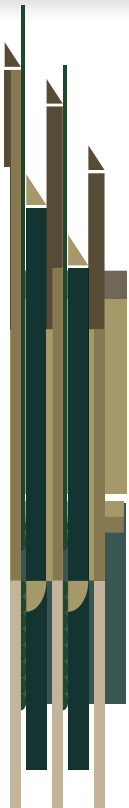


# FINAL REPORT

## SUSTAINABLE CONSTRUCTION IN INDIAN COUNTRY INITIATIVE



May 2011-May 2013



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# **Final Report**

# **Sustainable Construction in Indian Country Initiative**

**Prepared for:**

**U.S. Department of Housing and Urban Development,  
Office of Policy Development and Research**

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**May 2011-May 2013**

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## **Disclaimer**

The contents of this report are the views of the contractor and do not necessarily reflect the views or policies of the Department of Housing and Urban Development or the U.S. government.



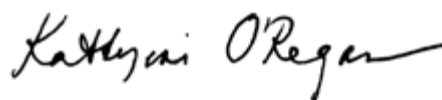
## Foreword

The U.S. Department of Housing and Urban Development (HUD) has worked as a partner with Native American communities since the Department's creation in 1965. The Native American Housing Assistance and Self-Determination Act (NAHASDA) of 1996 moved that partnership to a new level. NAHASDA emphasized flexibility that led directly to some of the wonderful examples of sustainable housing described in this report that are taking place in Indian Country.

These innovations are needed now more than ever. Indian Country faces new challenges related to energy and climate. Although these challenges resonate globally, within the United States, Native American communities are more likely to be affected by these challenges because of their often-remote locations and disproportionately low income levels. American Indian tribes and Alaska Native villages may already face high fuel costs because of their remote locations, and these costs are exacerbated by volatile fuel prices. Extreme weather conditions can also drive up fuel costs, cause additional fuel needs, and threaten housing stock.

In implementing the Sustainable Construction in Indian Country initiative, HUD has found that many tribes and villages are already taking steps to weatherize their housing to increase consumer comfort and energy efficiency and to decrease utility and maintenance costs. Every HUD region has many exciting examples of Native American residential housing using sustainable technologies. These examples include, but are not limited to, the use of structural insulated panels in the Citizen Potawatomi Nation, lava block manufacture at the Pueblo of Isleta, straw bale construction at the Coeur D'Alene Tribe of Indians, and a geothermal system in a development of the St. Regis Mohawk Tribe. As part of the demonstration project selection process and training sessions, Native American communities shared their experiences in working together to gain the knowledge required to make informed choices about the sustainable technologies that are best adapted and most cost effective in their regions and communities. Even more communities asked how they could do the same.

Still, the distance that HUD has come in constructing new housing, renovating deteriorating units, and demolishing substandard housing may not always be remembered in the face of painful continuing concerns about overcrowding and substandard units. It can be hard to plan for the future when many pressing needs are in the present. Investments made wisely today, however, will contribute to increased prosperity, economic health, and an improved ability to meet housing needs tomorrow. HUD applauds these communities for their commitment to their communities and to the world.



Katherine M. O'Regan  
Assistant Secretary for  
Policy Development and Research

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## Executive Summary

The Sustainable Construction in Indian Country (SCinIC) initiative was a congressionally mandated effort of the Department of Housing and Urban Development (HUD), Office of Policy Development and Research, in partnership with the HUD Office of Native American Programs (ONAP). The initiative promoted and supported sustainable construction practices in Native American communities<sup>1</sup> through a range of tasks.

### Initiative Overview

The initiative included four tasks.

- **The review of current activities** identified Native American communities that had or were developing on sustainable construction projects, funding resources, and technical assistance (TA) resources as of July 18, 2011.
- **A national impediments meeting** identified impediments to sustainable construction practices and opportunities for TA and training for the Native American communities.
- **Demonstration projects** were sought that could be featured in best practice case studies. These case studies will enable others to benefit from these best practices.
- **Training** was made available to Native American communities based on results of the other initiative tasks.

*Sustainability* can be defined in many ways. For purposes of this contract, the initiative defined sustainability using the U.S. Green Building Council definition of green homes, as being generally “healthier, more comfortable, more durable, and more energy efficient and have a much smaller environmental footprint than conventional homes.”<sup>2</sup>

The SCinIC initiative was designed to provide types of assistance that can play a role in promoting understanding about the benefits of sustainable construction technologies. Between 2011 and 2013, it has—

- Educated demonstration project teams about the range of sustainable construction technologies available.
- Provided supplemental TA to help tribes incorporate appropriate sustainable technologies into their residential construction projects.
- Helped build relationships among tribal staff and sustainability industry specialists that grow the capacity of both parties and facilitate sustainable design and implementation.
- Promoted the use of available tools for helping tribes make informed decisions about which sustainable construction technologies to implement. Potential tools include free blower-door

1 Native American communities refers to American Indian tribes and Alaska Native villages. As defined in NAHASDA, the terms “tribe,” “Indian tribe” and “American Indian tribe” are used throughout to refer to Indian tribes, bands, nations and other organized groups or communities including Alaska Native villages or regional and village corporations.

2 U.S. Green Building Council (2007): 4.

testing through HUD ONAP, free modeling and benefit analysis software, and the U.S. Department of Energy’s Tribal Energy Program TA.

- Highlighted regional best practice case studies of successful tribal sustainable projects.
- Supported tribes in collecting energy-related data for demonstrating energy and rehabilitation benchmarks and savings associated with sustainable technologies. This assistance can show savings for tribally designated housing entities (TDHEs) and residents.

## Key Findings

Analysis of the SCinIC activities supports the following key findings.

### 1. **Many obstacles to sustainable development in Indian Country are the same as the obstacles to conventional development in Indian Country.**

These obstacles include disruptions to the—often short—building cycle; the length of time to navigate requirements imposed by federal programs, funding, and tribal leadership; staff turnover; land ownership and usage issues; and political roadblocks.

### 2. **The dilemma between more housing and better housing can undermine the desire for sustainable construction.**

Overcrowding and pent-up desire for housing combine with limited housing authority budgets to complicate new housing production and rehabilitation decisions in many Native American communities. The upfront costs and sometimes the perceptions of sustainable construction as luxury can defeat efforts to make housing healthier, more durable, less expensive to operate, and more energy efficient. On the other hand, rehabilitating older housing with appropriate sustainable technologies might be a way to avoid some criticism and make similar gains in health, durability, and utility savings.

### 3. **Obstacles specific to sustainable development can also impede the adoption of technologies.**

Tribal housing authority staff, planners, and architects or engineers may not be familiar with the track record of different sustainable technologies within their climate. They may then disregard certain technologies or, if using them, fail to maintain them properly. Tribal force account<sup>3</sup> construction crews and local non-Native construction teams may have to bring in outside specialists to assist with installation or construction, increasing costs and potentially decreasing employment opportunities for tribal members.

### 4. **Obstacles to sustainable development are often rural development obstacles.**

Rural Native American communities often pay more for materials or have difficulty locating sustainable materials. Shipping materials long distances—when possible at all—can undermine the goal of decreasing the carbon footprint and can increase the development expenditures.

<sup>3</sup> *Tribal force account* refers to the method of construction controlled by the tribe or TDHE rather than contracted out. The tribe uses tribal employees or members to do construction work.

Rural Native American communities also experienced difficulties locating affordable, nearby, or experienced installation or maintenance specialists. The cost and difficulty decreases the cost-effectiveness or the lifetime of the technology.

**5. Resources exist to help alleviate some of the top obstacles specific to sustainability identified in the national meeting, including building codes, capacity building, and planning—but these resources are not adequate to need.**

An active federal interagency workgroup has been addressing issues of tribal building codes. TA and training, often regional in nature, exist to support capacity building, but tribes outside a region may not know what is taking place elsewhere. Federal and other opportunities exist to encourage master-planning efforts, but these resources are not well known and many more tribes need planning support than these resources can support.

**6. Training and technical support for new green residential construction for tribes is focused in Alaska, the Pacific Northwest, and the Southwest. The opportunities for Native American communities to receive these needed services in other regions of the country are more limited.**

One of the critical factors in supporting and increasing sustainable residential construction in Indian Country is having several organizations that provide training and TA with new green construction projects. Although several organizations do a lot of work with tribes, relatively few organizations provide training and TA on new sustainable construction in Indian Country. For example, key informants often mentioned the same entities in a given region: Cascadia Green Building Council in Alaska and the Pacific Northwest, Cold Climate Housing Research Center in Alaska, and the Enterprise Green Communities program in the Southwest. Increasing the sustainability of existing homes has more support, with the Environmental Protection Agency (EPA) and HUD offering training and regional workshops.

**7. Educational groups, such as tribal colleges, can help tribal members acquire professional green building skills and foster tribal capacity building, another example of tribes helping tribes. Tribal colleges, however, are primarily clustered in the Great Lakes, the Dakotas, Montana, and the Southwest.**

Educational organizations include Construction in Indian Country, in partnership with Arizona State University, and the College of the Menominee Nation. Although Red Feather Development Group and the Zuni Housing Authority have implemented successful models for increasing housing authorities' capacity to do their own sustainable construction projects, they are the exception rather than the rule. Most tribes depend on local construction firms and use tribal members in only relatively unskilled capacities. Further, in at least one ONAP region, tribes reported difficulty accessing construction firms with experience in sustainable construction technologies.

**8. Strong enthusiasm exists among those who are implementing sustainable technologies.**

At the training sessions and during the selection interviews, it became apparent that tribes that had already implemented sustainable technologies had champions who were strongly committed to the technologies and had the political ability to inspire others. This phenomenon seemed

especially true in the Upper Midwest and the west coast. These champions frequently expressed interest in getting the word out to other Native American communities.

**9. More tribes wanted help with sustainable design and construction than were able to receive it.**

This finding is positive in that it illustrates the enthusiasm for exploring sustainable technologies in Indian Country. It also shows, however, that more resources are needed—both TA and financing—than are currently available.

**10. Funding is still mostly limited to federal resources.**

Federal funding is still the source of the most capital for housing development or rehabilitation. The investment and housing finance industries, when they are familiar with Indian Country at all, hesitate to enter financial relationships because of political and land-ownership issues. Still, tribes are adding funding sources to their toolkits by working with Native community development financial institutions, among other solutions.

**11. Capacity building can include a broad range of skill sets.**

Capacity building, which in the area of Native American housing development is often taken to mean the ability to construct housing inhouse, is an economic development tool. The adoption of new technology and the ability to take on housing projects sized to both address overcrowding and allow for economies of scale can strain inhouse resources, however. Capacity building also means knowing how to request and receive specific outcomes from potential consultants and subcontractors, manage subcontractors, control the quality of work, manage the process, and harness the data to gain educated estimates of cost-effectiveness.

**12. Sustainable features are often linked with cultural features.**

As indicated in the section, “Historical Reference to Sustainability in Native American Communities,” sustainability is integral to many Native American communities. Instances exist of reinvigorating traditional building styles to be better adapted to climate, as in the octagonal shape of a house in the Native Village of Kwinhagak (Alaska). Sustainable housing, however, also can include ensuring that culturally relevant features are part of the initial design, such as orienting duplexes for the Nez Perce Tribe of Indians to the east in accordance with past practices.



*Native Village of Kwinhagak Energy Efficient Single Family Housing Under Construction*

*Image: Cold Climate Housing Research Center for HUD SCinIC*

## Recommendations

Together with other federal agencies and other committed partners, this initiative has implemented strategies that led to a new perspective for some and a deeper understanding of green for others. The SCinIC activities scratched the surface of potential support, however. Additional changes to policy, continued education, tools to support change, and increased federal agency cooperation are needed to continue to support tribes in making their housing more sustainable. The following recommendations promote continuing support for sustainable construction.

### **1. Leverage available federal resources and materials to support tribes and TDHEs.**

Resources include, but are not limited to, the SCinIC case studies, the interagency Tribal Green Building Codes Workgroup, and the HUD grantees—especially tribal and rural grantees—under the Office of Sustainable Housing and Communities (OSHC) to increase knowledge of the benefits of sustainable construction. The past grantees may be able to provide voluntary advice, mentorship, or networking support. Federal entities may encourage tribes to participate in EPA tribal TA and training opportunities or disseminate available HUD materials, including SCinIC case studies.

### **2. To support tribes in making informed decisions about when an investment is reasonable, assist tribes in accessing resources that will help them determine the true cost-effectiveness of sustainable materials and strategies.**

This recommendation may include access to modeling and other software or certification services, but it may also include information on how to request needed services and evaluate data provided by sustainability professionals.

### **3. Encourage Native sustainable construction champions to participate in training and conferences to discuss their own projects, but also to assist in inspiring and training a new and larger wave of sustainable building proponents.**

The best examples for Native American communities are other successful Native American communities. As indicated in the recommendations, tribal representatives who use sustainable technologies and materials are eager to spread the word. Their words may be especially convincing to other communities that have not yet tested sustainable construction.

### **4. Host a green building blog at HUD and use it to actively promote Native sustainable building models and conversations with tribes.**

A blog can provide a low-cost, easily shared strategy for disseminating information about successes and challenges in Indian Country and providing a space for discussion.

## **5. Encourage green building within federal programs and funding sources.**

Federal programs often have flexibility to include incentives for green building in notices of funding availability. Additional flexibility exists in waiver opportunities that can be linked to sustainable construction and the ability to leverage federal funds to encourage private investment. Another way to encourage a longer term and interrelated view of development is by coordinating funding opportunities among federal agencies.

## **6. Support funding for and partnerships with tribal colleges and other colleges and universities with a strong American Indian and Alaska Native presence in their efforts to create sustainable training programs.**

Tribal colleges are one source of capacity building for the next generation of leaders in Indian Country. They are already taking steps to offer degree and certificate courses in sustainable construction that will strengthen economies in Native American communities and provide generations of young workers with critical green-collar economy skills that will be in demand on and off the reservation.

## Introduction

In 2010, the first year of the Transformation Initiative (TI), the Department of Housing and Urban Development's (HUD's) Fiscal Year 2010 Appropriations Act made as much as 1 percent of program funds available for (1) research, evaluation, and program metrics; (2) program demonstrations; (3) technical assistance (TA); and (4) information technology. One 2-year program that Congress mandated through the TI was the Sustainable Construction in Indian Country (SCinIC) initiative. This initiative fulfilled many TI goals and brought increased attention to the issue of sustainable construction practices within Indian Country.

TI is part of a reinvention of HUD that leverages technology and a new way of doing business to respond to the need for increased transparency and improved service delivery. The SCinIC initiative benefited from TI's infusion of much-needed funding into the neglected areas of program demonstrations and innovative, crosscutting TA that goes beyond program compliance to improve grantee capacity, performance, and outcomes. HUD's Office of Policy Development and Research (PD&R) plays two roles in the TI, administering the research and demonstrations and serving as the technical lead department wide on TA projects.

The purpose of SCinIC was to facilitate sustainable construction in Indian Country by providing TA and by documenting these activities and disseminating the results. PD&R undertook the following tasks to promote sustainable construction in Indian Country: (1) it selected specific qualified sites that volunteered as Indian sustainable construction demonstration partners, (2) it provided TA to the demonstration partners to assist them in using sustainable building techniques in housing developments, and (3) it documented the activities undertaken in this project and assisted in disseminating the demonstration results to a wider audience.

This final report comprehensively documents activities, successes, and lessons learned during the 2-year course of this initiative.

## Historical Reference to Sustainability in Native American Communities<sup>4</sup>

### Overview

Sustainable construction within the Native American world, as elsewhere, is implemented for cost savings, energy savings, enhanced durability, and environmental benefit. The practice of sustainability in American Indian tribes, however, also carries with it a strong cultural component that is both contemporary and traditional. Most North American Indian tribes practiced environmental sustainability, or respect for the environment. Environmental sustainability is the “philosophy and practice in which people do not extract more resources from the environment than necessary, leaving resources available for future generations.”<sup>5</sup> Thus, it was fully consistent when the executive director of the Akwesasne Housing Authority (AHA), Retha Herne, stated at a training session that AHA’s sustainable housing development, Sunrise Acres, expresses itself culturally through its use of renewable energy and its land use conservation practices.<sup>6</sup>



*Sunrise Acres Housing on the St. Regis Mohawk Reservation*

*Image: Akwesasne Housing Authority*

Tribal cultures express their view of nature and the environment in several ways. The concept of seven-generation sustainability, which originated with the Iroquois, said that people must consider the effect of their actions on the seventh generation—that is, look into the future before they make decisions about the present. The Constitution of the Iroquois Nations: The Great Binding Law includes the passage, “Look and listen for the welfare of the whole people and have always in view not only the present but also the coming generations, even those whose faces are yet beneath the surface of the ground—the unborn of the future Nation.”<sup>7</sup>

Contemporary tribal leaders and advocates of many tribes articulate similar views. Oren Lyons, Chief of the Onondaga Nation, wrote, “We are looking ahead, as is one of the first mandates given us as chiefs, to make sure and to make every decision that we make relates to the welfare and well-being of the seventh generation to come.”<sup>8</sup> Lyons’ viewpoint is not limited to a particular tribe. Lydia Sigo, a Suquamish Indian and Suquamish Museum archivist/curator, said, “In traditional cultures, we try to look to the next seven generations. My concern is trying to sustain the environment for those future generations.”<sup>9</sup> Winona LaDuke, an environmental activist from the White Earth Reservation, stated, “Elders used to tell younger

4 *Native American communities* refers to American Indian tribes and Alaska Native villages. As defined in NAHASDA, the terms “tribe,” “Indian tribe,” and “American Indian tribe” are used throughout to refer to Indian tribes, bands, and nations or other organized groups or communities including Alaska Native villages or regional and village corporations.

5 Sustainable UCR (2009).

6 Herne (May 8, 2013).

7 “Constitution of Iroquois Nation.” Available at <http://www.indigenouspeople.net/iroqcon.htm> (accessed April 29, 2013).

8 Lyons (1994).

9 Grimley (2008).



generations how to live in one location for 1,000 years without destroying the land” and that a similar care for the environment could be seen in some families adopting older traditions.<sup>10</sup> In addition, Bonnie Butterfield wrote, “Many Native Americans had no concept of land ownership. Land was a gift from the creator and used in common by the whole society for survival and sustenance.”<sup>11</sup>

## Stewardship and Living in Harmony

The fundamental way that American Indians related to nature before the Europeans arrived has been described as follows.

Indians generally considered themselves to be just one among many entities in an animate world, living according to culturally defined canons of respect for other members, while nevertheless developing tools and technologies that allowed them to provide for their own subsistence.<sup>12</sup>

Native Americans, including Lakota lawyer and author Vine Deloria, Jr., Winona LaDuke, and others, believe “that Indians lived in accordance with ecological limits and limited the number of animals they hunted.”<sup>13</sup> Carolyn Merchant quoted LaDuke as saying—

We have a code of ethics and a way of living on this land which is based on being accountable to [natural] law. That is the understanding of most indigenous peoples.<sup>14</sup>

The evidence strongly suggests that Native Americans have a historic tradition of environmental stewardship.

The native peoples of the Cahuilla tribe inhabited present-day San Diego County and eastern Riverside County near Palm Springs. The Cahuilla lived in a harsh desert environment and had little access to water; due to the scarcity of water, there was limited plant or animal life for food. The natives realized that if they were to survive in such an environment, they would have to live sustainably and make a minimal impact on the environment. Mesquite beans were a common ingredient in the Cahuilla diet. They harvested the beans and ground them into a powder. The Cahuilla realized that if they harvested all of the mesquite beans available at one time, there would be no seeds left to produce more trees. Thus, they understood that their own survival as a people was closely tied to the well-being of their surrounding environment, and saw that it was absolutely essential they preserve the planet.<sup>15</sup>

Another, broader example of sustainable behavior is the Native American use of fire ecology.

The native peoples of America often practiced fire ecology to prevent massive, uncontrollable forest fires. Dead plant material, such as leaves, bark, and branches naturally accumulates on the forest floor. If too much organic litter accumulates on the forest floor and it catches on fire during a lightning storm, the entire forest could be burned down. To prevent such dangerous forest fires, indigenous peoples regularly burned the underbrush in a controlled manner. Trees soon became

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10 Grimley (2008).

11 Butterfield (n.d.).

12 Merchant (2007): 14-15.

13 Merchant (2007): 21.

14 Merchant (2007): 21.

15 Sustainable UCR (2009).

adapted to Native American fires; seeds of many tree species do not germinate unless they have been exposed to high temperatures that can only be provided by a fire.<sup>16</sup>

Many believe that Indians were the “original conservationists,” because of their reciprocal relationship with their natural environment and belief in the unity between their spiritual and physical worlds.<sup>17</sup> Stuart G. Harris of the Confederated Tribes of the Umatilla Indian Reservation, described the traditional land ethic as “stewardship and kinship... equality of all species.”<sup>18</sup> Talking about the environmental infrastructure, Harris stated—

My elders taught me to see the whole system. They taught me that our traditions and behaviors are conscious responses to rigorous environmental shaping. They understood the value of systematic observation and used inductive reasoning to determine the most probable reactions of very complex, interrelated ecosystem functions. They understand that ecological thermodynamics forms the basis of our resilient and adaptive holistic environmental management science. The application of this science has been codified into law and has been distilled into daily practice. This knowledge is still transferred between generations. Attention to and application of this knowledge means personal survival and enhancement of our ecology, culture and religion. Disregarding this knowledge can result in eating a poison, starving, degrading resources, or societal collapse.<sup>19</sup>

Nathan Sherrer and Tim Murphy stated that the typical Native American’s “entire method of living is inherently ecological because, to them, everything in the nature world was interrelated and shared the same life. Their lifestyles as well as their religion only served to emphasize this relationship between man and his environment.”<sup>20</sup> Eve Darian-Smith said that scholars of Indian law and the anthropologists, sociologists, and historians who study Native Americans “have documented the role the environment plays in tribal jurisdictional authority, social organization, cultural property, religion, health, and economic and cultural stability.”<sup>21</sup>

## Traditional View of Nature

The following quotations express some Native American views of nature in the past and in the present, orally and in writing.<sup>22</sup>

Treat the earth well. It was not given to you by your parents, it was loaned to you by your children. We do not inherit the Earth from our Ancestors, we borrow it from our Children.  
—Ancient Indian proverb

When all the trees have been cut down, when all the animals have been hunted, when all the waters are polluted, when all the air is unsafe to breathe, only then will you discover you cannot eat money.  
—Cree prophecy

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16 Sustainable UCR (2009).

17 Anderson (n.d.).

18 Harris (n.d.): 8.

19 Harris (n.d.): 9.

20 Sherrer and Murphy (2006):16.

21 Darian-Smith (2010):361.

22 United Association of Higaonon Tribes (n.d.).

Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect.

—Chief Seattle, 1854

Honor the sacred. Honor the Earth, our Mother. Honor the Elders. Honor all with whom we share the Earth: four-leggeds, two-leggeds, winged ones. Swimmers, crawlers, plant and rock people. Walk in balance and beauty.

—Native American elder

I do not think the measure of a civilization is how tall its buildings of concrete are, but rather how well its people have learned to relate to their environment and fellow man.

—Sun Bear of the Chippewa Tribe

You must teach your children that the ground beneath their feet is the ashes of your grandfathers. So that they will respect the land, tell your children that the earth is rich with the lives of our kin. Teach your children what we have taught our children, that the earth is our mother. Whatever befalls the earth befalls the sons of the earth. If men spit upon the ground, they spit upon themselves.

—Unknown



*Rain Garden in Yard at Pokagon Band of Potawatomi Indians*

*Image: Department of Natural Resources, Pokagon Band of Potawatomi Indians*

## Social Marketing Related to Environmental Sustainability and in Native American Communities

Developing case studies, creating promotional materials, and even selecting demonstration projects speak to the goal of the Sustainable Construction in Indian Country initiative to go beyond capacity building in the Native American communities with which the initiative has worked to inspiring and influencing other communities who come into contact with SCinIC products, activities, and demonstration project representatives. The message is not only that sustainable technologies have benefit and can be cost effective, but also that they are technologies appropriate to Native American communities and that Native American communities are implementing them to the benefit of the community and approval of tribal leadership and housing residents.

### Background

Although social marketing has been implemented for more than 40 years, it has been used primarily in the area of health education. For some time, however, social marketing—in particular, message framing—has been used in the United States to raise understanding of the state of the environment and to encourage behavior that is environmentally sustainable.<sup>23</sup> Cheng et al. noted that, “although the persuasive effects of message framing have been widely publicized in the field of social and cognitive psychology, there is a surprising dearth in the literature regarding the role of message framing as a strategy within the context of social marketing to influence environmentally sustainable behaviors.”<sup>24</sup> SCinIC research found nearly no literature regarding message framing or social marketing in Native American communities in the area of environmental sustainability.

Social marketing uses marketing principles for the purpose of societal benefit rather than commercial profit.<sup>25</sup> It is “the application of marketing to achieve specific behavioral goals for a social good.”<sup>26</sup> Social marketing was “born” as a discipline in the 1970s, when Philip Kotler and Gerald Zaltman realized that the same marketing principles that were being used to sell products to consumers could be used to sell ideas, attitudes, and behaviors.<sup>27</sup> Social marketing has been used extensively in international health programs and is being used more frequently in the United States.

Social marketing—

...draws on psychology, sociology, economics and anthropology in an attempt to fully understand people. Once this understanding has been gained, it develops products, services and messages that provide people with an exchange they will value. This concept of exchange is really important if you want to achieve sustainable behavior change.<sup>28</sup>

Because people do not always behave in their own or society’s best interest, it is important to educate people about important health and environmental issues in the hope of effecting behavior change.

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23 Cheng et al. (2011).

24 Cheng et al. (2011): 48.

25 Social Marketing National Excellence Collaborative (2002).

26 James (2010).

27 Weinreich (n.d.).

28 Merritt, Truss, and Hopwood (2011).

Social marketing typically addresses broad issues in health education, such as the use of condoms to prevent sexually transmitted diseases and HIV/AIDS, antismoking, breastfeeding, diabetes prevention and management, and so on. In a similar way, social marketing in Indian Country is focused primarily on health and safety—for example, HIV/AIDS prevention; methamphetamine use prevention; suicide prevention; mental health; and gay, lesbian, bisexual, transgendered, and transsexual support. Social marketing, however, is increasingly used for environmental sustainability.<sup>29</sup>

## Social Marketing and Energy Conservation

One successful example of the use of social marketing in increasing energy conservation is the case of the Pacific Gas and Electric Company (PG&E) in California. The company's experiment, conducted in 1990, gave homeowners a free home inspection and advice on ways to make their dwelling more energy efficient.<sup>30</sup> The program was unsuccessful until auditors incorporated two behavior-change tools during their home visits.

First, auditors began communicating with vivid, personal information. For instance, rather than simply point out cracks around doors, the auditor would compare the cracks to a hole the size of a baseball. ... Second, auditors were instructed to involve the customer during the home visit. For example, home owners might be asked to take measurements or read meters. This strategy was used to induce homeowners into making a commitment to weatherizing their homes.<sup>31</sup>

Doug McKenzie-Mohr, an environmental psychologist specializing in the behavioral aspects of sustainability and a leader in the field of social marketing for sustainability, presented an example of the effectiveness of social marketing on increasing energy conservation. In a 1994 study, he drew on the results of the PG&E study, identified social psychological variables relevant to residential energy conservation, and trained home auditors to use them.<sup>32</sup> Techniques included—

- Capturing the householder's attention; for example, by looking at utility bills and describing how much money is being lost by not retrofitting.
- Gaining the householder's trust; for example, by wearing an identification badge and sending material to the house in advance that highlights the assessor's training.
- Getting the householder to make a minor commitment; for example, agreeing to make changes by a certain date.
- Framing information in terms of loss rather than gain; for example, instead of focusing on the savings from retrofitting, telling the householder how much money is being lost by not weatherizing.
- Helping the householder understand household resource consumption; for example, explaining that visible devices like lighting consume fewer resources than less visible resources like water heaters and furnaces.

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29 James (2010).

30 Community-Based Social Marketing (n.d.).

31 Community-Based Social Marketing (n.d.).

32 McKenzie-Mohr (1994).

- Explaining the savings that the householder realizes from retrofitting.

These activities illustrate another motivator for change. Involving householders in the effort increased buyin by inspiring them to accept themselves as the type of people who care about energy efficiency and to take steps to save money and weatherize.<sup>33</sup>

McKenzie-Mohr reported that using social psychological knowledge increases the likelihood that people will engage in sustainable behaviors. The home auditors who were trained to use the techniques described previously rated themselves as significantly better able to encourage homeowners to adopt energy-conserving technologies.<sup>34</sup>

Discussing information in terms of loss rather than gain is a technique supported by message framing. Message framing is a communication technique within social marketing. This technique assumes that a message can be created in such a way that a specific audience will interpret the message to create a specific response. This response is often hoped to be a change in behavior.

Cheng et al. noted that loss-framed messages tend to be more effective in promoting environmental behavior. In particular, “loss frames were more effective for the low salience issue of energy conservation, whereas gain frames were more effective for the high salience issue of recycling.” Also, “loss framing was most persuasive when the losses were emphasized on the current generation as opposed to future generations.”<sup>35</sup> The authors, however, also found that certain audiences were more susceptible to loss or gain framing than others. This finding suggests that research might be required to determine if Native American audiences might be more likely to change their behavior based on a particular style of message. For instance, the American Indian cultural emphasis on future generations might suggest that Native audiences would be likely to respond to gain-framed messages that focus on future generations.

In another study, researchers used monthly feedback to reduce and control electricity use.<sup>36</sup> Participants received a letter each month stating the percentage change in electricity consumption from the same month both 1 and 2 years ago. The letter also showed how much money participants saved or lost and the difference in kilowatt-hours. The letter arrived a few days after the utility bill every month. Although individuals were not aware that they were participating in this study, households that received the letter reduced their electricity by 4.7 percent. The authors stated that—

The results of this study demonstrate the effectiveness and practicality of this form of feedback. In total, approximately \$16 was spent on this project, which is substantially less than other methods of attempting to reduce electricity such as advertisements and monetary payments.<sup>37</sup>

## One Native Community and Energy Efficiency Audits

In 1995, a Canadian province conducted a successful social marketing campaign to promote energy efficiency in an Indian community. British Columbia’s BC21 PowerSmart was a provincewide project

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33 Heath and Heath (2010).

34 McKenzie-Mohr (1994).

35 Cheng et al. (2011): 53.

36 Community-Based Social Marketing (n.d.b).

37 Community-Based Social Marketing (n.d.b).

to conserve resources and create jobs.<sup>38</sup> The project used energy audits and incentives to encourage residents to improve their energy and water efficiency. BC21 PowerSmart later used a similar approach in the Okanagan First Nations Community Project, a project for Canada’s Indian population living in the Okanagan Valley. In addition to creating jobs and conserving resources, the program focused on training First Nation members and improving their housing stock.

The program specifically attempted to be respectful of First Nation culture and to engage First Nation members.

A BC21 PowerSmart Okanagan First Nations Committee, made up of representatives from each of the six participating bands, was established to provide input about the specific needs of the community. This was essential for the program’s success, as there were some very sensitive issues which needed to be addressed, including political friction between band chiefs and the government, and a general mistrust of the government within the community. It was important to introduce the program as being neutral. To help achieve this, the project manager’s office was set up in his home in the Okanagan Valley, rather than in a government or band council facility to help overcome skepticism about the project by householders. First Nations members were hired as staff.<sup>39</sup>

Professional installers provided on-the-job training to staff (that is, the home auditors) in “basic building technology, product installation, customer service, and documentation and reporting. This helped them to provide related services to their own community, and to compete for utility and government contracts.”<sup>40</sup>

After the audit was complete, the home auditors offered to install one of each energy-saving product needed per home. The products included the following:

- Hot water tank blankets.
- Pipe insulation.
- Weatherstripping.
- Caulking.
- Gasket plugs.
- Faucet aerators.
- Flush reducers.
- Low-flow showerheads.

Both the audit and the products were provided free of charge as an incentive to encourage households to participate in the program. Program participants said they were very satisfied with the products and the service they received. They were happy that the project provided services that benefited their community.

## Effect on SCinIC

Research data are not available to prove that social marketing and message framing are especially effective at persuading Native American communities to adopt sustainable construction technologies. Research in behavior change, however, offers some concepts that point in the direction of the SCinIC

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38 Tools of Change (n.d.).

39 Tools of Change (n.d.).

40 Tools of Change (n.d.).

activities. Chip Heath and Dan Heath, for example, discussed the ability of “bright spots” to serve as champions and avenues forward to success for others who might otherwise feel overwhelmed by the size of the change they are trying to create within their own community. “These flashes of success—these bright spots—can illuminate the road map for action and spark the hope that change is possible.”<sup>41</sup> The SCinIC case studies, which emphasize the varied journeys that seven demonstration partners took in incorporating green technologies and materials into their housing, highlight these “bright spots.” This approach is intended to focus the reader on the ability of Native American communities to create their own sustainable change.

The “appeal to identity” referenced previously indicates that increasing the ability of communities that are already carrying out sustainable construction to tell their own story may be useful in appealing to other communities with an interest but no existing champion. The Native representatives involved in this initiative, and those encountered at training sessions and events, have an interest in sharing their journey. Other tribes that are at the beginning of a sustainable construction process may be especially receptive to their example and lessons.

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<sup>41</sup> Heath and Heath (2010): 40.



## Relationship of HUD Housing and Native American Communities<sup>42</sup>

The federal government, including the Department of Housing and Urban Development, has played a role in supporting housing in Indian Country since the 1960s. At times, this role has been somewhat prescriptive or perceived as such. With the passage of Native American Housing Assistance and Self-Determination Act of 1996 (NAHASDA), the relationship of tribes, and their tribally designated housing entities (TDHEs), to HUD has changed enormously. NAHASDA has emphasized flexibility and a local focus that has enabled tribes and TDHEs, far more than ever before, to prioritize according community need, leverage funds, and incorporate cultural and sustainable features into housing, if so desired. It has opened the door to the type of sustainable activities that this initiative has documented.

### United States Housing Act of 1937 and Establishment of the Office of Native American Programs

With its creation in the 1960s, HUD was assigned the task of providing affordable housing assistance to American Indians. The United States Housing Act of 1937 (1937 Act) was the primary vehicle for this early assistance.

The 1937 Act created the national public housing program for low-income households but did not initially address specific housing needs of Native populations living in Native American communities. In 1961, the Public Housing Administration, an agency that became part of HUD, issued legal opinions that American Indians living on reservations and in other Indian areas were eligible to participate in public housing programs.

#### *Administration*

As a result of this determination of tribal eligibility, the Public Housing Administration created Indian housing authorities (IHAs) for maintaining, operating, and developing affordable housing in Native American communities. IHAs were designed to operate similarly to public housing agencies (PHAs).

By the 1970s, however, HUD recognized that Native American communities (later still, Native Hawaiian communities) faced unique housing conditions, in part, related to remote geographical locations, economic conditions, historical land issues, historical discrimination, and tribal cultural practices. PHA operational practices and programs also differed from those of IHAs, because they both operated in different relationships to their local communities and because they received some of their funding from different sources.

To provide Native American communities with an advocate within HUD for their community and housing development needs, HUD established the Office of Indian Programs in 1974. In 1984, HUD established the Office of Indian Housing as a part of the Department's Office of Public and Indian Housing (PIH). The Office of Indian Housing was renamed the Office of Native American Programs (ONAP) in 1992. This change included creating regional offices for administering Native American programs under the management of a central office. ONAP in 2013 consists of a headquarters office in Washington, D.C., and a network of six field offices in Chicago, Oklahoma City, Phoenix (and Albuquerque), Denver, Seattle, and Anchorage. ONAP's mission is to—

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<sup>42</sup> This section on HUD and housing is largely adapted from HUD (n.d.b).

- Increase the supply of safe, decent, and affordable housing available to Native American families.
- Strengthen communities by improving living conditions and creating economic opportunities for tribes and Indian housing residents.
- Ensure fiscal integrity in the operation of the programs it administers.<sup>43</sup>

### *Programs*

Under the 1937 Act, 14 programs provided funding to American Indian tribes and IHAs. They were administered in a variety of ways: competitive, noncompetitive formula, and first-come, first-served. The primary housing programs administered under the 1937 Act were—

- **Low Rent (LR).** Beginning in 1961, Native American communities gained access to the LR program, which closely mirrored the Low Rent Public Housing Administration Program. HUD funds would go to an IHA that used them to acquire the rights to land and to build new units—or to acquire and rehabilitate existing ones—for rent by income-eligible families. The IHAs then managed the properties and received additional HUD funds representing the difference between allowable operating costs and tenant payments toward rent.
- **Mutual Help (MH).** The MH program provided opportunities for lower income Native families to purchase decent, affordable housing beginning in 1962. As with the LR program, the IHA developed the housing with HUD funding. The individual homebuyer became responsible for all operating and maintenance costs after completing the purchase, however. The program was a lease-purchase arrangement that built equity in an MH equity account, which was applied toward the purchase price of the home or refunded if the family left the MH program before achieving ownership. Families did not actually gain title to their properties until all their payment obligations were met, they exercised their option to acquire title, and the tribe completed conveyance, generally a 25-year process. For as long as the home was administered by the IHA, the IHA was responsible for operation and maintenance costs using 1937 Act funds. The MH program was available to qualified low-income Indian families on Indian lands. The Indian Housing Act of 1988 also established a self-help component that allowed lower income Indian families to contribute a major portion of the labor necessary to build their homes.<sup>44</sup>
- **Modernization Program.** Another very significant HUD program for the IHAs was the modernization program, funded through the Comprehensive Improvement Assistance Program (CIAP) and the Comprehensive Grant Program (CGP).

The National Affordable Housing Act of 1990 expanded the allowable uses for CIAP beyond modernization for rental housing to include modernization grants for MH units and management improvement grants for other homeownership developments. CIAP was distributed through a competitive allocation process. CGP, which became effective in 1992, provided large PHAs and IHAs (250 units or more) with a more flexible program distributed by a formula allocation.

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<sup>43</sup> HUD (n.d.a).

<sup>44</sup> HUD (n.d.c).

## Effect of the 1937 Act Program in Indian Country

These housing programs had a significant effect on the provision of housing in tribal areas in the decades after 1961.<sup>45</sup> By the end of fiscal year (FY) 1997, more than 100,000 units were either complete or in various stages of the production pipeline—many of them replaced significantly substandard housing. In FY 1998, 41.3 percent of the units were LR and 57.6 percent of the units were MH. The MH program was very popular because of the strong preference for homeownership in Indian Country.

The following table illustrates the housing inventory for the LR, MH, and Turnkey III (TK3) programs, as represented by the number of units in management by the six area offices at the beginning of FY 1998, the first year of NAHASDA.

### Units Under Management by Six Area Offices

Area Office	Low Rent	Mutual Help	Turnkey III	Total
Alaska	903	5,038	0	5,941
Eastern/Woodlands	5,376	3,574	382	9,332
Northern Plains	9,635	6,572	322	16,529
Southern Plains	3,124	10,255	0	13,379
Southwest	8,425	12,674	53	21,152
Northwest	1,926	2,879	6	4,811
<b>Total</b>	<b>29,389</b>	<b>40,992</b>	<b>763</b>	<b>71,144</b>

Source: Indian Housing Block Grant Database, FY98FIN.spss file

Although these programs created a substantial amount of affordable, decent housing on Indian reservations, serious problems and concerns persisted. Some tribal governments objected to the structure of HUD programs, saying that the somewhat independent role of the IHA undermined tribal sovereignty, in part because the IHAs were compelled to comply with HUD regulations and practices, in some cases in contradiction to tribal practice. Some IHAs, on the other hand, complained about excessively involved tribal councils.<sup>46</sup>

Significantly substandard and overcrowded housing conditions persisted—in part exacerbated by federal rules and regulations that limited IHAs and tribes in exploring more efficient and creative solutions to resource allocation.<sup>47</sup> Furthermore, HUD practices and regulations developed for urban settings did not always translate into often rural, Native American communities. Creating subdivisions, clustering housing units, and using non-Native architectural styles and materials contributed to housing abuse and deterioration, the growth of gang culture, and the loss of culture and clan relationships. These programs did not address the difficult land ownership issues that discouraged private investment in housing, land, and mortgage opportunities.<sup>48</sup>

45 HUD (n.d.c.).

46 Biles (2000) and the Harvard Project on American Indian Economic Development (2008).

47 HUD (1996).

48 HUD (1996).

## NAHASDA

The passage NAHASDA on October 26, 1996,<sup>49</sup> signaled a new era in HUD's relationship with American Indian tribes and Alaska Native villages, with significant practical and policy implications. From a policy standpoint, NAHASDA recognized the right of tribal self-governance and the unique relationship between the federal government and the governments of Indian tribes, established by longstanding treaties, court decisions, statutes, Executive orders, and the United States Constitution.<sup>50</sup>

NAHASDA eliminated several separate programs (including the LR, MH, TK3, and modernization programs) and replaced them with single block grant program: the Indian Housing Block Grant (IHBG). NAHASDA created more flexible reporting rules, recognizing the different needs and conditions in different Native American communities and providing federal assistance for Indian tribes in a manner that recognized the rights of tribal self-governance.

NAHASDA has been the primary housing program for tribes since FY 1998. Section 202 of NAHASDA lists the following eligible affordable housing activities.

- **Indian housing assistance.** Modernization or operating assistance for housing previously developed or operated by HUD's former Indian housing programs.
- **Housing development.** Acquisition, new construction, reconstruction, and moderate or substantial rehabilitation of affordable housing.
- **Housing services.** Housing-related services for affordable housing, such as housing counseling for rental or homeownership assistance, the establishment or support of resident management organizations, energy auditing, activities related to self-sufficiency, and other services.
- **Housing management services.** Management services for affordable housing.
- **Crime prevention and safety activities.** Safety, security, and law enforcement measures and activities appropriate to protect residents of affordable housing from crime.
- **Model activities.** Specifically HUD-approved housing activities that are designed to develop and support affordable housing.

The style or design of the housing is not defined except as *moderate design*, defined in 24 CFR§1000.156 as "housing that is of a size and with amenities consistent with unassisted housing offered for sale in the Indian tribe's general geographic area to buyers who are at or below the area median income." This definition relates to all affordable housing development activities, including acquisition, new construction, reconstruction, moderate or substantial rehabilitation of affordable housing, and homebuyer assistance and model activities.

In a project, units with the same number of bedrooms must be comparable with respect to size, cost, and amenities.<sup>51</sup>

49 Public Law No.104-330, 110 Stat. 4016 (codified as amended at 25 U.S.C. §§ 4101-4195 (Supp. IV 1998)).

50 HUD, Office of Public and Indian Housing (2007).

51 66 FR 49790, Sept. 28, 2001.

## HUD Sustainable Housing Support in Indian Country

HUD has several mechanisms in place to support sustainable building technologies in Indian Country housing.

Budgeting for developing affordable housing under NAHASDA is strongly shaped by total development costs (TDCs). TDC values are developed annually by ONAP based on average construction cost data from two sources, RSMMeans Reed Construction Data and Marshall & Swift/Boeckh, leading suppliers of construction cost information. These construction cost data are adjusted by adding an additional 75 percent for site development.



*Architectural Rendering of Planned Nez Perce Multifamily Construction*

*Image: 7 Directions Architects/Planners for HUD SCinIC*

Tribes may develop their own standards of moderate housing design and may exceed TDC by up to 10 percent before needing to seek approval.<sup>52</sup>

In addition, using the TDC variance request, tribes can include sustainable housing technologies in their eligible housing activities. Tribes and TDHEs have long been able to request variances to allow them to meet costs beyond allowable TDCs on a cost-per-unit construction basis. Beginning in 2006, however, green technology was mentioned specifically as a potential reason for waiver, provided the requester had also worked with the Area ONAP to lower the costs of the project.

Significant additional costs for incorporating green building, energy efficiency or other innovative practices, such as Indian Energy Resource regulation compliance.<sup>53</sup>

TDC variance for Alaska follows a somewhat different pattern. The PIH notice on TDCs for tribes automatically allows for a slight increase in published TDCs in Alaska to allow TDHEs, villages, and corporations to meet Alaskan energy efficiency standards.

Additionally, this Notice constitutes HUD approval for a 2% increase above the attached TDCs for construction projects in Alaska to meet Building Energy Efficiency Standards (BEES) requirements. BEES are only required when funds provided by the State of Alaska are used in conjunction with HUD funds.<sup>54</sup>

For certain sustainable technologies, tribes and TDHEs may also choose another approval option. Tribes and TDHEs may seek approval under NAHASDA for model demonstration activities. The cost cap in this case is the lesser of up to 20 percent of the grant or \$2 million.

HUD wrote incentives for sustainable construction into its American Recovery and Redevelopment Act

<sup>52</sup> Most recently authorized in PIH Notice 2011-63, described most recently in PIH Notice 2010-47.

<sup>53</sup> PIH Notice 2006-17: 3.

<sup>54</sup> PIH Notice 2010-47: 4.

of 2009 (ARRA) notices of funding availability awarded in 2009. Under the IHBG competitive ARRA program, applicants could receive up to seven additional points for using ENERGY STAR products; having the units rated by a home energy rater as ENERGY STAR-qualified home; providing homebuyers with a housing counseling curriculum, including an energy conservation, budgeting, and ENERGY STAR component; and having the program certified under programs including—

- LEED (Leadership in Energy and Environmental Design).
- ENERGY STAR Plus Indoor Air Package.
- ENERGY STAR Advanced New Home Construction.
- Earthcraft.
- Enterprise Green Communities initiatives.
- National Association of Home Builders Green Building guidelines.

The Indian Community Development Block Grant (ICDBG) program, an annual funding program, allows for energy efficiency and green development for either housing rehabilitation or public facilities. Public services “directed toward improving the community’s public services and facilities, including...energy conservation”<sup>55</sup> are also eligible under ICDBG.

HUD has written support for energy efficiency and energy conservation into the ICDBG application process. An ICDBG application may receive a point for compliance with HUD policy priorities for sustainability provided it successfully addresses the following.

(1) Support and promote an energy-efficient, green, and healthy housing market by retrofitting existing housing or community facilities, supporting energy-efficient new construction, and improving home energy labeling. An applicant must demonstrate that the rehabilitation or construction of housing or community facilities at a minimum meets the standard for Energy Star for New Homes, or recognized green building rating standards utilizing one of several recognized green rating programs for new construction or substantial rehabilitation. An applicant should also identify the buildings or units that will include healthy design features that meet or exceed the mandatory requirements identified in a green building standard. The application must indicate which standard will be used by the applicant. Grantees will be expected to report on outcome measures including the number of housing units or community facilities rehabilitated or constructed to meet energy efficiency and green development standards, or the number of housing units or community facilities rehabilitated or constructed to meet healthy design standards.<sup>56</sup>

Applicants also gain points for developing feasible and measurable outcomes. HUD has written the potential for sustainability into this rating subfactor as well. Allowable outcomes that an applicant may cite as measurables for the project include the reduction of drug-related crime or health-related hazards and improved energy efficiency.

More language supporting HUD’s environmental sustainability priority is found in its housing standards policy. If an ICDBG applicant requests approval for housing standards less stringent than the Section 8 Housing Quality Standards, the new standards the applicant develops must provide for “a livable home environment and an energy efficient building and systems that incorporate energy conservation measures.”<sup>57</sup>

55 <http://portal.hud.gov/huddoc/2013icdbgnofa.pdf> (accessed February 19, 2013).

56 <http://portal.hud.gov/huddoc/2013icdbgnofa.pdf> (accessed February 19, 2013).

57 <http://portal.hud.gov/huddoc/2013icdbgnofa.pdf> (accessed February 19, 2013).

Not all HUD sustainability grants are construction based. Just as the Sustainable Construction in Indian Country initiative worked with demonstration projects on issues related to planning and standards, HUD's Office of Sustainable Housing and Communities has provided tribes, among others, with regional planning grants and partnered with federal agencies on community challenge planning grants. Tribes were among the awarded grantees in each of these grant programs between 2010 and 2013.

Between 2005 and 2008, HUD ONAP provided onsite assessments of mold and moisture conditions in a limited number of tribal housing units. In 2008, HUD expanded the program area to include energy assessments. The program included quarterly material dissemination, regional training sessions, written site visit reports with energy efficiency recommendations, and three Greener Homes National Summits, which brought tribes together for topics including energy efficiency and renewable energy sources. Between 2005 and March 2013, this contract assessed 616 housing units, providing tailored assessment and recommendations on rehabilitation and energy efficiency upgrades to 74 different American Indian tribes and Alaska Native villages.

Within the limits of the current fiscal belt tightening, HUD is taking steps to demonstrate its commitment to policies and programs that support increasing sustainability and that nurture innovation in housing in Indian Country while also maintaining affordability and decreasing overcrowding. These steps are not enough to meet the need, however.

## Task Overview and Implementation

The Sustainable Construction in Indian Country initiative included four tasks.

- **The review of current activities.** Identifying American Indian and Alaska Native American communities that have or are working on sustainable construction projects, funding resources, and technical assistance resources.
- **National impediments meeting.** Conducting a national meeting to identify impediments to sustainable construction practices and opportunities for TA and training for Native American communities.
- **Demonstration projects.** Seeking demonstration project partners that can be featured in best practice case studies. These case studies will enable other tribes to benefit from these best practices.
- **Training.** Making available to Native American communities training based on experience and needs.

### The Review of Current Activities

The statement of work assigned the contractor to “conduct a review of current activities promoting sustainable construction in Indian country.”<sup>58</sup> This review set the stage for other activities under the contract by beginning the process of defining the TA and financial resources available for tribes seeking to implement sustainable technologies in their residential housing and by providing some insight into the amount of knowledge of and enthusiasm for sustainable technology on the part of federal, tribal, nonprofit and other organizations working with tribes. Interviewees also naturally described current and future sustainable residential construction or rehabilitation projects, which are also briefly described in the report. The report process, key informants, findings, and statistics on tribal projects are in the section, “Findings and Recommendations From the Review of Current Activities.” The full report was completed on July 18, 2011, and is reproduced in appendix A.

### National Impediments Meeting

The Department of Housing and Urban Development conducted a meeting to explore impediments to sustainable construction practices and solutions to these impediments. The meeting consisted of two parts: (1) a set of focus groups and (2) a followup analysis session. The meeting was conducted at HUD’s third Greener Homes National Summit in Denver on September 28 and 29, 2011. Participants from governmental, nongovernmental, and tribal focus groups offered observations regarding impediments to sustainable construction in Native American communities.

Representatives of the focus groups met the next day to analyze the primary obstacles identified by each group, prioritize these obstacles in terms of their effect on sustainable housing, and brainstorm potential solutions. Because several participants were from federal agencies, the group focused on steps that federal partners might be able to implement. HUD completed the draft report on this meeting on January 29, 2011, and posted it on the HUD USER website. The full report is also reproduced in appendix B.

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<sup>58</sup> R-DEN-02502, Task Order No DEN-T0006 Sustainable Construction in Indian Country: 5.



## Demonstration Projects

### *Selection Process*

The selection process required the development of a request-for-projects letter, an interview protocol, and a set of selection considerations. HUD sent out a request for demonstration projects in November 2011. The mailing list included 788 tribes and tribally designated housing entities. HUD received 25 requests to be part of the program, and SCinIC team members conducted 17 interviews.



*Image: Cocopah Indian Housing and Development*

More partnering sites would have benefited from TA than could be funded. The demonstration project selection process included diversity in climate regions, in Office of Native American Programs regions, in housing types, in sustainable technologies, and in completed versus planned projects. In addition, selection considerations included a determination that construction funding was secured, that tribal leadership was onboard with the project, and that the prospective demonstration was willing to receive TA and participate as a possible case study. Tribes received TA only and no funding was used for construction.

At least one demonstration project was selected in each HUD ONAP region. The following table lists each project's technologies and project types.

## Demonstration Projects

Demonstrations	Sustainable Technologies	Project Type
Pokagon Band of Potawatomi Indians	Community master plan; Best Management Practices (BMP) in site plan including bioswales, cluster housing design, permeable pavement, use of prairie grass, and indigenous vegetation.	Completed 2004-2006. Sustainable water management and conservation in single-family housing subdevelopments.
Nez Perce Housing Authority	Hybrid straw bale construction with ductless minisplits; culturally adapted design; low-emissivity (low-E) windows; BMP in site plan.	Planned 2012-2013. New construction of 20 single-story duplex units.
Cocopah Indian Housing and Development	Compact Fluorescent Lamps (CFLs); ENERGY STAR appliances; indoor and outdoor lighting.	Planned 2013. Rehabilitating three eight-unit multifamily buildings.
Navajo Housing Authority	Green standards; green review process; green request for proposals .	Planned 2013. New construction and policies to support sustainable development.
Pawnee Housing Authority	Insulating concrete forms (ICFs).	Planned 2013. New construction of duplex units.
Akwesasne Housing Authority	Geothermal heating and cooling; ICFs; solar voltaic panels; solar domestic hot water.	Completed 2011. Five quadplex buildings for seniors within a community containing sustainable features.
Choctaw Housing Authority	Structural insulated panels (SIPs); low-E windows and doors; CFLs; ENERGY STAR appliances.	Completed 2009-2012. Eight duplexes and 74 single-family houses.
Native Village of Kwinhagak	Monolithic spray foam envelope; aerodynamic shape; whole-house truss.	Planned 2012-1013. Five single-family houses.
Muscogee (Creek) Nation	SIPs; geothermal heating and cooling; SIPs manufacturing plant.	Completed 2012. Housing development for seniors with 24 units and individual replacement houses.

### Technical Assistance

HUD stipulated that TA be supplemental in nature. The TA providers were not to take a leading role in the demonstration project.

The types of TA “necessary for the incorporation of sustainable construction techniques and technologies into Tribal projects” per the Statement of Work<sup>59</sup> are broad in nature. Types of TA that the team recommended offering included—

- Assistance with developing procurement and bid announcements.
- Charrette implementation.
- Architectural design drafts.
- Existing design review and recommendations.
- Engineering schematic development.
- Appropriate sustainable product, material, and technique recommendations.
- Assistance with product, material, and technique installation.
- Education on the maintenance of products and materials.
- Assistance with the Green Communities and LEED for Homes designation processes.
- Assistance in developing or adopting a Green Development Standard.
- Energy modeling for the analysis of optimal systems, materials, orientation, openings, and energy use.
- Life-cycle analysis to assist in determining the costs and benefits of specific systems.
- Conceptual site plans.
- Postconstruction testing (blower door).

The tribes or TDHEs with projects already completed as of 2012 included the Pokagon Band of Potawatomi Indians, the Akwesasne Housing Authority, the Choctaw Housing Authority, and the Muscogee (Creek) Nation. These demonstration projects primarily requested postconstruction-related TA. In some cases, these demonstration projects requested assistance to benefit planned projects connected with the completed projects.

The demonstration projects with forthcoming construction or rehabilitation primarily requested assistance in making their housing designs more energy efficient. This benchmark included a wide range of recommendations, from changes to site plans, to passive solar orientation, to the incorporation of sustainable materials and technologies. In one case, the TA included helping the housing entity link up with its utility provider to access programs for which the housing entity and tenants were eligible.

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59 R-DEN-02502, Task Order No DEN-T0006 Sustainable Construction in Indian Country: 11.

## Technical Assistance Provided

Demonstrations	Technical Assistance Provided
Pokagon Band of Potawatomi Indians (Michigan, Indiana)	Appropriate sustainable product, material, and technique recommendations (geothermal costs and incentives); energy modeling; charrette assistance; design recommendations.
Nez Perce Housing Authority (Idaho)	Charrette implementation; energy modeling; appropriate sustainable product, material, and technique recommendations (straw bale); low-income housing tax credit application support; research into certification opportunities.
Cocopah Indian Housing and Development (Arizona)	Liaison in linking to utility program; developing energy modeling; appropriate sustainable product, material, and technique recommendations.
Navajo Housing Authority (Arizona, Utah, New Mexico)	Assistance with developing procurement and bid announcements; design review and recommendations; creating green standards; recommendations for adding sustainability to request for proposals; recommendations for creating a green design review process.
Pawnee Housing Authority (Oklahoma)	Appropriate sustainable product, material, and technique recommendations (insulating concrete forms).
Akwesasne Housing Authority (New York)	Energy modeling; appropriate sustainable product, material, and technique recommendations (for rehabilitating older units).
Choctaw Housing Authority (Mississippi)	Design review and recommendations; site plan recommendations.
Native Village of Kwinhagak (Alaska)	Design revisions and revised construction manual; assistance with product, material, and technique installation.
Muscogee (Creek) Nation (Oklahoma)	Postconstruction testing.

The energy modeling and postconstruction testing yielded TA resource reports that provided communities with useful information. Assessments of energy usage provided communities with completed projects with a baseline against which to measure and compare their future use. Those communities could also use the recommendations section with potential or estimated payback and other cost-effectiveness information to measure against the real-world costs or longevity of their own installed technologies. Likewise, communities planning future projects could use the recommendations sections to plan their budgets and determine how to invest the upfront dollars for a cost-effective return.

All demonstration projects with planned projects received TA, but not all reached their anticipated goals, for a variety of reasons. These reasons were reflective of the findings in the review of current activities

and the national meeting and included—

- Need for additional TA.
- Need to scale back because of lack of anticipated funding, or need to pursue additional funding for added sustainable elements or additional specialists because tribe members or local area residents lacked training in specific techniques.
- Longer learning curve with new techniques or equipment.
- Weather or archeological delays.
- Internal politics.

### *Case Studies*

According to the statement of work, case studies were intended to “provide both technical and general information that will be of value and interest to ONAP and Tribes. The text shall be concise but informative with an emphasis on technologies and builders’ experience in both installation and operation after installation. It shall be presented in such a manner that stakeholders can learn from it and take action.”<sup>60</sup> Although HUD is emphasizing best practices, “the case study shall include ‘challenges to’ implementation and strategies for addressing those challenges.”<sup>61</sup> SCinIC team members conducted interviews and collected data and images from the Native Village of Kwinhagak, Muscogee (Creek) Nation, Nez Perce Tribal Housing Authority, Cocopah Indian Housing and Development, Pokagon Band of Potawatomi Indians, and the Akwesasne Housing Authority. These case studies are in appendix C.

### **Outreach**

Early in the contract, the initiative established a web presence on the HUD USER website, at <http://www.huduser.org/portal/SCinIC/home.html>. From this site, users could sign up for periodic e-mail updates, read updates on the progress of the demonstration partners, download TA documents developed under the contract, and learn about training opportunities or other events.

On May 2, 2013, HUD’s Office of Policy Development and Research (PD&R) and ONAP cosponsored a reception with Enterprise Community Partners, Inc. The event celebrated sustainable construction projects that were demonstration projects and case studies under both the SCinIC contract and the PD&R Small Grants Program. At the event, 21 communities with 25 projects were represented with case studies, posters, videos, speakers, and other materials. Invitees to the event included federal partners, green and affordable building industry representatives, tribes and TDHEs, and members of Congress.

### **Training**

Training topics were determined based on the outcomes of the national meeting, TA interactions with the demonstration projects, and discussions with trainers on what the next logical steps would be if the HUD Greener Homes regional trainings offered additional indepth information. As a result, HUD offered

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60 R-DEN-02502, Task Order No DEN-T0006 Sustainable Construction in Indian Country: 12.

61 R-DEN-02502, Task Order No DEN-T0006 Sustainable Construction in Indian Country: 12.

training sessions titled “Sustainable Construction in Indian Country: Assessing Conventional-Built and Sustainable Buildings.” The training session materials are reproduced in appendix D. Training task activities included site selection, developing an agenda and curriculum, identifying trainers, creating training material and a notebook, marketing, registration, and delivering training.

The curriculum included benchmarking, modeling, state and local utility funding opportunities and policies, and energy-reduction cost measures with a real-life focus on the TA provided to the cold-climate Akwesasne Housing Authority and the warm-climate Cocopah Indian Housing and Development.

Two training sessions took advantage of economies of scale by adding a day of sustainable construction training after a Greener Homes regional training session. The trainer at all sessions was Kate Brown of the University of Illinois at Urbana-Champaign. Her co-trainer at Hogansburg, New York, was Kevin Fitzgibbons, consultant and former HUD official. Data on those trainings, speakers, and participants are in the following tables.

<b>December 13, 2012</b> <b>Skirvin Hilton—Oklahoma City, Oklahoma (SPONAP)</b>	Overall Rating:	100%
	Number of Participants:	12
<b>Attendees</b>		
<ul style="list-style-type: none"> <li>• Comanche Nation Housing Authority.</li> <li>• Housing Authority of the Choctaw Nation of Oklahoma.</li> <li>• Housing Authority of the Pawnee Tribe.</li> <li>• Muscogee (Creek) Nation Environmental Services.</li> <li>• Osage Nation Housing Department.</li> <li>• Sun’aq Tribe of Kodiak.</li> <li>• HUD Southern Plains ONAP.</li> </ul>		
<b>Speakers</b>		
<ul style="list-style-type: none"> <li>• Tom Lance, Sun’aq Tribe of Kodiak, Alaska; James Williams, Muscogee (Creek) Nation.</li> </ul>		

<b>February 14, 2013</b> <b>Marriott—Albuquerque, New Mexico (SWONAP)</b>	Overall Rating:	<b>100%</b>
	Number of Participants:	<b>22</b>
<b>Attendees</b>		
<ul style="list-style-type: none"> <li>• Consolidated Solar Technologies.</li> <li>• Dry Creek Rancheria</li> <li>• Energy Tech.</li> <li>• Ho-Chunk Housing and Community Development Agency.</li> <li>• Hopi Tribal Housing Authority.</li> <li>• HUD—EWONAP.</li> <li>• Native American Housing Consultants, LLC.</li> <li>• Navajo Housing Authority.</li> <li>• Navajo Nation Community Housing and Infrastructure Department.</li> <li>• Ohkay Owingeh Housing Authority.</li> <li>• Pueblo Acoma.</li> <li>• Pueblo of Santa Ana Planning and Building Services.</li> <li>• Sandia National Laboratories.</li> <li>• Santo Domingo Tribal Housing Authority.</li> <li>• Santo Domingo Tribe.</li> <li>• U.S. Department of the Interior, Bureau of Indian Affairs.</li> </ul>		
<b>Speakers</b>		
<ul style="list-style-type: none"> <li>• Chelsea Chee, Sandia National Laboratory; Ken Hughes, New Mexico Energy Conservation Management Division; Neil Whitegull, Ho-Chunk Housing and Community Development.</li> </ul>		

Part of the AHA’s new sustainable housing project included a training center. The AHA offered to provide complementary training space for sustainable construction training. To take advantage of the hands-on opportunities at this location, the training expanded to include a tour of the new sustainable housing and an optional tour of the Frank S. McCullough, Jr., Hawkins Point Visitors Center and Boat Launch, a source of renewable hydropower energy. Data on this training is in the following table.

<b>May 7–9, 2013</b> <b>Sunrise Acres Training Center—St. Regis, New York</b>	Overall Rating:	<b>100%</b>
	Number of Participants:	<b>23</b>
<b>Attendees</b>		
<ul style="list-style-type: none"> <li>• Akwesasne Housing Authority.</li> <li>• Eastern Band of Cherokee Indians.</li> <li>• Kickapoo Housing Authority.</li> <li>• Mohawk Housing Corporation.</li> <li>• Seneca Nation of Indians.</li> <li>• St. Regis Mohawk Tribe.</li> </ul>		
<b>Speakers</b>		
<ul style="list-style-type: none"> <li>• Retha Herne, Executive Director, Akwesasne Housing Authority; John MacArthur, Beardsley Design Associates; two residents of the housing complex; staff from the Diabetes Center for Excellence.</li> </ul>		

## Findings and Recommendations From The Review of Current Activities

Several clearly defined awards, organizations, and certification programs can help an observer locate sustainable residential construction and sustainable affordable residential construction activities—if not really define the universe thereof. They include the U.S. Green Building Council, Enterprise Green Communities, AIA/HUD Secretary’s Awards, the Environmental Protection Agency (EPA), Department of Housing and Urban Development, Policy Development and Research Best Practices online, and the U.S. Department of Energy. Tribes and tribal organizations are eligible to participate, but not well represented, in these programs. Thus, it can be difficult to gauge the actual state of sustainable construction in Indian Country.

The review of current activities of the Sustainable Construction in Indian Country initiative aimed to identify sustainable construction projects, resources, and technical assistance within Indian Country. Team members interviewed 26 organizational representatives, conducted literature reviews, and followed up with reviews of websites as appropriate. The report reached out to federal agencies, regional tribal housing associations, green building industry organizations, educational organizations, and nonprofit organizations.

The report, completed in July 2011, reported on 37 green tribal residential projects in 18 states that were in the planning stages, in progress, or recently completed, as the following map shows. This list is not all encompassing but does provide a good indication of the scope and popularity of sustainable construction activities taking place in Alaska and the lower 48 states. The enthusiasm for sustainable building in Indian Country was also reinforced when the application process for demonstration projects began; 24 tribes in 15 states sought demonstration project status, nearly all self-selecting. (Of the tribes interviewed, five were listed in the review of current activities, although they did not necessarily seek assistance with the project described in the report.)

### Findings

- 1. More green building services are targeted toward American Indian and Alaska Native communities to meet needs related to existing housing projects than to meet needs related to new residential construction projects.**

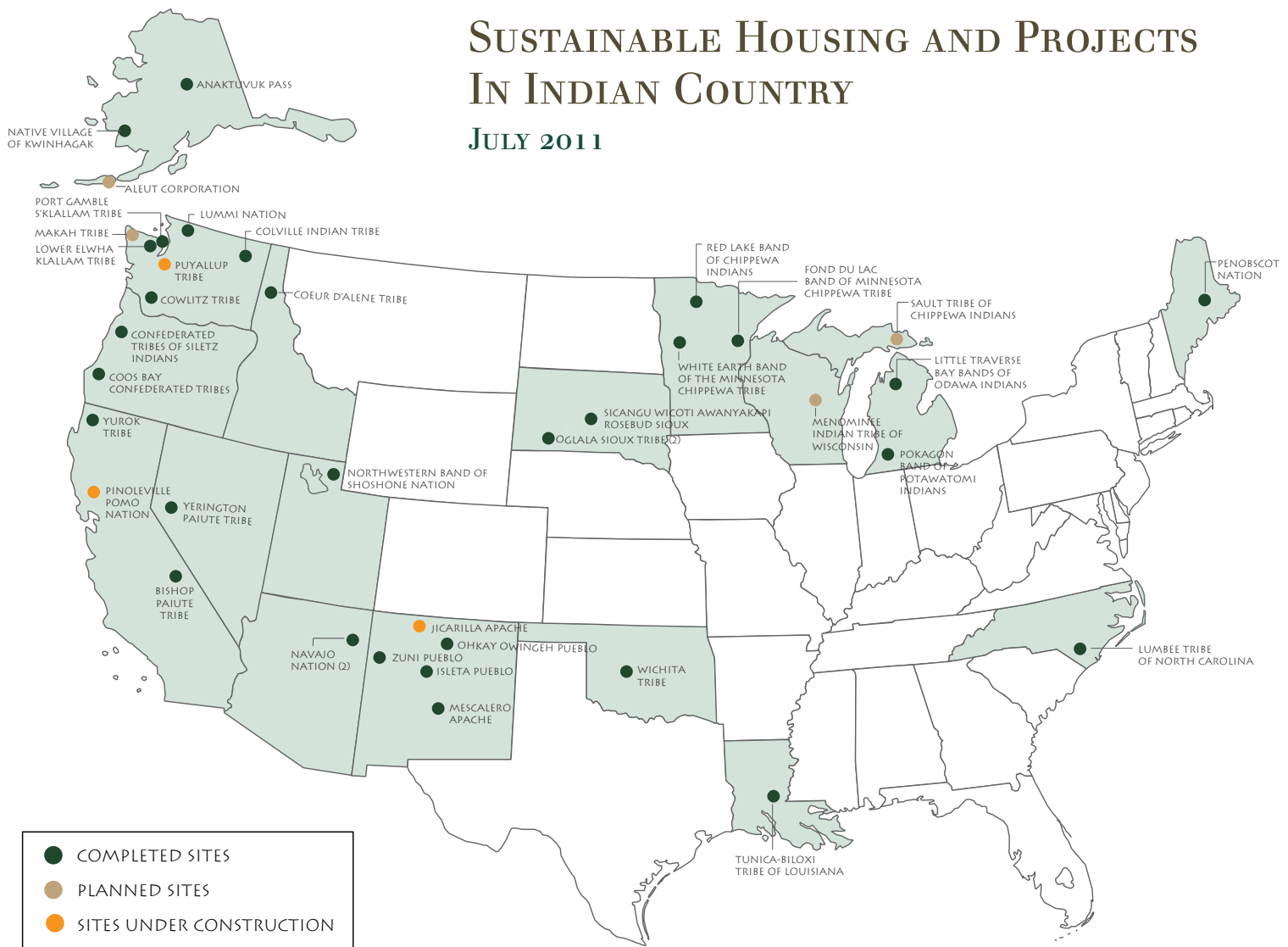
More organizations provide training and TA for increasing the sustainability of existing homes. For example, EPA conducts substantial training on assessment and remediation of indoor air quality and mold on existing homes. Since 2005, a HUD program focused on energy efficiency and rehabilitation has conducted approximately 12 energy assessments annually and conducted regional workshops. The federal Bonneville Power Administration has a low-income weatherization program for tribes in the Pacific Northwest.

Fewer organizations provided training and TA on new construction in Indian Country. Key informants often mentioned the same entities in a given region; for example, Cascadia Green Building Council in Alaska and the Pacific Northwest, Cold Climate Housing Research Center in Alaska, and the Enterprise Green Communities program for American Indians in the Southwest.



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**2. Educational entities such as tribal colleges offer avenues for tribes to increase the number of members with professional green building skills.**

The report found four tribal colleges and one branch of a state university in a tribal community that offered degree or certificate programs in areas related to green-collar construction jobs. The tribal colleges, however, geographically clustered primarily in the Great Lakes, the Dakotas, Montana, and the Southwest.

**3. The ability of tribes to implement sustainable construction technologies may be limited by (1) their lack of internal residential construction capacity, coupled with (2) their inability in small and rural communities to hire general managers or construction firms with experience to implement the technologies.**

Red Feather Development Group and the Zuni Housing Authority both have implemented successful models for increasing the capacity of housing authorities to carry out their own construction projects, but this model is not common in Indian Country. Most tribes work with the construction firms available in their area, and, when they use tribe members, it is usually in

relatively unskilled capacities. In at least one region, tribes have had difficulty accessing construction firms with experience in sustainable construction technologies, which is especially true when they are required to use the lowest bidder.

#### **4. Tribal funding sources are very limited.**

Although regional funding sources such as the Alaska Finance Corporation and the Greater Minnesota Housing Fund exist, most of the funding for residential construction in Indian Country comes from government sources such as Indian Housing Block Grant and the Indian Community Development Block Grant. The American Recovery and Reinvestment Act funds used between 2010 and 2012 were a tremendous creator of sustainable residential housing in Native American communities. Housing authorities and tribally designated housing entities typically combine funding from several of or all these sources in conjunction with state or private financing (for example, the New Mexico Mortgage Finance Authority).

#### **5. Tribes interviewed expressed a desire for TA.**

Tribes were interested in hearing about the initiative and about resources for additional support and TA.

## **Recommendations**

The report did not include recommendations because it was an exploration of activities and opportunities. The following are two recommendations drawn from the findings to support the continued development of sustainable construction in Indian Country.

#### **1. Increase national support for TA.**

Elevate support for TA to a national level in areas including design, construction management, procurement, materials, and certification to provide support for geographic areas with fewer resources.

#### **2. Increase support for educational resources.**

Partner with and support colleges and universities serving significant numbers of Native students, including tribal colleges and universities.

## Ranking and Recommendations From National Impediments Meeting

This section summarizes the results and recommendations generated by focus groups and the coordination meeting that made up the national impediments meeting.

To help ensure that trainers and technical assistance providers were aware of what factors tribes and organizations working with tribes perceive as impediments to sustainable construction practices, an opening task of this initiative was to conduct a meeting to explore the impediments and the solutions to these impediments. Invited participants from governmental, nongovernmental, and tribal focus groups offered observations regarding impediments to sustainable construction in Indian and Alaska Native American communities. Participants in a followup coordination meeting ranked the impediments associated with sustainable construction and brainstormed about potential solutions. The full report of the meeting is in appendix B.



*SIP House Subdivisions on the Mississippi Band of Choctaw Indians Reservation*

*Image: Pritchard Engineering*

### Ranking

This list cannot be considered exhaustive because it was developed from small focus groups, but it is indicative of concerns that the TA team members encountered in the field and that training participants echoed. Working from the wide variety of impediments identified by the focus groups, members of the coordination meeting ranked these four impediments to sustainable construction as most important.

1. **Building codes.**
2. **Costs and funding.**
3. **Capacity building.**
4. **Planning.**

The following graphic provides a brief summary of these impediments.

## Highest Ranking Impediments to Sustainable Construction in Indian Country

<p><b>Building Codes:</b></p>	<p>Communities develop building codes to protect health and safety, but also to show commitment to particular issues. Minnesota and Washington States, for instance, require compliance with green building codes or standards. Tribes have the ability to adopt existing green building codes or standards, or to create their own. The balancing act with a building code is to avoid being overly strict or posing undue cost burden and, thus, inhibiting desired growth.</p>
<p><b>Costs and Funding:</b></p>	<p>Sustainable construction is perceived as more expensive, but this is not always true. Some sustainable construction technologies require more expensive upfront costs; however, the energy savings and more durable housing can offset the higher costs or lead to savings later. Some sustainable construction technologies are more expensive and lack a payoff time that is practical for communities with a strong need for affordability. Some sustainable construction technologies do not add additional construction costs. Education can change the perspective and life cycle assessments and benefit analyses can provide tools to determine the technologies that provide the greatest bang for the affordable buck.</p>
<p><b>Capacity Building:</b></p>	<p>Tribal housing authorities may have difficulty building capacity or even maintaining levels of capacity due to understaffing and staff turnover. New elections in tribal council or decreased Federal budget funds can lead to enormous changes in staffing. Some smaller tribes may not have the staffing on a regular basis to carry out the housing development their community needs to keep pace with housing need. Repeated training, onsite training, and partnerships with other organizations are ways to build lasting capacity.</p>
<p><b>Planning:</b></p>	<p>Sometimes tribes find themselves planning projects simply because Federal funds are suddenly available. This can lead to a mismatch in community need and available resources—land, staff time, housing, funds, etc. Long-term planning, on the other hand, can help rebalance that mismatch, and support a tribe’s overall goals, such as creating a cohesive “place” with increased opportunity for all residents, increasing healthier housing, supporting economic development, and moving toward energy self-sufficiency.</p>

## Recommendations

Because the participants in the coordination meeting were primarily from federal agencies, they primarily developed recommendations of what federal agencies may do to assist in resolving these impediments. Given the time constraints and the focus on sustainability, the group primarily limited its recommendations to the first four (the highest ranking) impediments related to the sustainable construction process.

## 1. Building codes

Green building codes or standards are a topic of interest for tribes in some parts of the country. Green building standards already affect several tribes. In Minnesota, tribes must abide by state green building codes when they incorporate certain types of state funding into affordable housing projects. In Washington State, tribes must abide by the energy code.

These standards comprise another area in which tribes have the freedom to develop standards that reflect their cultural priorities, and they have the option to be more stringent than state standards. The Pinoleville Pomo Nation developed its own green building standards between 2008 and 2012 with TA from the interagency Tribal Green Building Codes Workgroup. One issue they encountered was difficulty getting their units insured.<sup>62</sup> If tribes do not always know that they can develop their own codes and standards, then the housing industry is not always sure what to do with these codes—just as they struggle to incorporate new types of sustainable housing such as straw bale.

In addition, the process does require caution because too much strict regulation can inhibit construction. One possibility is to adapt the International Green Construction Code to each individual tribe's needs. Federal agencies can provide incentives to tribes to implement green practices and to meet green standards. Another part of the process includes considering ways to build tribal capacity to enforce building codes. The level of interest in green building standards at the tribal level is evident in the work of the Tribal Green Building Codes Workgroup.

### Best Practices: Building Codes

The interagency Tribal Green Building Codes Workgroup, begun in March 2010, includes more than 50 representatives from federal and tribal agencies and nonprofit organizations engaged in exploring how tribes can adopt or adapt sustainable building codes or standards to support housing that meets “the environmental, social and cultural priorities of Tribal people” (National Tribal Green Building Codes Summit statement). Building codes shape federally funded housing standards in Indian Country, but not all tribes have building codes or standards that express their priorities.

The workgroup held its first summit June 23 and 24, 2011, when it developed a set of priorities that included—

- “It is important to maintain clarity about the need to have tribally-driven and culturally-based process.”
- “Our emphasis needs to be on the development of a **process** rather than a product, from which tribally determined green building codes, and, or tribe-specific systems can develop.”
- “Codes need to support each Native Nation’s sovereignty, and be reflective of the community and culture.”

*For more information, contact Michelle Baker at 415-972-3206 or [baker.michelle@epa.gov](mailto:baker.michelle@epa.gov), or Laura Bartels at 970-379-6779 or [laura@greenweaverinc.com](mailto:laura@greenweaverinc.com).*

62 Chee (2013).

## 2. Costs and funding

Costs and funding are constants, especially in an economic period focused on reduction rather than on growth. The group suggested options for doing more with less, which promote the use of sustainable construction practices from two directions.

- **Education.** The first direction can show tribes how sustainable investments can save money and how tribes can get their money's worth. Each session of the Greener Homes and the Sustainable Construction in Indian Country training provided information on how participants could identify federal, state, and utility funding for sustainability. The SCinIC trainings also included information on contacting state energy offices, locating information on net metering and policies through American Council for an Energy-Efficient Economy, carrying out online benchmarking programs, and accessing data sheets to evaluate payback on sustainable investments.
- **Federal program use.** The second direction, a thorough understanding of federal programs, reveals built-in supports to sustainable construction practices.

Education-related recommendations included letting tribes know how the health benefits of sustainable housing can spill over into savings in other arenas. For example, healthcare costs can decrease when people live in healthier buildings, and maintenance costs can decrease when materials are more durable.

Other suggestions included creating tools to help tribes make smart energy improvement choices, such as cost-benefit analysis tools or a matrix for tribal housing that shows the energy improvements with the greatest returns on investment, similar to the matrix for public housing agencies available at [http://www.energystar.gov/index.cfm?c=affordable\\_housing.affordable\\_housing\\_phas](http://www.energystar.gov/index.cfm?c=affordable_housing.affordable_housing_phas). In addition, federal agencies could develop a matrix that enumerates potential governmental funding sources for green improvements. In addition to the funding coordination listed in the previous text box, federal agencies could incentivize sustainable building practices in their grant programs, as they did American Recovery and Reinvestment Act grant programs.

Some other education suggestions involved federal agencies reaching out to other housing industry entities such as banks and lenders, insurance companies, and appraisers to educate them on the added value in energy-efficient homes.



*Muscogee (Creek) SIP House*

*Image: FirstPic, Inc. for HUD SCinIC*

Federal programs have flexibility and credibility. Department of Housing and Urban Development (HUD) funding is still often seen simply as housing money, but it is also a tool that tribes can use to leverage other funds. Leveraging can be written into grants as a matching requirement, but HUD staff can also emphasize it in training, when reviewing Indian Housing Plans and when working with tribes. Sustainable building components can be added into existing HUD training curricula. Federal agencies together can ensure that their training and TA efforts cross-reference and consistently provide information on federal efforts such as the Environmental Protection Agency's green labeling programs, HUD's green construction programs, and the U.S. Department of Energy's weatherization and energy efficiency programs. In addition, although it might also be useful for total development costs to include life-cycle costs, tribes are already eligible to apply for a variance to exceed the TDC with area-office approval based on the incorporation of sustainable building technologies.<sup>63</sup>

### **Best Practices: Federal Agency Funding Coordination**

An exciting example of federal agencies joining forces to standardize requirements, combine funding sources, and enhance collaboration is the groundbreaking cooperation between the HUD Office of Sustainable Housing and Communities, the Department of Transportation (DOT), and the Environmental Protection Agency (EPA) on the Interagency Partnership on Sustainable Communities. This partnership promotes better access to affordable housing, more transportation options, and lower transportation costs.

It has also led to coordination planning, policy, and investment such as in the Transportation Investment Generating Economic Recovery (TIGER) II grants. In TIGER II, for the first time, DOT and HUD jointly awarded grants for local planning activities that will eventually lead to integrated transportation, housing, and development.

The U.S. Department of Agriculture and the EPA also assisted with the grant program.

*For more information, visit <http://www.sustainablecommunities.gov/>*

### **3. Capacity building**

To expand the capacity of the tribes seeking to develop sustainable housing and communities, participants suggested expanding the services provided by nongovernmental organizations and supporting an increase in the capacity and number of community development corporations (CDCs). Some suggested that the number of Native CDCs with the specific mission of serving Native American communities might be increased. One underused resource may be tribal colleges. Tribal colleges are not only providing critically important training certificates and degrees in sustainable building vocations, they are, in many cases, leading the way in educating their communities and regions about sustainability from a long-term Native perspective. See the following text box for a brief overview of sustainability efforts at one tribal college, the College of Menominee, Sustainable Development Institute.

63 PIH Notice 2010-47.

### Best Practices: Capacity Building and Sustainability Education

The College of Menominee, Sustainable Development Institute (SDI) is one example of a college creating a rounded approach to sustainability by increasing campus efficiency, educating and inspiring students and regional communities in sustainability efforts, and providing training in green-collar careers. SDI—

- Provides financial assistance to student interns researching sustainability issues, such as campuswide baseline conditions including energy benchmarking and greenhouse gas emissions, vermiculture, and indoor air quality.
- Has increased the environmental education units in all areas of study and is engaging the campus community on campus sustainable development through nine visioning sessions with more than 90 participants.
- Has engaged Great Lakes-area tribes in climate change education and outreach.
- Supports carpooling and other efforts among staff and on campus.
- Conducts applied, participatory action research as identified by tribes, including the sustainability indicators research project.

*For more information, contact Beau Mitchell at 715-799-5600, ext. 3145 or [bmitchell@menominee.edu](mailto:bmitchell@menominee.edu).*

During this meeting, a few participants reacted to the need for education because of frequent leadership and other turnover and also to help leadership embrace quality, which would decrease the need to rebuild as frequently. These recommendations, similar to suggestions mentioned previously, include providing incentives and rebates for sustainable construction, developing baselines and collecting comparison information on efficiencies and savings, adapting analyses on sustainability in other communities for Native American communities, and getting the word about model tribal projects out to other tribes. One suggestion was for a tribal college version of the solar decathlon, where college teams compete to build innovative, affordable houses—often rooted in their regional culture or meeting a regional need—powered with solar energy. For sustainable building to be successful, educating prospective homeowners is as important as educating leadership, because they will live in and need to maintain the final product.

Tribal capacity building also refers to the need to develop specific technical skill sets that will enable Native American communities to control some costs of sustainable construction by doing the work inhouse.

The partnership of the U.S. Army Corps of Engineers (USACE) and American Indian tribes in Oklahoma offers a different model, wherein smaller tribes that lack the capacity and staffing to carry out aspects of a construction project can collaborate with USACE. USACE takes on some of the technical aspects and wins quality and cost gains for the tribes.



### Best Practices: Capacity Building

Smaller tribes do not always have the capacity or staffing to manage construction projects. In Oklahoma, because of a memorandum of understanding between HUD and USACE, allowed by 10 U.S.C. 3036d, the Chief's Economy Act, tribes can partner with USACE to help with their grant applications and project management.

USACE will work with tribes to provide supporting documentation for their project applications, which adds credibility to the package. This documentation can include floor and site plans, a letter of support, and cost estimates. If the project is awarded, the tribe enters into a contract to pay USACE approximately 6 percent of a grant.

USACE, as is typical, will provide the tribe with request for qualifications and interview support, documentation for the audit process, analysis of prospective subcontractor cost proposals, and design review. USACE has structural, mechanical, and architectural engineers on staff.

During the project, USACE provides tribes with multiple quality assurance inspections, which have led to an increase in the quality of materials used in projects and an increase in the square footage of projects. They review the pay application to ensure that anticipated work is completed before payment is made, ensure that the punch list is completed, and conduct a warranty inspection slightly before a year after completion.

*For more information, contact Cynthia Kitchens at 918-669-7042 or [cynthia.kitchens@usace.army.mil](mailto:cynthia.kitchens@usace.army.mil).*

## 4. Planning

Sustainable construction does not mean simply adding energy efficiency to individual housing units, it also means planning for long-term community development. Many tribes are already creating long-term plans with their communities to guide land purchases, housing development, and funding and site placement decisions. The Pokagon Band of Potawatomi Indians have been conducting long-term planning since 2004, whereas the Pine Ridge Oglala Lakota Sioux approved their first long-term plan in 2012. The Navajo Nation has long had planning sessions within its 10 chapters, and the chapters have developed their own plans—with varying degrees of success. During 2010 and 2013, however, the Navajo Nation, through the Navajo Housing Authority, has launched a comprehensive planning project to identify available land for construction, collect information from residents about types of housing and site uses desired, and evaluate barriers to land use and siting. The process takes time and is likely to change as chapter needs change and residents learn more about planning. In addition, without TA to support the resolution of some barriers to development, the housing so urgently needed by the community is not likely to be built.

Participants in the coordination meeting suggested that the federal government was well positioned to encourage and support long-term sustainable planning by informing tribes about available resources. These resources include Indian Community Development Block Grant funds, Economic Development Administration public works planning grants, and Administration for Native Americans grants that support long-range planning. In addition, federal agencies can let

tribes know about their own regional planning commissions, which may have technical staff available to support communities with needs such as community comprehensive planning, grant preparation and assistance, mapping services, hazard mitigation planning, and environmental assessments. They can also alert tribes to planning assistance training opportunities available through organizations including the National American Indian Housing Council and the Native Learning Center.

The Mayor's Institute on City Design is a National Endowment for the Arts initiative that helps transform communities through design by preparing mayors to be the chief urban designers of their cities. Participants suggested that federal agencies could team up to create a tribal version to bring sustainable development concepts to more tribal leaders.

## **5. Federal coordination.**

Participants also offered some overarching recommendations to facilitate better information sharing and resource use among federal agencies.

- Identify the right contact person in other agencies to provide TA or services. Federal agency staff do not always know their counterparts in other agencies or realize who offers what services within a federal agency. Regional contact lists could help.
- Coordinate and schedule trainings and meetings jointly rather than having multiple meetings with tribes.
- In a similar way, coordinate among agencies to align agency visits to tribes.
- Support local and regional training with multiple-agency presence.
- Implement a joint project wherein agencies work together on, for example, a master plan, a green building toolkit, or a green building codes or standards toolkit.
- Develop a clearinghouse of meetings on sustainability topics relevant to tribes.
- Conduct interagency meetings or establish an interagency workgroup.

## Conclusion

The Sustainable Construction in Indian Country initiative has provided education, training, and technical assistance in sustainable technologies to Native American communities both for new building and for increasing the sustainability and health of existing homes. Between 2011 and 2013, the initiative helped build relationships among tribal staff and sustainability specialists, and it promoted the use of available tools for helping Native American communities make informed decisions about which sustainable construction technologies to implement. For example, tribes received free blower-door testing and free modeling and benefit-analysis software, which enabled them to make the most cost-effective choices. Further, the initiative supported and highlighted regional best practices in case studies that will inspire and educate tribes.

Key findings identify both impediments to and supports for sustainable construction in Indian Country. Many obstacles to sustainable development in Indian Country are the same as the obstacles to conventional development in Indian Country, including an often short building cycle, staff turnover, land ownership and usage issues, rural location, and political roadblocks.

Some obstacles are specific to sustainable construction. Of potential concern is that the upfront costs will result in the construction of fewer units in areas with housing shortages and pent-up demand. Tribal housing authority staff and local planners and architects may not be familiar with sustainable construction techniques or have the capacity to adequately maintain sustainable homes. Further, local construction teams may not have expertise or experience in building with the new technologies. Finally, although more options are becoming available, at present, funding is still mostly limited to federal resources.

The initiative also identified supports and rewards for sustainable construction. Strong enthusiasm exists among tribes that already have implemented sustainable technologies, and they are eager to share their experiences with other tribes. Several organizations are providing training and TA for sustainable building in Indian Country, as are several colleges and universities serving substantial American Indian and Alaska Native populations.

Although these types of supports tend to focus in certain regions of the country—primarily Alaska, the Southwest, and the Pacific Northwest—they represent a major step in building capacity for funding, selecting, designing, and building sustainable projects. In addition to providing more affordable and healthy housing, sustainable construction is integral to many Native American communities. Not only do most tribes value and respect the environment, sustainable construction enables them to incorporate culturally relevant features in their designs.

The findings of the initiative have resulted in recommendations for continuing support for sustainable construction. One set of recommendations is to encourage tribes to adopt sustainable construction by having experts champion sustainable strategies in conferences, trainings, blogs, and other outreach efforts. Financial recommendations include leveraging available federal resources and materials to support tribes and tribally designated housing entities, encouraging green building within federal programs and funding sources, and supporting funding for and partnerships with local tribal colleges and other colleges and universities with a strong Native presence in their efforts to create sustainable construction programs.

The results of this initiative also recommend supporting tribes in making informed decisions about the cost-effectiveness of different sustainable strategies by providing software and analyses that give them concrete information about anticipated outcomes and costs.

Increasing the use of sustainable construction technologies in Indian Country, as in the rest of the country, carries an appeal for additional financial incentives to support the incorporation of these technologies.

A change in perspective, however, may be equally critical to encouraging acceptance of and desire for sustainable construction technologies. This new perspective includes the following insights.

- Sustainable housing does not have to be in conflict with issues of overcrowding or the replacement of substandard housing. As one meeting participant framed it, “Housing development that is not sustainable perpetuates the current problem. It impoverishes families with high energy costs, high maintenance costs, and health issues.”
- Sustainable housing does not have to be more expensive over the life of the housing unit. The inclusion of cost-effective sustainable technologies does require making informed choices based on the availability of materials, the suitability of materials to climate and housing unit, the return on investment, and budget considerations.
- Sustainable housing offers health and financial benefits for residents. The savings from reduced energy costs or doctors’ visits—in the case of decreased asthma attacks, for example—can be redirected to other family needs.

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