Low-Cost Milk Dryer
Market

• 325 billion kg of milk were produced in the developing world in 2009
• 3.1 billion rural farmers
• $100M of evaporated milk imported to Senegal in 2007
Customer Needs

• $15 estimated cost for production
• Low Cost of Operation – biomass
• Human Powered Mechanics
• Locally available materials – steel, biomass, milk
• No welding required
• Reparable with common materials
Technical Feasibility

• Preliminary Estimates
  – Energy required: 4 Kg wood per 1 Kg of dried milk
  – Milk output: 2 Kg / hour, thus we would need 8 logs per hour (~1Kg each)

• Experiments and Results
  – Findings
    • Applicator: vertical spray nozzle
    • Scraper: difficult, maybe Teflon surface
    • Metal thickness: 1 Solid layer best, no insulation
    • Heat distribution: Use heat plate for even surface
Demonstration
Demonstration
Technical Feasibility

• Design
Benchmarking

- Industrial Powdered Milk
  - Does not reach all people in need
- Natural Milk
  - Short shelf life
- Other Culturing Methods
  - Churning into yogurt and cheese