

A History of the Cold Climate Housing Research Center



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As the Cold Climate Housing Research Center (CCHRC) approaches its 20th year, we are very grateful for the significant effort Anne Rittgers has made to author this comprehensive history of the Research Center. All of the CCHRC staff wishes her well in achieving her Master's at the University of Alaska Fairbanks. This document constitutes the project requirement for the graduate degree. The Alaska Housing Finance Corporation provided funding for Ms. Rittgers stipend and the costs of publication. Our sincere thanks to AHFC for their generous contribution.

It is important that there be a record of the efforts of the many talented people that have worked toward making the research center a success. That success has been measured over the years by the improvement to people's lives through energy efficient, durable and affordable housing. While many individuals are referenced here for their contribution to CCHRC and the history of improving housing in Alaska, we have missed many. We hope that those that weren't included in this narrative will realize that there was only so much that could be done in a limited time frame.

The First Alaskans, for thousands of years, were successful in creating sustainable shelter in some of the most severe climates on Earth. From that success, rich cultures developed with a strong tradition of vital communities and healthy families. Unfortunately, in just the last century, the introduction of inappropriate buildings from new arrivals have replaced time-proven traditions. The result has been a legacy of unhealthy, inefficient and structurally compromised homes. The CCHRC was established to reverse that trend. As well as revisiting the traditional successes of the past, it is important to embrace the technologies and advancements in building science evolving in the early 21st century. The greatest success will occur through indigenous wisdom and the embracing of current technologies to enhance that timeless knowledge. Alaskans should be proud that they are now building among the best high performance, healthy homes in the Circumpolar North.

We hope you enjoy reading and becoming familiar with who we are and where we came from. We would also like you to contribute to our progress and invite First Alaskans and more recent Alaskans to stay in touch with us, keep an eye on what we're doing, and add your invaluable creativity to the successes we're trying to build.

A handwritten signature in black ink, appearing to read 'Jack Hebert', with a stylized, looped 'J' and a horizontal line extending from the end of the signature.

Jack Hebert, Founder/CEO
Cold Climate Housing Research Center

INTRODUCTION

This project presents a history of the Cold Climate Housing Research Center (CCHRC), a nonprofit organization based in Fairbanks, Alaska. Long before CCHRC's inception in 1999, the energy efficiency movement was active across the state. Because Alaska is a "small" state, the individuals involved in this industry tend to know one another well. Many of the people who were involved in the formation of CCHRC have been working in Alaska's housing industry for their entire careers and have devoted tremendous energy to addressing the housing needs in the state in a variety of industries, including homebuilding, banking, policy making, and engineering.

Throughout this project, I have been impressed by the dedication to solving Alaska's housing challenges among the cast of characters I interviewed. Many of them identify deeply with the organization, as reflected in how so many still refer to the organization as "we." I am impressed by what a small group of people with drive and a vision can accomplish in this state.

The value of my project is threefold: 1) to the people of the Cold Climate Housing Research Center, it records institutional knowledge; 2) to the partners of CCHRC, it shares and celebrates the spirit of collaboration that has driven so many of the projects at this organization; and 3) to a broader audience of the Circumpolar North, the project offers an opportunity to learn from the history of an organization whose mission addresses a core need of Arctic residents.

The project represents a partial fulfillment of my Master of Arts in Arctic and Northern Studies degree from the University of Alaska Fairbanks. The project idea came about over a conversation with Jack Hébert, Founder and CEO of CCHRC. He discussed the need for a recorded history of the

Cold Climate Housing Research Center. Since its inception, CCHRC has transformed from a group of homebuilders seeking methods and products in their homes to stand behind to a well-established institution in the state of Alaska. In just twenty years, CCHRC has built a research and testing facility to house its operation that itself stands as a demonstration of building science in the North. The organization has an extensive track record of building science research projects, building prototype homes across the state, providing permanent housing in the wake of natural disasters, and helping evolve energy efficiency policy standards.

As the Founder/CEO, Hébert has spent nineteen years at the helm of the organization. His career over this time has evolved from homebuilder to nonprofit leader, and he is beginning to plan a transition out of the CEO role. The timing of the history project during this transition is intentional, as Hébert is the only employee who has been with the organization throughout its entire history. He is thus the institution's foremost knowledge holder. This project documents the stories and experiences of how the Cold Climate Housing Research Center came into existence, and how it has evolved in the last nineteen years.

METHODOLOGY

During the summer and fall of 2017, I interviewed twenty-five people who had been integrally engaged in the work of the CCHRC. I selected interviewees based on their close affiliations with the organization, either as board members (past or present), employees or former employees, founding members, Alaska Housing Finance Corporation (AHFC) former or current employees, or members of other closely affiliated organizations. In some cases, individuals filled multiple roles over a lengthy affiliation with CCHRC. I identified nearly all at the beginning of the project, and some later through the snowball method. I applied for approval from the University of Alaska Fairbanks's Institutional Review Board (IRB) in June 2017. I submitted a full explanation of my project, including interview questions, to the IRB. On June 22, 2017, the IRB approved this research project as exempt. All interviews took place between July 5 and December 13, 2017. I conducted semi-structured interviews to allow for a series of standard questions to guide the interview, while retaining the flexibility to ask follow-up questions and tailor the interviews to each interviewee. Of the twenty-five interviews, I conducted seventeen in person and eight over the phone. In-person interviews took place at the CCHRC, at a local library, and in interviewee's offices and homes. I audio-recorded all the interviews, with participant consent, and later transcribed them myself, aided by Trint, an online transcribing service. For a fee, Trint provides a computer-generated transcript of an audio recording. The original computer transcription contains many errors; within the Trint program, I listened to each interview and corrected the transcription inaccuracies. When all interviews were transcribed, I analyzed them for themes using a qualitative data analysis method. In addition to coding direct responses to the set interview

questions, I identified relevant themes that arose in multiple interviews. Examples include the role of the late Senator Ted Stevens, the boom and bust cycles of Alaska's resource-driven economy, and the role of Canadian research partnerships in Alaska's building industry in the 1980s and 1990s.

My interviewees were almost exclusively male, reflecting the gendered demographics of the building industry in Alaska at the time of events. I attempted to interview two additional females, but their schedules did not permit it. Currently, the staff of CCHRC is over 50 percent female, perhaps reflecting a shift in the demographic makeup of the housing industry in Alaska.

I am grateful to all the individuals who generously gave of their time to share their stories and experiences, without which I could not have produced this history. Owing to the scope and timeline of the project, I was not able to interview everyone who was involved in the formation of this organization and its evolution. Many interviewees recommended other people to interview whom I did not have the time to approach. Given the parameters of a Master's project, I was not able to interview all individuals who could have contributed. I am struck by the vast number and geographical distribution of people who over time, in one way or many, aided the establishment and work of this organization.

I also want to acknowledge and thank the Alaska Housing Finance Corporation (AHFC) and the Cold Climate Housing Research Center (CCHRC), which have funded this project.

STUDY LIMITATIONS

Three limitations to this project bear mention. First, owing to project timeline constraints, I was not able to interview every individual who has been involved in the establishment of the CCHRC, as discussed above. The stories captured during interviews, together with numerous published and unpublished documents, have permitted me to produce an authentic narrative of the organization's history. I recognize that additional voices could have enhanced the final product.

Second, in some cases, temporal distance from interview topics led to some interviewees' difficulties in remembering specific details of events and general timelines. To account for any possible chronological confusion, I constructed a timeline of milestone events in CCHRC's history using published newsletters, annual reports, and research reports to verify dates and other technical details. I also validated responses through accounts from multiple interviewees.

Lastly, my personal relationship to the organization could be viewed as a limitation. I have close personal relationships with Jack Hébert and others associated with CCHRC. I do not believe that I allowed these friendships to influence my work on this project or my analysis of the organization's history. Rather, I found these relationships to facilitate my conducting this research, as they fostered trust with project partners.

LIST OF INTERVIEWEES

Bill Allen
John Anderson
Mimi Burbage
Bryan Butcher
Aaron Cooke
Colin Craven
John Davies
Chuck Dearden
Corey DiRutigliano
Oliver Drerup
Terry Duszynski
Marquam George
Jess Hall
Jack Hébert
Mark LaLiberte
Brent LeValley
Dave Miller
Mike Musick
Clai Porter
Chuck Renfro
Rich Seifert
Mac Sheldon
Scott Waterman
Alan Wilson
Steve Wisdom



The CCHRC research and testing facility under construction. Photo credit CCHRC archives.

THE NEED FOR COLD CLIMATE HOUSING

For generations, Alaska Native groups have constructed shelters adapted to local environments to escape the elements. Pre-contact homes in Alaska were made with regionally available materials, sized appropriately by region for energy efficiency and fuel sources; and they reflected culturally appropriate designs. Western contact brought changes to shelter in Alaska. With the arrival of non-Native migrants, standards for housing of all Alaskans changed.

Perhaps most notably, changes impacted occupant health. Tuberculosis contributed to high death rates among Alaska Natives throughout the state. Early visitors, including missionaries, often commented on the links between housing and occupant health. The semi-subterranean homes of the Inupiat and Yup'ik groups along the coast were noted as cold, damp, overcrowded, and poorly ventilated. In *Chills and Fever*, physician Robert Fortuine discusses several accounts from teachers, doctors, and military personnel that describe the homes as smelly and smoky due to fires inside.

Native homes, according to the early narratives, were often crowded, dirty, and poorly ventilated, to the extent that some visitors were unable to remain inside for more than a few minutes. And most of these visitors were themselves used to the crowded, smelly accommodations on board ship and thus must have had a rather high tolerance for poor hygienic conditions.

... A much later writer noted that the constant exposure in their houses to dampness, dirt, and cold made them unusually susceptible to pulmonary disease.¹

In *Walter Harper: Alaska Native Son*, Mary Ehrlander writes about housing conditions through the eyes of Hudson Stuck while he was shadowing a medical missionary in Barrow. Stuck was distressed by the poor quality of the living conditions and the suffering of the people.

Dr. Spence had practiced medicine for many years before being ordained in the Presbyterian Church just prior to his arrival in Barrow. As Stuck shadowed him on his rounds one day, he agonized over the poor health and living conditions of the people. Many had tuberculosis. Every home had a sheet-iron stove, but the people had no fuel other than seal oil. The cold, crowded, poorly ventilated underground homes would have slowed recovery from any disease, but especially tuberculosis.

Stuck found the health of the Inupiat all along the coast to be 'scandalously neglected.' He was so impressed with the work of Dr. Spence and his wife and with the need for a hospital at Barrow that he later contacted the Presbyterian Mission Board and pled for a hospital. The following summer a ship arrived carrying materials for building the hospital and a supervisor and nurse to staff it.²

Elsewhere in the territory, similar conditions prevailed. Ehrlander writes in her introduction to missionary Albin Johnson's memoir of his service at Yakutat in Southeast Alaska, *Seventeen Years in Alaska*: "Despite these advantages, the Tlingit suffered from the high disease and mortality rates that plagued Alaska Natives following contact with Euro-

¹ Fortuine, Robert. *Chills And Fever: Health and Disease in the Early History of Alaska*. Fairbanks, Alaska :University of Alaska Press, 1989. 32.

² Ehrlander, Mary F. *Walter Harper, Alaska Native Son*. Lincoln :University of Nebraska Press, 2017. 113

Americans, owing to their low immunity and poor sanitary conditions and ventilation in homes.”³ The links between housing and occupant health were clear. As Fortune explains, “Once established in a Native family, the disease soon spread throughout the household because of the crowding and poor ventilation characteristic of most dwellings.”⁴

Despite the regional differences, missionaries made similar recommendations: to westernize Alaska Native housing to improve living conditions and slow or stop the rapid spread of tuberculosis. Alaskans have been trying for decades to strike a balance between a heating level that promotes occupant comfort and a ventilation level that suits indoor air quality standards. In the Interior, Episcopal mission supporters provided windows and doors to area Athabascans who built log homes. As Ehrlander explains, at Nenana, missionary Annie Farthing “urged the area’s Athabascans, who had been living in tents all winter, to build cabins. In support of that advice the church established the Window and Door Fund, which provided two windows and a door for each cabin the people built.”⁵

While missionaries, teachers, and others sought to teach Alaska Natives about sanitation and cleanliness, to reduce the spread of disease, challenges in cross-cultural communication and ethnocentrism may have reduced Native receptiveness to the advice. Fortune notes that in some early accounts, the visitors’ records reflect feelings of contempt or superiority to Alaska Native groups: “Early visitors ... their descriptive comments, unfortunately, usually betray the thinly veiled attitudes of superiority, condescension, or even contempt toward those whom many of them considered to be unenlightened savages.”⁶ With an approach that thinly veils such attitudes, one can imagine the tension in such exchanges.

Decades after responses such as the window and door fund, Alaska’s first policies targeting housing emerged. Following WWII, Alaskans began addressing housing difficulties through research and policy. First, the Alaska Territorial Legislature established the Alaska Housing Authority in 1945. Next, Alaska’s territorial government worked through its congressional delegate Bob Bartlett to achieve the Alaska Housing Act in 1949. This congressional measure created the Remote Dwelling Loan Program, which allotted “character” loans⁷ of up to \$500 for improvement of housing structures in remote villages. Homeowners used the funds for upgrades to flooring, roofing, insulation, and in some cases framing and enclosing a new, small cabin. The Alaska Remote Housing Implementation Plan, published in 1971, credits the program with assisting in the reduction of tuberculosis and respiratory disease rates. Fortune also credits improved housing as one of the factors fostering better health of Alaskans: “Over the last few decades the health of all Alaskans has greatly improved, due to higher incomes, better housing, improved water supplies, more effective treatment methods, and the greater availability of medical care.”⁸ Housing was one of many factors that reduced tuberculosis incidence and death rates.

Within the reports and supporting documents produced over the following decades, craftsmen and bureaucrats identified the greatest obstacles to effective housing posed by the Arctic and sub-Arctic environments. The building challenges changed little over time; recurring themes included climatic, technical, logistical, and social/cultural constraints. Some reports included detailed lists with explanations, while others embedded the challenges within the document narratives. The following pages summarize the findings of several reports.

³ Johnson, Albin, 1865-1947, and Ehrlander, Mary. *Seventeen Years in Alaska: a Depiction of Life among the Indians of Yakutat*. Fairbanks: University of Alaska Press, 2014. XVI

⁴ Fortune, *Chills and Fever*, 259.

⁵ Ehrlander, *Walter Harper: Alaska Native Son*, 27

⁶ Fortune, *Chills and Fever*, 34

⁷ The loans required no collateral – the borrower merely had to demonstrate good character.

⁸ *Ibid*, 318

SELECTED HISTORICAL HOUSING REPORTS

1949: Alaska State Housing Act; Hearings before the Committee on Banking and Currency House of Representatives, U.S. Congress.

Statements from Bob Bartlett (Delegate from the Territory of Alaska), Raymond Foley (Housing and Home Finance Administrator), Kenneth Kadow (Director of the Alaska Staff for the Department of the Interior), the Reverend Paul C. O'Connor (Chairman, Board of Commissioners, Alaska Housing Authority), R. C. Price (Special Assistant to the Assistant Secretary, Department of the Interior), and E. Glen Wilder (Executive Director, Alaska Housing Authority).

The testimony describes the wide variety of housing challenges in Alaska and the need for the Alaska State Housing Act to address these deficiencies and serves as an early example of the difficulty of communicating Alaska's housing challenges to an audience unfamiliar with the conditions within the state.

1965: Studies on Housing for Alaska Natives, Dennis Wik, William Page, Michael Shank. U.S.

Department of Health, Education, and Welfare; Public Health Service. Environmental Sanitation Section, Arctic Health Research Center, Anchorage, Alaska.

This source documents housing challenges in Alaska and describes four experimental homes constructed in the mid-1960s in rural Alaska by the Arctic Health Research Center experimental housing program.

1967: Housing the Alaska Native, Charles Abrams

In 1967, New York-based lawyer, professor, and housing expert for underdeveloped areas Charles Abrams visited Alaska for ten days and reported on the historical context of housing in Alaska, Alaska's current housing challenges, and he offered a variety of recommendations.

1971: Decent Shelter for Alaskan Natives: Goals, Obstacles, Recommendations Alaskan Natives: Goals, Obstacles, Recommendations

– prepared by the Alaska Federation of Natives, under contract to the Alaska State Housing Authority, December 1971

Written by the Alaska Federation of Natives, for the Alaska State Housing Authority, this study outlined housing policy goals by and for Alaska Natives; explained obstacles in context; and offered recommendations for policymakers.

1971: A Study of Housing Requirements for Alaskan Native People HUD Contract H2319, July 1971

Report No. 6 - Phase One Final Report – from the series A Study of Housing Requirements for Alaska Natives. This Phase One Final Report published by a Seattle contracting firm for the Department of Housing and Urban Development contract profiles Alaska Native communities, housing stock, designs, and policy conditions.

1982 Alaskan Statewide Housing Needs Study

- Prepared for State of Alaska DCRA – Division of Community Planning, 1982

This Phase One report, requested by the Alaska Legislature, proposed policy solutions based on the housing delivery system in Alaska in a context sensitive to the state's "unique physical characteristics and cultural diversity."

2017: Housing challenges identified by project interviewees

Interviewees for this project emphasized climate-related problems when asked about Alaska's unique housing challenges.

ALASKA REMOTE HOUSING IMPLEMENTATION PLAN

HOUSING THE ALASKA NATIVE — Abrams

RECENT SHELTER FOR ALASKAN NATIVES ALASKA FEDERAL

A STUDY AND EVALUATION OF ALASKA HOUSING

A STUDY
OF HOUSING
REQUIREMENTS
FOR ALASKAN
NATIVE PEOPLE

NARAMORE,
BAIN, BRADY &

THE CHALLENGES OF BUILDING IN ALASKA

Every postcard description of Alaska highlights the sources of its logistical challenges: Alaska is cold, remote, and vast. The harsh Arctic and sub-Arctic climate poses the greatest challenges to housing in Alaska. Extreme environments and hazards are easy to identify, but difficult to address. For instance, water – in its many forms – presents myriad challenges, ranging from irksome to catastrophic drainage and groundwater problems, coastal and riverine erosion, violent spring break-ups, and even tsunamis. These conditions vary dramatically by region. Changes to climatic conditions, such as reduced sea ice that encourages further coastal erosion, and melting permafrost, have exacerbated the difficulties posed by Alaska's harsh climate.

Technical challenges include how to build on permafrost, where to select and prepare the ideal site, how to engineer the optimal wall construction, what type of insulation to use, and what type of ventilation system to use. These challenges drive building science research in the state. An Arctic-appropriate design and build remains the holy grail of housing in the North. While much progress has been made, this class of challenges will continue to evolve. A changing climate affects permafrost zones and behavior across the state, leading to a need for new foundation styles. Technological advances in insulation could change how we build. Engineers, architects, and builders will continue to seek innovative solutions to the technical challenges posed by the cold northern climate.

Remoteness presents its own set of challenges. Alaska's Arctic climate lies far from where architects earn their degrees, building materials are sourced, and policy makers debate issues of public concern; housing construction in Alaska has always encountered special difficulties as a result. High material, shipping, and labor costs, along with higher costs associated with the life cycle of

buildings, contribute to exorbitant price tags on modern shelters in the Arctic. Moreover, the small number of specialists with place-based expertise presents additional barriers to Alaskans' access to healthy, energy-efficient, affordable housing. The harsh climate, combined with technical and logistical challenges in remote regions of Alaska, demands continual innovation by specialists with extensive experience with such building conditions.

In addition to the physical complexities of building in the far North, social/cultural factors pose hurdles to the building of desirable, healthy, energy-efficient shelters. Historical and economic forces and conditions in rural areas, such as lack of access to local capital, low economic activity, and the absence of financial institutions, relate to the traditional subsistence economies common in rural Alaska. Policy and regulation issues, such as limitations of federal housing laws, absence of public utilities, and difficulty in coordinating agencies, have long hindered access to quality housing. The large number of stakeholders at the local, state, and federal levels complicates policy and regulation issues. Occupant health also falls in this category, primarily factors related to over-crowding and insufficient ventilation, which contributed to the spread and intractability of tuberculosis in the past.

The consistency of problems identified in these reports and lists over time, from post-WWII to present, suggests that the bulk of building challenges identified since WWII continue to stymie policy makers, builders, and homeowners today in the Arctic. While scientific advancements have enhanced living conditions, some of the challenges posed by Alaska's remote location and harsh climate have not and will not change. Technical advances have improved communication among remote places, but five hundred air miles to fly building materials from an urban center to a remote location is still five

hundred air miles. Before remote places had access to electricity for indoor lighting, reports identified illumination and bringing in daylight as priorities. Years since most communities have access to electricity, a renewed effort is underway to improve access to natural daylight in the interest of health and mental wellness.

Those familiar with housing conditions in the Arctic will note that the above list is not comprehensive. Myriad additional building challenges pose barriers to broad access to affordable, durable, healthy housing in the Arctic. Political processes and forces complicate access to quality housing further, in ways that differ by region and are not easily isolated, identified, and openly discussed. In addition, the complexities surrounding funding of housing in rural Alaska are so great that they often generate separate reports.

These challenges warrant Arctic-specific design, construction, and maintenance of modern-day homes in the North, and the incorporation of local knowledge and perspectives in the process. The Cold Climate Housing Research Center, comprised of individuals committed to solving these conundrums, articulates this objective clearly in its mission statement: “Promoting and advancing the development of healthy, durable, and sustainable shelter for Alaskans and other circumpolar people.” Decades before CCHRC was established, a group was building experimental houses in rural Alaska. The Arctic Health Research Center built four experimental homes in the mid-1960s. The Division of Indian Health funded the AHRC’s housing studies, primarily in the interest of eradicating tuberculosis through the provision of adequate housing. The effort also responded to a perceived failing of the 1949 Alaska Housing Act: funding for structures was available, but the specifications of an ideal structure were unclear and untested. The

AHRC’s experimental approach, incorporating ideas from modern building science, was a revolutionary approach at the time. Arctic Health Research Center personnel felt confident in their designs’ potential, as evidenced by the bold statement in the preface to this 1965 report: “The current report deals with studies which were undertaken to gather technical knowledge about housing in Native Alaska so that adequate designs could be developed. On the basis of these studies, it may be said that the technical problems which hindered the 1949 Remote Dwelling Program need no longer obstruct the housing program for Native Alaska. The next steps toward this program will be administrative and legislative rather than technical in nature.” Such optimism – the claim that four experimental designs would resolve the need for innovation in housing design in the state – illustrates a lack of appreciation for the complexities of meeting Alaska’s housing needs. But the AHRC’s experimental approach was appropriate. Fifty years later, innovation and experimentation continue to drive CCHRC’s work in rural Alaska, as new generations of Alaskans seek to design and build better housing.

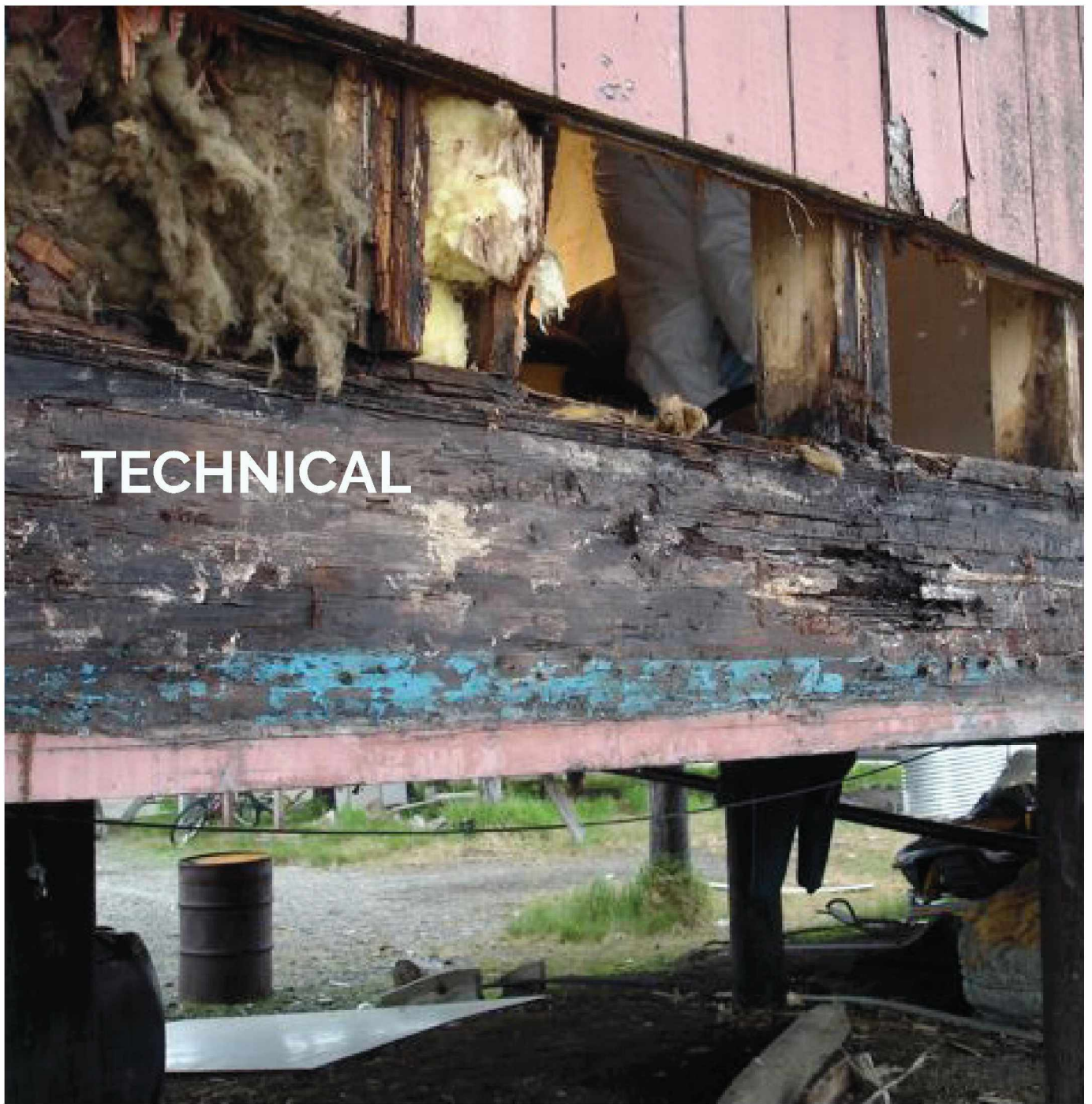
A review of these reports highlighting the major challenges to providing healthy, durable, and sustainable housing illustrates the complexity and intractability of these challenges. Hence the need for an organization like the Cold Climate Housing Research Center to devote its expertise and experience to enhancing the health and wellbeing of Alaskans through improved shelter.

The following pages contain charts which reflect the types of housing issues described in each report. An X in the column under the year indicates the corresponding issue in the left hand column that appeared in that report.

CLIMATIC



	1949	1965	1967	1971	1971 HUD	1982	2017
Climatic							
Extreme climate				x	x		x
Regional diversity of conditions							x
Permafrost				x			x
Flood and erosion hazards				x			
Wind protection		x					
Delicate ecological balance of land					x		
Short construction season	x			x		x	
Illumination (natural daylight)		x					



TECHNICAL

	1949	1965	1967	1971	1971 HUD	1982	2017
Technical							
<i>Arctic-appropriate design/build</i>							x
Insulation		x					
Vapor control		x					
Site selection		x				x	
Foundations (permafrost)		x					x
Meeting incredible heating demand							x
High cost of house design			x				
Durability							x
<i>Site</i>							
Poor soil conditions for building			x				x
Prep of building site (permafrost, muskeg, forest)	x						
<i>Legal</i>							
No code							x
Regulation of construction						x	

LOGISTICAL



	1949	1965	1967	1971	1971 HUD	1982	2017
Logistical							
<i>High costs</i>							
High building costs	x		x			x	
High shipping costs	x	x	x	x			x
High material costs	x	x					x
High labor costs	x						x
Heat economy (high cost of energy)		x	x				x
Land development costs				x			
High life cycle costs of homes							x
Lack of local building materials/services				x	x		
<i>Land</i>							
Land speculation	x						
Lack of sound land titles			x		x		
<i>Other</i>							
Communications				x			
Remoteness/size of villages		x			x		
High Demand	x						
Provision of housing related infrastructure						x	

SOCIAL/CULTURAL

	1949	1965	1967	1971	1971 HUD	1982	2017
Social/cultural							
<i>Economic</i>							
Lack of loans through local banks	x						
Low economic activity		x					
Low rates of Natives' earnings			x				
Seasonality of earnings			x				
Lack of facilities for savings			x				
Inadequate fiscal resources				x			
Social/economic structure of villages					x		
Income limits						x	
Availability of capital						x	
<i>Policy/Regulation/Gov't</i>							
Limitations of federal housing laws	x						
Absence of utilities			x				
Roles of state/local govt						x	
Inadequate institutional resources				x			
Difficulty in coordinating agencies					x		
<i>Health</i>							
TB- expressly or implied	x		x				
High rate of population growth		x	x		x		
<i>Other</i>							
Semi-permanence of some village locations			x				

THE STORY OF CCHRC

A FAIRBANKS CHARACTER

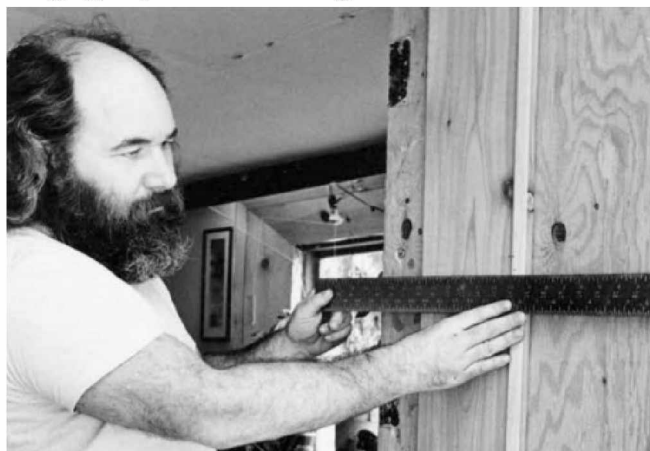
When asked about the origins of the Cold Climate Housing Research Center in Fairbanks, most interview respondents started further back in time – to a scene of a man scraping insulation off a pipe. Fairbanks resident Bob Roggasch was, by nearly all accounts, a Fairbanks “character.” People who knew him described him as dyslexic, but incredibly good with numbers. Roggasch recognized “the fact that our houses were not built for the environment, and no housing in Alaska at that time was really built for the environment,” according to Mimi Burbage, an Alaska housing weatherization specialist and former business partner of Roggasch. Having lived in houses not suited for the environment, Roggasch saw the value of superinsulation - building with much more insulation than what was standard at the time. This was a cutting-edge idea in these early days of building science, and it led Roggasch to repurpose insulation that he chipped off a discarded pipe, likely some pre-pipeline experiment, in 1976. The insulation became part of a second experiment in Roggasch’s home.

“He advocated for uniform building up of R-60⁹ on six sides: the roof, the floor, the four walls. He built to that specification and he heated it with chickens, because a chicken coop was inside his house. And it worked. It was warm. But we learned a lot about ventilation then too,” Burbage recalled.

While chickens were not the only source of heat, this charming and aromatic flock inside the home emphasized the need for fresh air through ventilation in such super-insulated homes.

While Roggasch and others experimented on their own homes and began to build for others, University of Alaska Cooperative Extension professionals addressed Alaska housing concerns through Extension research and outreach. Fairbanks Cooperative Extension agent Axel Carlson established a well-regarded base of Alaska-relevant housing information in the late 1960s and 1970s. Former Fairbanks Cooperative Extension agent Rich Seifert, the agent who filled Carlson’s position after his retirement, said Carlson’s work was valued by Extension service stakeholders.

In the late 1970s and early 1980s, as interest in energy efficiency and building science mounted in the state, Canada was heavily funding building science research. In fact, Canada was said to be a decade ahead of Alaska in Arctic building science. “The Canadians were the model everyone wanted,” said Juneau homebuilder Alan Wilson in 2017. When Anchorage Cooperative Extension Agent Don Markle attended a workshop on the Canadian R-2000 program in Montreal in 1985, he made a valuable connection with instructor Oliver Drerup that would have far-ranging impacts on housing in Alaska.



Bob Roggasch.

Photo by Chena Koponen; from Architectural Glass Concepts, 2013.

⁹ R-value refers to the resistance to heat flow through a material. The higher the R-value, the slower heat will move through the material (Garber-Slaght, Robbin. Personal communication, January 2018).

CANADIAN CONNECTION: PLANTING THE ACHP SEED

A flood of modern-building science techniques and practices came into widespread use in Alaska in the late 1980s, led by the Alaska Craftsman Home Program, which drew from Canadian building science. Canada's flagship energy efficiency program – R-2000 – began in 1981. The Canada Mortgage and Housing Association (CMHC)¹⁰ coordinated the program that provided a standard for energy efficiency and a framework to share building science through coordinated, organized outreach efforts. Canadians from northern regions led the way in finding better ways to adapt construction methods and materials to the local environment. Partnering with Alaskans made sense, given the similar environmental conditions, and created a positive working relationship between building professionals in the two countries. The relationship likely began in 1985, when Markle attended the R-2000 workshop in Montreal. Canadian instructor Oliver Drerup recalls, "...Don listened to what we had to say and just decided that this was the solution for Alaska and that we had to be there."

Rich Seifert, UAF Cooperative Extension Agent, who replaced retiring agent Axel Carlson in 1982 recalls: "1985 - '86 is when it really happened . . . we became aware of a Canadian program called the R-2000 program where they would train people - contractors in communities to build energy efficient housing, and they would establish this by having a training session where you arm the people with manuals and teaching tools and then you send out teams to do this. . . . (In Alaska we started) the Alaska

Craftsman Home Program. . . with the cooperation of the state homebuilders association. Teams from all over the state, which became a network of core people . . . This was the seed that got planted."

The need for better housing had been well-recognized in Alaska since the mid-1940s, but the new relationship with Canada marked a new era in addressing Alaska's housing needs. The timing was ideal. Alaska was in an economic recession in the late 1980s, owing to a crash in oil prices, and mortgage default rates were high. Banker Brent LeValley recalled the previous decade when Alaska's housing market was strong; flush with pipeline money, consumers were eager to build new homes. "I remember going home at night literally hoarse and I'd have people lined up four and five deep with home plans under their arms and wanting to talk to me and, you know, I might have a day that I'd talk with 30 or 40 people, and it was busy, busy times." In sharp contrast, by 1986 to 1987, "There wasn't a week that went by that I didn't have people come by my office and drop their keys off [and] say we've lost (our) job, we can't make our payment anymore, and we can't sell the house." Many of the new homes had been constructed hastily, with contractor profit prioritized above energy efficient designs. "A lot of shady builders got away with a lot of shady homes," said Tim Sullivan, former ACHP board director. A group of Alaskan homebuilders concerned with quality adapted the Canadian R-2000 model; it was called the Alaska Craftsman Home Program. Primarily funded through Alaska legislative appropriations through AHFC, the program educated Alaskans about building science topics such as quality air tightness, vapor barriers, and super insulation.¹¹

¹⁰The building science research formerly a part of CMHC is now in NRCan (Natural Resources Canada)

¹¹Both countries had yet to find the importance of mechanical ventilation in hand with superinsulation.



24 original ACHP trainers and assigned regions:

Tom Marsh and Ron Smith, Fairbanks; Philip Kaluza and Charles Huss, Northwest; John Sullivan and Jim Helfinstine, Kodiak; Philip Loudon and Scott Shuttner, Arctic Slope; Richard DeBusman and Steve Shows, Gulf of Alaska; Glenn Green and

Jess Hall, Kenai Peninsula; David Birchell and Mimi Burbage, Interior; Harvy Bowers and Ron Bissett, Mat-Su; Jim Malapanes and Geoff Feiler, Anchorage; Mark White and Jon Stackelrodt, Aleutians; Gordon Isaacs and Terry Duszynski, Southwest; Richard Seifert and Leslie Schnick, Southeast (not in photo order).



Original 24 Alaska Craftsman Home Program trainers, circa 1986. Photo credit Oliver Drenup.

THE STORY OF CCHRC

THE SEED: THE ALASKA CRAFTSMAN HOME PROGRAM

Thus, the Alaska Craftsman Home Program (ACHP) adapted the framework of the Canadian R-2000 program (Northern Comfort, 2005). ACHP represented a coordinated effort on the part of the State of Alaska, the University of Alaska, and building industry trade associations in the state.¹² A 1986 press release describes the program:

Research, demonstration, and development around the world has changed the way homes are being built in Northern climates. So many technical advancements have been achieved that an educational organization is needed to inform the building industry of Alaska of them. With such an organization, the industry can stay abreast of advancements in other parts of the world as well as other parts of the State. The Alaska Craftsman Home Program is that educational effort.¹³

Like the Canadian R-2000 version, the heart of the Alaska Craftsman Home Program lay in relationships between homebuilders and building scientists. The strength of those partnerships with people in the building industry explained much of the success of the R-2000 program in both regions. “The R-2000 program essentially put this information in the hands of advocates for the technology who were drawn from industry. And that is terribly important. So these were architects, engineers, and builders who were practicing, who worked in the field doing the work and who were convinced that air tightness, ventilation, combustion air, etc., etc., were the way forward,” explained Oliver Drerup. Often, these

stakeholders competed with each other on various projects, but this program brought them together in a new way.

An explicit goal of the Alaska program was to foster craftsmanship and thermal efficiency in the state’s shelter industry. Two dozen volunteers, with broad geographic statewide representation, were assigned, in pairs, to twelve different regions of the state to deliver two-day trainings on energy efficiency homebuilding to homebuilders and homeowners.¹⁴ In 1987, two industry leaders, one American and one Canadian – Ned Nissen and Oliver Drerup – trained these original two dozen Alaskan trainers. At the time Nissen was writing the well-known newsletter, *Energy Design Update*, from New York City; Oliver Drerup was a leader in the R-2000 program in Canada, and acted in an instructor role in establishing the Alaska program. Even in 2017, thirty years later, the list of these twenty-four original trainers reads like a Who’s Who of leading individuals in various building-related industries in the state.

ACHP was most active in this role from late 1987 until 1995. Two-day building workshops drew statewide audiences. The workshop would later fulfill the State of Alaska education requirement for the residential building endorsement of the contractor’s license. Northern Comfort: Advanced Cold Climate Home Building Techniques, most recently published in 1995, is a legacy of this program in the state. The manual, published by ACHP, offered the two-day workshop curriculum to anyone in the state. This program changed the way Alaskans viewed building science, and it greatly expanded awareness of energy efficiency and building science in the state.

¹² State through AHFC and DCRA; UA through Cooperative Extension; and Alaska State Homebuilders Association

¹³ Press Release, ACHP, 1986: Program Justification.

¹⁴ See page 22 for full list of 24 original ACHP volunteers.

ACHP TRANSITION

Through education and outreach, ACHP significantly changed building practices in the state. Nevertheless, the organization was reconfigured structurally in 1994. Nearly all interviewees with direct knowledge of the ACHP program indicated internal politics led to the change. Some suggested that the split followed ACHP's copyrighting public information and selling this information through publications, with proceeds benefitting members; others said they thought that the decades-old urban-rural Alaska divide drove the tension that brought a change to ACHP; and others simply identified internal tension and personality conflicts. Regardless of the causes, the primary vehicle to disseminate relevant building science and energy efficiency information across the state was broken. Multiple groups subsequently attempted to fill this need.

One group that stepped up to the plate was the Alaska Building Science Network (ASBN), led by Cooperative Extension agent Rich Seifert. According to ASBN's newsletter, the network provided education to ACHP's audiences "to offer technically accurate and practically useful energy education, and to coordinate those services with other public/private groups who have similar goals."¹⁵ While the organization still exists on paper it never really met its potential, according to Seifert.

In the late 1990s, a second group comprised primarily of homebuilders, led by Fairbanks builder Jack Hébert laid the foundation for a research center. Hébert had built ACHP-certified homes and had two decades of building experience in Alaska under his tool belt; he had a vision that Alaskan building research should be led by builders, in the place where the research would be put to use -- Alaska.

¹⁵ ASBN Newsletter v 2.1, Summer/Fall 1996.

THE STORY OF CCHRC

PARTY LIKE IT'S 1999: CCHRC IS BORN

In November 1999, the first meeting of the transitional board of directors of the Cold Climate Housing Research Center took place in Fairbanks. The five interim directors present included four builders and one architect - Jack Hébert, Richard Tilly, Clai Porter, James Irvine, and Steve Burnett; others included a lawyer and other consultants. Substantial groundwork had preceded this first meeting, but much more work lay ahead.

Jack Hébert, a Fairbanks homebuilder, was an active member of the Alaska State Home Building Association (ASHBA). Like the ACHP, the Alaska State Homebuilders Association played a vital role in the establishment of CCHRC. When asked about the founding of the organization, many interviewees shared stories about conversations with Hébert about his vision for this organization. Anchorage architect Clai Porter, a founding member of the research center, identified an ASHBA meeting in Homer in 1998 as the center's inception. Porter recalls:

ten or twelve of us at the meeting (decided) that we would pursue the research portion, because all these things had come to a point. But there was no overall statewide enforcement, or basic knowledge as to what needed to be or what was best practice -- what was not, what was good practice, but not best practice, a whole series of things. . . . CCHRC was . . . hopefully prescriptive for (establishing best practices) and (making)

them enforceable and usable so that people didn't have the high cost of energy and high cost of housing eat them alive.

While builders throughout the state sought to battle energy costs, the various regions used different approaches and methods to address energy costs and other building challenges. In Alaska, there had been little research to test building methods; not only did builders disagree on best practices, the Alaska Housing Finance Corporation (AHFC) had recently released a new version of BEES - Building Energy Efficiency Standards¹⁶ that frustrated and divided builders on the best methods to achieve these standards.¹⁷ Alan Wilson recalls that at the ASHBA meeting in Homer, Hébert proposed a research center to bring modern building science research to Alaska. Homebuilders would lead the research to address inconsistencies in Alaska housing standards and other concerns. Attendees passed a hat to raise money for an attorney to start the corporate paperwork. The idea for the research center had momentum among this group from the beginning. "It was something that homebuilders supported wholeheartedly, I mean it was, we felt, very, very important and it would be a great asset to the state," said Mat-Su builder Jess Hall.

CCHRC founders favored Fairbanks as the ideal location for the research center. Clai Porter said, "The decision to base in Fairbanks was an easy one." At the time, the only cold climate building research in the United States was taking place on the East Coast. Alaskan homebuilders preferred the cold, extreme, unforgiving, natural laboratory that Fairbanks

¹⁶The AHFC Building Energy Efficiency Standard (BEES) was established by the State of Alaska to promote the construction of energy efficient buildings. It sets building energy use standards for thermal resistance, air leakage, moisture protection, and ventilation.

¹⁷ From 2003 CCHRC newsletter: Builders want to know what works, what is affordable, and what is required by the public and lenders to meet acceptable standards.

offered for reliable research relevant to Alaskans. In addition, founders considered a base in Fairbanks wise, given the proximity to research capacity and scientists of multiple disciplines at the University of Alaska Fairbanks. “And we have the University of Alaska right there... on the hill in Fairbanks and they have research capabilities, there’s scientists up there,” recalled former Fairbanks mayor Bill Allen. An early CCHRC business plan also cites the large number of innovative private-sector homebuilders in this area. Those who conceived of the center felt certain that research done by Alaska builders, in Alaska, had much greater potential for credibility and relevancy among Alaskans.

From the beginning, the research center prioritized identifying processes, methods, and products to improve energy efficiency, and sharing that information with the building community. The organization’s mission statement eloquently expresses these goals: “Promoting and advancing the development of healthy, durable, and sustainable shelter for Alaskans and other circumpolar people,” a mission CCHRC continues to embrace warmly.

The organization’s funds grew, and within two months CCHRC had garnered a commitment for a \$500,000 start-up grant from Fannie Mae. A year into operations, by November 2000, CCHRC had guaranteed funding of nearly one million dollars from Fannie Mae, the Department of Energy (DOE), and the Alaska Housing Finance Corporation (AHFC). The late Alaska Senator Ted Stevens helped secure the \$500,000 Fannie Mae grant and maintained ties with the organization. Alan Wilson shared a story about meeting with Senator Stevens, who has a long legacy of bringing federal funding to Alaska projects, in Washington, D.C. regarding this funding. Disbursement had been delayed; after Senator Stevens made one phone call the check was delivered by the end of the day. In 2000, following a residential fire in rural Alaska, from which an occupant could not escape through a window, Senator Stevens

wrote to the research center about the need for safer windows in Alaska. In response, researchers at CCHRC quickly developed an improved egress window that allowed easier escape during a fire. To address problems often found in rural Alaska, the egress window could be installed in even the most structurally unstable home and would always operate because of a rigid, engineered frame. It was also designed to withstand icing, a condition that makes many windows inoperable during winter months. The development of this window demonstrated the organization’s potential to solve Alaska’s unique and varied housing challenges.

The late Dan Fauske, a legend in Alaska’s housing industry, supported CCHRC from the beginning. Fauske had lived in Barrow and was intimately familiar with Alaska’s housing needs, especially in the far North. Clai Porter recalled that as AHFC’s CEO, Fauske advocated for energy efficiency and building standards.

The relationships that Hébert and the other founding members had across the state led to early success in garnering funding and pursuing various projects. CCHRC home designs were constructed in two communities through the Building America in Alaska program, and a number of smaller research projects were conducted on wall systems, indoor air quality, and energy use. Such projects produced useful results, but organization members recognized that meeting their goals would be impossible if they remained housed in an office in downtown Fairbanks that builder Dave Miller described as “literally two card tables, a couple of folding chairs, a part time helper, and Jack.” By 2001, plans were underway to design the organization’s dream headquarters: a research and testing facility (RTF) that could in itself be a testament and display of energy efficiency in cold climates. Such a bold move would require substantial funding, and significant work to find the right location. The location was difficult enough to find; securing funding would delay the project by several years.

THE STORY OF CCHRC

“UNDESIRABLE LAND. LESS DESIRABLE, I SHOULD SAY.”

In June 2002, the CCHRC newsletter reported the following:

CCHRC and the University of Alaska at Fairbanks (UAF) are working to establish a partnership for the purpose of planning, designing, and constructing a Cold Climate Housing Research Facility. The proposed building will be located on University property, adjacent to the campus. It will include office space for CCHRC in addition to: a testing lab with sufficient space and a controlled environment to conduct research and testing structural components and materials used in the housing industry. Jack Hébert just returned from a trip to Washington DC where he discussed funding with Senator Stevens for this joint endeavor. Research and testing will be cooperatively managed for the benefit of both parties and all peoples of circumpolar regions. Current efforts are focused on a formalized agreement between the parties, a preliminary design, and a business plan.

The building site considered by UAF and CCHRC for the facility was formerly part of the UAF Experimental Farm. Building on this bottom land with ice-rich silty soils would require an innovative foundation design to provide stability in an area with permafrost ranging from a depth of four feet to thirty feet. CCHRC sought exactly these conditions for its research and testing facility. A demonstration site needed “poor placement,” or an “undesirable” site, to show what was possible. “We wanted something

adverse to provide data to the building community that would work,” said CCHRC founding member Chuck Dearden. The negotiation process between UAF and CCHRC took longer than the research center expected; some interviewees compared the process to herding cats and noted the high legal costs associated with this negotiation. On March 17, 2005, the parties signed a lease, establishing a long-term relationship with the University.¹⁸ The RTF’s design, by Jack Hébert and Clai Porter, reflected the organization’s mission and vision. No date for the groundbreaking ceremony could be set, however, until the funding was in hand. Hébert and others pursued financing for the RTF relentlessly from 2001 to 2005.

A project this large needed a diverse funding base. Former Fairbanks mayor Bill Allen, now the head of the U.S. Department of Agriculture – Rural Development office, provided significant support. Other major funders included the Alaska Housing Finance Corporation (AHFC), the Alaska Department of Commerce and Economic Development, Fannie Mae Corporation and Foundation, Rasmuson Foundation, and the U.S. Department of Commerce’s Economic Development Administration.¹⁹ This diverse financial support for the project illustrated the organization’s broad potential for contributing to healthier and more energy efficient housing within the state. After several years of project planning and a vigorous fundraising efforts, on July 21, 2005, the groundbreaking ceremony celebrated a major accomplishment for the young organization. Bryan Butcher, AHFC, recalled just how momentous the groundbreaking was: “To some degree, that part of it is almost more fun than the ribbon cutting because once the groundbreaking happens and you know you have the funds, you know you’re going to get to the

¹⁸ An updated lease was signed in June 2011, thereby terminating the 2005 lease.

¹⁹ A complete list of partners, including public sector, corporate donors, and individual donors, is available in the appendix.

ribbon cutting. But what you didn't know you were ever going to do is get to the groundbreaking."

A new cast of characters in Fairbanks, working out of the CCHRC research and testing facility, was about to take building science research in Alaska to a whole new level.

IT'S A "WE"

During my interviews, the most repeated word in response to the question "How did CCHRC come to be established?" was the word "Jack." Jack Hébert, the CCHRC CEO/Founder, has been essential to the success of the organization for last nearly twenty years. Bryan Butcher, current AHFC CEO/Executive Director, summarized this point well: "Without Jack, it never would have happened. And I'm sure you've heard that from a lot of different people -- that there needed to be somebody to continue to tirelessly work." Many interviewees from various sectors of the building industry talked about their conversations with Hébert as the organization formed, and he sought to establish partners and lay the groundwork for its work. Hébert's tenacity emerged in multiple contexts within the interviews – in discussing the success of the organization, the building of partnerships across Alaska and the United States, and the diverse funding stream that contributed to the building fund. Through Hébert's lead, collaboration has been a pillar of the organization since its inception. Hébert said in a 2003 CCHRC newsletter: "CCHRC is your research center. The success of what ultimately the CCHRC will become is really up to your involvement and

energy. I am just sharing with you a vision that all of us really have. We can do this together, but just a few of us cannot do it alone." This spirit of collaboration is reflected in interviewees' many references to the organization as "we" – even those who have not been directly involved with operations for some time. It also expresses itself in the organization's core values of teamwork, credibility, relevance, sustainability. The following section will explore these themes in-depth.



Jack Hébert with a quad shot latte on site at the RTF² construction.



L to R: Clai Porter, Bill Allen (USDA- Rural), and Jack Hébert



Jack Hébert speaks at the groundbreaking ceremony



Senator Gary Wilken, Bill Allen, and Jack Hébert



Clai Porter speaks at the groundbreaking ceremony



Clai Porter, Senator Gary Wilken, Mike Buller (AHFC), Bill Allen, Steve Jones (UAF Chancellor) and Jack Hébert

CCHRC CULTURE + OPERATIONS

Located in Fairbanks, the Cold Climate Housing Research Center (CCHRC) is an industry-based, nonprofit corporation created to facilitate the development, use, and testing of energy-efficient, durable, healthy, and cost-effective building technologies for residents of the Circumpolar North.²⁰ CCHRC, a 501 (c) (3) nonprofit, is primarily funded by the State of Alaska and through private contracts. State appropriations, which constitute the largest percentage of the annual revenues, are managed through the Alaska Housing Finance Corporation (AHFC).

In 2005, CCHRC officially moved from a “couple of card tables” in a rented office space to a state-of-the-art research and testing facility. With two labs, offices, and administrative space, the organization suddenly had the capacity to pursue its mission much more vigorously. Staffing levels increased in response: the staff doubled from about 15 in 2005 to about 30 in 2007. Personnel completed research projects on topics ranging from wall systems to indoor air quality in the building’s two labs specially designed for housing research. In direct proportion to the amount of research, outreach to Alaska’s homebuilders and consumers dramatically increased. The building buzzed with excitement at a time when, as one employee new to the organization at that time put it, the “price tag was still on the building with the stickers still on the windows.” Now that the building was complete, CCHRC became the organization we know today and came into its own to promote and advance the development of healthy, durable, and sustainable shelter for Alaskans and other people of the Circumpolar North.

THE BUILDING

The Research and Testing Facility, often referred to as the RTF, represents not only the office space for CCHRC, but also the heart of the organization. The 15,000 square foot building is a “living test center.” A 2006 CCHRC publication highlighting the new, completed RTF captures the excitement surrounding the new facility:

Every material, building technique, and system in the structure, from the foundation to the mechanical systems, is designed for cold climates and is being monitored and evaluated for operational efficiency in all weather conditions. It is a living test center with over 400 monitors built in to assess performance of everything from the moisture content of the walls to the slightest shift in foundation. The Builders’ Books Library, connected to both the National Association of Home Builders web site and the Elmer E. Rasmuson Library at the University of Alaska Fairbanks, will serve as the nerve center for monitoring the sensors, allowing for an interactive display of the different components at any given time. The RTF incorporates components being tested as possible additions to the practice standards of northern building. For example, the RTF is built on a foundation that can be adjusted to accommodate for any change in the permafrost on which it is built. Heat is supplemented by a masonry heater, a highly efficient wood-burning system that releases heat throughout the day. The walls are constructed based on the best performing wall section from the 2004 Mobile Test Lab

²⁰ <http://www.cchrc.org/about-us>

study. Lighting uses the most energy efficient lights available, set to respond to the ambient daylight and to the motion of people entering or leaving the space. In addition to the office, library, and classroom spaces, there are two test laboratories, each over 2000 square feet.

Hébert designed the RTF to feel like a home; the organization is a housing research center, after all. Immediately upon entering, occupants face a highly efficient stone masonry heater. Rock from a river near Healy gives the commercial-sized fireplace the feel of a home. A builders' resource library, a local art collection, local birch door and window trim, and a green roof contribute to the home-like feeling of the structure. In the summer months, there is no better spot for a meeting than the green roof – a living greenspace with employee gardens, plants, and other vegetation. Designed to maximize green space and reduce storm water run-off, CCHRC has the farthest north commercial-building green roof in the state.

CCHRC leadership were determined that the structure would meet the standards of the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) New Construction (NC) standards. LEED is a third-party certification standard designed to, in the case of new structure construction, encourage the design and construction of more sustainable buildings. Completing the LEED certification process was more difficult than anticipated, and many individuals at CCHRC over a period of several years worked on the certification process. In 2010, four years after completion, the building achieved the LEED Platinum (the highest) certification. The building was at the time, and remains, the farthest north LEED Platinum building in the world. It has won several awards, including a 2010 award from Siemens Corporation's "Smartest Buildings in America."

When asked about the building, many interviewees commented on the remarkable efforts of Jack Hébert and other CCHRC staff to fundraise for the \$5.2 million dollar building. The structure itself represents the mission and vision of the organization. Other people stressed the building's noteworthy features, its energy sources, how energy use is monitored, and how the data from over 1500 sensors is shared. Others emphasized the permafrost setting, and how the foundation itself is an excellent demonstration project. Others stated more simply that the structure is appropriate, durable, and beautiful. One tie that binds is the deep emotional connection that people have to this building, the organization, and the people here.

A large painting in the foyer embodies that connection. This painting was custom produced for CCHRC by a former client of Hébert's during his homebuilder days. The painting depicts the artist's ancestral homestead in Norway, and brings a spread of color to the vertical expanse of the foyer space. The artist worked with Hébert to select the location of the painting, so in January and February, when the light returns in Fairbanks, the painting is illuminated in a beautiful natural glow from south-facing windows. The layers of meaning and intent in this painting reflect the intentionality of the design and build of this structure for this site.



*CCHRC RTF with the supermoon of 2018.
Photo by Jack Hébert.*





CCHRC CULTURE + OPERATIONS

ESSENTIAL GROUPS, PROGRAMS, and PARTNERS

Board of directors: An eleven-member board of directors meets twice a year to provide guidance to and receive updates from CCHRC personnel. Statewide representation has been an intentional configuration of the board since CCHRC was founded. Members and ex-officio delegates represent homebuilders, a local bank, the University of Alaska Fairbanks, housing authorities, AHFC, and other industry partners. A list of all past board members appears in the appendix.

Staff: Many interview respondents indicated one of the features that makes CCHRC so special is the diversity of those who sit at the table, in terms of positions and experience. Staff, board members, and partners are builders, building scientists, engineers, architects, bankers, and policy makers coming together to improve housing. Outside of this collaborative environment, in the private sector, these industries can sometimes be at odds with each other. This collaborative spirit, and the people whom CCHRC brings together, enhance the organization's reputation and credibility in the state.

Programs: Within CCHRC, there are four primary programs: Building Science Research, Policy Research, Sustainable Northern Communities, and Outreach. The next section provides a more detailed overview of each program and its projects. CCHRC's mission has lain in applied research – rooted in the organization's founding story is the desire to have research done in Alaska, by Alaskan homebuilders, for the building industry and Alaska residents. The

research the organization produces reflects and benefits the building community. The findings reach their intended consumers, rather than sitting on a shelf in a report. The research lives in improvements to buildings across the state.

Committees: Two committees with representation from CCHRC staff and Alaska's business and homebuilding sectors drive the direction of research at the organization. The first committee, the Industry Advisory Council (IAC), is comprised of corporate members of CCHRC who guide the organization toward issues of concern in the housing and infrastructure industry. The IAC meets several times per year and elects one of its members to serve in an ex-officio capacity on the CCHRC Board of Directors. The IAC has operated for over ten years. The second committee, the Research Advisory Committee (RAC), identifies CCHRC research questions relevant to homebuilders across the state. This directs the type of research undertaken. The RAC committee is designed to overcome distance and climatic differences, and communicate local housing challenges and needs. The committee played a central role in the early formation of CCHRC's research agenda.

Members: Individuals and/or businesses can enroll in membership in CCHRC at six levels: student, individual, small business, sustaining, foundation, and corporate. Membership benefit levels increase with larger annual donations. Benefits include voting rights, annual meeting attendance, facility tours, and recognition on CCHRC materials. Ninety percent of

CCHRC's charter members are general contractors from across the state. The Alaska professional building community is highly regarded as a national leader in energy-efficient housing design and construction, boasting the largest per capita builders' association membership in the nation.²¹

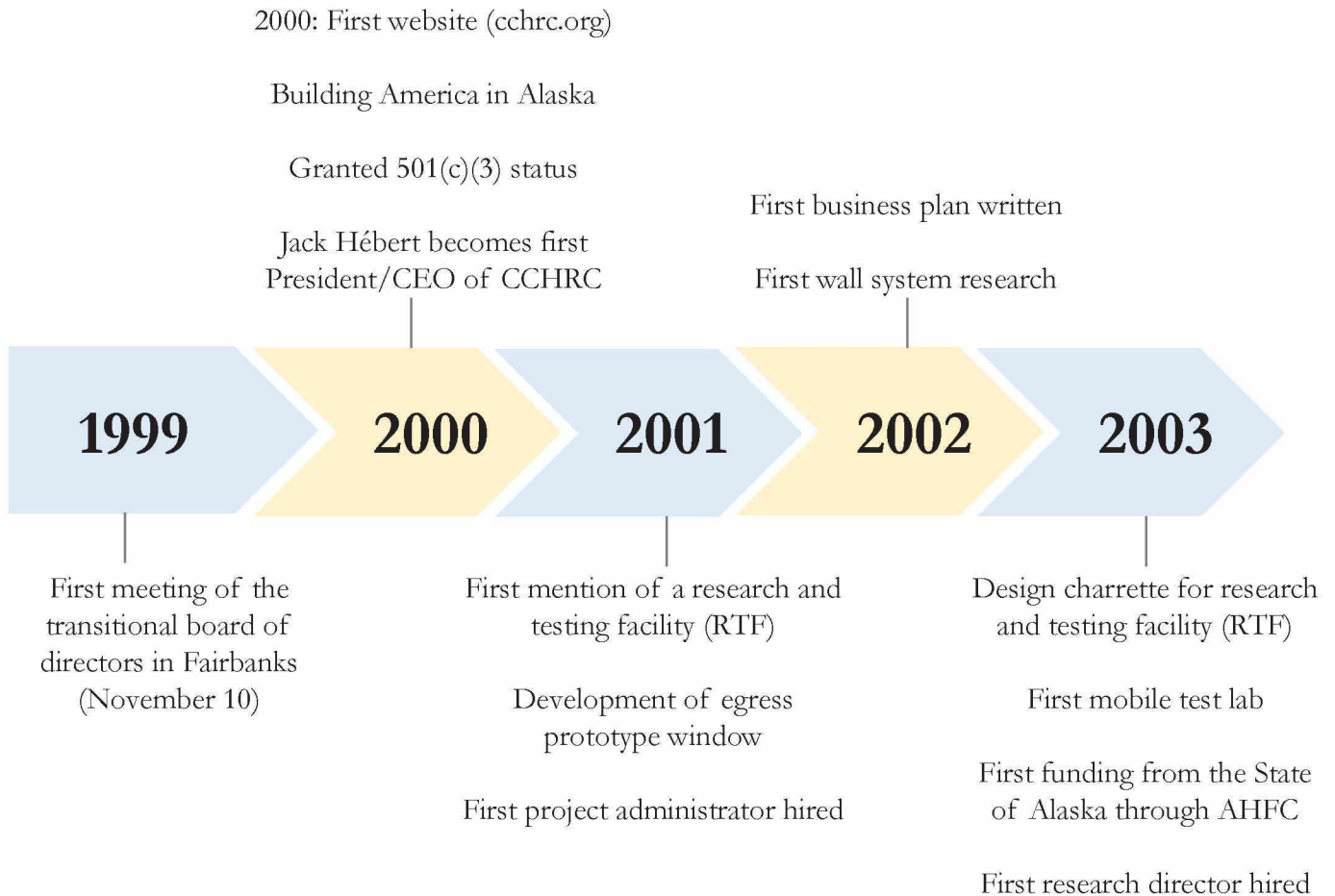
Partners: As noted in several interviews, CCHRC has a positive reputation throughout Alaska. Over the course of two decades, CCHRC has developed successful partnerships with organizations across the state and in the Lower 48. CCHRC currently has more than two dozen partners collaborating on projects in Alaska. Examples of partners include organizations both public and private, large and small.



CCHRC project map, 2015

²¹www.cchrc.org/about-us

CCHRC TIMELINE



New phase for the organization: new building, new board members, new staff, new energy

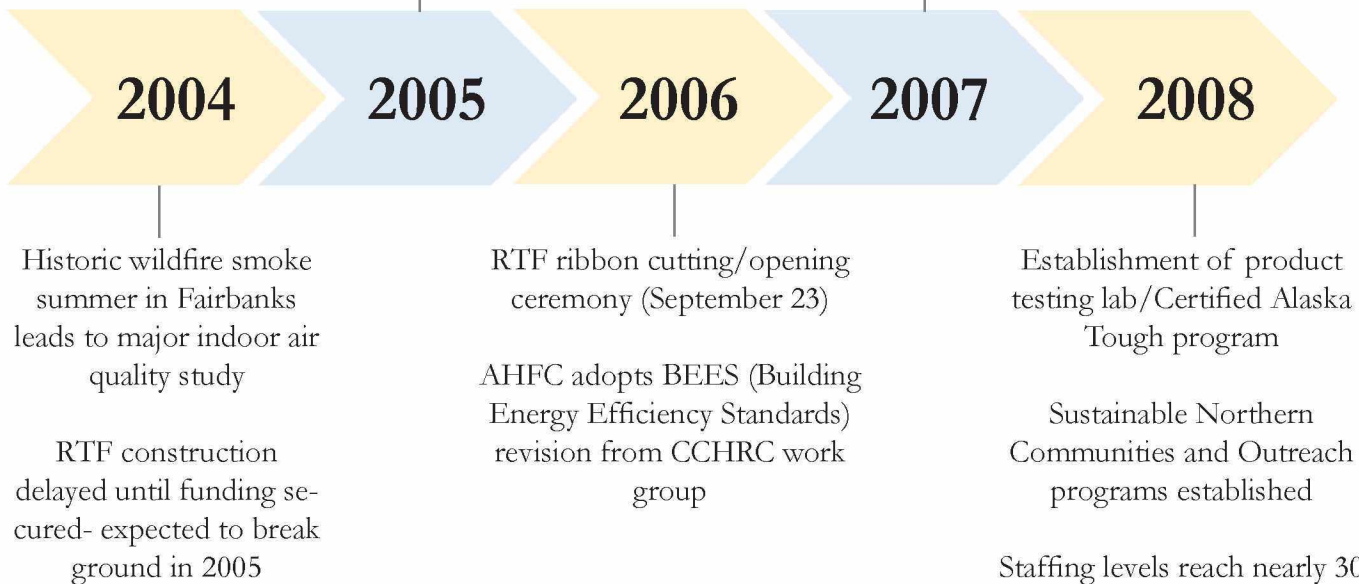
Jack Hébert testifies before U.S. Senate – subcommittee on Energy and Natural Resources

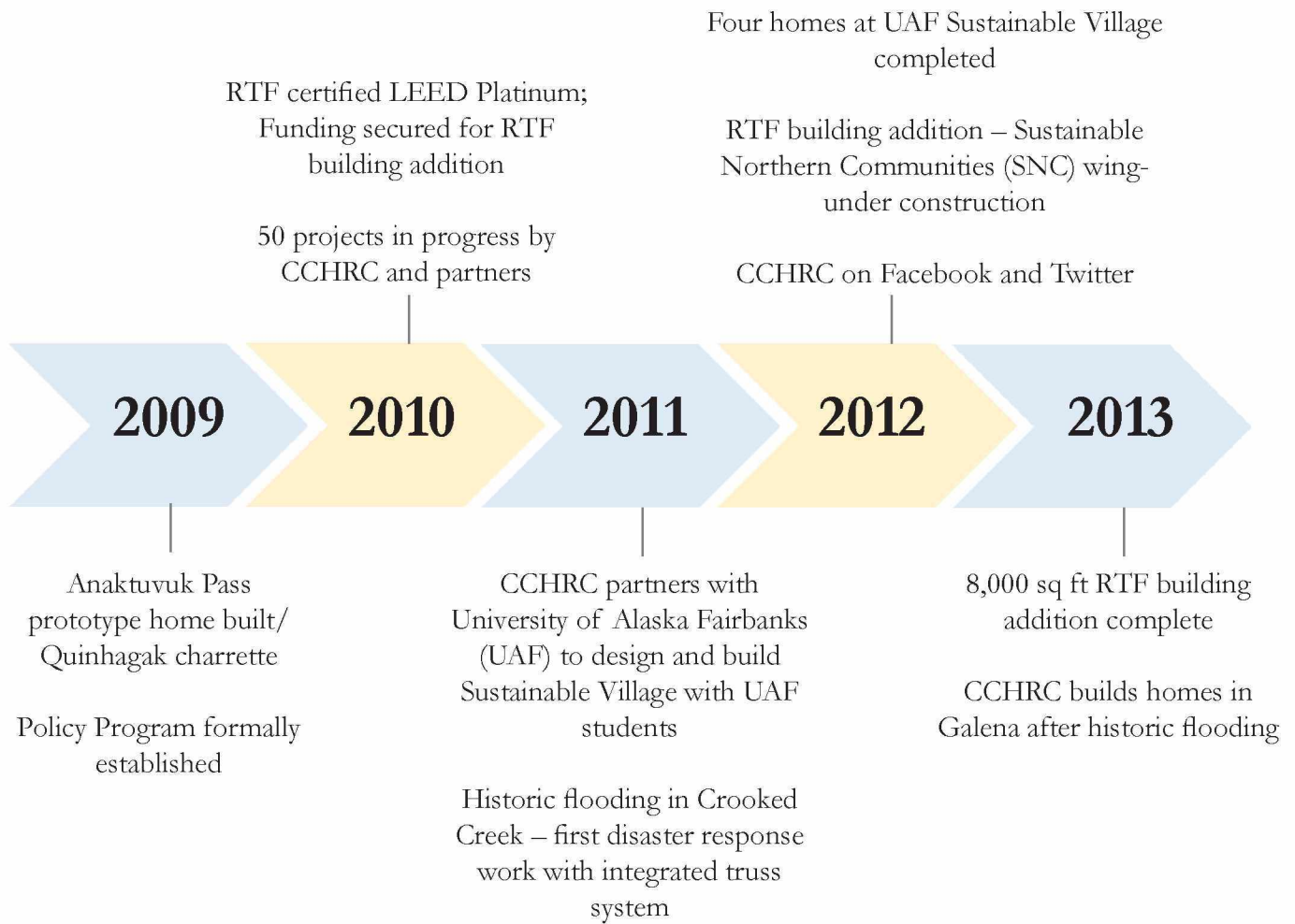
CCHRC organizes and hosts Circumpolar Housing Forum, (during Fourth International Polar Year)

CCHRC Builders Resource Library opens

Building Science Research Program officially established, building on years of existing research

RTF groundbreaking and construction



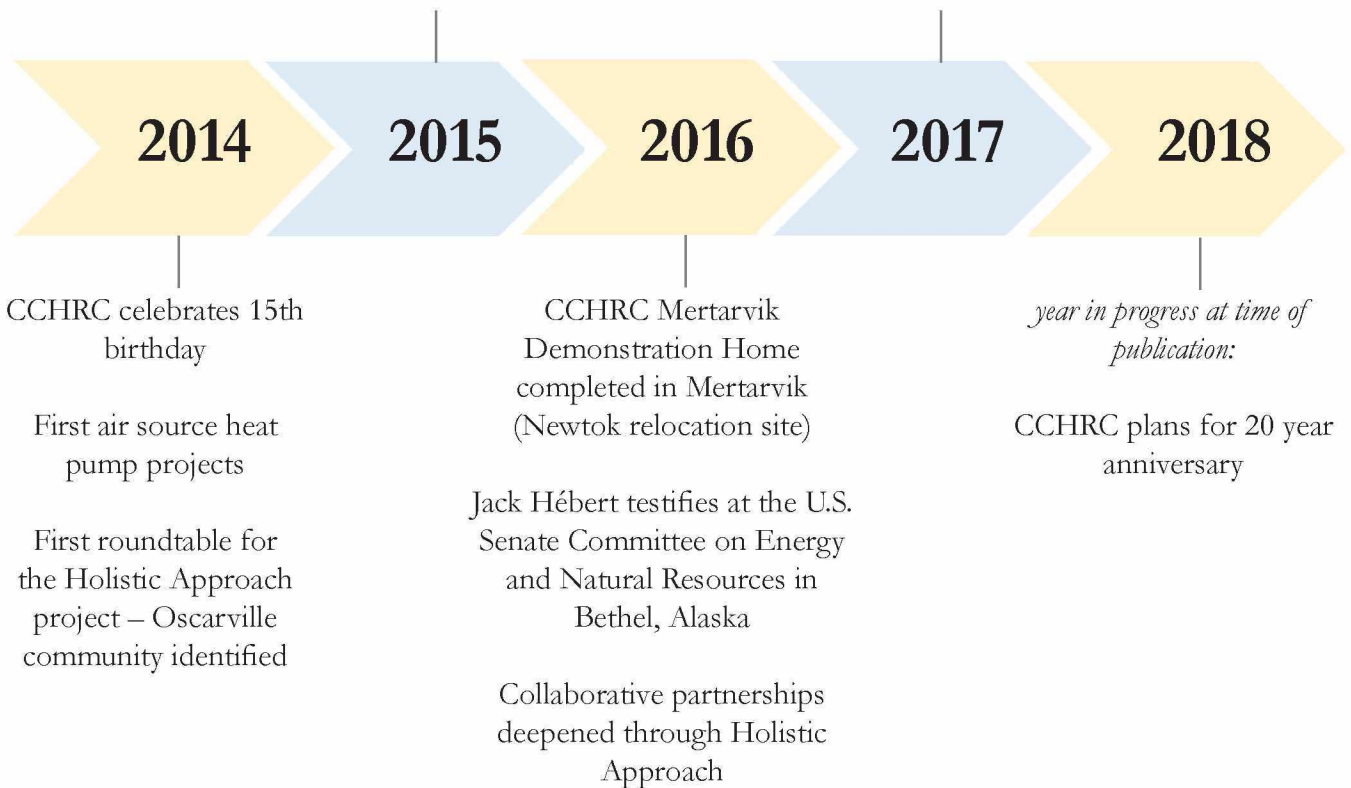


First Certified Alaska Tough windows available to consumers

Water systems installed in Kivalina (Portable Alternative Sanitation Systems, or PASS)

Funding contraction at state level leads to staffing contraction (down to 15 from 30 the previous year)

Neput – first Holistic Approach home completed in Oscarville



CCHRC PROGRAMS

CCHRC operates four core programs: Building Science Research Program (BSRP), Sustainable Northern Communities Program (SNC), Policy Research, and Outreach. This section briefly describes the work of each program, highlight major projects, and list the projects overseen by each program. The collaborative nature of the organization often leads to multiple programs engaging in each project; for this review, projects are listed under the primary program responsible for the project outcomes.



CCHRC staff celebrate the 15th birthday of the organization in 2014.

BUILDING SCIENCE RESEARCH PROGRAM (BSRP)



CCHRC's Mobile Test Lab (MTL), an ongoing BSRP project.

CCHRC's Building Science Research Program tests and vets building envelopes,²² foundations, heating and mechanical systems, and other essential components of healthy, durable housing in cold climates. Historically, many buildings in Alaska have failed due to the use of technologies inappropriate for the Arctic. CCHRC building scientists focus on moisture control, thermal performance, space and water heating, ventilation, and indoor air quality. These projects have benefited Alaskans by developing and vetting cost-effective and durable wall systems,

foundation systems for permafrost, ventilation strategies that protect air quality, and region-specific alternative energy strategies that can save money. CCHRC houses the library of all publications of the Permafrost Technology Foundation and is a major contributor to the development of innovative, cost effective foundation strategies for problematic soils. The BSRP became a formal program in 2006, but has been completing projects since 2000.

²² All the components that comprise the outer shell of a building: walls, roof, floor, windows, doors, etc. (Garber-Slaght, Robbin. Personal communication, March 2018).

BSRP PROJECTS

Certified Alaska Tough: Certified Alaska Tough identifies building products that can withstand the extreme climate conditions of Alaska, while meeting strict energy efficiency standards.

2018 Designs for Rural Alaska Walls: This project monitors CCHRC demonstration homes for efficiency and moisture infiltration several years after construction.

2018 BrHEAThe Evaluation: The BrHEAThe Evaluation system assesses CCHRC's BrHEAThe, a combined heating and ventilation system developed in 2011, which provides space heating and fresh air with one system to high-performance homes in cold climates.

2018 DOE Energy Efficiency and Renewable Energy Projects: These projects seek to reduce and stabilize energy costs of tribal buildings in four communities in Southwest Alaska.

2017 Ground Source Heat Pump Demonstration at CCHRC: This project continually tests a ground source heat pump at CCHRC's facility in Fairbanks to study performance in cold soils.

2017 Residential Indoor Air Quality (IAQ) Study: This project examines new ventilation standards and recent IAQ research findings in ventilation to inform homebuilders, architects, engineers, and other housing professionals.

2017 Alaska Water-Sewer Challenge: The Alaska Water and Sewer Challenge looks for innovative, affordable water and sewer solutions for rural households.

2017 Biomass Greenhouse Handbook: The handbook serves as a resource for school districts on how to build and operate a biomass-heated greenhouse.

2016 Permafrost Foundations: CCHRC collaborated with the U.S. Army Cold Regions Research and Engineering Laboratory to pair information on permafrost soils with optimal foundation designs.

2015 Energy Recovery Ventilators (ERVs) in Cold Climates: ERVs are whole house ventilation systems that exchange stale indoor air with fresh outside air, recovering both heat and moisture from the indoor air to save energy. They improve indoor air quality in cold, dry climates like Interior Alaska.

2015 Safe Effective Affordable Retrofits: The project tested new wall systems that can provide affordable retrofit options.

2015 Thermal Storage Demonstration at CCHRC: The project demonstrated a thermal storage system that uses water to seasonally store solar energy.

2015 Structural Insulated Panels: This project provided guidance for Alaska homeowners interested in Structural Insulated Panels (SIPs), which are prefabricated building materials for cold climates.

2015 Three-Stage HRV Evaluation: This project studied the effectiveness of various frost protection techniques for their effects on energy efficiency and indoor air quality.

2014 Anchorage Foundation Insulation Study:

This research investigated whether a popular insulation practice was causing frost heave in Anchorage homes.

2014 Durable Envelopes for Cold Climates: This research developed and tested building envelope designs that can withstand cold climates and healthy indoor humidity levels. The Mobile Test Lab had nine test wall bays, each with a different configuration of studs and insulation, including a control wall with fiberglass batt insulation for a baseline comparison.

2014 Ground Source Heat Pump and Solar Thermal at Weller School: In partnership with the Alaska Center for Energy and Power, this study conducted the first in-depth assessment of ground source heat pumps in Alaska at a local elementary school that uses warmth from the ground to heat the building, and recharges the soil with solar energy in the summer.

2014 Thermal Mass Study: This project clarified the role of thermal mass, the ability of a material to absorb and store heat energy, which can be useful in cold climate housing. It included a literature review and energy modeling with IDA Indoor Climate and Energy (ICE) software.

2014 Your Northern Home Website: This webpage makes information on energy efficiency, new construction, retrofits, ventilation, and other homeowner topics available to the public via the CCHRC website.

2014 Air Source Heat Pumps for Residential Baseboard Heating: In partnership with utilities in Southeast Alaska, this research identified air source heat pumps effective in homes with baseboard hydronic heating by investigating data and availability of compatible technologies for residential applications in the United States and foreign markets.

2013 Air Source Heat Pumps in Southeast

Alaska: This study consisted of a review of the literature, a market assessment, and preliminary modeling on residential air source heat pumps (ASHPs) in Southeast Alaska. ASHPs take heat from the outdoor air and use electricity to raise the temperature. Because they require less electricity than electric heating appliances, heat pumps can reduce heating costs for Southeast residents.

2013 Combustion Safety Test Failure Analysis:

This project investigated why buildings fail the combustion safety test and how to avoid these failures, in both new construction and retrofits. It includes a literature review, preliminary data analysis, education video, project planning, and test protocol prove-out, to improve fire safety in homes.

2013 Fuel Use Monitoring:

Researchers tested several methods of monitoring fuel use in households to identify a cost-effective and accurate method for monitoring heating oil consumption across Alaska.

2013 Passive Refrigeration:

This project examined ways to use Alaska's cold winter temperatures to lower the electrical demands of residential refrigerators and freezers, and partnered with industry to test a prototype of a passive refrigerator/freezer that used electricity only when the outdoor air temperature is too warm to sustain refrigerator temperatures.

2013 Permafrost Technology Foundation

Library: The Permafrost Technology Foundation produced manuals and videos to explain what permafrost is and where it occurs, how to conduct a thorough permafrost site investigation, and techniques for building new structures and stabilizing existing structures on permafrost.

2013 Thermal Storage Technology Assessment:

Thermal storage allows storage of solar, wood or other heat for later use. This project examined the potential of thermal storage systems to expand the use of renewable heating systems in cold climates and improve efficiency.

2013 Vapor Diffusion-Open Walls Study: This study monitored Fairbanks builder Thorsten Chlupp's super low-energy home to see how its innovative systems performed in the Fairbanks climate. The house has super-insulated walls and foundation, an integrated heat storage system, and an open wall design that allows vapor to diffuse throughout.

2012 Domestic Hot Water Energy Modeling: This project analyzed how to maximize the efficiency of a domestic hot water system.

2012 Foam Moisture Study: This project established a method for measuring the moisture content of foam insulation to respond to building science questions on insulation products.

2012 Geopolymer Cements: This study analyzed the local market potential for geopolymer cements, including a survey of available local materials, potential for local product manufacturing, and economic feasibility.

2012 Green Infrastructure: This project designed ten systems that home owners can implement to reduce rainwater and pollutant runoff from their property, which were demonstrated at homes throughout Fairbanks.

2012 Interior Shutter Evaluation: This research evaluated an interior window shutter system designed to reduce heat loss through window while preventing moisture condensation between the window and the shutter. The window was instrumented with thermocouples, a heat flux sensor, and relative humidity sensors.

2011 Evaluating Window Insulation: This research tested eight types of common window insulation treatments during a Fairbanks winter to see how they performed with heat loss and moisture buildup. Exterior insulation methods, like shutters and storm windows, tended to perform the best and have the fewest condensation problems.

2011 Heating Appliance Use Survey: This project observed patterns of wood heating appliance use at twelve homes in Fairbanks to quantify energy use with wood heating compared to other heating sources.

2011 Reflective Insulation Study: This project evaluated the effectiveness of reflective insulations in cold climate construction. It found that reflective insulation can be effective in reducing solar heat gain in hot, sunny climates but is less effective in cold climates.

2011 Safe & Effective Exterior Insulation Retrofits: This study evaluated the thermal and moisture performance of different wall designs in various housing retrofit techniques. The results provide standards for building energy efficient, durable, healthy homes.

2011 Wood-Burning Technology Study: This research evaluated the economic and environmental considerations of a variety of residential wood energy appliances, including wood stoves, pellet stoves, wood boilers, and masonry heaters.

2010 Insulating Paints: This study evaluated two coating products to determine whether they contribute insulating properties to the building envelope when applied on the Interior.

2009 Hybrid Micro-Energy Project: This project explored and demonstrated how a variety of renewable energy sources can be integrated to supply single- and multi-family housing energy demands in Alaska.

2008 Combustion Air/Carbon Monoxide (CO) Study: This study examined at how homeowners provide combustion air for atmospherically vented appliances and assessed the performance of power-vented appliances.

2007 Mobile Test Lab - Wall Systems for Southeast Alaska: Wall sections appropriate for the Southeast Alaska climate were tested in the Mobile Test Lab.

2007 Building America in Alaska: A “Building America in Alaska” team of industry professionals from across the state worked with cold climate experts to develop plans for energy efficient, durable, healthy, and cost effective homes affordable to moderate income Alaskans.

2006 Frost-Protected Shallow Foundation Study: Frost-protected shallow foundations rely on placing enough insulation outside of a shallow foundation to protect it from heaving due to seasonal freezing. Temperature sensors were installed at two houses with these foundations to measure the thermal regime of the soil.

2006 Straw Bale House Monitoring: This study gathered data on temperature and moisture gradients throughout the straw bale insulation of exterior walls in three straw bale houses in the Fairbanks area.

2006 REMOTE Wall Study: From 2002-2005, this research studied the performance of two residential dwellings built with different wall systems. One was a standard wall system with an interior vapor/air barrier and the other was a modified PERSIST (Pressure Equalized Rain Screen Insulated Structure Technique) wall that has been named “REMOTE,” which stands for Residential Exterior Membrane Outside Insulation Technique.

2005 Southcentral Ventilation Study: This study monitored nine houses in Anchorage to assess the effectiveness of their ventilation systems and compliance with the Alaska Building Energy Efficiency Standard ventilation requirements.

2005 Healthy Homes in Alaska: This project demonstrated cost-effective, preventative measures to correct health hazards in homes that lead to serious upper respiratory illness in children. It also addressed how changes in indoor air quality affected the health of residents.

2004 Health House VOC Monitoring: This study collected data on Volatile Organic Compounds in various new homes in Fairbanks and Juneau to assess the effects of different ventilation practices on indoor air quality.

2004 Kenai Indoor Air Quality Study: This project examined the most common causes of indoor air quality problems in Southcentral Alaska by monitoring 100 homes for carbon monoxide, carbon dioxide, temperature, relative humidity, and radon.

2003 Mold Survey: A survey of mold problems in Alaska Native housing examined 73 regional or village housing authorities in Alaska and documented over 1,700 apartments or homes with some degree of mold problem.

2002 Evaluating Residential Heating Systems: This project measured the design heat load of houses by monitoring the runtime of the furnace in relation to outdoor temperatures. The study monitored 20 houses in the Anchorage area during very cold weather to better determine appropriate heating system sizing for the heating, ventilation, and air conditioning (HVAC) industry.

(year unknown) Evaluating Ventilation Systems and IAQ: This study monitored 100 homes in 3 different climatic regions for relative humidity, particulates, and volatile organic compounds (VOCs). The goal was to evaluate the extent to which ventilation practices, house characteristics, location, and other factors affect indoor air quality.

(year unknown) Wood Storage Best Practices: This study investigated multiple wood storage methods to learn how long it takes to cure firewood. Burning dry wood produces fewer PM 2.5 emissions and more heat energy, a benefit to both homeowners and all borough residents.

SUSTAINABLE NORTHERN COMMUNITIES PROGRAM (SNC)



Corey DiRutigliano, former SNC designer, updates a proposed floor plan

The Sustainable Northern Communities program applies the findings and knowledge gained in CCHRC labs to housing challenges throughout Alaska. SNC designers and building scientists work with tribal and regional housing entities, federal and state agencies, design firms, and partners across the state to construct demonstration buildings that emphasize energy efficiency, local resources, and workforce development. Through innovation and partnerships, these demonstration buildings have reduced energy use by 80 percent on average, while reducing construction costs dramatically. This program was formally established in 2008.

CCHRC has developed several prototype homes that can be affordably reproduced throughout Alaska to provide much-needed housing. The program, which started with an experimental house made of spray foam in Anaktuvuk Pass, has grown to encompass more than a dozen Alaska villages.

CCHRC has also worked with agencies to design and construct climate-appropriate replacement housing for communities such as Galena and Crooked Creek that have been devastated by natural disasters. This approach to disaster relief housing has saved millions of dollars in state and federal funding and ensured that new housing stock is affordable and durable for generations to come.

The Holistic Approach is the cornerstone of the Sustainable Northern Communities program. The Holistic Approach is a collaborative effort that begins with the community and includes all the stakeholders, and relevant agencies and regional organizations to address prioritized issues. Historically, such efforts often have not been coordinated, resulting in increased expenses and wasted resources. The Holistic Approach has been demonstrated in a pilot project in the Yukon-Kuskokwim Delta (Y-K) region and is expected to be a template for village relocations and communities statewide.



Judith Grunau, former SNC designer, taking notes at a design charrette

In early 2008, the leaders and stakeholders of Anaktuvuk Pass invited the CCHRC to work with them to explore housing suited for their needs. In June, the CCHRC design team and village leaders held a design charrette in the community, ensuring that all village residents could attend sessions and contribute their ideas. The resulting criteria, floor plan, and building site were further developed by the CCHRC design team. CCHRC incorporates this charrette process in nearly all SNC design projects.

SNC PROJECTS

Anaktuvuk Pass Prototype Home

CCHRC partnered with the Tagiugiullu Nunamiullu Housing Authority (TNHA) and the village of Anaktuvuk Pass to design and construct an affordable, energy efficient, and healthy home. Through a partnership with Iligsagvik College, local student labor was trained to construct CCHRC's first prototype house in June of 2009.

Quinhagak Prototype Home

CCHRC worked with the Native Village of Kwinhagak on a super-efficient octagonal prototype home that sheds wind and reflects the tastes of the community. The prototype was constructed in 2010 and monitored for two years. The home used 171 gallons of heating oil the first year, compared to 1,000 for the average home in theregion. The prototype is being reproduced by a local crew in an effort to replace more than 50 homes in the village that are in structural failure. Three new homes were built in Summer 2012 with the guidance of CCHRC.

Buckland Prototype Home

CCHRC and the community of Buckland built an energy efficient home in 2012 that uses an integrated truss design. It is oriented to minimize wind load, and the diagonal roof ridge allows solar gain and extra storage space. CCHRC collaborated with the UAF Chukchi Campus, Northwest Inupiaq Housing Authority, the Native Village of Buckland.

Galena Prototype Home

An ice jam on the Yukon River caused major flooding in Galena in 2013, destroying many homes in the community. CCHRC partnered with Galena residents, FEMA and the state to develop affordable, energy efficient replacement housing. The super-insulated homes use integrated truss technology and a combined heating and ventilation system to maintain healthy indoor air quality. More info at [<http://www.cchrc.org/galena-prototype-home>].

Crooked Creek Prototype Home

CCHRC designed a prototype house for Crooked Creek, a small village on the Kuskokwim River, after flooding destroyed 10 homes in May 2011. The replacement homes used a unique integrated truss design and demonstrated energy efficient, affordable, flexible, and quick construction in a remote location. Crews replaced the homes in the span of four months with the help of many organizations and volunteers. CCHRC is working with the Alaska Department of Homeland Security and Emergency Management to develop housing concepts for each region in Alaska that are appropriate for the environment and can be rapidly deployed in an emergency. [<http://www.cchrc.org/crooked-creek-prototype-home>].

Venetie Prototype Home

CCHRC worked with the Yukon Flats School District to design teacher housing that combines local materials with super-insulated building techniques. . This design used locally milled logs and an insulated standoff wall to improve the thermal performance. The four-plex was constructed in 2013 by a local village crew. During the first year of occupancy, the four units used less than 400 gallons of heating oil, 90% less than the average home in the region. More at [<http://www.cchrc.org/venetie-prototype-home>].

Bethel Aviation Housing

CCHRC partnered with the the Association of Village Council Presidents (AVCP) to design two duplexes for flight school students in Bethel. The duplexes incorporate integrated truss technology and combined heating and ventilation systems to ensure healthy indoor air quality. They demonstrate a viable technology in a region that needs 2,000 housing units over the next 10 years. More info at [<http://www.cchrc.org/avcp-bethel-housing>].

Atmautluak Prototype Home

CCHRC worked with the community of Atmautluak in 2013 to develop two energy efficient prototypes and launch a local construction community. More about the project at [<http://www.cchrc.org/atmautluak>].

UAF Sustainable Village Prototype Homes

CCHRC collaborated with the University of Alaska Fairbanks to design a sustainable student village that includes super energy efficient homes with unique building, heating and mechanical systems. Four homes were constructed in the summer of 2012, and CCHRC is monitoring the energy performance of the homes to compare the various systems. To see how the homes performed, visit [<http://www.cchrc.org/sites/default/files/docs/SustainableVillageTwoYearSnapshot.pdf>].

North Slope Housing Prototypes

CCHRC partnered with the Tagiugiullu Nunamiullu Housing Authority (TNHA) to design affordable, energy efficient, healthy homes across the North Slope region. The homes feature a unique foundation system adapted to the permafrost conditions in the high Arctic. New homes were constructed in Point Lay, Kaktovik, Atkasuk and Anaktuvuk Pass. The homes reduce energy use by 80 percent and use innovative foundation, building envelope and heating technologies. More info at [<http://www.cchrc.org/north-slope-housing-prototypes>].

Holistic Pilot Project in Oscarville

CCHRC is working with a number of partners on a pilot project in Oscarville, a small community in the Yukon Kuskokwim Delta region, to address the many elements of sustainability through community engagement and interagency partnerships. This roundtable concept – the Holistic Approach – has brought together some of the important components of a healthy community: residents and their culture, housing, energy, infrastructure, water/sewer, community health, and economic development.

Newtok Relocation

CCHRC partnered with the people of Newtok to design and build energy efficient homes as they relocate their village to a safe place. Severely threatened by coastal erosion and melting permafrost, the village is moving to a new site on higher ground called Mertarvik. CCHRC worked with a village crew to build a demonstration home in 2016 and produced a master plan for housing at the new village. [<http://www.cchrc.org/mertarvik-evacuation-center>].

Portable Alternative Sanitation System (PASS)

CCHRC worked with the Alaska Native Tribal Health Consortium and Lifewater Engineering to develop an affordable gravity-fed water and wastewater system for the village of Kivalina. Residents currently haul water and empty honey buckets by hand. The Portable Arctic Sanitation System (PASS) includes a 100-gallon water tank, pump, and filtration system so residents can treat water from the river or the water plant. It also includes a gravity fed system that flows to a water basin so residents won't have to reuse the same water throughout the day. The system is being tested in nine homes in Kivalina and expanded to other villages. More at [<http://www.cchrc.org/water-sewer-project-kivalina>].

2007 Sustainable Northern Shelter Forum

In October 2007, CCHRC hosted a conference titled “Sustainable Northern Shelter in a World of Diminishing Resources,” which brought together participants from the Circumpolar North, including Greenland, Russia, Sweden, Norway and Canada, the continental United States, and throughout Alaska.

SNC Monitoring

The Sustainable Northern Communities program develops energy efficient, affordable, healthy housing that fits the climates and cultures of Alaska communities. SNC brings together local residents, tribal governments, state and federal agencies, housing authorities, and other partners. CCHRC monitors the prototype homes to troubleshoot and improve designs.

Sustainable Northern Communities (SNC) Addition

CCHRC completed an 8,000-square-foot addition to the Fairbanks Research and Testing Facility (RTF) that demonstrates what optimal energy performance, advanced control systems, and sustainable construction in an extreme environment. The photo at right shows the building in early stages of construction.



The first SNC prototype home under construction in Anaktuvuk Pass



Quinhagak prototype home after completion



SNC addition under construction



CCHRC staff and local crew at Mertarvik home



Completed CCHRC demonstration home in Mertarvik, Newtok's new community site

POLICY RESEARCH PROGRAM

The Policy Research Program analyzes and packages data on Alaska's buildings to inform statewide housing policies and programs. This work leads to deeper understanding of Alaska's housing and commercial building stock, energy use, and potential for energy savings. CCHRC regularly updates Alaska's regional residential energy standards to reflect the best building science and economic considerations. As a direct result of the CCHRC's research, a home built today in Alaska uses 30 percent less energy on average than a new home constructed twenty years ago. Durability and indoor air quality have also improved at little additional cost to homeowners. Two highlighted projects from this program are:

Housing Assessments: The 2005, 2009, 2014, and 2018 Alaska Housing Assessments provide an in-depth view of the type and quality of housing units across the state. They have been completed in partnership with the Alaska Housing Finance Corporation (AHFC). These reports are used by Alaska regional and tribal organizations, as well as research and project consultants, to prove need when seeking funding, develop community and other long range plans, conduct preliminary site research, and plan prior to traveling to remote communities.

Database- The Alaska Retrofit Information System (ARIS): This database, created for the Alaska Housing Finance Corporation (AHFC), contains all residential and commercial building energy models funded by the AHFC and the Alaska Native Tribal Health Consortium (ANTHC). This database also holds the energy usage and costs on a monthly basis for all state owned or leased

facilities, as well as model data on over one-third of Alaska's occupied housing. This data aids in targeting future state funding to areas of the state in serious housing distress, providing primary data for the housing assessments. The data has allowed AHFC to better manage the over \$600 million in funding for retrofits the state legislature has allocated.

POLICY RESEARCH PROJECTS

4-5 Star Plus Energy Rated Homes Survey & Analysis: Ivan Moore Research (IMR) of Anchorage conducted a customer survey of Four-Star Plus and Five-Star Plus homes to determine customer satisfaction and understanding of the building components of these high energy efficiency-rated homes.

6-Star Green Program Development: This project outlined a program to add a 6th Star to its home rating system, which included an AkWarm energy analysis and a green building analysis, a national standard for energy efficiency.

AKWarm Modernization and Improvements: This project contracted with Arctic Energy Systems to develop computer software that calculates the design heating load of a home, to properly size a home heating system. The free online program can be used by contractors and homeowners to model and plan the components of their houses.

AkWarm Updates: This study updated AkWarm, the software used to rate the energy efficiency of Alaska homes, to account for renewable energy, heat loss characteristics, and regional variations in climate and energy.

Alaska Housing Assessment: This report provides an overview of the current characteristics of Alaska's housing stock, at a variety of scales: statewide, by region, census area, and community.

BEES Study: This research conducted economic analyses of AHFC's energy efficiency standards, known as Building Energy Efficiency Standards (BEES). The project examined the construction and maintenance costs of meeting the standards, and it quantified the savings in categories such as energy, health, and safety.

Building Usage Data System (BUDS) Project: This project produced a data collection and usage visualization package designed to be the standard for energy raters and auditors in Alaska.

Energy Efficiency Program & Policy Recommendations: This project provides a comprehensive review and analysis of the energy efficiency policies and programs in the State of Alaska. CCHRC completed the final report in 2008, and many of the recommendations were implemented.

Energy Use in Alaska's Public Facilities: This study provided the first in-depth picture of energy use by Alaska public buildings based on comprehensive energy audits of 327 public facilities. It found that the average building can save \$25,000 per year on energy with modest investments in efficiency.

Fairbanks Nonprofit Retrofit Pilot: This project helped Alaska nonprofits save money by making their buildings more energy efficient. The goal was to help the nonprofit sector substantially reduce its energy costs, so organizations could spend more on their missions.

HERS Software Development: This research developed guidelines for AHFC staff to use when reviewing software for compliance with the Home Energy Rating System (HERS) standard.

Mountain View Housing Study: This study evaluated new homes built by the Cook Inlet Housing Authority (CIHA) and a local contractor that are heated with boilers or furnace. Researchers examined the energy efficiency, homeowner comfort, indoor air quality, and humidity control of the homes.

PM 2.5 Reduction Policy: This project developed a model to estimate PM2.5 emissions from residential heating sources in Fairbanks and evaluated a variety of policy options aimed at reducing emissions, finding that these efforts could cut emissions in half.

Rebate & Weatherization Program Evaluation Audit Process: This project evaluated AHFC's weatherization and rebate programs to determine outcomes and recommend improvements.

Remediation of Smoke Particles in Fairbanks Homes: In the summer of 2004, CCHRC initiated this project in response to and in the midst of the heavy smoke in the Fairbanks area due to wildfires. An emergency study was conducted to improve indoor air quality and address simple and affordable filtration techniques. CCHRC installed systems in houses of people with a history of respiratory problems and monitored air quality.

OUTREACH PROGRAM



A class in the CCHRC lab

Outreach represents a core component of CCHRC's mission. The outreach program, formally established in 2008, disseminates research and best practices information through homeowner and trade shows, classes, and consulting with contractors and homeowners. CCHRC staff write articles for newspapers and trade magazines and share publications and videos on its website and YouTube channel. CCHRC has direct contact with over 1,400 individuals each year. To date, more than 200 YouTube videos provide detailed, hands-

on advice about construction for professionals and homeowners. These videos have received nearly one million views and are used in professional training courses throughout Alaska and cold regions worldwide. The outreach program works directly with BSRP, SNC, and Policy Research to publicize the work of all CCHRC programs.



Carpenter Ilya Benesch at a CCHRC outreach booth

Public Service for Building Education

CCHRC staff have decades of experience building in Fairbanks; homeowners can call, email, or make appointments visit to ask questions about their homes and receives thorough, personalized responses.



Ty Keltner, a former CCHRC filmmaker, films the first SNC prototype home in Anaktuvuk Pass

Online outreach

The CCHRC website is a one stop shop for disseminating information on building in the Circumpolar North for homeowners and homebuilders. Research projects and publications are available to any site visitor. A section of the website

is dedicated to sharing information with potential homebuilders. The CCHRC YouTube channel shares content on projects and homebuilding; CCHRC had an on-staff filmmaker for several years.

OUTREACH PROJECTS

Website: CCHRC's website features hundreds of publications, project reports, and information for homeowners and homebuilders in the Circumpolar North.

YouTube Channel: Over 200 videos, covering a range of topics from past CCHRC projects to answering commonly asked homebuilding questions, have received nearly one million views on CCHRC's Youtube channel. [<https://www.youtube.com/user/ColdClimateHousing>]

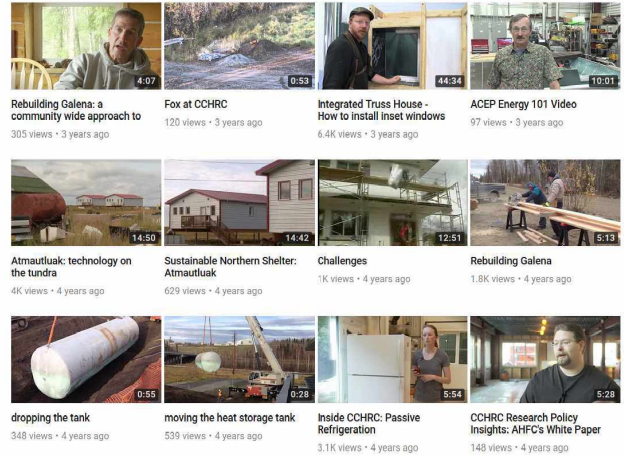
Ask a Builder Columns: Written by CCHRC staff, these local newspaper columns respond to frequently asked questions.

Builder's Resource Library: In collaboration with the National Association of Home Builders (NAHB), CCHRC provides a broad array of texts and technical materials to those who visit the RTF off site and online. Visitors can access CCHRC's latest research, a plethora of building related materials, and the NAHB's online library.

Newsletters: Quarterly newsletters highlight CCHRC's current projects.

Classes: CCHRC offers classes throughout the year on topics including building on permafrost, foundations, energy use, and more. The building is often used as a host site for other construction certification courses.

2015 CCHRC Project Map: The interactive Project Map illustrates the locations of all CCHRC projects across the state and allows visitors to the site to learn about each of the projects. [<http://cchrc.org/cchrc-project-map>]



A sampling of videos from a screenshot of CCHRC's YouTube channel



The CCHRC Builder's Resource Library



UNIQUE APPROACH

CCHRC tackles Alaska's housing challenges from a variety of angles, through these four programs, which complement one another.

The success of these programs reflects the heart and soul that CCHRC employees pour into their work. Employees and outside parties comment on the culture and organizational structure that explain this organization's success in fulfilling its mission.

CCHRC brings together engineers, architects, carpenters, and builders to collaborate on projects—an arrangement that is not typically seen in the

private sector. A signature method of CCHRC's SNC program is a design charrette – a process that involves being invited into a community and holding a listening session about what a community would like to see in a home. Many interviewees noted this structure as being unique and a major contributing factor to the success of CCHRC's work.

Within the building, the humans of CCHRC embrace the mission of the organization, and describe the culture as being like a family. Kids, dogs, and friends are welcomed.

A TWENTY-YEAR LEGACY IN THE STATE

Alaska's remote, Arctic and sub-Arctic setting presents unique challenges to providing healthy, durable, and sustainable housing. Since time immemorial, building shelters to protect people from the harsh Arctic and sub-Arctic elements, and securing food, have been Alaskans' two primary concerns. Climatic, logistical, technical, socio-cultural challenges in the state are well recorded post WWII; generations of Alaskans have attempted to address housing needs in innovative ways, but an Arctic-appropriate design and build remains a holy grail of building in the North. Alaskans work on balancing heating and ventilation, and affordability and durability. Some embrace the opportunity to create shelters that reflect regionally appropriate designs that reflect local culture. The Cold Climate Housing Research Center structure reflects the need to create shelters that reflect regionally appropriate designs and local culture.

The boom-bust cycle that characterizes Alaska's resource-driven economy hinders the CCHRC and other agencies and organizations from making long-range plans. While the state seeks long-term solutions to its recurring fiscal crises, those who depend on state funding allocations struggle to secure dependable, multi-year funding streams.

CCHRC came into existence in 1999, at a time when the number of nonprofits in the state was rapidly increasing each year. Alaska stands in the top ten states in nonprofits per capita – in 2016, there was one nonprofit for every 130 people – reflecting the importance of the nonprofit sector to the overall economy.

While the CCHRC's significant economic impact on the state is clear, it, like all the state's nonprofits,

is particularly susceptible to ebb and flow of the state's economic health. Nearly all the individuals interviewed for this history of the CCHRC indicated that they viewed funding concerns as the primary challenge the organization faces.

Respondents highlighted a wide variety of contributions CCHRC has made to Alaska's housing industry and Alaskans' well-being. Many noted its collaborative style and culture that allow the organization to serve as a bridge between the building industry and rural communities, so Alaskans benefit from the latest building science research applied to specific localities. Several highlighted the two decades of outreach and education provided to Alaskan homeowners. They also valued the technical and research findings the organization has produced over the past two decades, and the improvements in energy efficiency in the state owing to CCHRC's work. Interviewees spoke of CCHRC's history and legacy with warmth.

Mark LaLiberte noted the organization's people-oriented culture: "So CCHRC had to be very specific to the needs of the state and they've been very dedicated to doing just that. If it was a village or an area or a region which had complex soils, complex weather, complex people, they would sit and listen and work with people..."

Mac Sheldon highlighted the quality and value of CCHRC's research: "Well designed, very livable, and very energy efficient, and very durable homes. In my estimation, in my experience, there is nobody who has been able to provide this kind of service and this kind of knowledge and with the interest and the passion that this staff of CCHRC have."

Alan Wilson spoke to the lasting benefits of the organization's research: "The mark that we've [CCHRC] left on the state from an energy efficiency standpoint will certainly be long lived."

CCHRC's strong reputation extends well beyond the state. "You know we've been a good example for our colleagues in the Circumpolar North," Aaron Cooke said, "to show new ways of approaching community development and building science, working with rural communities, and we've had success stories that can maybe encourage them to do similar work in their own areas."

Others commented on the legacy of demonstrated success of collaborative methodology. Former CCHRC board chair and Juneau-based homebuilder Alan Wilson said, "...we've shown that when you work as a group, collaborative(ly), that you get more done. You get a better product in the end and everyone feels good about the product . . ."

Decades ago, Alaskan builders recognized the need for building research in remote northern regions based on collaborative problem solving. They established this organization drawing on their own collective experience, as well as decades of Canadian expertise and professional best practices.

Twenty years after CCHRC's founding, the vision, passion, and collaborative orientation that Jack Hébert and other CCHRC founders brought to the organization continue to guide and inspire its personnel in pursuit of healthy, durable, and sustainable shelter for Alaskans and other circumpolar people.

April 2018

So... what's next? Nearly 20 years ago, our founders had a vision to create an organization that served the needs of builders, homeowners, policymakers and cold climate communities around the world. Our mission is to promote and advance the development of healthy, durable, and sustainable shelter for Alaskans and other circumpolar people. And, indeed, CCHRC wouldn't exist without the the right people being in the right place at the right time. The spark of inspiration that created this organization has motivated us ever since. Yes, we're improving shelter, but at the very core of it, what inspires us to do this work every day is knowing we are making a positive difference in the lives of people.

First Alaskans built and lived in sustainable housing for 10,000 years. Why is it today, in a world with space-age technology, that so many people live in homes that make them sick? Why is the cost of heating these homes so high that people have to choose whether they want to eat or stay warm? With new resources, new technology, and traditional knowledge, we can solve these problems. As we address these challenges, we are constantly asking: what can we do to ensure the people in this climate can live here sustainably for the next 10,000 years?

While our need for shelter will never change, our world around us changes constantly. So too, do our approaches to solve these problems. As new building needs arise and new building technologies surface, we will be ready to innovate. As our finite energy supplies diminish and our renewable energy supplies become available, we will be ready to adapt. As the climate changes and permafrost thaw accelerates, we will be ready with solutions. As communities adapt to their changing future, we will be there to help.

Once again, something great is coming from the right people, at the right time, and in the right place. As the last of our founders looks forward to our future, and the next generation of leaders to carry the vision, we know that the success of CCHRC in meeting its mission, depends on our ability to fully understand our history, our core values, and why we exist. Thank you, Anne, for taking the time to capture the vision and history of those before us. Thank you for inspiring the next generation of CCHRC and helping us know our story, our purpose, and our values. This work couldn't have come at a better time.

We move forward remembering that we are stewards of something greater than us. We are here to sustain the vision of the founders to serve the people in providing healthy, sustainable, and durable shelter in cold climates. This is not just our organization; it is your organization. Our job is to nurture it into a better state than it was when we arrived so that those after us will thrive and continue this important work. And our mission will be accomplished when every person in Alaska and circumpolar regions has healthy, durable, and sustainable shelter.

Until then, we remember who we are, roll up our sleeves, and make life better for those on the horizon.



Bruno Grunau
CCHRC Chief Programs Officer (CPO)



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APPENDIX A: INTERVIEW PROTOCOL

Part I: You and CCHRC

What is your story about the history of energy efficiency homes in Alaska or in the North?

What years were you affiliated with CCHRC?

What was your role at CCHRC?

How did you come to be in this role?

What are your favorite project(s) at CCHRC?

How were you involved in these projects?

Part II: CCHRC as an entity

From your perspective, how did CCHRC come to be established?

What are the unique housing challenges in Alaska?

What housing challenges was CCHRC formed to respond to?

How does the research and testing facility (RTF), CCHRC's building, showcase CCHRC's mission/vision?

What do you see as CCHRC's significance in the state?

What do you see as CCHRC's significance in the Circumpolar North community?

What key partnerships/collaborators have aided CCHRC's work?

How do you perceive CCHRC's mission to have evolved over time?

How has CCHRC met evolving challenges? How has CCHRC fallen short of meeting evolving challenges?

What do you see as the greatest accomplishments of CCHRC, during the time you were involved or otherwise?

What do you see as the greatest challenges of CCHRC, during the time you were involved or otherwise?

How do you describe CCHRC's work culture?

Part III: Other

Do you have any photos, videos, or other media you'd like to share with this project?

Do you have any additional comments on the history of CCHRC?

Do you have suggestions on additional folks to talk to?

APPENDIX B: CCHRC BOARD MEMBERS

1999 - 2000

Jack Hébert
Richard Tilly
Clai Porter
James Irvine
Steve Burnett

2000 - 2001

A Steve Burnett, Vice President
B Richard Tilly, Secretary/Treasurer
C Jack Hébert / Chuck Renfro
D Clai Porter, Chair
E Dave Dillard
F Mark LaLiberte
G Chuck Dearden
H Oliver Drerup
I Wayne Mundy

2001 - 2002

A Steve Burnett
B Richard Tilly, Secretary/Treasurer
C Chuck Renfro
D Clai Porter, Chair
E Dave Dillard
F Mark LaLiberte
G Chuck Dearden
H Oliver Drerup
I Wayne Mundy
Ex-Officio: Jack Hébert

2002 - 2003

A Steve Burnett
B Richard Tilly, Secretary/Treasurer
C Chuck Renfro
D Clai Porter, Chair
E Dave Dillard
F Mark LaLiberte
G Chuck Dearden
H Oliver Drerup
I Wayne Mundy
Ex-Officio: Jack Hébert

2003-2004

A Steve Burnett
B Richard Tilly, Secretary/Treasurer
C Chuck Renfro
D Clai Porter, Chair
E Dave Dillard
F Mark LaLiberte
G Chuck Dearden, Vice Chair
H Oliver Drerup
I Kimberly Williams
Ex-Officio: Jack Hébert, Theresa Weston

2004 - 2005

A Steve Burnett, Vice Chair
B Richard Tilly, Secretary/Treasurer
C Chuck Renfro
D Clai Porter, Chair
E Dave Dillard
F Mark LaLiberte
G Chuck Dearden, Vice Chair
H Oliver Drerup
I Kimberly Williams / Wendy Knight
Ex-Officio: Jack Hébert, Theresa Weston, Mike Sfraga

2005 -2006

A Steve Burnett, Vice Chair
B Richard Green, Secretary
C Chuck Renfro
D Clai Porter, Chair
E Dave Dillard
F Mark LaLiberte
G Chuck Dearden
H Oliver Drerup
I Wendy Knight
J Brent LeValley, Treasurer
K Jess Hall
Ex-Officio: Jack Hébert, Theresa Weston, Mike Sfraga

2006-2007

A Steve Burnett, Vice Chair
 B Richard Green, Secretary
 C Chuck Renfro
 D Clai Porter, Chair
 E Dave Dillard
 F Mark LaLiberte
 G Chuck Dearden
 H Oliver Drerup
 I Wendy Knight
 J Brent LeValley, Treasurer
 K Jess Hall

Ex-Officio: Jack Hébert, Bill Semple, Mike Sfraga
 Mike Buller, Craig Moore, Theresa Weston

2007-2008

A Alan Wilson, Vice Chair
 B Richard Green, Secretary
 C Chuck Renfro
 D Clai Porter, Chair
 E Dave Miller
 F Mark LaLiberte
 G Kelley Roth
 H Bill Semple
 I Jess Dilts
 J Brent LeValley, Treasurer
 K Jess Hall

Ex-Officio: Jack Hébert, Mike Sfraga, Mike Buller,
 Dan Duame

2008-2009

A Alan Wilson, Vice Chair
 B Richard Green, Secretary
 C Chuck Renfro
 D Clai Porter, Chair
 E Dave Miller
 F John Straube
 G Kelley Roth
 H Bill Semple
 I Jess Dilts
 J Brent LeValley, Treasurer
 K Jess Hall

Ex-Officio: Jack Hébert, Mike Sfraga, Mike Buller,
 Dan Duame, Walt Murphy, Pat Pitney, Russ
 McDougal

2009-2010

A Alan Wilson, Chair
 B Richard Green, Secretary//Treasurer
 C Jerry Herring
 D Lauri Strauss
 E Dave Miller, Vice Chair
 F John Straube
 G Kelley Roth
 H Bill Semple
 I Jess Dilts
 J Brent LeValley
 K Jess Hall

Ex-Officio: Jack Hébert, Pat Pitney, Mike Buller,
 Dan Duame, Walt Murphy, Wally Smith

2010-2011

A Alan Wilson, Chair
 B Richard Green, Secretary
 C Jerry Herring
 D Lauri Strauss
 E Dave Miller, Vice Chair
 F Joe Beedle
 G Kelley Roth
 H Bill Semple
 I Jess Dilts
 J Aaron Hines, Treasurer
 K Jess Hall

Ex-Officio: Jack Hébert, Pat Pitney, Mike Buller,
 Dan Duame, Walt Murphy, Dave Owens,
 Mark LaLiberte

2011-2012

A Alan Wilson, Chair
 B Bert Bell
 C Jerry Herring
 D Lauri Strauss, Secretary
 E Dave Miller, Vice Chair
 F Joe Beedle
 G Kelley Roth
 H Bill Semple
 I Jess Dilts
 J Aaron Hines, Treasurer
 K Jess Hall

Ex-Officio: Jack Hébert, Pat Pitney, Mike Buller,
 Irene Catalone, Walt Murphy, Chas
 Edwarson, Mark LaLiberte

2012-2013

A Alan Wilson, Chair
 B Bert Bell
 C Jerry Herring
 D Lauri Strauss, Secretary
 E Dave Miller, Vice Chair
 F Dave Owens
 G Kelley Roth
 H Andrew Spinelli
 I Jess Dilts
 J Aaron Hines, Treasurer
 K Joe Beedle
 Ex-Officio: Jack Hébert, Pat Pitney, Mike Buller,
 Jennifer Maguire, Walt Murphy, Chuck
 Homan, Mark LaLiberte, Bill Semple

2013-2014

A Scott Cragun
 B Bert Bell, Chair
 C Jerry Herring
 D Lauri Strauss, Secretary
 E Daniel White
 F Dave Owens
 G Daniel Fauske
 H Andrew Spinelli, Vice Chair
 I Jess Dilts
 J Aaron Hines, Treasurer
 K Joe Beedle
 Ex-Officio: Jack Hébert, Pat Pitney, Mike Buller,
 Jana George, Mac Sheldon, Jeff Twait,
 Mark LaLiberte, Bill Semple, Cate Sorocza,
 Alan Wilson

2014-2015

A Scott Cragun
 B Bert Bell, Chair
 C Jerry Herring
 D Lauri Strauss, Secretary
 E Daniel White
 F Dave Owens
 G Daniel Fauske
 H Andrew Spinelli, Vice Chair
 I Joe Beedle
 J Aaron Hines, Treasurer
 K Alan Wilson
 Ex-Officio: Jack Hébert, Pat Pitney, Mike Buller,
 Jana George, Mac Sheldon, Chuck Homan,
 Mark LaLiberte, Bill Semple, Cate Sorocza

2015-2016

A Scott Cragun
 B Bert Bell, Chair
 C Michael Hoffman
 D Dena Strait
 E Daniel White
 F Dave Owens
 G Daniel Fauske
 H Andrew Spinelli, Vice Chair
 I Joe Beedle
 J Aaron Hines, Treasurer
 K Alan Wilson
 Ex-Officio: Jack Hébert, Mike Buller, Jana George,
 Mac Sheldon, Andre Spinelli, Mark
 LaLiberte, Bill Semple, Cate Sorocza

2016-2017

A Carol Gore
 B Bert Bell, Chair
 C Michael Hoffman
 D Dena Strait
 E Daniel White
 F Dave Owens
 G David Miller
 H Andrew Spinelli, Vice Chair
 I Joe Beedle
 J Songzhen Lang, Treasurer
 K Alan Wilson, Secretary
 Ex-Officio: Jack Hébert, Mark Romick, Jana
 George, Mac Sheldon, Aaron Welterlin,
 Mark LaLiberte, Bill Semple, Lauri Strauss

Ex-officio members represent partnerships with various organizations including but not limited to: the Alaska Housing Finance Corporation, the Alaska State Home Builders Association, regional housing authorities, the University of Alaska, the Canada Mortgage and Housing Corporation, and CCHRC advisory committees.

Founding Members

Steve Burnett
Chuck Dearden
Dave Dillard
Oliver Drerup
Jack Hébert
James Irvine
Mark LaLiberte
Wayne Mundy
Clai Porter
Chuck Renfro
Richard Tilly

Past Board/Lifetime Emeritus Status

Chuck Dearden
Mark LaLiberte
Wayne Mundy
Richard Tilly
Dave Dillard
Steve Burnett
James Irvine
Clai Porter
Brent Levalley
Richard Green
Wally Smith
Lauri Strauss
Jerry Herring
Aaron Hines
Dave Miller



COLD CLIMATE HOUSING RESEARCH CENTER

CCHRC

APPENDIX C: BUILDING PARTNERS

RTF building partners - circa 2005-2006

Major Funders

Alaska Housing Finance Corporation
Alaska Dept. of Commerce and Economic
Development
FannieMae Corporation and Foundation
Rasmuson Foundation
US Dept. of Agriculture - Rural Development
US Dept. of Commerce - Economic Development
Administration

Public Sector Supporters

Fairbanks North Star Borough
Golden Valley Electric Association
University of Alaska Fairbanks
University of Alaska

Corporate Donors

Alaska Pro-Sell Agents
Alaska State Home Building Association
Alaska Stone & Precast
Alaskan Counterfitters
Alaskan Granite & Exterior Works
Anchorage Home Builders Association
Arctic Office Products
Armstrong
ARXX
Boise Engineered Wood
Campbell Scientific, Inc.
Capitol Glass/Northern Windows
Denali State Bank
DIRTT
Dryvit Systems
Dupont Corporation
Electric Power Research Institute
Evergreen Building Products
Expanko Cork
Fairbanks Title Agency
Familian Northwest
Ferguson Enterprises
Firestone
Florcraft-Carpet One

Forbo Flooring
Frontier Plumbing
Geo-Watersheds Scientific
Greer Tank and Welding
Heat-Line
Hebert Homes/Taiga Woodcraft
Hilti, Inc.
Interior Alaska Building Association
Johns Manville
Journal of Light Construction
Ken Murray Insurance, Inc.
Kenai Peninsula Builders Association
Landmark, Inc.
Lanoga Corporation
Lifewater Engineering Co.
Lithonia Lighting
Louisiana Pacific Corp.
Mannington Commercial
Mat-Su Home Builders Association
Maxximum Construction
Mt. McKinley Bank
NCP Architects & Planners, Inc.
NAHB Builders' Books
Northern SE Alaska Building Industry Assoc.
Paragon Design
Rivers' Wood Products
Seapac
Siemens
Solutions to Healthy Breathing
Southern SE Alaska Building Industry Assoc.
Spendard Builders Supply
Stone Castle Masonry
Superior Hardwoods
Surface Art Tile
T&A Supply
The Sherwin-Williams Company
The Woodway
Thermo-Kool
Total Electric Supply Company
University Redi-Mix, Inc.

Uresco
Usibelli Foundation
Venmar
Vertex
Viesmann Boiler Company
Wattstopper-LeGrand
Weil-McLain
Western Insulfoam
Wirsbo/Uponor

Individual Donors

Steve Burnett
John Davies and Linda Schandelmeier
Chuck Dearden
Dave and Cindy Dillard
Oliver Drerup
Richard and Nancy Green
Jess Hall
Jack and Michele Hébert
Wendy Knight
Mark LaLiberte
Brent LeValley
Dave and Laurie Miller
N. Claiborne Porter, Jr.
Chuck Renfro
Cole and Nancy Sonafrank

SNC Building Addition partners - circa 2011

Economic Development Administration (EDA)
Rasmuson Foundation
Alaska Department of Commerce, Community and
Economic Development (DCCED)
Wallace Foundation

APPENDIX D: LIST OF ACRONYMS

ABSN - Alaska Building Science Network

ACHP - Alaska Craftsman Home Program

AHFC - Alaska Housing Finance Corporation

ANTHC - Alaska Native Tribal Health Consortium

ARHC - Arctic Health Research Center

ASHA - Alaska State Housing Authority

ASHBA- Alaska State Home Building Association

CCHRC - Cold Climate Housing Research Center

CMHC - Canada Mortgage Housing Corporation

CRREL - Cold Regions Resource and Engineering
Laboratory

IAC- Industry Advisory Council

IAQ- Indoor air quality

NRCan - Natural Resources Canada

RTF- Research and Testing Facility

TNHA - Tagiugiullu Nunamiullu Housing
Authority



Aerial view of CCHRC

