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Ms. Samantha Meserve
Deputy Director, Renewable and Alternative Energy Division
Massachusetts Department of Energy Resources
100 Cambridge St #1020
Boston, MA 02114

RE: Stakeholder comments on 2020 APS Minimum Standard Review

Dear Ms. Meserve,

In response to the DOER request for stakeholder input, the International District Energy Association (IDEA) would like to strongly encourage MA DOER to continue with inclusion of combined heat and power (CHP) as an eligible and qualified technology in the Alternative Energy Portfolio Standard (APS).

I am writing on behalf of the International District Energy Association (IDEA), a 501 c 6 non-profit industry association based in Westborough, MA and founded in 1909. With approximately 2,400 members worldwide, our member operating systems located in Massachusetts include Vicinity Energy (Boston and Cambridge), Engie North America (Longwood Medical Area Total Energy Plant), Harvard University, Northeastern University, Massachusetts Institute of Technology, University of Massachusetts Amherst, UMASS Medical School (Worcester), Tufts University, Williams College and numerous service providers, consulting firms and equipment suppliers.

This letter is offered as representing the opinions and position of the IDEA and is not intended to represent the specific views of any of our member organizations.

The APS program has been very important to successful deployment of CHP in the Commonwealth, particularly for our member systems who have integrated CHP with district energy thermal networks to achieve significant emissions reductions and energy efficiency gains while also strengthening energy reliability and economic resiliency.

As you likely know, Massachusetts and DOER were recognized nationally for vision and insight in establishing the Alternative Energy Portfolio Standard as part of the 2008 Green Communities Act. DOER understood that recovering thermal energy in CHP systems would be valuable and important in hundreds of locations across the state. In establishing the Alternative Energy Portfolio Standard to include Alternative Energy Certificates (AEC's) for CHP systems, the policy would recognize thermal energy as a valuable and useful resource to displace downstream emissions, rather than simply exhausting as a waste stream. Since then, other states have implemented similar CHP programs to help reduce carbon emissions through recovered thermal energy while adding much-needed resiliency to power supplies.

The role of CHP in the Massachusetts economy

As you know, Massachusetts is recognized and even envied globally as a "knowledge economy", underpinned in greater Boston by the "Meds and Eds" sector, including life sciences, healthcare, research, pharma manufacturing, and higher education. These organizations all rely heavily on uninterrupted delivery of reliable, resilient and sustainable electricity and thermal energy services. In the face of more extreme weather events and aging utility infrastructure, many have made specific investment in CHP as a key energy efficiency/reliability strategy and cornerstone of their climate action plans. Even as the New England electricity grid gets cleaner, CHP has served as a primary strategy to improve energy efficiency, reduce carbon emissions and achieve other environmental goals while positioning these assets for continuous modernization and timely transition to lower-carbon resources like renewable natural gas or even hydrogen as available.

In many of these settings, end users have concurrent electricity and thermal energy needs that are well-suited for CHP. By utilizing and recycling waste heat from power generation or the simultaneous production of useful heat and power, CHP coupled with district energy systems reduce regional carbon emissions while avoiding downstream combustion for heating and cooling space, producing domestic hot water, sterilization, humidification and process thermal energy.

Recognizing how many college/ university campuses and healthcare facilities are located in Massachusetts, MA DOER intentionally designed and created the Alternative Energy Credits to specifically stimulate and support investment in CHP. This was one of the original intents of the APS program, to stimulate investment in these types of systems, recognizing thermal energy as a valuable resource and use, deserving clarity and focus in state policy attention and not just addressing electricity. MA DOER specifically sought program levers to motivate action on CHP to drive potential for emissions reductions and additional benefits of enhanced resiliency at college and healthcare campuses. As 2021 nears, there are still many dozens of potential sites in the Commonwealth that have not yet deployed CHP.

AEC payments have been and continue to be vital to the economics of CHP/district energy/microgrids, enhancing discounted cash flow (DCF) for CHP project deployments and improving the ability to attract private capital to invest and finance these high efficiency, lower-carbon technologies. Eliminating or reducing the AEC provision for CHP at this time would be highly detrimental to this important sector of the Massachusetts economy, akin to throwing the baby out with the bathwater. This is even more important right now as the financial condition of many of these organizations have been severely impaired by the ongoing COVID-19 pandemic and economic downturn.

To reduce or eliminate the current incentives for gas-fired CHP systems would make it substantially harder to attract the type of private capital investment that municipalities, agencies and non-profit institutions in Massachusetts will need (in the form of public-private partnerships and other investment frameworks) to achieve institutional, local and statewide goals for lower-carbon, resilient energy infrastructure. While it's clear that the New England electricity grid is getting cleaner with integration of more renewables, CHP continues to provide net CO2 reductions at scale.

Moreover, the revenue stream that the APS program currently provides to CHP operators is crucial to maintain ongoing re-investment in infrastructure renewal and improvements, including enhanced digital controls, system optimization, energy storage and evaluating transition to future

fuels including renewable natural gas, bio-fuels and potentially hydrogen. It is precisely the aggregation of multiple customers in a thermal district energy system that creates the economies of scale to facilitate transition to future fuels. Thermal aggregation is likely to enable upstream injection of renewable natural gas or other lower-carbon options.

Comments on the Daymark Report assertions

As requested, we would like to share feedback on the Daymark Energy Advisors Report (Daymark) dated October 30, 2020, which specifically calls for additional stakeholder input.

> *We disagree with the assertion that natural gas CHP systems do not provide any emissions benefit (page 22 of Daymark)*

The actual experience of emissions reductions at IDEA member CHP systems stands in clear contrast to this assertion. It may be that the three CHP models in Daymark (small 100 kw; medium 633 kw; and large 3326 kw) are not representative of the scale or scope of IDEA member systems, which are sized for campuses, clusters and cities and not reflective of the residential or light commercial market.

In fact, IDEA member CHP systems have been specifically recognized by the US EPA with CHP Energy Star Awards because of achievements in reducing emissions, accomplished at scale:

- The CHP system at UMASS Medical School in Worcester was one of four 2016 EPA Energy Star CHP Award winners recognized for annual avoidance of more than 21,000 tons of CO_2. UMASS has since expanded their CHP capacity to support real estate growth on the campus.

- The Medical Area Total Energy Plant (MATEP) serving the Longwood healthcare district, was recognized by US EPA under prior ownership, for avoiding 117,500 tons of CO_2 annually, equivalent to the generation of electricity for 13,000 homes.

- Massachusetts Institute of Technology, an early adopter of CHP in 1995 and recipient of the US EPA CHP Energy Star Award in 2002 in recognition for cutting annual average CO_2 emissions by 68,000 tons per year, is currently commissioning a 44 MW CHP facility, doubling its installed capacity in 2021 to achieve "regulated pollutant emissions…25 percent lower than 2014 emissions levels, and greenhouse gas emissions… 10 percent lower."

- Currently owned by Vicinity Energy, the Kendall Station Green Steam CHP conversion in 2014 not only increased energy efficiency and reduced CO_2 emissions, it also diverted and reclaimed excess thermal energy from the Charles River to productive use for district heating customers in Boston. The APS program was pivotal to this investment, which supported $21 million in direct labor costs during construction.

- Harvard University continues to rely on district energy to reduce campus emissions, including investment in a new CHP/district energy facility to support more sustainable development for the future Allston campus expansion.

This is just a sample of CHP district energy systems in Massachusetts. Based on the CO2 reductions above, IDEA would urge MA DOER to **expand** AEC eligibility for large scale CHP, not eliminate it. These case examples above demonstrate that CHP at district energy scale can accelerate CO2

reductions, by aggregating dozens of thermal users at a primary central plant or plants. We would urge DOER to focus on this sector, district energy/CHP, to more carefully assess the economics of emissions reductions achieved at community scale.

There are many multiples of similar CHP district energy opportunities across the Commonwealth that will not be realized if CHP eligibility under the APS is discontinued. It will send a chilling market signal that MA no longer welcomes innovation at scale in the form of commercial/institutional CHP coupled with district energy to support this vital Eds and Meds sector and economic engine.

We think cutting CHP from the APS program would be a huge policy mistake at a time when the Commonwealth should specifically be aiming to **help** these quality employers **grow** their existing MA operations organically, to attract new like-minded businesses with similar mission-critical manufacturing facilities for whom assurance of energy supply is of paramount importance. A robust CHP APS program supporting mission-critical district energy microgrids, could be a useful economic development tool and differentiator to attract high-growth, high-value pharma, life science research and manufacturing facilities. To attract leading global organizations, energy supply must be clean, reliable and resilient. Savvy facilities executives also critically value electricity generation located on site or nearby, and not solely reliant on the commercial grid or remote generation located 75-100 miles away.

Emissions factors

We respectfully request MA DOER revisit the comparative calculations for CO_2 reduction for CHP cited by Daymark. Part of the problem may be limitations of modeling three CHP cases (small -100 Kw; medium – 632kw and large 3326 kw). We do not concur with the report's assertion that "there are no emissions benefits for CHP", which seems to rely on electric and natural gas emissions factors that are different from those used by Massachusetts utilities and prescribed by the Massachusetts Department of Environmental Protection. The Daymark report uses a natural gas emissions factor that overstates on-site combustion emissions, and an electric emissions factor that understates emissions from grid electricity, essentially tipping the scales against CHP. Both of these work to the detriment of CHP and do not describe its actual environmental benefit. We urge more scrutiny on this assertion.

Economic incentives

Daymark contends that state incentives and federal investment tax credits are sufficient for the CHP market. While Mass Save CHP funds are currently robust, the submittal and application process remains burdensome and requires significant professional assistance on the front end. The 10% investment tax credit (ITC) is at best, a marginal motivator, and is largely immaterial to public sector entities lacking income tax liability. Ten percent ITC by itself is insufficient to undertake structuring a tax equity partnership. Furthermore, to qualify for the Section 48 10% ITC for CHP, construction must commence by January 1, 2022, essentially imposing a sunset after next year. It is important the MA DOER consider the full range of conditions in the marketplace.

We do not concur with the Daymark statement that incentives are no longer needed for CHP systems. In reference to large CHP systems, the Daymark-cited cost figures seem to reflect equipment hardware costs only and do not include other fully-installed project costs for CHP systems which include engineering, permitting, construction management and labor, grid

interconnection and fuel supply costs, among others. Therefore, we believe Daymark's cost figures that argue incentives are sufficient as presented in the report are understated, potentially to a significant degree of 30-50%. We would urge DOER to canvass recent large-scale CHP projects in the Massachusetts labor market for more accurate cost profiles.

IDEA members have benefitted from the current APS incentives to overcome internal organizational hurdle rates, enabling them to make continued investments to further optimize their systems, decrease emissions, and prepare those systems for potential transition to future fuels that will become increasingly important over the next 5-15 years (renewable natural gas, hydrogen, and more). We believe that large-scale CHP will serve as an early-stage adopter of these future fuels and the aggregated thermal customer base will facilitate conversion investments due to scale and locational advantages. The incentives provided by the APS program will continue to play an important role for CHP system owners and operators, particularly for medical and higher education institutions in Massachusetts, many of whom have publicly pledged lower carbon futures.

Daymark notes their CHP models include potential for the unit to sell excess energy to the grid, providing additional revenue in the discounted cash flow. Current industry practice does not necessarily support nor indicate widespread utility re-purchasing of excess power. We would urge further consideration on this matter as it likely overstates CHP revenues.

IDEA supports further evaluation of opening APS participation to natural gas LDC's. While there is already significant utility consolidation present in the Massachusetts market, natural gas providers are currently experiencing social and political headwinds. Enabling their participation in the APS might create synergies and alignments that can expedite lower carbon solutions and avoid or diminish stranded costs.

As to AEC pricing volatility, we support the mechanism of price tiers on AEC credits based on annual efficiency factors, but would also urge establishing a price floor to provide stronger market assurance to investors and financiers. Further, it may be worthwhile to consider adoption of a market correction mechanism to regularly adjust to market supply and demand that scales obligated purchase requirement of AECs to their availability. With introduction of additional eligible technologies, the AEC market may be better served by some form of market correction mechanism, rather than pre-scheduled incremental annual increases. Additionally, a separate category or set aside for renewable thermal might better drive investor behavior. The original design intent of the AEC market was positive, but the evolution of the program now merits consideration of slight reforms.

CHP systems provide important ancillary services to the grid and local community

In addition to reducing regional carbon emissions, CHP systems increase energy efficiency, and provide enhanced resilience to organizations for which energy reliability is mission-critical (i.e. hospitals, medical centers, research universities, etc.). CHP systems provide a range of other highly-valuable economic and environmental benefits, including:

- Serving as primary local generation resources for microgrids, enabling islanding and long-duration energy services to provide business continuity for mission-critical end-users, especially during grid interruptions due to extreme weather events or infrastructure failures

- Providing local power generation resources closer to load centers, reducing the need for expensive transmission and distribution (T & D) upgrades
- Relieving grid congestion, peak demand and reducing distribution level line losses, especially during periods of peak demand or seasonal strain in extreme hot or cold weather
- CHP district energy systems often include thermal storage to offset diurnal peaks and displace grid demand
- Fast-ramping grid-tied generators can provide valuable balancing capacity to support greater penetration of intermittent renewable energy resources
- During extreme weather events, long duration fuel-supplied CHP district energy microgrids can provide community support for at-risk citizens and first responders with areas of refuge or heating/cooling centers, as shown during the events of Super Storm Sandy.

In summary, IDEA supports adjustments to the APS program to accelerate a cleaner energy system in Massachusetts, but we strongly believe CHP should continue to play a role in that future. The APS has been instrumental in supporting mission-critical CHP for vital segments of the Massachusetts economy, especially the keystone medical, research and higher education sector.

We appreciate the opportunity to provide this input and thank you in advance for your consideration of these comments. Please don't hesitate to contact me with any questions.

Sincerely,

Robert P. Thornton
President and CEO