

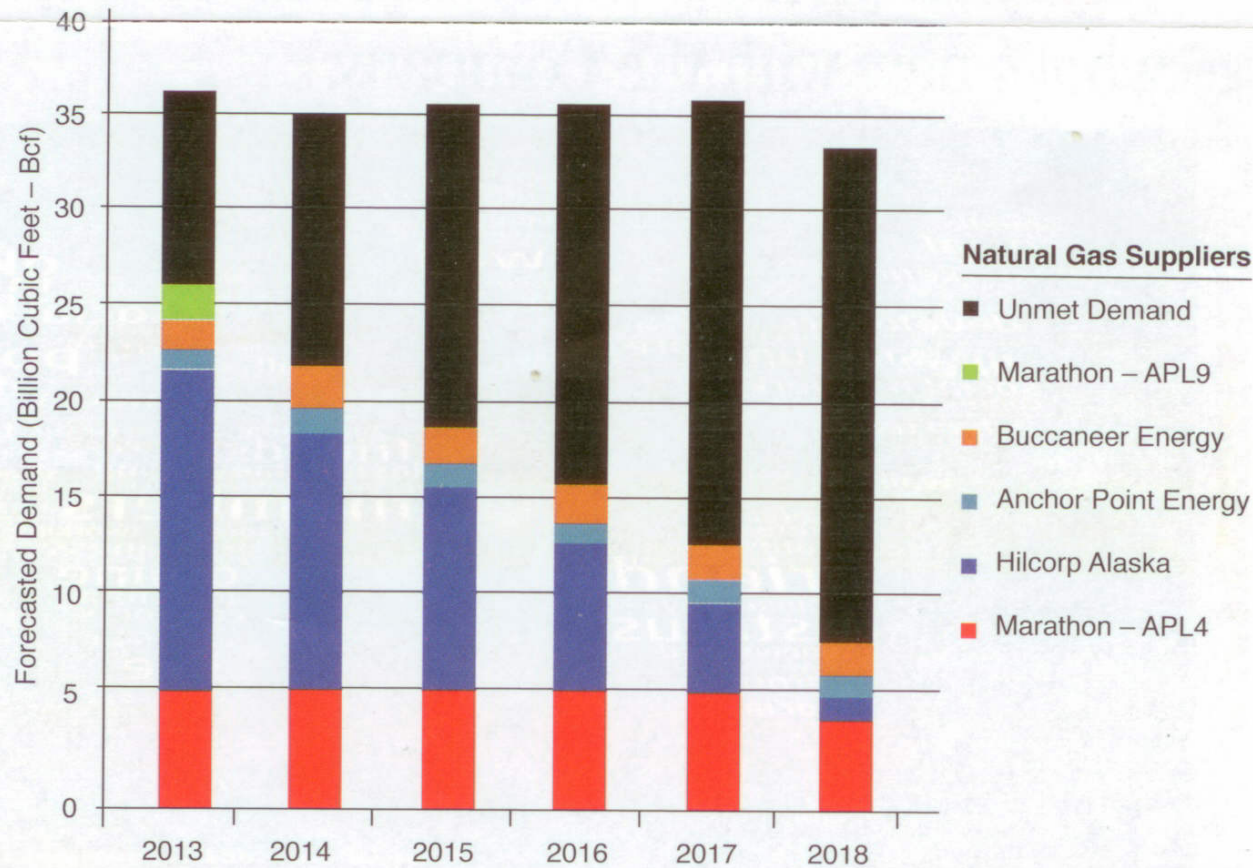
# Thermal Remodeling Wasilla, Alaska

Harvey Bowers  
[harvey@agateinn.com](mailto:harvey@agateinn.com)



# Southcentral Alaska Future Energy Outlook

**ENSTAR Supply and Demand Forecast for 2013 and Beyond.**



# Goals

- Determine needs and budget
- Plan thermal remodel to avoid future energy remodels
- Include current/future plans for alternative energy where possible (Net Zero Ready)

Examples: Farm Electric Panel;

Solar Thermal piping into the envelope

# Planning Tools

- Modeling helps make right choices and saves money
  - Passiv Haus Wufi Program
    - NREL BeOpt2
- Analyze options vs. costs vs. skill level
- Consider future maintenance and durability
- Keep water out (good flashing details)

# Bowers Home Remodel Case #1

Built – 1976

Four thermal remodels over 30 years



South view - before remodel

Still to do.....  
Thermal shutters  
Ground level remodel  
Complete interior finish



South view – December 2012  
60,000 btu solar thermal  
3 KW solar PV



# Remodel Steps



South wall removal



Support beam added



New Framing



# Remodel Steps



South wall insulation before new windows



New windows and siding



North roof remodel



North  
Side



# Summary Bowers Home

- Project started fall 2009
- 3,200 s.f. total living area
- Windows R-2 to R-7
- Walls R-19 to R-60
- Ceiling R-40 to R-60
- Doors R-7 to R-13
- Basement floor R-0

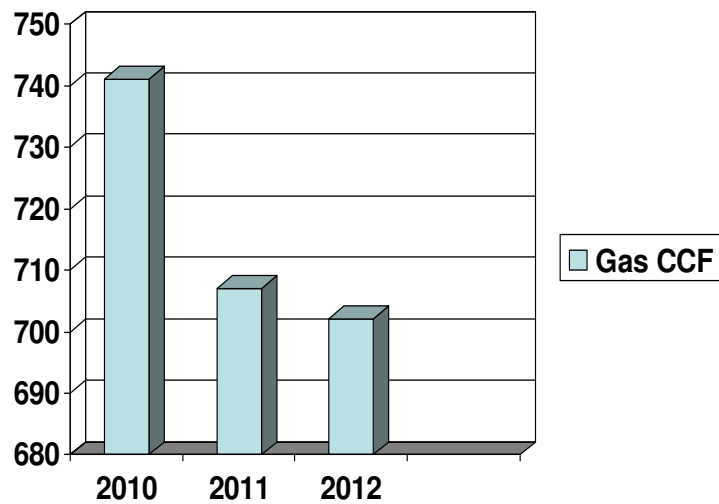


# Bowers Home Remodel Cost

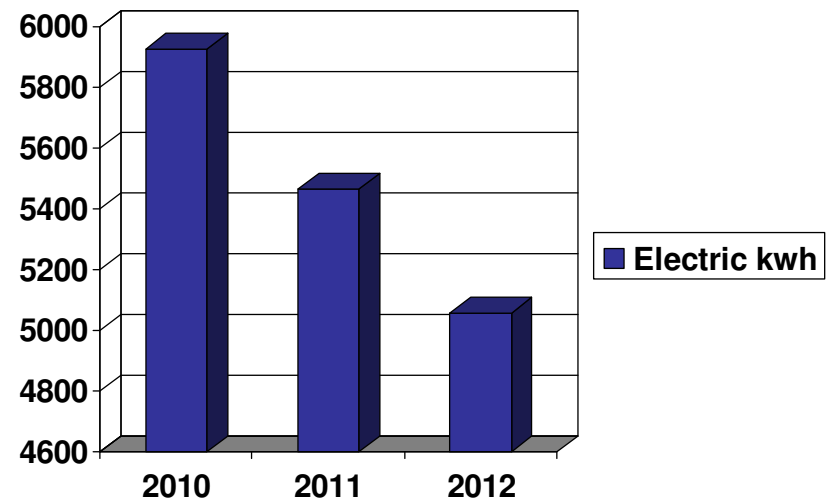
- \$40,000 total budget
- Walls & siding \$13.50/s.f. (half was labor cost)
- Ceiling \$13.50/s.f. including labor
- Windows < \$50/s.f. Fiberglass, triple pane, low E, argon gas
- Doors \$25/s.f. average
- Lights/Appliances/Pumps/Motors \$3,000  
(including HRV cleaning)

# Bowers Home Energy

## Natural Gas



## Electric Purchased



# Agate House Remodel Case #2



Before

West wing added  
in 2000

East wing remodel  
2010 to 2011

West side –  
2 x 6 + furring

Walls R-32

Ceiling R-56

Windows R-7

Foundation R-10

East side –  
2 x 4

Walls R-13

Ceiling R-13

Windows R-1.5

Foundation R-0.5

Built – 1975  
West wing not included in  
thermal remodel



After – Summer 2011

# Foundation Details

- 9" extruded insulation
- R-45 to footer
- Drainage layer and Cement board at grade





# Wall Preparations

- Added Vapor radiant barrier
- Added ½" sheathing
- Extended windows with cement board
- Replaced oldest R-1 windows with fiberglass windows



An ACAT hands-on workshop



# Insulation, Rain Screen, Siding

- 6" insulation board
- 4" furring strips, every 16"
- Perforated radiant barrier
- Hardiboard cement siding



# Summary Agate House

- Project summer 2011
- Heated remodeled space 2,080 s.f.  
(West wing, 3,000 s.f. no changes)
- Windows R-1.5 to R-7
- Walls R-13 to >R-43
- Ceiling R-13 to R-50
- Foundation R-0.5 to R-45
- Crawlspace floor R-0

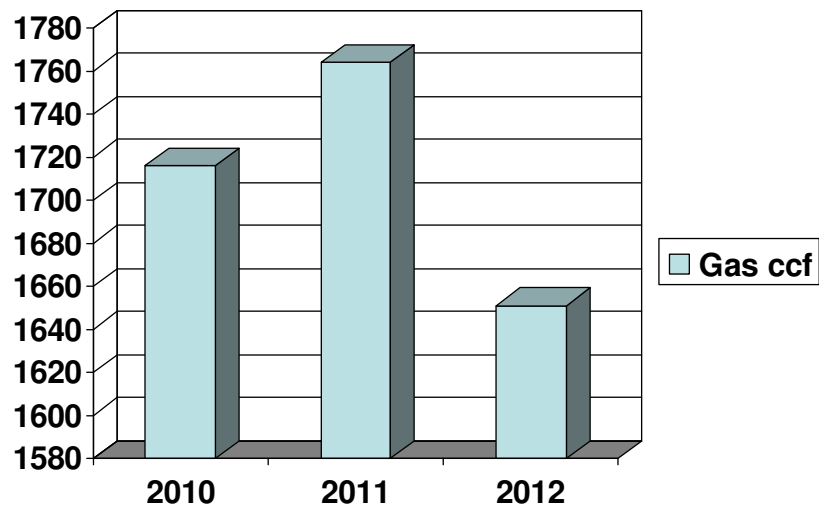
# Agate House Remodel Cost

- \$25,000 total budget
- Walls & siding \$13.50/s.f. (half was labor cost)
- Ceiling < \$13.50/s.f. including labor
- Windows < \$50/s.f. Fiberglass, triple pane, low E, argon
- Foundation \$13.50/s.f.
- Lights/Appliances/Pumps/Motors \$3,000
- HRV Venmar EKO 1.5 \$3,500

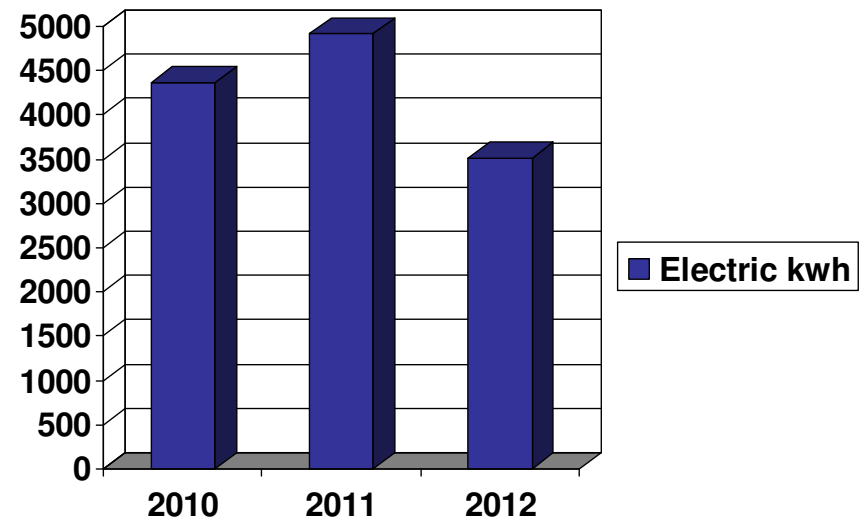


# Agate House Energy

## Natural Gas



## Electric Purchased



Gas furnace – 1985 Day/Night

Gas boiler/DHW – 2001 Weil-McLain Gold

Two gas fireplaces

1975 Electric heat still functioning in one bath and one bedroom

2013 solar thermal installation and equipment upgrade planned

# Susitna Cottage Case #3

Built – 1980



Before

Built as summer cabin  
Electric heat



Current remodel

# Foundation Details

- 9 inches R-45 extruded insulation
- 8 feet to footer
- 2 foot horizontal sloped - 3" board
- Drainage layer
- Cement board extends from 6" below grade

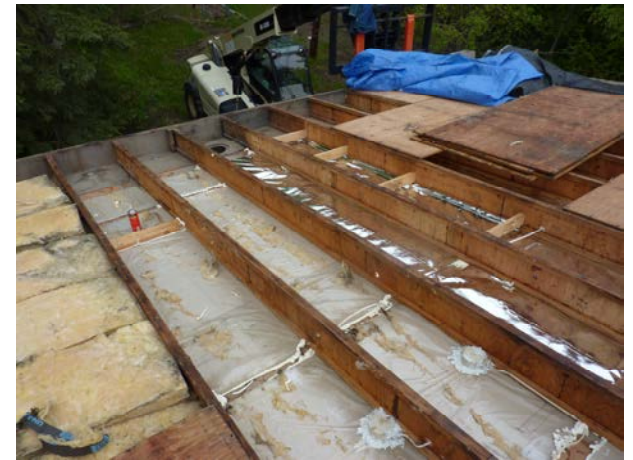


# Roof Details

## Old roof insulation removal and sealing air leaks



Dark area on fiberglass batts is dirt from air leakage



New radiant vapor barrier in bottom of joist bay  
All penetrations sealed with duct sealant



# Roof Details

- Radiant barrier
- 9" spray foam insulation
- 1" to 1/2" ventilation
- Replaced old 5/8" CDX
- Underlayment
- Re-installed metal roofing



# Wall Detail

- Tyvek
- 6" Insulfoam
- 4" furring strips
- Perforated radiant barrier
- Hardiboard cement siding



Furring strips



Air barrier, insulation  
Old electric meter base  
replaced with breaker  
box



Prep for final siding



# Window and Finishing Details

- 3/8" gap edge between window and foam to accommodate siding
- 15 degree slope on bottom sill
- Furring strips to edge of foam
- Perforated radiant barrier to edge
- Hardiboard cement siding wrapped into window frame



# Summary Susitna Cottage

- Project started fall 2011
- Heated space 1,500 s.f.
- Windows R-1.5 to R-7
- Walls R-13 to >R-43
- Ceiling R-19 to R-65
- Foundation R-0.5 to R-45
- Crawlspace floor R-0

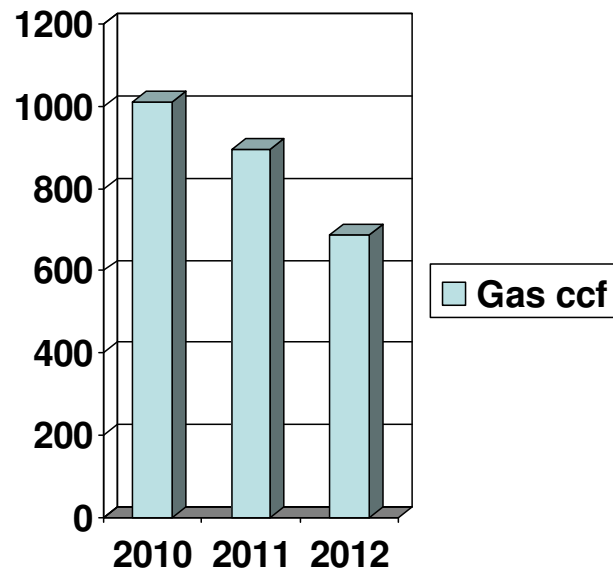


# Susitna Cottage Remodel Cost

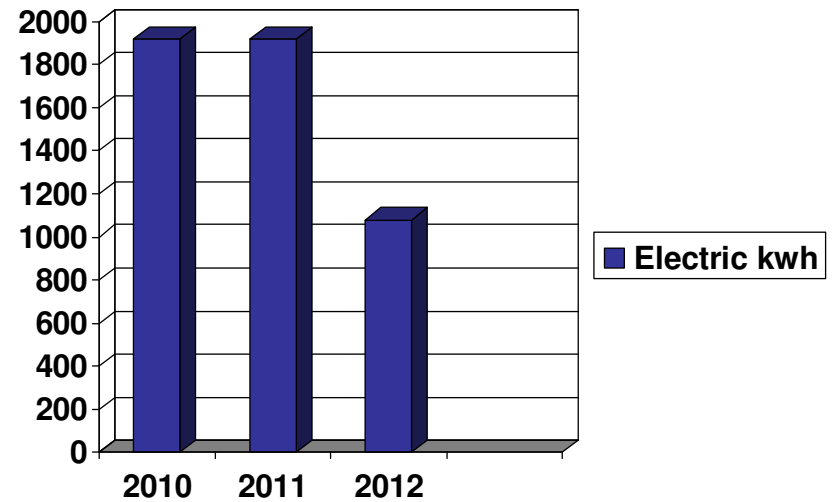
- \$35,000 total budget
- Walls & siding \$13.50/s.f. (half was labor cost)
- Ceiling \$13.50/s.f. including labor
- Windows < \$50/s.f. Fiberglass, triple pane, low E, argon
- Foundation \$13.50/s.f.
- Lights/Appliances/Pumps/Motors \$2,500
- HRV Ventaire (reconditioned) \$1,500

# Susitna Cottage Energy

Natural Gas



Electric Purchased



# Other Options

- Solar Decathlon 2012



Vinyl insulated house wrap



# Summary

- Flexibility for heating system choices (may not need delivery system)
- Very small electric or solar combination heater may meet heating needs
- Paybacks – reduced heating system maintenance and replacement; energy savings; greater comfort with less outside noise; less chance of damage during prolonged utility outages
- Possible combined HRV and heating
- Net Zero is possible (hinges on occupants' life style)