Sustainable Engineering Infrastructures and Solutions for Tribal Nation's Energy Sovereignty (TES)

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University of North Dakota
Energy Sovereignty Workshop
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Project Team

NDSU NORTH DAKOTA STATE UNIVERSITY

TURTLE MOUNTAIN COMMUNITY COLLEGE

Tribal Nations TNRG Research Group

HIDATSA NUETA SAHNISH COLLEGE Established 1973 New Town, North Dakota

UND UNIVERSITY OF NORTH DAKOTA

Haskell Indian Nations University

KANSAS STATE UNIVERSITY

Introduction to TES

- Research driven by Tribal Nations and Communities in North Dakota and Kansas
- Technologies and Solutions to assist Indigenous peoples in having more control over their energy generation and distribution
  - Increased resiliency to global climate change
  - Energy resources that are consistent with local Indigenous values

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Introduction to TES

- Adaptive Research Agenda based off feedback from Tribal Government Leaders and community members
- Support for training more Native/Indigenous Engineers and Scientists
  - Professional Development for K-12 Teachers
  - INgineering Program

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Research Elements of TES

1. Advanced photovoltaic thermal energy production,
2. Integration of direct heat pump energy generation with small scale renewable energy technologies
3. Development and analysis of renewable energy technologies using identified resources by stakeholders for transportation and heat fuel needs.
4. Development of microgrid systems that can connect to larger, non-Tribal Nations' load networks to increase power system resiliency
5. Creation and support of a more diverse workforce via an INgineering program developed and supported by the tribal college partners along with tribal nation input and acceptance.
6. Professional development conducted for tribal high school teachers to engage student interest and persistence in STEM, using culturally responsive project-based learning.

Indigenous Driven Research Design

- Led by Tribal Nations Research Group – Anita Fredricks
- Social Surveys to see what barriers community members see to switching to renewable energies
- Conversations with Tribal Government Leaders
- Work with TCUs
  - adapting research projects to fit student interests
  - projects fitting within TCU faculty time constraints and available resources
- Bringing best practices of educating Native students in STEM to the research institutions

Adapting Research Agenda

- Currently working on preliminary research/base level projects
- Waiting to adapt and further define research until survey results are in
- Biggest limitation is time
  - IRB takes time, working with Tribal Nations requires time
  - Government funding operates on different timelines
- TCUs have been fantastic resource for helping adapt current baseline projects to fit student interests
- Listening and creativity will be key factors to moving this project forward

Expected Deliverables

- Social survey data disseminated within the Tribal Communities and with Tribal Government Leaders
- Research Roadmap Reports with engineering designs, resource availability, current energy profiles, identified energy solutions
  - Basis for future implementation grants and work with non-profits, NGOs, and other funding sources
- Successful INgineering program at all three research universities
  - Collaboration between TCUs and Research Universities
  - Connection with AISES
  - Strong cohort of Native STEM students rooted in their culture to be the next generation of engineers and scientists

NSF Tribal Nations TNRG Research Group
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Turtle Mountain Community College
Haskell Indian Nations University
Nueta Hidatsa Sahnish College
NDSU North Dakota State University
UND University of North Dakota

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