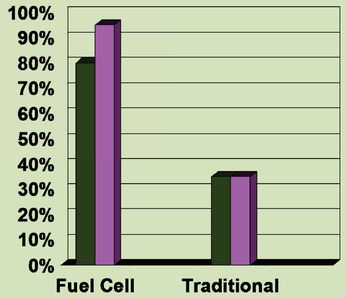
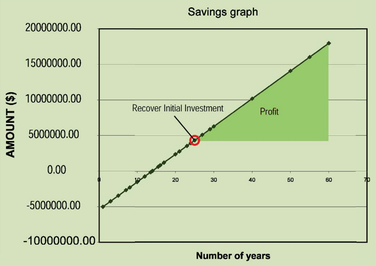
Fuel Cell/Geothermal Sustainable Energy: Software Solution

Considerations

- Take advantage of government subsidies and grants to lower initial costs.
- Offer commercial facilities: stores, restaurants, and offices to attract buyers. These will also use electricity more efficiently, increasing cost-effectiveness of the system.
- Provide facilities to charge hybrid electric vehicles at night, and other incentives to use electricity at off-peak hours.

Economics





- Initial Costs
  - ⇨Fuel Cell Cost: $5,300,000
  - ⇨Heat Recovery Costs: $120,000

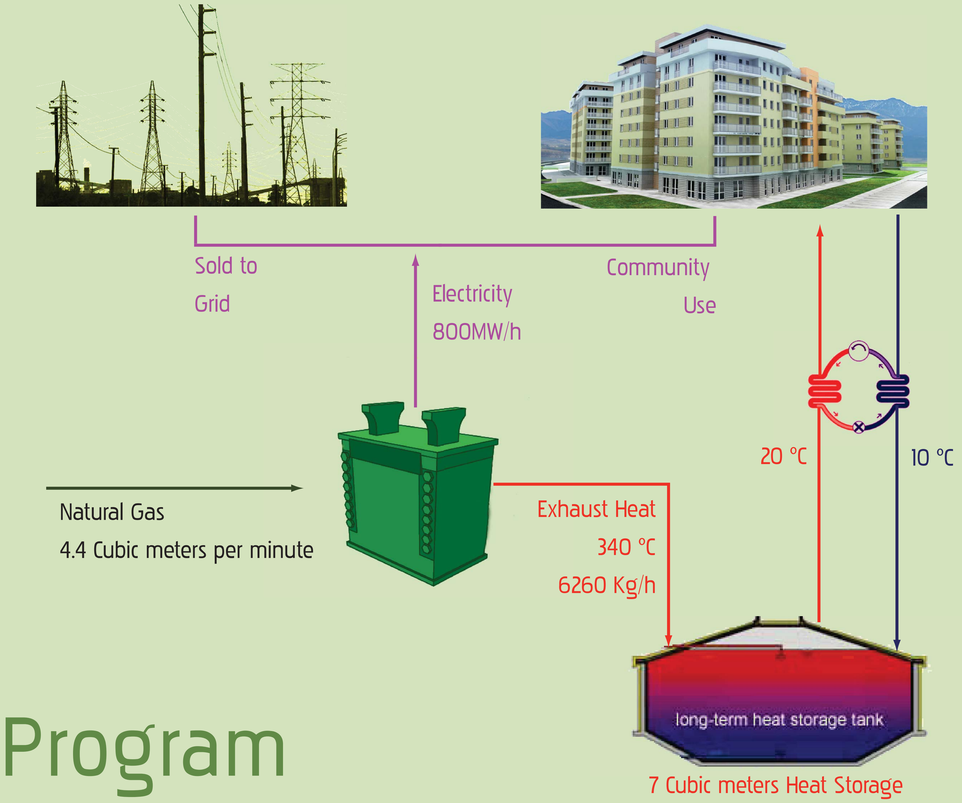
  Total System Cost: $5,420,000
- Annual Costs
  - ⇨$15,000 maintenance
  - ⇨Fuel and Production: $750,000

Annual Earnings: $175,000

Annual Savings: $230,000

Simple Payback Period: 13.5 years

System Design



Program

Data Input:

IF specific data is not known, the user imports the area of the surfaces to be considered.

IF The user has specific knowledge the program can take the following values:

- ⇨Location of Project
- ⇨Electrical Power
- ⇨Max Heat
- ⇨Number of Buildings
- ⇨Type of Buildings
- ⇨Other Values

Results: The Program sizes the System

Gives Heat Pump and Fuel Cell Configurations

Optimizes Cost

Team

Sponsors: HNTB, Sister Cities International Chicago

Schools: UIC, Illinois Institute of Technology

Students: CHE 496, CHE 296, and IPRO 345

Subteams: Design
Economics
Environment
Ethics
Deliverables

Recommendations

- For Future Semesters
  - ⇨Gather Climate, Energy, and Law/Economic data from other locations around the world
  - ⇨Continue Developing a more in-depth algorithm
  - ⇨Focus more on the software side of the project
  - ⇨Test Software against Real-World Projects