

Fuel Cell Battery

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Background: Why Use PEM Fuel Cells

- Only water as by-product, zero pollutant emission. Fuel cells are more efficient; use less fuel and produce more energy.
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- Hydrogen can be produced by renewable energy.

Goal: Improve PEM Fuel Cell using different porous media materials

Requirements: this fuel cell should meet the requirements of The Department of Energy (DOE) 2020 targets for PEM (a cell potential of 0.8V while outputting a current density of 300mA/cm²).

Innovation: A porous media can improve the efficiency if the correct material is used.

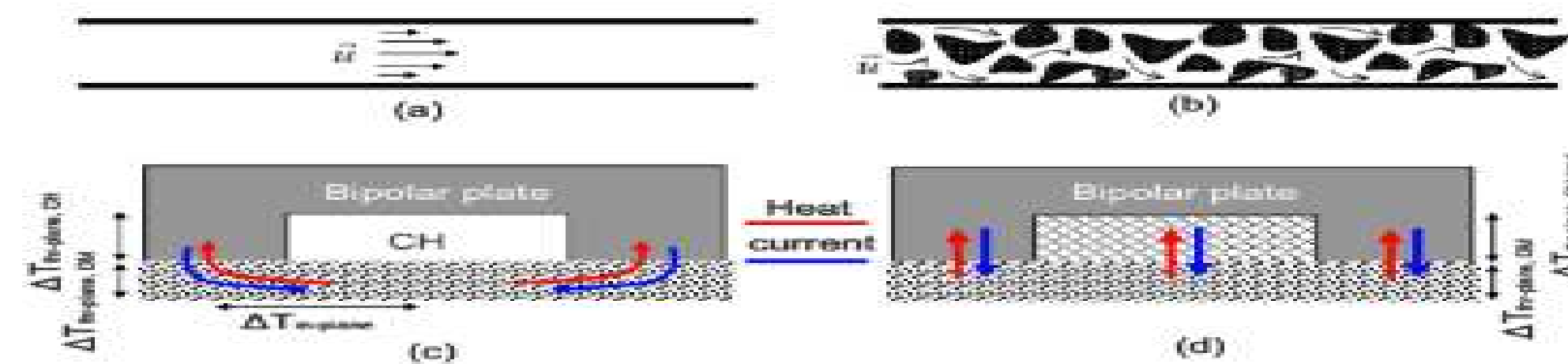
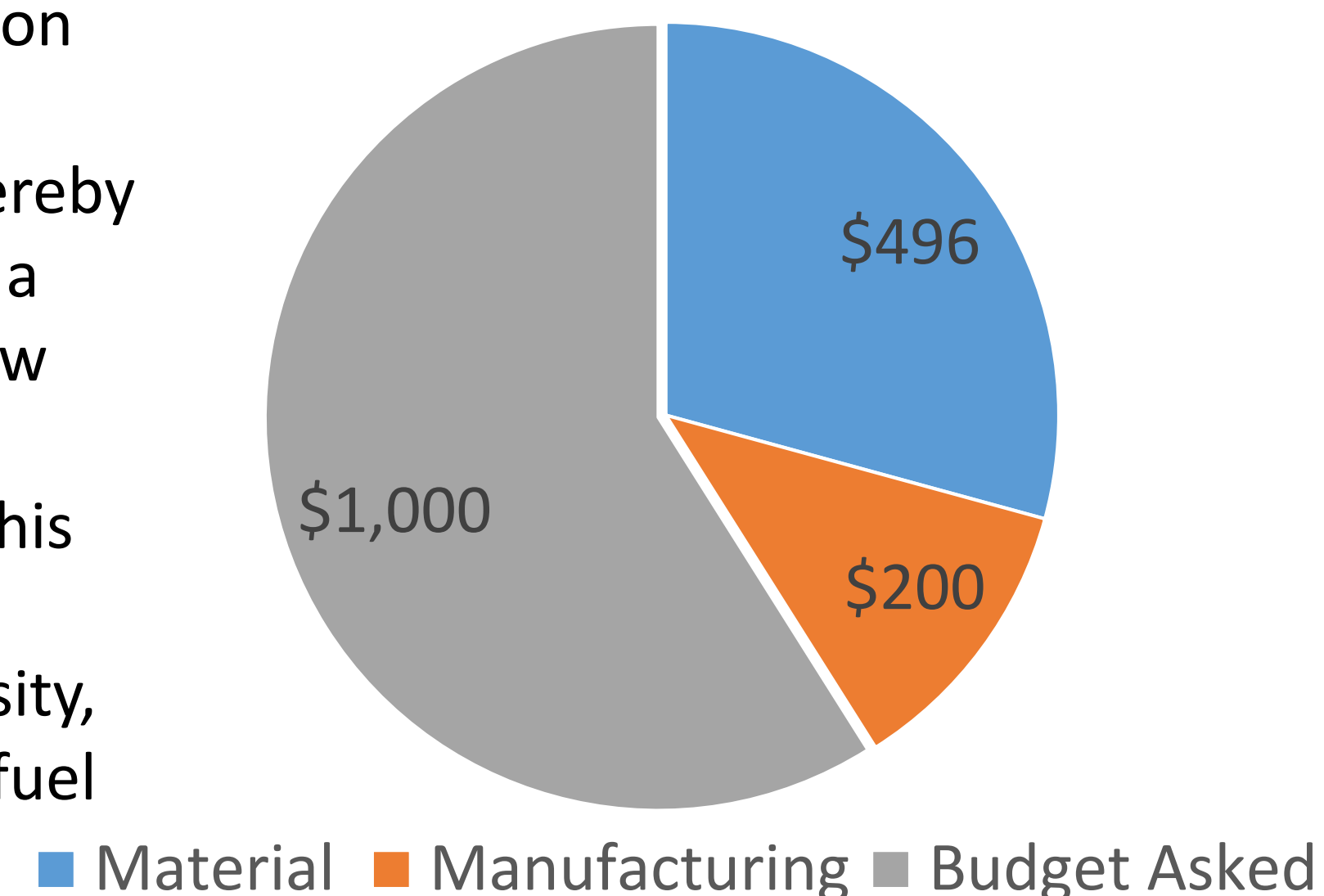


figure1. porous media apply (Wang, 2009)

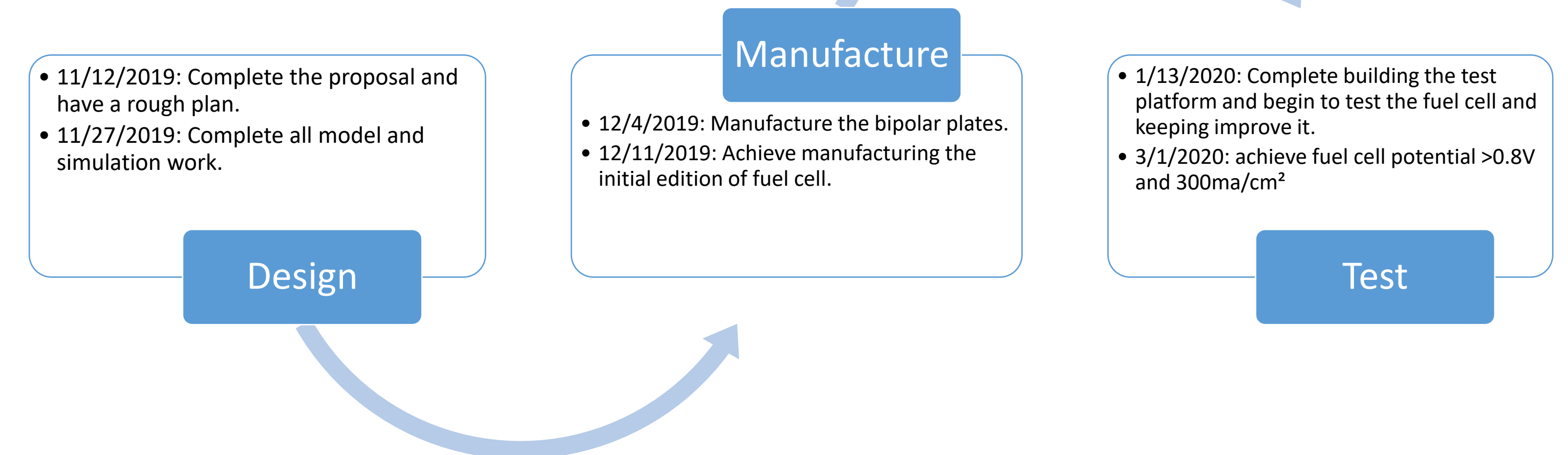
Bigger Picture: Proving that a porous media in the flow channel and choosing a cost-effective material. Through this promoting more renewable energy. The Team will do modeling, manufacturing, and testing in this project.

Project Introduction: In general, the flow field is grooved in bipolar plates featured by hollow channels with a cross-section dimension of ~1 mm. Using hollow channels increases the thermal resistance and electric resistance in the fuel cell, thereby reducing cell performance. In this project, we plan to design a proton-exchange membrane fuel cell using porous media flow field, which fills channel space by porous media. We will investigate fuel cell performance and flow conductance for this new flow field design. The porous media selection will be optimized, in terms of parameters including porosity, tortuosity, pore size, and mechanical properties, for high-performance fuel cells.

Budget Proposal

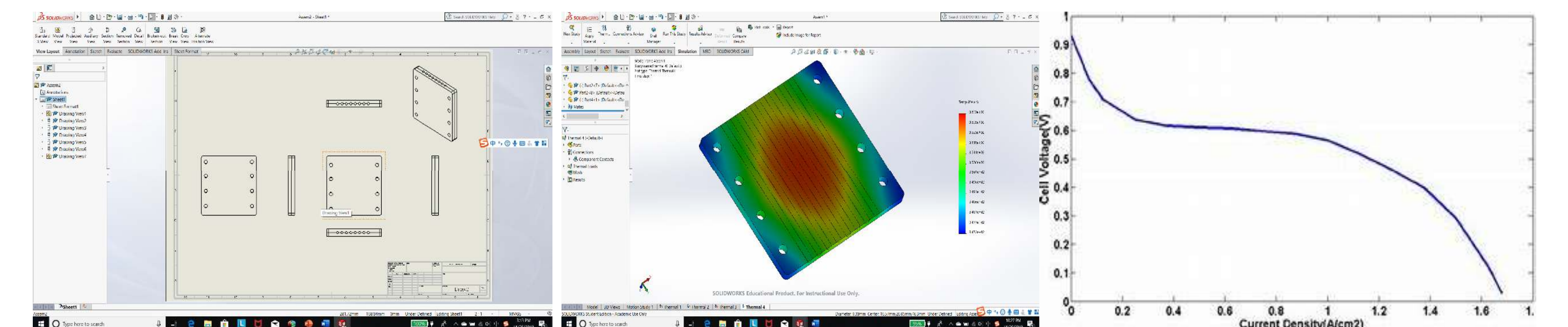


Timeline:



Current Progress:

1. Complete the design of flow field configuration.
2. Determine the way to apply the copper foam to the flow channels.
3. Optimized thermal management of bipolar fields.
4. Do the simulation of pressure on the bipolar plates.
5. Predict the polarization curve.



Future Task:

1. Realize our design and manufacture a porous media fuel cell.
2. Build a test platform, the platform should be able to test voltage, current and temperatura.
3. Test manufactured fuel cell and keep improving it.

Contact Us

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