

Country Energy Security Indicator Profile 2009















Palau Country Energy Security Indicator Profile 2009

Prepared by the Energy Programme, Economic Development Division Secretariat of the Pacific Community Suva, Fiji 2012

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Foreword



Solomone Fifita DeputyDirector (Energy), Economic Development Division, SPC

In August 2010 at the 41st Pacific Islands Forum at Port Vila. Vanuatu, the Forum Leaders endorsed the Framework for Action on Energy Security in the Pacific (FAESP) (2010-2020) as the regional blueprint for the provision of technical assistance to the energy sectors of Pacific Island countries and territories (PICTs). FAESP encompasses the Leaders' vision for an energy secure Pacific, where Pacific people at all times have access to sufficient sustainable sources of clean and affordable energy and services to enhance their social and economic well-being.

The Implementation Plan for Energy Security in the Pacific (IPESP) (2011–2015) is a five-year plan for pursuing the vision, goal and outcomes of FAESP. It reflects the priority regional activities that are to be collectively delivered by the participating members of the Council of Regional Organisations in the Pacific to support, complement and add value to national efforts on energy security.

In order to better appreciate the impacts of FAESP and its implementation plan on the energy security status of PICTs, baseline energy security indicators must be established, against which performance in future years can be benchmarked.

The energy security indicators in this report derive from a consultative process involving representatives of PICTs, regional organisations, the private sector and development partners. The process culminated in the adoption of IPESP and its monitoring and evaluation framework, the energy security indicators, at the Inaugural Regional Meeting of Ministers of Energy, ICT and Transport in April 2011.

As a first attempt to improve the transparency and accountability in the energy sector, there is obvious room for improvement. Access to reliable and sufficient data is a common problem and this monitoring and evaluation tool can only get better with the kind assistance of the custodians of the energy sector data.

Solomone Fifita Deputy Director (Energy) Economic Development Division, SPC

Abbreviations

ADB	Asian Development Bank
ADO	automotive diesel oil
AusAID	Australian Agency for International Development
Ave.	average
CO ₂	carbon dioxide
DPK	dual purpose kerosene
e.	estimate
EEZ	exclusive economic zone
EPD	Energy Planning Division of MRD
EPPSO	Economic Policy, Planning and Statistics Office
FAESP	Framework for Action on Energy Security in the Pacific
14 FICs	Forum Island countries (SIS and non-SIS affiliation)
GDP	gross domestic product
GHG	greenhouse gases
GJ	gigajoules
GWh	gigawatt hour
HIES	household income and expenditure survey
IP&E	Isla Petroleum & Energy

IPP	independent power producer
IUCN	International Union for Conservation of Nature
kWh	kilowatt hour
kWp	kilo watt peak
km	kilometre
LPG	liquefied petroleum gas
MJ	megajoules
n.a.	(data) not available
N/A	(indicator) not applicable
NDBP	National Development Bank of Palau
NEC	National Energy Committee of Palau
Non-SIS	Non-Forum small island state members – Fiji, FSM, PNG, Samoa, Solomon Islands, Tonga & Vanuatu
North-REP	North Pacific ACP Renewable Energy and Energy Efficiency Project
PEO	Palau Energy Office
PICTs	Pacific Island countries and territories

Pacific Power Association

PPUC	Palau Public Utilities Corporation
ppm	parts per million
PRISM	Pacific Regional Information System (Statistics for Development, Secretariat of the Pacific Community)
PV	photo voltaic
RE	renewable energy
REP-5	Support to the Energy Sector in Five ACP Pacific Island countries' programme funded by the European Union
SEDREA	Social and Economic Development through Renewable Energy Applications
SIS	Forum small island states – Cook Islands, Kiribati, Nauru, Niue, Palau, RMI & Tuvalu
TJ	tera joule
ULP	unleaded petrol (another name for motor gasoline)
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar

Country profile

National energy vision of Palau National Energy Policy 2010

"... a reliable and resilient energy sector delivering to Palau sustainable, low emissions energy services..."

Country	Republic of Palau
Capital	Koror
Capital island	Koror Island
Population	20397 (2009 PRISM projection; 53.6% male); 19,907 (2005 census)
Land area	488 km²
Max height above sea-level	213.5 m (Mt. Ngerechelchuus)
Geography	Palau consists of 200 islands of which nine are permanently inhabited. Over 95% of the islands and more than 90% of the population lie within a single large, complex reef structure. Within the main reef are the three biggest islands of Babeldaob, Koror and Peleliu. Babeldaob has over three quarters of Palau's total land area of 458 km².
Location	Latitude 8° 10′ - 3° North and longitude about 132° 45′ – 134° 25′ East
EEZ	629 000 km ²

Climate	Palau's climate is tropical. Prevailing winds are the north-eastern trade winds, with a mean wind speed of 9.65 kilometres per hour. The normal relative humidity averages 85%.
Rainfall	Palau has a maritime tropical rainy climate with a mean annual rainfall of around 3700 mm. The heaviest rains fall during the monsoon storms that generally occur between the middle of June through August, and the lowest during the months of February to April.
Mean temperature	27°C (82°F)
Economic	Palau's economy consists primarily of tourism, subsistence agriculture, and fishing. The services sector consists largely of government administration and trade. Large gaps exist between imports and exports. These gaps are financed largely by grant assistance from the USA.
GDP per capita	USD 8055
Currency	American dollar – USD
Language	Palauan, English; minor – Filipino, Japanese, Chinese
Government	Republic in a compact of free association with the United States of America.
Country representative to SPC	Minister of State Office of the Minister PO Box 100, Koror, Republic of Palau 96940 Tel: (680) 767 2490/2509/3681 Fax: (680) 767 2443 / 3680 Email: state@palaugov.net

Energy context

Palau energy consumption in 2009 is estimated at 1864 TJ (excluding domestic biomass consumption) of which 99.95% comes from imported fossil fuels. Blue Bay Petroleum Incorporated and Island Petroleum & Energy (IP&E) are two new petroleum companies that entered the market in 2009 to supply petroleum to Palau. Blue Bay Petroleum imports fuel via Mobil Exxon from Singapore, whilst IP&E imports fuel mainly from Guam. In 2009, Palau imported 25.6 million litres of diesel, 14.3 million litres of petrol, and 11.7 million litres of kerosene. The recorded fuel import bill stood at around USD 19.6 million, with a current gross domestic product (GDP) of USD 164.3 million.

Diesel fuel for electricity production accounted for 93% of total diesel fuel imported in 2009, which is around 46% of total fuel products imported. The transport sector is estimated to account for around 50% of total petroleum fuel imported in 2009.

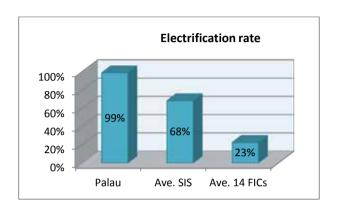
In the power sector, close to 99% of households in Palau are connected to the public grid network provided by Palau Public Utilities Corporation (PPUC). In 2009, PPUC generated 83 GWh of electricity of which 77.5 GWh was sold, recording an estimated 21% distribution loss.

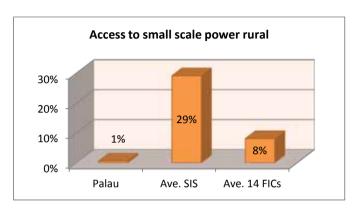
Contributions from renewable energy sources into Palau's overall energy balance in 2009 are mainly accounted from the grid-connected solar photo voltaic (PV) systems. This included the 100 kW grid connected system at Capitol Building and the 100 kW solar PV systems at the hospital, amounting to 901.4 gigajoules of energy consumed. This covered 0.05% of total energy consumed, which translates to 0.30% of clean energy contribution in the electricity sector in 2009.

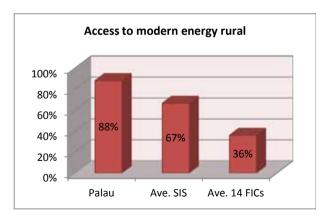
The 2009 baseline energy security indicators presented in this report are compiled and structured according to the four key energy security outcomes and the seven action themes of FAESP. Graphical comparison included in the analysis provides a snapshot of Palau's situation compared to other Forum small island states and Forum Island countries.

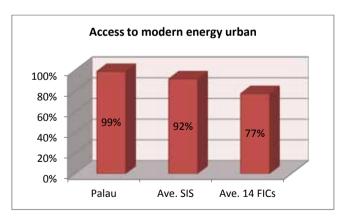
FAESP key energy security outcome 1 – access to energy

No.	FAESP indicators		Explanatory notes
1	Electrification rate (%)	98	The indicator tracks the share of households actually connected to a utility grid. Referenced data is sourced from the 2005 census. Of this average estimate, 99.7% is access in urban areas (Koror) whilst 97.5% is access in rural areas (rest of Palau).
2	Access to small scale power rural (%)	1	The indicator tracks the share of rural households with access to basic electrification (solar, pico hydro, small wind, community grid) An indicative estimate of less than 1% access to small scale power was established from the national energy workshop on policy and planning. This is rounded off to 1% as per indicator reporting
3	Access to modern energy rural (%)	88	The indicator tracks the share of rural households with access to modern cooking and lighting, which specifically covers all forms of energy other than traditional biomass. Data calculated is the average from access to modern forms of cooking and lighting, based on the 2005 national census. Access to modern forms of cooking – 77%. Access to modern forms of lighting in rural areas was estimated to be 100%. Data presented from the census had no clear separation between urban and rural breakdown, so places excluding Koror in this analysis were taken as rural.
4	Access to modern energy urban (%)	99	The indicator tracks the share of urban households with access to modern cooking and lighting, which specifically covers all forms of energy other than traditional biomass. Based on the 2005 census, the percentage for access to modern forms of cooking is 98%. Based on the Palau National Policy and Planning workshop – there is 100% access to modern forms of lighting in the urban area (Koror). Average access to modern forms of cooking and lighting is taken as the estimated percentage on access to modern forms of energy.



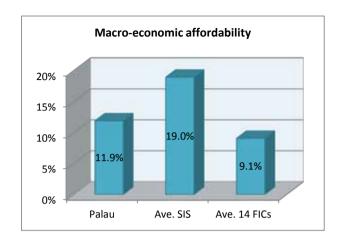


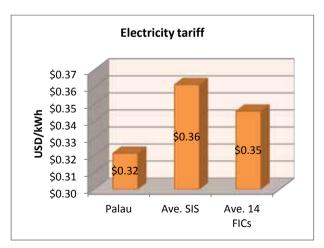


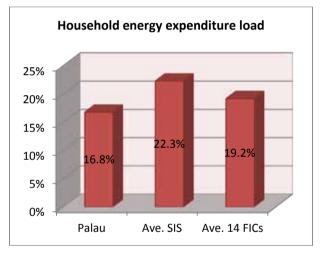


FAESP key energy security outcome 2 – affordability

No.	FAESP indicators		Explanatory	notes		
5	Macro-economic affordability (%)	11.9	The indicator tracks fuel imports as a percentage of GDI economy is to world market price volatility. The following figure was calculated from reference dat in 2009 against estimated fuel imports from customs.	a in the national sta	atistics office	for total GDP
6	Electricity tariff	0.32	The indicator tracks average tariffs for the year (all	Electricity tariff		0.32
	(USD/kWh)		tariff categories, i.e. residential, commercial and	Commercial block	USD/kWh	USD 0.34
			industrial). Requires averaging throughout the year as tariffs in most PICTs are adjusted several times a year. Refer to the table on the right for reference calculation of the average tariff.	Industrial block	USD/kWh	USD 0.34
				Residential block	USD/kWh	USD 0.28
				1-500 kWh	USD/kWh	USD 0.22
				500-2000 kWh	USD/kWh	USD 0.30
				> 2000 kWh	USD/kWh	USD 0.34
				Lifeline	%	79.4%
7	Electricity lifeline (%)	79.4	Relation between average tariff and lifeline tariff if a lifeline tariff exists. Refer to the table on the right for the reference calculation for electricity lifeline.	Referenced electricity tariff calculation based on PPUC data		
8	Household energy expenditure load (%)	16.8	The indicator tracks average household expenditure for household income. The analysis was based on the 2002 HIES. Reporting operation expenditure and annual transport expenditure calculated from these two reference categories.	gives a breakdowi	n of the annu	ıal household

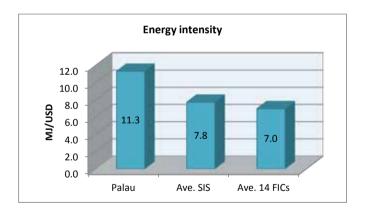


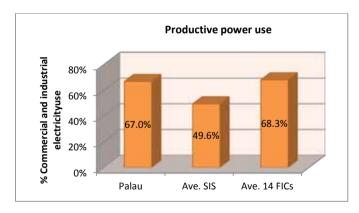




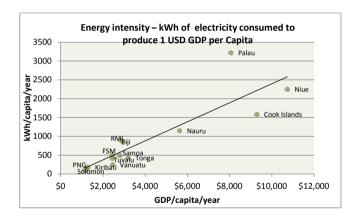
FAESP key energy security outcome 3 – efficiency and productivity

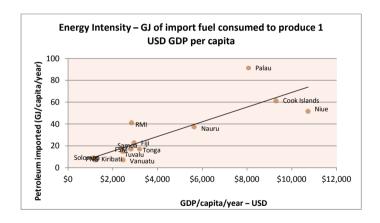
No.	FAESP indicators	Explanatory notes	
9	Energy intensity (MJ/USD)	11.35	The indicator tracks the amount of energy utilised to produce 1 USD of GDP. The calculation is based on total petroleum consumed over total GDP generated in 2009.
10	Productive power use (%)	67	The indicator tracks the share of commercial and industrial use of electricity in total supply. Sourced from PPUC.





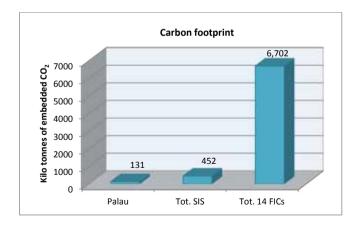
Provided below are energy intensity graphs that are presented in terms of electricity and fuel consumption against GDP when seen on a per capita comparison. Countries identified above the trend line are perceived to have higher than average energy consumption levels per person compared to their corresponding economic wealth [GDP per capita]. That is, countries above the trend line are considered to be relatively energy inefficient compared to countries below the trend line.

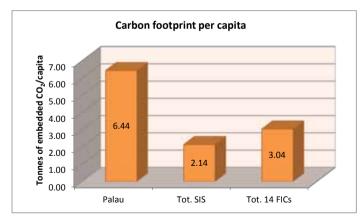




FAESP key energy security outcome 4 – environmental quality

No.	FAESP indicators		Explanatory notes
11	Carbon footprint (tonnes of CO ₂)	131,273	The indicator tracks total GHG emissions using embedded carbon as a measure (not UNFCCC method). Referenced calculation is based on the quantity of petroleum products imported into the country. Carbon emission is calculated specifically from diesel (ADO & IDO), motor gasoline (mogas/ULP) kerosene (DPK) and cooking gas (LPG).
12	Diesel fuel quality (ppm S)	5,000 & 50	The indicator assesses the standard for sulphur content of diesel fuel in parts per million (ppm) sulphur. Blue Bay via Guam (50 ppm) and IP&E imports fuel from Singapore (5000 ppm), and Guam (50 ppm).





FAESP action theme 1 – Leadership, governance, coordination and partnership

No.	FAESP indicators		Explanatory notes
13	Status of energy administration (score)	1	The indicator assesses the status the energy administration has in the country. (Score system: Energy ministry = 3; Energy department = 2; Energy office = 1) The Palau Energy Office falls under the Bureau of Public Works in the Ministry of Resources and Energy. Only one position, that of director, is established. In 2009, there was one director and one energy staff member (project-funded) based there. The Palau Energy Office acts as an international contact point and represents Palau in overseas energy meetings. It also acts as a project management unit for a number of renewable energy and energy efficiency projects.
14	Energy legislation (score)	1	The indicator assesses the status of energy sector legislation in the country. (Score system: Updated energy act = 3; Adopted energy policy = 2; Subsector act or policy = 1) There was no comprehensive energy sector legislation established for Palau in 2009. However, Palau endorsed its National Energy Policy and Strategic Action Plan in 2010. In addition, Palau developed its Energy Efficiency Action Plan in 2008.
15	Co-ordination and consultation (score)	1	The indicator aims to measure how decisions and directions given at regional or subregional events translate into practical action at national level. (Score system: Meetings lead to relevant national action = 1; No action = 0) Palau actively participates in regional energy activities; PPUC is an active member of the Pacific Power Association (PPA).

FAESP action theme 2 – Capacity development, planning, policy and regulatory frameworks

No.	FAESP indicators	Explanatory notes
16	Energy planning status (score)	1 The indicator assesses the state/quality of energy planning. It distinguishes between integrated planning and subsector (i.e. power, petroleum) planning. (Score system: Whole of energy sector plan/roadmap operational with M&E framework = 3; Subsector plan operational with M&E framework = 2; Energy sector plan under preparation = 1) Palau National Energy Policy and Strategic Action Plan were endorsed in 2010. The Energy Efficiency Action Plan was endorsed in 2008. The PPUC Power Development Plan is available. In 2009, activities undertaken in Palau covered the drafting of the national energy policy and action plan. Subsector plans, as in the case of the PPUC Power Development Plan and the Energy Efficiency Action Plans, were available in 2009, but had no detailed monitoring and evaluation (M&E) framework.
17	Energy sector regulation (score)	0 The indicator assesses the state of energy sector regulation. It measures progress towards regulator independent of government or regulated entities. (Score system: Independent whole of energy sector regulator established = 3; Whole of energy sector regulator established = 2; Subsector regulator established = 1) Electricity tariff prices are not independently regulated. They are set by the PPUC Board and go through Senate for advisement. Fuel prices are not regulated.
18	Enabling framework for private sector participation (score)	0 The indicator assesses progress towards an enabling framework for private sector participation in selling electricity to the grid. (Score system: Standard power purchase and petroleum supply agreements operational = 3: Standard agreements for subsector operational = 2; Standard agreements under preparation = 1) In 2009, no legislation had been established in Palau to encourage independent power producers (IPPs) to sell to PPUC at a commercial level. In 2012, Palau endorsed their Net Metering Act to encourage grid connected solar installation at the residential and commercial level. Excess power is sold to the utility at 1/2 the normal PPUC tariff. However, no cash transfer occurs but there is debit of credits.
19	Private sector contribution (%)	 The indicator tracks the share of electricity produced by independent power producers under a power purchase agreement. No IPPs were established in 2009. Therefore there is no recorded contribution from IPPs.

FAESP action theme 3 – Energy production and supply

3.1 Petroleum and alternative fuels

No.	FAESP indicators	reconstruction of the second s		
20	Fuel supply security (days)	308	The indicator measures the number of days a country can keep operating in case of a petroleum product supply interruption. Calculation used if actual data are not available (size of total petroleum storage (m3)/average petroleum product consumption per day). Calculated.	
21	Fuel supply diversity (%)	0	The indicator measures the share of locally produced fuel (biofuel and fossil fuel) as a percentage of total supply. No biofuel-related projects undertaken in Palau in 2009.	
22	Fuel supply chain arrangements (score)	1	The indicator assesses control of countries over fuel supply chain. (Score system: Joint procurement scheme operational = 2; Participation in preparation of joint procurement arrangements = 1) In 2009, there were two oil companies in Palau that imported fuel via a separate supply chain, and they still do. Blue Bay purchases fuel from Guam via a local coastal tanker and IP&E imports fuel from Singapore as well as Guam. Palau together with Marshall Islands and FSM were part of the first group of countries that pursued the bulk purchasing of petroleum initiative from 2005 to 2007. However, the joint procurement scheme did not eventuate as each of the countries had their own fuel supply contracts and arrangements, which have yet come to an end.	

3.2 Renewable energy

No.	FAESP indicators		Explanatory notes		
23	Renewable energy share (%)	0.05	The indicator measures the share of renewable energy as a percentage of total supply for a given year. The following analysis considers only the contribution from solar PV grid connected systems. Contributions from Biomass and solar water heaters are not included in the analysis due to lack of data. Data are calculated from the 100 kW grid connected system at Capitol building and the 100 kW system at the hosptal.		
24	Renewable resource knowledge (score)	1	The indicator assesses the quality of knowledge of national renewable energy potential. (Score system: Comprehensive assessment of all RE resources including cost for each source = 3; Comprehensive physical assessment of all RE resources = 2; Resource assessments fragmentary, under way = 1) Empirical data on physical and economic performance of PV systems are available; there are no other reliable resource data. Wind resource measurement to be undertaken as part of the North Pacific ACP Renewable Energy and Energy Efficiency Project (North-REP) in 2012.		
25	Least-cost RE development plan (score)	0	The indicator assesses if data and information on renewable energy (RE) have been translated into a least-cost development plan that gives priority to the most economical RE resource or application. (Score system: Least-cost development plan operational = 2; Least-cost development plan under preparation = 1) No least-cost development plan for Palau in 2009. However, priority activities are identified in the National Energy Strategic Action Plan with associated costing listed.		

FAESP action theme 4 – Energy conversion

4.1 Electric power

No.	FAESP indicators		Explanatory notes	
26	Generation efficiency (kWh/l)	3.48	The indicator measures the annual average fuel conversion efficiency for diesel generation in power utilities. Referenced figure was calculated from the total electricity generated in 2009 divided by the total litres of ADO used by the power utility. Source: PPUC	
27	Distribution losses (%)	20.60	The indicator compares the amount of kWh sold with the amount of kWh sent out from the power station. Source: PPUC	
28	Lost supply (SAIDI) – (hours)	0.46	The indicator tracks electricity outage time (hours of lost supply per customer per year) No data were provided by PPUC on SAIDI for 2009. However, based on PPA bench-marking report 2011, SAIDI stands at 0.46 minutes in 2010.	
29	Clean electricity contribution (%)	0.30	The indicator measures the share of renewable energies as a percentage of total electricity supply. Contribution from the 200 kW grid connected solar PV system (100 kW at the Capitol Building; 100 kW at the hospital).	

FAESP action theme 5 – End-use energy consumption

5.1 Transport energy use | 5.2 Energy efficiency and conservation

No.	FAESP indicators			Explanatory notes
30	Retail fuel prices	Retail price	Wholesale price	The indicator tracks retail and wholesale fuel prices for petroleum products (diesel, petrol, MPK, LPG)
	USD/l – ADO	USD 0.93	n.a.	Data referenced from the Palau Bureau of Statistics with recorded averages from January to June 2009.
	USD/l – ULP	USD 0.84	n.a.	Data referenced from the Palau Bureau of Statistics with recorded averages from January to June 2009.
	USD/l – DPK	USD 1.77	n.a.	Data referenced from the Palau Bureau of Statistics with recorded averages from January to June 2009.
	USD/kg – LPG	USD 3.58	n.a.	Data referenced from the Palau Bureau of Statistics.
31	Legislative framework (score)	0	for import of encovering transport operational = 2; I No legislative fram devices in 2009. I for Palau to including the importation of the importation of the control of the importation of the control of the importation of the importation of the control of the control of the importation of the control of t	esses progress towards a comprehensive legislative framework ind-use devices. (Score system: Comprehensive framework ind-use devices. (Score system: Comprehensive framework int, appliances, buildings = 3; Legislative for one subsector Preparation of frameworks under way = 1) mework was in place for the importation of efficient end-use In the 2010 National energy policy document, there are plans ude incentives for the importation of end-use devices – "An e will be developed and introduced that provides incentives for f efficient equipment and discourages the import of inefficient es and machinery."
32	Appliance labelling (score)	0	appliance labelling No compulsory	ssess the state of appliance labelling. (Score system: Compulsory goperational = 2; Appliance labelling under preparation = 1) appliance labelling programme had been adopted in 2009. It in retailer shops in Palau mostly carry American labelled

FAESP action theme 6 – Energy data and information

No.	FAESP indicators		Explanatory notes
33	Availability of national energy balance (score)	1	The indicator assesses the availability of national key energy data to the SPC data management unit and other regional stakeholders. (Score system: Comprehensive data sets covering energy input conversion and end use available 6 months after end of reporting year = 3; Partial data set available within 6 months = 2; Partial data set available within 12 months = 1) No energy balance established in Palau in 2009, including earlier years from 2000. Energy datasets available are fragmented with irregular reporting.

FAESP action theme 7 – Financing, monitoring & evaluation

No.	FAESP indicators		Explanatory notes
34	Energy portfolio (USD)	2,724,000	The indicator tracks the flow of funding into the region's energy sector. Grant aid commitments + loan commitments Snapshot of donor portfolio as of 2011 (not 2009 baseline). Of note, project funding covers a number of years. Listed donor and development organisations or projects involved in the energy sector in Palau include Social and Economic Development through Renewable Energy Applications (SEDREA) – Global Environment Facility; International Union for Conservation of Nature – Italian funding, and the North-REP project.
35	Availability of financing information (score)	2	The indicator assesses availability of national energy financing information to SPC and other regional stakeholders. (Score system: Comprehensive set of information covering petroleum, utility and government financing = 3; Partial information set available within six months = 2; Partial information set available within 12 months = 1) Draft copies are available in the energy office. However, consolidation of financial records may take more than two months due to the issue of the separating actual financials of long-term energy-funded projects.
36	Monitoring framework (score)	0	The indicator assesses if there is a national energy sector M&E framework in place. (Score system: M&E framework in place = 1, No M&E framework = 0) No specific monitoring and evaluation framework is available for Palau. However, priority activities are identified in the National Strategic Action Plan, and the National Energy Committee is to monitor the implementation of the National Action Plan

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