Comox Valley Schools
School District No. 71

Open Committee of the Whole Report to the Board
November 14, 2023

In Attendance at Meeting:

Trustees:
Shannon Aldinger, Chairperson
Michelle Waite, Board Chair
Chelsea McCannel-Keene, Trustee
Susan Leslie, Vice-Chair
Cristi May Sacht, Trustee
Sarah Jane Howe, Trustee

Staff:
Dr. Russell Horswill, Acting Secretary Treasurer
Dr. Jeremy Morrow, Superintendent

Regrets: Janice Caton, Trustee
Recording Secretary: Heidi Bell, Sr. Executive Assistant

1. Call to Order

Chairperson, Shannon Aldinger called the meeting to order at 7:04 pm.

The Board of Education acknowledges that we are on the traditional territories of the K'ómoks First Nation. We would like to thank them for the privilege of living on their land and the gift of working with their children.

2. Adoption of Agenda

THAT the agenda be approved as presented.
[Howe/Leslie]
CARRIED

3. Information Item - None

4. Presentations/Delegations

i. Strat Plan – Sustainability Energy Report

Pages 1-64

Presented by: Ian Heselgrave - Director of Operations, Molly Proudfoot – Manager of Capital Projects and Tree Murdock - Senior Admin. Assistant Operations

Adjournment – 8:06 pm

THAT the meeting be adjourned.
[Leslie/McCannel-Keene]
CARRIED

Comox Valley Schools
A Community of Learners
INNOVATIVE • INQUISITIVE • INCLUSIVE

Operations Department
GHG Reduction Work Update

November 14th, 2023

Comox Valley Schools
A Community of Learners
INNOVATIVE • INQUISITIVE • INCLUSIVE

Urgent and Immediate...

MISSION: To provide the best possible facilities for the students and staff of SD 71

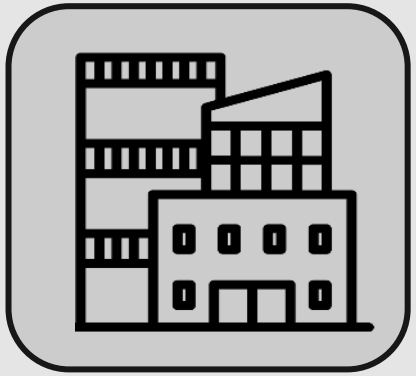
Board Strategic Priority 3 – Goals and Actions

- Priority - Organizational Stability and Environmental Stewardship.
- Goal - Foster environmental stewardship
- Key Result - Reduce carbon emissions and environmental footprint
- The Board Strategic Plan influences the work of Operations. We directly support the Board Priorities as part of the educational team.

Why GHG emissions matter

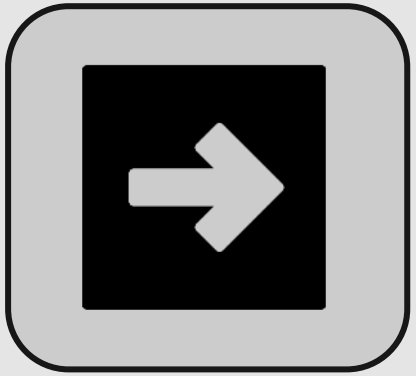
Targets

Performance Highlights



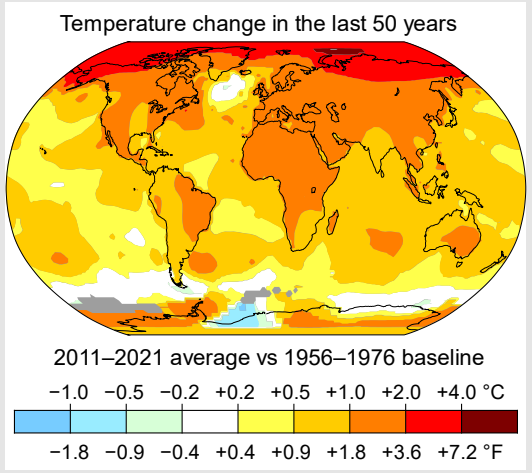
Projects

Priorities & Funding



Coming Year

Why do we care about GHGs?



- GHGs describe gases that trap heat in the atmosphere.
- They “thicken the Earth’s blanket” which makes the planet warmer. GHGs remain in the atmosphere anywhere from a few years to thousands of years.
- Climate change refers to long-term shifts in temperatures and weather patterns.
- Since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas.
- The consequences of climate change now include, among others, intense droughts, water scarcity, severe fires, rising sea levels, flooding, melting polar ice, catastrophic storms and declining biodiversity.

The need to take urgent action together to reduce the impacts of climate change and build a strong clean economy for everyone has never been clearer than it has this past year.

Two international reports outlined the challenge ahead and called for faster action. The landmark study from the Intergovernmental Panel on Climate Change provided the latest scientific consensus on climate change and was characterized as a **'code red for humanity'** by leading scientific and climate experts.

The CleanBC Roadmap to 2030 is our plan to achieve 100% of our emissions target while building a cleaner economy that benefits everyone.

Roadmap points to ponder

It includes a range of accelerated and expanded actions across eight pathways.

- Low Carbon Energy
- Transportation
- Buildings
- Communities
- Industry, including Oil and Gas
- Forest Bioeconomy
- Agriculture, Aquaculture and Fisheries
- Negative Emissions Technologies

Baseline & Targets

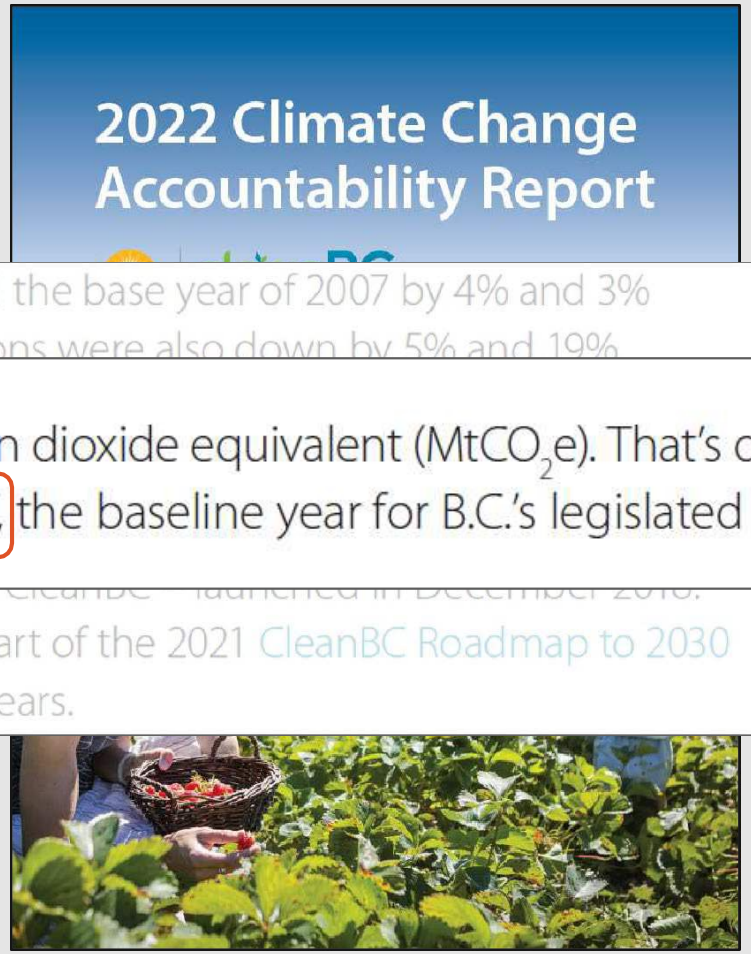
TARGETS – BC Reduction Mandate!

GHG Reduction from 2007

2025 – 16%
2030 – 40%
2040 – 60%
2050 – 80%

- 2022 Climate Change Accountability Report

BC RESULTS FROM 2022 CCAR

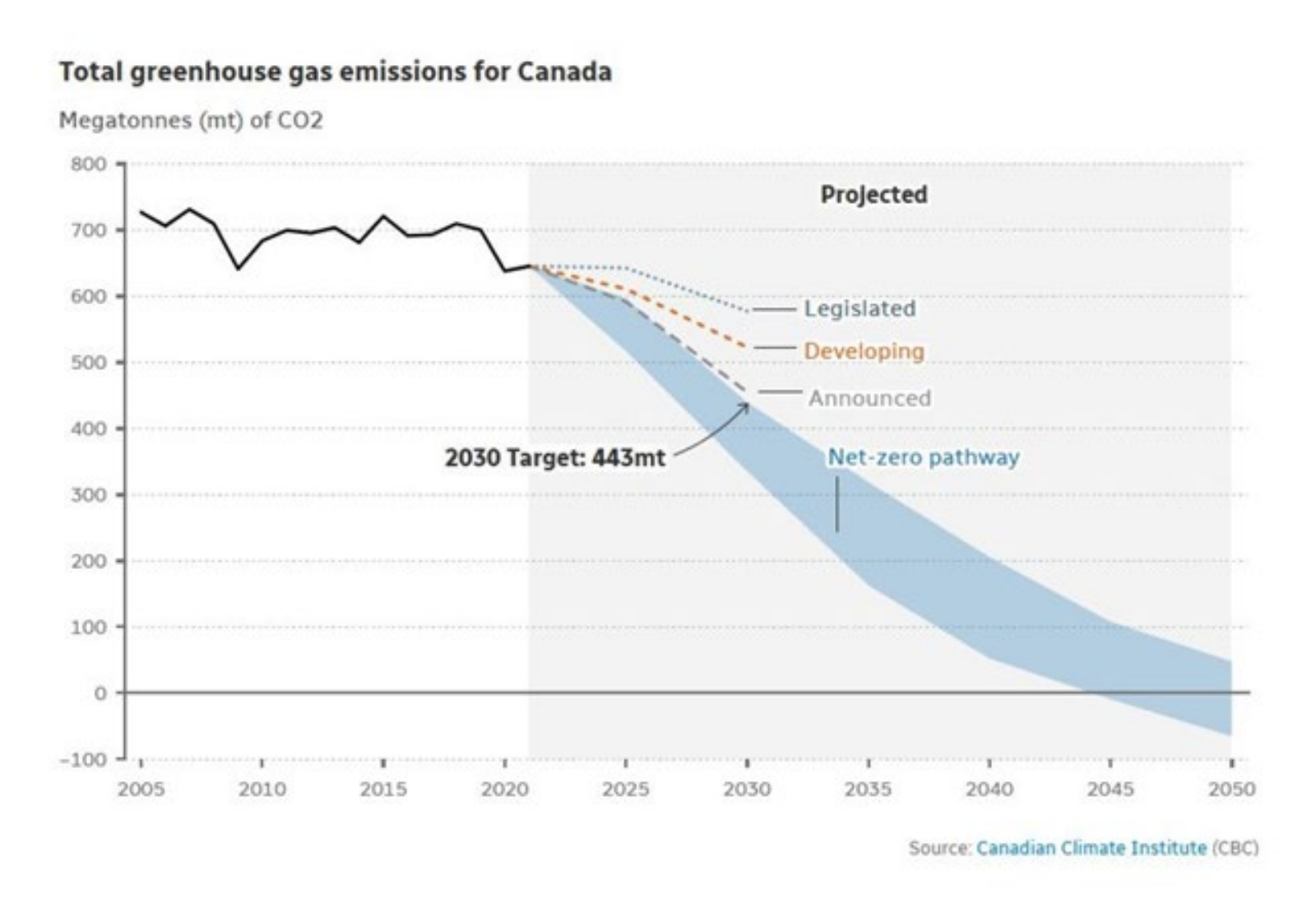


In 2020, B.C.'s net emissions were down compared to 2019 and the base year of 2007 by 4% and 3% respectively, and our per capita greenhouse gas (GHG) emissions were also down by 5% and 19%

B.C.'s gross emissions for 2020 were 64.6 million tonnes of carbon dioxide equivalent ($MtCO_2e$). That's down 5% (-3.3 $MtCO_2e$) from 2019 and down 1% (-0.9 $MtCO_2e$) from 2007, the baseline year for B.C.'s legislated targets.

Many policies and programs, including those announced as part of the 2021 CleanBC Roadmap to 2030 (Roadmap), are expected to reduce emissions in the coming years.

Canada's Performance



Targets – 2 Metrics

Carbon

- Absolute values year over year
- Building area changes don't matter
- Low-emissions energy is key

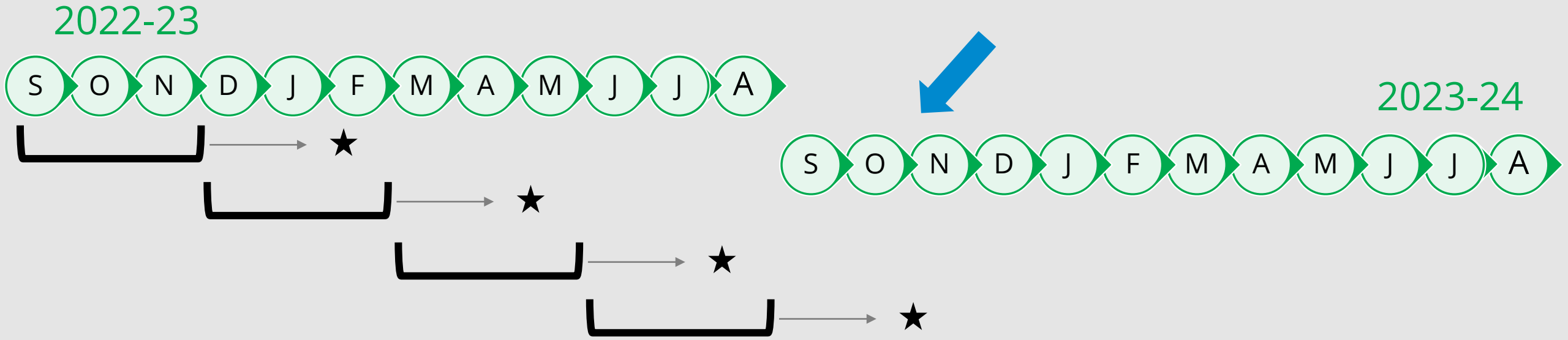
GHG in T CO_2e

Energy Intensity

- Relative consumption year over year
- Accounts for changes in building area
- Based on total energy use

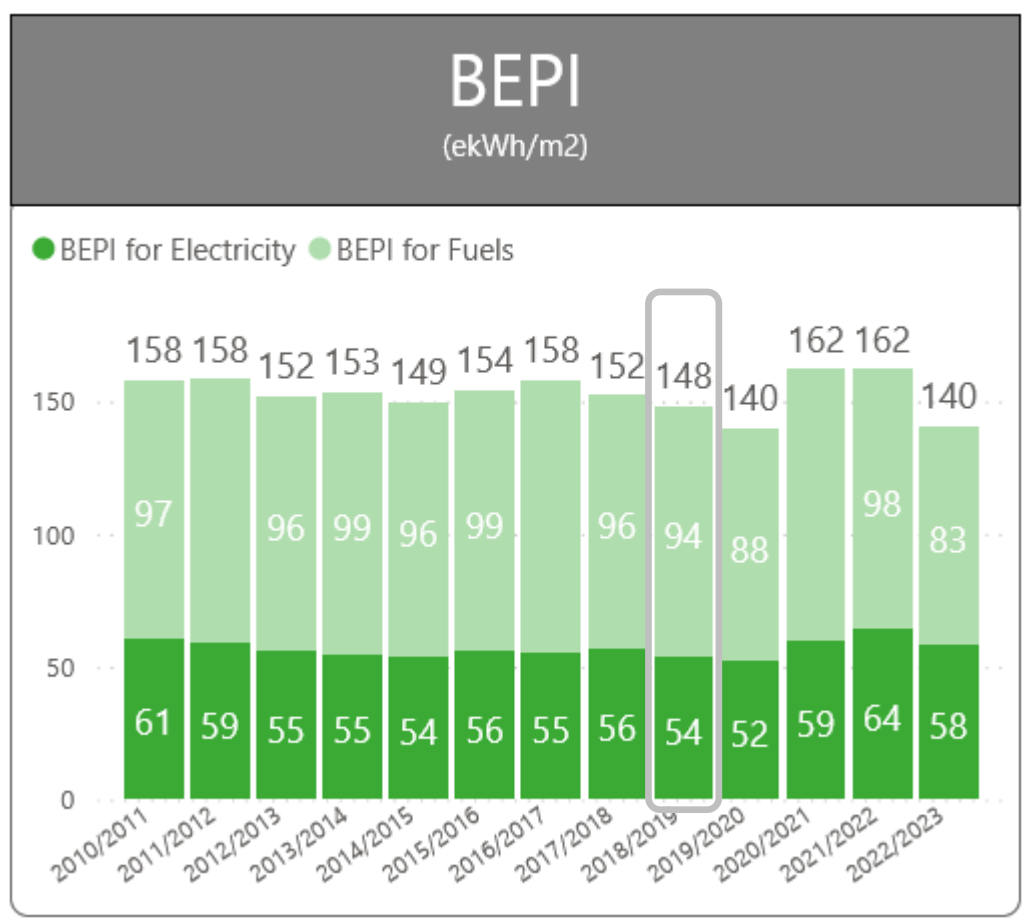
ekWh / m^2

Reporting cycle based on School Year



*** Fine print *** – reporting includes 30 school/admin sites

SD 71 BEPI Baseline Year



2019-20

- Low due to Covid closures

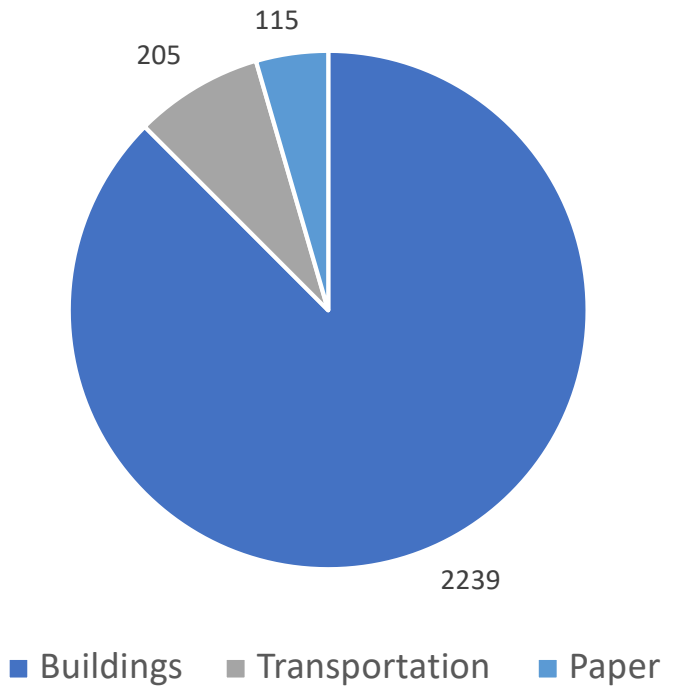
2020-21 & 2021-22

- High due to extra ventilation

2018-19 is BEPI Baseline

SD 71 CARBON Baseline 2010

		($t CO_2e$)
Buildings	Direct Fuel Combustion (natural gas, propane, heating oil)	2000
Buildings	Purchased Energy (electricity)	239
Fleet	Mobile Energy Use (gasoline, diesel)	205
Paper	Paper	115
	Total	2559

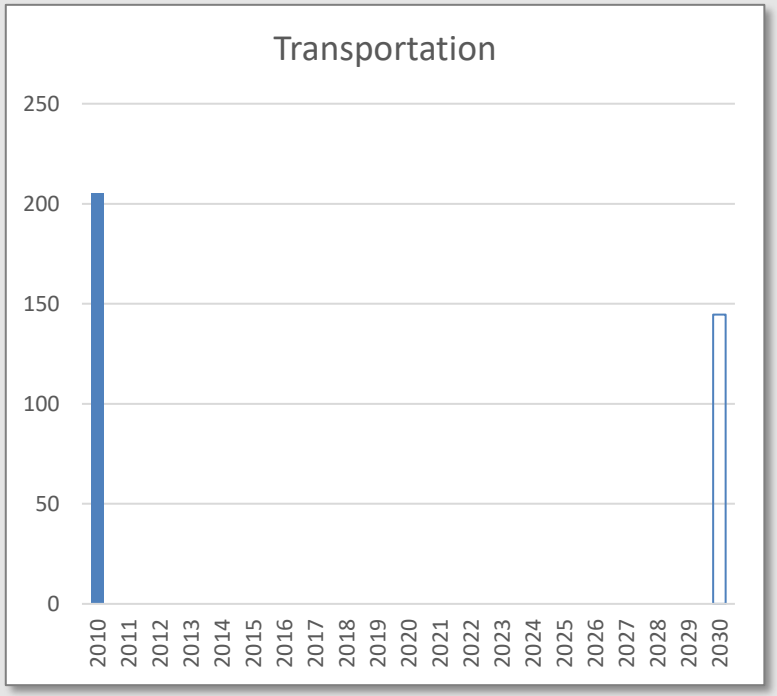


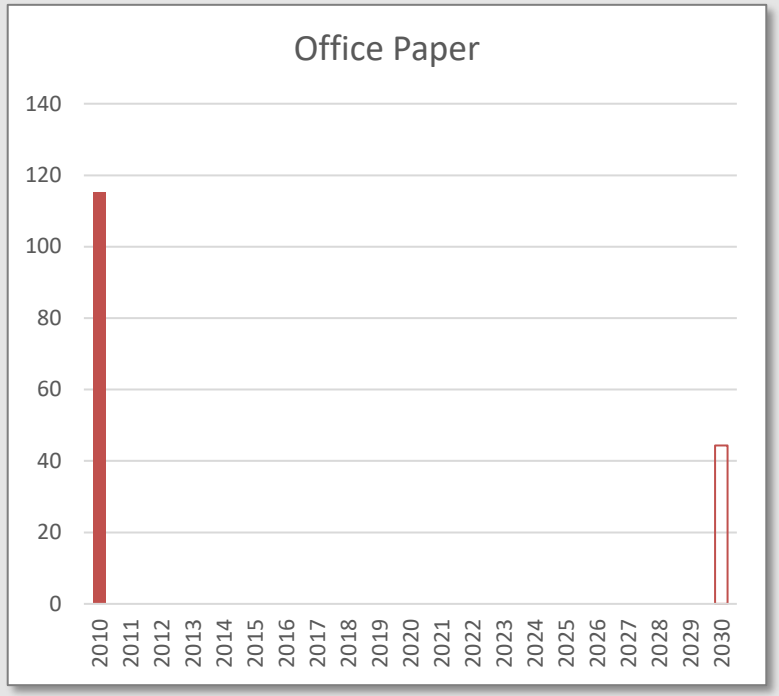
Baseline 2010

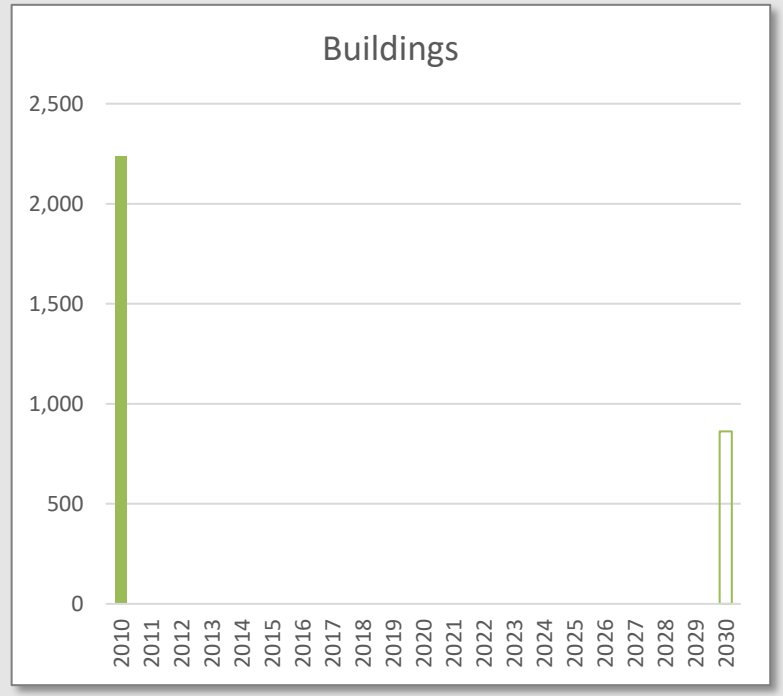
		($t\ CO_2e$)	Reduction Mandate	Reduction Needed	Target 2030 ($t\ CO_2e$)
Buildings	**Direct Fuel Combustion** (natural gas, propane, heating oil)	2000	**59-64%**	1180-1280	720-820
Buildings	**Purchased Energy** (electricity)	239	**59-64%**	141-153	86-98
Fleet	**Mobile Energy Use** (gasoline, diesel)	205	**27-32%**	55-66	139-150
Paper	**Paper**	115	**59-64%**	68-74	41-47
	Total	**2559**		**1444-1572**	**987-1115**

2022 = 2140 tCO2e, or 16% reduction to date

Target - Carbon







Target – Energy Intensity

148 ekWh/m²
2018-19

	BASELINE	TARGET	REDUCTION
ELEC	54	50	7%
FUELS	94	39	58%
TOTAL	148	89	40%

8-YEAR GOAL

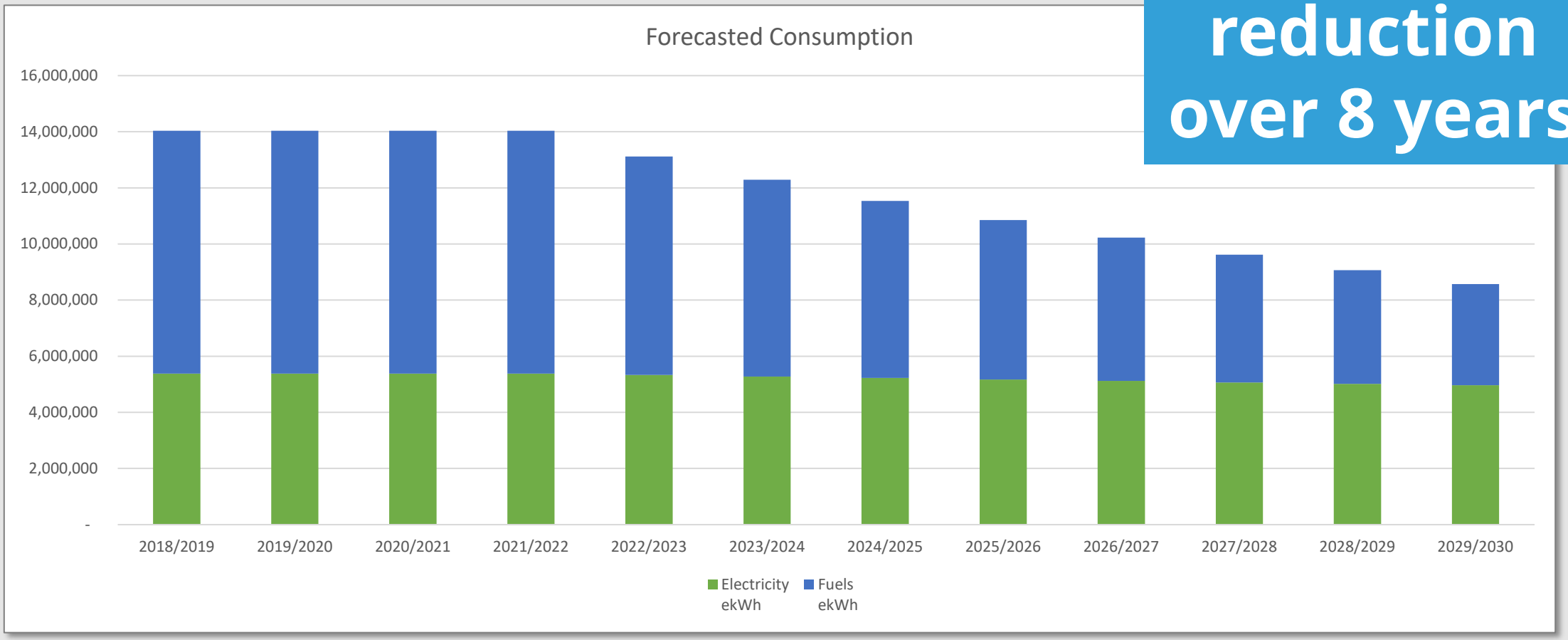
Target – Energy

	CARBON BASELINE	BEPI BASELINE								TOTAL
	2010	2018-19	COVID	2022 - 23	2023-24	2024-25	...	2028-29	2029-30	
Elec.	--	54	--	1%	1%	1%	1%	1%	1%	7%
Gas	--	94	--	10%	10%	10%	11%	11%	11%	58%
										40%

COVID OPERATIONS

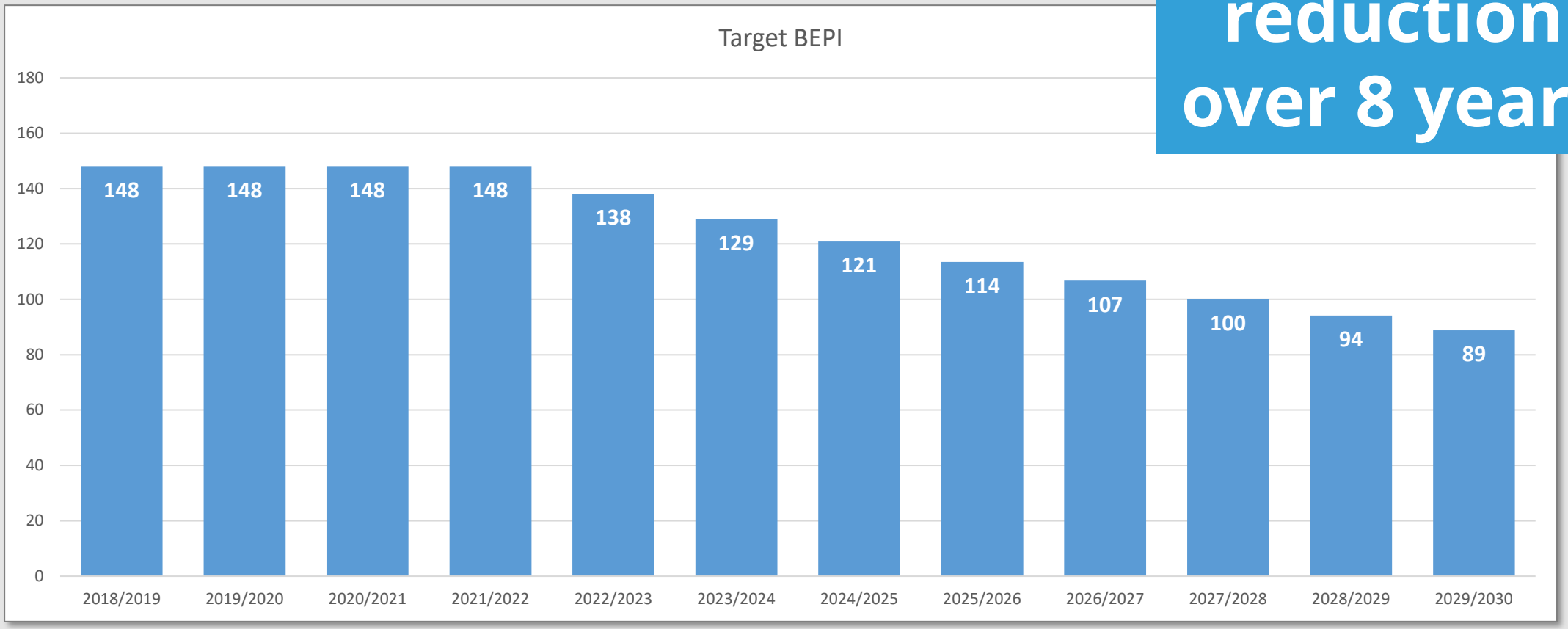
Targets - Energy

40% reduction over 8 years

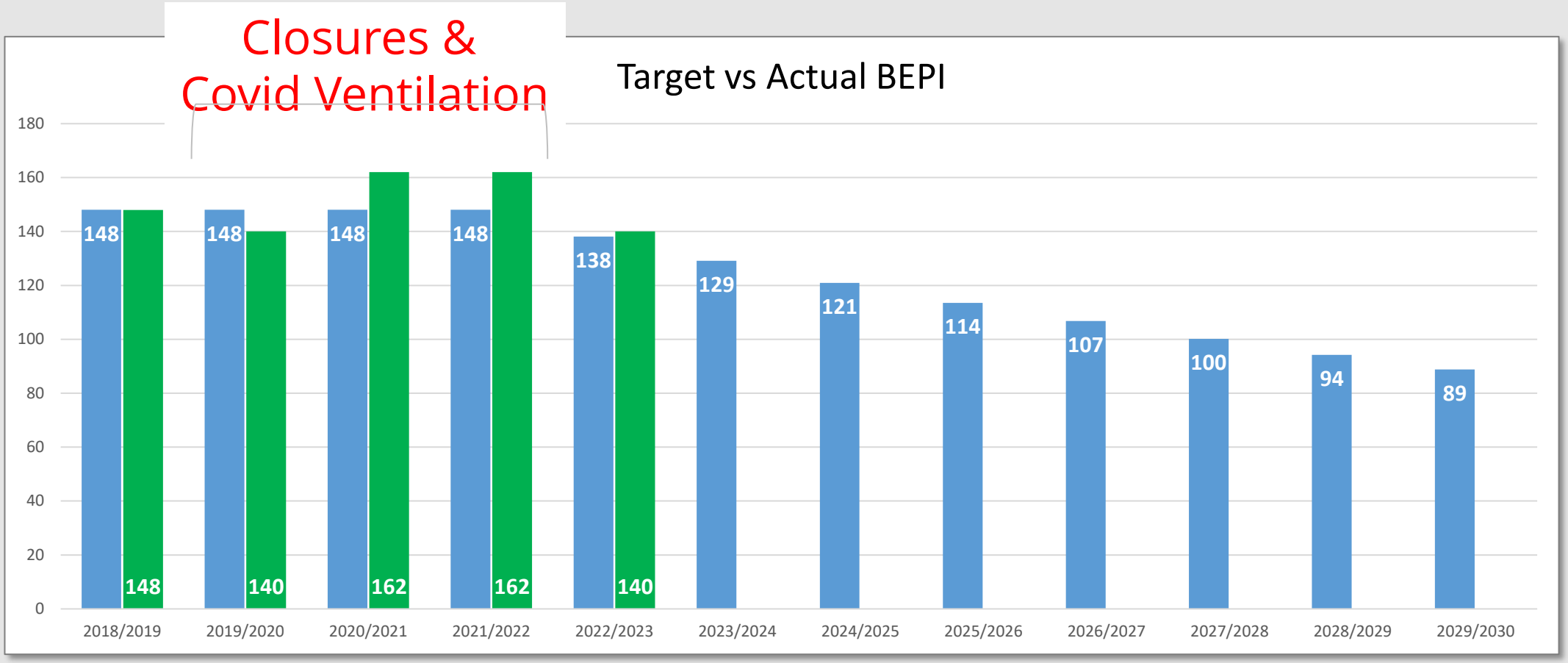


Targets - BEPI

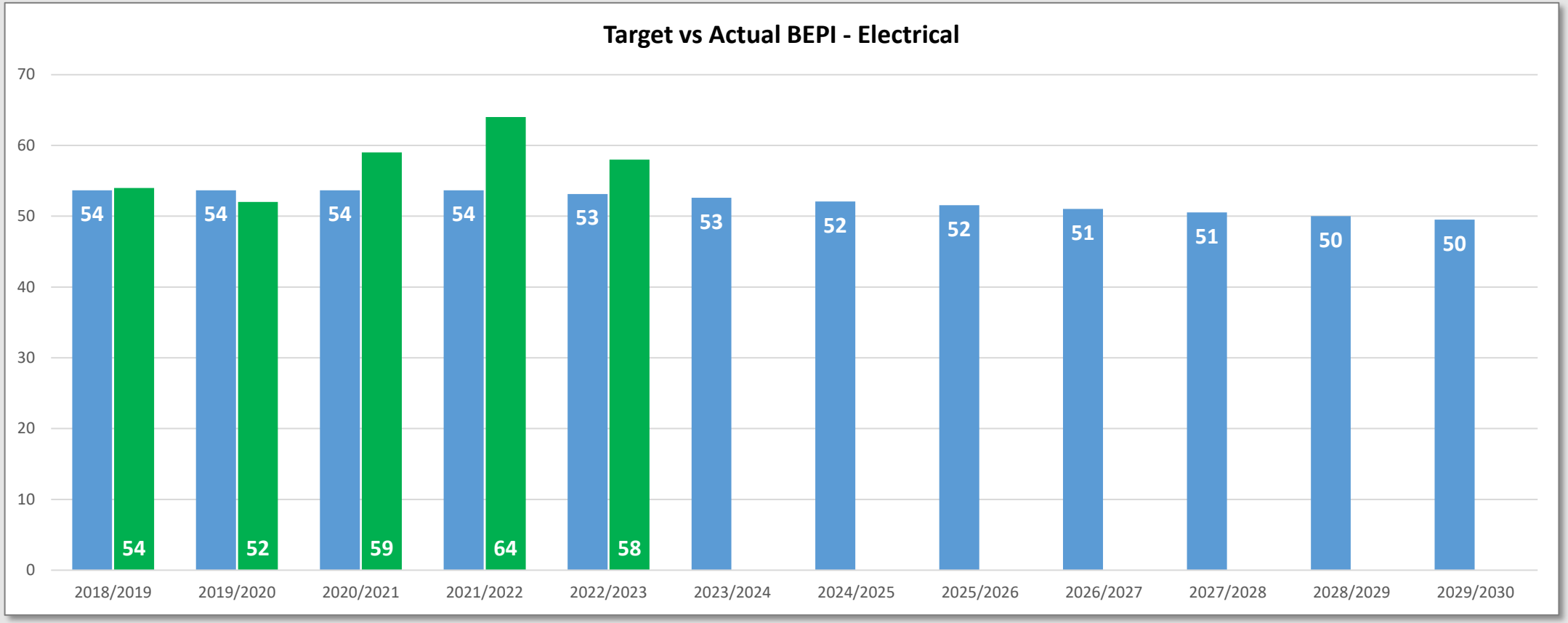
40% reduction over 8 years



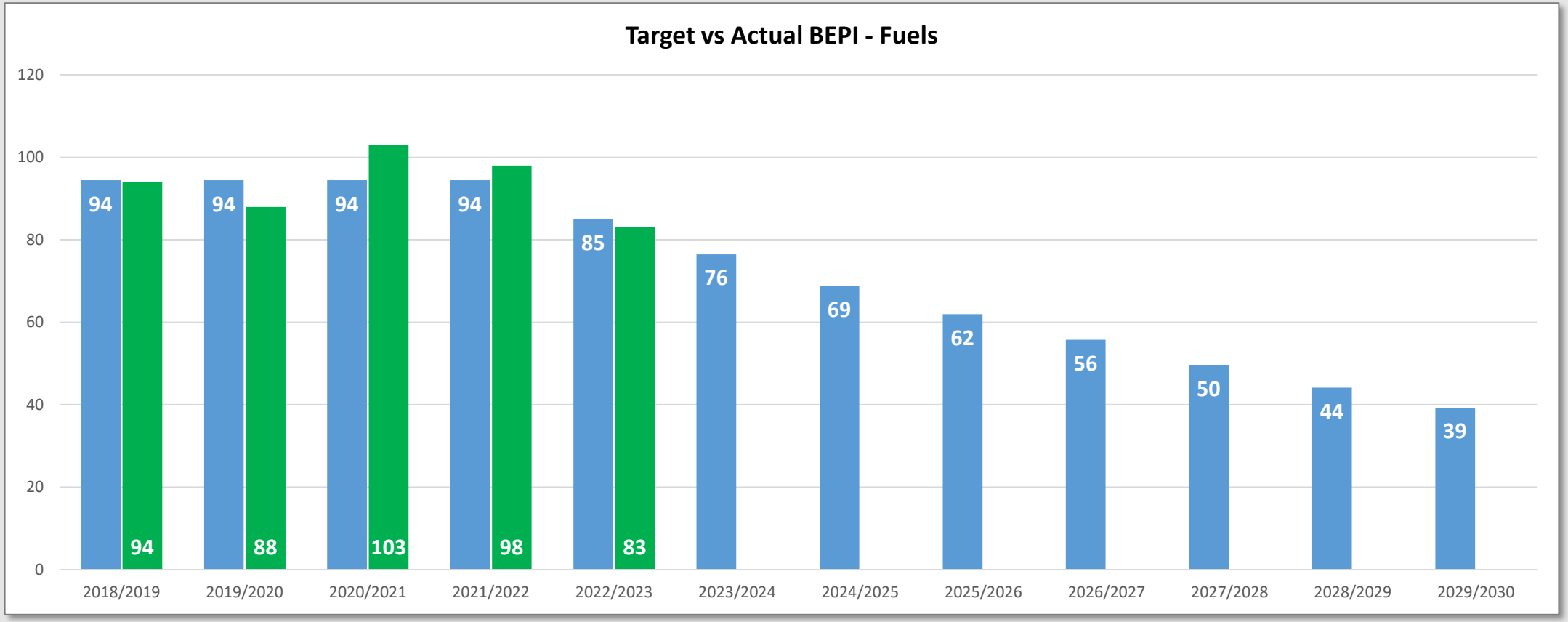
Target & Actual BEPI

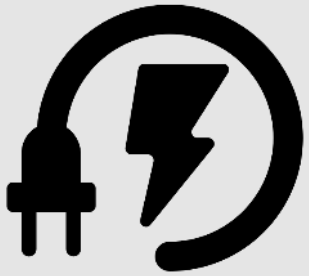


Actual BEPI – Electricity



Actual BEPI – Fuels



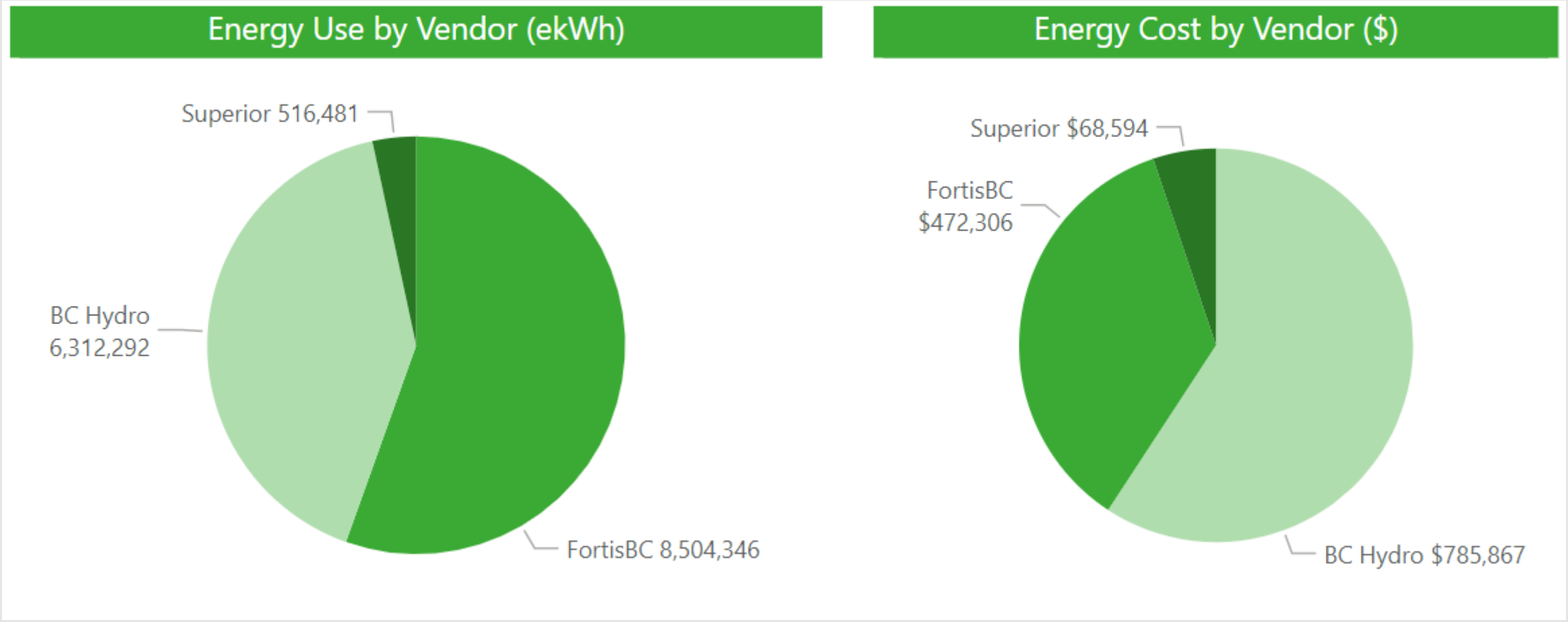


Utility Rates

Annual Energy Rates

Energy Type	Electricity		Natural Gas		Propane	
Year	$/ekWh	$/GJ	$/ekWh	$/GJ	$/ekWh	$/GJ
2010/2011	$0.097	$26.92	$0.051	$14.24		
2011/2012	$0.104	$29.01	$0.058	$16.02	$0.091	$25.25
2012/2013	$0.107	$29.69	$0.060	$16.77	$0.071	$19.82
2013/2014	$0.110	$30.45	$0.061	$16.81	$0.085	$23.65
2014/2015	$0.117	$32.43	$0.053	$14.79	$0.084	$23.44
2015/2016	$0.125	$34.80	$0.036	$9.97	$0.074	$20.61
2016/2017	$0.129	$35.84	$0.033	$9.08	$0.082	$22.76
2017/2018	$0.128	$35.54	$0.033	$9.07	$0.094	$26.17
2018/2019	$0.128	$35.46	$0.033	$9.08	$0.091	$25.30
2019/2020	$0.127	$35.14	$0.035	$9.60	$0.096	$26.54
2020/2021	$0.123	$34.12	$0.041	$11.47	$0.095	$26.29
2021/2022	$0.122	$34.01	$0.050	$13.88	$0.105	$29.16
2022/2023	$0.124	$34.58	$0.056	$15.43	$0.133	$36.89

Cost / Use Breakdown

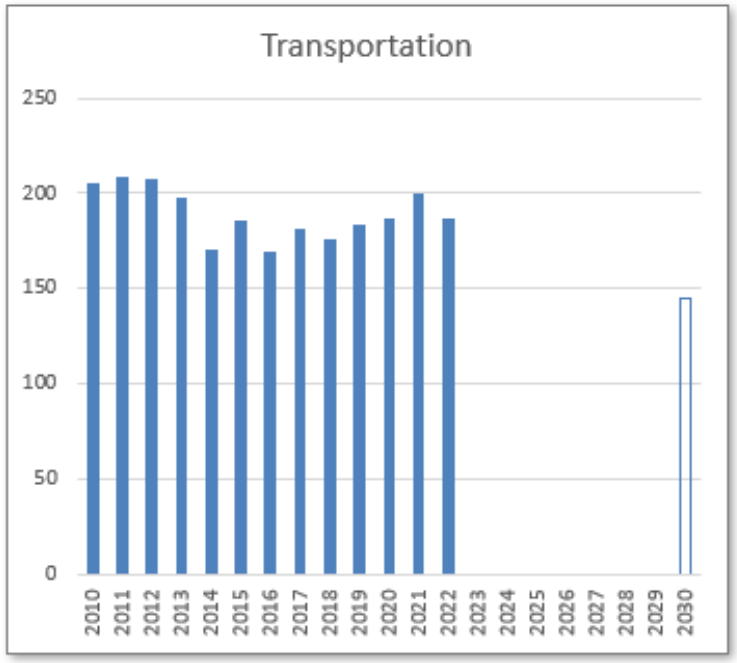


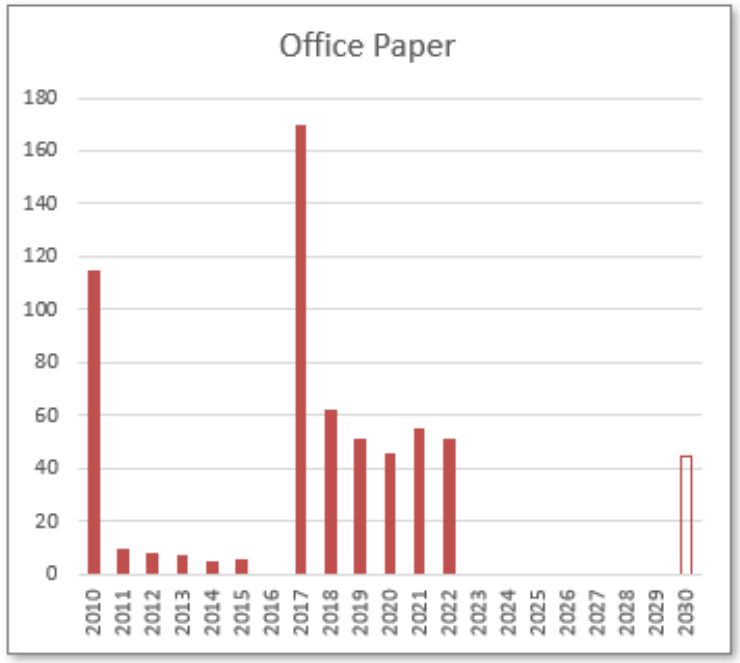
Performance – Energy Intensity

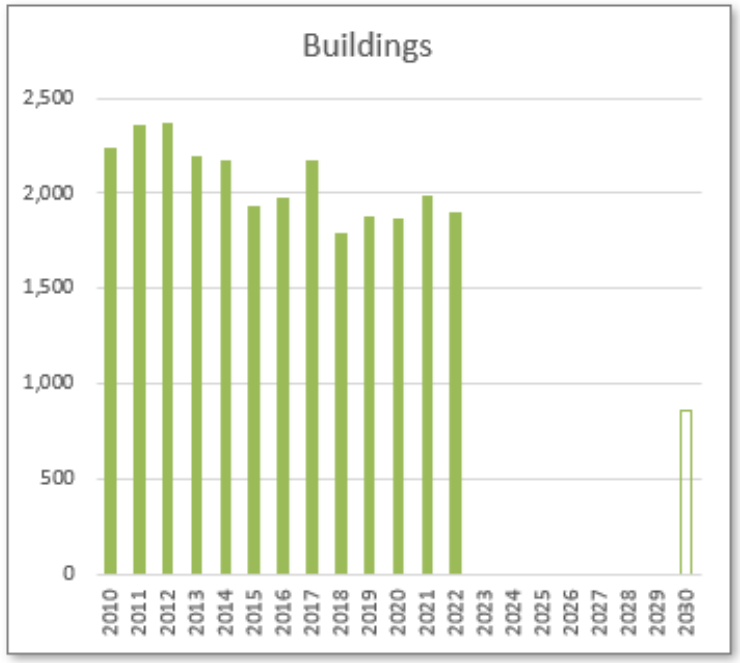
	2018-19 BASELINE	THIS YEAR TARGET REDUCTION	2022-23		THIS YEAR TARGET BEPI
ELEC	54	1%	58		53
FUELS	94	10%	83		85
TOTAL	148	6.7%	140		138

Performance – Carbon

2022 = 2140, or 16% reduction to date



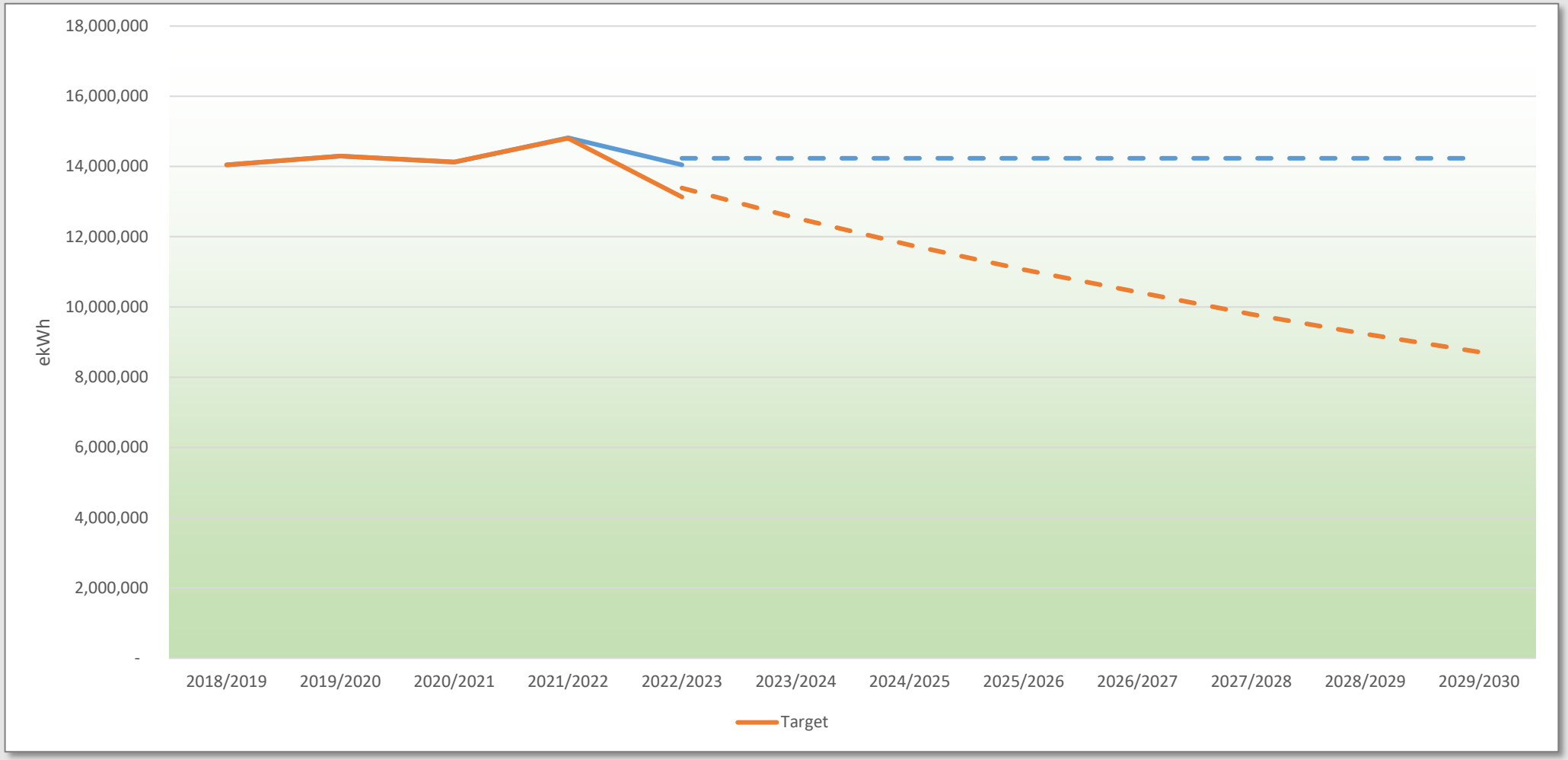




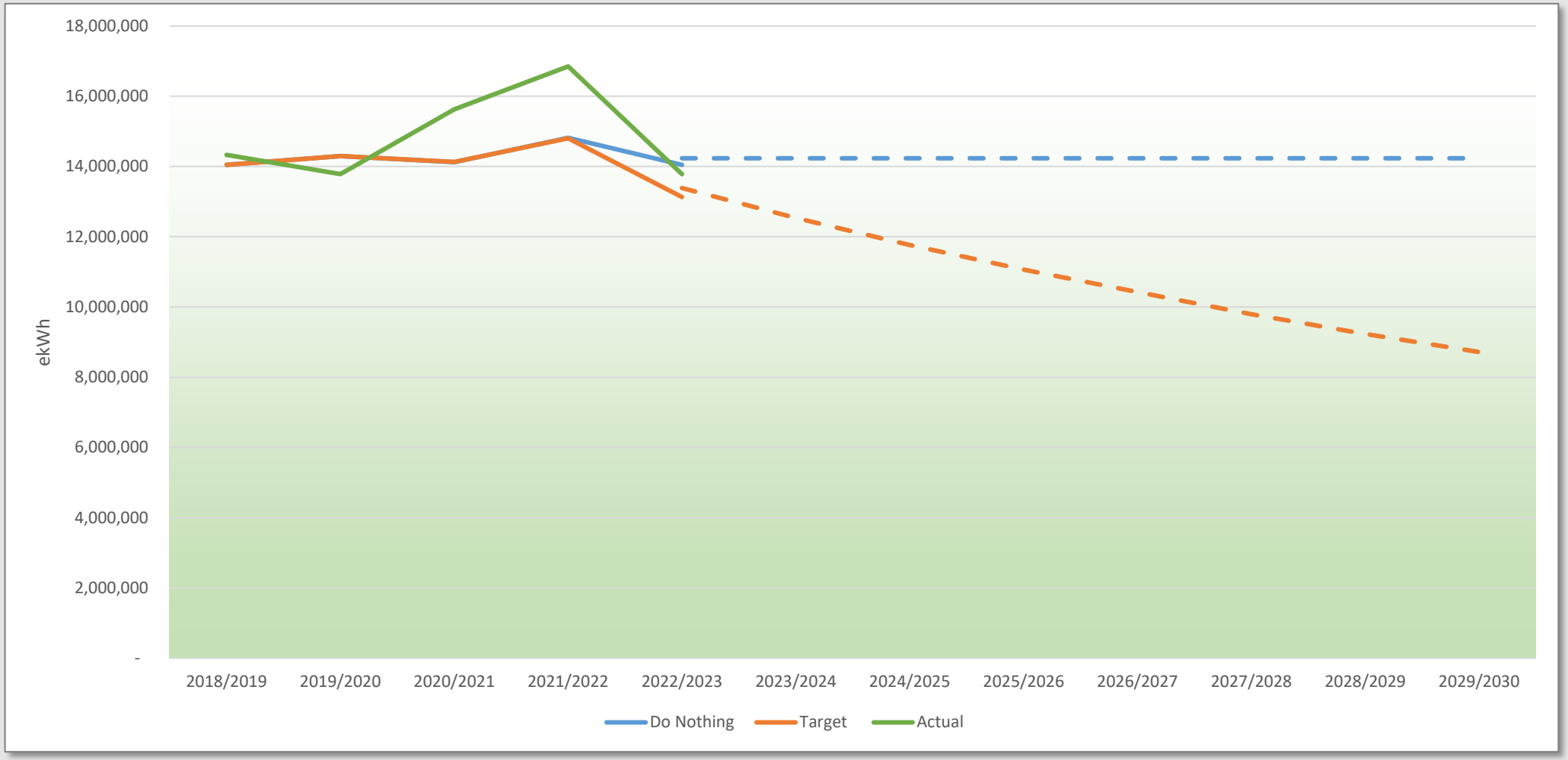
Bottom Line

- 2022-23 showed an energy reduction of **4%** compared to the 2018-19 baseline
- **18% improvement over 2021-22**
- If targeted reductions met the cumulative savings expected to be **$1,600,000** by 2029-30

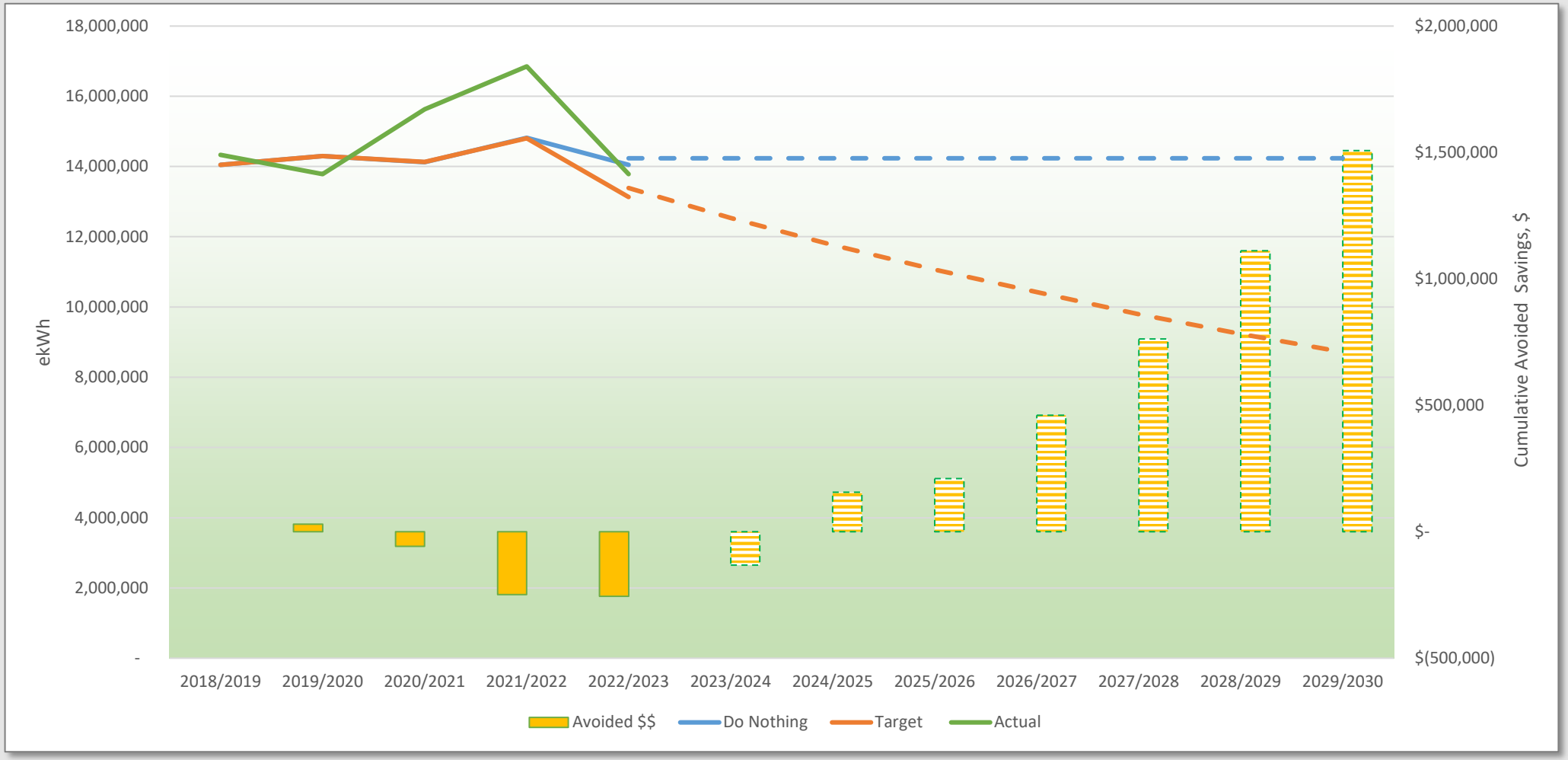
CUSUM – MODEL CUMULATIVE SAVINGS OVER TIME



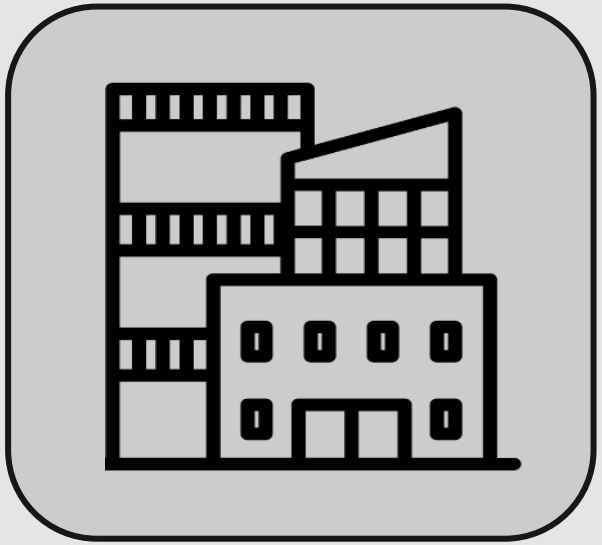
CUSUM


18,000,000
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
-
ekWh
2018/2019
2019/2020
2020/2021
2021/2022
2022/2023
2023/2024
2024/2025
2025/2026
2026/2027
2027/2028
2028/2029
2029/2030
Do Nothing
Target
Actual

CUSUM



Performance Highlights



Infrastructure & Projects

Status of Major Energy-Related Systems:

- **Lighting**
- **Fleet**
- **Buildings (Mechanical)**

Lighting

Facility Name	Classroom LED	Exterior LED	Occupancy Sensors	Hallway Control	Remote Access
Aboriginal Ed Centre	None	Excellent	Good	None	None
Airport Elementary	Excellent	Excellent	Good	Excellent	Excellent
Arden Elementary	None	Excellent	Good	None	None
Aspen Park Elementary	None	Excellent	Good	None	None
Brooklyn Elementary	None	Excellent	Good	TBD/LV	None
Courtenay Elementary	None	Excellent	Good	None	None
Cumberland Perseverence	None	Excellent	Good	None	None
Denman Island Elementary	Excellent	Excellent	Good	Excellent	Excellent
Ecole Puntledge Park Elementary	None	Excellent	Good	None	None
Ecole Robb Road	None	Excellent	Good	None	None
Georges P Vanier Secondary	Excellent	Excellent	Good	Good	None
Glacier View Learning Centre	Excellent	Excellent	Good	None	None
Highland Secondary	None	Excellent	Good	None	None
Hornby Island Elementary	Excellent	Excellent	Good	Good	None
Huband Park Elementary	None	Excellent	Good	TBD/LV	None
Lake Trail Community School	Excellent	Excellent	Good	Good	None
Maintenance Office and Shops	None	Excellent	Good	Good	None
Miracle Beach Elementary	None	Excellent	Good	None	None
North Island Distance Education	None	Excellent	Good	None	None
Queneesh Elementary	None	Excellent	Good	TBD/LV	None
Royston Elementary	None	Excellent	Good	None	None
Sandwick Alternate	None	Excellent	None	None	None
School Board Office - Cumberland Rd	Excellent	Excellent	None	None	None
Secondaire Mark R. Isfeld Secondary	None	Excellent	Good	Good	None
Valley View Elementary	None	None	Good	None	None

LED Lighting

Major actions underway:

1. Methodical Full lighting replacement funding requests for schools in annual capital plan submission
2. Full inventory of every light in the district (data driven decisions)
3. Updated technical specification for all future lighting jobs
4. Determined optimum lighting controls solution
5. Applying for funding

Fleet – transition to BEV

Fleet

- **Fleet Decarbonization Study** – GHD Engineering
- Inventory
- In depth review to determine needs
- Electrification Plan
  - Vehicle Purchases
  - Charging Infrastructure
- Holman Group for purchasing

Fleet Decarbonization report scenarios

Table 4.1 – Scenario overviews

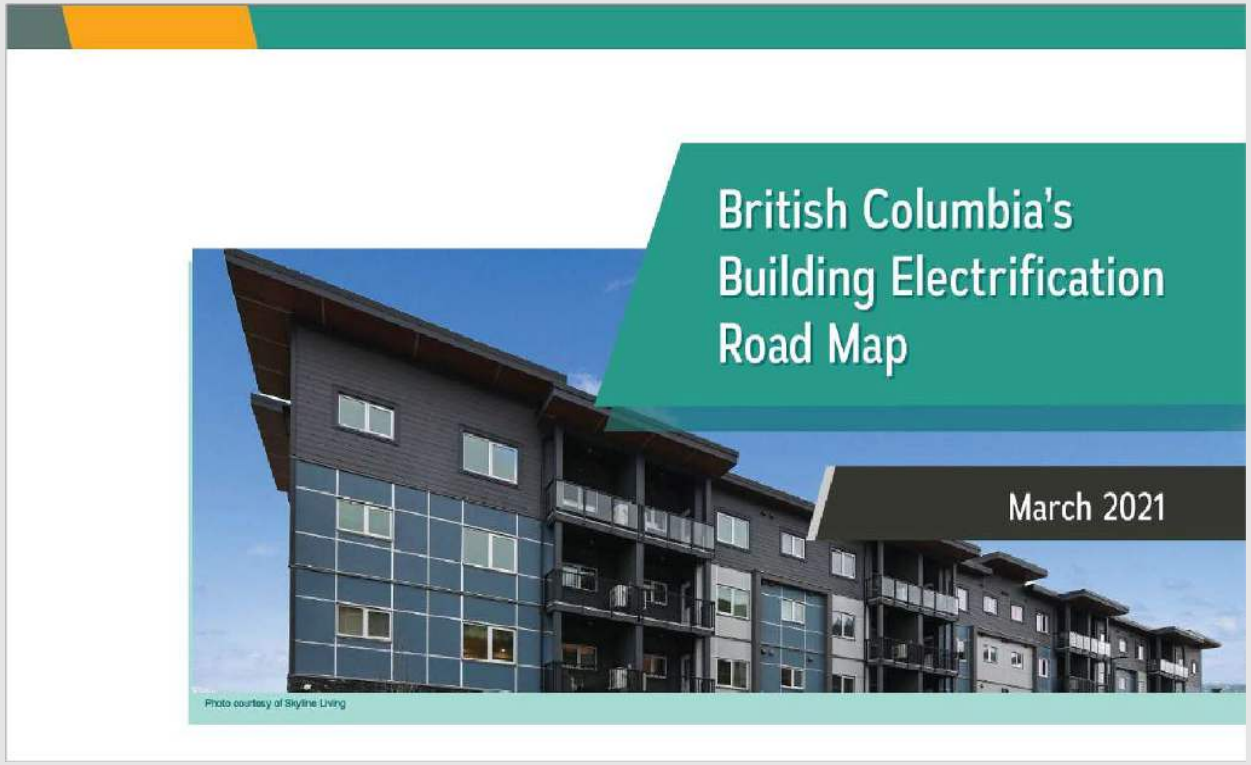
Scenario	Transition Scenario	Fleet Type of ZEVs and fleet replacement rate per annum	Financial (TCO, CAPEX, OPEX)	Environmental (CO_2 emissions, air quality (NOx, SOx, VOCs, PM2.5, PM10)	Energy & Infrastructure (peak demand, # of chargers)
1	Business as usual	1-2 vehicles per year, depending on established District budget	$9.6 M total cost of ownership OPEX highest of all scenarios	No reduction	N/a
2	Provincial guideline electrification	2-4 vehicles per year to EVs, keeping pace to meet provincial target 50% more vehicles purchased over study period than Scenario 1 or 2	$10.5 M total cost of ownership CAPEX highest of all scenarios May be eligible for up to 400k in infrastructure rebates	49% emission reduction by 2030 100% reduction by 2037	Typical Peak Demand capacity: 147 kVA. 45 L2 EVSE + 1 50kW DCFC
3	Electrification based on budget	1-2 vehicles per year to EVs. Same replacement plan as Scenario 1 / Business as usual except with EVs	$8.9 M total cost of ownership May be eligible for up to 400k in infrastructure rebates	28% emission reduction by 2030 100% reduction by 2045	Typical Peak Demand capacity: 147 kVA. 45 L2 EVSE + 1 50kW DCFC

Fleet – Funding Options

- NR Can – **Zero Emission Vehicle Infrastructure Program**
- ASTSBC – **Go Electric Bus Program**
- Infrastructure Canada – **Zero Emission Transit Fund**
- Clean BC – **Go Electric Fleets Program**

- Canada Infrastructure Bank – offering favorable loans

How do we de-carbonize buildings?



- “Fuel Switching”
- “Electrification”
- Heat Pumps

Mechanical

Options	New	Aging	End of Life	Proposed	

Facility Name	Plant LWT	Terminal LWT	2021	2022	2023
Aboriginal Ed Centre	FURNACES				
Airport Elementary	Y	TBD	10	11	12
Arden Elementary	Y	TBD	9	10	11
Aspen Park Elementary	Y	N	0	1	2
Brooklyn Elementary	Y	N	0	1	2
Courtenay Elementary	Y	N	4	5	6
Cumberland Perseverence	ELECTRIC				
Denman Island Elementary	ELECTRIC				
Ecole Puntledge Park Elementary	Y	N	2	3	4
Ecole Robb Road	Y	N	4	5	6
Georges P Vanier Secondary	Y	TBD	11	12	13
Glacier View Learning Centre	HEAT PUMP				
Highland Secondary	Y	N	2	3	4
Hornby Island Elementary	Y	Y	0	1	2
Huband Park Elementary	Y	N	0	1	2
Lake Trail Community School	Y	TBD	0	1	2
Maintenance Office and Shops	ELECTRIC				
Miracle Beach Elementary	Y	Y	7	8	9
North Island Distance Education	Y	TBD	0	0	1
Queneesh Elementary	Y	N	1	2	3
Royston Elementary	Y	N	6	7	8
Sandwick Alternate	HEAT PUMP				
School Board Office - Cumberland Rd	ELECTRIC				
Secondaire Mark R. Isfeld Secondary	Y	TBD	2	3	4
Valley View Elementary	Y	N	3	4	5

Strategic Priorities

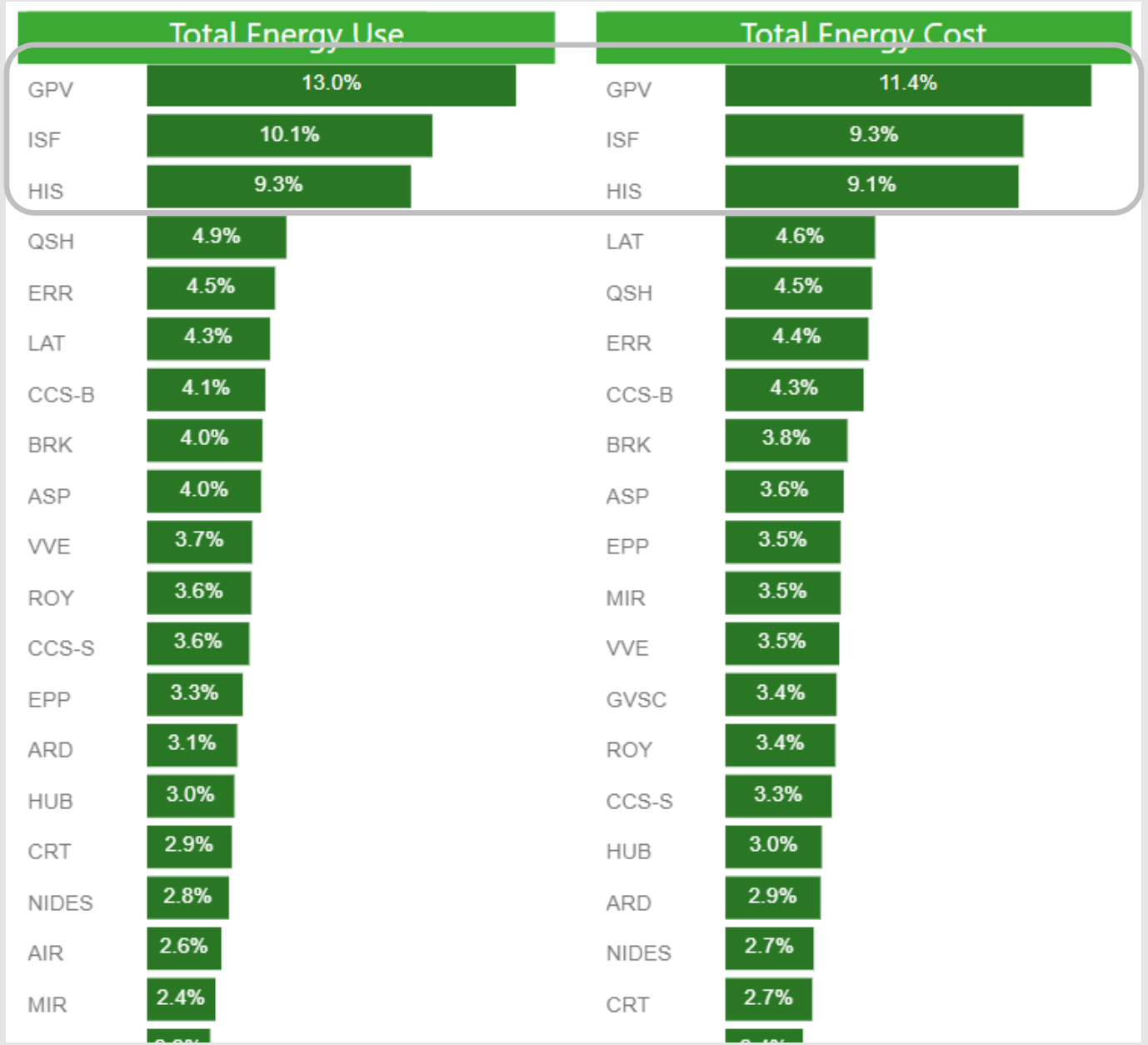
1. Biggest emitters (large consumers)
2. Poor performers
3. GHG Reduction
4. Maintenance issues

Strategic Priority:

Large Consumers

The largest 3 consumers account for 32% of the District's energy use.

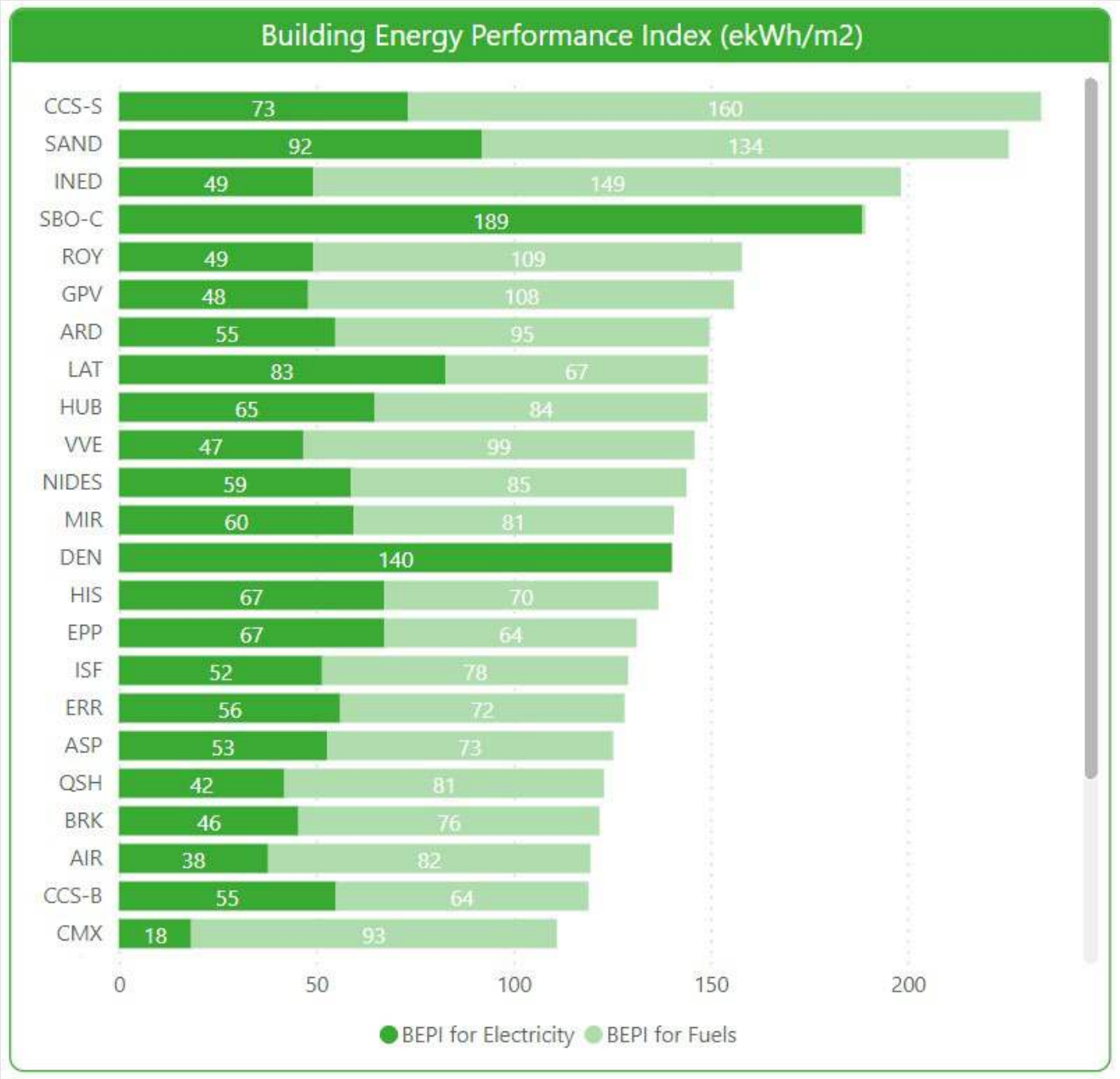
2022-23 Data



Strategic Priority:

Poor Performers

2022-23 Data



Strategic Priority:

High use/cost

+

High intensity

=

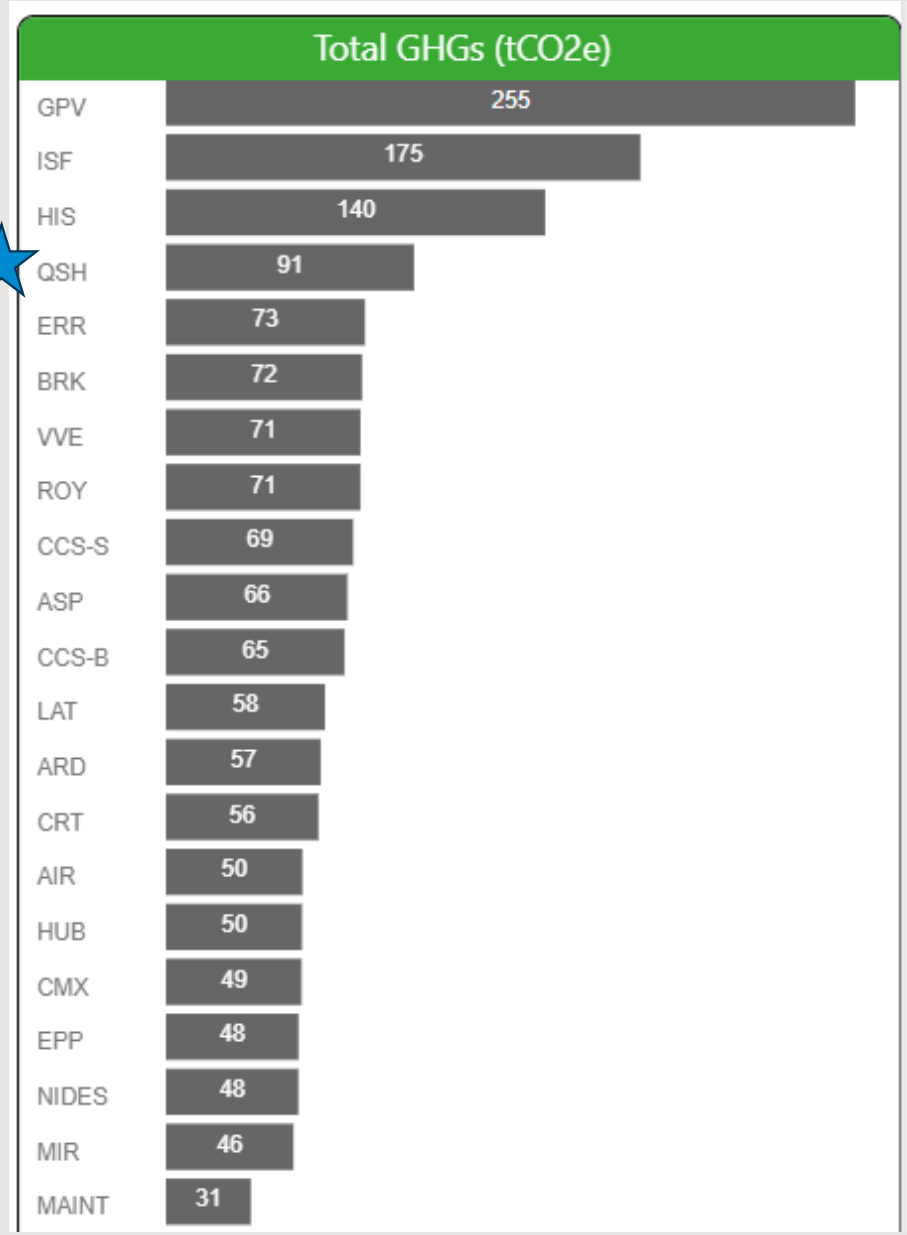
Top Priorities

2022-23 Data

Strategic Priority:

GHG Reduction / Electrification

2022-23 Data



How do we pay?

1. Ministry resources:
    - AFG funding
    - SEP funding
    - CNCP funding
2. Provincial – CleanBC Custom Incentives (max 750K)
3. Federal Government – Low Carbon Economy Fund (max 25M)

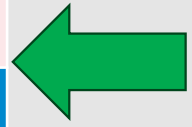
It’s not all bad news

What has the Operations Department done to reduce GHGs

1. Collected and developed a tremendous amount of baseline data.
2. Boiler replacement at all schools in past 12 years from low efficiency to very high efficiency condensing boilers. **Electrification transition started.**
3. Digital building controls replacement at all schools.
4. LED lighting upgrades for all large gyms, most small gyms, all shop classes, large multi-spaces, most parking lot lights, all exterior wall pack and many hallways.
5. Full school LED lighting at Vanier, Lake Trail, Hornby, Glacier View, and Denman. Airport school is out to tender.
6. Vehicle fleet transition has begun with compact trades vans and electric van.
7. Working to develop Strategic Energy Management long term plan with targets.

2023-2024 Targets

	2022-23 Consumption	2023-24 Reduction Target	2023-24 Reduction ekWh
Electricity	6,175,069	1%	62,000
Natural Gas	7,898,556	10%	790,000
Total	14,516,835		852,000



Gap to Target - Energy

	Elec	Fuels	Total ekWh
Target Reduction	62,000	790,000	852,000
Proposed Projects	**RCx**	**Denman/ Queneesh**	**>1,000,000**
Gap			

Building projects underway and upcoming

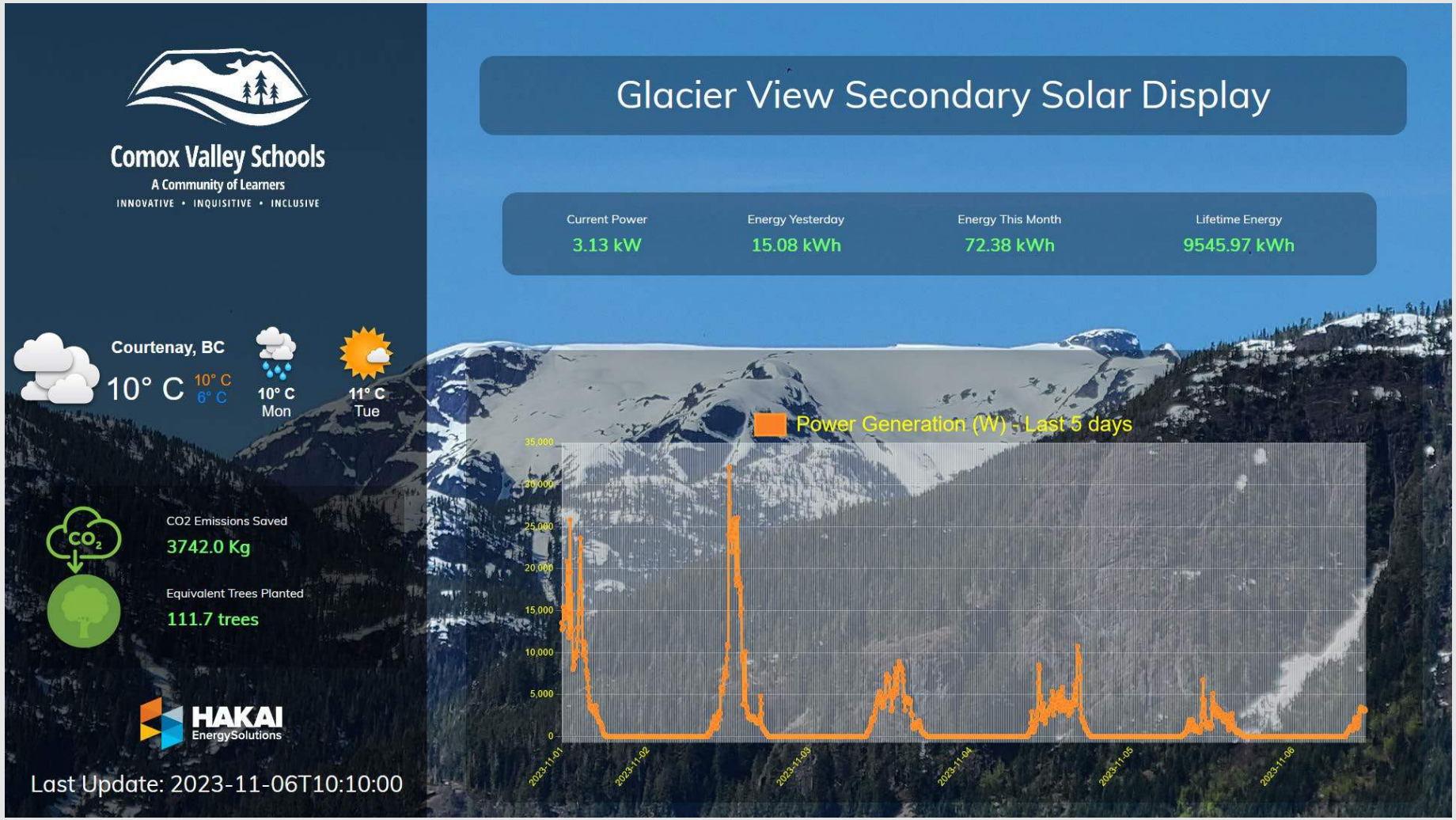
- Glacier View mechanical upgrade – PV array
- Denman mechanical upgrade – electrification
- Idiens Way SBO - electrification
- Continuous Optimization (RCx) - The Continuous Optimization Program is a joint offer from BC Hydro and FortisBC which provides customer assistance to save energy and improve operations in large commercial buildings without having to undertake a major capital investment. The primary focus of the program is to help you improve the efficiency of your most energy-intensive systems, such as heating, ventilation, and air-conditioning (HVAC), with simple, low-cost solutions.
- Queneesh Elementary – electrification project request

Proposed Projects 2023-24

Facility	Description	Cost	Proposed Elec. Savings (%)	Proposed Fuel Savings (%)	Proposed Elec. Savings ekWh	Proposed Fuel Savings ekWh	Total Savings ekWh
DEN	Phase 2 - PV Array	$ 290,000					
AIR	DDC Upgrade to Delta	$ 132,000					
Multiple	Hallway Lighting Upgrades – 11/12 elementary schools	$ 144,000					
NIDES	Envelope Upgrade	$ 755,000					
GPV	MUA 1, 2 & 3	$ 721,000					
QSH	Phase 1 - ERV (Electrification)	$ 450,000					

Glacier View School

Glacier View School



RCx

Georges P Vanier Secondary
Brooklyn Elementary
Aspen Park Elementary
Huband Park Elementary
Secondaire Mark R. Isfeld Secondar
Queneesh Elementary
Lake Trail Community School
Courtenay Elementary
Ecole Puntledge Park Elementary
Valley View Elementary
North Island Distance Education
Highland Secondary
Ecole Robb Road
Cumberland Elem-Jr Sec - Beaufort
Royston Elementary
Airport Elementary
Glacier View Learning Centre
Arden Elementary
Miracle Beach Elementary

- 19 Sites
- Planned completion date of May 2024

Potential Savings:
- Electricity 7%
- Fuel 12%
- **Up to 2.5M ekWh**

Major Findings Categories:

- Scheduling
- Holiday Calendars
- Optimized Start Update
- Demand Based Ventilation

Continuous Optimization - Queneesh

Culture change

Canada's emissions cut plan insufficient to meet targets, official report finds

Auditor general says key measures to cut emissions by 40-45% to meet Paris accord commitment delayed or not prioritized

Thick smoke from a wildfire fills the air in Scotch Creek, British Columbia, on 20 August. Wildfires released huge quantities of carbon into the atmosphere. Photograph: Darryl Dyck/AP

Canada's emissions reduction plan is insufficient to meet its target to cut emissions by 40% to 45% below the 2005 level by 2030, according to a new a report released by the country's auditor general.

The audit found the government's plan insufficient because key measures needed to meet the 2030 target were delayed or not prioritized, according to a statement from the office of the auditor general on Tuesday.

Falling short of the minimum 40% target for 2030 would mean Canada missing its commitment under the United Nations' Paris agreement on climate change.

School Energy Report Cards (Learning Summaries??)

School District No. 71
(Comox Valley)

Energy & Carbon
INFORMATION FOR CLASSROOMS

Rede BUILDING ENERGY EFFICIENCY

GLOSSARY

BEPI
Building Energy Performance Index - A calculation of annual energy consumption by unit of floor area. The BEPI can be used to easily compare buildings of different sizes. These results are used to focus efforts on poorly performing buildings. BEPI is measured in ekWh/m2.

L12M - Last 12 Months
The key metric of BEPI is reported on an annual basis. The "Last 12 Months" measure is used to display mid-year results. This rolling 12-month calculation steps 2 months back in time (when we typically have complete utility data), and then provides a summary of the previous 12 months' performance.

ekWh
Equivalent kilowatt hour - A standardized unit of measure that allows multiple energy sources, such as electricity [kWh], natural gas [GJ], and propane [L] to be added together.

Weather Normalization
To accurately compare utility data from year to year, the data must be normalized for weather. This removes the impact of variations in weather, enabling comparison of utility data from year to year to determine if overall energy use has gone down.

GHG (tCO2e)
Greenhouse gas emissions, as measured in tonnes of equivalent carbon.

OPPORTUNITIES FOR IMPROVING ENERGY PERFORMANCE

Power Consumption
- Turn off lights when leaving a room, or on a sunny day when lights aren't needed.
- Power down devices when not in use.
- Limit the use of discretionary appliances such as personal fridges, microwaves, kettles and heaters.
- Assign one student in the classroom each week to be the energy-efficiency steward.

Heating & Ventilation
- Close exterior doors and windows during cold weather, when the building's heating system is running.
- Establish a green team to review energy performance data. Identify and troubleshoot problem areas.
- Notify your facilities team if ventilation and heating systems appear to be running when the building is unoccupied.

OPPORTUNITIES FOR REDUCING GREENHOUSE GAS EMISSIONS

Fuel Efficiency
- Reduce consumption through the measures listed above
- Replace old equipment, such as boilers, with newer, more efficient models.

Fuel Switching
- Replace fossil fuel-burning equipment (those that use natural gas, propane or diesel) with equipment that runs on electricity. such as a heat pump.

Transportation
- Switch from gasoline vehicles to electric or hybrid vehicles.
- Use active transportation options such as walking, cycling, or public transportation.

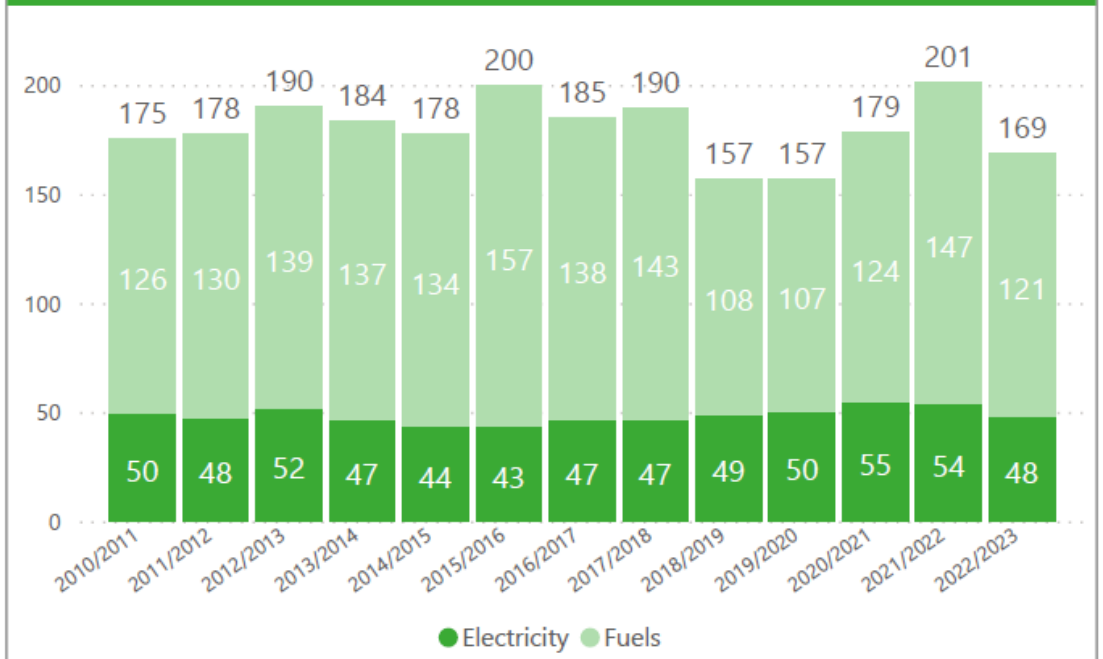
School District No. 71 (Comox Valley)

Valley View Elementary

Historical Performance

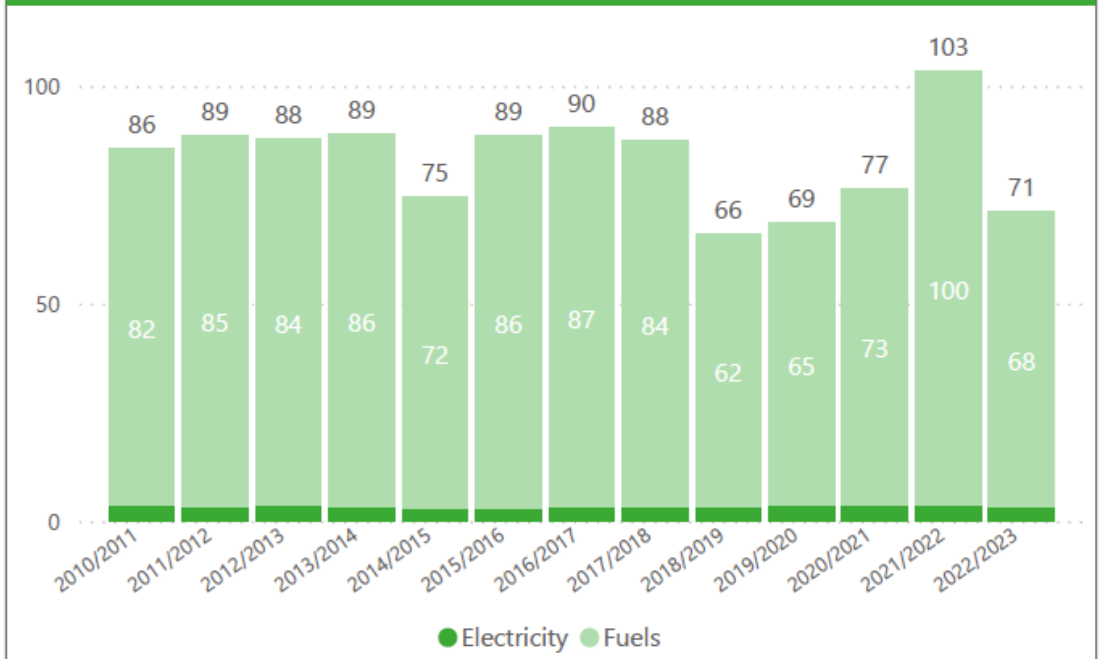
Rede BUILDING ENERGY EFFICIENCY

Building Energy Performance Index (ekWh/m2)



These values are weather normalized.

GHG Emissions (tCO2e)



These values are not weather normalized.

Last 12 Months Average		
49	122	171
Electricity	Fuels	Total

2030 BEPI Target		
50	40	90
Electricity	Fuels	Total

Last 12 Months Total
72
GHG Tonnes L12M

2030 GHG Target
59 - 64%
Reduction from 2010

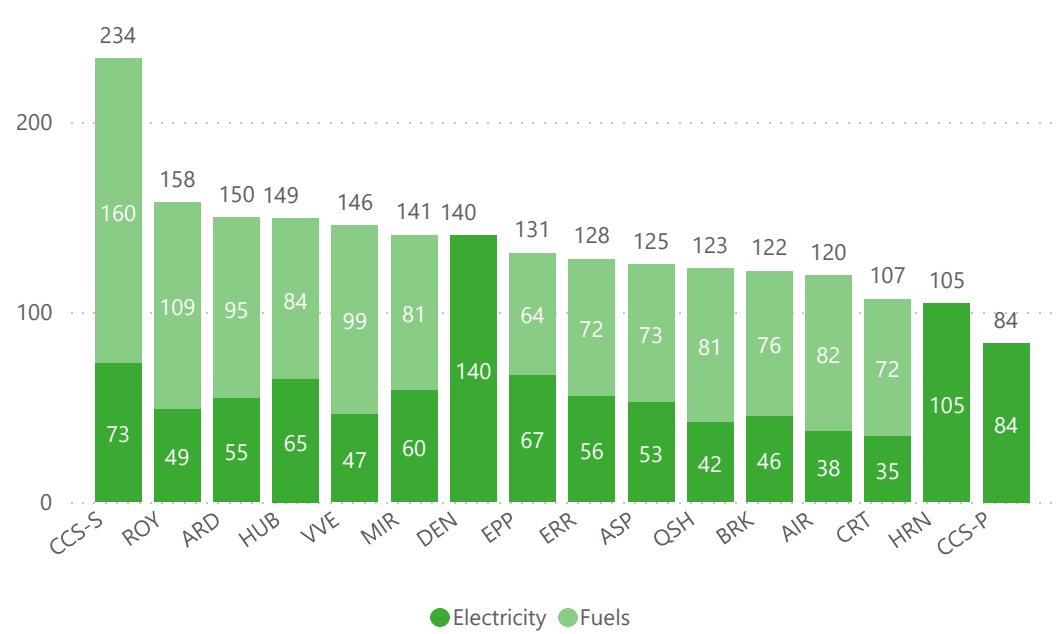
School District No. 71 (Comox Valley)

Elementary Schools

Relative Performance
2022-23

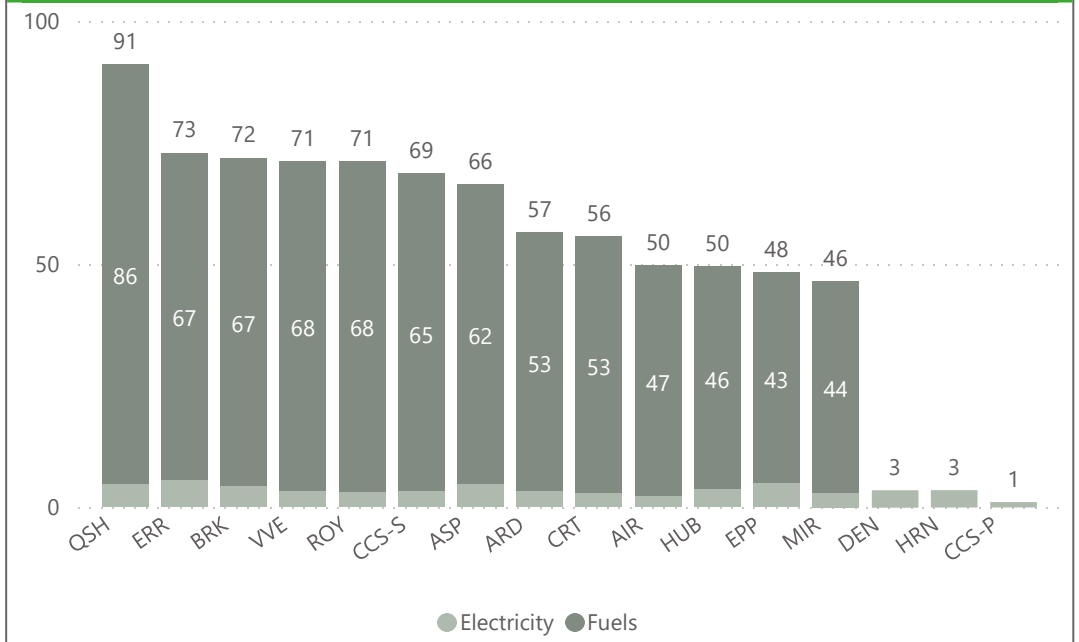
Rede BUILDING ENERGY EFFICIENCY

Building Energy Performance Index (ekWh/m2)



These values are not weather normalized.

GHG Emissions (tCO2e)



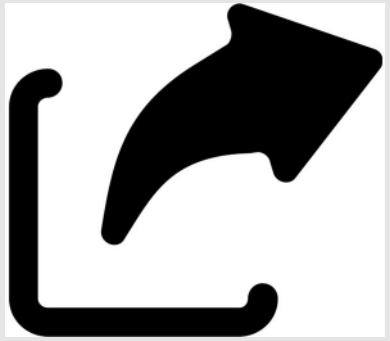
These values are not weather normalized.

2022-23 Average		
55	79	135
Electricity	Fuels	Total

2030 BEPI Target		
50	40	90
Electricity	Fuels	Total

2022-23 Total
827
GHG Tonnes

2030 GHG Target
59 - 64%
Reduction from 2010



Next Steps

1. Continue work on strategic energy management plan.
2. Request projects to meet the SD 71 specific GHG reduction targets.
3. Implementation of Fleet Decarbonization plan.
4. Continuous optimization work.
5. Annual reporting to Board.


FILA
THRASHER