* Methods and Materials
  + How did you go about achieving your technical goal? What instruments, materials, applications, strategies, and/or equipment did you use? What methods, techniques, experiments, and/or procedures did you use? How did you choose among various methodological / product development / design alternatives and determine a configuration of methods and materials optimal for your project?
* Data Analysis
  + What’s the source of the data? How is raw data collected? What’s data quality?
  + What are some of the insights from exploratory data analysis? How is relevant data extracted? How is it integrated? What are the distributions? What metrics are you using to classify the data?

Methods and Materials

By bringing the information from the aforementioned papers and resources together, we are aiming to create a skeletal model of a hybrid nuclear power system that is able to load follow in accordance to a given energy demand. This model will give us unique insight into the effectiveness of the plant and estimate how quickly load following can be achieved and the cost effectiveness of such an endeavor. The first step to creating this model was to lay out a skeleton of our system by characterizing the aspects of our hybrid plant. While there are countless permutations to create a hybrid plant, we slowly honed in on the design we wanted by performing cost benefit analysis on each block of the plant.

This step by step selection process benefited from the fact that each selection put restrictions on other components. For example, we chose a supercritical rankine cycle which limited the options for the heat exchanger. In most components or systems, there doesn’t exist a best technology so a decision was made based on the aspects the team considered the most important. For example, passive safety and extensive documentation were the most important aspects for choosing a nuclear power system while economic benefits and potential for scaling were considered the most important aspects of our secondary process.

With this skeletal model set up, numbers and formulas can be combined to estimate the values that we actually care about. These equations come from a mix of fundamental thermodynamic laws and an experimentally identified expressions for the various components we chose. They are implemented into a code that iteratively solves for system values that ultimately satisfies all the equations and boundary conditions. These boundary conditions come from the temperature, mass flow rate, and pressure values given by Thorcon’s MSR at 100% energy production as shown in ***FIGURE***. Once the system’s temperature characteristics and energy output can be identified for any required electrical load (from 0 to 100%) by our MATLAB code, we will identify how much hydrogen we can produce. Incrementally, we will build upon our previous findings in our given system until the model is complete.

As a quick overview, the way our hybrid system works is that molten salt travels through the secondary system and then to the power generation system as shown in ***FIGURE***. Heat can be extracted to the hydrogen production system which means that the molten salt going to the the energy generation loop comes in at a lower temperature and thus the water comes out at a lower temperature. While the total heat extracted from the molten salt between the two systems stays constant, the efficiency of electricity generation decreases at lower steam temperatures. This means that putting 70% of the heat from the molten salt into the energy generation system will generate less than 70% of the total electricity generation potential. Using this information we can ident

Data Analysis

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