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Published in 2013 by United Nations Industrial Development Organization (UNIDO) and International Center on Small Hydro Power (ICSHP).

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Recommended citation:
5 Oceania

5.2 Pacific Island Countries and Territories – Melanesia, Micronesia, Polynesia

Micronesia

5.2.6 Federated States of Micronesia

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Key facts

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
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<tbody>
<tr>
<td>Population</td>
<td>106,487</td>
</tr>
<tr>
<td>Area</td>
<td>702 km² (land area), occupying &lt;2.6 million km² of the Pacific Ocean</td>
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<tr>
<td>Climate</td>
<td>Tropical; located on southern edge of the typhoon belt prone to occasionally severe storms</td>
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<tr>
<td>Topography</td>
<td>Approximately 607 islands (among which 74 are inhabited). The islands vary geologically from high mountainous islands to low, coral atolls; volcanic outcappings on Pohnpei, Kosrae, and Chuuk</td>
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<tr>
<td>Rain Pattern</td>
<td>Heavy year-round rainfall, especially on the eastern islands. Rainfall varies geographically, with a low record of 300 mm on drier islands to over 1,000 mm per year in the mountainous areas of Pohnpei. Wet season: June-October; dry season: November-May</td>
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Table 1

<table>
<thead>
<tr>
<th>State</th>
<th>Electrification access in Federated States of Micronesia (Percentage)</th>
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<tbody>
<tr>
<td></td>
<td>Chuk</td>
</tr>
<tr>
<td>% Household electrified (2000 census)</td>
<td>33</td>
</tr>
<tr>
<td>% Household electrified (main island)</td>
<td>75</td>
</tr>
<tr>
<td>% Household electrified (2009 estimate)</td>
<td>46</td>
</tr>
</tbody>
</table>

Source: Micronesian Department of Resources and Development

The Government aims to provide affordable and safe electricity to all the households in the main island centres by 2015. It also aims to have an electrification rate of 80 per cent of rural public facilities by 2015 (Strategic Development Plan 2004-2024).

State-owned corporations control power generation in Micronesia. Each island state has its government-owned incorporated electric utility authority, i.e. Pohnpei Utilities Corporation (PUC), Kosrae Utility Authority (KUA), Chuuk Public Utility Corporation (CPUC), and Yap State Public Service Corporation (YSPSC).

Capacity concerns and unreliable electricity production problems have made most major businesses and government offices in Chuuk purchase and operate their own electrical generators. Renewable sources, such as copra from coconut or solar energy for cost-effective photovoltaic (PV) and solar water heating use, have been implemented but their use could be further increased. Between 2007 and 2009, the European Union funded REP-5 project installed over 100 kWp of grid-connected and off-grid solar PV across the four states. A 1.5-MW wave energy development project was launched in October 2011 in Kosrae.

Electricity sector overview

Each of the four states of the Federated States of Micronesia (Micronesia) – Yap, Chuuk, Pohnpei and Kosrae - maintains considerable autonomy for their development strategy. Yap, Pohnpei and Kosrae have extended electrical power distribution lines reaching about 95 per cent of the population. In Chuuk, the utility company only provides electrical power to the island of Weno. Other islands rely on private systems, as the utility’s generators have broken down. Around 55 per cent of all households in Micronesia had electrification from some source (2000 census). See table 1.

The energy sector is overwhelmingly dependent on the import of petroleum for commercial energy use i.e. transport, electricity, business and households (figure 1).

![Figure 1 Electricity generation in the Federated States of Micronesia](image-url)

Source: International Renewable Energy Agency

Small hydropower sector overview and potential

During the Japanese occupation in World War Two, several small hydropower installations were developed. In post-war years they were not maintained and provided little energy. Since 2008, the increasing demand for electricity and higher
generation costs have led to renewed interest in hydropower development.

In 1988, the Nanpil river hydropower system was commissioned on Pohnpei. While the installed capacity is 2.06 MW (maximum output of 1.8 MW), technical problems prevent it from reaching its full capacity (figure 2). It is currently not in operation due to penstock damage.⁵

![SHPinstalled capacity SHP potential](image)

Figure 2: Small hydropower capacities in the Federated States of Micronesia

Some surveys indicated additional small hydropower potential sites, but these were not economically feasible at the time of the survey. In light of the current higher fuel prices, the economics should be recalculated. A study by the United States Army Corps of Engineers in 1981 identified numerous potential hydropower sites on Pohnpe: one on Senipehn River and three on Lehnmasi River. Due to the lack of road access, the relatively high cost for site development and the distance from existing grids, they were not developed. Their total peak potential is approximately 4-5 MW, with an average of 2-3 MW. During the dry months, less power would be produced.

On Kosrae, sites have limited hydropower potential and are unlikely to be cost effective for development. The Malem River in Kosrae was proposed as a site for development of a 35 kW hydropower plant in the late 1980s, but land tenure issues stalled the plans and the project was never materialized.⁵ However, further study of pico hydropower as stand-alone systems to power houses located near rivers should be further studied. Yap and Chuuk have no identified hydropower sites.

### Renewable Energy Policy

The Energy Division of the Micronesian Department of Transport, Infrastructure and Communication is responsible for planning and implementing energy programmes at the state level. The Department of Economic Affairs (DoEA) is the lead organization for climate change, petroleum imports, and legislation pertaining to utilities. Furthermore, the Sustainable Development Council, established in the mid-1990s, meets monthly and deals with energy issues related to sustainable development.⁴

The Strategic Development Plan 2004-2024 includes a number of references to energy by 2020:

- To decrease the import of petroleum fuels and their use by 50 per cent through improved energy efficiency, energy conservation, elimination of energy subsidies, and public education; and
- To generate 10 per cent of electricity in urban centres and 50 per cent in rural areas using renewable energy sources (solar power, wind, and/or solar/wind hybrids) through incentives and public education.⁶

The major goal of the policy is to become less dependent on imported sources of energy, by having an increased share of renewable energy sources and cross-sectoral energy conservation and efficiency standards in place. Therefore, by 2020 the share of renewable energy sources will be at least 30 per cent of total energy production, while energy efficiency will increase by 50 per cent.

A new energy policy and energy action plans were endorsed in 2012 and have the following targets:

- Renewable energy: thirty per cent energy supply from renewable energy sources by 2020;
- Energy efficiency: enhance supply side energy efficiency by 20 per cent by 2015 and increase the overall energy efficiency by 50 per cent by 2020;
- Conventional energy: regional bulk purchase, centralized storage and coordination to secure and obtain efficiency by 2015.

To achieve its goals, the Government had initiated the National Energy Work Group. This group is chaired by the energy division and works closely together with the energy sector in the four Micronesian states.

Additionally, the National Government has prepared its own energy action plans which, in combination with the various states’ action plans, will delineate a road map to assist the nation in achieving its goals and objectives.

Several activities have been delineated under priorities one, two and three:

- Rehabilitation measures to refurbish and put back online existing hydropower turbines.
- In-depth reassessment for the capacity expansion of the Nanpil River Hydropower Plant.
- In-depth reassessment of feasibility of hydropower potential development of all mini- and micro-hydropower schemes, including Lehnmesi and Senpehn rivers, for power generation.
- Completion of design of viable hydropower schemes leading to implementation and commissioning.
- Conduct of feasibility study on building hydropower plant in Kosrae.
• Construction of hydropower plants based on findings and recommendations of study.

**Barriers to small hydropower development**

• There is currently no effective national energy planning, as the Micronesian Congress decided that energy should be dealt with at the state level. From the late 1990s to 2004, national energy matters were handled on a part-time basis by staff of the Department of Economic Affairs (DoEA);³

• There is no clear energy role for the DoEA and no formal links between the office and the four states on energy matters;⁵

• Pohnpei has high interior rainfall on both islands, approximately 35 streams have small catchments. According to the Micronesian National and State Energy Action Plans², these streams are not generally practical for base load hydropower without using expensive and environmentally problematic storage ponds. A trade-off between reliability of power delivery and cost of installation would need to be made. In some cases drinking water reservoirs have been used as storage ponds to secure more constant water supply.

**Note**

i. The Support to the Energy Sector in Five ACP Pacific Island Countries (REP-5) programme was a 9th European Development Fund (EDF9) multi-country initiative which funded renewable energy and energy efficiency projects in five Pacific Island Countries, including FSM. Source: www.rep5.eu

**References**


