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Testimony of Arjun Makhijani in support of HB 1007, Renewable Energy Portfolio Standard and
Geothermal Heating and Cooling Systems
Before the Economic Matters Committee, February 25, 2021

Chairman Davis and members of the Committee, I appreciate your allowing my testimony to be read to you rather than presenting it myself. I am Chair of Energy Advocates, a Maryland coalition that works for energy affordability and access for low- and moderate income families in Maryland as well as for renewable energy and efficiency. I am also president of the Institute for Energy and Environmental Research in Takoma Park, Maryland.

I am in strong support of HB 1007, which would create specific targets for geothermal heating and cooling systems and improve the incentives for them as part of the state's Renewable Portfolio Standard (RPS). A widespread transition to efficient electrification of heating is essential if Maryland is to achieve its greenhouse gas reduction goals. Geothermal heating and cooling is by far the most efficient of the commercial technologies available to us. Setting targets for geothermal technology is a much needed step for Maryland.

I am also in support of this bill for other important reasons. It is a bill to promote renewable energy that has strong equity provisions. The allocation of 100% of the compliance payments to the Strategic Energy Investment Fund to increase affordability of geothermal heat pumps for low- and moderate-income families is a critical consideration for Energy Advocates. Similarly, the provision that 25% of the geothermal RECs must come from systems installed in low- and moderate-income housing from hospitals and schools serving mainly serving low- and moderate-income people is exemplary. When natural gas heating is replaced by geothermal heat pumps, the burden of local pollution will decline. And CO₂ emissions for these heating systems will be reduced and eventually eliminated as we progress to a carbon-free grid.

The labor provisions of the bill support the equity provisions. Putting geothermal heat pump installations in low-income neighborhoods with well-paid jobs will open up new opportunities for the families in those neighborhoods. In this regard we especially appreciate and support the apprenticeship provision of HB 1007.

The question about the possible transfer of costs to non-participants is an important one. While I have not done the economic modelling, there are very strong electrical engineering considerations that point in the direction of minimal impact, if any.

Geothermal heat pumps would, in the vast majority of cases, replace existing central air conditioning systems. These are the very systems that cause higher electricity costs and drive much higher transmission and distribution losses at the time of high air conditioning loads. On the hottest days, these losses can be two times or more higher than the annual average. The peak loads in the summer also drive the need for added investment in generation to serve them. Generators serving these loads, like gas turbines, typically run for a small fraction of the year, imposing significant cost on the system. Based on approximate calculations of my own geothermal heat pump, each typical residential geothermal would reduce peak load by roughly 2 kilowatts. The avoided investment, when capacity is needed, would be about \$2,000 since it costs \$1,000 to build a kilowatt of gas turbine capacity. All ratepayers pay when capacity needs to be added. Thus, the reduced peak demand would save all ratepayers a significant amount of money by delaying or avoiding the need for investments in peaking generation for which all ratepayers.

Geothermal heat pumps will also save non-participating consumers money in the winter. Since Maryland's demand peaks in the summer, the distribution systems are not fully utilized in the winter. But the vast majority of the costs of the distribution system are fixed in the substantial investment and fixed maintenance they need. Thus, the costs of the distribution system are spread over a relatively small number of kilowatt-hours of electricity, raising the cost of each. Geothermal heat pumps would in many or most cases be replacing natural gas heating systems, increasing winter electricity use. Now the distribution system costs will be spread over a larger number of winter kilowatt-hours, making each one cheaper for all customers, whether or not they have geothermal heat pumps.

In sum, there will be significant cost savings for non-participants from both the summer and winter characteristics of geothermal heat pumps to offset cost increases reflected in utility compliance payments.

I urge a favorable report for HB 1007.

Thank you for your time. I would be happy to answer your questions.