4th NATIONAL ENERGY FORUM

ENERGY STRUCTURAL FRAMEWORK -UPDATES

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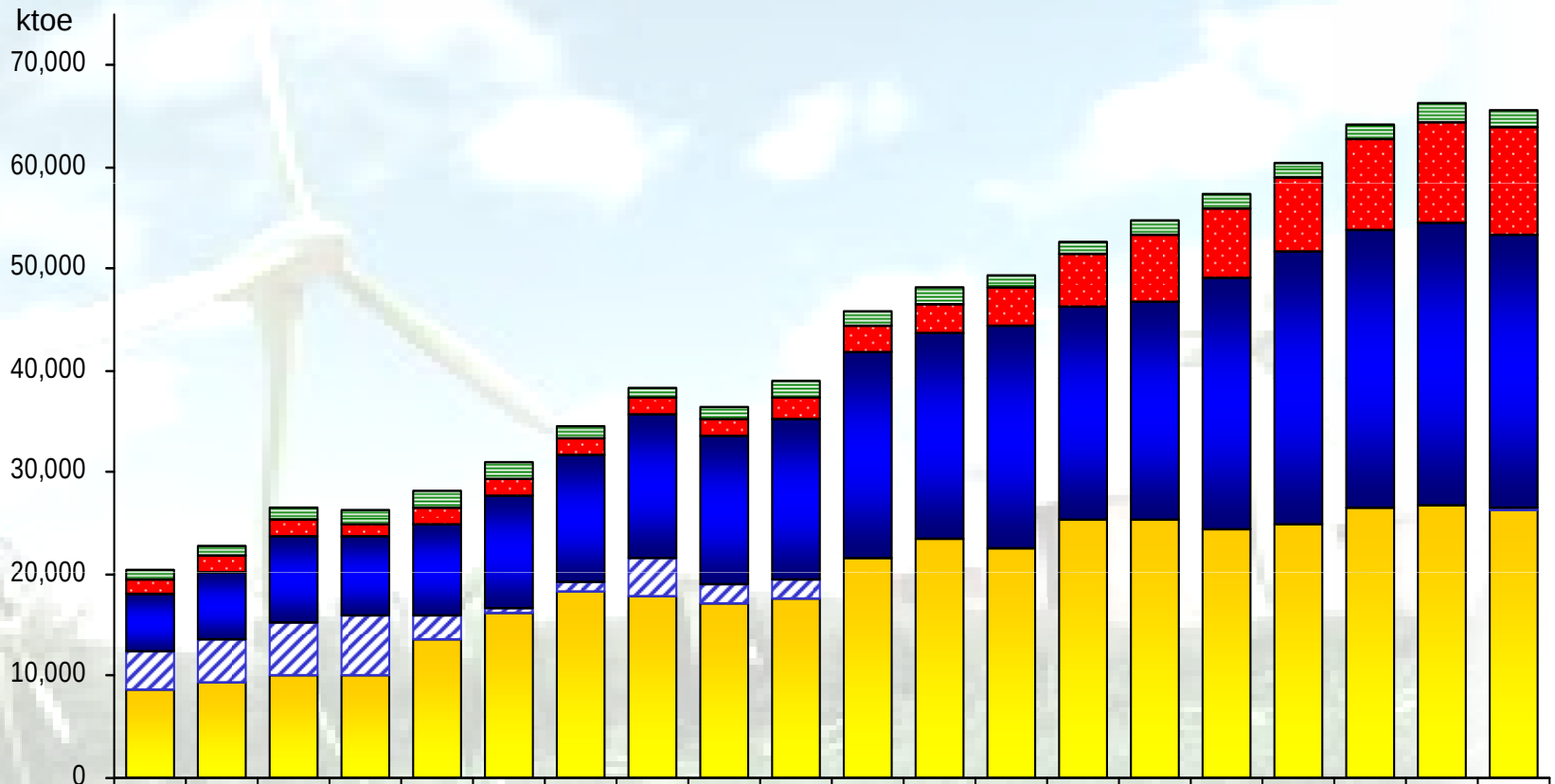
KeTTHA
KEMENTERIAN TENAGA, TEKNOLOGI HIJAU DAN AIR

PRESENTATION OUTLINE

- Ensuring Malaysia's Long Term Energy Security
- Malaysian Electricity Supply Industry Reform
- National Energy Efficiency
  - programme, incentives, way forward
- Renewable Energy
  - Making Green and RE commercially viable & attractive

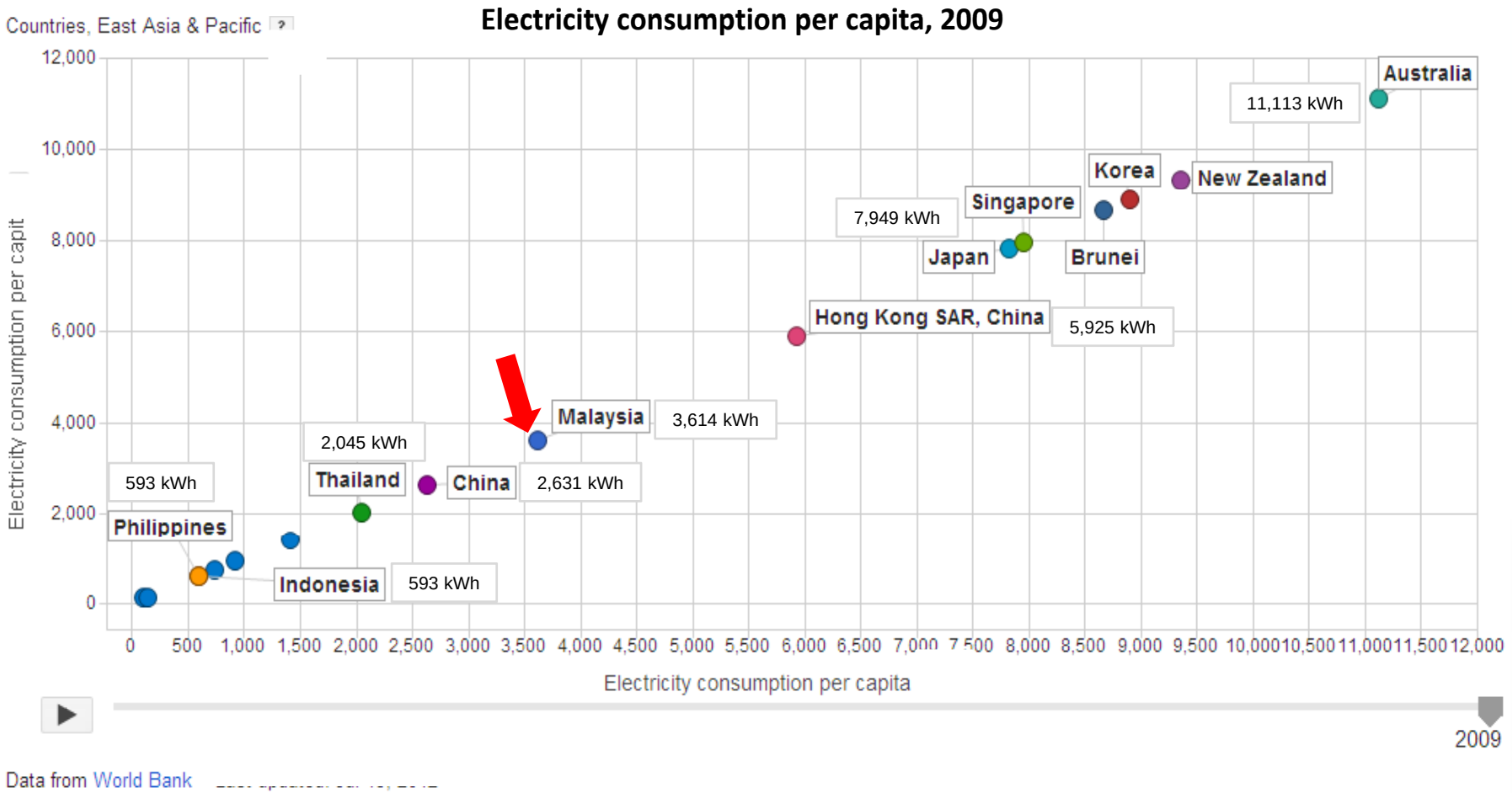
Ensuring Malaysia's Long Term Energy Security

Malaysia's Energy Profile



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Hydropower	915	1,053	997	1,262	1,652	1,540	1,243	790	1,113	1,668	1,560	1,687	1,329	1,056	1,329	1,313	1,568	1,510	1,964	1,627
Coal and Coke	1,326	1,564	1,640	1,352	1,563	1,612	1,677	1,622	1,731	1,940	2,486	2,970	3,642	5,316	6,631	6,889	7,299	8,848	9,782	10,623
Natural Gas*	5,690	6,675	8,545	7,729	8,977	11,064	12,339	14,108	14,549	15,893	20,194	20,032	21,802	20,878	21,409	24,783	26,704	27,362	27,800	26,960
Petroleum Products & Others	3,651	4,165	5,100	5,814	2,446	610	1,099	3,802	1,920	1,807	(1,431)	(1,917)	(521)	(1,391)	(37)	(75)	(1,474)	(995)	(2,282)	96
Crude Oil	8,783	9,443	10,175	10,135	13,605	16,159	18,255	17,916	17,133	17,643	21,673	23,590	22,647	25,344	25,335	24,339	24,909	26,571	26,776	26,386

High-income Economy: Increasing Electricity Demand



The country requires a fuel mix policy that would ensure long-term security of fuel supply

Managing Fuel Mix and Fuel Supply Security

To ensure an **efficient, secure** and **environmentally sustainable** supply of energy

–Malaysia National Energy Policy 1979

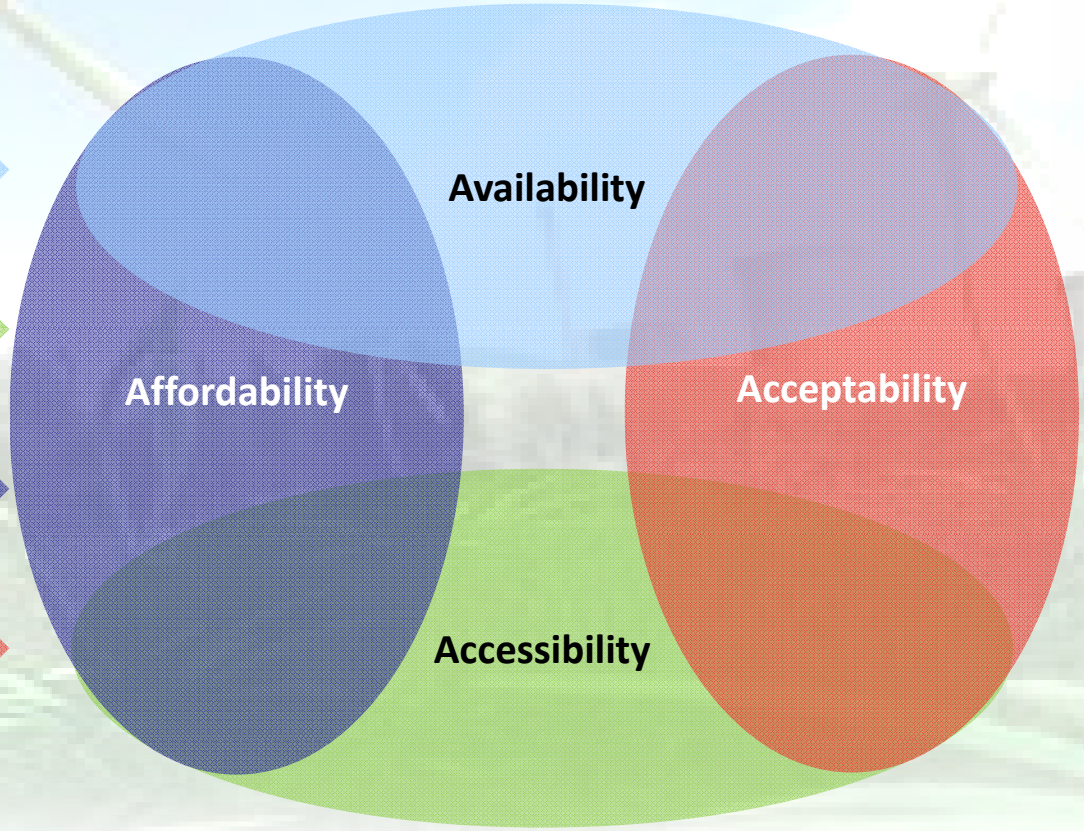
Four dimensions of energy security

Availability: resources and infrastructure

Accessibility: barriers and constraints (fuel and supplier diversity)

Affordability: cost to users, and risk to the economy (reliance)

Acceptability: environmental, social objectives



Efforts in Ensuring Energy Security - Long Term Plan

Gas

- Review Gas Supply Agreements
- Enhance supply through Regasification Terminals in Melaka & Johor
- Open Access to Peninsular Gas Network and determination of gas transportation charges
- Study on possibilities of having Oil Stockpiling facilities

Coal

- Diversifying coal supplier countries to ensure the security of coal supply - Australia, Russia, South Africa, etc
- Explore possibilities of mine ownership in supplier countries
- Encourage the usage of latest technology for higher efficiency i.e supercritical boiler etc.
- Constant review on coal storage requirement

Efforts in Ensuring Energy Security - Long Term Plan

Hydro Power from Sarawak

- Power importation from Sarawak as a long term option since Sarawak has hydro power potential of more than 20,000MW

Regional and Bilateral Arrangements

ASEAN Power Grid (APG)

- Establish Electricity Open Market among ASEAN countries for resource optimization. Expected to be fully completed by 2020

Trans-ASEAN Gas Pipeline (TAGP)

- Gas exports among ASEAN countries for gas usage optimization

Bilateral Agreement

- Conduct a bilateral agreement with neighbouring countries such as Singapore, Thailand and Indonesia for power import/export

- On going process

Malaysian Electricity Supply Industry Reform

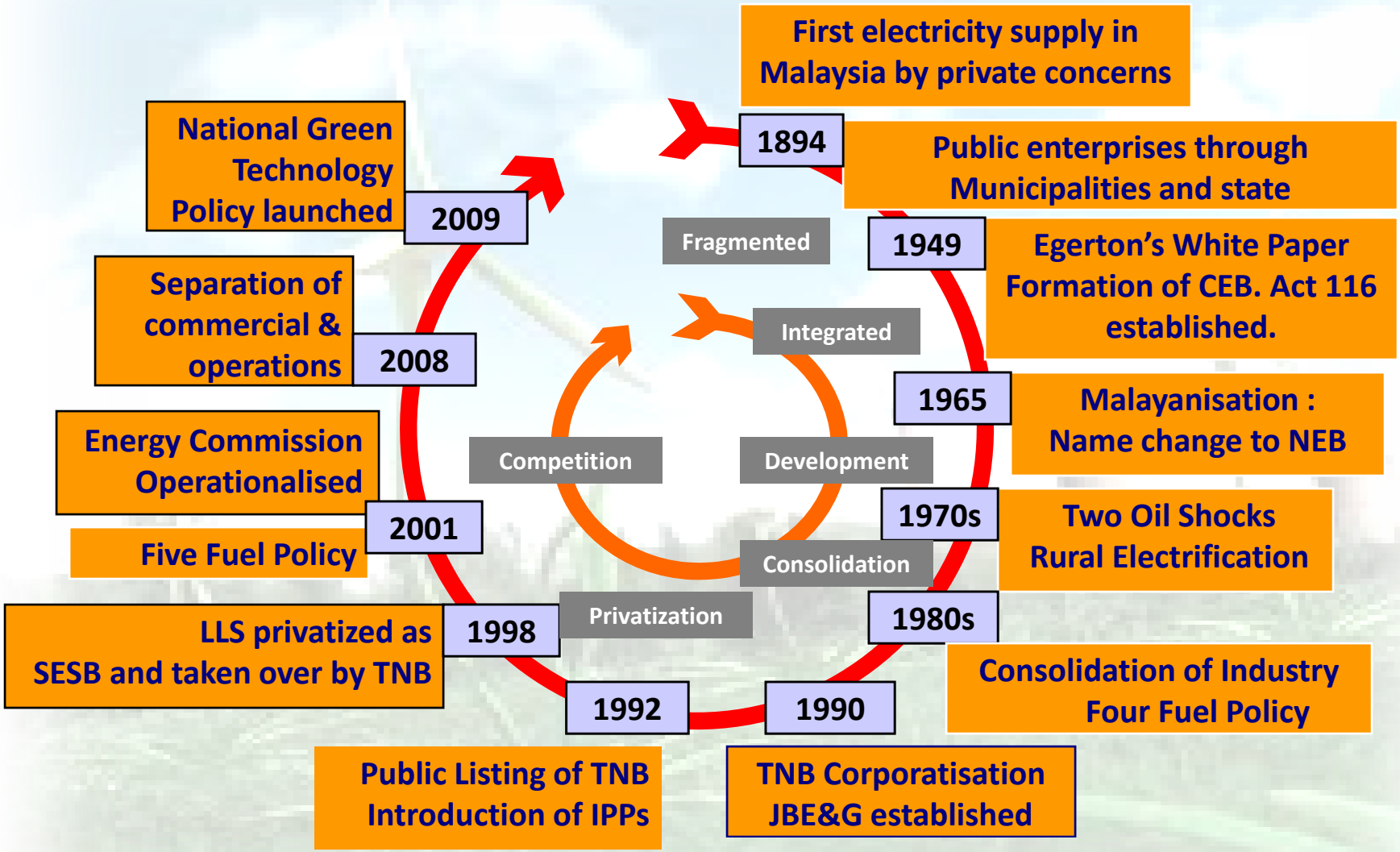
Snapshot on Malaysia Electricity Supply Industry (MESI)

As of June 2012	INSTALLED CAPACITY (MW)		PEAK DEMAND (MW)	RESERVE MARGIN (%)
Pen. Malaysia	TNB	7,096	15,872	39%
	IPPs	14,777		
	Total	21,873		
Sabah	SESB	410	843	23%
	IPPs	625		
	Total	1,035		
Sarawak	SEB	1,349	1,067	26%
	Total	1,349		

Total installed capacity is **24,257MW**

3 major utility companies in Malaysia

Evolution of MESI in Peninsular Malaysia and Sabah



Transforming the MESI

Status quo

UNDER-PERFORMING MESI

- High cost (i.e. PPAs, reserve margins)
- Lack transparency
- Fragmented governance

UNSUSTAINABLE TARIFFS AND FUEL

- Fuel supply risks (load shedding a real risk)
- Subsidized tariffs equivalent to ~10-15sen/kwh or RM8b - RM12b/year

ENERGY INEFFICIENT ECONOMY

- Attract industries that competes based on subsidized energy

Expected outcomes of transformation

Performance driven

- Regionally competitive on cost and service quality
- Increased transparency and efficiency
- Streamlined and credible governance

People first

- Long term supply security and quality
- Gradual transition to sustainable tariff and reduce subsidy bill
- Sustainable tariff support for the poor

Congruence in policies for Energy Efficiency and Conservation, Green Technologies and Innovation

- Efficient use of Energy
- Flexibility to support 'Renewable Energy' in a sustainable manner
- Align with New Economic Model

Expectations of Stakeholder Groups

Efficiency

- Expect **higher efficiency**

Tariff Setting Mechanism

- A **commonly agreed** tariff setting mechanism to be established

Transparency

- **Load dispatch process**
- Currently managed by TNB

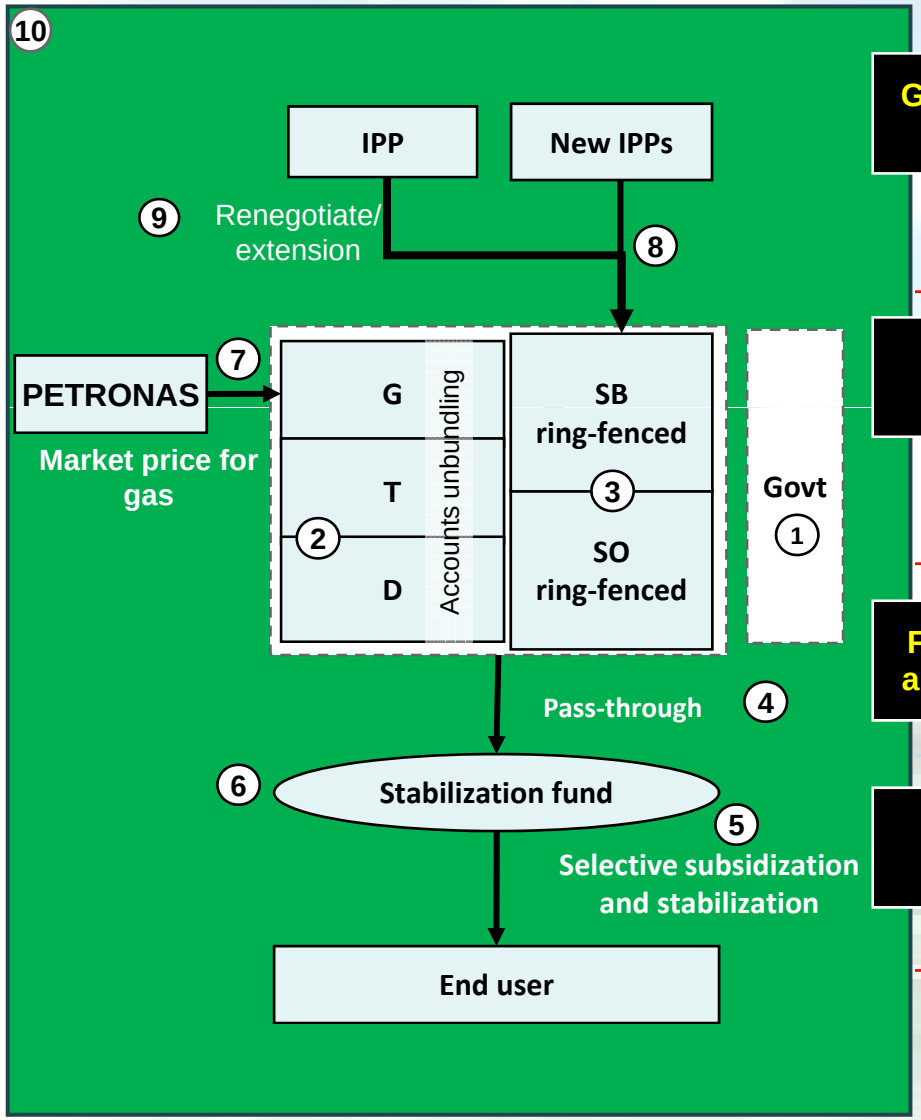
Fuel

- No **fuel cost pass-through**; thus higher fuel subsidies
- Need to address **long term fuel supply and security**

Customer Choice

- Desire for **options**

The MESI Transformation Package



Governance/ Policy

1. Agency Roles
2. Accounts Unbundling
3. Ring-fence Single Buyer and System Operations

Tariff

4. Value Chain (G/T/D) Tariff
5. End-user Tariff
6. Stabilization Fund

Fuel Supply and Security

7. Fuel Mix Policy

Market Structure

8. Competitive Bidding
9. PPA Renegotiation

10. **Ensure all the packages are executed for a balanced outcome**

Competitive bidding to ensure least cost

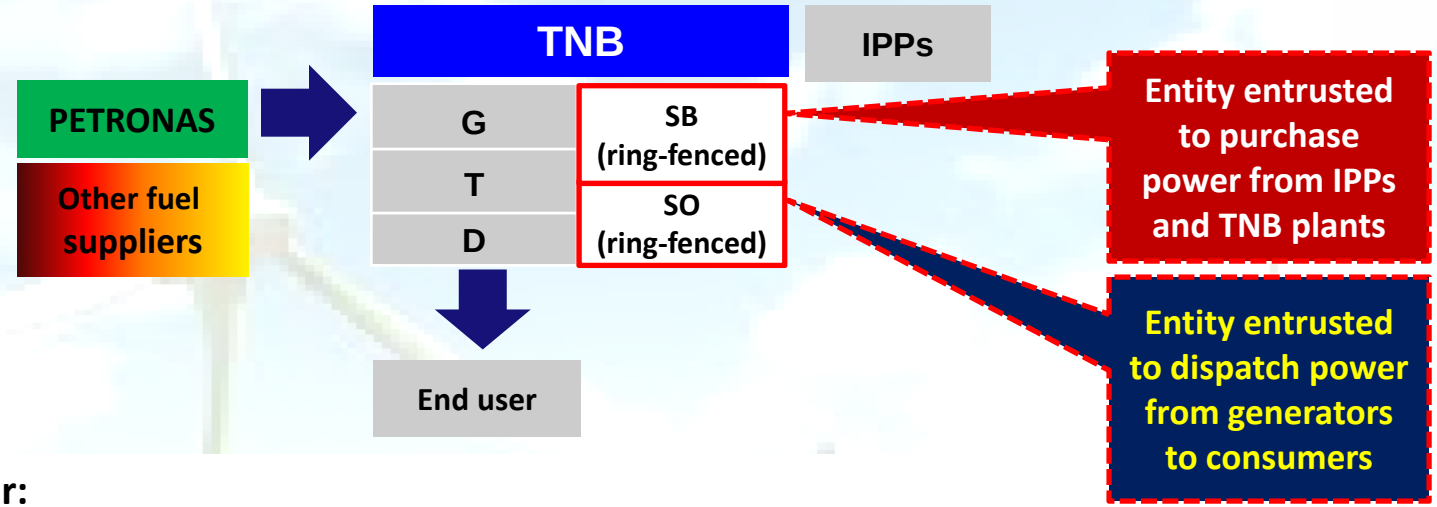
Several negotiations between the 1st Gen IPPs and the Government were held and concluded that a **competitive bidding** exercise will produce a **least cost option** to the system

All new capacity requirements shall be procured via a **competitive bidding** process to be **conducted by Suruhanjaya Tenaga**.

Through **open bidding**, it seems that the government has finally got what it has always wanted for the power sector that earlier on had seemed impossible.

The Edge Malaysia, 20 August 2012

Ring-Fenced Single Buyer (SB) and System Operator (SO)



– **Single Buyer:**
  - Strengthen the planning process, increasing transparency of scheduling and dispatch, power purchase settlements
  - Establish of arms-length relationships for power purchase agreements
  - Clear separation of functions between SO and SB

– **System Operator:**
  - Increase transparency of dispatch to enable compliance audits by regulators
  - Increase stakeholder confidence that dispatch will be at optimum cost to system
  - With transparent least cost operations, automated cost pass-through is less controversial

The operation and functions of the SB & SO will be governed by a set of well defined rules and guidelines – supervised by Suruhanjaya Tenaga

Incentive Based Regulation (IBR)

Current

- General cost recovery system
- Lacks scrutiny on regulated / unregulated functions and cost elements

Incentive Based Regulation (IBR)

- Approved regulatory cost elements
- Key Performance Indicators (KPI)

Future

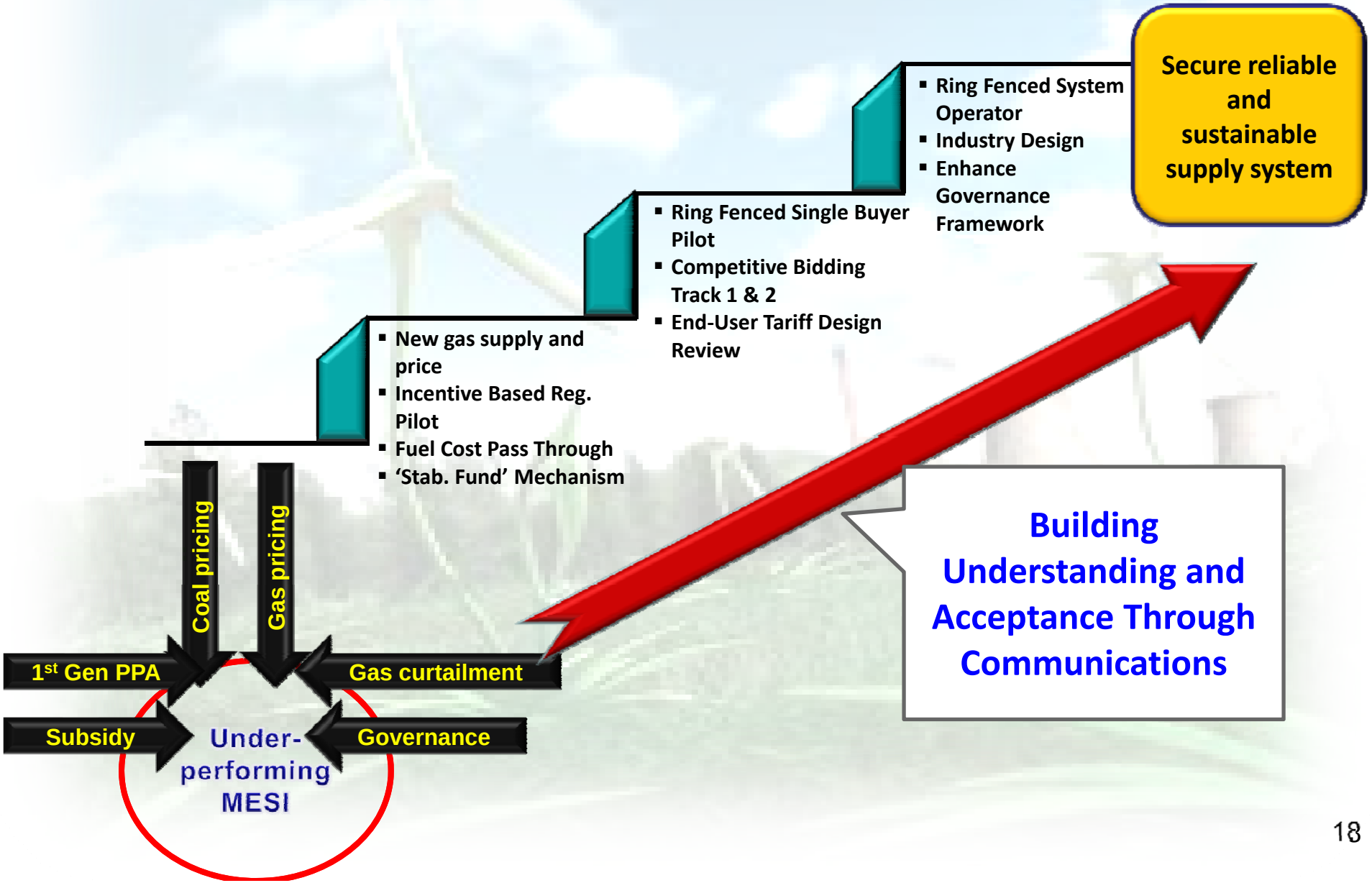
Target implementation in 2014

- Specified regulatory cost recovery procedures
- Reward based on KPI performance

Transparent and efficient G/T/D cost elements to be incorporated in future customer bill.

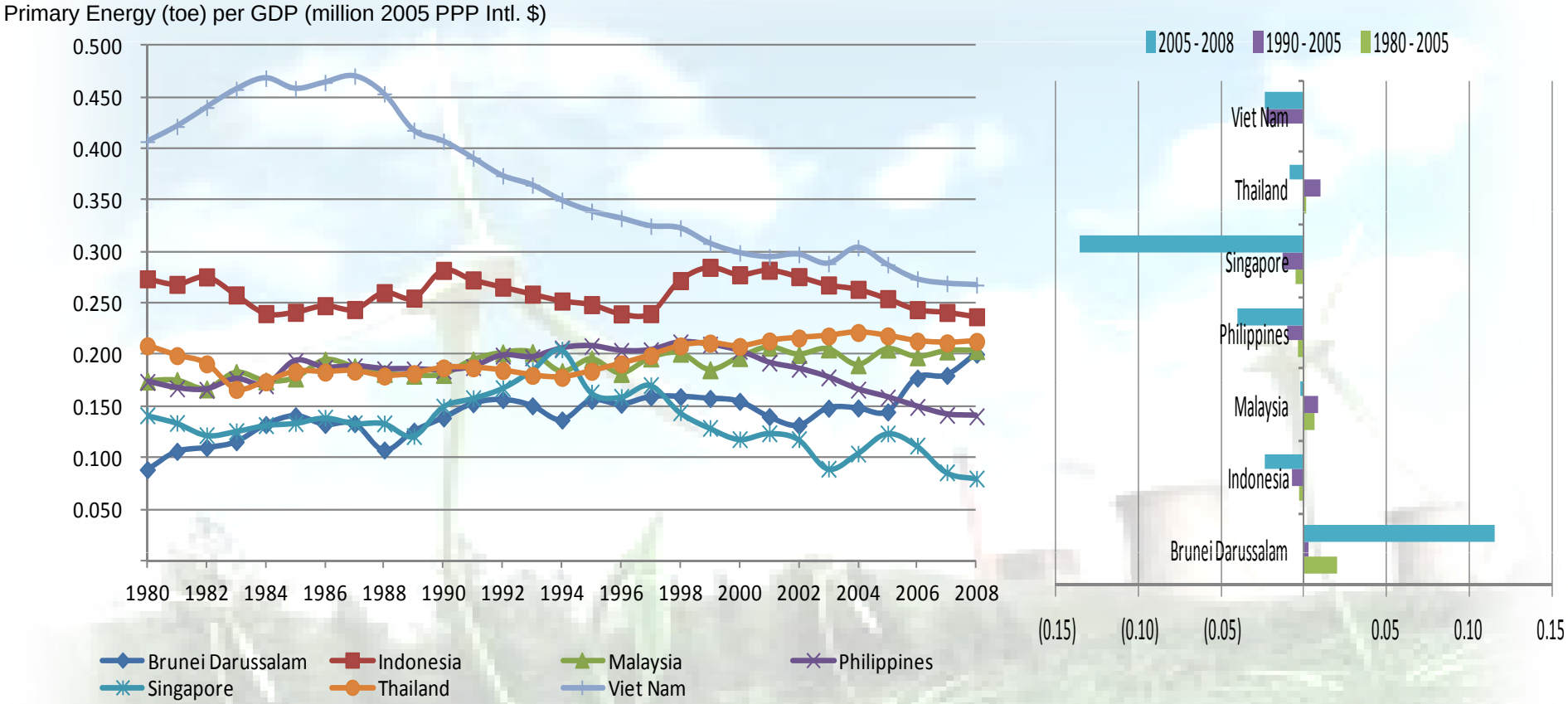
MESI Transformation / Expected outcome

MESI Reform:
Preparing for growth and direction for transformation



ENERGY EFFICIENCY

Indication on Energy Use vs Economic Output

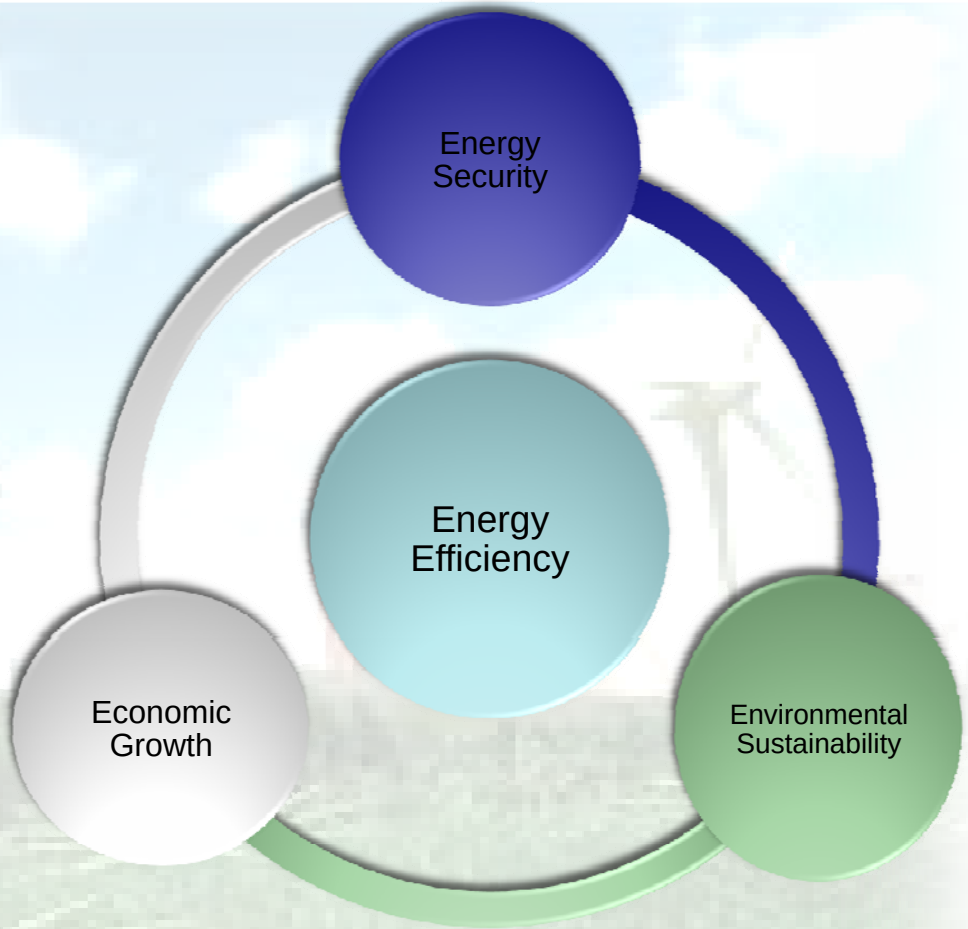


-In 2008, Malaysia's energy intensity (EI) value was 0.204 toe/million 2005 PPP Intl.$. The value had positioned Malaysia in the 4th rank among seven ASEAN countries.

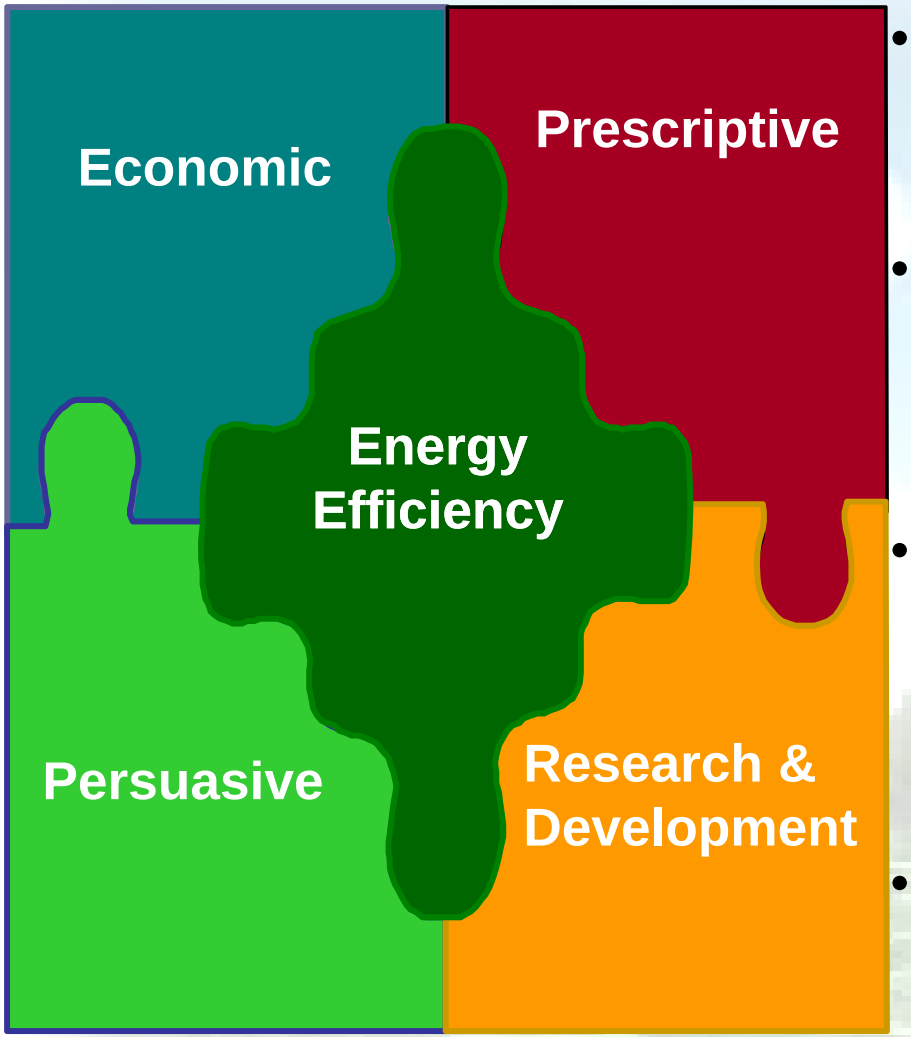
- From 1980 to 2005, Malaysia's EI was growing at an average rate of 0.7% annually but from 2005 to 2008 the value was declining at an average rate of 0.23% annually. The major reason for the decline was the global economic crisis.

Energy Efficiency (EE) Role in Energy Policy

- Energy Efficiency offers solution on issues related to energy supply and use
- Energy efficiency enhances energy supply security, promotes economic growth and mitigate environmental issues related to energy-use
- Energy efficiency has a prominent role in Malaysia's energy policy framework.



EE Policy Approach



- **Economic measures –** energy pricing structure, tax, fiscal incentives and etc)
- ***Prescriptive measures***- technical standards, building codes, emission limitations or MEPS (minimum energy performance standards), etc
- ***Persuasive measures*** - dissemination of information and awareness to create a voluntary behavioural shift among the target audience
- ***Research and development*** - to commercialise new energy efficiency technologies and initiatives

EE in the Tenth Malaysia Plan (2011-2015)

Sector	Highlight Initiatives
Residential	• Phasing out of incandescent light bulbs by 2014 to reduce carbon dioxide emissions by an estimated 732,000 tonnes and reducing energy usage by 1,074 gigawatts a year • Increasing energy performance labelling from four (air conditioner, refrigerator, television and fan) to ten electrical appliances (six additional appliances - rice cooker, electric kettle, washing machine, microwave, clothes dryer and dishwasher). Labelling appliances enables consumers to make informed decisions as they purchase energy efficient products
Industrial	• Increasing the use of energy efficient machineries and equipment such as high efficiency motors, pumps and variable speed drive controls • Introduction of Minimum Energy Performance Standards for selected appliances to restrict the manufacture, import and sale of inefficient appliances to consumers
Building	• Revision of the Uniform Building By-Laws to incorporate the Malaysian Standard: Code of Practice on Energy Efficiency and Renewable Energy for Non-Residential Buildings (MS1525). This allows for integration of renewable energy systems and energy saving features in buildings • Wider adoption of the Green Building Index (GBI) to benchmark energy consumption in new and existing buildings • Increasing the use of thermal insulation for roofs in air conditioned buildings to save energy

➢ The EE initiatives are targeted to produce a cumulative energy saving of 4,000 ktoe by 2015.

Other EE Programs

Other EE programs being implemented include:

- Showcase and demonstration of energy efficient buildings;
- Efficient management of building energy use;
- Development of energy services companies; and
- Development of standards and labeling for electrical appliances; and
- SAVE rebate program .

The National Energy Efficiency Master Plan (NEEMP)

- The NEEMP was developed from an energy model.
- The Plan covers EE programs for 10 years with specific goals.
- The Plan will put forth strategies to overcome the barriers that impeding EE improvement.

Strategic Action Plans

Phase 1		Phase 2		
No Cost Measures		Cost Measures		
Energy Management System	Energy-Efficient Practices	Industrial	Building	Equipment/Appliances
-Energy Management Policy - Internal Energy Management Committee	-Switch off -Temperature setting (24 ^{0}C) - Day lighting	- Energy Audits - Energy Management - Cogeneration	- Energy Audits (EPC) - Energy Management - Building Design (MS1525)	- MEPS -Labeling

EE Incentives

- Pioneer Status (PS) **with tax exemption of 100% of statutory income for 10 years;** or
- Investment Tax Allowance (ITA) of 100% on qualifying capital expenditure incurred within a period of 5 years to be utilised against 100% of the statutory income for each year of assessment.
- The incentives are valid until **31 December, 2015**
- Exemption on import duty and sales tax on energy efficient equipments and appliances including locally produced insulation materials.
- The exemptions are valid until **31 December 2012**

RENEWABLE ENERGY

Renewables: Making RE commercially available and attractive in Malaysia

Renewable Energy (RE)

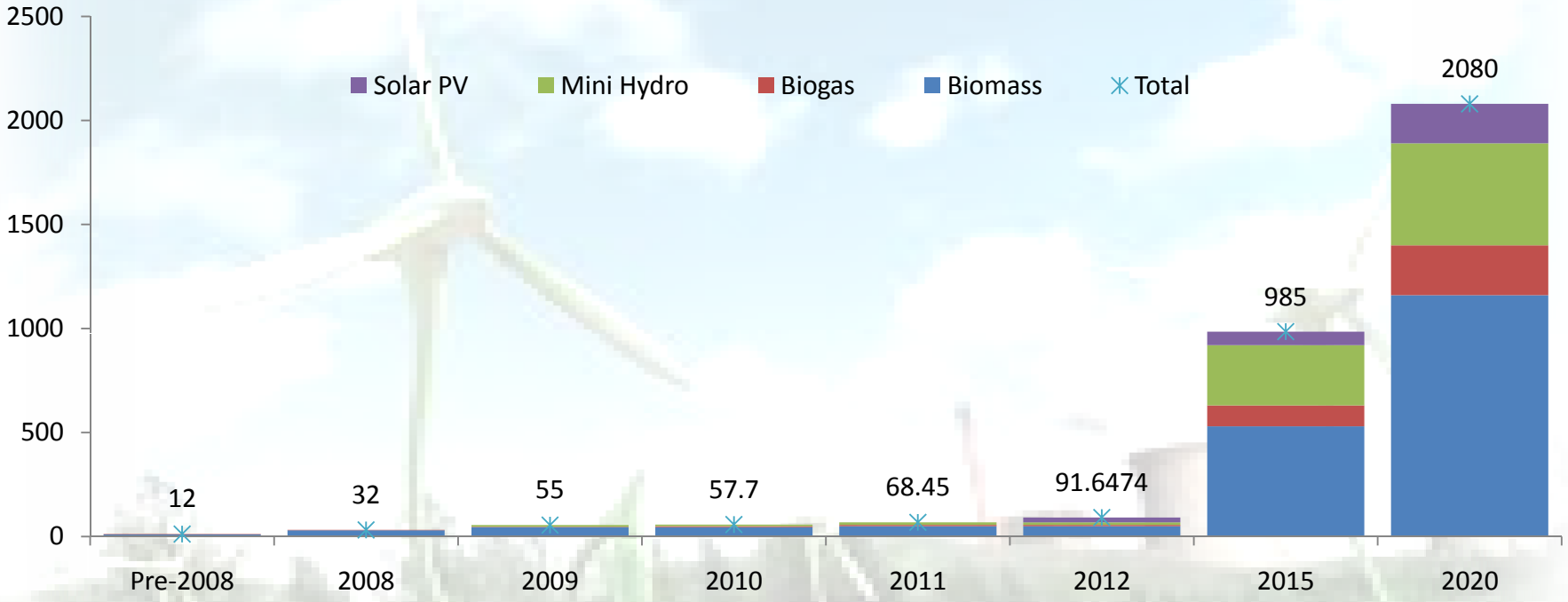
- Current installed capacity – 91.45 MW
- Many RE technologies are already commercially viable:
  - Hydro
  - Biomass
  - Biogas (landfill)
  - Solar Photovoltaics
- There are other RE technologies that are yet to become commercially viable and resource dependent such as:
  - Ocean Thermal Energy Conversion (OTEC)
  - Tidal;
  - Wind;
  - Geothermal; etc

Renewables: Making RE commercially available and attractive in Malaysia

- **The Renewable Energy Policy and Action Plan (REPAP) – 2 April 2010**
  - Introduced in to address existing barriers
  - Price-support mechanism: feed-in tariff (FiT) – 1 December 2011
  - Enforcement of the RE Act 2011 – 1 December 2011

- **Comprehensive action plan to spur the growth of RE industry**
  - Thrust 1 - Introduce Legal and Regulatory Framework
  - Thrust 2 - Provide Conducive Business Environment for RE
  - Thrust 3 - Intensify Human Capital Development
  - Thrust 4 - Enhance RE Research and Development
  - Thrust 5 - Create Public Awareness & RE Policy Advocacy Programms

Renewable Energy Contribution Targets



Biomass	10	30	45	45	50	50	530	1160
Biogas	2	2	2	4.7	5.95	5.95	100	240
Mini Hydro	0	0	8	8	12.5	12.5	290	490
Solar PV	0	0	0	0	0	23.1974	65	190
Total	**12**	**32**	**55**	**57.7**	**68.45**	**91.6474**	**985**	**2080**

Renewable Energy Contribution Targets

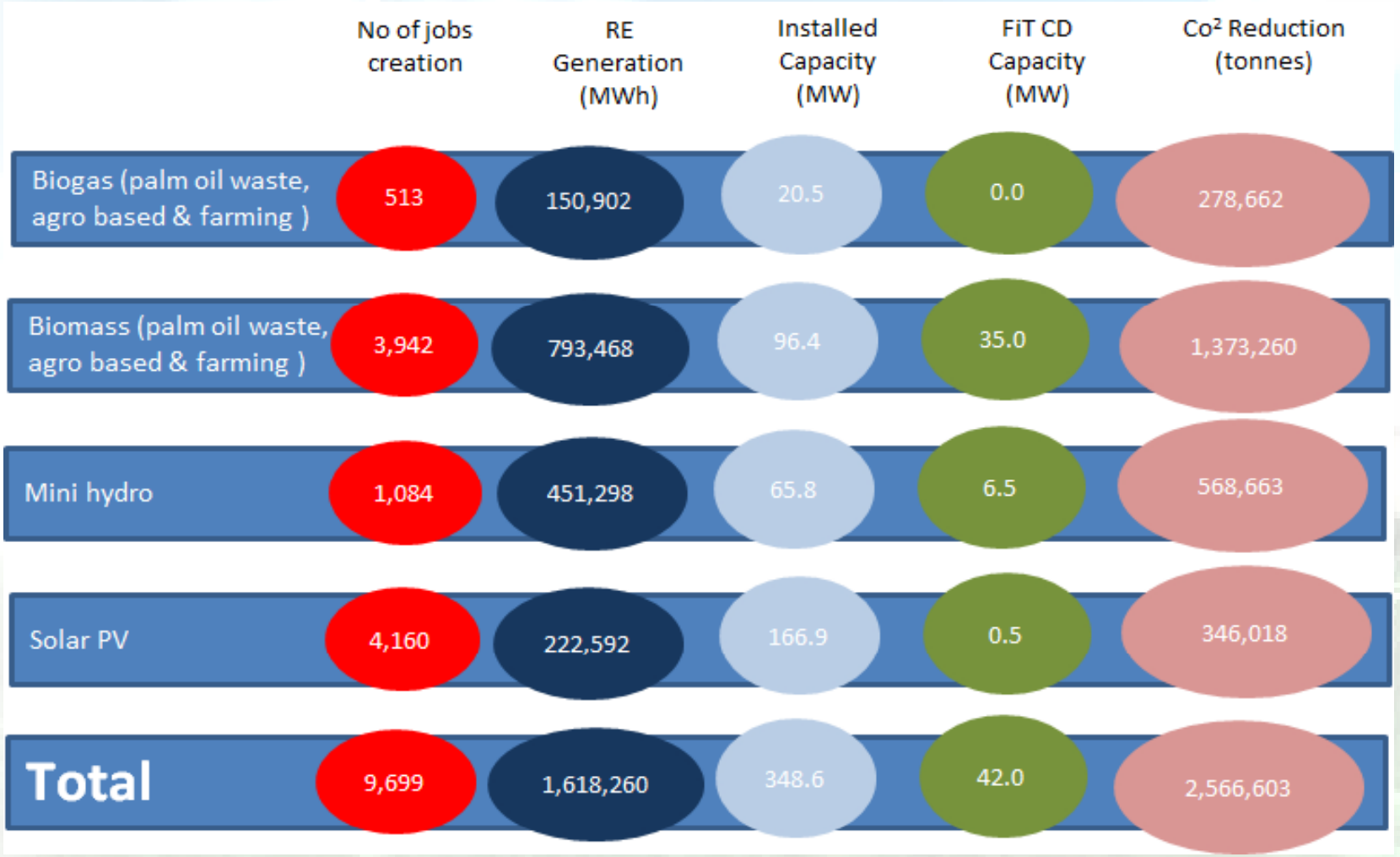
No.	Renewable Energy Resource	Applications	Capacity (MW)	Percentage (%) from total capacity
1	Biogas	13	20.53	6%
2	Biomass	10	96.40	28%
3	Mini Hydro	11	65.75	19%
4	Solar PV	408	165.89	47%
	Total	442	348.57	100%

Application for RE projects approved to date August 31, 2012

Renewable Energy Quota

	Available MW installed capacity for FiT Applications		Allocated MW installed capacity	
	H1	H2	H1	H2
Biogas	N/A	4.41	0.00	5.48
Biogas (Landfill/Sewage)	N/A	0.88	4.66	3.70
Biomass	N/A	5.58	32.00	37.90
Biomass (Solid Waste)	N/A	0.00	8.90	0.00
Small Hydro	N/A	0.00	12.50	3.20
Individual	N/A	2.60	3.73	3.95
Non-individual (≤ 500kW)	N/A	0.00	1.28	1.24
Non-individual (> 500kW)	N/A	0.00	30.78	30.24
Housing Developer	N/A	0.00	0.00	0.00

CO2 Reduction



	No of jobs creation	RE Generation (MWh)	Installed Capacity (MW)	FiT CD Capacity (MW)	Co^2 Reduction (tonnes)
Biogas (palm oil waste, agro based & farming)	513	150,902	20.5	0.0	278,662
Biomass (palm oil waste, agro based & farming)	3,942	793,468	96.4	35.0	1,373,260
Mini hydro	1,084	451,298	65.8	6.5	568,663
Solar PV	4,160	222,592	166.9	0.5	346,018
Total	9,699	1,618,260	348.6	42.0	2,566,603

Estimates of jobs and the reduction of carbon dioxide emissions through the tariff mechanism encouragement until H1 2014

Conclusion

❑ Long term energy security & MESI Reform

- The transformation of MESI is **imperative** in order to develop a **reliable, transparent, efficient** and **sustainable supply system** to benefit the *'Rakyat',* industry and the economy.
- **Continual transformation efforts** with desirable outcomes are being planned for implementation over the next 5 years to support the growing economy and Government's long term energy security plans
- Ensure sustainable evolution of industry to be efficient, **more market oriented**, and due consideration for targeted segments.
- **Enhance fuel diversification** to reduce overdependence on certain types of fuel as well as reduce supply interruption risk and security risk. Nuclear is a good candidate for reliability; but the risks have to be properly studied
- **Comprehensive long term planning** is imperative to ensure reliable & adequate electricity supply, including APG and Trans ASEAN for supply security

Conclusion

❑ National Energy Efficiency

- Implementation of EE policy with clear strategies and action plan
- Development of specific goals for strategies and action plans
- Establishment of monitoring mechanism with indicators

❑ Renewable Energy

- Need to address the various barriers that exist:
  - Market;
  - Legal & Regulatory framework;
  - Institutional framework;
  - Financial barrier
- Development of clear & specific policy measures and tools to address the barriers


THANK YOU