smma

Advisory Team - Sustainability & MEP Systems 7

Project Name:	Medford High School	Project Number:	25100
RE:	Advisory Team - Sustainability & MEP Systems	Meeting Date:	10/01/2026
Prepared by:	Brenda Lam, Martine Dion	Meeting Number:	07
Distribution:	Attendees		

Owner

- ☑ Libby Brown, *SBC Member, Architect at Goody Clancy*
- ☑ Suni Dillard, *Medford Resident, Sustainability Leader at HMFH Architects*
- ☑ Austin Ditz, *Medford Resident, Solar Project Manager*
- ☐ Audrey Feitor, *Medford High School Teacher*
- ☐ Jenny Graham, *Chair of SBC, Vice Chair of School Committee*
- ☐ Chris Hogan, *Medford Resident*
- ☑ Elisabeth Krautscheid, *Medford Resident, MassSave Decarbonization Program*
- ☑ Ken Lord, *MPS Chief Operating Officer*
- ☐ Sarah Michelman, *Medford Resident, Sustainable Design Consultant at The Green Engineer*
- ☐ Nicole Morell, *SBC Member*
- ☑ Jessica Parks, *Medford Resident, MIT Energy Efficiency Project Manager*
- ☐ Brenda Pike, *City of Medford Climate Policy Planner*
- ☐ Luke Preisner, *SBC Member*
- ☐ Chris Richard, *Medford Resident, Senior Project Superintendent at Turner*
- ☑ Paul Ruseau, *SBC & School Committee Member*
- ☐ Nathan Scott, *Medford Resident, Capital Construction at Tufts University*
- ☑ Sam Riley, *City of Medford Climate Policy Planner*
- ☑ Alicia Hunt, City of Medford Director of Planning & Sustainability

SMMA & Consultants

- ☑ Martine Dion, *Director of Sustainable Design*
- ☑ Brenda Lam, *Sustainable Design Project Coordinator*
- ☑ Helen Fantini, *Project Manager*
- ☑ Matt Rice, *Principal-in-Charge, Architect*
- ☐ Abigail Ransmeier, *Head of Research*
- ☐ Soala Ajienka, *Architectural Designer*
- ☐ Jamay Li, *Architectural Designer*
- ☐ Emily Ehlers, *Mechanical Engineer*
- ☐ Stella Drizin, *Electrical Engineer*
- ☑ Andy Oldeman, *Director of Engineering*
- ☐ James Job, *Plumbing & Fire Protection Engineer*, AKAL Engineering
- ☑ Rohan Kollu, AKAL Engineering
- ☐ Tommaso Bitossi, Transsolar

Leftfield

- ☐ Jen Carlson, *Project Director*
- ☐ Matt Gulino, *Project Manager*
- ☐ Adele Sands, *Educational Liaison*
- ☑ Linda Liporto, *Director*

Item No.	Action	Discussion
06.01	Record	**Meeting #7 Agenda** • Welcome & introductions • Vote to Recommending HVAC System • Preliminary Solar PV Assessment • Red List Free Materials • Embodied Carbon & Mass Timber • Water Efficiency & Stewardship • Next Steps
06.02	Record	**Vote to Recommend HVAC System** • Vote to recommend to SBC 100% full air-to-water heat pump system (AtWHP) as the preferred HVAC system for the school building. Complies with the all-electric pathway for the Specialized Opt-in Stretch Code. Works with the Phase 1 and 2 avoiding the need for temporary heating and cooling. • AtWHP System is most cost-effective overall and in the overall 50-year life cycle, reduction in total project cost (from PSR budget), equipment will be on roof which would avoid any geothermal bore wells on the deed-restricted land (that would trigger an Article 97 permitting process). Question: if pool is treated separately and not part of the building LCCA, would incorporating the pool show a cost benefit? The design team advised it would not impact AtWHP system because the pool hot water heating is separate from the main building heating and cooling system. The pool HVAC system will be the same as the school, AtWHP, while the pool hot water heating system will be selected through the pool LCCA (comparing a natural gas boilers' water heating system and an all-electric AtWHP with back up electric boilers. **Vote for 100% Air-to-Water Heat Pump for the building system (Option 3) (9 voted affirmatively).**
06.05	SMMA	**Preliminary Solar PV Analysis** • Visual examples (photos) of roof and parking structure Solar PV systems were provided, for low roof mounted and high canopy Solar PV roof systems, as well as parking space only canopy and long span parking Solar PV systems. • An early assessment of the Solar PV capacity was conducted, in partnership with the Solar PV consultant, Solar Design Associates, showing that the site and building facility may be able to provide enough area/capacity for a large Solar PV system that would get close to achieve a Net Zero Energy (NZE) Facility. The preliminary assessment demonstrated that a hybrid of low roof mounted/high canopy Solar PV system and parking space cover/longs span Solar PV parking canopies would be required to attain the NZE goal, with an estimated 50% NZE provided by the Solar PV roof system and 50% NZE by the Solar PV parking system. • The 100% Net Zero Energy Site Capacity would require a ~5.5-6.0 MWh System. • A site plan showing the potential PV over parking areas was presented noting the deed-restricted land where PV canopies cannot be installed. Site areas and associated PV parking capacities will be developed/updated as the design progresses. • A PPA (Power Purchase Agreement) would entail design, procurement, installation, maintenance, replacement, and utility coordination by a third-party: the PPA entity. PPA contract with large system may include a battery system. Financial benefits are that a PPA offers low to no upfront costs for the Owner, with the exception of Solar PV readiness at the roof and parking and electrical utility infrastructure. However, the PPA third-party owns and benefits from all energy production grants/incentives, peak load reductions etc. RECs rights may be negotiated in the contract. The building owner would benefit from a

reduction on the utility $/kWh (may be up to ~$0.05/kWh). For LEEDv4, the renewable energy credit requires the Owner to own the RECs and full commissioning of the PV systems (which have been challenging with PPAs in previous projects). [Note: City of Medford has benefitted a better PPA rate by letting the PPA own the RECs, while they purchased RECs separately, at a low cost (~$0.03/kWh) to obtain LEED points on LEED projects].

- A School/City Owned Solar PV system would entail that Medford would own the design, procurement, Installation, Maintenance, Replacement, infrastructure and coordination with utility company. It may also include a battery storage system to benefit from all State and Utility incentives relative to the battery peak management energy costs reductions. The Owner would receive the benefits including grants/incentives, peak load reductions, and renewable energy certificates (RECs). For LEEDv4, the renewable energy credit requires commissioning be included in the scope of the project to be able to claim all associated energy points.
- The design team has met with the Medford PPA/solar partner to discuss this project.
- The PSR estimate had 3 PV Options priced and this Advisory Team will recommend an option to the SBC on October 6, 2026:
    - PV1 - A Roof Solar PV System capacity is approximately 50% of usable roof area and produces approximately 2,991,000 kWh or 2.7 MW (2,749 kWdc) of total annual energy production and estimated total cost of $19,677,000. This represents an equivalent of close to 50% NZE. It is a higher costs than the PSR priced PV1 alternate (estimated at $3,274,000), which accounted for about 20% of NZE.
        - This option would benefit long-term with including all necessary additional PV readiness for 100% NZE in light of future PV/battery installations.
        - The lengthy utility coordination process for this project would need to be restarted and infrastructure likely redone/upgraded for any future PV/battery, if not included upfront for 100% NZE in this project.
    - PV2 - A Parking Solar PV System capacity is approximately 50% NZE and produces approximately 2,681,000 kWh or 2.2MW (2,180 kWdc) of total annual energy production and estimated total cost of $20,979,000. The PSR PV2 alternate (estimated $28, 792,000) accounted for the parking canopy structure only, assuming a 100% NZE PPA.
        - The majority of PPAs now pay for the parking canopy structure (this was adjusted and accounted for in the LCCA).
        - The upfront cost of ($4,319,000) includes the underground site components and conduits for site. This cost includes infrastructure to accept electrical equipment (space considerations).
    - PV 3 - The Roof and Parking Solar PV System would produce a total of 5,672,777 kWh and estimated cost of ~$40,656,000 for a 100% NZE, and the battery Storage/Micro-grid has an estimated cost of $4,900,000, for a total of $45,456,000. The PSR PV3 alternate (estimated $59,352,000) included a larger system, based on the 609,000 SF facility. Total Facility SF is not reduced to 570,000 SF
        - Most expensive option.
        - Maintenance and utility net metering management by Owner. [Owner mentioned they would need to hire a management company]
        - The payback is not financially beneficial, as it goes beyond the system end of life. PV3 does not recuperate the cost of install within it's life cycle. [Note: Yearly savings would bring cash flow savings. Some communities may calculate and apply to payback (to be done at the city level).]

- Baseline Scenario at PSR was PV1 scope purchased from PPA. All options would be added costs to the current estimate.
- This current cost information differs from the total costs in the PSR estimate for PV1, PV2 and PV3, as described above.
- The estimated costs of panel and structure are based on most recent high school projects.

Solar PV Discussion:

- Question: if the $4.3 M directly related to canopy project? Clarification response: The project has to bring conduits from the electric infrastructure to the parking lot and sizing of electrical rooms need to be part of the Owner's cost. The structure itself is the canopy ($20 M), which costs will be covered by the PPA. Attendee mentioned that that cost may also be negotiated with the PPA.
- Request to discuss the analysis and savings metrics (electricity rate and other data information obtained from the City of Medford), as well as assumptions on the electrical tariff under the PPA option.
    - The design team advised the current rate is $0.15/kWh (from discussion with Solect) vs. current blended rate -supply and demand)- of $0.22/kWh.
    - The PPA lower rate applies to the supply, not the demand (peak), so a blended rate is assumed at this time.
    - The design team to follow-up with the City of Medford for the utility rate (supply and all-in, demand charges).
    - The LCCA accounted for in 3% cost escalation.
- Question regarding a microgrid. The design team advised that the microgrid is the electronic brain of the PV system and battery storage to manage how much is given to the utility. PV3 currently includes micro-grid and battery storage system. PV2 (PPA) is a 20-yr. fixed rate $/kWh reduction from utility cost. Pending on financial incentives, the PPA will elect if a battery storage system will be installed. In the case they don't, battery storage readiness is recommended to allow future installations, when financial incentives present benefits.
- Question if what if the Solar PPA company goes "belly-up"? The City of Medford mentioned that this happened on another project (battery storage company). Medford representative mentioned that the PPA contracts include write-in in the case a company goes bankrupt or taken-over, and that lawyers will review solar contracts.
    - What is the goal of battery? They are perceived to bring significant peak demand charge savings (peak shaving), and incentives. However, they require daily energy management through a microgrid. The PPA's perspective are that battery incentives programs (state level) are currently 5-year programs, without a longer vision of incentives beyond those 5 years. PPA's are not committing to batteries for those reasons.
    - Structure and cost associated with PPA - a bigger electrical room is required for a bigger solar system. A bigger electrical room is a different cost than making a classroom bigger.
    - Parking Canopies: Carports: New construction is different from a renovation. It's best to plan and install all underground conduits/electrical prior vs. having to dig out after the fact a new parking surface.
- Comment that PV1 does not meet 100% Net Zero Energy (NZE) goals. PV3 is most expensive. Reminder is goal of net zero but be in mind of the minimizing long-term operating costs. PV2 is preferred option for those reasons.
- Comment about not wanting to the money for the PV system to be taken away from students and teachers instead of PV.
- Question Is PV an eligible reimbursable MSBA cost? PV system will not affect the MSBA reimbursement, nor will it get any additional reimbursement. MSBA does not participate in renewable energy systems.
- If pool needs gas for hot water (space heating would be Air-to-Water HP (same as building) - Does the PV1 (20% NZE) cover that? If so, it must be included in the cost. The understanding is that PPAs do not count for the Specialized Stretch Energy Code, i.e. it must be owned to meet code**.
    - The design team advised the MSBA is not looking at the pool for reimbursement. (building only for incentives)
    - The pool building is required to be Specialized Stretch code compliant. The size of the required Solar PV for the pool natural gas option is listed on the presentation slide, in the notes below the LCCA table [~ 24 kW PV system, well below the 2,749 kWdc potential capacity of the school building roof]
    - National Grid advised that the pool would be exempted, that would affect the incentives (still awaiting confirmation in writing).
    - **Note: DOER (Green Communities) confirmed that PPA are accepted as part of the Stretch Code requirement (reached out and confirmed following this meeting by City of Medford).
- PV2 (PPA) may likely include a combination of high-canopy and low-ballasted for the roof. PPA will look to optimize roof and parking areas. Design coordination will be key (and critical) for best project outcomes.
- Discussion:
    - Comment - PV1 + PV3 as an alternate (concerned about upfront and operating costs). This needs to be studied more. Building should not be an island. The city should figure this as a collective, concerned about tax payer dollars. Maximize roof area for the system (which would need to be priced). Not opposed to PV2 and understand it might be better from city perspective (should include SRECs).
    - Comment - environment for BESS is evolving and can be very different when school is built
    - Comment - PV2 (PPA) manages the Solar PV arrays for city, on other buildings as roofs are becoming ready for solar. Need to prep the building for 100% electric readiness (right sized infrastructure, rooms, and prepare National Grid).
        - Currently the PPA benefit from a lot of the incentives, including the tax credits (which is limited/reach maximum for the municipality). PPA also benefits from the current IRA (older projects as it sunsets in 2028). This may change by 2030.
        - Solar PPA companies can do the project cheaper than owning (solar PPA companies get savings from government that the city cannot get).
        - Would like to see the gym and pool roofs' structural analysis/capacity [Design team clarified that the roof will be upgrades for HVAC and snow loads, etc. and PV readiness will be included].
        - PPA is most likely way to get a good cost and work with the installer without commitment due to relationship with Solect and Power Options. Go for as much solar on site as we can. Buy Class 1 RECs upfront. (make sure that is in the cost).
        - Comment that it would be helpful to understand if the PV3 cost includes keeping the RECs or participating in the SMART program, and if any of the items include the cost of buying RECs on the market. The design team advised that based on $0.038/kWh, the cost of buying MA Class 1 RECs would be approximately $230,000-250,000 pending final estimated annual energy use of the new school.
    - Comment - PV2 meets school committee goals and reasonably costed, and gets more solar.
    - Recommendation for PV2, but confirm not going gas for pool or need to confirm PPA for Specialized Stretch Code [Note: see above PPA allowed per

		Green Communities email]. Maintenance perspective - it is one less thing to maintain over time. ○ Suggestion to uncouple the ownership with the NZE in the presentation table. • **Motion to include as much solar PV as possible through a PPA under the PV2 option, while including the cost of purchase of SRECs as part of the owner's project costs. (The Advisory Team voted unanimously, see individuals above.)** • Design team is to confirm with the Authority Having Jurisdiction if pool elects to go natural gas, is the solar-ready roof required to meet the Specialized Code included in the base costs [Note: The pool building is required to be Specialized Stretch code compliant. The size of the required Solar PV for the pool natural gas option is listed on the presentation slide, in the notes below the LCCA table [~ 24 kW PV system, well below the 2,749 kWdc potential capacity of the school building roof. DOER (Green Communities) confirmed that PPA are accepted as part of the Stretch Code requirement (reached out and confirmed following this meeting by City of Medford]
06.06	SMMA	**Healthy Materials** • Postponed to a future meeting
06.07	SMMA	**Water Stewardship** • Postponed to a future meeting
06.08	SMMA	**Embodied Carbon & Mass Timber** • Postponed to a future meeting
06.10	SMMA	**Next Steps** • SBC Meeting October 6th, 2026 - Advisory Team Recommendations: ○ Solar PV and Battery Storage System option recommendation: PV2 ○ All-Electric Heating/Cooling System preferred system option: AtWHP ○ Mass Timber Approach to Addition Structure [postponed] • Next Advisory Team meeting, November 10, 2026: ○ Continue presentation of topics from this meeting: Healthy Materials, Embodied Carbon/Mass Timber, Pool LCCA.