

Technology Priorities for CalNEXT

July 26, 2022

Agenda

- 1 Introduction to CalNEXT
- 2 Understanding TPMs
- 3 Understanding Projects
- 4 Feedback/Q&A



Introduction to CalNEXT

Presenters



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About CalNEXT

CalNEXT's vision is to identify emerging technology trends and bring commercially available technologies to the energy efficiency program portfolio.



Program Objectives

-  **Communicate** program priorities to stakeholder community.
-  **Scan, Prioritize, Evaluate** commercially available, emerging, or underutilized technologies and their applications to support increased adoption in the IOU EE portfolios.
-  **Broadcast** results to inform stakeholders, support technology transfer, and advance industry understanding to support large-scale commercial adoption.
-  **Advance** California's decarbonization, equity, and grid priorities by incorporating them into research priorities.
-  **Execute** emerging technology research projects that support the IOU energy efficiency portfolios.

IOU Portfolios

Workpaper
Development

Program Integration

C&S Readiness

Market
Transformation

Understanding TPMs



What are Technology Priority Maps?



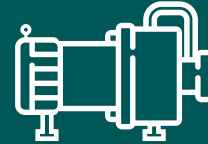
Appliances &
Plug Loads



HVAC



Lighting



Process
Loads

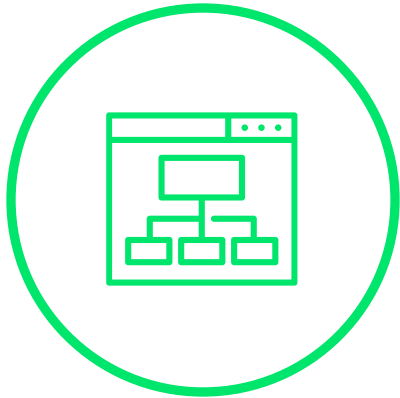


Water
Heating



Whole
Buildings

What are the TPMs?



High-Level Framework

Explains the CalNEXT program priorities with annual updates, sorted into six technology categories



External Communications Tool

Defines what CalNEXT research topics we want to fund.



Internal Tool for Screening

25% of score is based on alignment with TPMs

How are TPMs structured?



Organized into Six Technology Categories

- TPMs are organized into broad “Technology Categories” such as HVAC and water heating and then further organized into “Technology Families”



Highlights Program Priorities

- The TPMs highlight our priorities at the “Technology Family” level which indicate the broad types of projects we want to see.
- TPMs also communicate the Role (Observer, Collaborator, or Leader) that we will play.



TPMs as a living document

- The most recent TPMs were published in 2020. Going forward , new TPMs will be updated every year to reflect changes in policy, market, and technology

Poll #1

Who is joining us today?

Please respond to the Zoom poll

Current TPMs (2020)

Current TPMs were developed in 2020 under the previous iteration of the electric ET program. While they are still active for CalNEXT, they may seem out of date in this rapidly evolving field.

While we are updating all TPMs by the end of this year, we will continue utilizing the existing TPMs to evaluate ideas & project submittals.

Technology Priority Maps

About the Technology Priority Maps

The primary goal of the Technology Priority Maps (TPMs) is to provide a framework to help California's Emerging Technologies Program (ETP) identify high priority areas and reduce duplication of effort across utility service areas. They capture the emerging technology needs of the Rolling Portfolio and help drive project ideation for ETP implementers who will seek to identify, evaluate, and recommend a comprehensive set of suitable technology options for consideration by resource program designers and implementers.

The TPMs are living documents to allow responsiveness to changing technology, regulatory, and energy landscapes. They can assist communication with resource program designers, Commission staff, and the emerging technologies community. They will be reviewed periodically and updated in order to stay current with technological advances and accommodate changes in priorities or newly defined needs, such as shifts in the marketplace or evolving state policies. The TPMs are an important tool for Program Administrators' quality assurance needs but are not prescriptive, and are not research plans, checklists, nor the only sources for ETP ideas.

TPM Summary

This section describes the TPM structure and a description of areas of focus for the Emerging Technologies Program. It identifies linkages with codes and standards, demand flexibility, and non-energy decarbonization opportunities, and helps practitioners identify areas of overlap within the ETP. There is a TPM for each of the following **six Technology Categories**:

1. Heating Ventilation and Air Conditioning
2. Plug Loads and Appliances
3. Process Loads (Commercial, Industrial, Agriculture and Water)
4. Lighting
5. Water Heating
6. Whole Buildings

Each Technology Category contains multiple Technology Families with Subgroups.

- **41 Technology Families** include technology types (transportation refrigeration units), sectors with unique needs (water treatment), or broad categories (commercial water heating). Integrated controls are important in almost all Technologies Families.
- **Over 200 Technology Subgroups** describe types of equipment within a Technology Family (e.g., "Sterilizers" are a Subgroup within "hospitals" Technology Family).
- Two approaches were used to address technologies that crossover between Categories. Technologies that require integration (for example, combination systems that integrate water heating and space conditioning) are included in the Whole Buildings Category. Alternatively, controls and pump systems are repeated in multiple Technology Families - for example, efficient pump systems are a part of water use control systems, pool systems, variable refrigerant flow HVAC systems and more. Because these pump systems are a part of the technology itself, they are included in each relevant Subgroup.

This TPM summary is followed by Technology Category Pages that contain more detail about unique ETP opportunities and barriers and related utility priorities.

HVAC TPM (2020)

Our program has had strong interest in research related to variable speed heat pump systems.

HVAC

Technology Families

- Decoupled HVAC systems
- Variable capacity systems (commercial)
- Variable capacity systems (residential)
- Automated fault detection and diagnostics
- Air-to-water heat pumps for space heating and cooling
- Non-compressor-based HVAC
- Low-GWP refrigerants in HVAC
- HVAC controls

Technology Area

Decoupled ventilation and heating/cooling systems incorporating low energy technologies with advanced design and controls features—including heat recovery ventilators, variable refrigerant flow systems, chilled beams, and radiant systems—are leading the movement for greater efficiency gains. Advanced controls, system integration, and fault detection are gaining importance in advancing building energy efficiency and occupant comfort. Non-compressor and variable capacity compressor technologies, and sustainable refrigerants are also emerging areas of interest.

Unique Opportunities and Barriers

The emphasis on low-energy systems and decarbonization has the potential to lower energy use, while utilizing refrigerants that have low global warming potential or avoiding refrigerants altogether. Adopting cost-effective, climate-appropriate technologies for the hot, dry service territory of Southern California is important.

Highlighted Priority Areas

Tech Family	Tech Subgroups	Definition	Priority
Variable Speed Compressor Systems (commercial)	Variable refrigerant flow (VRF); Variable speed RTU's, chillers, water-source heat pumps, and PTACS.	A reversible heat pump or cooling-only system that uses a variable-speed compressor to modulate refrigerant flow to optimize energy consumption. VRF, PTAC, and WSHP are almost always reversible heat pumps, RTUs and chillers are nearly always cooling-only, but are available in reversible models.	High
Variable Speed Compressor Systems (residential)	Mini- and multi-split systems (non-ducted & ducted) and traditional central split systems; usually air source but can be water-source or geothermal	A reversible heat pump or cooling-only system that uses a variable-speed compressor to modulate refrigerant flow to optimize energy consumption. Mini- and multi-splits sold in the USA are nearly all reversible heat pumps. Traditional splits are available in both configurations.	High
HVAC Controls	Building Automation System/Energy Management Information System (commercial); communicating thermostat (residential)	Controls, monitors, and manages the building's HVAC energy use and component functionality. Allows interaction of devices, systems, controls, automated response to predetermined settings. Understands the operation of building systems to improve performance.	High

HVAC TPM (2020)

Technology Family	Technology Subgroups	ETP Role	ETP Priority
Variable speed compressor systems (commercial)	Variable refrigerant flow (VRF); Variable speed RTU's, chillers, water-source heat pumps, and Package Terminal Air Conditioner Systems (PTACS).	1-Lead	1-High
Variable speed compressor systems (residential)	Mini- and multi-split systems (non-ducted & ducted) and traditional central split systems; usually air source but can be water-source or geothermal	1-Lead	1-High
HVAC controls	Building Automation System/Energy Management Information System (commercial); communicating thermostat (residential)	1-Lead	1-High
Decoupled HVAC systems	Decoupled HVAC systems (e.g. HRV/DOAS + chilled beams, radiant, fan coils, or VRF); Advanced HRV controls: modulating heat recovery bypass control and IAQ sensors for DCV; Advanced HRV design: counterflow heat exchanger	1-Lead	2-Medium
Air-to-water heat pumps for space heating and cooling	Air-to-water heat pumps for space heating; air-to-water reversible heat pumps for space heating and cooling.	1-Lead	2-Medium
Low-GWP refrigerants in HVAC	Low global warming potential (GWP) refrigerants, applies to room AC and dehumidifiers, packaged systms, VRF, etc.	1-Lead	2-Medium
Automated fault detection and diagnostics	Small/Medium Commercial Buildings - FDD reporting format; Large Commercial Buildings - FDD reporting format; Residential Buildings - FDD reporting format; Small/Medium Commercial Buildings - HVAC equipment (natural gas furnaces, small boilers, fans, etc.); Large	2-Collaborate	2-Medium
Non-compressor based HVAC	Sub wet-bulb systems, High-performance evaporative systems, Natural ventilation systems, Radiant systems, Solid state (thermoelectric, magnetocaloric), Systems designed for compressorless heating/cooling (passive, ambient loops, etc.)	2-Collaborate	2-Medium

By the numbers:

- 8 Technology Families
- 3 are identified as 'High Priority'
- 6 have identified ETP in a 'Lead' role

Water Heating TPM (2020)

Our program has had strong interest in heat pump water heaters and will continue to do so.

Water Heating

Technology Families

- Residential
- Commercial and large multi-family

Technology Area

Water heating electrification using heat pump water heater (HPWH) technologies represents one of the major strategies to achieve deep greenhouse gas emission reductions from buildings. Driven by this strategic goal, there are active research and development efforts underway to advance HPWH equipment, grid-interactive load control technologies, and system integration solutions.

Unique Opportunities and Barriers

Wide adoption of HPWHs in existing single-family homes requires 110V-based models to avoid expansive electric system upgrade. Supporting market development and adoption for retrofit-ready HPWHs (e.g., 110V) presents an ETP opportunity. Central HPWH systems applications require design solutions and guidelines supported by extensive field installation examples. HPWH load controls for single family homes require enhanced field validation. Central HPWH load control solutions are yet to be developed and demonstrated. Most HPWHs use high-GWP refrigerants and availability of products based on low-GWP refrigerants needs to be improved.

Highlighted Priority Areas

Tech Family	Tech Subgroups	Definition	Priority
Residential	High-performance packaged heat pump water heaters and load control technologies for single family and individual multi-family dwelling units.	Electrify water heating by using high-performance HPWHs with low GWP refrigerants; achieve load flexibility to further reduce building GHG emissions and support grid operation.	High
Commercial and large multi-family	Central heat pump water heater systems and load control technologies for multifamily, hotel/motel, and commercial buildings.	Electrify water heating by using high-performance HPWH equipment and central HPWH system designs; achieve load flexibility to further reduce building GHG emissions and support grid operation.	High

Water Heating TPM (2020)

Technology Family	Technology Subgroups	ETP Role	ETP Priority
Residential	High-performance packaged heat pump water heaters and load control technologies for single family and individual multi-family dwelling units.	1-Lead	1-High
Commercial and large multi-family	Central heat pump water heater systems and load control technologies for multifamily, hotel/motel, and commercial buildings.	1-Lead	1-High

By the numbers:

- 2 Technology Families
- 2 have identified us in a 'Lead' role
- 2 have identified as high priority

Whole Buildings TPM (2020)

Research interests on whole buildings has been strongly driven by statewide policies focused on Zero-Net-Energy Buildings.

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 environmental 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 environmental footprint.	High

Whole Buildings TPM (2020)

Technology Family	Technology Subgroups	ETP Role	ETP 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)	1-Lead	1-High
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 lighting, etc), Combination systems (water heating + space conditioning)	1-Lead	1-High
Distributed energy resources to reduce GHGs	PV and storage integration, DC controls, AC/DC networks, Microgrid for resiliency value, Interoperability, integration with building systems	1-Lead	2-Medium

By the numbers:

- 3 Technology Families
- 3 have identified us in a 'Lead' role
- 2 have identified as high priority

Poll #2

What technology area are you most interested in?

Please respond to the Zoom poll

Plug Loads & Appliances TPM (2020)

Our program has indicated EVSE-related research as the highest priority within Plug Loads and Appliances.

Plug Loads and Appliances

Technology Families

- Electric vehicle supply equipment
- White goods
- Home entertainment, networking, office, and security equipment
- Medical equipment (residential and assisted living)
- Medical equipment (health care facilities and clinics)
- Mobile charging devices
- Miscellaneous Plug Load (residential)
- Miscellaneous Plug Load (commercial)

Technology Area

Plug loads and appliances is a broad category that includes electric vehicle supply equipment (EVSE), white good appliances, home entertainment and office equipment, medical equipment, and miscellaneous plug loads.

Unique Opportunities and Barriers

The EVSE end-use category is growing due to increasing electric vehicle adoption and there are a range of energy efficiency and demand flexibility opportunities. Efficiency gains for white good appliances still exist as do increased demand flexibility opportunities. Increasing induction range market acceptance and demand is an important strategy for building decarbonization. Plug loads remain a challenging area because of the large number of diffuse and diverse items that use relatively low amounts of power. Some appliances and electronics with connectivity and advanced intelligence features hold some new promise for both energy efficiency and demand flexibility.

Highlighted Priority Areas

Tech Family	Tech Subgroups	Definition	Priority
Electric vehicle supply equipment	Electric vehicle supply equipment (EVSE)	"EVSE" means the conductors, including the ungrounded, grounded, and equipment grounding conductors, the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatuses installed specifically for the purpose of delivering energy from the premises wiring to the electric vehicle. Charging cords with NEMA 5-15P and NEMA 5-20P attachment plugs are considered electric vehicle supply equipment. Excludes conductors, connectors, and fittings that are part of a vehicle. EVSE products are included with EVs by manufacturers, sold online, and sold through commercial channels.	High

Plug Loads & Appliances TPM (2020)

Technology Family	Technology Subgroups	ETP Role	ETP Priority
Electric vehicle supply equipment	Electric vehicle supply equipment (EVSE)	1-Lead	1-High
White goods	Refrigerator, Washer, Dryer, Dishwasher, induction cook tops, ranges	2-Collaborate	3-Low
Home entertainment, networking, office, and security equipment	Televisions, Automation, security equipment, set-top boxes, home entertainment equipment, gaming consoles and computers, computers and peripherals, home networking equipment	2-Collaborate	3-Low
Medical equipment (residential and assisted living)	Breathing machines, mobility devices	3-Observe	3-Low
Medical equipment (health care facilities and clinics)	Centrifuges, autoclaves, imaging equipment (also included in hospitals family)	3-Observe	3-Low
Mobile charging devices	Laptops, tablets, mobile phones, portable rechargeable batteries, USB outlets, wireless charging devices	3-Observe	3-Low
Miscellaneous Plug Load (residential)	Power tool charging/standby, advanced power strips, Coffee makers, lawn equipment, robotics (e.g., vacuums), residential pool pumps, electric pool heaters, other	3-Observe	3-Low
Miscellaneous Plug Load (commercial)	Commercial networking and computing, advance power strips, Robotics, Mixed reality devices, water coolers, lawn equipment, eMobility stations	3-Observe	3-Low

By the numbers:

- 8 Technology Families
- 1 is Identified as ‘High Priority’
- 1 has identified a ‘Lead’ role

Process Loads TPM (2020)

(Commercial, Industrial, Agriculture, and Water)

Our program has indicated Supermarkets and Commercial Refrigeration research as the highest priority within the Process Loads TPM.

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

Tech Family	Tech Subgroups	Definition	Priority
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 TPM (2020)

(Commercial, Industrial, Agriculture, and Water)

Technology Family	Technology Subgroups	ETP Role	ETP Priority
Refrigeration (commercial)	Self contained; central systems, walk-ins	1-Lead	2-Medium
Supermarket Systems	Central refrigeration rack systems, etc.	1-Lead	2-Medium
Food service equipment	Food preparation (cooking, baking, product storage, etc.); Water heating/dish washing; Food service-specific refrigeration	2-Collaborate	2-Medium
Pools (non-residential)	Pool pumps, pool heaters	2-Collaborate	2-Medium
Transport refrigeration units	Transport refrigeration units	2-Collaborate	2-Medium
Off-road fleet charging	Fork lifts, golf carts, ground support equipment	2-Collaborate	2-Medium
Wastewater treatment and water treatment	Oxygen process optimization, water treatment facility design, reverse osmosis	2-Collaborate	2-Medium
Food processing	Roasting, washing, dehumidifier, process cooling and process heating systems, etc.	2-Collaborate	3-Low
Refrigeration (industrial)	Walk-ins; Warehouses	2-Collaborate	3-Low
Data rooms and data closets	Data rooms and data closets	2-Collaborate	3-Low
Laboratories	Fume hoods; ultra low temp freezers, medium temp freezers, refrigerators, other lab plug load equipment (e.g., mass spectrometers, incubators, etc.), process water heating systems, purified water systems, compressed dry air systems, vacuum systems	2-Collaborate	3-Low
Hospitals	HVAC systems providing a large amount of reheat, MRI machines and other imaging equipment, sterilizers, autoclaves	2-Collaborate	3-Low
Agricultural water conveyance	Irrigation and delivery, pump system optimization, water reuse, leak reduction.	2-Collaborate	3-Low
Water use controls	Pressure management controls, pump system optimization, data analytics for water/energy (e.g., AMI/AMR), for efficiency and demand side management	2-Collaborate	3-Low
Industrial water process management	Process water reuse and heat recovery, process heating (e.g., low temp steam generation), cooling tower water, chemical management	2-Collaborate	3-Low

By the numbers:

- 15 Technology Families
- 2 have identified us in a 'Lead' role
- 0 have identified as high priority

Lighting TPM (2020)

Currently, there are no lighting technology families which we have identified as a lead role.

We are expecting to add Horticultural Lighting in the next update.

Lighting	
Technology Families <ul style="list-style-type: none">Integrated controlsAdvanced lampsCentralized DC power conversion systemsDaylightingSignage	Technology Area <p>LEDs and related controls continue to mature, having demonstrated their ability to achieve high efficacies and connectivity between lighting, window shades, and other building systems. New research into the role lighting plays on physical well-being of occupants may push specifiers to increase total installed lighting power, making continued development in easily installed, programmed, and tested lighting controls imperative to prevent achieved lighting demand reductions from backsliding. OLED hardware remains an immature but advancing technology. LEDs and connected lighting controls continue to draw consumer and operator interest for their non-energy benefits. Signage and indoor agricultural lighting have emerged as practical energy-saving opportunities.</p> Unique Opportunities and Barriers <p>This sector continues to evolve with less utility ET intervention than some other sectors. However, though gains in efficiency and advanced features continue, there has been some backsliding on product quality. ETP will monitor this and intervene as appropriate to ensure maximum efficiency and quality. ETP will conduct this work with partners that include California Lighting Technology Center, other California utilities, and other lighting industry stakeholders and laboratories.</p> Highlighted Priority Areas <p><i>The "Highlighted Priority Area" tables list ETP priority = high or medium and ETP Role = Lead. As described above, none of the Lighting Technology Families meet this requirement.</i></p>

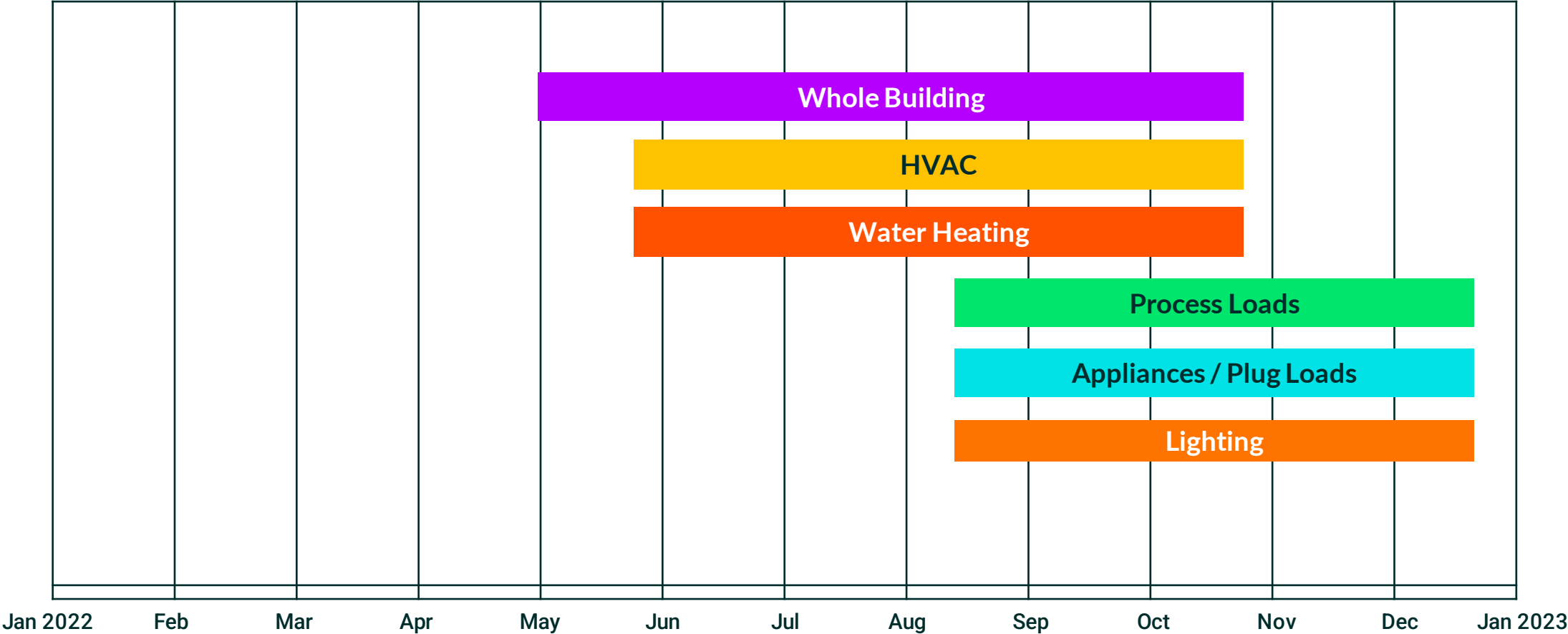
Lighting TPM (2020)

Technology Family	Technology Subgroups	ETP Role	ETP Priority
Integrated controls	Residential indoor/outdoor (home automation), lighting EMS	2-Collaborate	3-Low
Advanced lamps	Residential and commercial indoor/outdoor connected lamps	2-Collaborate	3-Low
Centralized DC power conversion systems	24-48 volt DC internal grid using single transformation to power lighting systems. Higher voltage internal DC grid.	2-Collaborate	3-Low
Daylighting	High performance passive daylighting, active daylighting (e.g., electrochromic), and fenestration accessories	2-Collaborate	3-Low
Signage	Interior and exterior LED/LCD displays	2-Collaborate	3-Low

By the numbers:

- 5 Technology Families
- 0 have identified us in a 'Lead' role
- 0 have identified as high priority

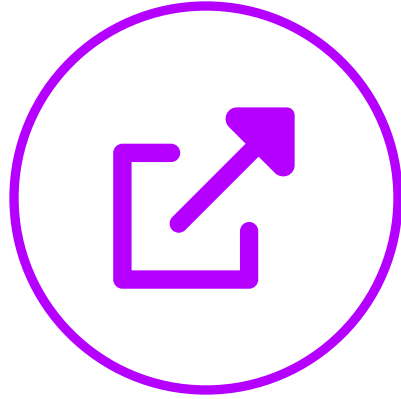
TPM Update Schedule



Understanding Projects

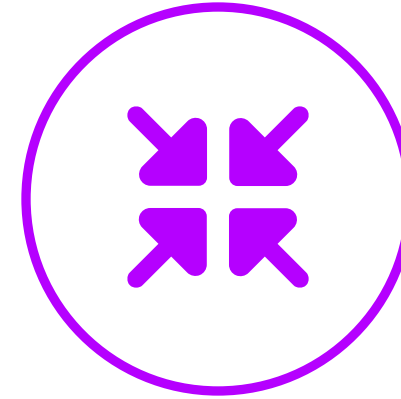


Project Types



Technology Support Research

Projects focused on addressing market barriers or developing the commercial capability of *market-ready technologies*.



Technology Development Research

Projects focused on addressing market barriers or developing the commercial capability of *early-stage technologies*.

Poll #3

**How close is your product to
commercialization?**

Please respond to the poll

Project Submission



Submit an Idea



Submit a Project

Feedback/Q&A



CA Statewide Gas Emerging Technology

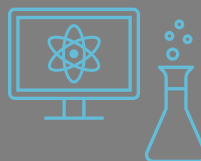
The Statewide Gas Emerging Technologies Program (GET) advances promising as potential measures for future energy-efficient programs. Working with cross functional stakeholders, the GET program sources and screens technologies at a TRL of 4 and higher to gather necessary technical and savings potential data, identify key market barriers to adoption, and develop strategies to overcome these barriers.



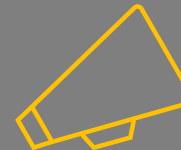
Scanning and
Screening



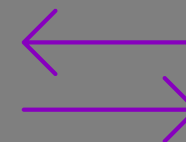
Planning and
Prioritization



Technology
Evaluation



Dissemination



Technology
Transfer

For more info: <https://cagastech.com>



Thank You!

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Cal **NEXT**