Manufacturing Cost Model Tool for Flow Battery Stacks

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Motivations

Reduce cost of grid-scale energy storage

1. Grid-scale electrical energy storage will only be adopted if they are cost effective
2. Materials and manufacturing costs individually exceed cost targets for the entirety of an installed system
3. Existing spreadsheet models contain limited manufacturing process flexibility, are typically point solutions with respect manufacturing, and are difficult to modify and easy to "break"

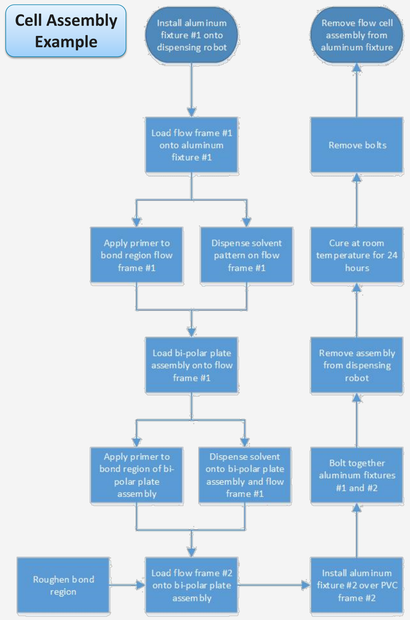
Objectives

Develop a user-friendly manufacturing cost model tool

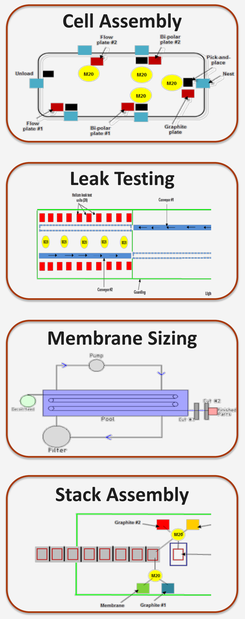
1. Create a tool for simulating manufacturing costs that is flexible for any domain (e.g. Flow battery, Li-ion, Fly wheel)
2. Identify processes where innovation would have greatest impact on cost reduction for large-scale production
3. Solve inverse problem to determine what the manufacturing costs would need to be to meet system level cost targets

Modeling Steps

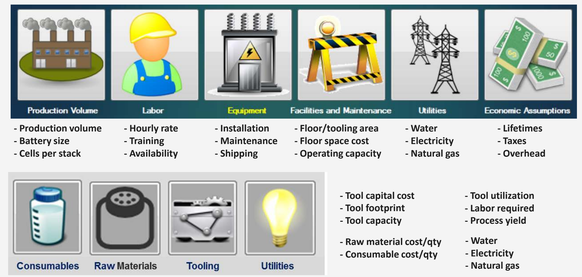
Step 1: Process Flows



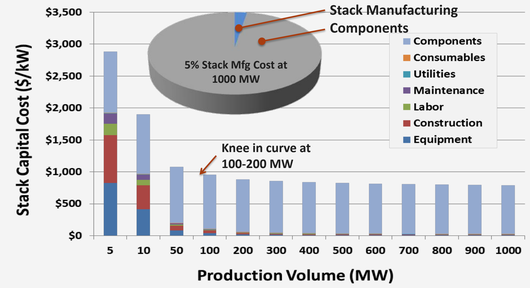
Step 2: Manufacturing Flows



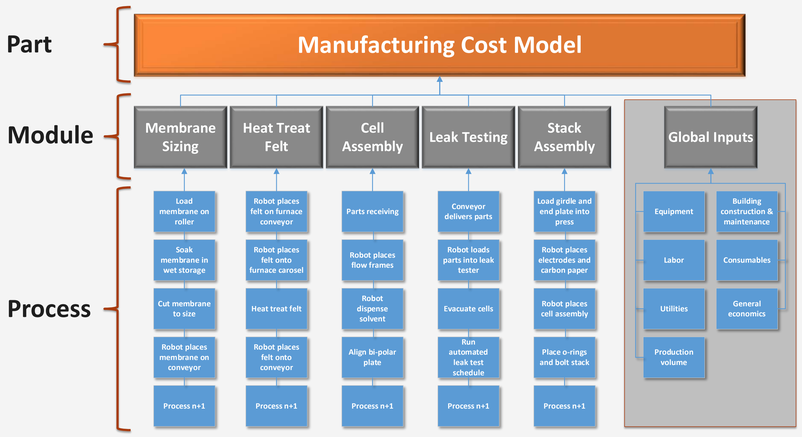
Step 3: Populate Cost Model



Step 4: Run Model

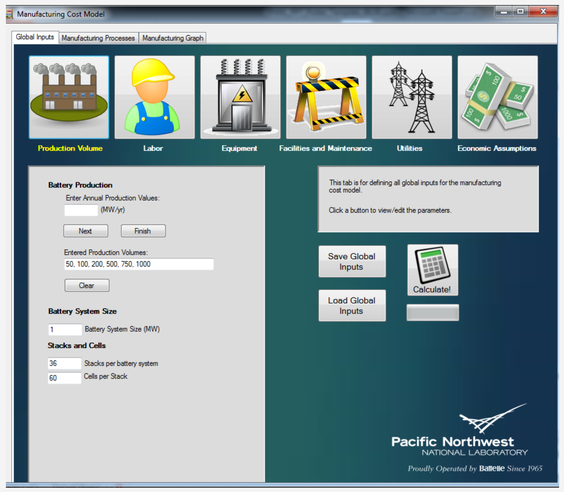


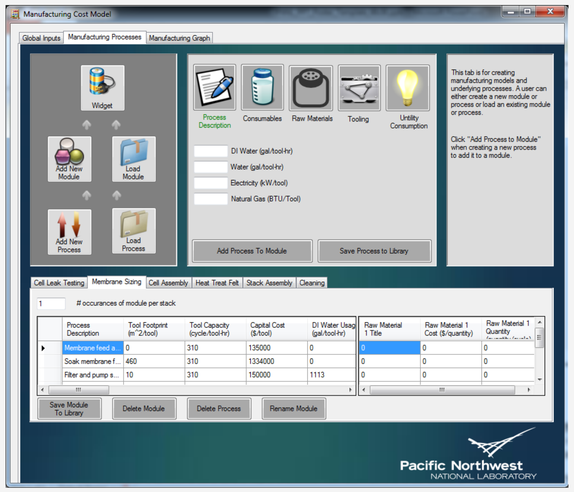
Model Architecture

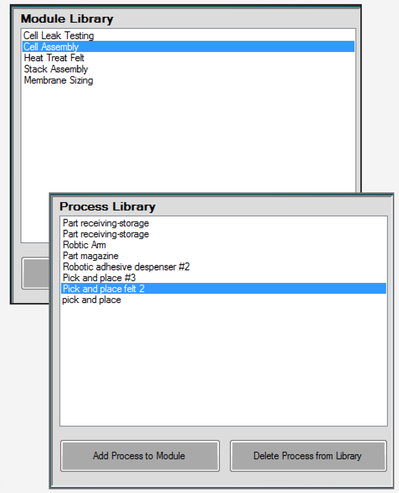


This figure contains example processes and modules to illustrate the conceptual architecture of the model. It is not a comprehensive listing of all modules and processes required to manufacture a flow battery stack.

Tool Developed in Visual C++







U.S. DEPARTMENT OF ENERGY
Electricity Delivery & Energy Reliability

We thank OREGON STATE UNIVERSITY and JR AUTOMATION for their excellent contributions to this work

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