Self-Generation Incentive Program (SGIP)
Heat Pump Water Heater (HPWH)
Workshop – Part 2

May 7, 2020

California Public Utilities Commission (CPUC)

Nora Hawkins & Nate Kinsey
CPUC Energy Division
WebEx and Call-In Information

WebEx:  
https://cpuc.webex.com/cpuc/onstage/g.php?MTID=e3640a4c370dbe376cbccb176f68129b2

Recommend using audio through your computer if possible.

Call-in:  +1-415-655-0002 (please note this number has tolls)
Meeting number (access code): 262 559 154

All participants in listen-only mode by default.  
Please submit questions/comments via the WebEx chat and/or use the “raise hand” function.
Ground Rules

• State your name and organization at start of your comment or question.

• Keep comments focused on the agenda topic being discussed.

• If you are unmuted, please try to keep noises around you to a minimum.

• If you are only participating via phone and you have a question, please email it to: Asal.Esfahani@cpuc.ca.gov
Recent CPUC Decisions on SGIP
(HPWH explicitly brought into SGIP as thermal energy storage technologies)

• Decision 19-08-001 adopted on August 1, 2019
  – “GHG Decision”
  – Modifies program rules to ensure energy storage systems reduce greenhouse gases (GHGs) emissions

• Decision 19-09-027 adopted on September 12, 2019
  – “Equity Resiliency Decision”
  – Created a $4 million budget to fund heat pump water heaters (HPWH) for equity customers

• Decision 20-01-021 adopted on January 16, 2020
  – “SB 700 Decision”
  – Adopts an annual funding level of $166 million for 2020 through 2024
  – Added an additional $40.7 million for “general market” HPWH incentives
Workshop Objectives

• **D.19-09-027:** “The HPWH workshop should seek to address these priority questions raised by parties in their comments including:
  • Achieving market transformation of HPWHs;
  • HPWH incentive design;
  • Administration of SGIP incentives;
  • Achieving equity in HPWH deployment;
  • Ensuring load shifting;
  • Future allocation of SGIP incentives; and,
  • Coordination with other Commission programs.”

• **D.20-01-021:** “HPWH deployment may provide GHG reductions that significantly exceed the five-kilogram carbon dioxide per kWh (kg CO2/kWh) required for storage system by this Commission in the GHG Decision. . . this workshop will consider whether SGIP should require use of controls to ensure HPWH re-heating off-peak.”
Part 1 Workshop Recap

• Held via webinar on March 19, 2020
  • Slides available at: https://www.cpuc.ca.gov/sgip/

• Topics covered:
  • Building Decarbonization and other HPWH programs;
    - Nate Kinsey, CPUC Energy Division
  • SGIP Overview
    - Rosie Magana, Southern California Gas
  • HPWH Basics: Technologies and Control Options
    - Pierre Delforge, NRDC
  • SGIP HPWH Program Design Principles and early draft straw proposal
GHG Reductions by Type of Water Heater (WH)

Pierre Delforge, NRDC

- Gas tankless condensing WH to heat pump WH
- Electric resistance tankless WH to heat pump WH*
- Electric resistance storage WH to heat pump WH
- Gas or propane storage WH to heat pump WH

* Electric resistance tankless is a proxy for emissions reductions by heating water via a HPWH vs. heating water at the time of consumption as tankless water heaters do.
Today’s Part II Workshop:

**WORKSHOP AGENDA**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00am – 9:10am</td>
<td>Welcome, Safety, Introductions, Objectives and Scope</td>
<td>Energy Division (ED) Staff</td>
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<tr>
<td>9:10am – 9:30am</td>
<td>Market Transformation and Current Barriers</td>
<td>Panama Bartholomy, BDC</td>
</tr>
<tr>
<td>9:30am – 10:10am</td>
<td>Unitary &amp; Central HPWH Case Studies</td>
<td>Mike Corbett &amp; Brett Korven, SMUD &amp; Nick Dirr, AEA</td>
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<tr>
<td>10:10am – 10:30am</td>
<td>Incorporating Equity into the SGIP HPWH Program</td>
<td>Elise Hunter, GRID Alternatives</td>
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**Break (15 minutes)**

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<tr>
<td>10:45am – 11:00am</td>
<td>Straw Proposal Design Principles</td>
<td>HPWH Working Group(^2) &amp; ED Staff</td>
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<tr>
<td>11:00am – 11:45am</td>
<td>Straw Proposal Incentive Structure &amp; Value</td>
<td>HPWH Working Group &amp; ED Staff</td>
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<tr>
<td>11:45am – 12:15pm</td>
<td>Straw Proposal Application &amp; Verification Process</td>
<td>HPWH Working Group &amp; ED Staff</td>
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<tr>
<td>12:15pm – 12:30pm</td>
<td>SoCalGas HPWH Program Concept</td>
<td>Jason Legner &amp; Blaine Waymire, SCG</td>
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<tr>
<td>12:30pm – 1:00pm</td>
<td>SGIP HPWH Q&amp;A and Open Discussion</td>
<td>Energy Division Staff</td>
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</table>
Guiding Principles for Workshop Dialogue

• Shared goal of determining the most effective and least administratively burdensome way to support HPWHs through SGIP.

• Conversation needs to focus on how HPWH deployment will align with SGIP’s statutory mandate to improve efficiency and reliability of the distribution and transmission system, and reduce emissions of GHGs, peak demand, and ratepayer costs (Public Utilities Code §379.6).

• Consensus need not be reached today. CPUC will ultimately issue a staff proposal for comment.
SGIP Resources

• Statewide program page: https://www.selfgenca.com/

• CPUC Docket for recent decisions in Docket R.12-11-005: https://apps.cpuc.ca.gov/apex/f?p=401:1:0

• CPUC point of contact:
  – Nora Hawkins, SGIP Analyst in the Energy Division
  – Email: Nora.Hawkins@cpuc.ca.gov
Self-Generation Incentive Program
Market Transformation and Current Barriers

PANAMA BARTHOLOMY

Director, Building Decarbonization Coalition
California’s Climate Goals

By 2030
40% below 1990 levels (SB 32, 2015)

By 2045
100% zero-carbon electricity (SB 100) &
carbon neutral economy-wide (EO B-55-18)
California’s GHG emissions today – Buildings 24%

The Case for Building Electrification

There is a growing consensus that building electrification is the most viable and predictable path to zero-emission buildings. This consensus is due to the availability of off-the-shelf, highly efficient electric technologies (such as heat pumps) and the continued reduction of emission intensities in the electricity sector.
Up to 60% GHG emission reductions can be achieved in the near term by electrifying a whole home in California.

Greenhouse Gas Savings
1990s vintage Single-Family Home (Sacramento)

California prepares to shift away from natural gas, while keeping power reliable and affordable

By Liane Randolph, Special to CalMatters
Energy Use in California Buildings

- Commercial Gas: 16%
- Commercial Electric: 27%
- Residential Gas: 33%
- Residential Electric: 24%

Water Heating: 14%
Space Heating: 15%
Other: 1%
Clothes Drying: 1%
Cooking: 2%

Source: California Energy Commission
Water Heating

Increase the share of high efficiency heat pumps for water heating from 1% of sales in 2018, to 50% in 2025 and 100% in 2030.
January 16th, 2020
CPUC Business Meeting

“This is a very efficient emerging technology that can greatly assist in reducing GHG and electrification. It can also help in managing peak load. Water can be heated at the right times and then used later on. We are going to need hundreds of millions, if not billions to deal with this issue, it’s important to start transforming the market as soon as possible.”
Barriers
Average Installed Cost of Gas WH and HPWH

**Gas Home**
- **Gas Storage (existing buildings)**
  - $1,000-$1,600
  - 0.63 UEF
- **Gas Tankless (new construction)**
  - $3,700-$5,700
  - 0.81 UEF

**Electric Home**
- **Heat Pump**
  - $2,100 to $7,900
  - 3.0 UEF
Emergency
Contractor Value Proposition

- Cost at distributor or retail
- Ease of program use
“So why would [a plumber] want to learn something like that when he can put in his normal water heater he's always put in, and get several done in a day if he wanted to?”
Panel Upgrades and Wiring

Panels: $3,000-$4,000
220V Wiring: $300-$1,000
Fuel-switching is a leap of faith.

- Need broad-based and specific education
- Need the finances to be clearly better than a gas model, a no-brainer
GOAL 1: Customers, contractors and policymakers are aware of and demand building decarbonization measures.

GOAL 2: Customers receive a good value from adopting building decarbonization measures.

GOAL 3: Building decarbonization provides a better value to contractors than fossil-fuels.

GOAL 4: Supply-chains and delivery agents are able to meet rising demand for carbon-free building technologies with a quality product.

GOAL 5: Policies are aligned to maximize customer awareness of and interest in building decarbonization, the customer, builder and contractor value proposition, and the industry’s ability to meet rising demand.
Recommendations

Support rebates and incentives for fuel switching and for upgrading to efficient electric equipment.

Bringing down upfront costs motivates end-users to pursue those options and will help contractors sell this equipment more frequently.
SGIP
January 16th, 2020
CPUC Business Meeting

“This is a very efficient emerging technology that can greatly assist in reducing GHG and electrification. It can also help in managing peak load. Water can be heated at the right times and then used later on. We are going to need hundreds of millions, if not billions to deal with this issue, it’s important to start transforming the market as soon as possible.”
Needed

- Long-term (10 Year) State vision for water heating transition and investment plan
- Programs that can lower HPWH unit and installed cost below that of gas alternatives
  - Instant rebates give customers the carrot they need to switch fuels
- Programs that are easy for installers and customers to use
  - Pre-approved product list
  - Mid-stream, instant rebates
  - Simple and fast application and eligibility verification
- Panel upgrade and wiring assistance
Thank you!
Buildingdecarb.org
Heat Pump Water Heaters: Rebate Program, PowerMinder, and load flexibility

Brett Korven
Mike Corbett

5/7/2020
About Sacramento Municipal Utility District

- Not-for-Profit Municipal Electric Utility
- Sacramento County in California with about 625,000 accounts
- Vertically integrated with generation, T&D, and customer facing functions
- Net zero carbon goal by 2040 impacting the generation portfolio, appliance electrification, and load flexibility initiatives
Present day opportunities for Time-of-Day Rates

• SMUD Residential Time-of-Day Rates helps align customer costs with utility costs on average

• Provides an opportunity for shared savings

• However, cost of energy and capacity (bulk and local) are more complex than Time-of-Day captures

Actual Utility energy or capacity costs vary day to day

Day 1 peak

Day 1 off-peak

Day 2 peak

Day 2 off-peak

Day 3 peak

Day 3 off-peak

Day n peak

Day n off-peak

Summer – Residential Time-of-Day (5 – 8 p.m.) Rate
June 1 – September 30
Load flexibility with Heat Pump Water Heaters

• Changing the water temperature setpoint to overheat the water allows for load shifting

• Mixing valve keeps temperature constant for consumed water

• Shift load without the customer noticing!
Looking beyond Time-of-Day Rates

Greater utility responsibility

- **Flat monthly bill (cell phone plan)**
- **Volumetric rates**
- **Time of Day rates**
- **Traditional rate with load shift credit**
- **Dynamic rates**
- **Transactive energy (peer to peer trading)**

Greater customer responsibility

Aspiration for a simplified customer billing contract that also provides utility load flexibility
Pilot Design

• Research compares 3 modes of HPWH operation
  1. Baseline – no active load shaping
  2. Time of Day (TOD) rate optimization – load shape to reduce on-peak consumption and increase off-peak consumption
  3. Utility influenced load shaping based on utility day ahead electricity costs

• Customer contract design
  • Default mode is TOD rate optimization
  • 120 days/year can be event days – either Baseline or Utility load shaping
  • Customer receives $75/$150 up front credit for signing up for the program and $2/month participation bill credit
Virtual Peaker

Founded: 2014
Located: Louisville, KY
Business Model: SaaS

Other Programs:
- ✓ Glasgow/TVA SET Program (Battery, HPWH, Thermostat)
- ✓ GMP BYOD Program (Battery)
- ✓ Belmont Light Peak Reduction Rewards (All Devices)
- ✓ GMP EV Unlimited Program (EVSE)
- Water Heater Optimization Program
- BYOD Enrollment
- Multi Manufacturer Support

How PowerMinder Works

1. PowerMinder heats your hot water when it's most cost-effective.
2. Hot water is always available when you need it.
3. You always have ultimate control over your device settings.
4. Enjoy watching your energy savings month after month.
Wholesale Cost Optimization
Water Heater Arbitrage

- Learn Water Use Behavior
- Integrate with Pricing Server
- Dispatch Based on Hot Water Capacity and Price
- Optimize Wholesale Cost
- Ensure Water Delivery Temperature
Mid Project observations

- 65 customers enrolled so far
- TOD optimization/ ISO Price
- Responsive/ Baseline groups rotate on event days
- Very little customer feedback after initial setup
- Currently working on OpenADR and CTA-2045 integration
Program Challenges

- Mixing Valve Support
  - Safety Concerns
- Terms and Conditions
  - Mixing Valve Safety
- Multi-Manufacturer Support
  - Different min and max temperatures
  - Different data granularity
- Population Size
  - Learning benefits from large population
Customer Learnings

- Simple Enrollment a must
  - Single POC for credentials
- Few People Change Behavior
- Difficult to manage very low use customers
Heat Pump Water Heater Rebate Program

Electric to Electric HPWH
• Rebate: $500
• Suspended beginning May 29th due to COVID-19 budget impacts
• 2020 Installations YTD: 58
• 2019 Installations: 125
• 2018 Installations: 125

Gas to Electric HPWH
• Rebate $2,500
• Suspended beginning May 29th due to COVID-19 budget impacts
• 2020 Installations YTD: 597
• 2019 Installations: 1,118
• 2018 Installations: 171
Key Program Drivers

Supply Chain Partnership
• Built relationships with local distribution network in Sacramento region (Ferguson, PACE, Slakey Brothers, Home Depo Specialty Trade Pros, others)
• Actively engage key contractors (bulk of installations done by 4 contractors)
• Created feedback loop with manufactures so they can better assist in training and contractor support

Payment and processing
• Rebate levels to achieve cost parody with installing a natural gas tank water heater (customer out-of-pocket $1,800 or less)
• 7-10 day payment turnaround
• Assignment of the rebate payable to the contractor
• Simple requirements
  • QPL, 1-page rebate form, pre-post photos, invoice
Program Challenges

• Mixing valve requirement- YES or NO?
  • From a liability standpoint, if a utility is going to control water heater temperature, IT IS A MUST
  • From a practical standpoint, the mixing valve may create more customer satisfaction problems than it solves
    • Water not hot enough for customer’s liking
    • Wrong temperature range valve installed (90-110 versus 90-140)
    • Construction challenges (slab on grade buried plumbing)
    • Mixing valves are installed 80%+ of the time wide open to avoid customer call back to adjust

• Sizing 50,65 or 80?
  • Still see almost 100% of installs with 50 gallon, where larger units should have been used
  • No demand for larger units, means limited supply

• Running electrical circuits is expensive
  • $500+
  • This will not be solved by a 120V unit. Either way 240V or 120V, will require dedicated power
Future of SMUD HPWH Program

• Beginning May 29th, 2020 the program is suspended

• Changes to promote future installations
  • SMUD is still providing incentive to change electrical panels and add a future HPWH circuit during a customers HVAC conversion from gas to electric
    • For these customers, it would allow for a faster, less expensive change-out
  • Possible distributor or manufacture buydown?
  • Still must achieve cost parody with gas tank water heater in order to be a viable option for customers to adopt
Questions

Rebate Program Questions
Contact:
Mike Corbett. Phone: 916-732-6798, Email: Michael.Corbett@smud.org

Load Shifting, controls etc.
Contact:
Brett Korven. Phone: 916-732-6115, Email: brett.Korven@smud.org
Opportunities for HPWH in Multifamily

• **Individual apartment water heaters**
  • ~11% of apts are unitary electric
  • ~39% of apts are unitary gas

• **Central water heaters serving multiple apts**
  • ~50% of apts are central gas

• **Other**
  • Water heaters serving only shared laundry rooms
  • Pool/spa water heaters
Heat Pump Water Heaters - Individual

Split Heat Pump Water Heater

Combined Heat Pump Water Heater
Heat Pump Water Heaters - Central
Residential Apartment Water Heaters

• Same technologies as residential/single family applications
• Multifamily nuances
  • Typically located in internal or external closets
  • Ducting or volume space challenges
  • Limited electrical panel capacity and breaker spaces
  • More complexity for dedicated circuit runs
  • Tenant turnover and associated changes in Wi-Fi
  • Many apts have fewer water fixtures but higher occupancy density relative to single family
Central Multifamily Considerations

• **Electrical**
  • Large amperage units (100A/240V) or 3-phase equipment
  • Distance from nearest panel (scattered sites)
  • Transformers

• **Space**
  • High volume storage tank(s)
  • Heat pump location(s)

• **Recirculation**
  • Higher return temperatures and flow rates
  • Constant loads
## Central Heat Pump Water Heater Types

<table>
<thead>
<tr>
<th>Units Served</th>
<th>HPHW Types</th>
<th>Example Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-8 apts</td>
<td>65-80 gal individual HPWH</td>
<td>Large Residential HPWH: Rheem, AO Smith, Sanden, others</td>
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<tr>
<td>10-25 apts</td>
<td>Central tank-type, split HPWH</td>
<td>AO Smith (CAHP-120), Sanden (“ganged”)</td>
</tr>
<tr>
<td>25+ apts</td>
<td>Central HPWH w/ large tank(s)</td>
<td>Colmac, Nyle, Mitsubishi (2021), Rheem (Australia)</td>
</tr>
</tbody>
</table>
Central HPWH
System Configurations
Single-Pass HPWH

Hot Water To Building

Highly-Stratified Storage Tank

LESS HOT DOWN HERE

HOT UP HERE

Cold Water Makeup

Single-Pass HPWH
Multi-Pass HPWH

HOT UP HERE

Stratified Storage Tank

LESS HOT DOWN HERE

Hot Water To Building

Cold Water Makeup

Multi-Pass HPWH
What about Recirculation Return?

Stratified Storage Tank(s)

Single-Pass HPWH

Hot Water To Building

Cold Water Makeup
What about Recirculation Return?

Stratified Storage Tank(s)

Hot Water To Building

Recirc Pump

Cold Water Makeup

Single-Pass HPWH
What about Recirculation Return?

- Single-Pass HPWH
- Stratified Storage Tank(s)
- Hot Water To Building
- Recirc Pump
- Cold Water Makeup
What about Recirculation Return?

Stratified Storage Tank(s)

Recirc Tank
HP or Elec Res

Single-Pass HPWH

Hot Water To Building

Recirc Pump

Cold Water Makeup
What about Recirculation Return?

Stratified Storage Tank(s)

Recirc Tank
HP or Elec Res

Single-Pass HPWH

Mixing Valve
Hot Water To Building

Recirc Pump

Cold Water Makeup
Single-Pass w/ Recirc Tank

- Single-Pass HPWH
- Stratified Storage Tank(s)
- Recirc Tank HP or Elec Res
- Mixing Valve
- Hot Water To Building
- Recirc Pump
- Cold Water Makeup
Recirc – Single Pass w/ Swing Tank

- Stratified Storage Tank(s)
- Swing Tank
  - HP or Elec Res
- Mixing Valve
- Hot Water To Building
- Recirc Pump
- Cold Water Makeup
- Single-Pass HPWH
Multi-Pass w/ Recirc Tank

Stratified Storage Tank(s)

Recirc Tank
HP or Elec Res

Mixing Valve

Hot Water To Building

Recirc Pump

Cold Water Makeup

Multi-Pass HPWH
Recirc – Multi-Pass Direct Return

- Multi-Pass HPWH
- Stratified Storage Tank(s)
- Mixing Valve
  - Hot Water To Building
  - Recirc Pump
  - Cold Water Makeup
Sizing and Load Shifting

- **Ample hot water storage** is critical
  - Allows for less heat pump
  - Increases potential for meaningful load shift

- Limited remote control options
  - Some are not yet control-compatible
  - Some have proprietary control hardware and software
  - One can use third party control

- Research and demonstration projects ongoing – standardization needed

Flow Monitoring for Sizing New HPWH System
Central HPWH – Energy Savings

PROJECT B
COMMON AREA ENERGY USE

HPWH (HPWH)
LED lighting
DHW controls
Low flows

Construction

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<th>Month</th>
<th>Electricity</th>
<th>Natural Gas</th>
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Central HPWH – Energy Savings

PROJECT A
COMMON AREA ENERGY USE

HPWH (HPWH)
Com. HVAC LED lighting
DHW controls
Low flows
VS pool pump

Construction

Electricity
Natural Gas

Apr-16 May-16 Jun-16 Jul-16 Aug-16 Sep-16 Oct-16 Nov-16 Dec-16 Jan-17 Feb-17 Mar-17 Apr-17 May-17 Jun-17 Jul-17 Aug-17 Sep-17 Oct-17 Nov-17 Dec-17 Jan-18 Feb-18 Mar-18

0 20,000 40,000 60,000 80,000 100,000 120,000 140,000 160,000 180,000 200,000

kBTU
Thank you

Nick Dirr | CPHC, CEM
Director of Programs
ndirr@aea.us.org
510-431-1792
Equity Considerations for Heat Pump Water Heaters
AGENDA

- Intro
- Clean Energy Barriers in Frontline Communities
- Addressing Barriers in Program Design
- Equity recommendations for HPWH in SGIP
Introduction
Our Vision & Mission

Founded 2001 – nation’s largest nonprofit solar installer

GRID makes renewable energy technology and workforce training accessible to underserved communities

GRID advocates for equitable & inclusive solar and renewable energy policies and programs
Key Programs & Initiatives

GRID is Program Administrator (PA) of multiple low-income solar programs

- SASH
- DAC-SASH
- LIWP single-family solar
- SOMAH (co-PA)
GRID’s Impact

Systems Installed: 11,400+

- kW Installed: 48,000+
- Lifetime Savings: $343 Million+
- Participants Trained: 29,500 (1,500+ placements)
- Tons of Greenhouse Gas Emissions Prevented: 850,000+
Benefits of Clean Energy Access in Frontline Communities

- Cost savings / stabilization / reduced energy burden
- Tools to mitigate and adapt to climate change and COVID-19
- Access to comprehensive services such as energy efficiency, supplement energy assistance programs
- Reduced shutoffs
- Accessible job training and economic opportunities
- Health and safety
- Resiliency
- Environmental justice
Clean Energy Barriers in Frontline Communities
Barriers to Clean Energy in Frontline Communities

- Sensitivity to up-front costs
- Difficulty obtaining loans, power purchase agreements, or other financing
- Inability to take advantage of tax incentives
- Renting rather than owning; mis-aligned incentives to invest in energy savings
- Site barriers: inadequate space, unpermitted work, faulty wiring, MSP upgrades needed, etc.
- Distrust of salespeople due to history of predatory practices in LMI communities
- Language and/or energy literacy barriers
- More info in SB 350 Barriers Report
Addressing Barriers to HPWH within the SGIP Equity Budget
The HPWH $4M set-aside is a carveout within the SGIP Equity Budget\(^1\) therefore, Equity Budget principles should apply to HPWH program design:

### Affordability
- Customer should not have to pay out of pocket to access HPWH benefits
- Incentive levels should cover all costs, including equipment, installation and ongoing management and operations
- Consider incentive payments to equity project developers prior to installation to ensure viability during COVID-19

### Dedicated ME&O
- Dedicated ME&O Budget should communicate with customers in their languages, at their energy literacy levels, through existing channels used by customers (e.g. internet may not be an option)

### Streamlining/Leveraging
- Co-marketed alongside complementary programs: SASH/DAC-SASH, SOMAH, ESA, SJV pilots, CARE/FERA, etc.
- Maintain same eligibility thresholds as general SGIP Equity Budget
- Consider automatic eligibility pathways with complementary programs

---

1. Decision 19-09-027, p.72
Additional Considerations not yet in SGIP Equity Programs

**Consumer Protection**

• Building upon other successful equity programs, measures should ensure customers receive a certain threshold of savings or benefit, and are protected from financing mechanisms likely to be harmful (e.g. liens on homes)
• Mechanisms to inform customers of risks, such as consumer info packets and/or a dedicated Consumer Advocate

**ME&O Partnerships**

• A portion of the ME&O Budget should be shared with organizations already trusted and known by communities: CCAs, CBOs, SJV CENs, low-income solar PAs, and other low-income clean energy program administrators

**Workforce Development**

• Strengthening pathways to clean energy careers is a great benefit to communities that can be provided by equity programs!
• Consider: requiring trainees on installations, creating resume- and job-banks, tracking job placement, creating partnerships with Job Training Organizations (JTOs)
Additional Considerations for the HPWH technology

**Technology Education**

- HPWH are a relatively new technology, and customers may have less familiarity than with solar, battery storage or EE. ME&O may need to cover ‘the basics’ more than other technologies.
- Of note: HPWH provides numerous benefits, but only battery storage provides resilience during outages.

**Alignment with Electrification**

- SGIP-incented HPWH should be enabled to pair with broader decarb/electrification programs, including the SJV pilots, TECH, BUILD, and other programs.

**Bill Protection**

- Low-income households are sensitive to bill increases. If the customer is switching away from propane or gas to electric, and/or changing rates, a comprehensive energy bill analysis, along with usage education, should accompany a HPWH installation.
Elise Hunter
Policy & Regulatory Affairs Director
ehunter@gridalternatives.org
Self-Generation Incentive Program (SGIP)
Heat Pump Water Heater (HPWH) Workshop

Break until 10:45 AM

California Public Utilities Commission (CPUC)
Developed with input from broad industry and climate advocates coalition
HPWHs are Fundamentally Different than Typical SGIP Systems

- Unitary HPWHs are more analogous to home appliances
- Water heaters are a necessity for every home
- Consumers typically purchase water heaters when their existing one breaks and seek to replace a broken system within hours
- SGIP rebates for unitary HPWHs must be instant and readily available via a simple process. Otherwise, the State misses out on a critical opportunity to upgrade for an additional 12 to 15 years (when the water heater is likely to be replaced again)
Principles

• Ease of Validation
• Simple, Yet Verifiable Application Processes
  • Differentiated by size
• Extra Incentives for Systems that Can Load Shift
• Additional Project Costs Covered
• Project Caps
• No Double Dipping, Possible to Access Additional Costs
• Equity Assistance
Ease of Validation

• SGIP eligibility for HPWH models should be linked to easily validated programs

• Examples: Eligible HPWH models would be only those certified by NEEA for advanced water heating specification Tier 3 version 6 or 7, California Energy Commission for JA13, EPA’s ENERGY STAR program, or California Energy Commission’s Title 24 CBECC Software or equivalent certification

• The SGIP Program Administrators shall establish a linked list with the CEC, NEEA, and EPA’s ENERGY STAR eligible HPWH lists. These lists by EPA, NEEA, and CEC shall be hyperlinked in the SGIP handbook
Simple, Yet Verifiable Application Processes

Similar to today’s SGIP, the HPWH program should have different reservation processes depending on the type and size of the project and incentive amount.
Smaller HPWH Systems (small residential and commercial)

• A midstream instant rebate that is available to the distributor, contractor, or retailer within the IOU service territories.

• A new mobile portal in the SGIP database will need to be established and maintained by the SGIP Program Administrators to verify eligibility and capture end-user address data.
Smaller HPWH Systems (small residential and commercial) - Continued

• For example, a customer would go to a big-box retail store that is advertising an instant rebate. The customer could use their smartphone to scan a QR code and enter the data necessary to get the rebate redemption code. The rebate would then be given directly to the customer by the big-box retailer.

• The rebate would be given instantly and cross-referenced with available SGIP funds in a given IOU service territory in real-time. At this point, funds would be “reserved” and the distributor or retailer would receive reimbursement on a monthly basis.

• Additional eligible project costs would be applied for via an additional rebate process once work is complete and proven. The same online system would be used.
Larger HPWH Systems (large residential and commercial)

• A 2-step process wherein (1) the incentive amount is reserved and (2) the project is built and verified funding is received by the developer or system owner.

• Due to longer project lifecycles (18-24 months) than smaller projects, developers need assurance that incentives will be available at time of project completion.

• Similar to SGIP projects today, project cap levels will be established.
Extra Incentives for Systems that Provide Additional Help for the Grid

• HPWHs that can shift load should be provided with an additional incentive because of the additional value they can provide to the grid.

• Systems must meet pre-set eligibility requirements (e.g., JA13 compliance, program standards) and must also be on the SGIP pre-approved HPWH lists discussed above (i.e., CEC, NEEA, and EPA’s ENERGY STAR eligible HPWHs.)
Additional Project Costs

• All HPWH projects shall be eligible for additional project costs to include:
  • labor
  • panel upgrades
  • wiring
  • supply and return plumbing
  • electrical components
  • expansion tanks
  • code required upgrades
  • construction costs.

• Smaller systems will submit for additional project costs post installation via the online portal once work is completed. Larger systems will submit via their application process (similar to large storage projects today).
Project Caps

• There should be a per project cap on HPWHs within the SGIP program.
  • Unitary Residential, Unitary Commercial and Central Commercial projects should have per project caps
  • Central Residential should have a per apartment cap as well as an overall project cap
No Double Dipping for Unit Rebates, Possible for Additional Costs

• HPWHs that receive an SGIP incentive shall not be eligible for other active rebates or incentives.
• All IOU customers are eligible for rebates relating to eligible product costs as described above.
• Recipients shall decide which program they want to take advantage of.
Equity

- Projects serving disadvantaged communities should be given special consideration in distribution of funds. This should occur via the creation of a separate, protected category for equity customers.
Principles

• Ease of Validation
• Simple, Yet Verifiable Application Processes
  • Differentiated by size
• Extra Incentives for Systems that Can Load Shift
• Additional Project Costs Covered
• Project Caps
• No Double Dipping on Units, Possible to Access Additional Costs
• Equity Assistance
SGIP HPWH
Budget Allocation & Incentive Proposal

Pierre Delforge (NRDC), Kayla Robinson, Panama Bartholomy (Building Decarbonization Coalition), Matt Vespa (Earthjustice)

May 7, 2020
Budget Allocation

Similar to the treatment of energy storage systems today in SGIP, we suggest carve outs by category of HPWH:

<table>
<thead>
<tr>
<th>Category</th>
<th>Allocation Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unitary or Central – Equity</td>
<td>At least 30% of Overall Budget ($13.4 MM)</td>
</tr>
<tr>
<td>Unitary Systems – Open*</td>
<td>At most 50% of Overall Budget ($31.3 MM)</td>
</tr>
<tr>
<td>Central Systems – Open*</td>
<td>At most 20% of Overall Budget ($13.4 MM)</td>
</tr>
</tbody>
</table>

*Open: any customer, equity and others
4 Classifications of HPWH Systems

- Unitary Residential
- Unitary Commercial
- Central Residential
- Central Commercial
### Classifications of HPWH Systems

<table>
<thead>
<tr>
<th>HPWH Type</th>
<th>Application Process</th>
<th>Definition</th>
<th>Eligibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unitary Residential</strong></td>
<td>Midstream Instant Rebate + Mail-In for Additional Costs</td>
<td>Heat pump water heater with a total nominal compressor output power of 6 kW or less, including <strong>integrated</strong> heat pumps with storage as shipped from the point of manufacture and <strong>split-system</strong> heat pumps that consist of a separate heat pump and storage tank that are designed and marketed to operate together.</td>
<td>NEEA Tier 3-compliant + JA13-compliant for load shifting adder</td>
</tr>
<tr>
<td><strong>Unitary Commercial</strong></td>
<td>Midstream Instant Rebate + Mail-In for Additional Costs</td>
<td>Heat pump water heater with a total nominal compressor output power <strong>greater than 6 kW</strong> with <strong>integrated storage</strong> as shipped from the point of manufacture, including skid systems that are pre-plumbed and wired.</td>
<td>ENERGY STAR-certified + Appendix A-compliant for load shifting adder</td>
</tr>
<tr>
<td><strong>Central Residential</strong></td>
<td>2-Step Reservation Process</td>
<td>Heat pump water heater(s) without integrated storage as shipped from the manufacturer, and <strong>designed for residential, single and multi-family applications.</strong></td>
<td>Approval in CEC Title 24 CBECC software + Appendix A-compliant for load shifting adder</td>
</tr>
<tr>
<td><strong>Central Commercial</strong></td>
<td>2-Step Reservation Process</td>
<td>Heat pump water heater(s), without integrated storage as shipped from the manufacturer, and <strong>designed for commercial applications.</strong></td>
<td>Approval in CEC Title 24 CBECC software + Appendix A-compliant for load shifting adder</td>
</tr>
</tbody>
</table>
Incentive Design Principles

1. Come in slightly below the conventional price for both product and installation to get customer attention and drive market transformation

2. Significant customer “co-pay” to stretch program funds to more units

3. Load shifting controls adder built into the retail price with incentive for load shifting

4. Avoid incentive to undersize, encourage right-sizing to maximize efficiency and flexibility benefit
Cost Case Studies

Total cost for each install will vary greatly based on:

- Product Cost (size and equipment type)
- Load Shifting Product Cost (hardware/software)
- Installation Cost (basic install/wiring/ducting)
- Energy Source Conversion Cost (panel upgrade)
## Unitary Residential – Cost Samples

<table>
<thead>
<tr>
<th>50 gallons</th>
<th>Description</th>
<th>Cost No load shifting</th>
<th>Cost with load shifting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit</td>
<td>$1,100</td>
<td>$1,500</td>
</tr>
<tr>
<td></td>
<td>Wiring From unit to panel</td>
<td>$300-$1,000</td>
<td>$300-$1,000</td>
</tr>
<tr>
<td></td>
<td>Other installation labor (plumbing)</td>
<td>$700-$1,000</td>
<td>$700-$1,000</td>
</tr>
<tr>
<td></td>
<td>Panel upgrade</td>
<td>$3,000-$4,000</td>
<td>$3,000-$4,000</td>
</tr>
<tr>
<td></td>
<td>Total pre-incentive installed cost (w/o panel)</td>
<td>$2,100-$3,100</td>
<td>$2,500-$3,500</td>
</tr>
<tr>
<td></td>
<td>Total pre-incentive installed cost (w/ panel)</td>
<td>$5,100-$7,100</td>
<td>$5,500-$7,500</td>
</tr>
<tr>
<td>Incentive</td>
<td>Base incentive</td>
<td>$800</td>
<td>$800</td>
</tr>
<tr>
<td></td>
<td>Load shifting adder Installation up to $800</td>
<td>$400</td>
<td>$400</td>
</tr>
<tr>
<td></td>
<td>Panel upgrade Max $1,600-$4,100</td>
<td>$2,000-$4,500</td>
<td>$2,000-$4,500</td>
</tr>
<tr>
<td>Total Cost to Customer</td>
<td>Retail price</td>
<td>$300</td>
<td>$300</td>
</tr>
<tr>
<td></td>
<td>Installed cost (w/o panel)</td>
<td>$500-$1,500</td>
<td>$500-$1,500</td>
</tr>
<tr>
<td></td>
<td>Installed cost (w/ panel)</td>
<td>$1,000-$3,000</td>
<td>$1,000-$3,000</td>
</tr>
</tbody>
</table>
# Unitary Residential – Cost Samples

<table>
<thead>
<tr>
<th>80 gallons</th>
<th>Description</th>
<th>Cost No load shifting</th>
<th>Cost with load shifting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td></td>
<td>$1,900</td>
<td>$2,300</td>
</tr>
<tr>
<td>Wiring</td>
<td>From unit to panel</td>
<td>$300-$1,000</td>
<td>$300-$1,000</td>
</tr>
<tr>
<td></td>
<td>Other installation labor (plumbing)</td>
<td>$700-$1,000</td>
<td>$700-$1,000</td>
</tr>
<tr>
<td>Panel upgrade</td>
<td></td>
<td>$3,000-$4,000</td>
<td>$3,000-$4,000</td>
</tr>
<tr>
<td>Total pre-incentive</td>
<td>Unit price</td>
<td>$1,900</td>
<td>$2,300</td>
</tr>
<tr>
<td></td>
<td>Installed cost (w/o panel)</td>
<td>$2,900-$3,900</td>
<td>$3,300-$4,300</td>
</tr>
<tr>
<td></td>
<td>Installed cost (w/ panel)</td>
<td>$5,900-$7,900</td>
<td>$6,300-$8,300</td>
</tr>
</tbody>
</table>

| Incentive   | Base incentive                                   | $1,600                | $1,600                  |
|            | Load shifting adder                              | up to $800            | up to $800              |
|            | Installation                                     | $2,500                | $2,500                  |
|            | Panel upgrade                                    | $2,400-$4,900         | $2,800-$5,000 (cap)     |

| Total Cost to Customer | Retail price                                      | $300                  | $300                    |
|                       | Installed cost (w/o panel)                        | $500-$1,500           | $500-$1,500             |
|                       | Installed cost (w/ panel)                         | $1,000-$3,000         | $1,300-$3,300           |
## Proposed HPWH Incentives

<table>
<thead>
<tr>
<th>HPWH Type</th>
<th>Base Rebate</th>
<th>Load Shifting Capability Adder</th>
<th>Additional Eligible Project Costs</th>
<th>Total Project Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unitary Residential</strong></td>
<td>&lt;= 45 gal: $700</td>
<td>$400</td>
<td>Installation: up to $800 (itemized)</td>
<td>$2,500 / installed HPWH (w/o panel)</td>
</tr>
<tr>
<td></td>
<td>&gt;45-55 gal: $800</td>
<td></td>
<td>Panel: $2,500</td>
<td>$5,000 / installed HPWH (w/ panel)</td>
</tr>
<tr>
<td></td>
<td>&gt;55-75 gal: $1,200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;75 gal: $1,600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unitary Commercial</strong></td>
<td>$300 / kW*</td>
<td>$100 / kW</td>
<td>Installation: up to $150 / kW (itemized)</td>
<td>$30,000 / installed HPWH</td>
</tr>
<tr>
<td>(e.g. $3,000 for a 10-kW system)</td>
<td>($1,000 / 10 kW)</td>
<td>($1,500 / 10 kW)</td>
<td>Panel: $2,500</td>
<td></td>
</tr>
<tr>
<td><strong>Central Residential</strong></td>
<td>$800 / kW</td>
<td>$400 / kW</td>
<td>Installation: up to $700 / kW (itemized)</td>
<td>$1,900 / kW</td>
</tr>
<tr>
<td>(e.g. $52,000 for a 50-unit project)</td>
<td>(e.g. $26,000 for a 50-unit project)</td>
<td>(e.g. $45,000 for a 50-unit project)</td>
<td>Panel: $0</td>
<td>Project / reservation cap: no project can exceed: $200,000</td>
</tr>
<tr>
<td><strong>Central Commercial</strong></td>
<td>Same as Central Res</td>
<td>Same as Central Res</td>
<td>Same as Central Res</td>
<td>Project / reservation cap: no project can exceed: $200,000</td>
</tr>
</tbody>
</table>

* Total nominal compressor output capacity
Appendix A: Qualification Requirements for HPWHs – Requirements

Complement to Joint Appendix 13 ("JA13") for commercial and central HPWH

Leverages JA13 with adjustments for commercial and central HPWH specifics
Appendix A: Qualification Requirements for HPWHs – Requirements

To qualify as a demand management heat pump water heater for the purposes of SGIP rebate eligibility, the following requirements must be met:

1. Safety Requirements
2. Minimum Thermal Storage Requirements
3. Control Requirements for Demand Management and Local Time-of-Use
4. **Load shifting performance requirements**
5. Non-standard mode exception
6. Local time management
7. Override and permanent disabling
8. User interface
9. Measurement and validation
## 2. Minimum Thermal Storage Requirements

<table>
<thead>
<tr>
<th>Unitary Residential (JA13, for reference)</th>
<th>Unitary Commercial</th>
<th>Central Residential</th>
<th>Central Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comply with First Hour Rating (FHR) in 2018 Uniform Plumbing Code (UPC)</td>
<td>Must have a minimum hot water delivery of <strong>300 gallons per day</strong></td>
<td>Must have a minimum <strong>0.84 kWh</strong> thermal storage per person based on design occupancy of the project described in the SGIP rebate application.</td>
<td>Enough thermal storage to support a minimum <strong>4 hours of compressor operation</strong>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The sizing calculation is based on an ambient air temperature of 67.5 F and an inlet water temperature of 58 F</td>
<td></td>
</tr>
</tbody>
</table>
For a heat pump water heating system sized per the minimum storage requirements in section 2, above, and with the set point from the point of manufacture, the System shall be able to shift:

<table>
<thead>
<tr>
<th>Basic Load Up + Light Shed</th>
<th>Unitary Residential (JA13, for reference)</th>
<th>Unitary Commercial</th>
<th>Central Residential</th>
<th>Central Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A minimum of 0.5 kWh of electrical energy per event</td>
<td>A minimum of 1 kWh of electrical energy per 100 gallon storage per event</td>
<td>A minimum of 0.2 kWh of electrical energy per person per event (design occupancy)</td>
<td>4 hours minimum of compressor run time at nominal rated power (same 4 hours as thermal storage requirement, not additive)</td>
</tr>
<tr>
<td>Advanced Load Up + Light Shed</td>
<td>A minimum of 1 kWh of electrical energy per event, including at least 0.5 kWh on Advanced Load Up</td>
<td>A minimum of 2 kWh of electrical energy per 100 gallon storage per event</td>
<td>A minimum of 0.4 kWh of electrical energy per person per event, including at least 0.2 kWh on Advanced Load Up (design occupancy)</td>
<td></td>
</tr>
</tbody>
</table>
Questions?
Self-Generation Incentive Program

APPLICATION PROCESS OVERVIEW
Two-Step Application Process for Residential & Non-Residential Entities (<10kW)

1. RESERVATION REQUEST
   - Completed RESERVATION REQUEST FORM submitted to PA with required attachments
   - ONCE A PROJECT IS ASSIGNED FUNDING IN A GIVEN STEP, PA reviews Reservation Request documents. Once documentation has been approved and eligibility requirements have been met, a CONDITIONAL RESERVATION LETTER is issued.
   - INCENTIVE CLAIM FORM (ICF) documents are due within 12 months of the Confirmed Reservation date.

2. INCENTIVE CLAIM
   - Completed ICF documents submitted to the PA once the system is installed, interconnected and operational.
   - PA reviews ICF documents and may schedule a site inspection to verify system eligibility.
   - Upon approval, the incentive payment process begins. Upfront Incentive will be issued and the Performance Budget Incentive process begins (where applicable).
Three-Step Application Process for Public & Non-Public Entities (10kW+)

1. **RESERVATION REQUEST**
   - Completed **RESERVATION REQUEST FORM** submitted to PA with required attachments.
   - **ONCE A PROJECT IS ASSIGNED FUNDING IN A GIVEN STEP,** PA reviews Reservation Request documents. Once documentation has been approved and eligibility requirements have been met, a **CONDITIONAL RESERVATION LETTER** is issued.
   - **PROOF OF PROJECT MILESTONE (PPM)** documents are due within 90 calendar days of the Conditional Reservation date for non-public entities and 240 days for public entities.

2. **PROOF OF PROJECT MILESTONE**
   - Completed **PROOF OF PROJECT MILESTONE** documents submitted to the PA by the PPM due date.
   - PA reviews PPM documents. Once the documentation has been approved a **CONFIRMED RESERVATION LETTER** is issued.
   - **INCENTIVE CLAIM FORM (ICF)** documents are due within 18 months of the Conditional Reservation date.

3. **INCENTIVE CLAIM**
   - Completed **ICF** documents submitted to the PA once the system is installed, interconnected and operational.
   - PA reviews ICF documents and may schedule a site inspection to verify system eligibility.
   - Upon approval, the incentive payment process begins. Upfront Incentive will be issued and the Performance Budget Incentive process begins (where applicable).
Reservation Requests

2.3.1 Submission
• Complete package submitted online, not to exceed the Developer cap for the active step.

2.3.2 Lottery Process
• Lottery triggered if applications exceed available funds for a given budget / step and conducted separately for large scale, small residential and by territory.

2.3.2.1 Priority Projects
• Located in LADWP or West LA LCR of SCE, and those with on-site renewable generation claiming the ITC, charging a minimum of 75% from on-site renewable generator.
• In lottery, priority SGIP: 1) renewable projects using wind, waste to heat to power, pressure reduction turbines or 100% biogas; 2) 100% directed biogas; 3) Blended on-site biogas; 4) Blended directed biogas.

2.3.3 Pause Period
• No less than 20 days when a budget category changes to the next incentive step.
• After 10 days, Pas determine if the incentive level for storage technologies will increase from $0.05/Wh to $0.10/Wh.

2.3.4 Incomplete Reservation Request
• Applicants will have 15 calendar days to respond to PA with necessary information.

2.3.5 Approval
• Conditional Reservation for 3-Step Applications / Confirmed Reservation Letter for 2-Step Applications.

2.3.6 Wait List & Program Closure
• Once funds have been fully allocated, applications will be placed on a waitlist to be funded as incentive funds become available throughout the remainder of the program.
Proof of Project Milestone & Incentive Claim

<table>
<thead>
<tr>
<th>Proof of Project Milestone</th>
<th>Incentive Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.4.1 Submission</strong></td>
<td><strong>2.5.1 Submission</strong></td>
</tr>
<tr>
<td>• Completed PPM submitted to PA online.</td>
<td>• Completed ICF submitted to PA online.</td>
</tr>
<tr>
<td><strong>2.4.2 Incomplete PPMs</strong></td>
<td><strong>2.5.2 Incomplete ICFs</strong></td>
</tr>
<tr>
<td>• If PPM package is not received by the due date, the application may be cancelled by the PA.</td>
<td>• If complete ICF is not received by the reservation expire date, the application may be cancelled by the PA.</td>
</tr>
<tr>
<td>• Applicants have 15 days to respond with necessary information.</td>
<td>• Applicants have 30 calendar days to respond with necessary information.</td>
</tr>
<tr>
<td><strong>2.4.3 Approval</strong></td>
<td><strong>2.5.3 Inspections</strong></td>
</tr>
<tr>
<td>• A Confirmed Reservation Letter is issued once all PPMs requirements have been met.</td>
<td>• PA may schedule inspection to verify system installation, operations, interconnection, and conformity to SGIP eligibility requirements.</td>
</tr>
<tr>
<td></td>
<td><strong>Failed Inspections</strong></td>
</tr>
<tr>
<td></td>
<td>• Notification to applicant, host customer &amp; system owner of reasoning for failed inspection; +60 calendar days to bring the project into compliance</td>
</tr>
<tr>
<td></td>
<td><strong>If the site load, renewable fuel or waste energy forecast has not yet materialized:</strong></td>
</tr>
<tr>
<td></td>
<td>- Payment issued based on demonstrated side load, renewable fuel or waste energy available at the time of initial post-installation inspection; or</td>
</tr>
<tr>
<td></td>
<td>- Wait for the site load, renewable fuel or waste energy to materialize within 12-months from the date of the ICF &amp; documents were received.</td>
</tr>
<tr>
<td></td>
<td><strong>2.5.4 Approval</strong></td>
</tr>
<tr>
<td></td>
<td>• Approval received with approved IC documentation &amp; inspection</td>
</tr>
</tbody>
</table>
2.6.1 Modifications Pre-ICF
• Changes pertaining to System Owner, Payee, equipment type or system capacity must be approved by PA before application can proceed.

2.6.2 Modifications Post-ICF
• In general, changes to completed project are not allowed. If the event that a system needs to be upgraded / changed due to poor performance, applicant must notify PA.

2.6.3. Extensions & Exceptions
• Extensions reviewed on case-by-case basis after submitted in writing to the PA. Extensions cannot exceed reservation expire date.
• Projects are limited to a maximum of three 6-month extensions.
4 Classifications of HWPH Systems

- Unitary Residential
- Unitary Commercial
- Central Residential
- Central Commercial
<table>
<thead>
<tr>
<th>APP. PROCESS</th>
<th>HPWH TYPE</th>
<th>DEFINITION</th>
<th>ELIGIBILITY</th>
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<tbody>
<tr>
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<td>Unitary Residential</td>
<td>Heat pump water heater with a total nominal compressor output power of 6 kW or less, including integrated heat pumps with storage as shipped from the point of manufacture and split-system heat pumps that consist of a separate heat pump and storage tank that are designed and marketed to operate together.</td>
<td>NEEA Tier 3 compliant + JA13- compliant for load shifting adder</td>
</tr>
<tr>
<td>Midstream Instant Rebate + Online Submission for Additional Costs</td>
<td>Unitary Commercial</td>
<td>Heat pump water heater with a total nominal compressor output power greater than 6 kW with integrated storage as shipped from the point of manufacture, including skid systems that are pre-plumbed and wired.</td>
<td>ENERGY STAR CERTIFIED + Appendix A compliant for load shifting adder</td>
</tr>
<tr>
<td>2-Step Reservation Process</td>
<td>Central Residential</td>
<td>Heat pump water heater(s) without integrated storage as shipped from the manufacturer, and designed for residential, single and multi-family applications.</td>
<td>Approval in CEC Title 24 CBECC software + Appendix A compliant for load shifting adder</td>
</tr>
<tr>
<td>2-Step Reservation Process</td>
<td>Central Commercial</td>
<td>Heat pump water heater(s), without integrated storage as shipped from the manufacturer, and designed for commercial applications.</td>
<td>Approval in CEC Title 24 CBECC software + Appendix A for load shifting adder</td>
</tr>
</tbody>
</table>
New Process for Unitary (Residential and Commercial) HPWH Instant Midstream Rebate

1. RECEIVING OF INITIAL REBATE
   - Customer, distributor or contractor to login into new page in SGIP.
   - Once there, they select which IOU they are a customer of and enter installation address. They also select the water heater model they are purchasing to determine their incentive level (model type will impact whether they receive DR adder).
   - They then sign the equivalent of a “host customer contract” that obligates them to agreed upon terms and conditions, confirms they are not receiving other HPWH monies, etc. Note: If the “host customer” is not purchasing the equipment, they have 30 days to e-sign.

2. ADDITIONAL ELIGIBLE PROJECT COSTS
   - All HPWH projects shall be eligible for additional project costs to include: labor, panel upgrades, wiring, supply and return plumbing, electrical components, expansion tanks, code required upgrades and construction costs.
   - These costs will be capped.
   - Upon installation of HPWH and completion of work eligible for additional costs, lead applicant will enter proof of work in the SGIP system, using the unique SGIP ID and customer address. This will be reviewed by SGIP and a check will be sent within 30 days.

   - Once submitted, this is cross referenced instantly with funds in SGIP system and if funds are available, a coupon is issued.
   - Once information is entered and validated, purchaser instantly receives an SGIP Project ID and a “rebate coupon”.
   - They take this coupon to the register where it is scanned and linked to a specific HPWH (by serial number). The seller now has a reserved rebate that is earmarked and cross referenced with HPWH serial number and SGIP project ID.
Process for Central (Residential and Commercial) HPWHs

1. **RESERVATION REQUEST**
   - Completed RESERVATION REQUEST FORM submitted to PA with required attachments
   - Once a project is assigned funding in a given step, PA reviews Reservation Request documents. Once documentation has been approved and eligibility requirements have been met, a CONDITIONAL RESERVATION LETTER is issued.
   - PROOF OF PROJECT MILESTONE (PPM) documents are due within 90 calendar days of the Conditional Reservation date for non-public entities and 240 days for public entities.

2. **PROOF OF PROJECT MILESTONE**
   - Completed PROOF OF PROJECT MILESTONE documents submitted to the PA by the PPM due date.
   - PA reviews PPM documents. Once the documentation has been approved a CONFIRMED RESERVATION LETTER is issued.
   - INCENTIVE CLAIM FORM (ICF) documents are due within 18 months of the Conditional Reservation date.

3. **INCENTIVE CLAIM**
   - Completed ICF documents submitted to the PA once the system is installed, interconnected and operational.
   - PA reviews ICF documents and may schedule a site inspection to verify system eligibility.
   - Upon approval, the incentive payment process begins. Upfront Incentive will be issued and the Performance Budget Incentive process begins (where applicable).

HEAT PUMP WATER HEATERS

While details still need to be worked out we are proposing that the process for central projects mirror the existing SGIP process as closely as reasonable.
Questions?

HPWH APPLICATION PROCESS OVERVIEW
Heat Pump Water Heater Application and Incentive Calculation Process

Presenters: Jason Legner & Blaine Waymire
SoCalGas
HPWH Value Stacking

“We are aware that energy efficiency or other programs offer and may expand incentives for HPWHs but observe that SGIP is concerned with load-shifting and other storage technology services, not energy efficiency.”

-Page 98 D.19-09-027- Decision Establishing Equity Resiliency budget

- Multiple EE programs are offering upstream and midstream incentives (rebates, discounts, etc.) for HPWHs
- Leveraging other programs will help maximize ratepayer value
- SGIP eligible HPWHs should receive incentives for their ability to operate as an energy storage system
- Market transformation will require quick access to incentives and value stacking
“Quick Access”
Residential System Applications

• Conditional incentive reservation can be issued at site upon customer verification, proof of purchase or purchase order (no payment required), and electronic signature (will require database upgrades)

• Upon installation an online incentive claim request to be submitted with the following information:
  • Contractor/Installer Licensing
  • Permit (if necessary)
  • Total Eligible Project Cost information
  • Confirmation of **technology with JA13** (where applicable)
  • Payee Information
  • Verification of installation (if necessary)

• E-Signatures
  • Will agree to all program T&Cs (10 year warranty language, M&E participation, and other legalese)

• Payment can be generated within (?) days of confirmed installation

• Commercial Systems to follow current Application and PBI protocol
Incentives Calculated on an Energy Basis (kWh)*

- For illustration purposed examples are using existing Energy Storage rates:
  - General Market: $0.25/Wh
  - Equity: $0.85/Wh
  - Potential Control Adder: $0.25/Wh
- Example: 65 Gallon HPWH at 130 F Set Point:
  - Load shift = 3.7 kWh
- SGIP Incentive General Market:
  - $3.7 kWh * $(250+250)/kWh = $1,850
- SGIP Incentive Equity Budget:
  - $3.7 kWh * $(850+250)/kWh = $4,070

*PUC § 379.6(l)(3)
### kWh Incentives (Based on Preliminary Info)

*all costs provided by NRDC to HPWH working group on 3/16/2020*

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Size and Cost</th>
<th>SGIP Incentive Rate per kWh</th>
<th>Total (General Market)</th>
<th>Total (Equity Budget)</th>
</tr>
</thead>
</table>
| **Equipment (no load shifting controls, retail)** | 50-gallon: $1,100 to $1,300  
65-gallon: $1,600 to $1,800  
80-gallon: $1,800 to $2,000 | General Market  
HPWH $0.25  
Equity HPWH $0.85 | GM @ Set point of 120 - 150 (F)  
50 - $600 - $925  
65 - $800 - $1,600  
80 - $975 - $1,475 | Equity @ Set point of 120-150 (F)  
50 - $2,040 - $2,890  
65 - $2,720 - $4,080  
80 - $3,315 - $5,015 |
| **Load shifting incremental costs** | HPWH w/controls $0.25 | Load Shifting Control Adder  
(120 – 150 F)  
50 - $600 - $925  
65 - $800 - $1,200  
80 - $975 - $1,475 | Load Shifting Control Adder  
(120 – 150 F)  
50 - $600 - $925  
65 - $800 - $1,200  
80 - $975 - $1,475 |
| **Installation** | $800+ | **Total Possible Incentive:**  
50 - $1,200 - $1,850 (45 – 64%)  
65 - $1,600 - $2,800 (50 – 82%)  
80 - $1,950 - $2,950 (57 – 81%) | Equity  
50 - $2,640 - $3,815 (98 – 132%)  
65 - $3,520 - $5,280 (103 – 155%)  
80 - $4,290 - $6,490 (126 – 180%) |
| **Additional project costs** |  
- Electrical conduit  
$500-$1,000  
- Electrical panel upgrade  
$3,000-$4,000  
- Vents and ducts  
$200-$500 | For equity customers only including electrical upgrades into TEPC will allow them to obtain the total incentive up to 180% of the total costs |  
| **Total Equipment Costs + Installation + Electrical Upgrades:** | 50 - $6,400 - $8,400  
65 - $7,000 - $8,900  
80 - $7,200 - $9,100 |

*all costs provided by NRDC to HPWH working group on 3/16/2020*
Existing Measurement and Evaluation

- Residential HPWH will be measured on a fleet level for 10 years, and will follow existing protocol as residential batteries
  - Metering to be completed on a sample basis by Itron
- Non-Residential HPWH will be measured by PBI performance on a project by project basis for year 1 – 5 and Fleet Performance for Years 6 – 10
  - PBI Metering to be used for all 10-year reporting
Appendix

- **EE HPWH Programs:**
  - **SDG&E** - $100 to $350 rebate
  - **SCE** – up to $1000 upstream incentive
    - [https://www.sce.com/residential/rebates-savings/rebates](https://www.sce.com/residential/rebates-savings/rebates)
  - **PGE** - $300 rebate

- **Building Decarbonization Program:**
  - [http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M326/K933/326933578.PDF](http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M326/K933/326933578.PDF)
Self-Generation Incentive Program (SGIP)
Heat Pump Water Heater (HPWH)

Q&A
Open Discussion