Power Stove

Purple A

What is the Power Stove?

The Power Stove uses a Stirling Engine to convert the heat from a wood stove into electricity

Analytical Model

- Requirement: Output 100W electricity
- 15kW output of typical wood stove
- Transport 500W to Stirling Engine
- Need less than 1% conversion of heat to electricity

Design Challenges

- Geometric layout
- Transfer of heat from stove to Stirling engine
- Optimization of thermodynamic conditions for engine
- Dissipation of heat from “cold” side of engine

Benchmarking

- Solar Power: $4/W (no support equipment), $8-$12 (with support equipment)
  - Not as effective in winter months/night/bad weather
- Wind: 5c/kWh
  - Unreliable (only works where it's windy)
- Natural Gas Powered Co-Gen
  - Works well for those who use natural gas to heat

Customers and Market

- 180,000 US families currently live off-grid
- What can 100W do?
- Over 10 million wood stoves currently used in the United States
- 500,000 new ones purchased annually
- Great Wood Stove Change Out – reimbursements for purchase of new stove

Conclusion

- If we can find a fitting 100W Stirling engine we're optimistic for this system for off grid applications

- We're also looking into a larger 1KW Stirling engine directly coupled to the hot box
  - When commercially produced this engine will cost under $1000, ¼ the price of solar cells