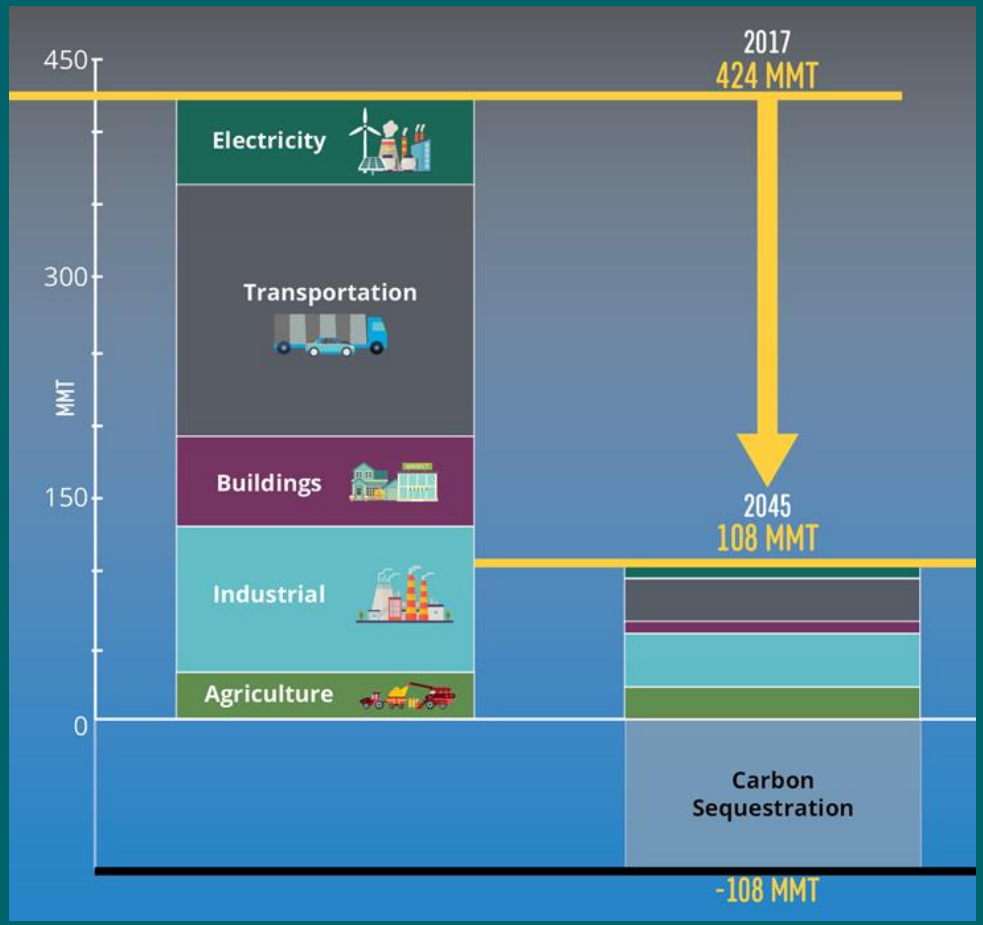
Need and Opportunities in Energy Storage Integration

DOE Energy Advisory Committee

February 3-4, 2021

Pathway 2045: Achieving 100% carbon neutrality

- Decarbonization of the **electric sector**
- Significant electrification of **transportation** and **buildings** and the use of **low-carbon fuels** to hard-to-electrify applications, such as industrial and heavy-duty transportation
- Sequestration of remaining carbon through natural processes and engineered solutions
- Concludes California will need **30 GW of utility-scale energy storage** and projects another **10 GW of customer-sited storage**



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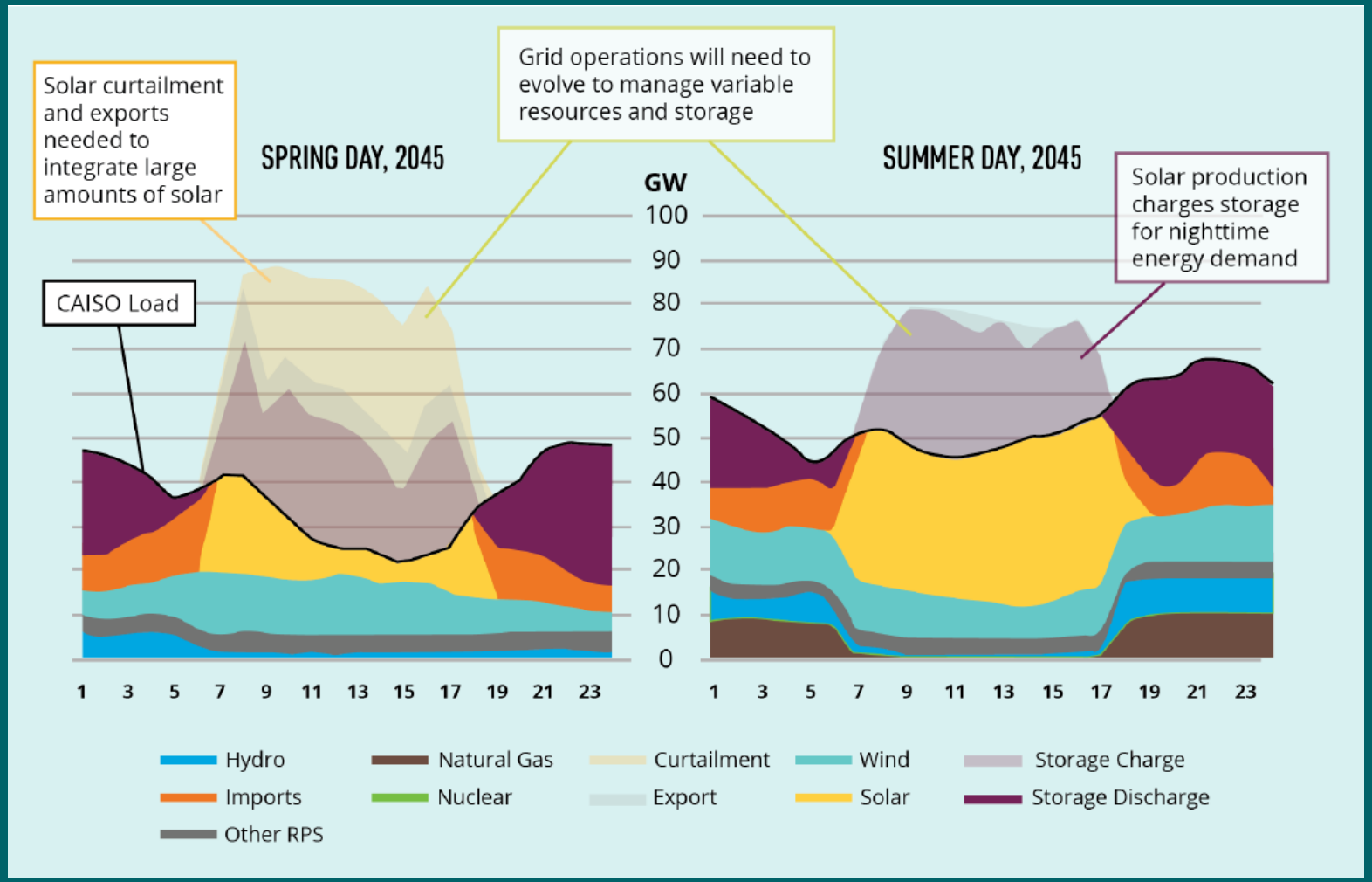
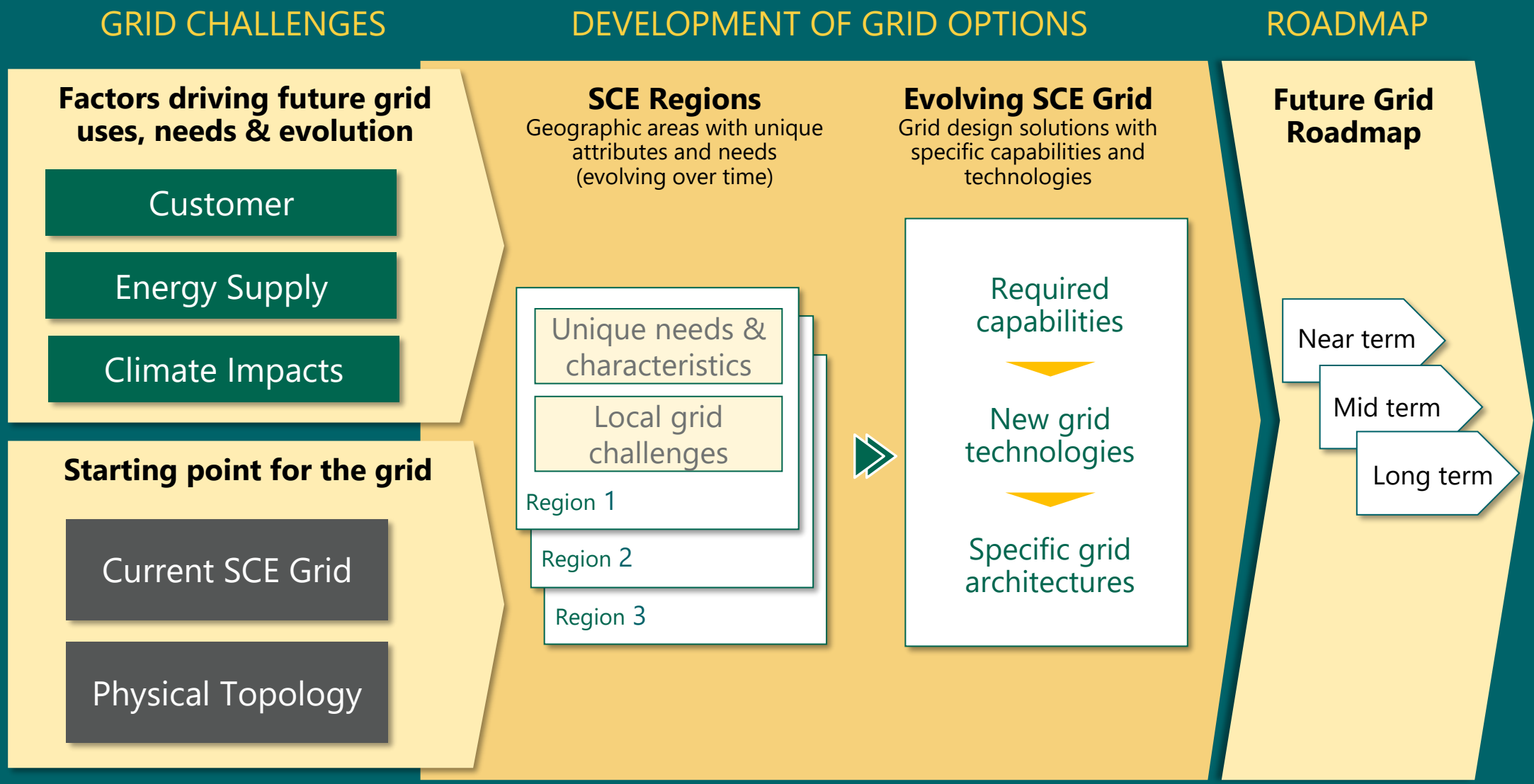


Our Reimagining the Grid approach



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

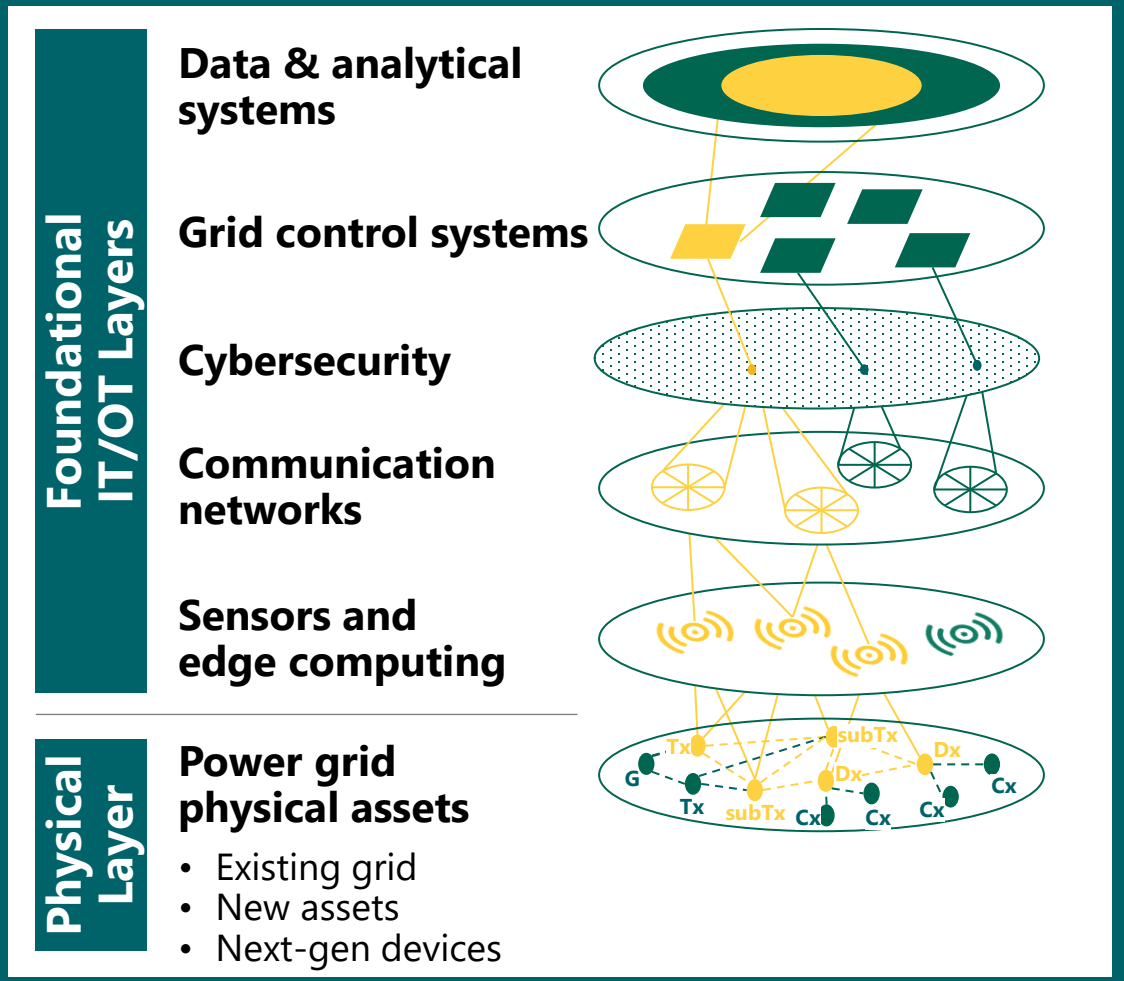
- **Integrating very high levels of renewables** (far from load centers)
- **Ensuring Resource Adequate** with an evolving mix of resources
- Maintaining grid stability and resilience under **lower levels of inertia** with conventional generation retirements

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**

What the Reimagined Grid may look like

- Our vision for the reimagined grid will require rethinking various aspects of the grid.
- We are developing additional operational flexibility and will require substantial advancements in grid control system technologies and the underlying communication networks and an integrated cybersecure platform.
- The rapid growth of DERs and large-scale renewables and storage is driving us to develop and test new technologies and customer programs.



SCE and Sunrun® Virtual Power Plant (VPP) pilot

- How it works:
  1. Enroll 300 residential customers with PV-Paired battery systems from Sunrun®
  2. SCE calls events utilizing its existing demand response automation system for notifications
  3. Sunrun® receives event signal and calls on customers' batteries
  4. SCE utilizes a 3rd party to analyze the results
- Test cases are selected to determine effectiveness at addressing local grid needs, such as a distribution circuit peak capacity constraint.
- Pilot anticipated to develop understandings on:
  - The customer value proposition
  - Ability of a 3rd party aggregator to provide the required services
  - Technical data such as the resultant MW capacity from the systems, performance characteristics, etc
- Pilot will last 12 months and ends in June 2021