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

PROBLEM. SOLUTION. BUDGET. CONCLUSION.
Difference Between Panels

PROBLEM. SOLUTION. BUDGET. CONCLUSION.
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

PROBLEM. SOLUTION. BUDGET. CONCLUSION.
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**

<table>
<thead>
<tr>
<th></th>
<th>10 yr. with Natural Gas</th>
<th>10 yr. with Solar Thermal</th>
<th>10 yr. Savings with Solar Thermal</th>
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</thead>
<tbody>
<tr>
<td>Cost of Gas</td>
<td>$72,220</td>
<td>$20,220</td>
<td>$52,000</td>
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<tr>
<td>CO2 emitted</td>
<td>2,747,330lbs</td>
<td>769,250lbs</td>
<td>1,978,080lbs</td>
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</table>
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
QUESTIONS OR COMMENTS?

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- Western Solar
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