



CALIFORNIA ENERGY COMMISSION

Energy Code in the age of Decarbonization

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Current California Policy Drivers

- Double energy efficiency savings by 2030
- 60% renewable electricity by 2030; 100% by 2045
- Provide equitable low-carbon solutions for low-income residents & disadvantaged communities
- Electrify transportation
- Decarbonize buildings & industry

Carbon-free economy by 2045



Zero Net Energy (ZNE) Buildings

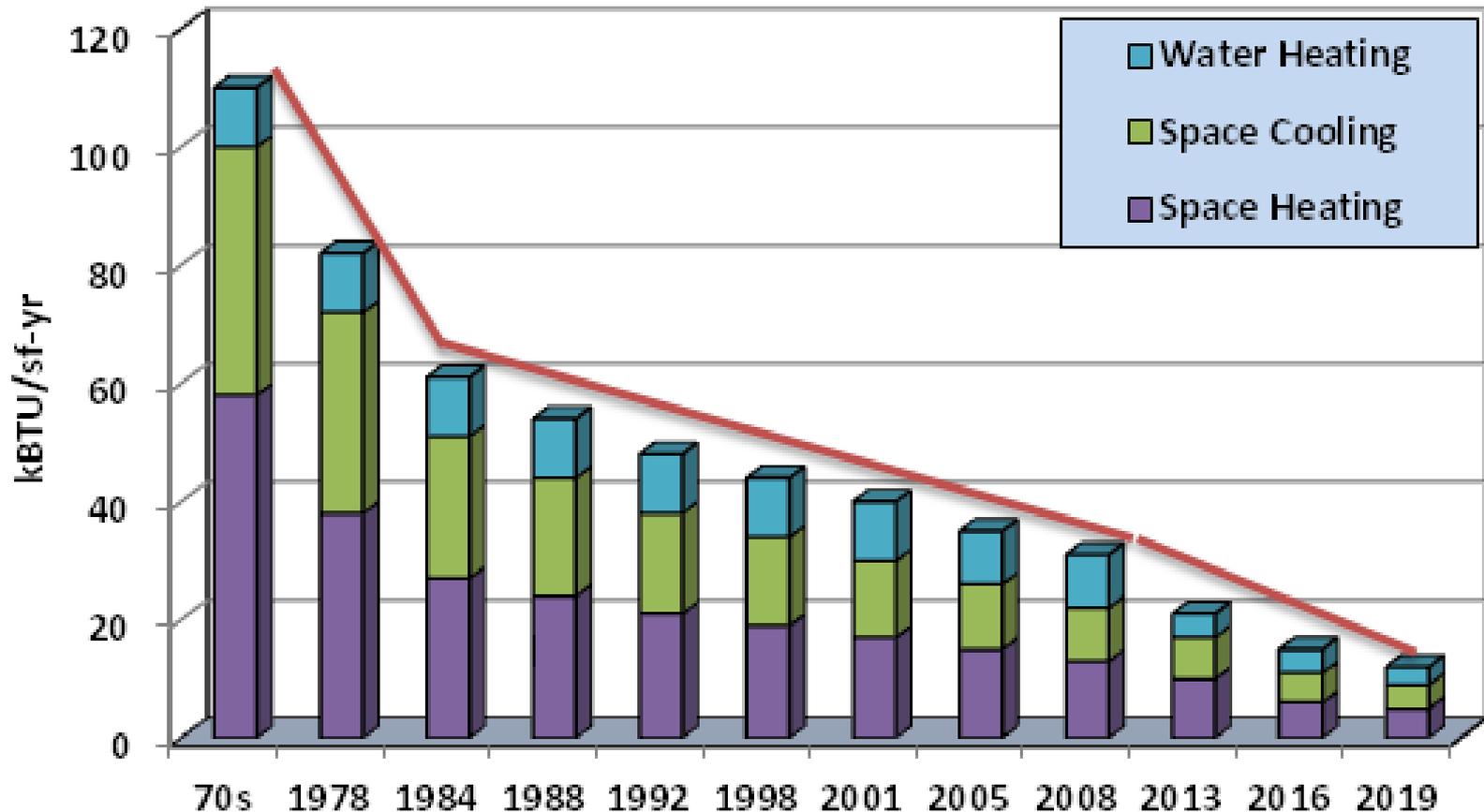
CA policy goals set 10+ years ago:

- All new homes are ZNE by 2020
- All new commercial buildings are ZNE by 2030
- State Buildings: All new, 50% existing ZNE by 2025

*A variety of **complementary efforts** will be needed to achieve these goals, including building standards and scaled-up market offerings.*



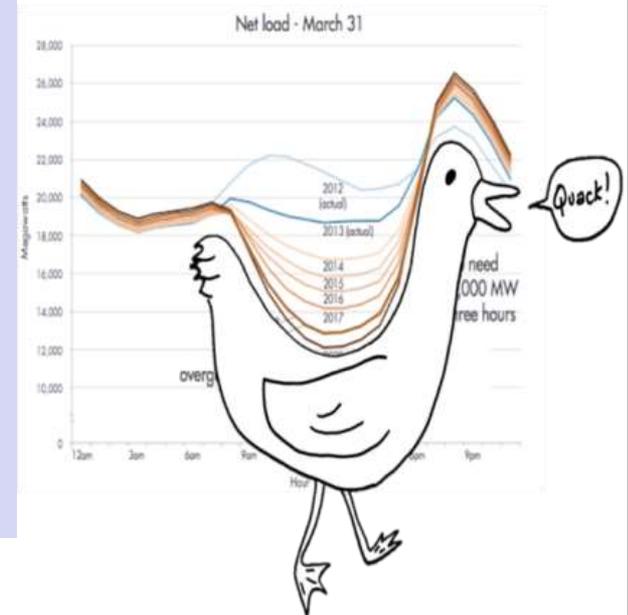
Building Standards Have Saved \$60+B Since 1976





Zero Net Energy Buildings Challenge:

- Net Energy Metering rules discourage over generation
- Time Of Use rates are changing as the Duck Curve changes
- **RESULT:** future value of solar is uncertain, but likely lower without support (e.g., storage)

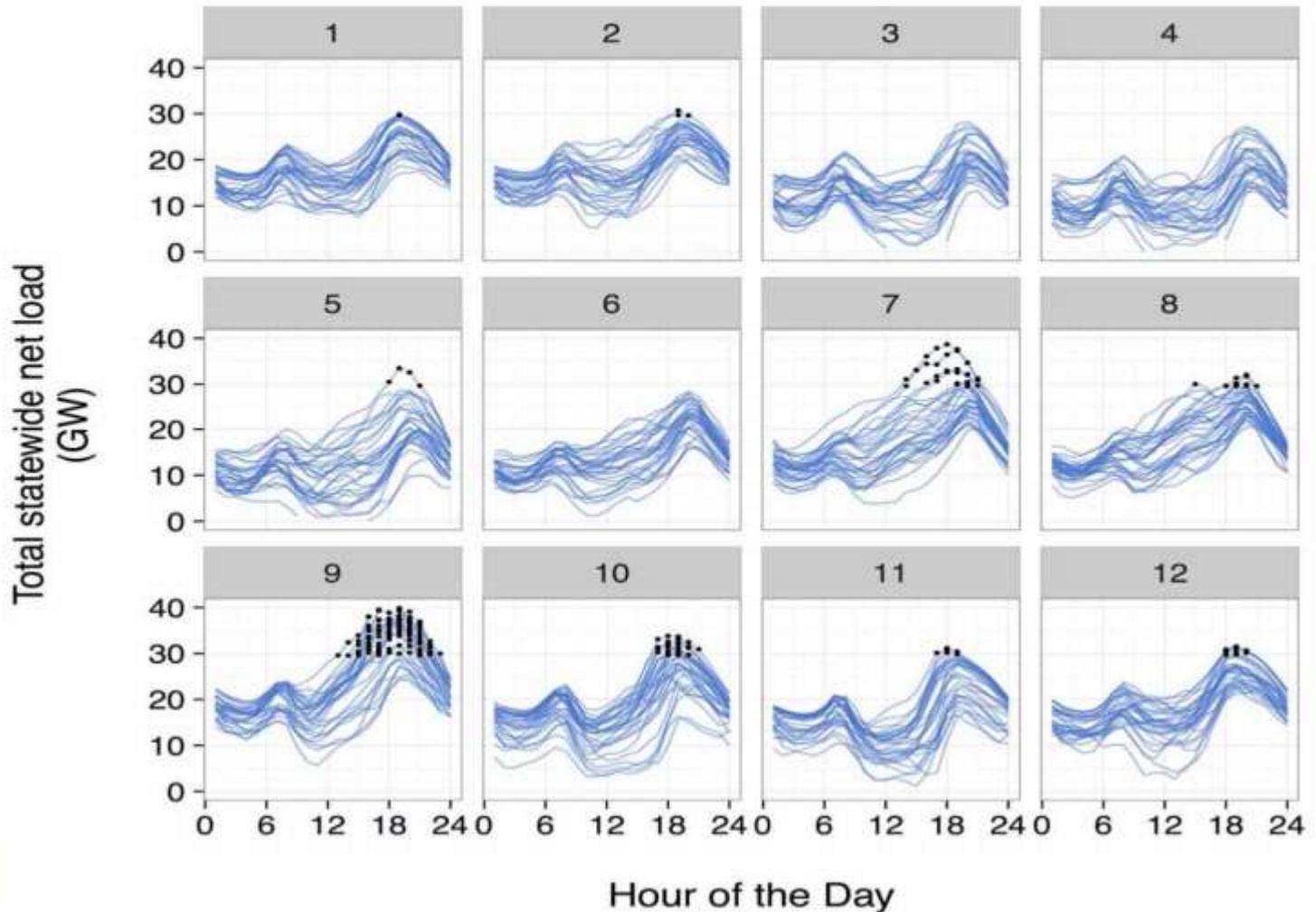




Ducks Every Month

2025 Daily Net Load Profile

By Month | CEC Medium Growth Building Stock | 1in2 weather





Zero Net Energy Buildings

Codes can help:

- Envelope efficiency
- Modest sized PVs
- Grid integration/harmonization strategies
- Maximize self-utilization of the PV output; Limit exports to the grid
- Encourage competition, innovation, and flexibility to foster new grid and end use technology solutions



2019 Building Energy Code: Where Are We?

- High efficiency envelopes
- On-site PV requirements to offset expected annual electricity
- Fuel neutral performance code – options for gas and electric equipment





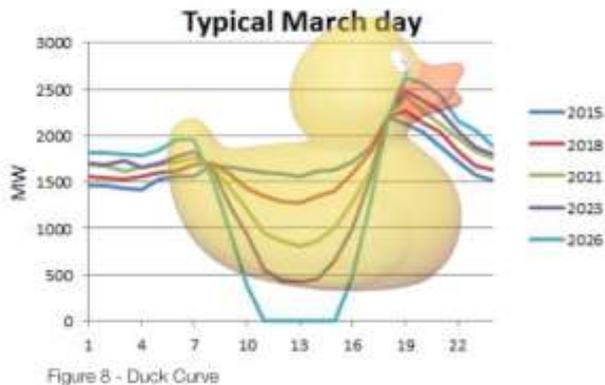
Summary of Residential Changes 2019

- **Increased efficiency for envelope**
 - Wall and ceiling insulation
 - QII prescriptive
 - U-factor for doors
- **IAQ updates**
 - MERV 13 filtration
 - ASHRAE 62.2-20
 - 16 applied w/ modifications
 - HERS verification for kitchen range hoods
- Prescriptive options for **heat pump water heaters**
- **PV required**
 - Prescriptive
 - Several exceptions to reduce size
- Performance Credit for **Variable Capacity Heat Pumps**
- Performance Credit for **Battery Storage**



Building Energy Code: What's Next?

- Multi-family & Commercial Buildings
 - Envelope Efficiency
 - More electric equipment options
 - On-site PV
- Demand Flexibility





Decarbonization: What's Next?

- SB 1477 (\$200 M over 4 years) – starts in 2020
 - **BUILD:** new construction incentives for GHG reductions
 - **TECH:** incentives, workforce development & transformational pilots for low carbon space and water heating technologies





Policy Implementation: What's Next?

- SB 100 **100% Renewable Electricity by 2045**
 - Will require significant contributions from buildings and industry
 - Demand flexibility will provide the best outcomes for CA ratepayers
 - Appliances and equipment communications & controls will enable cost-effective load shifting





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