

The Emerging Technologies Roadmap

CalNEXT Outlook and Building Together

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Agenda

- 1 Emerging Technology Primer

- 2 Emerging Technology in California

- 3 CalNEXT Efforts and Goals

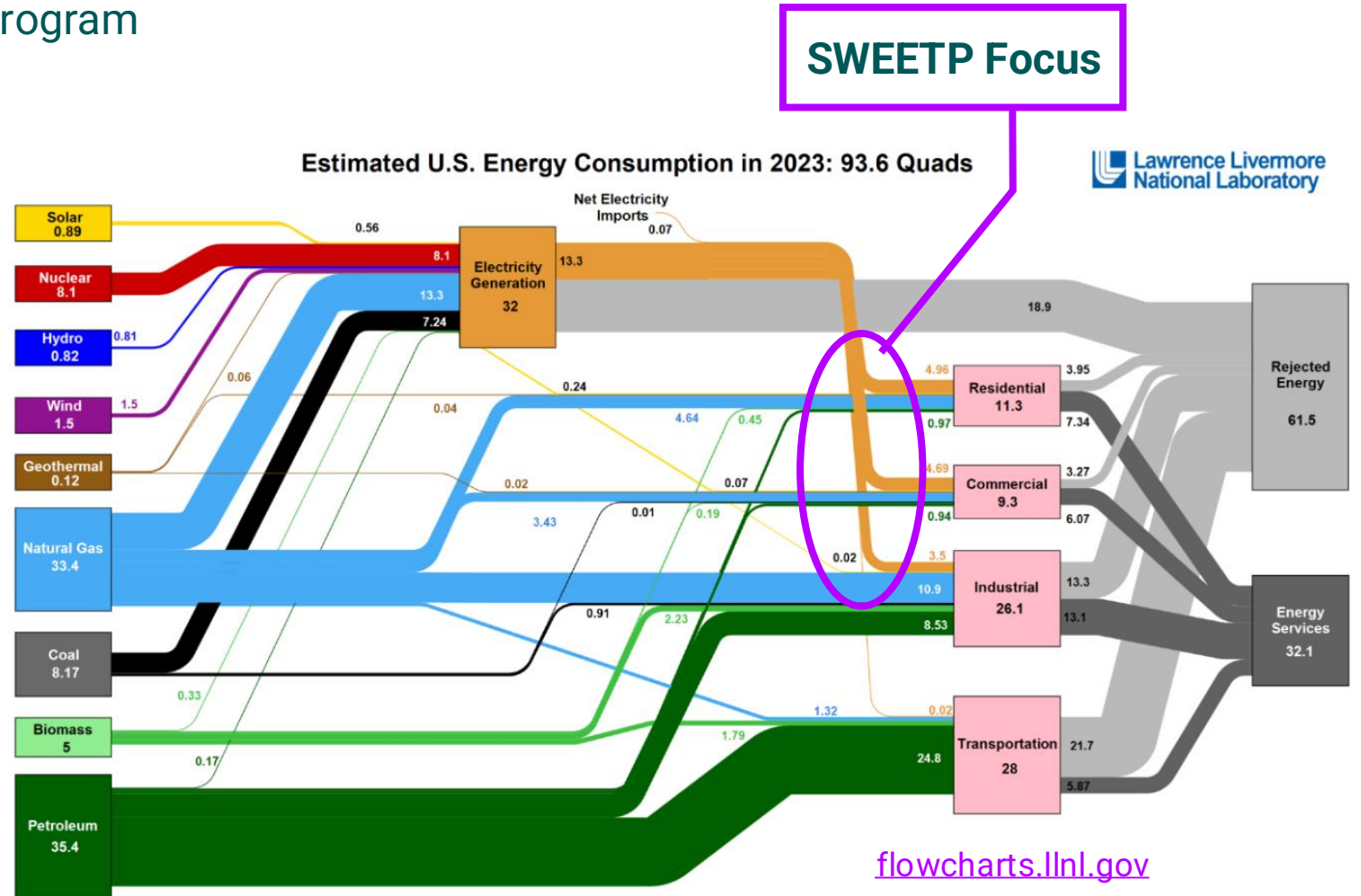
- 4 Workshop Intro

SWEETP

Statewide Electric Emerging Technology Program

SWEETP is focused on technologies that impact IOU EE program portfolios.

Also have interactive effects with DERs, C&Ss, MTIs, and decarbonization goals.



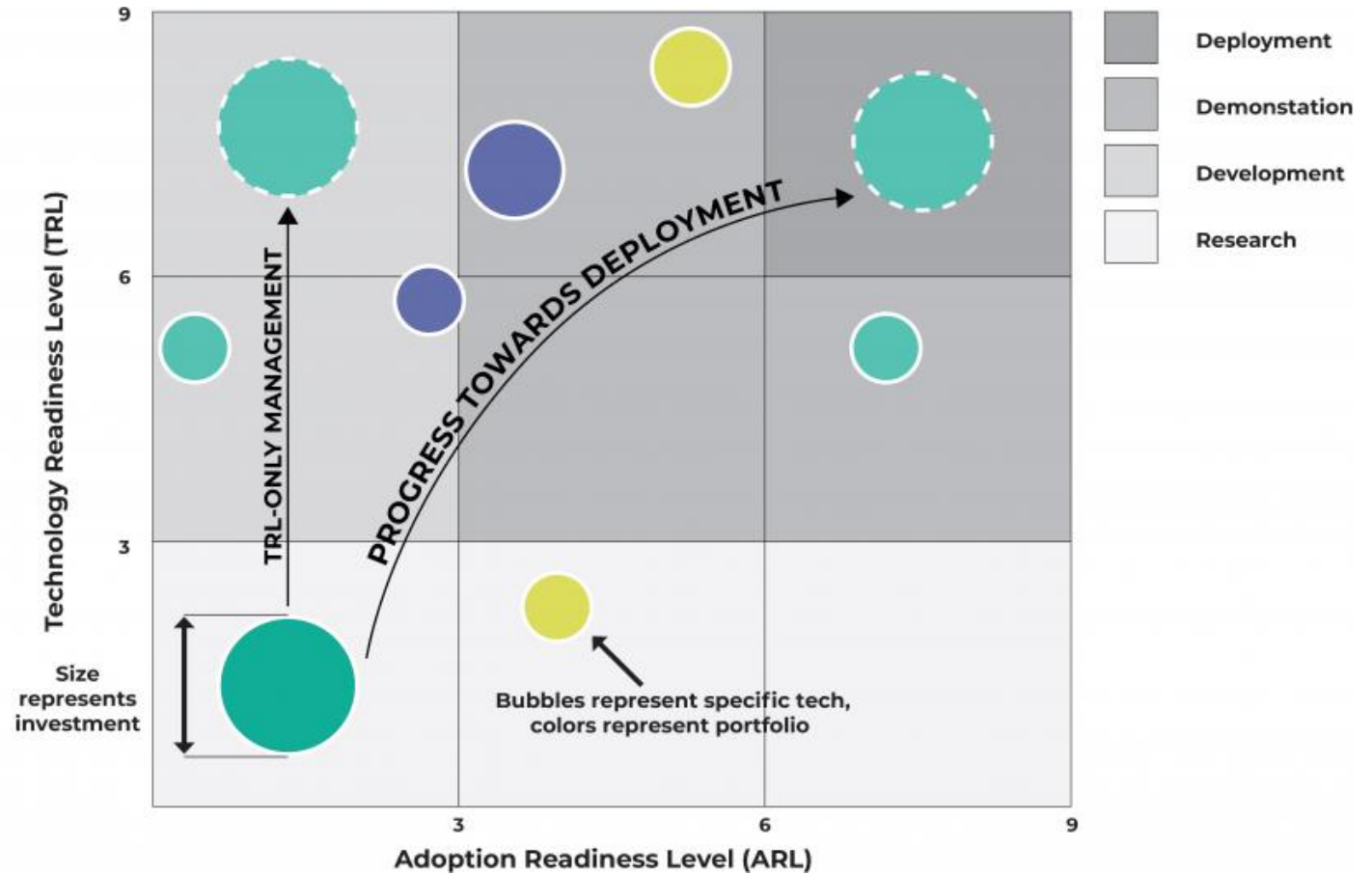
The Many Flavors of Emerging Technology

Emerging Technologies and Readiness Levels

Emerging Technology covers a huge spectrum of ideas and equipment in various stages of development.

Readiness levels have been developed/adopted by numerous organizations and help characterize the status of a technology.

There are different readiness levels that categorize ET with different focuses like: Technology, Adoption, Program



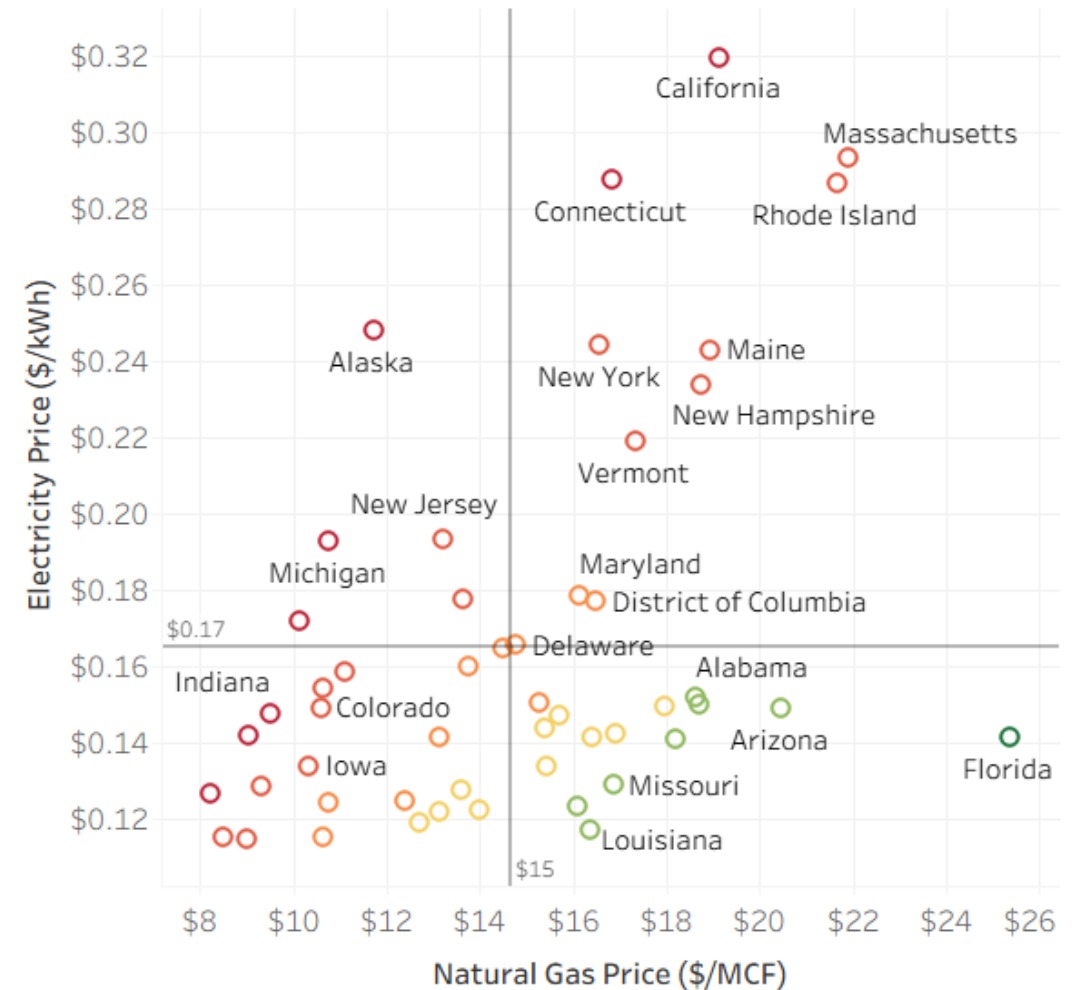
flowcharts.llnl.gov

Electric ET and Electrification

Many technologies in development are focused on electrification. Due to the Spark Ratio, even very efficient heat pumps may cost more to operate than natural gas alternatives. One industry trend increasing affordability is the incorporation of load control and energy storage technologies into efficient electrification options.

Spark Ratio: Refers to the ratio of electricity prices to natural gas prices, a high gap can act as a barrier to electrification and heat pump adoption. A lower gap can make electrification cost effective for end users.

2024 Residential Price Data (EIA)



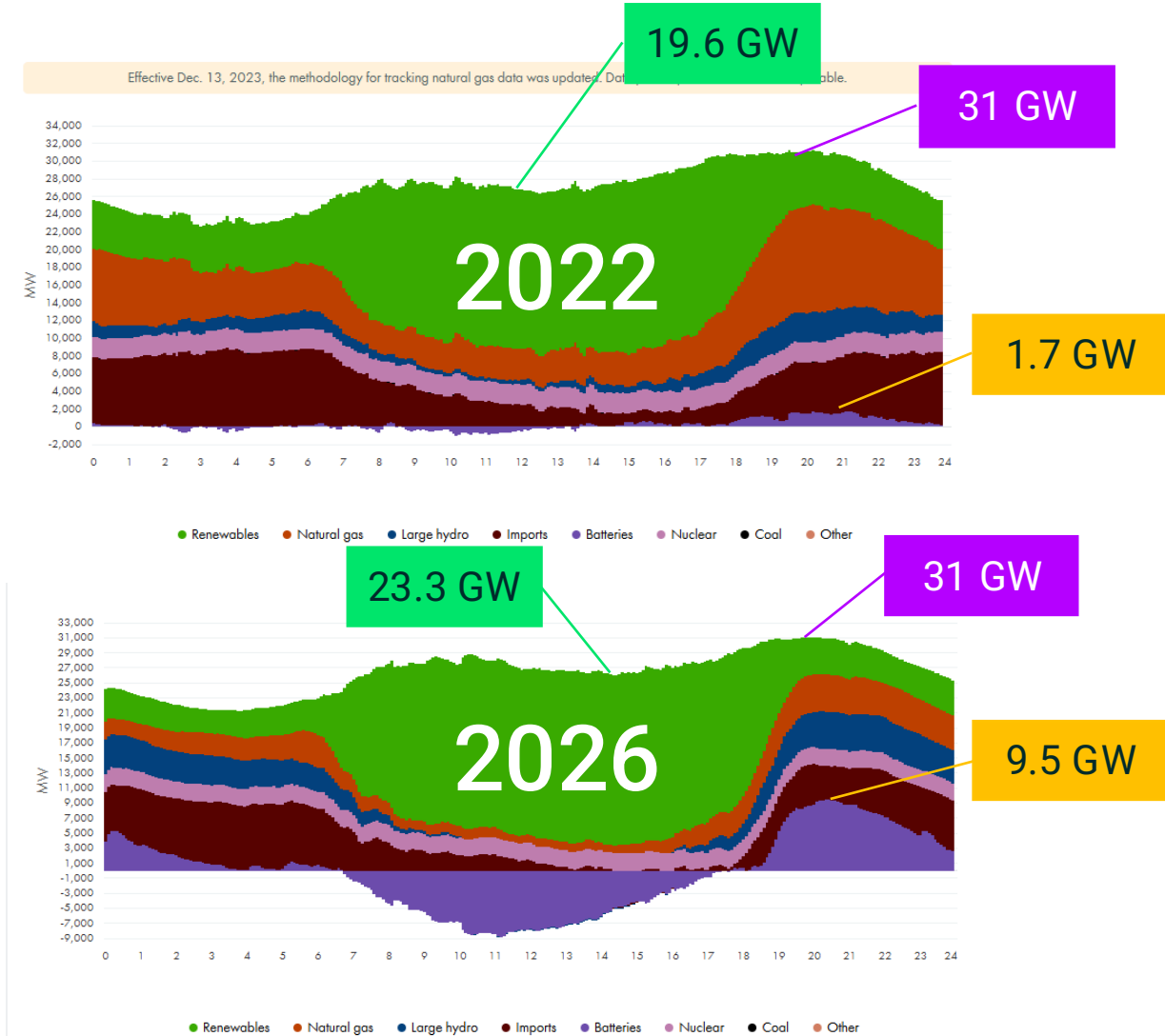
Cal ISO – Supply Trends

Renewables growing quick nearly 20% or 4 GW increase in 4 years.

Peak load on a random day in May about the same as 4 years ago.

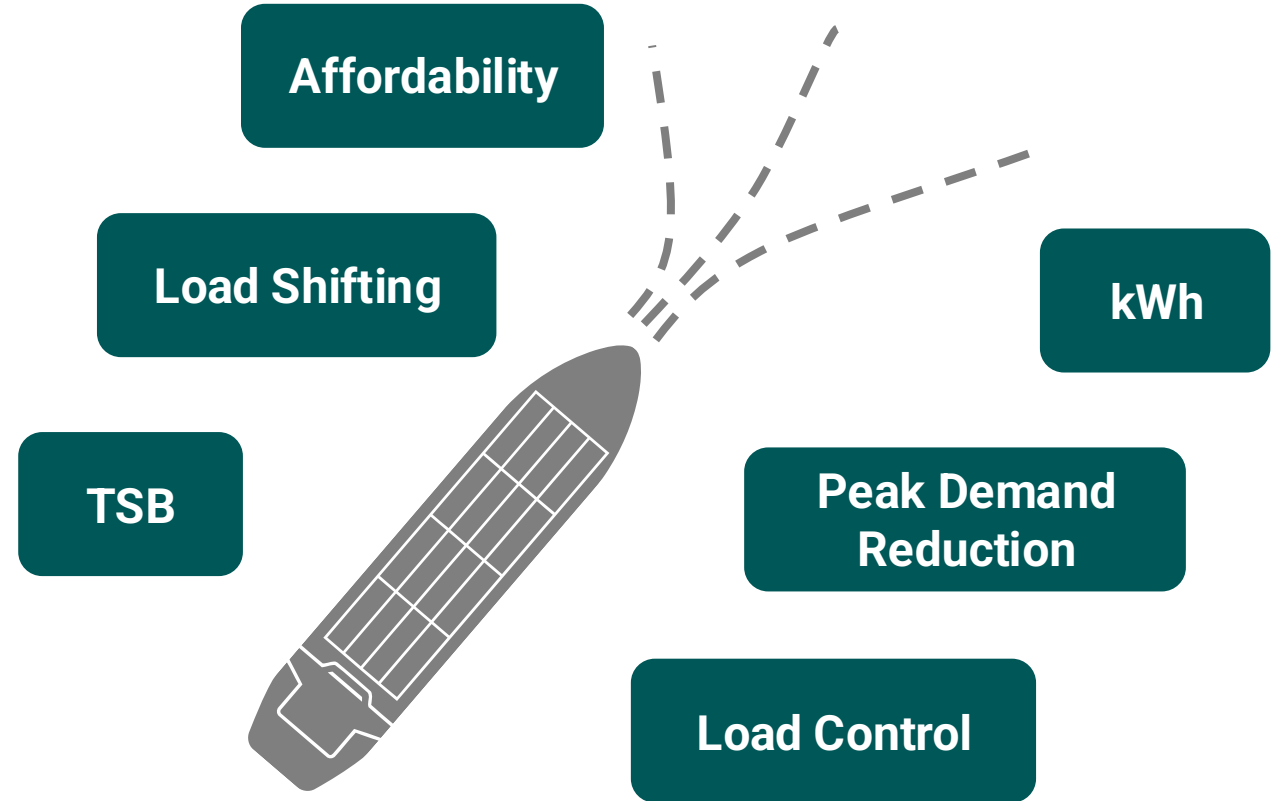
Huge battery storage growth, over 5x growth in 4 years.

Fun Fact: 1.4 TWh of wind and solar curtailed in BOTH April and May.



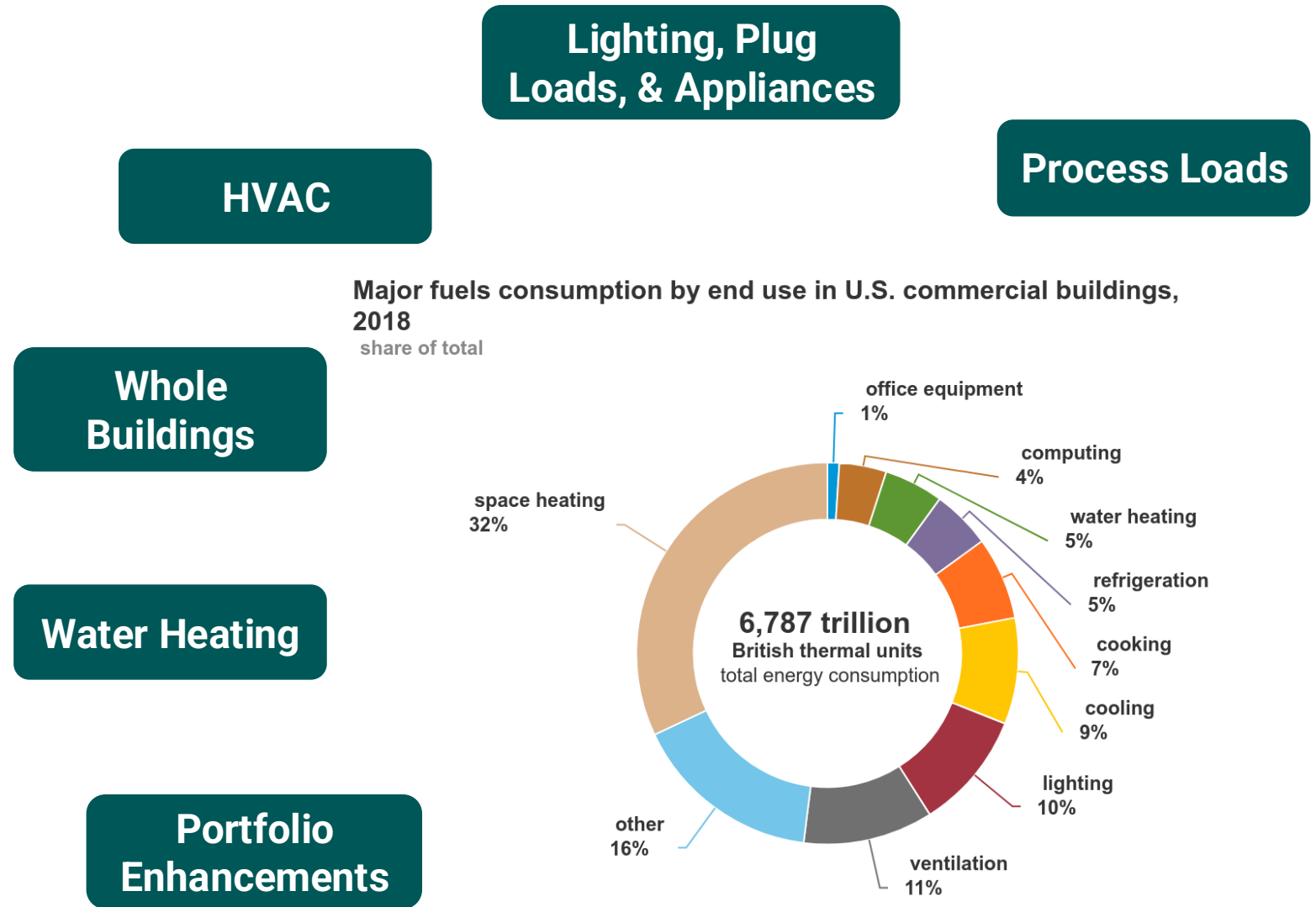
Steering the Ship

CalNEXT is a large program with a lot of momentum. We work with stakeholders to focus in on current needs and future goals. The TPM's research areas and initiatives are evaluated every year to adjust to the changing needs of the EE Portfolio and direction of market trends.



TPM Families

Emerging technology efforts are focused on technology groups and efforts that have the potential to make material impacts to how energy is used today.



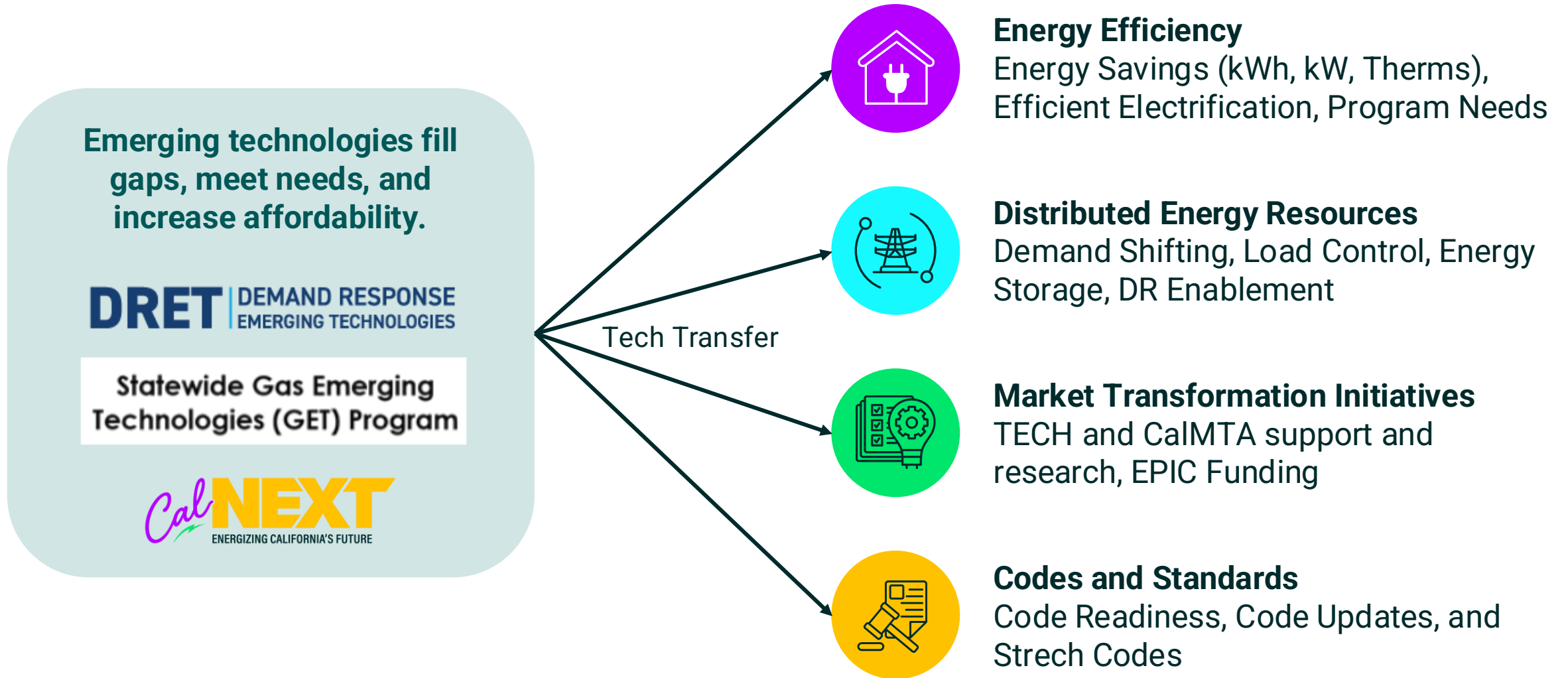
eia Data source: U.S. Energy Information Administration, 2018 Commercial Buildings Energy Consumption Survey, December 2022

Tech Transfer Pathways

- CASE Advocacy and Code Readiness
- Follow-Up Project
- Measure Package Revision, Recommendation, or New Package Development
- Measure Study/Recommendation
- Custom measure development/calculator
- Tool Development
- Project Findings for EE Program Integration



The Emerging Technology Pipeline



Goals



Develop new measures and increase claimable energy savings



Fill measure development gaps



Demonstrate emerging technologies to build market adoption support and verify energy savings potential



Identify and overcome barriers for underperforming technologies



Identify systemic portfolio challenges and test solutions



Support the development of the budding technologies with the potential to make big energy saving impacts

131

Completed
Projects

61

Ongoing
Projects

62

Projects Getting
Started



Thank You!

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Workshop – Building the Emerging Technology Roadmap Together

Bringing together this group's perspectives to brainstorm some significant opportunities for the future of each technology group, while identifying challenges, trends, and potential roadmaps for the future.



Reflection, Brainstorm challenges, Document priority technologies/features, Rank the top 5, Pick your favorite and next steps



We will be keeping time and announcing the time and there are moderators for each group

Technology Groups



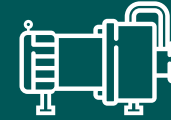
HVAC

- Room Heat Pumps
- Commercial Air2Air HPs
- Decarb of Complex HVAC
- Commercial QI and QM
- Comm Hydronic HPs
- Resy Multifunction HPs



Water Heating

- Single-Family Systems
- Comm DHW Sys Design
- Resy Multifunction HPs
- Comm Multifunction HPs



Process Loads

- Controlled Environment Hort
- Comm Kitchen Decarb
- Data Centers
- Comm Refrigeration
- Advanced Motors
- Pumping Systems



Lighting, Plug Loads & Appliances

- EV Supply Equipment
- Decarbonizing Appliances
- Adv. Exterior Lighting
- Medical Equipment
- Lighting Controls



Whole Buildings

- Integrated Systems
- Operational Performance
- Envelope
- Electrical Infrastructure
- Community Scale Strategies



Portfolio Enhancements

- DAC and HTR Needs
- Policies for EE Success
- TOU & Value of Load Flex
- Embodied Carbon
- Electrification and Fuel Sub