National Programs

- Steve Badan Resnet = HERS Index
- Sam Rashkin Building America = net 0
- Al Cobb Passive House
Regional Areas
House as a System Approach

- Solar thermal coll. (optional)
- Super insulation
- Triple pane double low-e glazing
- Supply air
- Extract air
- Ventilation system with heat recovery
- Ground heat exchanger
HVAC
HVAC
Team Understanding of Each Other
What do YOU Need to Know About HVAC

- Regionally Specific at times
- Air Source Heat Pumps
- Ground Source Heat Pumps
- Furnace- AC Combo
- Gas-Electric-Solar-Wood-Wind
- Air To Air Exchanger ERV-HRV
- Intake only- Exhaust Only
System Design Start

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<th>ACCA System Design Process</th>
<th>ACCA Residential Manuals</th>
<th>ACCA Commercial Manuals</th>
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What YOU Need to Know About HVAC Sizing

- Start with a MANUAL J = heat or cooling load
- Critical to size any system correctly to your type of construction
- Look for Correct Address +zip-building tightness-fireplaces-temp settings-windows-WALLS-foundation
- Lousy Design = Lousy Comfort
What YOU Need to Know About HVAC Sizing

- Manual S = Size choose correct appliance
- Manual D = Duct design (if applicable)
- Choose a company that asks questions and can offer suggestions and implement the design
Manual D & S

Manuals D & S must be ACCA approved software
What YOU Need to Know About HVAC Options

- Equipment
- Air Source Heat Pumps
- HSPF rating
What YOU Need to Know About HVAC Options

- Ground Source Heat Pumps
- COP rating
What YOU Need to Know About HVAC Options

- Equipment
- Furnace AC combo
- ECM Motors –zoneable-SEER rating (higher the better)
- 97% of the world's supply of it is in the USA
What YOU Need to Know About HVAC Options

- Radiant Heat
- Electric or Gas, oil, wood
- Made to Zone
- Heats Objects not Air
What YOU Need to Know About HVAC Options

- Mini-Split AC
- No Duct work
- Zonable by design
What YOU Need to Know About HVAC

- Solar thermal
- Climate driven?
What YOU Need to Know About HVAC Design

- Ductwork
- Balanced air flow to design Critical

Fig. 60 Typical section of reducing trunk system
Ductwork

- Kitchen Exhaust Hood
- Bath Fans
- Dryer Exhaust
- Radon Exhaust
- Garage Exhaust?

Most tight homes will run under negative conditions at least periodically - is it designed to operate under that condition?
Ventilation

- ASHRAE 62.2
- Bigger isn’t better

\[
Q_{\text{min}} = 0.01A_{\text{floor}} + 7.5(N_{\text{bed}} + 1)
\]

where

- \( Q_{\text{min}} \) = ventilation flow rate, cfm
- \( A_{\text{floor}} \) = floor area, ft²
- \( N_{\text{bed}} \) = number of bedrooms; not to be less than one

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<td>&lt;1500</td>
</tr>
<tr>
<td>1501-3000</td>
</tr>
<tr>
<td>3001-4500</td>
</tr>
<tr>
<td>4501-6000</td>
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<tr>
<td>6001-7500</td>
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<tr>
<td>&gt;7500</td>
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Ventilation

- Air to Air Exchanger ERV vs HRV
- Exhaust Only
- Intake Only

- YOU MUST MECHANICALLY EXCHANGE A SET AMOUNT OF CFM
Ventilation

- ERV vs HRV
- Energy vs Heat
- It’s the core that counts
- Balanced?
- Duties?
Ventilation

- Exhaust Only
- Less than 1 sone
Ventilation

- Intake only
- Must be controlled
Ventilation

What happens when cost is the only driver
Commercial Systems

City Multi
Gypcrete is typically for Fire protection can be the base for radiant floor heat.
Commercial Geothermal

- Bigger loads can shorten paybacks
- Directional boring or drilled wells minimize impact on lot
Sips Help all of these Strategies

- Tighter envelope = less load
- Tighter envelope = Improved ventilation from designed areas
- Effective in all Climate zones