Samoa

Country Energy Security Indicator Profile 2009

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Samoa Country Energy Security Indicator Profile 2009

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Table of contents

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The *Framework for Action on Energy Security in the Pacific* (FAESP) country energy security indicator report 2009 was prepared by the Energy Programme of the Economic Development Division of the Secretariat of the Pacific Community (SPC).

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The cooperation of the many contributors to this booklet is gratefully acknowledged. The source note below each table credits the various government and private sector agencies that have collaborated in furnishing information for the booklet.

Foreword

Solomone Fifita
Deputy Director (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
AUA	Apia urban area
Ave.	average
BOC	British Oxygen Company
CO_2	carbon dioxide
DPK	dual purpose kerosene
e.	estimate
EEZ	exclusive economic zone
EPC	Electric Power Corporation
EPPD	Economic Policy and Planning Division (Ministry of Finance)
FAESP	Framework for Action on Energy Security in the Pacific
FICs	(The 14) Forum Island countries (SIS and non-SIS)
GDP	gross domestic product
GHG	greenhouse gases
GJ	gigajoules
HIES	household income and expenditure survey
IPP	independent power producer
IUCN	International Union for Conservation of Nature
HFO	heavy fuel oil
kWh	kilowatt hour
kWp	kilowatt peak
km	kilometre
LPG	liquefied petroleum gas
MCIL	Ministry of Commerce, Industry and Labour
MJ	megajoules
MOF	Ministry of Finance
MNRE	Ministry of Natural Resources and Environment
n.a	(data) not available
N/A	(indicator) not applicable
NECC	National Energy Coordinating Committee
PICTs	Pacific Island countries and territories
PPA	Pacific Power Association
ppm	parts per million
PPS	Petroleum Products Supplies
PRISM	Pacific Regional Information System (Statistics for Development, Secretariat of the Pacific Community)
PV	photovoltaic
RE	renewable energy
SHS	solar home systems
SIS	(Forum) smaller island states — Cook Islands, Kiribati, Nauru, Niue, Palau, RMI and Tuvalu. Non-SIS members are Fiji, PNG, Samoa, Solomon Islands, Tonga and Vanuatu.
SROS	Scientific Research Organisation of Samoa
ULP	unleaded petrol (another name for motor gasoline)
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

Country profile

Samoa National Energy Policy vision 2007

'to enhance the quality of life for all through access to reliable, affordable and environmentally sound energy services and supply.'

Country	Samoa
Capital	Apia
Capital island	Upolu
Population	183,203 (2009 PRISM estimate; 52% male); 180,741 (2006 census)
Land area	2,935 km^2
Max height above sea-level	1,860 m (Mount Silisili)
Geography	Mostly volcanic in origin; consists of two large islands and four small ones. Main islands are Savai'i (1,820 km^2) and Upolu (1100 km^2).
Location	Latitude 13°15' to 14°5' South and Longitude 171°23' to 172°48' West
EEZ	120,000 km^2

Climate	The climate is warm, humid and tropical with distinct wet and dry seasons. The tropical dry season is from May to September. The wetter, more humid months are from November to April. During the latter season, Samoa can experience occasional severe tropical storms and hurricanes. Sunshine averages 2,500 hours annually.
Rainfall	Varies from 5,000–7,000 mm (windward side) and 2,500–3,000 mm (leeward side) per annum.
Mean temperature	25°C
Economy	The leading producers of income in Samoa are agriculture, tourism, manufacturing, remittances, aid and financial services; exports include fresh fish, coconut/copra products, beer and cigarettes.
GDP per capita	USD 2,798
Currency	Samoan Tala — WST
Exchange rate	WST/USD — $0.3584 [OANDA]
Languages	Samoan and English
Government	Independent state and member of the Commonwealth
Country representative to SPC	Chief Executive Officer Ministry of Foreign Affairs & Trade P O Box L1859, Apia, Samoa Tel: (685) 21171 / 25313 Fax: (685) 21504 Email: mfat@mfat.gov.ws

Energy context

In 2009, Samoa's energy consumption scenario totalled 3,167 TJ with petroleum fuels accounting for 95.6% and renewable energy (RE) contribution from hydro and solar accounting for 4.4% (contribution from biomass is excluded in this analysis). Liquid petroleum fuel is currently supplied to Samoa by Petroleum Product Supplies via Mobil from Singapore and Australia. In 2009, around 39.9 million litres of diesel, 27.3 million litres of petrol, 18.6 million litres of kerosene and 1.6 kilo tonnes of liquefied petroluem gas (LPG) were imported into the country. LPG is mainly imported from Australia by Origin Gas and the British Oxygen Company (BOC). Fuel import for 2009 stood in the vicinity of USD 86.08 million with the current gross domestic product (GDP) of USD 510.9 million. Samoa also re-exports fuels to Tokelau. The transport sector (land, maritime and air) is perceived as the major sector that consumes fuel imported into Samoa — accounting for some 70% of the fuel consumed.

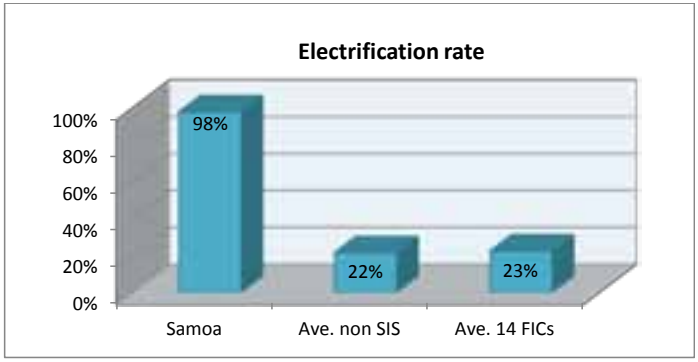
For the power sector, around 98% of households in Samoa are connected to the electricity grid network provided by Electric Power Corporation (EPC). In 2009, EPC generated 108 GWh of electricity, of which 91 GWh was sold, recording an estimated 16.02% in distribution loss.

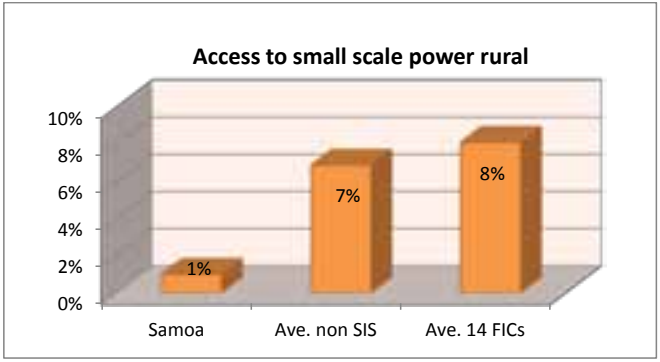
Electricity supplied by EPC has two major grid networks, namely the Upolu and Savaii electricity gridlines. Electricity is supplied to Manono Island via under-sea electricity cables from Upolu. Apolima has a mini grid solar photovoltaic (PV) system that was installed in 2007. Of the electricity generated in 2009, 16% was sourced from hydro. Around 17 million litres of diesel fuel were consumed for electricity generation in 2009.

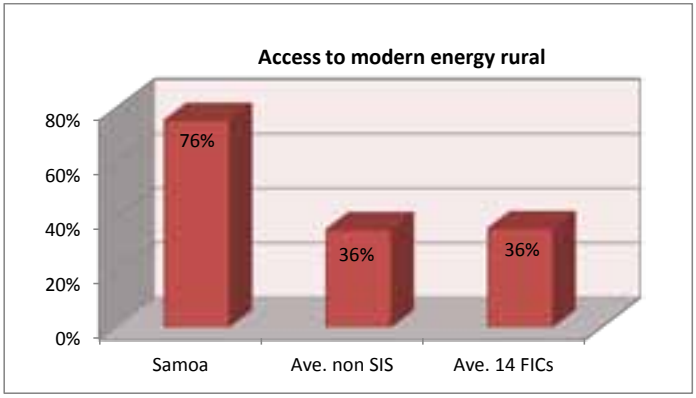
The 2009 baseline energy security indicators presented in this report are compiled and structured according to the four key outcomes to energy security and the seven action themes of FAESP. Graphical comparison included in the analysis provides a snapshot of Samoa's situation compared to other Forum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

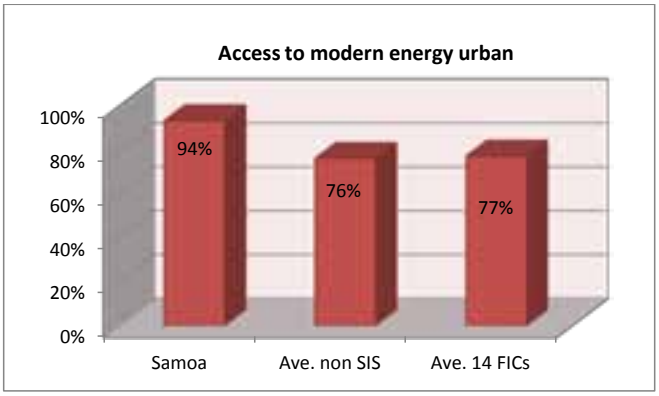
FAESP key energy security outcome 1 — access to energy

No.	FAESP indicators		Explanatory notes
1	Electrification rate (%)	98	*The indicator tracks the share of households actually connected to a utility grid.* The 2006 population census report places grid connection at around 96% of the population, of which 98.6% covers the Apia urban area (AUA) and an estimated 95.8% covering the rest of Samoa. Updated estimates from the Samoa PV Electrification Program survey report estimated increased access to grid connection in the rural areas of Samoa, which places national grid connection to around 98.1%.
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).* The following accounts for the solar mini-grid connection at Apolima, including an estimate of the access of households in rural areas to small scale power — solar home systems, small generators etc.
3	Access to modern energy rural (%)	76	*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.* The 2006 population census report estimates that access to modern forms of cooking in rural areas in Samoa is 51.6%. Estimated access to modern forms of lighting in rural areas is 99.8%. The estimate provided is the average calculated from access to modern lighting and cooking.
4	Access to modern energy urban (%)	94	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. The 2006 population census report estimates that access to modern forms of cooking in AUA is 81%. Estimated access to modern forms of lighting in AUA is 100%. The estimate provided is the average calculated from access to modern lighting and cooking.


Electrification rate
100%
80%
60%
40%
20%
0%
98%
22%
23%
Samoa
Ave. non SIS
Ave. 14 FICs


Access to small scale power rural
10%
8%
6%
4%
2%
0%
1%
7%
8%
Samoa
Ave. non SIS
Ave. 14 FICs


Access to modern energy rural
80%
60%
40%
20%
0%
76%
36%
36%
Samoa
Ave. non SIS
Ave. 14 FICs

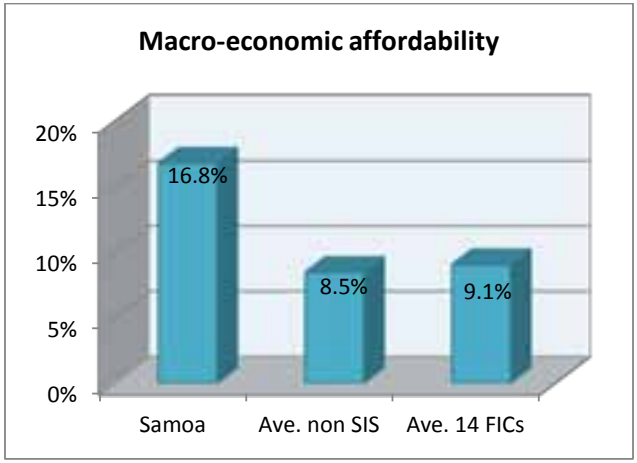

Access to modern energy urban
100%
80%
60%
40%
20%
0%
94%
76%
77%
Samoa
Ave. non SIS
Ave. 14 FICs

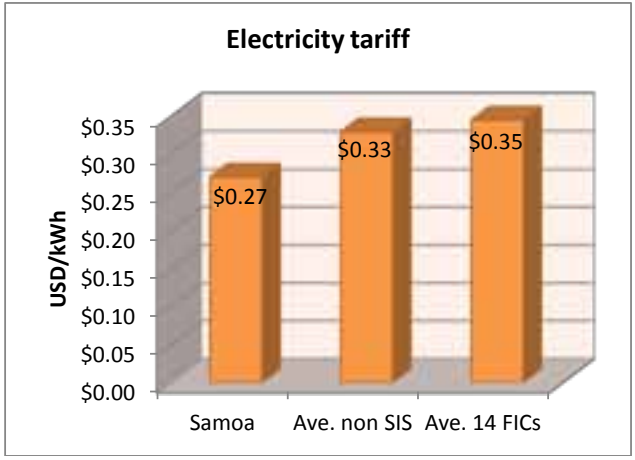
FAESP key energy security outcome 2 — affordability

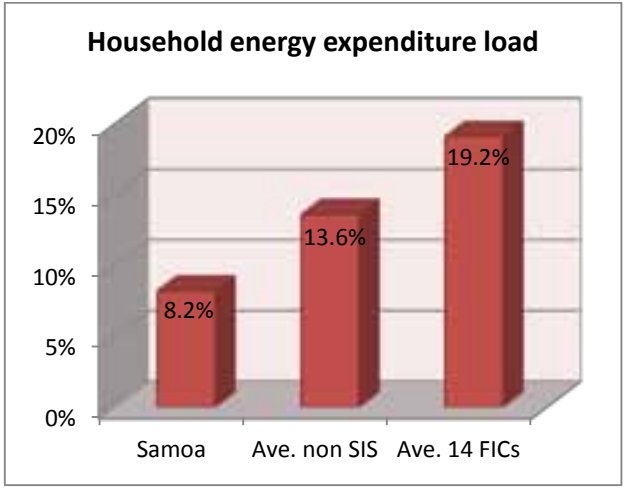
No.	FAESP indicators		Explanatory notes
5	Macro-economic affordability (%)	16.9	*The indicator tracks fuel imports as a percentage of GDP. The higher the figure, the more vulnerable an economy is towards world market price volatility.* The macro-economic affordability was calculated from reference data provided by the Samoa Bureau of Statistics website. Total value fuel imports over total GDP for 2009 (USD 86,071,406 / USD 510,878,495).
6	Electricity tariff (USD/kWh)	0.28	*The indicator tracks average tariffs for the year (all tariff categories, i.e. residential, commercial and industrial). Requires averaging during the year as tariffs in most PICs are adjusted several times a year.* Refer to the table on the right for reference calculation of the average tariff.
7	Electricity lifeline (%)	91.4	*Relation between average tariff and lifeline tariff if a lifeline tariff exists.* Refer to the table on the right for reference calculation of the lifeline tariff.
8	Household energy expenditure load (%)	8.2	*The indicator tracks average household expenditure for energy per year as a percentage of average household income.* The estimate attained is based on the 2008 HIES. Reporting gives a breakdown of expenditure accounted from the total annual costs to household operation and transport expenditure.

Electricity tariff		USD 0.28
Commercial block	USD/kWh	USD 0.29
Industrial block	USD/kWh	USD 0.29
Residential block	USD/kWh	USD 0.27
1-50 kWh	USD/kWh	USD 0.25
>50	USD/kWh	USD 0.29
Lifeline	%	91.4%

Referenced electricity tariff calculation based on EPC data

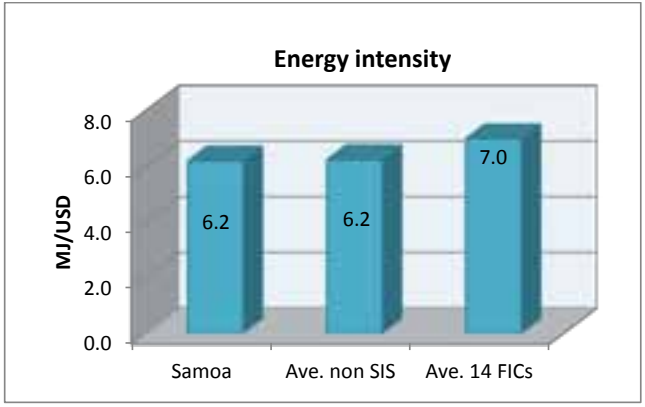

Macro-economic affordability
20%
15%
10%
5%
0%
16.8%
8.5%
9.1%
Samoa
Ave. non SIS
Ave. 14 FICs

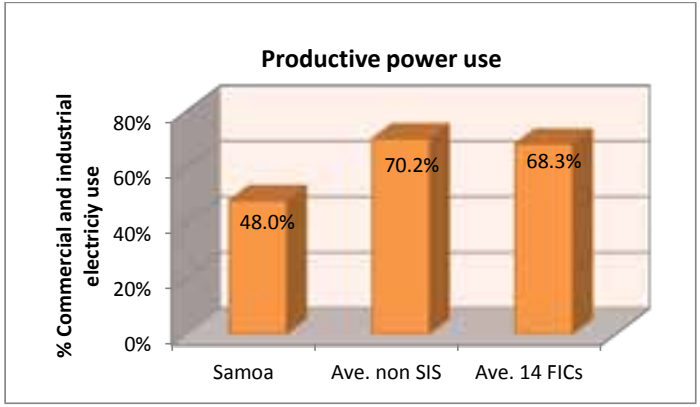

Electricity tariff
USD/kWh
$0.35
$0.30
$0.25
$0.20
$0.15
$0.10
$0.05
$0.00
$0.27
$0.33
$0.35
Samoa
Ave. non SIS
Ave. 14 FICs


Household energy expenditure load
20%
15%
10%
5%
0%
8.2%
13.6%
19.2%
Samoa
Ave. non SIS
Ave. 14 FICs

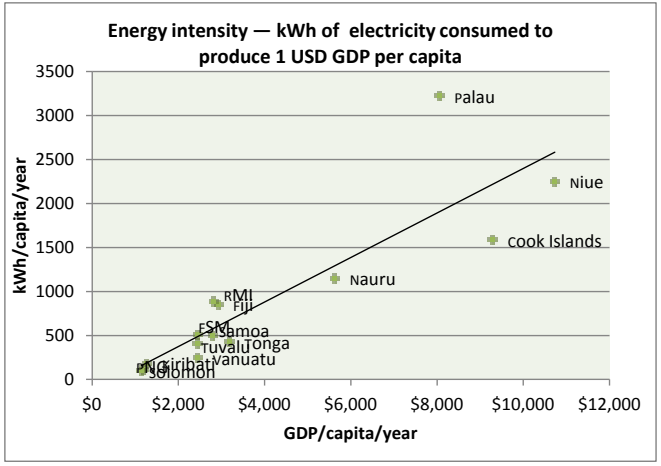
FAESP key energy security outcome 3 — efficiency and productivity

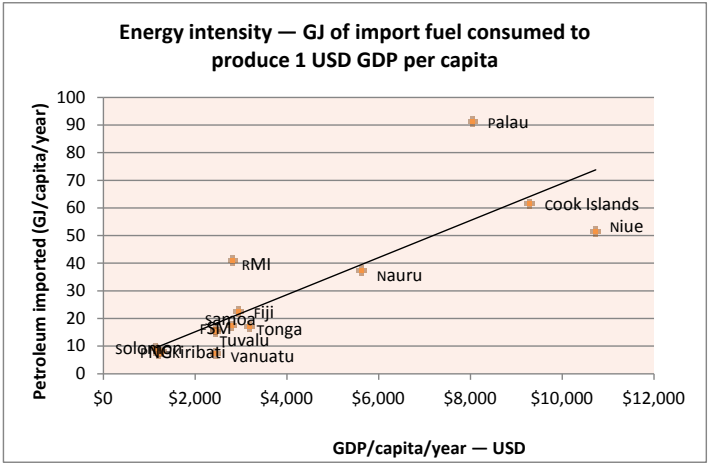
No.	FAESP indicators		Explanatory notes
9	Energy intensity (MJ/USD)	6.2	*The indicator tracks the amount of energy utilised to produce 1 USD of GDP.*
10	Productive power use (%)	48.0	*The indicator tracks the share of commercial and industrial use of electricity in total supply.* Data sourced from the Samoa Energy Review 2009.





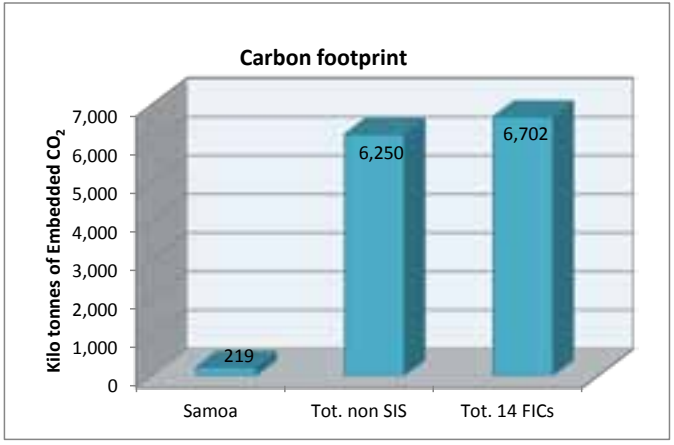
Provided below are energy intensity graphs that are presented in terms of electricity (kWh) and fuel (GJ) consumption against GDP when seen on a per capita comparison. Countries identified above the trend line are perceived to have higher than average energy consumption levels per person compared to 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.

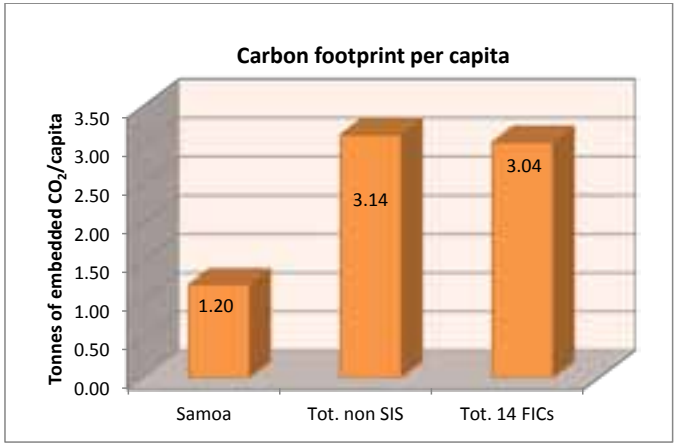




FAESP key energy security outcome 4 — environmental quality

No.	FAESP indicators		Explanatory notes
11	Carbon footprint (tonnes of CO_2)	218,809	*The indicator tracks total GHG emissions using embedded carbon as a measure (not UNFCCC method).* GHG emission calculated is specifically accounted from the total fuel imported into Samoa, which mainly covers diesel fuels, kerosene (DPK), motor gasoline (mogas/ULP), and cooking gas (LPG).
12	Diesel fuel quality (ppm S)	500	*The indicator assesses the standard for sulphur (S) content of diesel fuel in parts per million (ppm) sulphur.*





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 Samoa Energy Unit is based in the Economic Policy and Planning Division of the Ministry of Finance and is government's focal point for overall energy sector planning, the energy policy and its coordination. The Ministry of Finance, working through the Tenders Board and cooperating closely with the Prime Minister's office, is also responsible for petroleum supply arrangements. The Petroleum Product Supply currently has exclusive tender rights for the importation of liquid fuel products (excluding LPG products) into Samoa. Origin and BOC supplies LPG to Samoa. The Ministry of Commerce, Industry and Labour is responsible for the setting of LPG prices in Samoa under the price control act. The Ministry of Natural Resources and Environment is responsible for environmental aspects of energy use, including greenhouse gas (GHG) emissions and climate change — more generally, covering renewable energy and energy efficiency activities. EPC is responsible for the generation and supply of electricity throughout Samoa. The Scientific Research Organisation of Samoa is also involved in the energy sector through its research and resource assessment of renewable energy sources.
14	Energy legislation (score)	2	*The indicator assesses the status of the energy sector legislation in the country. (Score system: Updated energy act = 3; Adopted energy policy = 2; Subsector act or policy = 1)* There is no energy act for Samoa. However, Samoa developed its national energy policy and strategic action plan in 2006, which were endorsed by Cabinet in 2007 with four focal areas (planning/management, renewable energies, electricity and petroleum). In addition, the following acts play a role in Samoa's energy sector — The Electricity Act of 1980 and its amendments of 2001 and 2010 mandate EPC to distribute electricity in Samoa and also issue permits for generation of electricity. The Petroleum Act of 1984 makes provision for the supply, transport and storage of petroleum. The Price Control Act establishes the procedures under which the maximum prices of certain commodities, including wholesale and retail prices of petroleum fuels, are controlled.
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)* Samoa actively participates in regional activities. EPC is a utility member of the Pacific Power Association. Clear sense of collaboration efforts among key energy stakeholders in the country.

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

No.	FAESP indicators		Explanatory notes
16	Energy planning status (score)	2	*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 plans in preparation = 1)* Samoa has an endorsed national action plan in place which lies towards subsector planning. There is a long-term development plan for power utility under an Asian Development Bank (ADB) loan. Revision of the Samoa energy sector plan is planned for 2012.
17	Energy sector regulation (score)	1	*The indicator assesses energy sector regulation. It measures the progress towards a 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 regulation is through Cabinet, fuel prices are regulated by the Ministry of Finance pricing template, and the Price Control Board (which operates under the Ministry of Commerce, Industry and Labour) sets the LPG ceiling price range.
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 in preparation = 1)* EPC is sole supplier of electricity. There was no general framework for private sector participation in 2009.
19	Private sector contribution (%)	0	*The indicator tracks the share of electricity produced by independent power producers under a power purchase agreement.*

FAESP action theme 3 — Energy production and supply

3.1 Petroleum and alternative fuels

No.	FAESP indicators		Explanatory notes
20	Fuel supply security (days)	61	*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 (m^3)/average petroleum product consumption per day).* Calculated
21	Fuel supply diversity (%)	0.01	*The indicator measures the share of locally produced fuel (biofuel or fossil fuel) as a percentage of total supply.* EPC in 2009 trialled blending coconut oil with diesel in Upolu for power generation. This is estimated to account for 0.01% of total fuel consumed in 2009.
22	Fuel supply chain arrangements (score)	0	*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)* Samoa's petroleum imports are solely supplied by Exxon Mobil and distributed by Petroleum Products Supplies. In 1998, the Government of Samoa took control of supply and pricing arrangements by owning all the petroleum storage facilities. Procurement by competitive tendering every five years. This arrangement allows the control of domestic petroleum prices to be reflective of international market prices. LPG imports are by BOC and Origin Gas, which are international firms with part local ownership.

3.2 Renewable energy

No.	FAESP indicators		Explanatory notes
23	Renewable energy share (%)	5.6	*The indicator measures the share of renewable energy as a percentage of total supply for a given year.* Referenced calculation takes into account RE contributed from hydro and solar. Contribution from biomass is excluded in this analysis.
24	Renewable resource knowledge (score)	2	*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)* Reliable wind, solar and hydro data available, some empirical data on feasibility of coconut oil as diesel substitute, economic analysis of biofuel option available.
25	Least-cost RE development plan (score)	0	*The indicator assesses if data and information on 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 in preparation = 1)* Elements of least-cost development plan available, plan not yet a fully developed option.

FAESP action theme 4 — Energy conversion

4.1 Electric power

No.	FAESP indicators		Explanatory notes
26	Generation efficiency (kWh/l)	4.04	*The indicator measures the annual average fuel conversion efficiency for diesel generation in power utilities.* Referenced figure was calculated for the diesel generators only in 2009. Source: EPC.
27	Distribution losses (%)	16	*The indicator compares the amount of kWh sold with the amount of kWh sent out from the power station.* Source: EPC
28	Lost supply (SAIDI) — (hours)	885	*The indicator tracks electricity outage time (hours of lost supply per customer per year)* Referenced data sourced from 'Performance Benchmarking for Pacific Power Utilities'.
29	Clean electricity contribution (%)	36	*The indicator measures the share of renewable energies as a percentage of total electricity supply* Percentage contribution of hydro and solar. Source: Samoa 2009 Energy Review.

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				*The indicator tracks retail and wholesale fuel prices for petroleum products (diesel, petrol, MPK, LPG).*
			Retail price	Wholesale price	
		ADO (USD/l)	0.81	0.67	Sourced from MOF
		ULP (USD/l)	0.81	0.67	Sourced from MOF
		DPK (USD/l)	0.74	0.62	Sourced from MOF
		LPG (USD/kg)	3.06	2.79	Sourced from MCIL
31	Legislative framework (score)		0		*The indicator assesses progress towards a comprehensive legislative framework for import of end-use devices. (Score system: Comprehensive framework covering transport, appliances, buildings = 3; Legislative for one subsector operational = 2; Preparation of frameworks under way = 1)* No comprehensve legislative framework in place for regulating importations of efficient end-use devices in 2009.
32	Appliance labelling (score)		1		*The indicator assesses the state of appliance labelling. (Score system: Compulsory appliance labelling operational = 2; Appliance labelling in preparation = 1)* No compulsory appliance labelling endorsed yet for Samoa. In 2009, Samoa was identified as part of a sub-regional planning study on labelling. Study was undertaken in 2010. Appliance imports in Samoa mostly came from New Zealand and Australia, and mostly carry Australian and New Zealand energy labels.

No.	FAESP indicators		Explanatory notes
33	Availability of national energy balance (score)	2	*The indicator assesses availability of national key energy data to 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)* Energy balance available and considered as an important planning tool for energy administration.

FAESP action theme 7 — Financing, monitoring & evaluation

No.	FAESP indicators		Explanatory notes
34	Energy portfolio (USD)	104,668,600	*The indicator tracks the flow of funding into the country's energy sector. Grant aid commitments + loan commitments.* Funding contribution as of 2011 into Samoa.
35	Availability of financing information (score)	3	*The indicator assesses the 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 6 months = 2; Partial information set available within 12 months = 1)* Financial data records of funded projects are available at the Economic Policy and Planning Division where indicative estimates of the latest spending can be easily provided.
36	Monitoring framework (score)	1	*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)* Comprehensive monitoring and evaluation framework in place for ADB–supported power sector expansion project. No specific monitoring and evaluation framework in place for the energy sector.

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