

DOCKETED

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Building Decarbonization

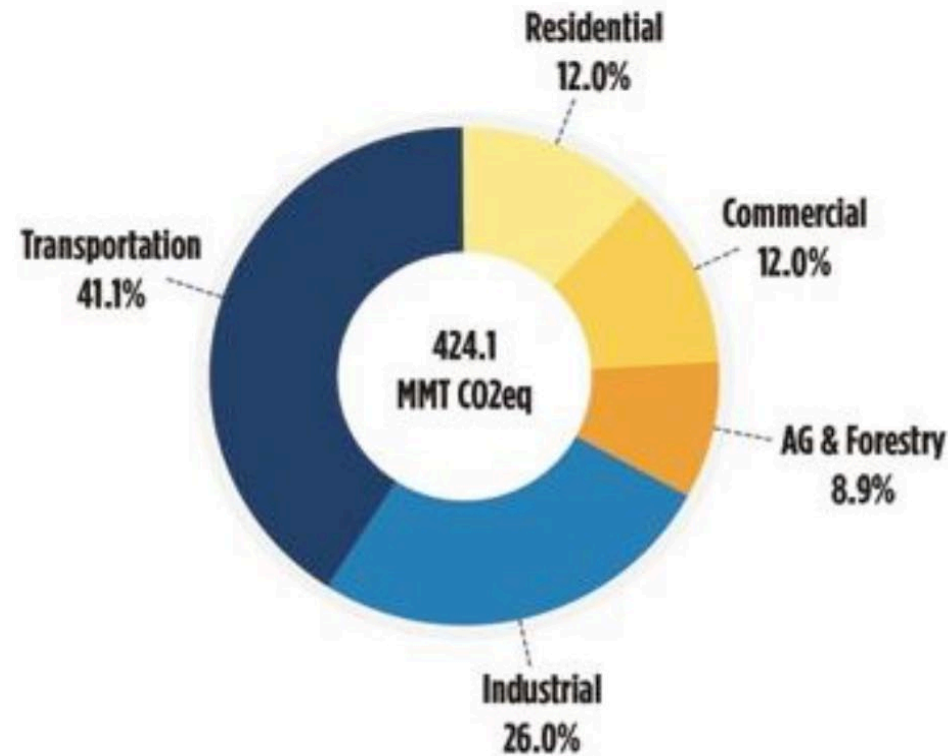
Workshop for the 2021 Integrated Energy Policy Report (IEPR)

Michael Sokol, Efficiency Division Deputy Director

California Energy Commission

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California's Greenhouse Gas Emissions



Source: CEC using data from CARB 2019 GHG Inventory and the adopted 2019 IEPR Electricity Forecast. Emissions estimate extracted from [2018 IEPR Update, Chapter 1, Figure 1, p. 27.](#)



Legislative and Regulatory Context

- **SB 32** (2016, Pavley) – Reduce statewide GHG emissions 40% below 1990 levels by 2030
- **AB 3232** (2018, Friedman) – Assessment of potential to reduce building GHG 40% by 2030
- **SB 100** (2018, De León) - 100% zero carbon resources by 2045
- **SB 1477** (2018, Stern) – Low-emissions building technology deployment incentives
- **CEC, CPUC, CARB, and other agencies** taking action to assess and implement strategies to reduce building GHG



Building Decarbonization Assessment (AB 3232)

Assembly Bill 3232 Requirements:

- CO₂e cost per metric ton
- Space and water heating cost-effectiveness
- GHG emission reduction from low-income and multifamily housing, high-rise buildings
- Load management strategies
- Ratepayer, construction costs, and grid reliability considerations





Variables Impacting Decarbonization

Building/Technology Impacts

- Building age
- New construction practices and costs
- Availability of heat pumps and low-GWP refrigerants
- Electric panel upgrades
- Internet access





Variables Impacting Decarbonization

Customer/Consumer Impacts

- Project financing
- Program design
- Scheduling retrofits
- Retrofit costs
- Cooking practices
- Utility bill changes
- Existing programmatic and regulatory restrictions
- Workforce training
- Split incentives





Seven Broad Strategies of Building Decarbonization

1. Building end-use electrification

2. Decarbonizing electricity generation system

3. Energy efficiency

4. Refrigerant conversion and leakage reduction

5. Distributed energy resources

6. Decarbonizing gas system

7. Demand flexibility



Senate Bill 100

California's

Clean Electricity Goals



2020

33%

Under the Renewables Portfolio Standard, eligible resources include solar, wind, geothermal, biomass and small hydroelectric.



2030

60%

2045

100%

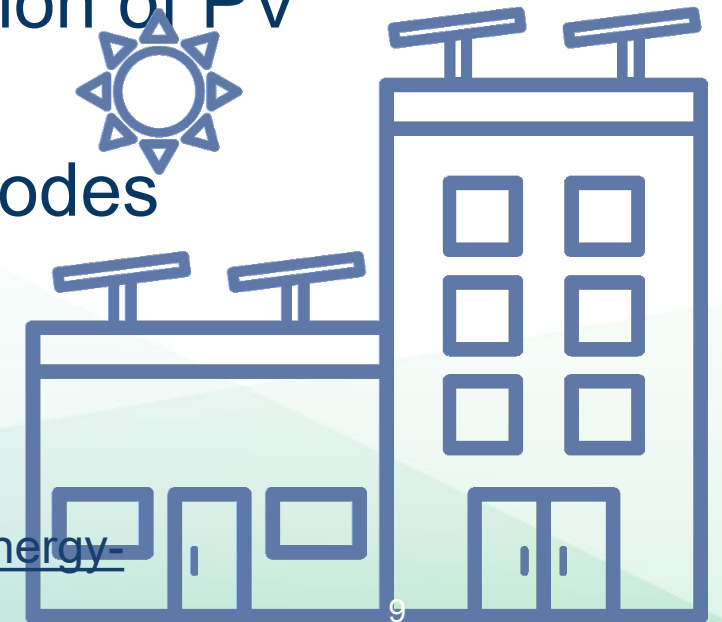


Under SB 100 which expands eligibility to include additional carbon-free resources



Proposed 2022 Energy Code Goals

- Increase building energy efficiency cost-effectively
- Contribute to the state's GHG reduction goals
- Enable pathways for all-electric buildings
- Reduce residential building impacts on the electricity grid
- Promote demand flexibility and self-utilization of PV generation
- Provide tools for local government reach codes



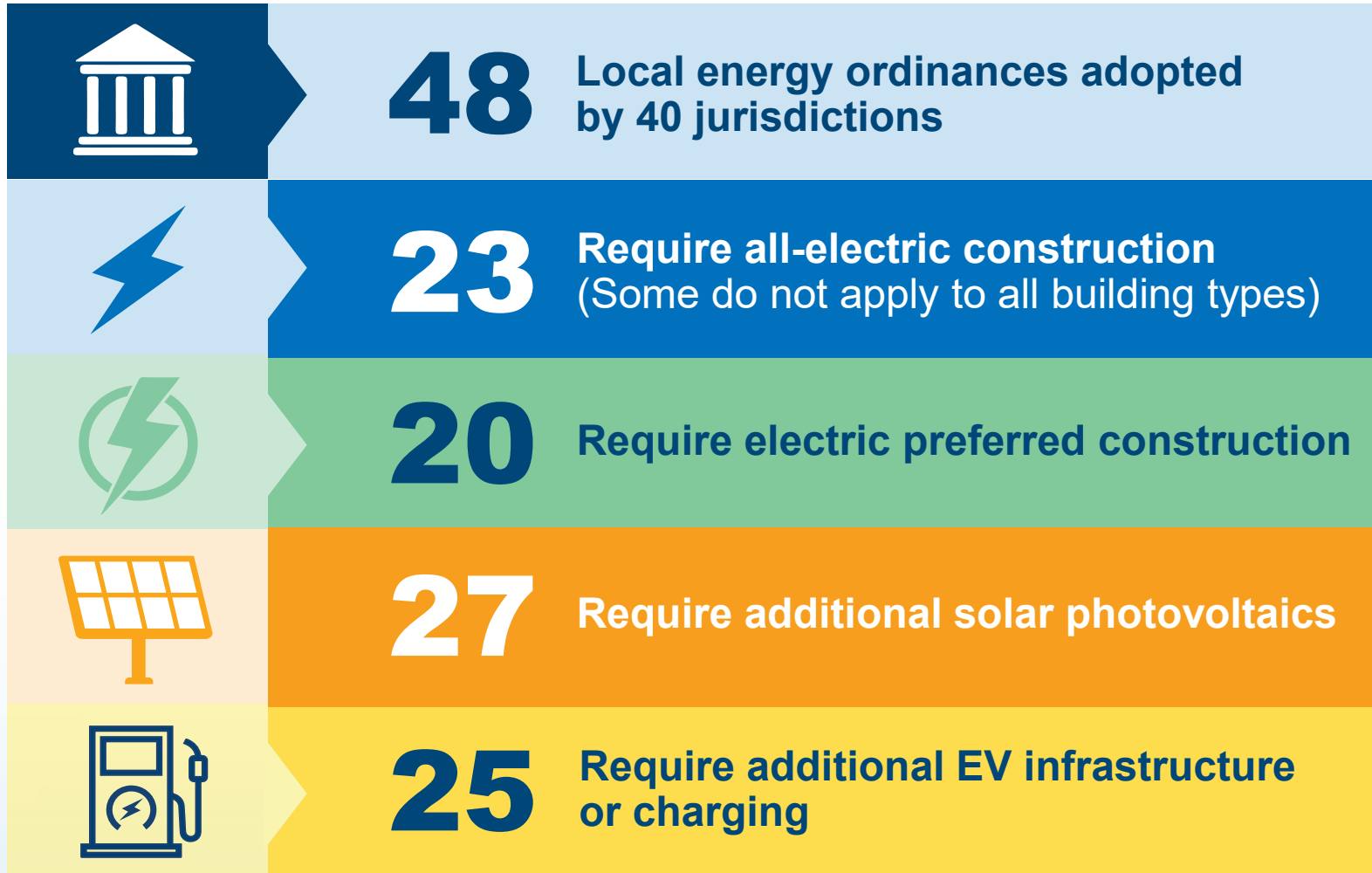


2022 Energy Code Update

- 1. Electric Heat Pumps**
- 2. Electric Ready**
- 3. Solar + Batteries**
- 4. Indoor Air Quality**



Local Ordinances Exceeding 2019 Energy Code



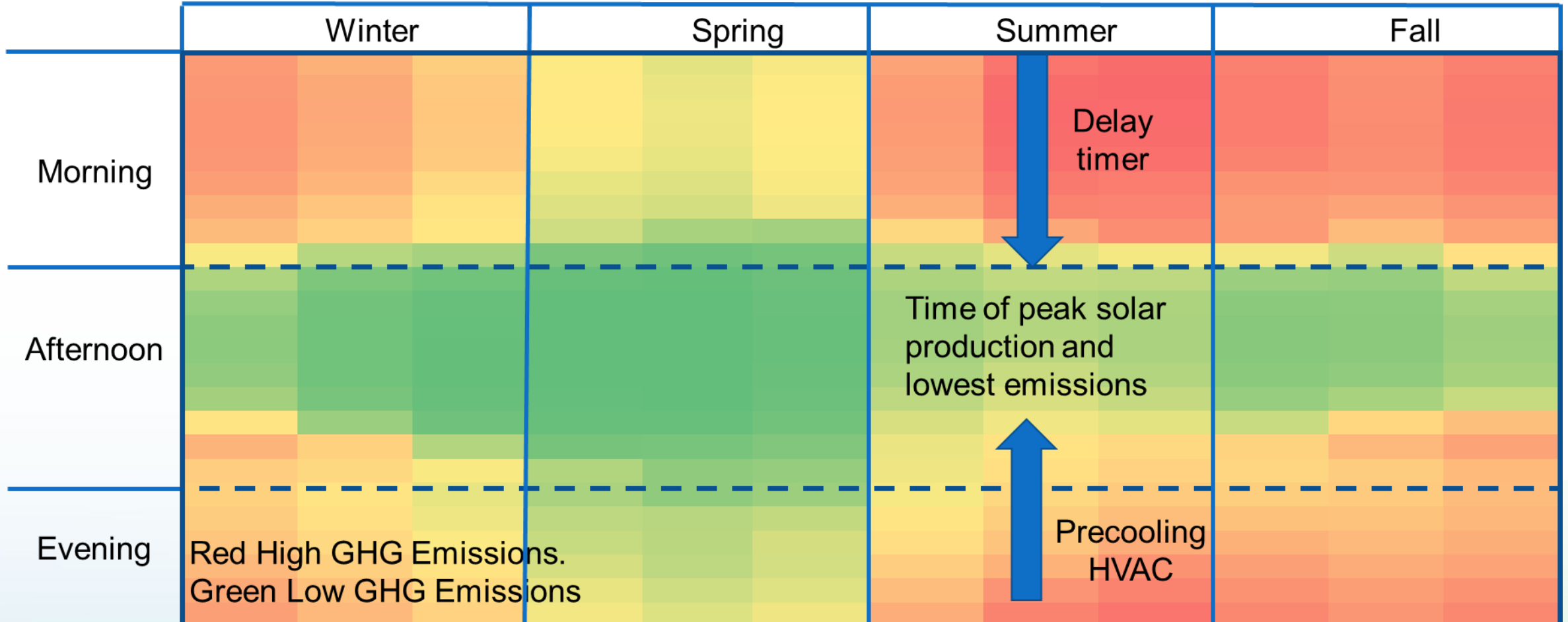
1 IN 3
CALIFORNIANS

lives in a community with an energy code exceeding state standards



Load Flexibility - Schedule, Shift, and Curtail

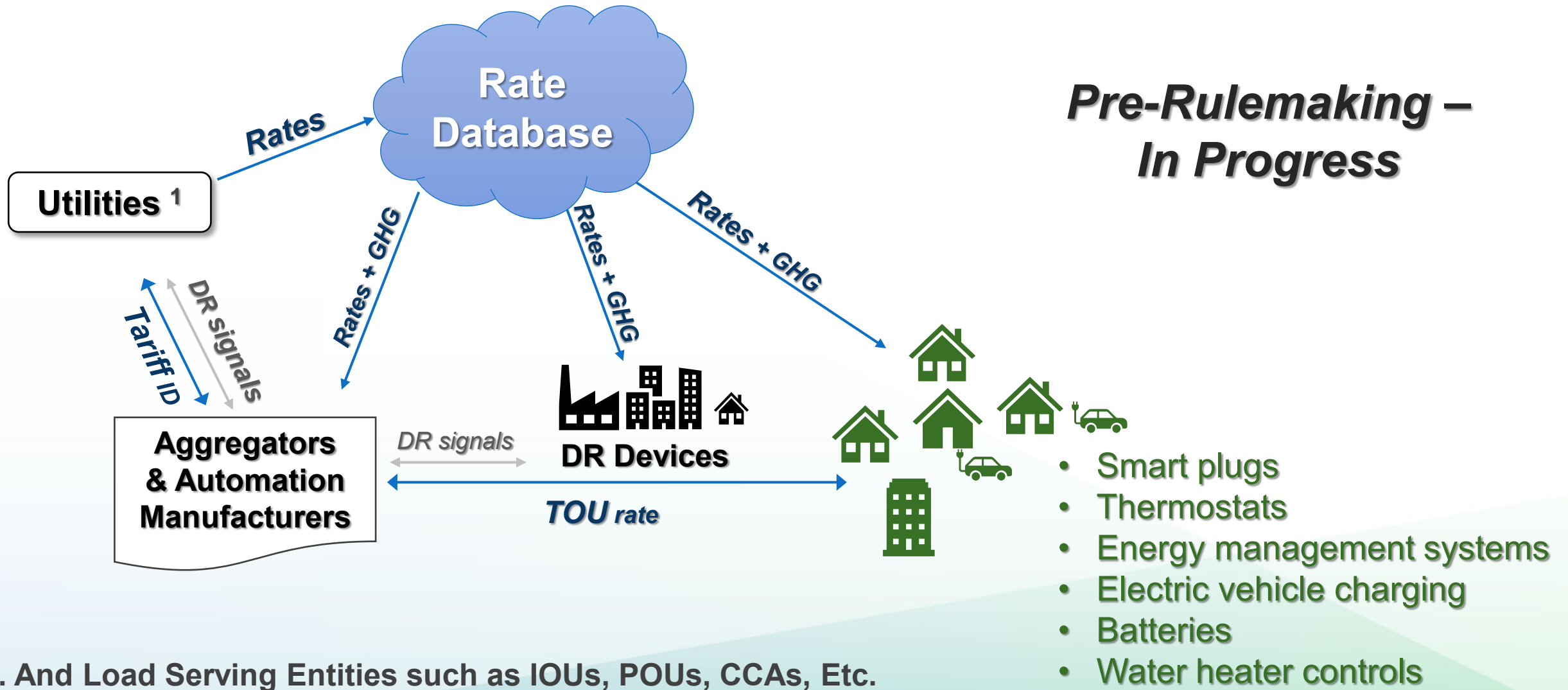
GHG Emissions by Hour and Season (2030)



Flexibility is key to reducing emissions from homes and businesses



Load Management Standards





Senate Bill 49 Requirements

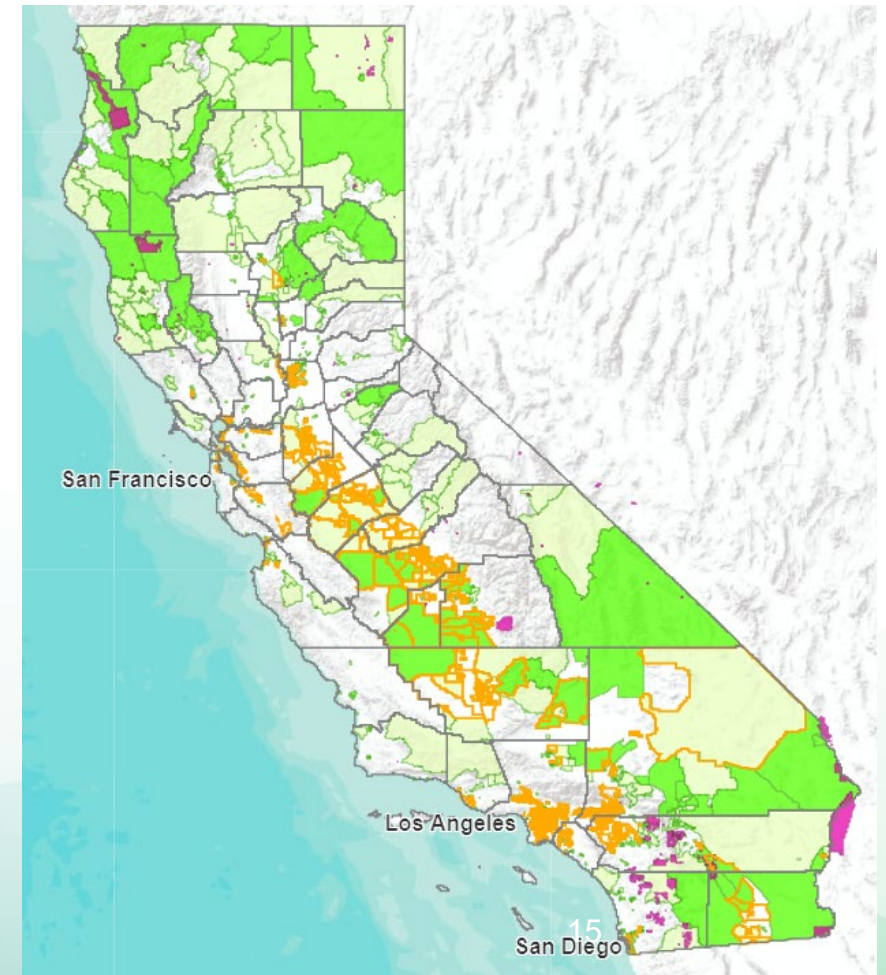
- Requires CEC to develop **Flexible Demand Appliance Standards**, in coordination with LSEs and CPUC
 - ❖ Cost-effective, including GHG and grid benefits
 - ❖ Requires consumer consent
 - ❖ Open source and user-friendly
 - ❖ Cybersecurity
- Report on progress in the Integrated Energy Policy Report



Consumer Centric Approach

- Prioritize and invest in community outreach and engagement
- Commitment to Inclusion, Diversity, Equity, Access (IDEA)
- Collaborate with Disadvantaged Communities Advisory Group (DACAG)
- Consult with CA Tribes
- Partner with local community-based organizations (CBOs)

California Tribal Lands, SB 535 Disadvantaged Communities and Low-income Communities





Thank you