



JR 7617A

Report on Building Benchmarking and Performance Standards

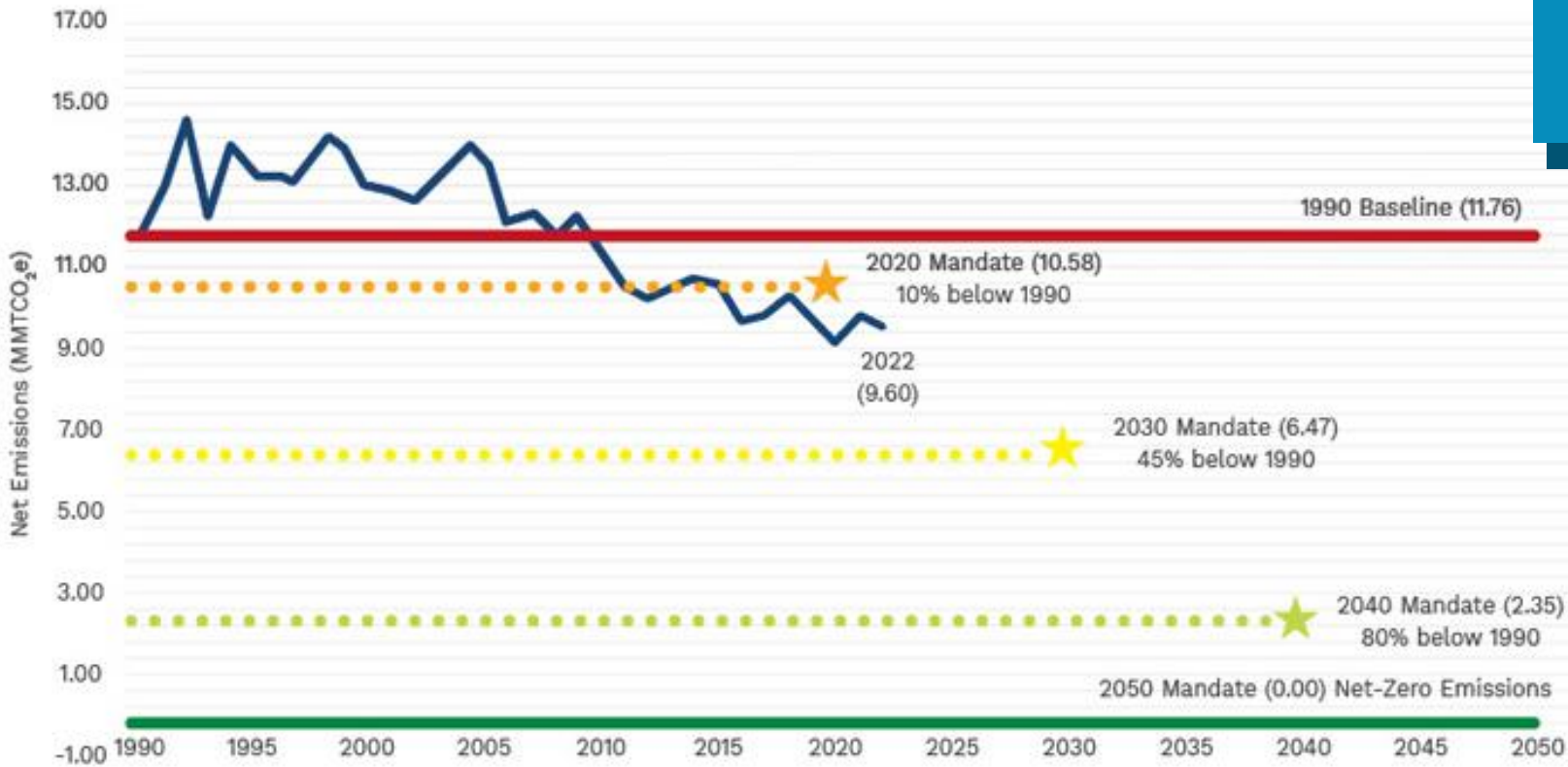
EC4 Meeting

2/10/2025

Jack Green

Act On Climate Emissions Reduction Goals

1990-2022 RHODE ISLAND GREENHOUSE GAS EMISSIONS ACT ON CLIMATE REQUIREMENTS



must reduce 2022 emissions by
32.6% Over 8 Years
to meet 2030 target

JR 7617A

- The General Assembly requested that the Executive Climate Change Coordinating Council (EC4) prepare a report that includes:
 - “**recommendations** for the **implementation** of benchmarking and building performance standards for **large existing buildings** in Rhode Island, meaning those with at least **25,000 sq. ft.** of gross floor area and including both **publicly** and **privately** owned buildings”
 - “recommended **approaches** and **implementation plans** to collect and evaluate” seven key facets of this topic

2024 -- H 7617 SUBSTITUTE A
LC005012/SUB A

STATE OF RHODE ISLAND
IN GENERAL ASSEMBLY
JANUARY SESSION, A.D. 2024

JOINT RESOLUTION

RESPECTFULLY REQUESTING THE EXECUTIVE CLIMATE CHANGE COORDINATING COUNCIL (EC4) TO PREPARE A REPORT ON BENCHMARKING AND BUILDING PERFORMANCE STANDARDS

Introduced By: Representatives Kislak, Cortvriend, Fogarty, Carson, Speakman, McEntee, Spears, Morales, McGaw, and Felix
Date Introduced: February 15, 2024
Referred To: House Environment and Natural Resources

1 RESOLVED, That this General Assembly of the State of Rhode Island hereby
2 respectfully requests that the Executive Climate Change Coordinating Council ("EC4") provides
3 the Speaker of the Rhode Island House of Representatives and President of the Rhode Island
4 Senate, and members of the Rhode Island House Environment and Natural Resources Committee,
5 and the Senate Committee on Environment and Agriculture with a report on benchmarking and
6 building performance standards; and be it further

7 RESOLVED, That this General Assembly hereby requests that said report shall include
8 recommendations for the implementation of benchmarking and building performance standards
9 for large existing buildings in Rhode Island, meaning those with at least 25,000 sq. ft. of gross
10 floor area and including both publicly and privately owned buildings; and be it further

11 RESOLVED, That said report shall also include recommended approaches and
12 implementation plans to collect and evaluate the following, but not be limited to:

13 1. A summary of the State's building sector emissions using the best available data on
14 what is known about the energy use intensity and emissions from large buildings;

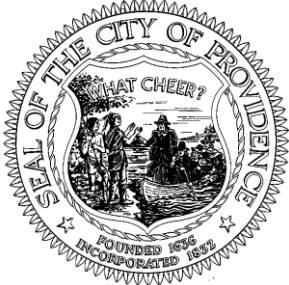
15 2. An inventory of properties that would be subject to benchmarking and building
16 performance standard requirements, including building type and size;

17 3. A summary of the best available data on current energy sources for large buildings,
18 including delivered fuels such as oil, coal, and propane, natural gas, grid electricity, district
19 energy systems, and on-site renewable energy;

Research Process

- OER consulted with **over 13 organizations** to develop insights for this report

State Partners



Regional Organization



Federal Agencies & Labs



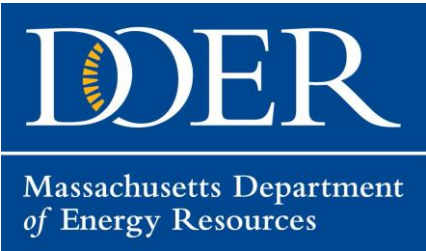
Lawrence Berkeley National Laboratory



Utilities

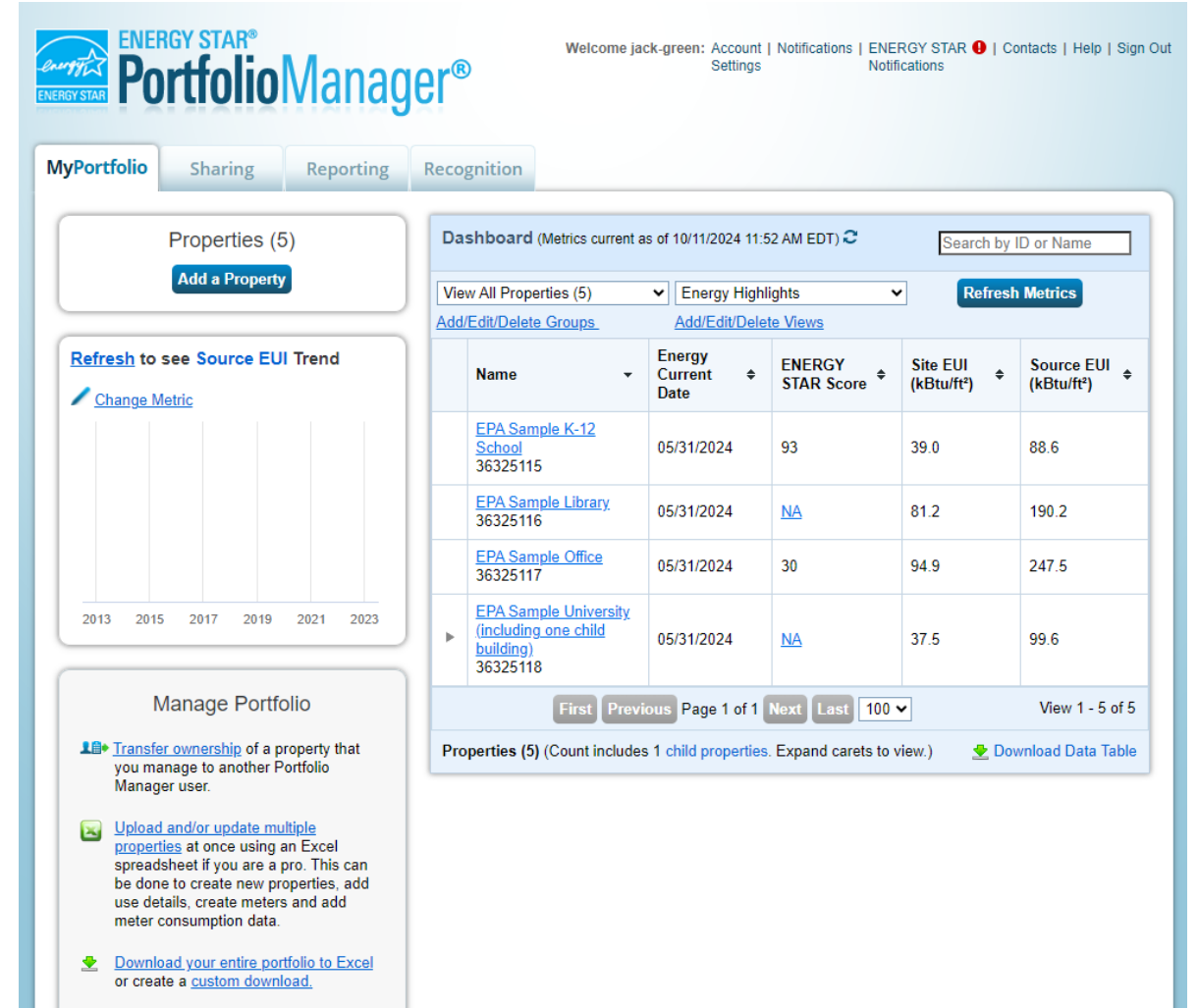


Peer Jurisdictions



What is Building Benchmarking?

- Tracking and comparing a building's energy and/or water usage to reference values.
- Understanding consumption is the first step in reducing building energy use.
- Many jurisdictions require benchmarking
- Software: EPA's Energy Star **Portfolio Manager**



The screenshot displays the Energy Star Portfolio Manager interface. At the top, it says "ENERGY STAR Portfolio Manager" and "Welcome jack-green: Account | Notifications | ENERGY STAR Notifications | Contacts | Help | Sign Out Settings". Below this, there are tabs for "MyPortfolio", "Sharing", "Reporting", and "Recognition".

The main dashboard area is titled "Dashboard (Metrics current as of 10/11/2024 11:52 AM EDT)" and includes a search bar "Search by ID or Name". It features a dropdown menu for "View All Properties (5)", a "Refresh Metrics" button, and links for "Add/Edit/Delete Groups" and "Add/Edit/Delete Views".

A table lists five properties with the following data:

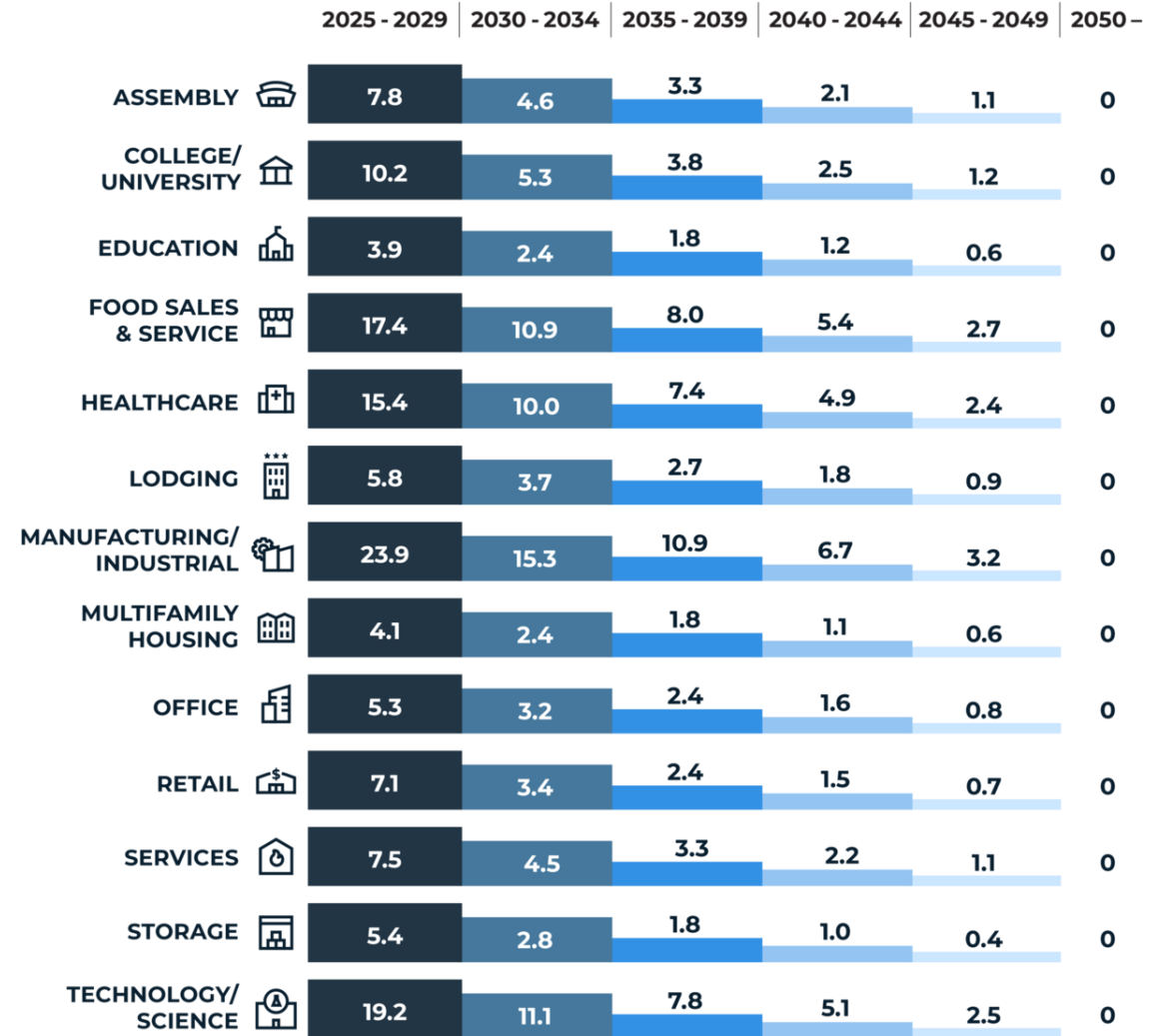
Name	Energy Current Date	ENERGY STAR Score	Site EUI (kBtu/ft ²)	Source EUI (kBtu/ft ²)
EPA Sample K-12 School 36325115	05/31/2024	93	39.0	88.6
EPA Sample Library 36325116	05/31/2024	NA	81.2	190.2
EPA Sample Office 36325117	05/31/2024	30	94.9	247.5
EPA Sample University (including one child building) 36325118	05/31/2024	NA	37.5	99.6

Below the table, there are navigation controls: "First", "Previous", "Page 1 of 1", "Next", "Last", "100", and "View 1 - 5 of 5". At the bottom, it says "Properties (5) (Count includes 1 child properties. Expand carets to view.)" and a "Download Data Table" button.

On the left side, there is a "Properties (5)" section with an "Add a Property" button. Below that is a "Refresh to see Source EUI Trend" section with a "Change Metric" link and a line graph showing data from 2013 to 2023. At the bottom left is a "Manage Portfolio" section with three options: "Transfer ownership", "Upload and/or update multiple properties", and "Download your entire portfolio to Excel".

What are Building Performance Standards (BPSs)?

- Compulsory energy or emissions targets by building type that owners must meet to avoid fines.
- Less common than benchmarking policies
- Targets **ratchet down over time**, typically every 5 years



Emissions standard (kgCO₂e/ft²/year)

Image Source: Boston BERDO

FINDINGS



1 – Building Sector Emissions

- **Scope 1** Emissions
 - From **onsite combustion of fuels**
- **Scope 2** Emissions
 - From **imported energy** (electricity, steam)
- **No bottom-up data is available for large buildings**
- Estimate based on known floor area and modeled fuel usage

best estimate:

Buildings >25k SF

account for

20% of Building Emissions

(including all residential, commercial, and industrial buildings), and roughly

10% of Statewide Emissions

1 – Linking Energy to Emissions

- Emissions determined by:
 - Fuel Usage (**Energy Efficiency**)
 - Fuel Type/**Emissions Intensity**
 - **Implications of fuel switching** to grid electricity?

Typical Heat Pump

results in

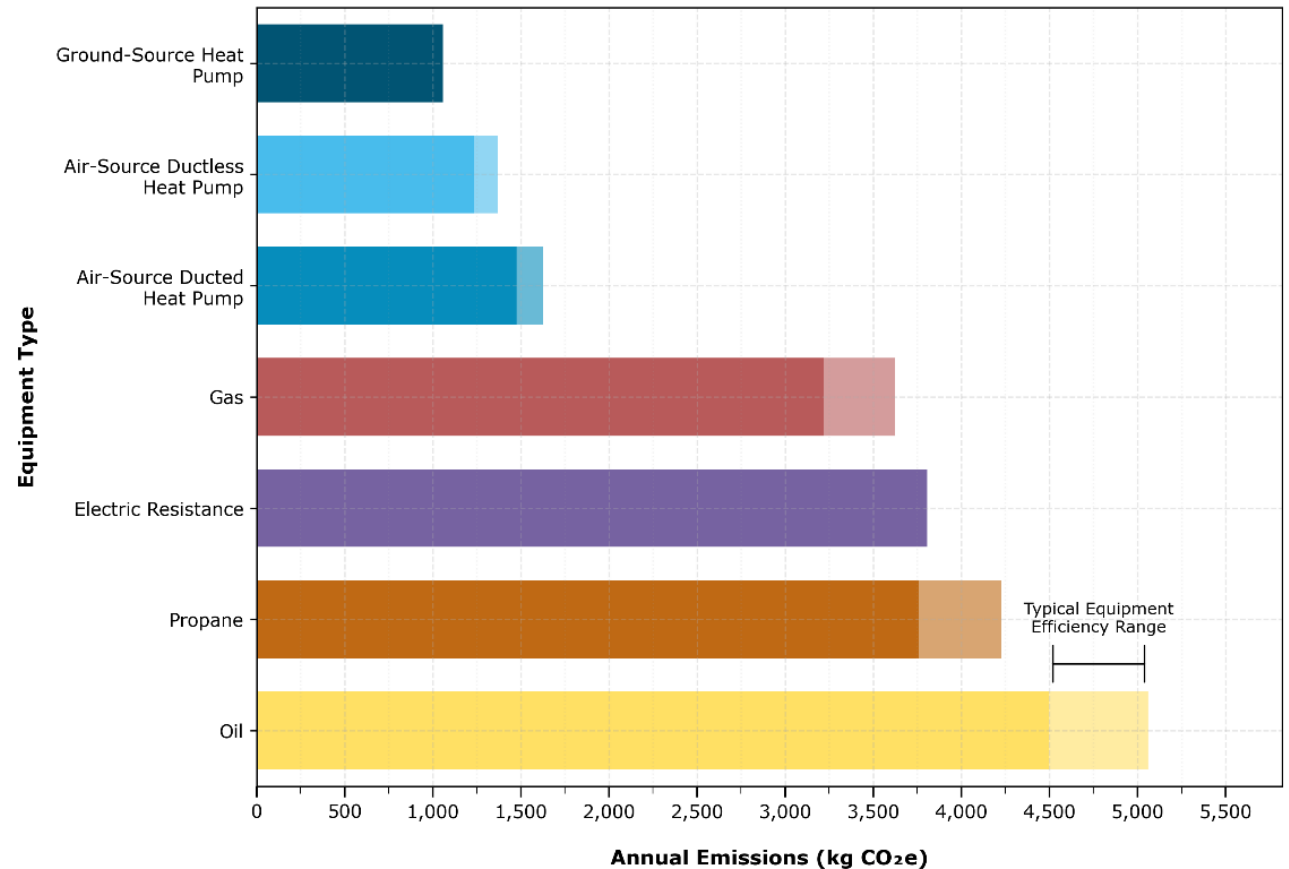
Half the Emissions

of an

Efficient Gas Boiler

Annual Space Heating Emissions by System Type

*For the Average Rhode Island Residential Heating Load
Based on Portfolio Manager and RI DEM Emissions Intensities*



1 – Energy Use Intensity Data

- Providence offers only recent building-level data
 - And for municipal buildings only
 - **Other data are outdated**, anonymized, or aggregated
- **Lead By Example benchmarking report** on 16 state-owned buildings forthcoming

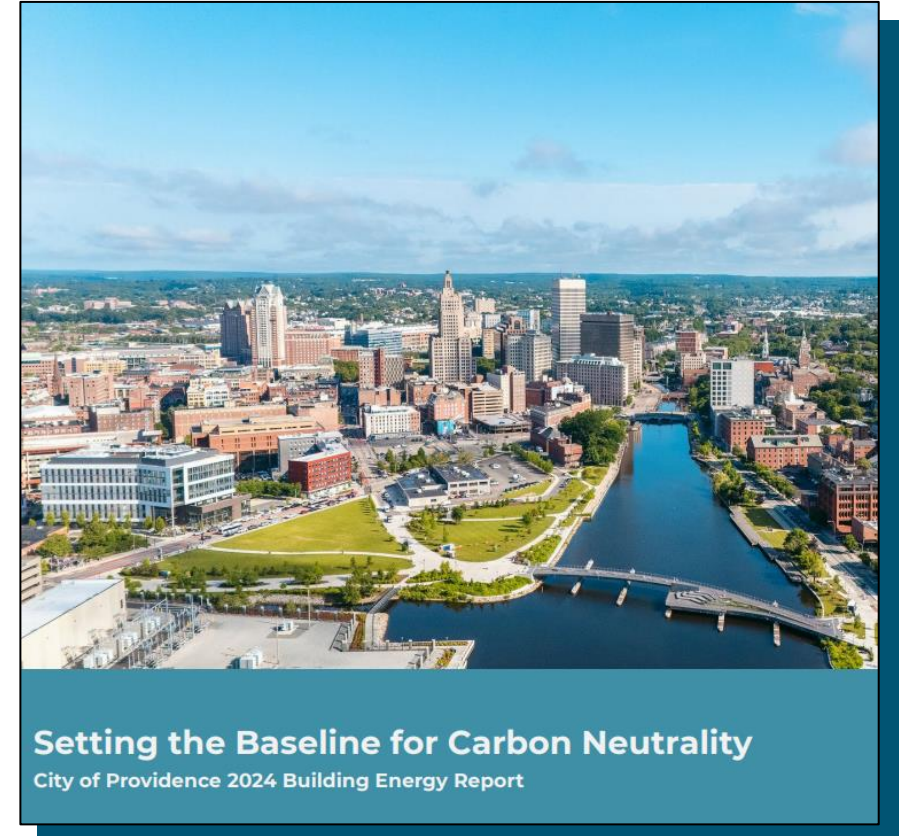
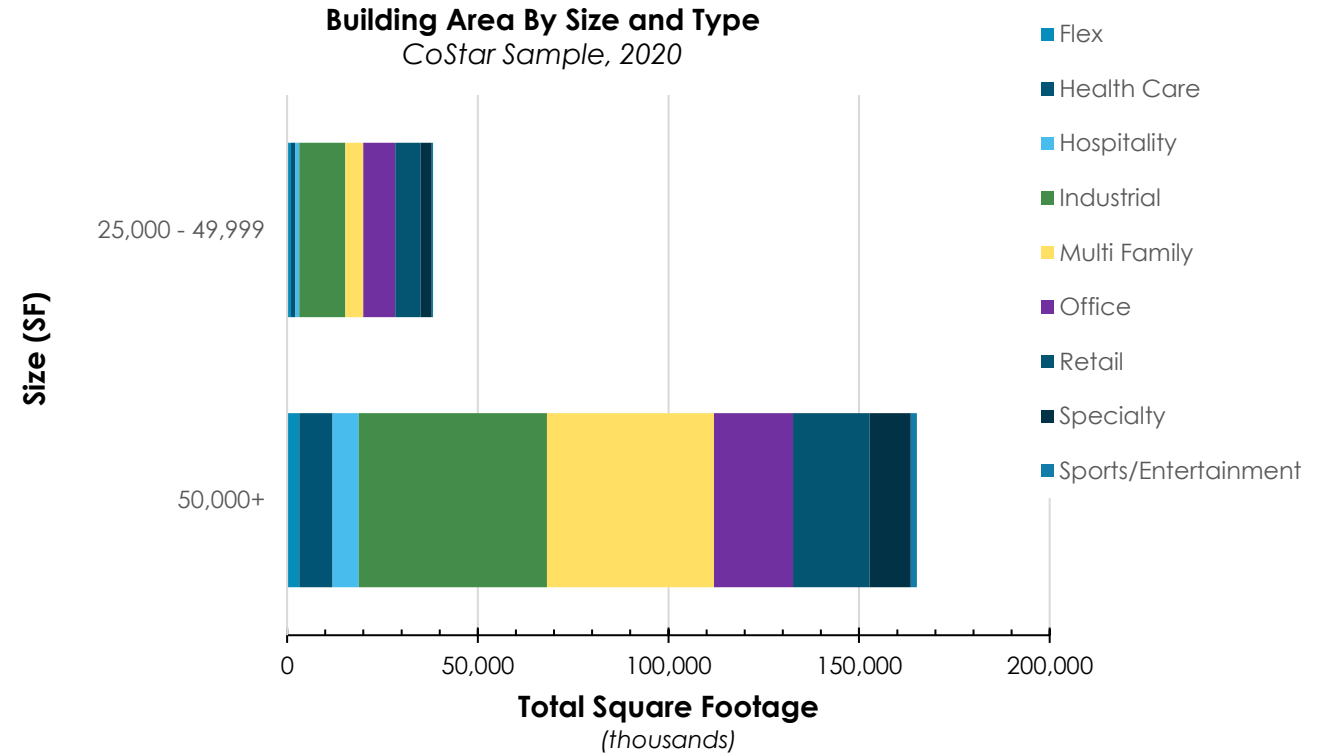


Image Source: Providence BERO

2 – Inventory of Large Buildings

- **No comprehensive database currently available**
 - Creation would be costly and time-intensive
- Statewide Parcel Model under development
- Available data from commercial real estate database
 - **Shows >2,320 buildings over 25,000 SF statewide**

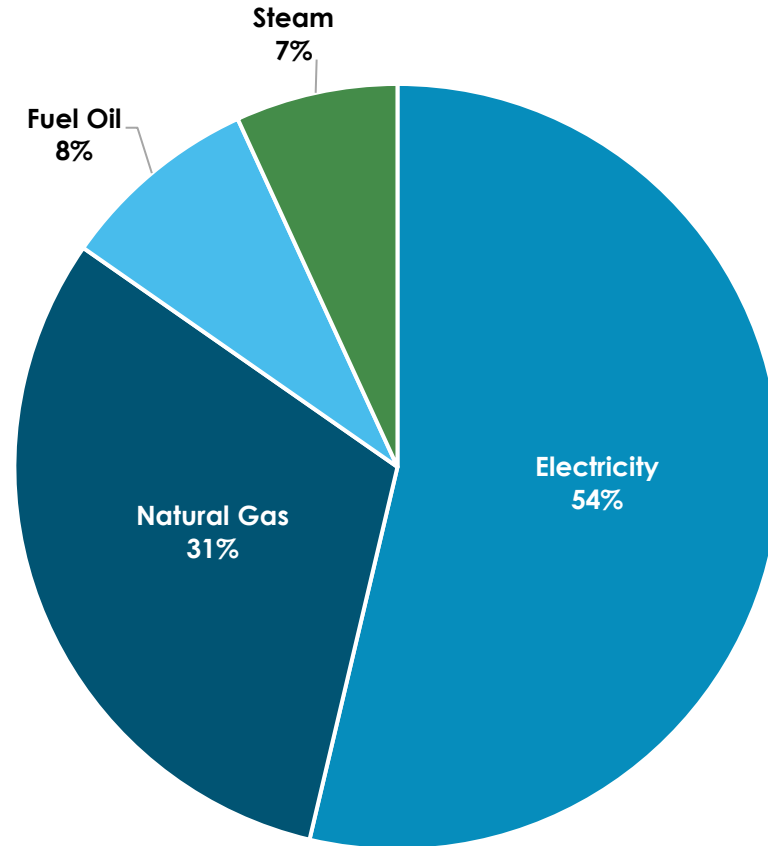


3 – Energy Sources of Large Buildings

- Building-level energy data largely not available
 - Information tracked on **meter/account basis**
- **Half of state-owned large buildings served by district steam**
 - Pastore campus accounts for 34% of floor area of state-owned large buildings

Share of Aggregate Large Building Energy Use by Fuel

2018 CBECS: >25k SF, in NE and RI Climate Zones



4 – Cost of Compliance with Benchmarking

- **First year: can be challenging** to gather building information and set up automatic building energy data reporting systems
 - More support may be necessary for **municipalities with large portfolios** and limited staff time
- Benchmarking should require **fewer than 10 hours of staff time per building annually**



4 – Cost of Compliance with Performance Standards

- **Hard construction costs vary substantially** by scope of work, building age, type, size, etc.
 - Limited data available from State projects
- **Not enough data** to produce a benefit-cost analysis
 - Additional soft costs would need to be included



5 – Relevant State Agencies

- **Office of Energy Resources (OER)** best suited state agency to lead energy benchmarking efforts
 - **OER Lead By Example (LBE)** team already implementing the benchmarking of state buildings
 - Extensive experience with state, municipal and school building energy retrofit programs and projects
- DOA, DEM, DBR, RIIB, and Building Office may also be involved in supporting OER benchmarking efforts depending on the subject.



6 – Advancing State Energy Benchmarking Program

- Need **one full-time employee** to be dedicated full-time to benchmarking and performance standards for **large state buildings**
- **Governor McKee's FY26 budget** includes a new OER FTE for these efforts



6 – Program for Private Buildings Would Require New Funding

OER STAFF NEEDS

best estimate:

4 Full-Time Employees

- 1 Program Manager
- 1 Policy Analyst
- 2 Compliance Officers

PROGAM BUDGET

initially

\$600,000/year

scaling to

\$1.4 Million/year

annually following rollout of technical support program

- **Free Assistance** With:
 - Incentives
 - Bidding
 - Execution

7 – Timeline: Addressing Goals

CLIMATE

more emissions reductions
required this decade
to stay on target

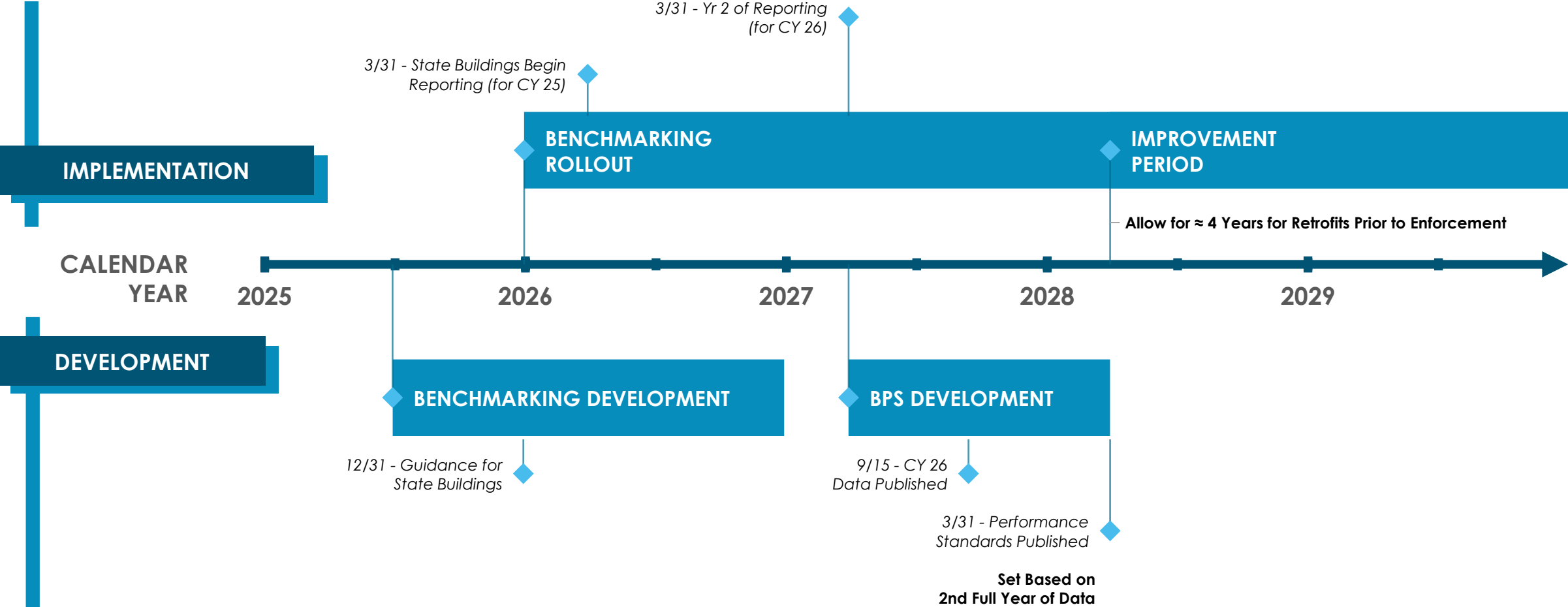
EFFECTIVENESS

benchmarking and BPS take
time and resources
to achieve success

- **Need to balance priorities to achieve a fast yet effective rollout**

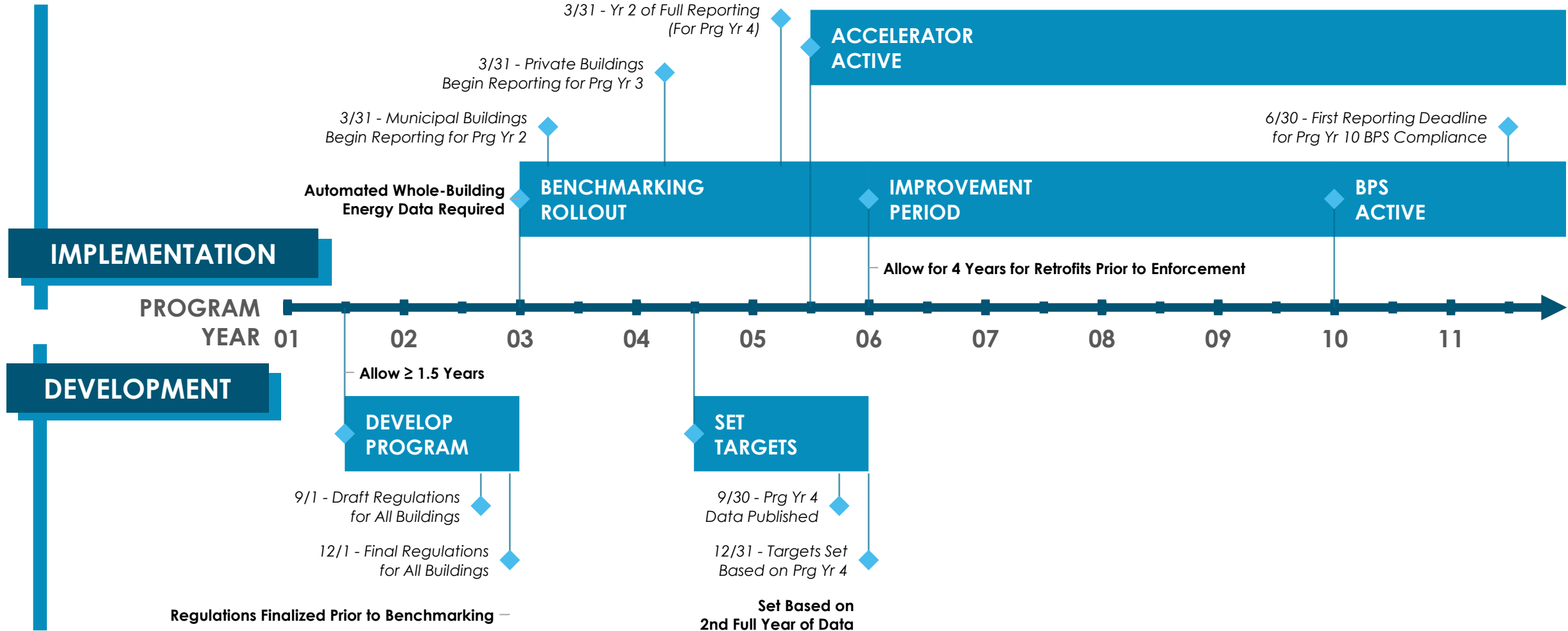
7 – Potential Timeline - State Buildings

Potential Timeline for Ongoing Development and Implementation of Benchmarking and Future BPS for **Large State-Owned and State-Occupied Buildings** per Gov. McKee's FY26 Budget Article Proposal



7 – Potential Timeline - Municipal and Private Buildings

Potential Timeline for Development and Implementation of Benchmarking and BPS for Large Municipal and Private Buildings



Takeaway: Municipal & Private Sector Program Challenging

- Lack of **data on private buildings** and thus cost of compliance
- Lack of **whole-building energy data** infrastructure (RI Energy work in-progress)
- Lack of state **infrastructure** to manage compliance



Recommendations for 2025 Legislative Session

- **Enact Governor McKee's FY26 State Budget Article** for an expanded state-facility benchmarking and performance standards program beyond existing Lead By Example EO 23-06 activities
- **Fund 1 New OER Full Time Employee** to enable execution of this expanded program



Questions/Comments

Jack Green

US DOE Energy Innovator Fellow

RI Office of Energy Resources

