Coordinating DERs and Flexible Loads

Leveraging CA's Transformation of Retail Electricity Pricing

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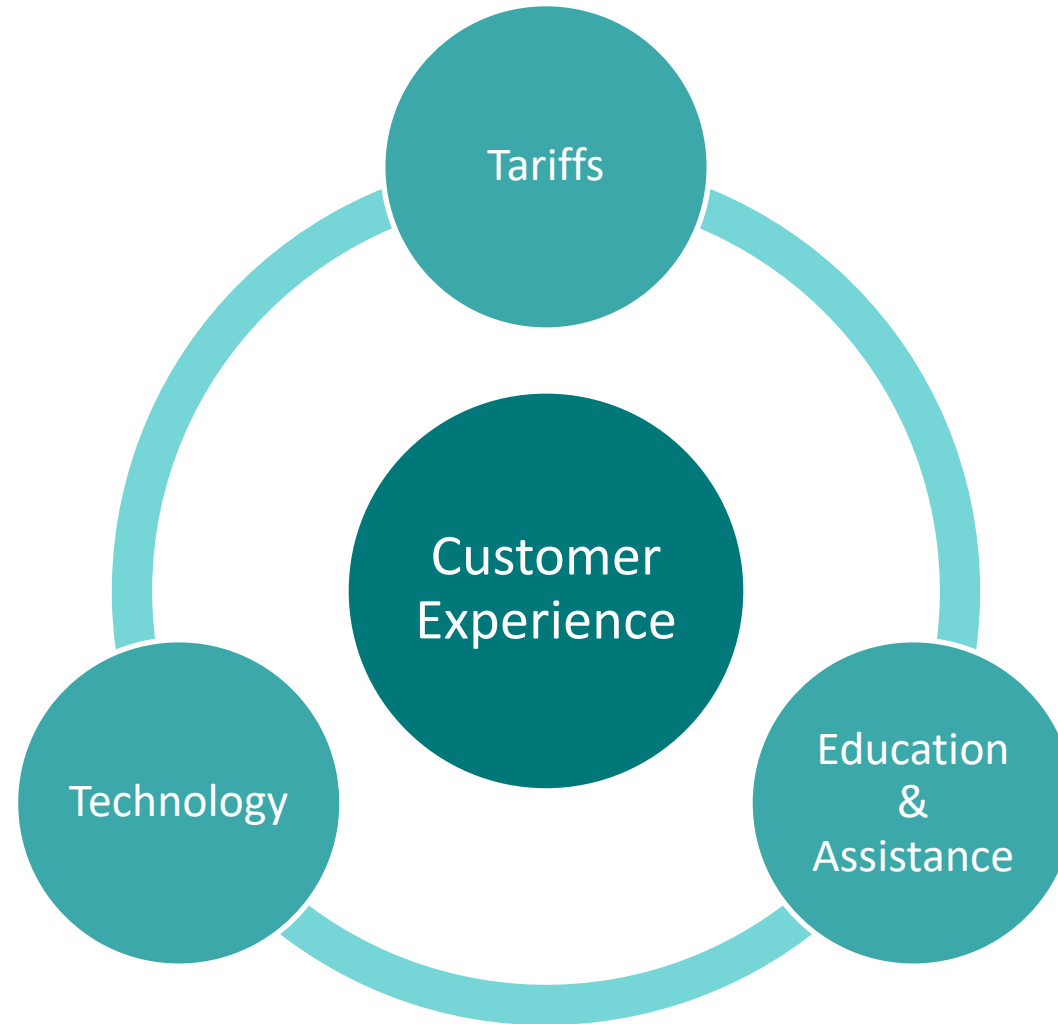Lawrence Berkeley National Laboratory

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The Opportunity

- CA reforming retail electricity tariffs using **dynamic pricing** to:
  - Shape demand
  - Encourage electrification
  - Promote use of renewable energy and distributed energy resources
- CEC Load Management Standard
- CPUC Demand Flexibility proceeding (Rulemaking R.22-07-005)
- SB 846 load-shift goal – 7GW by 2030*
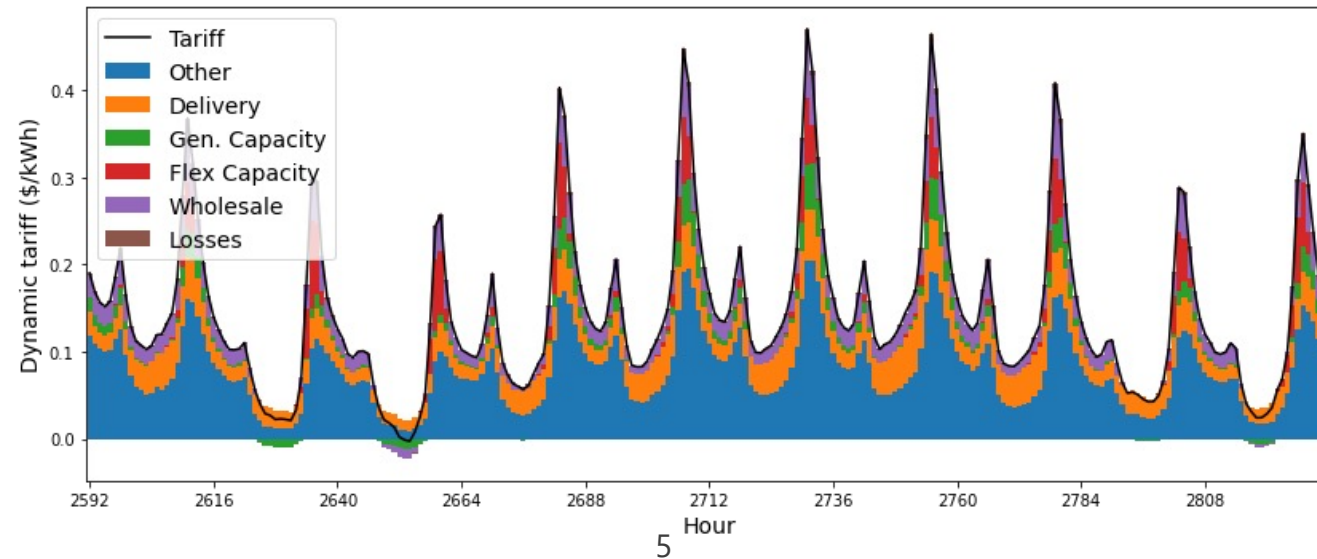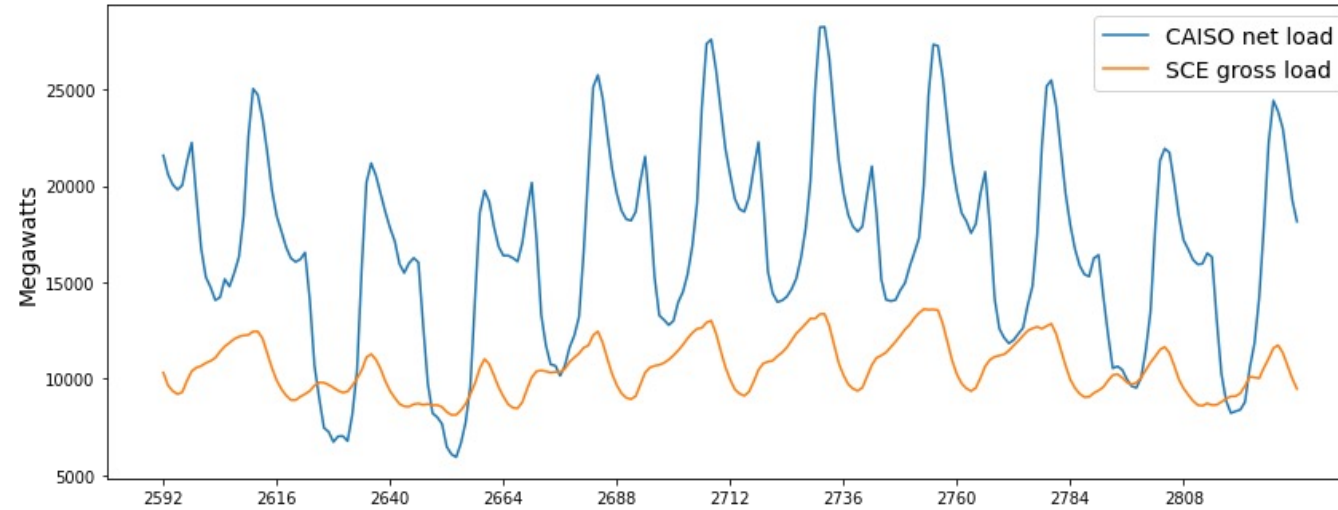- Grid-Interactive Efficient Buildings can reduce system costs by $18B/yr and peak load by >100GW nationally by 2030**

*https://www.energy.ca.gov/publications/2023/senate-bill-846-load-shift-goal-report

**https://gebroadmap.lbl.gov
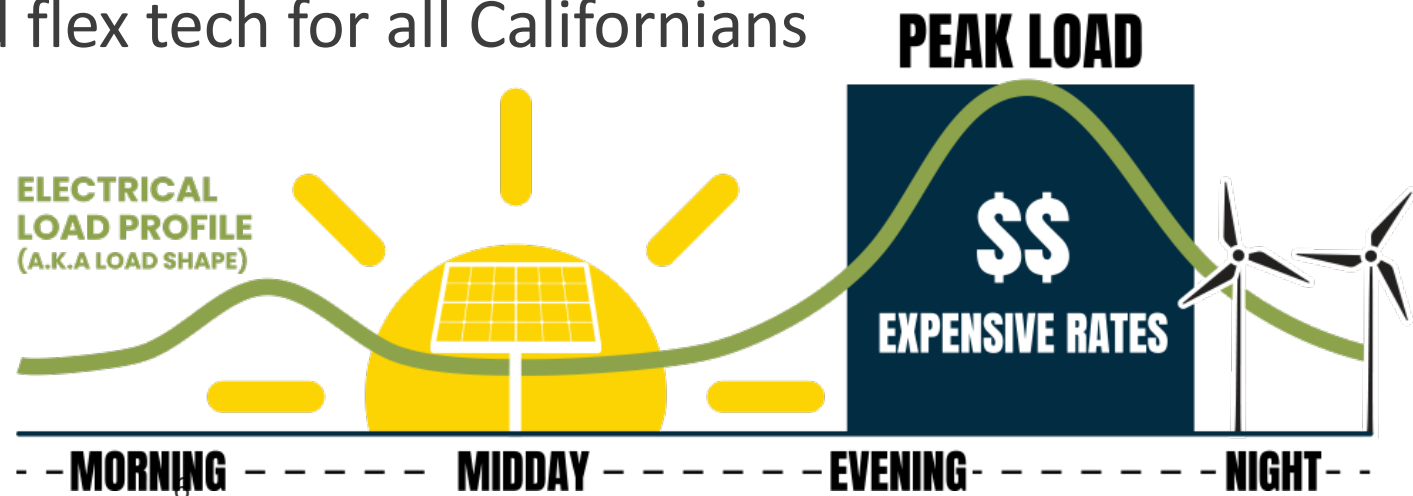
Elements for Successful Dynamic Pricing

Tariffs: Dynamic Prices Reflect System Conditions

# Technology: A future with real-time price information to adjust electricity use <u>automatically</u>

- CalFlexHub working to:
  - Identify, develop, and demonstrate pre-commercial, load-flexible technologies
  - Explore how to ensure the signals used to communicate dynamic price and GHG information are successful in motivating load flexibility
  - Promote equity among load flex tech for all Californians

https://calflexhub.lbl.gov

ELECTRICAL LOAD PROFILE (A.K.A LOAD SHAPE)

PEAK LOAD

$$ EXPENSIVE RATES

-- MORNING ----- MIDDAY ------ EVENING ------ NIGHT --

Technology: CalFlexHub Communication Architectures

Price / GHG signal gets to Flexible Loads primarily through 4 pathways:

- Through the OEM cloud;

- Through a 3rd party cloud (most complex, has many variations);

- Directly to the load through a local controller;

- Through a building gateway
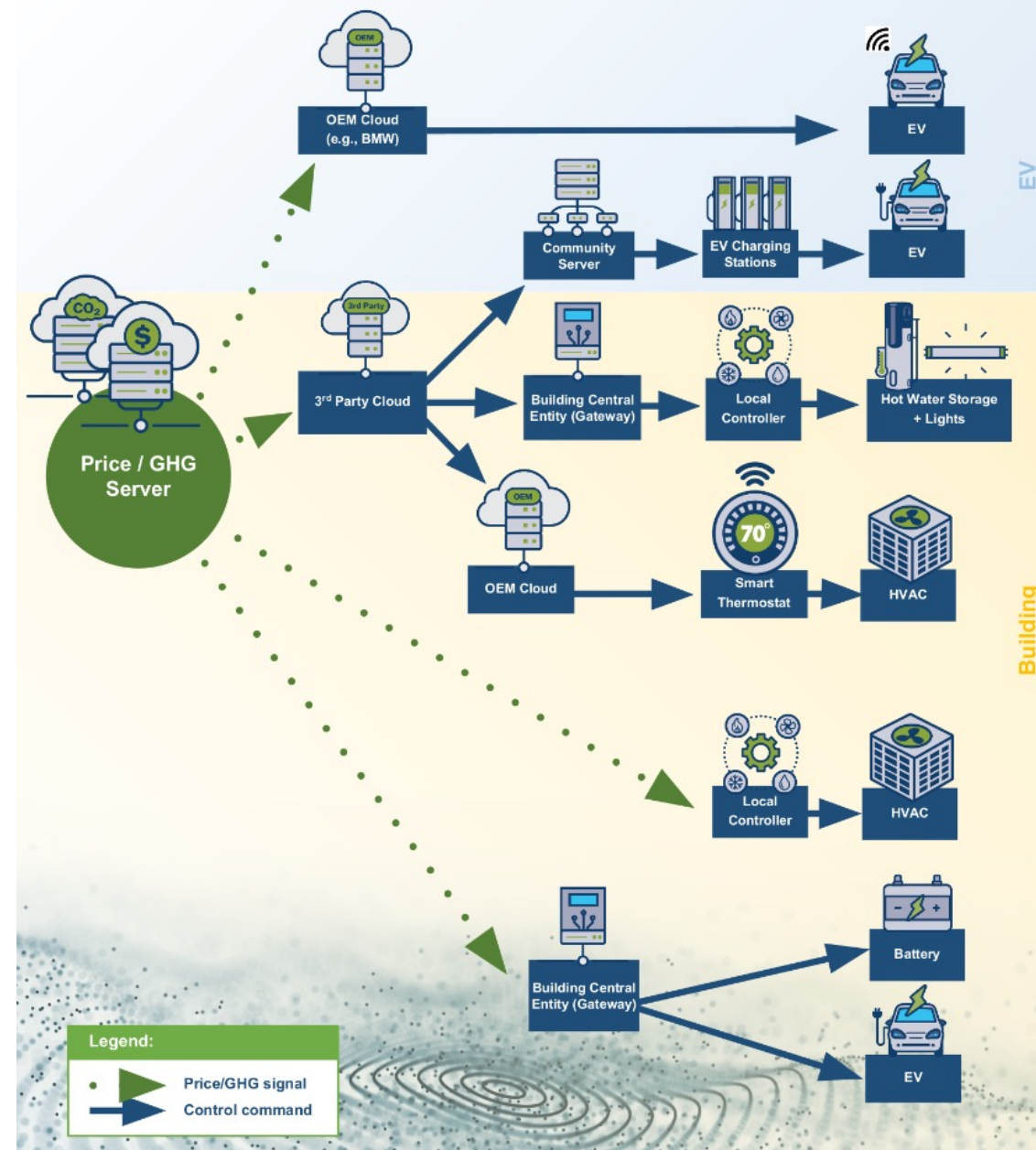
Education and Assistance

- Customers will need help to:
  - Understand and opt into dynamic tariffs
  - Purchase and install automation and demand flexibility technologies
  - Enable and maintain automation technologies
- CA needs a robust market to support customers
  - Information and tools from load-serving entities
  - Price-responsive end-use equipment and automation technology
  - Demand-flex technologies (e.g., thermal energy storage, V2X)
  - Service providers to enable and support automation
- Market transformation programs needed to develop market

1. Demand Flexibility has big potential to address power system problems

2. Dynamic pricing is key to enable "year-round" flexibility

3. Good tariff design is important, but to be successful:

4. We need to develop a market for the price-responsive technologies and services that lead to positive customer experience

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