NAU Renewable Energy Capstone '08

Requirements and Specifications

1. Mechanical

   Different wind technologies will be compared. Things that will be looked at are blades, size, shape and output. Different solar technologies will be studied as well. The things that will be looked at are different types of plants, size, and efficiency of cells.

2. Economic
   I. New property taxes
   II. New revenues to private and public landowners, plus multiplier benefits
   III. New jobs will be created for the Coconino County
   IV. Economic Development – attraction factor for new manufacturing and service jobs
   V. Multiplier effect of ratepayer dollars staying in-state vs. sending our utility fees to other states when we import energy
   VI. Stable priced energy (wind, solar), not subject to fuel price volatility and increases

3. Environmental
   I. Zero (wind, solar) emissions from the plant
   II. Improved air quality in the Coconino County compared to fossils
   III. Zero or minimal water consumption for energy generation compared to thermal generation
   IV. Watershed preservation
   V. Prevent habitat fragmentation (alternative to subdividing large ranches)
   VI. Needs to be able to operate in cold weather

4. Social
   I. Public health benefits (no toxic air emissions contributing to asthma and other public health issues)
   II. Economic diversification for land owners
      a. Provide alternative to subdividing

b. Provide new revenues to augment traditional agricultural economics (ranching, farming)
c. Help preserve rural way of life and ranching/farming viability

III. Compatible land use
a. Renewable energy generation is compatible with ranching, farming, and public land uses

IV. Domestic energy source
a. Reduce dependence on foreign energy sources

5. Documentation
I. Our documentation must consist of all research, tables and models used in determining the best renewable energy source.
a. We must disclose all sources of information for this project.
b. We must include all parameters we used in a software model.
c. We must disclose which software models we used.

6. Testing
I. The only testing we will need to do is with software models of the specific renewable energy sources. We must exhaustively simulate multiple implementations of biomass, solar and wind energy.
II. The final results will also include the cost per kWh that the customer will be paying, and it should be competitive to the other existing resources.

7. General
I. Our client would prefer to build one large plant of a single type of renewable energy. The end cost to the user must not be significantly higher than existing fossil sources
a. The cost to the end user will be higher initially, but must not be so high as to double or triple a user's utility bills.

End users must understand that renewable energy will become cheaper in the long term, when costs of fossil fuels escalate in the next 10 – 20 years.