Solar & Thermal Systems, Inc.

For the Connecticut Academy of Science and Engineering

For CT Clean Energy Fund ODP

Questions for the TRC

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- Virtual Prototyping

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- Commercial Demonstration

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- Virtual Prototyping
- Commercial Demonstration
- Energy Balance
  - Daily Cycles
  - Monthly Cycles

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- Virtual Prototyping
- Commercial Demonstration
- Energy Balance
- Example Systems
  - 25KW Commercial Sample
  - 2000 sq.ft. Residential Sample

Questions for the TRC

- Virtual Prototyping
- Commercial Demonstration
- Energy Balance
- Example Systems
- Discussion & Questions

Virtual Prototyping

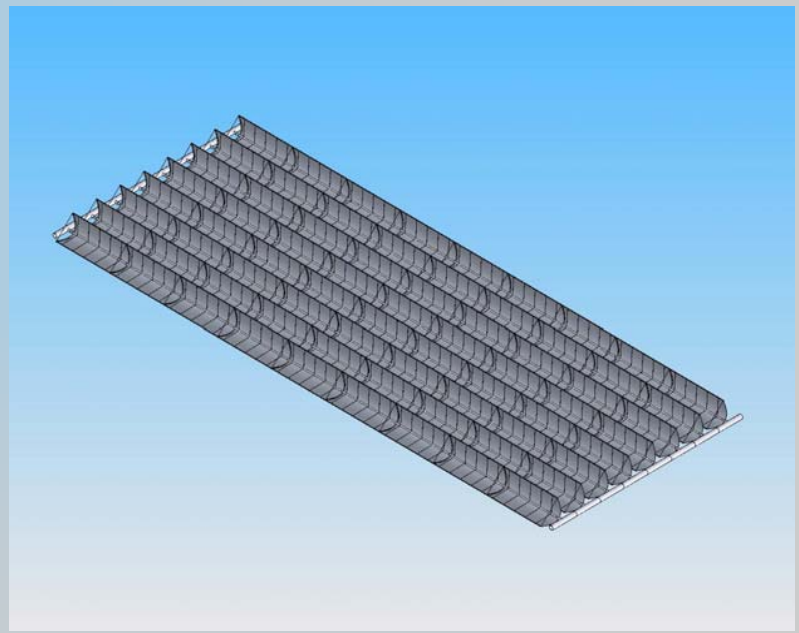
- Computer Aided Design
  - SolidWorks
- Finite Element Analysis
  - Cosmos
- Computer Aided Machining
  - SolidCAM
  - MasterCAM

Commercial Demonstration

- Panels – Welded Pipe Fabrication
- Engine – Need 3: lab, destructive, live test
- Enclosure – Sheet Metal Fabrication
- Software – RTOS & u-controller
- Generator – COTS Marathon Electric
- BOS – COTS Square-D, Dayton, GE, etc

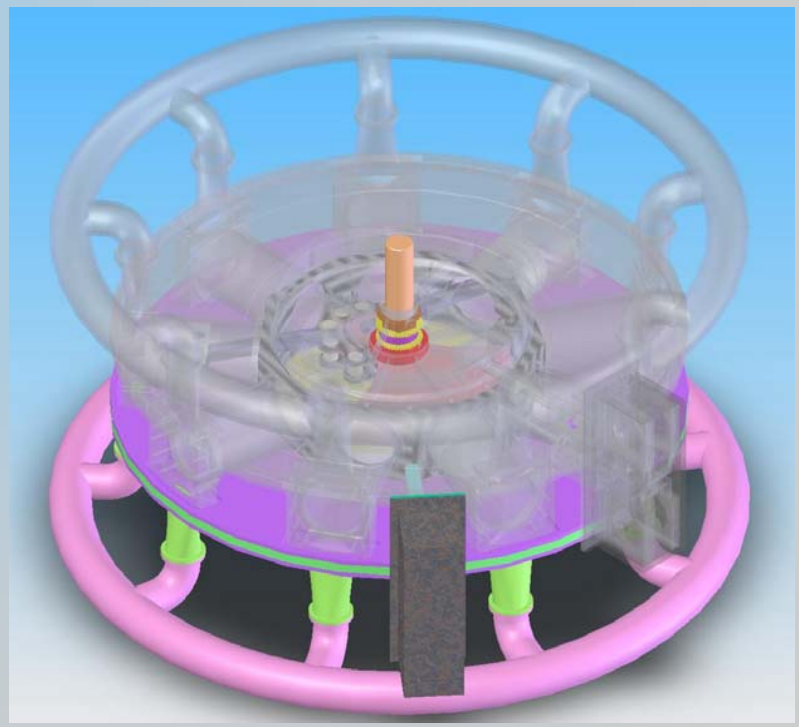
Collector Panels

- Panel
  - 164 sq. ft.
  - 9 Sections Trough
  - 8 Parallel Troughs
  - 185 lbs (dry)
  - 360 degree rotation
  - 0-90 deg inclination
  - 40N Flux 13.7kW(th)



Radial Engine

- Engine
  - 9 Cylinder, 814 cid
  - 4.25 x 6.375 (B x S)
  - 1750 lb-ft peak torque
  - 11 flywheel sizes
  - 480 lbs (dry)
  - 190F inlet 250kW(me)



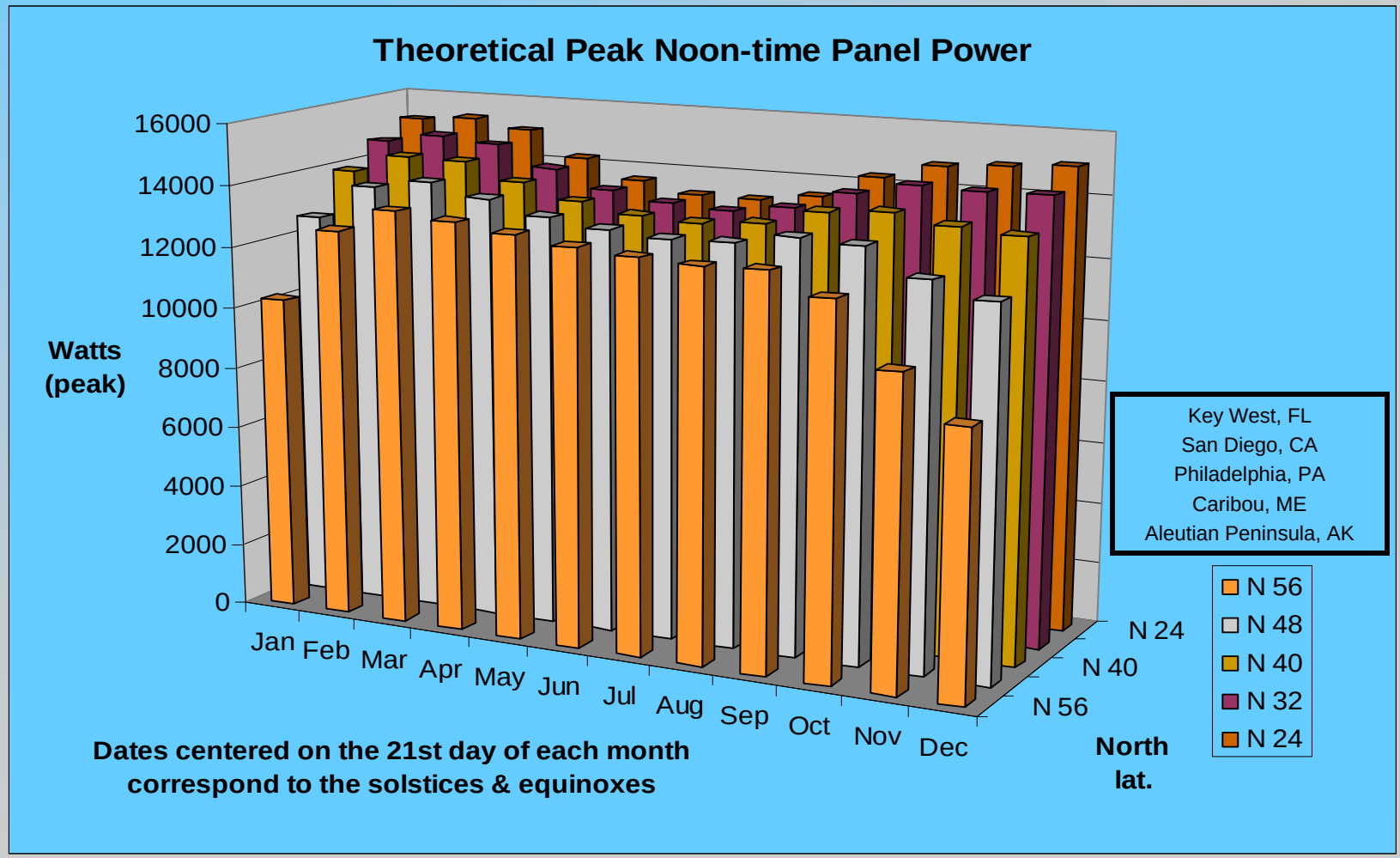
Energy Balance

- Daily Curves
- Annual Cycles

Panel Power (Daily)

- Solar Noontime
- Normal Startup & Shutdown
- Delayed Onset of sunlight
- Early Termination of sunlight
- Transient loss of sunlight
- Resumption of sunlight

Panel Power (Annual)



Example Systems

25kW Commercial

- 5000 sq ft, 8 panels → 242kW(th)/half-day
- Electric Use 3.2MWHr/mo ($6259.20/yr)
- Generated Energy 2.37MWHr/mo
- Utility buy $521.60/mo → $135.31/mo
- RECs $367.33/mo Net Cash $232.02/mo
- Total Cost $2.00/Watt(electric) = $50K
- First Year Benefit $9043.38

2000 sq ft Residential

- 9.6kW 5 panels →93kWHr(th) /half-day
- Electric Use 1.2MWHr/mo ($2466/yr)
- Generated Energy 910kWHr/mo
- Utility buy $205.50/mo → $55.89/mo
- RECs 101.92/mo Net Cash $46.03/mo
- Total Cost $2.00/Watt(electric) $19288.70
- First Year Benefit $3018.37

Discussion & Questions