



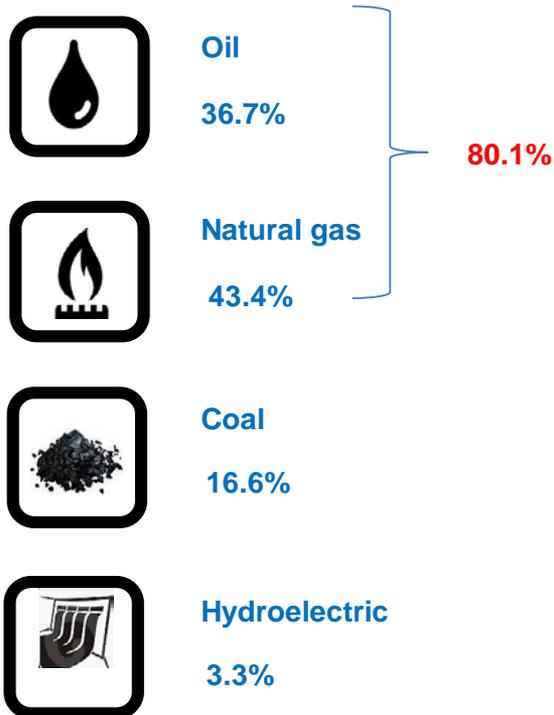
Malaysia updates on RE programme

29 March 2017

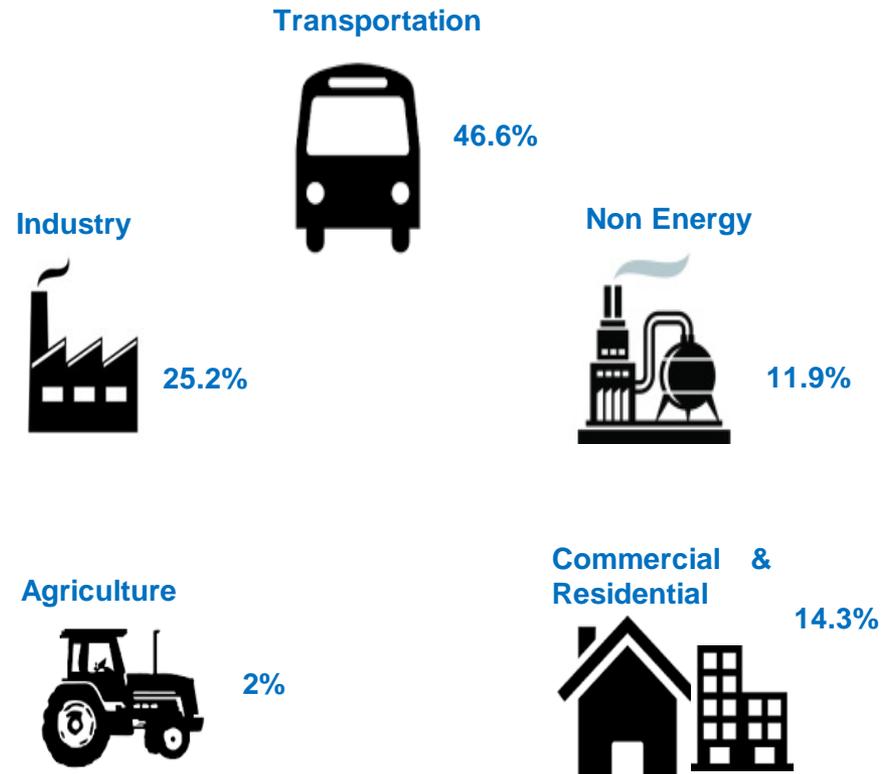
48th APEC EGNRET, JEJU ISLAND, SOUTH KOREA

Today, oil and gas accounts for 80.1% of the primary energy supply in Malaysia

Primary Energy Supply

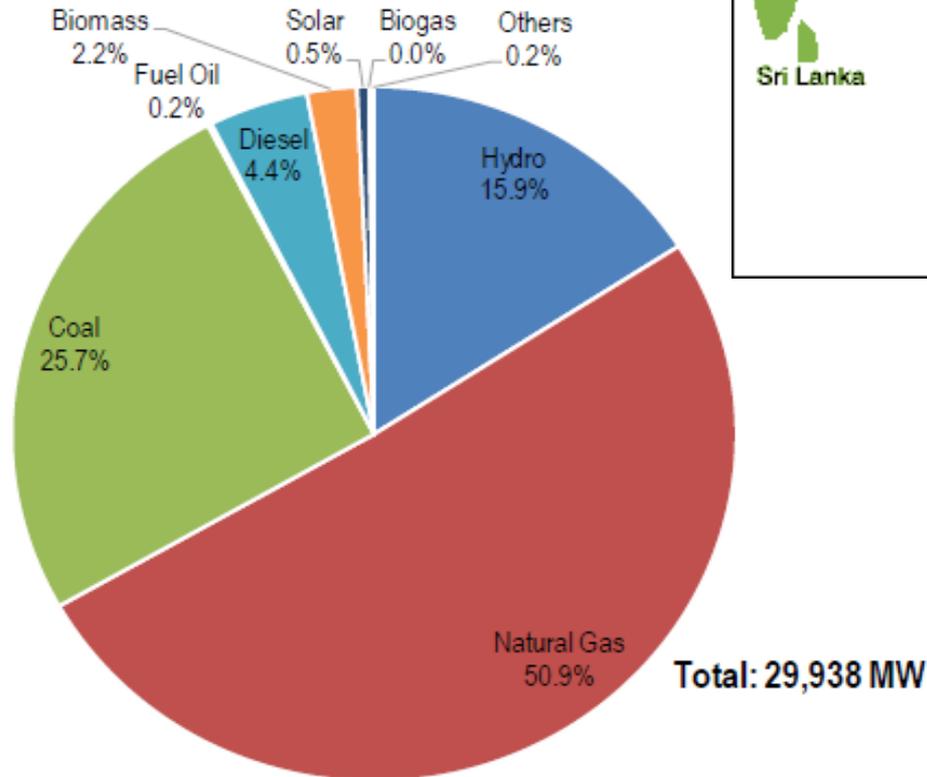


Final Energy Consumption



Electricity Data

- Installed capacity by sources



RE: 16.4% (including hydro)

Electrification rate: Peninsula 99.8%, East Malaysia 93%

Source: Malaysia National Energy Balance 2014



Overall Energy Policy

Major Energy Policies

To meet the energy challenges

National Petroleum Policy (1975)

Efficient utilization of petroleum resources

Ensuring the nation exercises **majority control** in the management and operation of the industry

National Energy Policy (1979)

Supply Objective: Ensure **adequate, secure and cost-effective** energy supply.

Utilization Objective: Promote **efficient utilization of energy and eliminate wasteful and non-productive** usage

Environmental Objective : Minimize **negative impacts** to the environment.

National Depletion Policy (1980)

To prolong the life span of the nation's oil and gas reserves

Four-fuel Policy (1981)

Aimed at ensuring **reliability and security** of supply through **diversification** of fuel (oil, gas, hydro and coal)

Five-fuel Policy (2001)

Encourage the utilization of renewable resources such as biomass, solar, mini hydro etc

Efficient utilization of energy



Major Milestones in RE Policy Development

8TH Malaysia Plan (2001 - 2005)

- RE as the 5th Fuel
- 5% RE in energy mix

9th Malaysia Plan (2006 – 2010)

- Targeted RE capacity to be connected to power utility grid:
 - 300 MW – Peninsular Malaysia; 50 MW - Sabah
- Targeted power generation mix:
 - 56% natural gas, 36% coal, 6% hydro, 0.2% oil,
 - 1.8% Renewable Energy
- Carbon intensity reduction target: 40% lower than 2005 levels by 2020

RE Status as of Dec 2016

- Connected to the utility grid (as of 2015): 5,400 MW (which include large hydro)
- Off-grid: >500MW (private palm oil millers and solar hybrid)
- All RE including hydro – > 5,400 MW



Strategic Thrusts of the National RE Policy & Action Plan 2010

Strategic Thrust 1

Introduce Legal and Regulatory Framework



Strategic Thrust 2

Provide Conducive Business Environment for RE



Strategic Thrust 3

Intensify Human Capital Development



Strategic Thrust 4

Enhance RE Research & Development



Strategic Thrust 5

Create Public Awareness & RE Policy Advocacy Programs



Renewable Energy Legislations

- **Renewable Energy Act 2011**
- **Sustainable Energy Development Authority Act 2011**
 - ❑ Enabled the establishment of SEDA Malaysia
 - ❑ Launched the Feed-in Tariff Mechanism, 1st Dec 2011
 - ❑ Establish the RE Fund to finance the FiT (1% levy to electricity consumers, 1.6% from 1st Jan 2014)



RE Targets under FiT, RE Policy Action Plan 2010

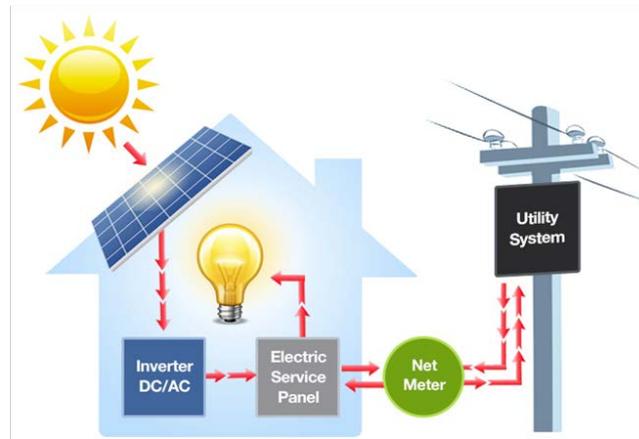
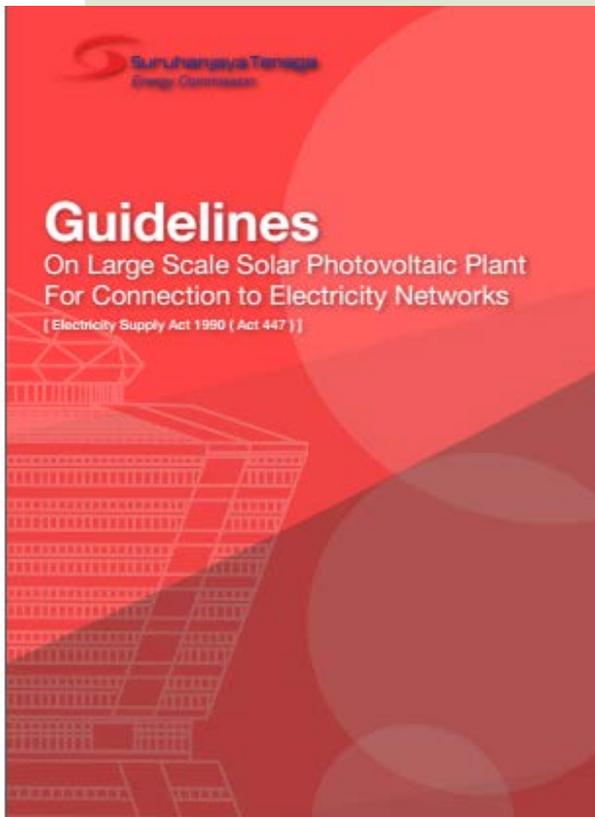
Year	Cumulative RE Capacity	RE Power Mix (vs Peak Demand)	Cumulative CO ₂ avoided
2015	985 MW	5.5%	11.1 mt
2020	2,080 MW	11%	42.2 mt
2030	4,000 MW	17%	145.1 mt

Note; Target is being revised, to include other initiatives.



New additional RE Quota (beyond FiT) (launched in 2016)

No	Programme	Year	(MW)
1.	Net-metering	2016-2020	500
2.	Large scale solar (1 to 50MW)	2017-2020	1000
TOTAL			1500 MW



- ✓ NEM is “in-direct connection behind the meter”
- ✓ Consumer to self-consume first
- ✓ Only excess energy flow to grid



RE (under FiT) Status as of Dec 2016

NO	SOURCE	Percentage (%)	CAPACITY (MW)
1.	Biogas	7	31
2.	Biomass	18	75
3.	Small Hydro	7	30
4.	Solar PV	68	284
TOTAL			420 MW



Target based on technical potential

Year	Cumulative Biomass (MW)	Cumulative Biogas (MW)	Cumulative Mini-Hydro (MW)	Cumulative Solar PV (MW)	Cumulative Solid Waste (MW)	Cum Total RE, Grid-Connected (MW)
2011	110	20	60	9	20	219
2015	330	100	290	65	200	985
2020	800	240	490	190	360	2,080
2025	1,190	350	490	455	380	2,865
2030	1,340	410	490	1,370	390	4,000
2035	1,340	410	490	3,700	400	6,340
2040	1,340	410	490	7,450	410	10,100
2045	1,340	410	490	12,450	420	15,110
2050	1,340	410	490	18,700	430	21,370

Assumptions, RE Technical potential:

Biomass (EFB, agriculture): 1,340 MW will be reached by 2028.

Biogas (POME, agriculture, farm): 410 MW will be reached by 2028.

Mini-hydro (not exceeding 30 MW): **490 MW** will be reached by 2020.

Solar PV (grid-connected): **unlimited.**

Solid waste (RDF, incineration, sanitary landfill): projection of 30,000 tonne/day of Solid Waste as projected by KPKT, followed by 3% annual growth post 2024



RE Challenges



Hydropower

- High initial capital outlay; longer time to recoup investment
- Long development time (7 years or more)
- Potential sites are located in remote areas
- Complication in permits application (>21 permits)



Biomass

- Difficulty obtaining long term fuel (EFB,PKS) supply commitment
- Boiler reliability and maintenance issue
- Most POMs are located in remote areas



Geothermal Power

- High risk; high initial investment cost for study & exploration
- Potential site in remote areas; far from existing transmission lines



Solar PV

- Reliability issue
- Intermittent source
- Large footprint (~4 acres/MW)
- Relatively high cost (> RM0.50 / kWh)
- Requires energy storage to improve reliability



Wind Power

- Constant wind is needed; dependent on location.
- Reliability issue
- Intermittent source
- Requires energy storage to improve reliability

RE Initiatives Way Forward

- **FiT is for kick-start. Solar PV will end in 2017, while others will be until 2025.**
- **To revise national targets – existing target was based on FiT (limited fund), to include large scale and net-metering.**
- **Ramp-up Renewable Energy capacity through:**
 - ❑ Large Scale Solar PV (1 to 50MW sizes), Launched in 2016, total of 1000MW by 2020
 - ❑ Net-Metering including self-consumption, Launched in 2016, total of 500MW by 2020
- **To explore the possibility of wind energy (both onshore & offshore).**



Thank you

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