



# EXPERIMENTAL ENERGY ACCOUNTS FOR THE FEDERATED STATES OF MICRONESIA

24 JULY 2017

Sharon Pelep, Lomalida Jibemai, John Adolph Jr., Santos Talugmai, Brihmer Johnson  
Statistics Division, Department of Resource and Development, National Government, Federated  
State of Micronesia

Sanjesh Naidu  
United Nations Economic and Social Commission for the Asia Pacific, Pacific Office

Michael Vardon  
Australian National University

**DEPARTMENT OF RESOURCES & DEVELOPMENT**  
**Federated States of Micronesia**  
**P. O. Box PS 12**  
**Palikir, Pohnpei FM 96941**  
**Phone: (691) 320-6260/2646/5133 fax: (691) 320-5854**  
**Email: [fsmrd@fsmrd.fm](mailto:fsmrd@fsmrd.fm)**

## TABLE OF CONTENTS

1. Introduction.....	3
2. Summary of results.....	6
4. Policy Considerations .....	15
5. Next steps.....	16
6. Acknowledgements .....	19
7. References .....	20
Annex 1. Energy accounts – Tables and Figures.....	21
Annex 2. Data Sources and Methods.....	36
Annex 3. FSM 2015 Economic Statistics.....	40

Note: To continuously improve the coverage and quality of the energy accounts, and to assist in the development of the environmental-economic accounts in FSM, feedback can be sent to Ms. Sharon Pelep on [spelep@fsmrd.fm](mailto:spelep@fsmrd.fm)

## 1. INTRODUCTION

This report presents experimental energy accounts for the Federated States of Micronesia (FSM). Complete physical and monetary accounts are presented for the year 2015 for FSM and each of the four States (Chuuk, Kosrae, Pohnpei and Yap). Complete accounts for the island of Kosrae were compiled for 2013, 2014 and 2015. The accounts were developed using the System of Environmental-Economic Accounting – Central Framework (SEEA)<sup>1</sup>.

Energy accounts were identified as a priority in an assessment report<sup>2</sup>, prepared by Statistics Division of Department of Resource and Development, FSM National Government with support from the United Nations Economic and Social Commission for the Asia Pacific (UNESCAP) in 2015. The assessment, conducted in conjunction with national stakeholders, drew upon key national policy documents to identify areas of national priority and determine technical feasibility based on available statistics.

In particular, the FSM Strategic Development Plan 2004-2023<sup>3</sup>, identified several goals, one of which directly related to energy accounts:

*Strategic Goal 3 is to improve the environment and it states: reduce energy use and convert to renewable energy sources/ minimize emission of greenhouse gases.*

A range of related actions and targets are outlined in the Plan, including:

- Lessening energy demand via conservation strategies and use of more efficient energy using appliances; and
- Installation of alternative energy production technologies (i.e. renewable energy, e.g. solar and hydro-electricity).

The FSM National Government's National Energy Policy (2012) reinforces these goals, and highlights the need for:

- Safe, reliable, cost-effective and sustainable energy supply;
- A diversified energy resource base; and
- Environmentally sound and efficient use of energy.

---

<sup>1</sup> The SEEA was adopted as an international statistical standard in 2012, and can be integrated with the System of National Accounts (SNA), which among other things produces the indicator of Gross Domestic Product (GDP).

<sup>2</sup> Found at <http://www.fsmstats.fm/wp-content/uploads/2017/07/FSM-Environment-Statistics-Assessment-Report.pdf>

<sup>3</sup> <https://www.adb.org/sites/default/files/linked-documents/cobp-fsm-2015-2017-sd-02.pdf>

The overarching target of the Energy Policy includes the need to raise the share of renewable energy sources and improve efficiency in both energy supply, and energy use.

The energy priorities and associated indicators in the FSM Strategic Development Plan 2004-2023 and National Energy Policy are also found in the global Sustainable Development Goal (SDGs) 7 on Energy. Given the integrated and cross-cutting nature of energy data (where it comes from, how it is used and what impacts it has on the environment, economic and society), targeted policy development and implementation as well as monitoring progress towards national and, where appropriate, global targets is important.

Data for the monitoring of several national and SDGs Goal 7 targets can be derived from the SEEA energy accounts model. For example: proportion of population with access to energy services; share of renewable energy in the national energy mix; and rate of improvement in energy efficiency. On a related closely related point, the SEEA carbon and carbon dioxide emission accounts are directly linked to the energy accounts and could be prepared in later stage. This would assist significantly in the development and monitoring of Intended Nationally Determined Contributions<sup>4</sup>.

### *1.1. Focus of the experimental energy accounts*

These accounts were prepared with the aim of determining the extent to which existing data sets can support the construction of energy accounts that meet policy demands in FSM.

Two main forms of energy are supplied in the market economy of FSM: fossil fuels by FSM Petroleum Corporation and electricity by four State owned power utilities, namely: Pohnpei Utility Corporation (PUC), Kosrae Utilities Authority (KUA), Yap State Public Services Corporation (YSPSC) and Chuuk Public Utility Corporation (CPUC). It was estimated in 2010 that around 55% of households are connected to the electricity network<sup>5</sup>. Some electricity produced by the power authorities is sold via energy retailers.

Most electricity is generated from fossil fuel (diesel) but a small amount is generated from solar, and this amount is predicted to increase<sup>6</sup>, while a small hydro-electric plant operates in Pohnpei. Practically all fossil fuel is imported by the FSM Petroleum

---

<sup>4</sup> United Nations Framework Convention on Climate Change, INDCs: [http://unfccc.int/focus/indc\\_portal/items/8766.php](http://unfccc.int/focus/indc_portal/items/8766.php)

<sup>5</sup> Expression of Interest to Participate in SREP, Micronesia Climate Investment Funds: [https://www.cif.climateinvestmentfunds.org/sites/default/files/meeting-documents/federated\\_states\\_of\\_micronesia\\_eoi\\_0.pdf](https://www.cif.climateinvestmentfunds.org/sites/default/files/meeting-documents/federated_states_of_micronesia_eoi_0.pdf)

<sup>6</sup> World Bank Energy Sector Development Project: <http://www.cpuc.fm/wp-content/uploads/2014/03/Chuuk-State-FSM-WB-ESDP-Consultation-Report-10-Mar-14-Final.pdf>

Corporation (a small amount may be imported by fishing and marine transport vessels re-fueling from tankers at sea). In addition, to fossil fuels and electricity, firewood and other vegetable matter (especially coconut husks) are also used as energy sources.

The experimental energy accounts are focused on the supply and use of fossil fuels and electricity for which there is readily available national information. This includes information from the national accounts on the use of energy in monetary terms for the period 2009 to 2015 as well as more detailed data from FSM Petroleum Corporation and the power utilities for 2013 to 2015.

Previous work on the use of firewood and other vegetable matter as energy (Fifita 1999) is indicative but unlikely to reflect current use. Information on the generation and use of solar and hydro-electricity has not yet been obtained. If data can be identified or new data collected, then the generation and use of renewable energy could be included in future energy accounts for FSM.

A range of unpublished data that supported the construction of national accounts is also available although not fully explored. The compilation of the accounts brought to light some limitations and inconsistencies in the data which will need to be addressed over time (and suggestions for this are made in Section 5 “Next Steps”).

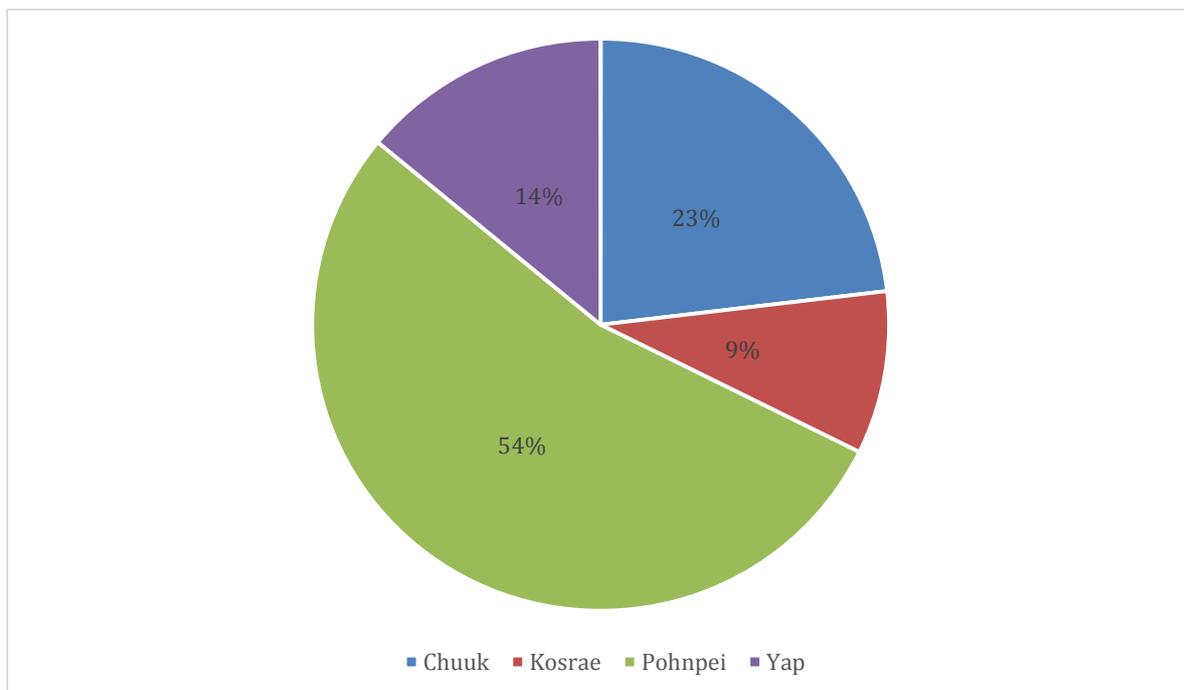
The tables included are simplified versions of those presented in the SEEA Central Framework. In particular, the industry split in the supply and use table is very limited, the imports by the FSM Petroleum are shown as a direct supply to uses and there is no inventory column. The simplification is used to align with the data available and to aid interpretation by those new to the SEEA. Overtime the tables can be expanded to include greater detail and more information (and again suggestions for this are made in Section 5 “Next Steps”).

## 2. SUMMARY OF RESULTS

A summary of information related to the supply and use of energy in FSM is presented in Table 1 and Figures 1-10. The full experimental energy accounts for FSM and each of the states for 2015 are found in Appendix 1 and the data sources and methods are described in Appendix 2.

Total use of energy products (fossil fuels and electricity) in physical terms was 4,610 million Gigajoule (Gj) in FSM in 2015. The greatest use of energy products was in Pohnpei, which accounted for 54% of the total (Fig. 1). The total value of energy product use in FSM increased 25% between 2009 and 2015, from \$32.4 million to \$40.4 million<sup>7</sup>. This increasing trend was seen in all states except Yap (Fig. 2). Energy use by states was generally reflective of the size and growth of the economy in each state as measured by Gross Domestic Product (GDP) (Fig. 3).

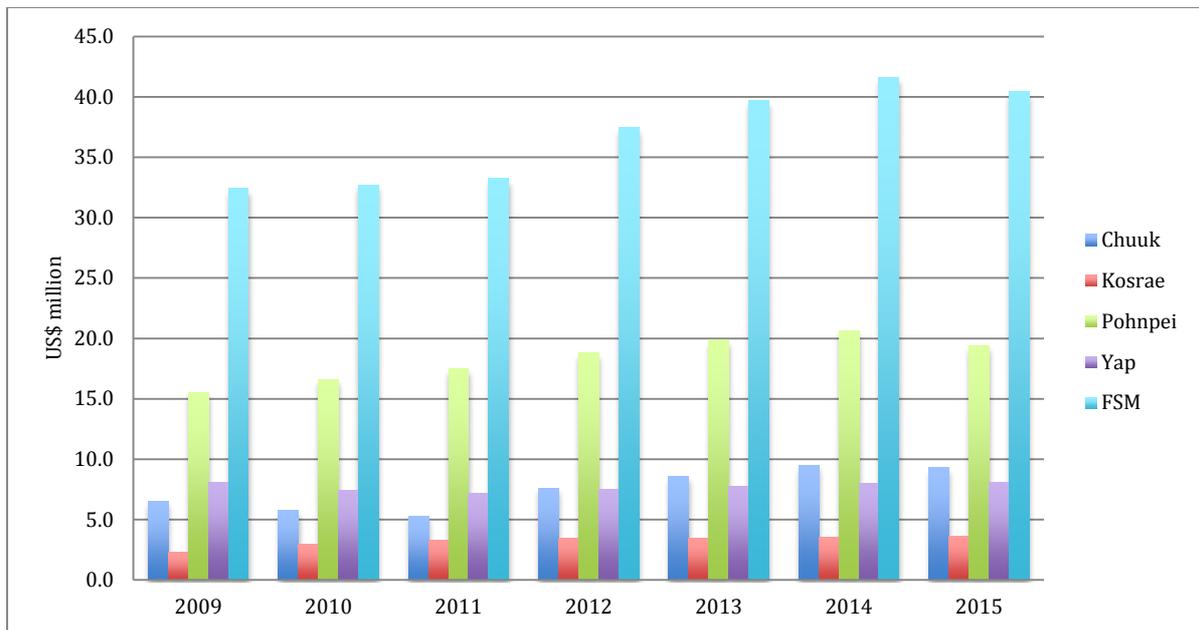
**Figure 1.** Total use of energy products by state, 2015 (percentage)



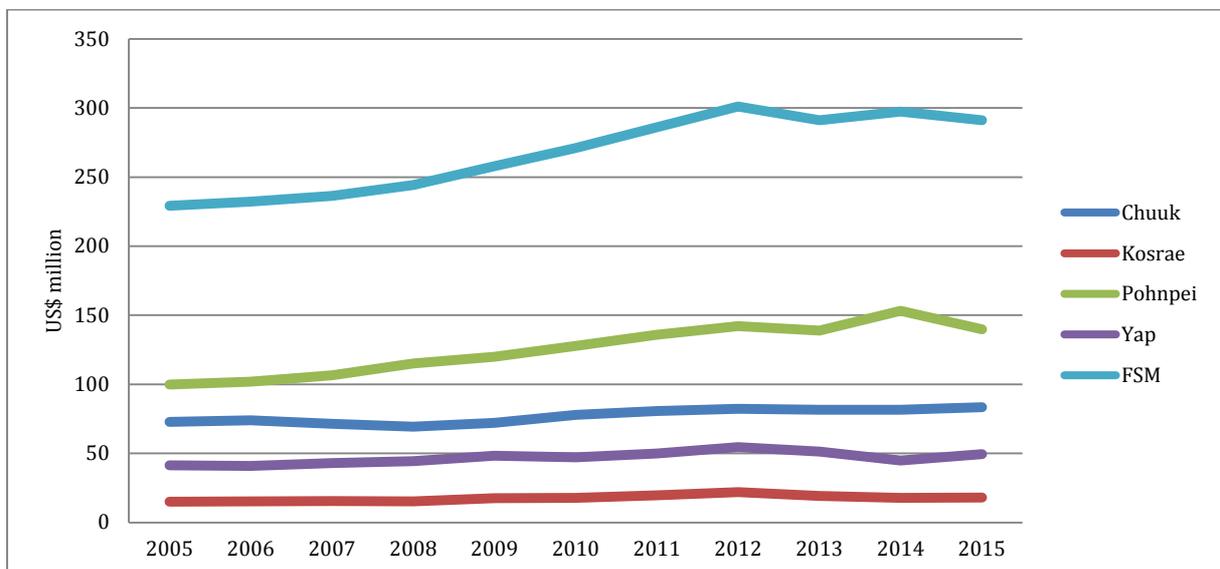
---

<sup>7</sup> These are all in current prices and hence the changes reflect both the changes in the amount of fuel used as well as the price of fuel

**Figure 2.** Total value of energy product use by state, 2009 – 2015 (US\$ million, current price)



**Figure 3.** State GDP and GDP growth, 1995 to 2015 (US\$ million basic<sup>8</sup> prices, current price<sup>9</sup>)

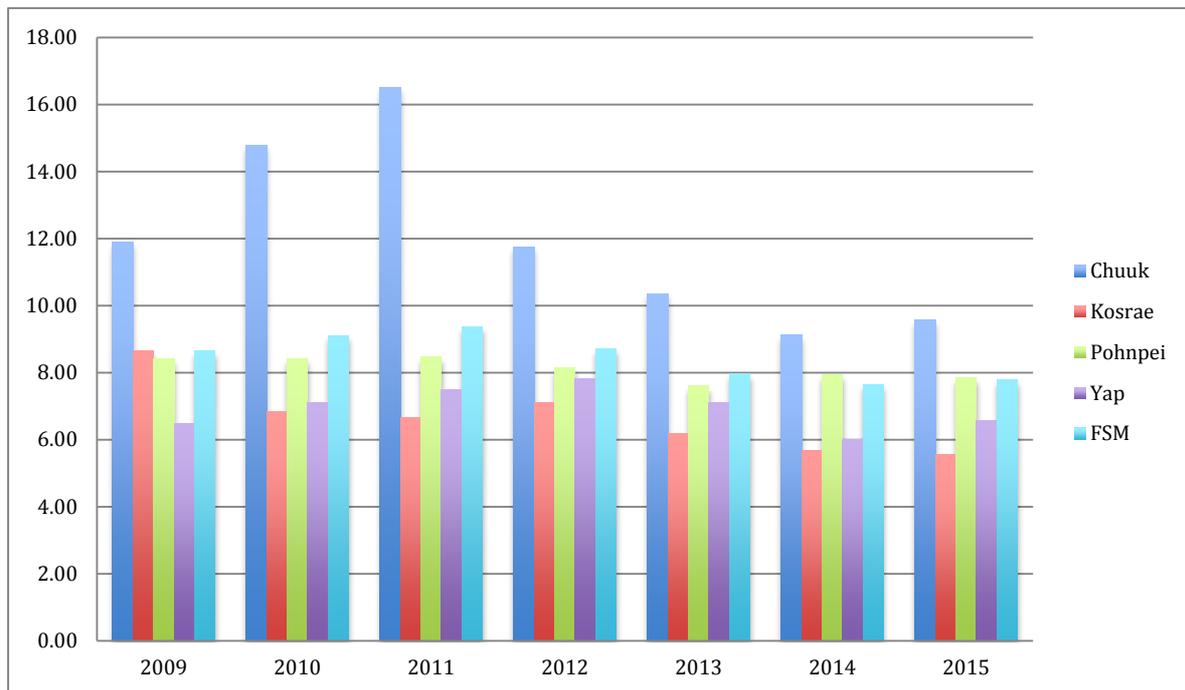


<sup>8</sup> Basic prices are the amounts received by the producers of goods and services. The prices excludes taxes or subsidies paid by the purchasers as well as transport costs separately invoiced by the producers. See SNA 2008, Para 6.205.

<sup>9</sup> Current prices are the prices of goods and services that prevail in the accounting period in which they are consumed. See SNA 2008, para 1.67. They are distinct from constant prices which apply the price prevailing in a single reference year to all other years.

The ratio of economic production to the value of energy used in FSM is shown in Figure 4. This is GDP for each dollar of energy product used. Total economic productivity in FSM has declined 10 %, from 8.66 US dollars GDP per energy dollar used in 2009 to 7.79 dollars in 2015. Declines in economic productivity between 2009 and 2015 were also seen Chuuk (-19%), Kosrae (-36%) and Pohnpei (-7%) but increased in Yap by 1%. The overall decline in economic productivity of energy use indicates that the value of energy used is increasing faster than GDP. It is also noted that the industry value added (IVA)<sup>10</sup> of the energy sector is increasing as a share of the FSM economy (Fig. 5).

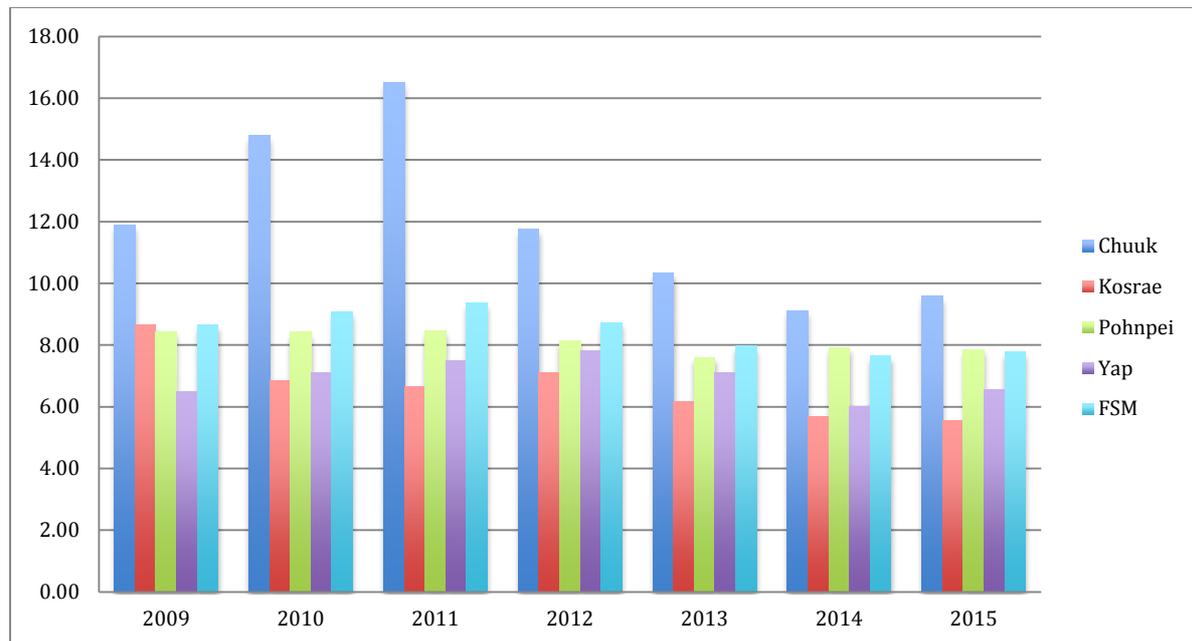
**Figure 4.** Economic productivity of energy use, FSM 2009 to 2015 (US\$ of GDP at purchasers price<sup>11</sup> per total value of energy used, current prices)



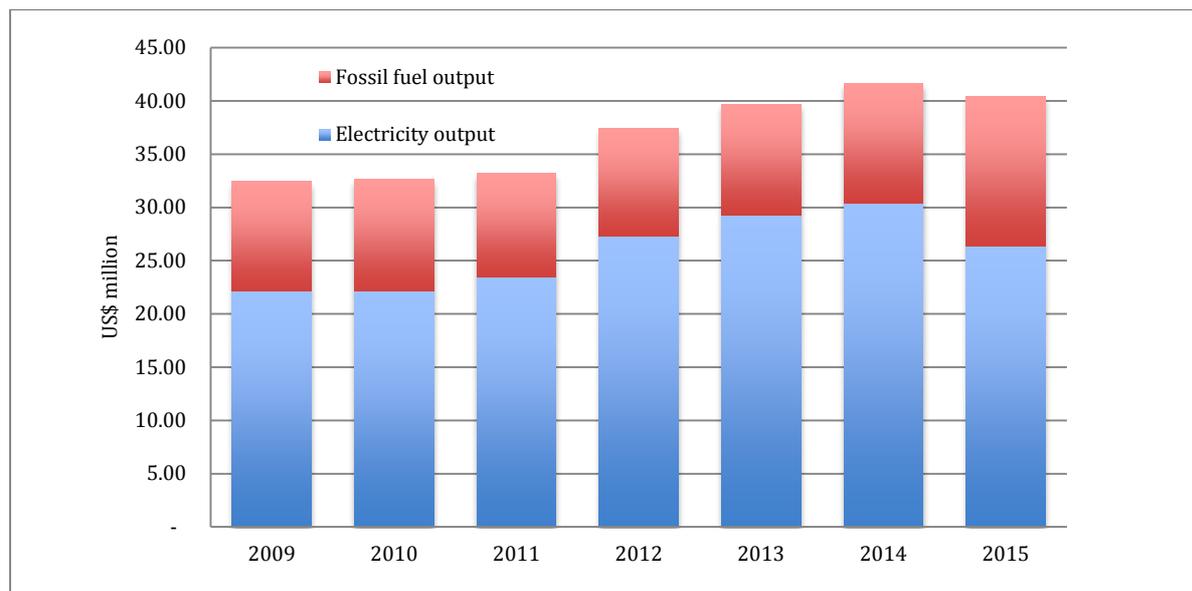
<sup>10</sup> IVA in the contribution of each industry to GDP, i.e. the sum

<sup>11</sup> Purchasers prices are the amounts paid by the users of goods and services. This is different (usually less) from the basic price, which is the amount received by the suppliers of goods and services. Purchasers price = basic price + trade and transport margins + taxes less subsidies.

**Figure 5.** Energy industry value added as percentage of GDP, FSM 2009 to 2015 (purchases price)

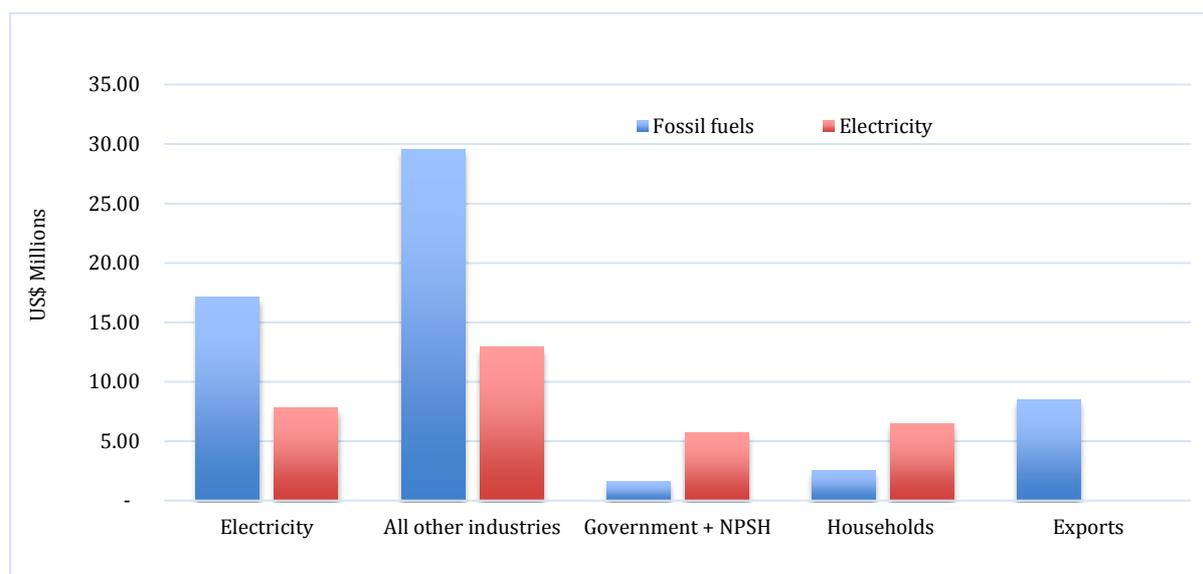


**Figure 6.** Value of output by fuel type, FSM 2009 to 2015 (Basic price)



The value of the energy output in FSM is shown in Figure 6 for fossil fuels and electricity. The amount has increased between 2009 and 2015. Figure 6 shows electricity as the dominant contributor to output. However, output is not equal to total sales for fossils as all fossil fuel is imported and then on-sold by the FSM Petroleum Corporation. The output is essentially the difference between the price paid by the FSM Petroleum Corporation for the imports and the price for which these are sold.

**Figure 7.** Monetary use of energy products by sector, FSM 2015 (Purchasers price)



Care must be taken with the interpretation of the data on the use of electricity by industry and sector (Figs 7 to 8). Firstly, the industry breakdown is coarse, and secondly there is retailing of electricity via power cash cards, whereby the monetary flow may be recorded as a use of electricity by the retailer, but the physical flow may be recorded as a use by households. Going forward, this issue will need to be addressed, with the likelihood that part of the monetary use by “All other industries” will be re-allocated to households.

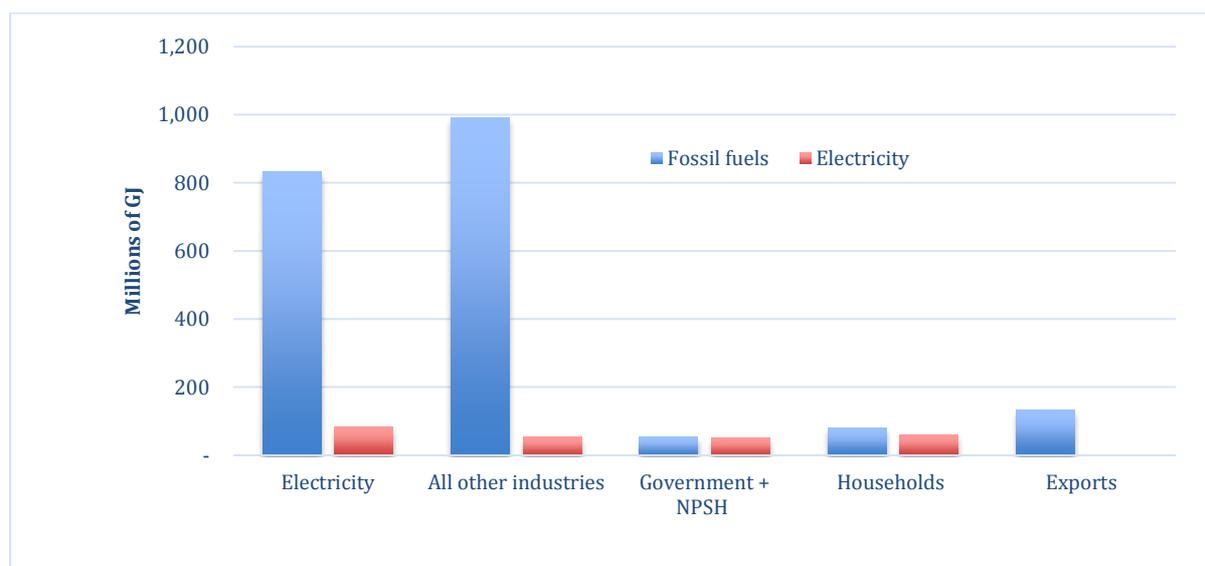
The value of fossil fuel and electric energy used by the different sectors in 2015 in FSM is shown in Figure 7. The electricity industry was the largest single user of energy by value, accounting for US\$17.1 million or 29% of fossil fuel use by value. Almost all of this was diesel, used for electricity generation. All other industries (retail, domestic transport, telecommunications, etc.) accounted for US\$29.6 million or 50% of fossil fuel use. Re-export of fossil fuels, to international airlines and fishing vessels accounted for US\$8.5 million or 14%. By value, households accounted for US\$2.5 million or 4% of fossil fuel use and US\$6.5 million or 24% of electricity use. Further details are found in the monetary supply and use tables in Annex 1.

The physical use of fossil fuel and electric energy by different sectors in 2015 in FSM is shown in Figure 8. Physical energy use is all shown in gigajoules (Gj), with both gallons of the different fossil fuels and gigawatt hours of electricity converted to this measure<sup>12</sup>. The pattern of physical use is broadly like the monetary use, but the percentage share of the physical use by the electricity and other industries is higher than the monetary use (Table 1). For example, the electricity industry used 40% of the total physical use of

<sup>12</sup> See Annex 2 Data sources and methods for details of the conversion.

fossils but only 29% of monetary value of fossil fuel use. This reflects the different prices paid by different parts of the economy and Figure 9 shows the implied price of the energy use by sector, i.e. US\$ per Gj. Interpretation of the data on implicit price is made difficult by energy retailing, which artificially inflates the implied price of electricity to business and reduces the price for households. In addition, the different fossil fuel types are combined.

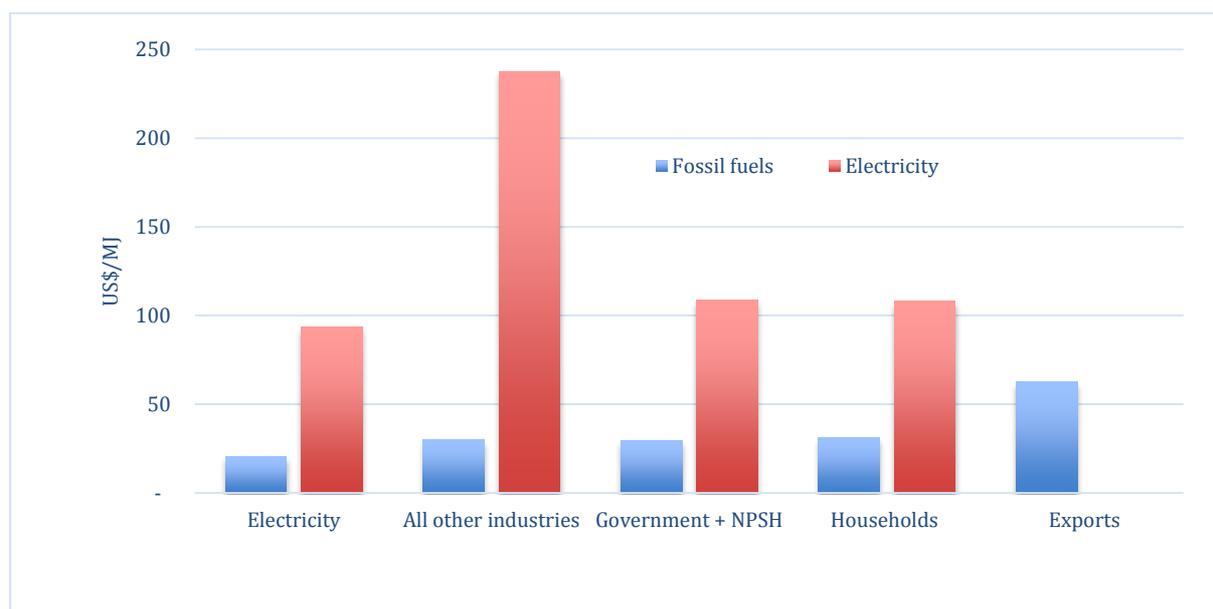
**Figure 8.** Physical use of energy by sector, FSM 2015 (Millions of Gj)



**Table 1.** Percentage physical and monetary use of energy products by sector, FSM 2015

	Electricity	All other industries	Government + NPISH	Households	Exports	Total
<b>Percentage of total monetary use</b>						
Fossil fuels	29%	50%	3%	4%	14%	100%
Electricity	24%	39%	17%	20%	0%	100%
<b>Percentage of total physical use</b>						
Fossil fuels	40%	47%	3%	4%	6%	100%
Electricity	33%	22%	21%	24%	0%	100%

**Figure 9.** Implied price of energy products by sector, FSM 2015 (US\$/MJ)



Note: Care must be taken with the interpretation of the implied price of electricity owing to the retail of electricity which artificially inflates the price of electricity to the “All other industries” category.

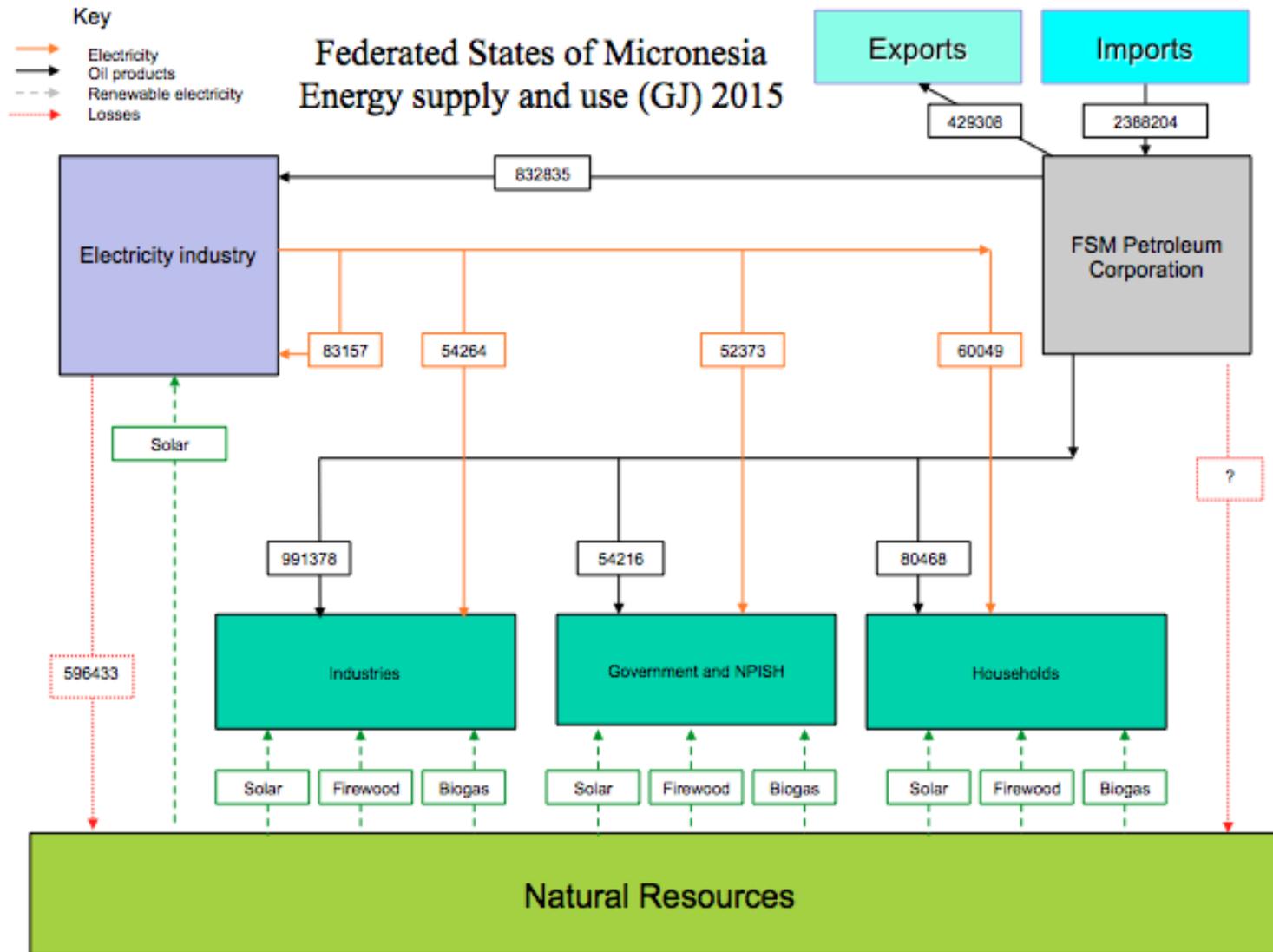
Figure 10 presents a diagram of physical energy flows for FSM in 2015, while Figure 11 shows the matching monetary flows. The physical flow accounts highlight the losses of energy in conversion (i.e. the energy loss in burning fossil fuel to generate electricity), which were 596,433 GJ in 2015. Losses in the states are shown in Table 2. Losses in electricity distribution (83,157 GJ in 2015) are not separately shown but would be included in the energy industries use of electricity category.

Annex 1 presents the physical flows of energy for each of the states in 2015: Chuuk (Fig. A1.1), Kosrae (Fig. A1.2), Pohnpei (Fig. A1.3) and Yap (Fig. A1.4).

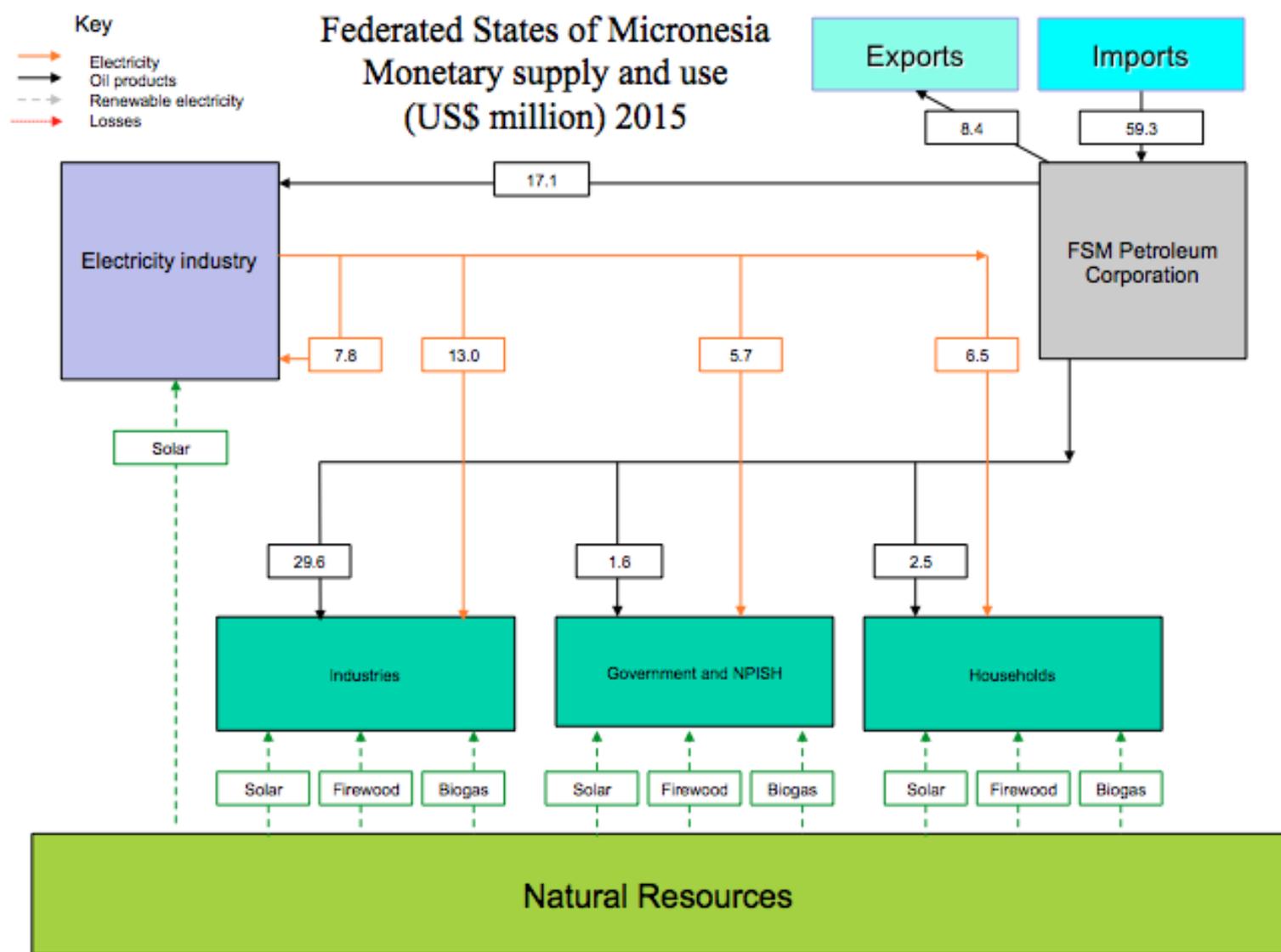
**Table 2.** Losses in energy conversion by electricity industry, 2015

	Losses during conversion (GJ)	Diesel use (GJ)	Losses as percentage of total diesel (%)
Chuuk	113,592,182	161,759,018	70%
Kosrae	57,862,862	76,675,681	75%
Pohnpei	310,996,089	436,777,873	71%
Yap	113,982,164	157,554,755	72%
FSM	596,433,297	832,767,327	72%

**Figure 10.** Physical energy flows for the Federated States of Micronesia, 2015 (GJ)



**Figure 11.** Monetary energy flows for the Federated States of Micronesia, 2015 (US\$ millions)



#### 4. POLICY CONSIDERATIONS

Policy considerations from the results of the energy accounts could be interpreted in various forms. Specific use of the results for policy will depend on type of user and nature of development challenge to be addressed. The accounts have some limitations due to the data available and the methods used and these must be considered when applying the information to specific decisions. Ways to address the limitations are considered in the Section 5 Next Steps.

The energy accounts are not meant to provide policy measures, rather they present existing energy data using an international accounting standard, that can then be used to inform the development, implementation and monitoring of national energy policies and priorities.

The energy accounts can be linked to the policy objectives contained in FSM's National Energy Policy (2012), including through the following areas (which are expanded on below): infrastructure capacity planning; regulatory considerations; and tracking implementation progress against national development priorities.

*Infrastructure capacity planning* – using data on loss in generation and distribution of energy, and comparing across States and globally, investment decisions on appropriateness and state of generation and distribution technologies and infrastructure could be assessed. An example is understanding reasons for greater losses 75% in distribution and generation in Kosrae, compared to national level of 70% (Table 2), and through such analysis informing more targeted policy interventions to improve conversion energy in other States. In addition, by analyzing trends in use of energy, more targeted investments could be made to improve access to energy to communities in the four states. Estimates of the overall energy supply and distribution capacity can help plan for future energy requirements.

*Regulatory considerations* – information on the intensity of energy use by households, industry and government (Table 1 and Figure 9), provides better understanding of user-pay implications and are potentially useful in the consideration of more equitable pricing tariffs. Such considerations could lead to better management of energy resources.

*Tracking implementation progress against national development priorities* – the energy accounts provide relevant data to track progress against priorities and targets contained in national and international development agenda. By producing baseline data and adding additional year-on-year reference points, comparison of progress against set targets can be achieved. For example, estimates to measure targets included in the FSM Energy Policy such as the cost effective energy supply target and efficient use of energy target can be obtained from the energy account (e.g. Fig. 4).

## 5. NEXT STEPS

This experimental account is the first attempt towards accounting for energy availability, supply and use in FSM. It has shown that existing data can be used to produce a set of energy accounts that are, notwithstanding some limitations, suitable for government use and in particular to address the National Energy Policy and Strategic Development Plan 2004-2023<sup>13</sup>.

While valuable information can be derived from the current experimental compilation, further development of the energy accounts will allow more complete analysis of important policy questions and specific goals related to energy in the Strategic Development Plan, namely reducing energy use and greenhouse gas emissions and increasing the use of renewables. Some specific questions to consider are:

- How much energy is available for use in all forms (including cooking gas, biomass, solar and fuelwood)?
- Which sources of energy is FSM most dependent most on and for what purposes? Is it sustainable? Are there alternatives?
- Which states and/or industries use energy more/less efficiently?
- What is the coverage profile of communities with access to specific types of energy sources?

To provide better evidence to support these policy questions, the Division of Statistics will consider the following future work:

- Disaggregating main economic activity as closely possible to match International Standard Industrial Classification (ISIC), including Agriculture, Fisheries, Construction, Transport, Wholesale and Retail Trade to capture the amount of electricity and fuel energy use, and intensity of use, in different industries;
- Gathering and utilizing data on additional energy sources (cooking gas, renewable energy, fuel wood, biogas) to understand more completely total energy production and use;
- Compiling energy accounts for a future year to provide another reference point and facilitate analysis of trends and help institutionalize the process of producing SEEA based statistics in conjunction with relevant industry and government stakeholders. This will facilitate tracking of progress against priorities contained in the National Energy Policy, the national development plan as well as, relevant SDG targets and indicators;
- Additional investigation of electricity retailing to ensure that the monetary and physical use of electricity are better aligned;

---

<sup>13</sup> <https://www.adb.org/sites/default/files/linked-documents/cobp-fsm-2015-2017-sd-02.pdf>

- Additional investigation of energy use by domestic and international marine transport and fishing industries - in particular the supply of fuel from tankers at sea;
- Examining the available historical data underpinning the national accounts to extend the time series of physical energy use back to 2009 therefore matching the monetary energy use (in current prices) available from the national accounts and using this data to develop a time-series of monetary energy use in constant prices;
- Investigating the existing data on physical energy use for 2009 to 2015 to align this data (based on calendar years) to national accounts data (based on financial years);
- Updating the energy accounts at regular intervals, ideally annually, but it is understood that frequency of production will be constrained by human and financial resources. To support regular updates, the establishment of an inter-agency working group will be helpful. The working group could meet periodically, or through email and other communication means, to coordinate production of information and to ensure that as the accounts are developed they are suitable for analytical and policy applications;
- Developing a linked set of greenhouse gas emissions accounts alongside the energy accounts.

At a technical level, several issues were identified within the data sources and improvements to these, as well greater understanding of energy supply and use by the Statistics Division, are likely to lead to higher quality accounts. Specific improvements that could be made include:

- Data providers to supply information in machine-readable formats (e.g. csv files that can be read standard software like Excel) rather than PDF files;
- Energy suppliers to be encouraged to use ISIC (Revision 4<sup>14</sup>) for industry classifications and the sector classification of the system of national accounts;
- The references year for the national accounts is the financial year (1 October to 30 September) while the energy data is derived on the calendar year. With additional information and/or some assumptions these can be better aligned;
- Information on retail sales of fossil products is needed to split the amount supplied to households, government and corporations (industries);
- Data on fossil fuel inventories. No existing sources were identified;
- Data on the number of households using their own electric power sources (solar or generators). There is some limited information in the Household Income and Expenditure Survey but more is needed;

---

<sup>14</sup> <https://unstats.un.org/unsd/cr/registry/isic-4.asp>

- Data on the amount of biogas, fuelwood and other vegetable matter (e.g. coconut husks) is needed to develop estimates of energy use from these sources. Much of this is assumed to be household production and consumption. Survey information from the Household Income and Expenditure Survey and the Agricultural Census will help with this task; and
- Closer coordination between Statistics Division, relevant government departments and local experts will help ensure consistency between different information sources.

In addition to the energy accounts, additional accounts could be prepared to facilitate the examination of policy issues closely associated to energy policy. In particular, the energy accounts provide a platform for preparing greenhouse gas emissions accounts that may inform the setting of the Intended National Determined Contributions.

## 6. ACKNOWLEDGEMENTS

This report has been produced under the overall leadership and guidance of Mr. Marion Henry, Secretary for the Department of Resources and Development, FSM National Government. Staff at the Statistic Division (under the Department of Resources and Development) took responsibility for collection of data and information necessary for compiling the account. A dedicated team of staff led by Sharon Phelep, under the overall guidance of Brihmer Johnson, produced the experimental accounts, with technical support from Michael Vardon of the Australian National University and Sanjesh Naidu of UNESCAP Pacific Office.

The support to the Statistics Division by these technical experts was made possible by UNESCAP with funding from a UN Development Account project that responds to the requests of Member States in the Rio+20 outcome document for better data to support integrated policy making for sustainable development. In particular, UNESCAP funded a technical mission to FSM 6-10 March 2017 to support the Statistics Division to produce the accounts.

We would like to thank FSM Petroleum Corporation and the public utilities from Chuuk, Kosrae, Pohnpei and Yap for supplying the data needed to create the experimental energy accounts.

We would also like to thank Marion Henry, Hubert Yamada and Alisa Takesy for comments on the final draft accounts and Michael Bordt, Teerapong Praphotjanaporn of ESCAP, Joe St Lawrence of the Canadian Statistics Office and Glenn McKinley, a consultant on FSM national accounts, for comments on an early draft version of the accounts.

## 7. REFERENCES

ONPA (Official of the Nation Public Auditor). 2016. FSM Petroleum Corporation. Financial Statements and Independent Auditors Report Years ended December 31 2015 and 2014:

[http://fsmopa.fm/files/fy2016/FSMPC\\_fs15%20\[Final%20\]June%2030%202016\].pdf](http://fsmopa.fm/files/fy2016/FSMPC_fs15%20[Final%20]June%2030%202016].pdf)

Fifita, S. (1999). National Energy Policy FSM. SOPAC Miscellaneous Report 329:

[http://prdrse4all.spc.int/system/files/MR0329\\_0.pdf](http://prdrse4all.spc.int/system/files/MR0329_0.pdf)

Pitiviti (2016). FSM 2015 Economic Review:

<http://www.pitiviti.org/initiatives/economics/fsm.php>

UN (United Nations) et al. (2014). SEEA Central Framework:

<https://unstats.un.org/unsd/envaccounting/seearev/>

UN (United Nations) SEEA Energy: <https://unstats.un.org/unsd/envaccounting/seeae/>

UN (United Nations) International Recommendations for Energy Statistics:

<https://unstats.un.org/unsd/energy/ires/>

## ANNEX 1. ENERGY ACCOUNTS – TABLES AND FIGURES

**Table A1.1.** Energy physical supply and use tables, Federated States of Micronesia, 2015 (GJ)

Physical supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hydro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
Fossil fuels					2,388,203,841		2,388,203,841
Diesel					1,272,064,916		1,272,064,916
ULP					792,242,604		792,242,604
Jet Fuel/Kerosene					323,896,321		323,896,321
Propane					-		-
BioGas					-		-
Electricity	236,401,397				13,442,224		249,843,621
<i>Total energy products</i>	236,401,397				2,401,646,065		2,638,047,462
<b>Residuals</b>							
Conversion losses	596,433,297						596,433,297
Distribution losses**							
Heat	83,157,203	1,045,641,966	106,588,941	140,517,062	81,187,372		1,457,092,544
<i>Total residuals</i>	679,590,500	1,045,641,966	106,588,941	140,517,062	81,187,372		2,053,525,841
<b>TOTAL SUPPLY</b>	<b>915,991,897</b>	<b>1,045,641,966</b>	<b>106,588,941</b>	<b>140,517,062</b>	<b>2,482,833,437</b>	<b>-</b>	<b>4,691,573,303</b>
<b>Physical use table</b>							
Physical use table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hydro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
Fossil fuels	832,834,694	991,377,586	54,216,102	80,467,863	429,307,596		2,388,203,841
Diesel	832,767,327	209,252,862	49,603,948	46,394,730	134,046,049		1,272,064,916
ULP	67,368	755,708,141	4,612,154	31,854,941	-		792,242,604
Jet Fuel/Kerosene		26,416,583	-	2,218,192	295,261,546		323,896,321
Propane							
BioGas	-	-	-	-	-		-
Electricity	83,157,203	54,264,379	52,372,839	60,049,200	-		249,843,621
<i>Total energy products</i>	915,991,897	1,045,641,966	106,588,941	140,517,062	429,307,596		2,638,047,462
<b>Residuals</b>							
Conversion losses						596,433,297	596,433,297
Distribution losses**							
Heat						1,457,092,544	1,457,092,544
<i>Total residuals</i>						2,053,525,841	2,053,525,841
<b>TOTAL USE</b>	<b>915,991,897</b>	<b>1,045,641,966</b>	<b>106,588,941</b>	<b>140,517,062</b>	<b>429,307,596</b>	<b>2,053,525,841</b>	<b>4,691,573,303</b>
*including state owned enterprises							
**Distribution losses not separately shown but likely to be included in use of electricity by the electricity industry							
Grey = nil by definition							

**Table A1.2. Energy physical supply and use tables, Chuuk 2015 (GJ)**

Physical supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>					561,509,028		561,509,028
Diesel					250,820,648		250,820,648
ULP					226,019,952		226,019,952
Jet Fuel/Kerosene					84,668,428		84,668,428
Propane							-
<b>BioGas</b>							-
<b>Electricity</b>	48,166,836						48,166,836
<i>Total energy products</i>	48,166,836				561,509,028		609,675,864
<b>Residuals</b>							
<b>Conversion losses</b>	113,592,182						113,592,182
<b>Distribution losses**</b>							
<b>Heat</b>	14,204,442	291,403,135	13,104,231	48,017,665	81,187,372		447,916,846
<i>Total residuals</i>	127,796,624	291,403,135	13,104,231	48,017,665	81,187,372		561,509,028
<b>TOTAL SUPPLY</b>	175,963,460	291,403,135	13,104,231	48,017,665	642,696,400	-	1,171,184,892
Physical use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>	161,759,018	280,346,756	2,433,254	35,782,628	81,187,372		561,509,028
Diesel	161,759,018	50,761,620	2,426,517	32,332,207	3,541,286		250,820,648
ULP		222,809,557	6,737	3,203,658	-		226,019,952
Jet Fuel/Kerosene		6,775,579	-	246,763	77,646,086		84,668,428
Propane		-	-	-	-		-
<b>BioGas</b>							-
<b>Electricity</b>	14,204,442	11,056,379	10,670,977	12,235,037	-		48,166,836
<i>Total energy products</i>	175,963,460	291,403,135	13,104,231	48,017,665	81,187,372		609,675,864
<b>Residuals</b>							
<b>Conversion losses</b>						113,592,182	113,592,182
<b>Distribution losses**</b>							
<b>Heat</b>						447,916,846	447,916,846
<i>Total residuals</i>						561,509,028	561,509,028
<b>TOTAL USE</b>	175,963,460	291,403,135	13,104,231	48,017,665	81,187,372	561,509,028	1,171,184,892
*including state owned enterprises							
**Distribution losses not separately shown but likely to be included in use of electricity by the electricity industry							
Grey = nil by definition							

**Table A1.3. Energy physical supply and use tables Kosrae, 2015 (GJ)**

Physical supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>					224,063,579		224,063,579
Diesel					90,929,096		90,929,096
ULP					81,957,157		81,957,157
Jet Fuel/Kerosene					51,177,326		51,177,326
Propane							-
<b>BioGas</b>							-
<b>Electricity</b>	18,812,819						18,812,819
<i>Total energy products</i>	18,812,819				224,063,579		242,876,398
<b>Residuals</b>							
<b>Conversion losses</b>	57,862,862						57,862,862
<b>Distribution losses**</b>							
<b>Heat</b>	1,782,167	63,055,436	8,138,937	46,939,449			119,915,989
<i>Total residuals</i>	59,645,029	63,055,436	8,138,937	46,939,449	-		177,778,852
<b>TOTAL SUPPLY</b>	78,457,848	63,055,436	8,138,937	46,939,449	224,063,579	-	420,655,250
Physical use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>	76,675,681	57,495,334	3,755,081	39,852,755	46,284,728		224,063,579
Diesel	76,675,681	2,083,868	2,295,487	9,874,059	-		90,929,096
ULP		52,307,305	1,459,594	28,190,258	-		81,957,157
Jet Fuel/Kerosene		3,104,161	-	1,788,438	46,284,728		51,177,326
Propane		-	-	-	-		-
<b>BioGas</b>		-	-	-	-		-
<b>Electricity</b>	1,782,167	5,560,102	4,383,856	7,086,694	-		18,812,819
<i>Total energy products</i>	78,457,848	63,055,436	8,138,937	46,939,449	46,284,728		242,876,398
<b>Residuals</b>							
<b>Conversion losses</b>						57,862,862	57,862,862
<b>Distribution losses**</b>							
<b>Heat</b>						119,915,989	119,915,989
<i>Total residuals</i>						177,778,852	177,778,852
<b>TOTAL USE</b>	78,457,848	63,055,436	8,138,937	46,939,449	46,284,728	177,778,852	420,655,250
*including state owned enterprises							
**Distribution losses not separately shown but likely to be included in use of electricity by the electricity industry							
Grey = nil by definition							

**Table A1.4. Energy physical supply and use tables, Pohnpei, 2015 (GJ)**

Physical supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>					1,276,455,960		1,276,455,960
Diesel					712,284,466		712,284,466
ULP					389,890,159		389,890,159
Jet Fuel/Kerosene					174,281,335		174,281,335
Propane							-
<b>BioGas</b>							-
<b>Electricity</b>	125,849,152				13,442,224		139,291,375
<i>Total energy products</i>	125,849,152				1,289,898,184		1,415,747,339
<b>Residuals</b>							
<b>Conversion losses</b>	310,996,089						310,996,089
<b>Distribution losses**</b>							
<b>Heat</b>	50,555,249	565,420,735	39,288,482	36,129,731			691,394,196
<i>Total residuals</i>	361,551,337	565,420,735	39,288,482	36,129,731			1,002,390,285
<b>TOTAL SUPPLY</b>	487,400,489	565,420,735	39,288,482	36,129,731	1,289,898,184	-	2,418,137,621
Physical use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>	436,845,240	536,532,894	11,407,609	4,162,319	287,507,899		1,276,455,960
Diesel	436,777,873	134,936,009	9,500,972	3,579,696	127,489,916		712,284,466
ULP	67,368	387,455,130	1,906,637	461,025	-		389,890,159
Jet Fuel/Kerosene		14,141,755	-	121,598	160,017,983		174,281,335
Propane		-	-	-	-		-
<b>BioGas</b>							-
<b>Electricity</b>	50,555,249	28,887,842	27,880,873	31,967,412	-		139,291,375
<i>Total energy products</i>	487,400,489	565,420,735	39,288,482	36,129,731	287,507,899		1,415,747,339
<b>Residuals</b>							
<b>Conversion losses</b>						310,996,089	310,996,089
<b>Distribution losses**</b>							
<b>Heat</b>						691,394,196	691,394,196
<i>Total residuals</i>						1,002,390,285	1,002,390,285
<b>TOTAL USE</b>	487,400,489	565,420,735	39,288,482	36,129,731	287,507,899	1,002,390,285	2,418,137,621
*including state owned enterprises							
**Distribution losses not separately shown but likely to be included in use of electricity by the electricity industry							

**Table A1.5. Energy physical supply and use tables, Yap, 2015 (GJ)**

Physical supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>					326,175,273		326,175,273
Diesel					218,030,706		218,030,706
ULP					94,375,336		94,375,336
Jet Fuel/Kerosene					13,769,232		13,769,232
Propane							-
<b>BioGas</b>							-
<b>Electricity</b>	43,572,591						43,572,591
<i>Total energy products</i>	43,572,591				326,175,273		369,747,864
<b>Residuals</b>							
<b>Conversion losses</b>	113,982,164						113,982,164
<b>Distribution losses**</b>							
<b>Heat</b>	16,615,345	125,762,659	46,057,290	9,430,217			197,865,512
<i>Total residuals</i>	130,597,509	125,762,659	46,057,290	9,430,217			311,847,676
<b>TOTAL SUPPLY</b>	174,170,100	125,762,659	46,057,290	9,430,217	326,175,273	-	681,595,540
Physical use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>	157,554,755	117,002,602	36,620,158	670,161	14,327,597		326,175,273
Diesel	157,554,755	21,471,365	35,380,971	608,767	3,014,847		218,030,706
ULP		93,136,149	1,239,187		-		94,375,336
Jet Fuel/Kerosene		2,395,088	-	61,393	11,312,750		13,769,232
Propane		-	-		-		-
<b>BioGas</b>							-
<b>Electricity</b>	16,615,345	8,760,057	9,437,132	8,760,057	-		43,572,591
<i>Total energy products</i>	174,170,100	125,762,659	46,057,290	9,430,217	14,327,597		369,747,864
<b>Residuals</b>							
<b>Conversion losses</b>						113,982,164	113,982,164
<b>Distribution losses**</b>							
<b>Heat</b>						197,865,512	197,865,512
<i>Total residuals</i>						311,847,676	311,847,676
<b>TOTAL USE</b>	174,170,100	125,762,659	46,057,290	9,430,217	14,327,597	311,847,676	681,595,540
*including state owned enterprises							
**Distribution losses not separately shown but likely to be included in use of electricity by the electricity industry							
Grey = nil by definition							

**Table A1.6. Energy monetary supply and use tables, Federated States of Micronesia, 2015 (US\$)**

Physical supply table	Corporations*		Government and NPISH	Households	Rest of the World	Environment	TOTAL
	Electricity	All other industries			Imports (Petro. Corp)		
<b>Products</b>							
<b>Fossil fuels</b>					59,275,455		59,275,455
Diesel					26,457,982		26,457,982
ULP					25,371,464		25,371,464
Jet Fuel/Kerosene					7,446,009		7,446,009
Propane							
<b>BioGas</b>							
<b>Electricity</b>	25,791,681				1,165,717		26,957,398
<i>Total energy products</i>	<i>25,791,681</i>				<i>60,441,173</i>		<i>86,232,853</i>
<b>TOTAL SUPPLY</b>	<b>25,791,681</b>				<b>60,441,173</b>		<b>86,232,853</b>
Physical use table	Corporations*		Government and NPISH	Households	World	Environment	TOTAL
	Electricity	All other industries			Exports (Petro. Corp)		
<b>Products</b>							
<b>Fossil fuels</b>	17,101,041	29,575,216	1,602,602	2,532,611	8,463,986		59,275,455
Diesel	17,098,598	4,623,972	1,446,323	1,398,322	1,890,767		26,457,982
ULP	2,443	24,150,617	156,279	1,062,125	-		25,371,464
Jet Fuel/Kerosene		800,627	-	72,164	6,573,219		7,446,009
Propane							
<b>BioGas</b>							
<b>Electricity</b>	7,775,044	12,903,895	5,709,140	6,500,150	-		26,957,398
<i>Total energy products</i>	<i>24,876,086</i>	<i>36,548,279</i>	<i>7,311,742</i>	<i>9,032,761</i>	<i>8,463,986</i>		<i>86,232,853</i>
<b>TOTAL USE</b>	<b>24,876,086</b>	<b>36,548,279</b>	<b>7,311,742</b>	<b>9,032,761</b>	<b>8,463,986</b>		<b>86,232,853</b>

**Table A1.7. Energy monetary supply and use tables, Chuuk, 2015 (US\$)**

Monetary supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels					15,227,865		
Diesel					5,971,376		15,227,865
ULP					7,335,544		5,971,376
Jet Fuel/Kerosene					1,920,945		7,335,544
Propane							1,920,945
BioGas							-
Electricity	2,943,651						-
Total energy products	2,943,651				15,227,865		2,943,651
<b>TOTAL SUPPLY</b>	<b>2,943,651</b>				<b>15,227,865</b>		<b>18,171,516</b>
<b>Monetary use table</b>							
Monetary use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels	3,458,023	8,800,302	79,508	1,099,288	1,790,743		15,227,865
Diesel	3,458,023	1,375,628	79,267	976,707	81,749		5,971,376
ULP		7,220,453	241	114,850	-		7,335,544
Jet Fuel/Kerosene		204,221	-	7,731	1,708,994		1,920,945
Propane		-	-	-	-		-
BioGas							-
Electricity	868,085.27	1,543,781	652,142	747,728	-		2,943,651
Total energy products	4,326,109	9,475,998	731,650	1,847,016	1,790,743		18,171,516
<b>TOTAL USE</b>	<b>4,326,109</b>	<b>9,475,998</b>	<b>731,650</b>	<b>1,847,016</b>	<b>1,790,743</b>	<b>-</b>	<b>18,171,516</b>

\*including state owned enterprises

**Table A1.8. Energy monetary supply and use tables Kosrae, 2015 (US\$)**

Monetary supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels					5,944,615		5,944,615
Diesel					2,112,479		2,112,479
ULP					2,664,616		2,664,616
Jet Fuel/Kerosene					1,167,520		1,167,520
Propane							-
BioGas							-
Electricity	2,613,000						2,613,000
Total energy products	2,613,000				5,944,615		8,557,615
<b>TOTAL SUPPLY</b>	<b>2,613,000</b>				<b>5,944,615</b>		<b>8,557,615</b>
<b>Monetary use table</b>							
Monetary use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels	1,678,389	1,841,419	119,083	1,296,906	1,008,818		5,944,615
Diesel	1,678,389	56,059	70,915	307,115	-		2,112,479
ULP		1,685,447	48,168	931,002	-		2,664,616
Jet Fuel/Kerosene		99,914	-	58,788	1,008,818		1,167,520
Propane		-	-	-	-		-
BioGas		-	-	-	-		-
Electricity	247,533	777,268	608,894	984,304	-		2,613,000
Total energy products	1,925,922	2,613,688	727,977	2,281,210	1,008,818		8,557,615
<b>TOTAL USE</b>	<b>1,925,922</b>	<b>2,613,688</b>	<b>727,977</b>	<b>2,281,210</b>	<b>1,008,818</b>	<b>-</b>	<b>8,557,615</b>

\*including state owned enterprises

**Table A1.9. Energy monetary supply and use tables, Pohnpei, 2015 (US\$)**

Monetary supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels					29,245,054		29,245,054
Diesel					13,018,140		13,018,140
ULP					12,272,459		12,272,459
Jet Fuel/Kerosene					3,954,455		3,954,455
Propane							-
BioGas							-
Electricity	13,214,710				1,165,717		14,380,427
Total energy products	13,214,710				30,410,771		43,625,480
<b>TOTAL SUPPLY</b>	<b>13,214,710</b>				<b>30,410,771</b>		<b>43,625,480</b>
<b>Monetary use table</b>							
Monetary use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels	8,395,246	15,123,564	346,339	117,748	5,262,156		29,245,054
Diesel	8,392,803	2,520,748	282,525	97,691	1,724,373		13,018,140
ULP	2,443	12,189,930	63,813	16,272	-		12,272,459
Jet Fuel/Kerosene		412,887	-	3,786	3,537,783		3,954,455
Propane		-	-	-	-		-
BioGas							-
Electricity	5,062,746.57	8,096,096	2,927,613	3,356,718	-		14,380,427
Total energy products	13,457,993	18,156,914	3,273,952	3,474,466	5,262,156		43,625,480
<b>TOTAL USE</b>	<b>13,457,993</b>	<b>18,156,914</b>	<b>3,273,952</b>	<b>3,474,466</b>	<b>5,262,156</b>		<b>43,625,480</b>

\*including state owned enterprises

**Table A1.10. Energy monetary supply and use tables, Yap, 2015 (US\$)**

Monetary supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels					8,857,922		8,857,922
Diesel					5,355,988		5,355,988
ULP					3,098,845		3,098,845
Jet Fuel/Kerosene					403,089		403,089
Propane							-
BioGas							-
Electricity	7,020,320						7,020,320
Total energy products	7,020,320				8,857,922		15,878,242
<b>TOTAL SUPPLY</b>	<b>7,020,320</b>				<b>8,857,922</b>		<b>15,878,242</b>
<b>Monetary use table</b>							
Monetary use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels	3,569,383	3,809,930	1,057,672	18,668	402,268		8,857,922
Diesel	3,569,383	671,537	1,013,615	16,809	84,644		5,355,988
ULP		3,054,787	44,058		-		3,098,845
Jet Fuel/Kerosene		83,605	-	1,859	317,624		403,089
Propane		-	-	-	-		-
BioGas							-
Electricity	1,596,679	2,491,750	1,520,490	1,411,401	-		7,020,320
Total energy products	5,166,062	6,301,680	2,578,162	1,430,069	402,268		15,878,242
<b>TOTAL USE</b>	<b>5,166,062</b>	<b>6,301,680</b>	<b>2,578,162</b>	<b>1,430,069</b>	<b>402,268</b>		<b>15,878,242</b>

**Table A11. Energy physical supply and use tables, Kosrae, 2014**

Physical supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>					162,812,505		162,812,505
Diesel					74,427,156		74,427,156
ULP					57,741,982		57,741,982
Jet Fuel/Kerosene					30,643,367		30,643,367
Propane							-
<b>BioGas</b>							-
<b>Electricity</b>	19,665,984						19,665,984
<i>Total energy products</i>	19,665,984				162,812,505		182,478,489
<b>Residuals</b>							
<b>Conversion losses</b>	39,677,225						39,677,225
<b>Distribution losses**</b>							
<b>Heat</b>	3,302,778	61,514,538	7,641,149	23,334,572			95,793,038
<i>Total residuals</i>	42,980,003	61,514,538	7,641,149	23,334,572			135,470,263
<b>TOTAL SUPPLY</b>	62,645,987	61,514,538	7,641,149	23,334,572	162,812,505	-	317,948,752

Physical use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
<b>Fossil fuels</b>	59,343,209	56,048,383	3,313,962	16,764,710	27,342,242		162,812,505
Diesel	59,343,209	5,130,893	2,057,488	7,895,566	-		74,427,156
ULP		48,152,108	1,256,474	8,333,400	-		57,741,982
Jet Fuel/Kerosene		2,765,382	-	535,743	27,342,242		30,643,367
Propane		-	-	-	-		-
<b>BioGas</b>		-	-	-	-		-
<b>Electricity</b>	3,302,778	5,466,155	4,327,188	6,569,863	-		19,665,984
<i>Total energy products</i>	62,645,987	61,514,538	7,641,149	23,334,572	27,342,242		182,478,489
<b>Residuals</b>							
<b>Conversion losses</b>						39,677,225	39,677,225
<b>Distribution losses**</b>							
<b>Heat</b>						95,793,038.12	95,793,038
<i>Total residuals</i>						135,470,263	135,470,263
<b>TOTAL USE</b>	62,645,987	61,514,538	7,641,149	23,334,572	27,342,242	135,470,263	317,948,752

\*including state owned enterprises

\*\*Distribution losses not separately shown but likely to be included in use of electricity by the electricity industry

Grey = nil by definition

**Table A1.12. Energy physical supply and use tables, Kosrae, 2013**

Physical supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
Fossil fuels					162,260,100		162,260,100
Diesel					75,978,208		75,978,208
ULP					60,238,278		60,238,278
Jet Fuel/Kerosene					26,043,614		26,043,614
Propane							-
BioGas							-
Electricity	21,188,720						21,188,720
<i>Total energy products</i>	21,188,720				162,260,100		183,448,820
<b>Residuals</b>							
Conversion losses	19,576,689						19,576,689
Distribution losses**							
Heat	25,664,233	58,985,606	8,842,129	23,647,264			117,139,232
<i>Total residuals</i>	45,240,922	58,985,606.34	8,842,128.57	23,647,263.72			136,715,922
<b>TOTAL SUPPLY</b>	66,429,643	58,985,606	8,842,129	23,647,264	162,260,100	-	320,164,741

Physical use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Natural resources</b>							
Solar							
Hyro							
Firewood							
<i>Total natural resources</i>							
<b>Products</b>							
Fossil fuels	64,906,906	53,420,170	4,514,941	17,077,401	22,340,681		162,260,099
Diesel	64,906,906	3,891,472	2,090,970	5,088,859	-		75,978,207
ULP		46,771,195	2,423,971	11,043,112	-		60,238,278
Jet Fuel/Kerosene		2,757,503	-	945,430	22,340,681		26,043,614
Propane		-	-	-	-		-
BioGas		-	-	-	-		-
Electricity	1,522,737	5,565,436	4,327,188	6,569,863	3,203,497		21,188,720
<i>Total energy products</i>	66,429,643	58,985,606	8,842,129	23,647,264	25,544,178		183,448,819
<b>Residuals</b>							
Conversion losses						19,576,689	19,576,689
Distribution losses**							-
Heat						117,139,232	117,139,232
<i>Total residuals</i>						136,715,921	136,715,921
<b>TOTAL USE</b>	66,429,643	58,985,606	8,842,129	23,647,264	25,544,178	136,715,921	320,164,740

\*including state owned enterprises

\*\*Distribution losses not separately shown but likely to be included in use of electricity by the electricity industry

Grey = nil by definition

**Table A1.13. Energy monetary supply and use tables, Kosrae, 2014 (US\$)**

Monetary supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels					5,279,928		5,279,928
Diesel					2,276,631		2,276,631
ULP					2,074,738		2,074,738
Jet Fuel/Kerosene					928,559		928,559
Propane							-
BioGas							-
Electricity	3,649,320						3,649,320
Total energy products	3,649,320				5,279,928		8,929,248
<b>TOTAL SUPPLY</b>	<b>3,649,320</b>				<b>5,279,928</b>		<b>8,929,248</b>
<b>Monetary use table</b>							
Monetary use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels	1,783,681	1,974,173	115,050	595,029	811,994		5,279,928
Diesel	1,783,681	156,345	69,137	267,468	-		2,276,631
ULP		1,720,603	45,913	308,222	-		2,074,738
Jet Fuel/Kerosene		97,226	-	19,339	811,994		928,559
Propane		-	-	-	-		-
BioGas		-	-	-	-		-
Electricity	909,532	921,334	709,307	1,109,147	-		3,649,320
Total energy products	2,693,213	2,895,507	824,357	1,704,177	811,994		8,929,248
<b>TOTAL USE</b>	<b>2,693,213</b>	<b>2,895,507</b>	<b>824,357</b>	<b>1,704,177</b>	<b>811,994</b>		<b>8,929,248</b>

\*including state owned enterprises

**Table A1.14. Energy monetary supply and use tables, Kosrae, 2013 (US\$)**

Monetary supply table	Corporations*		Government and NPISH	Households	Rest of the World Imports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels					5,370,068		5,370,068
Diesel					2,386,531		2,386,531
ULP					2,166,075		2,166,075
Jet Fuel/Kerosene					817,462		817,462
Propane							-
BioGas							-
Electricity	3,387,060						3,387,060
Total energy products	3,387,060				5,370,068		8,757,128
<b>TOTAL SUPPLY</b>	<b>3,387,060</b>				<b>5,370,068</b>		<b>8,757,128</b>
<b>Monetary use table</b>							
Monetary use table	Corporations*		Government and NPISH	Households	Rest of the World Exports (Petro. Corp)	Environment	TOTAL
	Electricity	All other industries					
<b>Products</b>							
Fossil fuels	2,018,794	1,873,578	160,491	630,108	687,097		5,370,068
Diesel	2,018,794	123,012	70,851	173,873	-		2,386,531
ULP		1,654,241	89,639	422,195	-		2,166,075
Jet Fuel/Kerosene		96,325	-	34,041	687,097		817,462
Propane		-	-	-	-		-
BioGas		-	-	-	-		-
Electricity	551,736	958,532	745,269	1,131,523	-		3,387,060
Total energy products	2,570,531	2,832,110	905,760	1,761,631	687,097		8,757,128
<b>TOTAL USE</b>	<b>2,570,531</b>	<b>2,832,110</b>	<b>905,760</b>	<b>1,761,631</b>	<b>687,097</b>		<b>8,757,128</b>

\*including state owned enterprises

Figure A1.1. Physical energy flows for Chuuk, 2015 (GJ)

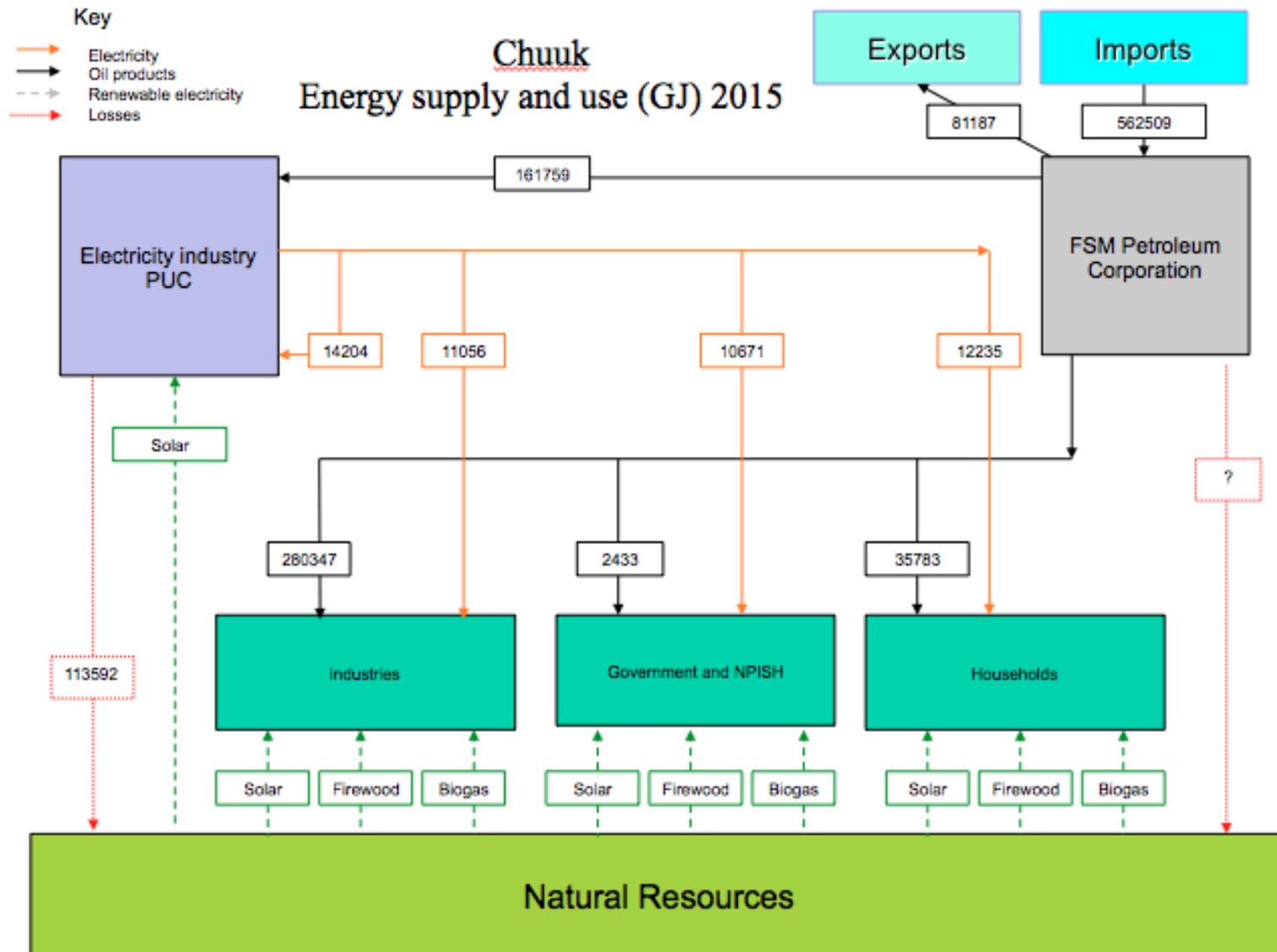


Figure A1.2. Physical energy flows for Kosrae, 2015 (GJ)

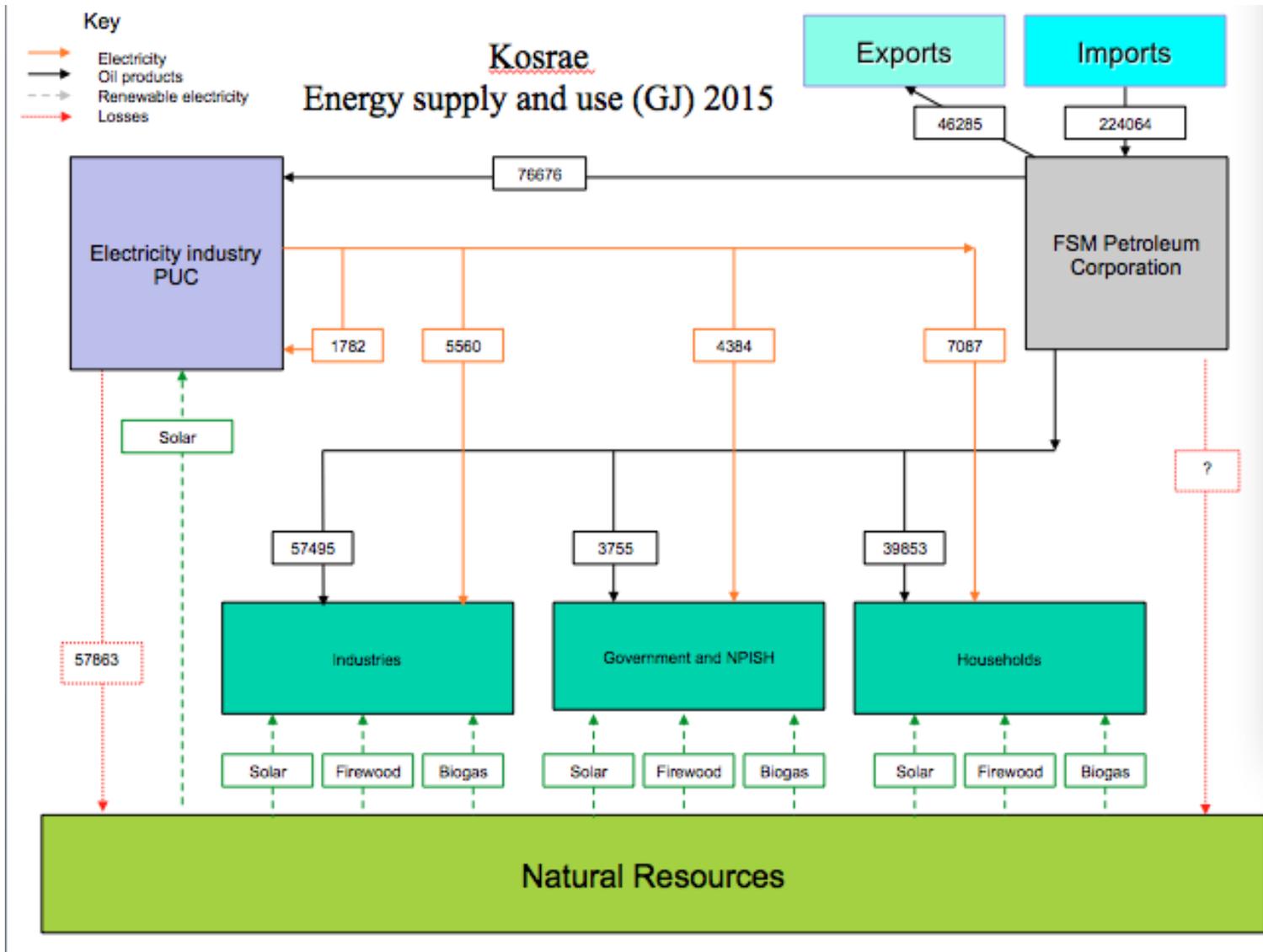


Figure A1.3. Physical energy flows for Pohnpei, 2015 (GJ)

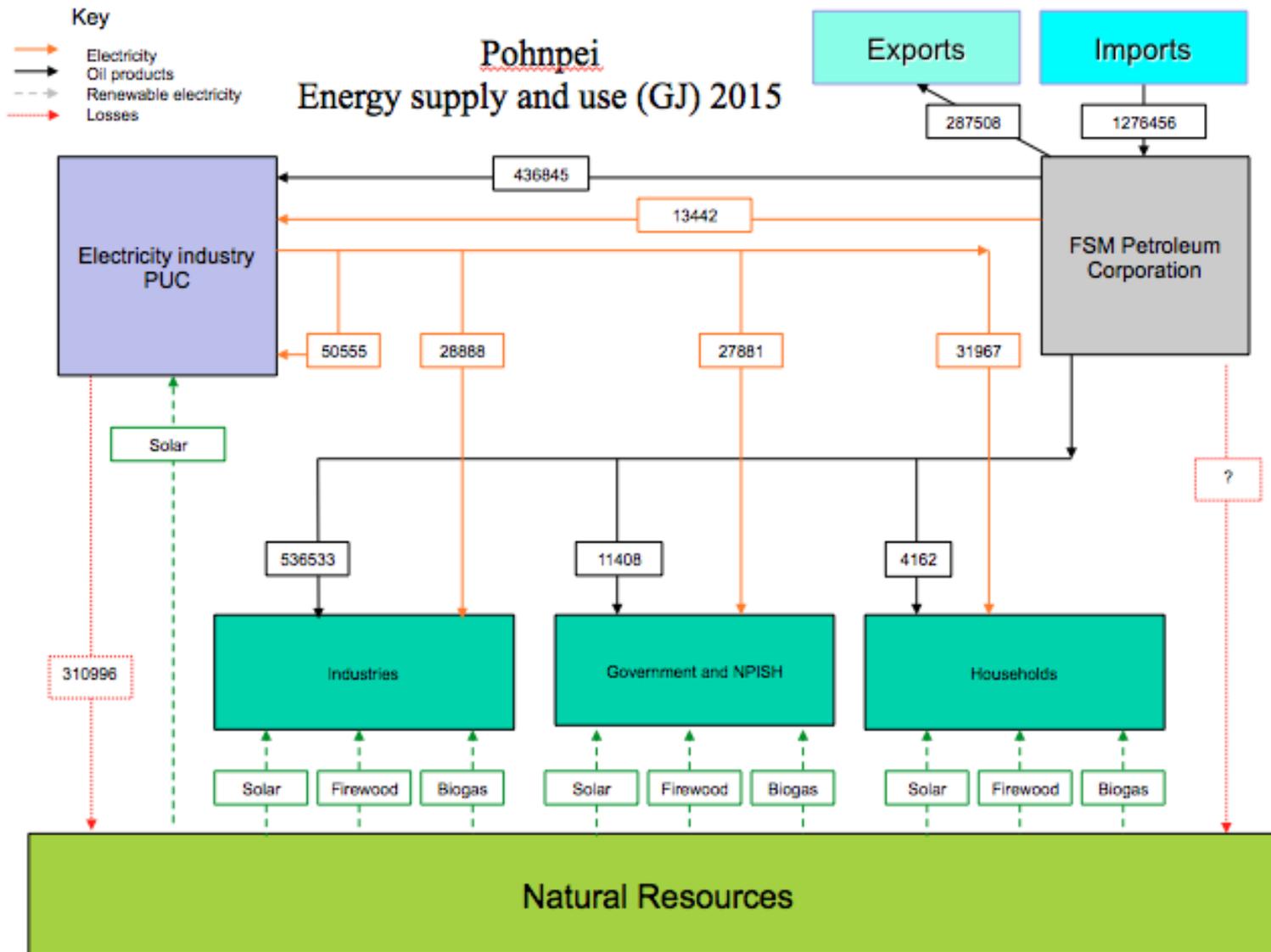
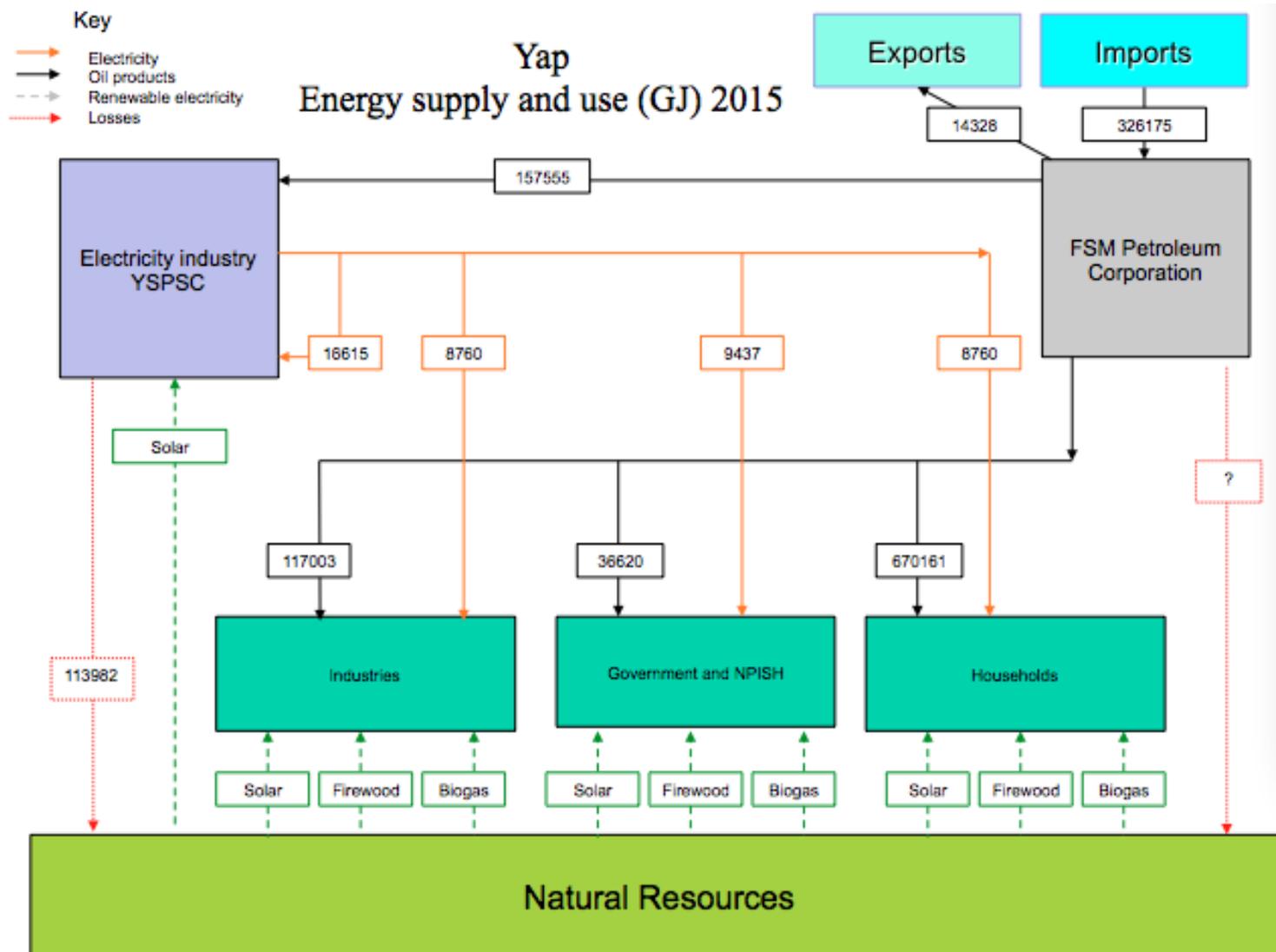


Figure 1A.4. Physical energy flows for Yap, 2015 (GJ)



## ANNEX 2. DATA SOURCES AND METHODS

The data sources and methods used to produce the energy accounts are consistent with the concepts and practices outlined in the SEEA-Energy and IRES.

### *A2.1 Data sources*

The data on energy supply and use were collected from the suppliers of fossil fuels and electricity. Information on total supply of fossil fuels and electricity was obtained for the calendar years 2013, 2014 and 2015. The energy suppliers also supplied information on the use of energy from their billing records for some years. In addition, the published economic information from the SNA has been used.

The data from the FSM Petroleum Corporation for 2015 was supplied as Excel spreadsheets, whereas the data for other years was supplied as PDF documents and hence was converted to a machine-readable form. The data from the power utilities was all supplied in Excel spreadsheets.

These records showed both physical use of energy as well as the amount billed for use. Users were classified to broad categories: e.g. government, commercial, residential and retail. Different energy suppliers used different classifications of users. None of the classifications directly matched those described by the ISIC<sup>15</sup> that is used in the SNA and SEEA.

The annual reports of energy suppliers, publically available from the Office of the National Public Auditor<sup>16</sup>, were also used for information. For example, those for the FSM Petroleum Corporation (ONPA 2016).

Published economic data for the FSM was used (see Pitiviti 2016). This economic data is made available in spreadsheets<sup>17</sup>. The fossil fuel and electricity industries are both included in this data although not separately identified. The electricity industry to which the State-owned electricity and water utilities belong are included under ISIC *Division E Electricity Gas and Water Supply*, and in the *Class 3510 Electric power generation, transmission and distribution*. This class includes the generation of bulk electric power, transmission from generating facilities to distribution centers and distribution to end users. This class includes:

- operation of generation facilities that produce electric energy, including thermal,

---

<sup>15</sup> ISIC Revision 4 <https://unstats.un.org/unsd/cr/registry/regdntransfer.asp?f=135>

<sup>16</sup> Office of the National Public Auditor <http://fsmopa.fm/>

<sup>17</sup> FSM 2015 Economic Statistics  
[http://www.pitiviti.org/news/downloads/FSM\\_EconStat\\_tabs\\_FY15\\_Pub2.xlsx](http://www.pitiviti.org/news/downloads/FSM_EconStat_tabs_FY15_Pub2.xlsx)

- nuclear, hydroelectric, gas turbine, diesel and renewable
- operation of transmission systems that convey the electricity from the generation facility to the distribution system
- operation of distribution systems (i.e. consisting of lines, poles, meters, and wiring) that convey electric power received from the generation facility or the transmission system to the final consumer
- sale of electricity to the user
- activities of electric power brokers or agents that arrange the sale of electricity via power distribution systems operated by others
- operation of electricity and transmission capacity exchanges for electric power

This class excludes:

- production of electricity through incineration of waste, see 3821

The FSM Petroleum Corporation is included with ISIC *Division G Wholesale and Retail Trade and Repair* under the *Class 4661 Wholesale of solid, liquid and gaseous fuels and related products*. This class includes:

- wholesale of fuels, greases, lubricants, oils such as:
  - charcoal, coal, coke, fuel wood, naphtha
  - crude petroleum, crude oil, diesel fuel, gasoline, fuel oil, heating oil, kerosene
  - liquefied petroleum gases, butane and propane gas
  - lubricating oils and greases, refined petroleum products

The national accounts presented information on the *ISIC Divisions G Wholesale and Retail Trade and Repair* and *Division E Electricity Gas and Water Supply*, and in the *Class 3510 Electric power generation, transmission and distribution* and this is shown for the national level in Annex 3. Equivalent state level data is available.

Additional unpublished information used in the compilation of the national accounts was used in this study to provide further disaggregation of the national accounts data. This included information on the income received from water and energy supply from the state utilities.

## *A2.2 Methods*

Physical energy supply and use tables were compiled for each of the States of FSM for 2015 and for Kosrae for the years 2013, 2014 and 2015. The first step was to convert the different energy types to comparable units (joules). The values used are shown in Table A.1.

**Table A2.1.** Conversation factors for energy products

<b>Energy type</b>	<b>Original unit</b>	<b>Conversation factor to megajoules</b>
<b>Diesel</b>	US Gallon	144.944577
<b>Gasoline</b>	US Gallon	127.109109
<b>Jet fuel/kerosene</b>	US Gallon	148.652461527907
<b>Electricity</b>	kWh	3.59985055

Source: United States Energy Information Administration<sup>18</sup> and the IRES (pp. 60-61, Table 4.1). Note: While a simple number is shown and is what was used in the production these accounts, the energy content varies with within energy types.

The use of energy was attributed to an industry or sector, based on the classification provided by the energy suppliers. Each energy supplier used categories of energy product users. The alignment of the classification used by energy suppliers with ISIC and the SNA sector classification is shown in Table 2.

**Table A2.2.** Classification of energy users to industry and sector

<b>SEEA</b>	<b>Petro. Corp*</b>	<b>CPUC</b>	<b>KUA</b>	<b>PUC</b>	<b>YSPSC</b>
<b>Sector</b>					
<i>Corporations</i>	Domestic marine, Utility, Retail		Commercial Industry, FSMTC		
<i>Government and NPISH</i>	Government		State government FSM agencies		
<i>Households</i>	Public		Residential		

<sup>18</sup> US EIA energy conversion calculator  
[http://www.eia.gov/energyexplained/index.cfm/index.cfm?page=about\\_energy\\_conversion\\_calculator](http://www.eia.gov/energyexplained/index.cfm/index.cfm?page=about_energy_conversion_calculator)

<i>Rest of the World</i>	International marine  Aviation
--------------------------	---

**Industry**

<i>All industries</i>	Domestic marine	Industry
-----------------------	-----------------	----------

<i>Electricity</i>	Utility
--------------------	---------

<i>Retail and wholesale trade</i>	Retail	Commercial
-----------------------------------	--------	------------

Telecommunications	FSMTC
--------------------	-------

\*FSM Petroleum Corporation also had an "Other" classification used for very small amounts of lubricating oil.

The classification of some users was problematic owing to State-Owned Enterprises and the classification of these by energy suppliers to the government category rather than the relevant industry.

All jet-fuel sold was classified as exports to "Rest of World".

Diesel and gasoline sold to retail outlets (i.e. gas stations) was classified to "All industries" category and then shown as a supply to "Households". The assumption being that while some of this will be to industries the majority is for household.

The output and value added of the Division E *Electricity Gas and Water Supply*, was adjusted to obtain an estimate of the amount relating to the Class 3510 *Electric power generation, transmission and distribution*. A ratio of 0.90 was used based on the average proportion of income received for electricity by the utilities supplying water and power.

## ANNEX 3. FSM 2015 ECONOMIC STATISTICS

Table 1f: FSM: Current price GDP by industry, FY2003-FY2015, highlighting shows the divisions in which the **electric utilities** and **FSM Petroleum Corporation** are included

	(US\$ millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
A Agriculture, Hunting and Forestry		32.5	31.0	32.8	34.8	37.1	38.3	41.2	43.1	44.8	45.1	46.2	47.9	48.7
B Fisheries		24.3	21.7	23.4	21.9	27.0	30.7	28.9	30.4	37.0	46.4	36.9	30.8	33.5
C Mining and Quarrying		~	~	~	~	~	~	~	0.0	0.0	~	0.0	0.0	~
D Manufacturing		4.0	3.3	1.4	0.9	1.0	1.1	1.2	1.3	1.3	1.3	1.2	1.2	1.3
<b>E Electricity, Gas and Water Supply</b>		<b>6.3</b>	<b>5.0</b>	<b>4.7</b>	<b>3.6</b>	<b>1.7</b>	<b>1.3</b>	<b>5.2</b>	<b>3.3</b>	<b>3.3</b>	<b>4.8</b>	<b>6.2</b>	<b>8.4</b>	<b>9.6</b>
F Construction		6.0	6.4	7.1	5.7	5.4	7.5	12.9	16.8	20.6	21.2	16.0	9.6	8.3
<b>G Wholesale and Retail Trade and Repairs</b>		<b>27.6</b>	<b>28.3</b>	<b>30.3</b>	<b>32.0</b>	<b>33.1</b>	<b>37.0</b>	<b>34.9</b>	<b>36.7</b>	<b>37.2</b>	<b>37.1</b>	<b>36.5</b>	<b>35.9</b>	<b>37.4</b>
H Hotels and Restaurants		4.9	4.8	5.1	5.3	5.2	5.1	4.9	5.2	5.3	5.6	5.5	5.3	5.8
I Transport, Storage and Communications		16.2	16.4	16.6	16.5	17.0	15.5	16.6	16.7	17.1	17.8	19.0	17.1	17.2
J Finance		3.8	3.6	5.0	5.9	6.5	6.3	5.6	6.6	8.1	9.3	10.4	26.2	12.1
K Real Estate, Renting, Business Activities		30.3	29.9	29.6	29.4	29.2	29.2	30.4	31.7	32.4	32.4	32.6	33.7	34.7
L Public Administration		34.0	31.9	33.9	35.2	31.6	30.0	31.0	31.2	31.8	32.2	33.1	32.6	33.7
M Education		29.4	30.1	30.1	31.2	31.1	31.4	32.9	34.5	32.9	33.8	33.1	33.1	33.7
N Health and Social Work		8.5	8.8	9.1	10.1	10.8	11.3	12.2	13.8	14.1	14.6	14.8	15.3	15.0
O Other Community, Social, Personal Services		3.1	3.2	3.3	3.5	3.5	3.7	3.8	4.2	4.3	4.1	4.2	4.8	5.0
<i>less intermediate FISIM</i>		-2.6	-2.4	-3.1	-3.7	-4.0	-4.2	-4.0	-4.4	-4.5	-4.6	-4.5	-4.6	-4.9
<b>GDP at basic prices</b>		<b>228.4</b>	<b>222.3</b>	<b>229.1</b>	<b>232.3</b>	<b>236.3</b>	<b>244.2</b>	<b>257.9</b>	<b>271.0</b>	<b>286.0</b>	<b>301.1</b>	<b>291.2</b>	<b>297.3</b>	<b>291.1</b>
<i>Taxes on products</i>		19.7	19.4	22.8	22.8	22.0	22.3	25.0	27.2	26.8	26.6	26.2	23.1	25.7
<i>less subsidies</i>		-2.4	-1.1	-1.2	-1.1	-1.1	-3.0	-2.4	-1.1	-1.7	-1.2	-1.1	-2.4	-1.8
<b>GDP at purchasers prices</b>		<b>245.7</b>	<b>240.6</b>	<b>250.6</b>	<b>253.9</b>	<b>257.2</b>	<b>263.5</b>	<b>280.5</b>	<b>297.0</b>	<b>311.0</b>	<b>326.5</b>	<b>316.3</b>	<b>318.1</b>	<b>315.0</b>

Source: SBOC estimates

[http://www.pitiviti.org/news/downloads/FSM\\_EconStat\\_tabs\\_FY15\\_Pub2.xlsx](http://www.pitiviti.org/news/downloads/FSM_EconStat_tabs_FY15_Pub2.xlsx)

Table 1j: FSM: Current price GDP by institutional sector and income components, FY2003-FY2015. Highlighting shows the divisions in which the electric utilities and FSM Petroleum Corporation are included.

	(US\$ millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
<b>1</b>	<b>Productive Enterprises</b>	<b>75.0</b>	<b>73.6</b>	<b>75.4</b>	<b>73.2</b>	<b>76.9</b>	<b>81.8</b>	<b>88.6</b>	<b>95.7</b>	<b>106.8</b>	<b>119.8</b>	<b>106.6</b>	<b>92.9</b>	<b>99.3</b>
1.1	Private Sector	57.5	57.7	58.4	58.5	60.4	64.3	62.1	70.8	77.9	77.7	72.0	65.6	66.8
	Compensation of employees	30.5	30.7	29.7	29.2	30.0	30.8	32.5	36.3	39.8	39.8	38.2	35.5	36.5
	Operating Surplus	26.9	26.9	28.7	29.4	30.4	33.5	29.6	34.5	38.0	37.9	33.9	30.1	30.3
1.2	Public Enterprises	17.5	15.9	17.0	14.6	16.5	17.5	26.5	24.9	29.0	42.1	34.6	27.4	32.6
	Compensation of employees	12.4	12.1	11.6	11.7	12.0	11.7	12.4	13.1	13.6	14.0	13.6	15.6	17.8
	Operating Surplus	7.5	4.9	6.7	4.0	5.6	8.8	16.5	12.9	17.2	29.3	22.1	14.2	16.6
	less Subsidies	-2.4	-1.1	-1.2	-1.1	-1.1	-3.0	-2.4	-1.1	-1.7	-1.2	-1.1	-2.4	-1.8
<b>2</b>	<b>Financial Institutions</b>	<b>3.3</b>	<b>3.1</b>	<b>4.4</b>	<b>5.2</b>	<b>5.7</b>	<b>5.4</b>	<b>4.8</b>	<b>5.6</b>	<b>7.0</b>	<b>8.2</b>	<b>9.3</b>	<b>25.0</b>	<b>10.6</b>
	Compensation	2.7	2.6	2.7	2.9	3.1	3.1	3.3	3.6	3.7	3.9	3.8	4.0	4.2
	Operating Surplus	0.6	0.5	1.7	2.3	2.6	2.3	1.5	2.1	3.3	4.4	5.5	21.0	6.4
<b>3</b>	<b>Government</b>	<b>73.3</b>	<b>71.9</b>	<b>74.0</b>	<b>77.2</b>	<b>73.8</b>	<b>72.8</b>	<b>76.0</b>	<b>79.3</b>	<b>78.8</b>	<b>80.5</b>	<b>80.4</b>	<b>80.1</b>	<b>81.5</b>
3.1	National	11.3	11.3	10.1	10.4	11.3	12.8	14.8	16.3	16.7	16.3	15.9	14.8	15.0
3.2	State	44.0	42.5	46.1	51.0	47.5	45.1	46.5	48.7	48.3	49.8	50.6	51.4	52.5
3.3	Municipalities	3.2	2.1	2.6	3.2	2.2	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1
3.4	Government Agencies	14.8	16.0	15.1	12.6	12.8	12.9	12.8	12.2	11.8	12.4	12.0	11.9	11.9
<b>4</b>	<b>Non Profit Organizations</b>	<b>2.7</b>	<b>2.8</b>	<b>2.9</b>	<b>3.0</b>	<b>3.1</b>	<b>3.3</b>	<b>3.4</b>	<b>3.7</b>	<b>3.8</b>	<b>3.9</b>	<b>4.1</b>	<b>4.4</b>	<b>4.5</b>
<b>5</b>	<b>Households</b>	<b>74.3</b>	<b>72.1</b>	<b>74.2</b>	<b>76.2</b>	<b>79.8</b>	<b>82.1</b>	<b>86.7</b>	<b>89.9</b>	<b>92.3</b>	<b>92.1</b>	<b>94.0</b>	<b>97.1</b>	<b>98.3</b>
	Mixed income	11.1	11.1	11.8	13.0	14.5	15.3	17.1	19.1	19.9	19.4	20.0	21.2	22.6
	Subsistence	40.4	38.2	39.6	40.4	42.5	43.9	45.8	46.7	48.1	48.1	49.2	50.5	49.9
	Home Ownership	22.8	22.8	22.8	22.8	22.8	22.9	23.8	24.1	24.3	24.6	24.8	25.5	25.8
	Taxes on Products	19.7	19.4	22.8	22.8	22.0	22.3	25.0	27.2	26.8	26.6	26.2	23.1	25.7
	less intermediate FISIM	-2.6	-2.4	-3.1	-3.7	-4.0	-4.2	-4.0	-4.4	-4.5	-4.6	-4.5	-4.6	-4.9
	<b>GDP at purchasers prices</b>	<b>245.7</b>	<b>240.6</b>	<b>250.6</b>	<b>253.9</b>	<b>257.2</b>	<b>263.5</b>	<b>280.5</b>	<b>297.0</b>	<b>311.0</b>	<b>326.5</b>	<b>316.3</b>	<b>318.1</b>	<b>315.0</b>

Source: SBOC estimates

[http://www.pitiviti.org/news/downloads/FSM\\_EconStat\\_tabs\\_FY15\\_Pub2.xlsx](http://www.pitiviti.org/news/downloads/FSM_EconStat_tabs_FY15_Pub2.xlsx)