East and Southeast Asia Renewable Energy Statistics Training Workshop

12 – 14 December 2016

Bangkok, Thailand

Outline

- Background
- Introduction
- The scope
- Collecting RE statistics
- Methodology
- Key challenges
- Recommendations

Background

Background on Malaysia

- Malaysia covers an area of 330,323 square kilometers and lies entirely in the equatorial zone, with the average daily temperature throughout Malaysia varies between 21°C to 32°C. It is made of 13 states in Peninsular Malaysia (Johor, Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Perlis, Pulau Pinang, Selangor, Terengganu as well as the Federal Territories of Kuala Lumpur and Putrajaya) and the states of Sabah and Sarawak on the island of Borneo as well as the Federal Territory of Labuan off Sabah.

- Malaysia is a multi-ethnic country with the principal ethnic groups of Malay, Chinese and Indian. Other significant groups are the indigenous people of Sabah and Sarawak, including Kadazan Dusun, Bajau and Murut in Sabah as well as Iban, Bidayuh and Melanau in Sarawak.

- Malaysia practises a system of Parliamentary democracy with constitutional monarchy. It has three branches of government - the Executive, the Legislature and the Judiciary.

- The Malaysian Parliament is made up of His Majesty Yang di-Pertuan Agong, the Senate (Upper House) with 70 members and the House of Representatives (Lower House) with 222 members. Out of the 70 senators in the Senate, 44 are appointed by the His Majesty Yang di-Pertuan Agong while 26 are elected by the State legislatures. The general election for the 222 members of the lower house must be held every five years. The last general election was held in 2013.

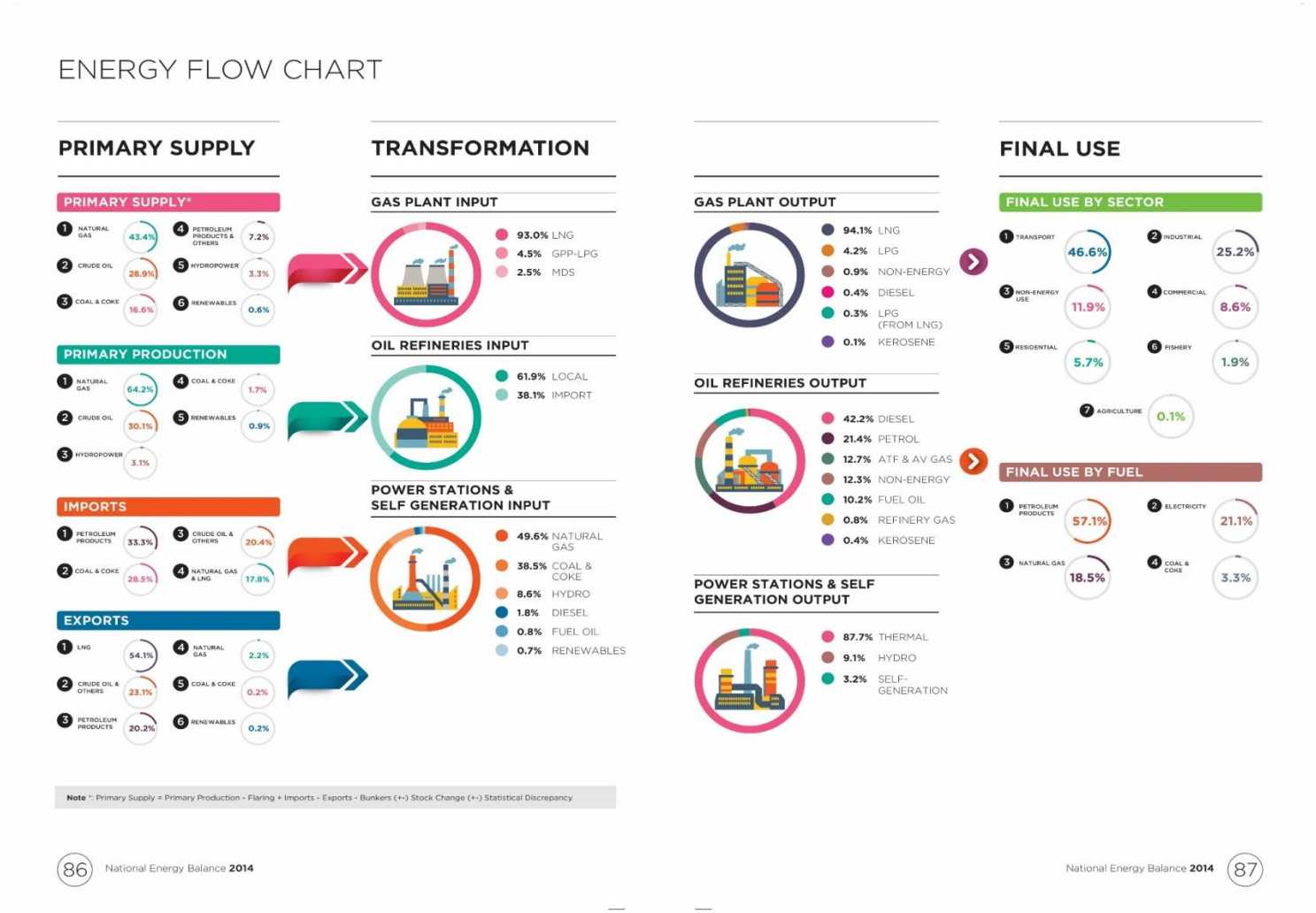
Background

MALAYSIA: BASIC STATISTICS

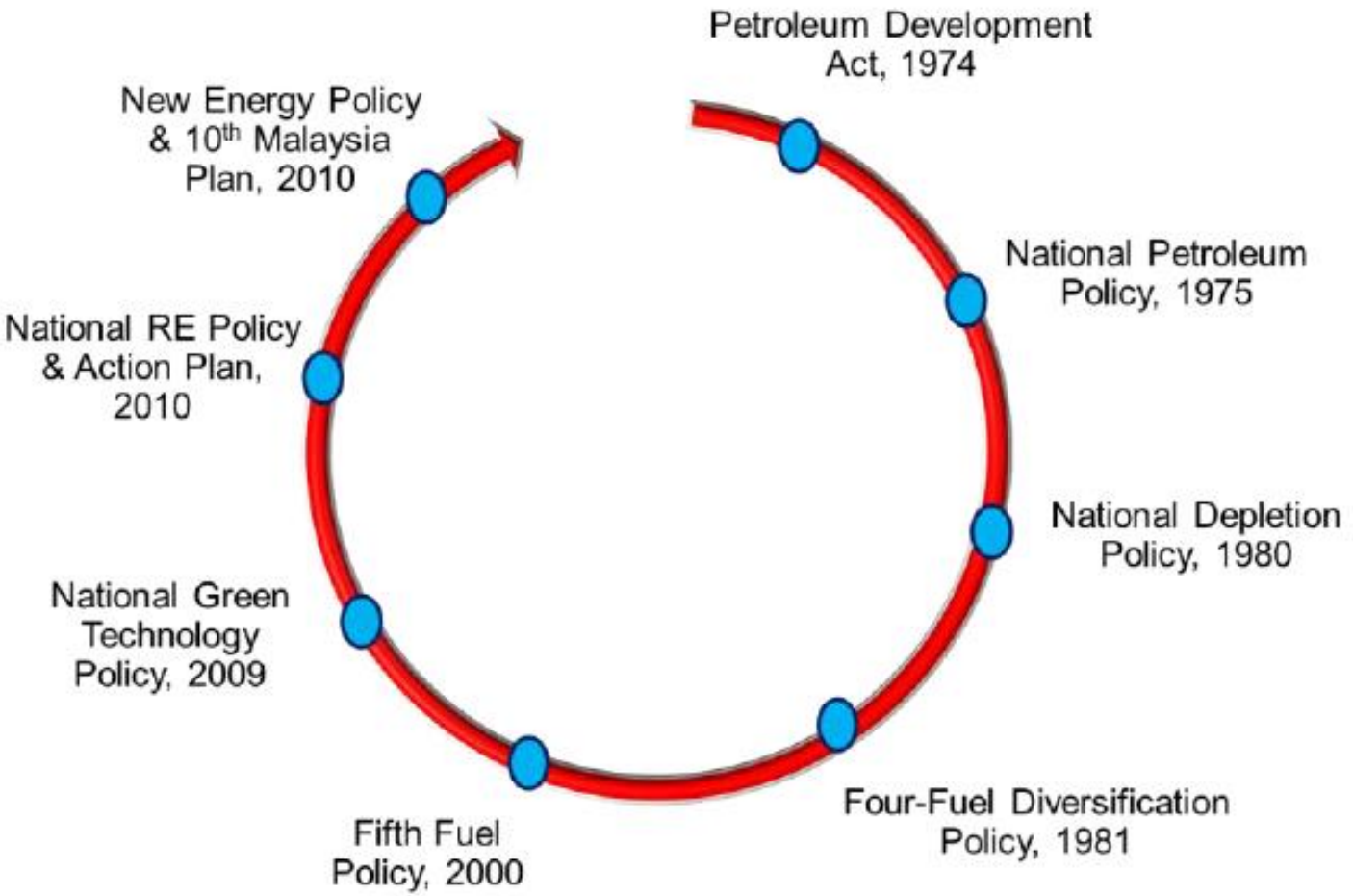
	2013	2014	2015 (p)	2016 (e)
Population (million)	30.2	30.7	31.2	31.4
Labour force (million)	13.6	13.9	14.2	14.6
Employment (million)	13.2	13.5	13.8 [1]	14.1
Unemployment rate (%)	3.1	2.9	3.1	3.3-3.5
Nominal GDP (RM billion)	1,018.8	1,106.6	1,156.9	1,229.0
Nominal GNI (RM billion)	984.8	1,069.3	1,124.7	1,191.0
Real GDP growth rate (%)	4.7	6.0	5.0	4.0-4.5
GNI Per Capita (RM)	32,596	34,945	36,285	37,930
GNI Per Capita (US$)	10,345	10,677	9,291	8,821
GNI Per Capita PPP (US$)	23,078	24,569	25,580	26,577
Inflation (% p.a.)	2.1	3.2	2.1	2.5-3.5
Merchandise exports (RM billion)	720.0	765.4	779.9	798.7
Merchandise imports (RM billion)	648.7	682.9	685.4	719.0
Current account of BOP (% of GNI)	3.6	4.4	3.0	1.0-2.0
Exchange rate (RM/US$)	3.15	3.27	4.29	4.11 [2]

Note : (p) Preliminary (e) Estimate
[1] Updated based on population estimates 2015 [2] January-May 2016
Source : Bank Negara Malaysia, Department of Statistics Malaysia and the World Bank

Background


ENERGY FLOW CHART
PRIMARY SUPPLY
PRIMARY SUPPLY*
1 NATURAL GAS 43.4%
2 CRUDE OIL 28.9%
3 COAL & COKE 16.6%
4 PETROLEUM PRODUCTS & OTHERS 7.2%
5 HYDROPOWER 3.3%
6 RENEWABLES 0.6%
PRIMARY PRODUCTION
1 NATURAL GAS 64.2%
2 CRUDE OIL 30.1%
3 HYDROPOWER 3.1%
4 COAL & COKE 1.7%
5 RENEWABLES 0.9%
IMPORTS
1 PETROLEUM PRODUCTS 33.3%
2 COAL & COKE 28.5%
3 CRUDE OIL & OTHERS 20.4%
4 NATURAL GAS & LNG 17.8%
EXPORTS
1 LNG 54.1%
2 CRUDE OIL & OTHERS 23.1%
3 PETROLEUM PRODUCTS 20.2%
4 NATURAL GAS 2.2%
5 COAL & COKE 0.2%
6 RENEWABLES 0.2%
TRANSFORMATION
GAS PLANT INPUT
93.0% LNG
4.5% GPP-LPG
2.5% MDS
OIL REFINERIES INPUT
61.9% LOCAL
38.1% IMPORT
POWER STATIONS & SELF GENERATION INPUT
49.6% NATURAL GAS
38.5% COAL & COKE
8.6% HYDRO
1.8% DIESEL
0.8% FUEL OIL
0.7% RENEWABLES
GAS PLANT OUTPUT
94.1% LNG
4.2% LPG
0.9% NON-ENERGY
0.4% DIESEL
0.3% LPG (FROM LNG)
0.1% KEROSENE
OIL REFINERIES OUTPUT
42.2% DIESEL
21.4% PETROL
12.7% ATF & AV GAS
12.3% NON-ENERGY
10.2% FUEL OIL
0.8% REFINERY GAS
0.4% KEROSENE
POWER STATIONS & SELF GENERATION OUTPUT
87.7% THERMAL
9.1% HYDRO
3.2% SELF-GENERATION
FINAL USE
FINAL USE BY SECTOR
1 TRANSPORT 46.6%
2 INDUSTRIAL 25.2%
3 NON-ENERGY USE 11.9%
4 COMMERCIAL 8.6%
5 RESIDENTIAL 5.7%
6 FISHERY 1.9%
7 AGRICULTURE 0.1%
FINAL USE BY FUEL
1 PETROLEUM PRODUCTS 57.1%
2 ELECTRICITY 21.1%
3 NATURAL GAS 18.5%
4 COAL & COKE 3.3%
Note *: Primary Supply = Primary Production - Flaring + Imports - Exports - Bunkers (+-) Stock Change (+-) Statistical Discrepancy
86 National Energy Balance 2014
National Energy Balance 2014 87

Introduction



Introduction

Malaysian National Renewable Energy Policy and Action Plan

Approved by Cabinet on 2nd April 2010

Policy Statement:
Enhancing the utilisation of **indigenous renewable energy** resources to contribute towards national **electricity supply security** and sustainable socio-economic development.

Objectives:

- To increase RE contribution in the national power generation mix;
- To facilitate the growth of the RE industry;
- To ensure reasonable RE generation costs;
- To conserve the environment for future generation; and
- To enhance awareness on the role and importance of RE.

Introduction

National Biofuel Policy

- A comprehensive palm oil biofuel programme was drawn up in 1982 and the programme has met with success and has established the use of palm methyl esters and the blend of processed palm oil (5%) with petroleum diesel (95%) as a suitable fuel for the transport and industrial sectors.

- The National Biofuel Policy was launched by the Government on 10 August 2005 with the following objectives:

  a) supplementing the depleting supply of fossil fuels with renewable resources;

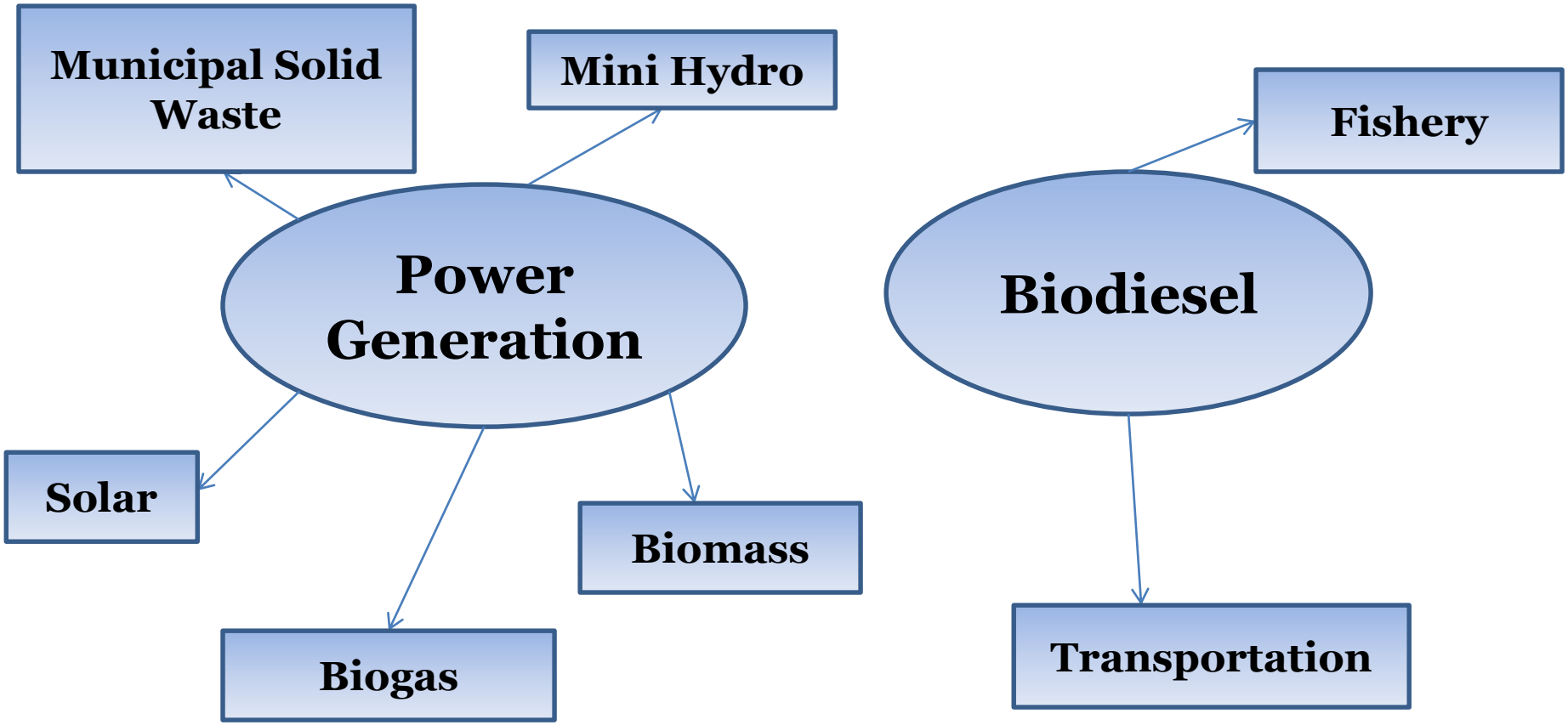
  b) mobilising local resources for biofuels

  c) exploiting local technology to generate energy for the transportation and industrial sectors;

  d) paving the way for exports of biofuels; and

  e) benefiting from the spin-off effect of more stable prices for palm oil.

Scope


Municipal Solid Waste
Mini Hydro
Fishery
Power Generation
Biodiesel
Solar
Biomass
Biogas
Transportation

Collecting RE Statistics

- To apply for Fit in Tariff (FIT) mechanism
- Licensed condition to generate electricity
- Reporting of National Energy Balance that covers energy supply and demand for the country
- An input to Government for future policy recommendation
- General public

Collecting RE Statistics

Installed Capacity (MW) of Commissioned RE Installations

Year	Biogas	Biogas (Landfill / Agri Waste)	Biomass	Biomass (Solid Waste)	Small Hydro	Solar PV	Geothermal	Total
2012	2.00	1.20	36.90	8.90	11.70	31.53	0.00	92.23
2013	3.38	3.20	0.00	0.00	0.00	101.95	0.00	108.53
2014	1.10	0.00	12.50	0.00	0.00	59.74	0.00	73.34
2015	0.00	6.40	12.00	7.00	6.60	59.94	0.00	91.94
2016	0.00	10.66	7.00	0.00	12.00	18.75	0.00	48.41
Cumulative	6.48	21.46	68.40	15.90	30.30	271.91	0.00	414.45

Annual Power Generation (MWh) of Commissioned RE Installations

Year	Biogas	Biogas (Landfill / Agri Waste)	Biomass	Biomass (Solid Waste)	Small Hydro	Solar PV	Geothermal
2016	2643.49	18452.54	123190.11	6963.50	11064.22	72464.92	0.00
2015	16626.45	40583.82	197207.62	18090.07	55406.38	249515.19	0.00
2014	19772.25	31844.44	226196.38	4347.83	64549.65	178329.59	0.00
2013	12217.15	9477.59	209407.59	11144.25	73032.12	48632.64	0.00
2012	98.11	7465.40	101309.87	3234.52	25629.78	4714.01	0.00

Source: www.seda.gov.my

Collecting RE Statistics

Public and Private Licensee Installed Capacity and Generation by Region in 2015

REGION	TYPE OF PRIME MOVER	INSTALLED CAPACITY (MW)	UNIT GENERATED (MWh)
Peninsular Malaysia	Solar - Non-FiT	0.5	144
	Mini Hydro – Cameron Highlands Scheme	11.9	32,809
	Mini Hydro – TNB	9.3	8,866
	Mini Hydro - IPP	20.0	-
	Mini Hydro - FiT	11.8	55,064
	Biogas - FiT	17.0	54,656
	Biomass - FiT	19.5	58,146
	Solar - FiT	220.9	268,558
	Sub-Total	**310.9**	**478,243**
Sabah	Mini Hydro - SESB	8.0	11,351
	Biomass – Co-Gen	26.2	89,485
	Mini Hydro - FiT	6.5	6,082
	Biogas - FiT	3.2	7,700
	Biomass - FiT	48.9	119,933
	Solar - FiT	9.6	4,172
	Sub-Total	**102.4**	**238,722**
Sarawak	Mini Hydro - SEB	6.8	12,904
	Solar	0.3	301
	Sub-Total	**7.1**	**13,205**
GRAND TOTAL		**420.4**	**730,170**

REGION	TYPE OF PRIME MOVER	INSTALLED CAPACITY (MW)	UNIT GENERATED (MWh)
Peninsular Malaysia	Biomass - Self-Gen	351.8	102,620
	Biogas - Self-Gen	4.9	7,140
	Solar - Self-Gen	1.0	120
	Mini Hydro - Self-Gen	2.1	5,280
	Sub-Total	**359.8**	**115,160**
Sabah	Biomass - Co-Gen	6.5	610
	Biomass - Self-Gen	135.8	191,050
	Biogas - Self-Gen	3.4	4,720
	Sub-Total	**145.7**	**196,380**
Sarawak	Biomass	44.3	80,700
	Sub-Total	**44.3**	**80,700**
GRAND TOTAL		**549.7**	**392,240**

Collecting RE Statistics

Biodiesel Statistics in 2015

Year 2015	Total Production (Metric Tonnes)	Total Export (Metric Tonnes)	Total Consumption (Metric Tonnes)
First Quarter 2015	146,987	39,107	95,652
Second Quarter 2015	169,553	24,170	95,652
Third Quarter 2015	204,410	94,246	95,652
Fourth Quarter 2015	152,582	21,419	95,651
Total	673,532	178,942	382,607

Methodology

- By letter, email and etc
- Setting up a meeting / discussion
- Develop a standard questionnaire format
- Make an agreement on the dateline of the data submission
- Collecting, compiling and make analysis
- Presenting the data and get endorsement

Challenges

- Data for power sector only captured the total generation but not the total input
- Estimation by power plant average efficiency
- Data from off-grid power generation is not easy to collect due to accessibility of the data
- Data for biodiesel stock currently not available
- Data for biodiesel consumption was based on sales and not actual consumption from the users.

Recommendations

- Support from international organisations is needed to enhance capacity building on RE statistics
- Dedicated energy survey especially to collect RE data by each sectors; residential, commercial and industry required high cost
- Workshop on RE statistics should be held regularly to deliver latest updates and exchange knowledge and expertise
- We should develop and maintained world RE statistics publication and database for benefit of all.

Thank You

www.meih.st.gov.my