SUSTAINABLE ENERGY SYSTEMS PORTFOLIO (SESP)

THE PROBLEM

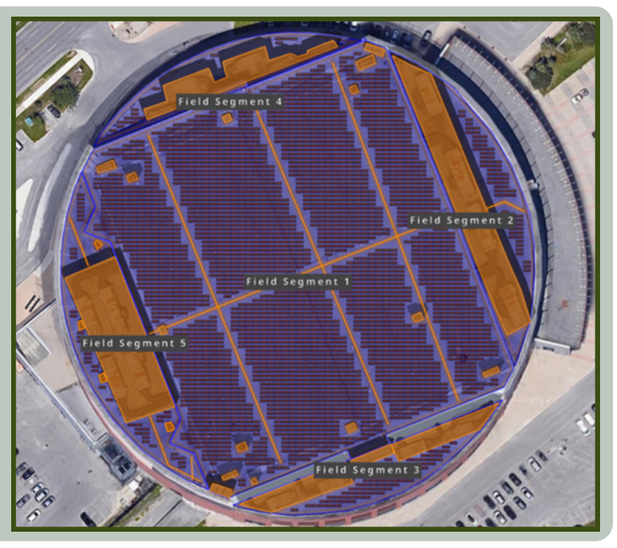
Currently 8.5% of all of Ottawa's CO2 emissions are due to power generation. Most of these emissions come from the energy imported.

THE SOLUTION

The proposed solution is a totally localized power grid that incorporates **Wind**, **Solar**, **Nuclear**, **Sustainable Buildings**, and **Energy Storage** to provide net-zero energy generation for the city of Ottawa by 2050.

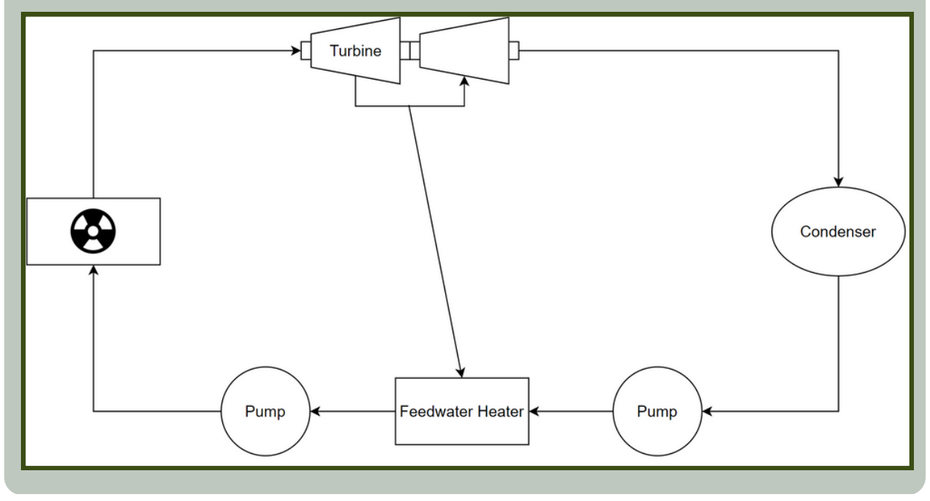
SOLAR TEAM

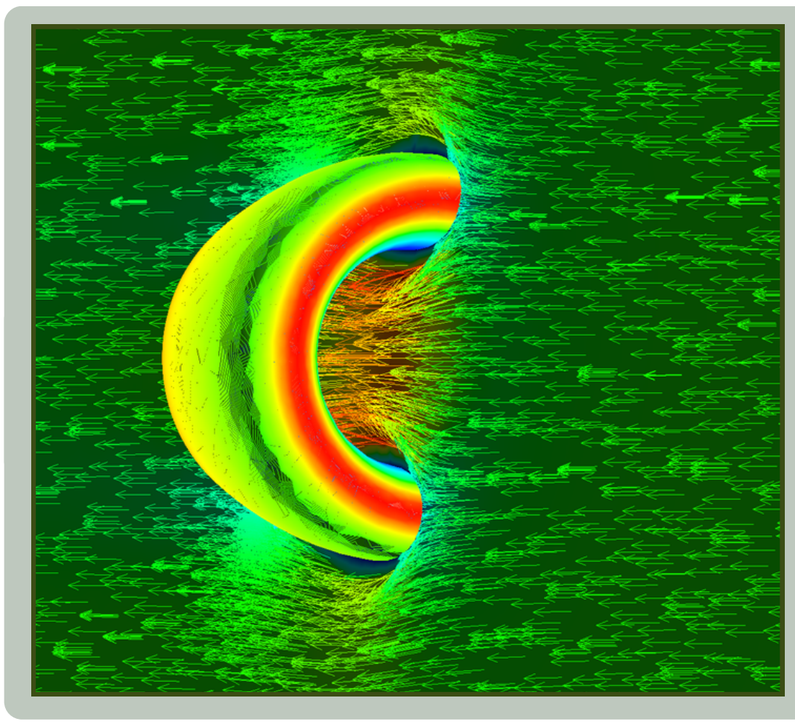
Solar team is responsible for designing novel implementations of photovoltaic solar panels throughout Ottawa. This includes rooftops, parking lots, and farmland!



NUCLEAR TEAM

The Nuclear team is developing a novel implementation of the Small Modular Reactor (SMR) - a small scale nuclear reactor that can be deployed in urban areas where traditional reactors would not fit.

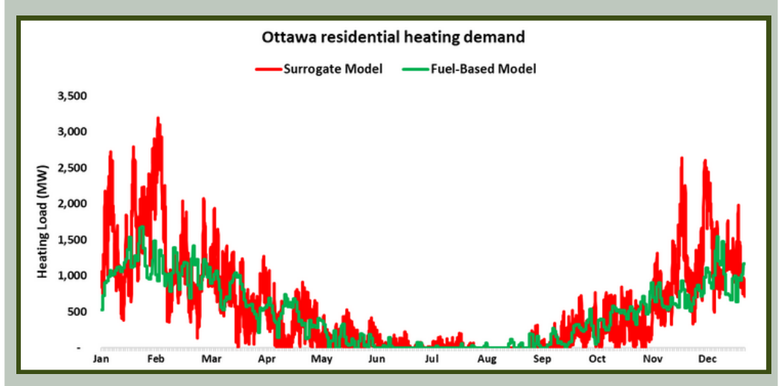




WIND TEAM

The Wind team is developing a Buoyant Airborne Turbine (BAT) and implementing it into the city as an alternative wind generation method.

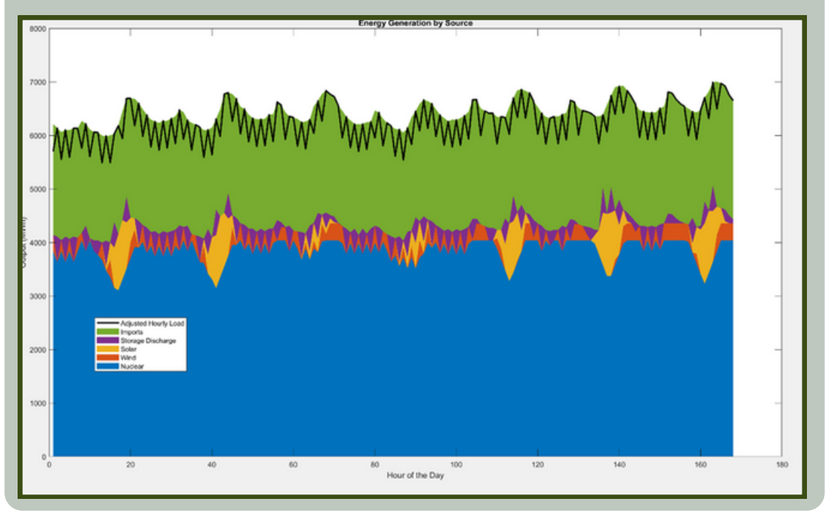
BUILDINGS TEAM



While other sub-teams are focused on generating enough energy, the Buildings team is focused on reducing heating loads, which will greatly reduce the CO2 emissions. They do this by improving the efficiency of homes across the city using electric based heating!

INTEGRATION

The Integration team takes all of the sub-team technologies, and uses a custom-built optimization model to determine the most cost effective deployment of the sub-team technologies. This model considers population, climate, and human factors like EV use and social carbon costs!



STORAGE TEAM

The Energy Storage Team is designing a Hybrid Energy Storage System comprised of Lithium Ion and Flywheel Energy Storage Systems to reduce the curtailment of renewables and increase grid reliability!