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California Building Decarbonization

Building Characteristics, Challenges, and Analysis



Presentation by Michael Kenney, Energy Specialist

June 22, 2021



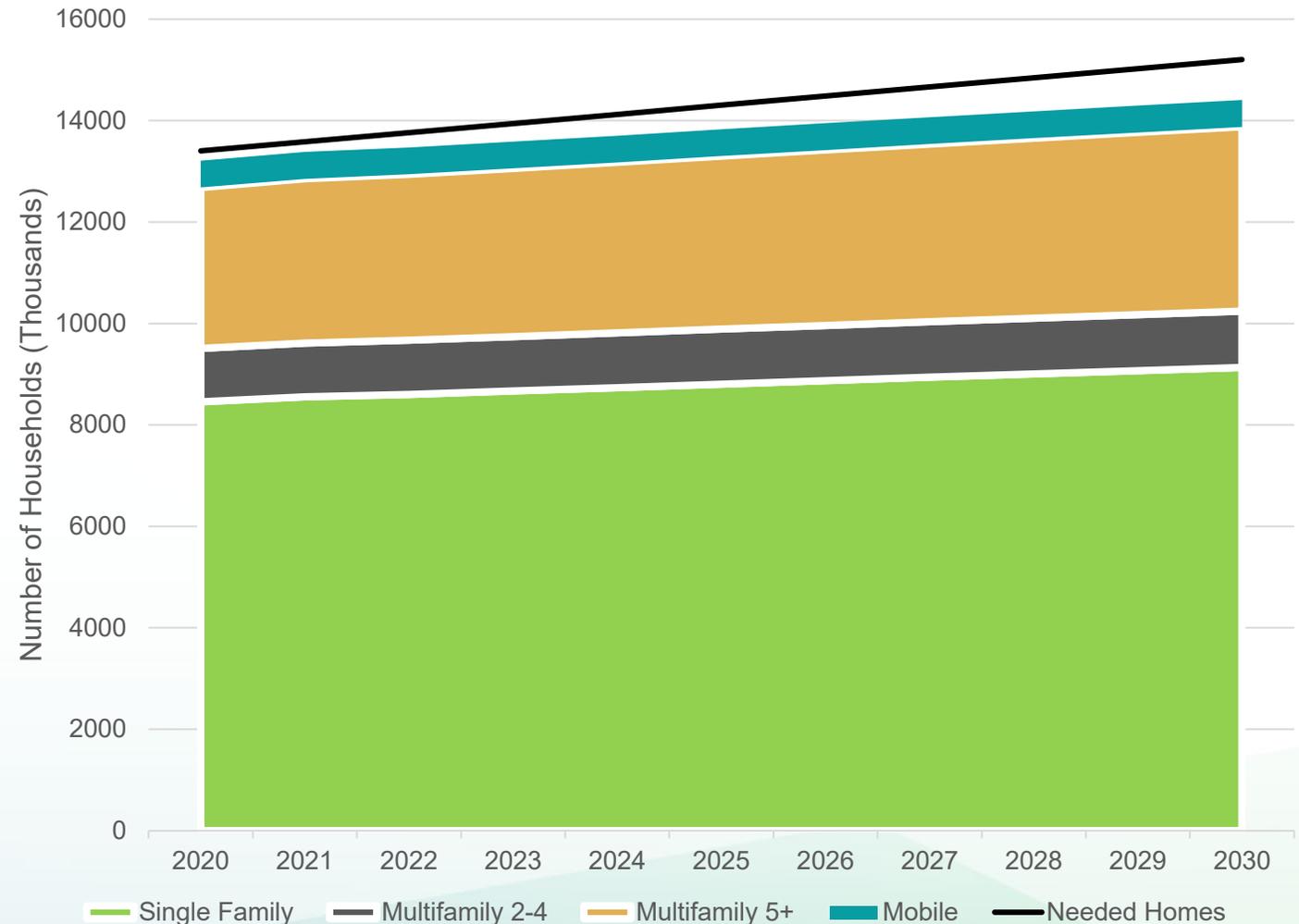
Overview

- CA Residential Building Breakdown
- CA Commercial Building Breakdown
- Building Challenges to Decarbonization
- California Household and Business Characteristics
- Household and Business Challenges to Decarbonization
- Energy Efficiency and Building Decarbonization Analysis



CA Residential Buildings

- Today, ~13.2 million households
 - 64% single-family
 - 32% multifamily
 - 4% mobile homes
- By 2030, nearly 14.5 million households forecasted
 - Averaging 120,000 new households per year
 - Need 180,000 new households per year

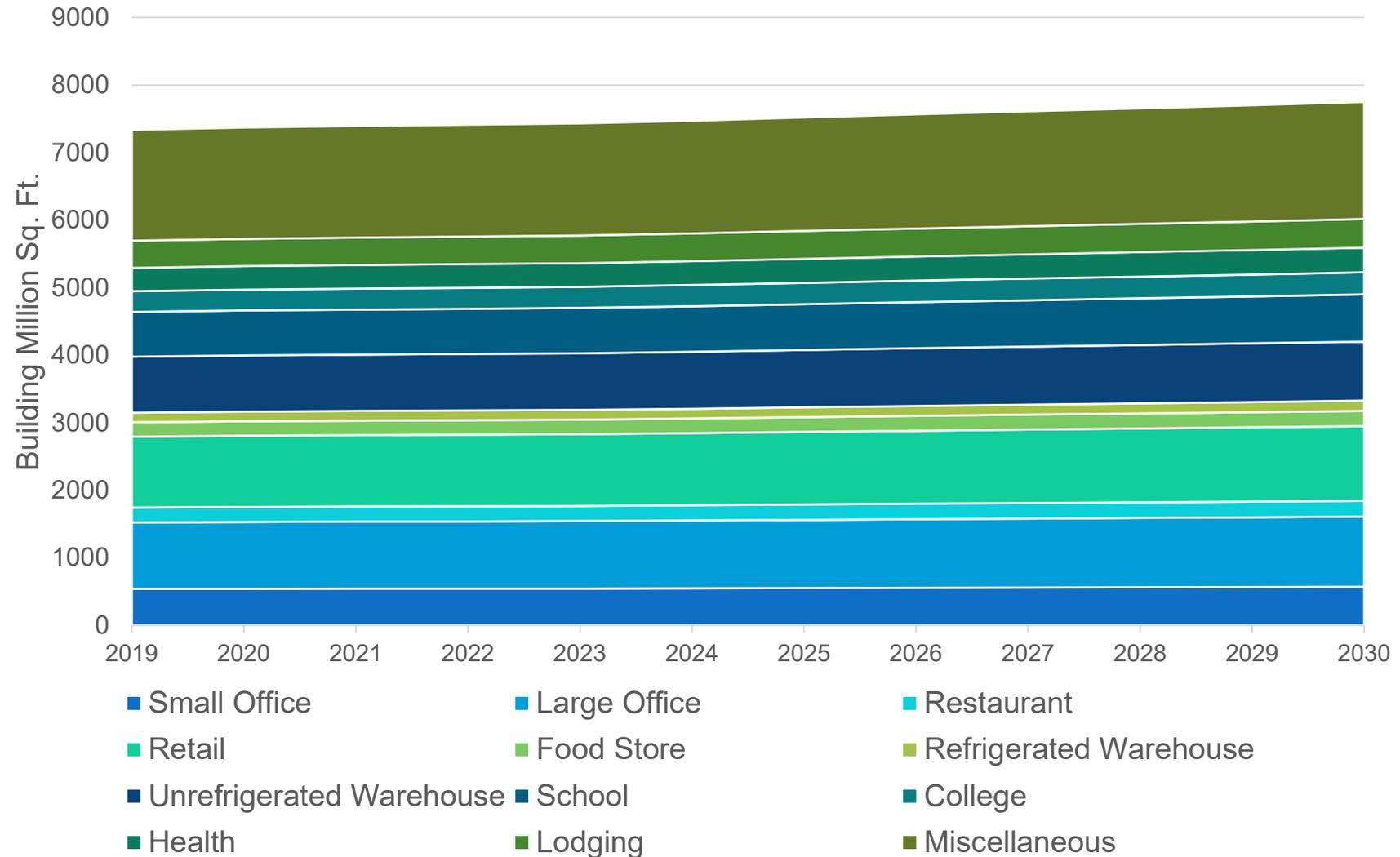


Source: 2019 IEPR; California Department of Housing and Community Development; CIRB



CA Commercial Buildings

- Commercial floor area grows over 400 million sq.ft. by 2030
- Miscellaneous includes churches, gas stations, prisons, movie theaters, and more





Building Challenges

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





Ongoing Considerations

Households

- Home prices and rents continue to grow
- Nearly 25% of households are enrolled in CARE
- Low incomes driving affordability concerns
- Renters relying on older, inefficient equipment

Businesses

- Changing workplace – office to telework
- Retail struggling
- Clean energy workforce expansion post-COVID



Customer Challenges

- Project financing
- Retrofit costs
- Utility bill changes
- Scheduling retrofits
- Split incentive





Decarbonization Analysis 2021 IEPR

- Energy efficiency (EE) tracking and forecast scenarios
 - Incorporate new data
 - Add new EE programs savings projections
 - Incorporate updates to code and standards
 - Consider program overlap in customer segments
 - Consider market-based activities that may result in EE savings





Electrification Updates

Expand electrification scenarios from a “what-if” analysis to projections

- Disaggregate low-income SF and MF as separate residential sectors
- Incorporate new data from incentive programs into analysis
- Incorporate electrification from local ordinances, proposed 2022 T24 updates
- Incorporate more space conditioning load profiles
- Improve and expand modeling of marginal annual and hourly emission intensities
- Explore additional end-uses and fossil fuels
- Disaggregate panel costs by building type
- Collaborate with CARB to update HFC emission estimates

2015

2020

2025

2030

2035

Time Horizon for Analysis

AB 3232 scenarios

AAEE & electrification load modifiers to IEPR forecast



Decarbonization Analysis for 2021 IEPR

- EE tracking/projections and hourly forecast load modifier
- New building electrification tracking/projections and hourly forecast load modifier
 - *Varying time horizons*
 - *Varying uncertainties*
 - *Varying uses*
- New long term demand scenarios in development

AB 3232 scenarios

SB 350 tracking towards EE doubling goal

Time Horizon for Analysis

2015 2020 2025 2030 2035 2040 2045

AAEE & electrification load modifiers to IEPR forecast

long term demand scenarios

Questions?

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