COGENERATION IN MALAYSIA

by
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Energy Commission
Malaysia
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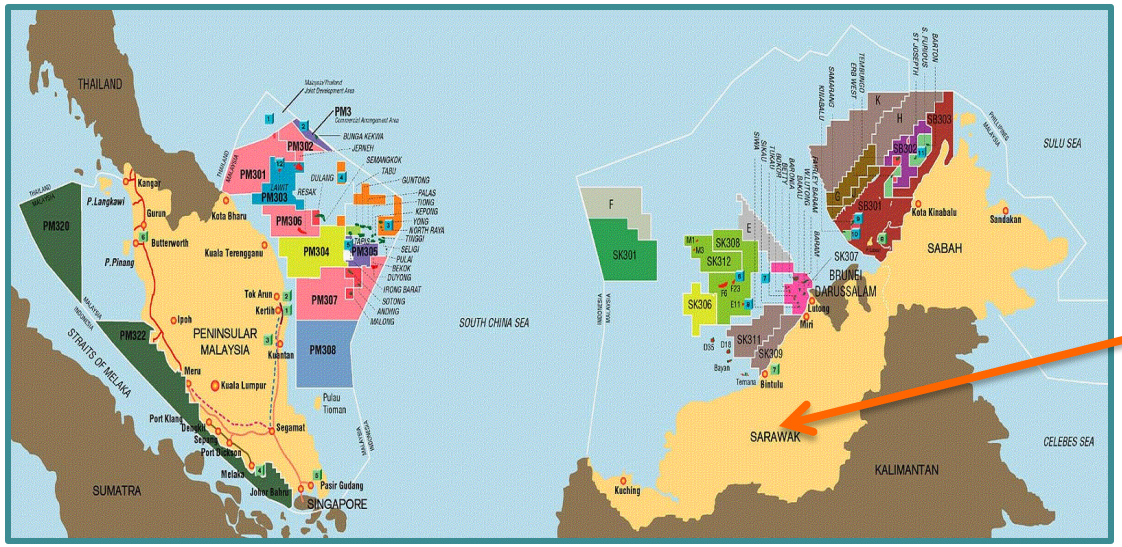
Suruhanjaya Tenaga

Malaysia's Major Energy Resources



CRUDE OIL & CONDENSATES : 5.8 billion barrels

NATURAL GAS : 88.0 trillion standard cubic feet

RESERVE LIFE : Oil – 20 years, Gas – 36 years

(Source: PETRONAS)

Potential Hydro Capacity Exceeds 20,000 MW

(Source: SEB)

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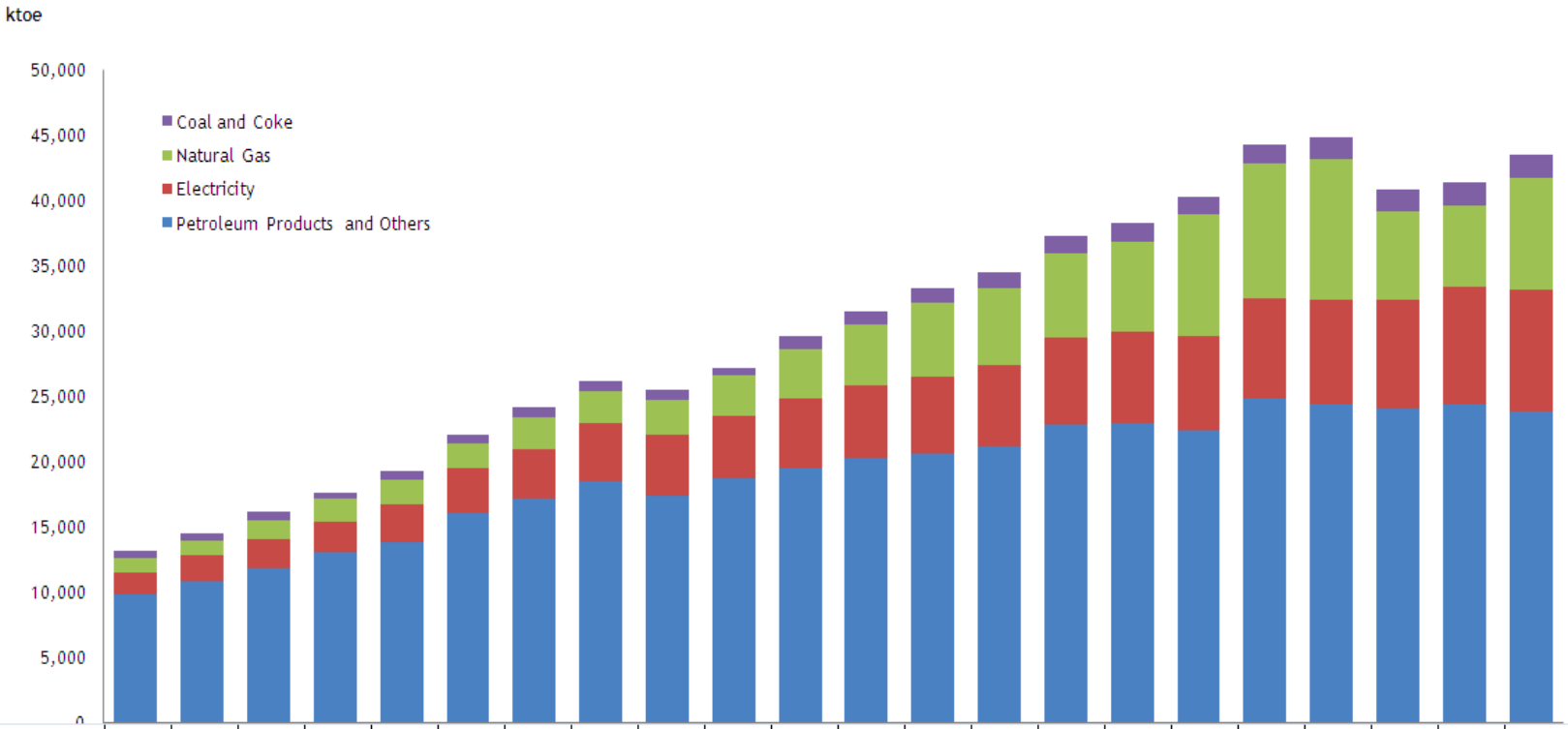
Final Use of Commercial Energy by Type of Fuels



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Petroleum Products and Others	74.9%	74.9%	73.7%	73.9%	72.1%	72.8%	71.1%	71.0%	68.4%	69.0%	65.9%	64.4%	62.0%	61.2%	61.3%	60.1%	55.5%	56.1%	54.5%	59.1%	58.8%	55.0%
Electricity	13.0%	13.2%	13.7%	13.6%	15.2%	15.2%	15.6%	16.8%	17.9%	17.7%	17.7%	17.7%	17.8%	18.3%	17.8%	18.1%	18.0%	17.4%	17.8%	20.3%	21.7%	21.2%
Natural Gas	8.3%	7.7%	8.5%	9.7%	9.6%	8.7%	10.2%	9.4%	10.7%	11.1%	13.0%	14.7%	17.0%	17.0%	17.4%	18.2%	23.1%	23.5%	23.9%	16.6%	15.1%	19.7%
Coal and Coke	3.9%	4.1%	4.2%	2.8%	3.1%	3.2%	3.0%	2.8%	3.0%	2.2%	3.3%	3.1%	3.3%	3.5%	3.5%	3.5%	3.3%	3.1%	3.8%	3.9%	4.4%	4.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Draft - National Energy Balance 2011

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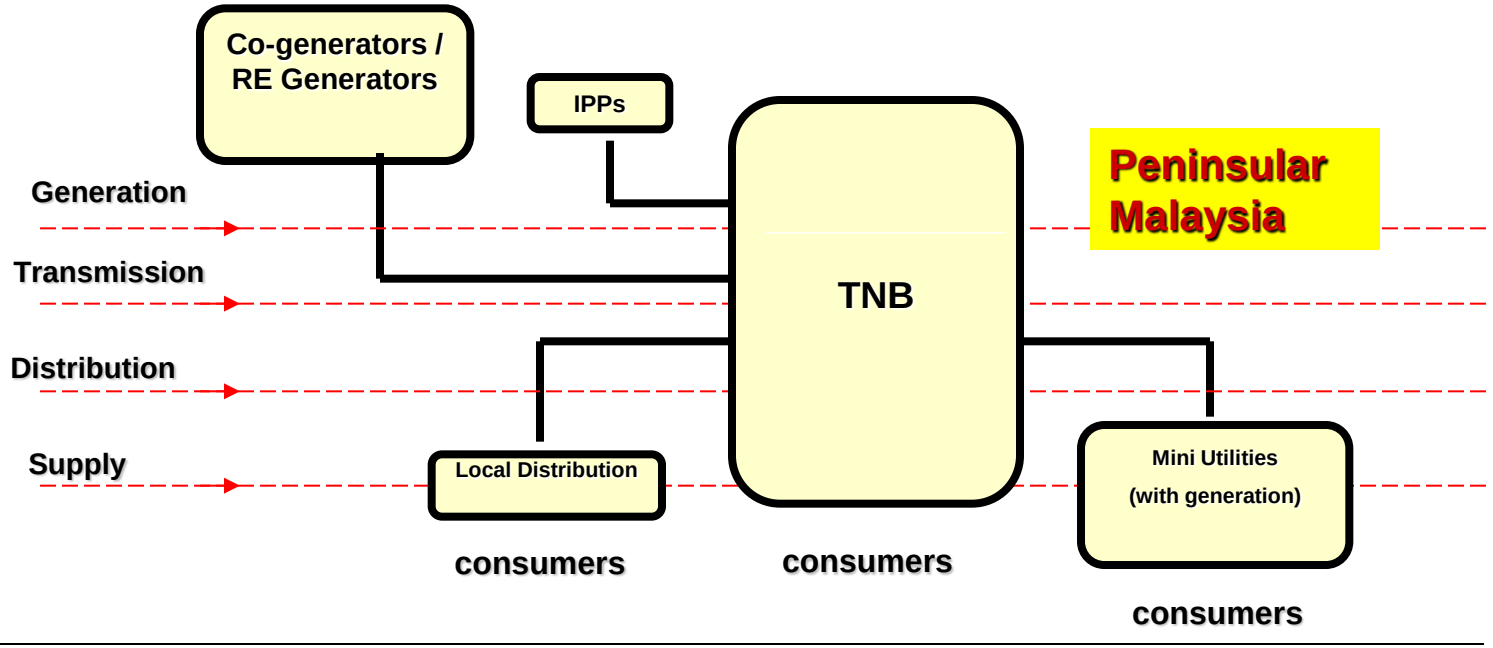
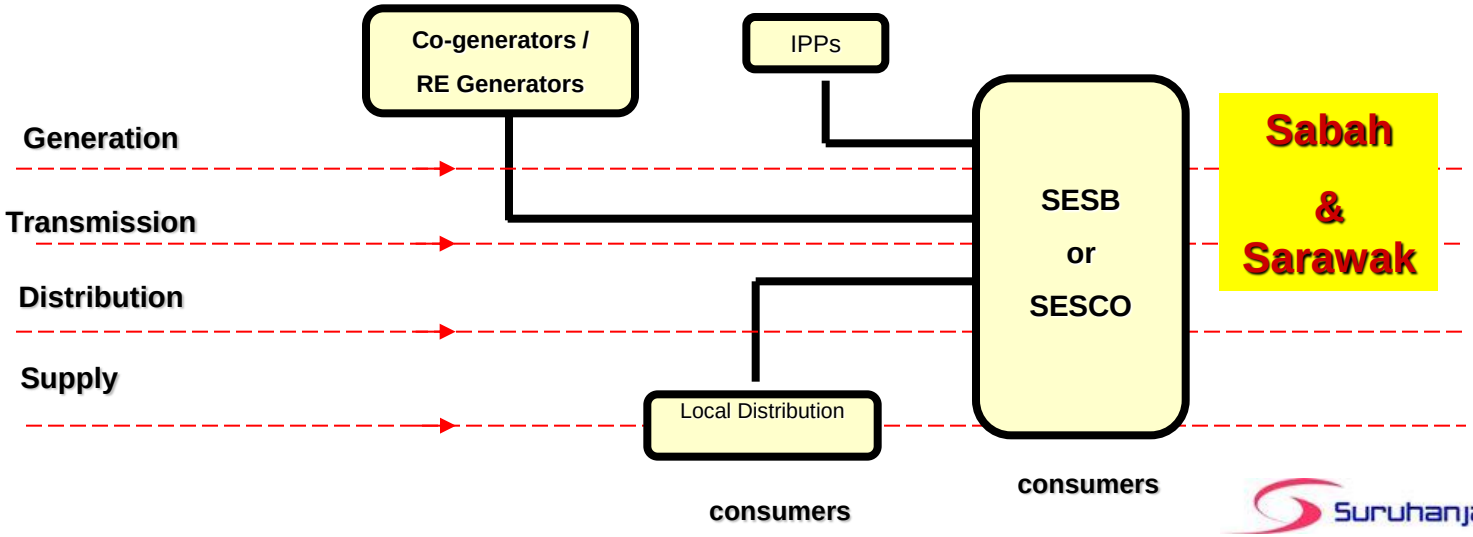
Electricity Supply Industry Structure





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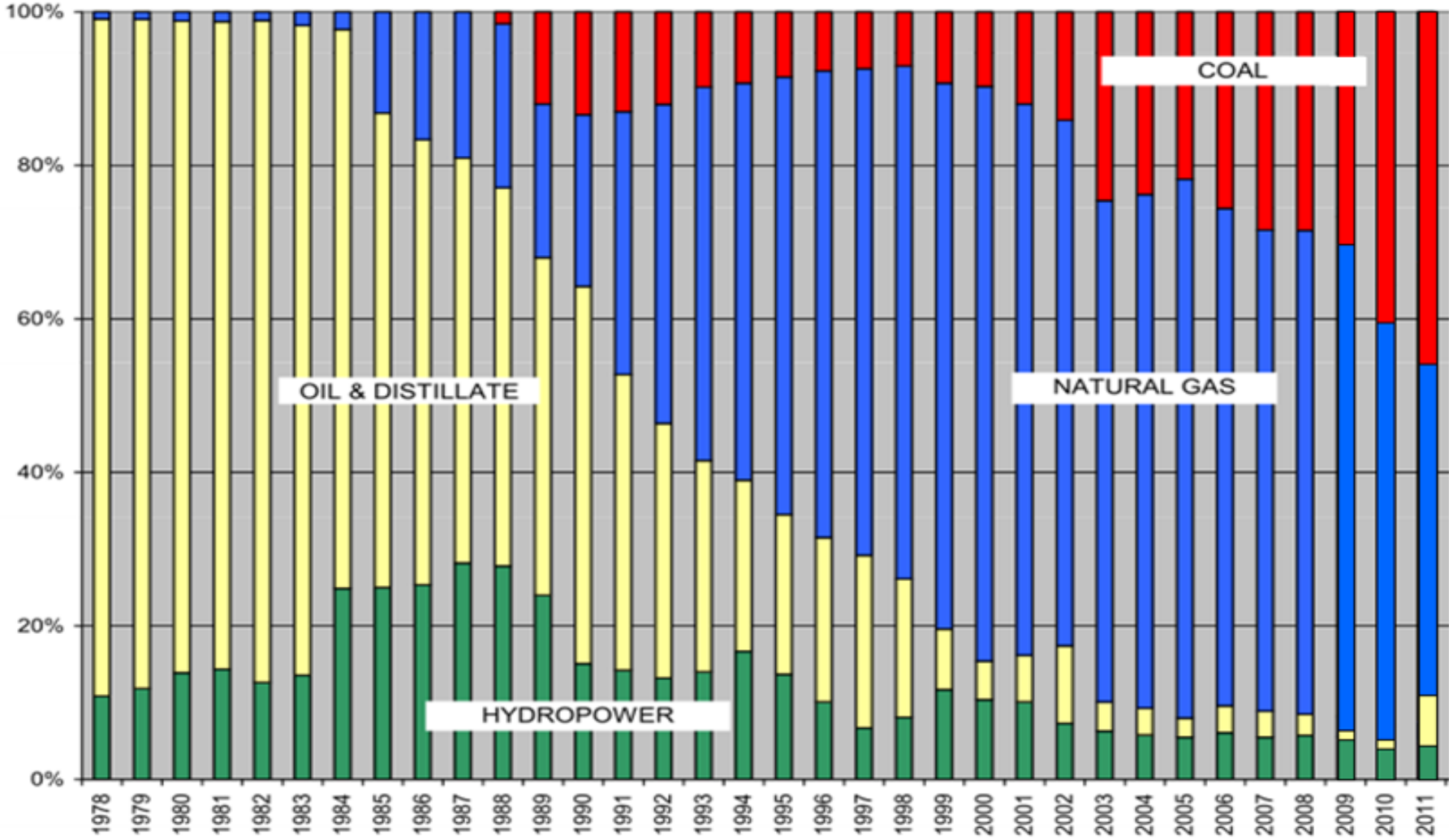
Malaysia's Electricity Generation Fuel Mix: From Oil To Gas And Coal



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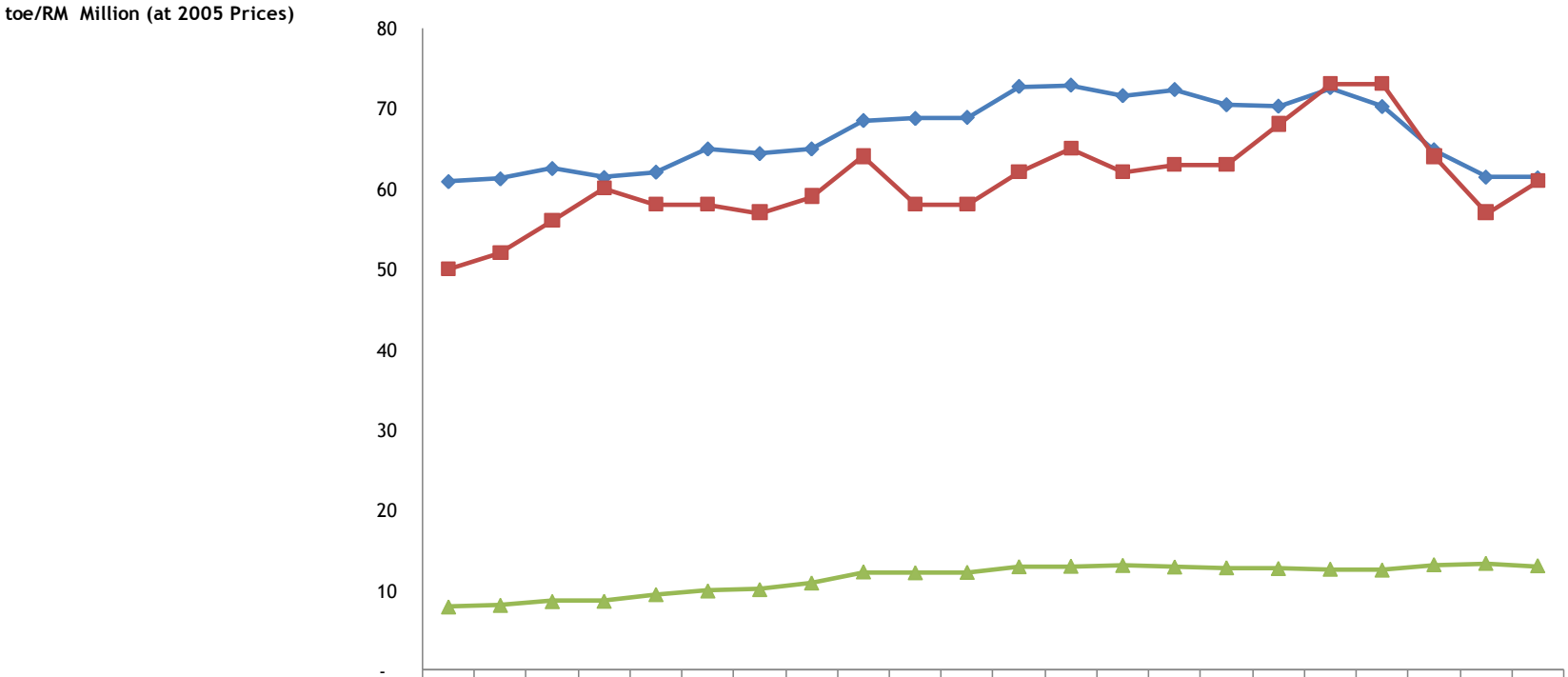
Energy Efficiency (EE) Initiatives (since 1990s)

- Energy efficiency awareness programmes
- Capacity Building in Energy Commission and Key Institutions on EE
- Fiscal Incentives For EE projects
- Malaysian Industrial Energy Efficiency Improvement Programme (MIEEIP)
- Development of EE Standards (MS 1525) and Guidelines
- Energy efficient building demonstration projects and energy audit programme for government buildings
- EE in education curriculum and university courses
- Implementation of EE regulations
- Equipment EE labelling and rebate scheme
- Setting up of institutions with EE roles

Final Energy Intensity



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Final Energy Intensity (toe/RM Million at 2005 Prices)*	61	61	63	61	62	65	64	65	68	69	69	73	73	72	72	70	70	73	70	65	61	61
Industrial Energy Intensity (toe/RM Million at 2005 Prices)**	50	52	56	60	58	58	57	59	64	58	58	62	65	62	63	63	68	73	73	64	57	61
Electricity Intensity (toe/RM Million at 2005 Prices)***	7.9	8.1	8.6	8.6	9.4	9.9	10.1	10.9	12.3	12.2	12.2	12.9	13.0	13.1	12.9	12.8	12.7	12.6	12.5	13.2	13.3	13.0

Notes: Intensity=Quantity of energy required per unit output or activity

*Final Energy Demand/GDP at 2005 prices

**Industrial Energy Demand/Industrial GDP at 2005 prices

***Electricity Demand (toe)/GDP at 2005 prices

Source: Draft - National Energy Balance 2011

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Recent Initiatives for EE

- Establish SMART EE targets and a blueprint to achieve them
- Establish effective and sustainable funding mechanism for EE projects
- Minimize costs and price distortions in energy supply
- Strengthen capacity of industry players and policy makers in EE
- Foster EE culture among Malaysians
- Strengthen and streamline policy as well as legal and institutional framework

Status Of Cogeneration In Malaysia

	Cogen Projects in Operation (MW) *	Planned Cogen Projects (MW) *
Public Licensees	575	433
Private Licensees	511	79
Total	1,135	512

	Installed Capacity (MW)	Max. Demand (MW)
Peninsula	21,869	15,476
Sabah	1,185	830
Sarawak	2,109	1,214
Total	25,163	

* As of 2011 and excluding Sarawak

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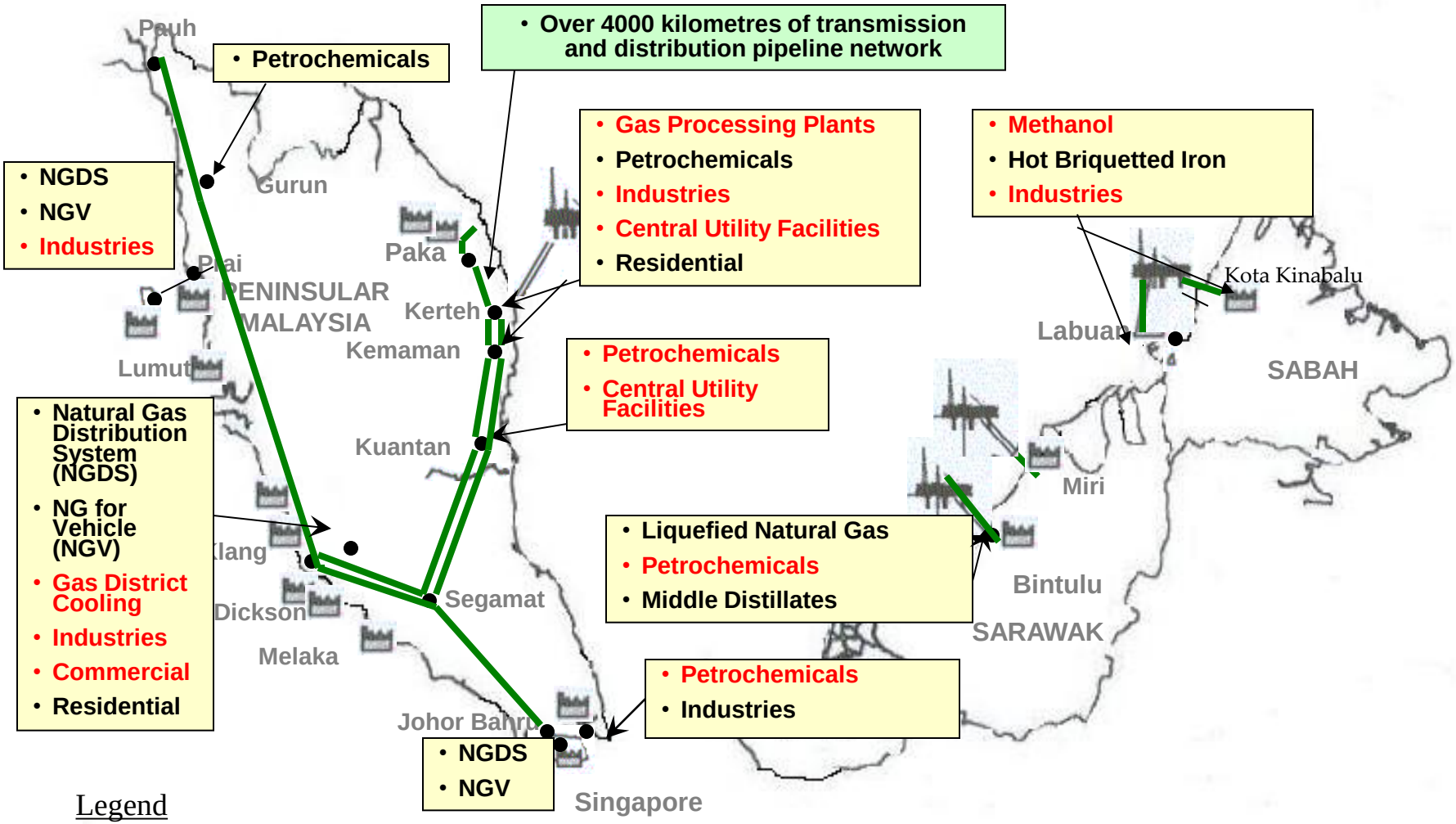
Major Cogeneration Systems Are In The Gas Sector



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Challenges To Cogeneration

- Constraints in natural gas supply for cogeneration
- Relatively low energy prices make cogeneration projects not as attractive
- High reserve margin in centralised electricity supply system
- Low purchase prices of cogeneration power by utilities
- High electricity stand-by charges
- Unattractive fiscal incentives and financing mechanisms to increase viability of cogeneration projects

Policy Measures Needed To Address Cogeneration Challenges

- Establish effective pricing policy for standby and top-up electricity for cogeneration facilities
- Enhance incentives and funding frameworks for cost-effective cogeneration projects
- Address fuel and electricity price distortions
- Ensure adequate and secure fuel supply for cogeneration

Conclusion And Recommendations

- Country recognises the inherent advantages of cogeneration
- Uptake has been relatively slow and policy measures are being put in place to address challenges
- APERC can undertake research to identify effective policies to boost cogeneration in the region
- Possible areas of research:
  - Benchmarking of effective energy pricing and incentive frameworks to promote cogeneration
  - Determination of reduction in externalities cost that can be derived from cogeneration