approach to a risk-based, multi-scenario, and adaptive approach
- Greater integration of generation, transmission, distribution, and customer resources to optimize planning and operating decisions
- Recognizing the heterogeneity of different regional needs, moving from uniform grid architectures to region-specific, “modular” designs
- Incorporating flexibility into future grid architectures with technologies that can rapidly reconfigure and isolate portions of the grid while utilizing storage, DERs, and controllable loads

Reimagined Grid

to enable Pathway 2045 vision and meet location-specific needs

- Heterogenous and integrated T and D architectures
- Grid decisions more autonomous, flexible, and software/network-centric
- Common IT/OT platform deployed across the grid with advanced cybersecurity
- Tailored grid architectures with existing and next-gen technologies deployed for different regions

Achieving our vision for the reimagined grid will require rethinking various aspects of the grid



**Increased
technology
focus and
collaboration**



**Coordinated
and adaptive
grid planning**



**Reimagined
approach to
grid design**



**More efficient
and integrated
licensing/
permitting
processes**



**Intelligent,
more
autonomous
grid
management
and operations**

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