
Creation of Multiple Effect Evaporator and Combined Cycle Modelica Modules, and Optimization of Potable Water Generation from Saltwater Sources

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ABSTRACT:

The goal of this research is to develop models of Multiple Effect Evaporators and Combined Cycle Gas Turbine systems for use in the Modelica framework. The models will be capable of being implemented into larger models of grid independent / near independent energy parks located about military bases, large manufacturing facilities, and in small communities where freshwater is limited. The end goal being to create an energy park that can supply its own energy and water through Small Modular Reactor nuclear systems and/or Combined Cycle Gas Turbine Systems with brackish to brine water sources (i.e., groundwater or ocean water).

The models will link in the need for water for the generation of power to supply evaporative condensers in the Rankine cycle, as well as water needed by the community for domestic and specified industrial uses. The use of multiple effect evaporators, supplied with extraction steam from a Rankine cycle or from the Heat Recovery Steam Generator of a combined cycle plant, will be modeled and compared to the option of simply using a Reverse Osmosis system powered by the power cycles.