“Promoting and advancing the development of healthy, durable, and sustainable shelter for Alaskans and other Circumpolar people.”
CCHRC Research and Testing Facility

LEED Platinum

SIEMENS
Runner-up
Smartest Building in America
Research Programs

Building Envelopes & Materials

Energy & Mechanical Systems

Policy & Program Development
Building Envelopes and Materials

Leader in “Green Building Standards”
Advancing Building Science
Net Zero-Passive House

Alaska can lead
Indigenous Wisdom for our dilemma in time

FIRST NEEDS

- Water
- Food
- Shelter

Archives, University of Alaska, Fairbanks
Sustainable Northern Communities

Building Alaska’s Future Together
The Need

32.5% of the housing stock is considered in need of major repair or falling apart.

74.4 % of households are considered drafty.

21.8% of households are unable to maintain 70° F on cold days in the winter.

37.4% of households reported having mold or mildew in the home.

Fuel oil prices reach as high as $10/gallon.

55.9% of households have income less than $20,000.

Arctic is changing, 184 Alaskan communities threatened by erosion.

Natural disasters are becoming more frequent.
Charette = Listen
Charette - Creating
Design
SNS Prototype Floor Plan
Energy and Cost Efficient

- Earth berming
- Sod
- Waste water treatment
- Heating and ventilation
- Alternative energy
- Lighting
Sustainable Northern Communities

“We need housing. Our young people have no place to live.”
George Paneak (1950-2009) Former Mayor of Anaktuvuk Pass

Design Challenges
• 16,000 HDD
• Electricity $.60/kWh
• Heating Oil $8/gallon
• 1,400 gallons/yr.
• New house is $750,000
• Last house built ten years ago
• Context appropriate housing
• Transportation costs

Construction Outcomes
• Cost significantly less than new home quotes
• 130 gallons fuel annually
• Completed in four weeks
• Local work force
• Approaches net 0
Tagiugmiullu Nunamiullu
Design Charettes
Tagiugmiullu Nunamiullu Housing Authority

- Insulated thermal raft foundation
- All utilities incorporated
- Light, energy efficient, lower cost

- Walls: Steel studs with plastic offsets
- R-60 spray foam insulation
- Metal siding
Tagiugmiullu Nunamiullu Housing Authority
Quinhagak
Design Charette
Quinhagak House Construction
Quinhagak House - Performance

- 130 gallons fuel oil first winter
- Superior indoor air
- Built in 6 weeks
- Local labor force
- Light materials
- High owner comfort
- Significantly less cost
- Durable
Quinhagak House becomes the people’s
Quinhagak House becomes the people’s

120 gallons to heat
Warm, healthy, affordable
Crooked Creek- SNS Immediately

Flooding in May 2010

Photo by John Madden
Crooked Creek

It takes a Village
To rebuild a village
The Challenge

• TIME – need 9 replacement homes by winter
• Building above floodplain
• Design must be easy to ship, quick to build
• Single modular design for small cabin and 4-BR house
• Very low cost
Crooked Creek

- Partner Co-ordination
- Materials arriving
- Volunteers Building
- Knowledge being shared
- Finished by Oct. 1
- Follow-up for future
Crooked Creek
Crooked Creek

Quick Assembly
No thermal bridge
Structural

Tight assembly must be ventilated
Annual fuel usage very low
Crooked Creek

An old life in a new home
Atmautluak
Atmautluak
Atmautluak
Atmautluak
Atmautluak
So many challenges we face together
GALENA
GALENA
GALENA- Jen’s Home
GALENA-
Jen’s Home
GALENA-
Jen’s Home
GALENA-Jen’s Home
The University of Alaska’s Sustainable Village

A dynamic and evolving community at the University of Alaska Fairbanks, committed to the tenets of sustainability, demonstrating what can be achieved to secure an enduring future for people of the circumpolar north.
Sustainable Village
“Willow House”
Solar Hydronic Heating

Diagram showing the layout and components of a solar hydronic heating system.
The Future of Housing

What do we want? What do we need? How will we live?

http://www.furniturestoreblog.com/2009/04/30/16_stone_veneer_houses_that_you_must_see.html
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