Feasibility of Installing a Solar Air Heater at the Natural Resources Research Institute

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Carbon Emission

- UMD cut emissions by 25%

- Heating makes up a large section of carbon budget

Schematic of a Typical Solar Air Heating System

- **Side-Mounted summer bypass**
- **HVAC System**
- **Heat loss through wall brought back by incoming air**
- **Outside air is heated passing through barrier**
- **Air space under negative pressure**
- **Profiled sheet provides wind boundary layer**

[Link to Image](http://www.eai.in/club/users/harita/blogs/1451)
Pros
- Renewable
- Passive
- Low maintenance
- Retrofitting

Cons
- High installation cost
- Supplemental energy
- Location dependent
RETScreen International 4

- Excel Based tool
- Evaluate renewable energy projects
- Natural Resources Canada
NRRI SAH Model

- Collector Area: 4,445 ft²
- Yearly Heating Cost: $15,000
- Installation Cost: $53,962
- Delivered heat: 230.3MBtu
- Yearly Savings: $3013
- Equity Payback: 15.2 years
- CO₂ Savings: 58.9 tCO₂
## Comparison to previous projects

<table>
<thead>
<tr>
<th>Site</th>
<th>RETScreen 4 (Mbtu)</th>
<th>Actual (Mbtu)</th>
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<tbody>
<tr>
<td>Aveda</td>
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Challenges with model

- Installation cost varies
  - Retrofitting, engineering concerns
- Variation in local weather
  - Wind speed
- Shading of building
  - Solar Exposure
- Volatile natural gas market
  - Fracking, Carbon Tax
Future Directions

- Refining model
  - R-value of wall, installation
- Engineering feasibility
  - Retrofitting necessary, costs associated
- Similar projects for different buildings
  - Minimal shading, large southern walls/roofs
- Funding