



Power Policy & National Development Plan



PRESENTATION OUTLINE

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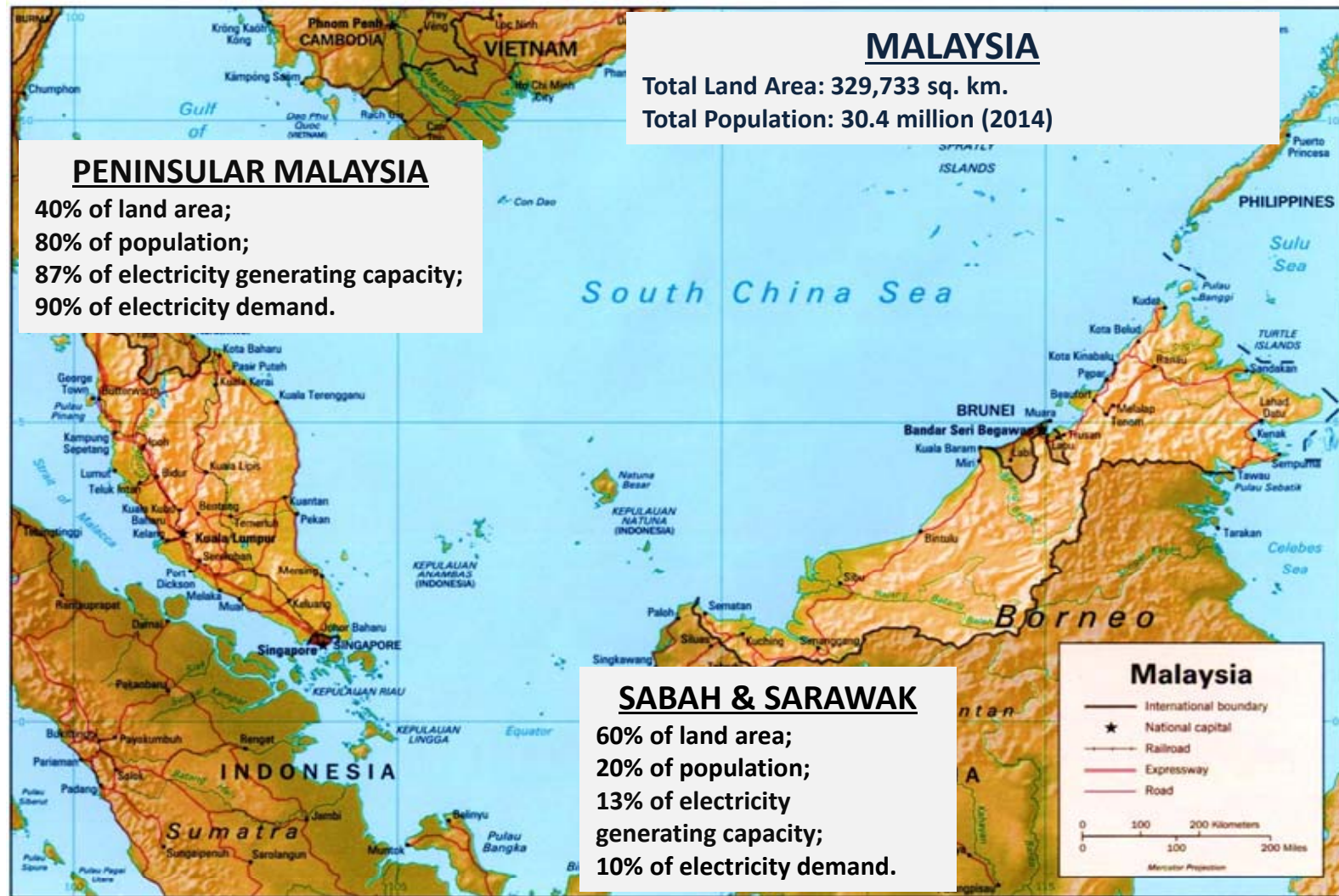
Conclusion



Introduction: Snapshot of Energy Sector in Malaysia



National Overview



Energy Resources (2015)

Oil	5.85 bbl
Gas	98.315 Tscf
Coal	1.938.37 bil ton (low grade)
Hydro (potential)	20 GW
RE (potential) – mini hydro, biomass, biogas, municipal waste, geothermal)	2,700MW

Malaysia Energy Policies

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

Malaysia Energy Policies

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

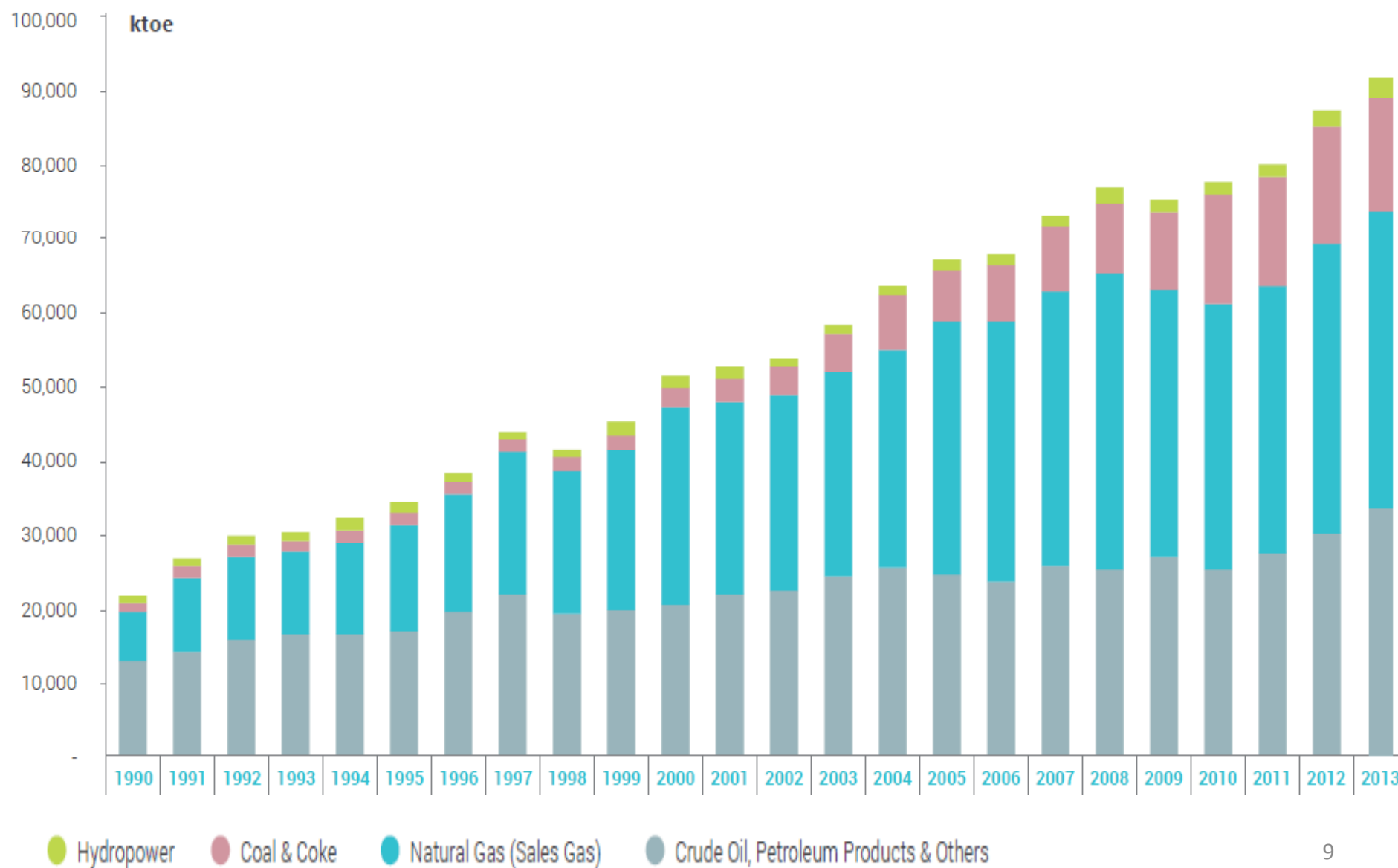
Renewable Energy (RE) Policy + Action Plan (2010)

- Outlines the major strategies to promote RE in the country. Main highlight is the Feed-in-Tariff (FiT) mechanism

Trends In GDP, Primary Energy Supply And Final Energy Consumption



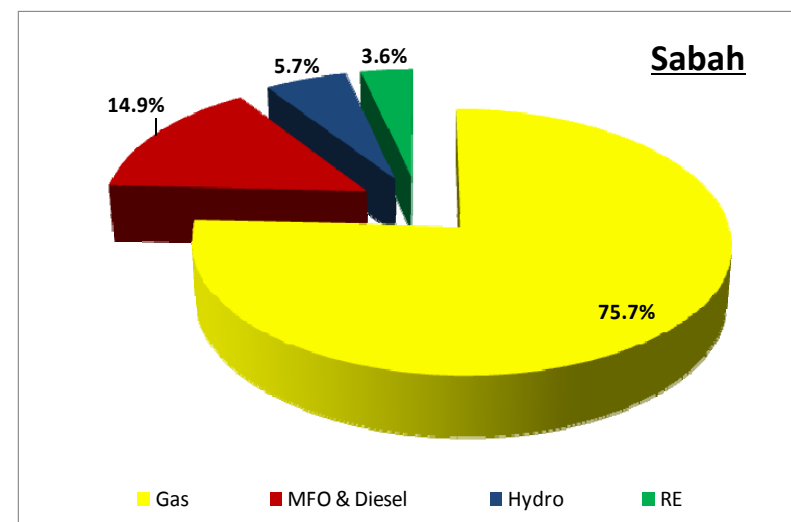
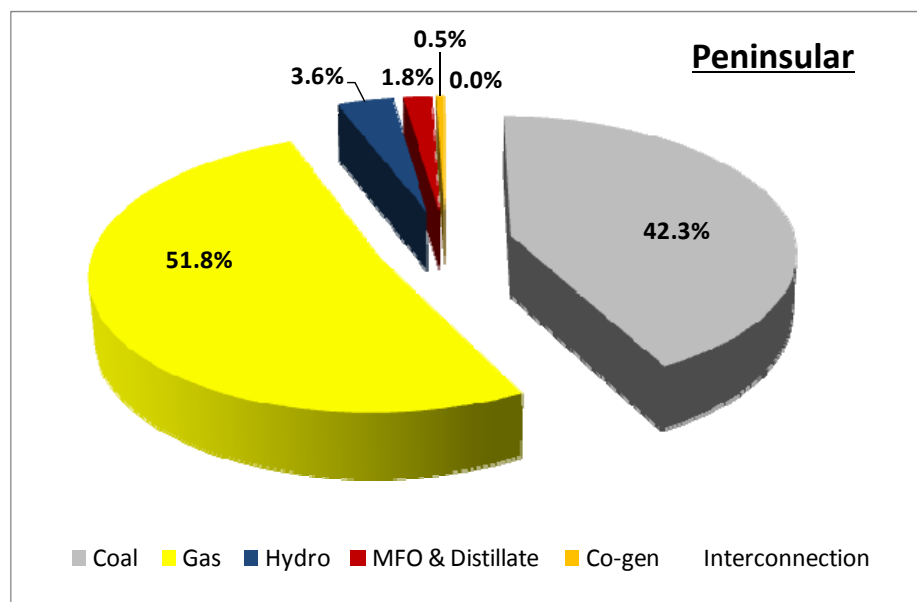
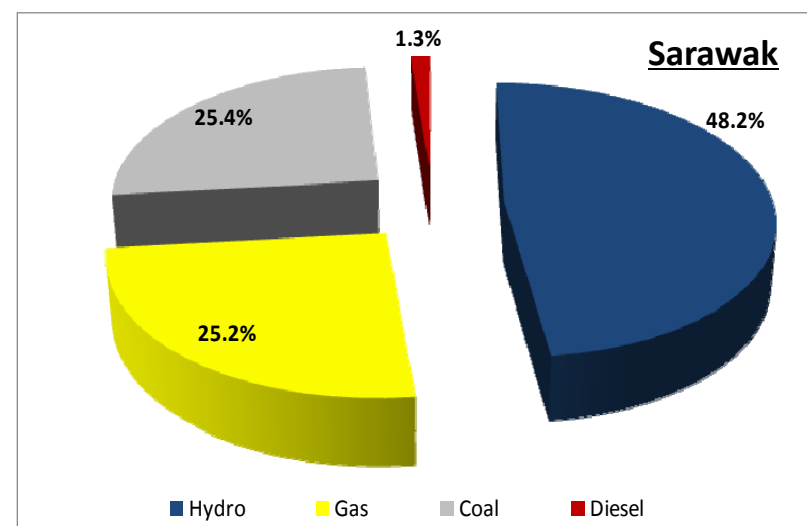
Primary Energy Supply by Type of Fuels



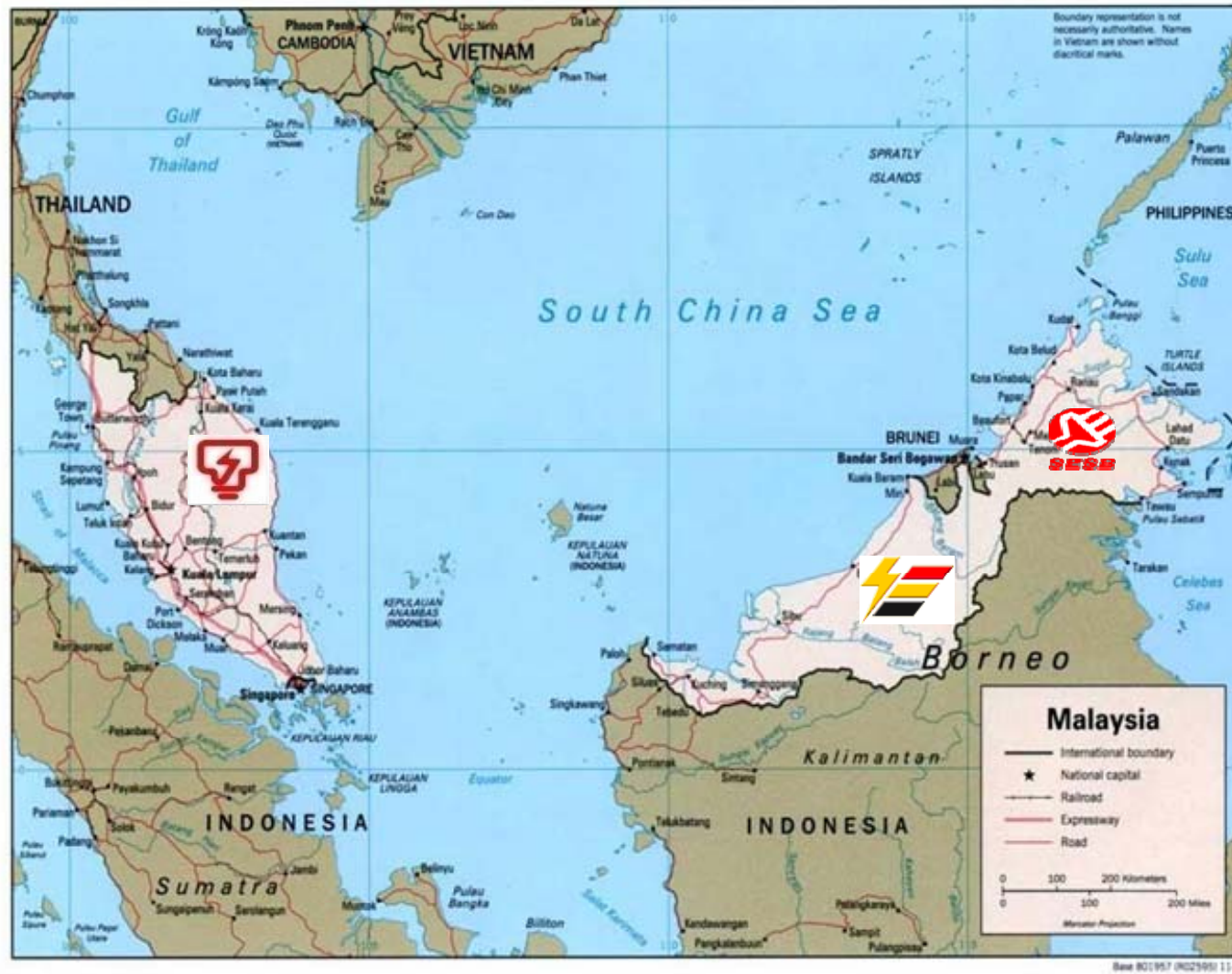
Electricity Generation Capacity & Fuel Mix

	Generation Capacity (MW)	Peak Demand (MW)	Reserve Margin (%)
Pen. Malaysia	21,954	16,901	30%
Sabah	1,324	914	45%
Sarawak	3,244	2,819	15%

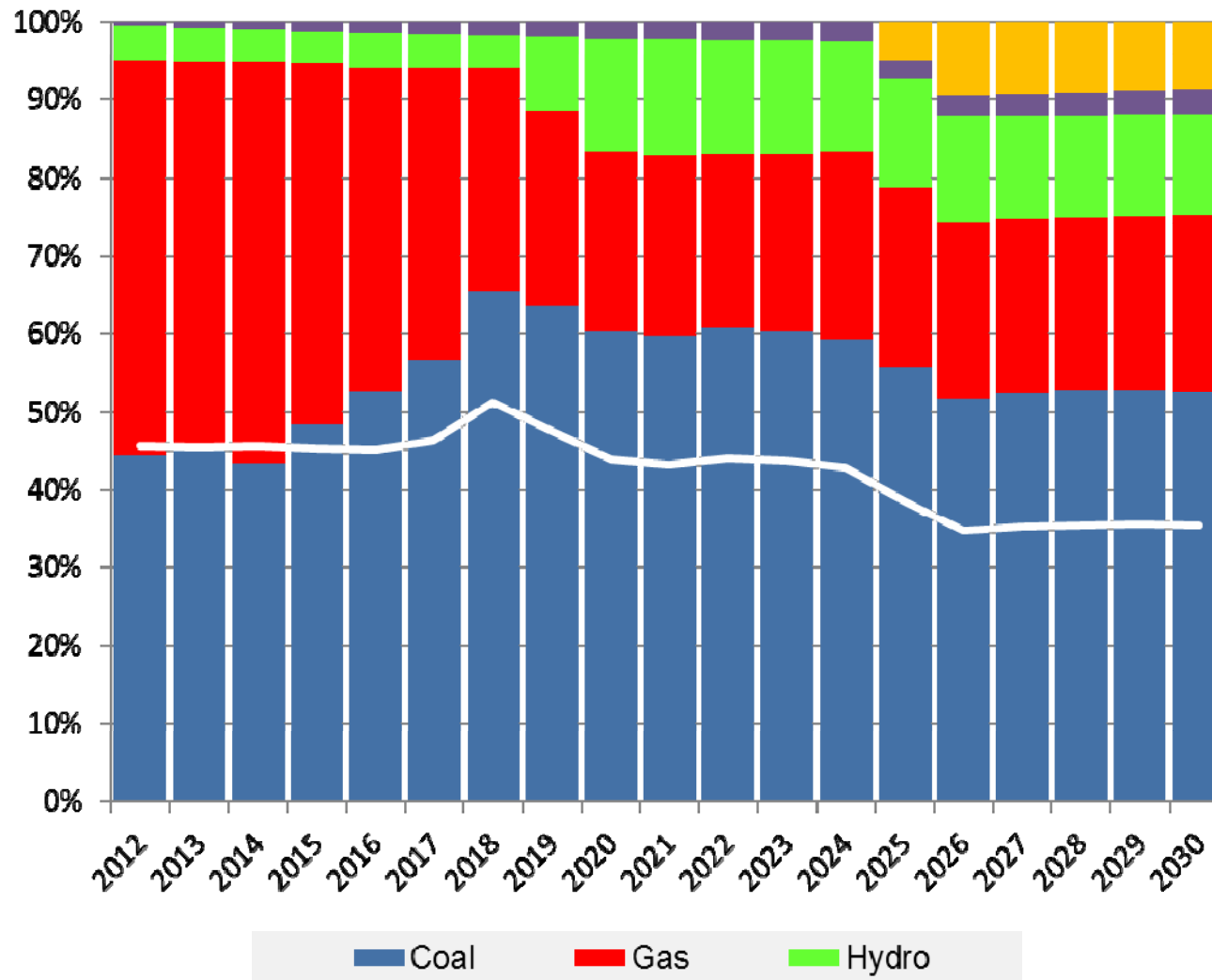
Source: JPPPET 1/2015



Major Utility Companies in Malaysia



Projected Generation Mix



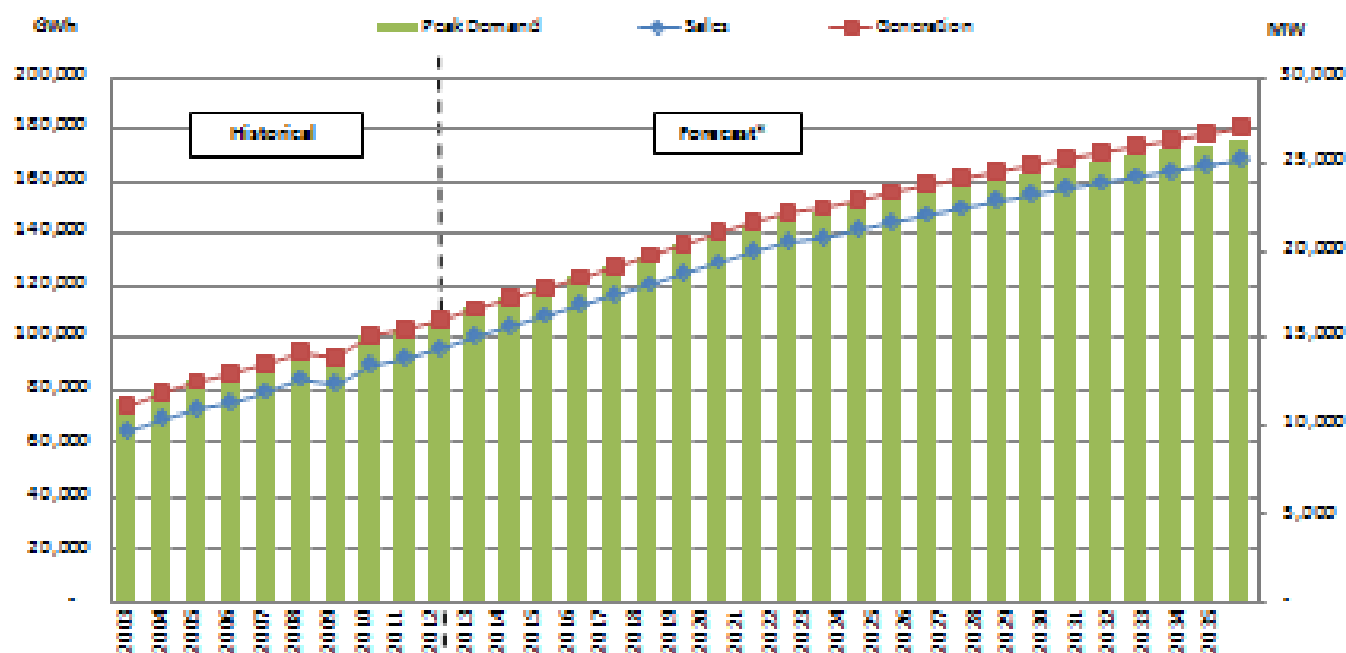
- If nuclear is not available post-2020, Peninsular Malaysia will be highly dependent on fossil fuels
 - e. gas and coal
 - Coal is 100% imported;
 - indigenous gas is depleting
- Renewable Energy is not able to provide base-load requirement
- Hydro capacity in Peninsular Malaysia is nearly fully developed

LONG TERM LOAD FORECAST FOR PENINSULA MALAYSIA

- PROJECTED AVERAGE ANNUAL DEMAND GROWTH RATE OF 2.3% UNTIL 2030

LONG TERM LOAD FORECAST FOR PENINSULA MALAYSIA

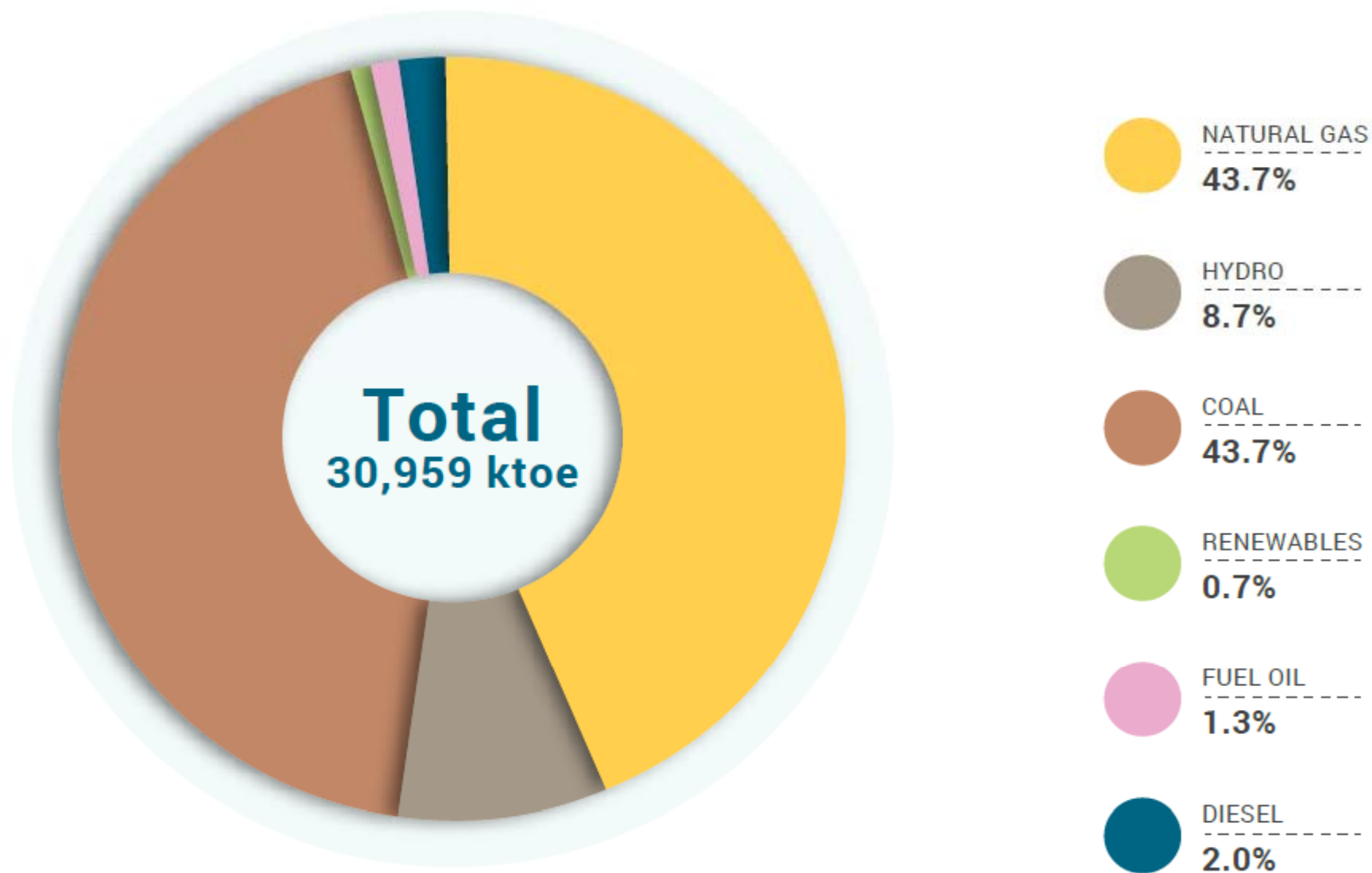
- PROJECTED AVERAGE ANNUAL DEMAND GROWTH RATE OF 2.3% UNTIL 2030



Average Period Growth Rates, p.a.	Sales (%)	Generation (%)	Peak Demand (%)
2013-2015	3.0	3.4	3.3
2013-2020	3.3	3.4	3.2
2013-2030	2.3	2.5	2.3
2015-2020	3.5	3.4	3.2
2020-2030	2.0	1.8	1.7

* 1% reduction in yearly sales growth rate due to energy efficiency initiatives is assumed

Fuel Input to Power Stations



Source: National Energy Balance 2013¹⁴



Challenges In Sustainably Meeting Demand



Malaysia's Key Challenges

Availability

- High dependence on depleting Peninsula gas supply
- Under investment and over-consumption due to subsidized pricing

Accessibility

- Limited reserve capacity for primary fuel and aging infrastructure
- Coal imports highly concentrated

Affordability

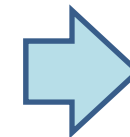
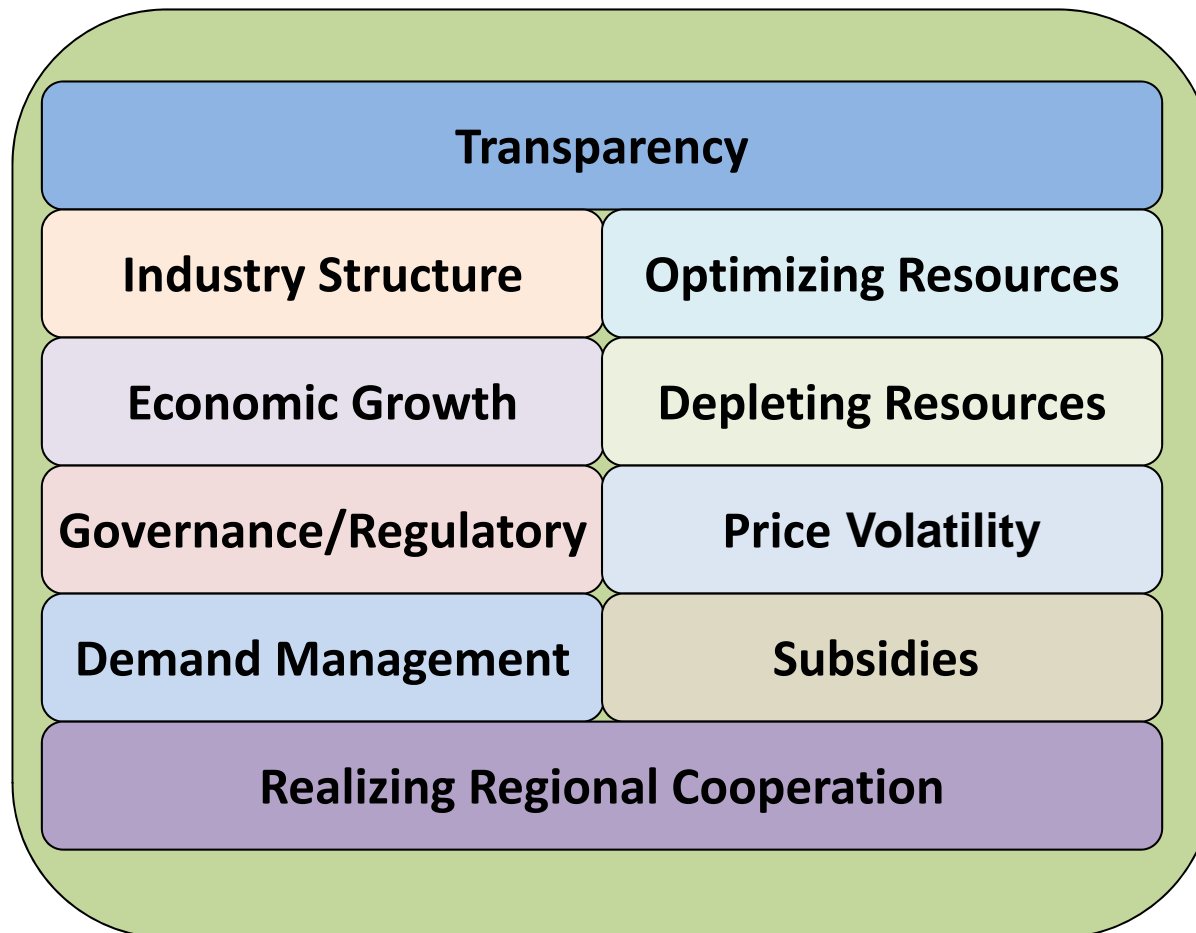
- Frequent gas supply curtailment has led to increase usage of high cost alternatives (distillate)

Acceptability

- Increasing sensitivities to the environment
- Increase the share of Renewable Energy in fuel mix
- Promoting the efficient use of energy

Malaysia's Key Challenges

Strong Policy Needed to tackle the challenges...





Initiatives to Address Challenges



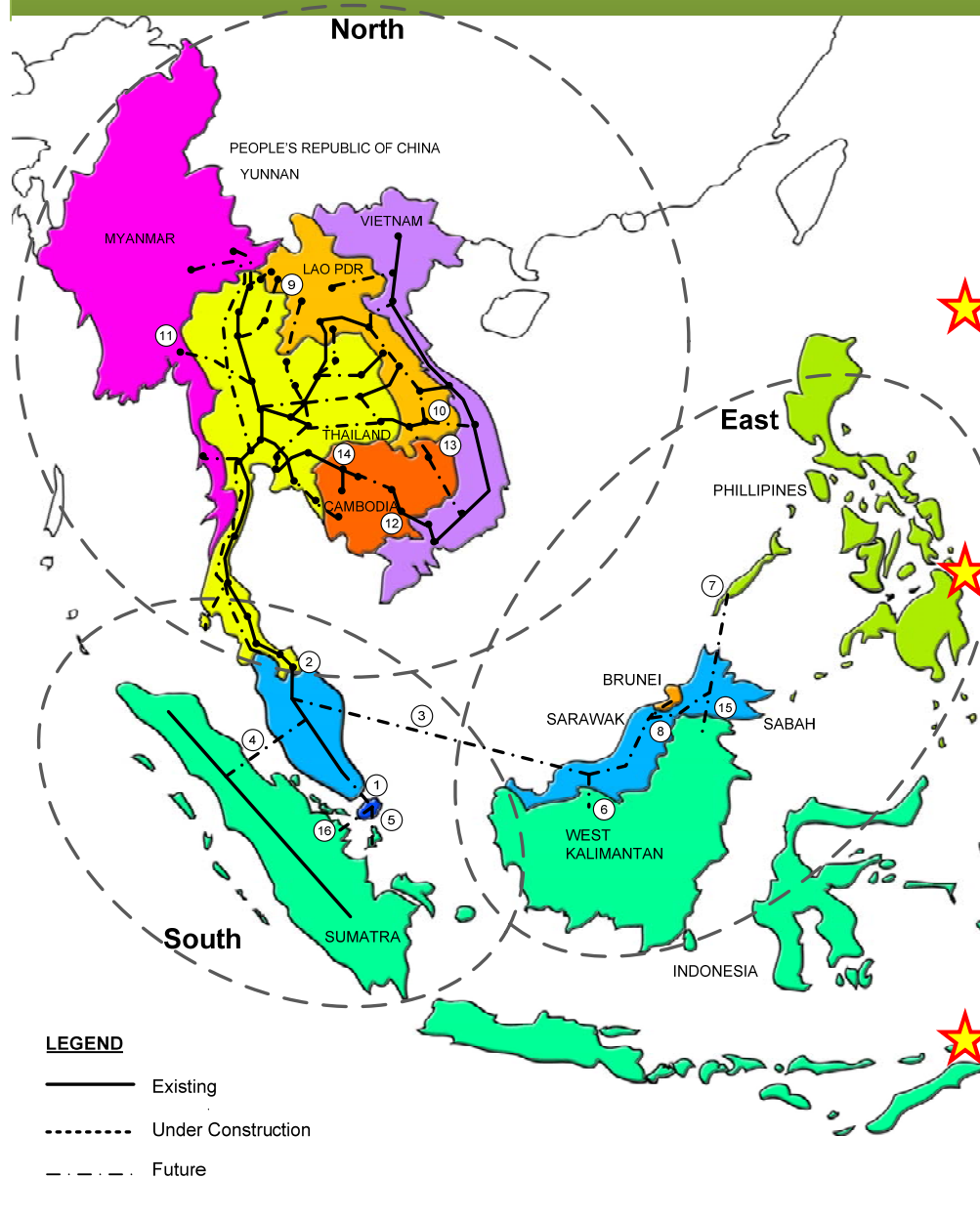
New Enhanced Dispatch Arrangement (NEDA)

- **Provides an opportunity for the power sector to improve its efficiency and be more cost effective in generating electricity;**
- **Introduces short run competition in daily generation dispatch among independent IPPs with PPAs, TNB generation with SLAs beginning 1st October 2015;**
- **For merchant generators who do not have PPA, NEDA will be available for them by first quarter of 2016;**
- **Is a step up from the current competitive bidding process introduced in 2012 for new generation capacity with long term PPA;**
- **Will ensure sufficient firm capacity at the most competitive price for consumers and establish a positive market for investment.**

ASEAN Power Grid (APG)

- **APG is a flagship program mandated in 1997 by the ASEAN Heads of States/Governments under the ASEAN Vision 2020 towards ensuring regional energy security while promoting the efficient utilization and sharing of resources;**
- **To pursue the program, ASEAN adopts a strategy that encourages interconnections of 15 identified projects, first on cross-border bilateral terms, then gradually expand to sub-regional basis and, finally to a totally integrated Southeast Asian power grid system;**
- **Objective of APG is to facilitate and expedite the implementation of the ASEAN Interconnection Master Plan and to further harmonize technical standards and operating procedures as well as regulatory and policy frameworks among the ASEAN Member States.**

ASEAN Power Grid (APG)



1)	P.Malaysia - Singapore (New)	post 2020
2)	Thailand - P.Malaysia	
•	Sadao - Bukit Keteri	Existing
•	Khlong Ngae - Gurun	Existing
•	Su Ngai Kolok - Rantau Panjang	TBC
•	Khlong Ngae – Gurun (2 nd Phase, 300MW)	TBC
3)	Sarawak - P. Malaysia	2025
4)	P.Malaysia - Sumatra	2020
5)	Batam - Singapore	2020
6)	Sarawak - West Kalimantan	2015
7)	Philippines - Sabah	2020
8)	Sarawak - Sabah – Brunei	
•	Sarawak –Sabah	2020
•	Sabah – Brunei	Not Selected
•	Sarawak – Brunei	2018
9)	Thailand - Lao PDR	
•	Roi Et 2 - Nam Theun 2	Existing
•	Sakon Nakhon 2 – Thakhek – Then Hinboun (Exp.)	Existing
•	Mae Moh 3 - Nan - Hong Sa	2015
•	Udon Thani 3- Nabong (converted to 500KV)	2019
•	Ubon Ratchathani 3 – Pakse – Xe Pian Xe Namnoy	2019
•	Khon Kaen 4 – Loei 2 – Xayaburi	2019
•	Nakhon Phanom – Thakhek	2015
•	Thailand – Lao PDR (New)	2019-2023
10)	Lao PDR - Vietnam	2016-TBC
11)	Thailand - Myanmar	2018-2026
12)	Vietnam - Cambodia (New)	TBC
13)	Lao PDR - Cambodia	2017
14)	Thailand - Cambodia (New)	post 2020
15)	East Sabah - East Kalimantan	post 2020
16)	Singapore – Sumatra	post 2020

★ Priority Projects

Earliest COD

Under the 11th Malaysia Plan : Encouraging Sustainable Energy Use to Support Growth



S1 : Strengthening Stakeholder Coordination and Collaboration in the Energy Sector

Fostering greater institutional collaboration on energy planning

- **A comprehensive governance, that allows for more structured inter-agency collaboration in the area of planning and management for the energy sector, will be instituted.**

Engaging end-users on efficient energy consumption

- **Comprehensive and effective communication plan on the sustainable use of energy resources is required to improve public awareness and understanding, and to manage public perception of the subsidy rationalisation programme.**

S2 : Ensuring the security of supply and reliability for the oil and gas subsector within a market-based approach

Ensuring security of supply for gas

- **construction of pipelines from the Malaysia-Thailand Joint Development Area to Kerteh, Terengganu, RGT-2 in Pengerang, Johor;**
- **commissioning of two floating LNG units offshore Sabah and Sarawak with a capacity of 2.7 mtpa;**
- **to ensure uninterrupted supply during emergencies, a swing field offshore east of Peninsular Malaysia will provide an additional 100-200 mmscfd of natural gas. These additional volumes, together with a 15% buffer of storage capacity from RGT-1 in Sungai Udang, Melaka, will cater for gas demand in Peninsular Malaysia; and**
- **Reliability of gas supply in Sabah will be improved with additional pipeline connections from offshore fields to demand centres in FT Labuan, as well as Kota Kinabalu and Komanis in Sabah.**

S3 : Enabling the growth in the oil and gas subsector

Supporting the development of Pengerang Integrated Petroleum Complex

- The facility will be able to produce EURO 4M and EURO 5 grade petrol, in addition to 7.7 mtpa of various grades of specialized products such as synthetic rubber and high grade polymer by 2020. The complex will have a 1,220 MW co-generation power plant of which 620 MW will be utilized by RAPID and the remaining 600 MW exported to the grid.

Moving towards third party access for gas supply to allow new entrants

- Third party gas players will be able to utilize gas supply infrastructure through the enforcement of the amended Gas Supply Act, 1993 (Act 501) in 2016.

Implementation of clean fuel in the transport sector

- The utilization of environmentally friendly fuel will be implemented when RON 95 petrol with EURO 4M, and diesel with EURO 5 standards.

S4 : Managing supply diversity for security of electricity subsector

Ensuring electricity supply security through better management of resources

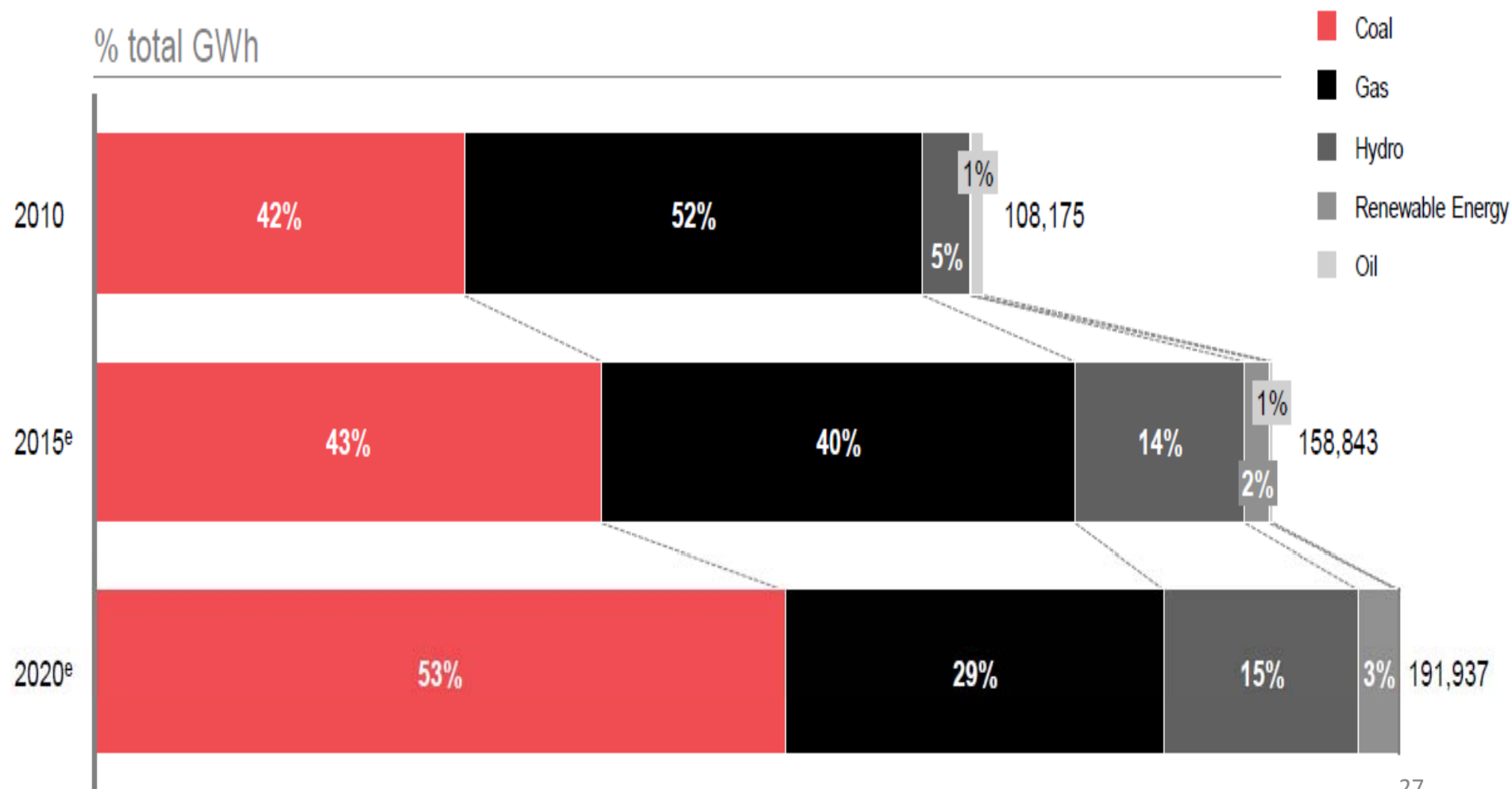
- the optimization of fuel mix and exploration of alternative fuels will be given priority to reduce the nation's dependency on fossil fuels for electricity generation;
- future power planting up must incorporate more stringent emission control technologies to ensure a progressive reduction of the energy industry's carbon footprint;
- Usage of clean and green energy sources in power generation will be made a priority and is expected to be increased substantially in the generation mix.

Augmenting rural electrification

- Rural electrification programs, especially in Sabah and Sarawak, will be enhanced to improve national coverage to 99% by 2020.

Optimisation of Fuel Mix

Generation mix in Malaysia

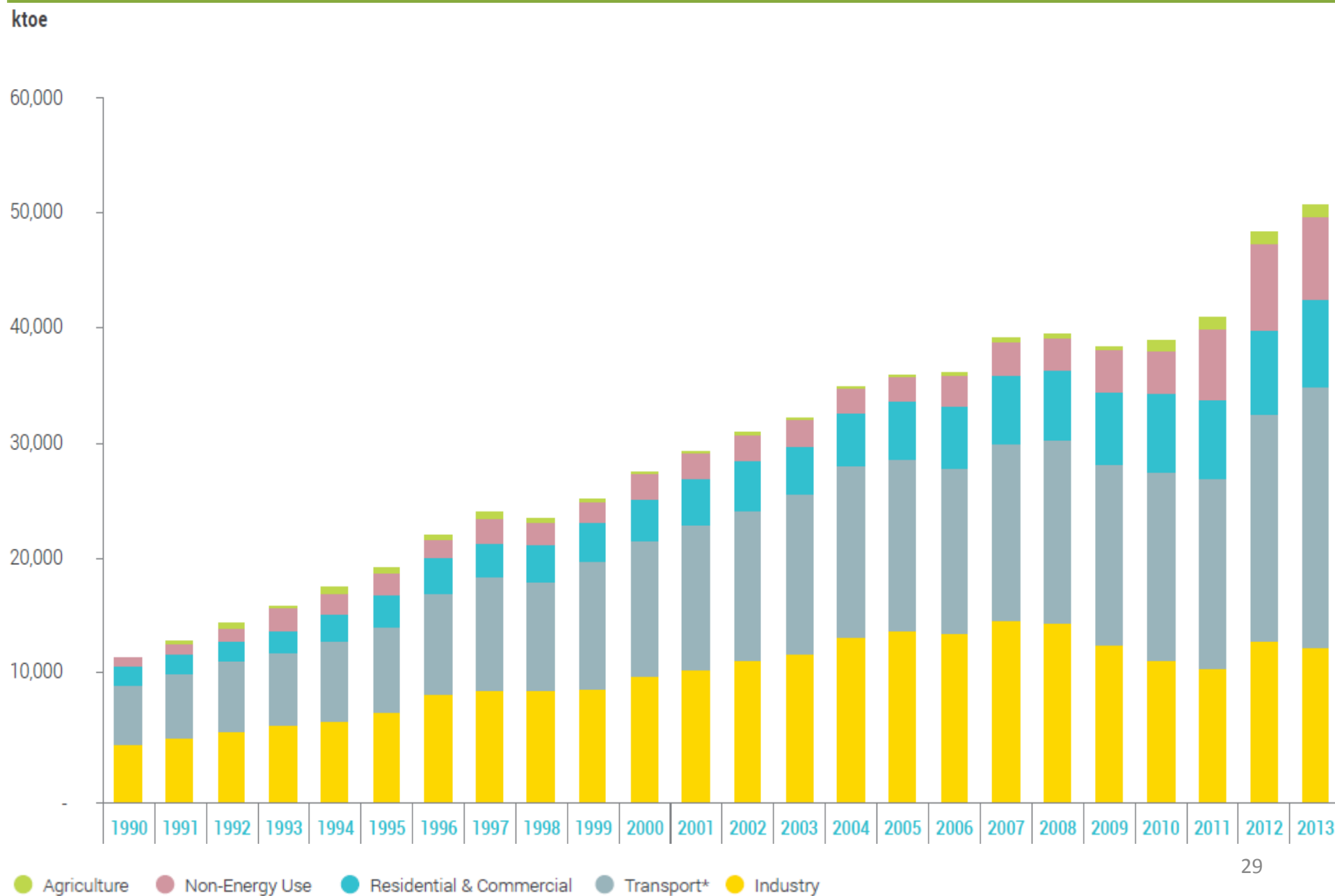


S4 : Managing supply diversity for security of electricity subsector

Enhancing alternative energy sources

- **biomass and biogas power plants will be pursued because of the large potential of these sources;**
- **Electricity generation capacity through renewable sources including biomass, biogas, solar PV, and mini hydro are targeted to reach 7.8% of total installed capacity in Peninsular Malaysia and Sabah by 2020, or about 2,080 MW;**
- **The usage of nuclear power as an alternative energy resource will be explored further. In this regard, an independent atomic energy regulatory commission will be established based on a new comprehensive nuclear law for electricity generation;**
- **The implementation of net energy metering (NEM), especially for solar-generated electricity, will provide savings on electricity bills to consumers.**

Final Energy Consumption by Sectors

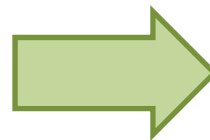
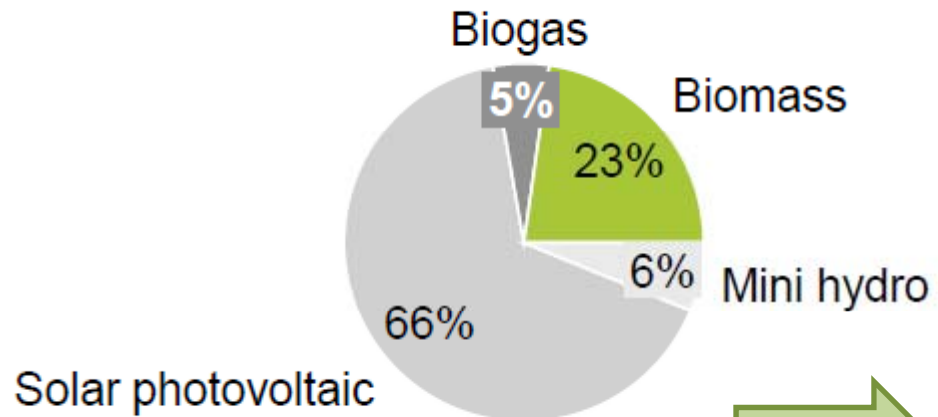


Increasing Share Of Renewables In Energy Mix

Total Installed Capacity
%

2014

243 MW

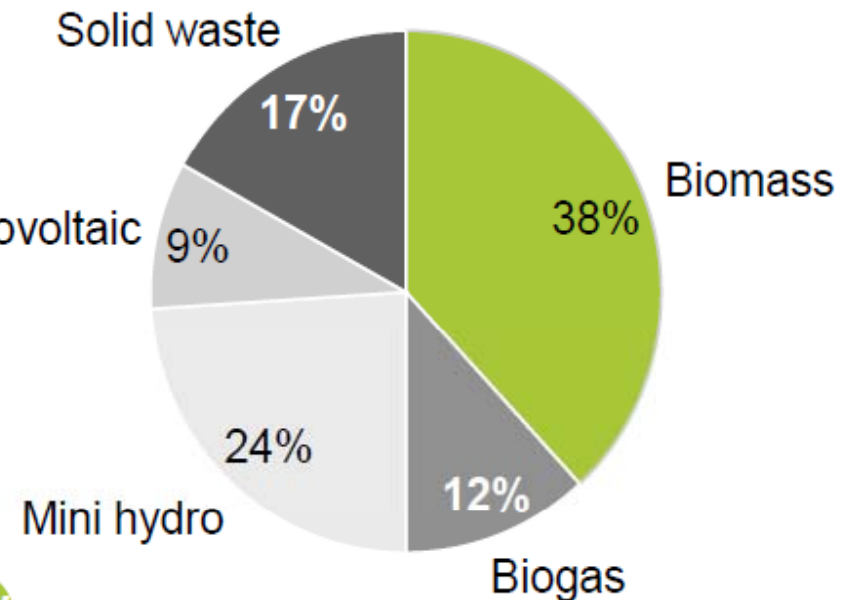


Solar photovoltaic

Total Installed Capacity
%

2020

2,080 MW



S5 : Improving the sustainability, efficiency and reliability of the electricity subsector

Creating a sustainable tariff frameworks

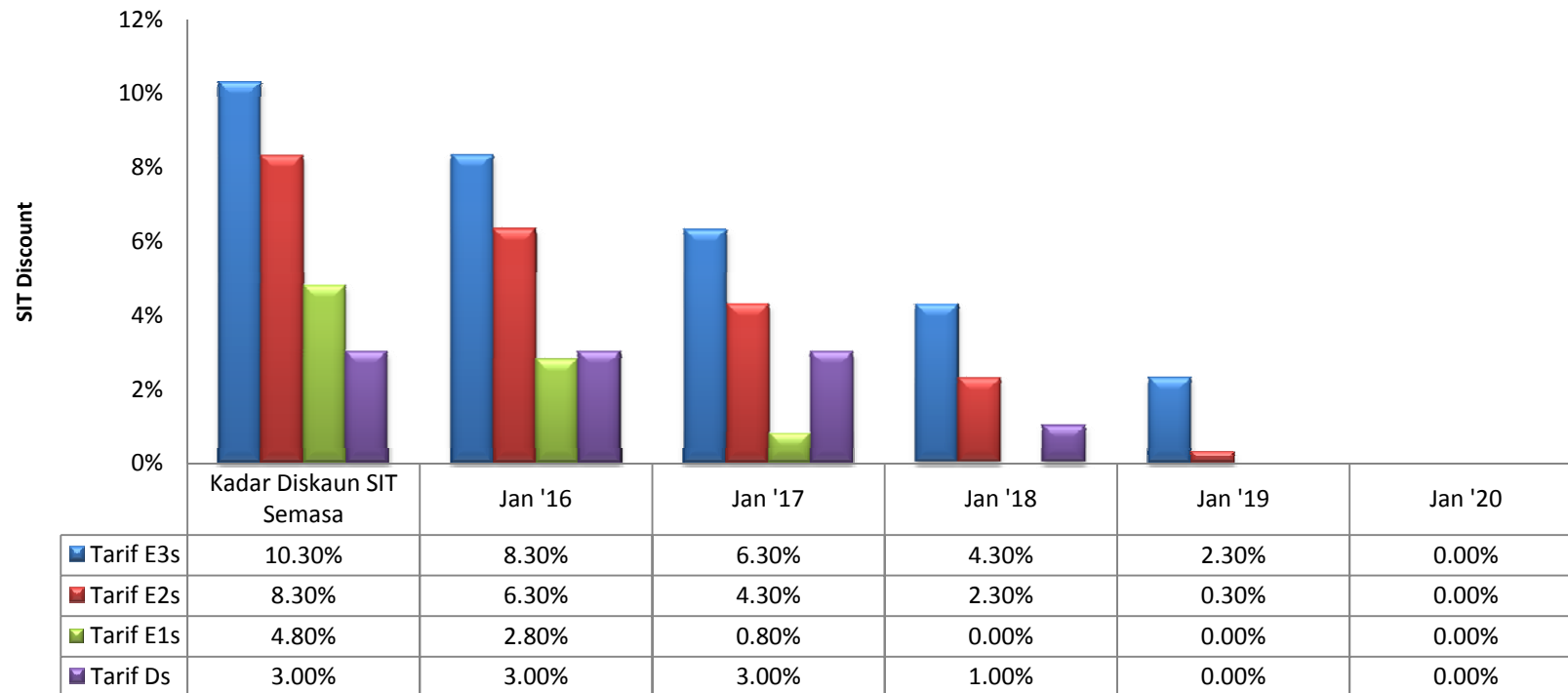
- **Subsidy rationalization for electricity tariffs will continue to be implemented;**
- **The Special Industrial Tariff will be abolished by 2020 and the implementation of IBR will be continued to ensure utility companies provide efficient services;**
- **New additions of power plants and extensions of existing power plants will continue to be selected through competitive bidding for greater transparency.**

Improving efficiency and reliability of electricity supply

- **Construction of new power plants to produce 7,626 MW will be initiated to replace retiring plants and meet the growing peak demand. A number of 500 kV and 275 kV transmission projects to reinforce the grid systems will be completed to enhance the security of supply to major load demand centres;**
- **The additional generation capacity coupled with expanded transmission and distribution networks will improve the SAIDI for Peninsular Malaysia, Sabah, and Sarawak.**

SIT Implementation

Phasing Out Special Industrial Tariff (SIT)

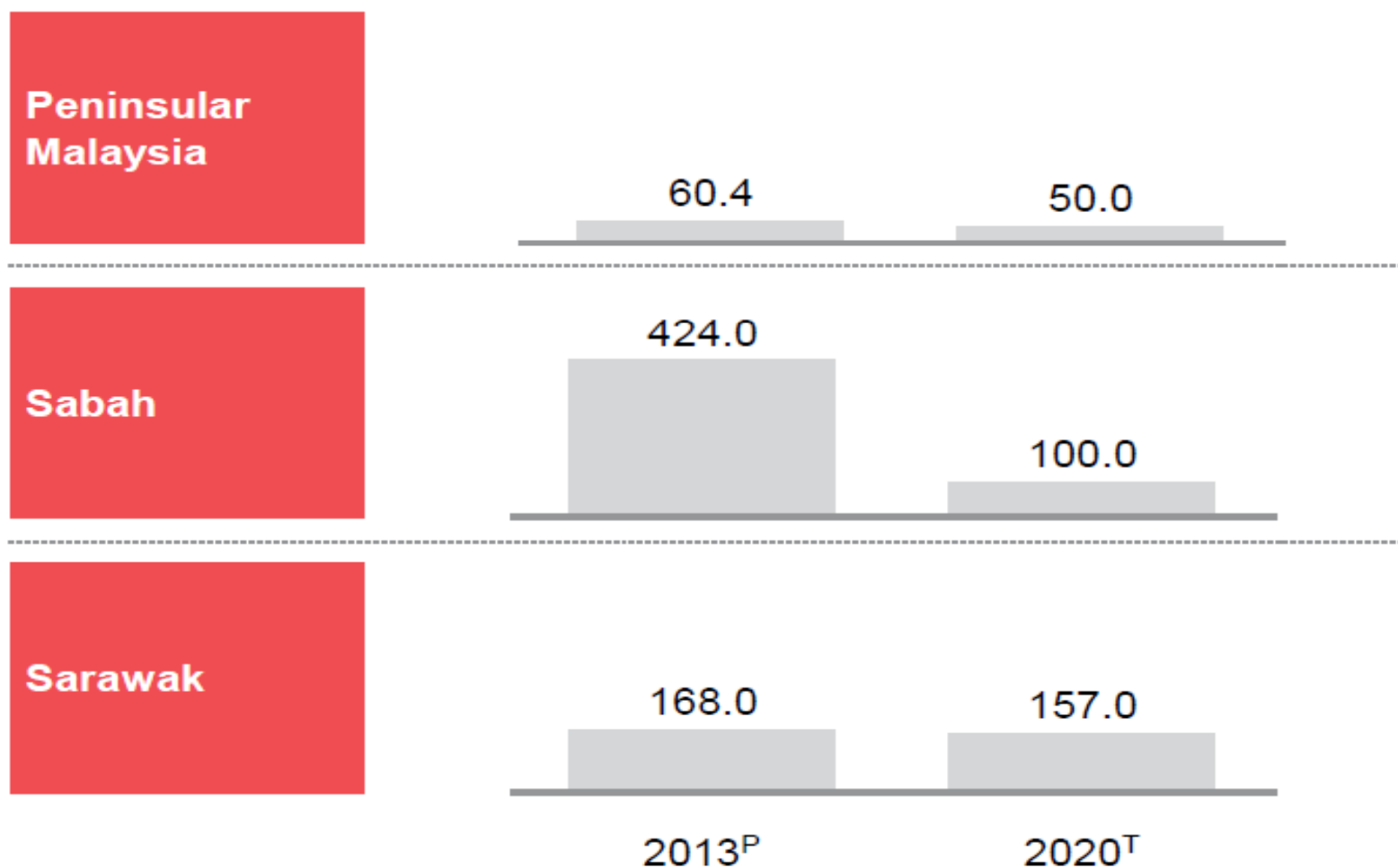


SIT discount will be phased out beginning
1 January 2016

SIT discount ending
1 January 2020

Improving Efficiency and Reliability Of Electricity Supply

System Average Interruption Duration Index,
minutes per customer



^P Progress
^T Target

Imbalance Cost Pass Through (ICPT)

- **The electricity tariff in Peninsular Malaysia is determined through the Incentive Based Regulation (IBR) framework and the Imbalance Cost Pass Through (ICPT) mechanism implemented in January 2014.**
- **The ICPT mechanism allows the government to review the tariff every six months based on changes in fuel and generation costs to reflect the true cost of electricity and provide transparency in the whole process.**
- **ICPT takes into account changes in the price of piped gas, LNG, coal, medium fuel oil, distillate and other generation costs such as those related to the PPAs, displaced cost from Renewable Energy and the cost of importing electricity.**
- **A system similar to ICPT has been adopted by many developed and developing countries such as Australia, UK as well as ASEAN countries such as Singapore, Thailand and the Philippines.**



Conclusion



Conclusion

- **The security of energy supply is of paramount importance as energy is the primary driver of the nation's growth – affecting not only the quality of life for all Malaysians but also enabling the continued growth of the economy;**
- **Malaysia is committed to ensuring energy security for the nation while improving infrastructure and service delivery for the oil, gas and electricity subsectors;**

Conclusion

•Efforts were undertaken to ensure the long-term sustainability of the energy sector through resource diversification, continuous investments in new infrastructure, and technology enhancement. In addition, the improvement of the implementation of efficient resource utilization measures were also undertaken including rationalizing energy subsidies to move towards a market based energy pricing.



Thank You



Contact : report@tky.ieej.or.jp