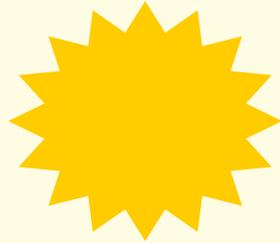


# SOLAR AIR HEATING



**Transpired Collectors or  
Solar Wall Systems**

**Typical Savings:**

**100,000 to 300,000**

**BTU/ft<sup>2</sup>/year**

# Industrial



World's Largest Solar Collector – Bombardier's  
Canadair Assembly Plant – Ville St-Laurent, QC

# Retail Buildings



Winner of the  
2001 AIA Top 10  
Green Projects  
Award

BigHorn Home Improvement Center –  
Silverthorne, CO

# Restaurants



Restaurant – Nagano, Japan

# Maintenance Facilities



Enbridge Inc. – Toronto, ON

# Military



Fort Carson – Colorado Springs, CO

# Schools & Other Institutions



Thetford Elementary School – Thetford, VT

# Community Centers



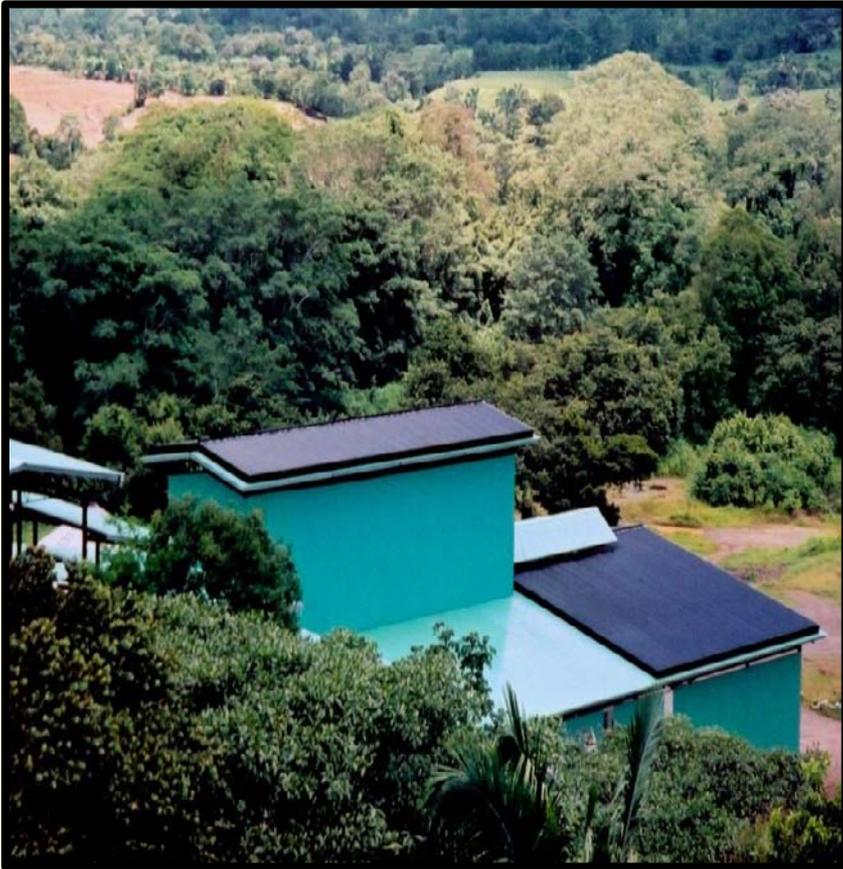
Rapid City Community Center – Rapid City, SD

# Crop Drying



Carriere & Sons, California  
(Walnut Drying)

# Café Duran – Coffee Bean Drying) – Panama



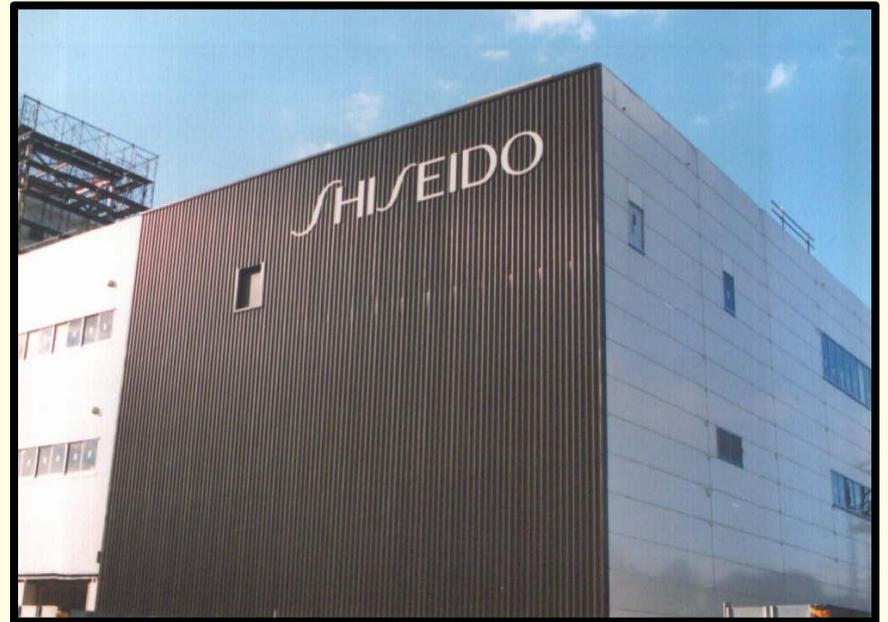
# Alaittuq High School Rankin Inlet, Nunavut



# Windsor Housing 22 stories



# Shiseido – Japan



# Korean Institute of Energy Research



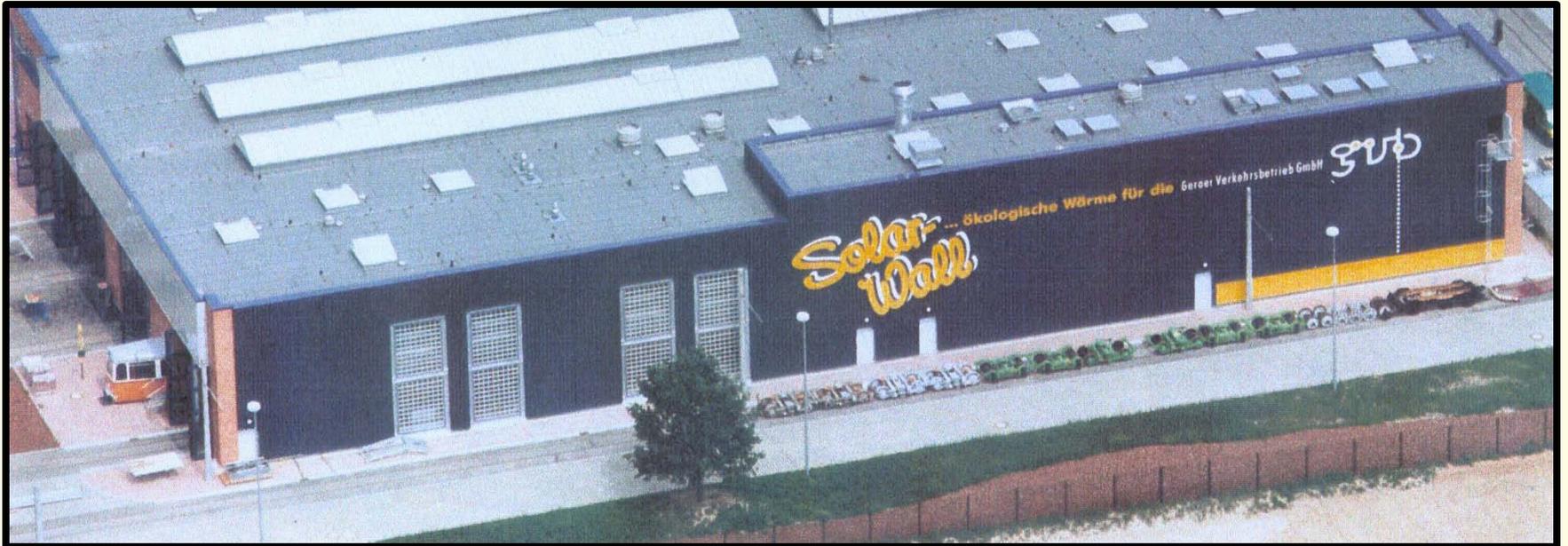
# Marigold Flower Drying - India



# Solar Wall on Calgary Transit Penthouse Wall – connecting to Air Handling Units

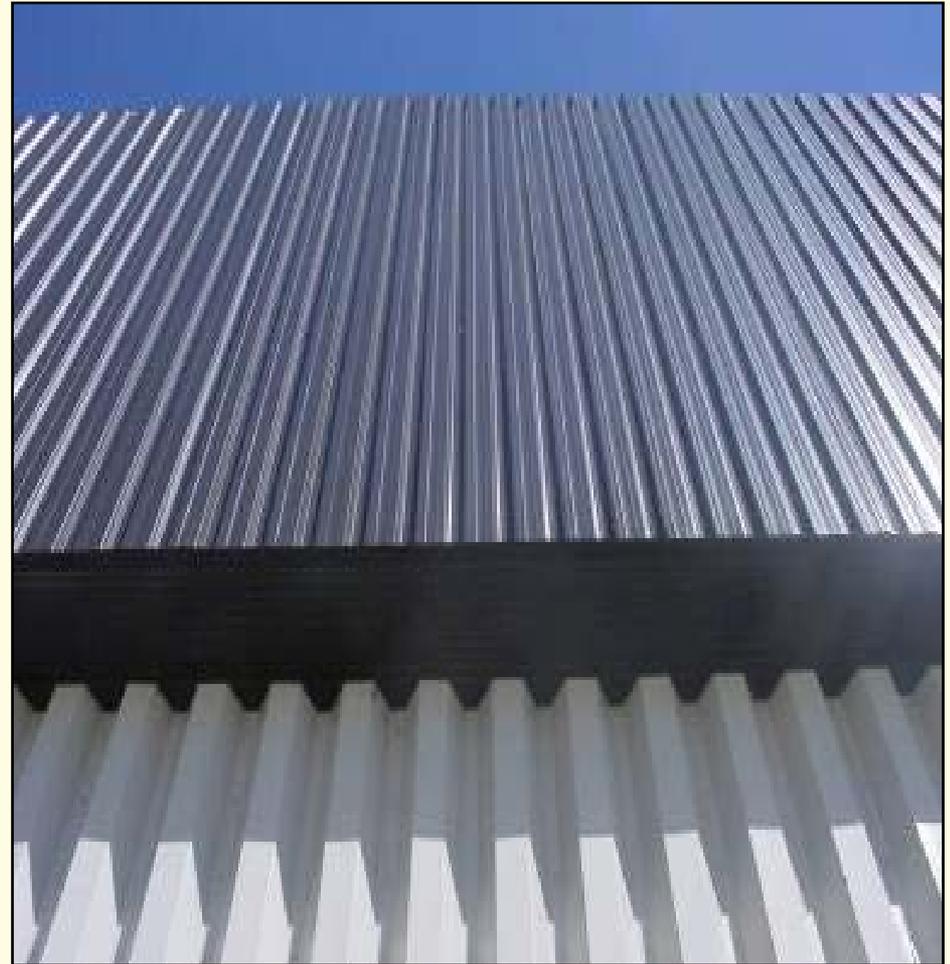


# Transit Garage – City of Gera, Germany



# Solar Wall or Transpired Panel

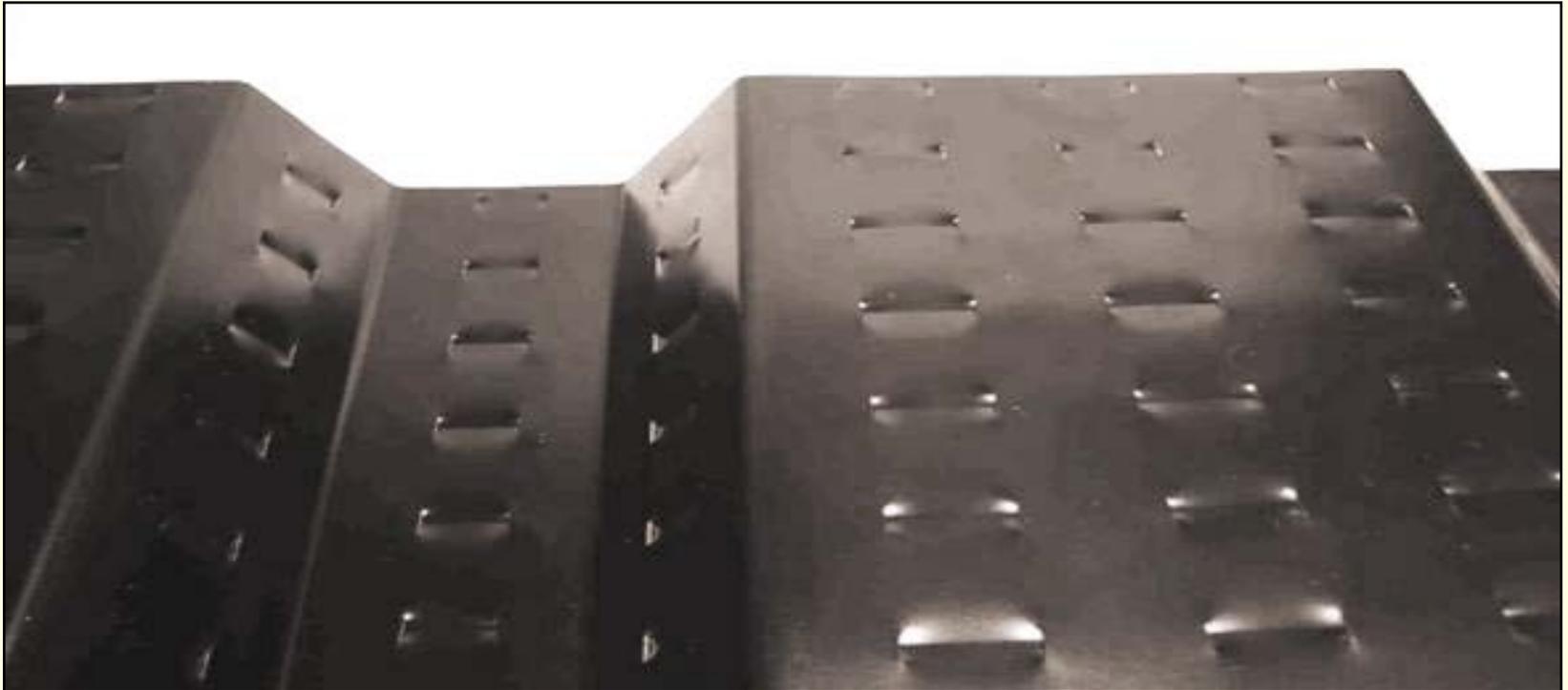
## *What is it?*



- 
- ▶
- 
- ▶
- 
- ▶
- 
- ▶
- ▶ of sun's

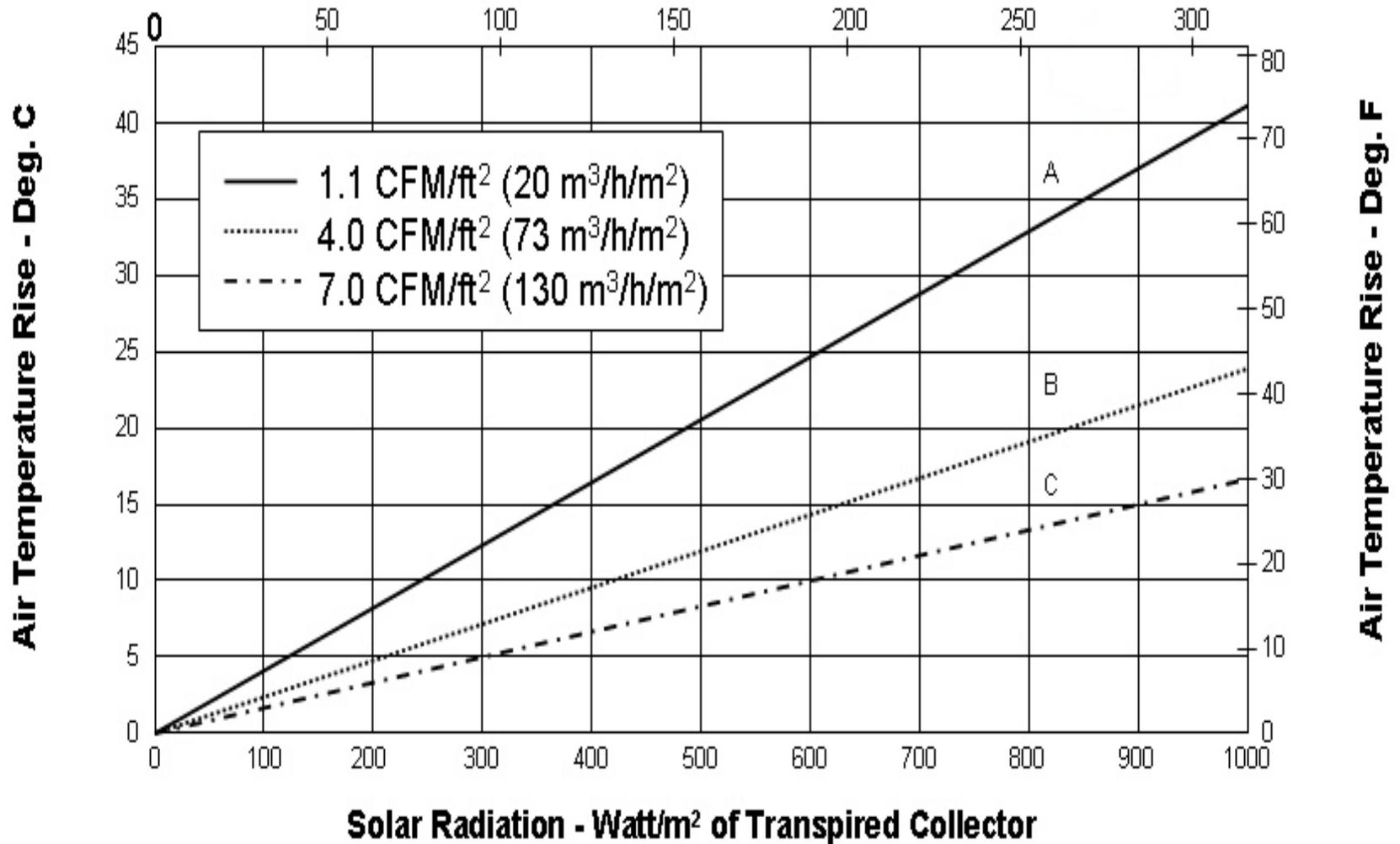
# Panel Properties

- Panels are 24/26 ga. galvanized steel or aluminum
- Wide variety of standard colors available: black or dark brown - preferred colors
- Over a hundred perforations per ft<sup>2</sup>
- Corrugated for structural rigidity

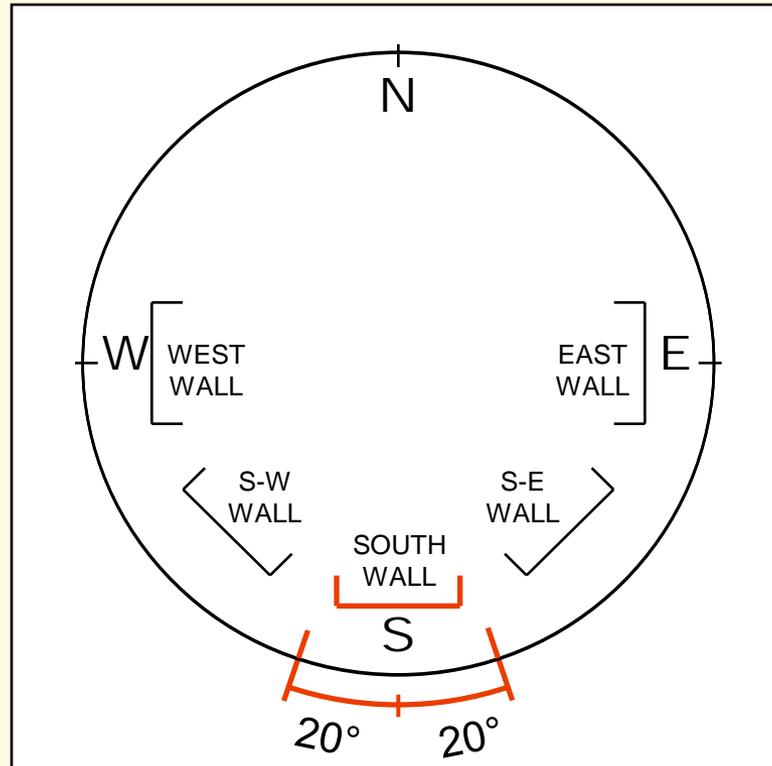


# Air Temperature Rise vs. Solar Radiation for Various Air Flow Rates

Solar Radiation - BTU/ft<sup>2</sup> of Transpired Collector

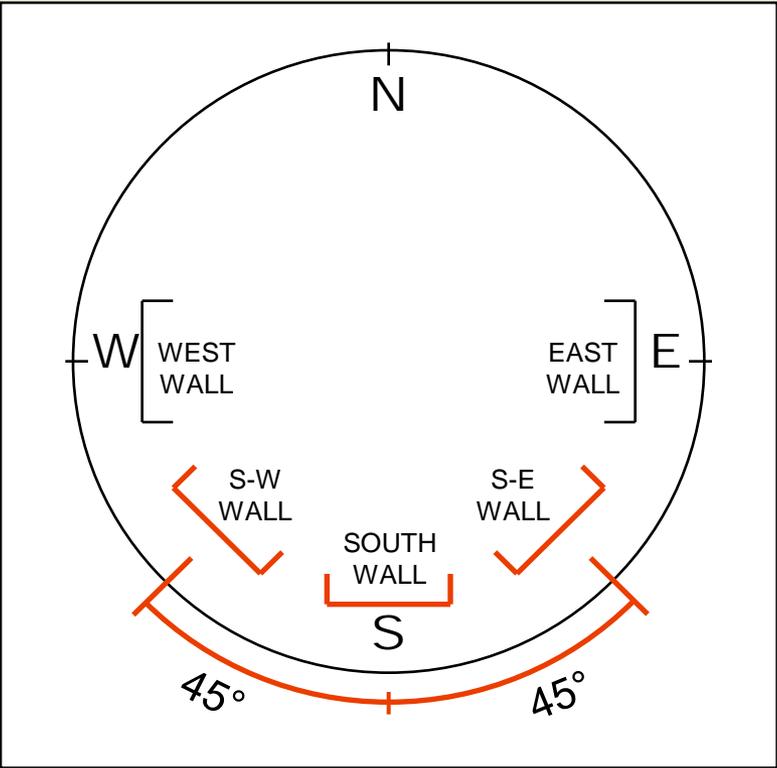


# Collector Ideal Orientation



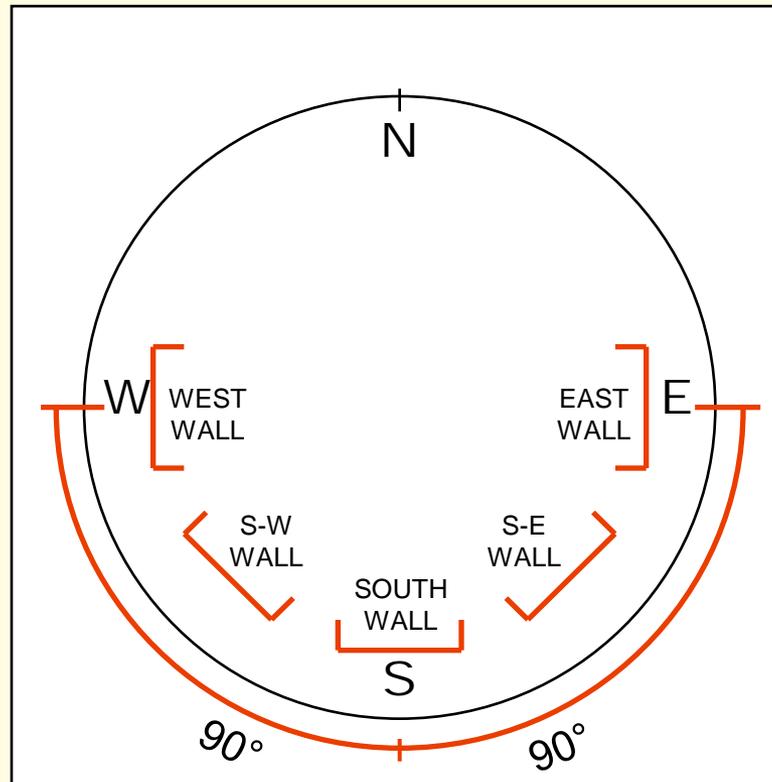
96-100% Solar Gain

# Collector Favorable Orientation



80-100% Solar Gain

# Collector Acceptable Orientation



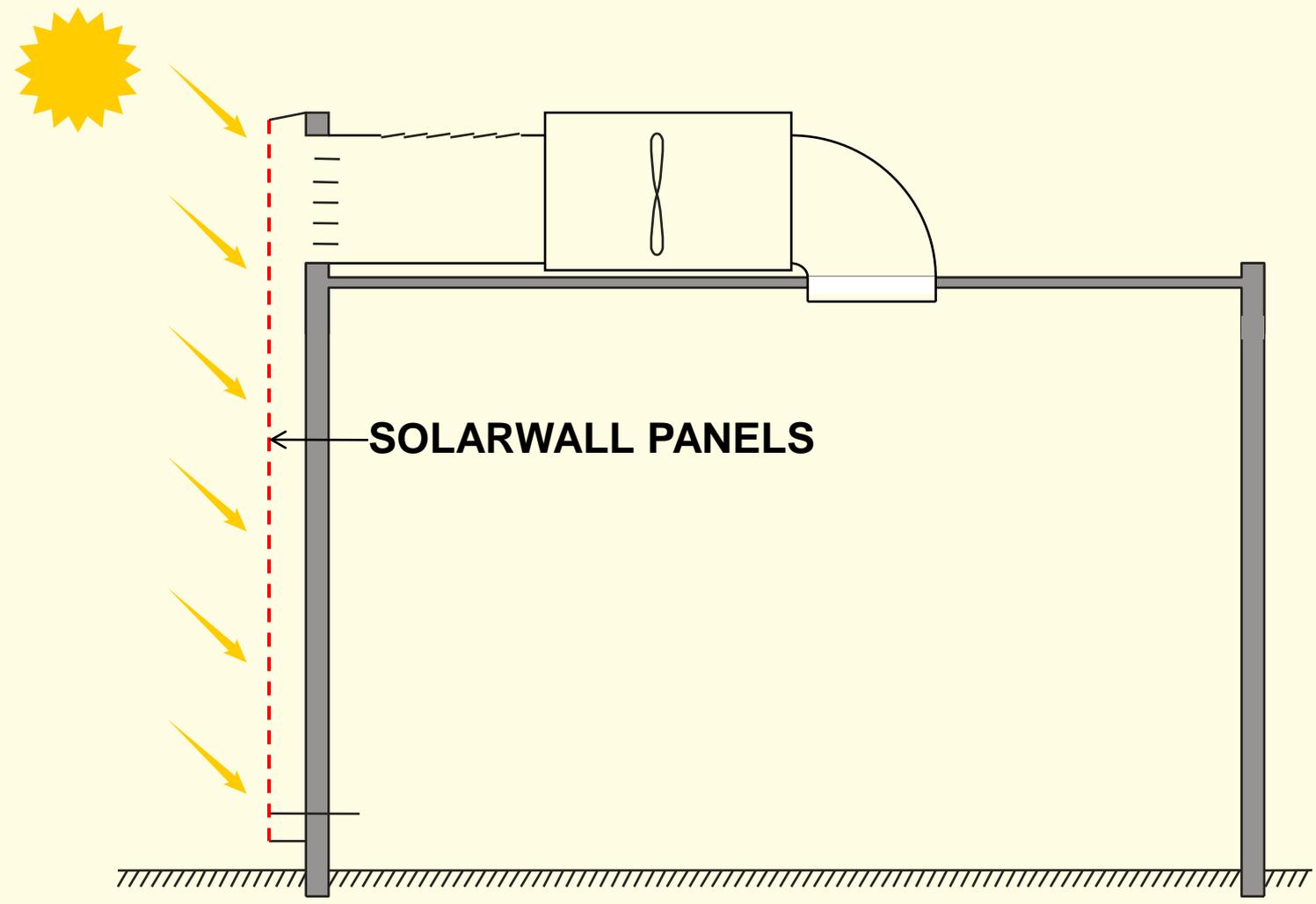
East & West facing walls each receive  
60% of solar gain

# **How Solar Air Heating Works**

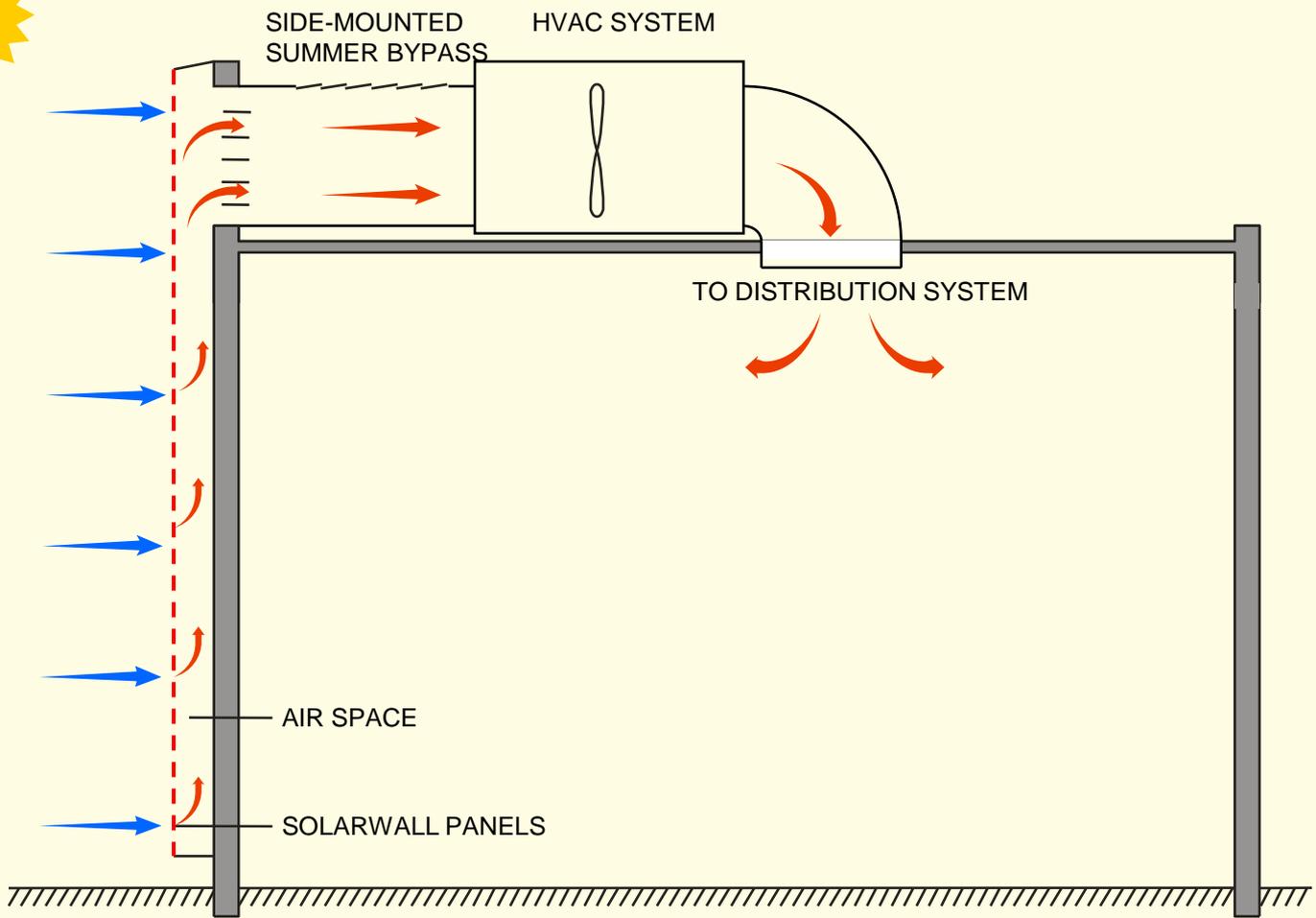
- 1. Sun shines on the SolarWall panels**
- 2. Air is drawn through tiny perforations**
- 3. Heated air is drawn to the top by a fan and distributed into the building**

The following animation will help to explain the concept:

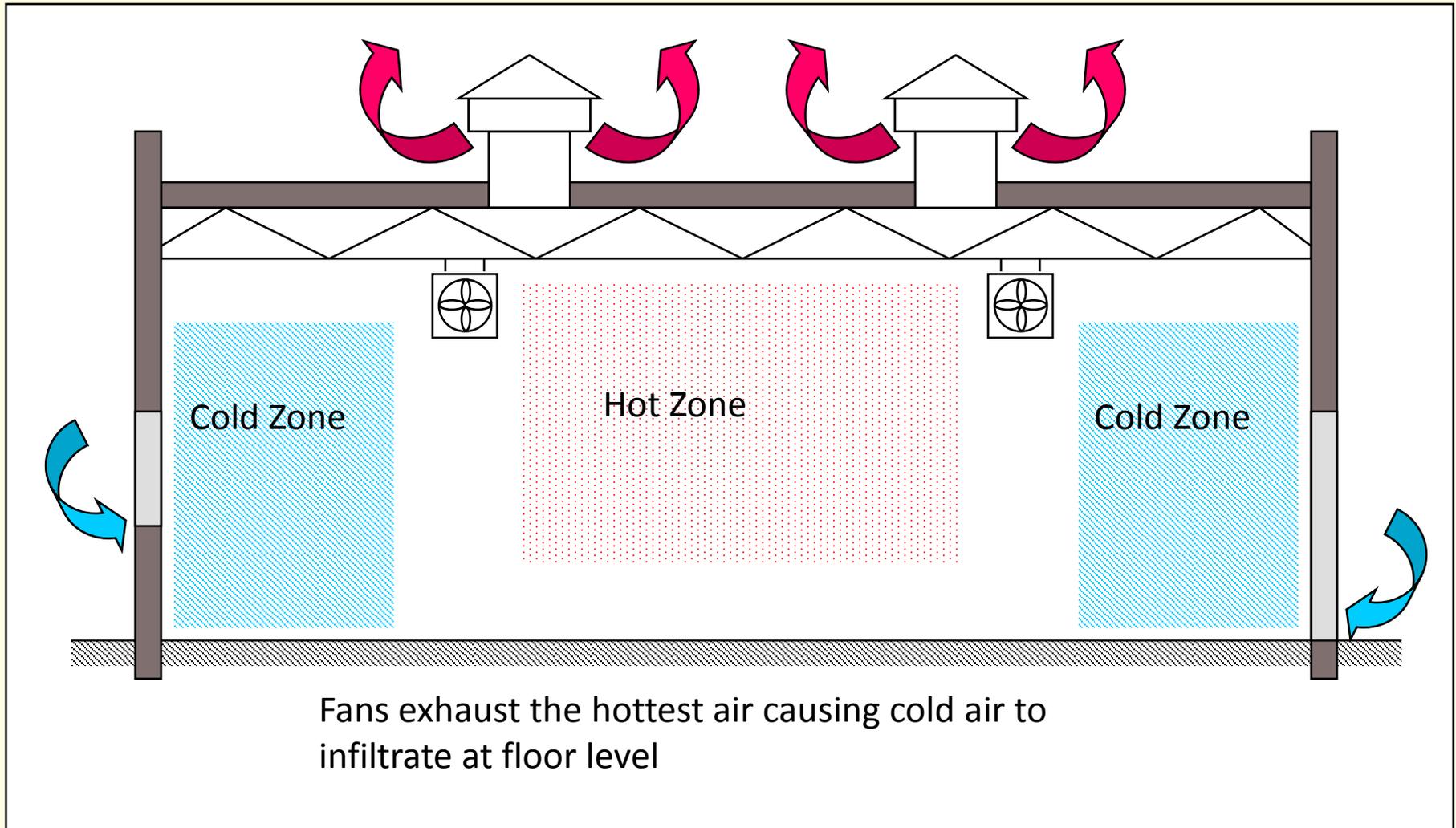
SolarWall → How does it work?

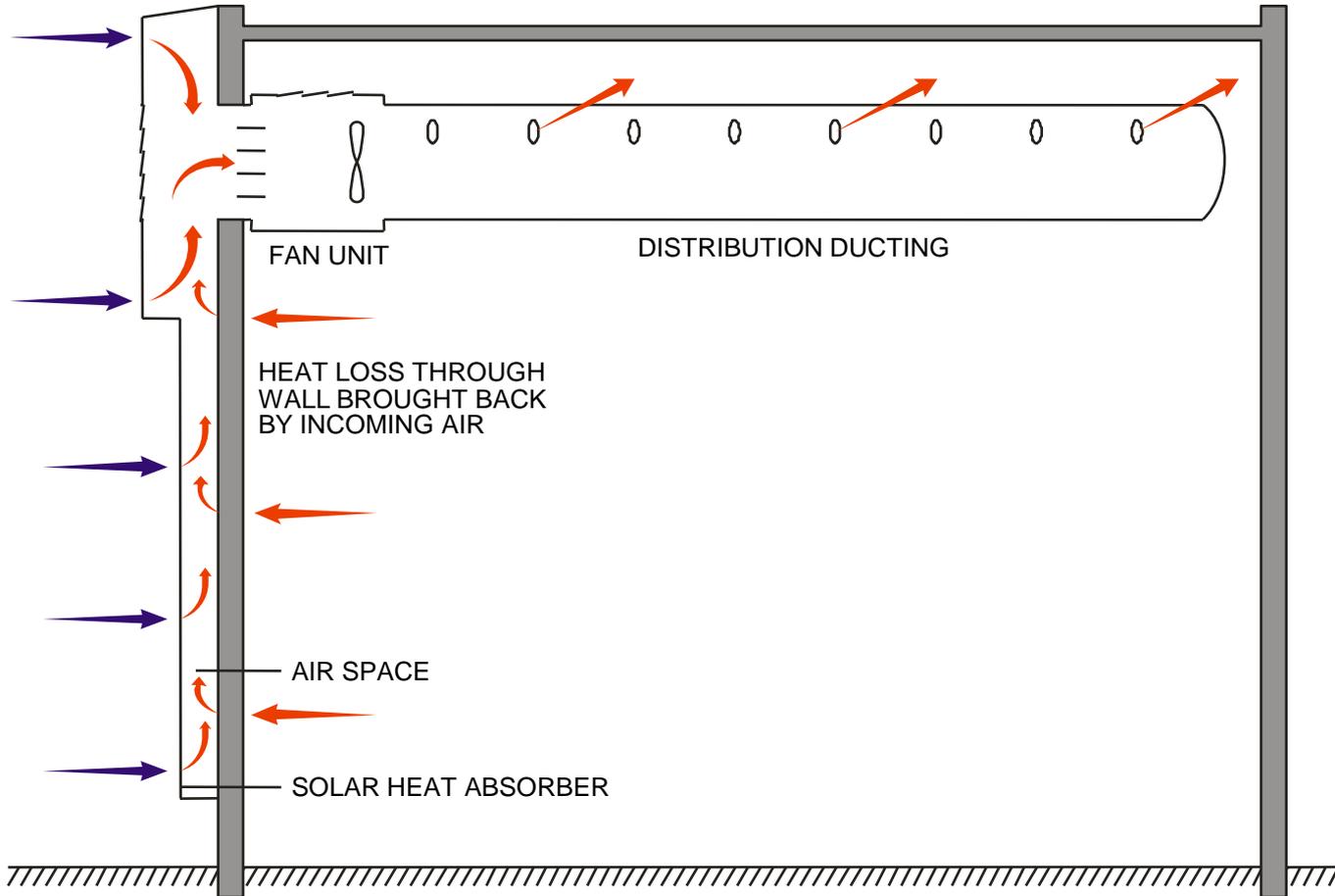


SolarWall → How does it work?



# Heat Stratification & Negative Pressure





Heat loss through the wall is recovered when the fan is running

# Solar Wall Construction on Structural Steel Framing



# BUILDING COMPLETED – Fort Drum



# Framing & Panels

- Panels installed 6-10 inch from wall to create an air cavity
- Attaches directly to building framing or masonry facade
- Installed over or around existing wall openings
- Connects to building ventilation system
- Building integrated for new construction or retrofit to existing buildings.



# Fort Drum Hanger Building with Canopy Header for Solar Wall







# Large Vehicle Service, Fort Drum



# Typical Masonry Installation

- Panels are installed 6 – 12 inches from wall
- Can be installed over or around existing wall openings
- Can be installed over any non-combustible wall material
- Easy installation – no special skills or tools needed





# Fan and Flexible Duct for Solar Heated Air Distribution



# Fan Connection



# Military



1. U.S. Military Fort Drum – NY
2. U.S. Military Fort Carson – CO
3. U.S. Military Fort Huachuca - AZ



# US Military continued



Fort Drum

# Industrial



1. Steel Care - Ontario

2. Sainsbury Distribution Center,  
Pineham – UK

3. Tapis Coronet – Farnham, QC Canada



# Commercial Buildings



1. Showroom - Italy
2. Wasag - Switzerland
3. Shandong Arch & Eng U - China



# Government Agencies



1. NASA's Dryden Flight Research Center - CA
2. Health Canada - ON
3. Environmental Protection Agency (EPA) - CO



# US Military



Alaska Elmendorf AFB



Edwards AFB Garage



Fort Carson

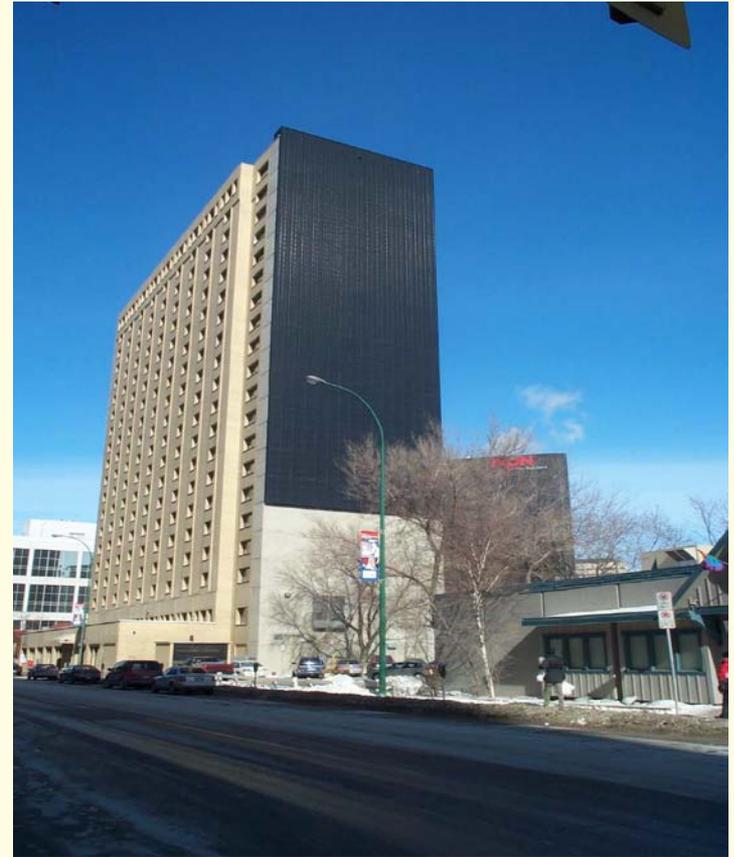


Cold Lake AFB Sewage Treatment

# Manitoba Housing



# INLET PLENUM & Finished SolarWall

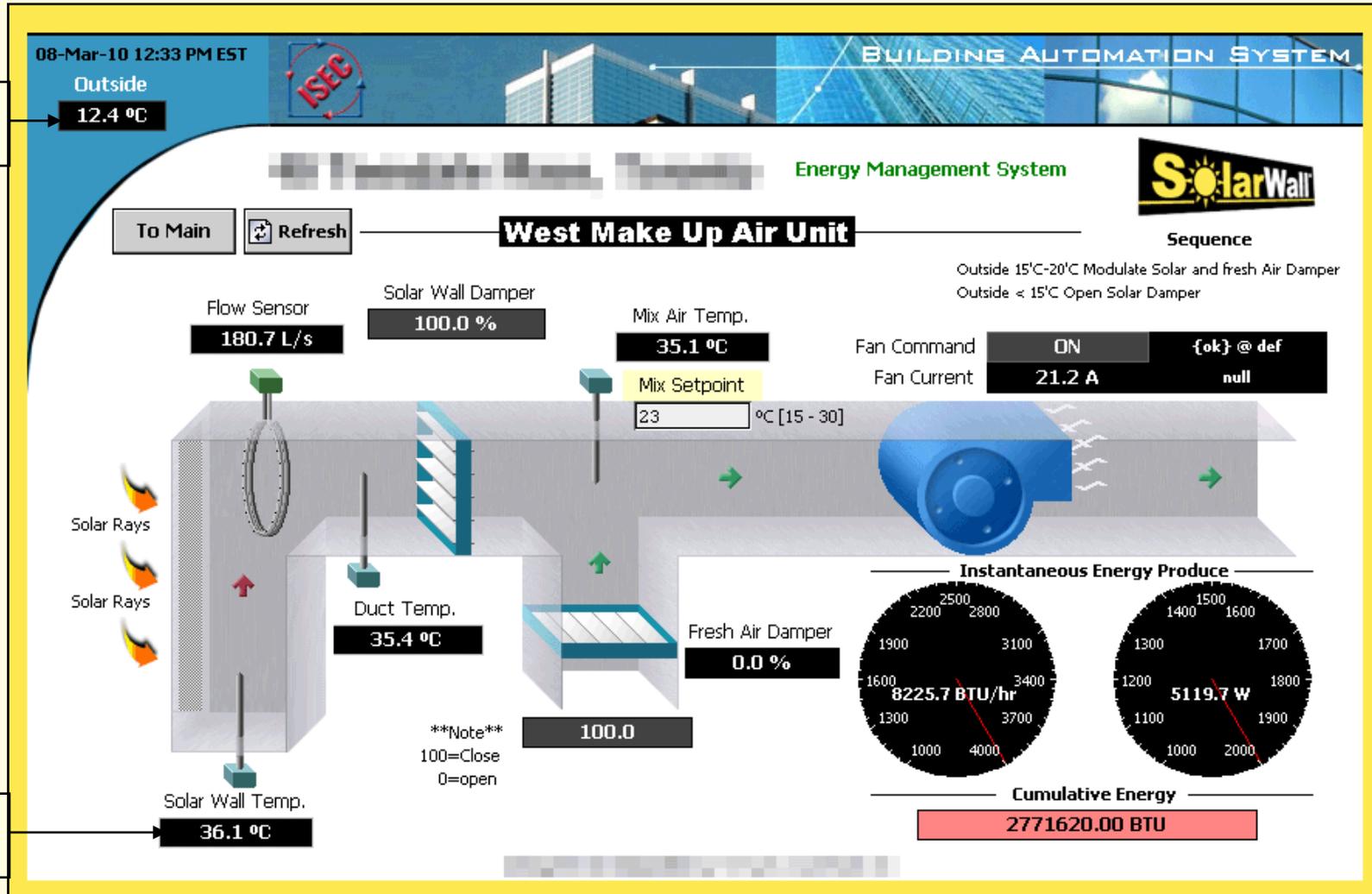


# Solar Wall Toronto Apartment



# Screenshot from a SolarWall Monitoring System

(March 8 2010, Toronto, Ontario)



Outside Temp 54° F

SolarWall Temp 97° F

# LEED™ Credits

Solar Wall qualifies for up to 6 LEED points

## 1. Energy & Atmosphere

- Optimize Energy Performance EAC1 (1-10)
- Renewable Energy EAC2 (1-3)



## 2. Materials & Resources

- Recycled Content MR Credit 4.1 (1-2)



## 3. Indoor Environmental Quality

- Ventilation Effectiveness (1)



# RETScreen → *Feasibility Analysis Software*

- 165,000 users in 222 countries
- Free software - Free Support - 26 Languages
- 9 Renewable Energy Technology Modules
- 48-years of weather data from over 1000 locations + NASA SSE data set
- User input site conditions (specific to technology)
- The global gold standard for feasibility analysis tools

*Developed by an International Community of Major Organizations for the International Community of Energy Consumers.*

# Computer Modeling Software



Natural Resources  
Canada

Ressources naturelles  
Canada

Canada

**RETScreen® International** is a standardised and integrated renewable energy project analysis software. This tool provides a common platform for both decision-support and capacity-building purposes. RETScreen can be used worldwide to evaluate the energy production, life-cycle costs and greenhouse gas emissions reduction for various renewable energy technologies (RETs). RETScreen is made available free-of-charge by the Government of Canada through Natural Resources Canada's CANMET Energy Diversification Research Laboratory (CEDRL). The user is encouraged to properly register at the RETScreen website so that CEDRL can report on the global use of RETScreen.

## Solar Air Heating Project Model

### [TO START \(click here\)](#)

- Brief Description & Model Flow Chart
- Cell Colour Coding

### [RETScreen Features \(click to access info\)](#)

- Online Manual
- Product Data
- Weather Data
- Cost Data
- Currency Options

### [Model Worksheets \(click to access sheets\)](#)

- Energy Model
- Solar Resource
- Cost Analysis
- Greenhouse Gas Analysis
- Financial Summary
- Blank Worksheets (3)



**RETScreen®  
International**

Renewable Energy  
Project Analysis Software

**RETScreen is available  
free-of-charge at**  
<http://retscreen.gc.ca>

### [Internet Options](#)

- RETScreen Website
- Training Information
- Registration
- Contact CEDRL

### [Contributors](#)

- 85 + Technology Experts
- Collaborating Organisations



# **Environmental Benefits from use of Solar Air Heating**

- **System converts the sun's radiation into non-polluting warm air**
- **Conventional heating system use is reduced**
- **Therefore solar air heating:**
  - **Reduces energy consumption**
  - **Reduces greenhouse gas emissions**
  - **Helps to reduce global climate change issues**

# Endorsements

- “Transpired collectors provide the most reliable, best performing, and lowest cost solar heating for commercial and industrial buildings available on the market today.” (U.S. Department of Energy)
- “It simply works – The simplest, most efficient, and least expensive way to preheat outside air for industrial and commercial applications is through the use of a perforated plate absorber”  
(Natural Resources Canada)

**Photos courtesy of  
Conserval Systems Inc.  
Buffalo, NY**



**[www.solarwall.com](http://www.solarwall.com)**