Clean Coalition

BE Smart: A proactive approach to mass beneficial electrification of existing buildings

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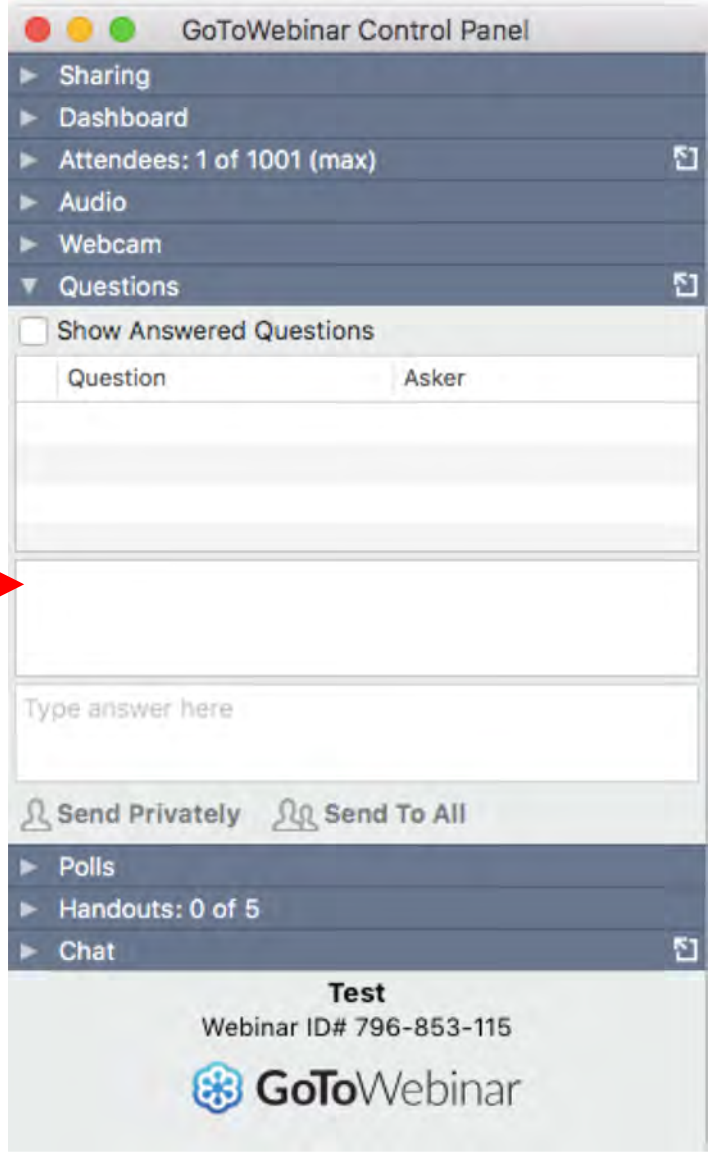
- For other questions, contact Rosana Francescato: rosana@clean-coalition.org



Mission

To accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise.

100% renewable energy end-game

- 25% local, interconnected within the distribution grid and facilitating resilience without dependence on the transmission grid.
- 75% remote, dependent on the transmission grid for serving loads.

Why electrify?

- Electrification is essential to get to 100% renewable energy.
- David Roberts: “Clean electrification is the entrée. Everything else is a side.” (https://www.volts.wtf/p/on-climate-policy-theres-one-main)

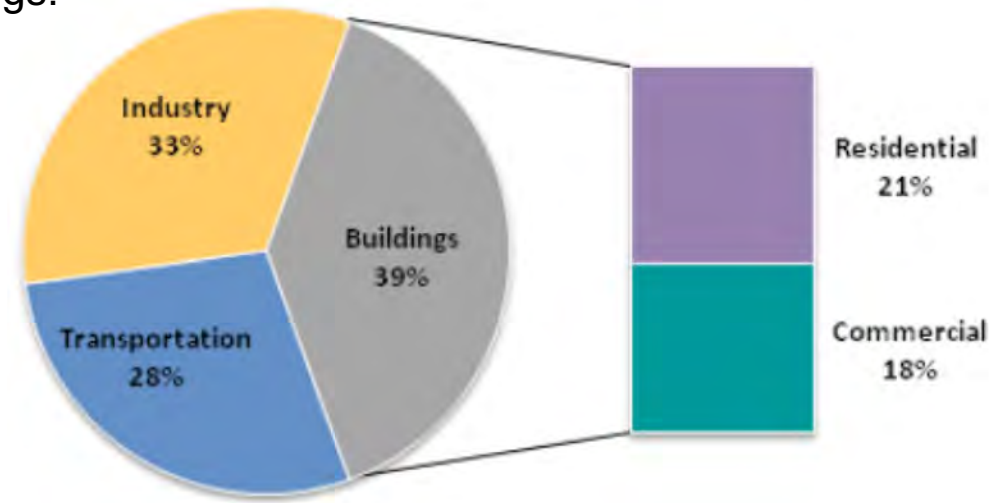
What is clean electrification?

Clean electrification means:

- **Clean up the electricity grid** by replacing fossil-fuel power plants with renewable energy and energy storage.
- **Clean up transportation** by replacing gas- and diesel-powered vehicles with EVs.
- **Clean up buildings** by replacing furnaces and other appliances that run on fossil fuels with appliances that run on electricity.

This webinar will focus on #3, cleaning up buildings.

- Buildings generate nearly **40%** of CO2 emissions, with nearly 30% of that coming from building operations (vs materials and construction).
- All-electric is cheaper for new buildings.
- Retrofitting existing buildings is challenging.
- That's why we need programs like BE Smart.



Presenters

Bruce Hodge is an environmental activist, fine art photographer, and computer scientist. He founded Carbon Free Palo Alto in 2011 and played a crucial role in convincing the City of Palo Alto to provide carbon-neutral energy to all utility customers. Since then, he's worked to keep Palo Alto in the vanguard of cities striving to implement a low-carbon energy future by focusing on strategies such as community solar and mass beneficial electrification. As an Adobe employee, he played a key role in convincing Adobe to build a new all-electric North Tower in San Jose. He also advocates for decarbonization policy as a board member of Acterra and Carbon Free Silicon Valley.

Bret Andersen is a consultant and activist who develops and promotes innovative, scalable policy and program solutions for climate protection that create more just and purposeful communities. He currently focuses on building decarbonization policy advocacy as a board member of Carbon Free Palo Alto and Carbon Free Silicon Valley. His past sustainability-related projects include neighborhood carbon footprint reduction, cleantech startup financing, alternative commuting, and environmental education. Bret has a background in international business development, strategy, and marketing in the information technology industry. He holds degrees in electrical engineering and business from the University of Minnesota and the Stanford Graduate School of Business.

OCTOBER 2021

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 direct installation solution with on-bill financing that balances customer benefit with cost recovery.

Challenges of mass electrification

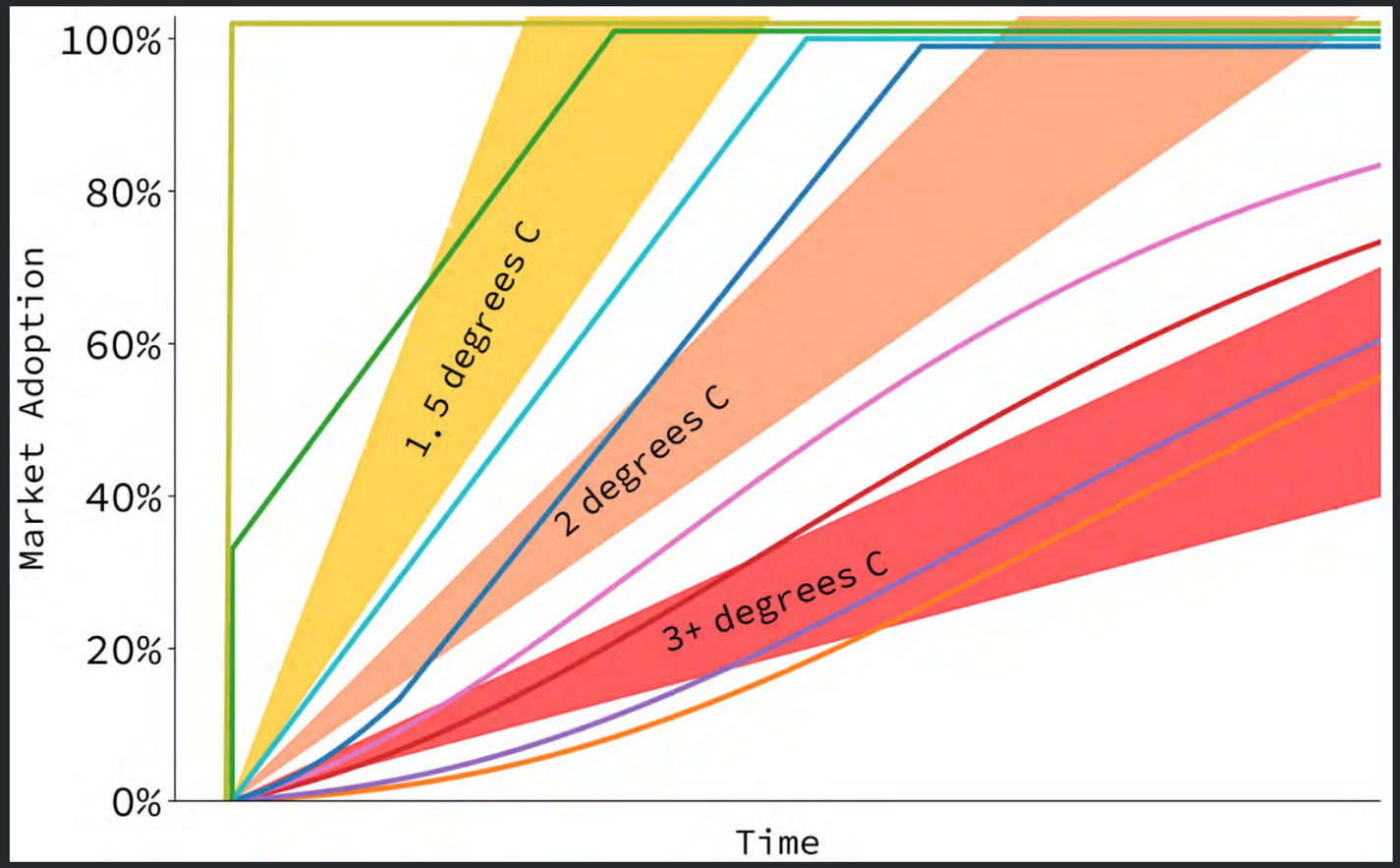
CHALLENGES

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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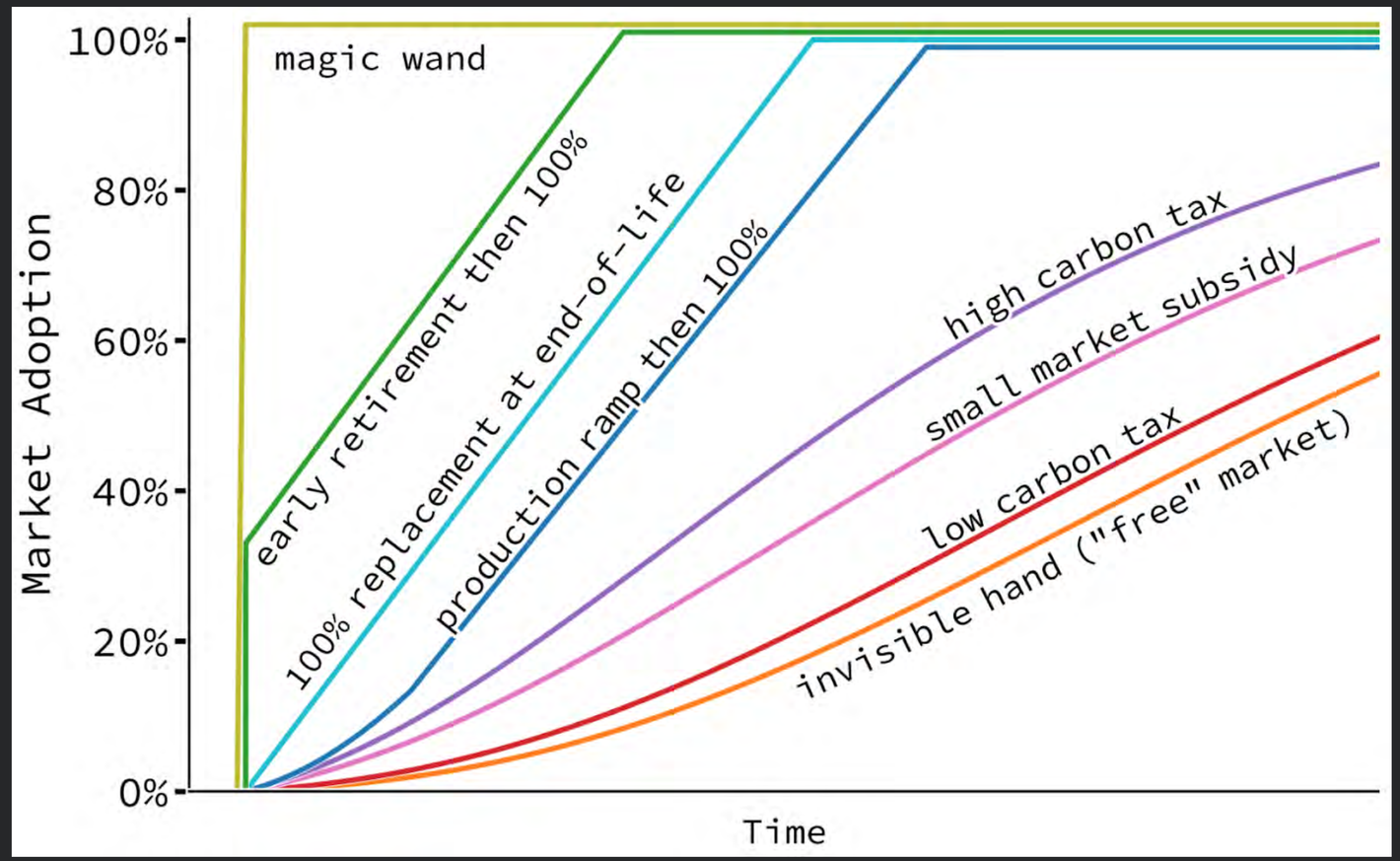


Mass electrification requires a more robust approach

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

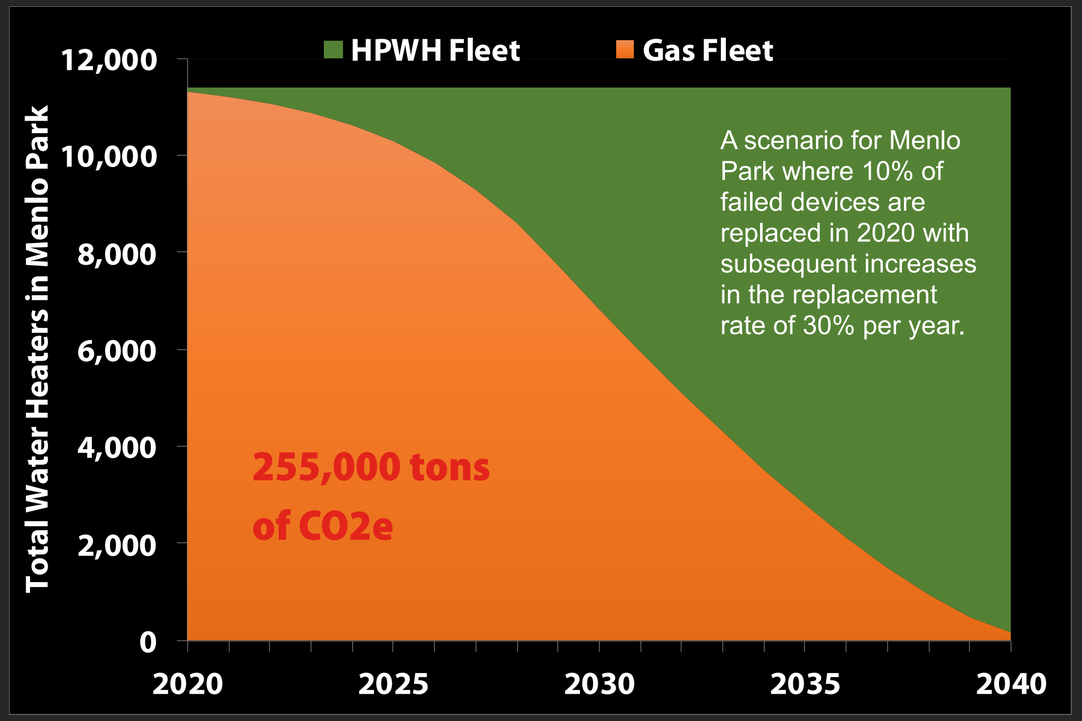
This adds more than $200M to the base of potentially stranded FF assets (devices) in the Bay Area each year.

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

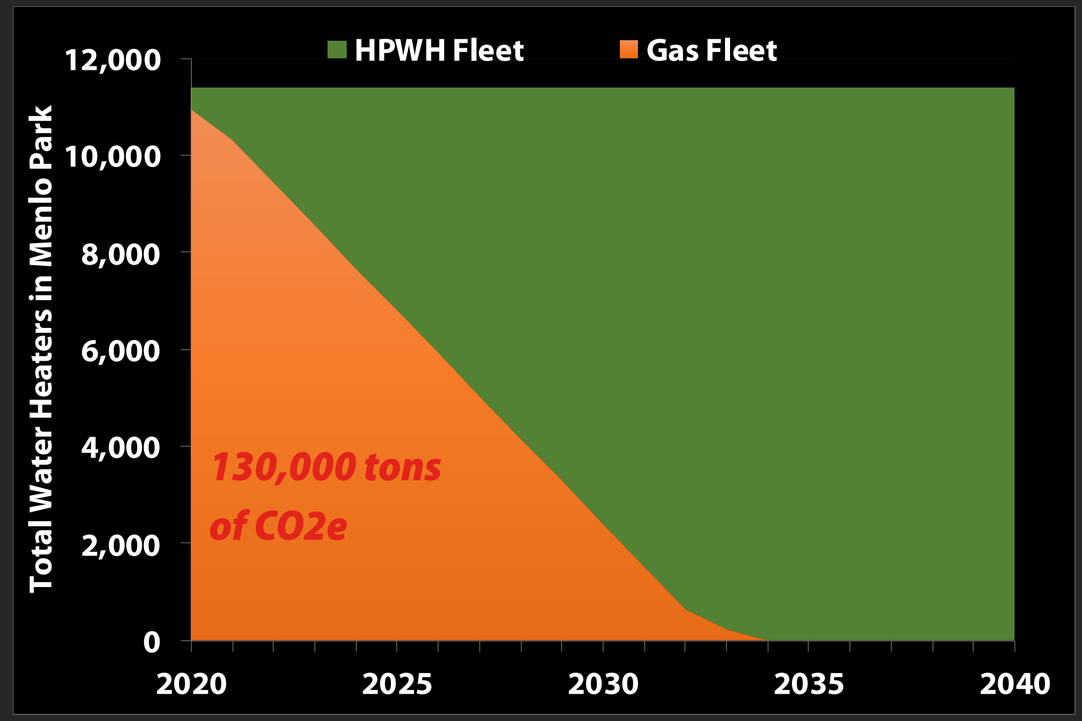
This must be done equitably for homes and businesses of all income levels.->

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 costs for installation of 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.->

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.

CHALLENGES

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 customers 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.->

SOLUTION - BE SMART

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

- TOB is an inclusive financing approach that has been shown to have very high adoption rates when applied to energy efficiency programs.
- The customer avoids high up-front costs by making monthly payments on their utility bill.
- 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.
- 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.->

BE Smart in a nutshell

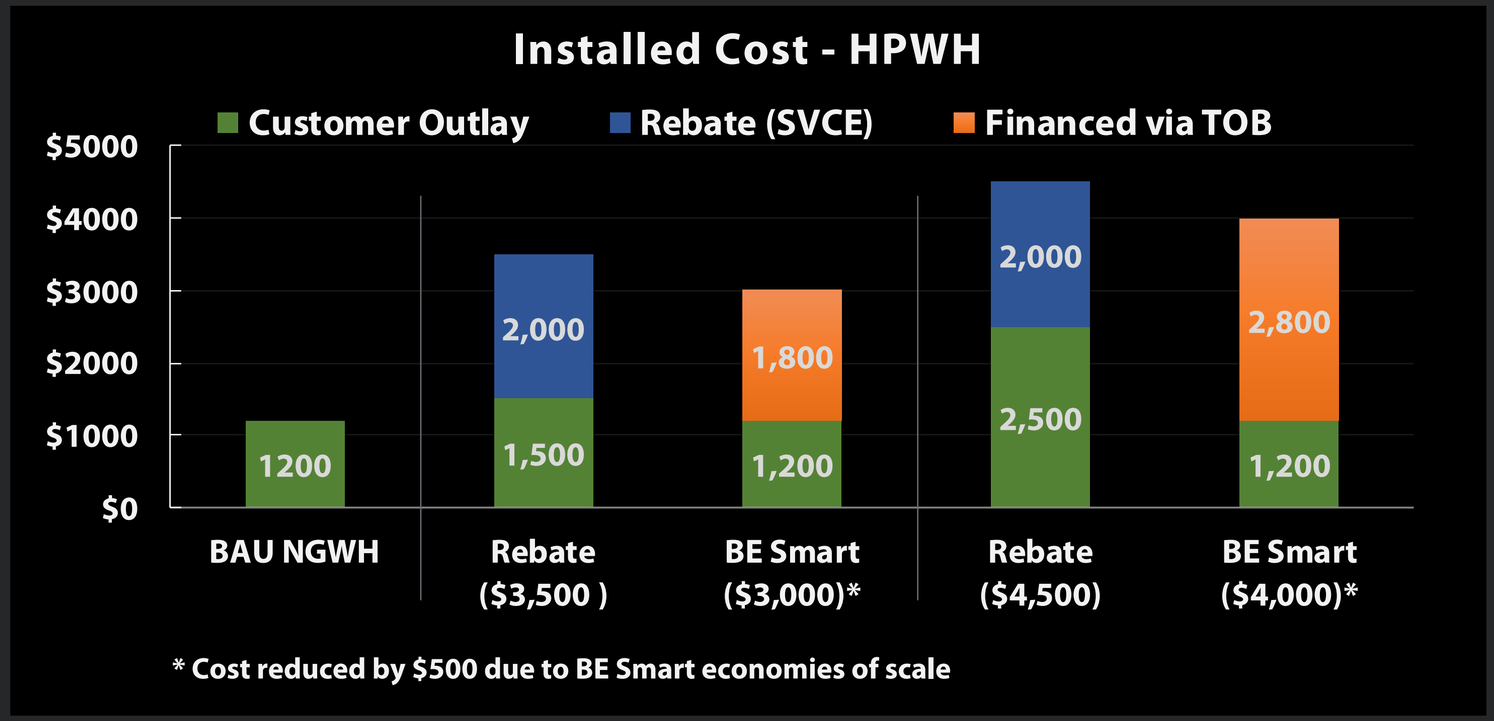
- Utilities proactively orchestrate the replacement of soon-to-fail FF devices with BE devices through a direct install program.
- The replacement process is designed to be quick and easy for the customer.
- Customers pay an initial outlay equal to the normal BAU cost of replacing the device with another 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.
- 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

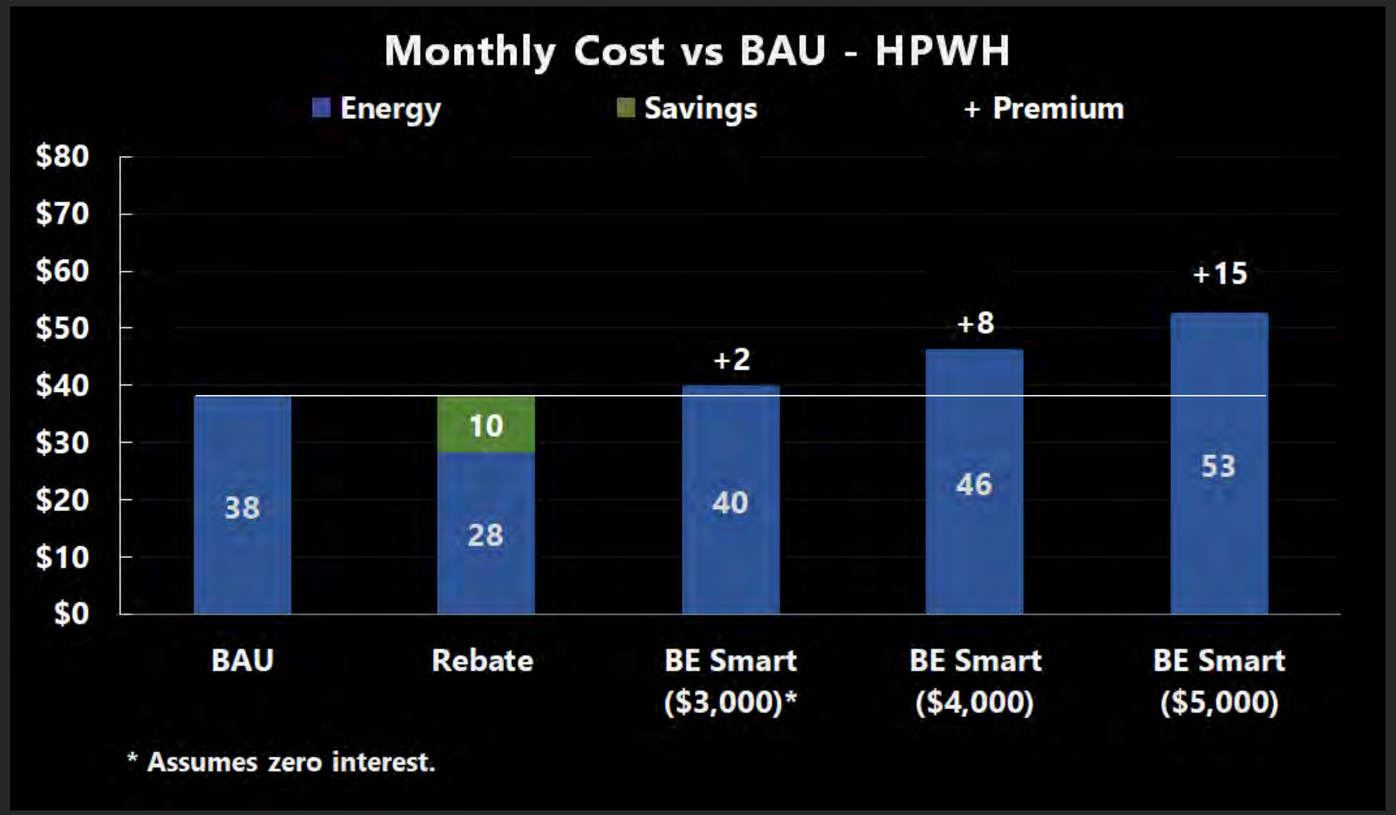


- Silicon Valley Clean Energy (SVCE) offers a $2000 rebate for heat pump water heaters (HPWHs).
- Even this generous rebate means customers might pay more up front than BAU (natural gas water heaters).
- BE Smart requires an outlay from the customer of $1200 (set to reflect BAU cost) — the rest of the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



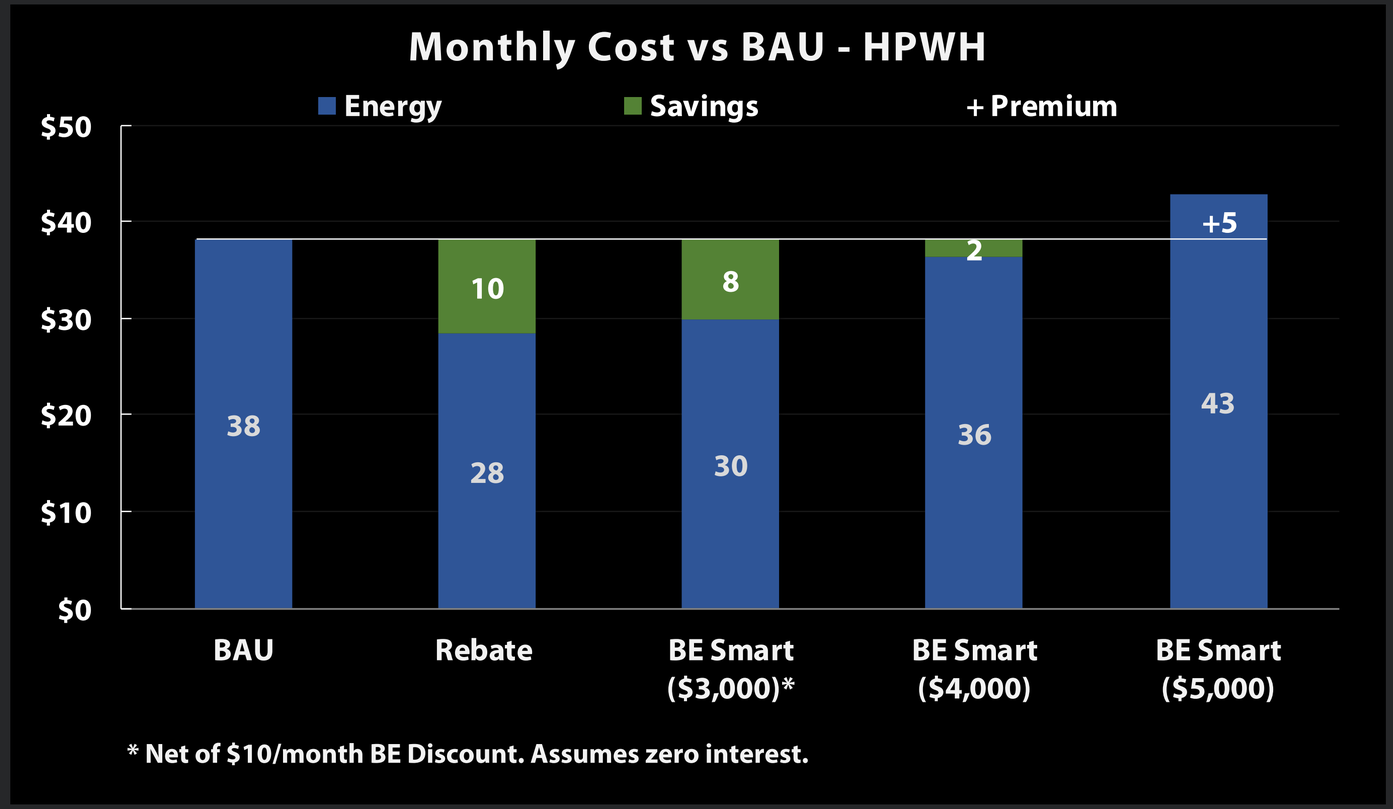
SOLUTION - BE SMART

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.

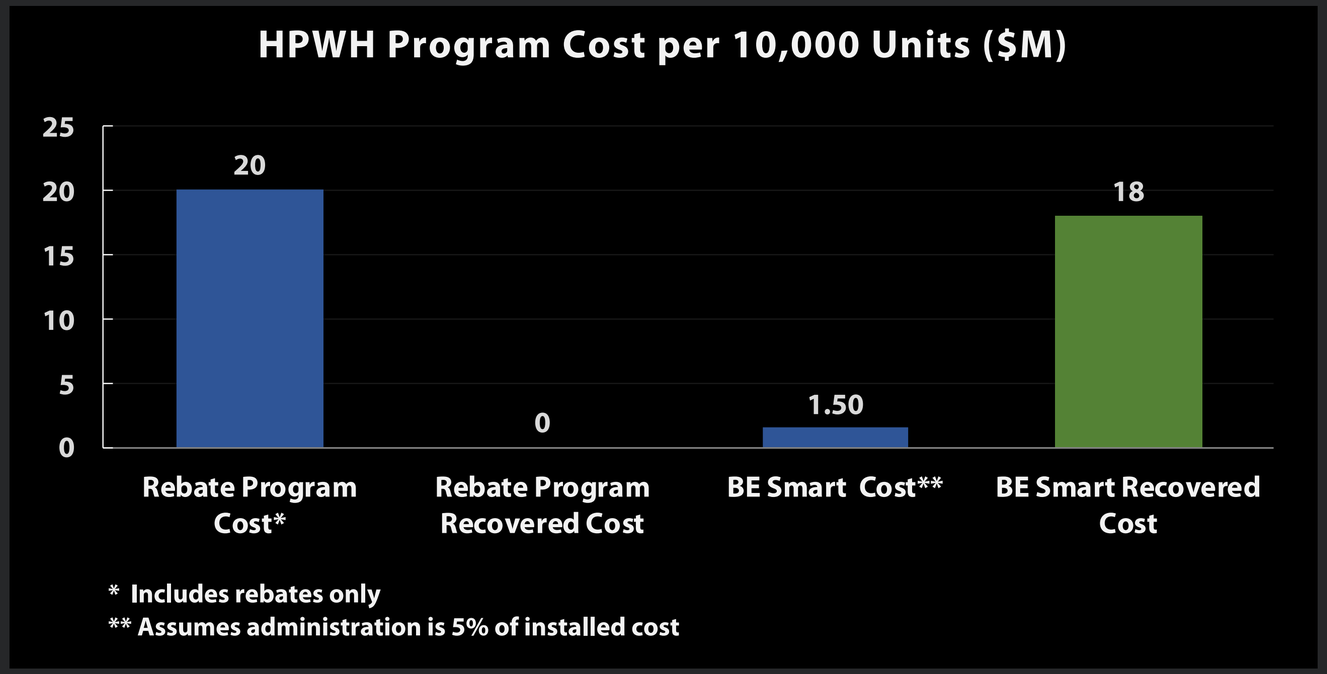
- New renters should not have to assume additional costs beyond BAU.
- LMI owners should qualify for equity reasons.->



SOLUTION - BE SMART

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

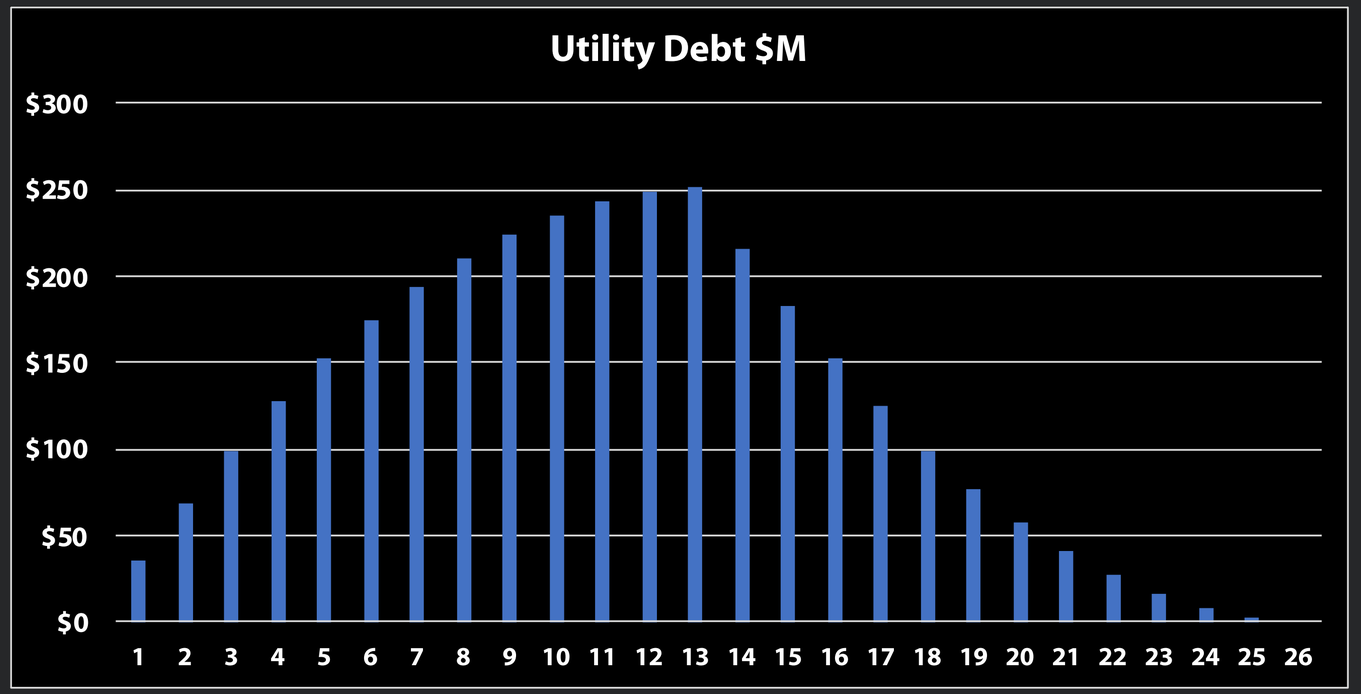
- A rebate approach would cost $20M in rebates to convert 10,000 installations (excluding program management costs).
- Crucially, BE Smart enables the utility to recover the entire cost of its loaned capital in such installations, about $18M. Customer defaults are extremely rare in the case of TOB.



- 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.->

Financing water heater replacements (continued)

- The BE Smart program is similar to Pay As You Save (PAYS) programs (which include direct installation and tariffed on-bill financing) but with crucial differences.
- BE Smart is focused on proactive decarbonization while PAYS is focused on energy efficiency.
- PAYS requires cost effectiveness - today, most electrification measures are not cost effective. 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. PAYS does not offer the LMI discount model.

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.->

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 customers to ensure that the program is accessible and attractive to citizens from all income levels
- Participation by landlords and renters to test the split incentive hypothesis
- 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 uses TOB to address the split incentive issue and employs a proactive approach for replacing devices before EOL.

REFERENCE PROJECTS

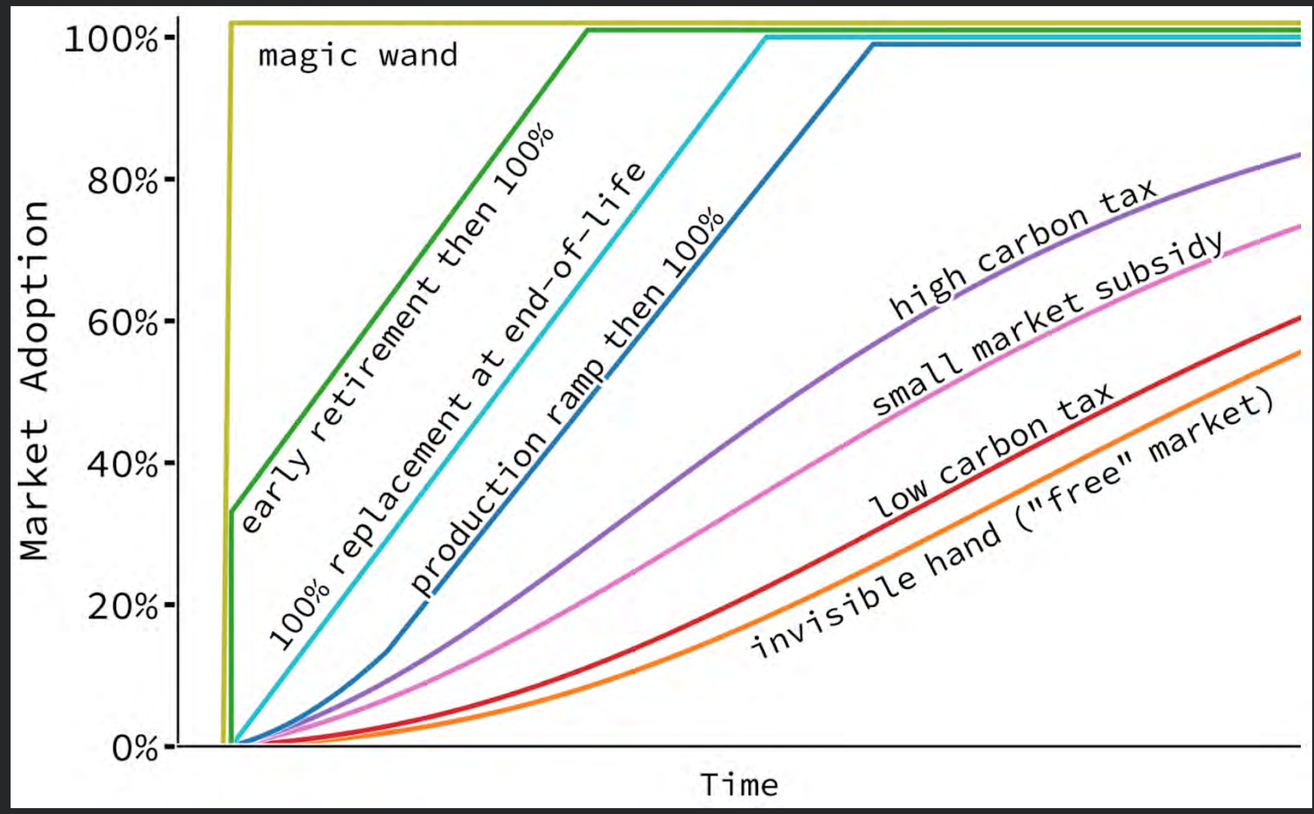
Rewiring America

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.

Thank you!

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