Making GEBs a "Win" for Customers and Utilities

PRESENTED BY

Ryan Hledik
The Brattle Group

PREPARED WITH

Andy Satchwell
Berkeley Lab

PREPARED FOR

2022 ACEEE Summer Study

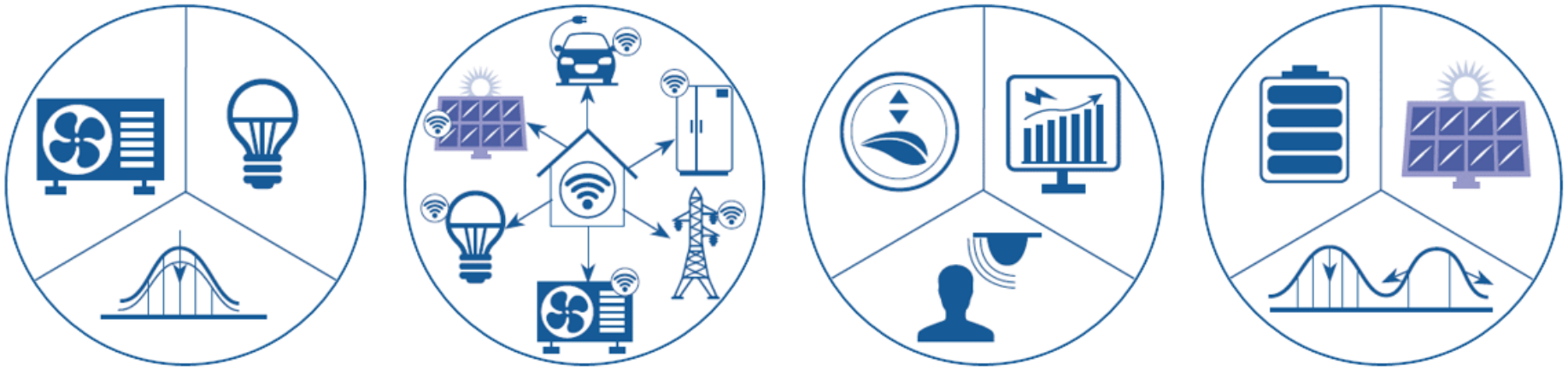
AUGUST 22, 2022

Brattle

First, what's a "GEB"?

The simple definition: **EE and DR for the residential and commercial sectors**

But it's more than that:



EFFICIENT

Persistent low energy use minimizes demand on grid resources and infrastructure

CONNECTED

Two-way communication with flexible technologies, the grid, and occupants

SMART

Analytics supported by sensors and controls co-optimize efficiency, flexibility, and occupant preferences

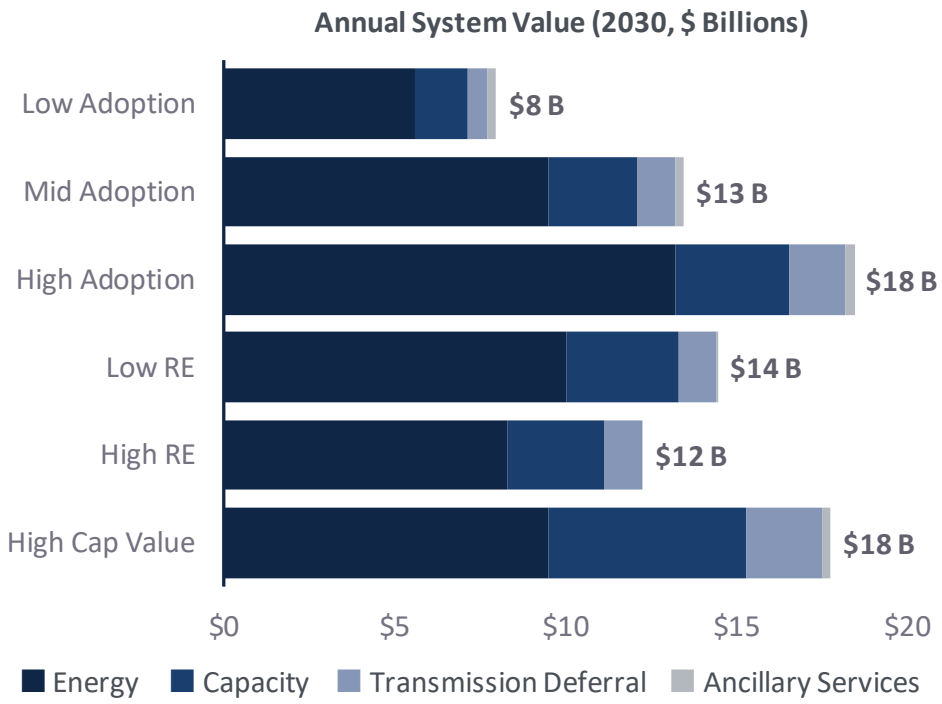
FLEXIBLE

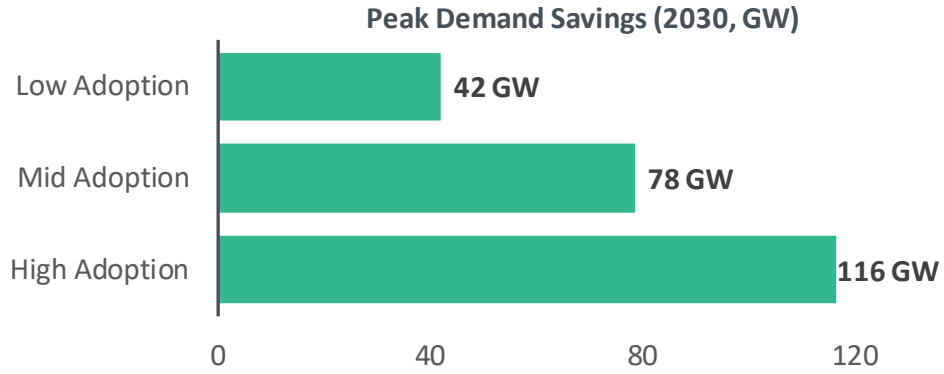
Flexible loads and distributed generation/ storage can be sued to reduce, shift, or modulate energy use

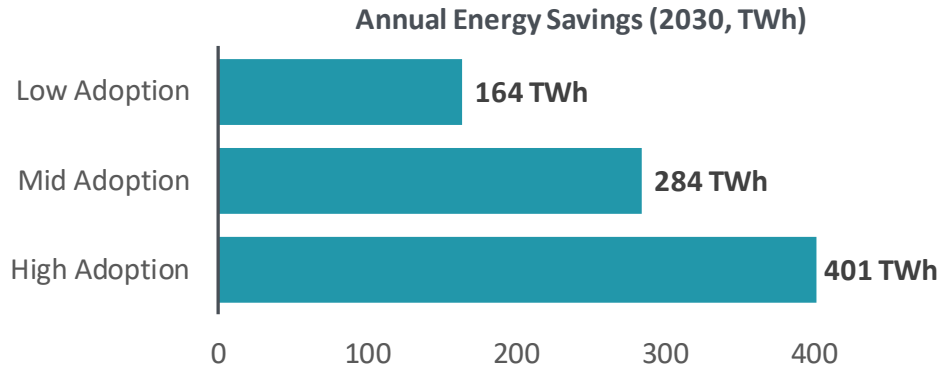
Figure source: Neukomm et al. (2019). Grid-interactive Efficient Buildings: Overview. US DOE Report.

GEBs are a $100+ billion opportunity

GEBs could more than triple existing EE and DR capability in buildings. This would save up to $18 billion per year in power system costs by 2030 - roughly $100 to $200 billion between 2020 and 2040.







Notes: All in 2019 dollars. Peak demand savings are computed as the sum of impacts during each region's coincident peak hour. $100 - $200 billion reflects the NPV at a social discount rate of 4% nominal (2% real).

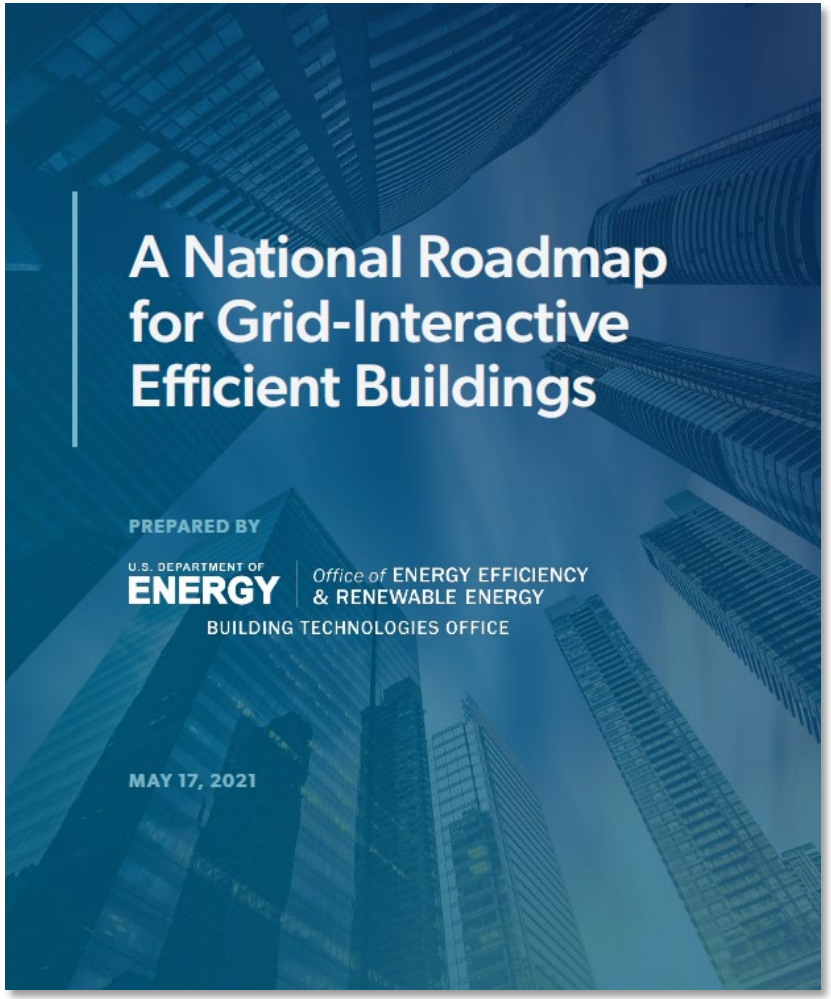
Then why aren't there more GEBs?

Barriers exist at each point in the supply chain

- See DOE's *A National Roadmap for GEBs* for (much!) more discussion

Our Summer Study paper focuses on overcoming utility and regulatory hesitance in deploying GEBs

- Utilities will play a central role in GEB development and implementation
- They interface with all major players in the supply chain



For more information:
https://gebroadmap.lbl.gov/

Key barriers to utility deployment of GEBs

- **Financial disincentive**
- **Perceived GEB performance and reliability limitations**
- **Lack of utility-wide integration into resource planning and operations**

We explore emerging models for overcoming these barriers, enabling utilities to facilitate GEB adoption and fundamentally benefit from its development, while also providing benefits to customers.

“Win-win” models are emerging in three areas

Utility business models

- Financial performance incentives
- Data services and other commercial opportunities

Pricing

- Subscription pricing
- Innovations in DER rate design

Utility infrastructure investments

- Facilitating electrification through EE and demand flexibility
- Investing in smart technology

Our Summer Study paper includes 13 mini-case studies in these areas

Example 1: Subscription pricing

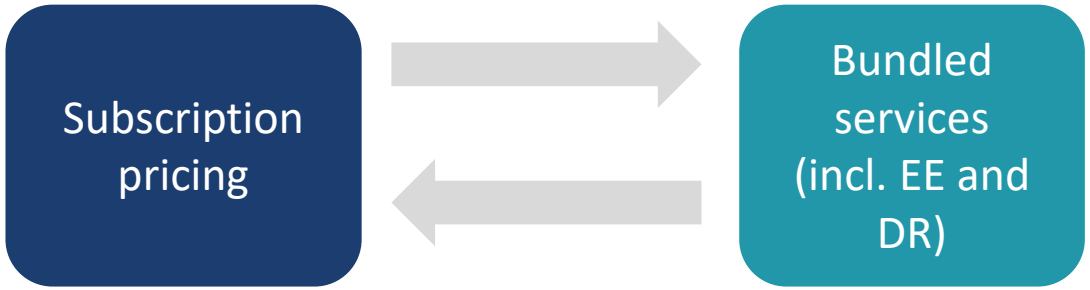
Subscription pricing is an entirely fixed monthly electricity bill. It's a "subscription fee" for electricity.

Common subscription pricing design elements:

- The customer's subscription pricing offer is based on their average expected bill under the standard rate, plus a risk premium
- Risk premium is typically less than 10% of bill
- Fixed contract period (typically one-year)
- No true-up for changes in usage

The fixed bill offer can be coupled with EE and DR requirements to provide environmental and economic benefits.

Subscription pricing makes EE and DR more attractive to customers



The bundled services align subscription pricing with corporate & policy objectives

Example 1: Subscription pricing (cont'd)

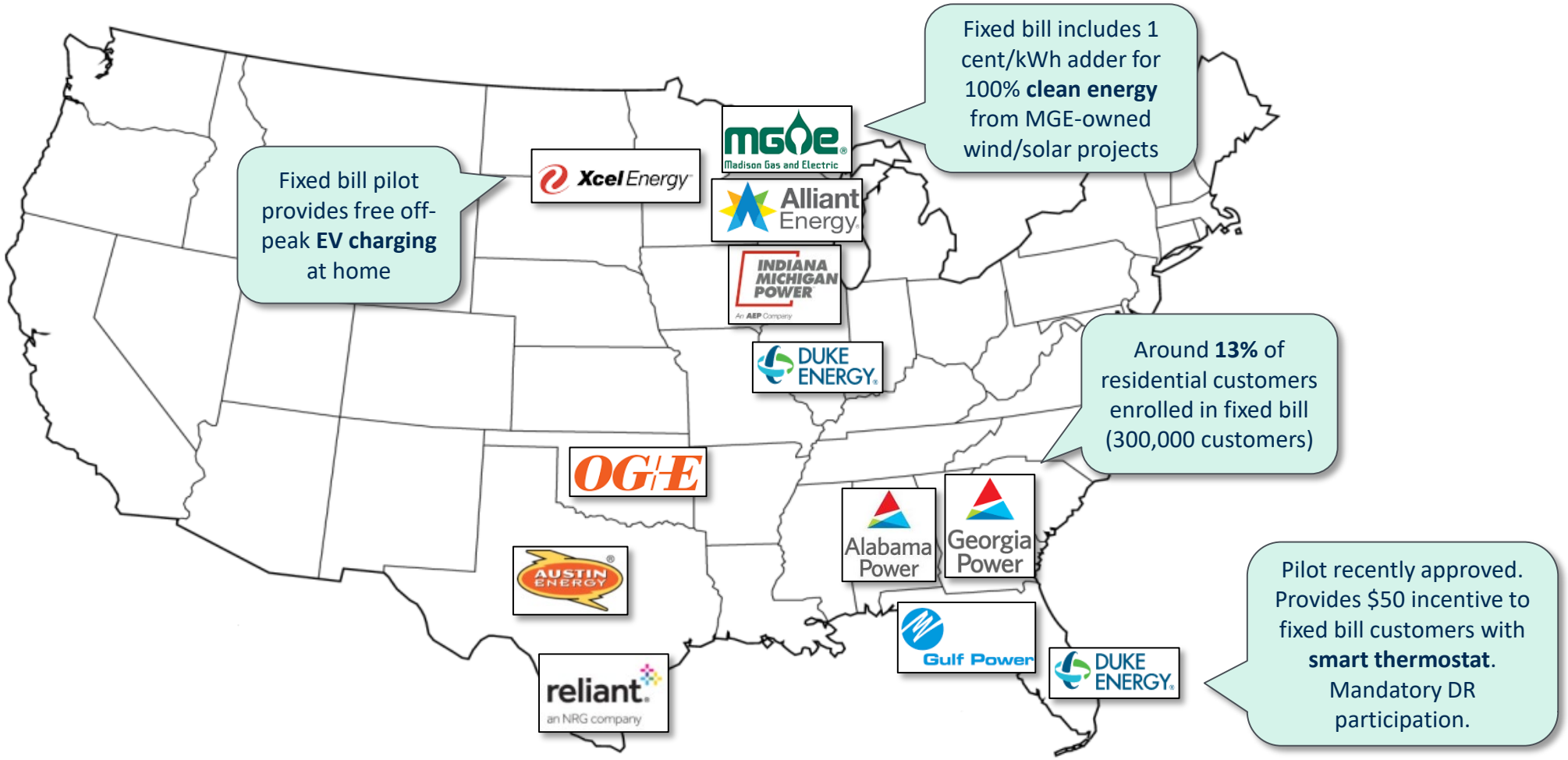
Customer benefits

- ✓ Rate choice
- ✓ Simplicity
- ✓ Improved predictability for budgeting
- ✓ No surprises
- ✓ No weather risk
- ✓ No true-up
- ✓ Potential bill reduction through EE and DR

Utility benefits

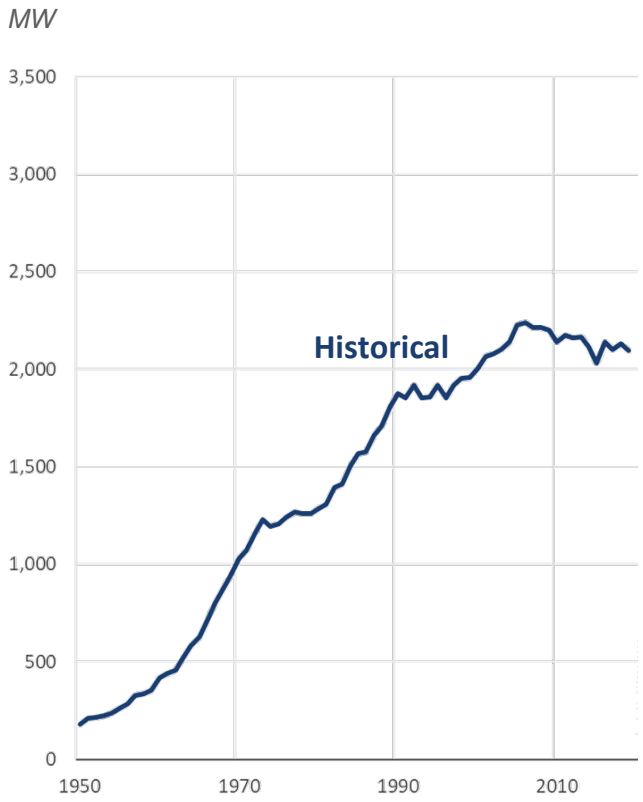
- ✓ Reduced high bill complaints
- ✓ Increased customer satisfaction
- ✓ Revenue stability
- ✓ Potential for higher earnings
- ✓ Aligns with increasingly fixed nature of utility costs
- ✓ Facilitates achievement of policy goals

Example 1: Subscription pricing (cont'd)



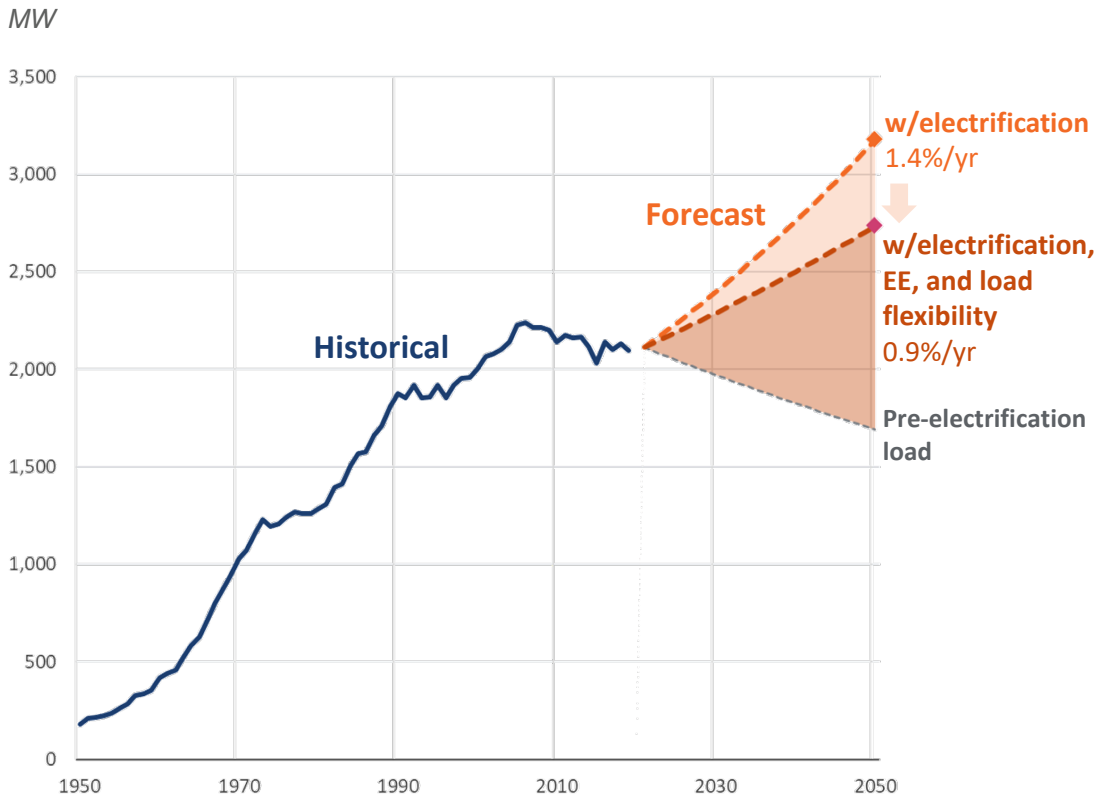
Example 2: Facilitating electrification through EE and demand flexibility

Pepco DC System Peak Demand with Electrification



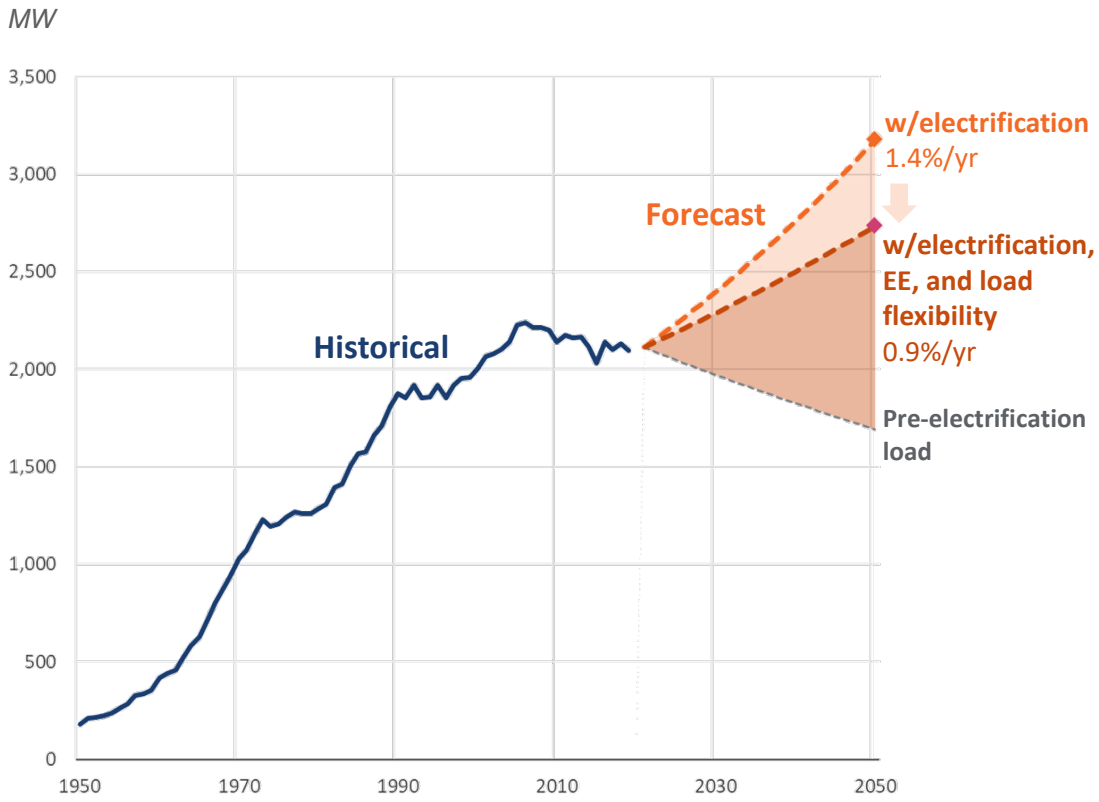
Example 2: Facilitating electrification through EE and demand flexibility (cont'd)

Pepco DC System Peak Demand with Electrification

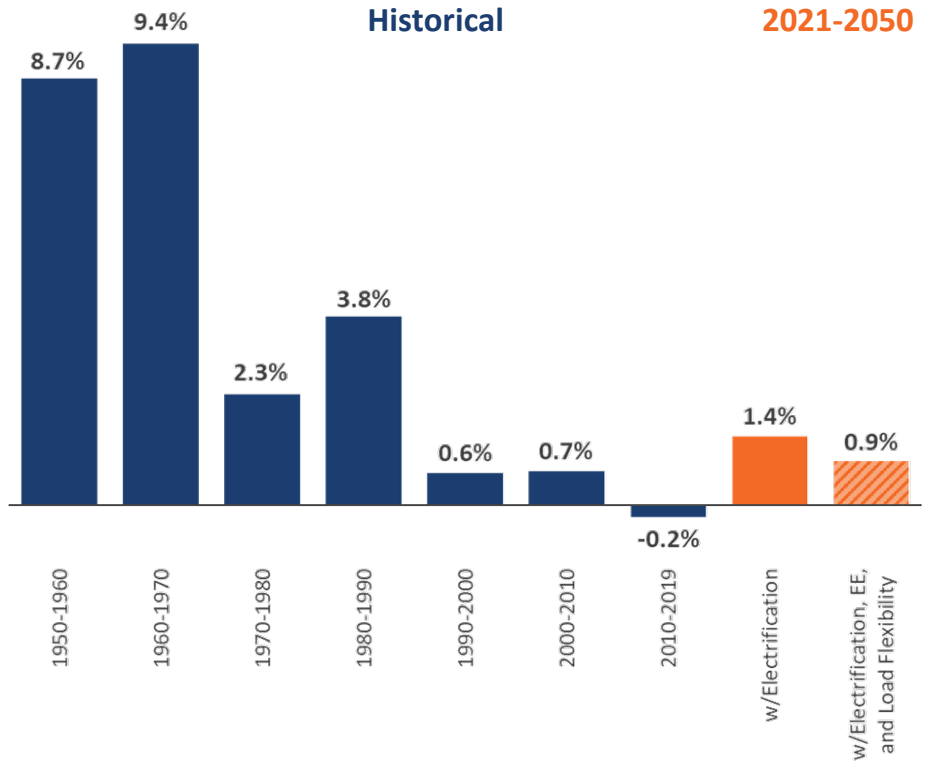


Example 2: Facilitating electrification through EE and demand flexibility

Pepco DC System Peak Demand with Electrification



Average Annual Growth Rate



Example 2: Facilitating electrification through EE and demand flexibility (cont'd)

EE and DF will be keys to making decarbonization affordable and reliable

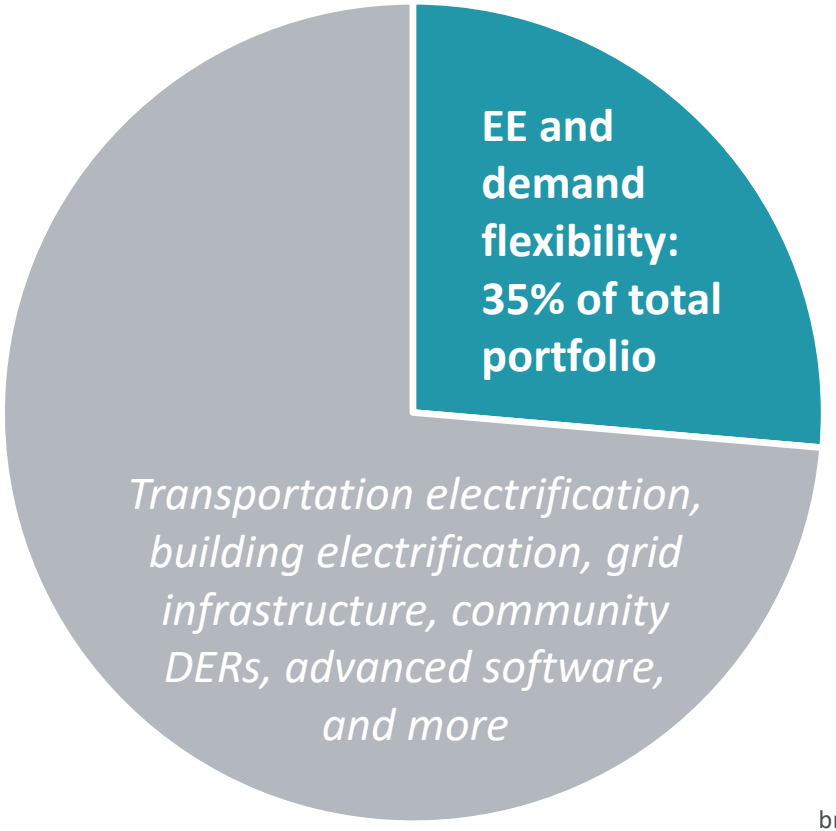
EE and DF will enable utility infrastructure investment, rather than reducing it

Pepco DC's Climate Solutions Plan is a good example

- 62 customer programs, including electrification with EE and DF
- Highly cost-effective (benefit-cost ratio of 1.7 to 1)

Pepco's 5-year Climate Solutions Plan Budget

Total Budget Estimate: $313 million (approx.)



Three recommendations for success

- Inclusive stakeholder processes… with an action plan
- Piloting novel concepts… with a blueprint for full-scale deployment
- Utility partnerships with technology providers... with flexible platforms