WWU SOLUTIONS

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Solar Thermal for Wade King Recreation Center

+

= saving money, reducing CO2, meeting campus sustainability goals

Problem:

- Climate Action Plan
  - WWU's goal of climate neutrality by 2050
- Dependent on fossil fuels
- 25% energy loss from natural gas/steam

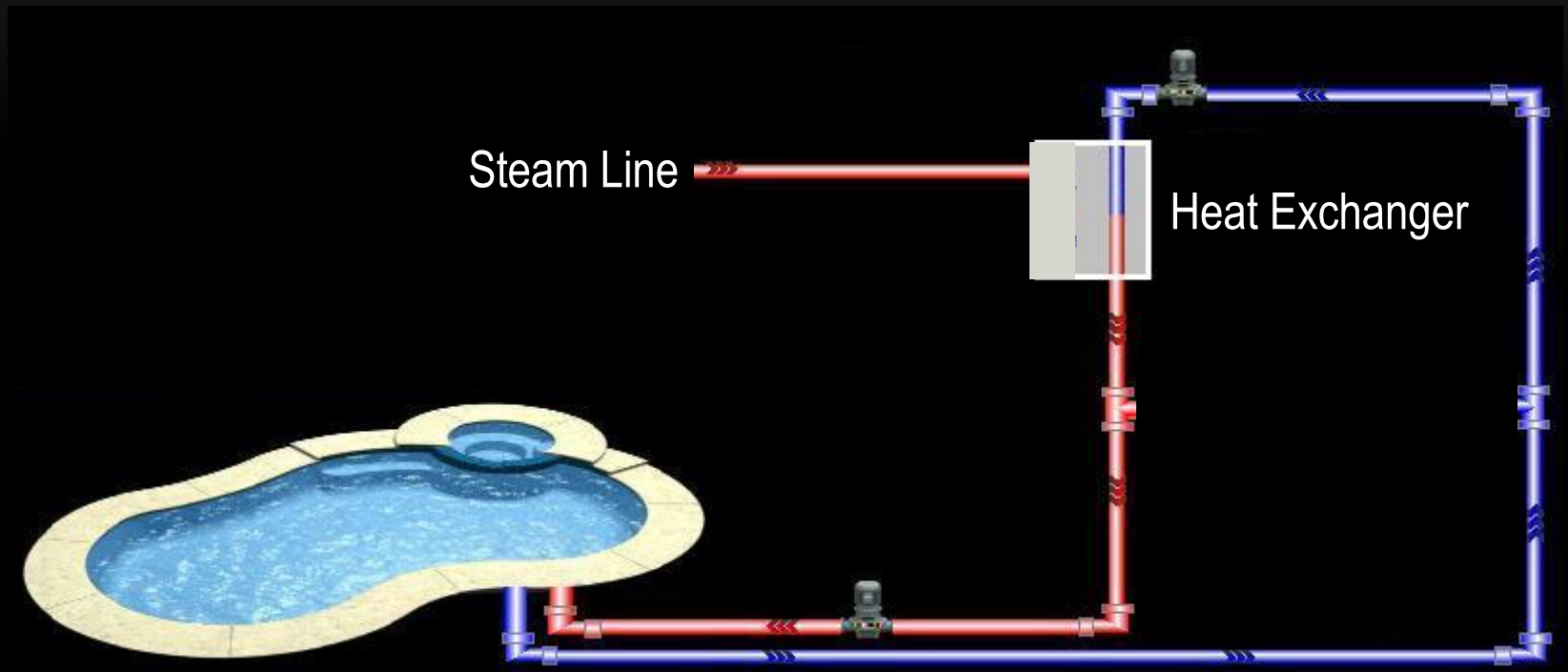
Pool Energy Consumption:

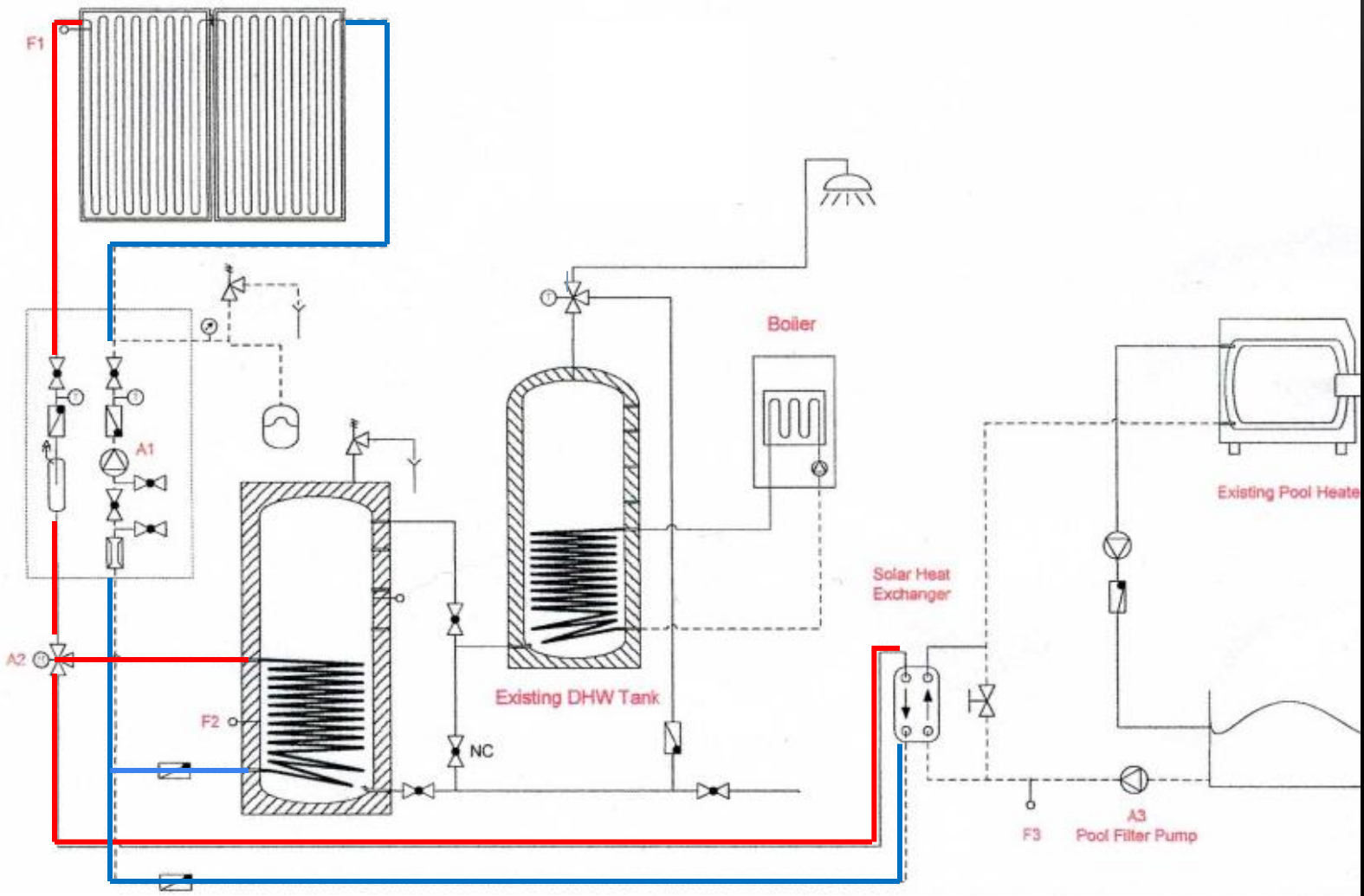
Pool heat exchanger at estimated 90 gpm (max capacity):

- Natural Gas used: 15,521 therms/year
- Cost of Natural Gas ($0.46/therm): $7,222 /year
- CO2 emissions: 274,733 lbs/year

- Everett Naval Station – 120 collectors for 365,000 gallon pool
- WWU pool – 45 collectors for 138,000 gallon pool

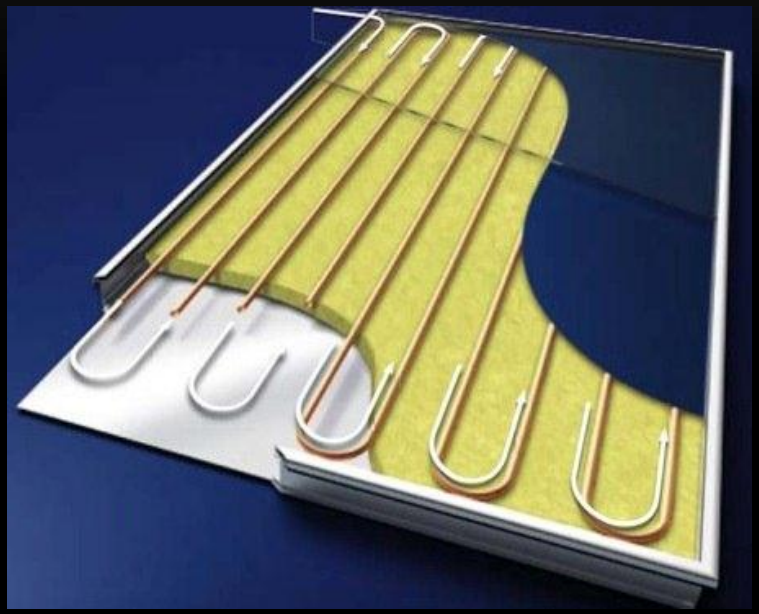
Current heating system




F1
A1
A2
F2
NC
Existing DHW Tank
Boiler
Solar Heat
Exchanger
Existing Pool Heate
A3
Pool Filter Pump
F3

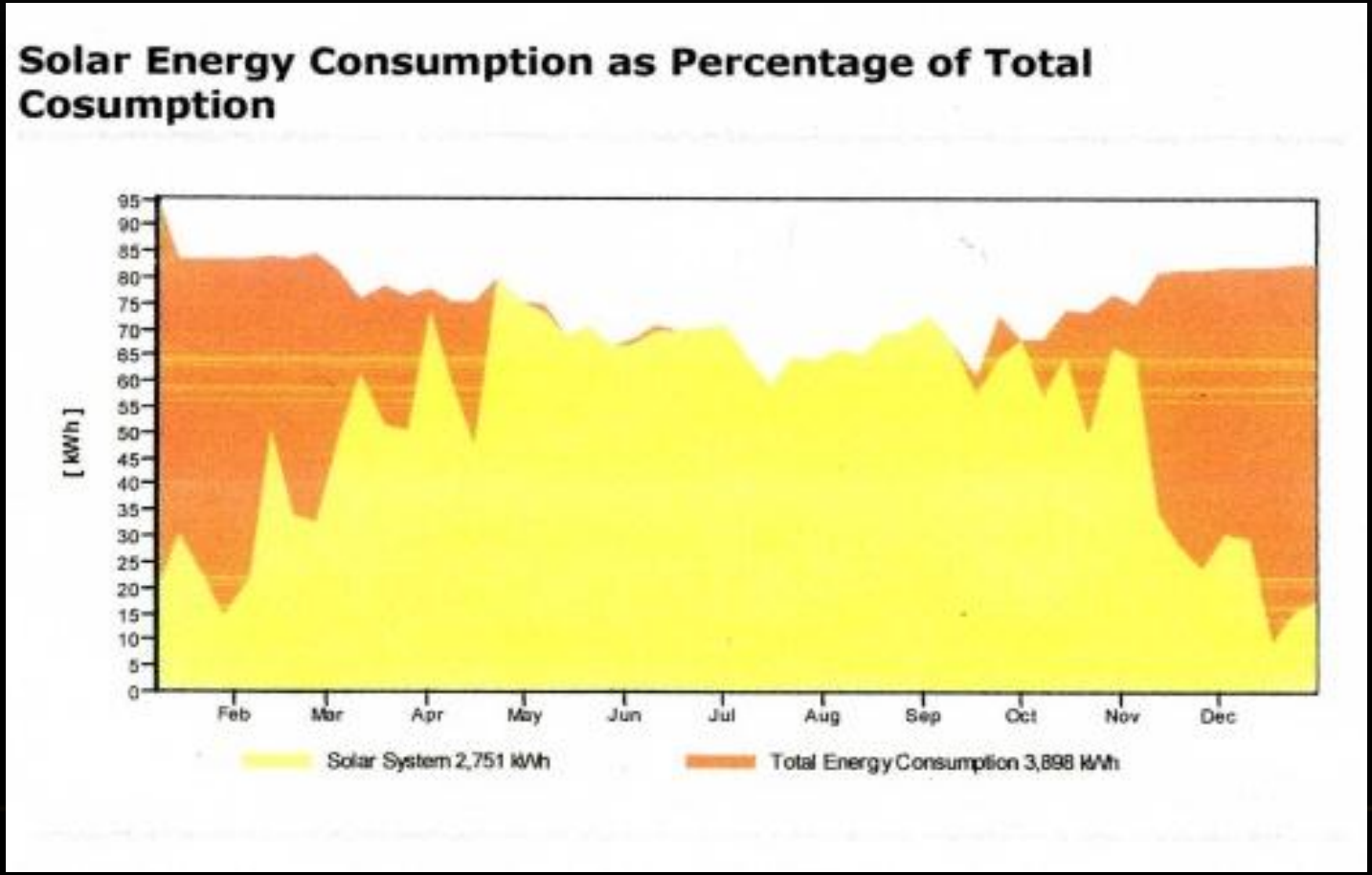
Difference Between Panels

VS.

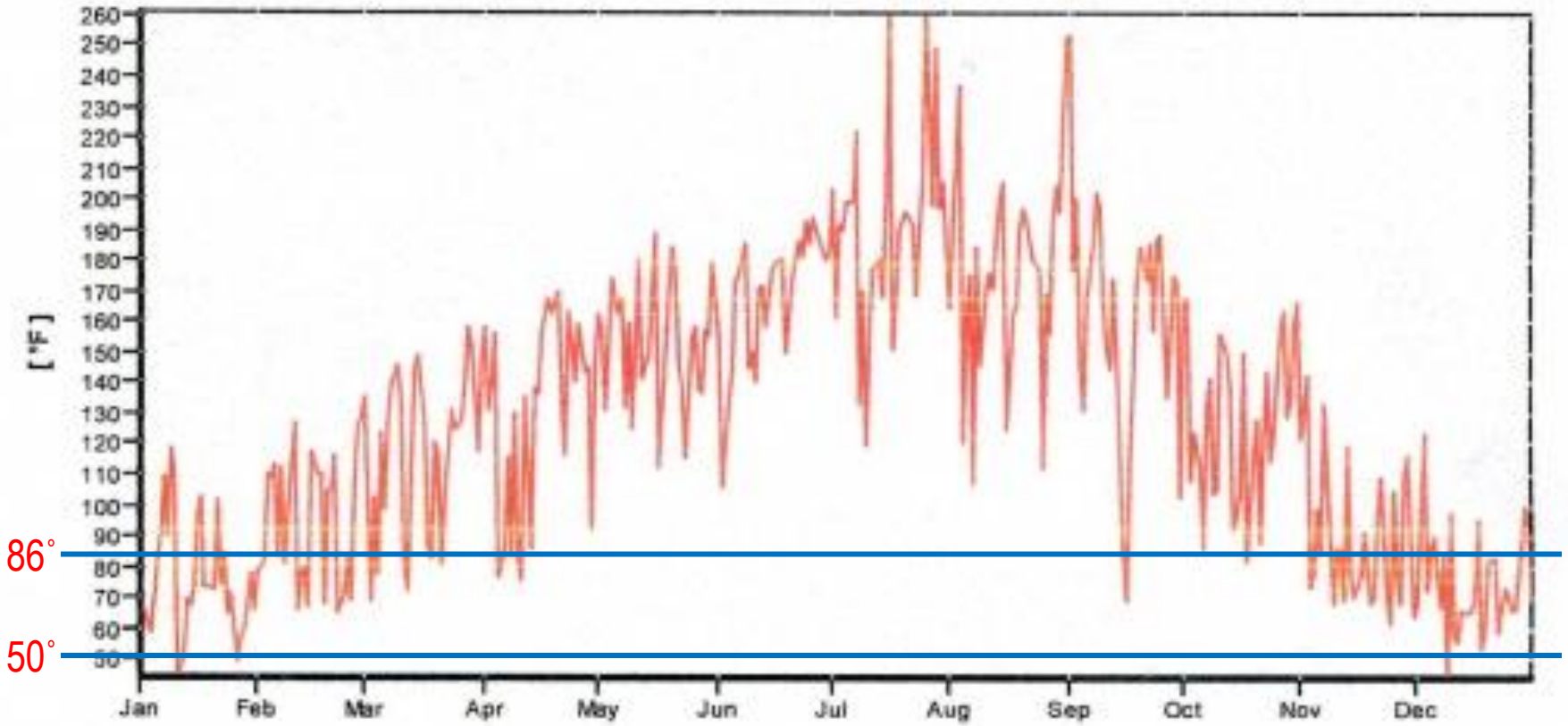


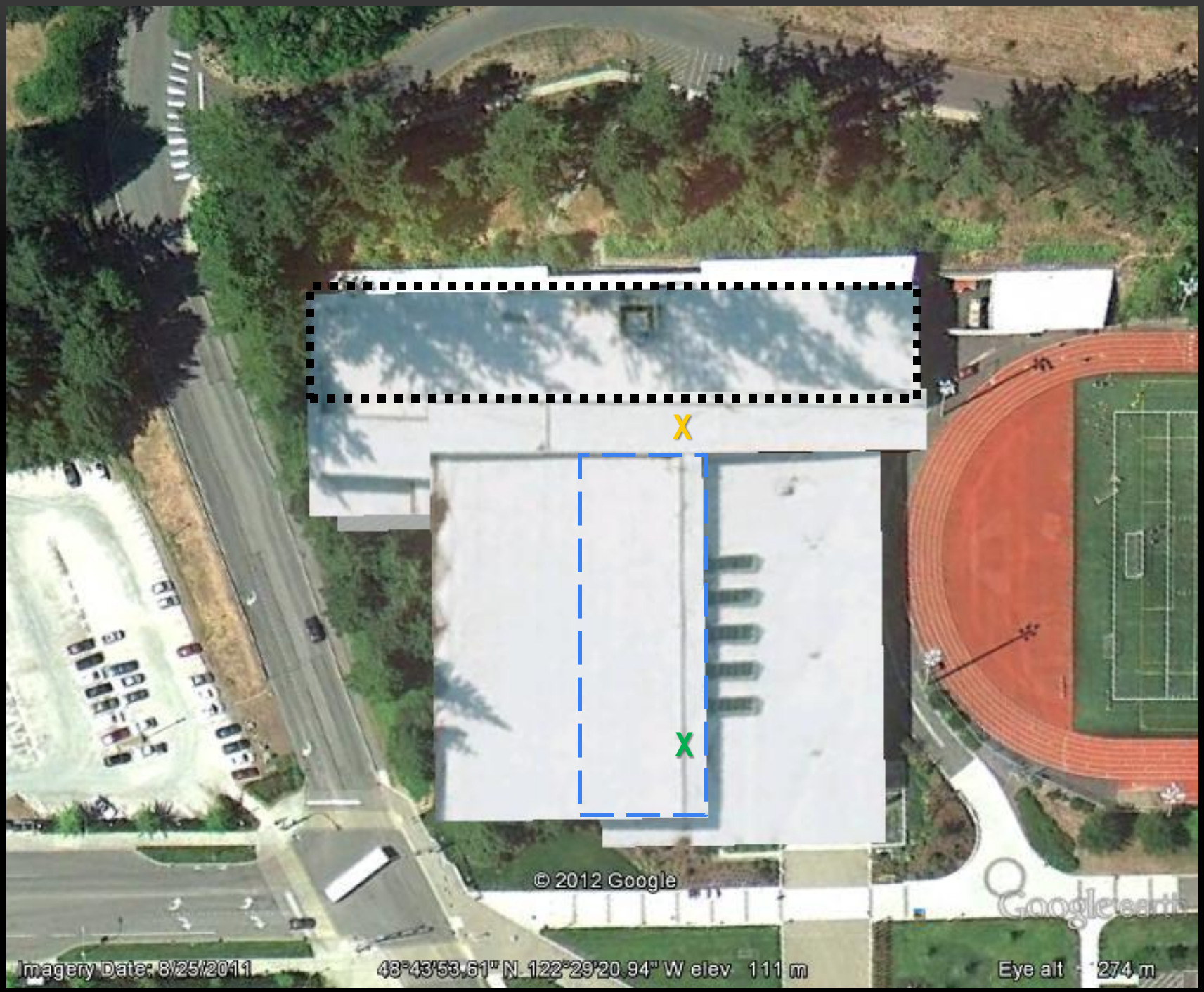
Typical System Production in Seattle

- Close to 100% solar thermal energy production during Apr-Oct
- 28% dependency on natural gas
  - 72% energy from solar thermal



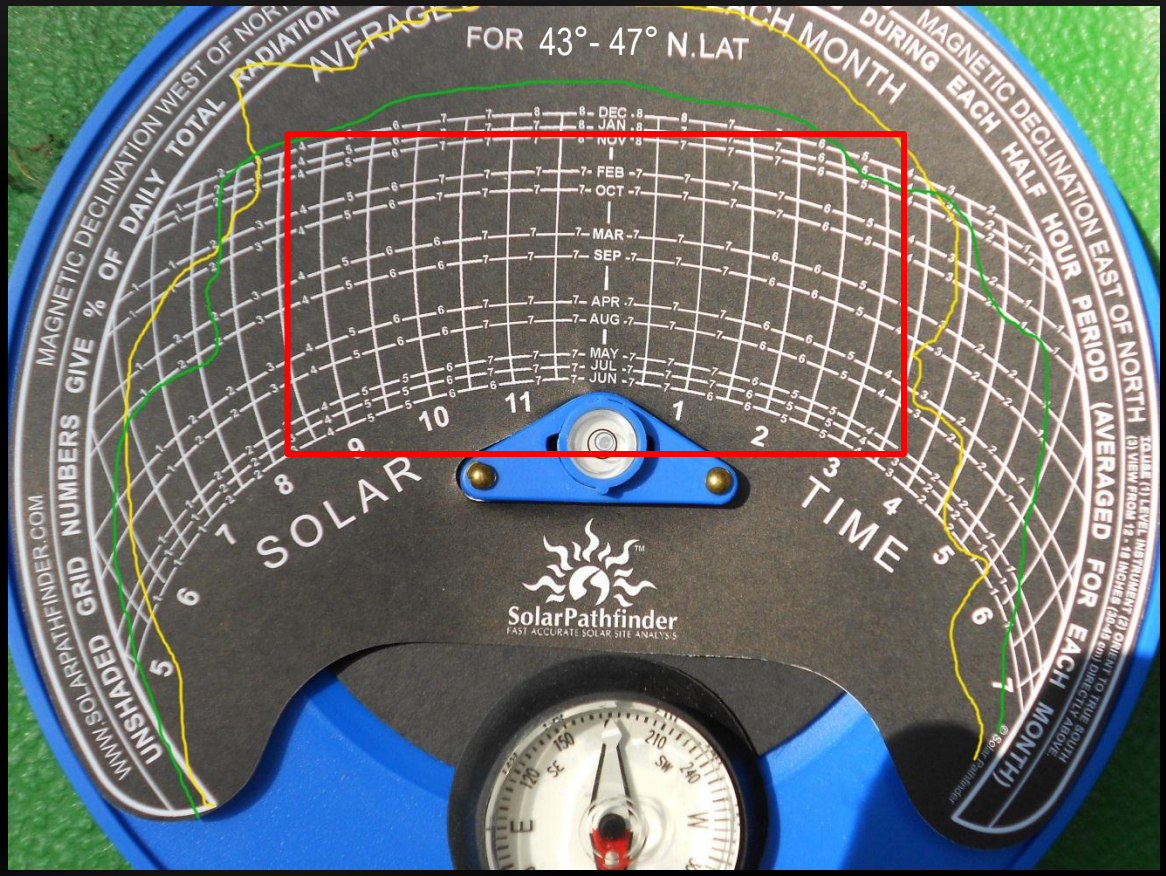
Daily Maximum Collector Temperature




X
X
© 2012 Google
Imagery Date: 8/25/2011
48°43'53.61" N 122°29'20.94" W elev 111 m
Eye alt 274 m

Solar Pathfinder

- Yellow line = West side of roof
- Green line = East side of roof



Example of Schüco flat plate collectors

- Low maintenance
- Durable
- Avg. output of 16,666 btu/day/collector

Educational Benefits

- 91% of students use the recreation center
  - Starting point for campus tours
  - Interior and online informational kiosk

- Learning example for several majors
  - Energy
  - Materials Science
  - Engineering
  - Environmental Studies and Science

Budget:

45 panels at $3500 per panel (package purchased at commercial rate includes installation, engineering, permits, and plumbing.)
- ref. Western Solar

Estimated investment: $157,500

	10 yr. with Natural Gas	10 yr. with Solar Thermal	10 yr. Savings with Solar Thermal
Cost of Gas	$72,220	$20,220	$52,000
CO2 emitted	2,747,330lbs	769,250lbs	1,978,080lbs

Funding Options:

- Wade King Recreation Center: 8 yr. payback period investment of $41,600
- Student Green Energy Fee Program: investment of $115,900
- Additional grants: ?

Overall Benefits

- Reduce carbon emissions
- Summer months can produce almost 100% of pool energy
- Rec center as an optimal location
- Moving toward WWU sustainability goals

Future Works/Research

- Correct gpm readings (Panametrix flow meter)
- Number of collectors still to be determined
  - Domestic water
  - Spa

Special thanks to:

- Western Solar
- Chris Hadley
- Dale Zimbelman
- Greg Hough
- Adam Leonard
- Sandy Fugami
- Steve Morrow
- Brad Johnson
- Kathryn Freeman
- The Sun

QUESTIONS OR COMMENTS?