

Process Loads

(Commercial, Industrial, Agriculture and Water)

Technology Families

- Food service equipment
- Food processing
- Refrigeration (industrial)
- Refrigeration (commercial)
- Data rooms and data closets
- Laboratories
- Supermarket systems
- Pools (non-residential)
- Transport refrigeration units
- Off-road fleet charging
- Hospitals
- Agricultural water conveyance
- Wastewater treatment and water treatment
- Water use controls
- Industrial water process management

Technology Area

Process Loads is a broad sector. Advanced controls, variable speed compressors and fans, and hybrid condensing units provide flexibility and load management opportunities that have not previously been available. Employing sensors to gather data and leveraging existing data collection sources with advanced data analytics will provide cost-effective opportunities for efficiency improvements in wastewater and water treatment, water delivery, and water use processes. New applications of heat recovery technologies in the food processing industry have the potential to reduce energy and water consumption.

Unique Opportunities and Barriers

The Statewide ETP is pioneering research in low-GWP refrigerants by working with local refrigerant startups and expert groups and undertaking pilots. There is a significant opportunity for more widespread transfer of technologies that had previously only been available within a narrower subset of commercial applications. Agricultural, water and wastewater systems and equipment are geographically remote, making sensor data collection historically difficult and costly to employ. Advances in communication technologies have lowered these barriers, resulting in new operational data that has yet to be fully exploited for system efficiency opportunities. Industrial process systems are designed to have long lifetimes, making equipment replacement with new, higher efficiency equipment difficult. Equipment demonstrations and pilot projects will be needed to convince industry decision makers to adopt new, unproven technologies over incumbent and proven technologies.

Highlighted Priority Areas

<i>Tech Family</i>	<i>Tech Subgroups</i>	<i>Definition</i>	<i>Priority</i>
Refrigeration (commercial)	Self contained; central systems, walk-ins	Food storage, low and medium temperature. Commercial and institutional food preparation.	Medium
Supermarket Systems	Central refrigeration rack systems, etc.	Includes heat recovery, closed loop cooling, controls	Medium

Process Loads at a Glance

			Energy Savings Technical Potential				Decarbonization Potential			Codes & Standards Alignment		Demand Flexibility Potential		Technical Performance KI	Market Knowledge Index (KI)	Program Intervention KI
Technology Family	Technology Subgroups	Definition	ETP Role	ETP Priority												
Food service equipment	Food preparation (cooking, baking, product storage, etc.); Water heating/dish washing; Food service-specific refrigeration	Equipment typical of commercial and institutional restaurant facilities, including fast food, sit down, hospitality, and	2-Collaborate	2-Medium										1-High	2-Medium	2-Medium
Food processing	Roasting, washing, dehumidifier, process cooling and process heating systems, etc.	Equipment used to transform agricultural products into food, or of one form of food into other foods.	2-Collaborate	3-Low										2-Medium	3-Low	3-Low
Refrigeration (industrial)	Walk-ins; Warehouses	Food storage, low and medium temperature, for industrial applications	2-Collaborate	3-Low										2-Medium	2-Medium	3-Low
Refrigeration (commercial)	Self contained; central systems, walk-ins	Food storage, low and medium temperature. Commercial and institutional food preparation.	1-Lead	2-Medium										2-Medium	1-High	2-Medium
Data rooms and data closets	Data rooms and data closets	Server rooms embedded in smaller facilities who serve a specific, narrow need for a single business.	2-Collaborate	3-Low										2-Medium	2-Medium	3-Low
Laboratories	Fume hoods; ultra low temp freezers, medium temp freezers, refrigerators, other lab plug load equipment (e.g., mass spectrometers,	Laboratories contained in academic, life science research (LSR), hospital, and non-profit research facilities, and for the	2-Collaborate	3-Low										2-Medium	2-Medium	2-Medium
Supermarket Systems	Central refrigeration rack systems, etc.	Includes heat recovery, closed loop cooling, controls	1-Lead	2-Medium										2-Medium	2-Medium	2-Medium
Pools (non-residential)	Pool pumps, pool heaters	Includes pumping systems and pool heating systems in public and commercial pools	2-Collaborate	2-Medium										2-Medium	2-Medium	2-Medium
Transport refrigeration units	Transport refrigeration units	Transport refrigeration units (TRUs)	2-Collaborate	2-Medium										2-Medium	3-Low	3-Low
Off-road fleet charging	Fork lifts, golf carts, ground support equipment	Work to maximize charging for fleet vehicles to minimize GHG impacts.	2-Collaborate	2-Medium										2-Medium	3-Low	3-Low
Hospitals	HVAC systems providing a large amount of reheat, MRI machines and other imaging equipment, sterilizers, autoclaves	Hospitals provide multiple uses in one: hotel, clean room, commissary, office, and laboratory. Warm water return heat	2-Collaborate	3-Low										1-High	1-High	3-Low
Agricultural water conveyance	Irrigation and delivery, pump system optimization, water reuse, leak reduction.	Applying automated communication systems, scheduling, sensors, and other telemetric systems. Applying VFDs and	2-Collaborate	3-Low										1-High	2-Medium	2-Medium
Wastewater treatment and water treatment	Oxygen process optimization, water treatment facility design, reverse osmosis	Achieving energy efficiency through enhanced reuse, water pressure monitoring and management. Precise	2-Collaborate	2-Medium										2-Medium	2-Medium	3-Low
Water use controls	Pressure management controls, pump system optimization, data analytics for water/energy (e.g., AMI/AMR), for efficiency and demand	Better use of data to optimize pumping energy use, better manage pressure in the system, and minimize water loss.	2-Collaborate	3-Low										2-Medium	2-Medium	3-Low
Industrial water process management	Process water reuse and heat recovery, process heating (e.g., low temp steam generation), cooling tower water, chemical	Localized waste water treatment for on-site reuse for consumption, washing, irrigation, etc.; Cooling tower water	2-Collaborate	3-Low										2-Medium	3-Low	3-Low