



PPS DECARBONIZATION ROADMAP

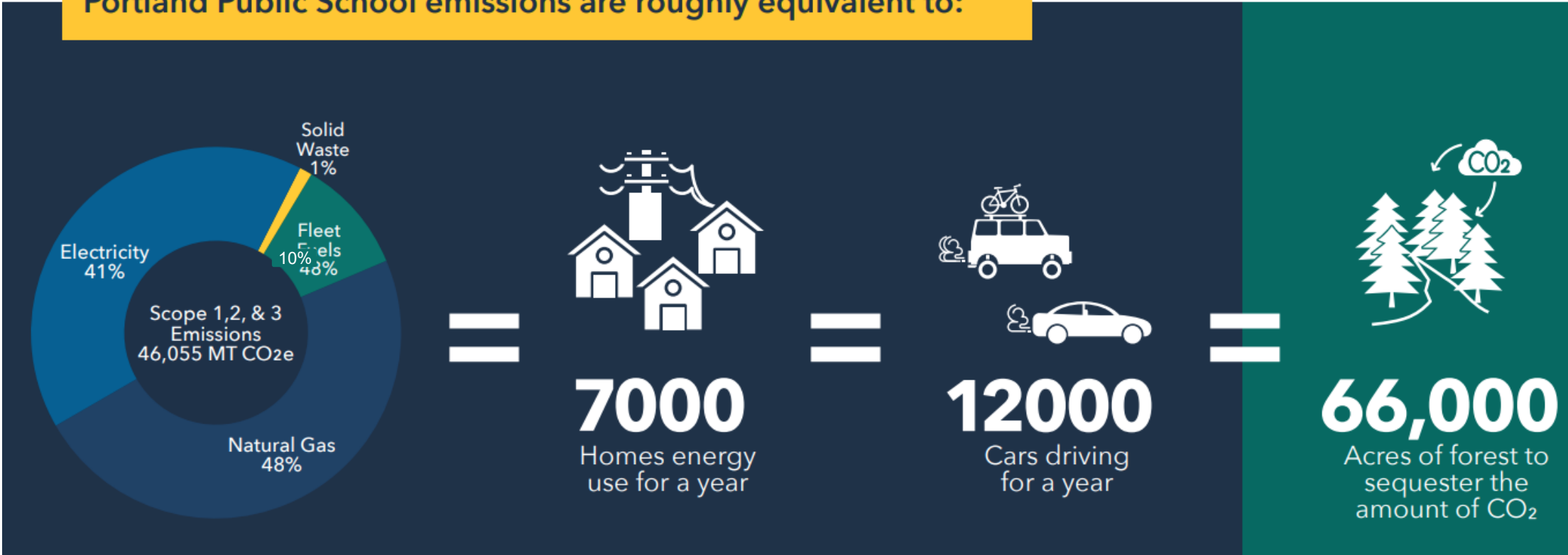


Agenda

1. Project Scope Quick Overview
2. Review Roadmap Development & Engagement Process
3. Project Prioritization Approach
4. Roadmap Scenarios
5. Implementing the Roadmap and Next Steps

Call for Climate Action

Portland Public School emissions are roughly equivalent to:



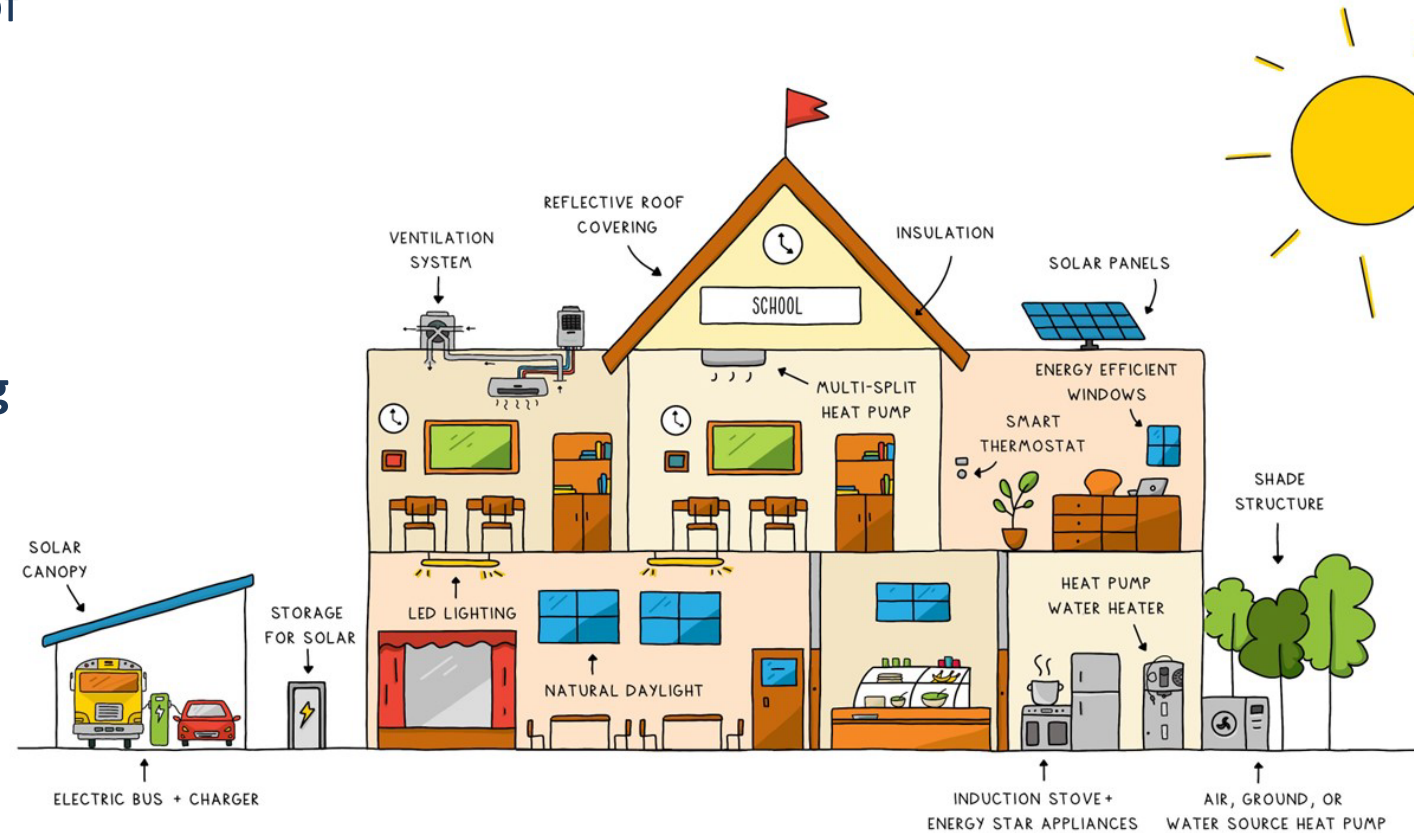
PPS Decarb Roadmap Scope

To define a set of actions that meet the goals of existing policies and standards to achieve zero carbon emissions and create efficient and resilient spaces with improved Indoor Environmental Quality (IEQ).

Decarbonizing the district will **improve building IEQ and comfort, resiliency, and student learning outcomes** while **reducing our carbon footprint and environmental impact**.

Note! The roadmap...

- **Is not** a set of design standards
- **Is not** a new policy
- Is focused on **buildings**



PPS Roadmap Development

Timeline

FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY



Stakeholder Input Meetings



Analysis and Prioritization



Stats from public
engagement:

4 in person session + 1
virtual

Create a Flexible Roadmap



Community Share Meetings



Check in with PPS Office of
Sustainability

**Final
Delivery**

Stakeholder Engagement

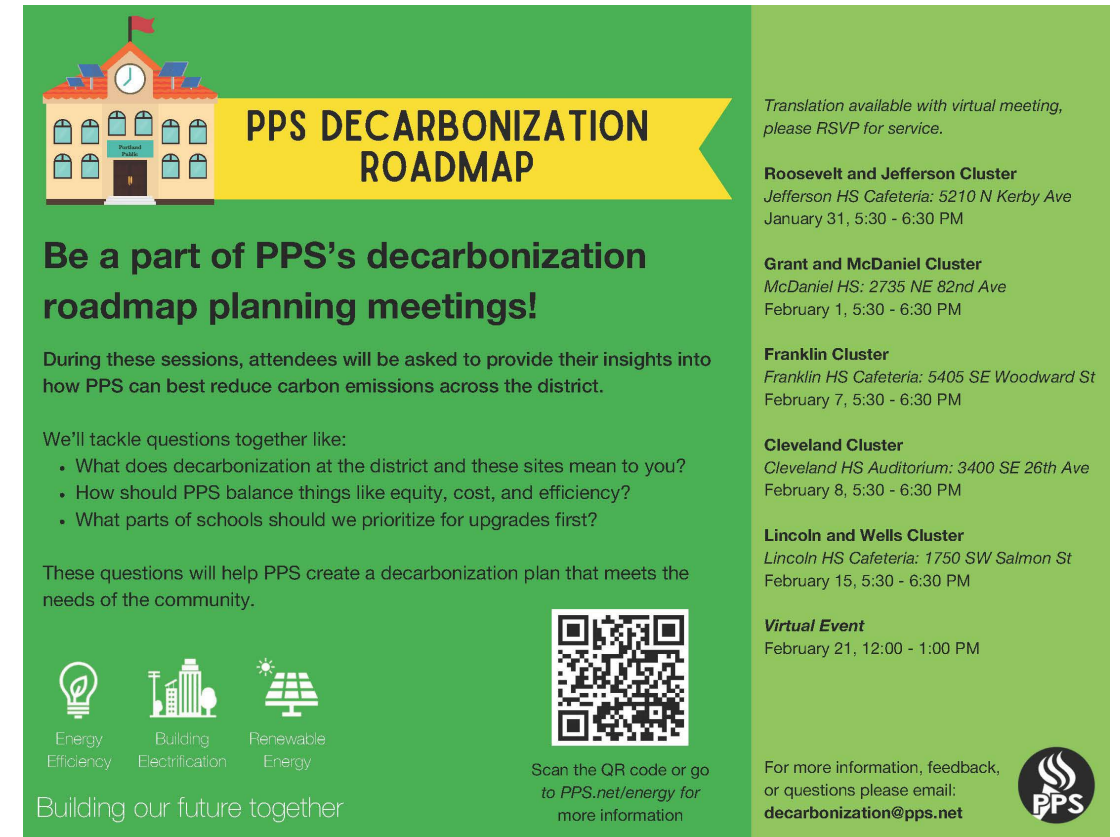
External Stakeholder Engagement

Engagement attendance:

- Online survey (45 responses)
- 4 in-person meetings and 1 virtual meeting (43 total participants)
- Classroom engagement
- Presented at All City PTA Meeting

Outreach process:

- Flyer and email sent out district wide
- Partners conducted additional outreach
- Flyer translated into 5 languages



The flyer is titled "PPS DECARBONIZATION ROADMAP" and features an illustration of a school building. It invites the community to participate in decarbonization roadmap planning meetings. The flyer lists several meeting clusters with their respective locations and times: Roosevelt and Jefferson Cluster (January 31, 5:30 - 6:30 PM), Grant and McDaniel Cluster (February 1, 5:30 - 6:30 PM), Franklin Cluster (February 7, 5:30 - 6:30 PM), Cleveland Cluster (February 8, 5:30 - 6:30 PM), and Lincoln and Wells Cluster (February 15, 5:30 - 6:30 PM). A virtual event is also listed for February 21, 12:00 - 1:00 PM. The flyer includes a QR code and a website link (pps.net/energy) for more information. It also mentions that a translation is available with a virtual meeting and provides an email address (decarbonization@pps.net) for feedback or questions. The PPS logo is in the bottom right corner.

PPS DECARBONIZATION ROADMAP

Be a part of PPS's decarbonization roadmap planning meetings!

During these sessions, attendees will be asked to provide their insights into how PPS can best reduce carbon emissions across the district.

We'll tackle questions together like:

- What does decarbonization at the district and these sites mean to you?
- How should PPS balance things like equity, cost, and efficiency?
- What parts of schools should we prioritize for upgrades first?

These questions will help PPS create a decarbonization plan that meets the needs of the community.

Energy Efficiency Building Electrification Renewable Energy

Scan the QR code or go to pps.net/energy for more information

Translation available with virtual meeting, please RSVP for service.

Roosevelt and Jefferson Cluster
Jefferson HS Cafeteria: 5210 N Kerby Ave
January 31, 5:30 - 6:30 PM

Grant and McDaniel Cluster
McDaniel HS: 2735 NE 82nd Ave
February 1, 5:30 - 6:30 PM

Franklin Cluster
Franklin HS Cafeteria: 5405 SE Woodward St
February 7, 5:30 - 6:30 PM

Cleveland Cluster
Cleveland HS Auditorium: 3400 SE 26th Ave
February 8, 5:30 - 6:30 PM

Lincoln and Wells Cluster
Lincoln HS Cafeteria: 1750 SW Salmon St
February 15, 5:30 - 6:30 PM

Virtual Event
February 21, 12:00 - 1:00 PM

For more information, feedback, or questions please email: decarbonization@pps.net

PPS

A summary of the engagement efforts can be found on pps.net/energy

External Stakeholder Priorities

1. Implementation Priority: *In what order should PPS implement GHG emissions reductions measures across schools and admin buildings to provide the best chance of meeting PPS emissions goals, given financial, industry, and facility constraints, while considering historic inequities in the distribution of resources across PPS?*



- Small Incremental Improvements to All Schools
- Completely Upgrade a Few Schools at Once
- Hybrid, Combination of Both

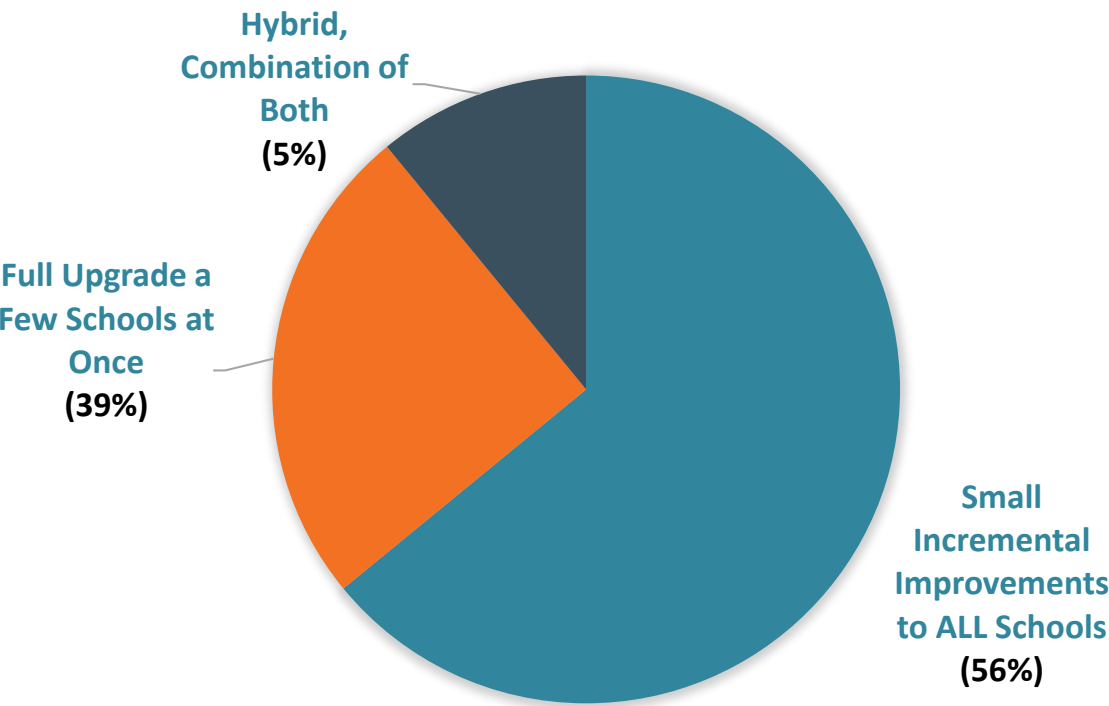
2. Project Priority: *What are our community members biggest priorities related to project level construction and decarbonization?*



- Reduce operating cost & maintenance
- Energy resiliency (Solar PV, batteries)
- Thermal comfort (AC, insulation, windows, air sealing)
- Improve Indoor Air Quality (filtration, ventilation, electric cooking)
- Visual Comfort (lighting, daylighting, access to views)
- Improved Outdoor Environment (greenspace, reduced heat island)

Stakeholder Outcomes

Implementation Priorities



Project Priorities

- 1 Improve thermal comfort
- 2 Reduce energy & carbon emissions
- 3 Improve Indoor air quality
- 4 Add energy resilience
- 5 Reduce operating cost & maintenance
- 6 Improve outdoor environment
- 7 Improve visual comfort

External Engagement Lessons Learned

- The timing of the teachers strike impacted our ability to do a stronger outreach approach.
- More collaboration with local CBOs would have been beneficial but difficult with compressed timeline.
- In person events were not as well attended as we would have hoped.
- Virtual engagement was the highest attendance.
- Decarb is a broad term and means different things to different stakeholders. Additional education and support around scope of roadmap may be needed.
- Frequently voiced concerns included: indoor air quality, equity, costs, and deferred maintenance/competing priorities.



ROOSEVELT-JEFFERSON CLUSTER



		RANKING (OUT OF 21)
AREA	44,859 SQUARE FEET	17
EUI	60 kBtu/SF	12
ENERGY COSTS	\$67,403	18
EMISSIONS	163 MTCO ₂ e	18
EMISSIONS INTENSITY	8.0 LBS-CO ₂ e/SF	15
WATER-USE INTENSITY	6.2 GAL/SF	13

Chief Joseph Elementary School

SUMMARY OF EXISTING CONDITIONS

- Aging HVAC equipment
- Space and domestic water heating provided by gas boiler systems
- Limited existing cooling in building
- Existing envelope includes aging windows and limited insulation
- Aging and inefficient lighting technology

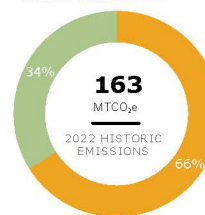
CURRENTLY PLANNED IMPROVEMENTS

- Upgrade lighting to high-efficiency LED fixtures
- Upgrades to HVAC controls to improve efficiency and performance

POTENTIAL OPPORTUNITIES

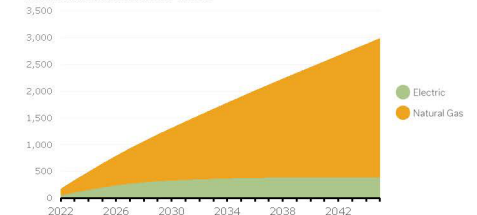
- ☐ Electrification of all heating systems within the building
- ☐ Incorporation of heat pump systems for heating and cooling
- ☐ Improved ventilation systems to provide enhanced filtration and maintain healthy indoor air quality
- ☐ Envelope enhancement to reduce conditioning loads and improve thermal comfort
- ☐ Incorporation of renewable energy systems to offset operational emissions

2022 HISTORIC EMISSIONS



JANUARY 31, 2024

CUMULATIVE EMISSIONS OUTLOOK*



*Electric emissions projection based on 2023 emissions outlook from PGE

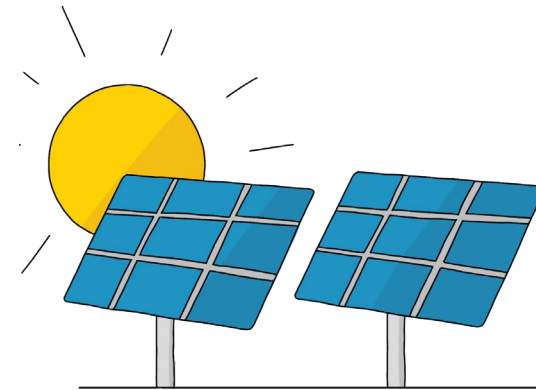
Internal Stakeholder Engagement

Offices in attendance:

- Chief Operating Officer
- Office of School Modernization
- Planning and Real Estate Management
- Maintenance Services
- Climate Justice
- Energy and Sustainability
- Design & Planning

Engagement Process

- 2 full group meetings for feedback (with PAE & team)
- Frequent small group or internal meetings (Energy & Sustainability and others)



Roadmap Project Prioritization

Prioritization Scoring Data Sources

Prioritization Category



Data Source

- Utility Data
- Prior Audits
- Facility Condition Assessment Data
- Workorder data
- Airflow reports
- Additional Facilities feedback
- Priority school lists (TSI/CSI*)
- Multnomah County heat vulnerability data
- Justice 40 data
- Stakeholder feedback

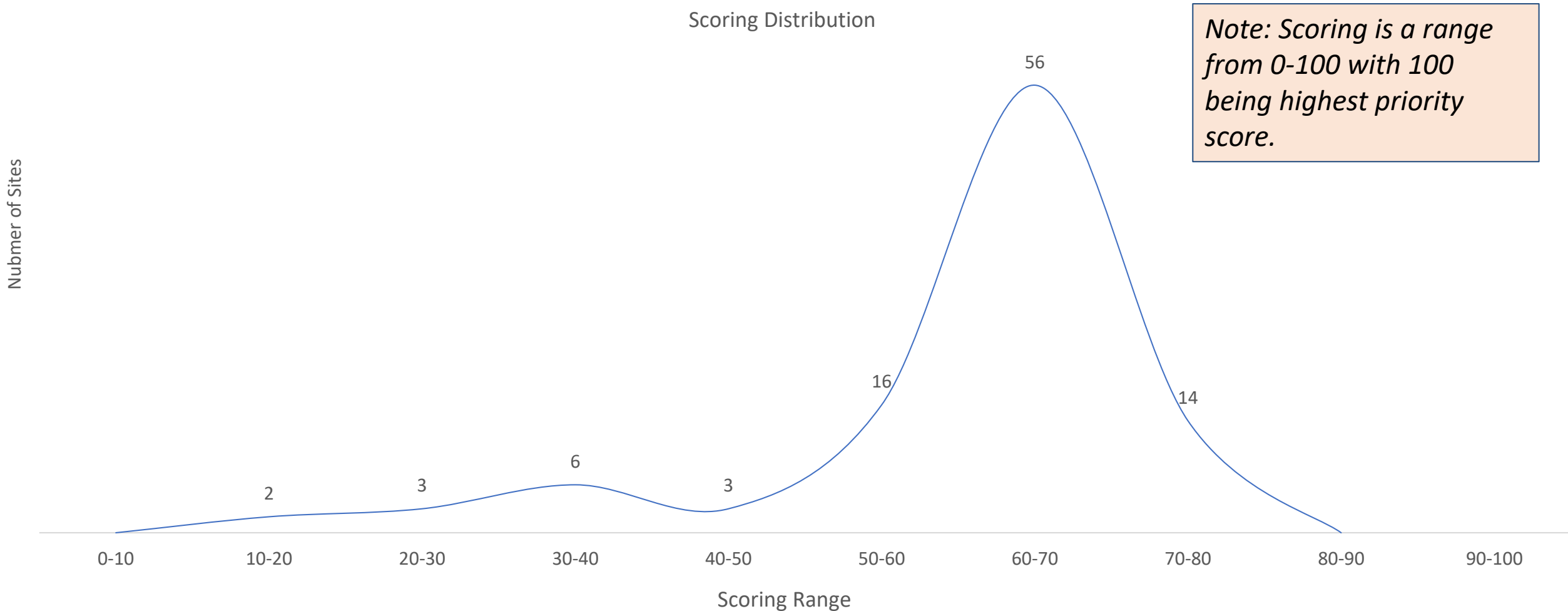
Category	Icon
General	
Facility Condition Assessment (FCA)	
Indoor Environmental Quality (IEQ)	
Equity	

Category	Max Category Score	Weighting in Overall Score
General	35	10%
FCA	80	45%
IEQ	30	30%
Equity	45	15%

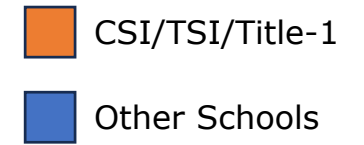
*Comprehensive Support and Improvement (CSI) and Targeted Support and Improvement (TSI) are school improvement programs that identify schools in need of additional support.

District-wide Scoring

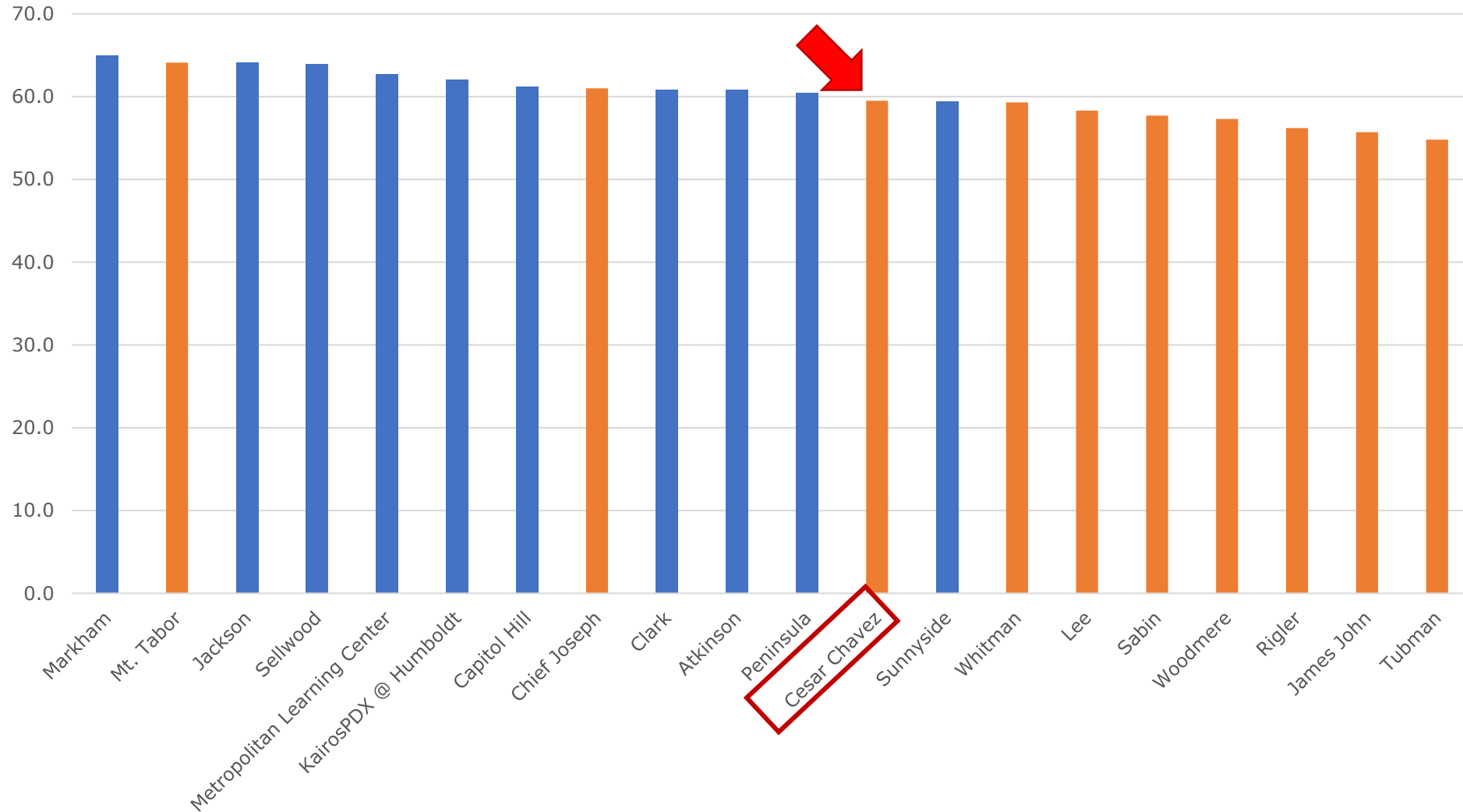
- Majority of sites have scored in the above average (60+) range indicating significant need for upgrades
- With the concentrated spread, equity scoring acts as a key differentiator in the prioritization



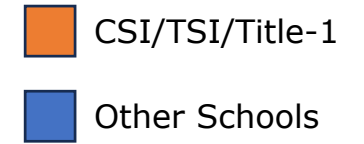
Equity Scoring Impact



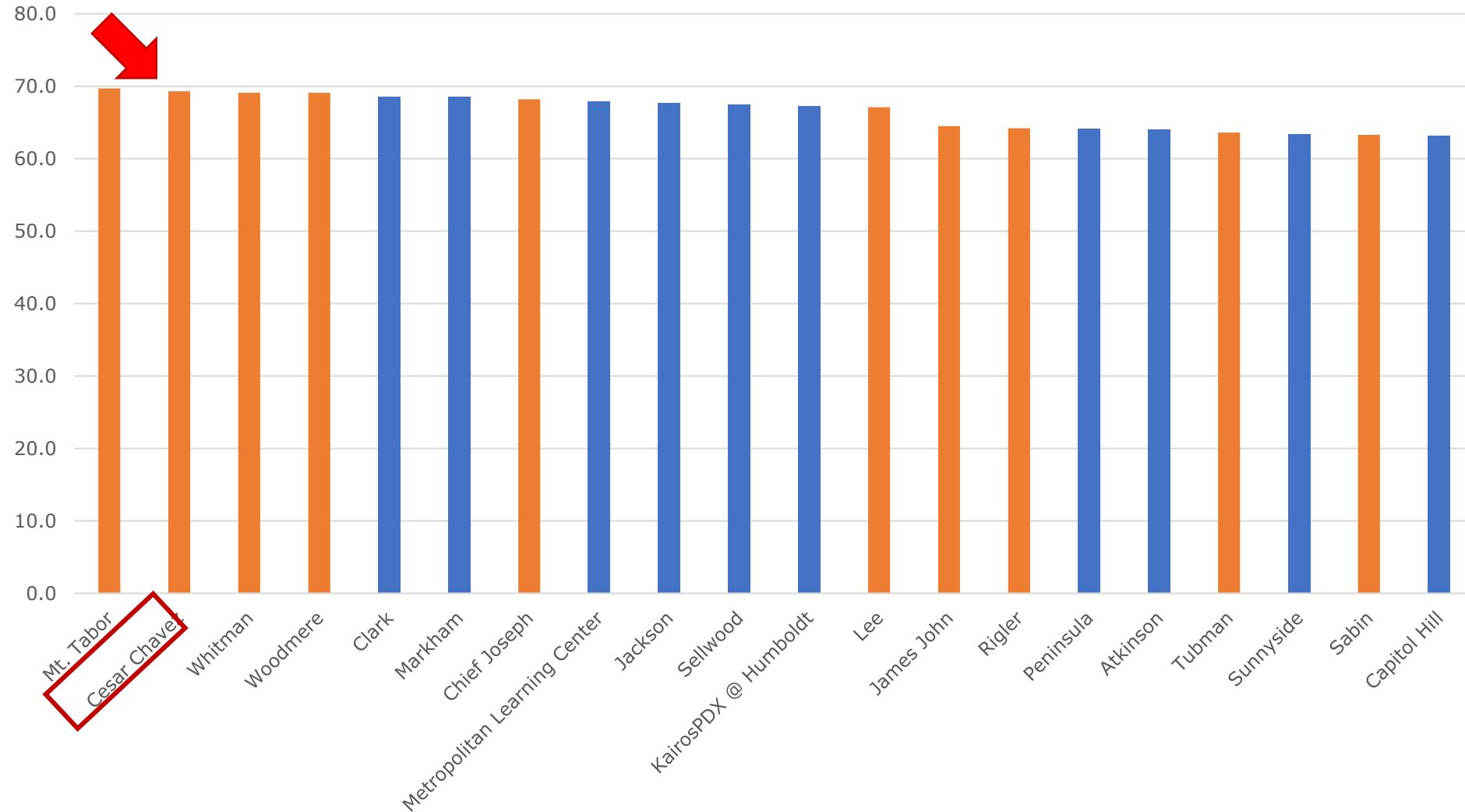
Scoring **without** Equity Factors



Equity Scoring Impact



Scoring **with** Equity Factors



Roadmap Scenarios

Level Setting the Roadmap

The Roadmap is a forecast of energy/emissions impacts from assigned energy efficiency, electrification, and onsite generation measures

This is done in a large spreadsheet, that shows costs and the prioritization scores. Selections can be made at the granular level and be rolled into scenarios to compare packages of options.

	Implementation Cost Estimate																			GREEN FILL INDICATES YEAR OF IMPLEMENTATION				
Display Name	ECM	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	General Score	Energy Score	Health Score	Equity Score	Overall Score	
Roseway Heights	Air Sealing																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Controls upgrade/RCx																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Cooking Electrification																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Cooling Addition																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Filtration Upgrade																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Heat Recovery Ventilation																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Heating Electrification - Air-Source																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Lighting Upgrade																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Roof Upgrade																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Wall Upgrade																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Water Heating Electrification - ER																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Water Heating Electrification - HP																		9.1	31.5	25	8.7	74.3	
Roseway Heights	Window Upgrade																		9.1	31.5	25	8.7	74.3	
Woodmere	Air Sealing																		4.9	30.4	27	11.7	74	
Woodmere	Controls upgrade/RCx																		4.9	30.4	27	11.7	74	
Woodmere	Cooking Electrification																		4.9	30.4	27	11.7	74	
Woodmere	Cooling Addition																		4.9	30.4	27	11.7	74	
Woodmere	Filtration Upgrade																		4.9	30.4	27	11.7	74	
Woodmere	Heat Recovery Ventilation																		4.9	30.4	27	11.7	74	
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Woodmere	Lighting Upgrade																		4.9	30.4	27	11.7	74	
Woodmere	Roof Upgrade																		4.9	30.4	27	11.7	74	
Woodmere	Wall Upgrade																		4.9	30.4	27	11.7	74	
Woodmere	Water Heating Electrification - ER																		4.9	30.4	27	11.7	74	
Woodmere	Water Heating Electrification - HP																		4.9	30.4	27	11.7	74	
Woodmere	Window Upgrade																		4.9	30.4	27	11.7	74	
Chief Joseph	Air Sealing																		5.1	34.9	26	8	74	
Chief Joseph	Controls upgrade/RCx																		5.1	34.9	26	8	74	
Chief Joseph	Cooking Electrification																		5.1	34.9	26	8	74	
Chief Joseph	Cooling Addition																		5.1	34.9	26	8	74	
Chief Joseph	Filtration Upgrade																		5.1	34.9	26	8	74	
Chief Joseph	Heat Recovery Ventilation																		5.1	34.9	26	8	74	
Chief Joseph	Heating Electrification - Air-Source																		5.1	34.9	26	8	74	
Chief Joseph	Lighting Upgrade																		5.1	34.9	26	8	74	
Chief Joseph	Roof Upgrade																		5.1	34.9	26	8	74	
Chief Joseph	Wall Upgrade																		5.1	34.9	26	8	74	
Chief Joseph	Water Heating Electrification - ER																		5.1	34.9	26	8	74	
Chief Joseph	Water Heating Electrification - HP																		5.1	34.9	26	8	74	
Chief Joseph	Window Upgrade																		5.1	34.9	26	8	74	

What Each Scenario Means



Scenario-1 (By School)

- Wholistic implementation of projects site by site
- **Comprehensive decarbonization projects** are implemented across all sites



Scenario-2 (By Measure)

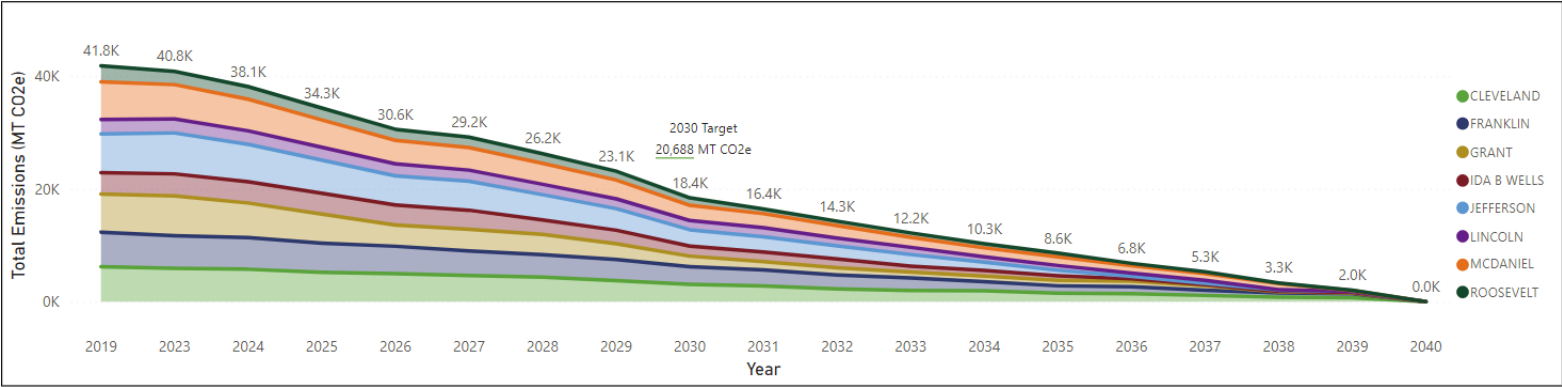
- Distributed implementation of projects at many sites
- Project implementation approach assumes **targeted decarbonization measures** are implemented across all sites



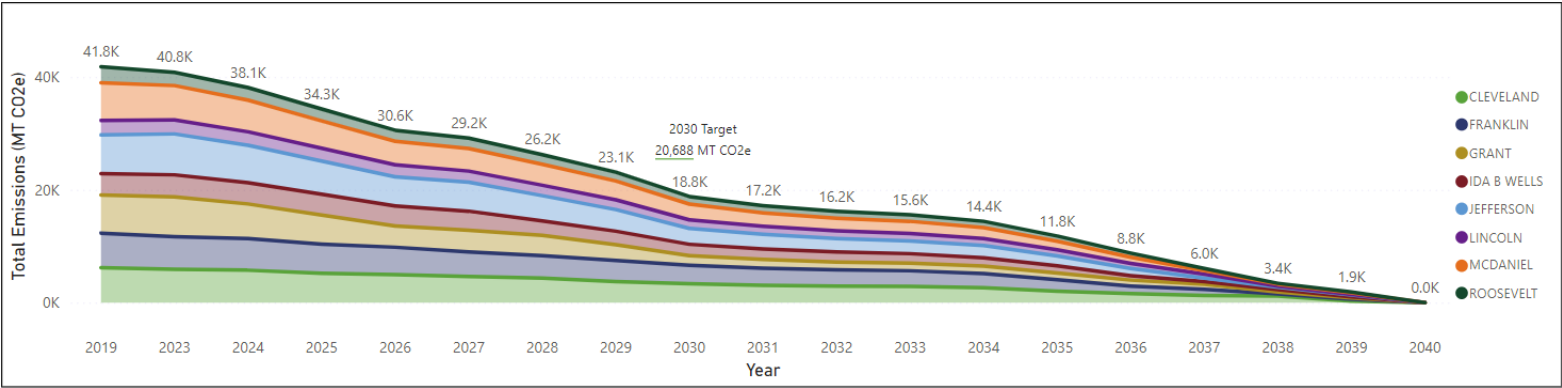
Scenario-3 (Planned only)

- Project implementation approach assumes **currently planned retrofit and high school modernization projects are completed, but no other investment in decarbonization is made** by the district.

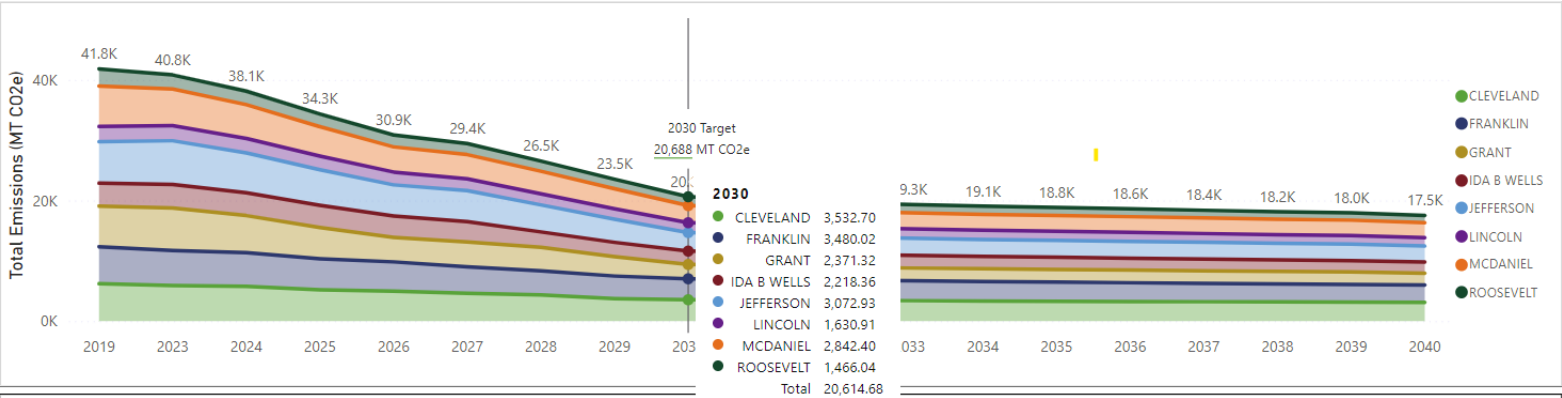
Scenario Comparisons – Total Emissions



Scenario-1 (By School)

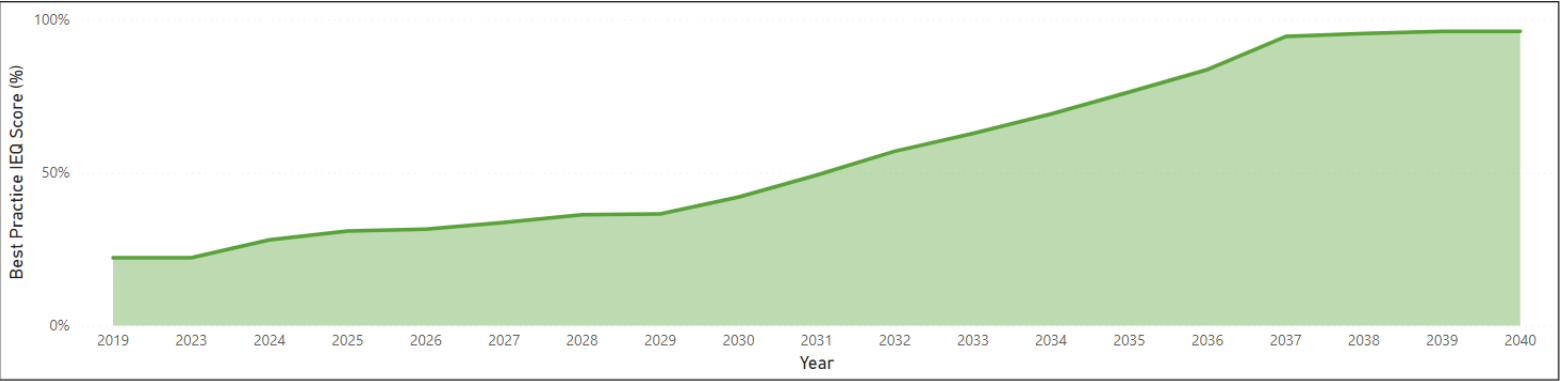


Scenario-2 (By Measure)

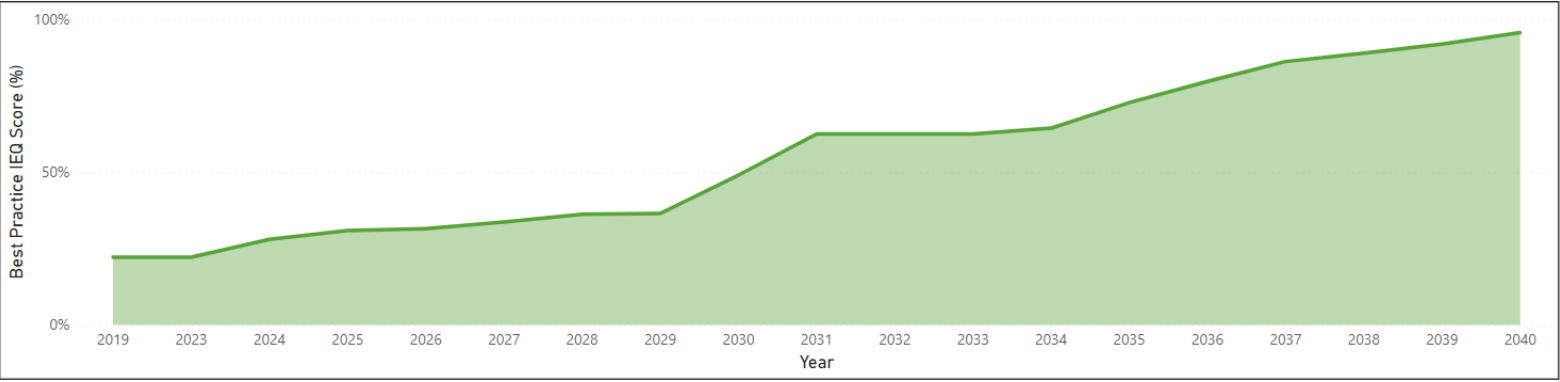


Scenario-3 (Planned only)

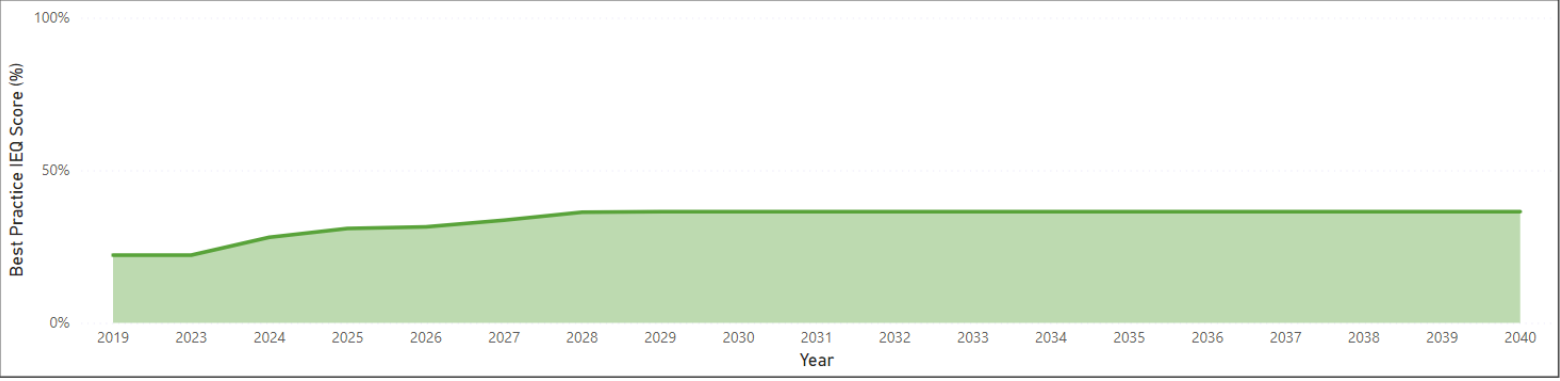
Scenario Comparisons – Best Practice Indoor Environmental Quality



Scenario-1 (By School)

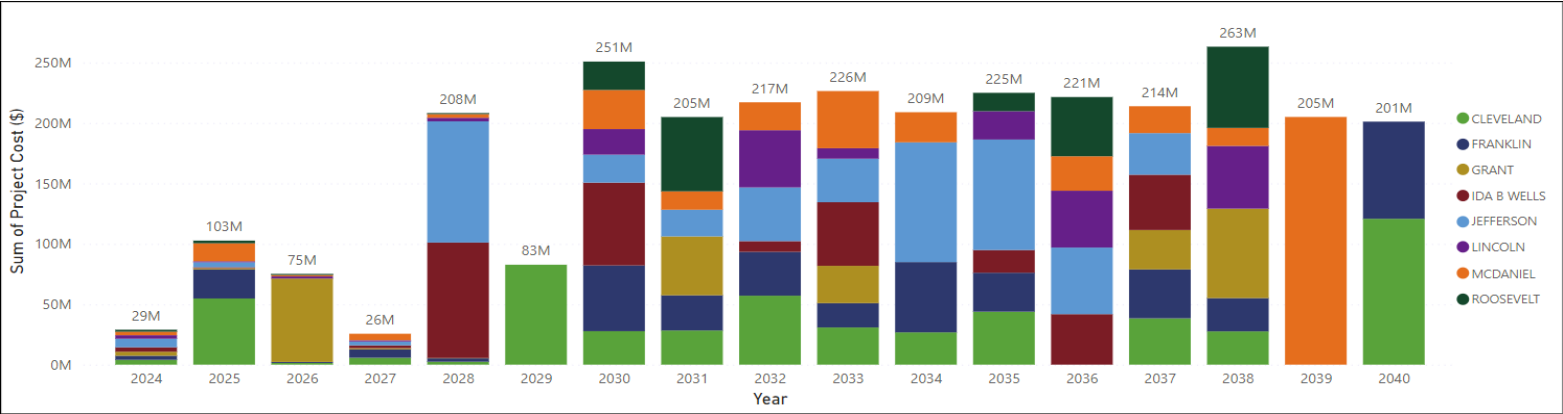


Scenario-2 (By Measure)



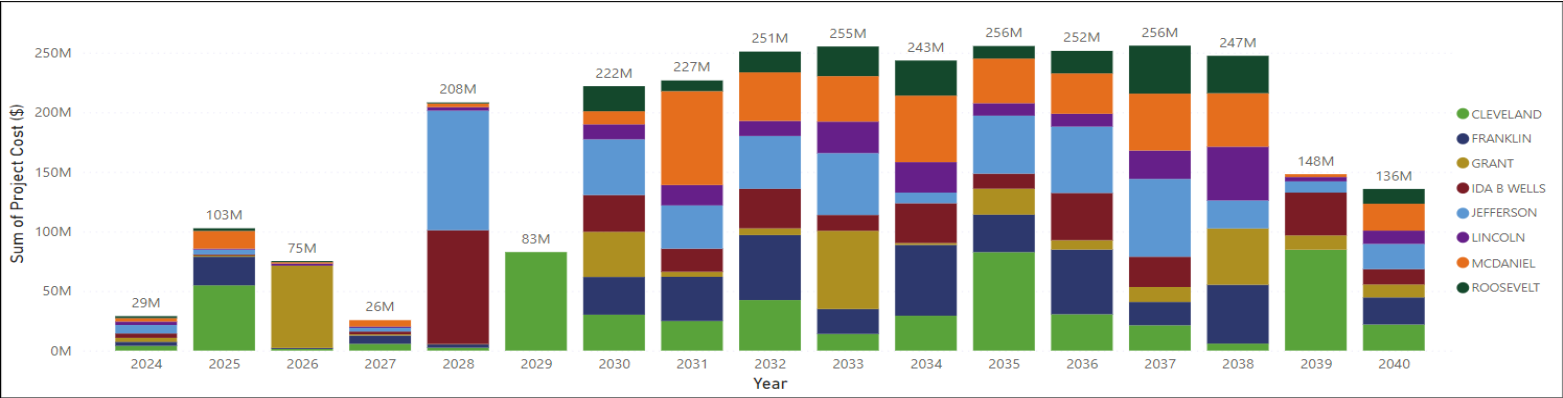
Scenario-3 (Planned only)

Scenario Comparisons – Sum of Project Costs*



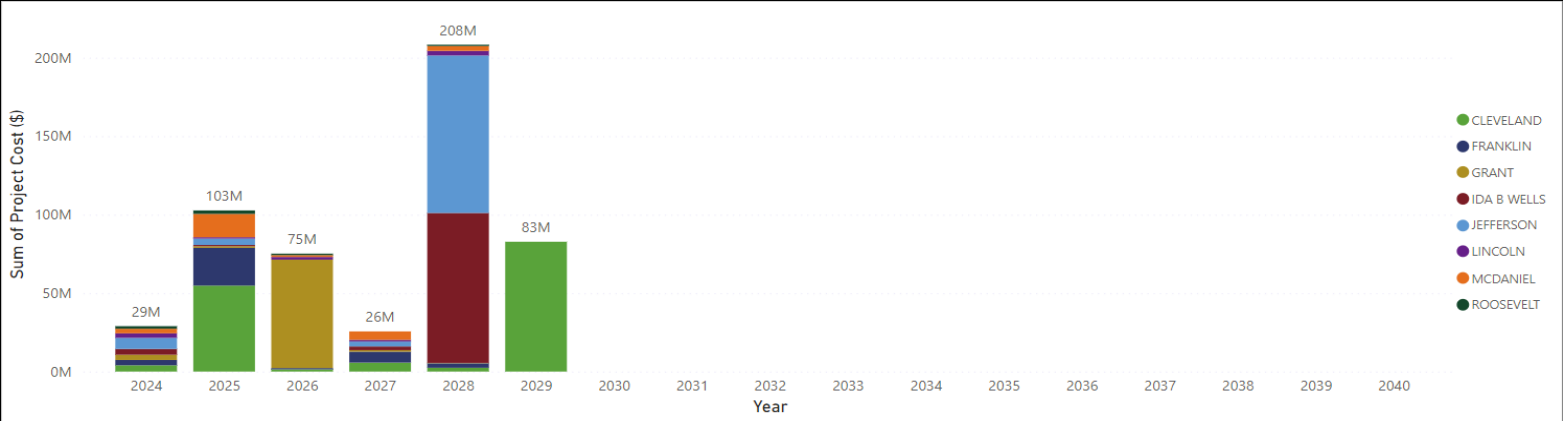
Scenario-1 (By School)

The estimated total cost of implementation is **\$2.96B**



Scenario-2 (By Measure)

The estimated total cost of implementation is **\$3.15B**



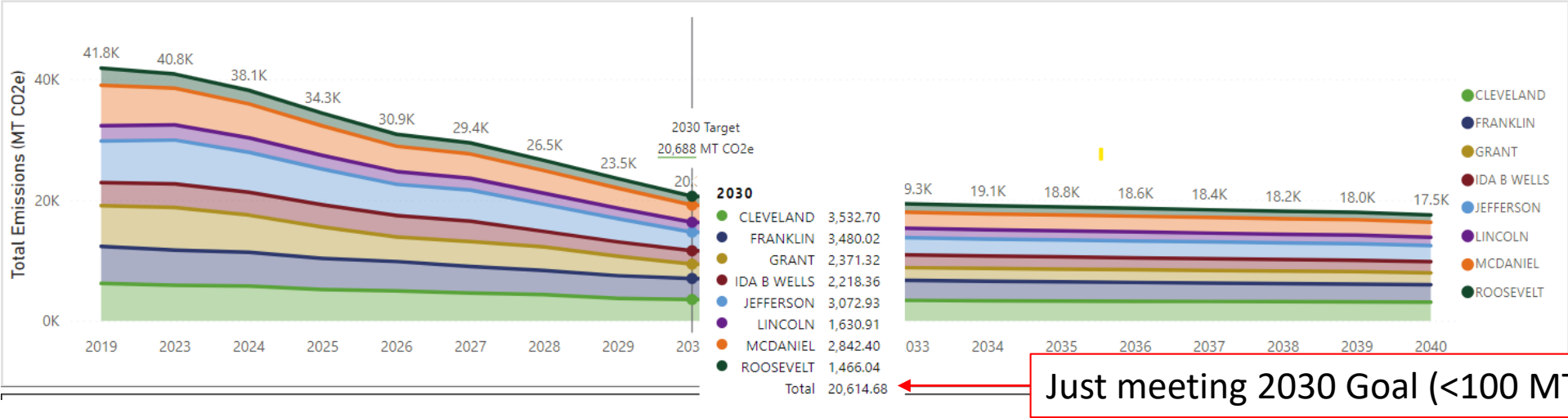
Scenario-3 (Planned only)

The estimated total cost of implementation is **\$521M**

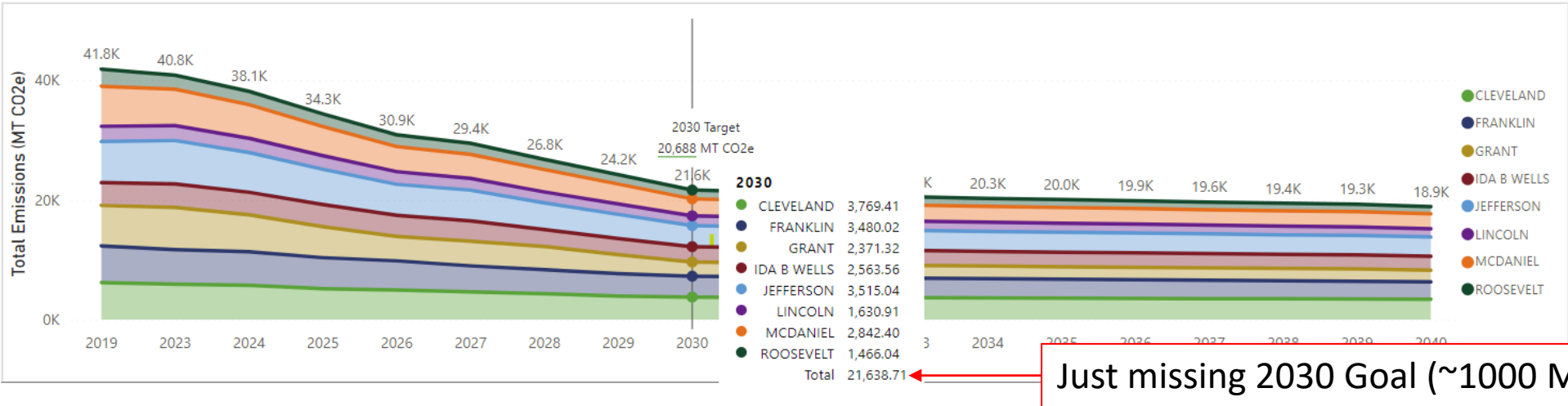
*Costs are a modeled scenario and include a 3.5% escalation factor. Note that political and economic factors may impact these numbers.

Scenario Comparisons – Planned Only Scenarios

Scenario-3 (Planned only)



Scenario-4 (Planned without electrified high schools)



Scenario Key Takeaways

To achieve PPS **2030** goals:

- Currently planned projects include **three remaining high school modernizations that meet PPS Sustainability Standards.**
- **Utilities meet the House Bill 2021** decarbonization goals

Will not meet 2030 goals if remaining HS modernizations do not electrify

House Bill (HB) 2021

- *By 2030: emissions must be 80% below baseline levels*
- 2035: 90%
- 2040: 100%

To achieve PPS **2040** goals:

1. Go all electric district-wide by 2040.
2. **Utilities meet the House Bill 2021** decarbonization goals.

Implementing the Roadmap

Incorporating this tool into practice

- **What will be delivered to PPS:**
 - Report with roadmap scenarios and approach documentation
 - Decarbonization and Prioritization Tool (Excel calculations and Power BI)
 - User guide and training
 - Community share out and communications packet
- **Policy implementation and decision making**
- **Emissions forecasting**
- **Storytelling and advocacy (in Portland and beyond)**
- **Bond planning and decision making**



How will this be funded?

- Bond dollars
- PCEF
- Grants
- Energy Trust
- SB 1149



Bond Dollars

PCEF



Grants

EnergyTrust
of Oregon



SB 1149

Climate Benefits of this Roadmap

- This is a decarbonization roadmap that incorporates many factors to drive a decarbonized future.
- Decarb also addresses deferred maintenance and competing priorities.
- Prioritizes energy and carbon reductions while also weighing other factors such as, facility condition, equity, and indoor environmental quality.
- Provides clarity around the scope of decarbonization and what it means for PPS.
- This roadmap gives us a path for PPS buildings to be zero emissions by 2040.



Community Benefits of this Roadmap



The roadmap will help guide the district towards smart, equitable, efficient and cost-effective approaches to construction projects.



Projects will enhance the learning environment by alleviating thermal and IEQ issues (too hot, cold or outdoor contaminants like wildfire smoke).



Cooling in all schools will be prioritized.

Next Steps



Schedule and promote webinar and press release to share roadmap outcomes.



- Implement roadmap and decision making in current and future projects.



- Discuss with CCRC how they would like to engage with this roadmap.





Discussion
