



Alternative Energy in American Samoa

Pacific Islands Environment
Conference

Dai-ichi Hotel – Saipan Beach
June 25, 2004

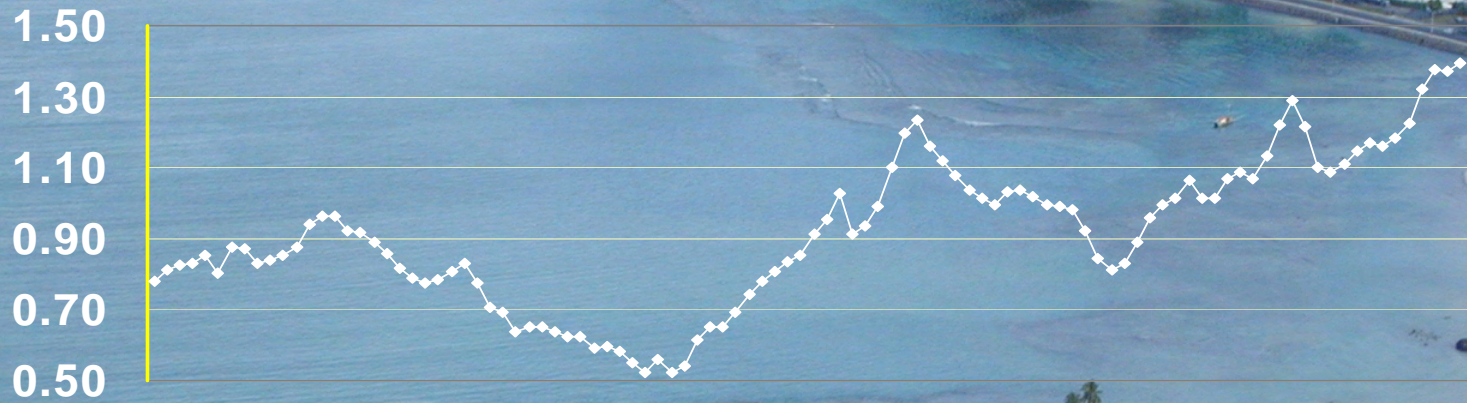
Jeff Shively
American Samoa Power
Authority



- American Samoa's Renewable Energy Action Plan
- Alternative Energy Options
- Current Projects
- Conclusions

Why We Should Pursue Alternative Energy

Weighted Fuel Cost Per Gallon



November 1995 - May 2004

- Global events are creating uncertainties
- Be part of the pollution solution

Renewable Energy Action Plan for American Samoa

- Omnibus Territories Act (1980) P.L. 96-597, Section 604
 - ❖ Develop comprehensive energy plans emphasizing indigenous renewable sources of energy.
 - ❖ Demonstrate these technologies through existing programs.
- The Act was Authorized but never funded.
- DOE funded the Territorial Energy Assessment (1990) and the Renewable Energy Action Plan for American Samoa (1992).
- Lack of funding prevented further plan development.



A tropical beach scene at dusk. The sky is a mix of deep blue and purple, with some light clouds. Several palm trees are silhouetted against the sky, with two large ones in the foreground on the right. The ocean is visible in the lower left, with waves breaking on the shore. The overall mood is serene and peaceful.

Renewable Energy Action Plan for American Samoa

- Evaluated the major indigenous renewable resources.
- Furnished budget estimates.
- Developed by a solid team of experts.

A photograph of a large industrial facility, possibly a power plant or manufacturing plant. The scene is filled with complex machinery, including large metal cabinets and pipes. Several workers wearing hard hats are visible, engaged in various tasks. The structure is supported by a network of steel beams and ladders. The lighting is bright, and the overall atmosphere is one of active industrial work.

ASPA Mission

“Provide quality, safe, sustainable and economical utility service in partnership with our customers, the community of American Samoa and the Pacific region.”

ASPA made the choice to pursue Renewable Energy and has set a goal to have 10% of electricity production come from renewable resources by 2010. This equates to about 3 megawatts of Renewable Resource availability.

Alternative Energy Options in American Samoa

Energy Management

Geothermal

Biomass

Wind

Hydroelectric

• Tree Farms

• Biogas

• Liquid Fuels

Solar

• Water heating

• Photovoltaics

• Process heat

Municipal Solid Waste

OTEC

Coal

Ocean Currents
and Waves

Energy Management

- In-house Lighting and AC upgrades.
- Waste Heat Recovery from Generators.
- Commercial Lighting Program.
- Other irons in the fire.

An aerial photograph taken from an airplane window, showing the Manu'a Islands in the Pacific Ocean. The islands are dark green and brown, with white sandy beaches and turquoise water. The sky is blue with some clouds. The text "Wind Energy" is overlaid in yellow at the top center.

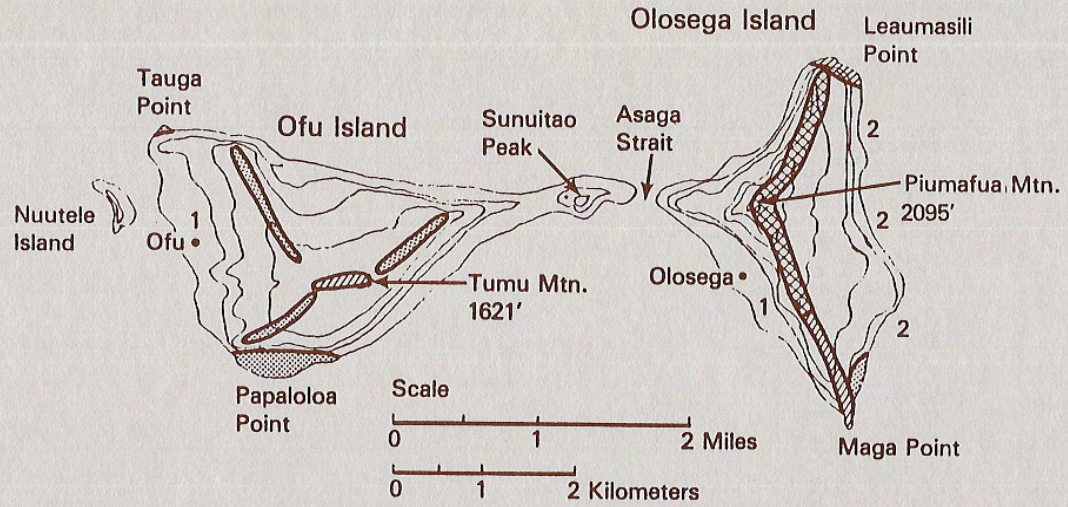
Wind Energy

- Manu'a Islands High Priority for Wind/Diesel Hybrid Systems. (50 kW turbines)
- Tutuila – 2-3 megawatts of installed availability by 2010. (250-600 kW turbines).

Ofu/Olosega Wind Map

American Samoa
Manua Islands
Annual Average Wind Power Estimates
Weibull $k \sim 2.2 - 2.4$

D-6



Manu'a Islands Are High Priority
for Wind/Diesel Hybrid Systems.

Wind Power Class

- 1-2
- 2-3
- 3-4
- 4-5
- 5-6
- 6-7

Elevation Contours

0, 250, 500, 1000, 1500, 2000 ft

Tau Wind Map

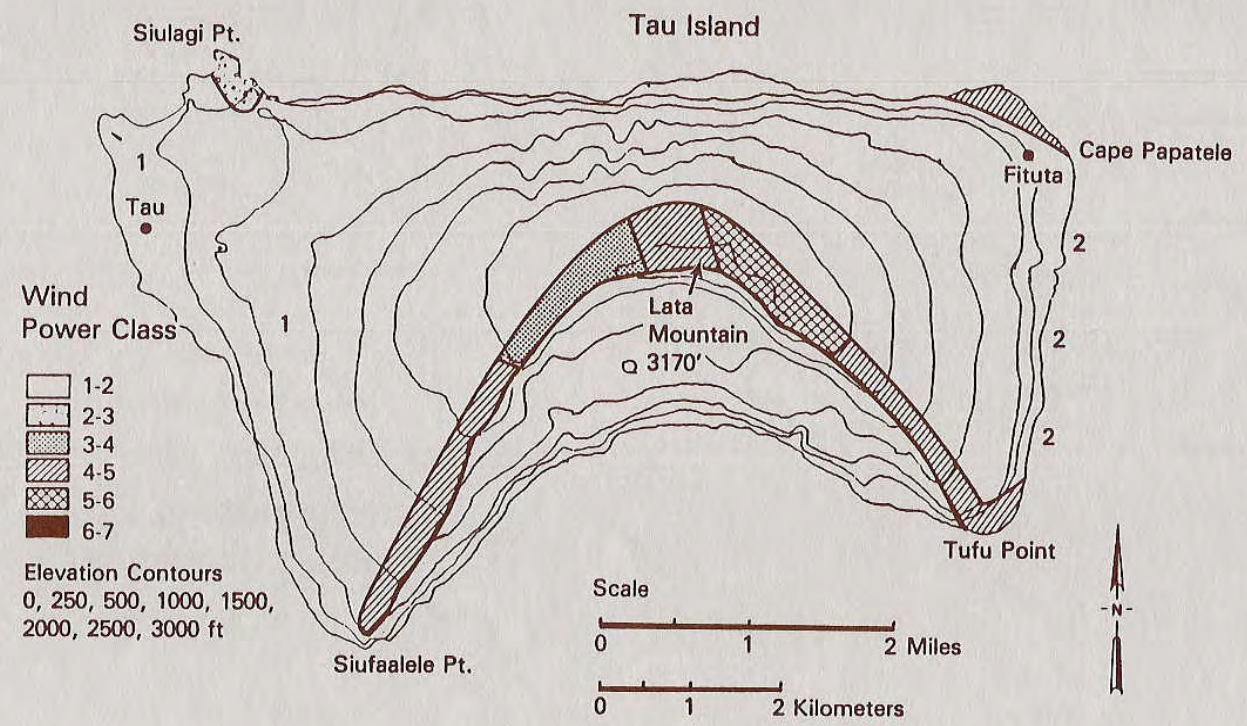
American Samoa

Manua Islands

Annual Average Wind Power Estimates

Weibull $k \sim 2.2 - 2.4$

D-7





Tau, Manu'a Islands

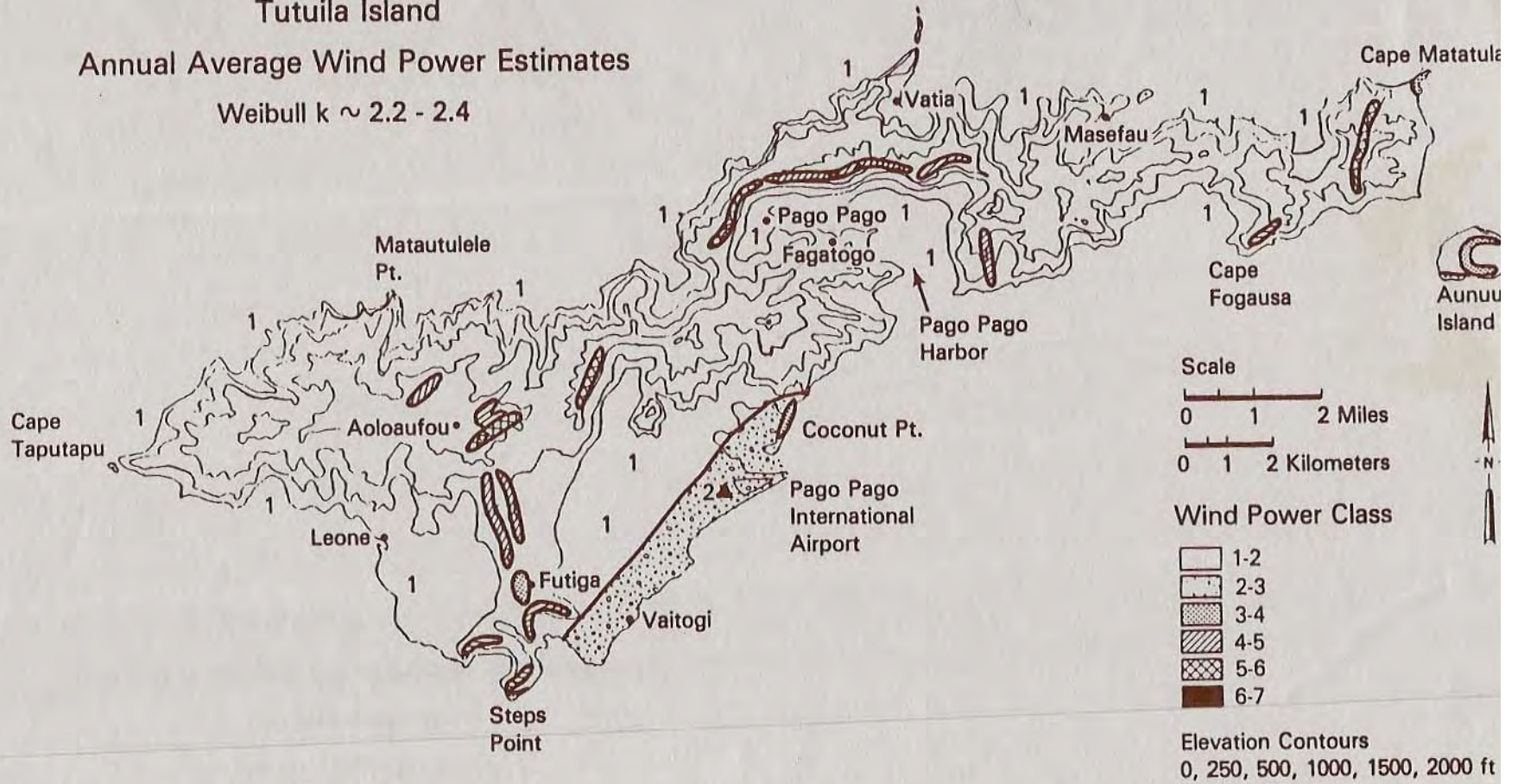
Tutuila Wind Map


American Samoa

Tutuila Island

Annual Average Wind Power Estimates

Weibull $k \sim 2.2 - 2.4$





Wind Site

Olotele Peak – 8.1 m/sec average



Olomoana Ridge Estimated 7.5-8.0 m/sec average

Solar Energy

➤ Solar water heating

❖ Old projects

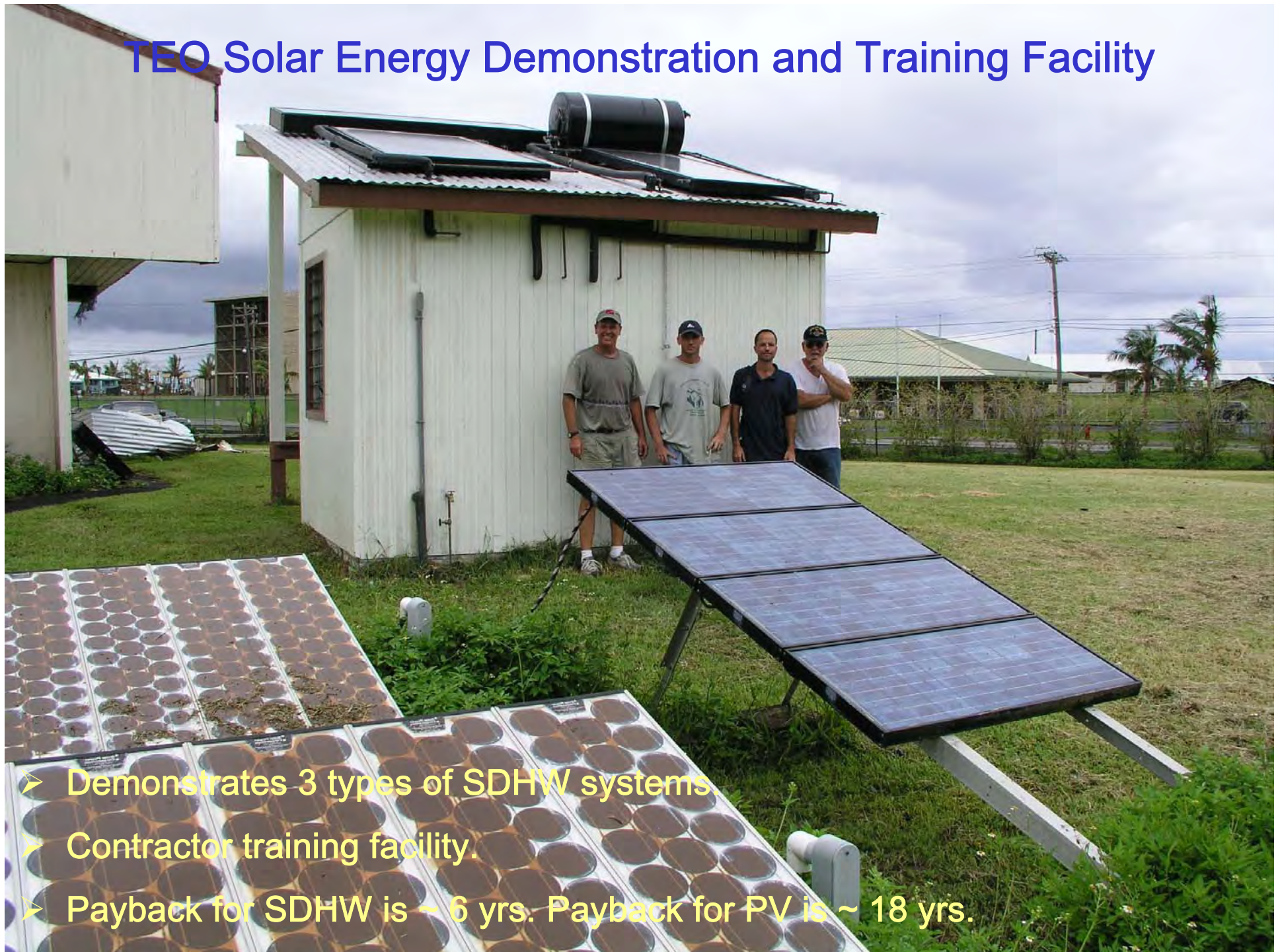
- Loan program – Great idea but not sustainable.
- School cafeterias – Good but with problems.
- LBJ Hospital – Disaster.
- Catholic Nursing Home – Good system.

❖ New projects

- Sadie Thompson Inn and Restaurant
- NOAA Housing
- TEO Demonstration and Training Facility



TEO Solar Energy Demonstration and Training Facility



- Demonstrates 3 types of SDHW systems
- Contractor training facility.
- Payback for SDHW is ~ 6 yrs. Payback for PV is ~ 18 yrs.

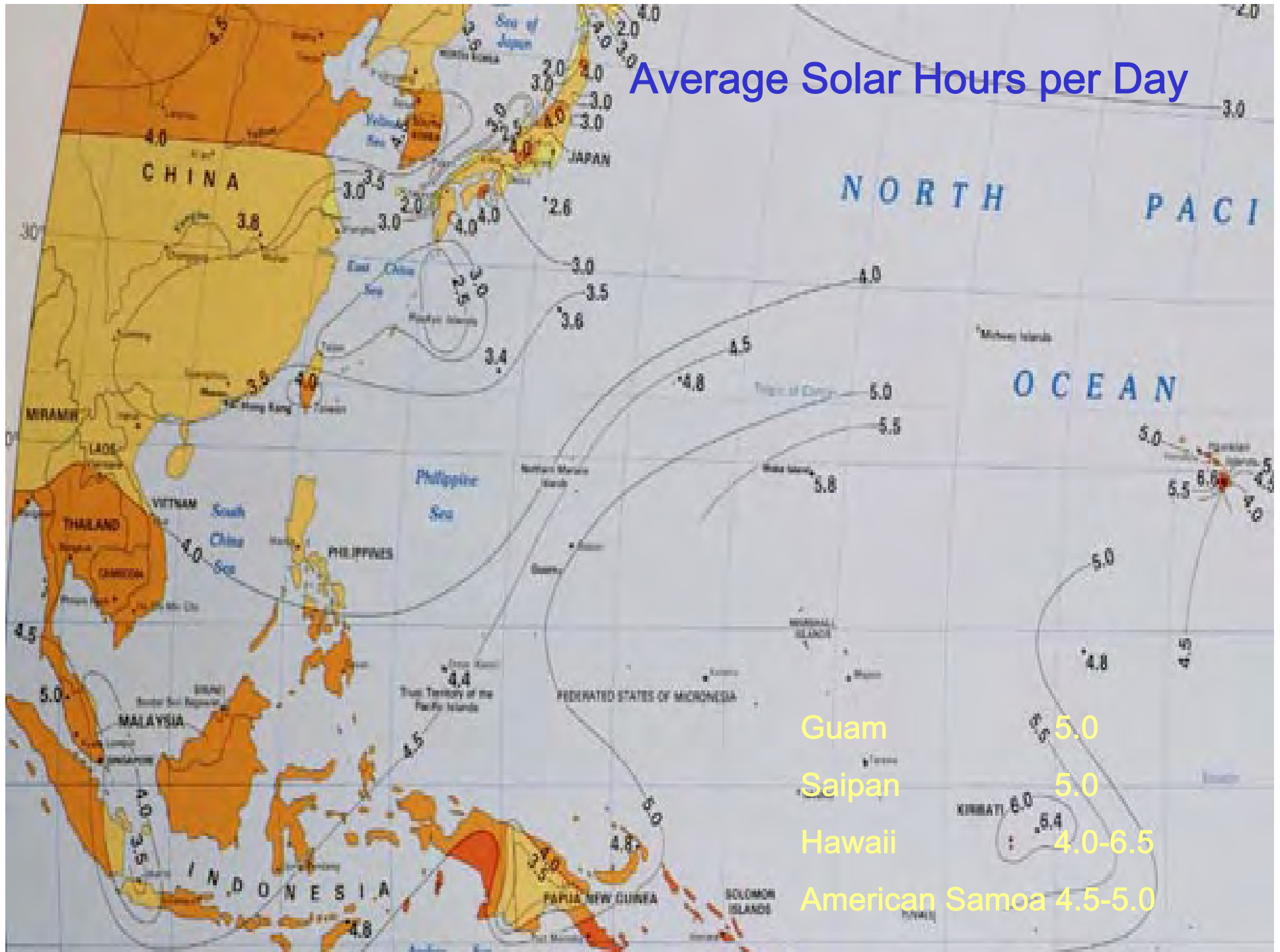


NOAA 6kW Photovoltaic System

➤ American Samoa's 1st Grid-tied System

- ASPA is not considering photovoltaics at this time.
- May be considered for Homeland Security.

Average Solar Hours per Day



Ocean Thermal Energy Conversion (OTEC)

➤ Benefits from OTEC

- ❖ Mariculture business
- ❖ Direct Air Conditioning
- ❖ Electricity Production

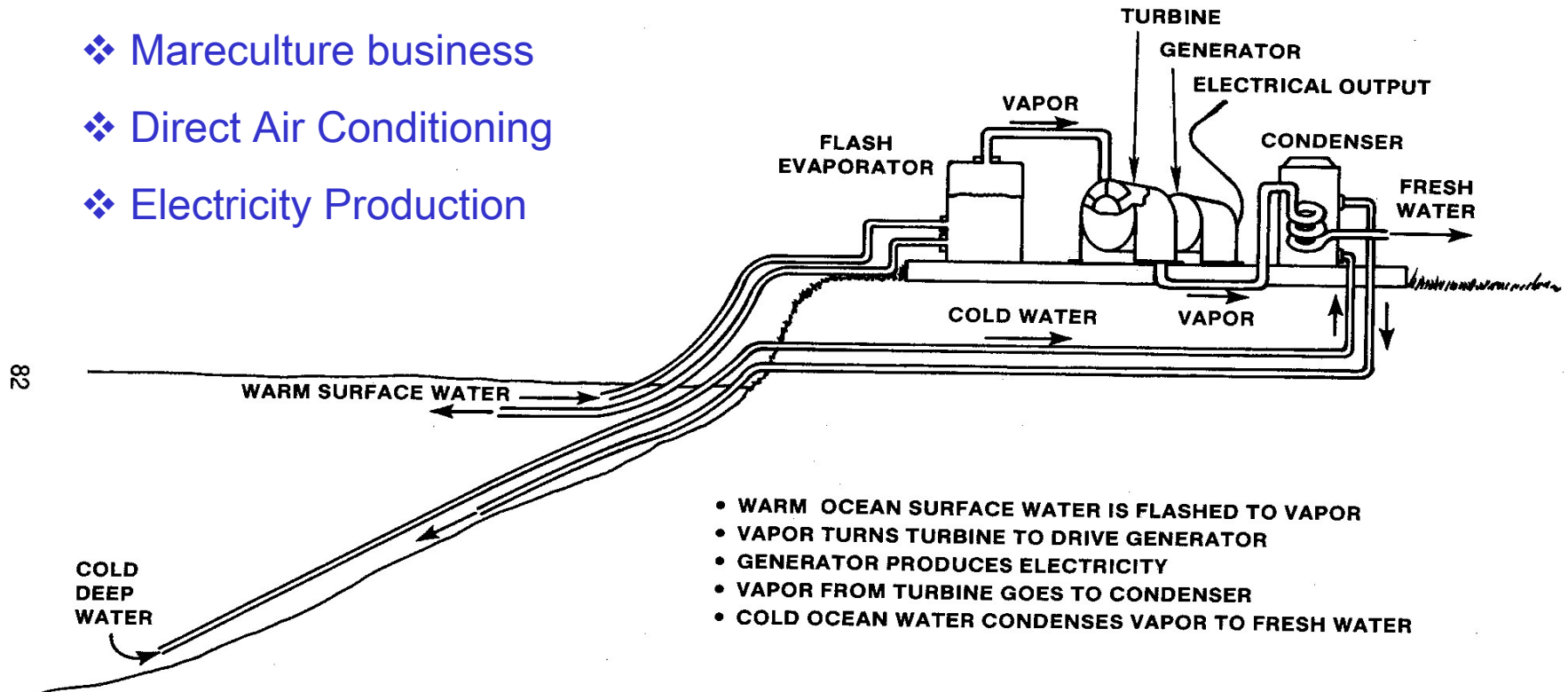


Figure 9. Open-Cycle OTEC Power Plant

Ocean Thermal Energy Conversion (OTEC)

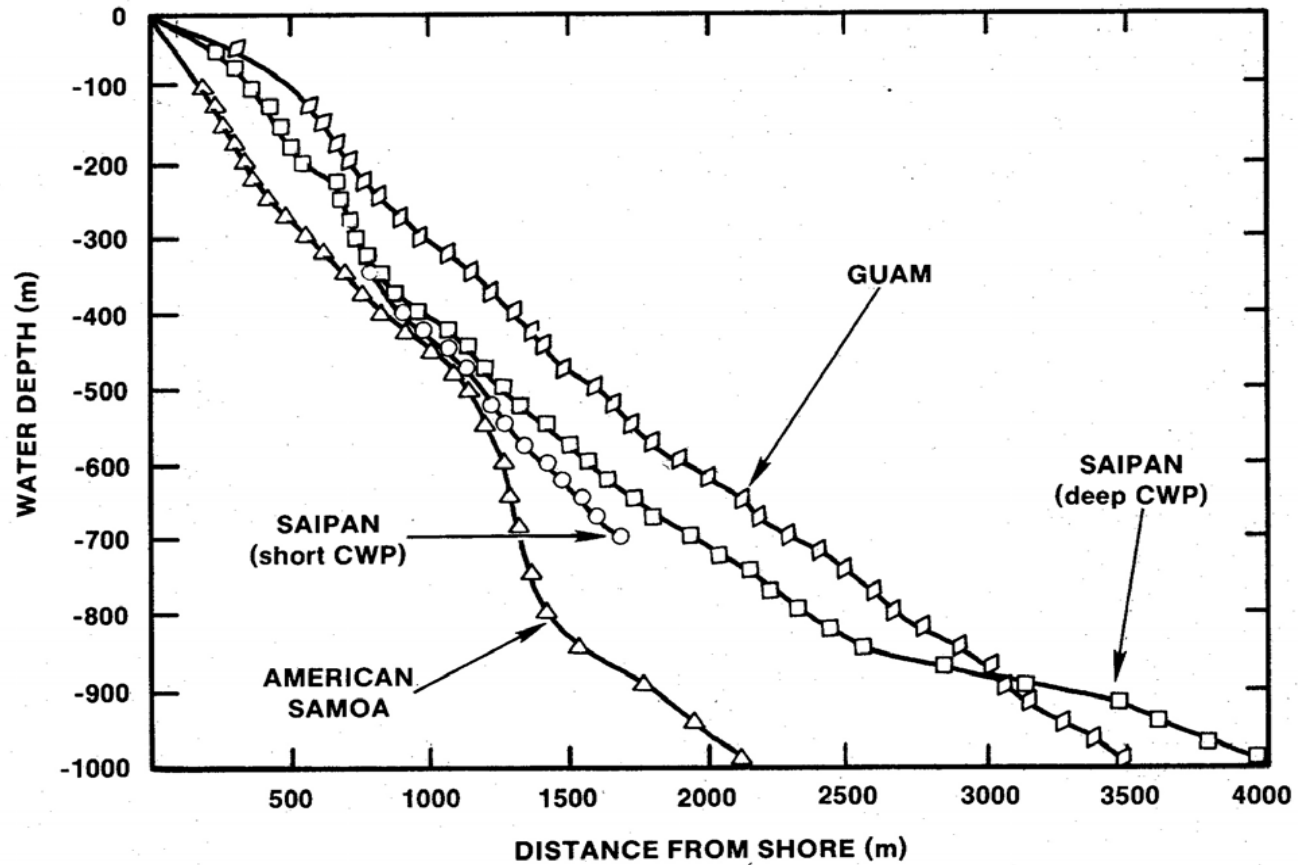


Figure 10. Bathymetric Profiles

An aerial photograph of a coastal town and harbor. The town is built on a hillside with many houses and buildings. The harbor is filled with fishing boats and a large ferry boat. The water is blue and the sky is clear.

Other Renewable Energy Options

- Geothermal.
- Hydroelectric.
- Municipal Solid Waste to Energy.

Conclusions

- **Uncertainties.**
- **Reliability, efficiency and renewables.**
- **Commercially feasible options.**
- **Lost opportunity.**
- **Hawaiian role model.**

A photograph of a tropical sunset. The sky is a mix of deep blue and orange, with a large, bright orange cloud on the left. The sea is calm, reflecting the colors of the sky. In the foreground, there are silhouettes of palm trees and other tropical plants. The text is centered in the lower half of the image.

Photographs by
Jim Wimberly
Joel Michalski
Jeff Shively