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To: Massachusetts Department of Energy Resources

From: Michael Intrieri

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Subject: APS Comments regarding Hybrid Solar

Solar Hybrid or Photovoltaic-Thermal (PV-T) technology is not directly mentioned in the guidelines. Will this be addressed under the miscellaneous guideline? Will each project need to be independently defined for APS participation?

Useful thermal energy is defined to include "cooling" in the standard. Will solar air conditioning will be eligible for APS credits when it is used to provide space cooling?

For reference please find attached a press release on a SunDrum Solar system that was recognized by the Association of Energy Engineers with their 2017 Innovative Energy project award. This system is participating in Washington DC's SREC program excluding energy used for pool heating.

Sincerely

Michael Intrieri
SunDrum Solar

ASSOCIATION OF ENERGY ENGINEERS (AEE) 2017 INNOVATIVE ENERGY PROJECT OF THE YEAR AWARD



ENSER - MORRIS HYBRID PHOTOVOLTAIC/SOLAR THERMAL HEAT PUMP (PV/T/ HP) SYSTEM

This hybrid PV/T HP project, designed and built by **Capital Sun Group**, maximizes roof-mounted solar energy collection utilizing a sandwiched dual collector system. The array combines high-performance **SunPower®** photovoltaic panels for generating electricity with **SunDrum® Solar** thermal panels mounted on their PV's rear surfaces to collect heat. The thermal component is a closed glycol loop acting as the source for a heat pump that amplifies the collected energy to heat the home, domestic hot water and pool/storage water. Summer cooling rejects waste heat to the night sky via the solar array. A closed loop circulates propylene glycol to the source side of a water-to-water heat pump whose load side heats the home via a water-to-air coil mounted above the legacy 92% efficient gas furnace retained as backup. Using three-way diverting valves, this load loop also delivers heat to the swimming pool, which is insulated in the winter months to store solar heat for nighttime use. Solar thermal energy collection is recorded on revenue grade Btu meters, allowing the client to participate in the Washington, DC Thermal SREC market. Further, solar power harvested is recorded on a revenue grade WattNode® meter for electricity SREC accounting. Cooling the home while heating the pool and domestic hot water, the system achieves a high TOTAL COP. Water heating gas consumption is minimal in the heating and cooling seasons. The fully instrumented monitoring system by **Net Zero Meter** provides real-time and historical summaries viewable online.

Since the system's commissioning in January 2016 to September 2017, the **Enser Morris Hybrid PV/T HP System** has provided 84.3% of the domestic water heating load, 86.1% of the space heating load, over 95% of the space cooling load, 100% of the pool heating load, and approximately 75.3% of the total electrical power consumed by the project. The clients are continuing to strive for a "**Net Zero Home**" by implementing further energy conservation measures (ECMs) to minimize their carbon footprint.

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