Whole Buildings

Technology Families

- Whole buildings (residential)
- Whole buildings (non-residential)
- Distributed energy resources to reduce greenhouse gas emissions

Technology Area

In California, legislative initiatives including AB 802 and SB 350 along with residential and commercial ZNE mandates and decarbonization goals are some of the largest drivers of energy efficiency. The continued proliferation of energy storage and other distributed energy resources (DERs), and emergence of building demand flexibility as an important design attribute, are major supporting elements of these initiatives. Maintaining building performance and integrating systems to achieve ongoing energy management information systems.

Unique Opportunities and Barriers

Integration of energy efficiency and DERs in buildings supports the clean energy economy of the future and allows for greater customer choice. ETP is working on integration of whole building solutions by coordinating research and implementation activities with stakeholders and demonstrating those strategies and solutions.

Highlighted Priority Areas

Tech Family	*Tech Subgroups*	*Definition*	*Priority*
Whole buildings (residential)	Decarbonization (including efficient electric water and space heating, and induction cooking), Efficient HVAC, High EE performance (including energy modeling), Integrated controls, Enclosures (includes building envelope and fenestration), Combination systems (water heating + space conditioning)	High-performance buildings with holistic designs (including envelope, electrified HVAC and DHW, and lighting), integrated controls (that communicate for demand flexibility and load management), and energy storage, resulting in lower operating cost and a smaller enviornmental footprint.	High
Whole Buildings (non-res)	Decarbonization (including efficient electric water and space heating, and induction cooking where applicable), Efficient HVAC, High EE performance (including energy modeling), Integrated controls, EMIS (Energy Management Information Systems), Enclosures (includes building envelope and fenestration), Managed charging (vehicle to building), DC power systems (opportunistic for lighting, etc), Combination systems (water heating + space conditioning)	High-performance buildings with holistic designs (including envelope, electrified HVAC and DHW, and lighting), integrated controls (that communicate for demand flexibility and load management), EMIS, and energy storage, resulting in lower operating cost and a smaller enviornmental footprint.	High

Whole Buildings at a Glance

Energy Savings Technical Potential
Decarbonization Potential
Codes & Standards Alignment
Demand Flexibility Potential

Technology Family	Technology Subgroups	Definition	ETP Role	ETP Priority	Technical Performance KI	Market Knowledge Index (KI)	Program Intervention KI
Whole buildings (residential)	Decarbonization (including efficient electric water and space heating, and induction cooking), Efficient HVAC, High EE performance (including energy modeling), Integrated controls, Enclosures (includes building envelope and fenestration), Combination systems (water heating + space conditioning)	High-performance buildings with holistic designs (including envelope, electrified HVAC and DHW, and lighting), integrated controls (that communicate for demand flexibility and load management), and energy storage, resulting in lower operating cost and a smaller enviornmental footprint.	**1-Lead**	1-High	2-Medium	3-Low	3-Low
Whole buildings (non-residential)	Decarbonization (including efficient electric water and space heating, and induction cooking where applicable), Efficient HVAC, High EE performance (including energy modeling), Integrated controls, EMIS (Energy Management Information Systems), Enclosures (includes building envelope and fenestration), Managed charging (vehicle to building), DC power systems (opportunistic for	High-performance buildings with holistic designs (including envelope, electrified HVAC and DHW, and lighting), integrated controls (that communicate for demand flexibility and load management), EMIS, and energy storage, resulting in lower operating cost and a smaller enviornmental footprint.	**1-Lead**	1-High	2-Medium	3-Low	3-Low
Distributed energy resources to reduce GHGs	PV and storage integration, DC controls, AC/DC networks, Microgrid for resiliency value, Interoperability, integration with building systems	Reduce conversion losses of AC>DC (grid sourced) or DC>AC>DC losses (on-site PV generation). Aim for flexibility to address high GHG intensity. Shifting load to manage energy efficiency. Examples include ways to operate storage and PV together; interoperability (e.g., software platforms and specifications).	**1-Lead**	2-Medium	3-Low	3-Low	3-Low