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TTC Energy APS Stakeholder Response

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1. What are the benefits of the APS program to ratepayers, including but not limited to economic, environmental, and societal benefits?

Answering these questions with respect to modern wood heating, and more specifically to APS-compliant woodchip fuel, the greatest benefits are economic. This is a very low cost heating technology that, for thermal energy intensive businesses, such as farms, can greatly reduce the cost of operation.

Wood chip heating can deliver a return on capital equipment with little subsidy at all. Unfortunately, we're in an era of historically low fossil fuel costs that may be with us for another decade. The APS incentives are vital to delivering an attractive, simple payback that can incentivize a farmer or other business owner, to consider modern wood heating.

If the Daymark report had highlighted a modern wood chip boiler system, along with one fueled by pellets, the contrast in costs per BTU delivered would stand out. The low cost of woodchips would have dramatically changed the cost benefit and simple payback equation.

One of the societal benefits of the APS is felt in rural communities, where wood is the people's fuel. Cordwood is available, sourced locally, and without question the cheapest way to heat ones home. Unfortunately, wood stoves and outdoor boilers are far from clean burning.

Environmentally, our vision at TTCE is to enable wood to remain the people's fuel but without the smoky emissions. The goal is to switch out the outdoor cordwood boilers to clean-burning, APS compliant wood chip boilers.

2. What are the costs of the APS program to ratepayers, including but not limited to economic, environmental, and societal costs?

A price paid for low particulate emissions is reflected in the high cost for clean-burning woodchip boiler systems. Under the regulatory framework in the Commonwealth, where ratepayers pay for the cost of incentives, the cost of decarbonization is quite easily calculated. When decarbonization is the result, while complying with mandated low emissions, the value to rate payers is optimized.

3. Do you believe the APS program should prioritize technologies, which provide the most benefits, such as greatest greenhouse gas emissions reductions?

TTCE believes that DOER should prioritize according to greatest benefit, so long as best efforts are taken to quantify the benefits (apples to apples). Clearly, a renewable thermal technology that “does not burn anything” can appear to deliver the greatest greenhouse gas reduction, but it is very unlikely to be scalable.

A thermal renewable technology that emits greenhouse gases through combustion, can deliver impressive decarbonization statistics. First by achieving carbon neutrality by way of a fossil fuel offset. Second, trees grow back, re-sequestering the carbon emitted by combustion. Third, waste wood in the Commonwealth short cycles its embodied carbon back into the atmosphere via decomposition, without a fossil fuel offset.

When waste wood is burned instead, the trees in the forest that did not get cut continue to sequester carbon while the waste wood burned delivers the fossil fuel offset.

This form of wood heating should be a prioritized technology, based on the numbers, driven by practicality.

4. From 2015 through the present, what have been the average quarterly Alternative Energy Certificates (AEC) sale prices?

TTCE has only been in business since the fall of 2019. The AEC market collapsed just as we began selling dry chips to our customers. The average quarterly price since we began is probably around \$2.50.

At TTCE, we burn dry chips to make heat that dries the chips we deliver. We earn AECs proportional to the heat we generate during the drying process. The greatest cost of drying is the heat. The net cost of making heat with wood chips is

radically low when AEC's are selling in the \$18-\$20 range. It was on this assumption that TTCE forecast the cost of our production.

Today, with the incredibly low cost of commercial propane, TTCE would be financially better off drying our chips with fossil fuel. Ideally, the AEC market pricing would be indexed with fossil fuel prices. When fossil fuel costs are high AECs are relatively unimportant in the return on investment calculation. Cheap fossil fuel and almost worthless AECs, on the other hand, is killing modern wood heating.

5. Is the current APS minimum standard and the annual rate of increase adequate? Please include details and any data supporting why or why not, where possible.

The simple answer is no, and no. Behind this inadequacy is a very straightforward AEC market condition and that is one of over-supply: attributable to gas-fired CHP. The Daymark report is quite critical on this point, suggesting that GFCHP does not even belong in the APS.

At TTCE is aware that re-leveling the AEC Market can be done in ways other than kicking out GFCHP. Adjusting the minimum standard and rate of increase are a couple of the levers available to DOER.

6. Do you anticipate a growth or decline in the supply of AECs in the APS program over the next 5 years? 10 years? If so, how would you quantify this increase in growth rate? Please include details and any data supporting your conclusions.

The supply will continue to grow and the price for AECs will languish, even lower than at present unless something like a fractional multiplier for GFCHP is implemented.

Modern wood heating facilities deliver decarbonization through fossil fuel offsets, amplified by the nature and origin of the chips. At TTCE, 100% of our wood chip feedstock is waste/residual material, predestined to deliver its embodied carbon back into the atmosphere as a result of decomposition.

We believe this powerful, and scalable means of decarbonization deserves AEC multipliers, especially when avoided costs of waste wood disposal are part of the equation.

7. Are there modifications to the APS program that could be made to reduce the volatility of the APS market?

Yes, as noted above under question #6.

Many of DOER's levers to realign the AEC market are not easy to comprehend. However, the tool kit could include establishing a floor for AEC pricing. The advantage of this approach is that system owners will have an assured revenue stream to present to prospective lenders.

8. Has the APS incentive had an impact on the decision of system owners to invest in APS eligible technologies? Why or why not.

Absolutely! None of the commercial-scale wood chip boiler installations that TTCE now serves would have come into existence without APS incentives and Mass CEC rebates. The reason? Because, fossil fuel is cheap and a six-year simple payback on a wood chip boiler system is unachievable without incentives, and rebates.

9. How could the APS program be improved to better influence residential or commercial purchasing behaviors?

On the fuel side of the equation, AECs with a \$15 floor, along with chips derived from waste are all that would be needed to favorably influence purchasing behavior. That said, TTCE's product can deliver these AEC benefits only after a prospective boiler system owner is persuaded by the economics.

Rebates wield the most influence at this stage but this form of incentive does not reside in DOER's tool kit. If there could be a rebate equivalent, designed into the APS, DOER would hold all the influence over purchasing behavior.

10. Are there currently eligibility criteria in the APS program that you believe are a barrier to participation in the program? How would you address these barriers?

For those of us involved in wood chip heating, APS compliance is complicated, particularly on the fuel side. Compliant chips, ones that fulfill the eligibility criteria, and deliver AECs to the system owner. The APS confers most of the complication on fuel producers, supplier and distributors. The wood chip supply chain is not inherently complicated but the APS provenance and chain of custody requirements make it so.

The core business of supply chain participants is inevitably something other than making wood into wood chips. These businesses may be sawmills, logging contractors, tree service companies, large utilities, and land clearing companies. For these businesses, wood chips are a residual, of little value and considerable inconvenience to dispose of. The paperwork related to provenance, origin, and fuel reconciliation is a big barrier to program participation on behalf of the parties essential to the supply chain.

TTCE would address these barriers by urging DOER to treat chips, including forest-derived thinnings as residuals/waste wood. We would also urge that wood chip producers no longer be required to upload to the biomass registry.

Contrary to the claims of wood heating adversaries, nobody in the region cuts down forests to extract the value of the trees as heating fuel. The cost of cutting, skidding, and chipping the trees is close to the value of the chips when sold.

- Sawmills make their money sawing the trees big enough to be lumber, this generates a lot of residuals in the form of chipped slab wood, for which there is little market in the region.
- Urban and suburban street trees provide a variety of amenities to residents. Vegetative management of the urban forest is a cost borne by municipalities. Woodchips are a residual of street and residential tree maintenance. In the commonwealth, a million tons of these residuals are generated annually.
- Utility owned transmission right of ways also require such vegetative management resulting in many thousands of tons of wood chip residuals.

All the eligibility criteria imposed on those who generate residuals are the hoops to jump through for participants in the APS supply chain. All this to prove that their chip origins are not from forest liquidation cuts.

11. What revisions to the existing APS eligibility criteria would you propose to improve and simplify the APS program, if any?

See answer to question 10.

12. Is there any additional information you believe DOER should consider in its 2020 APS Minimum Standard Review?

TTCE greatly appreciates the opportunity to provide stakeholder input.

DOER might consider APS-supported technologies from the system owner's particular place-based perspective. Just as SMART seeks to incentivize the places where solar technology is to be developed (or not), the APS could do the same.

For example, adders could go to farms supporting local food and addressing food insecurity through year-round greenhouse growing with modern wood heating. Adders for heating affordable housing are another such example.

The Daymark study highlights various factors as they seek to determine the total necessary incentive (necessary to yield an NPV of zero in 5 years). With savings over fossil fuel driving NPV, the type and cost of fossil fuel at the specific system owner's location dramatically alters the total necessary incentive. Where fossil fuel is cheap, the necessary incentive increases.

Today, commercial propane pricing has reached a new bottom in terms of cost per delivered BTU. It is almost impossible to deliver a business case for renewable wood heating in this environment. Coming back again to farms that grow year round, the great majority are using propane, with wood chip heating a rather small minority. Perhaps this is a case for a higher subsidy in the form of AEC adders to deliver the necessary incentive.