



TRIBAL BROADBAND:

Funding Access & Adoption

Corporation for Education Network Initiatives in California
CENIC

WITH SUPPORT FROM THE CALIFORNIA EMERGING TECHNOLOGY FUND

Introduction	1
Examples of Success	2
Access	4
General Definitions	4
Project Classifications	5
Level of Difficulty.....	5
Timescale	5
Planning Considerations.....	6
Human Capital.....	7
Access Project Activities.....	9
Funding and Business Models	10
Funding.....	10
Funding Challenges.....	10
Funding Agencies.....	11
Contention for Funds	11
Funds for Associated Infrastructure.....	11
Funding Programs	11
Financing	17
Utilizing SBA 8(a).....	18
Unanticipated Costs	20
Adoption	21
Reliable Electricity	21
Middle Mile Connectivity.....	21
Facility Siting.....	21
Health Concerns	22
Adoption Activities	22
Sustaining	26
Sustaining Activities	26

Introduction

Over the past three decades, the revolution in computers and telecommunications networks has created unprecedented changes in business, commerce, government, science, healthcare, and education. New jobs, new industries, an explosion in entrepreneurship, new modes of community building, increased learning opportunities, ease of access to timely information and global markets, and the ability of an extended community to interact closely across space and time: all are dividends of this revolution in network and information technology.

Yet the fruits of this Information Age are still unevenly distributed. This gap threatens to continue to cut off some populations in California on tribal lands from new opportunities. Access to new forms of education, good jobs, medical and health information, communication, and the chance to participate in the affairs of the broader society may be denied to them.

As many forms of vital information such as medical insurance and tax forms transition to online-only, it is becoming increasingly impossible to participate in public life without access to the Internet. Thus for some individuals, technology brings the promise of inclusion, education, opportunity, wealth, and better health; for others, the lack of access brings even greater isolation. It is in this way, tribal lands, particularly those in rural California, have been acutely underserved by traditional carriers.

Many look to tribal leadership to bridge this gap, to help develop both the core safety net, as well as the high-touch access points. This document explores strategies for access to broadband, funding and business models to support and sustain access, and models of broadband adoption to make greatest use of online resources. It is something of a cookbook, abbreviated, with recipes for each successive “course” of this broadband feast. Moreover, it is the hope of the authors that tribal communities will take charge of their telecommunications destiny and develop tribal-based approaches, owned infrastructures that will empower and enrich each community.

Examples of Success

YUOK TRIBE

In 2010 the Yurok Tribe received grant funding from the USDA Rural Utilities Service and a matching Grant from the California Consumer Protection Agency and successfully brought broadband internet access to its reservation. The Yurok Tribe ultimately decided to utilize its existing Public Utility district in order to maximize its available resources using wireless technology.

The tribe, with nearly 5,000 enrolled members, is located in northern California, stretching along a river for 45 winding miles in rough, mountainous, heavily forested terrain. Small nodes of population dot the reservation, with relative concentrations near either end.

Some 90% of the reservation land area has no infrastructure such as power, water, or telecommunications at all. Some of the areas have power, but no telecommunications.

The tribe created a sample implementation model for others to consider based on its successful experience exploiting “whitespace” wireless spectrum. This model is referenced later in this document.

COEUR D'ALENE TRIBE

In 2010 in Idaho, the Coeur d'Alene Tribe's Coeur d'Alene Reservation Fiber-to-the-Home Project received a \$6.1 million loan and a \$6.1 million grant through the USDA to provide broadband to community facilities and about 3,800 unserved and underserved households on the Coeur d'Alene Indian Reservation.

TULALIP TRIBES

The Tulalips, whose reservation spans 22,000 acres, connected their broadband network in 2009 to a Seattle-based exchange that gave them a cheaper and faster internet connection. The Tulalips, working with Seattle-based technology firm Cascadeo, created a nonprofit cooperative, the Washington State Rural Broadband Cooperative, and applied for \$12 million in federal stimulus money to push that network into remote parts of the state that have been beyond the reach of broadband.

Key to the success of the Broadband Cooperative is the Tulalip Tribes, which last October established a link from the reservation to the Westin Building, a Seattle internet hub. By connecting to the Westin hub, which is home to a wide array of internet service providers, the Tulalips got access to cheaper internet connectivity. The Tulalips also established direct, "peering," connections to companies such as Google and Microsoft that also have presence in the Westin, allowing for data to be transferred more quickly and cheaply by eliminating transit across carriers who charge for the transit service.

Access

General Definitions

Access	Means the delivery of internet to one or more service delivery points managed by a tribe from where it can be further distributed by wired or wireless to end users.
Broadband Data Network	For the purposes of this document, the California Public Utilities Commission (CPUC) definition of “broadband data network” is used, meaning highly available connectivity to the internet for data at speeds of 1M bits per second (bps) upstream, 3Mbps downstream or higher. “Highly available” is assumed to mean a service level of 99% availability, including scheduled and unscheduled maintenance.
Topology	The layout, “topology,” of the connectivity is assumed to be “hub and spoke,” where one or more provider concentration points in the region supply a data connection to a hub, typically on tribal lands. The hub, in turn, supplies connectivity to end sites with “spoke” circuits. The facilities at the hub and spokes will generally be managed and operated by tribal staff. Other topologies such as mesh or point to multipoint may be more appropriate and should be considered equally as alternatives.
Data Content	<p>Refers to data delivered to or from the community including individual users, businesses, and government from content providers. Access to broadband allows the tribal community to participate in the global commons. For example, the Hoopa Valley Tribe may wish to use internet facilities to express its concerns about water allocation as part of its information campaign.</p> <p>The content is one of the key drivers in the design of the system since content can have special delivery needs, such as gapless voice or smooth video. Content issues can arise when an application or infrastructure implementation conflicts with the implementation of the data network. The analysis of content requirements is a principal objective of a survey of user needs.</p>
Tariff	Sets forth the service offerings, rates, terms, and conditions applicable to the furnishing of intrastate communications services by a communications network to residential and business customers within the State of California.
Tariff Plan	Identifies charges that will be used to finance equipment and services delivered to a customer premise. In the case of Tribal infrastructure, such tariffs may be used to underwrite Tribal bonding needed for achieving carrier class service where it otherwise may not be available.

Project Classifications

When a project is approached at the conceptual stage, it's helpful to understand how it may be informally classified. Project classifications include:

- New projects, with little or no intersection with previous efforts
- Projects previously proposed, but not funded
- Projects previously begun, but not completed as envisioned with the proposed function provided to the endpoint
- Projects previously begun, but abandoned or implemented using a faulty design
- Projects completed and their goals being sustained and possibly enhanced
- Projects completed, but their goals not sustained, generally leading to problems with the resulting infrastructure or support facilities.
- Follow on projects proposed and “shovel ready,” with planning completed and permitting either completed or needing only to be refreshed
- Follow on projects proposed, but not shovel ready, requiring one or more project planning steps to begin implementation, generally permitting.

When considering new or existing projects, these informal classifications can help organize thinking to decide whether resources should be invested further on an existing project, or resources should be redirected to significantly modify a project, or resources should be used to develop a new project with different goals.

Level of Difficulty

Projects and phases within projects have different levels of difficulty, determined by political and operational factors.

For example, sustaining an implementation over the long term may be of high difficulty because of a lack of technical training infrastructure. Lack of technical training leads to scarcity of human resources to maintain the installed equipment.

Technical training requires substantial infrastructure that in itself is difficult to maintain. Technical skills typically need relatively up to date equipment to use in teaching lab settings so those trained can work on installed equipment without significant additional training. In addition trainers must have current skills, which also requires ongoing training to maintain currency.

Timescale

Based on development work in other areas in tribal communities, only some activities can be reasonably completed in months. To be effective, many activities need years of sustained effort.

Many activities require close coordination with tribal leadership. A change in tribal leadership can require development of relationships to build trust with the new leadership in order to begin new projects or continue those in progress.

Planning Considerations

Considerations important when planning access include:

- Tribal organization to develop service
- Right of way use agreements
- Approvals and permitting
- Incumbent carrier contention
- Local technical expertise
- Broader issue of human capital

TRIBAL ORGANIZATION

At some point there will need to be a cooperative to aggregate services. Such an entity could form the basis of an exchange which could charge for multiple classes of services that they finance.

Tribes can become eligible telecommunication carriers (ETCs) for the purpose of providing lifeline services. With digital equipment in place and wireless services available, the “bridge” to Tribes becoming a competitive local exchange is no longer “too far.” The Universal Service Administrative Company (USAC) information on ETCs is at <http://www.usac.org/hc/legacy/competitive-carriers/default.aspx>.

RIGHT OF WAY AGREEMENTS

Right of way agreements of some sort must be obtained for the entire path of the installation where real estate is involved. Sometimes the use of wireless technology can minimize or eliminate the need for some real estate agreements, at the expense of speed and sometimes reliability.

There are two basic cases when considering right of way agreements:

- On tribal lands
- Off tribal lands

Routes may need to be surveyed with detailed engineering drawings completed before agreements are provided.

APPROVALS AND PERMITTING

Approvals and permitting for the project may be time consuming, especially if federal land use or environmental permits are needed, coordination is needed with transportation agencies for road right of way, or if aerial builds are planned where poles in place may not meet current load bearing standards.

Approvals fall into two categories:

- From the tribe, typically through tribal resolutions
- From those government entities with jurisdiction

Before approval for the installation can be obtained, each element of the plan needs to be completed and validated. In many cases public notice and hearings are required.

For gaining tribal approval, tribal governments respond best to themes that describe local benefits and respect to Tribe's sovereignty and culture.

INCUMBENT CARRIER CONTENTION

Incumbent carriers sometimes may object to projects they view as competition. The incumbent may have long term plans for developing access to the planned site or the objection may be strictly anti-competitive.

Filing of incumbent objections can require legal preparation to prepare a response and participation at hearings. In some cases surveys of current broadband speeds are needed to validate the assertions of incumbent carriers of adequacy of current service.

LOCAL TECHNICAL EXPERTISE

During both installation and operations of the facilities developed by the project, local technical expertise is helpful, especially when planning restoration activities, if there is a service interruption. Local staff can generally get to the site of the outage more quickly and, if properly trained, can repair an outage faster than a restoration team that must travel from a farther distance.

The capability of the local technical staff depends, of course, on their level of training; their availability for dispatch; and their available, operational equipment. There may be no or limited technical training in the tribal area. The training that is available may be outdated or use obsolete equipment in lab settings. The trainers may have stale skills.

Human Capital

ISSUES

Broadband access and adoption is largely dependent on technical support for both installation tasks as well as ongoing maintenance.

The staff trained in telecommunications subjects need to be available before installation tasks and the lead time to develop trained staff is generally months. The training for the relevant telecommunications subjects typically requires a teaching lab, which itself requires development that usually requires weeks. Recruiting appropriate trainers can require months. This timeline for training of months needs to be considered when developing the overall implementation plan.

In addition to technical support skills specific to data communications, pre-installation tasks may require trained anthropologists to help with considerations if the installation path encroaches on sacred lands. While the anthropologists are usually recruited from outside the area, they may have assistants or job followers from the local area.

TRAINING

Training issues include:

- Development of curricula
- Development of education delivery sites

- Development of a teaching lab for technical subjects as well as sustaining the lab with current generation equipment
- Recruit trainers, teachers, and support staff
- Fund the site and staff as well as support supplies and equipment, both initially and ongoing.

RECRUITMENT

Recruitment issues include:

- Determine the skill sets needed
- Determine head count and location where staff will be based
- Identify recruiting support
 - Technical recruiters
 - Media campaigns both local and in appropriate outside areas
 - Tie in to education venues
- Fund recruiting activities

RETENTION

Retention issues include:

- Determine comparable wage rates
- Agile response to staff approached with job offers from outside
- Determine non-W2 compensation
 - Training
 - Company vehicle
- Equity wage adjustments
- Fund areas such as training that are often the first to be cut

KNOWLEDGE TRANSFER DURING CONSULTING ENGAGEMENTS

Consulting engagements often have little or no knowledge transfer to local staff during the engagement, accompanied by poor or incomplete documentation of what was done.

In some degree this is because consultants are in the business of generating follow on engagements. The consulting statement of work may have incomplete requirements in these areas.

Knowledge transfer from the consultants to local staff is important. A set of best practices for expectations can be developed to be included in statements of work.

Access Project Activities

Generally implementing access follows a standard project sequence. Access activities include:

- Determine tribe requirements
 - Current requirements to provide service to established needs with a horizon of approximately one year to accommodate user services expected shortly.
 - Future, with a time horizon of years, within the expected limits of next generation technology
- Determine system architecture
 - Current for both an initial phase in a larger, overall context to avoid “rip and replace” because of poor planning
 - Plan and implement a service upgrade somewhat before the end of the equipment’s technologic life to minimize disruption
 - Always plan on minimizing disruption when transitioning to a successor technology
- Budget
 - Real estate right of way, through easement or purchase
 - Equipment
 - + Initial acquisition
 - + Ongoing support
 - + Early replacement contingency in case the originally specified equipment doesn’t scale in capability to emerging requirements
 - + Consider whether is a cost premium is justified to have a homogeneous equipment environment to reduce support costs
 - Human costs, including salary, benefits, travel, and training
 - + Local staff
 - + Supplier staff man hours for consulting where necessary to fill a skills gap and staff training
 - + Consultant costs to fill staff skills gaps or to supplement staff head count where key positions aren’t filled
- Determine supplier hub configuration
 - Capabilities needed for long term, scaled up and out requirements
 - Footprint of communications shelter and associated facilities
 - Support needs (space, power, cooling, staff, restoration plan when facility is disrupted, especially by high impact weather or natural disasters)
- Determine tribal hub equipment configuration

- Survey right of way with sensitivity to sacred and culturally significant lands, hydrography, historic patterns of wildfire, and endangered species
 - On tribal lands
 - Off tribal lands
- Acquire right of way, including permitting, development of contingency routing if primary routes are deemed infeasible
 - On tribal lands
 - Off tribal lands

Funding and Business Models

Funding

Funding phases for a typical installation to tribal lands includes the following segments:

- From the “core,” the internet interior infrastructure to the “middle mile,” the intermediate speed segment connecting the core to hubs serving end points
- From the middle mile to hubs
- From hubs to end points

The “core” is the developed very high speed internet with multiple independent hubs, typically served by carriers such as AT&T. The “middle mile” begins at a core termination point and continues on a high speed aggregation link to a “hub” site, which may or may not be on tribal lands. The end points may be a connected site such as a library or school, which further distributes internet service. An end point may also be a residence or a mobile device.

Unless funding is provided and sustained for all of the segments in the service from core to end point, the end point can’t get and sustain service.

Funding Challenges

Funding challenges include:

- Understanding funding agencies, whether governmental or non-governmental
- Understanding the full range of funding options, including SADs, LIDs, COPs, Tribal Bonding, Special Tariffing
- Contention for funds
- Projects typically require more than just data communications infrastructure with required improvements in reliable electrical supply and, possibly, access roads.

Funding Agencies

In addition to discovering appropriate funding agencies, both governmental and non-governmental, one must understand:

- Appropriate contacts within each agency, which may be large
- Format for funding requests
- Whether partnering with tribes in advance is needed

Contention for Funds

As one might expect, there is significant contention for funds. Because of the typically long permitting cycle, there are a lack of shovel ready projects, which means that shovel ready projects may take precedence and otherwise worthy projects may go unfunded by the time their analysis phases is completed.

Funds for Associated Infrastructure

In addition to funding the base project, which typically includes sites for communications equipment and the real estate for any wired segments, even more basic infrastructure may need development, such as reliable electricity and all weather roads.

Funding Programs

Funding programs, both current and those in the not too distant past, include:

FEDERAL

U.S. Department of Agriculture Recovery Act Broadband Initiatives Program

[USDA Recovery Act Broadband Initiatives Program](#)

The Broadband Initiatives Program (BIP) was a one-time program associated with American Recovery and Reinvestment Act (ARRA) of 2009, now closed. By September 30, 2010 there were 320 awards obligated that total \$3.529 billion.

The total awards were 285 last-mile projects that totaled over \$3 billion, the 12 middle-mile awards totaled \$172.6 million, four satellite awards for \$100 million, and 19 technical assistance awards for over \$3.4 million. Awards were made in 45 states and one territory.

The BIP Satellite Program provided financial incentives for private satellite companies to offer satellite broadband connections to users in rural locations where terrestrial broadband services were not available.

Programs such as these, though closed, are useful for reference since there may be opportunities associated with previously funded projects, either augmenting to reach additional populations or in some cases completing work begun but suspended.

U.S. Department of Agriculture Rural Utilities and National Telecommunications & Information Administration Broadband Grants

These grants were generally associated with ARRA. Some of the previously funded projects may be able to be expanded upon or joined with other efforts to extend penetration.

U.S. Department of Agriculture Community Connect Grants

[USDA Community Connect Grants](#)

The Community Connect program serves rural communities where broadband service is least likely to be available. Indian Tribes or Tribal Organizations, as defined in 25 U.S.C. 450b(e) are eligible.

Grant funds may be used to finance the following:

- The construction, acquisition, or leasing of facilities, including spectrum, land or buildings, used to deploy service at the Broadband Grant Speed to all residential and business customers located within the Proposed Funded Service Area (PFSA) and all participating Critical Community Facilities, including funding for up to 10 Computer Access Points to be used in the Community Center.
- The improvement, expansion, construction, or acquisition of a Community Center and provision of Computer Access Points.
- The cost of providing the necessary bandwidth for service free of charge to the Critical Community Facilities for 2 years.

U.S. Department of Agriculture Farm Bill Loan Program

[USDA Farm Bill Loan Program](#)

This program is designed to provide loans for funding, on a technology neutral basis, for the costs of construction, improvement, and acquisition of facilities and equipment to provide broadband service to eligible rural communities.

U.S. Department of Housing and Urban Development

HUD sponsors or provides resources for improving access and adoption of infrastructure. For instance, the Comprehensive Community Infrastructure (CCI) projects provided approximately \$2.35 billion toward funding CCI projects that focused on Middle Mile broadband infrastructure projects to offer new or substantially upgraded service to community anchor institutions; bolstered growth in economically distressed areas; committed to serve community colleges and public safety entities; included a Last Mile infrastructure component in unserved or underserved areas or, alternatively, commitment letters from one or more Last Mile broadband service providers.

Federal Communications Commission Telecommunications Access in Indian Country

[FCC Telecommunications Access in Indian Country \(PDF\)](#)

The Indian Telecommunications Initiatives (ITI) is an umbrella term for all Commission programs intended to expand telecommunications access in Indian Country. These programs include Universal Service and Tribal Lands Bidding Credits.

The three principal ITI goals are:

- Increase the telephone penetration rate;
- Increase telecommunications infrastructure deployment; and
- Inform consumers on tribal lands nationwide about federal programs that provide discounts for telecommunications services.

To reach these goals, the FCC participates in four types of activities:

- Regional workshops and roundtables in Indian Country to foster intergovernmental consultation and provide “how to” information on telecommunications services and infrastructure development;
- Conferences and other events that address American Indian telecommunications issues;
- One-on-one meetings between tribal representatives and FCC staff; and
- Distribute educational materials through tribes and tribal organizations.

Broadband.gov – Broadband in Rural Areas

[Broadband.gov Broadband in Rural Areas](#)

The FCC’s Broadband.gov fosters access and adoption of broadband in rural areas generally. This web site outlines the general problem as well as indicates approaches to solving the problem. Although funding is not directly addressed, the program shows methods a community may use to make funding more attractive to outside agencies by enhancing chances for success.

One suggested method is to develop a strategic plan for broadband deployment including a comprehensive business proposal to broadband providers. Such a plan, for example, could demonstrate to broadband providers that deployment is a sound business decision that would benefit both the providers and the community.

This strategic planning process may include, but is not limited to, the following elements and strategies:

- Educating the community about the potential benefits of broadband service.
- Creating partnerships among community organizations and institutions that might benefit from broadband deployment.
- Systematic assessment and prioritization of the community’s needs for broadband service.

- Aggregating (consolidating) demand within the community to make service profitable for broadband providers. Participants may include, but are not limited to, individual consumers, businesses, educational institutions, health care facilities, and government agencies.
- Identifying an anchor tenant with adequate demand to spur infrastructure investment in broadband.

Commerce NTIA

[Commerce NTIA](#)

NTIA administers grant programs that further the deployment and use of broadband and other technologies, laying the groundwork for sustainable economic growth; improved education, public safety, and health care; and the advancement of other national priorities.

The agency manages two broadband grant programs funded by the American Recovery and Reinvestment Act: the Broadband Technology Opportunities Program (BTOP) and the State Broadband Initiative (SBI) (formerly called the State Broadband Data and Development Grant Program). Through these programs, NTIA is overseeing an investment of approximately \$4 billion in projects throughout the United States to support the deployment of broadband infrastructure, enhance and expand public computer centers, encourage sustainable adoption of broadband service, and promote statewide broadband planning and data collection activities.

While some of these programs may have expired, they are examples of agency funding opportunities. In some cases previously funded programs may be augmented by properly justified new efforts associated with the older projects.

FEMA Tribal Homeland Security Grant Program

[FEMA Tribal Homeland Security Grant Program](#)

The Fiscal Year (FY) 2013 Tribal Homeland Security Grant Program (THSGP) provides funding to eligible Federally-recognized tribes to strengthen their capacity to prevent, protect against, mitigate, respond to, and recover from potential terrorist attacks and other hazards. The FY 2013 THSGP plays an important role in the implementation of the National Preparedness System (NPS) by supporting the building, sustainment, and delivery of core capabilities essential to achieving the National Preparedness Goal (NPG) of a secure and resilient Nation.

FY 2013 THSGP funds were used for a variety of planning activities, equipment purchases, and maintenance and sustainment (including maintenance contracts, repair and replacement costs, upgrades, user fees, and implementation). Additionally, a maximum of five percent (5%) of THSGP funds awarded was retainable by the tribal grantee for the management and administration (M&A) associated with the grant award.

Similar funding opportunities associated with FEMA may be available in the future.

Broadband Deployment on Federal Property Working Group

[Broadband Deployment on Federal Property Working Group](#)

The Broadband Deployment on Federal Property Working Group, established by Executive Order, was formed in order to ensure a coordinated and consistent approach in implementing agency procedures, requirements, and policies related to access to Federal lands, buildings, and rights of way, federally assisted highways, and tribal lands to advance broadband deployment.

While this working group is not a direct funding agency, its charge includes simplifying such concerns as permitting and conduit use near transportation paths. Facilitation in these areas should reduce the overall cost and time for deployment of broadband in affected areas.

White House Rural Council

[White House Rural Council \(PDF\)](#)

Recognizing that Indian Country faces unique challenges when it comes to sustainable economic development, the White House Rural Council is working across federal agencies to address these challenges and promote economic prosperity and quality of life in Indian Country and across rural America. The Administration has already made important investments in infrastructure to support economic development in Indian Country. In order to bring high-speed, affordable broadband into tribal communities, both the Department of Agriculture and the Department of Commerce have dedicated programs for this effort and have awarded loans and grants worth over \$1.5 billion for projects to benefit tribal areas.

STATE

California Emerging Technology Fund

[California Emerging Technology Fund](#)

The CETF provides funds for projects such as the California Telehealth Network. The California Telehealth Network's goal is to provide health and medical care access by connecting more than 800 clinics and hospitals to medical centers, with an initial priority focus on rural sites and tribal lands. It expects to promote telemedicine to improve access, quality and cost-effectiveness.

California Advanced Services Fund

[California Advanced Services Fund](#)

The CASF provides grants to “telephone corporations” as defined under [Public Utilities Code 234](#) to bridge the “digital divide” in unserved and underserved areas in the state. With an initial funding of \$100 million, the CASF supports projects that will a) provide broadband services to areas currently without broadband access and b) build out facilities in underserved areas, if funds are still available.

Native American Broadband Association

[Native American Broadband Association](#)

The Native American Broadband Association was created to provide tribes with the information that they need to understand broadband issues, to help them apply for broadband funding grants and loans, and to find technology partners.

Tribal Digital Village Broadband Adoption Program

The Southern California Tribal Chairmen's Association(SCTCA) is addressing the lack of Internet access for its tribal communities, taking their wireless broadband network to the next level of support for its communities, the "tribal home". It has been a long term goal of the Tribal Digital Village(TDV), an SCTCA program that spawned the TDV Network (TDVNet) back in 2001 to bring Internet services to our key community buildings and programs.

The ground work has been done to support key community operations on reservations, and over 350 miles of point-to-point and point-to-multi-point links have been created supporting 86 tribal buildings, i.e.- tribal administration buildings, EPA departments, fire stations, law enforcement, utilities departments, and Libraries, Schools and Head Start programs.

Yurok Rural Broadband Model

[Yurok Rural Broadband Model \(PDF\)](#)

In 2010 the Yurok Tribe received grant funding from the USDA Rural Utilities Service and a matching Grant from the California Consumer Protection Agency to bring broadband internet access to its reservation. Included in their document are resources and an example model that can be used to replicate the project in other rural locations throughout the country. There is also an example equipment needs list and various technology recommendations.

Navajo Nation Middle/Last Mile Project

[Navajo Nation Middle/Last Mile Project \(PDF\)](#)

Another example project is the Navajo Nation Middle/Last Mile Project. In August 2009, Navajo Tribal Utility Authority (NTUA) submitted an application to the U.S. Department of Commerce National Telecommunications and Information Administration (NTIA) to build a fiber optic network communications and microwave infrastructure throughout the central core of the Navajo Nation based on availability at that time of American Recovery and Reinvestment Act (ARRA) funds.

The overall project budget is approximately \$46 million, which combines the NTIA grant award and a 30 percent matching contribution of \$11.3.M from NTUA and \$2.2 million from partner Commnet Wireless.

The Navajo Nation Middle/Last Mile Project will be implemented in five phases, which will extend over 530 miles. The construction plan includes installing 96 strands of aerial fiber optic cable and 33 new microwave tower sites. This undertaking amplifies NTUA's existing microwave network to provide broadband access to 15,120 square miles of the Navajo Nation's 27,000 square mile area.

In Place Tribal Investment

In some cases broadband funding can come wholly or in part from in place tribal investment. Tribal business and educational functions can be enhanced or simplified with broadband access, whether associated with commercial businesses, schools, or libraries.

NON-GOVERNMENTAL

Benton Foundation

While not providing direct funding, in the past the Benton Foundation has developed many policy recommendations for enhancing access to broadband for tribal lands.

Financing

Project financing can come from many sources:

- Capitalization of Infrastructure
- Contributed Capital
- Equity Investments
- Loan Financing
- Self-Generated Revenues (Revenue from Operation)
- Special Assessment Tariff
- Special Project Financing

CAPITALIZATION OF INFRASTRUCTURE

Infrastructure may be capitalized then, if economically justified, sold and leased back.

CONTRIBUTED CAPITAL

Project capital may be contributed through grants or donations. Each of these requires significant work for both development and follow on coordination. Grants may have deliverables subject to audit.

EQUITY INVESTMENTS

Project capital and operational funds may be obtained through equity investment. Equities are sold through private placement or publically, each subject to securities regulations.

LOAN FINANCING

Loans, either governmental or commercial, may be used as a source of funds.

SELF-GENERATED REVENUES

Revenue from operations is used both for ongoing expense as well as to pay debt, reinvestment, and possibly dividends on equity.

SPECIAL ASSESSMENT TARIFF

A special assessment tariff may be established for one time and ongoing funds.

SPECIAL PROJECT FINANCING

Special project financing through bonds or loans may be used.

Utilizing SBA 8(a)

There is a need for a new financing and ongoing operation funding model that addresses the institutional barriers to financing and operation of optimal networking for the high cost loop. Several challenges derived from tribal internal and external environments complicate the deployment of optimal networks:

- Market tension from supply and demand factors
- Cultural tensions involving access and use
- Technological tensions driven by legacy factors
- Economic tensions from institutional demands of capital
- Enterprise tensions from lack of ownership as well as scarcity of funds for maintenance and operation

To overcome these challenges, some new approaches include:

- Finance the model based on an OOI (Outcome of Investment) not an ROI (Return on Investment) financing model.
- Structure the initiative toward an 'owner-based' outcome which will result in local branding, jobs and ownership for the Tribes.

The SBA 8(a) Program is an under-utilized model in Indian Country. The 8(a) Business Development Program is a business assistance program for small disadvantaged businesses. The 8(a) Program offers a broad scope of assistance to firms that are owned and controlled at least 51% by socially and economically disadvantaged individuals.

The 8(a) program is somewhat different for Native American companies than the program rules for other minority businesses, such as Black and Hispanic. Tribes enjoy a special procurement advantage over other 8(a) participants, namely: they have the ability to obtain sole-source non-competitive contract to provide services for the federal government. For Tribes there is technically no limit to a sole-source procurement.

INDEFINITE DELIVERY/INDEFINITE QUANTITY CONTRACTS (ID/IQ)

Indefinite Delivery/Indefinite Quantity ID/IQ contracting is available under a single-order utilization purchasing. It is often a 60 month contract under which one or more Prime Contractors will negotiate individual “task orders” that will be booked against the total authorization.

For example, Company A has an ID/IQ for \$50 Million to provide telecommunication services to the USDA over 60 months. There is a broad Scope of Services governing that contract. The ‘cognizant agency’ which is responsible for procurement under the system, assigned a dedicated contract officer with whom the contractor will negotiate task orders. There may be some flexibility in interpreting the scope as long as the task orders conform to desired program and policy outcome incorporated in the statement of work (SOW).

PRE-AUTHORIZED FUNDING

ID/IQ contracts are authorized for up to 60 months. Instead of targeting scarce grant funds on an incremental basis, the 8(a) Teaming Partnership can negotiate a series of task orders to complete a full project, structured to be consistent with the SOW.

TEAMING AGREEMENTS

The SBA 8(a) program is intended to not only provide products and services to the government in an expedited procedure, it is also intended to build the capacity of Tribal businesses. Therefore, the program provides for such arrangements as ‘teaming agreements’ which allow a new Tribal Enterprise to be a ‘subcontractor’ and participate in the delivery of the Prime Contractor’s services or goods.

Another way a teaming agreement works is if the Tribal Contractor identifies an opportunity, for example, digitizing archival records for the Smithsonian, and forms a partnership with an experience archivist with solid ‘bona fides’ in the field. The Tribal contractor becomes the prime contractor and the archivist becomes a subcontractor. Together they originate a proposal which, even if unsolicited, may be considered by the agency.

MENTOR-PROTÉGÉ

Teaming Agreements may also be established under a “mentor-protégé” models. Here a prime contractor can work with a new Tribal 8(a) and share contracts. The prime contractor receives a bid incentive to offset any opportunity costs that may arise under the partnership.

CALIFORNIA TRIBES ELIGIBILITY AS 8(A) COMPANIES

There is a significant community of established companies who may act of a mentor to the Tribal Consortium formed as an 8(a). The explicit competitive advantage among their peers for contract services would make a teaming relationship with the Tribal 8(a) attractive to a large well-capitalized company. There are also tax incentives for the mentor if the project is well-structured.

There are thousands of prime contractors with ID/IQ contracts and the goal is to identify appropriate primes and SOWs for teaming. This is what a professional business developer working for an 8(a) company does. It is done all the time in the 8(a) world. There is an incentive on the part of the company to sell task orders to the Agency. Also, there is an incentive on the part of the agency to find credible projects to fund under the ID/IQ and there is a community of corporate and private stakeholders that will benefit from the completion of a project.

Unanticipated Costs

Even with detailed planning, complex projects such as these incur unanticipated costs. Recent projects such as Digital 395 have shown significant unanticipated costs in areas such as:

- Requirement for cable burial rather than allowing cable routed aerially on poles because of wildfire hazard (CPUC D. 12-01-032)
- Caltrans charges for staff time and encroachment fees for use of Caltrans fiber
- Costs to bore around ephemeral waterways, wetlands and special species
- National Historic Preservation Act section 106 (effects on historic properties) costs
- Owner controlled insurance program (OCIP) costs
- Biological monitoring costs
- SWPP (Storm Water Pollution Prevention Plan) costs
- Cultural site avoidance costs, including Class III intensive surveys conducted by professional archaeologists
- Tribal monitoring costs
- Slow response from agencies on permitting, requiring redeployment of construction crews to other route segments or using boring techniques instead of plowing because the route along a seasonally dry stream bed was flooded
- Additional legal costs associated with permitting
- Assessments for allotments controlled by the Bureau of Indian Affairs even when tribes granted rights of way for no fee

Adoption

Once access to broadband is provided to the tribal population, in order for the project to be successful, broadband service must be adopted.

Concerns during the adoption phase include:

- Availability of reliable electricity
 - From the grid
 - From generator resources, including fuel availability
- “Middle mile” connectivity to internet
 - “Middle mile” means in this context connectivity from the internet “backbone” to the regional hub on tribal lands.
- Siting of larger footprint components, such as communications hut
- Health concerns from local residents

Reliable Electricity

Typically, reliable electricity is a concern for both appropriately provisioning the communications infrastructure as well as for end users, who are dependent on electricity for devices to access the internet, whether computer or phone. Power supplied from aerial distribution may be on poles installed to previous, lower standards that are subject to disruption from wind and wildfire. Generator fuel may be hard to obtain during periods of regional outages with roads suitable for tankers disrupted.

Middle Mile Connectivity

Middle mile connectivity between the internet “backbone,” that is the high speed, highly available core of the Internet connectivity in the region, extending worldwide, to the regional hub on tribal lands may be difficult to install and maintain.

The initial installation may be problematic for a wired route because of the remoteness of the regional hub site. Wireless installations are often used successfully, but typically don’t scale to very high speeds.

Facility Siting

Communications shelters or “huts” that are used for placement of equipment range in size from approximately 6 feet x 6 feet to 12 feet x 20 feet, depending on installed equipment.

If wireless technology is used for either data access to or from the shelter, there may be one or more associated towers. Reliable power is required and often a backup generator. Generally an improved, but not necessarily paved road is need for access.

Health Concerns

Community outreach may be needed to alleviate health concerns about the siting of the communications shelter and associated radio frequency waves. These concerns may be more prevalent where services have a significant wireless equipment component.

Adoption Activities

Adoption activities include:

- Publicize program availability
- Get informed about program availability
- Decide to fund in competition with other priorities
- Train
- Acquire staff
- Develop partners
- Budget
 - Develop
 - Approve
 - Refine
 - Audit
- Develop draft plan
- Consult on draft plan internally and with partners
- Finalize plan for phased implementation
- Implement plan early phase
- Review project progress and issues
- Refine project plan based on experience
- Implement plan follow on phases
- Document project “as built”
- Use project “as built” documentation to inform parallel projects

PUBLICIZING PROGRAM AVAILABILITY

The first part of the adoption process is publicizing availability of funds by those agencies sponsoring adoption.

DISCOVERING PROGRAM AVAILABILITY

A group interested in fostering implementation of tribal broadband may not be aware of agency publicity of programs.

PROGRAM FUNDING DECISIONS

The group providing program funding must decide among requests submitted for program funds.

TRAINING

Appropriate training is key to both initial implementation as well as sustaining the program in the long term. Training includes:

- Administrative
 - Management
 - Accounting
 - Audit
 - Logistics
- Technical
 - Operational staff
 - Training staff

ACQUIRING STAFF

Suitable staff must be acquired, including both administrative and technical.

To acquire staff, the organization must:

- Establish an organization plan
- Develop job descriptions
- Develop recruiting and outreach programs
- Establish a hiring and personnel onboarding process

DEVELOP PARTNERS

Partners may be essential in fostering adoption. Partners may be tribal or non-tribal, formal or informal. Carriers bringing service to the tribal lands edge may be informal partners. Tribal business entities that can provide resources in exchange for benefits gained from broadband implementation may be more formal partners.

BUDGET

Budget activities include:

- Develop
- Approve
- Refine
- Audit

Develop

Budget development uses a time horizon of at least three years to project revenue and expense for capital and operational expenses. Equipment may have an allowable tax depreciation period that doesn't match expectations as equipment is used.

Approve

Budget approval requires consideration of the expected risks to ensure appropriate contingency resources are programmed.

Refine

At the end of each fiscal period the budget requires refinement to include actual costs and revenues, as well as expectations for following periods given the actual and expected business climates.

Audit

The concept of audit of the budget isn't so much a formal review by auditors as it is a sanity check among those knowledgeable about the objectives of the project and the resources available. The budget must be realistic so that the project can succeed without requiring constant requests for more funds because the initial budget was written to be attractive, but had no chance of fulfilling project objectives.

DEVELOP DRAFT PLAN

The draft plan is developed focusing on:

- Project objective
- Partner development
- Implementation design
- Resource estimation
- Estimated budget

COORDINATE DRAFT PLAN

After the draft plan is ready for external coordination, the project proponents coordinate the draft with partners, whether prospective or already committed.

At this stage the project objectives may be modified to reflect better practical considerations. Typically if objectives are modified, budget and implementation design are modified as well.

Coordination of the draft plan may be iterative if significant modifications are proposed and incorporated.

FINALIZE PLAN

After appropriate coordinate the plan is finalized and scheduled for implementation along with appropriate resources.

EARLY IMPLEMENTATION

In a complex plan, early implementation experience may lead to revisions in resource allocation; schedule; or, possibly, project objectives. There may be unanticipated factors such as permitting, seasonal construction issues, or governance changes that affect the plan.

PROJECT REVIEW

During the implementation project review is continuous, though formal review with weekly coordination meetings is standard to track and resolve issues.

PLAN REFINEMENT

Project review as well as field experiences typically lead to plan refinement, including early warning of schedule modifications, and mitigation of problem areas by reallocation of resources.

FOLLOW ON PHASES

Using the experience gained in the early project phases, the follow on phases may have their own schedules changed to reflect practical considerations. In some cases project scope is changed if budgeted resources won't allow completion of the original scope.

“AS BUILT” DOCUMENTATION

Construction plans, budgets, and implementation documents typically undergo changes during the implementation phase. A major implementation task is documenting the “as built” project. This involves documenting:

- Budget revisions for scope changes
- Change orders
- Construction plan changes to meet field conditions

FOLLOW ON PROJECT PLANNING

In addition to documentation developed before implementation, as build drawings and documentation allow follow on projects to plan more effectively and understand better areas where problems may arise.

Sustaining

After installation the challenges to maintaining the service are formidable. Challenges to sustaining operation include:

- Loss or redirection of ongoing funding
- Reduction of funding below a level sufficient to sustain the service
- Inability to retain trained staff
- Inability to upgrade to follow on technology leading to service obsolescence
- Vandalism (mistaking fiber cable for copper cable for wired cable installations)
- Inability to implement adequate service restoration leading to customer dissatisfaction
- Inadequate business continuity plan leading to lengthy service disruptions.

Sustaining Activities

Activities during the sustaining phase include:

- Maintenance
- Restoration
- Technology upgrades
- Training
- Retraining trained staff

A key to our work in Indian Country is to strengthen a local capacity that recognizes formal partnerships, including identification of local tribal representative and contacts who are best positioned to represent these interests.