

Summary of the Renewable Energy and Energy Efficiency Sections of the USDOl - 2006 Insular Areas Energy Assessment

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Background

- 1982 USDOE Territorial Energy Assessment
General Recommendations:
 - Increase energy conservation
 - Begin to utilize renewable energy to reduce diesel use
 - Hydro - develop more sites
 - Solar - thermal and photovoltaic
 - Wind - not a great resource but worth looking at
 - Ocean Energy - (thermal, tidal & wave) not technically ready
 - Geothermal Energy - Limited opportunity in a few places
 - Biological based energy - Biomass (tree farms), biogas and biofuels development

IAEA 2006

- Managed by the Pacific Power Association under DOI contract
 - Fielded three consultants
 - Two for utility surveys (split among different island areas)
 - One for renewable energy and energy efficiency
 - Input from USDOE through the NREL
 - Reviewed by USDOl

- Insular Areas visited and surveyed
 - Palau
 - Guam
 - CNMI
 - FSM
 - RMI
 - American Samoa
 - US Virgin Islands

- General Recommendations

- Increase energy efficiency

- Supply side - better efficiency of generation and distribution
 - Demand side - use of more efficient equipment
 - Increase vehicular energy efficiency

- Begin to utilize renewable energy to reduce diesel use

- Hydro - develop new sites/rehabilitate old ones
 - Solar - thermal and photovoltaic, grid and stand-alone
 - Wind - resource assessment and grid-connected trials
 - Ocean Energy - (thermal, tidal & wave) not technically ready. Wait for somebody to actually build one on a useful scale.
 - Geothermal Energy - Limited opportunity in a few places
 - Biological based energy - biofuel energy plus small scale biogas and biomass energy development

Supply Side Efficiency

- Utilities need to improve the efficiency of generation (better engine efficiency and lower power plant energy use)
- Reduce distribution losses
- Manage non-technical losses better

Demand Side Efficiency

- Air Conditioning Efficiency Improvement
- Building improvements to reduce A/C needs
- Pump efficiency improvements
- Replace Incandescent lights with more efficient units
- Public information
- Appliance labeling

Hydro

- Limited potential for development
- Re-examine sites previously considered uneconomic (Palau, FSM, American Samoa)

Solar

- Utilities to integrate grid-connected solar to offset diesel fuel use
- Replacement of electric water heating by solar and use solar for new water heating installations
- Independent solar power as the main power source for outer islands (FSM and RMI mainly)

Wind

- Carry out good quality wind resource assessments and prepare resource maps
- Institute trials of grid connected wind systems including good monitoring and evaluation

Biofuel

- Feasibility studies of coconut oil and other products for biofuel production
 - As an outer island fuel produced and used locally
 - For transport and power generation
 - Local trials underway on a small scale (RMI, FSM)

Biogas

- Land fill generated biogas for powering land fill equipment and sale to the grid
- Sewer plant biogas production to power plant machinery
- Pig farm and chicken farm digesters to meet environmental requirements for manure disposal
- Tuna cannery waste disposal

Biomass

- Review biomass resources with local on-site energy production in mind
 - Wood product fabrication waste
 - Agricultural waste

Geothermal

- Few sites with economically developable geothermal
 - Requires fairly large load and near surface heat for economic development

Maybe CNMI, American Samoa, US
Virgin Islands

Ocean Energy

- Ocean Thermal (OTEC) - not commercially available. No operating OTEC plants in the world that are producing commercial electricity.
- Wave energy - many types of systems tried and some now under test but none commercially proven
- Tidal energy - limited opportunity, low tidal range, no proven equipment

Since 2006

- Rapid advancement in solar
 - 225 kWp grid connected solar in Palau
 - 45 kWp grid connected solar in Kosrae
 - 65 kWp grid connected solar in RMI
 - 38 kWp powering two village mini-grids in Yap
 - 70 kWp providing stand-alone AC power to schools and health centers in FSM outer islands
 - Over 1000 lighting systems for rural homes in RMI for a total of about 200kW of solar
 - Initiation of financial incentives in Palau for solar water heating

Wind

- Small wind trials in Yap, CNM, RMI and US Virgin Islands
- Continued consideration of larger wind for American Samoa and US Virgin Islands
- CMI planning 450 kW of wind on Majuro

Energy Efficiency

- Palau government facility energy efficiency improvement policy developed
- Palau NDBP to provide incentives for energy efficient housing construction and solar water heater installation
- Palau and RMI programs for replacing incandescent lights with CFLs
- Engineer hired by PPA will provide northern utilities with supply side efficiency technical support
- General public information on energy efficiency delivered by energy offices

Transport Efficiency

- RMI required diesel vehicle purchases for government (not enforced)
- US Virgin Islands works to improve public transport efficiency