



MICROGRIDS FOR BROADBAND INFRASTRUCTURE

OFFICE OF INDIAN ENERGY AND ECONOMIC DEVELOPMENT

DIVISION OF ENERGY AND MINERAL DEVELOPMENT

PROGRAMS AND SERVICES

- **Technical Assistance**

- Liaison between Tribes and Industry
- Consultation on developing business models on reservations
- Assist Tribes with negotiation of resource development agreements
- Strategic and economic planning

- **Grant Programs**

- Energy and Mineral Development Program
- Tribal Energy Development Capacity Program

- **National Indian Oil and Gas, Energy and Mineral System (NIOGEMS)**

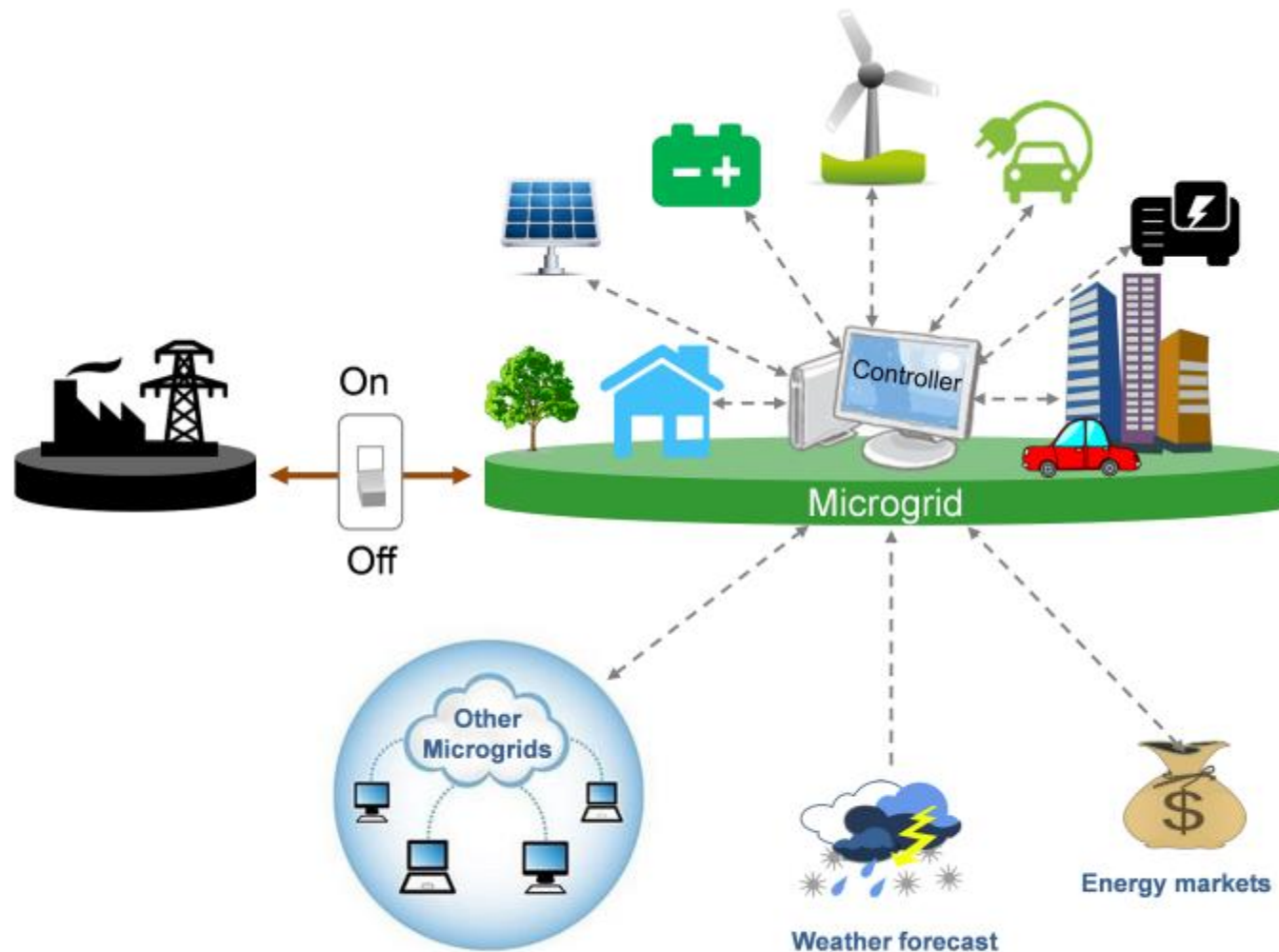
- NIOGEMS is a map-oriented computer application for managing reservation oil and gas lease, well, production, and other energy/mineral resource data.



AGENDA

- **Microgrids 101**
- **Tribal Project Examples**
 - Blue Lake Rancheria
 - Standing Rock Telecom
- **Tribal Utility Authorities 101**
- **Funding Resources**
- **Steps for Developing Energy Projects**

WHAT IS A MICROGRID?



MICROGRIDS COME IN MANY FORMS

Islands and
Remote
Communities

Community
Microgrid

Facility
Microgrid

District
Heating

Campus
Microgrids

The best solution will depend on local energy issues and goals.

- Emergency Preparedness
- Cost savings
- Electrification in remote locations
- Energy Independence
- Promotion of cleaner energy sources
- Power quality

TRIBAL MICROGRID EXAMPLE: BLUE LAKE RANCHERIA, CALIFORNIA

Goals

- Maximize use of clean energy
- Increase community resilience and disaster preparedness
- Reduce/stabilized energy costs



Source: Blue Lake Rancheria

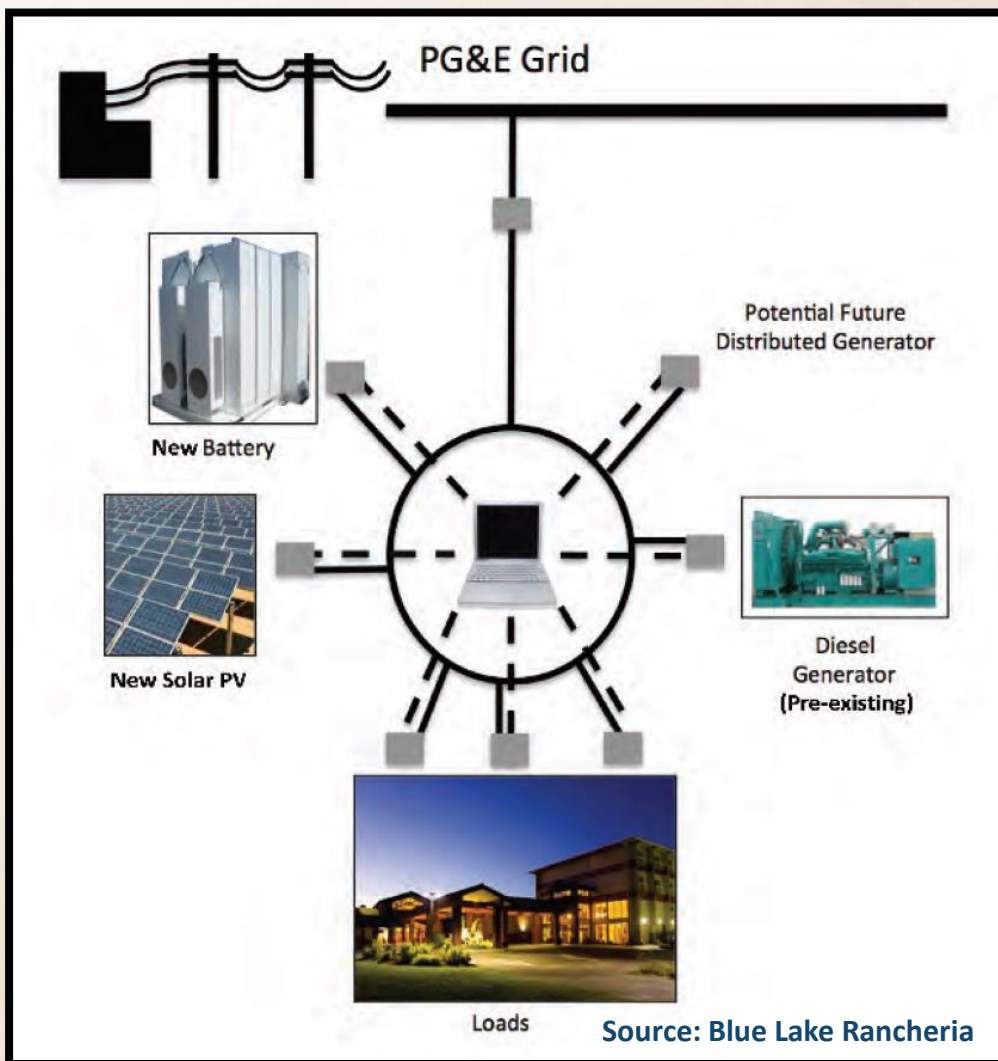
TRIBAL MICROGRID EXAMPLE: BLUE LAKE RANCHERIA, CALIFORNIA

Distributed Energy Resources

- 500 kW PV solar array
 - Planning to add 2 MW
- 1 MWh battery storage
- Existing diesel generators

Microgrid Control Systems

- Siemens advanced microgrid controller
- Ability to seamlessly disconnect with PG&E
- Load shedding of non-critical facilities during outages



TRIBAL MICROGRID EXAMPLE: BLUE LAKE RANCHERIA, CALIFORNIA

MICROGRID PROJECT PARTNERS

Building this microgrid was only possible due to strong public/private partnerships. We are grateful to these organizations for their investment, expertise, and climate action:

- Humboldt State University
- Schatz Energy Research Center
- California Energy Commission
- Idaho National Laboratory
- Pacific Gas and Electric Co.
- Siemens
- Tesla
- REC Solar
- Colburn Electric
- Kern Construction
- U.S. Department of Energy (DOE)
- DOE Office of Indian Energy
- National Renewable Energy Laboratory
- U.S. Department of Interior (DOI)
- DOI Bureau of Indian Affairs



Source: Blue Lake Rancheria

MICROGRIDS FOR TELECOM TOWERS

STANDING ROCK TELECOM

Issues

- Rural, geographically expansive communities
- Power interruptions
- High energy costs

Goals

- Energy reliability
- More economical and reliable telecom business

Distributed Energy Feasibility Study (completed 2017)

- Assessed multiple cell sites across reservation
- Reviewed condition of existing power components
- Reviewed energy bills
 - Average energy costs
 - Power interruptions
- Evaluation of technology vendors
- Economic analysis

MICROGRIDS FOR TELECOM TOWERS

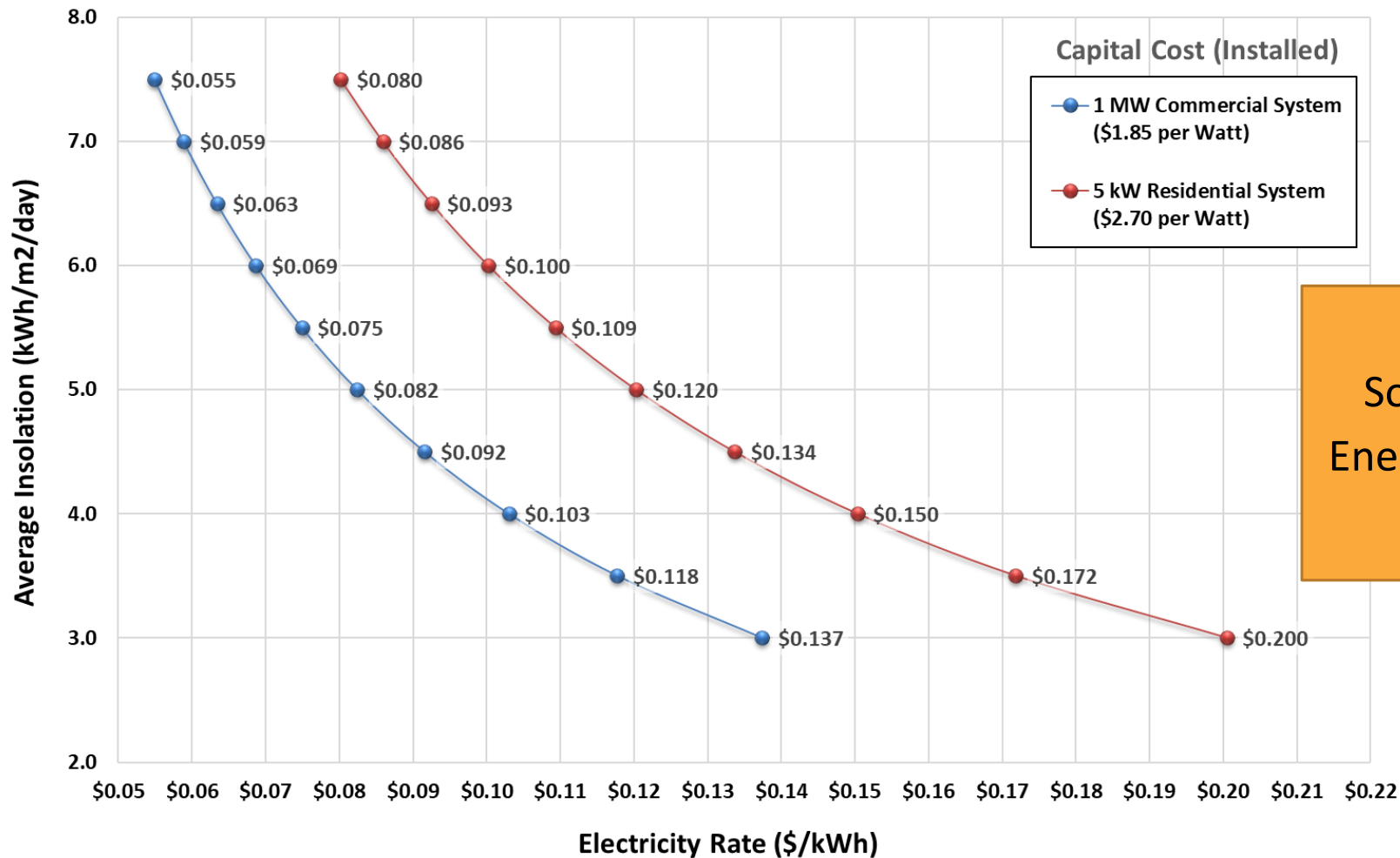
STANDING ROCK TELECOM

Key Findings:

- Energy reliability is TOP PRIORITY
- Power disruptions:
 - Due to limited availability of monitoring systems
 - Between 8 and 30 total outages/yr, ranging from a few seconds up to a few hours, averaging 15 minutes to 1 hour.
- Microgrid solutions
 - Solar – 18+ year payback
 - Wind – no payback
 - Existing battery and/or propane back-up worked, for the most part

SOLAR PV ECONOMICS

1 MW Community Scale vs 5 kW Residential Scale



Standing Rock

Solar Resource 4.5 kWh/m²/day
Energy Rates \$0.13-\$0.15 kWh/day
Telecom Need: 4-19 kW

WHEN MIGHT MICROGRIDS WORK FOR BROADBAND?

- **Industry is already using microgrids, in a sense**
 - FCC Mandate 07-107, § 12.2 Back-up Power
- **Better opportunity for *renewable* microgrids with more centralized broadband infrastructure**
 - Economies of scale!
- **New construction vs. retrofitting existing systems**
- **Other considerations:**
 - Decreasing costs for solar and energy storage
 - Funding assistance programs?

TRIBAL UTILITY AUTHORITIES

□ Analyze Energy Infrastructure

Existing Infrastructure



There is local gas and electric infrastructure that could provide ready access to wholesale markets

Current Consumption Electric



Estimated total electrical load: ~2,234 MWh/year

Cost-of-service



The "rate to beat" is \$0.132/kWh. Annually, the tribe pays \$331,000 of which \$132k is for "non-energy"

□ Review Legal & Regulatory Issues

Right-of-ways



Zia has significant leverage over JMEC as a consequence of the expired ROWs

State and Tribal Laws



Baker Tilly has not identified any legal/regulatory "fatal flaws", but legal counsel is needed

□ Asses Business Entity Options

Organizational options



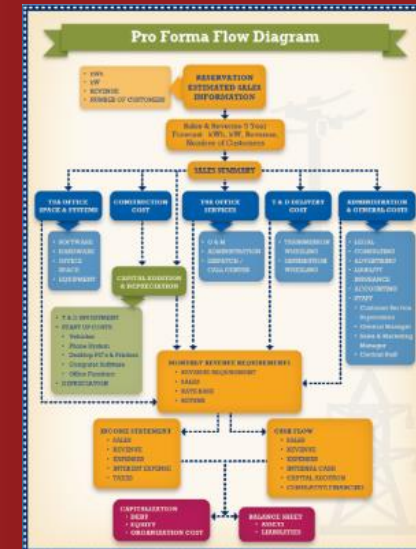
Org. Chart

- Key position: GM!
- The same positions exist in water, waste water, and electric utilities
- Big opportunities for efficiency!



Many positions exist today, or can be filled by contract. Exceptions: GM and Meter Reader

□ Financial Analysis

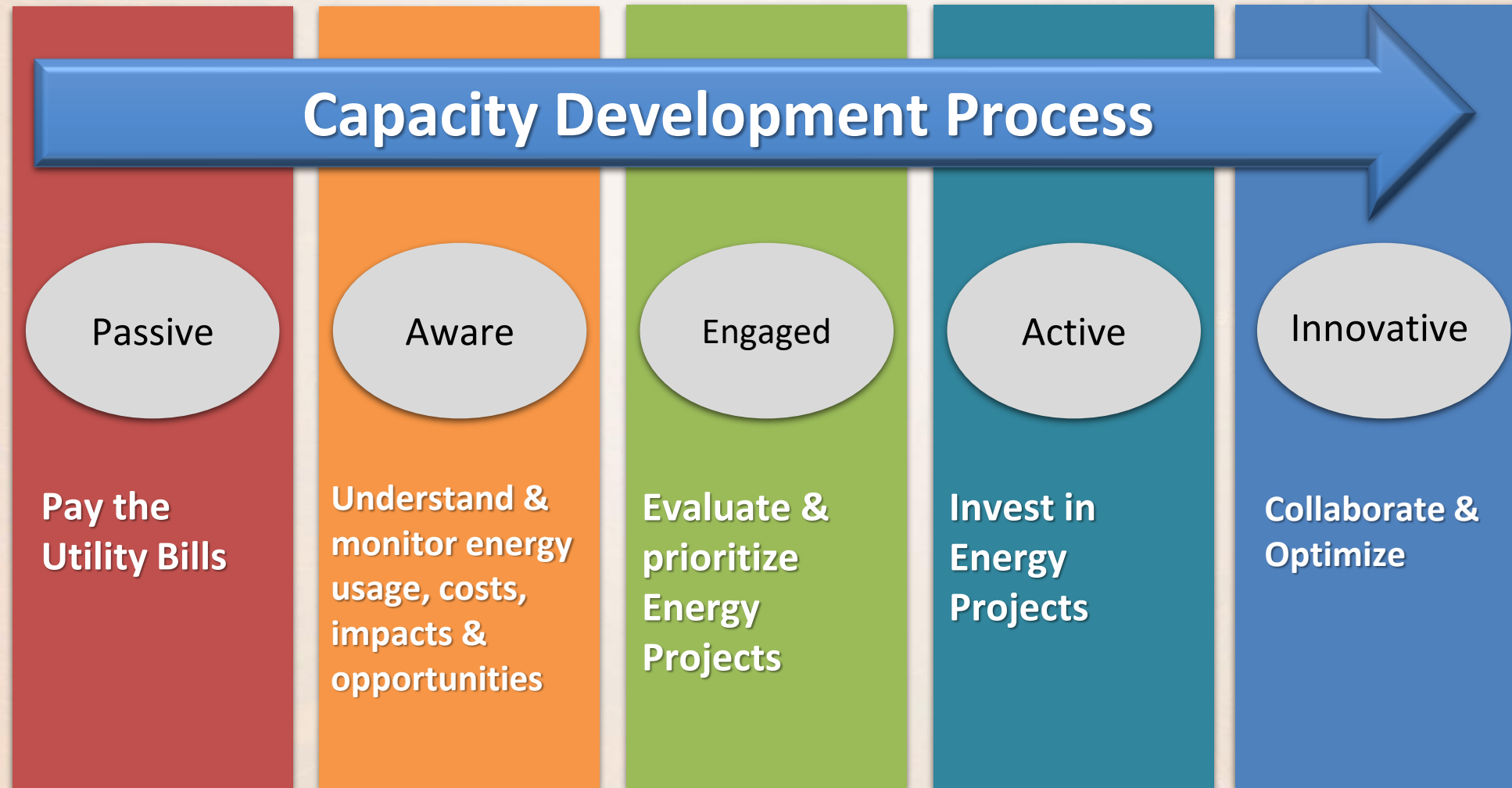


The Tribal Energy Development Capacity (TEDC) Grant Program has funded nearly 30 TUA projects from FY 2015 to FY 2018. The above information is a case study from a FY 2015 TEDC Project.

LESSONS FROM TUA WORK FOR BROADBAND

- **Almost everything directly translates to other tribal utility assets**
 - Water and Wastewater
 - Broadband/Communications
- **Sometimes taking over utility assets looks great...some times it doesn't**
- **The detailed TUA evaluation is ALWAYS valuable, and essential when planning for the future.**

ENERGY DEVELOPMENT CAPACITY



Source: Midwest Tribal Energy Resources Association (MTERA)

STEPS FOR GENERATING EFFECTIVE DEVELOPMENT STRATEGIES

1. Baseline assessments

- Identify critical issues

3. Identify available resources

- Conventional and renewable

2. Define short and long term goals

4. Evaluate options

- Iterative process of feasibility studies



HELPFUL RESOURCES

(FUNDING TO HELP WITH BROADBAND INFRASTRUCTURE)

- **DEMD Grant Programs**
 - Energy and Mineral Development Program
 - Tribal Energy Development Capacity Program
- **Other IEED Programs**
 - Native American Business Development Institute
 - Loan Guarantee Program
- **Department of Energy**
 - Energy Infrastructure Deployment on Tribal Lands
- **Local Public/Private Partnerships**

THANK YOU!

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ENERGY & MINERAL DEVELOPMENT PROGRAM (EMDP)

+ Grant program to assess, evaluate and promote development of tribal energy and mineral resources

- Resource Assessment and Exploration Studies
- Feasibility Studies
- Engineering Design
- Pre-construction Development

+ Resources Eligible for Funding

- Renewable Energy
- Conventional Energy
- Solid & Fluid Minerals

Proposed energy conversion technology must be proven, commercially available

TEDC GRANT PROGRAM

- + Grant program to develop tribal managerial, organizational and technical capacity to maximize the economic impact of energy resource development on Indian land**
 - Establish business entity structures and/or organizational structures related to energy resource development Business development capacity
 - Develop or enhance key regulatory activities
- + FY 2015 over \$1.5 Million awarded**
 - 10 Total Project Awards
- + FY 2016 over \$1.4 Million awarded**
 - 16 Total Project Awards

bit.ly/tedcgrant

BUSINESS ENTITY FORMATION ACTIVITIES (TEDC)

Examples:

- + Developing legal infrastructure for business formation
- + Establishing tribally chartered corporations under tribal corporation codes
- + Establishing tribal business charters under federal law (IRA Section 17 corporation)
- + Establish Tribal Utility Authority

REGULATORY ACTIVITIES (TEDC)

Examples:

+ Developing or enhancing tribal policies, codes, regulations, or ordinances related to regulating and developing energy resource(s)

- Land lease regulations for energy development purposes
- Helping Expedite and Advance Responsible Tribal Homeownership (HEARTH) Act

<http://www.bia.gov/WhoWeAre/BIA/OTS/HEARTH/index.htm>

+ Adopting secured transaction codes and subsequent joint power agreement with the tribe's respective state.

INELIGIBLE ACTIVITIES (TEDC)

- + Salaries or fringe benefits for tribal employees;
- + Establishing or operating a tribal office/ and/or purchase of office equipment;
- + Purchasing or leasing equipment or hardware such as drilling equipment, computers and
- + vehicles;
- + Paying legal fees;
- + Paying application fees associated with permitting;
- + Academic research projects;
- + Training;
- + Conducting studies related to meeting NEPA requirements for project development;
- + Attending conventions or travel to foreign countries.

NIOGEMS

NATIONAL INDIAN OIL & GAS, ENERGY AND MINERAL SYSTEM

Problem: The need for timely processing of Energy and Mineral permits

- Users had to access multiple databases to obtain all relevant information.
- There was a lack of geospatial tools and data management tools.
- Data quality was poor.

NIOGEMS

NATIONAL INDIAN OIL & GAS, ENERGY AND MINERAL SYSTEM

Solution: NIOGEMS provides efficient access to permit related information and other data

- NIOGEMS pulls from TAAMS, BLM, Commercial (IHS), ONRR, State, USGS, Census, USDA, Tribal, and others – so that NIOGEMS users can access data from just one source.
- Provides Tribal and Federal users with data management and map-based tools.
- NIOGEMS staff regularly updates data and conducts data scrubbing & quality control.

Other IEED Programs

- **Native American Business Development Institute (NABDI) Grant**

The objective of the NABDI economic development feasibility study programs is to conduct a feasibility study on the viability of an economic development project, opportunity, enterprise, business or technology.

All economic development projects and businesses pose some element of risk. Economic development feasibility studies weigh these risks to determine whether a project is worth pursuing. They empower tribes to make informed decisions regarding their economic futures by distinguishing viable economic opportunities from investments and enterprises that have a high likelihood of failure.

- **Indian Loan Guaranty, Insurance, and Interest Subsidy Program**

The Division of Capital Investment manages the Indian Loan Guaranty, Insurance, and Interest Subsidy Program which breaks through the conventional barriers to financing for tribes and individual Indians. The loan program helps facilitate loan financing for borrowers that would not be able to do so otherwise. The Division helps secure reasonable interest rates and reduces risks for all parties involved.