Renewable Thermal Collaborative
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Clerks' Office
California Air Resources Board
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The Renewable Thermal Collaborative (RTC) appreciates the opportunity to comment on the California Air Resources Board's Draft 2022 Scoping Plan Update. The RTC appreciates the Air Resources Board's commitment to advancing California's climate ambitions and public solicitation for comments throughout the process.

About the Renewable Thermal Collaborative (RTC)

The RTC serves as the leading coalition for organizations that are committed to scaling up renewable heating and cooling at their facilities and dramatically cutting carbon emissions.[1] RTC members are industrial and commercial thermal energy users with ambitious emissions reductions targets who recognize the urgent need to meet the growing demand for renewable heating and cooling in a manner that delivers sustainable, cost-competitive options at scale. RTC sponsors are renewable thermal solutions providers, including technology developers, consultants, and project financiers. California-based RTC members and sponsors include the University of California System, Kaiser Permanente, Rondo Energy, Antora Energy, Heliogen, Skyven Technologies, and SoCalGas.

Renewable thermal energy describes energy used for process-, water-, and space-heating and cooling applications that is derived from a sustainable renewable or waste-derived source, including biomass, biogas (including landfill gas), renewable natural gas (RNG or biomethane), geothermal, beneficial electrification, green hydrogen, solar thermal, and thermal storage.

2022 Scoping Plan Update

The RTC applauds California's continued commitment to emissions reductions across all sectors. We agree that electrification, biogas and biomethane, green hydrogen, and solar thermal technologies all offer opportunities to decarbonize the industrial and buildings sectors. In addition to these technologies,

[1] The Renewable Thermal Collaborative was founded in 2017 and is facilitated by the Center for Climate and Energy Solutions, David Gardiner and Associates, and World Wildlife Fund.

thermal storage can also achieve emissions reductions while taking advantage of low-cost renewable electricity generation, especially generation that might otherwise be curtailed.

We agree that electrification and solar thermal are well-suited to decarbonizing industrial processes that require relatively low temperatures, and it is important to note that these technologies can also support higher temperature needs. In addition, renewable thermal technologies that leverage renewable electricity are also available for higher temperature applications.

Various thermal storage applications are ready for piloting and demonstration at large scale. For example, an emerging class of technologies sometimes referred to as Electrified Thermal Energy Storage can capture intermittent electricity from on-grid and off-grid renewable sources of energy for highly efficient conversion into continuous heat that can be used directly or stored for later use for durations beyond ten hours. While the precise mechanisms vary, these technologies often deploy insulated storage containers directly at the point of end use that contain commonly available solid materials such as minerals, alloys, and ceramics that rapidly conduct heat through electrical resistance.

Unlike some earlier technologies, such as waste heat and pumped thermal storage projects, Electrified Thermal Energy Storage technologies show potential to reach even high temperature ranges (over 1,100 degrees Celsius) demanded by the most emissions-intensive industrial sectors, such as iron and steel, cement, and chemicals, making these technologies a potential drop-in replacement for fossil fuels. They also show versatility in meeting the various end-use needs, from direct heat to steam and heat transfer fluids. Modularity is of critical importance in meeting the manufacturing and buildings sectors' different temperature and production process needs.

These forms of thermal storage are likely to become both increasingly effective and vital, providing grid stability and arbitrage functions as renewable electricity expands and disparities between peak and off-peak power market values grow. Importantly, various thermal storage applications do not add to peak load on the grid, which is likely to prove advantageous as other sectors increasingly electrify and contribute to higher peak demands. Some markets with large renewable electricity capacity deployments generated by non-dispatchable resources and other sources with low marginal costs have multiple hours of curtailed output. Thermal storage can consume otherwise wasted electricity in these markets, making it cost-effective and creating an opportunity for emissions reductions. As renewable electricity capacity expands, so too does the potential for emissions reductions from thermal storage.

As many renewable thermal storage technologies do not rely on critical minerals, they are less reliant on foreign supply chains and can grow domestic manufacturing, often with lower overall manufacturing costs relative to some leading battery technologies. Investments in pilot and demonstration projects are crucial to helping these technologies scale in the marketplace.

We welcome the opportunity to offer further information on renewable thermal technologies and how thermal energy users are exploring their thermal decarbonization options. Thank you for your consideration.

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Sincerely,

Blaine Collison
Executive Director, Renewable Thermal Collaborative (RTC)