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Residential thermal energy storage for renewable energy resources integration

Project location: CanmetENERGY Ottawa, Ottawa, ON

Timeline: 3 years (2020 to 2023)

Program: Built Environment and Renewable Energy

Project description

Our team is developing data, information, and design and analysis tools to assess the potential for large-scale integration of residential thermal energy storage (RTES) to the electric grid, in various electricity jurisdictions in Canada. The main goal is to characterize the power-to-heat RTES potential and limits, in an effort to further decarbonize the Canadian electrical grid by integrating more renewables in the electrical grid that can be facilitated by RTES technologies deployment (through the electrification of residential heating loads). For the next three years, our team is working on three main activities:

Task 1: Conduct a case study on RTES deployment in eastern Canada.

Data, information, and design and analysis tools being developed as part of Tasks 2 and 3 will allow to estimate the impacts of RTES deployment in the residential sector, to increase the capacity of eastern Canadian provinces' grids to adopt a higher penetration of renewable energy resources, such as wind and or solar power generation.

Task 2: Thermal energy storage (TES) materials development.

In collaboration with Canadian universities and the mining and chemical industry, we seek to develop low-cost, novel, composite high-storage density TES materials at CanmetENERGY Ottawa's Thermal Storage Materials Laboratory (TSML).

CanmetENERGY Ottawa's Thermal Storage Materials Laboratory (TSML) →



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Task 3: RTES systems performance characterization.

We are reviewing existing, adapting and or developing standard test methods for RTES system performance characterisation, in consultation with the RTES industry and other stakeholders.

We will then adapt CanmetENERGY Ottawa's existing HVAC and solar systems test facilities using the consensus RTES dynamic performance standard test methods. The resulting data will allow us to validate dynamic energy systems analysis tools, to be used in Task 1.

Throughout the course of the project, we are collaborating with a number of internal and external stakeholders, including Steffes, Neothermal, QSBR Inc, Stash Energy, University of Ottawa, Carleton University, ZMM Canada Minerals Corp, SECURE Energy, and others.

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Contact CanmetENERGY in Ottawa



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