GRANDFATHER SUN

% HYDROGEN  20% HELIUM

Per second: 386 Billion- Billion Watts is produced by the Nuclear Fusion Reactions.

While traveling at the speed of light its energy reaches Earth and is the primary light we see. It takes 8 seconds to travel from there to here.

D.C. Energy travels in a wave length similar to the way a water stream flows. We invert it to A.C. which is a square wave length to run in our buildings.

Wave energy has a weight – 40 million tons of Energy Lands on Earth everyday.

This Photon Energy that feeds all life to grow, is the same photons that we collect on a Solar Collector to produce electricity. Thus the photosynthesis process of light on our green earth allows photovoltaic for the collect of sunlight for electric energy.

10 mile by 100 mile of solar panels can run the whole U.S. ---D.O.E. Quote.
Hualapai Reservation
Solar Water Pipeline 1997 to Present

- USDA Water Project
- Upgraded to provide water to Grand Canyon West Tourism area
- Currently being upgraded for increased flow and domestic water quality improvements
Earthship Project - 1999

- Funded by DOL Jobs in Recycling program
- Built by WIA workers
- Solar PV
- Water Catchment system
Guano Point 2000

- Off Grid 7 kilowatt PV and wind system
- Power for lights, kitchen, and cooling
- Recently upgraded and repaired new wind turbine, new batteries
GCW Solar Power System
2005 -2008

2 100Kw solar -diesel hybrid non-grid tied systems with 16kW solar- and 5400amp hour battery banks. Latest SatCon digitally integrated Inverters 50% -70% reduction in generator run time.
Hualapai Tribal Utility
Feasibility Study
DOE First Steps 2005

1. Feasibility of Stand Alone Utility Providing Service at Grand Canyon West -

2. Feasibility of Take-over of Reservation Electric Service from Local Co-op -

3. Feasibility of integrating Hualapai Wind Resource to meet tribal load-
Hualapai Wind Assessment Project
BIA-MAP 2005 - 2009

Overview

▪ Assess Wind Resources
  ▪ Grand Canyon West - 35% Capacity @ 6mps
  ▪ Peach Springs Area - 20% capacity @ 5.5mps
  ▪ Nelson - 25% Capacity @ 5mps
  ▪ Clay Springs Study Started

▪ Feasibility Study
  ▪ Phase I Environmental Screening Completed
  ▪ Avian Impact Assessment Completed
  ▪ Interconnection Study underway
  ▪ Wind Development Partner Identified
MOUs

- Clipper Windpower Development Company
  - Complete Final Wind Farm Feasibility

- Mohave Sun Power, LLC
  - Complete Transmission & Interconnection
  - Complete PV Solar Power Plant Feasibility
- Manufacturer of Clipper wind turbines
- Developer of wind farm projects
- Priority for Native American Wind Farm Projects
340 MW Concentrating Solar Power Facility
Grand Canyon West - Clay Springs Wind Farm
Clay Springs Solar- GCW Wind Project Concept
Transmission and Interconnection

- Hualapai Valley Solar - leads interconnection to WAPA system
- WAPA wants diversity - Solar CSP, PV Solar, and Wind. High priority for Native American projects
- WAPA funding to build interconnection substation & upgrade existing lines
- HVS - Connections to other APS- SCE transmission lines and power markets
Benefits of Renewable Energy Development

- Reliable Revenue Stream to the Tribe
  - Lease / Royalty Payments
  - Co-Ownership Revenues
- Jobs
  - Construction
  - Construction Support
  - On-going Operations
- Power Connection to Grand Canyon West
- Tribal Electric Utility control on Reservation
Funding Support

- DOE Tribal Energy Program
  - Wind Farm Business Development Phase

- BIA Energy and Mineral Development Program
  - Solar Power Plant Feasibility and Planning
Phase II - Business Development

- Business modeling
  - Ownership Scenarios & Financing Options
    - Tribal
    - Partnership
    - Lease to Developer
- Transmission and Interconnection Study
- Pre-Environmental Assessment
- Detailed Site planning
  - Turbine locations, roads, interconnections
- Final Project Feasibility Determination
- Go-No-Go Decision on Joint Venture Development
Participants

- Clipper Windpower & Mohave Sun Power
  - Economic Modeling, Business planning
  - PPA research
- V-Bar
  - Wind Resource & Site Assessment, Turbine Placements
- PDS Consulting
  - Interconnection Study
- Daystar Consulting, LLC
  - Project Management,
- RECON Environmental
  - Environmental Assessment
Supply & Demand

- Population growth and power demand will increase 3 times faster than supplies.
- Dependence on current sources will have a devastating affect.
MISSION
Market and deliver clean, renewable, reliable, cost-based Federal hydroelectric power and related services

VISION
Provide premier power marketing and transmission services

ABOUT WESTERN
Western is a Federal agency under the Department of Energy that markets and transmits wholesale electrical power through an integrated 17,000-circuit mile, high-voltage transmission system across 15 western states.

Employees work around the clock to sell power, operate transmission and provide maintenance and engineering services to:

- Cooperatives
- Federal and state agencies
- Municipalities
- Native American tribes
- Other energy service providers
- Public utility and irrigation districts

In turn, our customers provide electric service to millions of people from as far south as Texas all the way north to the Dakotas, and from the plains of Minnesota to the California coastline.

In 2009, Congress expanded Western's role to include the Transmission Infrastructure Program. Through funding partnerships, TIP will develop transmission infrastructure that delivers renewable energy across the grid in the West.

For more than 30 years, Western employees have been dedicated to providing public service, such as promoting environmental stewardship, energy efficiency and renewable energy, as well as implementing new technologies to ensure our transmission system continues to be the most reliable possible.
CONNECTING CALIFORNIA TO ENERGY SECURITY

Relying upon our connection with our West Coast customers, we implemented solutions to correct the market design flaws that caused the California energy crisis in 2000 and 2001. With the California Independent System Operator's deployment of the new Market Redesign Technology Upgrade, MRTU, on April 1, 2009, Western's Sierra Nevada Region, SN, stepped up to make sure its business processes and systems seamlessly transferred and operated in the newly redesigned market with minimal impacts to our customers.

Western's SN Regional Manager Tom Boyko attributes the successful transition to teamwork and strong leadership. "It takes a team effort to be successful, as everyone must pull the oars in the same direction and at the same time," observed Boyko. "I was gratified to see that so many people stepped up to ensure that SN's MRTU go-live transition went smoothly." Under MRTU, California's power prices are now calculated using a market-based, economic dispatch methodology known as Locational Marginal Pricing.
## Off and Running—Implementing Recovery Act

### 2009

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| Recovery Act passed, giving Western borrowing authority under Section 402 | Public processes held to:  
  1. Structure the new program  
  2. Request transmission project proposals | Received more than 200 proposals for transmission projects | Transmission Infrastructure Program formally created | Craig Knoell named TIP Manager | MATL announced as 1st TIP project | TIP office fully staffed | MATL broke ground |
CLIMATE SUMMIT

What if it's a big hoax and we create a better world for nothing?

- Energy Independence
- Preserve Rainforests
- Sustainability
- Green Jobs
- Livable Cities
- Renewables
- Clean Water, Air
- Healthy Children
- Etc. Etc.