2007 DOE Tribal Energy Program Review

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Manger
State, Local & Tribal
Integrated Application Group

National Renewable Energy Laboratory

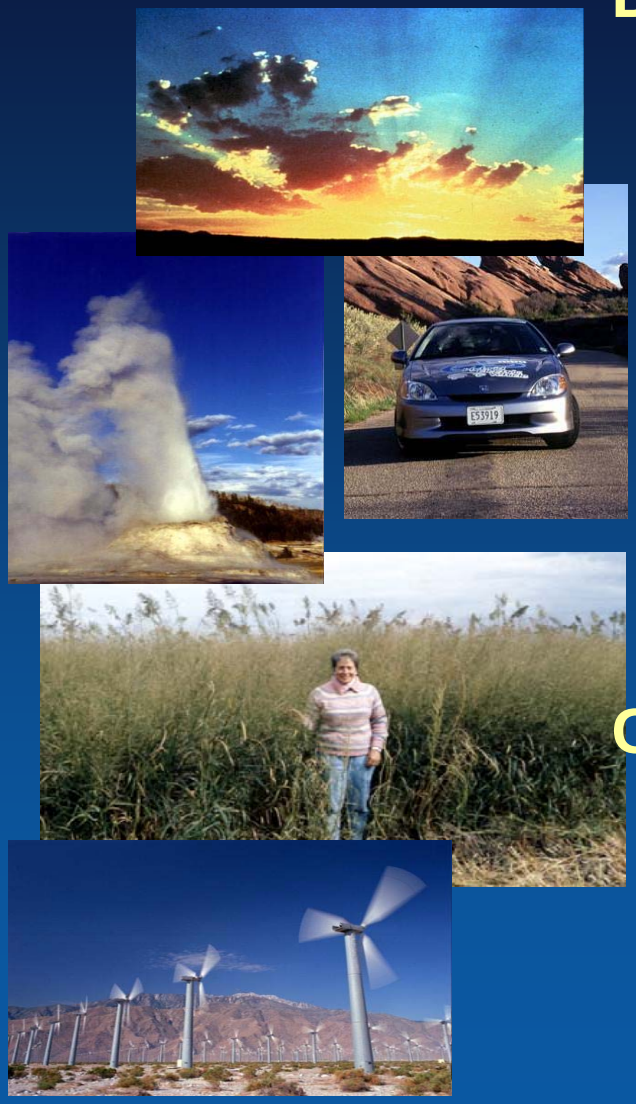
November 5-8, 2007

Major DOE National Laboratories

Major NREL Technology Thrusts

Supply Side

- Wind Energy
- Solar Photovoltaics
- Concentrating Solar Power
- Solar Buildings
- Biomass Power
- Biofuels
- Geothermal Energy
- Hydrogen
- Superconductivity
- Distributed Power



Demand Side

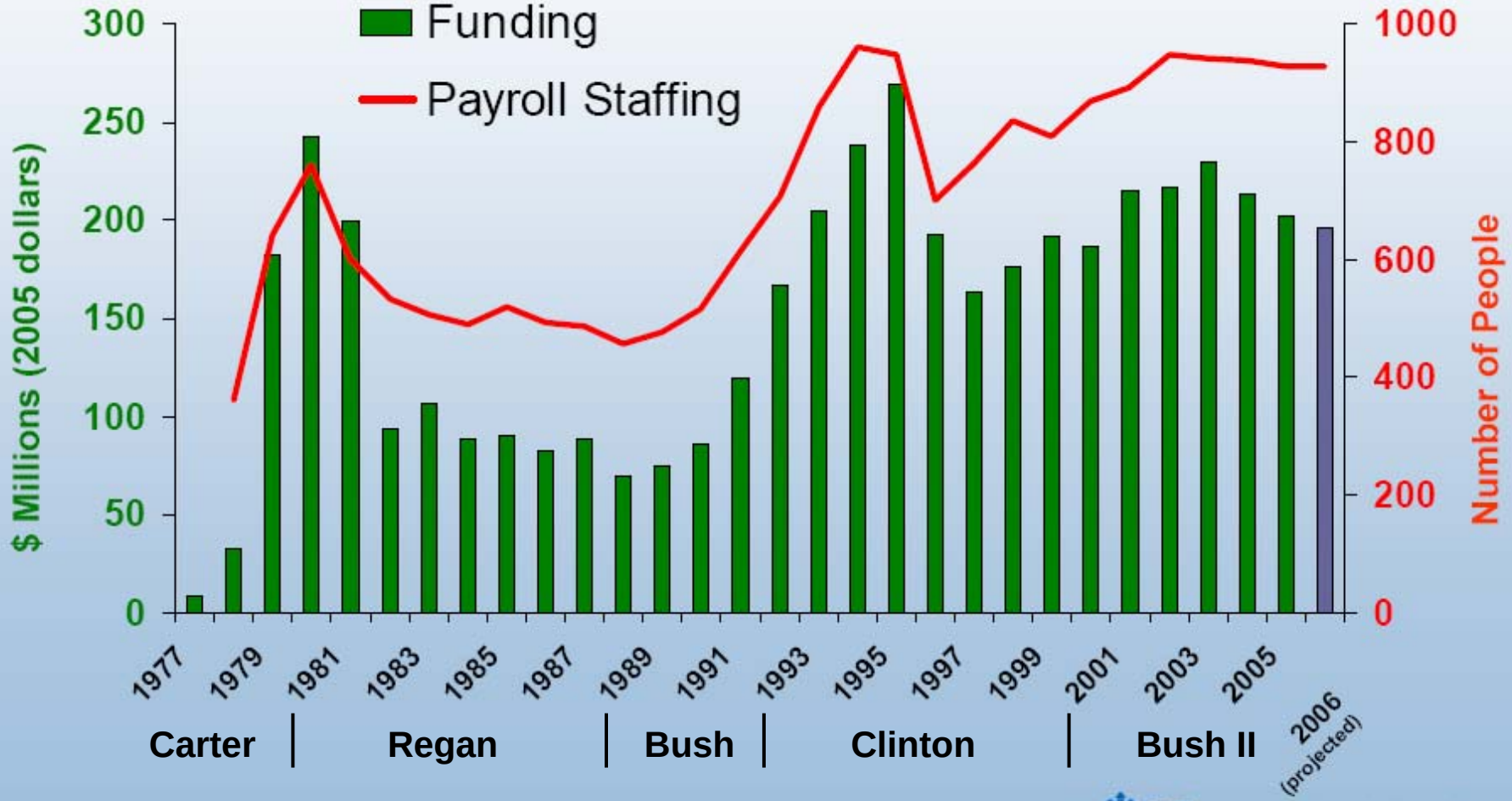
- Hybrid Vehicles
- Fuels Utilization
- Buildings Energy Technology
- Federal Energy Management
- Advanced Industrial Technologies

Cross Cutting

- Basic Energy Science
- Analytical Studies
- International Programs
- **Tribal Energy Program**

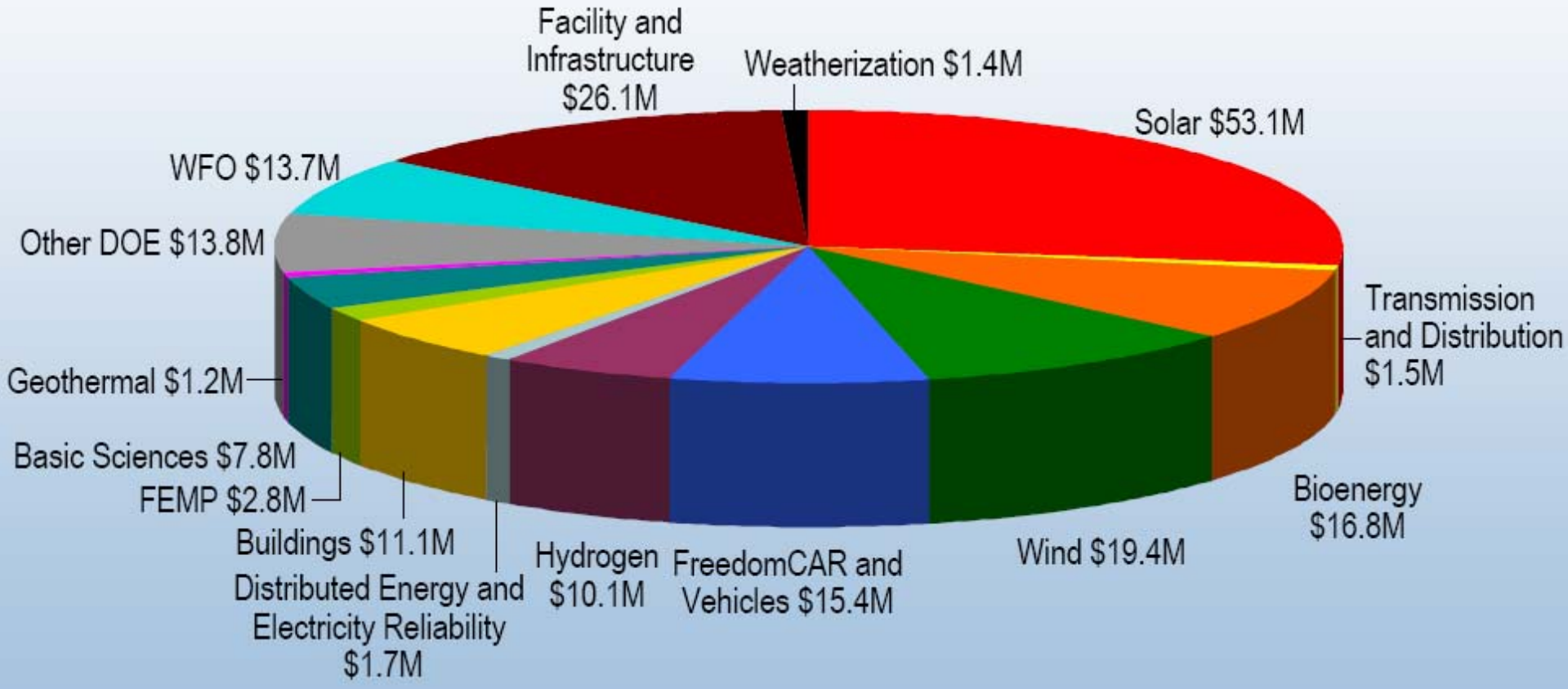
NREL Funding and Staffing

Funding in 2005 Dollars

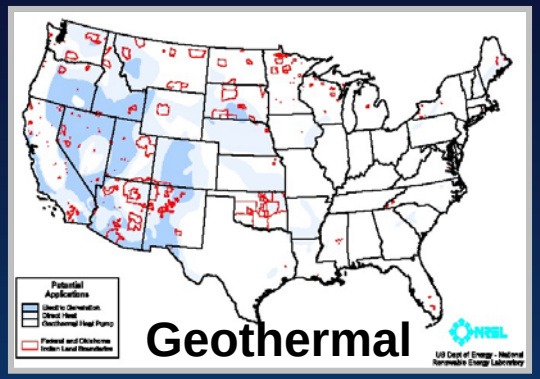


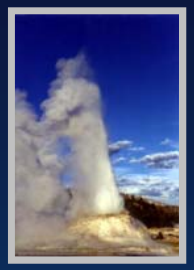
NREL FY 2006 Program Portfolio

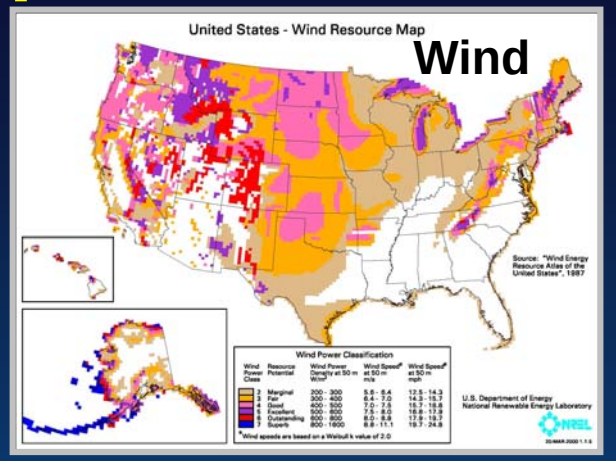
Estimated $195.9 Million

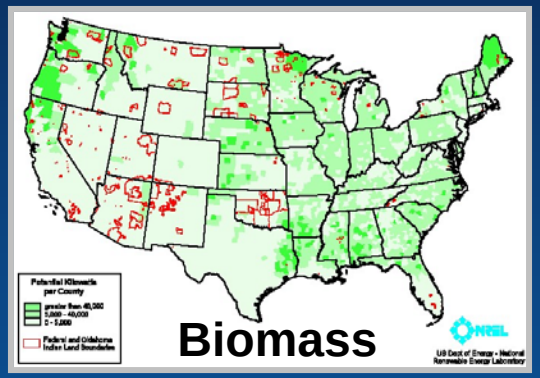


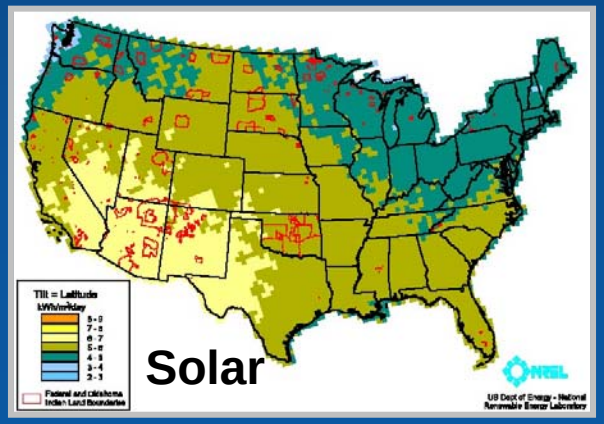
Renewable Resource Options

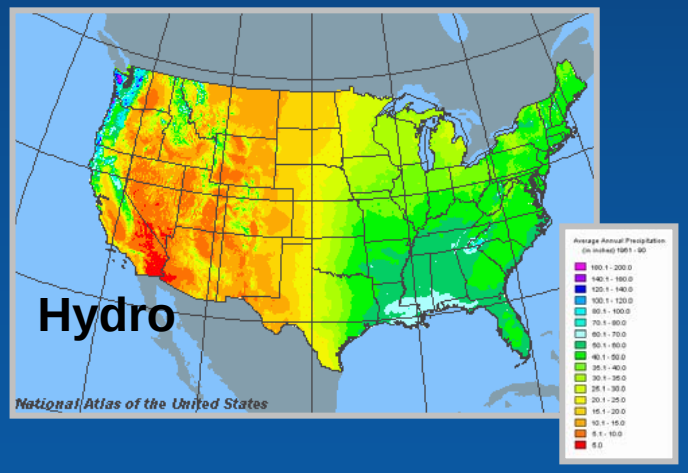






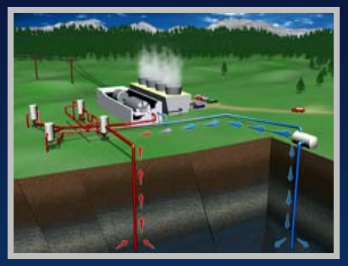






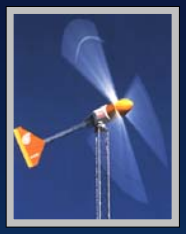
Renewable Technology Options

Power

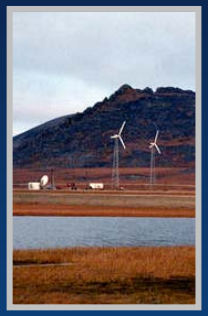


Small Modular Power

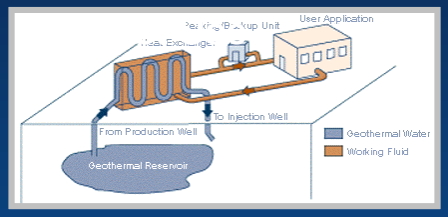
Small Wind

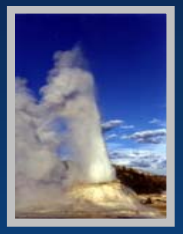


Diesel Hybrids



Direct Use

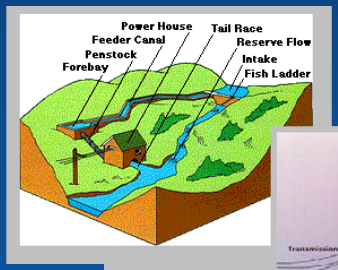


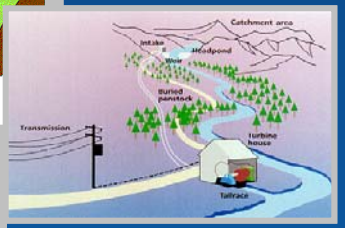


Big Wind

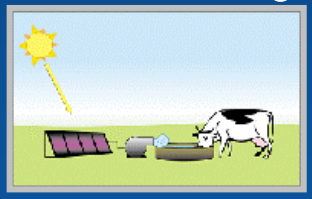
PV - Remote Homes

Small Hydro





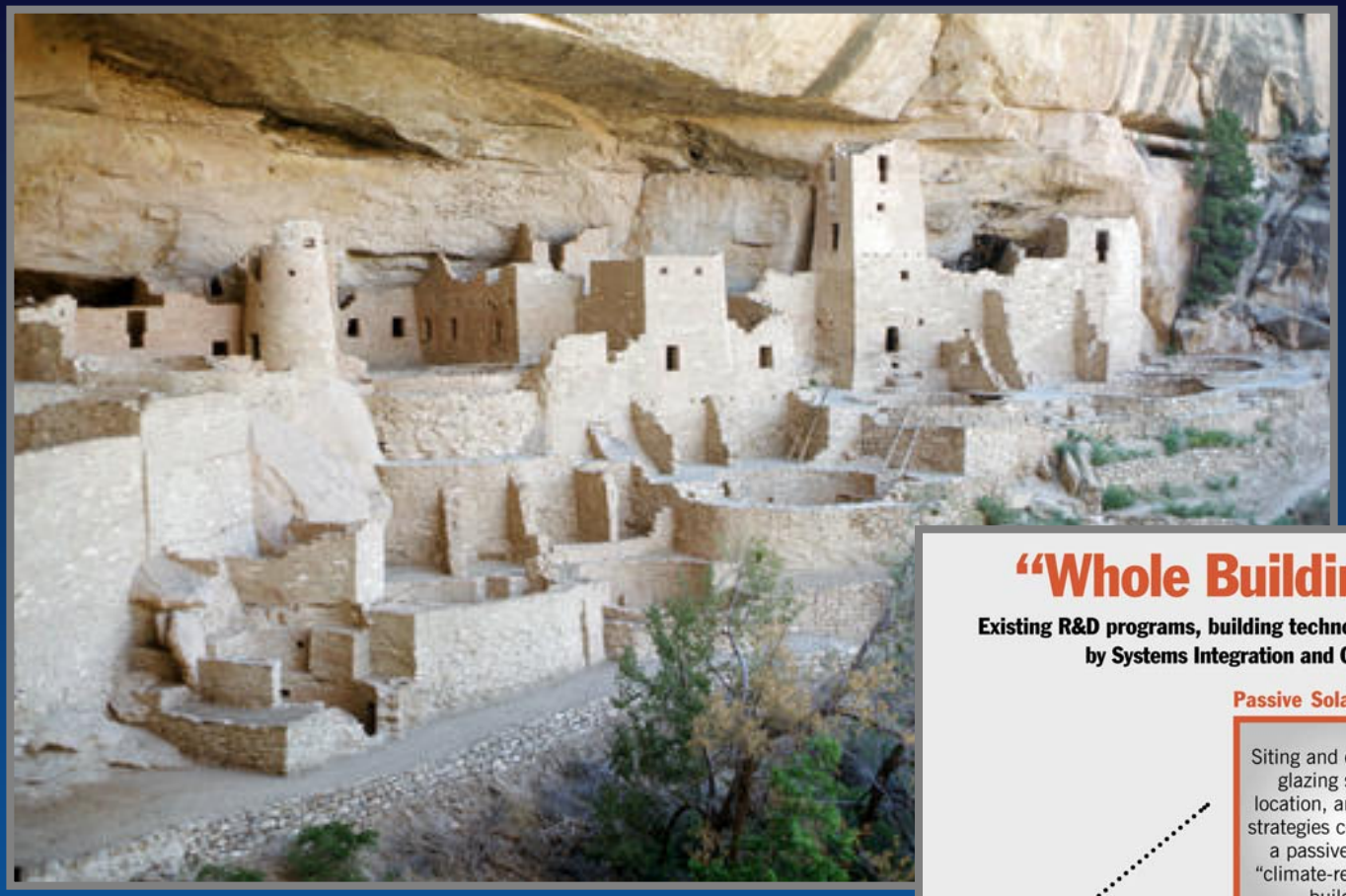
Stock Watering



Process Heat

Buildings

Building Design



"Whole Buildings" Strategy:

Existing R&D programs, building technologies, and components tied together by Systems Integration and Computerized Design Tools.

Passive Solar Strategies

Siting and orientation, glazing size and location, and shading strategies contribute to a passive solar, or "climate-responsive," building.

Advanced Technologies

Energy-saving appliances, advanced energy controls and thermostats, efficient heating and cooling systems, photovoltaics, and solar water heating systems.

Energy-Efficient Materials

Superior building materials, including high-efficiency windows, insulation, brick, concrete masonry, and interior finish products.

Energy Efficiency

Energy Star Appliances

Refrigerators – Half as much energy

Clothes Washers – Save up to $110 per year

Oil & Gas Boilers – Save up to 10%

Programmable Thermostats – Save up to $100 per year

Efficient Lighting

If every American changed out 5 lights, we'd save $6 billion/year and the equivalent of 21 power plants.

Wind Turbine Sizes and Applications

Small (≤10 kW)

- Homes
- Farms
- Remote Applications (e.g. water pumping, telecom sites, icemaking)

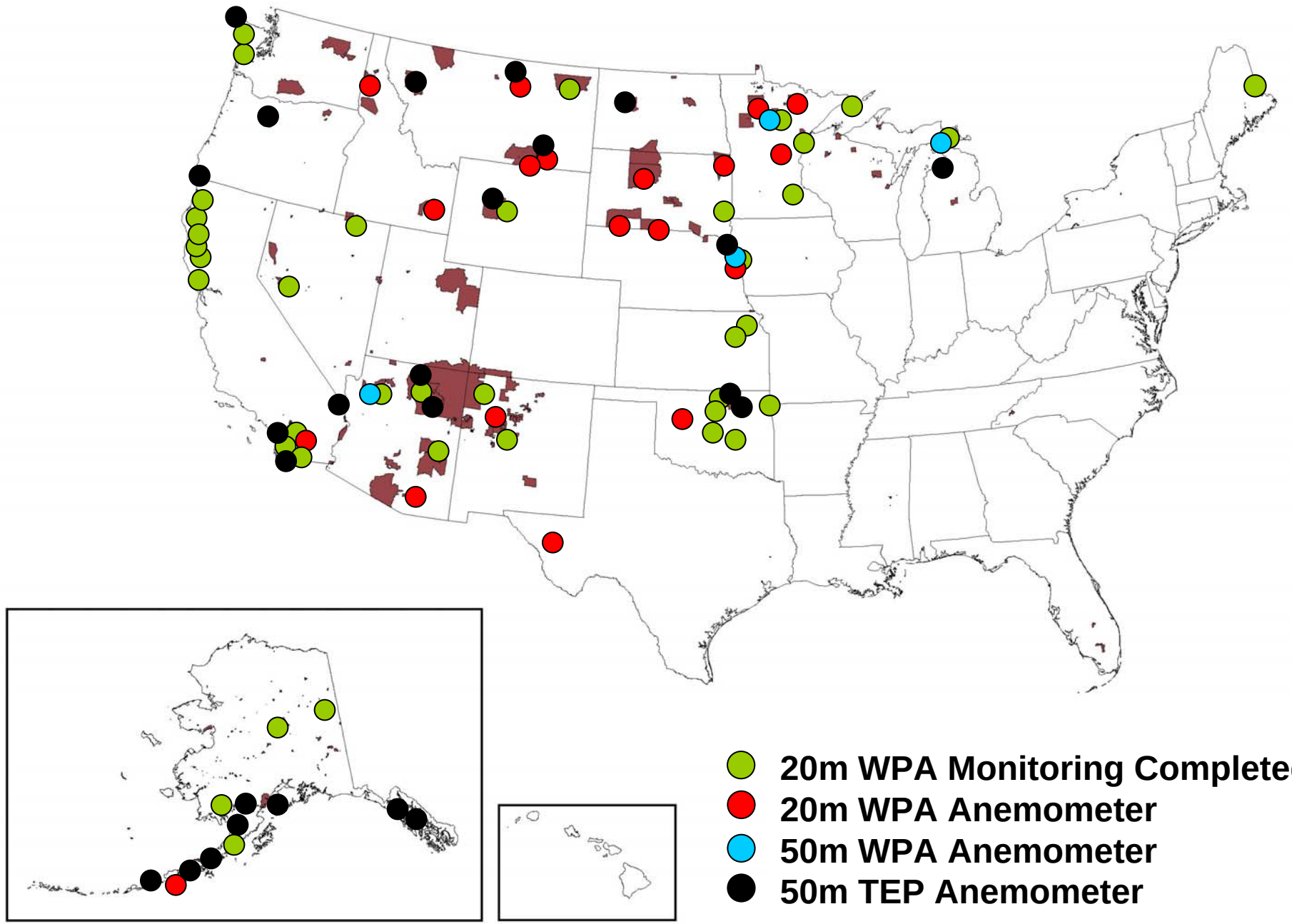
Intermediate (10-250 kW)

- Village Power
- Hybrid Systems
- Distributed Power

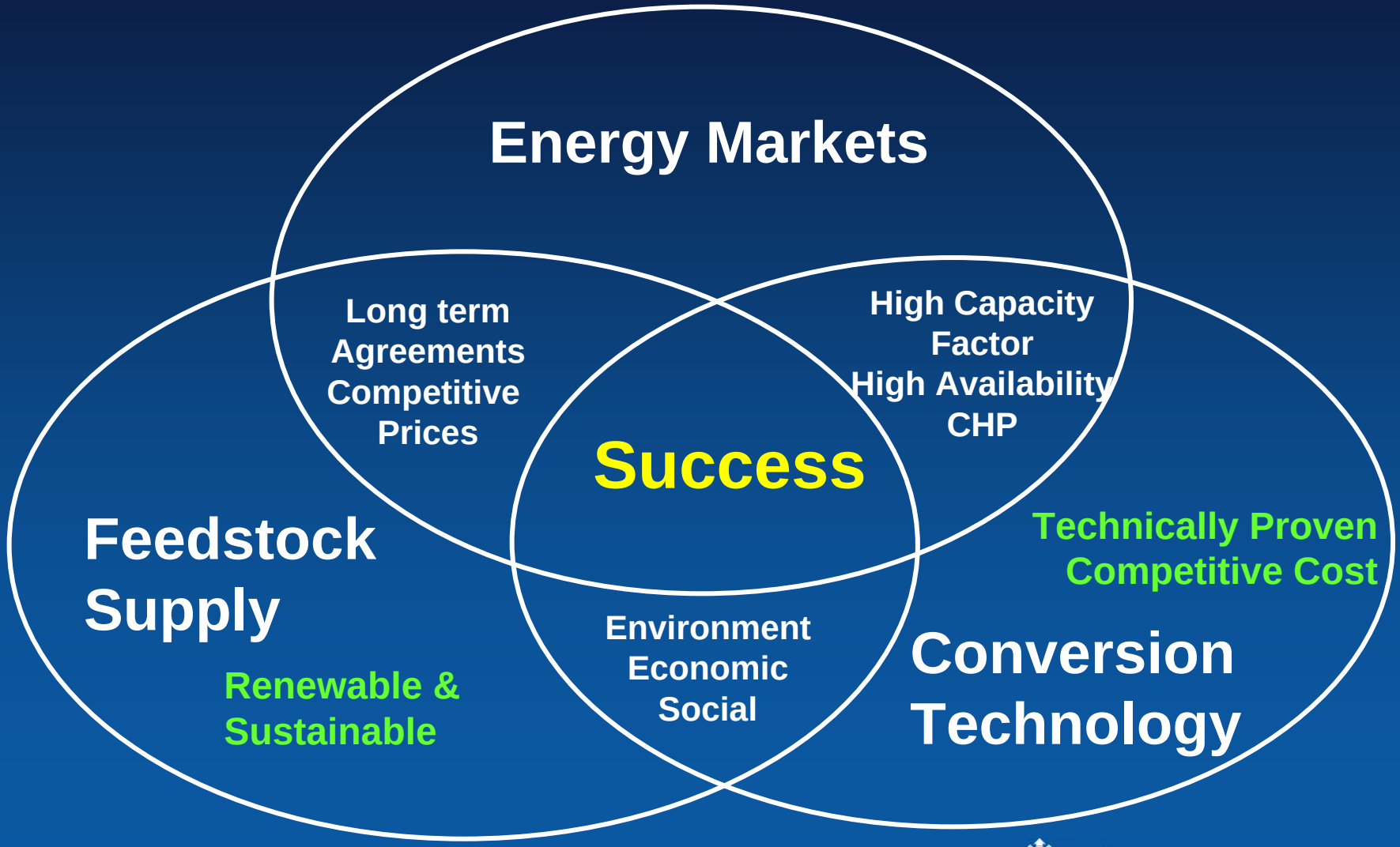
Large (250 kW – 2+ MW)

- Central Station Wind Farms
- Distributed Power

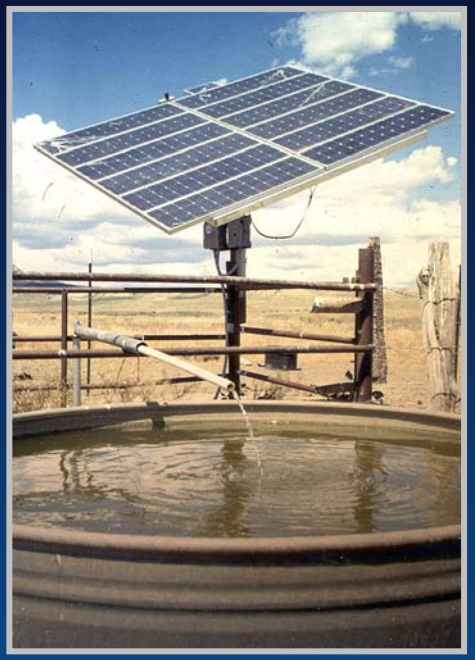
Tribal Wind Monitoring Sites



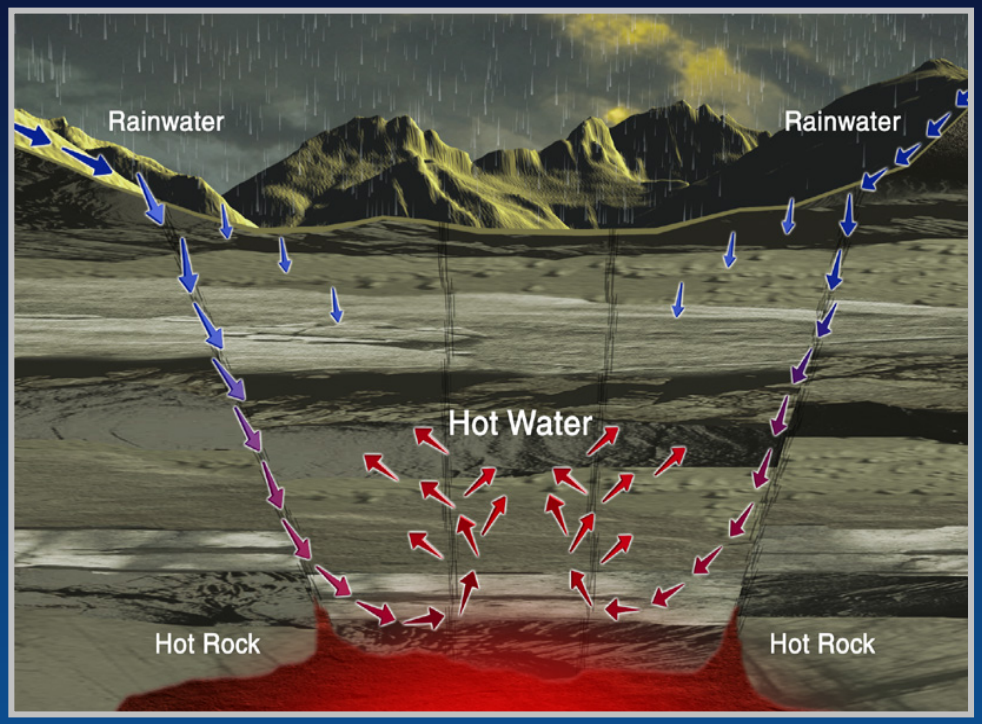
Bioenergy
Criteria for Success

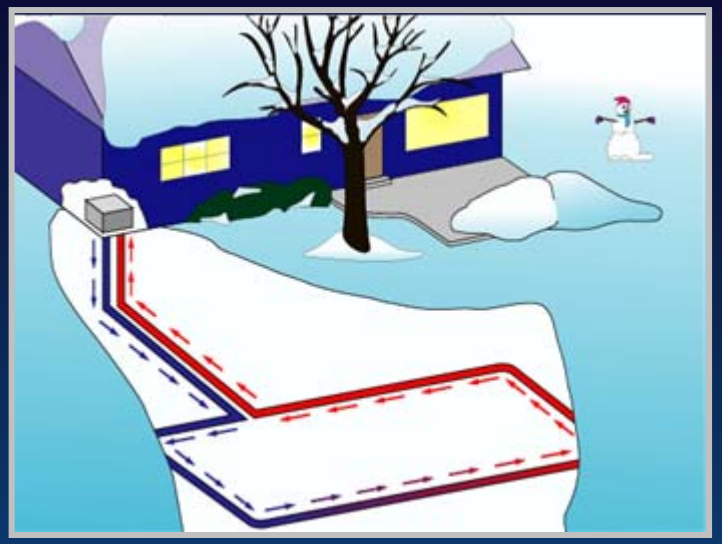


Solar Options

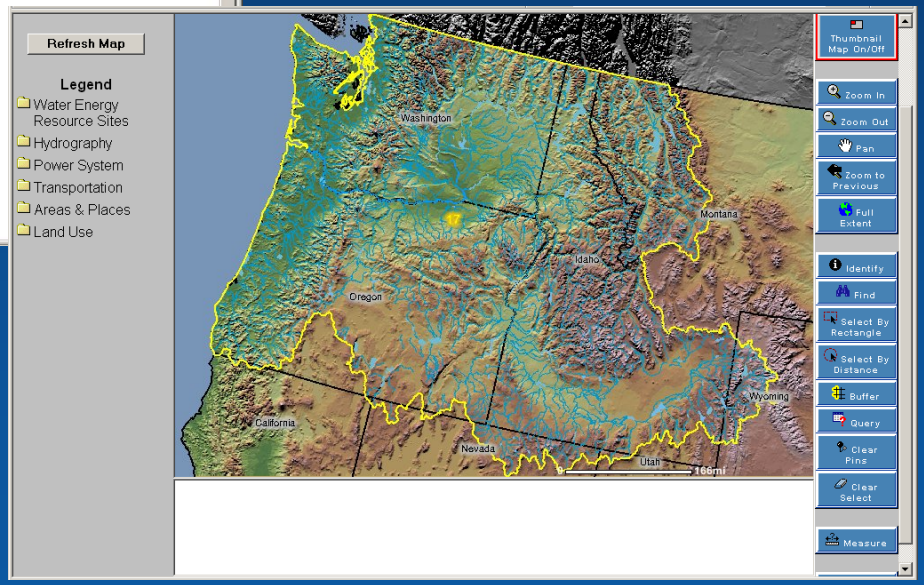


Geothermal Options

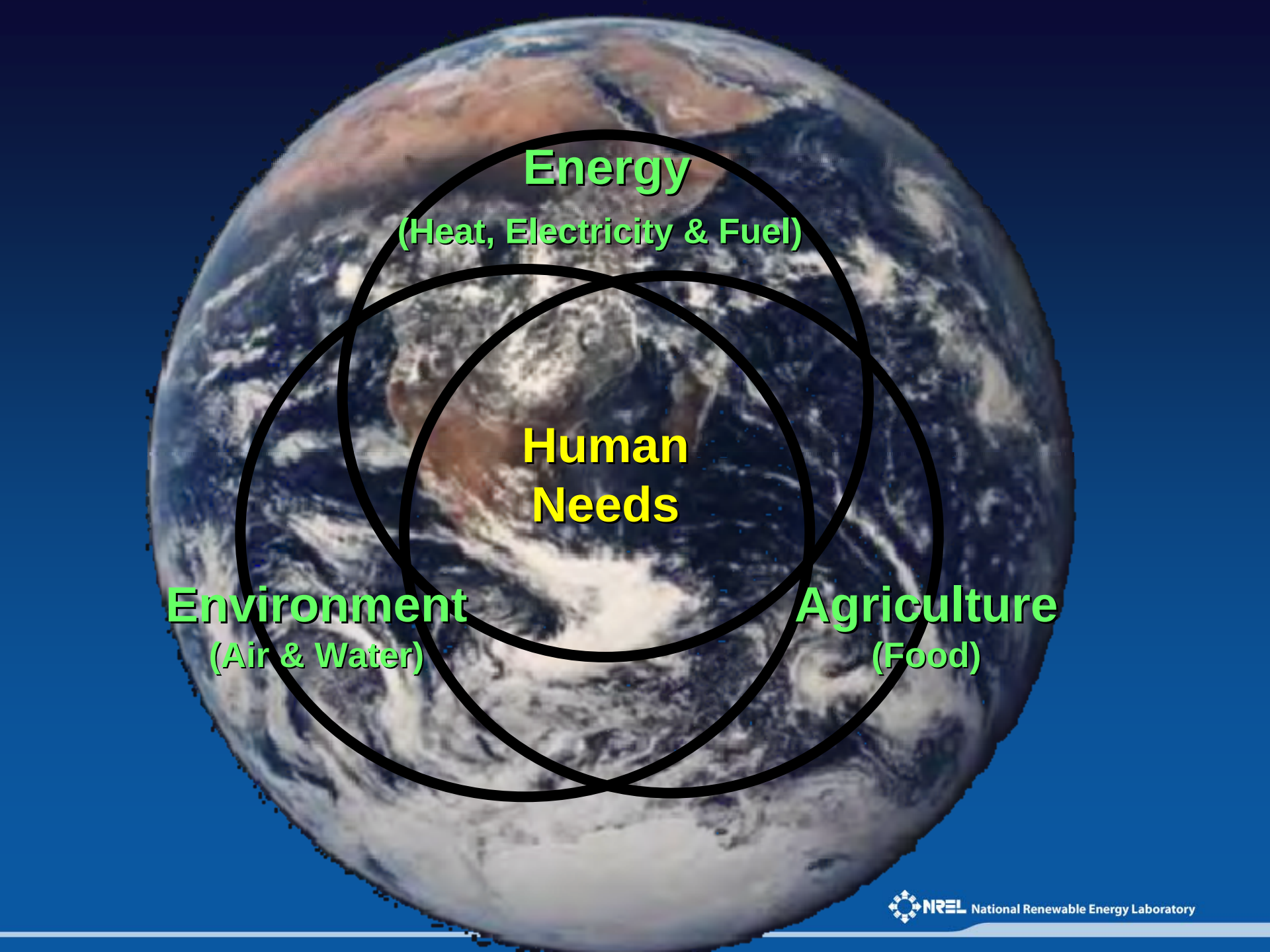




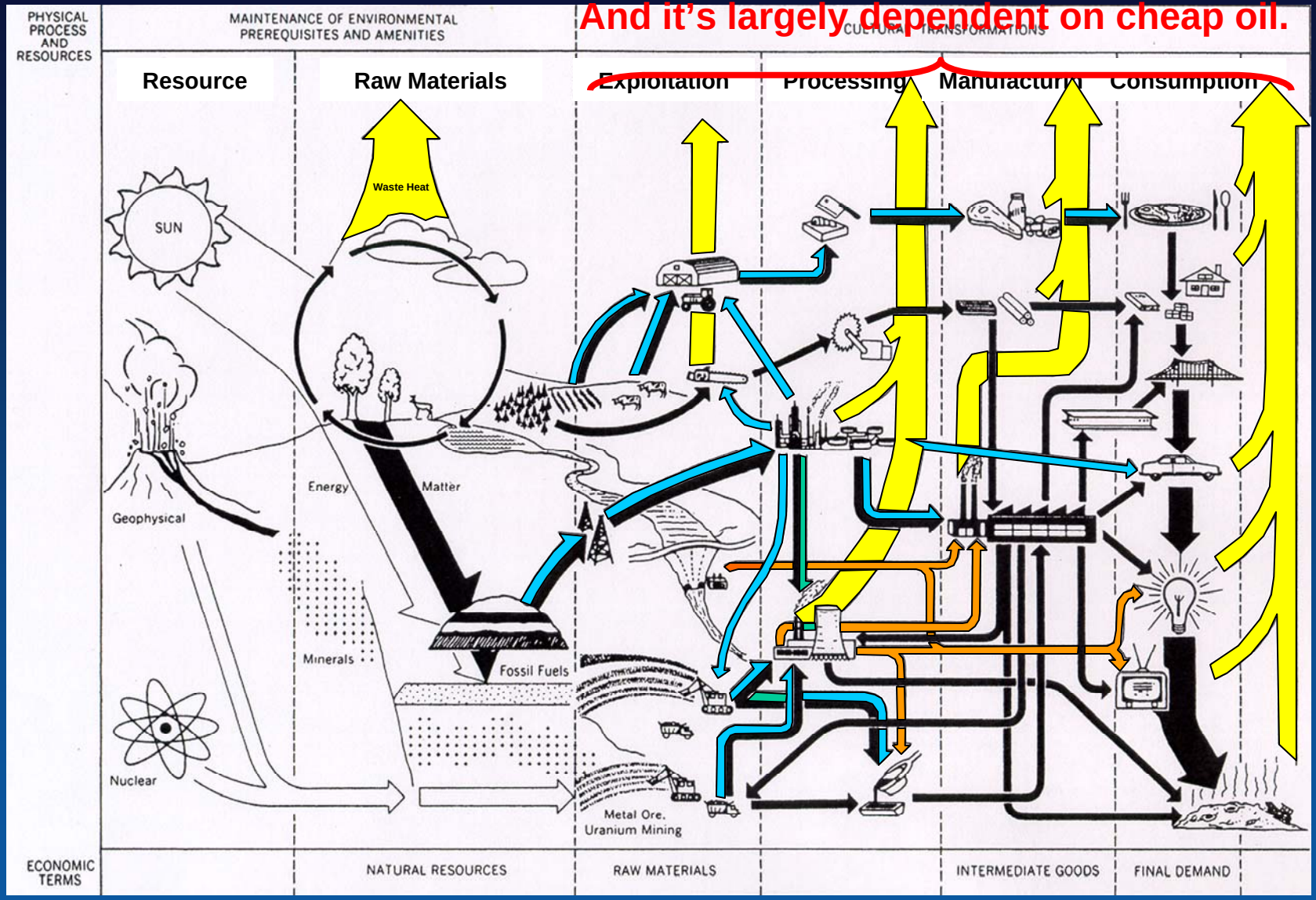
Small Hydro Power



http://hydropower.inl.gov/prospector/

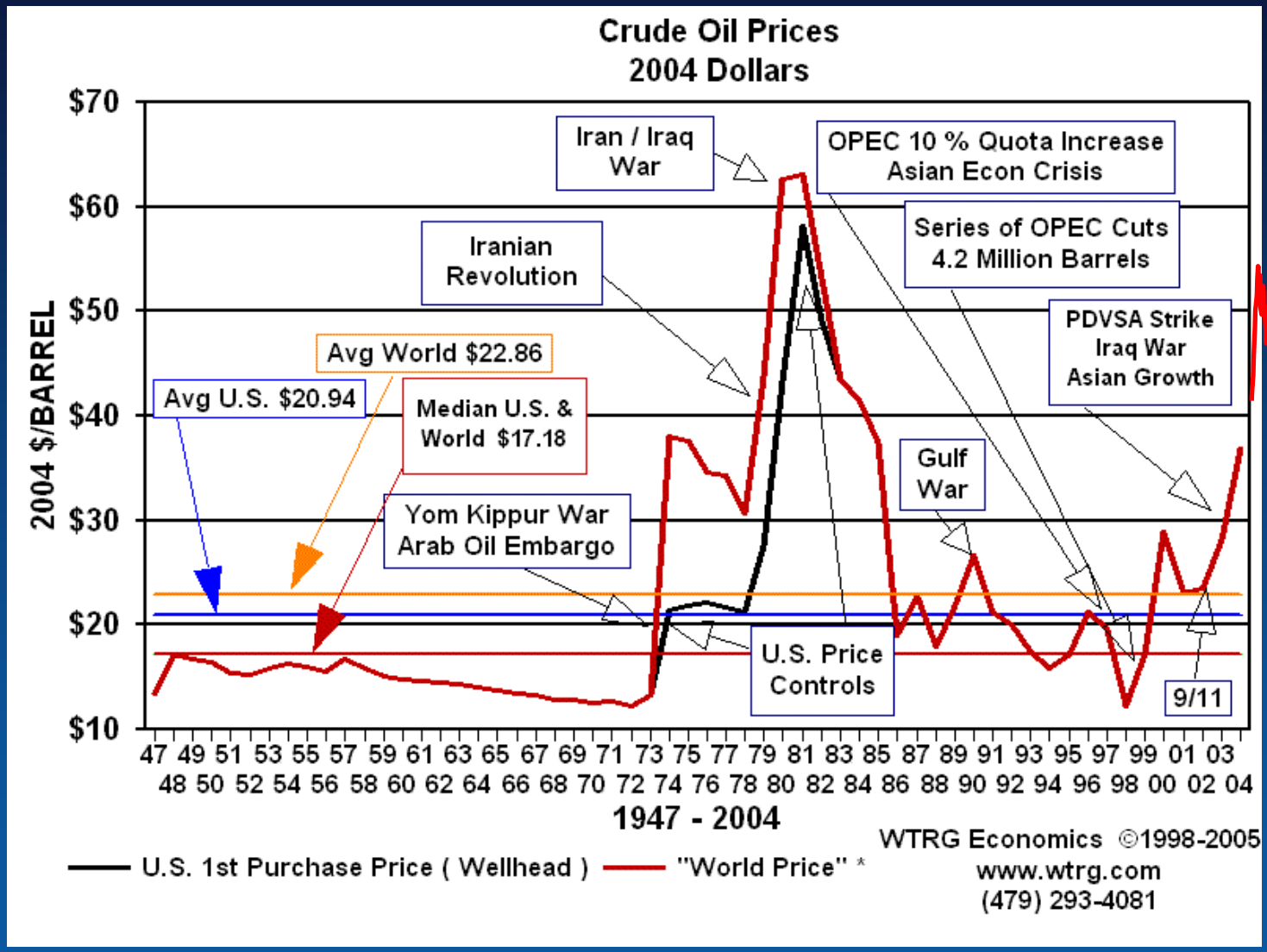

Energy
(Heat, Electricity & Fuel)
Human
Needs
Environment
(Air & Water)
Agriculture
(Food)

Where the global economy is very complex



And it's largely dependent on cheap oil.

Increasingly volatile, increasingly upward



~$95/bbl

~$77/bbl

~$60/bbl

7 Generations Span The Age of Oil

Our Grand Parents

Our Parents

Our Generation

80

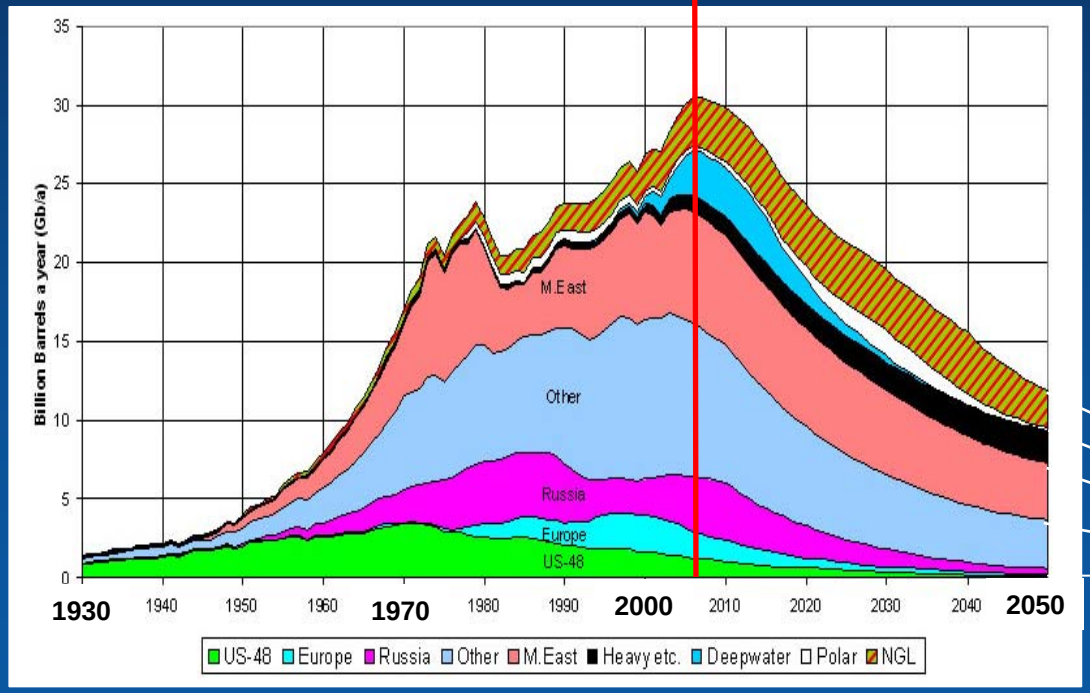
30

Our Children

Our Grand Children

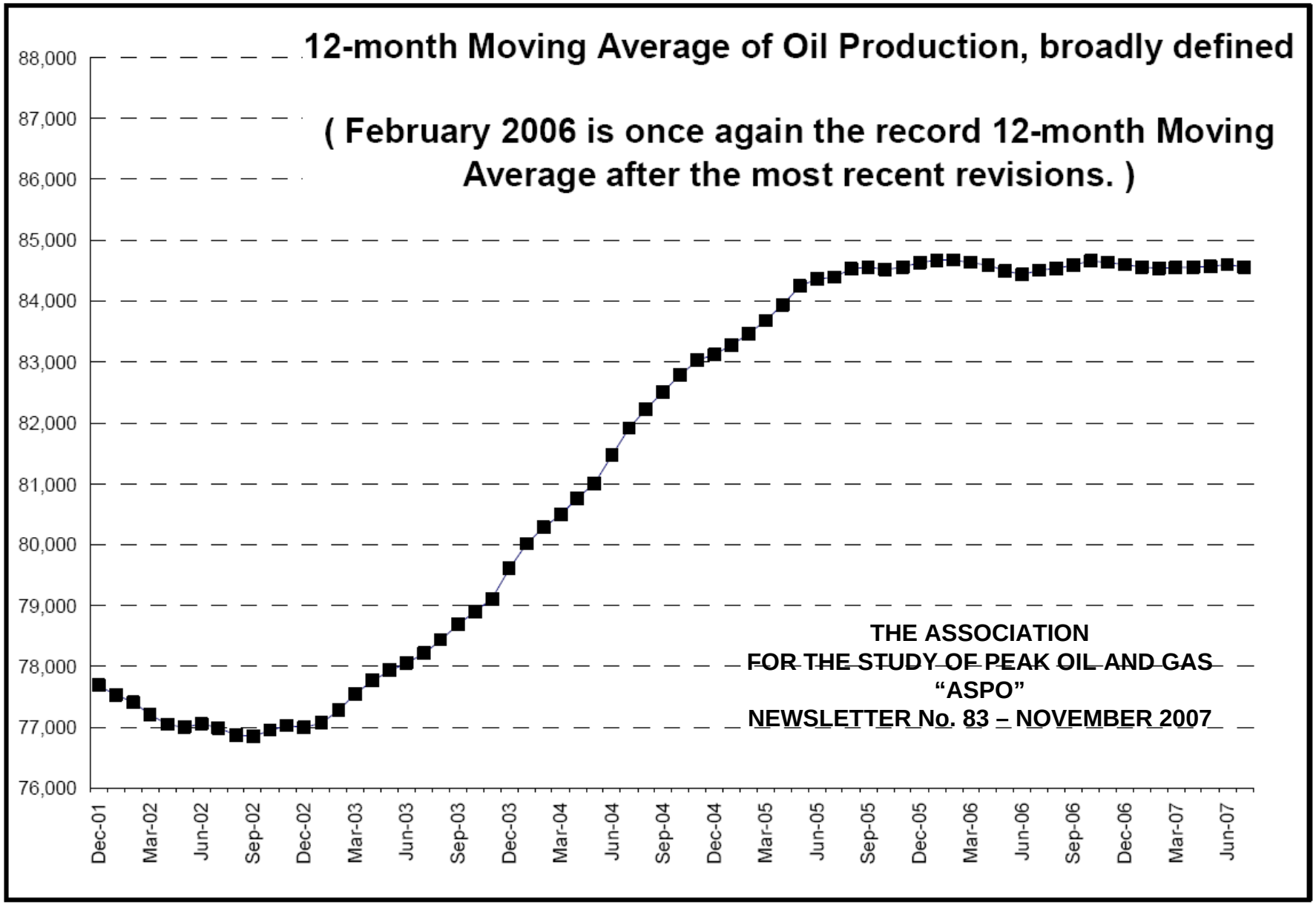
Our Great Grand Children

Our Great-Great Grand Children



2100

Peak Oil Graph from: ASPO.com - Colin Campbell 2004


12-month Moving Average of Oil Production, broadly defined
(February 2006 is once again the record 12-month Moving Average after the most recent revisions.)
88,000
87,000
86,000
85,000
84,000
83,000
82,000
81,000
80,000
79,000
78,000
77,000
76,000
Dec-01
Mar-02
Jun-02
Sep-02
Dec-02
Mar-03
Jun-03
Sep-03
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Mar-04
Jun-04
Sep-04
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Jun-05
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Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
THE ASSOCIATION
FOR THE STUDY OF PEAK OIL AND GAS
"ASPO"
NEWSLETTER No. 83 – NOVEMBER 2007

Tribal Energy Security & Sovereignty Through Local Self-Sufficiency

Economic Dependence

Oil Imports
Fuel at the Pump
National Grid
Coal-based Power
Water Transport
Foreign Manufacturing
Agro-Industry

"He who has the gold, makes the rules."

Community Independence

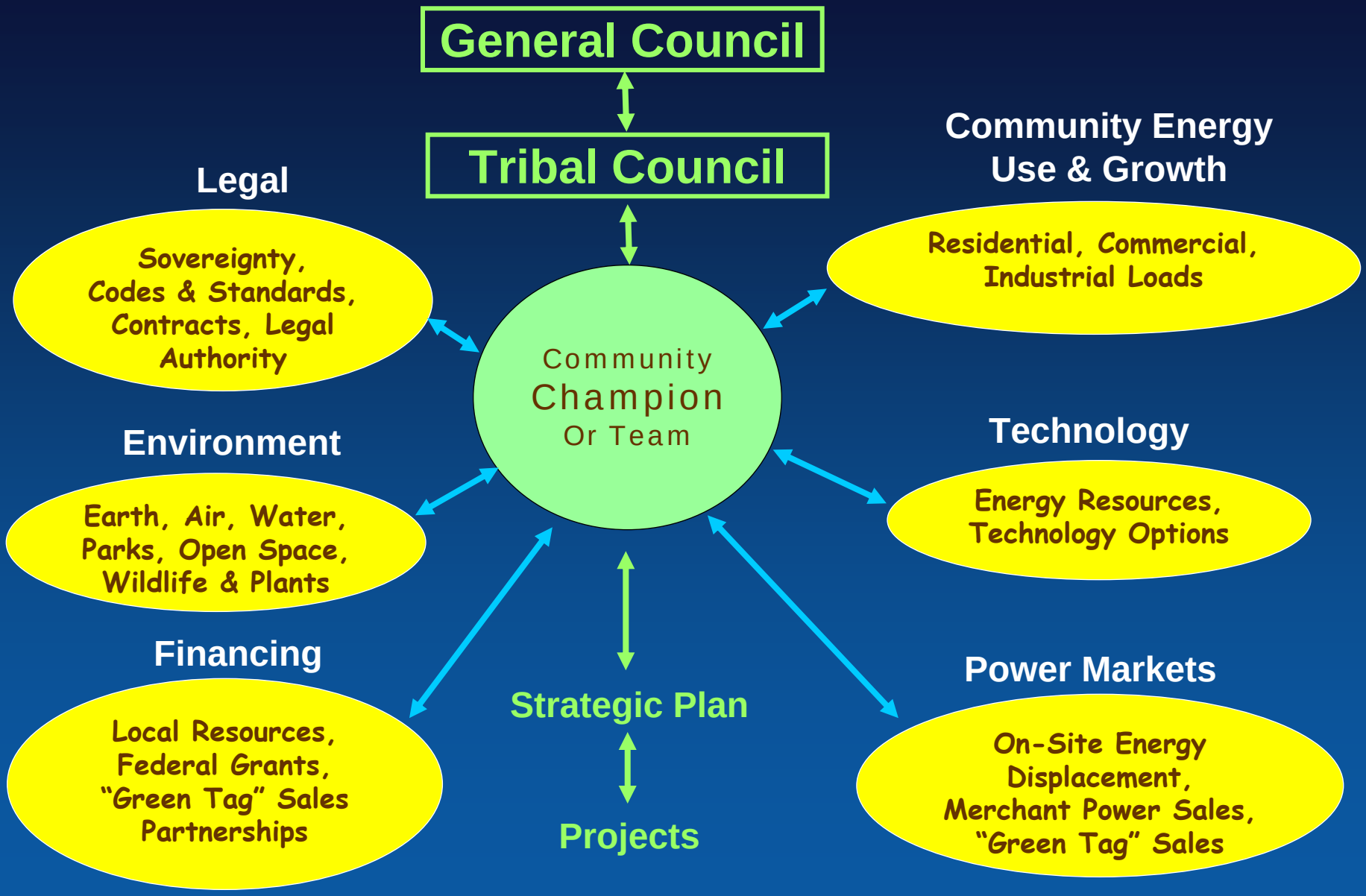
Self sufficiency
Food
Energy
Water

Skill Rebuilding
Local Production
Regional Sourcing

Sufficiency & Enoughness
Human Satisfaction

"Community of Cooperation"

The Community Energy Development Challenge



These 4 days provide a unique opportunity to learn from your colleagues.

Enjoy the presentations.
Have fun.
Bring home some new ideas.