MARCH 2021

BE Smart

A proactive approach to mass beneficial electrification (BE) of existing buildings

Carbon Free Palo Alto

OUTLINE

1. What is BE Smart and what does it solve?
2. Discussion

Goal | Strategy | Tactics

Goal: Mass electrification - replace the majority of existing fossil-fueled (FF) devices in residential and commercial buildings in the next 10 years.

Strategy: Make it easy and economical for all customers to replace their FF devices that are reaching their end-of-life (EOL) with BE devices.

Tactics:

1) Introduce BE Smart, a complete installation solution with on-bill financing that balances customer benefit with cost recovery.
2) Mandate BE measures as programs become available.

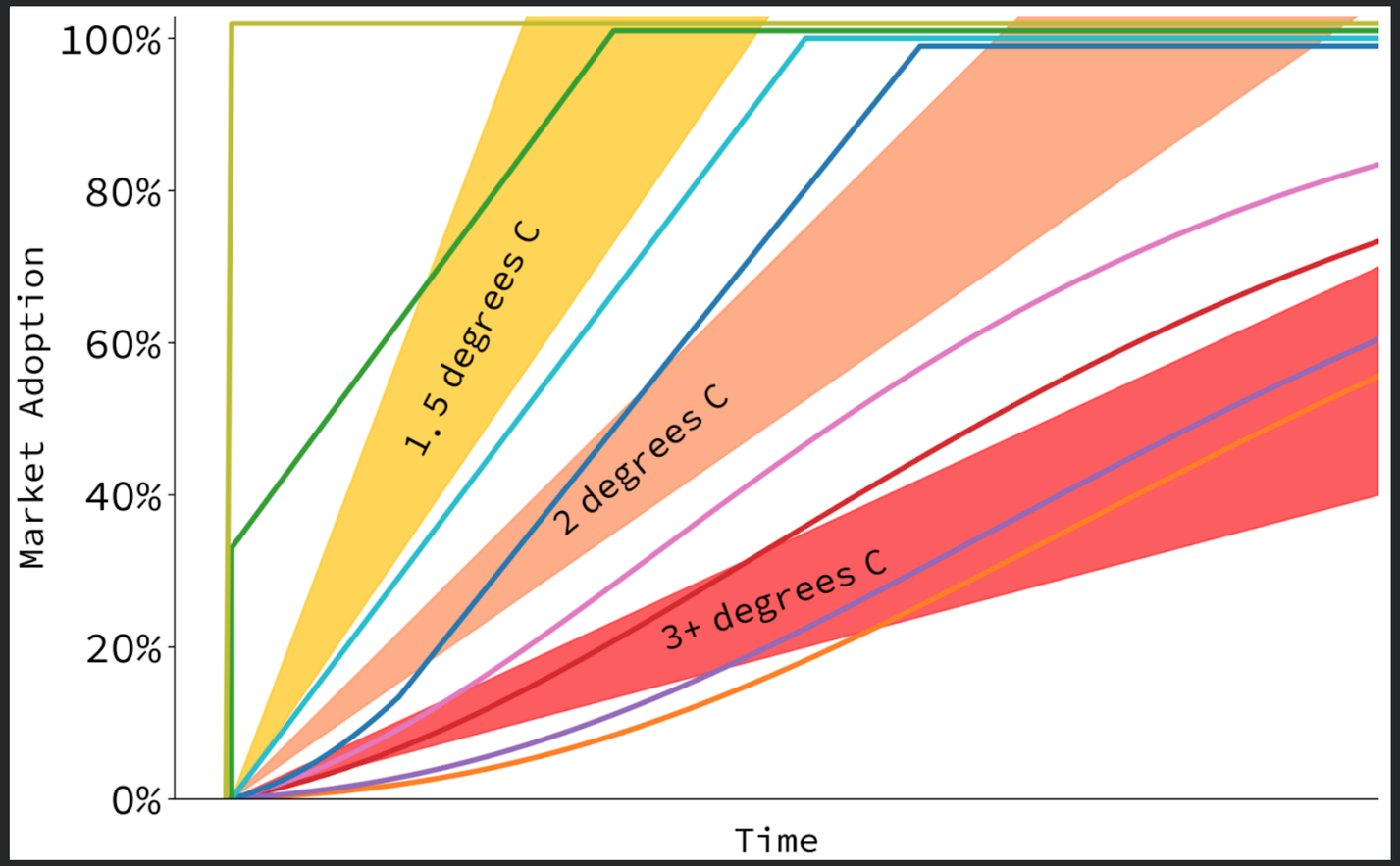
Challenges of mass electrification

We've run out of time

David Roberts of Vox:

"There is no room left in a 1.5° or 2° scenario for more fossil fuel infrastructure or machines."

"We need to radically ramp up production of electrification technologies and implement the policy and financing tools that will enable 100 percent substitution."



Rewiring America/Saul Griffith

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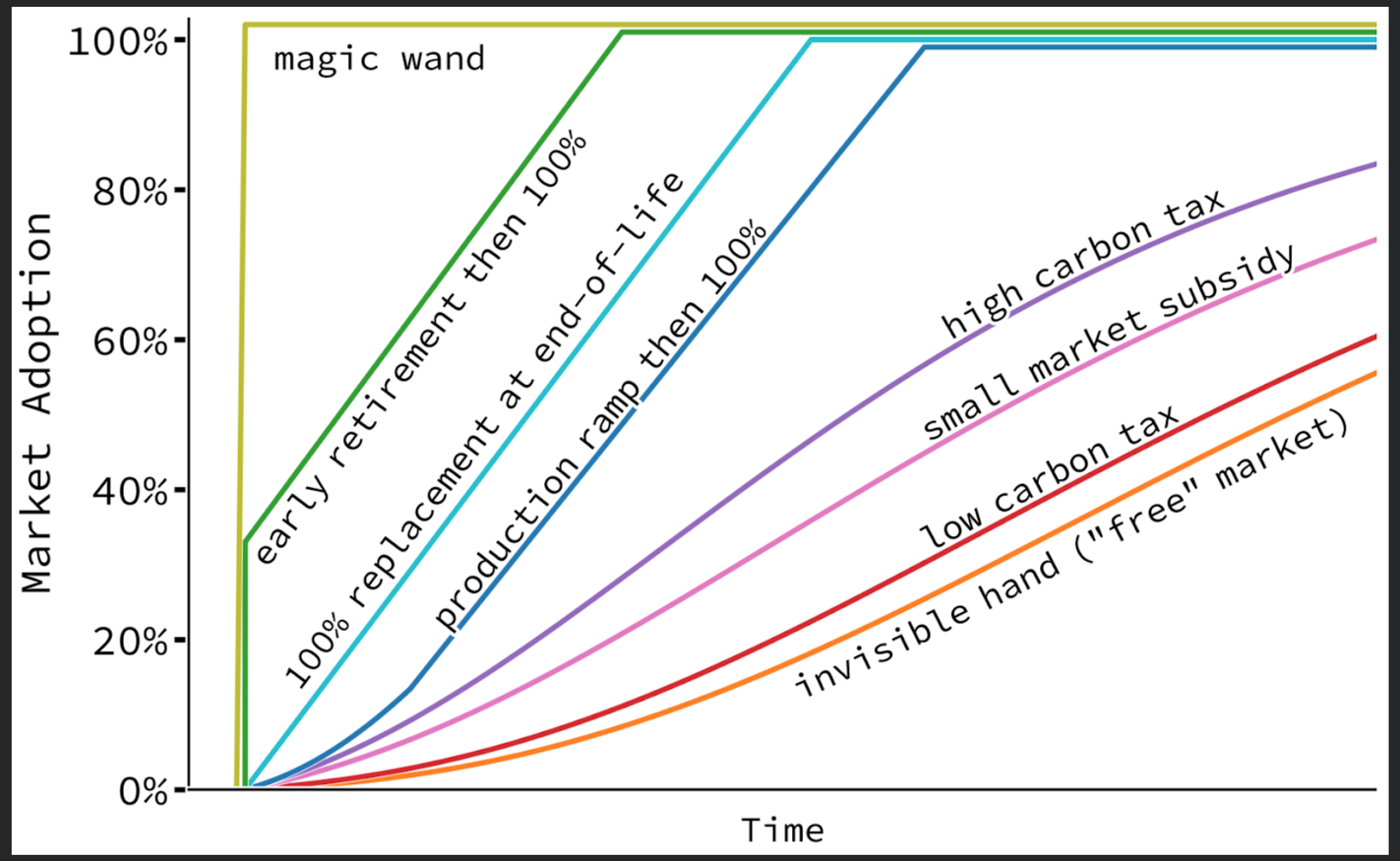


Mass electrification requires a more robust approach

For example, in the Bay Area, approximately 200,000 FF water heaters per year are replaced at their end of life (EOL).

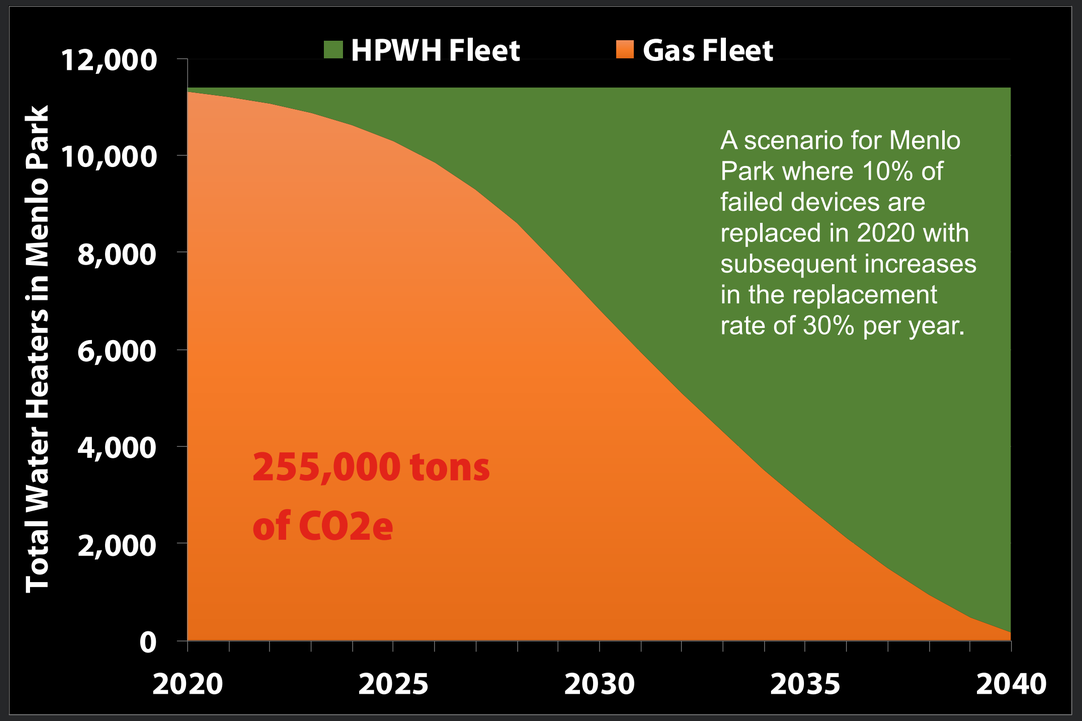
Building owners are investing about $200M annually on poluting FF assets (gas water heaters) in the Bay Area.

Using electric equivalents for all such replacements from now on is the most realistic way to eliminate most of these devices by 2030.

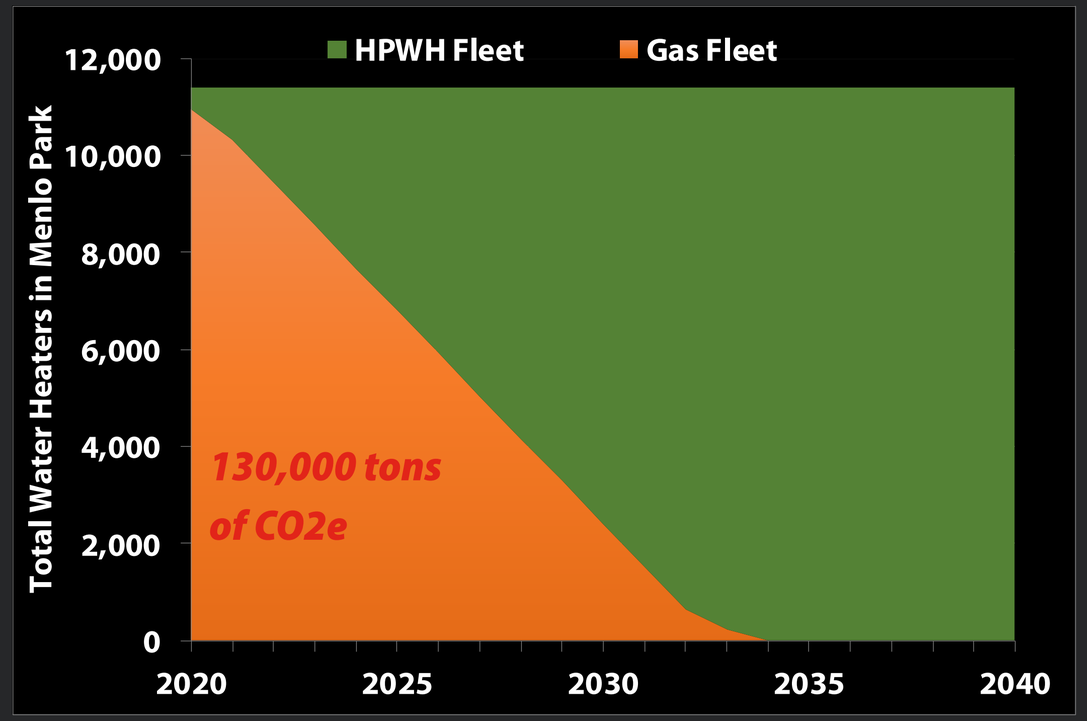
This must be done equitably for homes and businesses of all income levels.->

Business as usual (BAU) replacement rates are inadequate

Even aggressive rebates are not generating the replacement rates that are needed to electrify the majority of the water heater fleet in the next 10 years.



Replacing essentially all FF devices reaching their EOL with BE devices achieves the goal.



(charts adapted from 2020 Menlo Park Environmental Quality Commission report)

Mass electrification will still require regulatory solutions

The short timeline means that robust regulatory solutions will be required in addition to a comprehensive program like BE Smart that removes the main barriers to adoption of electric devices.

BE Smart as a first step can enable the introduction of regulatory approaches that will further accelerate adoption and market development.

CHALLENGES

Barriers to mass electrification

- High up-front, one time costs to retrofit beneficial electric (BE) devices
- Split incentives for renters vs. landlords - landlords don't experience direct savings and other benefits from installing BE devices
- Installation is complex, time-consuming and not a priority for most consumers.
- Emergency replacements are the norm, especially for hot water heaters, and favor replacement with gas devices.
- Mispriced gas and electric rates often disfavor BE by ignoring carbon costs and time-of-use costs.->

Rebates are inadequate

- Even large rebates don’t help low and moderate-income residents without the additional capital needed to participate.
- Rebates alone don’t reduce the complexities of electrifying for building owners.

Rebates are expensive

- Rebates do not scale beyond early adopters.
- For instance, SVCE's heat-pump water heater rebate will cost the utility $2M for only 1000 of the 20,000 water heaters that fail in one year.
  - For the Bay Area that would be $400M per year in rebates (assuming a $2000 rebate per water heater).
  - This is an absolute cost with no recovery, and is difficult if not impossible to apply to all customers over a 13 year period.

Solution - BE Smart

BE Smart Overview

BE Smart is a proactive approach to implementing beneficial electrification that uses marketing, finance and operational elements to jump-start and accelerate the adoption of ultra-efficient electric devices.

BE Smart in a nutshell

- Utilities proactively orchestrate the replacement of soon-to-fail FF devices with BE devices.
- The replacement process is designed to be quick and easy for the customer.
- Customers pay an initial outlay equal to the normal BAU cost of replacing the device with another FF device (BAU outlay).
- The difference between the device installation cost and the BAU outlay is financed at low interest rates (<= 2%) for all customers, with no credit checks.->

BE Smart in a nutshell (continued)

- The term of the loan is set to the average lifetime of the device.
- The maximum financed amount depends on the device type.
- Monthly payments for the financed amount are added to the utility bill as a tariff.
- Monthly operational savings offset the tariff amount.
- For renters and low and moderate-income (LMI) owners, the utility offers a fixed monthly BE discount on their bill.->

The utility employs a proactive approach for replacing fossil-fueled devices

- The utility identifies all customers who have FF devices reaching their EOL.
- Customers are offered an installation service that takes care of all the details.
- Electric utilities and CCA's are uniquely qualified to drive this effort because of their strength in managing capital-intensive infrastructures over extended periods of time and maintaining long-term service relationships with customers.->

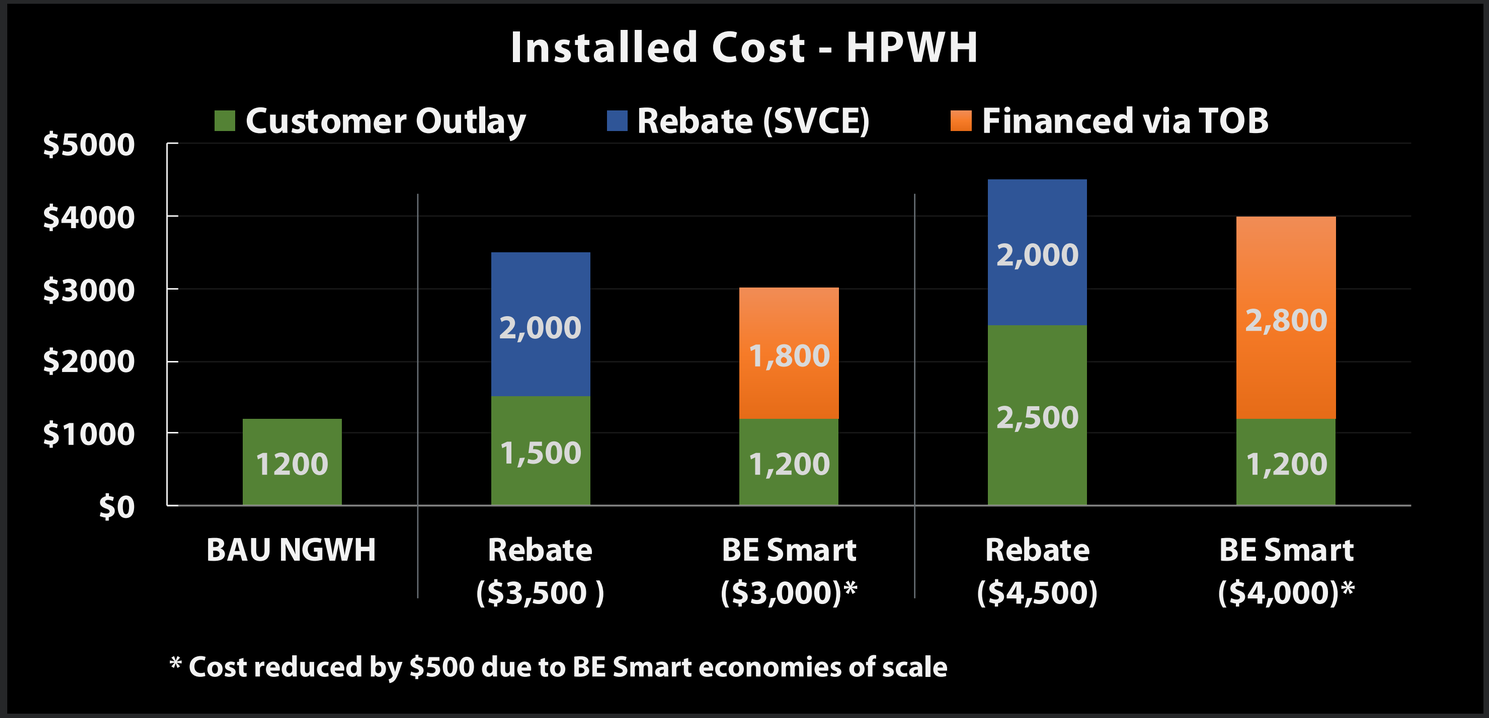
The utility offers *on-bill financing (OBF)* – *preferably tariffed on-bill financing (TOB)* – to its customers

- The customer avoids high up-front costs by making monthly payments on their utility bill.
- The utility uses its access to low-cost, long-term capital to finance installations.
- The financed amount is capped to manage monthly payment affordability and credit risk

- TOB is an inclusive financing approach that has been shown to have very high adoption rates when applied to energy efficiency programs.
- The charge is structured as an additional tariff paid by the current utility customer and not as a personal debt.
- The tariff is attached to the utility meter and any current utility customer qualifies.

SOLUTION - BE SMART

Installation costs vary, but BE Smart keeps the customer outlay low without rebates

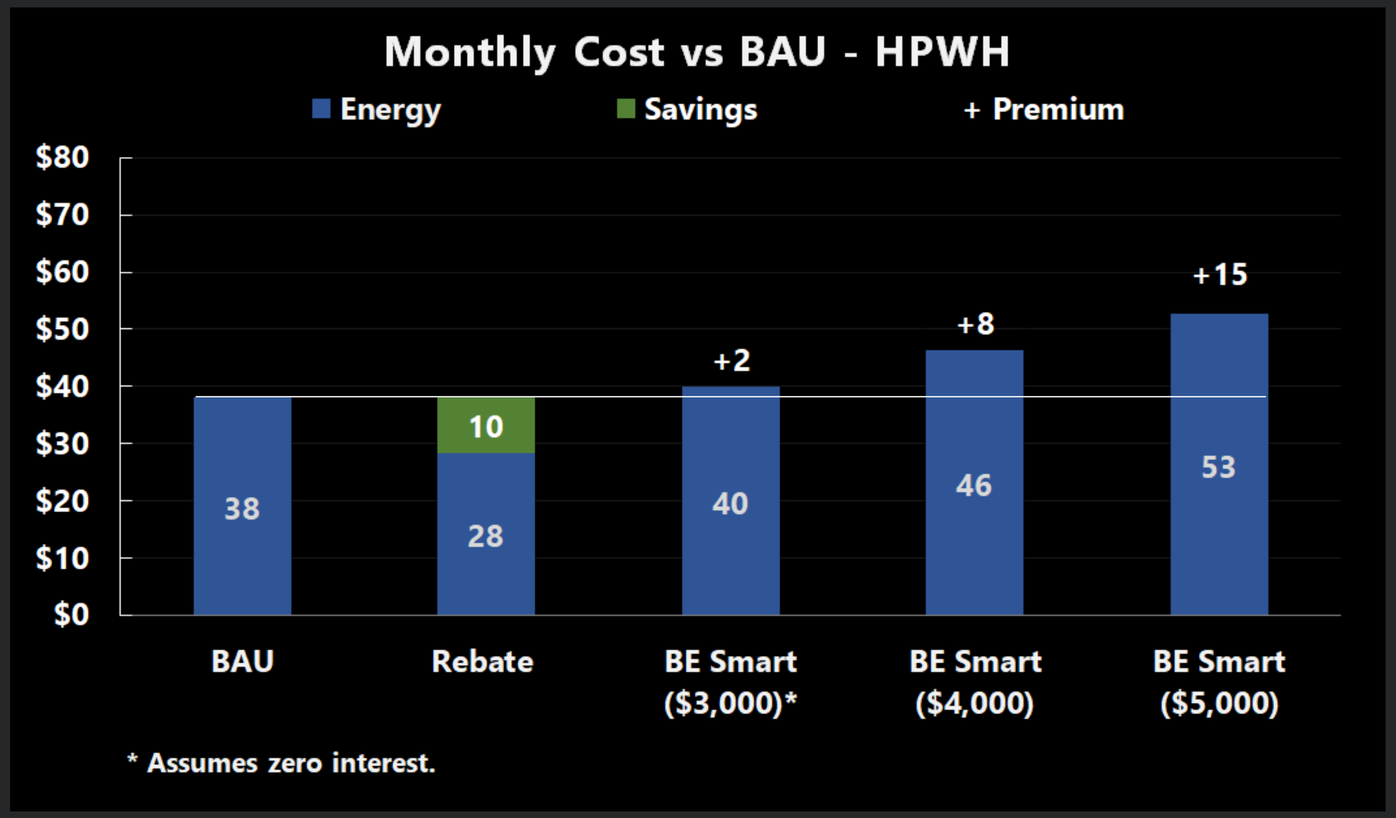


- Silicon Valley Clean Energy (SVCE) offers a $2000 rebate for heat pump water heaters (HPWHs).
- Even this generous rebate means customers might pay more up front than BAU (natural gas water heaters).
- BE Smart requires an outlay from the customer of $1200 (set to reflect BAU cost) — the rest of the outlay is financed via TOB.
- Because of economies of scale, BE Smart ensures that the installed HPWH cost can be decreased by at least $500 within 12-24 months.
- A competitive contractor management program keeps costs low.->

Monthly Cost vs. BAU - HPWH example

SVCE service territory example:

- Average electricity rate of $0.26 / kWh
- Average gas rate of 1.66 / therm
- Operational savings of $10 / month->



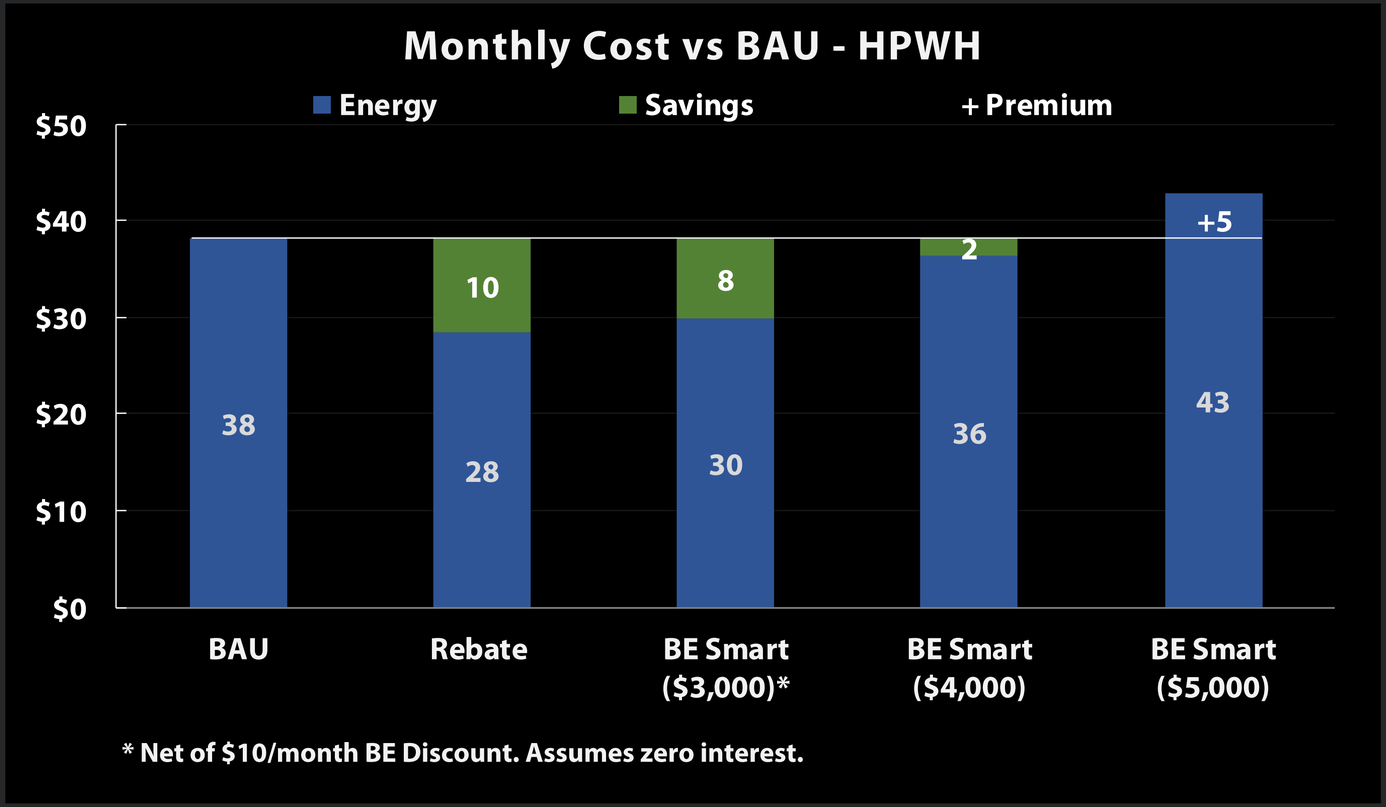
SOLUTION - BE SMART

BE Smart allows a monthly discount to some customer segments

In many cases the expected monthly energy savings are less than the tariff. This will increase the customer bill compared to BAU.

For certain customer segments, the utility should offer a monthly BE discount to ensure that there is no increase in the monthly bill.

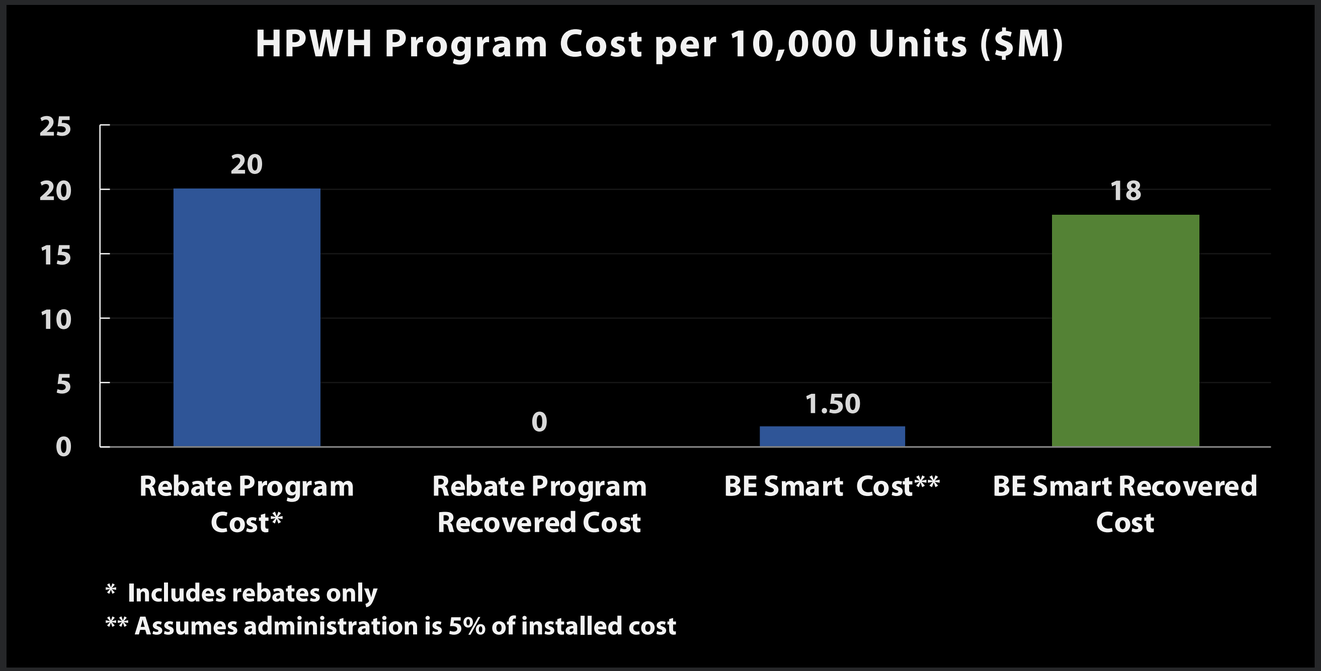
- New renters should not have to assume additional costs beyond BAU.
- Low and moderate-income owners should qualify for equity reasons.->



SOLUTION - BE SMART

Financing water heater replacements allows the utility to afford a large-scale proactive approach

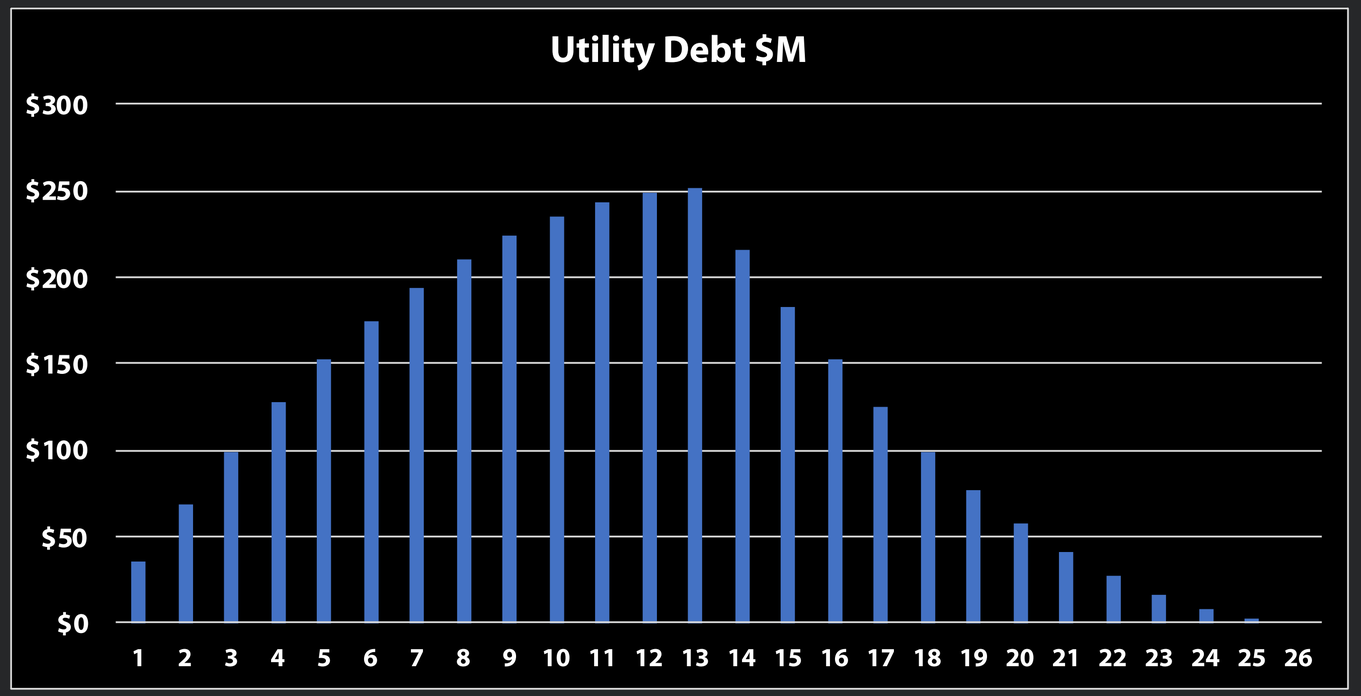
- A rebate approach would cost $20M in rebates to convert 10,000 installations (excluding program management costs).
- Crucially, BE Smart enables the utility to recover the entire cost of its loaned capital in such installations, about $18M. Customer defaults are extremely rare in the case of TOB.



- The BE discount would reduce the additional revenue from the new BE devices sold to renters and LMI customers.->

SOLUTION - BE SMART

Financing water heater replacements (continued)



- For example, SVCE's roughly 260,000 residential customers would require annual outlays of $36M - that would be increasingly offset by incoming payments.
- The graph shows the debt that SVCE would need to extend to convert all residential WHs in its territory to HPWHs.
- Utilities have the option to use reserve capital or they can access low cost capital from outside sources.->

Summary: BE Smart moves beyond rebates

The BE Smart approach

- Innovates beyond current utility approaches and distributes the costs of electrification equitably among the public and private sectors over time.
- Provides a blueprint for large-scale building electrification that can be expanded to multiple device classes.
- Optimizes the costs associated with electrification by operating at scale and focusing on cost reduction at every point in the process.
- Adds the leverage of public utility infrastructure funding to private BAU investment to achieve the necessary replacement rate of thousands per year.->

Reference Projects

Sonoma Clean Power On-Bill Financing Pilot

Sonoma Clean Power is rolling out a pilot program this fall aimed at existing building efficiency and electrification.

It features zero interest loans up to $10k for any current SCP account holder for qualified installations (water heating, space heating and more).

In contrast, BE Smart uses TOB to address the split incentive issue and employs a proactive approach for replacing devices before EOL.

Building Decarbonization Coalition and TOB

The Building Decarbonization Coalition released a white paper on Tariffed On-Bill financing (TOB) in July 2020. It lays out the case for TOB as the best available inclusive financing alternative – accessible to all income levels – for existing building decarbonization in California.

It also provides a detailed set of the mechanisms, considerations and best practices for TOB programs.

BUILDING DECARBONIZATION COALITION

REFERENCE PROJECTS

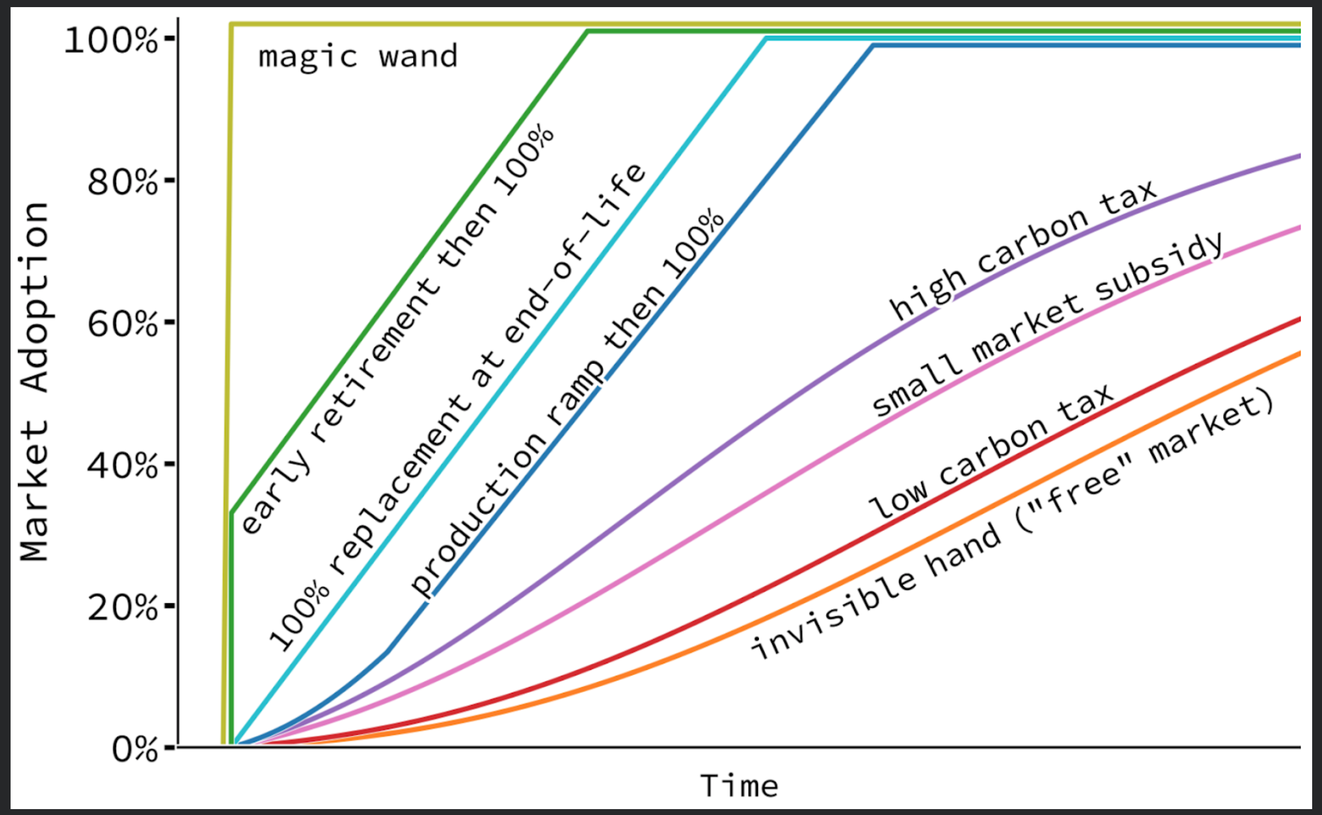
Rewiring America

How to drive fossil fuels out of the US economy, quickly(*):

The US has everything it needs to decarbonize by 2035.

The fastest way to decarbonize is to electrify everything.

There's no way to accomplish a rapid energy transition with market-based policies.



Rewiring America/Saul Griffith - https://www.rewiringamerica.org/jobs-report

The best way to ensure universal access to clean energy is clever financing.

Full electrification will bring all kinds of societal benefits.

(*) https://www.vox.com/energy-and-environment/21349200/climate-change-fossil-fuels-rewiring-america-electrify

Conclusion

Innovative

- The BE Smart approach innovates beyond current utility approaches and promises to distribute the costs of electrification equitably among the public and private sectors and over time.
- It provides a roadmap for building electrification at scale that can be expanded to multiple device classes.
- It optimizes the costs associated with electrification by operating at scale and focusing on cost reduction at every point in the process.

CONCLUSION

Scalable

Ultimately BE Smart could be applied at regional and state levels in virtually all electric utility service territories as a major driver of the transition to a decarbonized energy future.

Thank you!

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