Yurok Tribe

ARDC Report

ENERTRIBE CASE STUDY (ARDC GRANT)

Non-Profit

AMATEUR RADIO DIGITAL COMMUNICATIONS

About ARDC

Amateur Radio Digital Communications [ARDC] is a non-profit public benefit California corporation formed to further these goals. It does so by managing the allocation of network resources, encouraging research and experimentation with networking protocols and equipment, publishing technical articles, and other activities to promote the public good of Amateur Radio digital communications and related fields. We have recently begun to contribute funding to organizations, groups, individuals, and projects towards these and related goals.

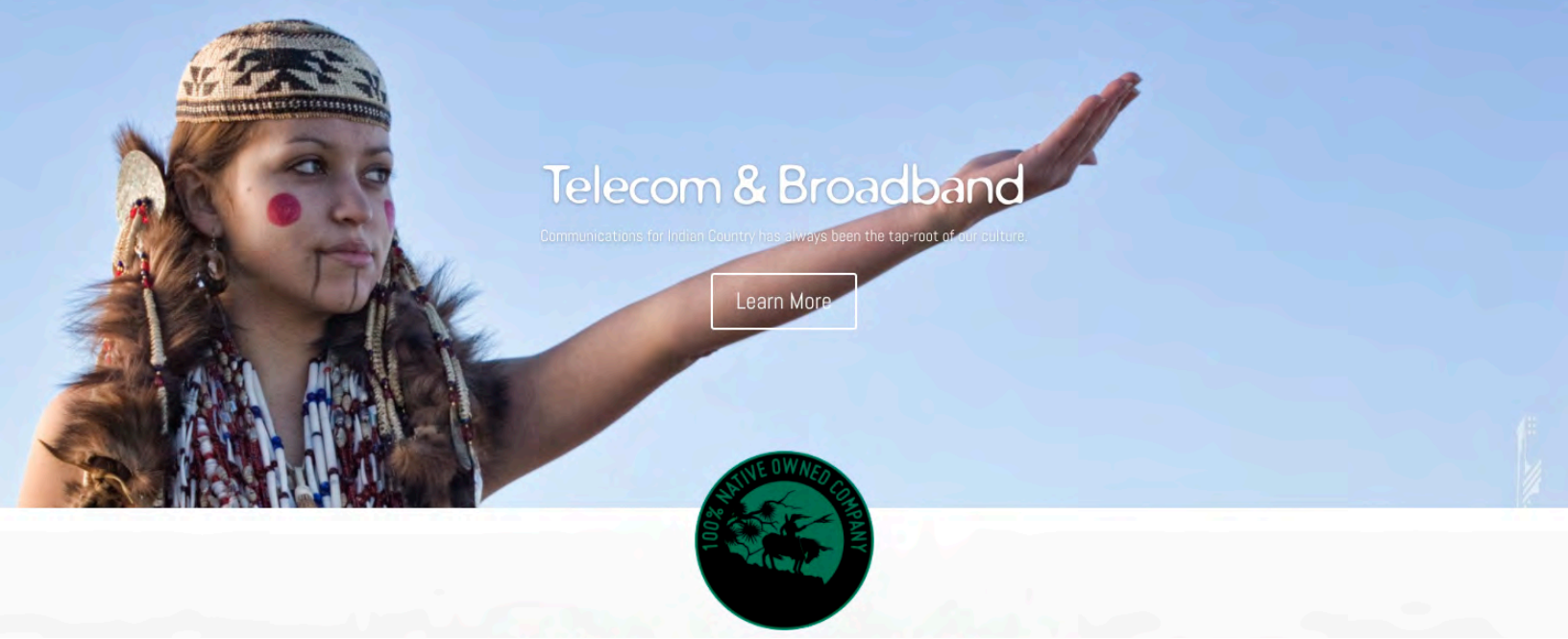
SAmateur Radio is an entirely volunteer activity performed by technically knowledgeable hobbyists who have proven their ability by passing government examinations (e.g., in the USA, exams are set by the Federal Communications Commission). No remuneration is permitted. Ham radio, as it is known, has proven its value in advancements of the state of the communications arts as well as in public service during disasters and times of emergency. (For more about ham radio, see the Wikipedia article, or visit ARRL, RSGB, IARU or any of the many national amateur radio organizations.)

Yurok Tribe

The Yurok Tribe is a federally-recognized sovereign nation with its own constitution and government. The Yurok people, inherent sovereignty, and the Yurok Constitution are the sources of the Tribal government's authority to carry out current governmental functions. The Yurok Constitution expressly delegates authority from the Yurok membership to the Council and authorizes the Council to exercise all legislative powers with "authority to enact legislation, rules and regulations" to further Tribal objectives. Those objectives, enumerated in the Preamble of the Yurok Constitution, include providing for the "health, education, economy, and social wellbeing" of its members and restoring, enhancing, and managing all natural resources. Council also maintains constitutional authority to "administer and regulate affairs, persons and transactions within Tribal Territory" and to manage Tribal lands.

he Yurok Tribe is governed by an elected Tribal Council, with seven Council members representing separate districts (Orick, South, East, Pecwan, Weitchpec, Requa, and North), and the Council Chairperson and Vice-Chairperson representing the Tribe at large. The Tribal Council is responsible for carrying out the mandates of the Yurok Constitution and enacting the regulatory, administrative, and policy structure of tribal programs and services. Not only does the Tribe govern itself, but many Tribal administrative departments oversee the everyday function of the Reservation and provide for Tribal members. The Yurok Tribe also owns and operates a number of tribal enterprises that benefit both the Tribe and the community at large.

The Yurok Tribe's main offices are located in Klamath. The Tribe employs an average of 325 employees (the most recent report from Human Resources lists 303 employees with 250 regular full time, 13 regular part time, 10 seasonal, 11 on-call, and 19 temporary), working across twenty programs and departments (see Organizational Chart). The Yurok Tribe maintains a significant number of departments and agencies within its structure of government, all of which have been established for the enhancement and viability of the Reservation and its Tribal members. With significant focus placed on the growth of the Reservation and (re)acquisition of both ancestral and new lands, the various departments have been established to further that goal, while concurrently improving the Reservation for its members.



About EnerTribe

EnerTribe is a Native American and Woman-owned telecommunications firm that specializes in the planning, engineering, funding, and construction of telecommunications infrastructure. EnerTribe has assisted hundreds of tribes over the past twelve years in the development of critical communications infrastructure within Indigenous communities. In addition to serving tribes, EnerTribe serves as a resource for State and Federal Agencies, and investment firms, seeking project development or stabilization on and around reservation lands. In support of nonprofits, EnerTribe assists with program development and management, as well as training in support of organizations interested in supporting the diverse needs of Indian Country.

Services include:

- Wireless & network engineering, procurement, and installation *(EDX Signal Pro for engineering, licensed microwave, millimeter-wave, WiFi & two-way comms)*
- Tower engineering & construction
- Electrical off-grid systems & communication huts
- Project, grant & program management
- Funding strategy & financial analysis
- Comprehensive economic development strategies
- Carrier outreach (e.g. interconnect, structure access, IRUs etc.)

Run Book

What were the materials and technology used in the deployment?

The project was engineered around the specifications of a “carrier-grade” network by making use of the Cambium line of both point-to-point (P2P) and point-to-multipoint (PMP) equipment. By means of a licensed microwave backhaul into Crescent City, the tribe has deployed a core-network and distribution system capable of providing broadband access to a much larger percentage of the population on the Yurok Reservation. EnerTribe installed a licensed microwave backhaul from Crescent City through to Weitchpec brining the backhaul up roughly 300% of what it was. This backhaul proved to be a critical piece of the ARDC Broadband project for Wautec.

The Wautec tower project made use of the 2+0 wireless backhaul from crescent city to provide broadband into the community of Wautec. In order for the tribe to take advantage of the backhaul, a significant investment was required to install a 150ft Trylon. M-310 SuperTitan in the community to deploy the wireless broadband, but also provide route diversity to future fiber optics. Final specifications can be found in the Yurok CAREs As-builts.

What were the steps taken to install these items?

It is important to understand that, unlike standard deployments, working on an Indian Reservation requires a significant amount of collaboration with the tribe, its departments and the community. EnerTribe is a TERO-certified preferred Native American contractor to the tribe with permits to work on the reservation in partnership with the Yurok Connect for the ARDC funded deployment. Prior to any installations, complete engineered drawings are required as well as ongoing reporting and meetings with the respective boards, departments and tribal councils. EnerTribe makes use of SmartSheets to ensure a project management timeline and schedule are built. By means of a field engineer and wireless engineer, several site surveys were conducted to ensure the proper bill-of-materials would be acquired for a successful deployment. Careful consideration was given to specialized bracketing systems and arrays to mount the radios maximizing the use of tower space and wind loading. Additional considerations were given to the power systems (e.g. generators, solar & battery), grounding, cabinets, and cabling for each site. Significant training was required if the tribe is to manage the newly built network. EnerTribe and Yurok Connect installed the part of the gear over the course of several weeks.

The tower engineering and construction require significant planning and coordination from design, engineering, procurement, transport and installation. Civil fingers had to create detailed site plans, inspect and test the foundation, structural engineers provided designs and tower engineering to ensure proper wind loading, wireless engineers had to confirm the site and height was adequate and frequencies were available.

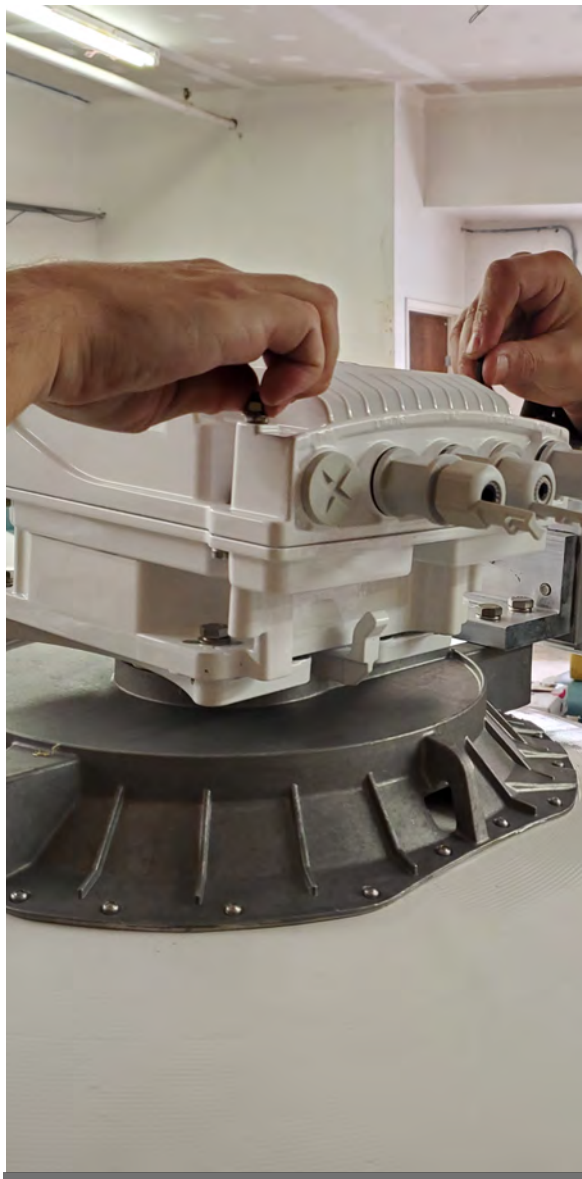
Yurok Connect Technician

How do people in the community use and access this technology?

Similar to water and power, the true value of these resources becomes apparent by means of the “applications" that come to life once the infrastructure is in place. In this case, the applications include, remote medical monitoring and consultation, two-way communications in the mountains, WiFi hotspots in specific areas, students, and Elementary Schools, Headstart, are both eager to make use of the new services. Residents in need of medical consultation are able to minimize risk and maximize social distancing by using video chat, parents who are pursuing continued education are now able to participate in online classes. The Tribal government itself relies heavily on robust communications systems to operate its many departments, programs, and entities. Wireless communications play a critical role in the economic health of indigenous communities and should be woven throughout the tribe’s comprehensive economic development strategy.

How will this system be monitored and maintained?

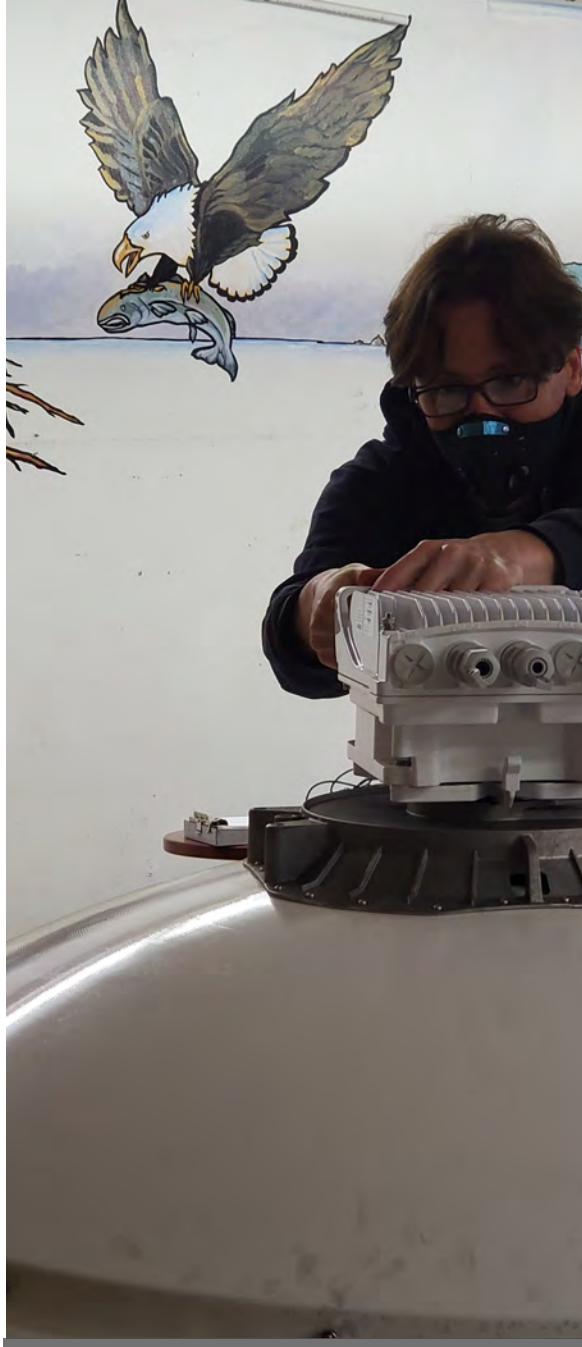
The new wireless infrastructure will be monitored and managed through various applications such as CN Maestro for wireless infrastructure management as well as a more robust system such as PowerCode for one-stop-shop management systems from construction to operations. The network will be maintained by in part by contractors like EnerTribe and the Yurok Connect staff. EnerTribe has spent extensive time and resources training tribal staff on the installation and maintenance of the infrastructure. On-going training and installation will continue as the infrastructure continues to evolve and grow . The goal is to have at least 2 individuals from the tribe get initial BICSI certifications in booth project management and outside-plant allocated from the PTHPO department. In time, the Yurok Connect staff will be more than qualified to operate and maintenance their broadband systems, with the majority of the training being on the power systems.



Training

Yurok Connect

Application Analysis



What was the problem that needed to be solved? What was unique about this situation?

As with many communities, the challenges faced by the local tribe and residents can be seen throughout all aspects of the community. Anchor institutions face growth challenges due to a complete lack of broadband access or communications in any form. The tribe and its departments like the Office of Emergency Services have been stretched incredibly thin trying to work in a safe manner due to the Pandemic. We have seen Tribe working 7-day weeks and long hours at their own costs trying to solve issues that should be simple in nature. For instance, trying to keep the residents up to speed on critical challenges in the valley required less than safe community outreach, physical signs being placed once or twice a week to keep the residents up to speed about the pandemic as opposed to providing emails. Notifying students of changes in school or homework has to be provided with paper in person instead of simply being able to email. We have personally seen many students gathered around a single computer on dialup unable to watch the simplest of animations 60 miles from their school to get to the closest internet feed.

Application Analysis

What was the problem that needed to be solved? What was unique about this situation? (Continued)

The unique aspect of indigenous communities when it comes to any form of communication is the real and direct impact little to no reliable communications has on the individual citizens. Tribal councils spend their days as one thing in some cases and their evenings as Tribal Council trying to keep their citizens fed, warm and healthy. Without communications, we have seen people die, unable to call 911 or radio for help after being in a tragic car accident, and unable to ask for help for days. To indigenous communities, communications serve a similar purpose as water and power.

Additional issue came from a lack of experience in working with a more robust system, this project solved not only a communications issues but gave the tribe an opportunity to operate a much more reliable network.

What solutions were considered? Which ones were chosen and why?

For tribes, there is no “silver bullet” when it comes to communications. The tribe makes use of two-way radio systems for the Office Of Emergency Services which operates on an off-grid system. Satellite communications have proven inadequate and expensive for a community with a significant percentage of residents below the poverty line. The tribe has had to rely on physical contact during the pandemic to ensure students were not lost in the mix, school work was dropped offend picked up regularly with parents. Tribal citizens have been all but unable to receive any form of medical consultation especially the ones in the “at-risk” category as opposed to remote medical consultation. The in-person approach is not sustainable at this time so the broadband and two-way comms systems were chosen to enable citizens in a safe and effective manner. A licensed microwave backhaul was installed as the life-line to the nearest interconnection. Cambium wireless systems were chosen for the core network and broadband access points to avoid having a complete “rip-and-replace” in a few short years. Tribes are so used to having little to no funds they typically buy the cheapest gear on the market and end up spending more money than had they simply purchased more carrier-grade produce. EnerTribe has often encountered tribes who spend roughly 40% of their time putting out “fires” due to poor equipment quality, a nicer produce would in effect decrease the loss of duns and resources internally.

How well does this application solve the problem?

Two-way communications and a carrier-grade wireless system typically address a significant amount of the issues faced by tribal communities by essentially “flattening” the geographic area, unifying the community during the pandemic, and provide a means by which the tribal leadership can keep the community up-to-speed. Oftentimes, however, the solution to the many challenges we face as indigenous communities is not solved by a single approach and requires a multifaceted solution from many different perspectives.

What issues came up? What might we do differently next time?

This project required replacing an already constructed wireless backhaul while in use. All while solving the major broadband limitations the tribe had to juggle multiple systems, some of which that were on antiquated power systems and not suitable for day-to-day operations of a broadband network, in some cases running hours into the mountain every other day to simply fill a generator with gas.

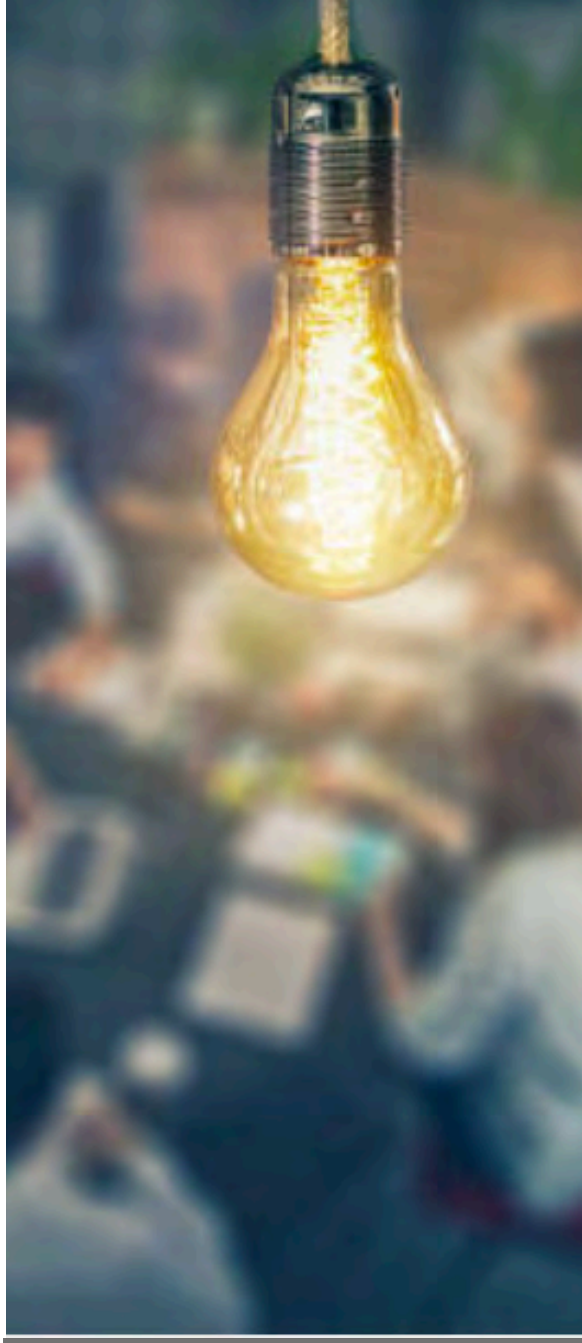
What skills were needed for deployment?

- Wireless engineering
- Network engineering
- Field engineering
- Tribal government & processes
- Permitting & environmental support
- Proper safety

The tribal technicians successfully obtained their tower climbing and fall protection safety certifications in early 2021.

Political & Financial Considerations

Careful consideration is required before engaging with a sovereign government. Many contractors do not adequately plan for the intricacies that come with work with tribes. Initial working sessions with the Tribal Council, boards of directors, departments, and even tribal citizens are required for a successful project. EnerTribe was the primary planning, funding, and consulting firm tasked with giving the tribal council and their departments the guidance needed to make good decisions. The decision-making process was a combination of EnerTribe leadership and Tribal leadership working closely with the team of contractors and staff to ensure the “bigger picture” was kept in mind and the needs of the people were met. The public was involved in regular tribal council meetings updates designed to better understand the personal needs of the community. Citizens express in writing or in person the problems they need support in solving. From an internal process for the tribe, however, careful consideration had to be given to the cultural aspects and long-term considerations of the project. EnerTribe serves as a resource between tribes and agencies, telephone companies, and organizations to ensure proper tribal protocol is clearly understood and followed. As such, working with the Tribal Historic Preservation Office, tribal elders, the planning department, realty, Office Of Emergency Services, and many other departments is required. Careful planning and execution was required on the tribe’s side to ensure a successful implementation.



How was the community able to source funding? What advice would you give to future communities seeking such funding?

As with many tribal communities, funding can be difficult to come by, let alone administer throughout a project. The Yurok Tribal council prioritized broadband and as such were able to apply for and win several grant awards. EnerTribe has helped garner over $250,000,000 in funding to for infrastructure over the past 12 years. The Yurok Tribe partnered with EnerTribe to assist in securing funding for the longer-term goals of the tribe by means of the Economic Development Agency, Bureau of Indian Affairs, ARDC, CPUC and others. The pandemic created a dire amount of pressure on EnerTribe to help the tribe and dozens of others in their efforts to plan, engineer, and build infrastructure.

To other tribes and contractors, it is critical to understand there is no “One-size-fits-all” when it comes to funding and grants are NOT “free” money. They often come with compliance requirements that take time and resources to manage. Most of the grants used for Broadband are partially or fully donated by contractors so understanding that you may need to take some risk. For tribes, ensuring there is adequate support to operate, procure and deploy a grant funded project is critical. EnerTribe witnessed first-hand many of the Yurok staff wearing several other hats juggling significant workloads, in some cases this affected customers poorly and left the staff burnt out.

Lastly, there is a critical need for a detailed scope of work to ensure the tribe’s needs are met, in this case, the funding agency gave little to no time to properly contract the work leaving major issues until the end of the project where both contractor and tribe had already made significant sacrifices.

What advice would you give to future communities seeking such funding?

If you are a community trying to identify funding looking for funding, it is important to understand basic principles. If you are looking for grant funding, it is critical you have a plan in place that outlines the project narrative, budget, and initial engineering. Grant funds are not “free” and in fact, can potentially prolong the execution of a project due to reporting and compliance requirements. Grant programs are funded based on the successful implementation of projects so the more planning you put into it, the better the project and the program will do. Projects are either funded by means of private investment, loans, or grant programs with agencies and nonprofits. We see instances where these three overlaps to pursue a complete solution using different funds for different phases. It is essential to identify a solid public/private partnership to ensure the community has the resources to complete and sustain the successful completion of a project. These partnerships may also help identify funding sources for one or more phases of a project. Bottom line, there is no “silver bullet” and ensuring you break your projects into phases will allow for a progressive approach. Here is a basic breakdown of the steps we typically include to ensure we not only fund but also complete a project.