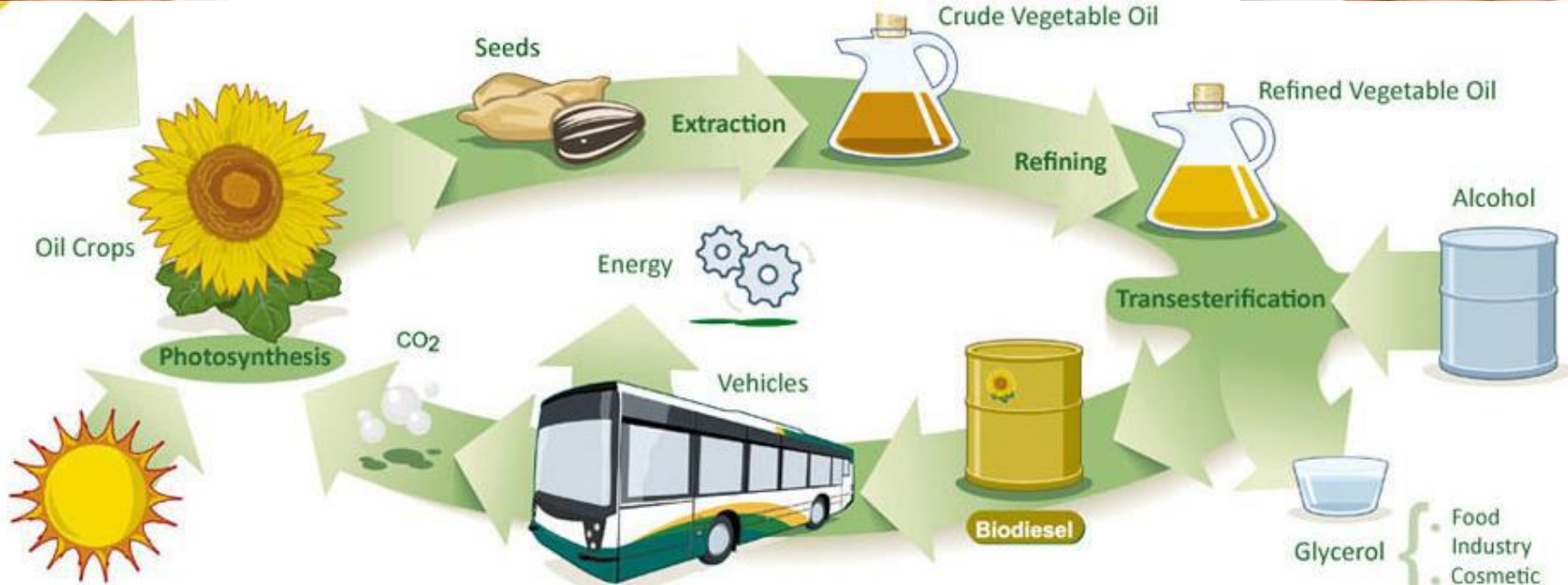


Social and Economic aspects of Renewable Energy Sources

A.M. KANNAN, Professor
ARIZONA STATE UNIVERSITY
OCTOBER 14, 2015



RTU
VASSI



Baltic-American Freedom Foundation



Ira A. Fulton
Schools of Engineering

ARIZONA STATE UNIVERSITY



ASU's *Polytechnic*
campus

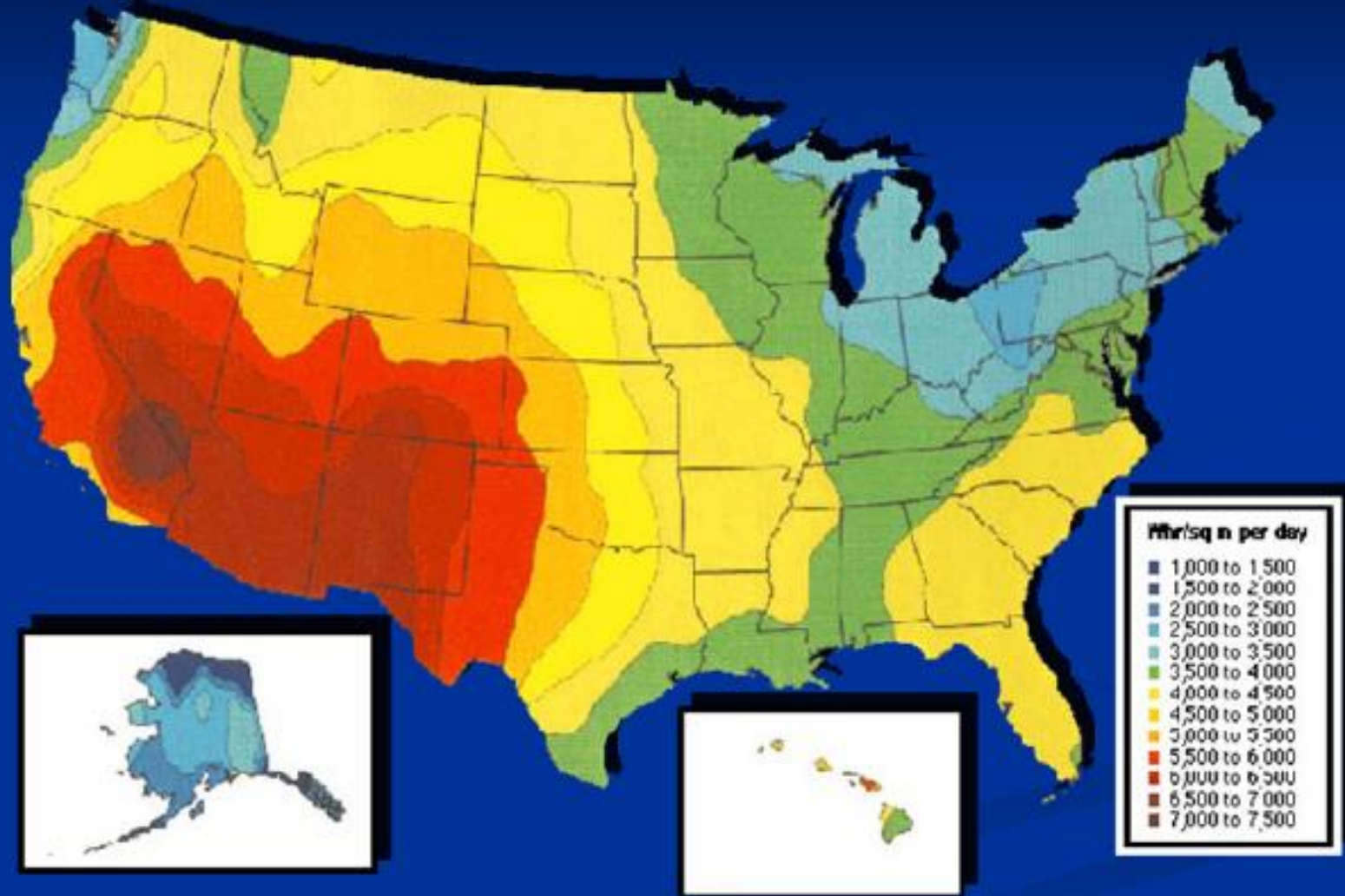
A.M. Kannan
amk@asu.edu





Solar Resource

Arizona Leads the Nation

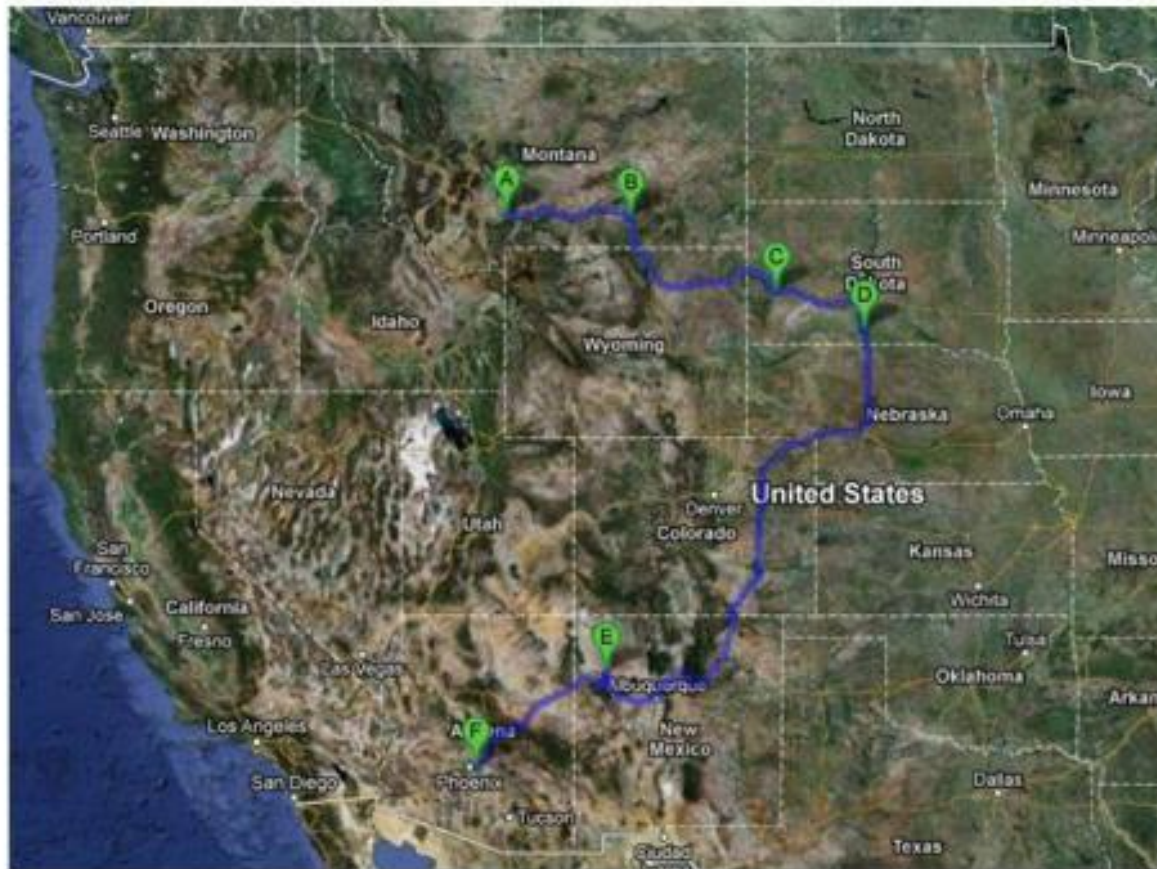


Socio-economic Advancements to Tribal Communities and Peoples and Through STEM Technical Transfer Projects

American Indian Research and Education Initiative (AIREI)



AIREI



- A. Montana State, Bozeman, MT
- B. Little Big Horn College, Crow Agency, MT
- C. SD School of Mines & Technology, Rapid City, SD
- D. Sinte Gleska University, Mission, SD
- E. Navajo Tech. College, Crownpoint, NM
- F. Arizona State University, Tempe, AZ

<http://energy.gov/diversity/american-indian-research-and-education-initiative-airei>

Navajo Nation Energy Issues





“Taken For Granted”







DESOLATE







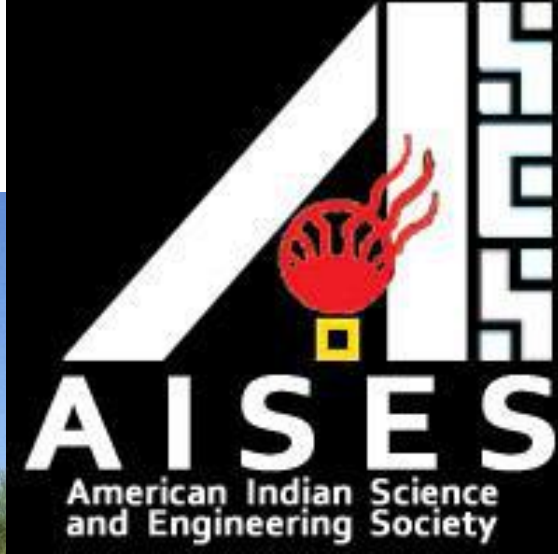






U.S. DEPARTMENT OF ENERGY

NREL NATIONAL RENEWABLE ENERGY LABORATORY



AIREI

How ASU supported







How ASU supported



How ASU supported























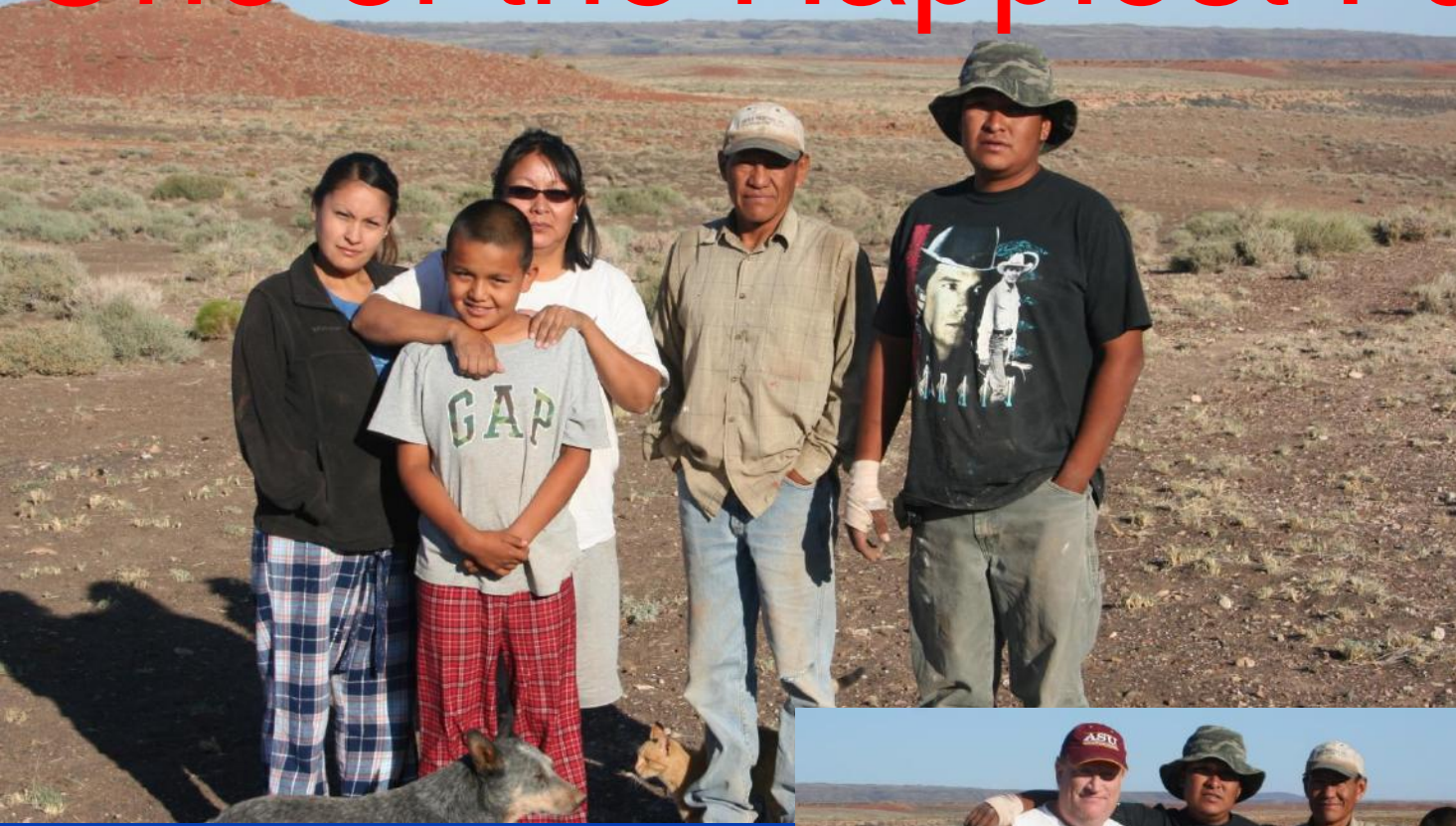








One of the Happiest Families







An Elder







One of the Happiest Families



Recent Trip Up to Leupp



- **Michael Funk and Martin Manuel went up to Leupp to update the MidNite Solar controller's firmware and collect data from 5 sampling sites.**

Trip Up to Leupp (01-06-13)



- **Martin Manuel went up to Leupp to collect data from 5 sampling sites and search for potential location of second anemometer recently purchased.**

5 Sampling Sites Chosen

5 Sampling Sites Chosen

- **Site 1: George & Nona Schuler**
- **Site 2: Gene Smith**
- **Site 3: Johnnie David**
- **Site 4: Henry & Mary Cody**
- **Site 5: Billy Tso**

***WeatherLink Station
installed**

Data Recorded in MidNite Solar

MidNite Solar controllers record a daily average for these variables:

- kWh
- Float Time (h:m)
- High Power (kW)
- High Temperature (C)
- Input Voltage (V)
- High Battery Voltage(V)

George & Nona Schuler (#1)



- WeatherLink Station installed here
- GPS Coordinates: N35°22'18.4" W111°13'08.4"
- Elevation: 4985'

PV Modules:

Location	Manufacturer	Model	S/N
1	Solar Power Industries	SPI-M230-60US	A1102000106
2	Solar Power Industries	SPI-M230-60US	A1102000105
3	Solar Power Industries	SPI-M230-60US	A1102000107
4	Solar Power Industries	SPI-M230-60US	A1102000110
5	Solar Power Industries	SPI-M230-60US	A1102000109

*Martin will draw 2 high level views of electrical diagram of the PV system

Gene Smith (#2)



- **GPS Coordinates: N35°22'35.6"
W111°12'12.7"**
- **Elevation: 4878'**

PV Modules:

Location	Manufacturer	Model	S/N
1	Solar Power Industries	SPI-M230-60US	A1102000113
2	Solar Power Industries	SPI-M230-60US	A1102000111
3	Solar Power Industries	SPI-M220-60US	A1101000001
4	Solar Power Industries	SPI-M230-60US	A1102000104
5	Solar Power Industries	SPI-M230-60US	A1102000102

Johnnie Smith (#3)



- **GPS Coordinates: N35°22'09.4"
W111°13'16.2"**
- **Elevation: 5041'**

PV Modules:

Location	Manufacturer	Model	S/N
1	GESOLAR	GES-P230	911042209012460008
2	GESOLAR	GES-P230	911042209012460003
3	GESOLAR	GES-P230	911042209012460004
4	GESOLAR	GES-P230	911042209012460005
5	GESOLAR	GES-P230	911042209012460006

Henry & Mary Cody (#4)



- **GPS Coordinates:**
N35°25'09.6" W111°13'17.7"
- **Elevation: 4760'**

PV Modules:

Location	Manufacturer	Model	S/N
1	Solar Power Industries	SPI-M230-60US	A1102000103
2	Solar Power Industries	SPI-M230-60US	A1102000105
3	Solar Power Industries	SPI-M230-60US	A1101000114
4	Solar Power Industries	SPI-M230-60US	A1102000112
5	Solar Power Industries	SPI-M230-60US	A1102000108

Billy Tso (#5)



- **GPS Coordinates: N35°26'27.0" W111°12'56.7"**
- **Elevation: 4634'**

PV Modules:

Location	Manufacturer	Model	S/N
1	Day 4 Energy	Day 4 60MC-1	111003372
2	Day 4 Energy	Day 4 60MC-1	111003343
3	Day 4 Energy	Day 4 60MC-1	111003351
4	Day 4 Energy	Day 4 60MC-1	111003364
5	Day 4 Energy	Day 4 60MC-1	111003356