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MARYLAND CHAPTERS
THE ASSOCIATION FOR COMMERCIAL REAL ESTATE

Electrification of New Buildings – General Comments

- There is no way to determine a date when *"decarbonization of the building sector"* can be accomplished. The speed of carbon reductions and adoption of renewables depends on interrelated policy, economic and technological considerations that are outside of the control of the state – some of which are being considered over the next several years by the PSC, PJM and FERC.

- The International Energy Conservation Code is on a path toward deep energy efficiency and GHG reductions in new construction. Its 15-year rate of energy reductions would reach near zero energy between 2045-2050.

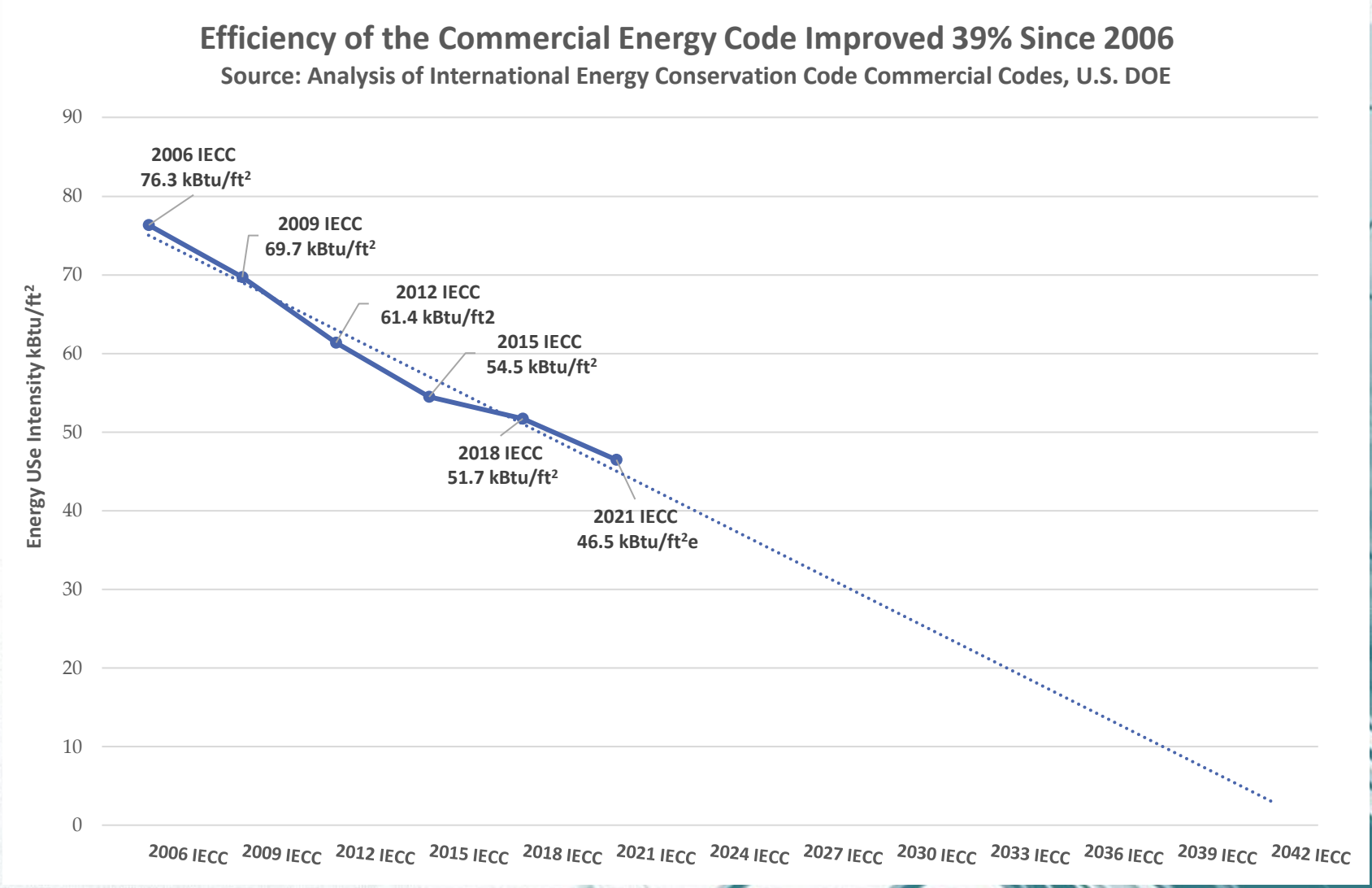
- Differences in winter climate and natural gas utility costs between California and Maryland make the California building electrification study of little use for policy making. We are not aware of any analysis of commercial buildings and ratepayer impacts for Maryland. We have included a summary slide of an energy

- Transitioning from on-site combustion of natural gas heat to utility generated electricity will only reduce GHG emissions if the PJM grid is generating electricity at lower marginal emissions than the on-site combustion.

- Given these factors and the extreme uncertainty caused by the pandemic, near-term efforts should be on efficiency measures in existing buildings that produce CO^2 reductions and immediate return on investment.

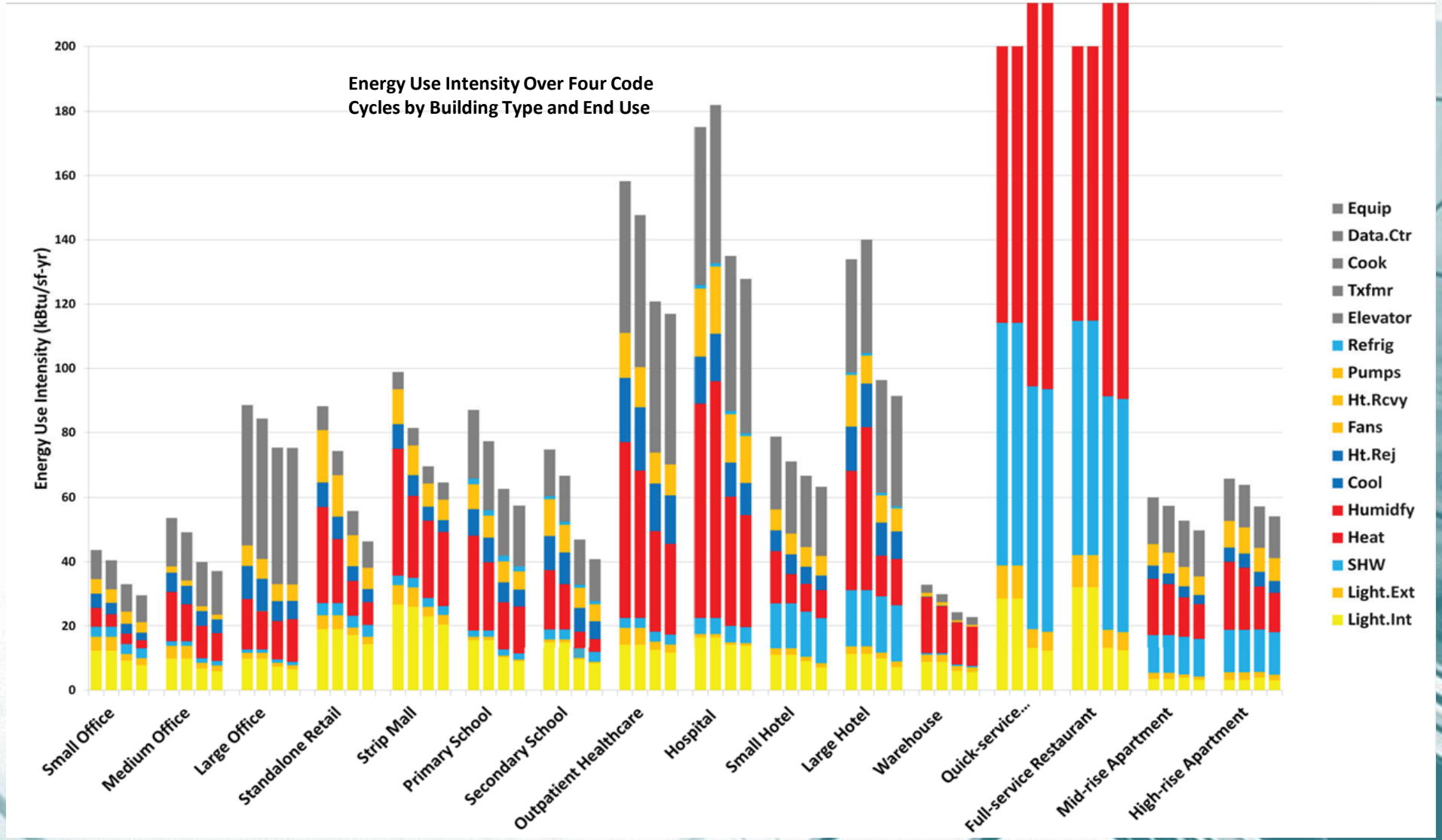
Energy Code is on a Path to Deep Energy and GHG Reductions

- Since 2006, each edition of the commercial energy code[IECC] improved energy efficiency by an average of 8%.
- The IECC will revise the energy code nine times between now and 2050.
- Dozens of organizations including the U.S. Conference of Mayors have endorsed working within the code writing process to achieve, *"an efficiency glide path of steady progress to net zero building construction by 2050."*
- The pace of future reductions will be based on a balance of cost-effectiveness, building comfort and environmental goals.



Reductions Will Be Challenging and Vary by Building Type

- Deep reductions in energy use and emissions from on-site combustion will be technically and economically challenging for many building types.
- Feasibility is particularly challenging for large commercial buildings with energy intense activities such restaurants, education, hotels, technology and medical providers, services with 24/7 365 operations.



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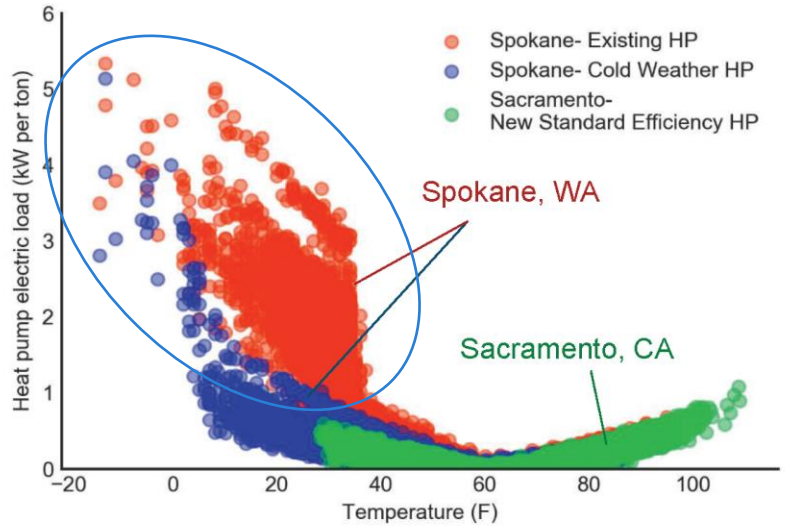
Cost Effectiveness – Calif Study Heat Pumps Did Not Use Supplemental Heat

- Air source heat pumps rely on extracting heat from outside air. When temperatures drop and the heat source is reduced, or non-existent supplemental heat sources are triggered and electricity use increases.
- The chart at right compares use of supplemental heat in Sacramento California to Spokane Washington – a city not included in the study presented to the subgroup.
- The increase in electricity used when supplemental heat is triggered at lower temperatures is circled.
- In the simulations done for the California building electrification study winter temperatures were warm enough that supplemental heat was not triggered.

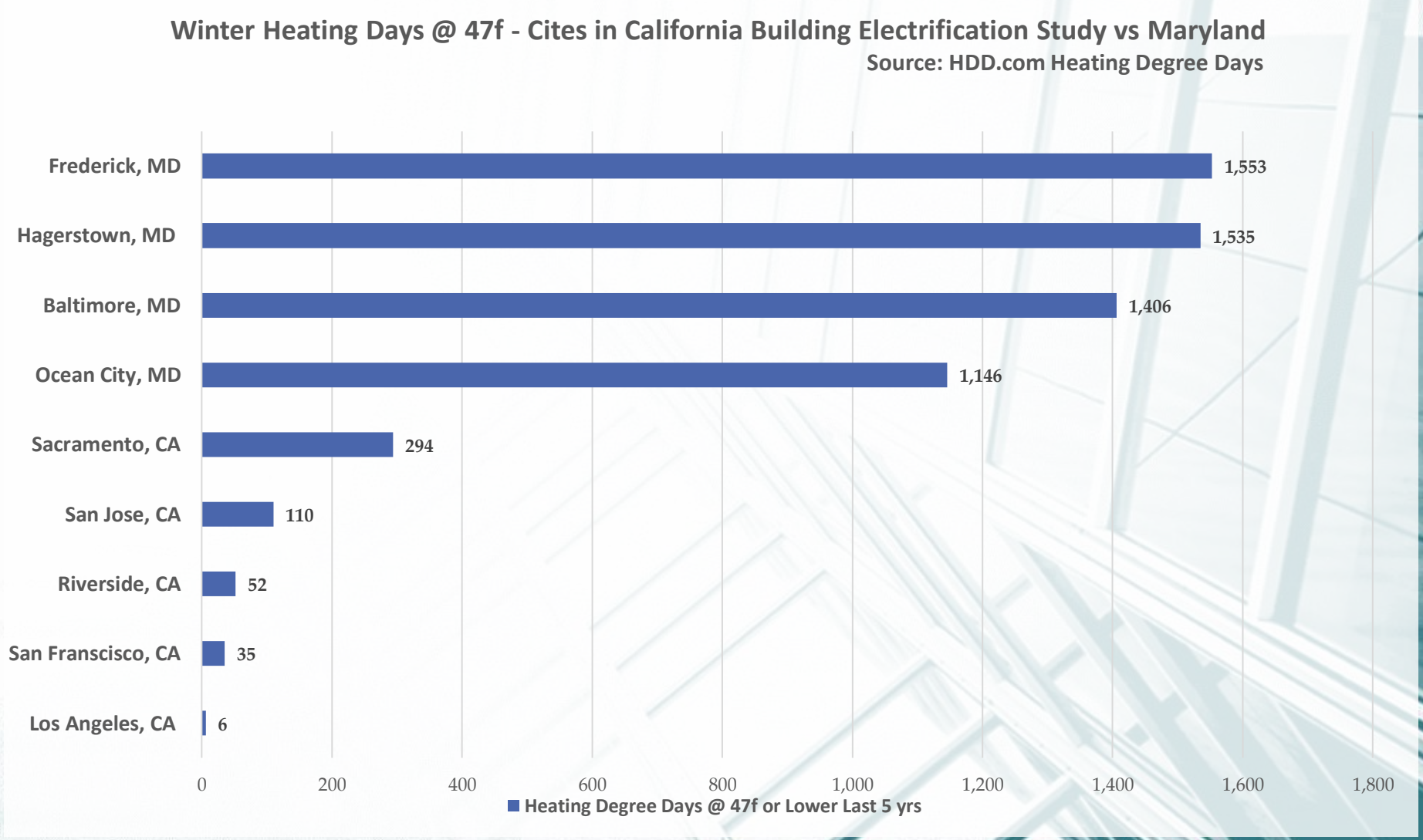
HVAC Heat Pump Performance depends on outdoor temperature & technology type



+ With moderate climate in California, heat pumps maintain high efficiency (efficiency > 1) throughout the modeled weather year, supplemental electric resistance heat is not triggered in these simulations
+ In low temperature conditions (30 degrees F or below), supplemental resistance heating (efficiency = 1) may be triggered; the temperature threshold depends on the heat pump technology

Cost Effectiveness – Calif Study Did Not Cover MD Climate

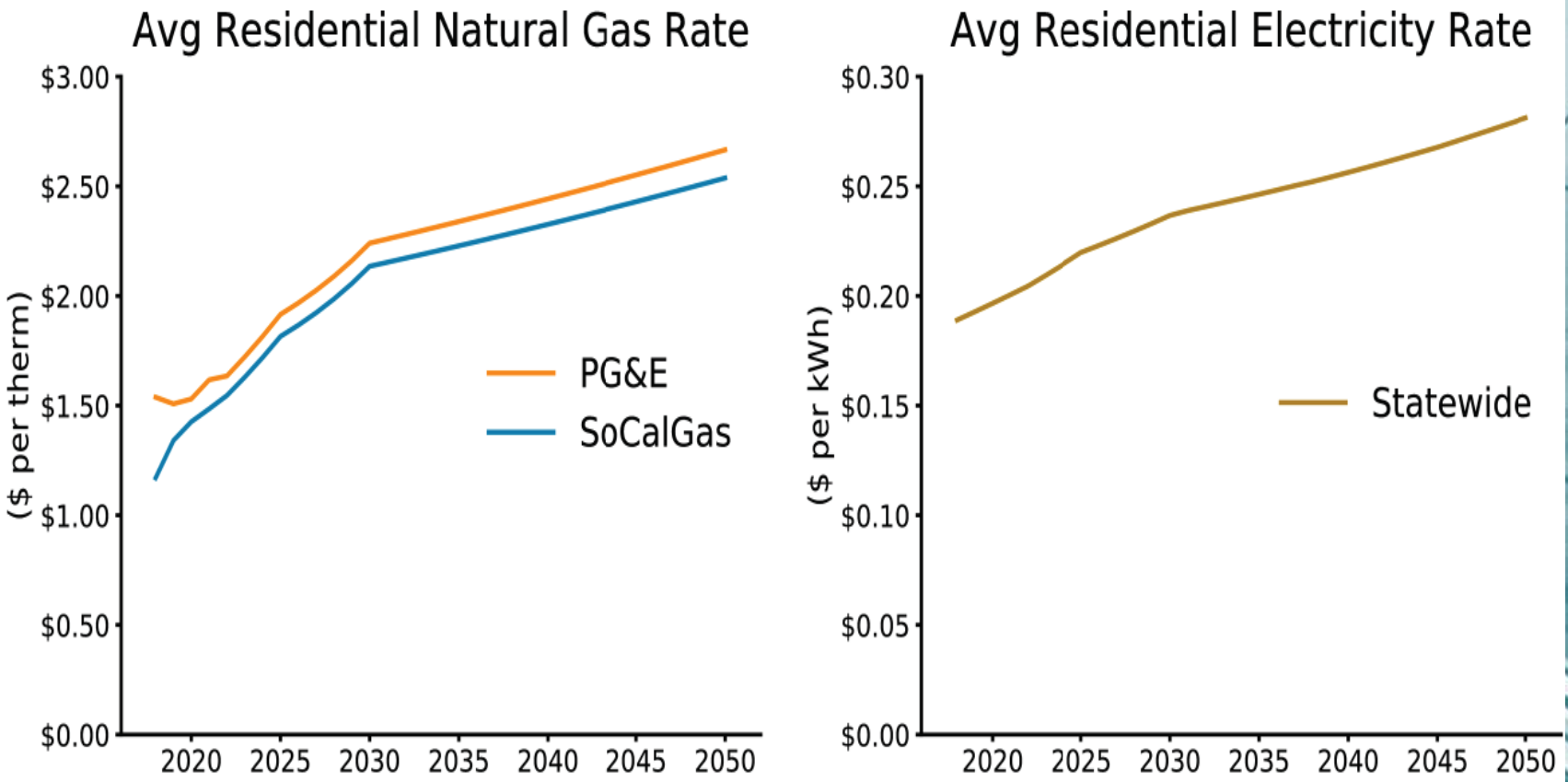
- The chart at right compares the number of heating degree days over a five-year period in Maryland Cities to the cities studied in the California building electrification study.
- The low number of California heating degree days is and indicator of why supplemental heat was not triggered in the building electrification study.



Cost Effectiveness – Calif Study's Utility Prices Are Not Representative of MD

- Our members pay approximately $0.77 per therm for natural gas and $0.12 per kWh for electricity.
- The California electrification study starts with prices that are far higher and escalates the natural gas prices based on California's carbon price.

Figure 2-10: Residential natural gas and electricity rates, reference scenario (real 2018$)



Rates are averaged over delivered natural gas for core customers and electricity for all end uses.

Cost Effectiveness – HVAC Energy Simulation in Four Climate Zones

- These charts illustrate an energy simulation of five different Carrier commercial HVAC systems in four climate zones
- System #3, the only electric system in the test, records the highest overall costs in three of the four climate zones
- System #3 is the same as system #2 except for the electric reheat coils which result in significantly higher heating costs in the Philadelphia and Chicago simulations and the highest heating costs in all four of the simulations