Solar Air Heat

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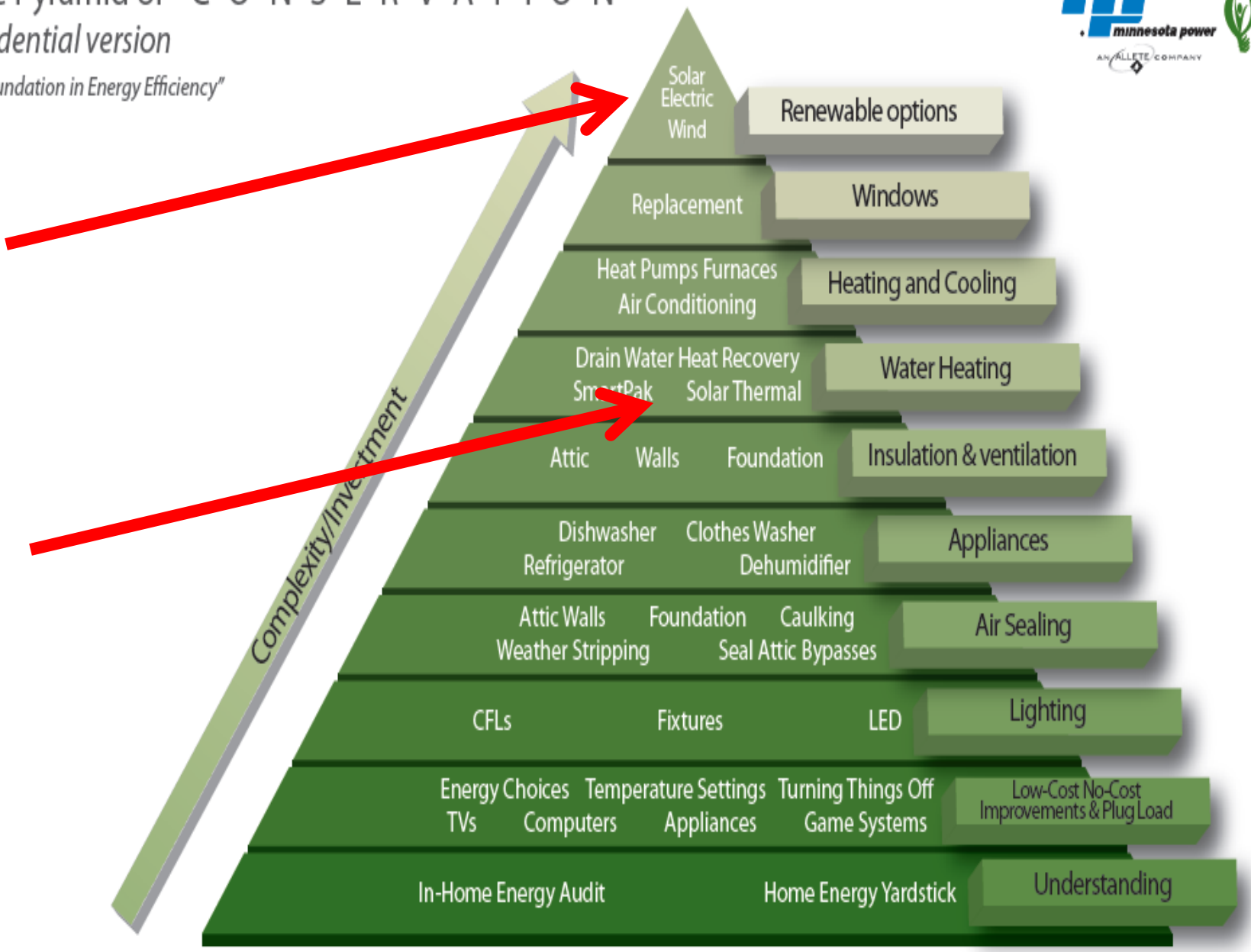
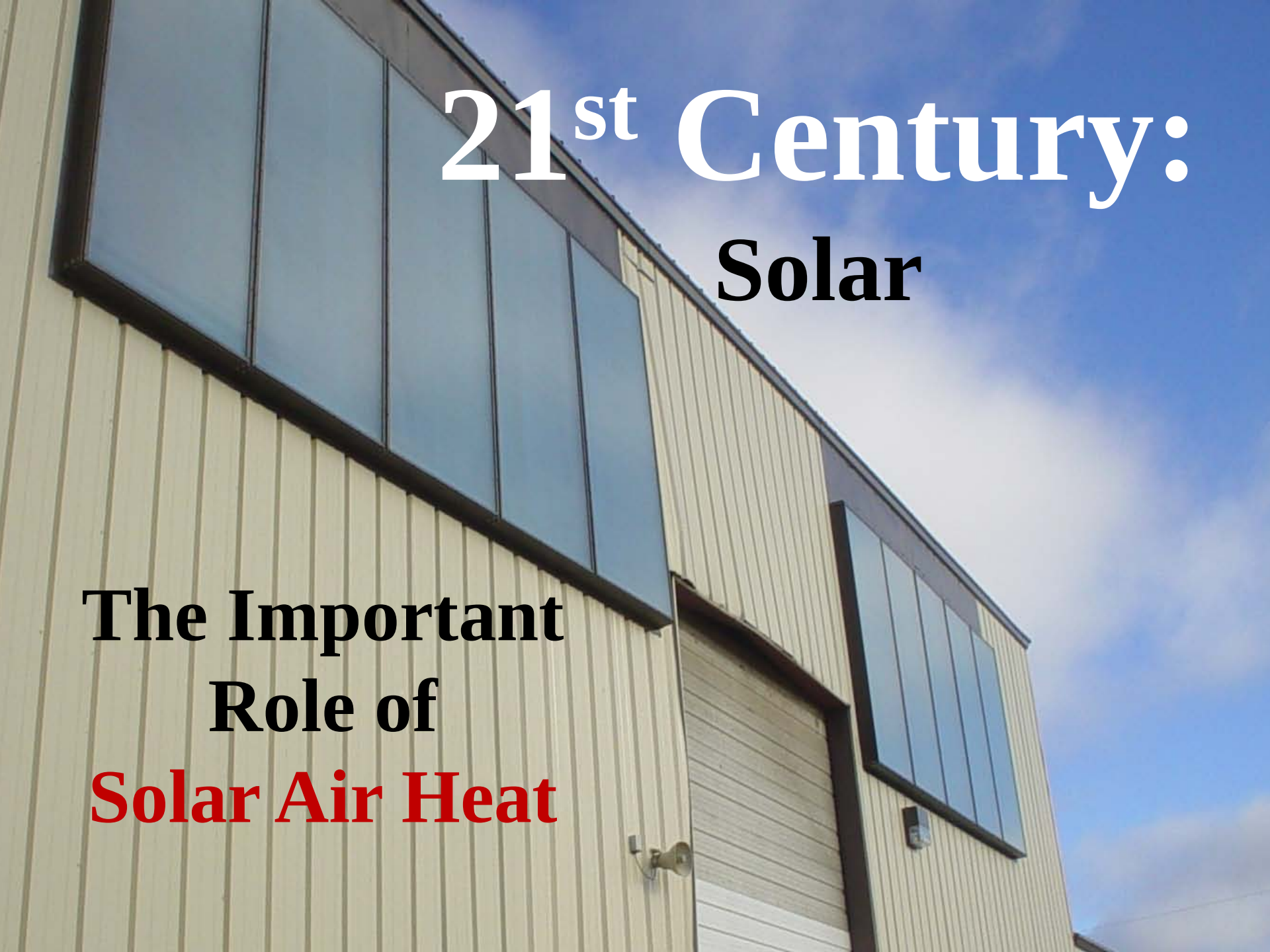
The Pyramid of CONSERVATION

residential version

"A Foundation in Energy Efficiency"





21st Century:

Solar

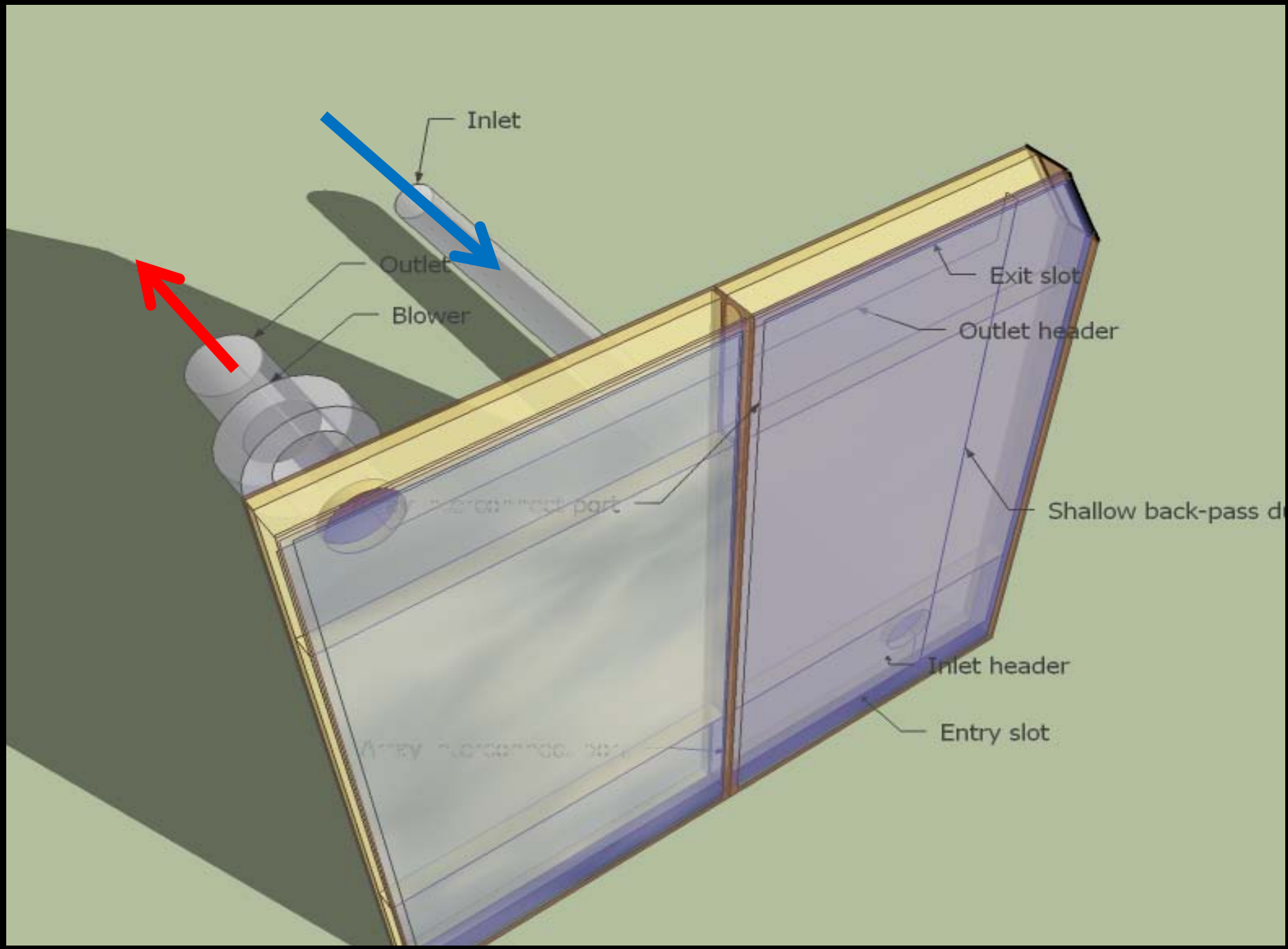
The Important Role of Solar Air Heat

Applications for Solar Air Heat:

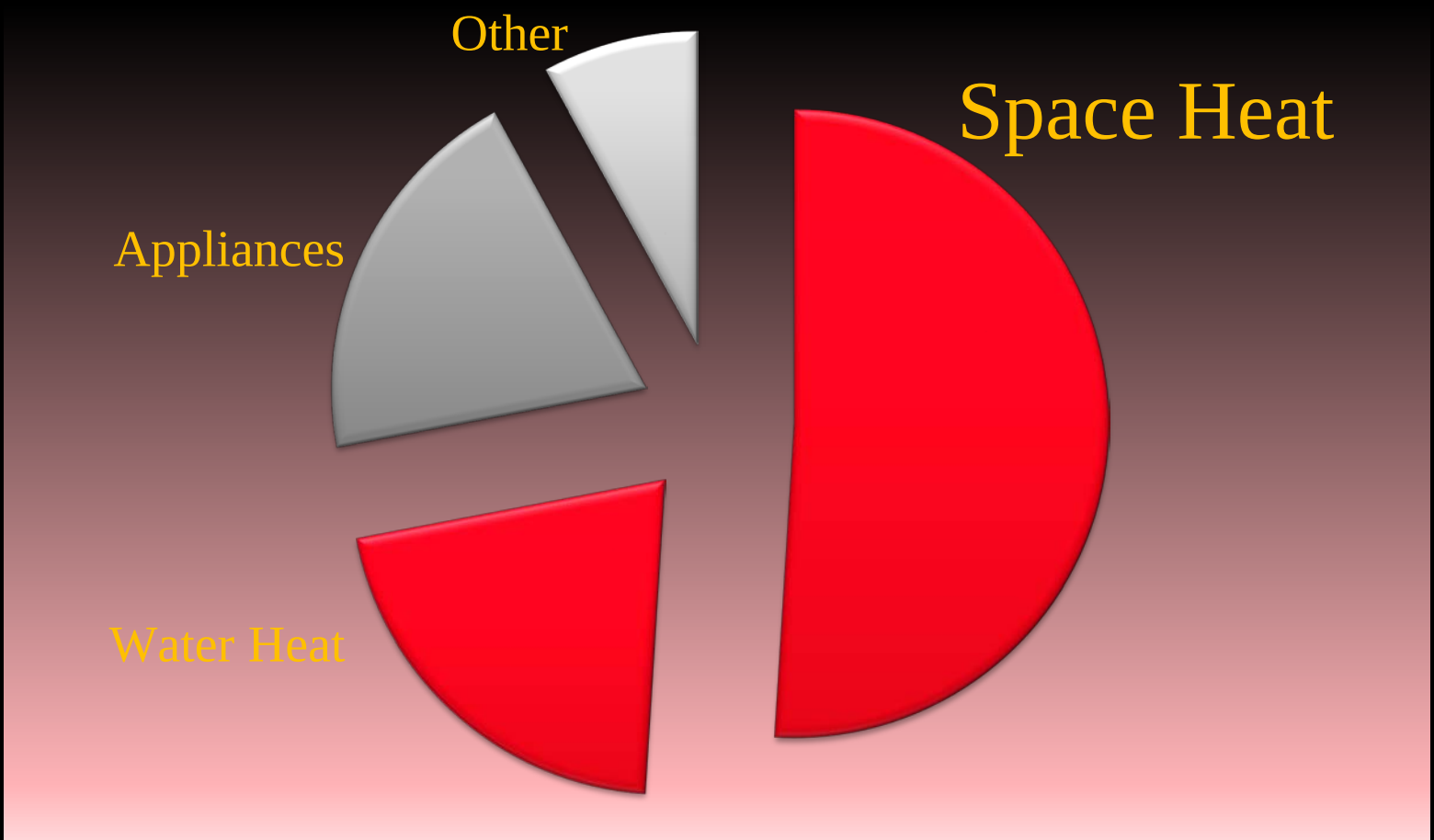
Agricultural

Ventilation Make-up and Process Heat

Space Heating


Inlet
Outlet
Blower
Exit slot
Outlet header
Shallow back-pass d
Inlet header
Entry slot

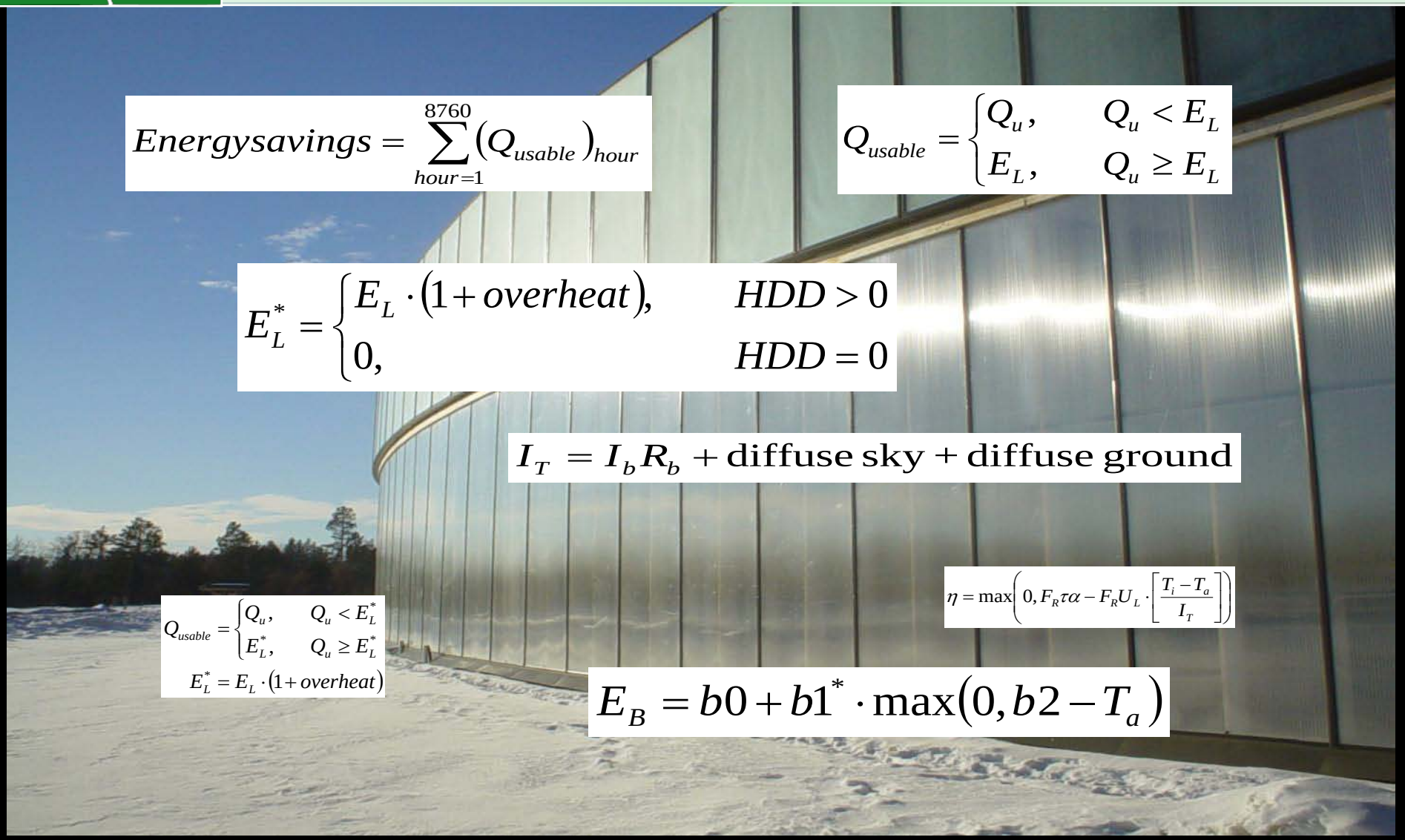
Why Solar Air Heat?



Why solar Air heat?

- Cost Effective
- Efficient
- Accessible
- Serviceable

ENGINEERED SYSTEMS



$$Energysavings = \sum_{hour=1}^{8760} (Q_{usable})_{hour}$$

$$Q_{usable} = \begin{cases} Q_u, & Q_u < E_L \\ E_L, & Q_u \geq E_L \end{cases}$$

$$E_L^* = \begin{cases} E_L \cdot (1 + overheat), & HDD > 0 \\ 0, & HDD = 0 \end{cases}$$

$$I_T = I_b R_b + \text{diffuse sky} + \text{diffuse ground}$$

$$\eta = \max\left(0, F_R \tau\alpha - F_R U_L \cdot \left[\frac{T_i - T_a}{I_T}\right]\right)$$

$$Q_{usable} = \begin{cases} Q_u, & Q_u < E_L^* \\ E_L^*, & Q_u \geq E_L^* \end{cases}$$

$$E_L^* = E_L \cdot (1 + overheat)$$

$$E_B = b0 + b1^* \cdot \max(0, b2 - T_a)$$

Solar Air Heat

Residential Examples

Case Study:
Commercial High Mass Building

Case Study 2: Commercial High Mass Building

80% Efficient Propane Furnace

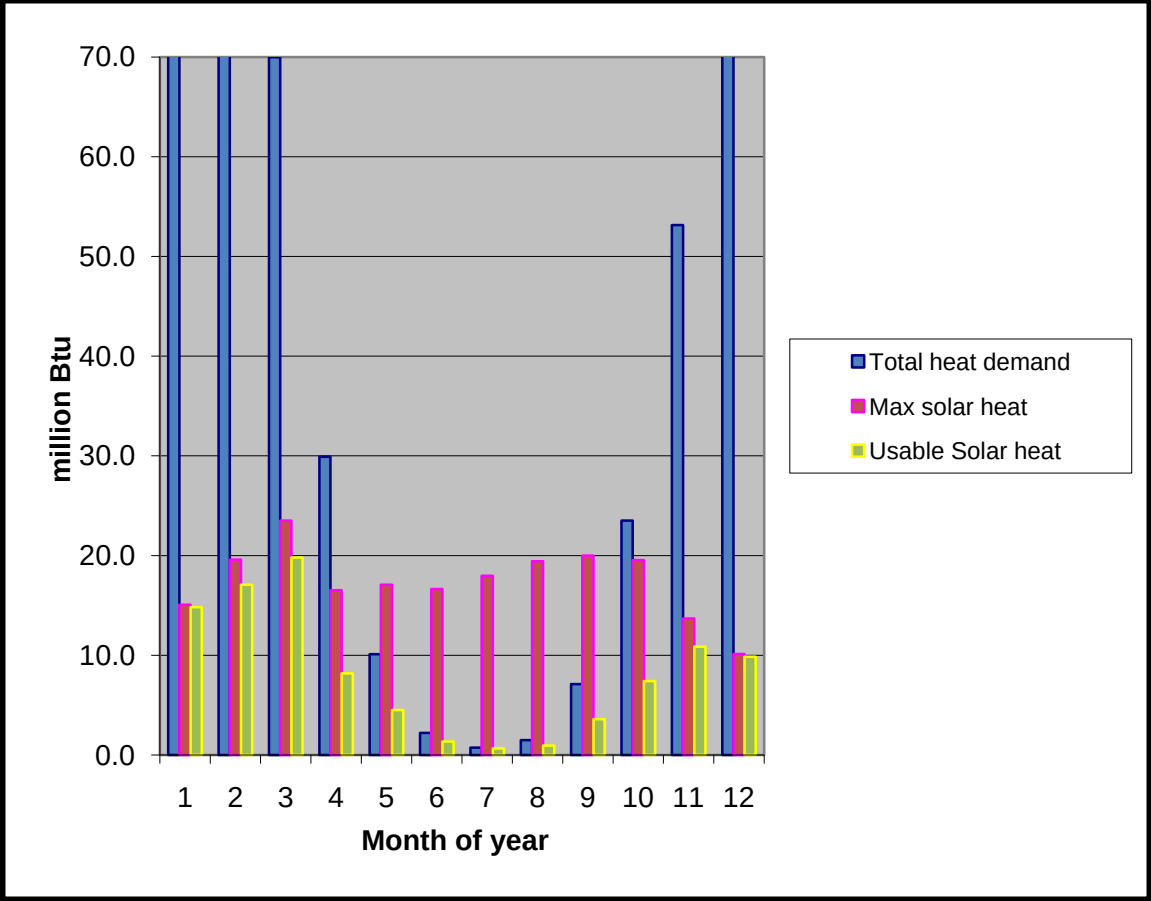
6400 Sq Ft. w/ 16’ Ceilings

Quality construction – good envelope

25– 4x10 High Quality Collectors

- 21% solar fraction
- 99.1 mmBtus produced by solar
- 123.9 mmBtus saved
- Installed cost - $45,000
- Payback of 11 years against propane
- Payback of 17 years against natural gas

Case Study 2: Commercial High Mass Building



Future Heating Costs

Greenhouse Gas Emission Reductions

Residential and Commercial Space Heating Accounts for 40% of CO2 Emissions!


RREAL
Rural Renewable Energy Alliance