Exterior Energy Use & House Size

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Exterior Energy Use & House Size

- Uses
- Energy Consumption
- Modelling
- Mitigation
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Exterior Energy Uses Identified:

- Snowmelt
- Pools
- Spas
- Icemelt
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Consumption and Prediction Variables:

- Temperature
- Wind Speed
- Snowfall
- Solar Gain
- Use Patterns
- Microclimate
- Utility Rates
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Mandatory Requirements:

- Controls
- Sensors
- Insulation
- No idling
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Mitigation Considerations:

- Fees
- Renewable Energy
- Btu/Btu Production
- Efficiency Bonus
- Year Round Production
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How do we determine Allowable Exterior Energy Use?

Per square foot?

• Per House?
• Per Lot?
• Per Capita?
• Per Bedroom?
• Energy Balance?
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How Much Energy Does Each One Use?

- Snowmelt- 81,000 Btu/sf *yr
- Pools- 332,000 Btu/sf*yr
- Spas – 430,000 Btu/sf*yr
- Icemelt-Unknown

*Pitkin County Numbers
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Exempt Areas/Fees in Lieu:

- Snowmelt: 200 sf / $33 per sf
- Pools: 0 / $136 sf
- Spas: 64 sf / $176 per sf
- Icemelt?
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Trade Offs:

- On site vs. Off site
- Solar Thermal
- Photovoltaics
- Wind
- Heat Pumps
- RECs
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Effectiveness:

• Solar Thermal-1:1 Oversized in summer
• Photovoltaics-3:1 Bonus Year round effectiveness
• Wind-Site specific
• Heat Pumps-2:1 Bonus Trade off
• RECs-Acceptable mitigation?
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Solar Thermal

- 1:1 Credit
- 60kBtu/day for 2-4'x8' flat plate, Max Credit Allowable
- 3.3 sf of solar thermal/sf of snowmelt
- Cost $100 per sf
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Photovoltaics

- 3:1 Credit
- 10 watts per SF
- Cost $5-$10 per sf depending on incentives
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Solar Thermal Caps for Credit

- Solar DHW- 2 Panels
- Solar Thermal for Heating-4 Panels
- SPA tied ST-2 Panels
- Pool tied ST-4 Panels
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Large Houses:

• > 3000 sf
• > 5000 sf
• > 8000 sf
• > 10,000 sf
• Flat Line or Ratcheting?
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- Flat Line or Ratcheting?
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- Stepped?
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ASHES Study
Climate Mitigation Services

- 2nd homes use as much energy per square foot as standard homes, even though they are occupied only a small portion of the year, due to exterior energy consumption.
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Exterior Energy:

• Privilege or Right?
• Un-American to Limit it?
• Immoral to use it?
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What is needed?:

• Monitoring Data from snowmelt installations
• Additional Research