

Westwood Hanlon Elementary School Sustainability Subcommittee DD meeting

June 8th, 2021

AGENDA

LEED Certification Overview

1. LEED Certification Process

- i. Minimum Program Requirements
- ii. LEED Certification Agreement and Confirmation of Agent's Authority
- iii. The Green Engineer's Role
- iv. Application Reviews and Certification
 - a. Design Phase Application and Construction Phase Application

2. Project's LEED Scorecard Review

- i. Overview of LEED Categories
- ii. Sustainability features tracked as 'Yes'
- iii. Sustainability features tracked as 'Maybe'
- iv. Sustainability features tracked as 'No'

3. Items for Owner Direction

- i. Electric Vehicle Charging Stations
- ii. Demand Response Program Enrollment
- iii. Renewable Energy Production

MSBA Green Schools Requirements

The MSBA's Green Schools Program provides incentives to a district to increase the energy efficiency and sustainability for new construction and major renovation/addition projects.

Applicable to project with an MSBA approved PSR on or after June 18, 2017.

- **Minimum requirement for ALL MSBA projects (no additional reimbursement):**
 - Achieve a minimum of LEED-Schools v4 “Certified” (40 points)
OR;
 - Achieve a minimum of NE-CHPS “Verified” (110 points for new construction or 85 points for addition / renovation),
AND;
 - Exceed the Massachusetts Energy base code by 10% (IECC 2018).
- Additional requirements for projects pursuing 2 additional reimbursement points:
 - Meet the minimum requirements described above, and the project must exceed MA State Energy code by 20% (IECC 2018).
- The MSBA also requires and pays for the entire cost of building commissioning (systems, envelope, and monitoring) for all MSBA-funded projects

LEED for Schools v4



- The latest, balloted version of the LEED Rating System.
 - The bar has been raised significantly from the previous version (v09).
- Version 4.1 has been released in beta forms. Teams can use either v4.0 or v4.1 paths.
- A project must satisfy all prerequisites and earn
 - 40-49 points for Certified (Minimum MSBA requirement)
 - 50-59 points for Silver
 - 60-79 points for Gold
 - 80+ points for Platinum certification
- Requires town commit to LEED Certification agreement with USGBC& share energy and water use data with USGBC for 5yrs post-construction (typically through EPA's Energy Star Portfolio Manager tool).

LEED Minimum Program Requirement

Commit to sharing with USGBC the resulting whole-project water and energy usage data for a five-year period beginning on the date the project accepts LEED certification or typical occupancy, whichever comes first.

This commitment must carry forward for five years or until the building changes ownership or lessee.



LEEDv4 BD+C: Schools (LEEDv4 SC) Project Scorecard

Project: **Westwood Hanlon ES**
Address: **790 Gay St, Westwood, MA 02090**
Date: **6/8/2021**



Legend
Questions on approach
Critical items
Previous point status

LEED Goal	Certified, MSBA 2%
Bldg Area	113,141 GFA
Parking	150
Site Area	902,521 SF (TGE Proposed LPB)
Staff	100 per 8.7.20 OPR
Students	560 students K-5 per 8/26/20 MSBA submission
Visitors	809 peak visitors per LEED default count - actual anticipated visitors to be determined.

POINT TOTALS

Yes M+ M- No

52 26 16 16

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

GENERAL PROJECT DOCUMENTATION

Responsible

Notes

D	Y				Plf1	Minimum Program Requirements	Req'd	Team	REQUIRED: Project must meet all MPRs to be eligible for LEED certification.
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Yes M+ M- No

1 0 0 0

INTEGRATIVE PROCESS

1

Responsible

Notes

D	1				IPc1	Integrative Process	1	Team	Early, pre-SD analysis performed by TT assessed potential ECMs as required.
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Yes M+ M- No

4 3 3 5

LOCATION & TRANSPORTATION

15

Responsible

Notes

D					LTc1	LEED for Neighborhood Development Location	15		Project not located in a LEED ND development.
D	1				LTc2	Sensitive Land Protection	1	Civil	Project complies. Located on land that has been previously developed.
D	1	1			LTc3	High Priority Site	1-2	Env. Eng.	Qualifies for option 2 - located within a DDA. Project eligible for second point under Option 3, Brownfield Remediation if site soil or groundwater is contaminated and jurisdiction requires remediation.
D	1	1		3	LTc4	Surrounding Density and Diverse Uses (RP@4)	1-5	TGE	Option 1 Surrounding Density - project not located in densely developed area. Project appears to meet 1 point threshold of Option 2 Diverse Uses with 4 to 7 publicly available services within a 1/2 mile walking distance.
D		1	3		LTc5	Access to Quality Transit (RP@1)	1-4	Owner	Project does not meet lowest threshold for number of publicly available public transportation trips. Need to determine student attendance boundary or intended boundary, and percentage of students living within 3/4 mile walking distance of the school. Points awarded at 50% of students (1 pt), 60% of students (2 pts), 70% or more (4 pts).
D				1	LTc6	Bicycle Facilities	1		Not served by an eligible bicycle network. Gay St has 35mph speed limit & Washington St a 40 mph with no separated bike lanes.
D				1	LTc7	Reduced Parking Footprint (v4.1)	1	Arch/Civil	Based on 560 students, the baseline parking spaces (0.25 spaces/student) is 140. With 150 parking spaces in design, the project does not meet a 30% reduction from baseline.
D	1				LTc8	Electric Vehicles (v4.1)	1	Arch/Civil	Project includes 4 EV charging stations satisfying credit for providing 2% of total parking. Westwood to determine if 4 is sufficient or if there's interest in providing additional EV charging capabilities to meet future demand of EV vehicles.

Yes M+ M- No

4 5 2 1

SUSTAINABLE SITES

12

Responsible

Notes

C	Y				SSpr1	Construction Activity Pollution Prevention	Req'd	Civil/CM	REQUIRED: ESC plan must conform to the requirements of the 2012 U.S. EPA Construction General Permit (CGP).
D	Y				SSpr2	Environmental Site Assessment	Req'd	Env. Eng.	REQUIRED: Phase II in the process for add. Investigation work to look into the history behind removal of three UST's and a leaking transformer from 20 years ago
D	1				SSc1	Site Assessment	1	Arch/Civil/LA	Team to complete and document a site assessment
D		1	1		SSc2	Site Development, Protect/Restore (v4.1) (RP@2)	1-2	LA	Per TGE Proposed LPB Site Area of 902,521 SF and the calculated previous Site Developed Area of 233,255 SF. Project would need to preserve and protect 40% of greenfield area (if any), and 1 point awarded for restoring 15% of total site area (135,378 SF). 2 points awarded for restoring 25% of total site area (225,630 SF).
D	1				SSc3	Open Space	1	LA	Per TGE LPB Site Area of 902,521 SF, the project would need to provide 270,756 SF of Open space. Of that Open Space Area, 67,690 SF needs to be vegetated.
D		2	1		SSc4	Rainwater Management (v4.1)	2-3	Civil	Team to review and confirm if the requirements can be met. 80% = 1pt, 85% = 2pts and 90% = 3pts. A combination of LID and Green Infrastructure practices may be implemented. Coal tar sealant are prohibited. Retention tanks are not considered LID or GI; they may be accepted only if used in conjunction with LIDs.

D		2			SSc5	Heat Island Reduction	1-2	Arch/LA	Prelim calcs show that project should meet Heat Island Reduction thresholds, assuming light colored roof.	
D	1				SSc6	Light Pollution Reduction	1	MEP/LA	DWA confirmed ext lighting will not exceed allowable BUG ratings as determined by the project's lighting zone (LZ).	
D				1	SSc7	Site Master Plan	1		No significant future development planned on the site	
D	1				SSc8	Joint Use of Facilities	1	Arch/Owner	Will make at least 3 spaces within the school available to public: auditorium, gymnasium, cafeteria, classrooms, playing fields, and/or joint parking. Owner to confirm which spaces will be made available.	
Yes M + M - No										
D	5	3	0	4	WATER EFFICIENCY			12	Responsible	Notes
D	Y				WEpr1	Outdoor Water Use Reduction	Req'd	LA	REQUIRED: Install landscape that does not require a permanent irrigation system beyond a maximum two-year establishment period OR reduce the project's landscape water requirement by at least 30% from the calculated baseline for the site's peak watering month. NOTE: The following landscape types may be included or excluded from landscape calculations: vegetated playgrounds, athletic fields, food gardens, and urban agricultural areas.	
D	Y				WEpr2	Indoor Water Use Reduction	Req'd	MEP/Kitchen	REQUIRED: DWA confirmed nurse will have full size refrigerator/ice machine deleted. Dishwasher will be ENERGY STAR. Need to confirm commercial kitchen equipment meets water use reduction limits. Food steamer to consume less than 6 gallons/hour/pan (12 pan steamer) for prerequisite, and less than 2 gal/hr/pan for credit. Pre-rinse spray valve to confirm less than 1.3 gpm. Flush and flow fixtures must reduce aggregate water consumption by 20% from the baseline. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled. Assumed fixture flow rates (WC: 1.28 gpf, UR: 0.125 gpf, LAV: 0.35 gpm, KS: 1.5 gpm), project will achieve 31% - 32.73% reduction dependent on male use of urinals.	
D	Y				WEpr3	Building-level Water Metering	Req'd	Owner/MEP	REQUIRED: Install permanent water meters that measure the total potable water use for the building and associated grounds. Commit to sharing	
D	1	1			WEc1	Outdoor Water Use Reduction	1-2	LA	Project will include irrigation, but will be limited to sports fields. Note sports fields and vegetated playgrounds can be included or excluded from	
D	3	2		2	WEc2	Indoor Water Use Reduction	1-7	MEP/Kitchen	Min reduction of 30% targeted. Refer to comments in WEp2. For additional commercial kitchen credit in Table 3: Confirm food disposer meets 3-8 gpm full load condition with 10 minute automatic shutoff, or 1 gpm with no-load condition. flush/flow fixture reduction and 1 point for commercial kitchen equipment compliance.	
D				2	WEc3	Cooling Tower Water Use	1-2		Design will not include a cooling tower	
D	1				WEc4	Water Metering	1	MEP	Intent is to pursue credit	
Yes M + M - No										
D	22	6	3	0	ENERGY & ATMOSPHERE			31	Responsible	Notes
C	Y				EApr1	Fundamental Commissioning and Verification	Req'd	CxA	REQUIRED: MSBA to provide A qualified CxA by end of DD to perform Cx services for all base-building HVAC&R equipment serving the project. OPR has been drafted by team	
D	Y				EApr2	Minimum Energy Performance	Req'd	Team/Modeler	REQUIRED: Project will exceed minimum requirements by satisfying MSBA requirements. GGD responsible for modeling effort	
D	Y				EApr3	Building-level Energy Metering	Req'd	MEP	REQUIRED: Install new or use existing base building-level energy meters, or submeters that can be aggregated to provide base building-level data representing total building energy consumption and commit to sharing whole-building energy-use data with USGBC for 5 years.	
D	Y				EApr4	Fundamental Refrigerant Management	Req'd	MEP	REQUIRED: Project will not use chlorofluorocarbon (CFC)-based refrigerants in new HVAC&R systems.	
C	6				EAc1	Enhanced Commissioning	2-6	CxA	10.23.20: The updated MSBA commissioning scope, as outlined in Project Advisory 63, satisfies all requirements. Mass Save MOU req's Enhanced and BECx. 4.15.20: MSBA requires and engages commissioning services for the project. Enhanced level of Building Envelope Commissioning discussed to support high performance envelope goals. PV panels must also be commissioned if any included in the project. Demand Response must be fully tested at least once if enrolled in program with Utility.	
D	14	2			EAc2	<u>OptimizeEnergyPerformance</u> (RP@8)	1-16	Team/Modeler	Project will pursue 2% Green Schools funding from MSBA by showing a 35% improvement over ASHRAE 90.1-2010.	
D	1				EAc3	Advanced Energy Metering	1	MEP	Intent is to provide required submeters.	
C	1	1			EAc4	Demand Response	1-2	Owner/MEP	Team to assess feasibility and approach for participation in DR program. Owner to determine if it will participate in a Demand Response program through utility provider, Eversource.	
D		3			EAc5	<u>RenewableEnergyProduction</u> (RP@2)	1-3	Owner	Project investigating roof mounted solar PV array. Will determine if able to offset energy costs by 1% (1pt), 5% (2pts), or 10% (3pts).	

D			1		EAc6	Enhanced Refrigerant Management	1	MEP	GSHP system may make compliance challenging.
C			2		EAc7	Green Power and Carbon Offsets	1-2	Owner	Pending green power and/or carbon offset purchase for a 5-year contract to offset 50% (1pt) or 100% (2pts) energy use
	Yes	M +	M -	No					
	4	3	1	5	MATERIALS & RESOURCES		13	Responsible	Notes
D	Y				MRpr1	Storage & Collection of Recyclables	Req'd	Owner/Arch.	REQUIRED: Recycling storage area included
C	Y				MRpr2	Construction and Demolition Waste Management Plan	Req'd	CM	REQUIRED: Specifications will include required CWM plan development and implementation
C				5	MRc1	<u>BuildingLife-CycleImpactReduction (RP@2)</u>	2-5		Team to continue to consider embodied carbon of materials selected irrespective of conducting a whole-building LCA model for LEED credit point.
C	1		1		MRc2	Building Product Disclosure & Optimization-EPD's (v4.1)	1-2		EPDs for at least 20 different permanently-installed products from 5 or more manufacturers will be provided. Option 2 achieved by installing at
C	1	1			MRc3	BPDO-Raw Materials (v4.1)	1-2		Project will use products that meet at least one of the responsible extraction criteria materials re-use; bio-based, recycled content, certified wood,
C	1	1			MRc4	BPDO-Material Ingredients (v4.1)	1-2	Arch/CM	HPDs, C2C, or Declare certified products will be used for at least 20 different permanently-installed products from 5 or more manufacturers. Option 2 achieved by installing at least 5 permanently installed products from 3 or more manufacturers with material ingredient optimization or action plans.
C	1	1			MRc5	Construction and Demolition Waste Management	1-2	CM	Assuming min. diversion at least 50% of the total construction and demolition material; diverted materials must include at least three material streams. (1pt). Second point maybe for 75% & four material streams (2pts), OR do not generate more than 2.5 pounds of construction waste per square foot of the building's floor area (2pts).
	Yes	M +	M -	No					
	7	2	6	1	INDOOR ENVIROMENTAL QUALITY		16	Responsible	Notes
D	Y				EQpr1	Minimum IAQ Performance	Req'd	MEP	REQUIRED: Project will meet requirements of ASHRAE 62.1-2010, Ventilation for Acceptable Indoor Air Quality.
D	Y				EQpr2	Environmental Tobacco Smoke (ETS) Control	Req'd	Owner	REQUIRED: Will prohibit smoking on campus. Provide signage within 10 ft of all building entries conveying the no-smoking policy.
D	Y				EQpr3	Minimum Acoustical Performance	Req'd	Acoust. Eng.	REQUIRED: Project will meet minimum acoustical requirements
D	2				EQc1	Enhanced IAQ Strategies	1-2	Arch/MEP	Will meet Opt 1: Entryway Systems, Interior Cross-Contamination Prevention, and Filtration. & Opt 2 Carbon Dioxide Monitoring
C	3				EQc2	Low-Emitting Materials (v4.1)	1-3	Arch/CM	Project will include compliant low-voc and low-emitting materials.
C	1				EQc3	Construction IAQ Management Plan	1	CM	Construction activities will follow an IAQ management plan that meets SMACNA guidelines
C			2		EQc4	IAQ Assessment	1-2	Owner/CM	Pending time/approach to IAQ testing and/or flush out
D		1			EQc5	Thermal Comfort	1	MEP	Project will provide required number of thermal comfort controls. Need to assess compliance with ASHRAE 55 in challenging areas (kitchen) while maintaining low-EUI of Path 1 Mass Save MOU.
D	1		1		EQc6	Interior Lighting (v4.1)	1-2	Arch/MEP	Project will provide required number of lighting controls. Opt 2 to be evaluated
D			2	1	EQc7	Daylight	1-3	Arch	Pending assessment
D		1			EQc8	Quality Views	1	Arch	Project should be able to meet this credit given qualifying views into almost all classrooms and offices.
D			1		EQc9	Acoustic Performance (v4.1)	1	Acoust. Eng.	Pending assessment by acoustician
	Yes	M +	M -	No					
	4	2	0	0	INNOVATION		6	Responsible	Notes
D	1				INc1.1	Innovation: Responsible Purchasing - Lamps	1	Team	Assume project is 100% LED.
D	1				INc1.2	Innovation: Economic and GHG Analysis of Mechanical S	1	Team	Compliance is met through the MSBA LCCA requirements.
D	1				INc1.3	Pilot: Integrative Analysis of Building Materials	1	Team	Assume use of >2 products that meet multi-attribute criteria for low-emitting materials, EPDs, & material ingredients.
C		1			INc1.4	Innovation: TBD	1	Team	Pending team approach
C		1			INc1.5	Pilot Credit:	1	Team	Pending team approach
C	1				INc2	LEED Accredited Professional	1	Team	Multiple team members hold an active, applicable LEED accreditation.
	Yes	M +	M -	No					
	1	2	1	0	REGIONAL PRIORITY 02090(underlined)		4	Responsible	Notes
D				X	RPc1	<u>LTc4SurroundingDensityandDiverseUses(4pts)</u>	1	-	Refer to base credit
D			1		RPc2	<u>LTc5AccessstoQualityTransit(1pt)</u>	1	-	Refer to EAc5
D		1			RPc3	<u>SSc2ProtectorRestoreHabitat(2pts)</u>	1	-	Refer to LTc5
D	1				RPc4	<u>EAc2OptimizeEnergyPerformance(20%/8pts)</u>	1	-	Refer to MRc1
D		1			RPcX	<u>EAc5RenewableEnergyProduction(5%/2pts)</u>	1	-	Refer to LTc4
D				X	RPcX	<u>MRc1BuildingLife-CycleImpactReduction(2pts)</u>	1	-	Refer to SSc2
	Yes	M +	M -	No					
	52	26	16	16	PROJECT TOTALS (Certification Estimates)		110		

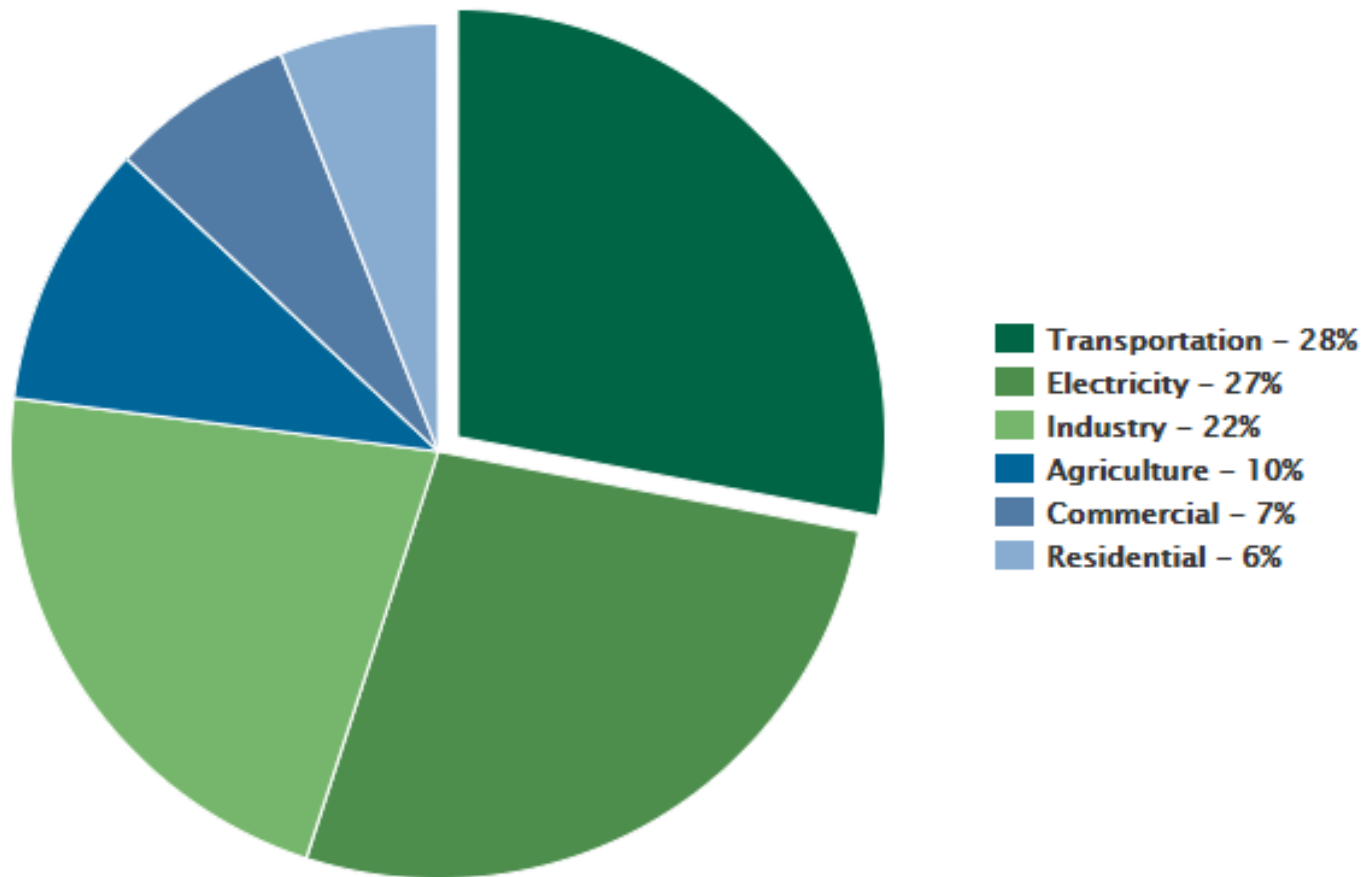
Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

Items for Owner Direction

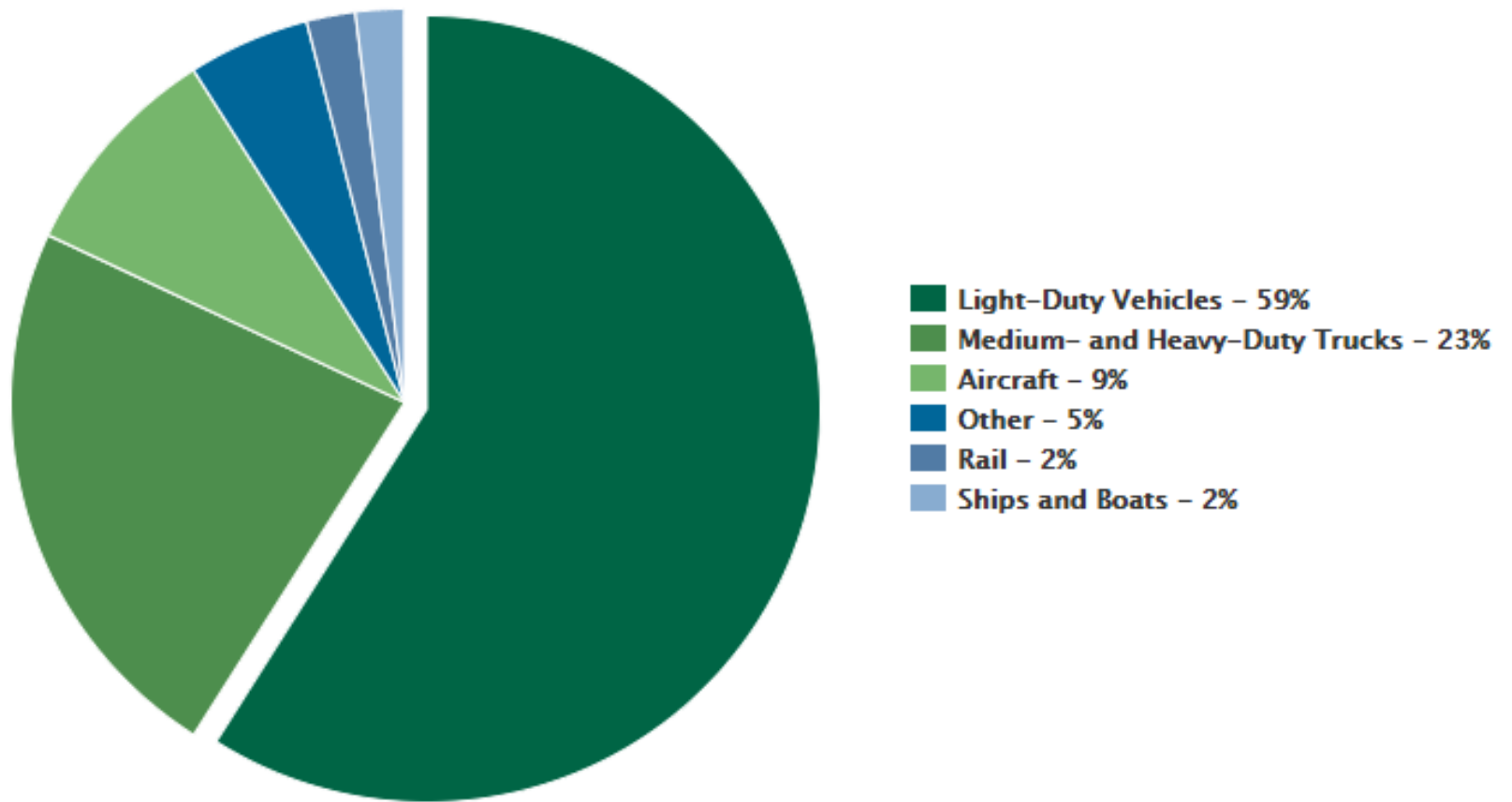
Electric Vehicle Charging Stations

- The project currently includes 2 dual port electric vehicle charging stations - a sufficient minimum for the associated LEED credit to provide 2% of total parking with EV charging.
- **Does Westwood want to provide additional EV charging capacity?**

2018 U.S. GHG Emissions by Sector



2018 U.S. Transportation Sector GHG Emissions by Source



Items for Owner Direction

Electric Vehicle Charging Stations

- Electric vehicle charging infrastructure is important to support the transition away from conventionally fueled vehicles – to reduce “tailpipe emissions”

What is the difference between tailpipe and upstream emissions?



Vehicle tailpipe emissions are the GHGs your car produces when driving.

<https://www.fueleconomy.gov/>

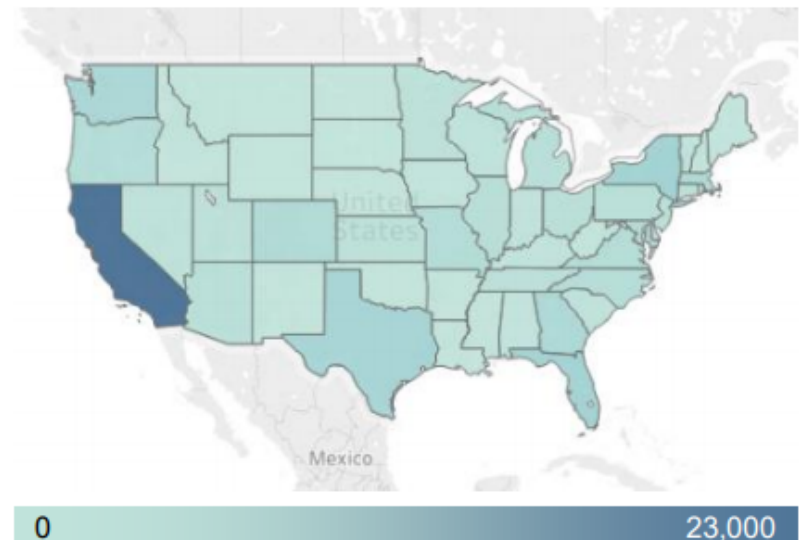


Upstream emissions are the GHGs associated with the production and distribution of gasoline and electricity.

Key drivers

Challenges remain

U.S. public charging connectors by state



Source: BloombergNEF, U.S. Department of Energy, various public- and private-sector data

Items for Owner Direction

Electric Vehicle Charging Stations

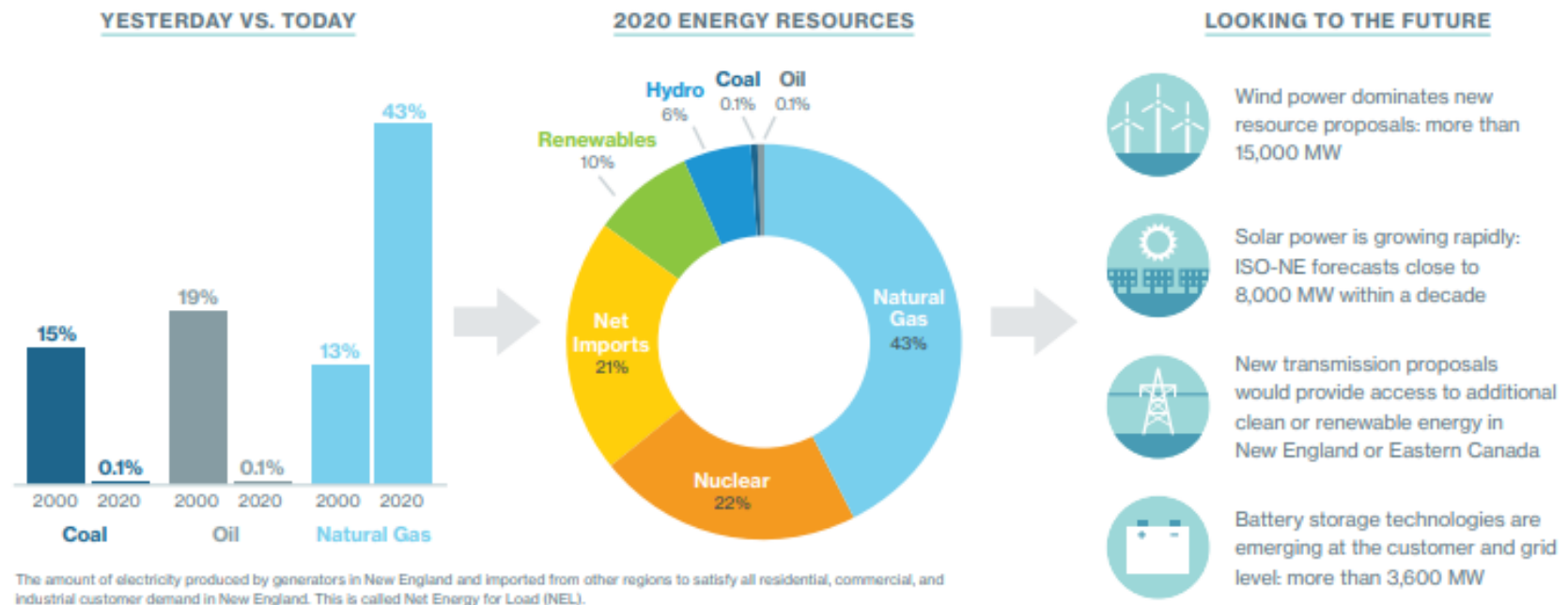
- As the amount of fossil fuel used for electricity production reduces, end-users that have transitioned to electric with their vehicles and/or buildings reduce associated greenhouse gas (GHG) emissions in tandem with the utility.

A Major Energy Transformation Is Underway

New England has shifted away from older coal- and oil-fired generation to cleaner burning natural gas.

Most of today's electricity comes from lower-emitting energy resources.

The region is transitioning to large-scale clean and renewable energy.



Items for Owner Direction

Electric Vehicle Charging Stations

- The trend is towards providing more EV charging to meet the growing demand as electric vehicles become more prevalent.
 - Newer LEED v4.1 requirements (project is not required to meet) increase minimum to 5% of total parking. Boston requires EV charging for 25% of total parking, and Cambridge may soon follow.

Items for Owner Direction

Demand Response

- Demand Response programs are utility incentive programs for customers to reduce energy consumption during high – or peak - demand events. By reducing consumption, demand resources can help ensure enough electricity is available to cost-effectively maintain grid reliability
- The environmental benefit to both designing for and enrolling in a demand response program, is to support the electrical grid from needing to turn to Peaking power plants – or "peaker plants" – to meet anticipated demand.
- The design team will be looking into a potential approach to meeting a demand response event. Should a feasible path exist, and the town is interested in enrolling in a demand response program for the project, **the next step would be to engage Eversource for additional details and program participation requirements.**

Items for Owner Direction

Demand Response

- Typically, peaker plants are less efficient than non peak plants. By participating in a demand response program and shedding energy consumption during peak-demand events, the project can help the utility avoid turning to supplemental electricity sourced from inefficient and higher polluting coal and oil-fired power plants.



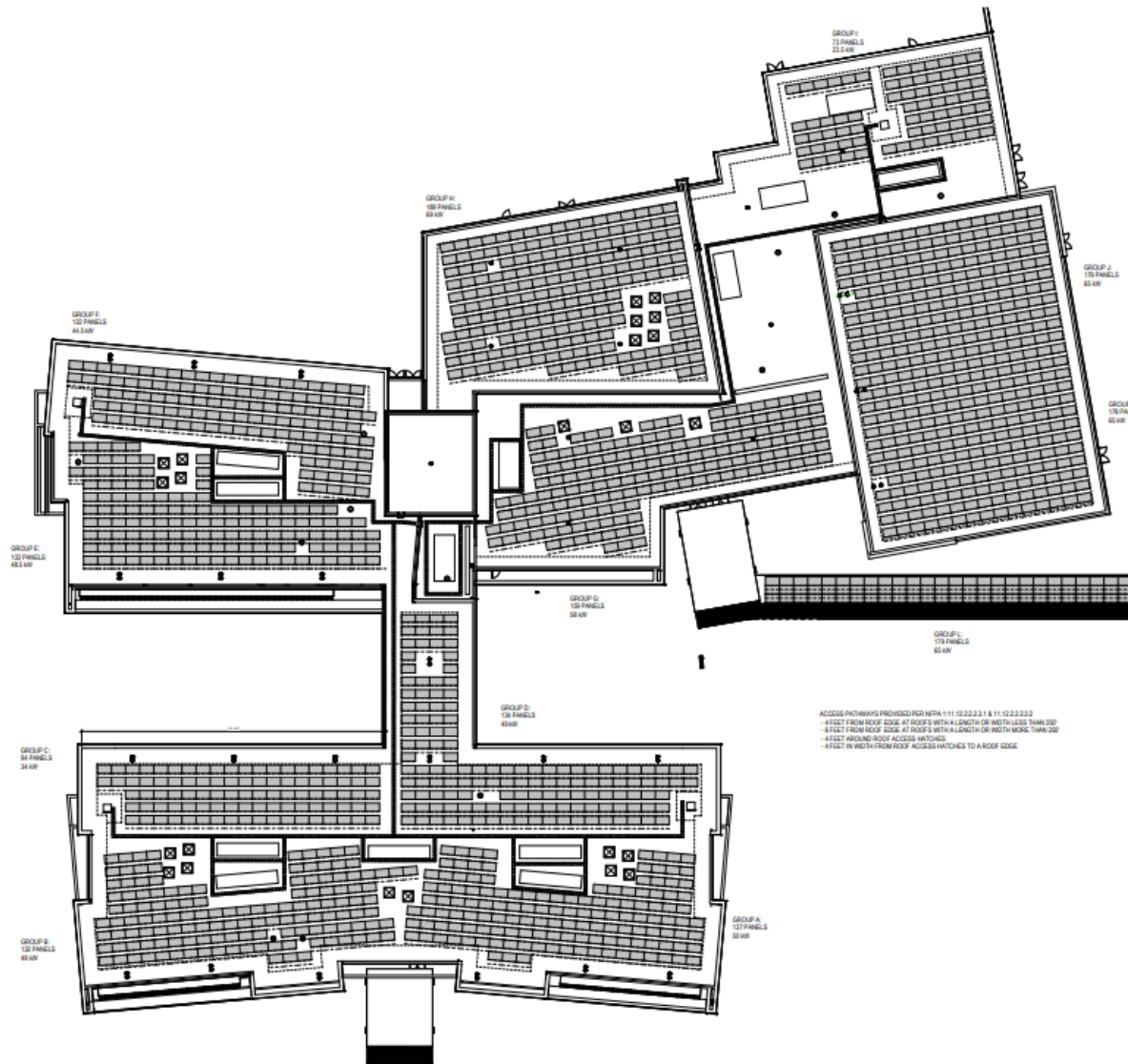
Source: Iso-New England: New England Power Grid 2020–2021 Profile



Photo Voltaic Systems OPTIONS

Sustainability Subcommittee Meeting

8 June 2021



Westwood Hanlon Elementary School - Rooftop PV layout Study

Not to Scale 2/9/2021

Power Purchasing Agreement (PPA) vs. Purchase

Purchase 500 kWh array = \$1M +/-

20-year loan = annual cost of \$55,000/year+/-

20-year savings: \$1.71M (\$85,000/year)

Net = \$30k/year, then \$85k/year after year 20

(assumes operation and maintenance costs, insurance, and system removal/recycling in 20 years)

CONSIDERATIONS

- Requires upfront capital
- All savings go to school district
- School District can sell panels at the end of the term

PPA 500 kWh array = \$0 upfront costs

20-year savings: \$1.13M (\$57,000/year)

*Assuming a fixed rate PPA of \$0.068/kWh, avoided utility cost of \$0.14/kWh.
Eversource commercial rate of \$0.14/kWh, rising 2% annually*

CONSIDERATIONS

- No upfront capital costs
- Savings go to the Developer along with tax credits
- School District pays a reduced electricity bill at fixed rate
- School District can buy panels at the end of the term

Assumptions:

- *Roof can support 500 kWh Array*
- *All numbers shown are approximate, ball park, preliminary numbers, based on a set of assumptions*
- *Savings noted are according to Solect Energy, Hopkinton, MA*