



July 14th, 2021

RE: Comments from Dandelion Energy on the April Draft of the 2022-2024 Three Year Plan

Dear Mass EEAC Team,

Thank you for the opportunity to comment on the April Draft of the 2022-2024 Three Year Energy Efficiency Plan and share more information about the potential of geothermal energy in Massachusetts.

Dandelion is one of the leading residential geothermal companies in the United States. We provide high-efficiency, ground source heat pumps (GSHPs) and are on a mission to make geothermal heat pumps so inexpensive and easy to install that we enable a widespread shift from fossil heating to renewables. This shift is critically needed, as over 75% of the Commonwealth's residential buildings<sup>1</sup> are heated using fossil sources and 18% of Massachusetts GHG emissions come from heating and cooling in homes.<sup>2</sup>

Dandelion applauds Berkshire Gas, Cape Light Compact, Eversource, Liberty Utilities, National Grid and Unitil for adding standard, per-ton incentives for GSHPs to Mass Save in 2021. As a direct result of these incentives, Dandelion is actively evaluating expansion into Massachusetts.

However, the current incentive levels are not enough to drive a rapid market transformation away from dirty fossil fuels for heating and cooling in time to meet Massachusetts' newly adopted climate goals, which call for a 50% GHG reduction by 2030 and achieving net zero emissions by 2050. For example, National Grid's latest available 2022-2024 BC model estimates that incentives at the current level will drive fewer than 100 fuel oil and propane homes to install GSHPs over the next 3 years.<sup>3</sup>

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<sup>1</sup> US Census, American Community Survey, House Heating Fuel, 2018 Data, <https://data.census.gov/cedsci/table?q=B25040%3A%20HOUSE%20HEATING%20FUEL&g=0400000US25&tid=ACSDT1Y2018.B25040&hidePreview=true>

<sup>2</sup> 2018 data, Mass DEP, Appendix C: Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017, with Partial 2018 & 2019 Data, <https://www.mass.gov/lists/massdep-emissions-inventories#2>

<sup>3</sup> See National Grid's 2022-2024 BC Model Electric posted on the MA EEAC website: <https://ma-eeac.org/wp-content/uploads/2022-24-National-Grid-BC-Model-Electric-April.xlsb>

In these comments, we will respectfully make recommendations to accelerate the growth of GSHPs in Massachusetts and build upon the recent changes to heat pump incentives.

### **Summary Dandelion's recommendations:**

- **Increase the incentive to at least \$3,000 per cooling ton in line with comparable markets such as ConEd's territory in New York.** Historically, ConEd incentives have been 30% higher than current Mass Save incentives for customers installing a standard, 5 ton system. As of July 2nd, ConEd increased incentives to \$5,000 per 10,000 BTU/h of heating capacity, which is approximately 130% higher than current Mass Save incentives for a standard, 5 ton system.
- **Raise the incentive cap to ensure that up to 12 tons, or approx. 90% of homeowners are fully covered.** The current cap of \$15,000 means that only 7.5 tons are effectively covered.

### **Efficiency & Peak Reduction of Ground Source Heat Pumps**

As Dandelion has noted in previous comments, GSHPs are not only the single most efficient way to heat and cool buildings, they're the least expensive for homeowners on an ongoing basis. All of Dandelion's products exceed Energy Star Tier 3 requirements, which for closed-loop, water to water means they have an EER 17.1 and a COP of 3.6<sup>4</sup>. On average, a 2,500 SQFT oil home in Westchester, NY that is replaced with a Dandelion geothermal system for heating and central A/C eliminates 421,250 lbs of CO<sub>2</sub> in heating and cooling over the lifetime of the heat pump.<sup>5</sup>

Ground source heat pumps also offer significant grid benefits; they increase baseload demand, decrease AC peaks and don't meaningfully increase winter peaks. This is in contrast to technologies such as air source heat pumps, which provide electrification benefits, but also dramatically increase peak demand. A study by the Brattle Group found that fully electrifying New England using GSHPs would only minimally impact peak demand and leave energy prices unchanged, whereas switching to air source heat

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<sup>4</sup> ENERGY STAR® Program Requirements for Geothermal Heat Pumps, Version 3.1, [https://www.energystar.gov/sites/default/files/specs/private/Geothermal\\_Heat\\_Pumps\\_Program\\_Requirements%20v3.1.pdf](https://www.energystar.gov/sites/default/files/specs/private/Geothermal_Heat_Pumps_Program_Requirements%20v3.1.pdf)

<sup>5</sup> Dandelion Air Environmental Impact, <https://dandelionenergy.com/environmental-impact>

pumps would nearly double the peak and increase electricity prices by up to 20%.<sup>6</sup> An analysis conducted with NEGPA shows that even top-of-the-line Mitsubishi ductless mini splits increase peak usage by 80% versus GSHPs in Massachusetts.

### **Limited incentives in Massachusetts as compared to New York**

The current rebate amounts for geothermal heat pumps in Massachusetts under Mass Save are \$2,000 per cooling ton with a cap of \$15,000<sup>7</sup>. This gives the current incentive an effective cap of 7.5 tons. Incentives are also limited to two fuel types -- fuel oil and propane -- and provide no monetary incentive for gas customers or customers with inefficient electric heating systems.

From an incentive design perspective, Westchester, New York bears a lot of similarities to Massachusetts: electricity rates are very close to those in Boston, Cambridge, and Springfield<sup>8</sup>, carbon is valued based on the federal social cost of carbon<sup>9</sup> just like in Massachusetts, and EUL for GSHPs under the TRM is 25 years<sup>10</sup>, which is 5 years less than the 30 year expected lifetime currently being used in Massachusetts.<sup>11</sup>

Yet in Westchester, ConEd has offered a \$2,850 incentive per 10,000 BTU/h of heating capacity to all homeowners who switch to geothermal heating since New York's "Clean Heat" program began. As of July 2nd, 2021, ConEd increased this incentive to \$5,000 per 10,000 BTU/h of heating capacity<sup>12</sup>.

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<sup>6</sup> The Brattle Group, Heating Sector Transformation in Rhode Island: Pathways to Decarbonization by 2050, Pages 30-31, <https://www.brattle.com/reports/heating-sector-transformation-in-rhode-island>

<sup>7</sup> Electric Heating and Cooling Equipment Rebates, Mass Save, <https://www.masssave.com/saving/residential-rebates/electric-heating-and-cooling>

<sup>8</sup> Lincoln Electric System, NATIONAL ELECTRIC RATE STUDY 2020, <https://www.les.com/sites/default/files/rate-survey.pdf>

<sup>9</sup> DEC Announces Finalization of 'Value of Carbon' Guidance, 12/30/20, <https://www.dec.ny.gov/press/122070.html>

<sup>10</sup> See NY TRM Version 8, Appendix P: [https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/72c23decff52920a85257f1100671bdd/\\$FILE/NYS%20TRM%20V8.pdf](https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/72c23decff52920a85257f1100671bdd/$FILE/NYS%20TRM%20V8.pdf)

<sup>11</sup> DNV, Ground Source Heat Pump eTRM Measure Review, [https://ma-eeac.org/wp-content/uploads/MA20C15-B-GSHP\\_GroundSourceHeatPump\\_final.pdf](https://ma-eeac.org/wp-content/uploads/MA20C15-B-GSHP_GroundSourceHeatPump_final.pdf)

<sup>12</sup> Because the cooling capacity of GSHP units is typically about 20% greater than their heating capacity, the dollar amounts awarded per 12,000 BTU/h of cooling capacity (MA metric) versus 10,000 BTU/h of heating capacity (NY metric) tends to be similar. Put differently, \$2,000 per 12,000 BTU/h of cooling capacity (MA) yields similar incentive payments to \$2,000 per 10,000 BTU/h of heating capacity (NY).

For comparison, ConEd incentives at \$2,850 per 10,000 BTU/h are 30% higher than in Massachusetts for customers installing a standard, 5 ton unit. With the new \$5,000 per 10,000 BTU/h offer, incentives will be 130% higher than in Massachusetts.

This incentive applies across all fuel types and for both home retrofits and new construction projects. The limit for prescriptive incentives is also 300,000 BTU/h, or 25 tons and incentives for custom projects beyond 25 tons have a pathway to approval.<sup>13</sup>

With the \$2,850/ton incentive, an average customer in ConEd territory spends \$20,000 out of pocket for a new geothermal system after utility and federal incentives, or nothing up front and \$140 per month if they choose to finance their system. More than half of Dandelion's customers today choose to finance their system because they typically see savings on day 1.

While Dandelion installs geothermal systems in homes of all sizes, our ideal customer has a 1500-3000 SQFT home currently heated by fuel oil or propane, which we can easily and cost-effectively convert to geothermal using a single 4 or 5 ton heat pump system. The ability to offer no money down and savings on day 1 has played a critical role in increasing the adoption of geothermal with this customer segment.

Under this model, geothermal installations in ConEd territory went from single digits per year to more than 200 heat pumps sold by Dandelion alone since January 2020. We expect this number to increase dramatically as Dandelion and other contractors expand their footprint and respond to the newly announced \$5,000/ton incentives.

### **Improving incentive design to increase GSHP adoption**

Massachusetts stands out as a market with exceptional potential for GSHPs to replace inefficient, expensive, and dirty heating systems. The current \$2,000/ton incentives for GSHPs provide a good start, but comparable markets such as Westchester, New York show that higher incentives are justified and cost-effective. Moreover, as demonstrated by the current utility BC models, the existing incentives are not high enough to encourage the meaningful transition from fossil sources to GSHPs for residential heating and cooling, particularly for the middle class homeowners targeted by

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<sup>13</sup> See ConEd's website, "Submit Heat Pump Projects and Custom Incentives":  
<https://www.coned.com/en/save-money/rebates-incentives-tax-credits/rebates-incentives-tax-credits-for-commercial-industrial-buildings-customers/electric-heating-and-cooling-technology-for-commercial-industrial-buildings/submit-heat-pump-projects-and-custom-solutions>

Dandelion. Put simply, Massachusetts can and should do more to maintain its climate leadership and hit its GHG reduction targets.

As you finalize the incentive amounts for GSHPs for the 2022-2024 Three Year Energy Efficiency Plans, Dandelion would like to respectfully encourage the EEAC to evaluate the following changes:

- **Increase the per-ton incentive to at least \$3,000 per ton in line with comparable markets such as ConEd's territory in New York.**
- **Raise the incentive cap to ensure that up to 12 tons, or approx. 90% of homeowners are fully covered.**

As always, Dandelion thanks the EEAC for allowing us to provide comments on this planning process and for evaluating opportunities to improve incentives for GSHPs in Massachusetts.

Sincerely,



Kathy Hannun

President and Co-Founder

Dandelion

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