Focused Pilot Technology Priority Map

Final Report

ET23SWE0026

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Executive Summary

The TPMs are an important part of the CalNEXT program to help define and communicate priorities that inform project selection. The TPMs were last updated in 2023, and this Final Report documents the methodology used by the CalNEXT program team thus far to develop a Focused Pilot TPM by reviewing the six end-use-oriented 2023 TPMs for potential Focused Pilot technology families and consulting with appropriate stakeholders to map barriers to the technology adoption and portfolio impact and to suggest activities to address those barriers. Intended next steps are included as well before finalizing and distributing the Focused Pilot TPM.

Disclaimer

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Abbreviations and Acronyms

Acronym	Meaning
BPA	Bonneville Power Administration
BUILD	Building Initiative for Low-Emissions Development
CA	California
CalMTA	California Market Transformation Administrator
CalTF	California Technical Forum
CBECS	Commercial Buildings Energy Consumption Survey
CEC	California Energy Commission
CPUC	California Public Utilities Commission
C&S	Codes and Standards
DOE	Department of Energy
DR	Demand Response
ECM	Electronically Commutated Motor
EE	Energy Efficiency
eRTU	Efficient Rooftop Units
ERV	Energy Recovery Ventilator
ESCO	Energy Services Company
ET	Emerging Technology
ETP	Emerging Technology Program
eTRM	Electronic Technical Reference Manual
ETCC	Emerging Technology Coordinating Council
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment

Acronym	Meaning
HP	Heat Pump
HPWH	Heat Pump Water Heater
HRV	Heat Recovery Ventilation
HVAC	Heating Ventilation and Air Conditioning
IEC	International Electrotechnical Commission
IOU	Investor-Owned Utility
M&V	Measurement and Verification
MT	Market Transformation
NEEA	Northwest Energy Efficiency Alliance
NEMA	National Electrical Manufacturers Association
NMEC	Normalized Metered Energy Consumption
OEM	Original Equipment Manufacturer
PA	Program Administrator
PDS	Power Drive System
PG&E	Pacific Gas and Electric
PNNL	Pacific Northwest National Laboratory
POS	Point of Sale
RTUs	Rooftop Units
SCE	Southern California Edison
SDG&E	San Diego Gas and Electric
SEM	Strategic Energy Management
SME	Subject Matter Expert
TAC	Technical Advisory Committee

Acronym	Meaning
TECH	Technology and Equipment for Clean Heating
TPM	Technology Priority Map
TSB	Total System Benefit
V2X	Vehicle-to-Everything
V2G	Vehicle-to-Grid
V2H	Vehicle-to-Home
V1G	Unidirectional Smart Charging
VRF	Variable Refrigerant Flow
VS	Variable Speed
WH	Water Heating

Introduction

The technology priority maps (TPMs) provide the CalNEXT Program a framework to externally communicate the priorities of the program, clearly define the central focus areas of the program, and assist with project screening. TPMs are a tool to document the impact potential, programmatic research needs, and market readiness of all technology families across each of the end-use technology areas. These TPMs which will drive product ideation and inform project selection. This final report covers the development process for the Focused Pilot TPM.

Background

The Statewide Electric Emerging Technology Program (ETP), branded as (CalNEXT,) has established the Focused Pilot project type as a way to focus on high-impact technologies that identify market barriers, conduct pilot tests to address market barriers, collaborate with other programs, and determine whether the technology should be transferred to energy efficiency (EE) resource programs or the market transformation (MT) portfolio. The Focused Pilot TPM is a specialized TPM for specific technologies — single technology family, or subarea(s) within a technology family — that focuses on market barriers and potential activities to address the barriers.

The TPM will support the creation of Focused Pilots, which will address a comprehensive set of barriers associated with a specific technology. During the TPM development process, the Program Team will create Blueprints that map the end-to-end market barriers for each high-potential technology being considered for a Focused Pilot. The Blueprints will suggest cost-effective and scalable approaches for incorporating the Focused Pilot technology into the portfolio. These approaches can include resource acquisition programs, the market transformation framework, Codes and Standards (C&S), other portfolio structures, or a combination of the above. Each Focused Pilot Project will test a hypothesis on how to overcome these documented market barriers for the technology. It will also include metrics to determine whether the hypothesis is valid or should be rejected. Focused Pilots will address true end-to-end market pain points for the technology, and with a holistic view of how each market pain point or barriers can be addressed by building on previously solved pain points.

Objectives

The development of the Focused Pilot TPM will define barriers and potential activities associated with the high-impact and ready-for-deployment technology families that have been identified through the 2023 TPM process. This TPM gives guidance on the development of Focused Pilot Projects in 2024 and beyond. Focused Pilot projects are large, deployment-focused projects aimed at testing new program intervention strategies to overcome key barriers. As with the end-use TPMs, the TPM process here is being used to gather SME input from the partner teams and get feedback on that from the California (CA) EE community—with a particular emphasis on statewide implementation teams. Focused Pilot planning will also include in-depth, primary research activities, supply chain

interviews, and solidification of the Blueprints, based on the TPM, will commence under the Focused Pilot planning.

Methodology

The TPM focuses on technologies that are both high impact and qualify as being ready to be used in a focused pilot project. High impact is defined as having both a "high" rating in the 2023 TPM in any one of the ETP priorities, i.e., energy savings, decarbonization potential. A ready for focused pilot is defined as one that scores a sum of five or less decided by the team of SMEs across the three knowledge index scores (technical performance, market understanding and program intervention).

CalNEXT has established the below process below established and refined during the development of the first six TPMs to engage stakeholders in the Focused Pilot TPM.

1. Energy Solutions and Partners (VEIC, AESC, TRC, UC Davis, and Ortiz Group) - For TPM development, technical SMEs on each of the Focused Pilot technology families among Energy Solutions and our Program Partners, identified in **Error! Reference source not found.**, held SME teams meetings for each high-potential technology family to provide technical and market expertise. Each SME team was responsible for developing the first draft of the TPM for their technology family. These drafts identified market barriers, using leading regional and national technology research, efforts focused on the technology as well as the SME team's insights, and conceptualizing activity ideas on how best to address the identified barriers. Their combined efforts were documented in the Preliminary Findings Report.

2. California Market Transformation Administrator (CalMTA) – A project team for the Focused Pilot TPM consulted with CalMTA to highlight that topics identified in the TPM for inclusion in future activities in the market transformation program. At the beginning of the Focused Pilot TPM development, the Project Team incorporated CalMTA's priority and interest in selecting certain Focused Pilot topic ideas from the eligible technology families under consideration for further development and inclusion in the TPM. The barriers and activities identified by the SME Teams were subsequently presented to CalMTA for additional feedback. This effort was reflected in the Preliminary Findings Report.

3. Southern California Edison (SCE) - Staff reviewed the TPM at the Preliminary Findings Report stage and the Draft Report, providing feedback through edits.

4. California Investor-Owned Utilities (IOU) (SCE, PG&E, SDG&E) Program Administrators (PAs) – The Project Team solicited feedback from multiple California-based IOU in a Focus Pilot TPM Technical Advisory Committee (TAC) meeting. These program administrators represented a broad range of technologies, including EE, C&S, and other ETP (Demand Response (DR) ET, Gas ET, Vehicle-to-Grid (V2G) ET).

The Focused Pilot TAC emphasized the inclusion of statewide implementers and IOU PAs and statewide leads, to allow for addressing delivery barriers in current programs. There was less focus on inviting manufacturers and the supply chain to the TAC, as the knowledge-gathering they could provide was designated for the Focused Pilot development instead of the TPM development stage. The draft Focused Pilot TPM, as documented in the Preliminary Findings Report, was presented to

the TAC to solicit feedback. CA IOU PAs were also given the opportunity to provide feedback on the research priorities identified by the SME Teams. The feedback from the TAC was incorporated into the Focused Pilot TPM and documented in the draft report. The list of TAC invitees as well as the program team's responses to TAC and other stakeholder feedback are included in this document as a reference.

5. Other ET Programs and Other Key Stakeholders – The Focused Pilot TPM covers a collection of diverse, high-potential technology areas, the Focused Pilot TPM lends itself to incorporating stakeholder feedback from both within and outside of the TPM TAC. The TPM TAC consisted of invitees with broad emerging technology (ET) interests, including those from the CA IOU PAs, C&S, and other technology experts with interest across broad technology groups, such as those from the California Energy Commission (CEC), Northwest Energy Efficiency Alliance (NEEA), and Department of Energy (DOE). Other ET experts with specific technology or market assessment expertise in one or more of the Focused Pilot technology families, or in market assessment, such as the new CalMTA, were consulted separately. Both types of stakeholders were identified in the Draft Report.

Upon the approval of the 2023 Focused Pilot TPM Draft Report, the SME team incorporated additional feedback and finalized its assessment of the barriers and activities associated with each Focused Pilot topic idea. The SME team then created an initial Blueprint for each topic idea. The Blueprint maps out the end-to-end relationships between the barriers, the activities, and the outputs from the activities. These Blueprints are included in this final report.

Table 1: SME Roster

Focus Pilot Technology	Organization
Residential-Duty Heat Pump Water Heater (HPWH)	Energy Solutions
Residential-Duty HPWH/Electric Vehicle Supply Equipment (EVSE)/HVAC	Ortiz Group
Residential-Duty HPWH/EVSE/HVAC	Ortiz Group
Residential-Duty HPWH	VEIC
Residential-Duty HPWH	AESC/ASK Energy
Residential-Duty HPWH	U.C. Davis
Residential-Duty HPWH	Energy Solutions
EVSE	Energy Solutions
EVSE	Energy Solutions
EVSE/Advanced Motors	Energy Solutions
EVSE	Energy Solutions
EVSE	U.C. Davis

Focus Pilot Technology	Organization
EVSE	TRC
EVSE	VEIC
EVSE	VEIC
EVSE	AESC/ASK Energy
Advanced Motors	Energy Solutions
Advanced Motors	Energy Solutions
Advanced Motors	Energy Solutions
Advanced Motors	Energy Solutions
Advanced Motors	VEIC
Advanced Motors	U.C. Davis
Advanced Motors	AESC/ASK Energy
High-Efficiency HVAC Heat Pumps (HPs)	Energy Solutions
High-Efficiency HVAC HPs	Energy Solutions
High-Efficiency HVAC HPs	Energy Solutions
High-Efficiency HVAC HPs	Energy Solutions
High-Efficiency HVAC HPs	VEIC
High-Efficiency HVAC HPs	VEIC
High-Efficiency HVAC HPs	AESC/ASK Energy
High-Efficiency HVAC HPs	U.C. Davis
High-Efficiency HVAC HPs	TRC

Draft Report Feedback

Following the submission of the draft report, the CalNEXT program team obtained additional feedback from SCE on February 6, 2024. A summary of each comment can be found in Table 1 with changes incorporated into the resubmitted and approved draft report as well as in this final report. Note that typos and editorial comments are omitted from the table.

In addition, the CalNEXT program team solicited additional feedback from SDG&E's HVAC engineering team, a third-party HVAC program evaluator, and a third-party HVAC program implementer. They also adjusted the approach based on the development of the eRTU advancement plan developed by CalMTA. Together, these led to substantive changes for the two HVAC-focused pilot topics when compared to the barriers and activities identified in the draft report. The substantive change was to expand the original focus on heat recovery only to the broader high-efficiency HP RTU product market. The changes are described in more detail in the "Focused Pilot Topic Background" section of Focused Pilot Topic (1): High Efficiency Rooftop Units.

Table 22: Additional Draft Report Feedback and Resolution

Topic Idea	Barrier/ Activity	Suggestion or Comment	Action Taken & Justification
Light-duty Commercial HPWH	Technology Family	So light-duty commercial HPWH falls under Technology Family: Residential-duty Water Heaters? What type of equipment characteristics makes it fall under Technology Family: Residential-duty Water Heaters? Please elaborate.	A detailed response was provided separately and captured below: The products to be addressed in this focus pilot fall under the TPM's Residential-duty Water Heaters technology family based on a few different attributes. Firstly, why isn't the TPM following existing DOE definitions? Because doing so would create too many distinctions that aren't important differences for electrified water heating, as this DOE explainer shows: *As defined in the Code of Federal Regulations (CFR), storage water heaters heat and store water within the appliance at a thermostatically controlled temperature for delivery on demand, and have an input rating less than 4,000 Btu/h per gallon of stored water. Instantaneous water heaters have an input rating not less than 4,000 Btu/h per gallon of stored water. Hot water supply boilers are packaged boilers that heat potable water for purposes other than space heating. Unfired hot water storage tanks store water that is heated externally .*

Topic Idea	Barrier/ Activity	Suggestion or Comment	Action Taken & Justification
			CalNEXT doesn't want that many technology families. For Electric water heating, a critical distinguishing feature is unitary vs. non-unitary. For our TPM, we are putting unitary products in the Residential-duty family regardless of their commercial/residential categorization by other benchmarks, so they can all be studied together. This Focused Pilot would only study customer segments with lower hot water demands, making them similar in water heating needs to residential uses, as stated in the TPM definition.
Evaluating the Different Customer Value Propositions for V2X Charging Solutions	Barriers	There can be also a barrier related to Homeowners insurance (additional upfront cost for customers). If an EV act as DER in homes the utility may require additional insurance, or the insurance premium may be higher. Not sure if this is adequate but thought I would just I would just throw it out here and see if the SMEs have any feedback.	The SME team determined that this is covered under the "Unclear value prop for customers" barrier since this qualifies as part of the potential "added complexity/cost" of V2X charging solutions.

Technical Advisory Committee Meeting

On December 14, 2023, the Preliminary Findings Report was presented to the Focused Pilot TPM TAC for feedback on the barriers and activities identified for the Focused Pilot topic ideas. This external committee includes the CA IOU PAs as well as stakeholders with ET interests from the State of California, other regions, and those with national interests.

In addition to the feedback collected from the TAC meeting attendance, the Focused Pilot SME team also requested additional feedback from industry experts in a targeted one-on-one manner and their feedback was incorporated into the Draft Report.

TAC and Other Stakeholder Feedback

The TAC meeting allowed advisory members to provide real-time, candid feedback with the opportunity to provide written comments and suggestions afterwards via a collaborative Word document hosted on Microsoft SharePoint. Suggestions were reviewed by the TPM coordinator and incorporated into the Focused Pilot TPM sections in the Draft Report. A detailed table of the changes made was documented in the Stakeholder Feedback and Resolution Matrix in the Draft Report and is reproduced here in Table 2.

Table 33: Stakeholder Feedback & Resolution Matrix

Topic Idea	Barrier/Activity	Suggestion or Comment	Action Taken & Justification
Light-duty Commercial HHPWH	Support for HPWH-conversant contractors serving light commercial customers	Suggest activities to understand the differences between the residential and commercial workforces for HPWH.	Added as detail to the activity.
Light-duty Commercial HPWH	Background	CA should drop JA13 and all other WH controls nomenclature in favor of CTA 2045; CalNEXT should advocate to CEC to require CTA 2045 for all electric WH products in the state.	No action taken. CEC regulations and nomenclature are outside the scope of focused pilot activity.
Light-duty Commercial HPWH	Energy cost of electrifying water heating (WH)	This can be solved with flexible load management and using existing CTA 2045 commands and mixing valves CTA 2045 B.	No action taken. More CA-specific, commercial-specific examples are needed, and, even if controls eliminate all cost concerns, commercial customers are likely to want to see example installations similar to their businesses.
Light-duty Commercial HPWH	Background	Recommend not blurring line by referring to Technology and Equipment for Clean Heating (TECH), Building Initiative for Low-	Recommendation accepted; removed “market transformation and.”

Topic Idea	Barrier/Activity	Suggestion or Comment	Action Taken & Justification
		Emissions Development (BUILD) etc. as “market transformation and incentive programs” when they aren’t formally market transformation (MT).	
Light-duty Commercial HPWH	Tech Family definition	Recommend you provide tank size, voltage range and first hour rating draw patterns and applications.	No action taken at this time.
Light-duty Commercial HPWH	Target Electric Resistance WH customers	Recommend you target the location in the house and geographic locations. as well. Garage, basements, large laundry rooms in almost all CZ's except high Sierras.	No action taken. These recommendations will be kept in mind for possible pilot implementation, but they are different in nature to the type of targeting in the activity.
Accelerate Advanced Motor Adoption in the original equipment manufacturer (OEM) Market	Power distribution characteristics impact equipment design	The PDS characteristics usually vary by tech. Pure synchronous reluctance has typical power factor issues. Switched Reluctance typically have noise and vibration issues. Most advanced motors have better power density and speed capability than their induction counterparts. Frame sizes are typically equal or smaller. Not usually a fit issue. Advanced motors can also often be requested in the larger form factor if needed.	Clarified that while certain PDS characteristics may have issues that impact equipment design, most are perceived issues.
Accelerate Advanced Motor	Motor-drive compatibility issues	Often, motor-drive compatibility is not an	Revised the narrative to

Topic Idea	Barrier/Activity	Suggestion or Comment	Action Taken & Justification
Adoption in the OEM Market		issue. Most advanced motor drive controls are based on typical control methods and fundamental physics principles, like back emf. Key drive manufacturers consider many of their drives to be universal between induction motors and advanced motors.	incorporate this comment.
Accelerate Advanced Motor Adoption in the OEM Market	Equipment OEMs lack established supply chains	Stocking and lead times of advanced motors are very significant and problematic issues.	No action taken to revise the narrative since the comment agrees with the identified barrier. It was noted, however, to potentially prioritize addressing this barrier if the topic idea does move forward to become a Focused Pilot project.
Accelerate Advanced Motor Adoption in the OEM Market	Lack of higher efficiency classifications	The test standard is under current development as the industry / advocacy motor coalition.	No action taken to revise the narrative. This comment is noted for future Focused Pilot projects to keep monitoring the status.
Accelerate Advanced Motor Adoption in the OEM Market	Lack of higher efficiency classifications	There will be a new National Electric Manufacturers Association (NEMA) motors and generators (MG1) standard (currently in the balloting	No action taken to revise the narrative as the standard is not yet publicly available.

Topic Idea	Barrier/Activity	Suggestion or Comment	Action Taken & Justification
		stage) with direct on line super premium efficiency levels IE4.	However, this is noted for future Focused Pilot projects to check on the status and adjust the priority accordingly.
Accelerate Advanced Motor Adoption in the OEM Market	Lack of higher efficiency classifications	This may no longer be the case. International Electrotechnical Commission (IEC) 60034-2-3 provides a means to test an inverter fed bare motor including advanced motors. IEC 61800-9-2 edition 2 provides a means to test a power drive system (PDS). Efficiency categories for variable speed motors are defined in IEC 60034-30-2.	Removed the related description as part of the barrier narratives.
Accelerate Advanced Motor Adoption in the OEM Market	Equipment OEM lowest-cost product positioning	Manufacturers being cost-sensitive is very much the case; it has always been a struggle to get folks to adopt based on lifetime total cost of ownership.	No action taken to revise the narrative since the comment agrees with the identified barrier.
Accelerate Advanced Motor Adoption in the OEM Market	Pilot an upstream EE program	Ideally, the upstream programs should target: • Electronically commutated motor (ECM) and small motors / fractional, like refrigerated cases, walk ins, other small fan drop ins. • Commercial building (e.g. fans and pumping) • Industrial / Heavy industry, with subdomain expertise. [Manufacturing, Chem and Petro, Food	Added language to elaborate on the potential target motor types and applications for the pilot program.

Topic Idea	Barrier/Activity	Suggestion or Comment	Action Taken & Justification
		processing, Pulp and Paper, etc.] • Ag, farm, and irrigation. CA is a high impact market for advanced motor submersible pumping (Grundfos). • Direct with manufacturer arm to provide extra activity in the programs. • Participation with SEM and industrial assessment center folks.	
Accelerate Advanced Motor Adoption in the OEM Market	Pilot an upstream EE program	The efficiency program should encourage / provide stock on hand programs for key advanced motor nominal speeds and power ratings.	Added verbiage to incorporate considerations that would encourage stock on hand.
Accelerate Advanced Motor Adoption in the OEM Market	Highlight system-level tests and demonstrations	This will have very high impact on adoption.	No action taken to revise the narrative as the comment confirms the activity identified.
Accelerate Advanced Motor Adoption in the OEM Market	Develop guides and training programs for equipment OEM	The industry could really use a demonstration library that shows successful application in most end uses with several points for each application.	No action taken to revise the narrative as the comment confirms the activity identified.
Accelerate Advanced Motor Adoption in the OEM Market	Motor OEM salesforce training	This ends up being a big issue. Can be very challenging to order an advanced motor from inside sales / reps / distributors.	No action taken to revise the narrative as the comment confirms the activity is needed to address the corresponding barrier.

Topic Idea	Barrier/Activity	Suggestion or Comment	Action Taken & Justification
Accelerate Advanced Motor Adoption in the OEM Market	Develop new efficiency measures for IE5 motors	Field trials with performance data transparency will have very high impact on adoption.	No action taken to revise the narrative as the comment confirms the activity identified.
Accelerate Advanced Motor Adoption in the OEM Market	Develop new efficiency measures for IE5 motors	Evaluate the cost effectiveness of incremental cost programs for IE5 ferrite products for select applications.	Added the consideration as an element of this activity.
Accelerate Advanced Motor Adoption in the OEM Market	Develop new efficiency measures for IE5 motors	Recommend not blurring line by referring to Technology and Equipment for Clean Heating (TECH), BUILD etc. as “market transformation and incentive programs” when they aren’t formally market transformation (MT).	Added consideration.
Accelerate Advanced Motor Adoption in the OEM Market	Develop new efficiency measures for IE5 motors	Recommend you target the location in the house and geographic locations. as well. Garage, basements, large laundry rooms in almost all crash zone sensor CZ's except high Sierras.	Added consideration.

2023 Focused Pilot TPM

Six focused pilot topic ideas across four technology families are included in the 2023 Focused Pilot TPM. The barriers and activities identified for each of the six topic ideas are detailed in the following sections.

The identified barriers are classified into four high-level categories: technology barriers, market actor barriers, IOU program design barriers, and supply chain barriers. Such categorization helps orient the thinking and development of activities that could address the barriers as well as the expected outputs and outcomes identified in the Blueprints. However, some of the barriers may be cross-cutting and fit into more than one of these high-level categories. In these cases, the barriers are classified under the category that is deemed to be the best fit, but aspects in other relevant categories are still considered in identifying activities, outputs and outcomes for the topic ideas.

Focused Pilot Topic (1): High Efficiency Rooftop Units *(formerly Heat Recovery in RTUs)*

Technology Family: High-Efficiency HPs for Space Heating and Cooling

Heat recovery in rooftop units (RTUs) belongs to the High-Efficiency HPs for Space Heating and Cooling technology family in the HVAC TPM. The definition of that technology family is:

- High-efficiency compressor-based packaged equipment that can provide efficient electric heating (and often cooling). Systems may include high efficiency air-to-air packaged HP units (ducted unitary HPs and ducted or ductless split systems), air-to-water HPs used to replace traditional boiler hydronic systems, or Variable Refrigerant Flow (VRF). "High-efficiency" equipment typically contains variable speed (VS) fans, compressors, and/or pumps. Other pathways to high efficiency include advanced heat exchangers and advanced controls algorithms.

Focused Pilot Topic Background

SMEs identified High-Efficiency HPs for Space Heating and Cooling technology family as being able to address a diversity of needs across multiple markets and timelines. One of the largest opportunities they identified was in improving HVAC rooftop unit performance outcomes, a ubiquitous system in light commercial. Heat recovery is a fuel-neutral EE measure and partial heating electrification measure which saves energy during peak heating and cooling conditions and was an initial focal point for this focused pilot. However, after discussions with additional third-party administrators and evaluators, feedback from the existing CalNEXT RTU focused pilot effort, and the release of the ERTU (Efficient RTU) market transformation initiative (MTIs) advancement plan from CalMTA, the scope was expanded beyond a heat recovery focus to a broader high-efficiency heat pump RTU product market to better align CalNEXT's efforts both internally and externally.

Barriers

Technology Barriers:

- Added complexity to integrate with economizers – Federal standards consider economizers and heat-recovery devices as add-on devices, and, as such, they are not governed by appliance standards. Economizers are extremely common add-on devices to RTUs and are required under the California Energy Code (Title 24, Part 6). In 2022, these requirements expanded to include all commercial systems 33,000 BTU/h or larger (2.75 tons) with a few exceptions. Heat recovery, on the other hand, has limited requirements in the California Energy Code. Integrating heat recovery will require additional complexity to ensure that the system controls allow for an economizer bypass (this can either mean stopping the rotation of the wheel or a bypass damper).

Market Actor Barriers:

- Low/No consumer demand: Low knowledge/low interest from end users on benefits
- Lack of contractor training on true value (industry is responsive to kWh and Therms, not evaluating a total system benefit (TSB))

- No clear definition for “Efficient Rooftop Units”

IOU Program Design Barriers:

- Unclear integration pathway for Heat Pump RTU market
- No active measure package
- Elevated baseline: partially required under Title24 Part 6, Sect 140.4(q)
- Misalignment between total system benefits and bill impacts

Supply Chain Barriers:

- Higher incremental costs
- Low availability/stocking practices
- Exhaust Air Heat Recovery currently sold as separate device, not incorporated within RTUs in California market

Activities

- Define “high efficiency” RTUs and develop product specifications driven toward procurement standards for key early-adopters.
    - Engage existing programs large asset owners (e.g. GSA, DGS, Counties, UC/CSU System) to collectively set product specifications
    - Engage manufacturers with innovation challenge plus financial incentives (e.g. incentives to retool manufacturing lines)
    - Engage distributors with incentives (e.g. bulk purchasing agreements, incentives for changing stocking practices)
    - Engage other regions or EE programs to increase geographic reach and financial resources
- Co-develop (with industry) training materials to educate contractors and specifiers:
    - Develop “high efficiency HP RTU” design tools to communicate economic, energy, and emissions reductions values
    - Case Studies highlighting benefits of high efficiency HP RTU
    - Technical specifications and controls sequences to integrate economizers and heat recovery systems
- Develop new high efficiency HP RTU measure package
- Pilot HRV/ERV for add-on to incentive programs

Initial Blueprint

The initial Blueprint for High-efficiency Rooftop Units is included at the end of this section.

The Blueprint maps out the relationships between the barriers and the above-identified activities. The Blueprint includes only abbreviated descriptions of each barrier and activity, and the readers should refer to the narratives above for the corresponding details of the barriers and activities. The Blueprint shows the expected outputs that would result from each activity. Where possible and appropriate, the Blueprint may include potential outcomes provided by the SME team. However, determining the outcomes is not part of the formal Focused Pilot TPM development process, as the outcomes are tied to a specific project and program. The outcomes provided herein should not be construed as a binding obligation for the 2024 Focused Pilot projects.

This Blueprint represents an initial first draft of a logic model that will be further developed during the development of the 2024 Focused Pilot projects. As such, the Blueprint is subject to changes and adjustments to evolve into the final logic model, based on the scope of Focused Pilot projects.

Reference Materials

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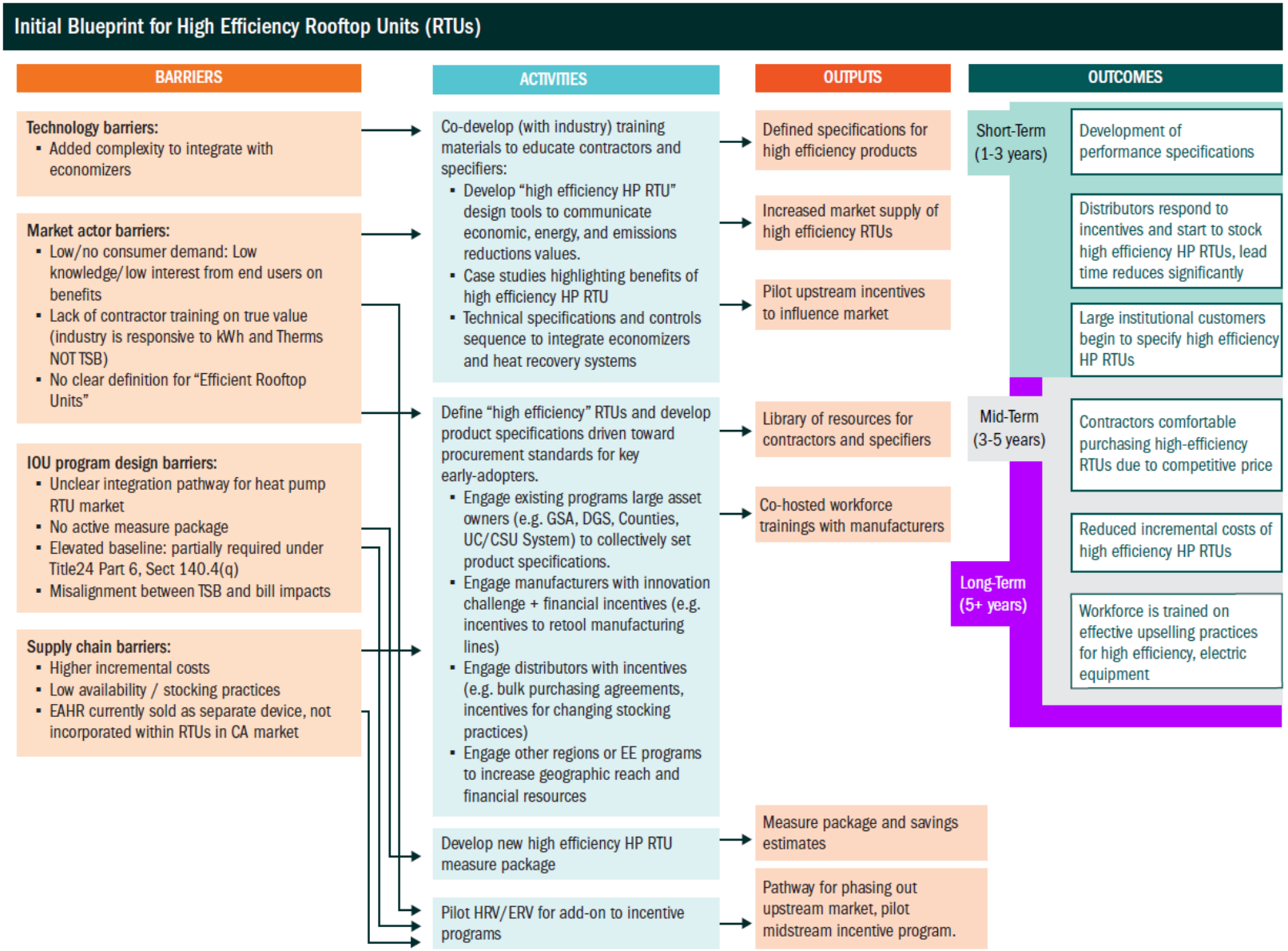

Figure 1: Initial Blueprint for High Efficiency Rooftop Units (RTUs)

Focused Pilot Topic (2): Quality Maintenance for Small and Medium Commercial Buildings

Technology Family: High-efficiency HPs for Space Heating and Cooling

Quality Maintenance for Small and Medium Commercial Buildings is included in High-efficiency HPs for Space Heating and Cooling, which is a technology family in the HVAC TPM. The definition of that technology family is:

> High-efficiency compressor-based packaged equipment that can provide efficient electric heating (and cooling). Systems may include high efficiency air-to-air packaged HP units (ducted unitary HPs and ducted or ductless split systems), air-to-water HPs used to replace traditional boiler hydronic systems, or Variable Refrigerant Flow (VRF). "High-efficiency" equipment typically contains variable speed (VS) fans, compressors, and/or pumps. Other pathways to high efficiency include advanced heat exchangers and advanced controls algorithms.

Focused Pilot Topic Background

The quality maintenance for the small and medium commercial market was seen as an additional research area within the High-efficiency HPs for Space Heating and Cooling technology family. While a number of programs were operating in the state up until mid 2010s, there is currently no statewide program. The original programs were based upon ASHRAE Standard 180 and struggled with low realization rates and high expenses for measurement and verification (M&V). This pilot effort would expand on traditional contractor training. It would investigate how using new digital contractor tools and modern verification methods, such as population-normalized metered energy consumption (Pop-NMEC) or strategic energy management (SEM), could contribute to a refreshed program design. It would also examine successful approaches from the energy service companies (ESCO) industry, which commonly serve much larger buildings. Additionally, it would explore how the transition to Total System Benefit (TSB) allows for new value streams from measures like refrigerant management. These kinds of steps could allow maintenance programs to account for the value of emissions reductions from leak mitigation and refrigerant recovery, recycling, and reclamation.

Barriers

Market Actor Barriers:

- Low customer education:
  - Lack of awareness of EE programs
  - Minimal understanding of EE measures
  - Lack of controls sophistication on site (limited EMS/trending capabilities)
- Low customer bandwidth and poor market engagement:
  - Lack of customer staff resources
  - Limited procurement capacity

- Limited existing contractor relationships
- Lack of market engagement

- Contractor business models and capabilities
  - Lack of business models to reward quality maintenance/performance persistence for SMB
  - Lack of standardized maintenance offerings
  - Lack of trust in contractors
- Unfavorable lease models (split-incentive):
  - Many facilities have triple-net lease landlord-tenant relationships, which require the tenants to pay operation and maintenance for the building, disincentivizing landlord participation

IOU Program Design Barriers:

- Outdated program infrastructure:
  - Lack of program design for refrigerant emissions (SWV002-01 is not adapted with TSB)
  - High data collection requirements associated with deemed measures
  - Previous program design lack accountability for underperformance (39 percent of "repaired" economizers failed functional testing in 2017 EM&V Report)

Activities

- Collect detailed data on a sample of program participants
- Develop customer marketing materials
- Conduct contractor trainings
- Develop standardized practice for HVAC maintenance
  - Standardize maintenance contracts
  - Standardize scope of work
  - Standardized contractor certification
- Incorporate meter-validated approach HVAC maintenance program design (population-NMEC or Strategic Energy Management). Split performance-based incentive among contractor and customer
- Develop program enhancement for refrigerant management
  - Develop contractor training materials for refrigerant management

    - Investigate use of digital maintenance tools that could support continuous leak detection

- Engage commercial landlords to inform them of the value of quality maintenance to improve their asset portfolios.

Initial Blueprint

The initial Blueprint for the topic idea of Quality Maintenance for Small and Medium is included at the end of this section.

The Blueprint maps out the relationships between the barriers and activities identified above. For the sake of clarity and simplicity, the Blueprint includes only abbreviated descriptions of each barrier and activity, and the readers should refer to the narratives above for the corresponding details of the barriers and activities. The Blueprint also shows the expected outputs that would result from each activity. Where possible and appropriate, the Blueprint may include cursory envisioning of the outcomes provided by the SME team. However, determining the outcomes is not part of the formal Focused Pilot TPM development process as the outcomes are tied to the specific project and program but not the TPM. The outcomes provided herein should not be construed as a binding obligation for the 2024 Focused Pilot projects to realize.

This Blueprint represents an initial first draft of a logic model that will be further developed during the development of the 2024 Focused Pilot projects. As such, the Blueprint is subject to changes and adjustments to evolve into the final logic model based on the actual scope of the Focused Pilot projects.

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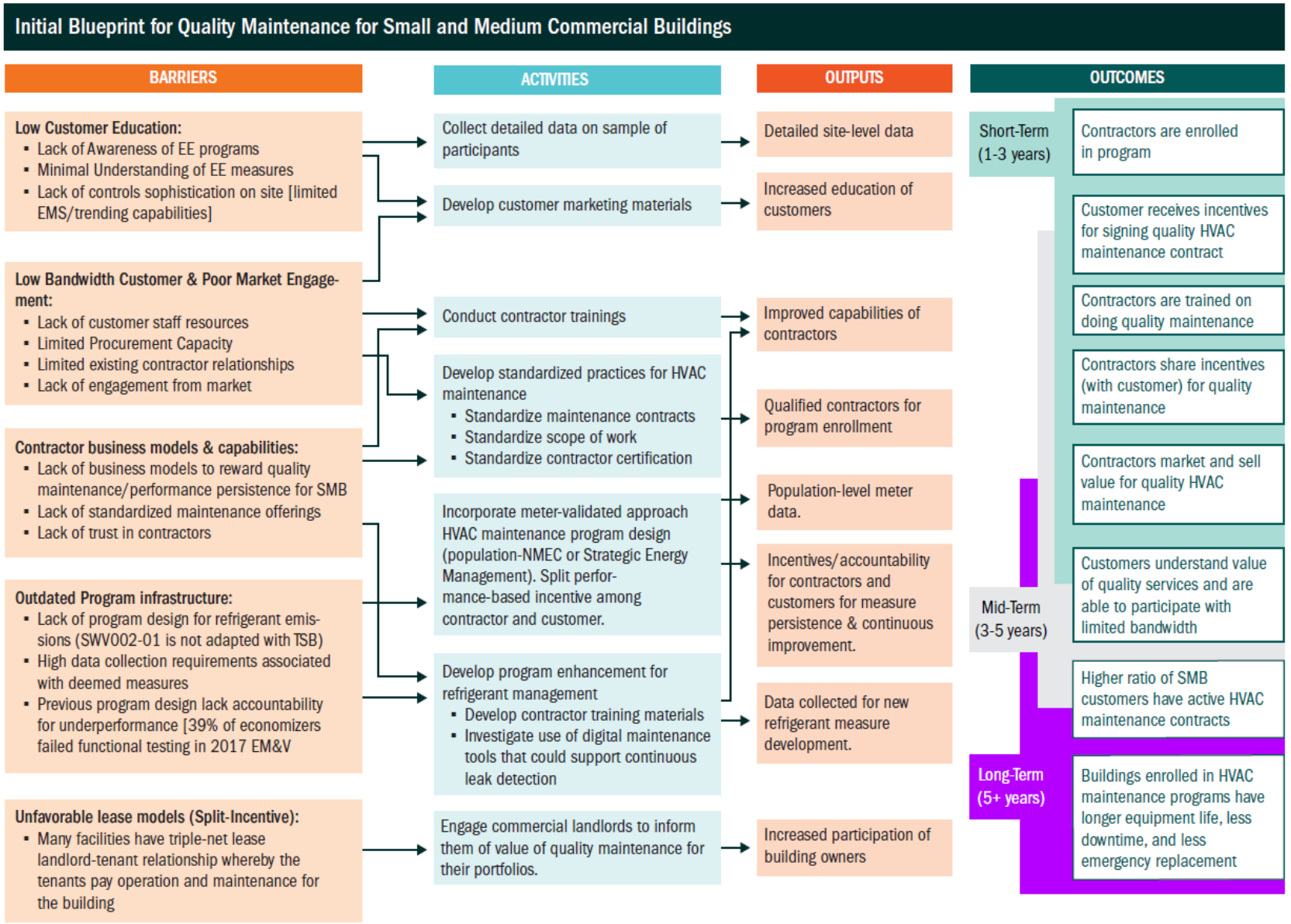

Figure 2: Initial Blueprint for Quality Maintenance for Small and Medium Commercial Buildings

Focused Pilot Topic (3): Light-duty Commercial HPWH

Technology Family: Residential-duty Water Heaters

Light-duty Commercial HPWH is a description for the use in a commercial facility of a unitary HPWH similar to those used in single-family residences. The Technology Families in the WH TPM are divided into residential-duty and commercial-duty based on the equipment characteristics, with unitary combinations of tank and heating elements that reflect those typically used for residential equipment. The TPM intentionally does not use the U.S. DOE definition of residential equipment, which is based on burner size. The TPM authors felt it important to distinguish between residential-duty equipment, where the technical performance and sizing guidelines are relatively well understood and product offerings are numerous, and that in the commercial-duty segment, where product knowledge is more limited. The definition of the commercial-duty technology family is as follows:

> Efficient, demand-flexible, electric HPWHs are designed to meet the hot water demands of residential households *or buildings with similar water heating needs*. This technology family will help meet the California Energy Commission's goal of installing at least six million heat pumps by 2030.

Focused Pilot Topic Background

Within the Residential-duty Water Heaters technology family, single-family and multifamily residential buildings represent the highest market transformation need and potential greatest areas of impact. However, these buildings are already the target customer segments of market transformation and incentive programs in California, including TECH Clean CA, BUILD, statewide and local HPWH programs, and connected HPWH programs from multiple IOUs. For this reason, the CalNEXT SMEs suggested building on the well-understood product and performance knowledge of Residential-duty HPWHs while also consider applying these products into applicable commercial segments. The TECH Program opened to commercial customers in October 2023, but has not yet tested out all the interventions and leverage points for commercial customers that have been tested over the course of TECH for residential customers, such as gas loaners or home remediation.

A HPWH Focused Pilot for light commercial applications could be used to identify barriers to eventual electrification, in preparation for a future zero-NOx led by the Air Resources Board that prevents installation of natural gas water heaters. Separately, Title 24, Part 6, JA13 or similar connected demand management measures may be a requirement in the future for electrified commercial WH.

Microdata from the 2018 Commercial Buildings Energy Consumption Survey (CBECS) survey shows the most common building types the mean annual WH energy use, the type of WH technology used for commercial buildings < 5,000 ft^2 in the Pacific census division. Analysis of the data suggests a few segments that could be targeted for electric resistance to HPWH retrofits: Education, Office, and Retail other than Mall.

Barriers

Technology Barriers:

- **Electrical capacity** – The spare capacity of electrical infrastructure is expected to vary significantly by segment. Anecdotally, cafes and coffee shops may already be at capacity, while retail and other segments have spare capacity

Market Actor Barriers:

- **Lack of familiarity by customers**
- **Lack of contractor familiarity** – The contractor pool serving these customers is a combination of commercial and primarily residential contractors. Residential contractors may be less likely to have an ongoing relationship with a commercial customer but may be able to perform water heater installations for electric panels at 240V and below at lower cost. Commercial contractors are not likely to be experienced with HPWH and are less likely to be able to access them on an emergency replacement timeline.

IOU Program Design Barriers:

- **Lack of program support or incentives**

Supply Chain Barriers:

- **Energy cost of electrifying water heating** – Energy costs could be much more significant for users above 100 gallons per day and/or those experiencing a demand rush during on-peak times

This list highlights barriers particularly applicable to HPWHs in a light commercial setting. In addition, barriers broadly relevant to HPWHs are important background, even if they wouldn't be the best target for a focused intervention. One good list of HPWH barriers across market segments is found in Table 10 of the report from the Schatz Energy Center listed below in the reference materials. For example, the higher cost of HPWH remains perhaps the important barrier in the broadest picture of HPWH uptake, but not tractable in the setting of a Focused Pilot.

Activities

- **Target electric resistance WH customers** – Target electric resistance WH customers first to circumvent electric capacity issues. Certain strip malls are likely to have been built without natural gas service
- **Gather information on electrical panel capacity by commercial customer segment –** This data can inform future commercial efforts and interventions
- **Pilot incentive offer, possibly aligning with TECH** – Light commercial water heaters are underserved but there are existing applicable products already on the shelf that could be used. Many of them include a thoughtful incentive design that doesn't put the financial risk on the contractors
- **Support for HPWH-conversant contractors serving light commercial customers –** Gather information on commercial-specific issues around health codes and permitting to inform

future market interventions. Document differences between the residential and commercial workforces for HPWH.

- **Contractor education and targeting assistance** – Educate contractors on the opportunity presented by HPWH. Identify barriers for a specific contractor business model and use activities from the TECH residential toolbox, such as a gas loaner program and space remediation needed for physical installation. Be deliberate on partnering, including manufacturers and distributors that can target the right contractors and structure financing.

Initial Blueprint

The initial Blueprint for the topic idea of Light-duty Commercial HPWH is included at the end of this section.

The Blueprint maps out the relationships between the barriers and activities identified above. For the sake of clarity and simplicity, the Blueprint includes only abbreviated descriptions of each barrier and activity, and the readers should refer to the narratives above for the corresponding details of the barriers and activities. The Blueprint also shows the expected outputs that would result from each activity. Unlike a typical logic model, the Blueprint does not include any outcomes as outcomes are tied to the scope of a specific project or program, not to the TPM. Determining the outcomes is not part of the formal Focused Pilot TPM development process.

This Blueprint represents an initial first draft of a logic model that will be further instantiated during the development of the 2024 Focused Pilot projects. As such, the Blueprint is subject to changes and adjustments to evolve into the final logic model based on the actual scope of the Focused Pilot projects.

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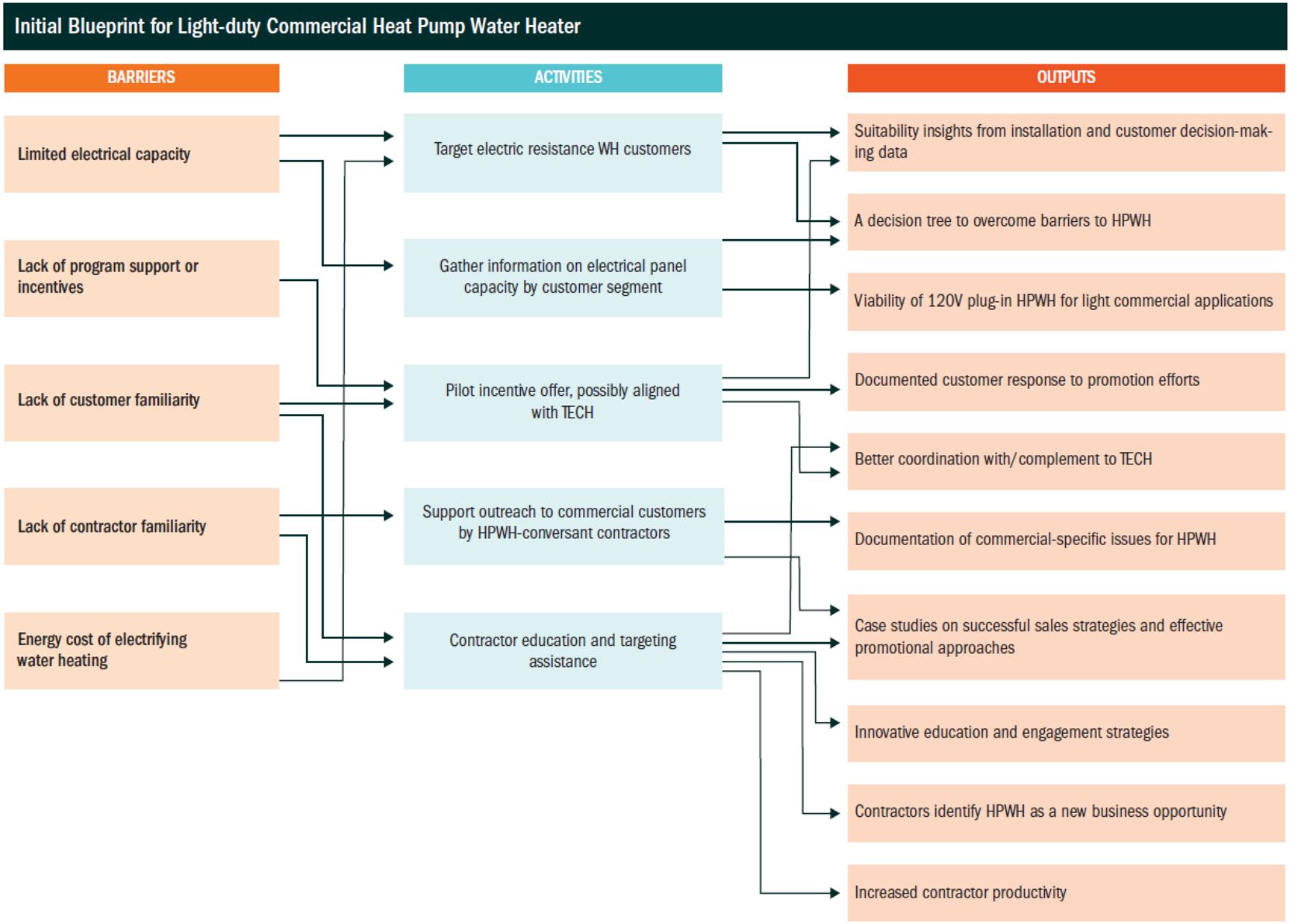

Figure 3: Initial Blueprint for Light-duty Commercial Heat Pump Water Heater

Focused Pilot Topic (4): Smart-splitting Panel Deployment to Stimulate Residential EVSE Adoption

Technology Family: Electric Vehicle Supply Equipment (EVSE)

Smart-splitting Panel Deployment to Stimulate Residential EVSE Adoption falls under the EVSE technology family, which is part of the Plug Loads and Appliances TPM. The definition of the EVSE technology family is as follows:

> EVSE is defined as the conductors, connectors, related equipment, and control software that deliver energy to an electric vehicle (EV). This technology family has strong overlaps with the Electrical Infrastructure technology family within the Whole Building TPM.
>
> *Note: A number of mobile battery charging applications exist outside of traditional passenger vehicles and are covered in separate technology families within the Plug Load and Process Loads TPMs. These include applications such as e-bikes, motorized wheelchairs, forklifts, and golf carts.*

Focused Pilot Topic Background

Within the EVSE technology family, addressing the issue of insufficient electrical panel capacity consumers may face when installing Level 2 EVSE was identified by SMEs as having the highest market transformation potential. Insufficient electrical capacity and the need for an expensive panel upgrade for EVSE installation would in turn discourage the adoption of EVs. For whole-home electrification, the SMEs anticipated EVSE would typically be the first large electric appliance homeowners would add. The benefits of introducing smart-splitting panels in EVSE are threefold: 1) it facilitates EVSE adoption, hence vehicle electrification; 2) It paves the way for homeowners to electrify other home appliances; and 3) it mitigates the pressure on the utilities to upgrade the electric power distribution infrastructure to accommodate rapid electrification effort.

Barriers

Technology Barriers:

- **Communication incompatibilities** – There are often communication issues between the panel and plug loads/battery/other smart systems.
- **Electric panel hardware limitations** – There are physical circuit limits in many smart panel boxes. Homes often have more than 32 circuits, and if the smart panel has a 32-circuit limit, then it will require the homeowner to have electrical system knowledge to manage a workaround, such as “doubling up” the circuits with two breakers per slot. Despite their many benefits, smart-splitting panels do not offer the same performance as a whole home panel upgrade.

Market Actor Barriers:

- **Lack of electrical system knowledge** – Customers and electricians often don’t have the necessary understanding of electrical panel upgrade needs for managing EV/EVSE demands, which causes headaches and inflated costs.

IOU Program Design Barriers:

- **Uncertain (or lack of) consumer appetite for automatic load management** – Customers are often uncomfortable and/or don't want their electric loads managed in this way.

Supply Chain Barriers:

- **Upfront costs** – This technology can be expensive upfront and create a significant financial burden on homeowners, even though it is cheaper than a full panel upgrade.

Activities

- **Deploy top smart-splitting panel products and compare technical capabilities/pain points** – Evaluate the top products in the market and use the findings to recommend the best solution to customers based on different electric needs, house type, levels of "smart home" capabilities, and other identified factors. This will help utilities understand the communication barriers in the existing panel upgrade market and the technical limitations that exist.

- **Create a customer point of sale (POS) education website on upgrade/service options to encourage smart-splitting panel adoption** – There are different configurations and panel upgrade solutions available for customers in this still nascent market. A robust customer education program that includes easy-to-follow web content for customer options. Teaching customers when smart-splitting panel is the best option will be a great way to boost adoption and address the panel upgrade barrier to installing EVSE.

- **Contractor/electrician/inspector training** – A training program for contractors, electricians, and inspectors will facilitate adoption and familiarize the market with the technology, building awareness that smart-splitting panels are a viable option for many EVSE customers. Leverage existing training as much as possible. The goal will be to create a robust marketplace for smart-splitting panels and a contractor/electrician network that will recommend this option to customers when appropriate, thus boosting adoption.

- **POS bundled incentive** – Offering incentives for EVSE and smart-splitting panels as one package, which ideally are compatible with one another. This will make the first cost more palatable to customers and panels easier to use once installed. Bundling the EVSE and smart-splitting panel purchase together will be an effective method to encourage adoption both directly and through word of mouth as people tell their network about smart-splitting panels.

- **POS education on electric load control benefits** – There are many benefits to being able to control electric consumption through the capabilities offered by a smart-splitting panel, even if customers are unfamiliar with the technology and this level of control over their electrical system. A robust customer education program that includes easy-to-follow web content and educates customers on the primary and ancillary benefits of smart-splitting panels.

Initial Blueprint

The initial Blueprint for the topic idea of Smart-splitting Panel Deployment to Stimulate Residential EVSE Adoption is included at the end of this section.

The Blueprint maps out the relationships between the barriers and activities identified above. The Blueprint includes only abbreviated descriptions of each barrier and activity, and the readers should refer to the narratives above for the corresponding details of the barriers and activities. The Blueprint also shows the expected outputs that would result from each activity. Unlike a typical logic model, the Blueprint does not include any outcomes as outcomes are tied to the scope of specific project or program, not to the TPM. Determining the outcomes is not part of the formal Focused Pilot TPM development process.

This Blueprint represents an initial first draft of a logic model that will be further instantiated during the development of the 2024 Focused Pilot projects. As such, the Blueprint is subject to changes and adjustments to evolve into the final logic model based on the actual scope of the Focused Pilot projects.

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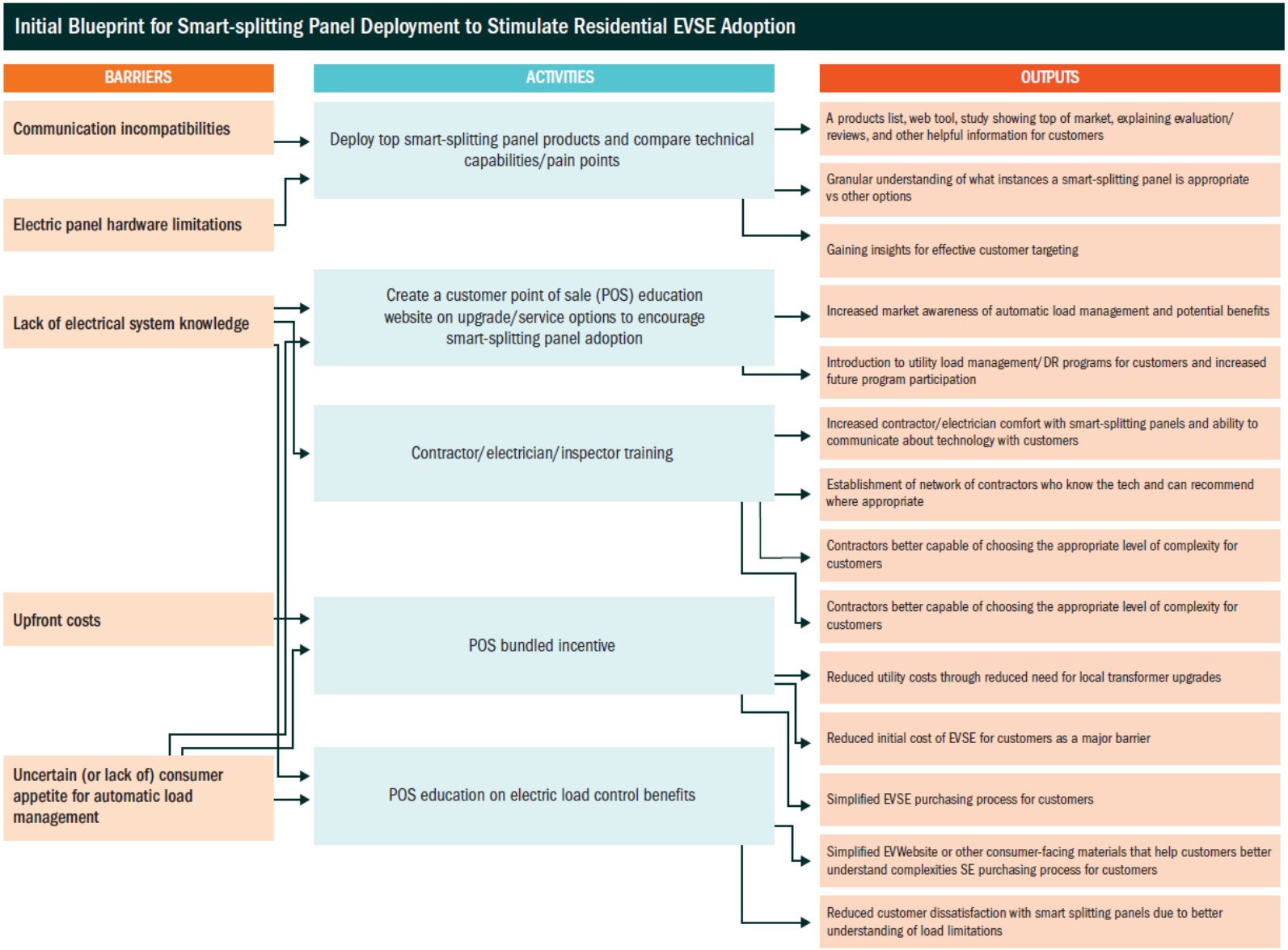

Figure 4: Initial Blueprint for Smart-splitting Panel Deployment to Stimulate Residential EVSE Adoption

Focused Pilot Topic (5): Evaluating the Different Customer Value Propositions for V2X Charging Solutions

Technology Family: Electric Vehicle Supply Equipment (EVSE)

Evaluate the Different Customer Value Propositions for Vehicle-to-Everything (V2X) Charging Solutions is part of the EVSE technology family in the Plug Loads and Appliances TPM. The definition of the EVSE technology family is as follows:

> Electric Vehicle Supply Equipment (EVSE) is defined as the conductors, connectors, related equipment, and control software that deliver energy to an electric vehicle (EV). This technology family has strong overlaps with the Electrical Infrastructure technology family within the Whole Building TPM.
>
> *Note: A number of mobile battery charging applications exist outside of traditional passenger vehicles and are covered in separate technology families within the Plug Load and Process Loads TPMs. These include applications such as e-bikes, motorized wheelchairs, forklifts, and golf carts.*

Focused Pilot Topic Background

Within the EVSE technology family, the subject matter experts (SMEs) identified the market transformation potential in bi-directional EV home charging solutions. EVs have the potential to be an important distributed energy resource asset in homes, not only as an integral part of an efficient home, but also as a means for increasing their resilience and grid responsiveness. For homeowners who are already considering EVSE installation, the potential benefits of enabling V2X could outweigh the incremental cost. Various large pilots have been conducted at the CA IOUs utilities to evaluate technology feasibility and gain technical understanding. A focused pilot will build on the lessons learned from the other pilots and ride the existing momentum to further accelerate market adoption.

Barriers

Technology Barrier:

- Product functionality may not align with product marketing – There are many different OEMS with different products on the market that do not all work as advertised. OEMs do not follow the same standards, leading to many one-off proprietary designs. Challenges include API/software connectivity issues that make realizing the benefits of V2X difficult to achieve for interested customers.

Market Actor Barriers:

- Unclear value proposition for customers – Perceived minor benefits to customers for all the added complexity/cost.

Supply Chain Barriers:

- Nascent market – There are a very limited number of EVs that currently allow V2G/Vehicle-to-Home (V2H).

- **Upfront costs** – V2G/V2H is an additional cost for the already expensive EV purchase process with unclear benefits to customers.

Activities

- **Customer education program** – A customer education program that lays out all EVs/EVSE currently on the market with V2G/V2H capabilities and available benefits from utilities, including incentives and DR program enrollment options. The tactics here could include intervening in the customer purchase process at the point which they are deciding which EVSE to purchase, and determining if closing the knowledge gap will increase V2G/V2H adoption.

- **Deploy V2G/V2H products to customers and compare technical capabilities/pain points** – A study evaluating the top products in the market and using the findings to recommend which products are as advertised would be a tremendous service to customers exploring V2H/V2G capabilities.

- **V2G bidirectional charger POS incentive and DR program auto-enrollment** – V2G offers more benefits to utilities than customers, who may see V2H as the more appealing option. Automatic enrollment in a DR program that demonstrates the added benefits of V2G will spur more adoption of this technology. Rate/tariff design to encourage V2G and maximize EE benefits should also be explored.

- **Quantify benefits of Unidirectional Smart Charging (V1G), V2G, and V2H** – Deploy V2G/V2H EVSE to different customer types and evaluate differing EE/DR benefits for each customer profile. Due to limited product availability and low market penetration, there is very little research on quantified benefits for customers (and not just utilities). The study would help collect data to help fill this gap and make the affirmative case to customers for V2H/V2G.

Initial Blueprint

The initial Blueprint for the topic idea of Evaluating the Different Customer Value Propositions for V2X Charging Solutions is included at the end of this section.

The Blueprint maps out the relationships between the barriers and activities identified above. For the sake of clarity and simplicity, the Blueprint includes only abbreviated descriptions of each barrier and activity, and the readers should refer to the narratives above for the corresponding details of the barriers and activities. The Blueprint also shows the expected outputs that would result from each activity. Unlike a typical logic model, the Blueprint does not include any outcomes as outcomes are tied to the scope of specific project or program, not to the TPM. Determining the outcomes is not part of the formal Focused Pilot TPM development process.

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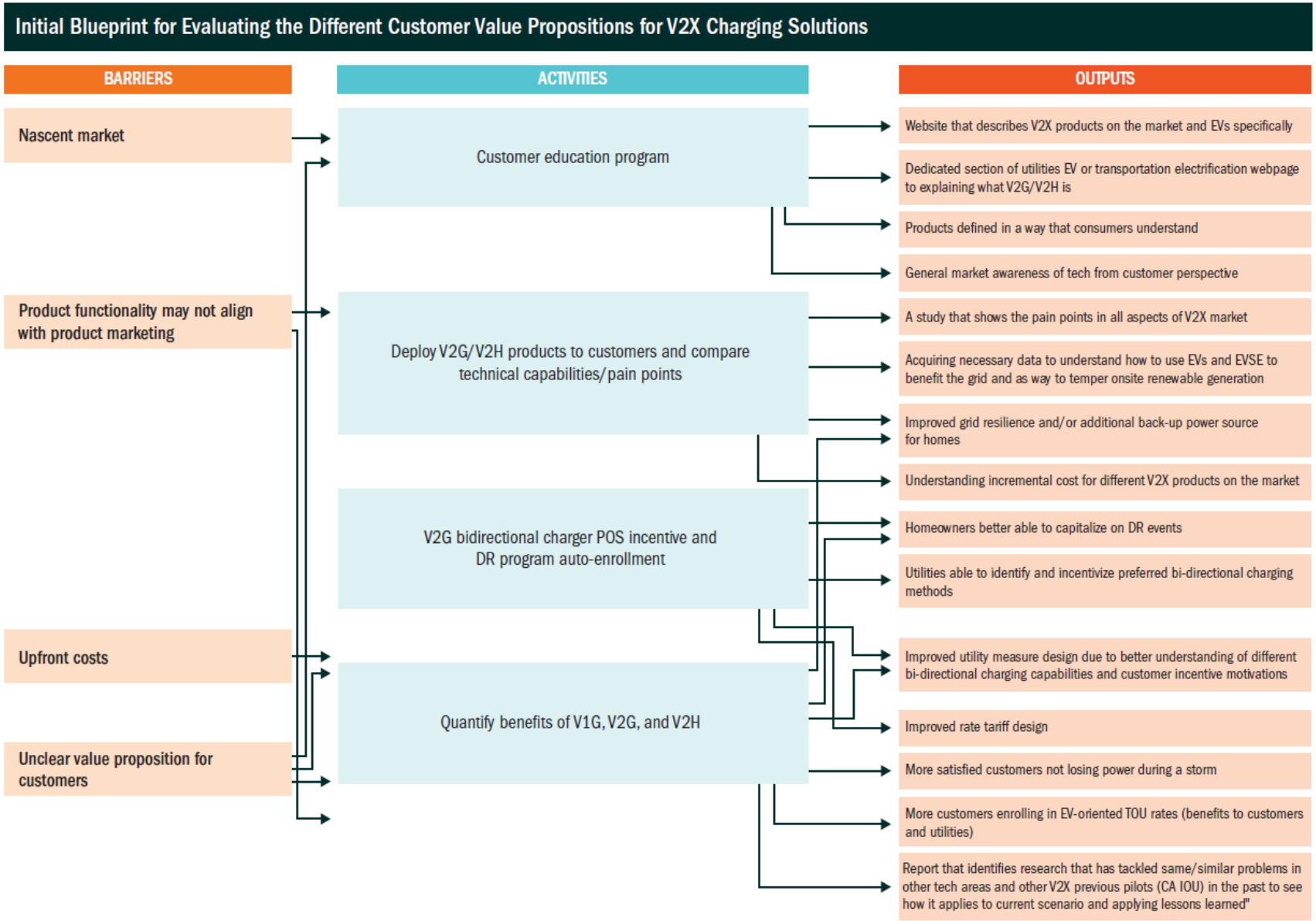

Figure 5: Initial Blueprint for Evaluating the Different Customer Value Propositions for V2X Charging Solutions

Focused Pilot Topic (6): Accelerate Advanced Motor Adoption in the OEM Market

Technology Family: Advanced Motors

Accelerate Advanced Motor Adoption in the OEM Market falls under the Advanced Motors technology family, which is part of the Process Loads TPM. The definition of the advanced motors technology family is as follows:

> The advanced motors technology family is focused on advancing electric motors and drive systems that exceed the NEMA premium efficiency standards with a strong emphasis on enhancing advanced electric motor technology market awareness, increasing equipment stocking and adoption, and supporting scalability.

Focused Pilot Topic Background

Within the advanced motors technology family, the SMEs identified the highest market transformation potential lies in directly influencing original equipment manufacturers (equipment OEMs) to adopt advanced motors in equipment design, such that the equipment is factory-installed and sold with highly efficient motors.

Barriers

Technology Barrier:

- PDS characteristics impact equipment design – PDS characteristics (e.g. noise, vibration, torque, speed range, frame size, power factor, etc.) may limit the application or require system modifications. The issues usually vary by the specific motor technology. However, many of these issues are ones of perception, due to a lack of understanding and experience with the advanced motors.
- Motor-drive compatibility issues – Specific drives may be needed to control certain types of advanced motors, some of which are proprietary to the motor manufacturer. A big portion of the compatibility issues may be perceived. Major drive manufacturers offer universal drive products that work for both traditional induction and advanced motors; however, such claimed compatibility may not be well understood or proven.
- Unclear motor performance vs. equipment efficiency – Motor performance data are available, but it does not scale to directly determine the level of improvement in the equipment performance in which the motors are installed.

Market Actor Barriers:

- Lack of familiarity by equipment OEMs – Most equipment manufacturers are risk-averse and will resist changes. Equipment designers lack knowledge of how to maximize the benefit of advanced motors for the optimal equipment efficiency level.

Supply Chain Barriers:

- Motor OEMs not established as a trusted/robust motor supply option for equipment OEMs – Equipment manufacturers have no existing trusted suppliers for motor sourcing.

The motor OEM may not be ready to produce motors at scale to support equipment mass production.

- **Post-sale maintenance and repair support**– Downstream impact on and implication of supporting the maintenance and repair of equipment with advanced motors.
- **Lack of higher efficiency classifications** – Current DOE and NEMA test standards and efficiency ratings for general-purpose electric motors are limited to fixed-speed induction motors. Efficiency classes are also only defined up to the current technology baseline (Premium Efficiency – IE3 equivalency).
- **Equipment OEM lowest-cost product positioning** – Manufacturers are very cost-sensitive on the lowest-cost highest-volume products, and any resulting costs may significantly affect the current product market position.

Activities

- **Pilot an upstream energy efficiency program** – Incentivize equipment manufacturers that incorporate advanced motors in product design through an upstream delivery approach of the EE program. The pilot program should consider targeting the following motor types and applications: ECMs and small/fractional motors, fan and pumping applications for commercial buildings, industrial and heavy industry with subdomain expertise, and agriculture farming and irrigation. The program should also be designed to encourage stock on hand for products with typical nominal speeds and power ratings.
- **Develop application notes on PDS characteristics** – Determine when and where inherent PDS characteristics will limit field application so that transparent guidance can be provided to the market.
- **Develop drive selection guides** – Develop drive selection guidance for each of the advanced motor architectures, including tested motor-drive compatibility and the required drive settings.
- **Highlight system-level tests and demonstrations** – In addition to focusing on the increased efficiency of the advanced motor per se, highlight the overall increase in efficiency of the equipment where advanced motors are installed through testing and demonstrations to showcase the direct impact of advanced motors.
- **Develop guides and training programs for equipment OEM** – Develop equipment OEM-oriented design guide, procurement guide, and training materials for different advanced motor types, and provide evidence that the new technology will work just as well and fit in the same footprint as current motors.
- **Motor OEM salesforce training** – Develop training programs for the motor OEM salesforce to equip them with skills and knowledge to speak to the needs and make to equipment manufacturers.

- **Motor OEM-sponsored maintenance training** – Organize motor manufacturer-sponsored training for equipment OEM technicians and contractors focusing on maintenance and repair of the motors installed in the equipment.
- **Develop new efficiency measures for IE5 motors –** Increase awareness and adoption through field trials with performance data transparency. Evaluate the cost effectiveness of zero incremental cost measures for selected applications using IE5-equivalent ferrite products. Develop new efficiency measures and pilot programs for utilities to support IE5 capable motors, utilizing IEC efficiency standards or the NEMA Power Index (PI).

Initial Blueprint

The initial Blueprint for the topic idea of Accelerate Advanced Motor Adoption in the OEM Market is included at the end of this section.

The Blueprint maps out the relationships between the barriers and activities identified above. For the sake of clarity and simplicity, the Blueprint includes only abbreviated descriptions of each barrier and activity, and the readers should refer to the narratives above for the corresponding details of the barriers and activities. The Blueprint also shows the expected outputs that would result from each activity. Where possible and appropriate, the Blueprint may include cursory envisioning of the outcomes provided by the SME team. However, determining the outcomes is not part of the formal Focused Pilot TPM development process as the outcomes are tied to the specific project and program but not the TPM. The outcomes provided herein should not be construed as a binding obligation for the 2024 Focused Pilot projects to realize.

This Blueprint represents an initial first draft of a logic model that will be further developed during the development of the 2024 Focused Pilot projects. As such, the Blueprint is subject to changes and adjustments to evolve into the final logic model based on the actual scope of the Focused Pilot projects.

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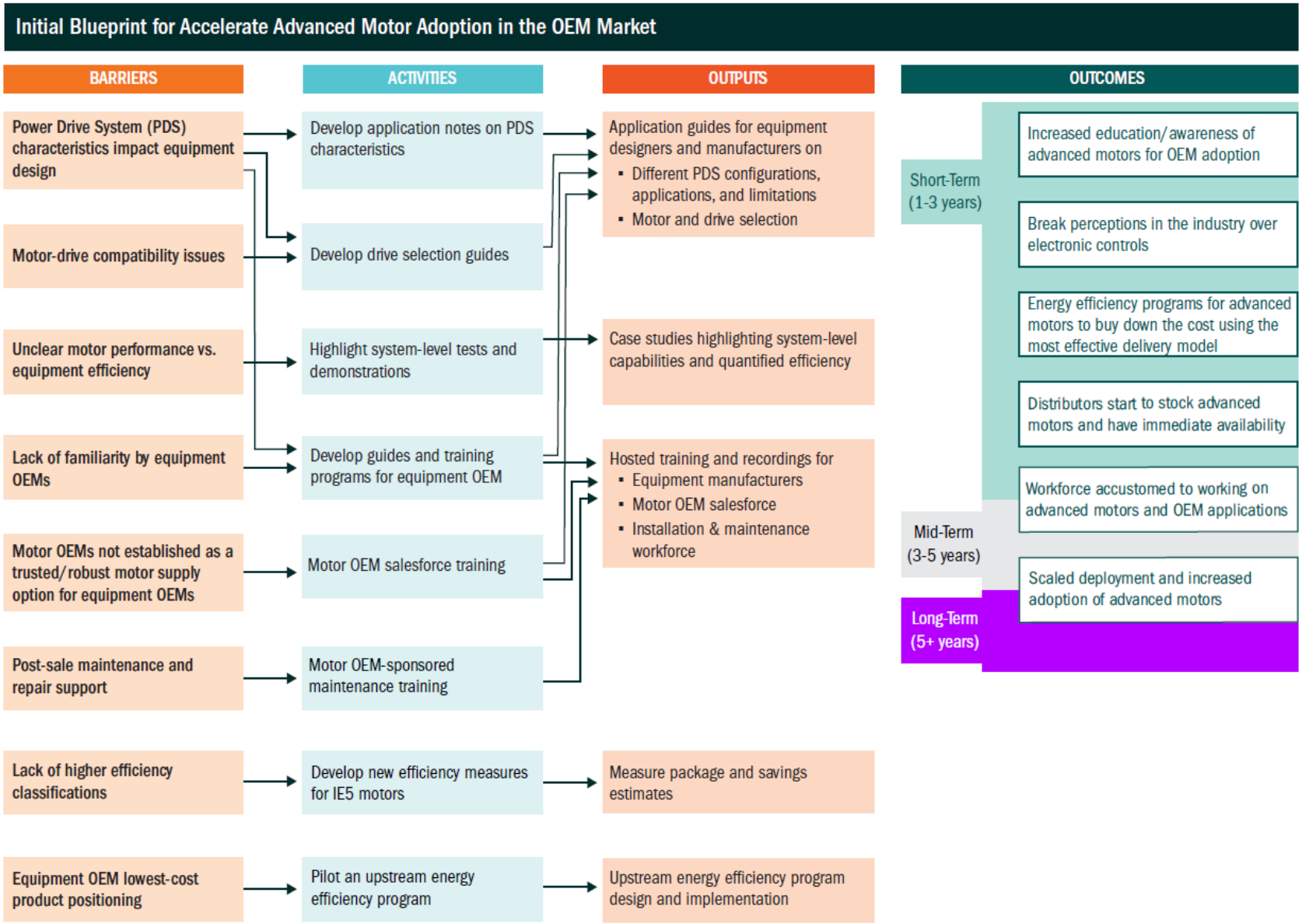

Figure 6: Initial Blueprint for Accelerate Advanced Motor Adoption in the OEM Market

Next Steps

The next steps following submittal of the 2023 Focused Pilot TPM will be the following:

1. Develop supporting graphics and additional media copy which will support upcoming dissemination efforts
2. Review and resolve comments, if any, on 2023 Focused Pilot TPM Final Report
3. Update CalNEXT website with new 2023 Focused Pilot TPM
4. Launch email announcement through email outreach
5. Develop and submit Distribution Report
6. Begin initial planning for Focused Pilot Projects, including feedback from IOUs and stakeholders on which of the six Focused Pilot topic ideas presented in this TPM are best suited for the three 2024 Focused Pilot Projects