Sustainable Energy Policy:
Overview Report on an Advisory Mission to the Cook Islands
Final Report; 4 October 2001

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* This report benefited from comments on an earlier draft by Ms Rikke Munk Hansen (Energy Resources Section, ESCAP) and Mr Chris Cheatham (ESCAP mission consultant). Mr Solomone Fifita (SPC), Mr Paul Fairbairn (SOPAC) and Mr Alan Bartmanovich (Forum Secretariat) all provided useful comments, advice and background information. Mr Mata Nooroa and Mr Tangitamaiti Tereapii of the Energy Division of the Ministry of Works also provided helpful comments on a partial first draft.
Summary

In cooperation with the SPC and SOPAC (and more broadly, the CROP Energy Working Group), ESCAP was asked to advise the Government of the Cook Islands (GoCI) on sustainable energy development, in particular to review existing national energy policies including legal tools, energy sector institutions and pricing issues. An ESCAP mission visited Rarotonga for one week in September 2001 and produced two reports:

i) **Overview.** This overview report summarises energy policy issues in the Cook Islands and provides general recommendations to improve both the policies and possible means to more effectively implement them; and

ii) **Detailed Commentary.** At the request of the Director of Energy, a separate paper provides a detailed commentary on the draft *Cook Islands National Energy Policy 2001* which was prepared with the assistance of SOPAC with additional input from the Forum Secretariat and SPC. The second report is in the form of an annotated version of the draft.

The mission visited Rarotonga while the Government was actively considering changes to energy policy, energy institutional arrangements, and future electricity supply. The ESCAP team also had the good fortune to be invited to brief the Cabinet on its work and to complement a UNDP/UNESCO supported team studying the feasibility of grid-connected wind energy. The Division of Energy, whose staff were very helpful, coordinated arrangements.

The main conclusions and recommendations are summarised below (in the same order as the topics are covered in the main report, not necessarily in order of priority).

1) **National Energy Policy.** A draft *National Energy Policy 2001* (NEP 2001) has been prepared by the GoCI. An updated national energy policy is both appropriate and timely, and the current draft states key energy issues concisely. However, information is somewhat out of date, the status of the document is unclear, it contains inconsistencies, and it lacks a sense of priorities for action. Proposed Government policies and strategies are unclear regarding the management and pricing of outer island electricity supply, particularly from renewable energy sources. **Regarding NEP 2001, it is recommended that:**

   i) *The current draft should be amended so it is internally consistent, provides practical guidelines, and clearly states for officials and donors the Government’s intentions, energy pricing policies, and priorities within the energy sector;*

   ii) *The revised draft should be circulated widely within Government (and externally) for debate and comments before it is finalised;*

   iii) *The final version should be endorsed by Cabinet by the end of 2001 and (if appropriate) by Parliament as soon as practical; and*

   iv) *Support for the finalisation process through a local consultancy should be sought.*

2) **Institutional Issues.** The Energy Division is physically located within the Ministry of Works but ministerial responsibilities for energy matters are scattered over a number of separate ministries with overlapping mandates. There is confusion among public servants (and others) regarding authority, responsibility, accountability and reporting. The Energy Division also handles electrical inspections and safety, which require different skills from energy policy and administration. The mission understood that the government may distribute energy policy staff between two ministries, in part to service a newly created Sustainable Energy Committee. However, dispersal is very likely to reduce, not improve, the capacity of the government to more effectively plan and manage the energy sector. **It is recommended that:**
i) Energy policy and management functions within the Energy Division should be retained as a single cohesive unit, not reduced in numbers with some staff dispersed among several ministries;

ii) The Energy Division should be strengthened with the addition of at least one additional staff member to deal with economic and pricing matters; and

iii) The GoCI should consider separating energy policy and management functions from inspections and safety.

3) Petroleum Supply, Management and Pricing. This report only touches briefly on petroleum, a topic that is being separately addressed for the Cook Islands by the Forum Secretariat. It is, however, noted that the GoCI is not adequately attending to a number of petroleum fuel quality, storage, safety, and pricing matters. It is recommended that:

i) The GoCI should designate a specific point of contact for petroleum matters;

ii) The GoCI should seriously consider adopting the regional petroleum storage standards developed by the Forum Secretariat and improve its safety inspections; and

iii) The GoCI capacity to effectively handle petroleum product storage, standards, quality, environmental protection and shipping should be improved through practical training for those who actually deal with these issues.

4) Energy-related Legislation. The Energy Act stipulates that the Energy Division is responsible for a wide range of functions. These include overall electricity planning; energy supply from renewable sources; electrical safety; efficiency and conservation of energy use; monitoring of electricity prices; monitoring fuel standards and quality; and assuring energy services which are environmentally sound. However the Division has no apparent legislated authority to carry out most of these functions or even clear-cut access to the necessary information. The legislation governing electricity supply on Rarotonga (the TAU Act) specifies a Board of Directors that includes the Secretary responsible for Energy. Currently there is no such representation and the Board may not be legally constituted. Also there may be discrepancies or ambiguities within the TAU Act, the Energy Act and other legislation (Dangerous Goods; Building Controls and Standards) regarding responsibilities for some aspects of electricity supply and petroleum product storage, standards and safety. It is recommended that:

i) The provisions of the TAU Act should be respected; in particular the Secretary responsible for Energy should be recognised as an ex-officio Board member;

ii) All legislation dealing with energy matters (including electricity, renewables and petroleum products) should be reviewed, and if necessary amended, to assure consistency with Government intentions and requirements for the present and near future;

iii) Legislation should be amended as required to provide the officials responsible for energy matters with the authority to effectively carry out their duties; and

iv) The GoCI should consider amendments to the TAU Act or its associated regulations to encourage energy conservation and renewable energy sources where cost-effective and commercially viable.

5) Electricity Supply and Pricing on Rarotonga. The mission has not studied TAU in any detail and is not in a position to assess institutional issues. The Asian Development Bank (ADB) carried out a comprehensive review of the electricity sector in 1998 and reached numerous conclusions which remain valid today. Regarding pricing, TAU has an increasing block tariff structure for households; i.e. as electricity consumption increases, the cost per unit consumed also increases. Businesses pay a higher flat rate than households. The tariff policy is presumably meant to assist low-income consumers while discouraging high levels of consumption by households. The rationale for cross-subsidies from Rarotonga’s businesses to households is not known. It is recommended that:
i) **TAU should retain its implicit policy of a subsidised ‘lifeline’ tariff to meet the basic needs of low-income consumers (perhaps reduced from 60 to 40 units per month). Consumption above this level should be at a flat rate that fully covers all costs (including the lifeline subsidy); and**

ii) **TAU should reconsider the justification of a tariff structure for business that exceeds costs, and replace it with the same flat rate which would be charged for household consumption.**

6) **Electricity Supply and Pricing in the Outer Islands.** Electricity supply away from Rarotonga is the responsibility of the Island Councils. Although there is no longer any formal subsidy for outer island supply, some maintenance costs are met by the Office of the Minister of Island Administration (OMIA). In addition, a portion of the cash grants to the Councils is used to offset some power station costs. Following staffing reductions at the power plants in the 1990s, the hours of electrical service decreased for some islands. It is likely that quality of service decreased as maintenance standards and spare parts inventories also declined. Recent information on the cost of electricity supply, and the portion of costs met directly by consumers, is not routinely calculated by OMIA. This is unfortunate as all subsidies should be explicit; both consumers and officials should know the true cost of electricity. **It is recommended that:**

i) **OMIA should develop a standard spreadsheet for use by the Island Councils (and OMIA itself) for calculating the actual full cost of electricity supply (all capital, operating, maintenance and OMIA support costs); and**

ii) **OMIA should assure that Island Councils are aware of the level of subsidies for electricity use (as these reduce the grants otherwise available for other island development).**

7) **Renewable Energy Development and Pricing.** In the Cook Islands (as in most of the Pacific) there is a long history of renewable energy projects in remote communities with inadequate attention to institutional arrangements, high subsidies, poor mechanisms for adequate cost recovery, a limited sense of local ownership, and often short operating lifetimes. The Puka Puka solar photovoltaic (PV) system has generally operated satisfactorily in a technical sense but will require substantial funding for batteries and maintenance in the near future; it has not been well managed financially. New PV and wind energy installations are planned for one or more islands but there are no clear or consistent arrangements for management, operations, pricing and training. **It is recommended that:**

i) **The GoCI should abandon the blurry distinctions among ‘pilot’, ‘demonstration’ and ‘commercial’ renewable energy installations and only consider technologies that are robust, reliable, commercially proven and practical now for use in the Cook Islands. (An exception could be made for small systems meant solely for education or training at training institutions);**

ii) **When the GoCI is considering outer island electricity supply from diesel or renewable options, the costs of each should be calculated on a comparable basis so a rational choice can be made;**

iii) **The management structures for all outer island renewable energy systems should include; a) a monthly consumer charge which is sufficient to cover all operating and maintenance costs; and b) a collection mechanism which is administered from Rarotonga, not locally; and**

iv) **The GoCI should seek external assistance from an appropriate neutral source (perhaps ESCAP) to evaluate options for proposed grid-connected wind energy for Rarotonga and advise on future government actions.**
Introduction

The Government of the Cook Islands (GoCI) requested the United Nations’ Economic and Social Commission for Asia and the Pacific (ESCAP) to advise it on sustainable energy development, in particular to review existing national energy policies including legal tools, energy sector institutions and pricing issues. In response, an ESCAP mission\(^1\) visited Rarotonga from 5 through 12 September 2001 and produced this report. The mission cooperated closely with the SPC and SOPAC energy programmes, working through the CROP Energy Working Group, chaired by the Forum Secretariat. *Terms of Reference* are attached as Annex 1, *Organisations and People Consulted* as Annex 2, *Acronyms and Abbreviations* as Annex 3 and the main written *Materials Consulted* as Annex 4.

This Cook Islands undertaking is a component of a wider “Advisory Mission to the Cook Islands, Fiji, Kiribati, Tuvalu and Tonga on Renewable Energy Policies, Reviews and Options for Subregional Cooperation.” Findings and recommendations dealing with subregional energy sector cooperation, particularly renewable energy, are presented in a separate report to be presented to a subregional Expert Group Meeting.

1. National Energy Policy

**Background.** In 1996, the Forum Secretariat Energy Division helped prepare *The Cook Islands National Energy Policy Statement*, a brief useful summary that was reportedly never finalised or adopted in part because it was felt by the GoCI to be a generic approach for the Pacific subregion, rather than specifically suited for local needs. Two years later, after most of ForSec’s energy services had been transferred to SOPAC,\(^2\) the government asked for SOPAC assistance to further develop an energy policy. This was subsequently prepared with additional inputs from the SPC and ForSec, the latter on petroleum issues. The paper has gone through several revisions, most recently in 2000 as a draft *National Energy Policy 2001* (NEP 2001). At the request of the Director of Energy of the GoCI, the ESCAP mission has prepared a separate commentary on the current draft. Therefore, to reduce repetition, this section of the mission’s overview report is brief.

**Sustainability.** NEP 2001 is meant to provide national policies for sustainable energy use and sustainable development. The concepts of ‘sustainable energy’ and ‘sustainable development’ have been dealt with in numerous global reports and specifically for island countries.\(^3\) The meanings of these terms are far from obvious, are controversial, and are not discussed in any detail in this report. However, a national energy policy that purports to be ‘a tool for sustainable development’, as the draft NEP 2001 does, should explain these terms sufficiently to assure that readers

\(^1\) The Cook Islands mission team consisted of Ms. Rikke Munk Hansen (Associate Economic Affairs Officer, Energy Resources Section, Environment and Natural Resources Development Division, ESCAP) and Mr. Peter Johnston (Consultant on Energy and Environmental Policy, Suva, Fiji).

\(^2\) Advice on petroleum product standards, pricing, storage, etc. remained, and still remains, with ForSec.

understand broadly what is meant. For the purposes of this report (and for GoCI consideration for use in NEP 2001), the following definitions are used:

- **Sustainable Development.** The standard definition\(^4\) is “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs”, and implies using resources more efficiently to improve the quality of human life within their carrying capacity.

- **Sustainable Energy.** According to UNDP,\(^5\) “the two major components of a sustainable energy strategy are: 1) more efficient energy use, especially at the point of end-use, and 2) increased use of renewable sources of energy.”

Although there is no really practical definition of ‘sustainable development’ to guide decision-makers and officials, it is nonetheless a useful broad guiding principle for a progressive shift in direction rather than some static end product. This is equally true of the energy sector and the concept of ‘sustainable energy.’ A simple but crude way to estimate progress in energy as a tool for sustainable development in the Cook Islands could be energy consumption as a proportion of GDP: energy use which grows at a lower rate than the economy would suggest a shift in the appropriate direction (assuming that the structure of the economy doesn’t change much).

**The NEP.** The Cabinet of the GoCI has stated\(^6\) its desire for increased use of properly managed and practical renewable energy sources. However, the GoCI has no stated policies for energy use and development. An updated national energy policy is both appropriate and timely. Although the current draft NEP 2001 states the key energy issues concisely, it requires amendments if it is to serve as a practical guide for officials, the private sector, potential donors and others:

- The status of the document is unclear. It appears to be a departmental document with little input from other Ministries. The mission understands that the intention is to seek formal endorsement by both Cabinet and Parliament. If this is done, the final document released to the public should clearly indicate their endorsement.

  *The revised draft should be circulated widely within Government (and externally) for comments. There should be a process to reach consensus within Government, logically through the Sustainable Energy Committee, before it is finalised. The final version should be endorsed by Cabinet by the end of 2001 and (if appropriate) by Parliament as soon afterwards as practical.*

- The draft was prepared in 1998 with only partial updating in 2000 so some information is out of date and should be changed. There are inconsistencies regarding policies and strategies, definitions, respective treatment of diesel-based and renewable energy, etc. which need addressing. There is no clear sense of priorities for action.

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4. This definition from the Brundtland Commission (WCED, 1987) is the concept most accepted internationally. The WCED's 'critical objectives' (an often ignored part of its definition) include reviving economic growth and changing its quality, ensuring a sustainable level of population, meeting basic human needs, conserving and enhancing the resource base, reorienting technology, managing risk, merging environmental concerns and economics in decision-making, and reorienting international economic relationships.


6. This was during discussions with the mission on 11 September 2001.
The current draft should be amended so it is internally consistent, provides practical guidelines, and clearly states for officials and donors the Government’s intentions, energy pricing policies and priorities within the energy sector.

- Because of tight budget constraints, the Energy Division of the GoCI has no funds available for further consultations, incorporation of a consistent policy perspective, further editing and finalisation.

The GoCI should seek external assistance to support the NEP finalisation process using a local (Cook Islands) consultant.

The September 2001 annotated version of the draft NEP 2001 contains many detailed suggestions that are not repeated here. It is suggested that the two reports should be considered together during the NEP consultative and finalisation process.

2. Institutional Issues

The Energy Division. An Energy Division is located within the Ministry of Works. A Director, who supervises four other staff, heads the Division and reports to the Secretary of Works who is responsible to the Minister of Works. The structure is shown below in Figure 1. The capacity for energy planning, administration and policy is even weaker than the small number of staff suggest. Two of them deal primarily with inspections of electrical wiring and related electrical standards and safety issues, matters not usually handled by energy officials. The Director is also the Chief Electrical Inspector and spends about half of his time managing inspection and safety matters.

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The GoCI initiated a request to ESCAP for such assistance during the mission. The finalised NEP 2001 could, in cooperation with the CROP EWG, be presented to the 2002 Regional Energy Meeting as a model energy plan for the Pacific region.

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7 The GoCI initiated a request to ESCAP for such assistance during the mission. The finalised NEP 2001 could, in cooperation with the CROP EWG, be presented to the 2002 Regional Energy Meeting as a model energy plan for the Pacific region.
Unclear Responsibilities. The Director is also responsible to the Minister for Energy for some aspects of the Division’s work with an informal allocation between the Energy and Works Ministers. As shown in Figure 2, Ministerial responsibilities for matters related to energy are actually scattered over a number of separate ministries and mandates overlap. There appears to be confusion among public servants and others regarding authority, responsibility, accountability and reporting.

<table>
<thead>
<tr>
<th>Ministerial Responsibility</th>
<th>Prime Minister</th>
<th>Minister for Energy</th>
<th>Minister for Island Administration</th>
<th>Minister for Works</th>
<th>Minister for Internal Affairs</th>
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<td>Responsible for:</td>
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<td>Emissions</td>
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<td>Responsible through:</td>
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<td>TAU</td>
<td>OMINA as Committee secretariat</td>
<td>Cabinet</td>
<td>OMIA</td>
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<td>Services</td>
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<td>?</td>
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Notes:
1) † Currently the same Minister holds both the energy and island administration (OMIA) portfolios. The Prime Minister is also the Minister responsible for Environment.
2) Energy Division staff report informally to Minister of Energy for renewable energy matters and the Minister for Works for energy policy matters (including electricity planning, electricity tariff and monitoring fuel standards and quality).
3) * The Prime Minister is responsible for government-owned corporatised entities, including TAU, through the Cook Islands Investment Corporation (CICC).
4) ** Establishment of the SEC was approved by Cabinet on 11 September 2001 but it had not met at the time of the mission.
5) *** For example, street lighting in Rarotonga.
6) **** There are no formal cash subsidies for outer island electricity supply. OMIA administers general grants to the islands some of which are used for electricity. In addition, OMIA pays for some staff who supervise / oversee power plant maintenance.

Figure 2: De Facto Ministerial Responsibilities for Energy Matters (September 2001)

It is not necessary that a single Energy Office, Department, Division or Ministry should handle all energy sector matters. In small countries with petroleum fuel price control, for example, the Finance Ministry often administers pricing whereas other Ministries (presumably with the necessary technical skills) oversee petroleum transport, storage and safety. It is also common for an Energy Office to deal with overall electricity utility policy with the Finance Ministry or utility itself having the final say on tariff levels and policy. Nonetheless, the current arrangements in the Cook Islands are unusually dispersed and hinder the development and implementation of consistent energy policies and their administration.

The Sustainable Energy Committee. The Terms of Reference (TOR) for a newly established Sustainable Energy Committee (SEC; shown in Figure 2) were not available to the mission. Apparently the SEC will report to the Minister of Energy, consist of nine public and private sector members, use the Office of the Minister for Island Administration (OMIA) as its Secretariat, and

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8 These are representatives of the Ministry of Finance & Economic Management, OMIA (for outer island matters), TAU (for electricity on Rarotonga), the Energy Division of MOW, the Office of the Prime Minister, the Crown Law Office, Environment Services, the Cook Islands Chamber of Commerce, and Mr Tom Wichman (a private renewable energy / environment consultant).
advise the Minister primarily on proposals for renewable energy development although it may make sense to expand the TOR to include a review of NEP 2001, petroleum matters and a sustainable approach to energy development overall. Options for support reportedly include a new staff member recruited specifically for the SEC, reallocation of MOW Energy Division staff to OMIA, or part-time support from the Energy Division with no staff relocated to OMIA.

**Observations and Recommendations.** The Cook Islands public service, including energy administration, has gone through considerable reform, reduction in staff numbers and budget cuts in recent years. It is unlikely that the GoCI would consider further major restructuring now, particularly involving substantial expenditures. In any case, a properly staffed Energy Division of five should be sufficient for a country of less than 20,000 people. There are various practical ways to structure energy planning, policy and administration to utilise a limited number of people more effectively. This mission does not recommend a particular structure or suggest that a specific Ministry should have prime responsibility for energy matters. This is a matter for the GoCI to resolve. However, considering the responsibilities of the Energy Division as prescribed under law, it is recommended that:

- *Energy Division staff should report to a single Minister (whether Energy or Works)*;
- *The Energy Division should be retained as a single cohesive unit that is the focal point for energy matters, not reduced in numbers with some staff dispersed among several offices or ministries. Dispersal would reduce, not improve, the capacity of the government to plan and manage the energy sector. It would also increase the likelihood of inconsistencies (in policies, management, pricing mechanisms, etc.) for electrical energy produced from diesel systems and renewable energy sources*;
- *To meet its legal obligations, the Energy Division should be strengthened with the addition of at least one additional staff member to deal with economic, financial and pricing matters and to help service the SEC*; and
- *Any additional staff hired to support the Sustainable Energy Committee should be based within the Energy Division and report through its Director*.

Although the mission does not recommend a specific structure, it makes the following observations and comments:

- *Electrical safety and inspections require different types of skills than those of energy planning and policy. It may make sense to separate them. A small MOW Safety and Inspections Division could handle technical energy sector safety issues for both electricity and petroleum (oil storage standards & inspections, fuel standards, service station safety, waste oil management, standards for fuel shipping to outer islands, etc.); and*
- *The Energy Division, losing its inspectors but gaining at least an economist, could then shift to the office of the Energy Minister and concentrate on its energy planning, pricing and management obligations, including electricity, petroleum fuel and electricity end-use efficiency, the Sustainable Energy Committee and renewable energy*.

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9 These legal responsibilities are discussed in Section 4.
In 1998, the Asian Development Bank ¹⁰ advised that the energy office required capabilities in economic analysis (energy pricing; capital and life cycle costing) technical analysis (conventional and indigenous energy systems), safety and inspections (electricity; petroleum), demand side management (for energy efficiency programmes) and broad project design and management skills. The ADB felt these could be adequately handled by three professionals (economist, management specialist; technologist) and two support (secretary/computer data entry; electrical and safety inspector). These conclusions remain valid if inspection responsibilities are to remain within the Energy Division.

3. Petroleum Supply, Management and Pricing

This report only briefly considers petroleum fuels, an important energy topic but for the most part beyond the mission’s terms of reference. In addition, the Forum Secretariat’s Petroleum Adviser is currently preparing a report that deals with petroleum fuel supply, pricing, quality and standards, storage, and safety. ForSec reportedly intends future advisory services on access to main island storage tanks and improved (and less costly) product supply to outer islands.

As shown in Figure 3, responsibilities for petroleum are spread among a number of ministries. TAU is also a major petroleum user and negotiates its own fuel supply contracts. Maximum wholesale and retail fuel prices are established by Labour and Consumer Services. The Dangerous Goods Inspector is responsible for assuring the safety of petroleum storage. Both the MOW’s Energy Division and Environment Services have responsibilities regarding environmental aspects of energy use such as oil spillage and waste oil management. There are also overlapping responsibilities (Energy Division; Internal Affairs) for fuel standards and quality. The Energy Division is responsible for energy efficiency and conservation in general, including fuel used for transport, power generation, or other purposes.

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<tr>
<th>Tenaonga Uira (TAU)</th>
<th>Environmental Services</th>
<th>Ministry of Works (Energy Division)</th>
<th>Office of Minister of Island Administration (?)</th>
<th>Ministry of Internal Affairs (Dangerous Goods Inspector)</th>
<th>Ministry of Internal Affairs (Labour and Consumer Services)</th>
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<tr>
<td>TAU fuel supply contract</td>
<td>Oil spills; Waste oil management; Environmental impact assessments; Emissions</td>
<td>Monitoring product standards and quality; Fuel use efficiency; Environmental aspects of energy</td>
<td>Petroleum product shipping to outer islands?</td>
<td>Petroleum storage and safety</td>
<td>Petroleum product pricing and quality</td>
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Figure 3: Apparent Responsibilities for Petroleum Product Matters (September 2001)

Apparently no GoCI ministry has been designated as the official point of contact for petroleum matters. This may explain in part why officials dealing with product pricing and

¹⁰ Cook Islands Power Development Study by John Worrall, et. al.
oil storage standards seem to be insufficiently aware of recent regional efforts to improve price calculations and monitoring or the development of regional petroleum storage standards. It is recommended that:

- The GoCI should clearly designate a specific point of contact for petroleum matters;
- The GoCI should seriously consider adopting the regional petroleum storage standards developed by the Forum Secretariat and improve its system of safety inspections; and
- The GoCI capacity to effectively handle petroleum product storage, standards, quality, environmental protection and shipping should be improved through practical training for those who actually deal with these issues on a day-to-day basis.

4. Energy-related Legislation

There are two Acts of the Cook Islands Parliament that deal directly with energy issues and (at least) two others dealing with related issues. These are discussed below:

The Energy Act (Act No. 18 of 1998). Under the provisions of the 1998 Energy Act, which came into force on 1 September 2000, “the principle functions of the Division shall be to:

(a) plan for, promote, and encourage, for the benefit of residents and temporary visitors in the Cook Islands, the development of different sources for the generation of energy including, but not limited to, diesel, gas, coal, photovoltaic, ocean, thermal, wind, and biomass generation;

(b) ensure standards of safety, efficiency, and economy of operation in respect of the generation, transmission, and distribution of energy;

(c) review any Act or legislation that may affect the energy sector;

(d) promote and encourage the safe and efficient use of energy;

(e) promote and encourage measures for conservation of all forms of energy;

(f) encourage research regarding exploitation of different energy sources consistent with local requirements and resources, bearing in mind the benefits of conserving the environment;

(g) monitor electricity tariffs; and

(h) monitor and approve the quality of imported petroleum products, and compliance with fuel standards.”

The bulk of the Act deals with electrical inspection and safety (which is normally not an energy office responsibility) and virtually all of the powers of the Division relate solely to these inspection functions, not those listed above.

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11 The mission did not have the time or opportunity to review Cook Islands environmental legislation or regulations related to energy use.

12 A revised bill was prepared in 1998 to replace the current Energy Act, establish a new Department of Energy and clarify the department’s responsibilities and authority. It was not enacted. The mission cannot comment on the proposed bill as it was no longer available.
The Division has *responsibility* for the planning aspects of generation of electricity but no *authority* to affect electricity planning within TAU for Rarotonga or within OMIA or Islands Councils (for outer islands) nor any *accountability* for doing so;

Similarly the Division is responsible for promoting and encouraging energy efficiency and conservation without any power to do so for either electricity or petroleum fuels.

The Division has monitoring responsibilities for electricity and petroleum but no clear-cut access to the information required to carry out these functions.

The Energy Division should not, of course, usurp the powers of TAU or the Island Councils. In the case of TAU, the Division’s responsibilities (and access to information) can be assured through Board membership. For outer islands, it requires a clear link with OMIA. For petroleum monitoring, it needs access from importers to accurate information on the products imported and the appropriate standards.

*All legislation dealing with energy matters (including electricity, renewables and petroleum products) should be reviewed, and if necessary amended, to assure consistency with Government intentions and requirements for the present and near future; and*

*Legislation should be amended as required to provide the officials responsible for energy matters with the authority to effectively carry out their duties.*

**The Te Aponga Uira O Tumu-Te-Varovaro Act** (Act No. 17 of 1991 and various amendments through 1999). The TAU Act established the authority or utility which generates and distributes electricity for the island of Rarotonga, about 90% of national generation. Under the Act, “There shall be a Board of Directors of the Authority which shall have overall control of the Authority, subject to the provisions of this Act. … The Secretary, Ministry of Energy, shall be ex-officio Director of the Authority.” There have been no amendments changing Board membership but the Secretary responsible for energy is no longer a member of the Board. Without representation on the Board, the Energy Division cannot fulfil its responsibilities under law for electricity planning and tariff monitoring.

The Energy Division has responsibilities related to the efficient use of energy. The draft NEP 2001 specifies (and presumably the final version will specify) that sustainable and renewable energy sources will be preferred for development where these are commercially proven and viable in the Cook Islands context. The GoCI has also signed the United Nations Framework Convention on Climate Change and has pledged to reduce emissions of Greenhouse Gases (GHGs); this can most easily be accomplished through improved energy efficiency and increased use of renewable energy sources to replace petroleum. The TAU Act requires the Authority to assure efficient supply of energy. However, there is nothing in the Act regarding renewable or sustainable energy

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13 Within the Act, ‘energy’ is explicitly defined as ‘electricity’. The term ‘all forms of energy’ is presumably meant to encompass petroleum, biomass, etc. as well.

14 Until recently, the Secretary for Works, Energy and Physical Planning and later the Secretary for Works (who is responsible for Energy) was a TAU Board member. The Director of Energy normally attended on behalf of the Secretary.

15 There is, however, no legally binding obligation under the UNFCCC or the Kyoto Protocol (which has yet to be ratified) for the Cook Islands to reduce GHG emissions.
and no requirement to promote the efficient use of energy.\textsuperscript{16} Incorporating energy end-use efficiency into the Act is a practical step toward sustainable energy as defined previously in Section 1. The following actions are recommended:

- \textit{The provisions of the TAU Act should be respected; in particular the Secretary responsible for Energy should be recognised as an ex-officio Board member; and}

- \textit{When the NEP 2001 is finalised, the Government should consider amendments to the TAU Act or its associated regulations to encourage energy conservation and renewable energy sources where cost-effective and commercially viable.}

\textbf{The Dangerous Goods Act} (Act No. 21 of 1984; associated regulations of 1991). This Act requires an Inspector of Dangerous Goods to assure the safe storage and handling of a range of dangerous substances such as flammable materials. It specifically includes petroleum products and their storage tanks. However, there are no clear standards for petroleum products or their storage, handling and inspection. The officials responsible (Ministry of Internal Affairs) tend to rely on the petroleum companies and storage tank owners to comply with requirements.

\textbf{The Building Controls and Standards Act} (Act No. 11 of 1968 and its associated 1991 Regulations) requires building permits for all storage tanks with a volume of 5000 imperial gallons (22,730 litres) or more but there are no specific requirements.

Regarding petroleum, the following are recommended:

- \textit{The GoCI should adopt clear and enforceable standards for petroleum products and their storage and handling;}

- \textit{The GoCI should develop an adequate system of storage licensing and inspections; and}

- \textit{As suggested previously, the GoCI should seriously consider adopting the regional petroleum storage and inspection standards and procedures developed by the Forum Secretariat.}

5. \textbf{Electricity Supply and Pricing on Rarotonga}

TAU, the Rarotonga electricity authority, has approximately 3,500 customers (85% domestic who consume about 44% of production; 15% commercial who consume 66%). Sales in 1998 were about 15 million kWh. The mission has not been asked to consider TAU institutional issues and does not offer advice on this. In any event, the 1998 ADB study (see Section 2) comprehensively reviewed the electricity sector on Rarotonga and the outer islands. The ADB reached a number of conclusions – including the role of the Energy Office/Division in TAU affairs – which remain broadly valid today. The Energy Division should not determine the electricity charge, which is a Board function. However, it should as the ADB advised, determine the actual costs of electricity services and ensure (through the Board and advice to the Minister) that the tariff is sufficient to

\textsuperscript{16} TAU does distribute brochures to its customers on more efficient use of energy. In the past, TAU reportedly installed solar water heaters (to reduce electricity use) with the cost added to the electricity bill, spread over some months. Apparently this was dropped due to private sector complaints that TAU was reducing private solar water heater sales. However, it should be readily easy for TAU to encourage solar water heating, energy-efficient lighting, etc. and address private sector concerns. The latter could import and install the equipment but with costs incorporated into the consumers’ monthly power bills and spread over a year or more.
fully recover costs while maintaining government policies on adequate provision of electricity to low income households.

As shown in Table 1, TAU has an increasing block tariff structure for households; i.e. as consumption increases, the cost per unit consumed also increases. Businesses generally pay a higher flat rate. This policy is presumably meant to assist low-income consumers while discouraging high levels of household consumption. The rationale for cross-subsidies from Rarotonga’s businesses to households is not known.

It is recommended that:

- **TAU should continue its policy of a low ‘lifeline’ tariff to meet the basic needs of low-income consumers** (but perhaps reduced from 60 to 40 units per month). Consumption above this level should be at a flat rate that fully covers all costs (including the lifeline subsidy); and

- **TAU should reconsider the justification of a higher tariff for business customers and replace it with the same flat rate which would be charged for household consumption.**

### 6. Electricity Supply and Pricing in the Outer Islands

According to SPC (2000), about 80% of the inhabitants of the eleven outer island groups have access to electricity, typically for 12-19 hours per day, from grids connected to diesel-fuelled generators. Electricity supply for all islands except Rarotonga is the responsibility of the respective Island Council. Table 2 shows that the actual 1998 cost of supply averaged NZ$ 0.58 per unit – ranging from $0.43 in Aitutaki to $1.00 in Palmerston – compared to $0.35 for Rarotonga. Domestic consumers paid much less (a flat rate of $0.36 per kWh) as costs were heavily subsidised from Rarotonga. Today there is no formal subsidy for outer island electricity and each Island Council sets its own rates depending on costs for that island’s power system (or systems). However, some maintenance costs are met by OMIA and varying portions of the cash grants to the islands are used to meet part of power station costs. Current costs and implied subsidies are not known, although OMIA routinely collects the information which would allow reasonably accurate estimates to be made.

Following staffing reductions at the island power plants in the 1990s, the hours of electrical service decreased for some islands. Maintenance standards and spare parts inventories also declined. In general the outer island systems excluding the largest (Aitutaki) suffer from irregular fuel supply.

#### Table 1: Rarotonga Electricity Prices (NZ$; 2001)

<table>
<thead>
<tr>
<th>Consumption</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td></td>
</tr>
<tr>
<td>1-60 kWh/m</td>
<td>23 ¢/kWh</td>
</tr>
<tr>
<td>61-240 kWh/m</td>
<td>41 ¢/kWh</td>
</tr>
<tr>
<td>Over 240 kWh/m</td>
<td>49 ¢/kWh</td>
</tr>
<tr>
<td>Commercial</td>
<td></td>
</tr>
<tr>
<td>Fixed charge</td>
<td>$5 / month</td>
</tr>
<tr>
<td>Flat rate per kWh</td>
<td>49 ¢ / kWh</td>
</tr>
</tbody>
</table>

**Notes:** 1) kWh = kilowatt hour = 1 ‘unit’. 2) A ‘dual’ tariff (premises used for business & residence) = $10/m plus the domestic rate for consumption. US$1.00 = about NZS2.40

#### Table 2: Island Electricity Cost (1998)

<table>
<thead>
<tr>
<th>Island</th>
<th>Full Cost in NZ $ / kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aitutaki</td>
<td>43</td>
</tr>
<tr>
<td>Atiu</td>
<td>58</td>
</tr>
<tr>
<td>Mangaia</td>
<td>54</td>
</tr>
<tr>
<td>Mitiaro</td>
<td>85</td>
</tr>
<tr>
<td>Mauke</td>
<td>74</td>
</tr>
<tr>
<td>Penrhyn</td>
<td>85</td>
</tr>
<tr>
<td>Manihiki</td>
<td>74</td>
</tr>
<tr>
<td>Rakahanga</td>
<td>88</td>
</tr>
<tr>
<td>Palmerston</td>
<td>100</td>
</tr>
<tr>
<td>All islands *</td>
<td>58</td>
</tr>
</tbody>
</table>

**Notes:** 1) * Excludes Rarotonga. 2) Source is ADB, 1998.

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17 Commercial consumers on average paid actual costs: NZS 0.58 per kWh plus a fee of $5/month.
poor fuel handling and poor maintenance skills and facilities. There is an apparent need for improved management of the island electricity systems but the mission did not travel beyond Rarotonga; it is inappropriate to advise on institutional arrangements. However, whatever institutional changes may be made, if any, it is important for the central government, Island Councils and consumers to know the real costs of electricity.

It is recommended that:

- **OMIA should develop a standard spreadsheet for use by the Island Councils (and OMIA itself) for calculating the actual full cost of electricity supply (all capital, operating, maintenance and OMIA support costs); and**

- **OMIA should assure that Island Councils are aware of the level of subsidies for electricity use (as these reduce the grants otherwise available for other island development).**

### 7. Renewable Energy Development and Pricing

As noted above in Section 6, about 80% of outer island residents already have electricity for twelve or more hours per day, generated from small diesel power plants. Until they require replacement or extensive overhaul, and assuming they are properly managed, these systems will remain the main source of electricity away from Rarotonga and generally the least expensive. Nonetheless, there has been a long history in the outer islands of renewable energy installations, particularly solar photovoltaics (PV). In Puka Puka, most of the island’s 780 inhabitants have electricity from oversized, costly stand-alone PV systems installed about ten years ago and financed through a low interest French loan and government grant. For major expansions or new outer island energy systems, PV (and possibly other renewable) systems can be competitive in cost and quality of service with new diesel plants. However, unless the institutional arrangements for renewable energy systems are well thought out, with adequately operation, maintenance and cost recovery, they will not be a viable alternative.

In the Cook Islands (as in most of the Pacific) renewable energy in remote communities has been heavily donor-subsidised, had inadequate attention to institutional arrangements, poor mechanisms for adequate cost recovery, a limited sense of local ownership, and poor prospects for long-term sustainability. The Puka Puka PV system will require substantial funding for batteries and maintenance in the near future. Although technically successful, the PV project is a management failure, with consumers paying nothing for the services received for many months and earlier funds possibly misappropriated. New PV and wind energy installations are also being considered for use in several islands but there are no consistent arrangements for management, operations, charges for consumers and training.

For Rarotonga, several options for a large grid-connected wind energy system are being explored. If an option is commercially viable and is implemented, a successful experience in the Cook Islands could result in replication elsewhere in the Pacific. A failure, however, would probably set wind energy development in the region back by many years.

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18 Also, the mission was not able to meet those staff or consultants at OMIA who advise, and assist, with outer island electricity operation and maintenance as they were away from Rarotonga.
The GoCI has received good advice in the past on technical and institutional aspects of PVs. Much of the past institutional advice is equally relevant to other energy installations, renewable or conventional, and is not repeated here. Nonetheless, several recommendations follow:

- **The GoCI should abandon the blurry distinctions among ‘pilot’, ‘demonstration’ and ‘commercial’ renewable energy installations and only consider technologies that are robust, reliable, commercially proven and practical for use now in the Cook Islands. (An exception is small systems which are meant solely for education or training at technical institutes, schools or possibly TAU);**

- **When considering outer island electricity supply from diesel or renewable options, the costs of each should be calculated, and compared, the same basis so a rational choice can be made;**

- **The management structures for all outer island renewable energy systems should include a monthly consumer charge which is sufficient to cover all operating and maintenance costs and a collection mechanism which is administered from Rarotonga, not locally; and finally**

- **The Government should seek independent advise to evaluate options for proposed grid-connected wind energy for Rarotonga and advise on future government actions.**

**Concluding Remarks**

Some of the conclusions, observations and recommendations made in this report are far from new. Many are quite similar to advice offered to the GoCI almost ten years ago. Some of the same recommendations were initially made nearly twenty years ago. The subsequent experiences within the energy sector in the region during the last one to two decades support the earlier conclusions that good institutional arrangements are important for a sound energy sector which delivers services effectively and efficiently; that consistent monitoring of petroleum supply arrangements and pricing are essential to assure safe and least-cost fuel supplies; and that renewable energy can be viable but it is not ‘free energy’. Like conventional electrification it requires good management, operation and maintenance.

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19 For example, see *PV Experience in the Pacific Islands* (Appendix E of ADB, 1998) and *Options for Subregional Cooperation on Sustainable Energy Development – Synthesis Report of an ESCAP Mission to Pacific Island States* (working title), both prepared by Herbert Wade.