

Step 1: Identify Barriers

1. First cost*
2. Existing conditions* ^{Upstream}
 - a. Space
 - b. Electric panel
 - c. Unpermitted work
3. Rates***
 - a. Customer will/may not save on bill ^{Downstream}
 - b. Rates will continue to change/ go up so savings could diminish over time ^{Downstream}
 - c. Customer concern over rate hikes
 - d. Gas is cheap right now
4. Lack of preemptive, proactive sales channel*
5. Emergency replacement* ^{Midstream}
 - a. Not stocked @ distributor/ retailer – 48 hrs gas vs. 2 weeks HPWH*
 - b. Distributors lack capital to stock a low-demand item
 - c. Contractors and customers lean toward like-replacement
6. Lack of broad marketing campaign / value proposition***
 - a. Customer Value Proposition ^{Upstream, Midstream, and Downstream}
 - b. Need clear show clear connection between EV, PV, HPWH, etc (full electrification package)
 - c. Unclear value that HPWH can supply ^{Upstream}
 - d. HPWH needs to be articulated in broader vision / broader value proposition (electrification, decarbonization, public health, etc.)
7. Customer cost perception
 - a. Lack of education about WH generally
 - b. Lack of awareness of incentive programs
 - c. Perception of high expense
 - d. Tariffs -> cost for distribution
8. Concerns about increased emissions w/early replacements
 - a. Life cycle assessment
 - b. Cradle to cradle
 - c. Prove positive impact
 - d. Green customers wary of refrigerants
9. Lack of “voice of customer” related to WH, especially HPWH ^{Upstream}
 - a. Customers don’t think about WH until it breaks, then want easy (like) replacement
 - b. Customer journey is too complex
10. Program issues**
 - a. Lack of cross-selling w/other electric offerings
 - b. Lack of favorable rate design
 - c. Lack of consistent Programs across utilities
 - d. Customers don’t know about Incentives
 - e. Require too much paperwork for contractor and end-user
11. Lack of education / trained installers**

- a. Installer dismissive of technology
- b. Risks of callback/install
- 12. Plumber business model ^{Midstream}
 - a. Plumbers not good advocates for electrification upsells
 - b. Prefer routine
 - c. Minimal paperwork
 - d. Overquote for unfamiliar technology- HPWH
 - e. Easier to give fast low quote for like-replacement (gas especially)
- 13. Lack of “ecosystem” to support HPWH (similar to gas storage) (PV adoption example of newly developed thriving ecosystem)
- 14. Requires multiple trades for install
 - a. Additional permitting hurdles
- 15. Building offices / permit offices lack of code understanding- ability to install electric replacement for gas WH
- 16. Society value/ cost not built in for customers
- 17. Resilience clarifications / lack of clarity GWH vs. EWH
 - a. Perception electric WH will not function without electricity, but gas will (during emergencies)
- 18. Policy prevents fuel switching
 - a. 3-prong test
- 19. Rural areas require special orders
- 20. Codes & Standards (*not focus of this forum*)

Step 2: What are good program elements?

- 1. Make it simple**
 - a. Easy choices
 - b. Streamlined, minimal paperwork for contractors and end-users
 - c. Upfront incentive savings (don't require participant to carry debt / rebate)
- 2. Cohesive statewide program*
 - a. Long term program commitment- set up a program and don't change it for a longer time period- needs time to work
- 3. Focus upstream
 - a. Pro-deals (get installers/contractors to home-test and then champion)
 - b. Equipment leasing
- 4. Price
 - a. Price near-equivalent to gas (worked in Maine)
 - b. Disrupt market for cost equivalency to gas
 - c. TOU- free electricity
 - d. 12-month thermal storage credit
- 5. Utilities facilitating HPWH purchase**
 - a. On-bill financing (OBF)
 - i. Works in AL (Southern Power)

- b. Bulk purchase for equipment
 - c. Midstream consignment program (for free inventory at distribution center so HPWH are ready for emergency replacement)
 - i. Have an upfront display / demo at distribution center and retail outlets
 - d. For L.I. buy HPWH & cost is install- bulk purchase
 - e. Data analytics on neighborhoods for scale & aggregate/ like pricing
6. Installation
- a. Point of sale change out
 - b. Good quality assurance
 - c. Support trade partnerships
 - d. Good quality control during install
 - e. Programs need consistent message that can be delivered by contractor
7. Encourage planned replacement / early replacement
- a. Modular bundling HPWH w/other energy upgrades
 - i. Pair HPWH w/ PV
 - ii. Bundling w/ other electrification & cleantech
 - iii. Bundling w/other decarbonization (EV, PV, etc)
 - iv. Complete sizing for electric service with or without PV
 - b. Target communities based on “good” housing stock to easily install
 - i. WH in first floor garage
 - ii. Already have panel upgrades
 - c. MF is good target- 1 contact for multiple WH
8. Focus on Emergency Replacement (ER)
- a. Propane -> HPWH a good starting market
 - b. Have HPWH available on the “emergency replacement truck”
 - i. Loaner gas WH on the truck (so client can have temp HW while waiting for HPWH)
9. Smart / Tech/ IoT
- a. Smart phone assessment/ sale – App development
 - b. Sell tech interface- settings, app, etc. – easy and engaging controls for customer (like Nest, Ecobee, etc)
 - c. Incentivize “smart” HPWH (stop selling “dumb” appliances/WH/etc), only install connected or connectable
 - d. Demo/retail installations w/ displays and data
 - e. Survey-smart phone site assessment to support evaluation of HPWH
 - i. App sends contractor pictures to get fast realistic pricing estimate
 - f. Tied to grid / DER
10. Include co-benefits in program design
- a. Quantify and include non-energy benefits (NEB)
 - i. lifestyle benefits
 - ii. Focus on health benefits
11. Include Disadvantaged Communities
12. Case study / referral
- a. Simulate market with a collection of targeted replacements

- b. Overall agreement- no more small pilots and demos
- 13. Provide wrap-around services, design/build “tiger teams” for ZC master plan

3 Program Design Priorities

Orienting methods:

- Keep it simple
- Focus on customer
- Don’t focus on legislation
- Connect recommendation to “starghl”?
- What value, to whom?
- ACTIVITIES, OUTPUTS, & OUTCOMES

Parking lot for other ideas:

- Central DHW
- Small/ light commercial cross-over market
- Workshop: local vs. national outreach marketing, national vision
- How to ID worst performing gas WH
- Codes & Standards dev.

Note from editor: the 5 groups engaged in organic discussions, where there output is not always reflective of the intended topic

1 Value proposition (financing, equity, value to stakeholders)

Sticky note

Top elements of value stream:

- Ratepayers
 - Is it saving money?
 - Is it healthy and safe for my family
 - Is it more sustainable?
 - Does it provide better service?
- Midstream
 - Higher profit margin
 - Differentiation / leg up on competition
- Manufacturers
 - Higher profit margin
- Utilities
 - Increased electricity sales, grid services/ reliability
- Activities:
 - Define tipping point for midstream backing/promoting of HPWH
 - Modify fuel substitution rules
 - Understand secondary value streams (grid services/DR)

- Analyze context/factors driving decision to switch- rates, DR, PV, financing, first costs
- Outputs
 - Flexible tool to help understand value factors and target MEO
 - Training / certification for contractors and other midstream
 - Market characterization to drive action/ engagement from midstream and upstream
- Outcomes
 - Market reflecting a more holistic and systems level capture of HPWH value proposition for interaction with stakeholders
- Upstream
 - Activities
 - sell more HPWH's
 - IOUs bulk sale purchase
 - Know bulk purchase threshold #'s for pricing
 - Output: increased orders from distributors & retail
 - Outcome: better margins, higher sales stimulate MT
- Midstream (builder, contractor, distributor, retail)
 - Activities
 - Focus on 'progressive' contractors
 - Need to define "tipping point" for positive value (profit? Incentives?)
 - Training and education, leads, certification, fast track permitting
 - Output
 - Training & ed
 - Certifications
 - Market characterization study
 - Outcome
 - More profit
 - Motivation to stock and install HPWH
- Downstream (consumers)
 - Activity
 - Analyze market
 - Work for ratepayer- TOU, first cost, DR, PV... incentives, finance (OBF)
 - Output: analysis/ retrofit tool/ calculator from CPUC and others
 - Outcome: combination of the above for segments. Prioritize those for whom it is already CE.

2 Workforce training/ contractor engagement

Sticky note

- *Question: who provides trainings?*
- *"when people are scared of something, they don't promote it"*
- *Pro-deals- let them live it. Pro-deals manufacturing, power company too?*
- *Types of markets/ training need*
 - *Existing: like for like, gas to HPWH*
 - *New: easier to start with new trainees (HVAC tech, etc)*
- *Who are we talking to?*

- HVAC (more technical) & Plumbers
- How many companies in CA do both? How can we train plumbers & electricians?
- Unions as training partners? How many union plumbers are there?
- Electrification cuts gas jobs – retraining opportunities?
- Plumbers are retooling, electricians are entering a new space
 - We don't necessarily want to trigger panel upgrades (expensive)
- Activity: contractor training
 - Who does it?
 - Manufacturer & distributor can do grainings for groups of builders
 - Example: SMUD worked w/ large distributors to reach contractors and representatives for training.
 - Q: is training brand specific? No, primarily HPWH fundamentals
 - Contractors and distributors have existing relationships
 - Sales pitch to building community about the product, what to share with consumers, and develop comfort w/ product
 - Coordinate education with rebates, and other incentives
- Output: trained contractors, product awareness, QA/QC
- Outcome: contractors are the salesmen
- Goal: educated installers act as HPWH guides during homeowner triage/assessment.
 - Note: distributors work in broad territories, meaning their education can have wide reach and high impact.
 - Could they share market research with cities and local governments?
- Challenge: building departments, trainings for inspectors and building officials
 - Questions arise from code inconsistency, interaction between mechanical, electrical, and energy code
- Targeting marketing downstream & incentives midstream is the simplest approach
- Trusted provider network vetted by utility?
- Verified energy savings? Pay for performance?
- “What can I expect to happen to my energy bill?”
 - P.S modeling capacity?
 - Online tool for correct sizing?
 - Contracts can help assess this
- Pitch “HPWH pay for themselves over time”
- New paradigm of built environment- bringing building industry along for all of electrification in an empower way
 - Fair wages, etc.

Summary

- Activities
 - Trainings
 - by manufacturers when selling to distributors + for installing contractors)
 - utilities (pacific energy center, BayREN, 3rd partys)
 - unions?
 - Ongoing efforts

- Coordination
 - Gov'ts Brand agnostic
- Audiences: union, designer, HVAC, plumbing, electrical, bldg. dept officials
 - Engage early and often!
- Outcomes
 - Simple guide to understand
 - Will it work in my home?
 - What will it do to my energy bill?
 - What's my incentive?
 - What's the value?
 - Empowered building community!

3 Marketing, Education, Outreach (customer acquisition)

Sticky note

- Marketing TO contractors/engineers/designers, consumers/HOAs/property managers, distributors, retailers, governments
- Marketing BY “educators”: manufacturers, utilities, distributors, NGO's, governments
- Focus on contractors*: rebates, trade shows, energy center ed., value proposition, pro-deals
 - A convincing marketing outreach push to contractors is higher impact than end-users, since end users don't have preferences other than “well priced hot water”
- All marketing needs to be preemptive and nuanced
 - Nuanced: regional and audience distinctions. Know your audience and their drivers
- Consumer oriented marketing should be simple. “HPWH Exist!” Incorporate consumer voice, segment message based on audience.
- Retailers/ Distributors are BOTH educators and an audience. Once they are convinced, they have high impact convincing contractors.
 - Note: retailers sell to contractors and DIY consumers, distributors just to contractors.

4 Cohesive, replicable program (simple for consumer, well branded, savings by design, administrative path)

Sticky note

- Equitable outcomes for customers across income and geography
- Connects well with other programs / aligns and leverages related programs
- Keep it simple
- Minimal paperwork for contractor and consumer
- Statewide consistency
- Effective incentive targeting
- Product needs to have controls (equipment eligibility)
- Program enrollment dependent on customers being made aware about grid-tied capabilities
- Activities
 - a. Design and implement appropriate incentive stream (could include permitting & entitlements) (3rd part program?)

- b. Work with existing workforce development groups to identify and/or train contractors/architects/engineers who can complete work -> funnel jobs to these contractors
- c. Documentation / information feedback / performance measurement
- d. Inspect installation
- e. Free technical “hotline” assistance (3rd party program?)
 - i. Can link customers to additional offering
- f. Group purchasing
- Outputs
 - Eligible product list
 - Participating contractors, distributors, etc.
 - Engaged utilities
 - Centralized website for statewide program
 - Program administrator
 - Tracking database
 - Informs program targeting
 - Coordinate w/ Cal Enviro Screen
 - Web based app
 - Coordinated training program
 - Ad campaign
 - Coordination plan w/ solar installers
- Outcomes
 - 100% HPWH where appropriate
 - Public educated about benefits & tech of electrification (ecosystem)
 - Well trained and registered workforce
 - HPWH stock on par (at least) w/ GWH (mark of successful MT)
 - Market leads to regulatory adoption nationwide
 - All electric ready homes (panel ready)

5 Market Research (segmentation, characterization, benchmarking; other successful programs)

Sticky note

- *Literature on successful programs (ME, VT)*
 - *Characteristics, target, program design*
 - *Are there successful programs where consumer does not save money?*
 - *NEEA- what’s working?*
- *Market Characterization*
 - *Electric to electric*
 - *Gas to electric*
 - *Heating oil to electric*
- *Housing stock*
 - *New construction*
 - *SFH*
 - *MF*

- *Disadvantaged communities*
- *Bucketize*
- *Database tracking (enlist university system)*
- *Rass survey*
- *Permit data – radiant labs*
- *Consumer segmentation*
- *Activities*
 - *Housing stock segmentation: 6-10 housing types*
 - *Potential general categories*
 - *SF electric*
 - *SF dual fuel*
 - *MF centralized WH*
 - *MF unitized electric WH*
 - *MF unitized gas WH*
 - *Additional characteristics*
 - *Difficulty of installation*
 - *% garage installation*
 - *Age home*
 - *Code compliance*
 - *Saturation blitz sampling*
 - *MLS subdivisions- Zillow*
 - *VT/ME program survey*
 - *Statewide or local? Outsourced?*
 - *Contract w/ plumbing contractors*
 - *Load profile study*
 - *In-depth consumer research*
 - *Cool factor like smart thermostats increase receptiveness to early replacements*
 - *Consumers w/PV or EV*
 - *Elimination of net metering*
- *Outputs*
 - *Profile of attractive customers*
 - *Individually*
 - *By geography*
 - *Save money, cool factor*
 - *Cheap to install, fast*
 - *VT/ME learning summary*
 - *DAC focus*
 - *Proof of concept- quant research*
 - *Match product/ potential as technology improves*
 - *Customers for bundling: PV, EV, Battery storage*
- *Outcomes*
 - *Evidence based programs*
 - *Feeds into program design / marketing plan*
 - *Trade allies*

- *Leads*

Summary

- Benchmark successful programs: VT, ME, NEEA
- Characterize housing stock
- Consumer/trade ally segmentation
- Activities: 6-10 housing types, tools, DAC bundling
- Outputs: profile of attractive customers, proof of concept, roadmap
- Outcomes: evidence-based programs w/ clear priorities, feeds into program design, marketing plan, leads to trade allies