

APRIL 2022

# BE Smart

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



## AGENDA

- 1. What is BE Smart and what does it solve?**
- 2. Pilot Proposal**
- 3. Discussion**

# Goal – Strategy – Tactic

**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.

**Tactic:** Introduce BE Smart, a complete installation solution for planned retrofits with optional on-bill financing.

# Challenges of mass electrification



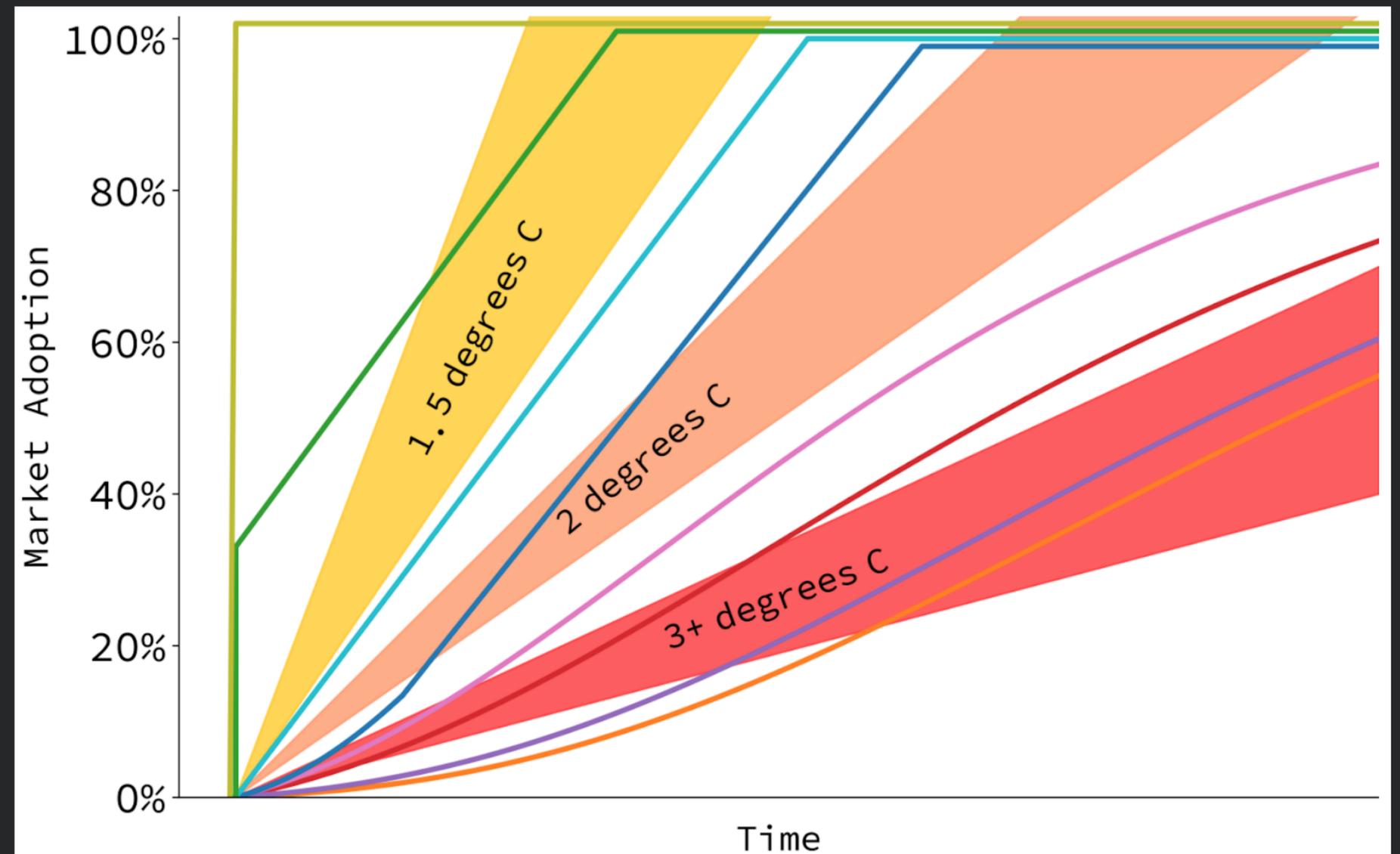
## CHALLENGES

# We've run out of time

"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."

David Roberts/ Vox



Rewiring America/Saul Griffith

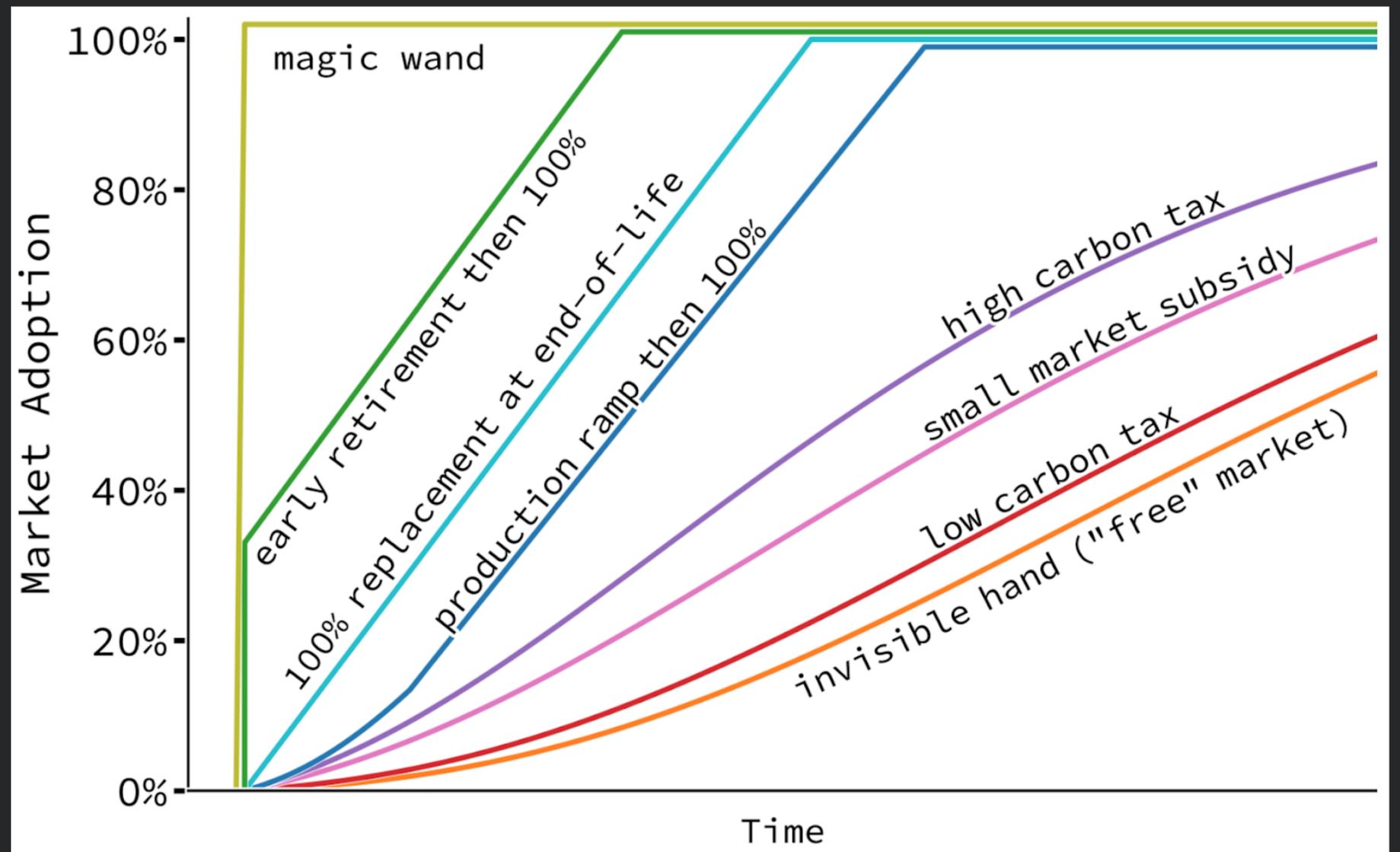
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## CHALLENGES

# 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).

This adds more than \$200M to the base of potentially stranded FF assets (devices) in the Bay Area each year.

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

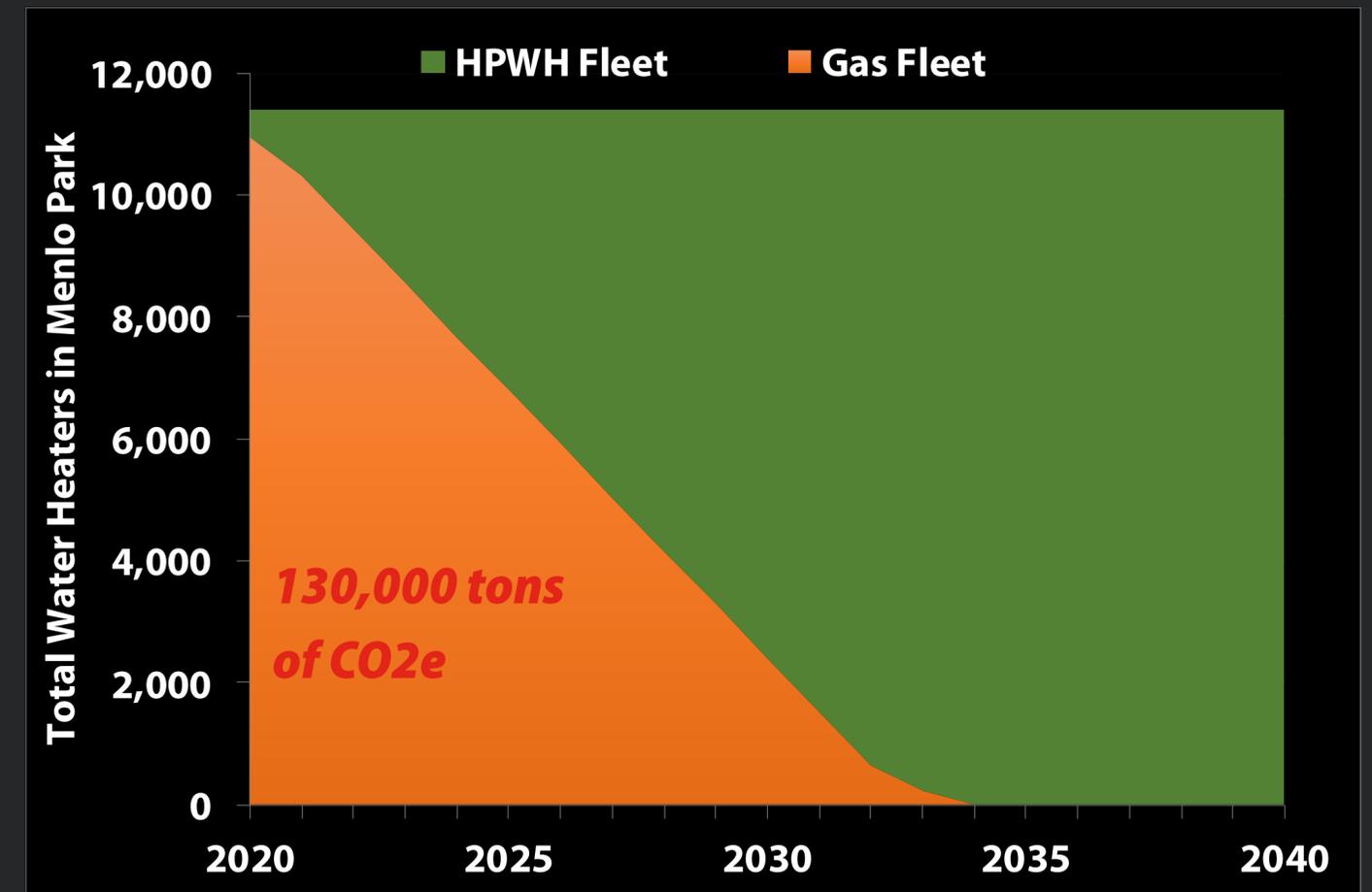
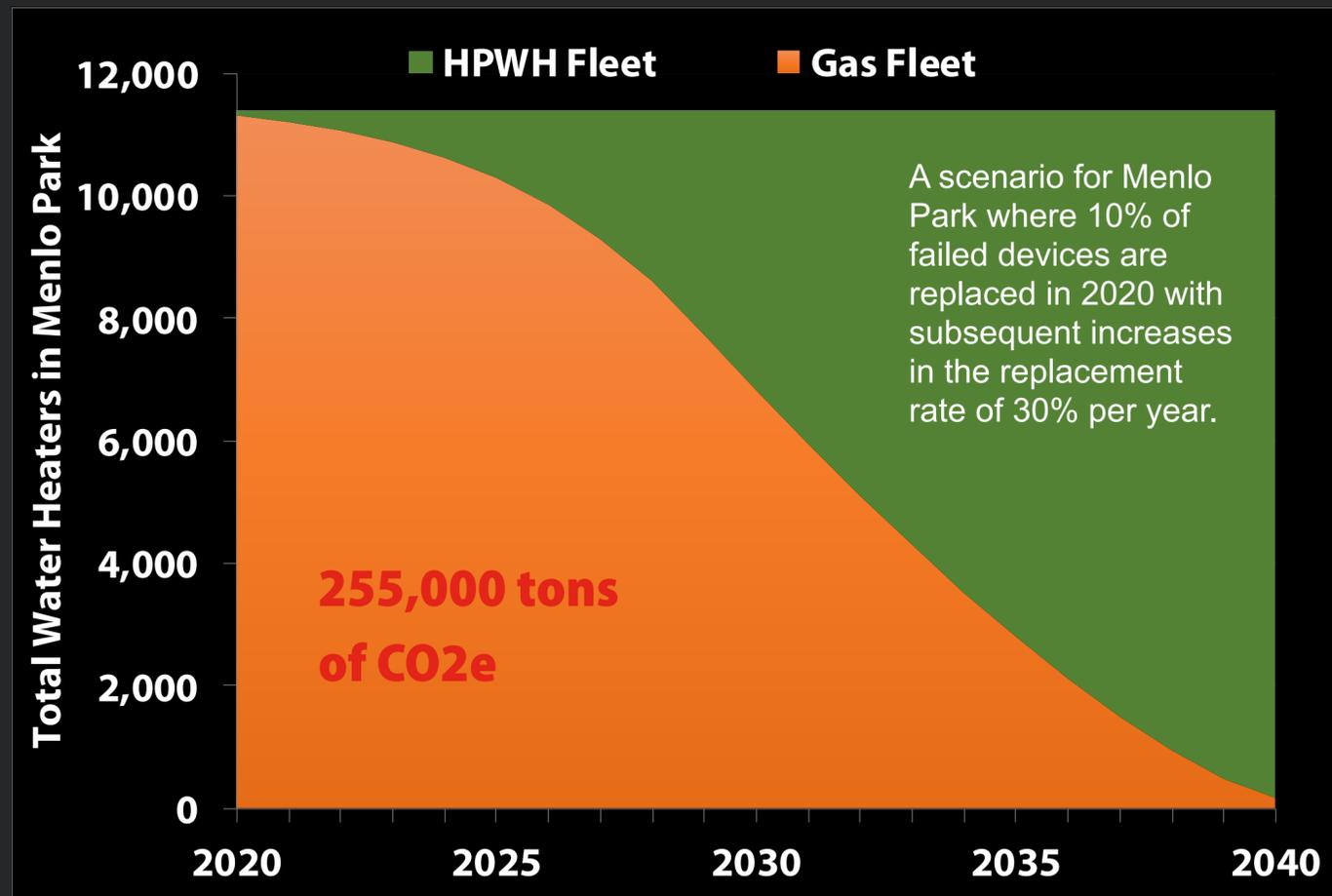
This must be done equitably for homes and businesses of all income levels.->

## CHALLENGES

# 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)

## CHALLENGES

# 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 costs for installation of beneficial electric (BE) devices
- Bill savings are limited to non-existent in the case of fuel switching as compared to a pure efficiency upgrade.
- 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.->

## CHALLENGES

# 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.

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

- The utility identifies all building owners who have FF devices reaching their EOL.
- Customers are offered a direct installation service that takes care of all the details.
- The utility negotiates volume installation contracts to control costs.
- 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)* to its building owner customers

- The utility uses its access to low-cost, long-term capital to finance installations.
- The building owner avoids high up-front costs by making monthly payments on their utility bill.
- The utility is also able to provide lower interest rates and longer loan terms than are typically available to building owners.
- Credit-enhanced loans will increase the number of qualified customers.
- The financed amount is capped to manage monthly payment affordability and credit risk.
- Non-payment of a bill does not result in termination of electric service.->

# BE Smart in a nutshell

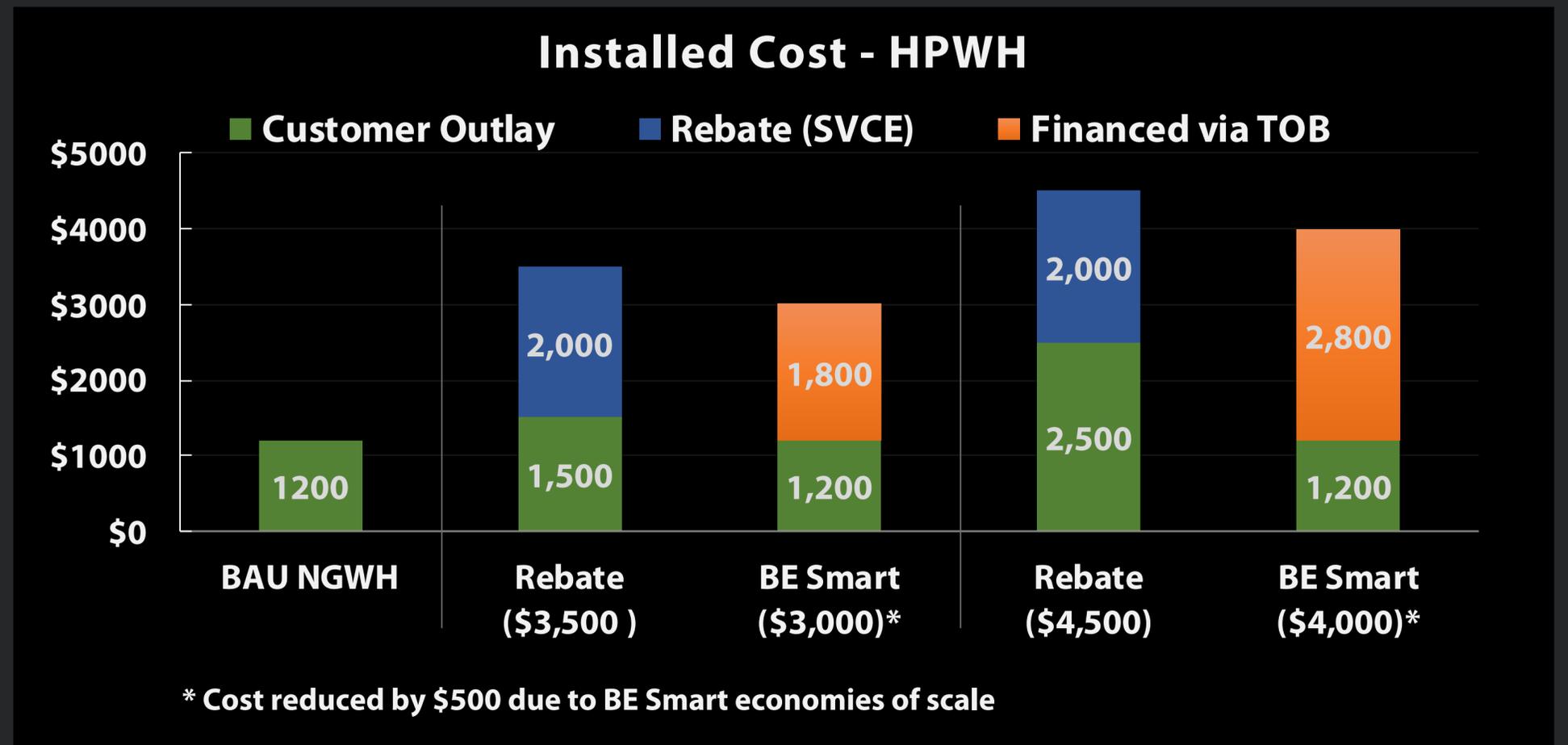
- Utilities proactively orchestrate the replacement of soon-to-fail FF devices with BE devices through a direct install program.
- The replacement process is designed to be quick and easy for the building owner.
- Building owners pay an initial outlay equal to the normal BAU cost of replacing the device with another FF device (BAU outlay).
- The difference between the device installation cost and the BAU outlay is financed at low interest rates ( $\leq 2\%$ ) 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.
- Monthly operational savings can offset the monthly payment.
- For qualified low and moderate-income (LMI) owners and renters, the utility offers a fixed monthly BE discount on their electricity bill.
- Ideally the LMI discount should result in no increase in the bill.->

## SOLUTION - BE SMART

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



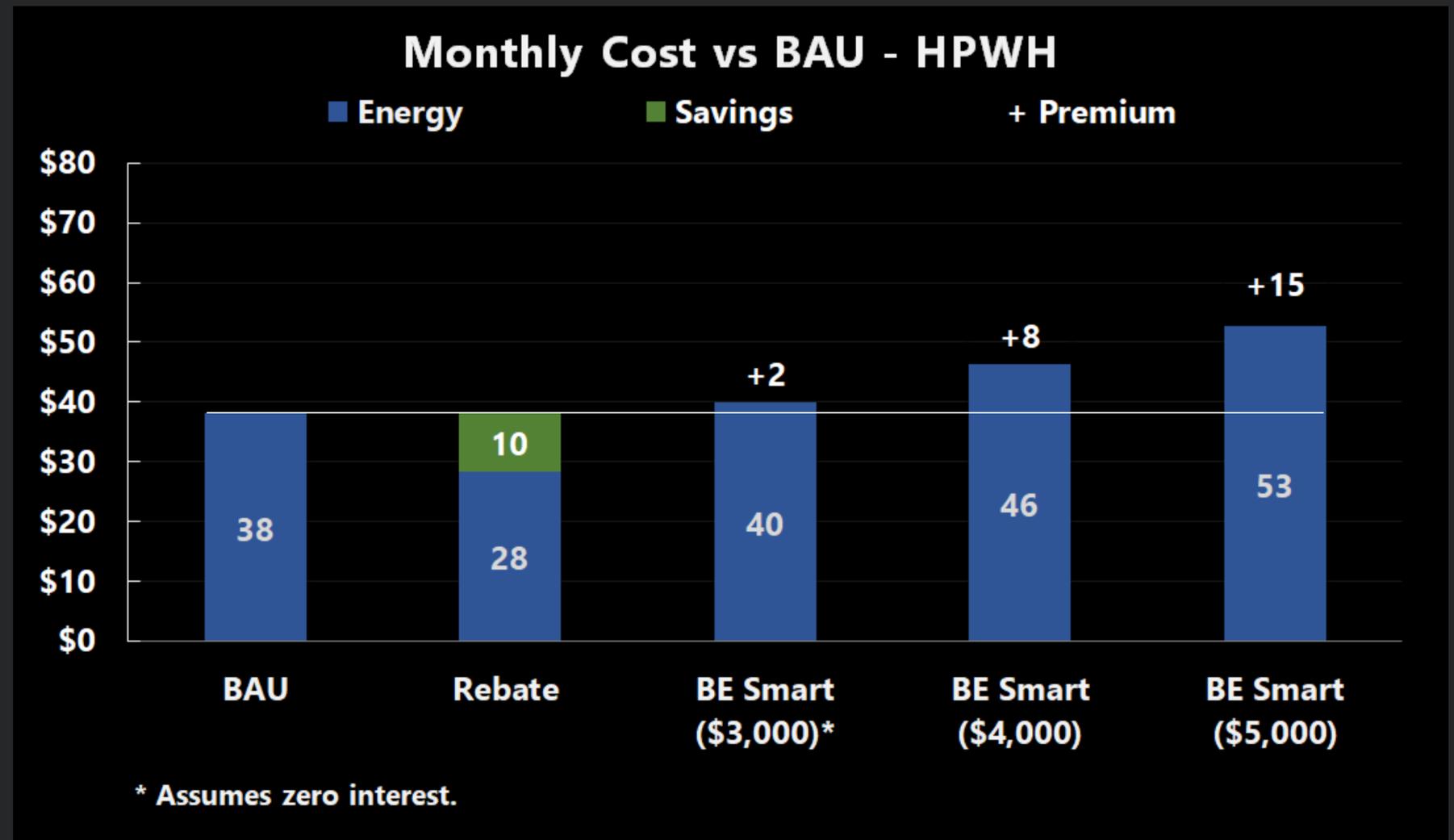
- Silicon Valley Clean Energy (SVCE) offers a \$2000 rebate for heat pump water heaters (HPWHs).
- Even this generous rebate means customers might pay more up front than BAU (natural gas water heaters).
- BE Smart requires an outlay from the customer of \$1200 (set to reflect BAU cost) — the rest of the outlay is financed via OBF.
- 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.->

SOLUTION - BE SMART

## 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->

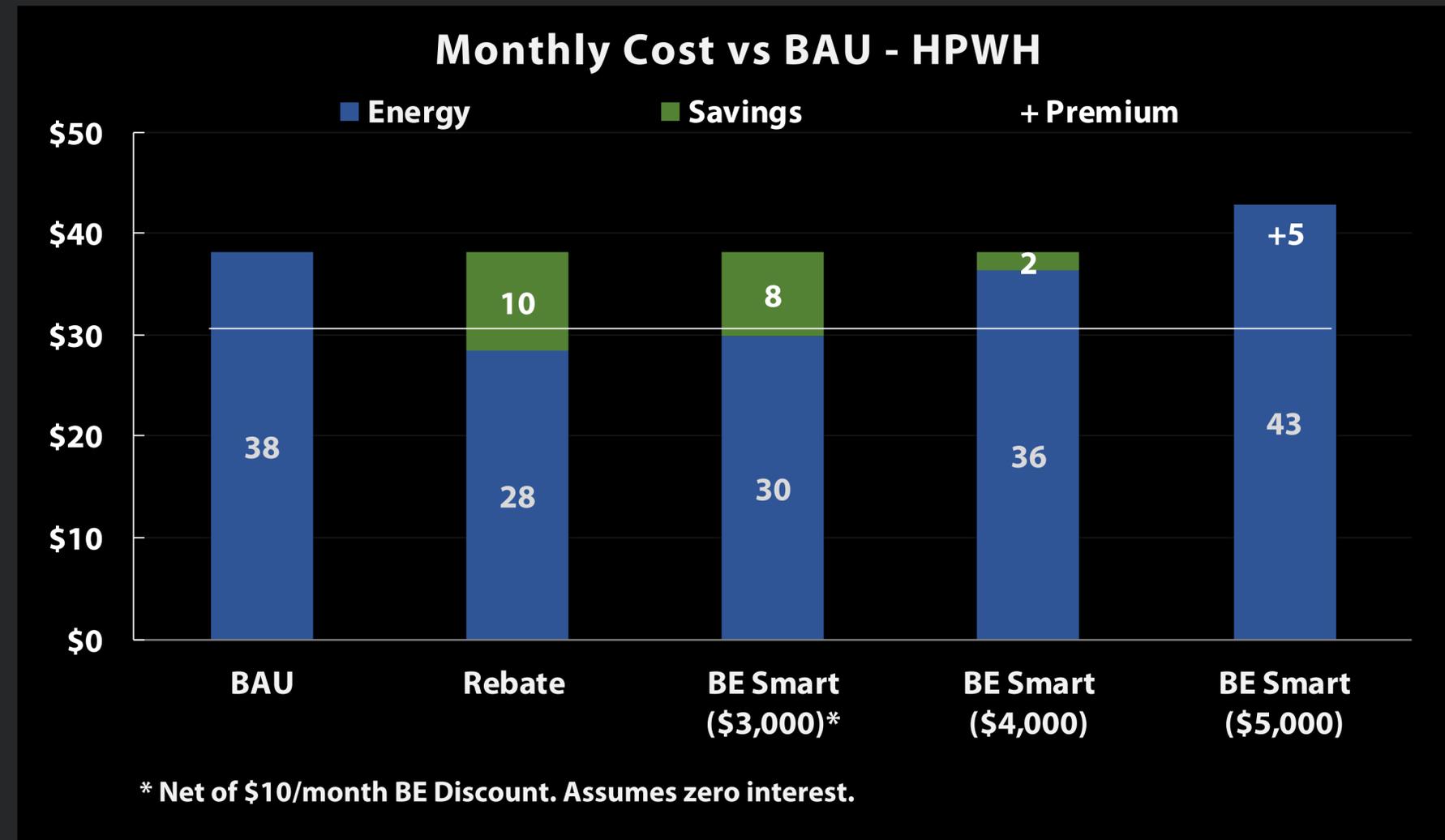


## SOLUTION - BE SMART

# BE Smart allows a monthly discount to qualifying LMI owners

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

- The utility should offer a monthly BE discount to qualifying LMI owners to ensure that there is no increase in the monthly bill.

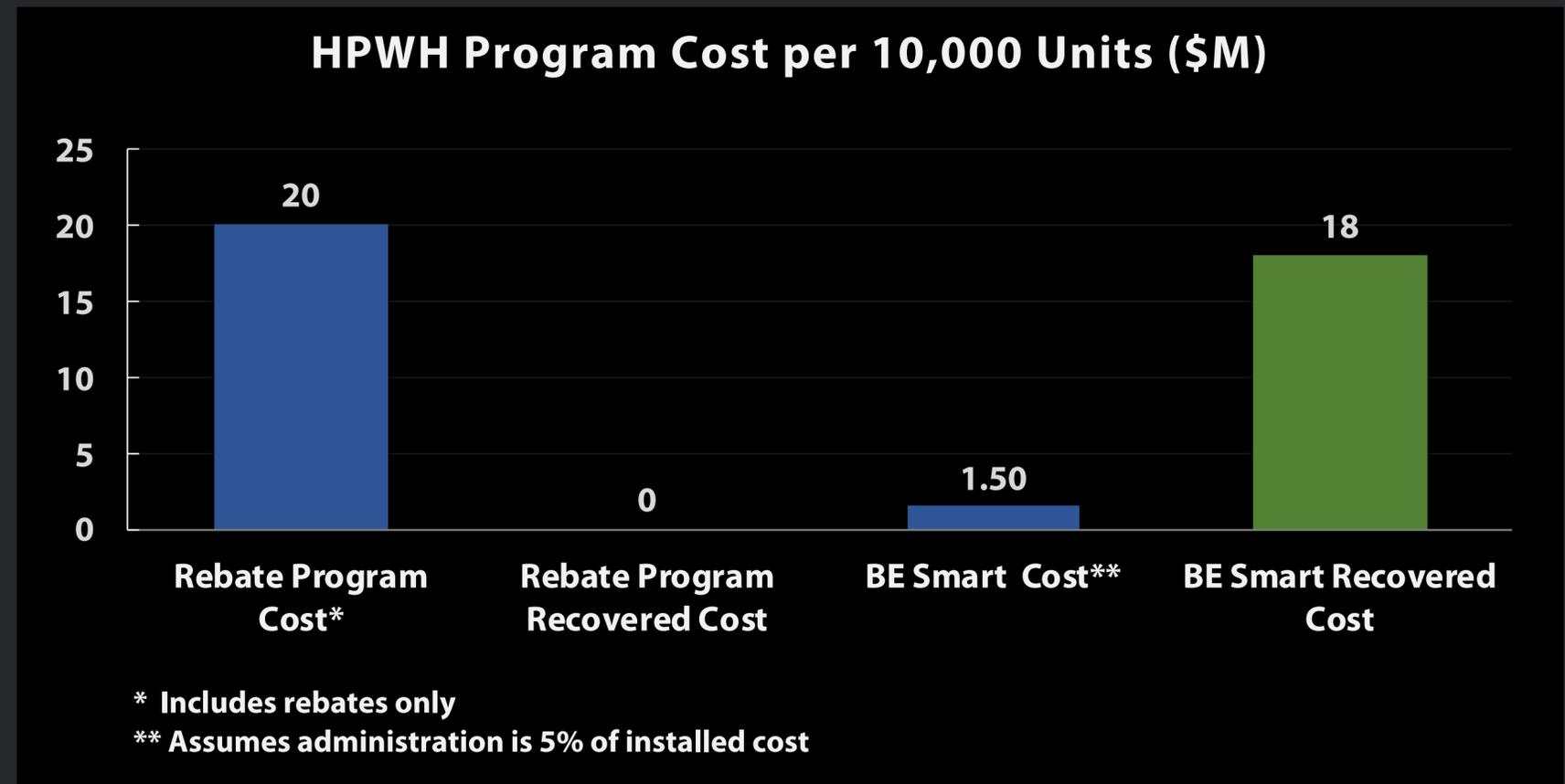


- The BE discount can be funded from a portion of the additional electrification revenue.->

## SOLUTION - BE SMART

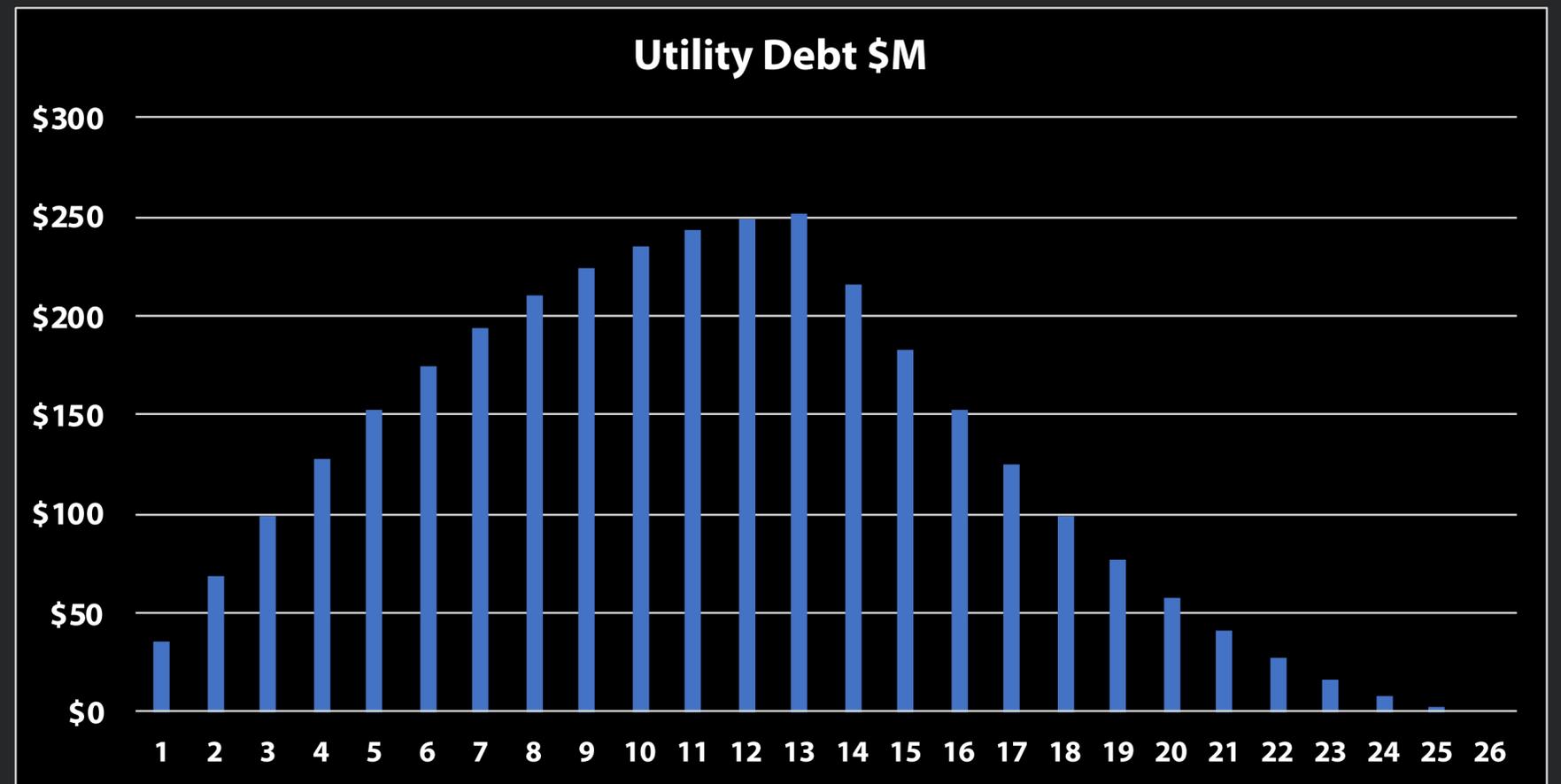
# Financing water heater replacements allows the utility to afford a large-scale proactive approach

- 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->



SOLUTION - BE SMART

## Capitalizing water heater replacements



- 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.->

## BE Smart vs. PAYS

- The Pay As You Save (PAYS) program (which includes direct installation and tariffed on-bill financing) is complementary to BE Smart. However there are crucial differences.
- BE Smart is focused on proactive decarbonization while PAYS is focused on energy efficiency.
- PAYS requires bill savings - today, most electrification measures do not generate bill savings. This prevents the program from scaling to a majority of replacements.
- **BE Smart does not require cost effectiveness.** The program applies to all device replacements and helps to kick-start market transformation.
- **BE Smart leverages incoming revenue and other mechanisms to achieve equity.** For example, electrification revenue and/or a utility user tax (UUT) could cover the LMI discount on a monthly basis.

## BE Smart Strategic Comparisons

- Whole building
  - \* e.g. Ithaca & BlocPower
- Incremental by device efficiency / bill savings
  - \* e.g. PAYS (accessible, tariffed on-bill financing)
- Incremental by device decarbonization
  - \* BE Smart->

SOLUTION - BE SMART COMPARISON-1

	<b>Ithaca / BlocPower</b>	<b>PAYS</b>	<b>BE Smart</b>
<b>General Strategy</b>	Whole building	Incremental device efficiency	Incremental device decarbonization
<b>Specific Strategy</b>	Whole building decarbonization with near term focus on cost-effective projects.	Incremental device - usually employed in efficiency programs.	Incremental device with explicit decarbonization goal - i.e. no new fossil fuel devices. Could also apply to whole building.
<b>Driver</b>	City	Utility	Utility/City
<b>Customer acquisition</b>	Public outreach and energy audits to target buildings with attractive potential for cost savings.	Public outreach and estimates based on projected energy savings.	Planned replacement driven by utility and/or city - identify devices and lifetimes and offer replacement near end-of-life (EOL) or sooner.
<b>Customer experience</b>	Whole building approach makes for an intensive customer experience.	Concierge-based approach (direct install). Immediate bill savings of 20% or more. Customer effort required is minimal	Concierge-based approach (direct install). Customer is contacted near the EOL of the device or sooner. Customer effort required is minimal.
<b>Customer financing</b>	Loan or lease	Tariff	Loan
<b>Low interest payments</b>	Yes	N/A (embedded in tariff)	Yes

SOLUTION - BE SMART COMPARISON-2

	<b>Ithaca / BlocPower</b>	<b>PAYS</b>	<b>BE Smart</b>
<b>Funding structure</b>	Complex, hard to replicate.	Rate payer funds.	Depends on source of capital.
<b>Source of capital</b>	Private - enabled by public subsidies.	Typically rate payer funds, but not always.	Public and/or private. Public subsidies can lower interest rates of private capital. Calif: Go Green.
<b>Debt recourse</b>	Unsecured	N/A (Utility recovers costs via tariff, i.e. terms include electricity shut off in case of non-payment)	Unsecured, but subject to debt collection. Other mechanisms to reduce risk can also be employed.
<b>Requires cost effectiveness</b>	Yes, at least for initial projects.	Yes	No
<b>Cost reduction is a primary goal</b>	Yes	No	Yes

	<b>Ithaca / BlocPower</b>	<b>PAYS</b>	<b>BE Smart</b>
<b>Avoids stranding new fossil fuel assets</b>	No	No	Yes
<b>Scales to all buildings</b>	Yes, in theory scales to all buildings, but exact mechanisms are still being designed. Automated assessment tools for identifying good candidates.	No, because of bill savings requirement and current economics of device replacement. Potential for increased applicability when multiple measures are combined to ensure cost-effectiveness.	Yes, scales to devices in all buildings except for large commercial HVAC and some multi-unit residential.
<b>Equity / LMI concerns</b>	Addressed	Addressed as a primary concern	Addressed
<b>Notes</b>	Implementation is just starting. No other cities are following their lead yet. Many specifics are still TBD.	Has been implemented in efficiency projects in about 25 utilities. PAYS pilot program proposed for PCE/SVCE. IOUs are also looking into PAYS.	Proposal - no concrete implementation to date.



## Summary: BE Smart moves beyond rebates **and works at scale**

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### The BE Smart approach

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- 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.->

# Pilot Proposal



# Pilot proposal

- A pilot can be implemented by one or more utilities and/or CCAs.
- Joint pilots should be encouraged, but not required.
- The utility would provide the capital for the installations (e.g. reserve funds or other sources). The utility would recover this amount over a 10-12 year period.
- We suggest that each utility commit at least \$1M in financing capital, which should be sufficient for the installation of about 500 devices per utility.->

# Pilot goals

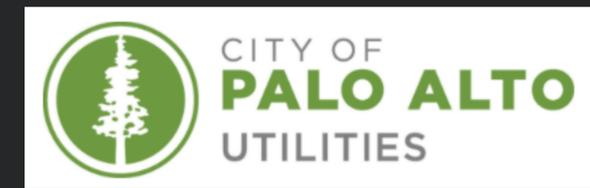
- Acquire 500 customers who replace their near-EOL water heaters with HPWHs.
- Validate key elements of the BE Smart program concept, including:
  - Participation by LMI building owners and renters to ensure that the program is accessible and attractive to all income levels
  - Successful utility cost-recovery mechanism
  - Scale the program based on project findings.->



PILOT

## Utility / CCA role

- Receives additional revenue from increased sales
- Supplies the capital to cover installation outlays (recovered over 10-12 years)
- Enters into contracts with customers



- Contracts with a third party to:
  - Provide program design, administration and management
  - Oversee installation of HPWHs, and supplies technical analysis
  - Manage contractors
  - Manage customer acquisition and relationships, marketing and communication->

# Additional perspectives

## Customer

- Reduces their building carbon footprint by approximately half
- Avoids water damage from WH failure
- Has a new device installed with little effort on their part
- Can take advantage of time-of-use (TOU) rates

## Municipalities

- Contribute towards significantly reducing the community's carbon footprint
- Help with streamlining permitting processes
- Marketing and communication of program and climate goals
- Aid customer acquisition by providing permitting data

## Contractors

- Benefit from new business opportunities
- Reduce customer acquisition costs (typically 10% of revenue)

# 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 employs a proactive approach for replacing high GHG emitting devices before EOL.

BE Smart also provides scaleable, credit enhanced financing.

REFERENCE PROJECTS

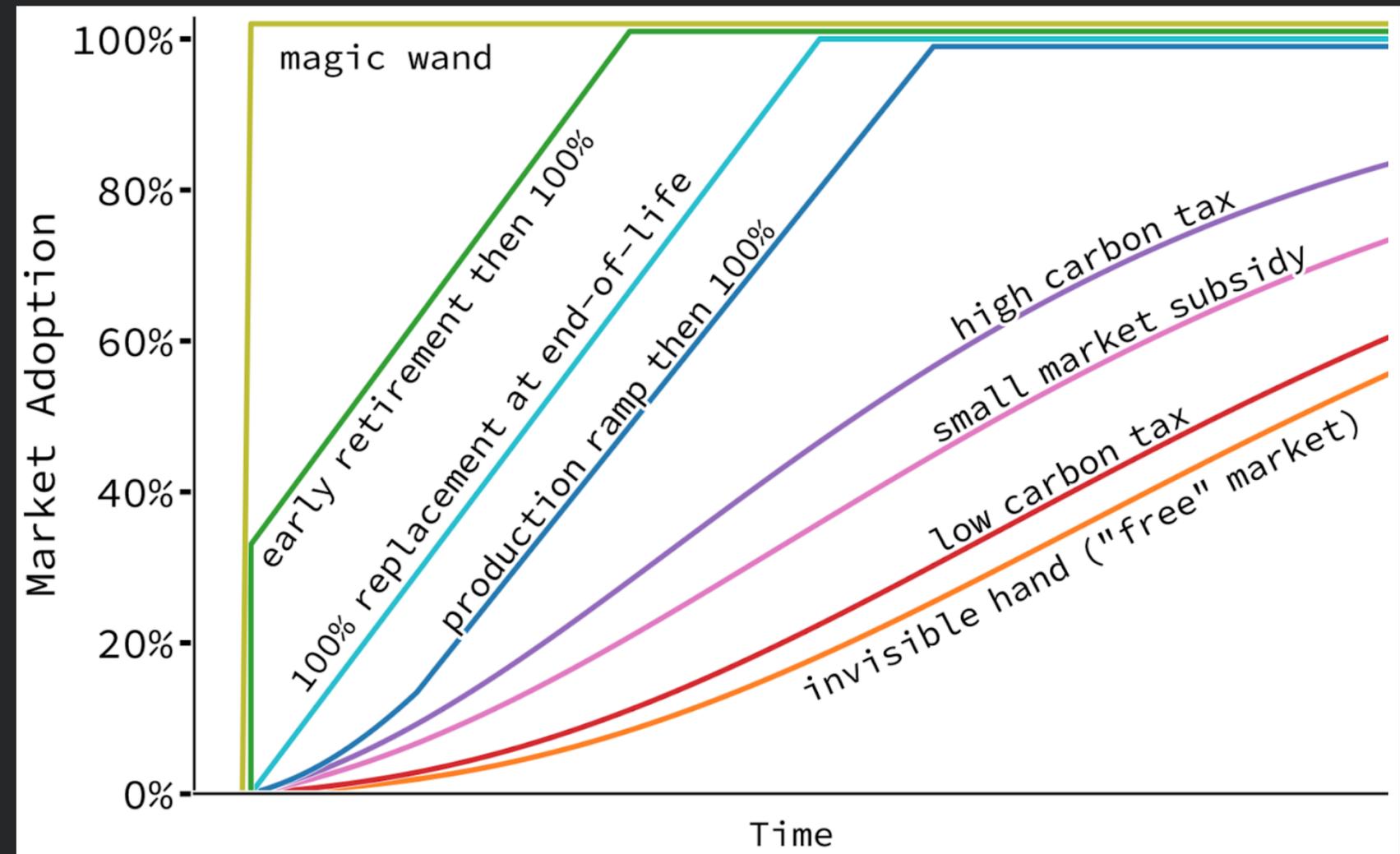
# Rewiring America

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



## 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.



CONCLUSION

# Thank you!

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