Issues of Concern to the General Public Relating to Electricity Supply Sector (FAQs)

19 December 2013

1. IS OUR GENERATION RESERVE MARGIN TOO HIGH?

The amount of reserve depends on number of factors and tradeoffs

- size of the utility system
- size of the generating unit
- forced outage rate
- maintenance schedule and other scheduled outage
- expected capacity in the area
- transmission constraint
- availability of fuel supply
- load shapes
- cost

Peninsular Reserve Margin Requirement

- Size of system
  Total generation capacity installed: 21,749 MW (2013)
  Maximum Demand: 16,562 MW (2013)

- Spinning reserve - largest unit in the system
  700 MW + 200 MW (REGULATING CAPACITY)

- Maintenance outages : Estimated = 1400 MW

Operating Reserve

- Variability in hydro output : 1300 MW (average annual CF 35%)

Based on the above assumptions, a minimum reserve margin of 25% would be required.

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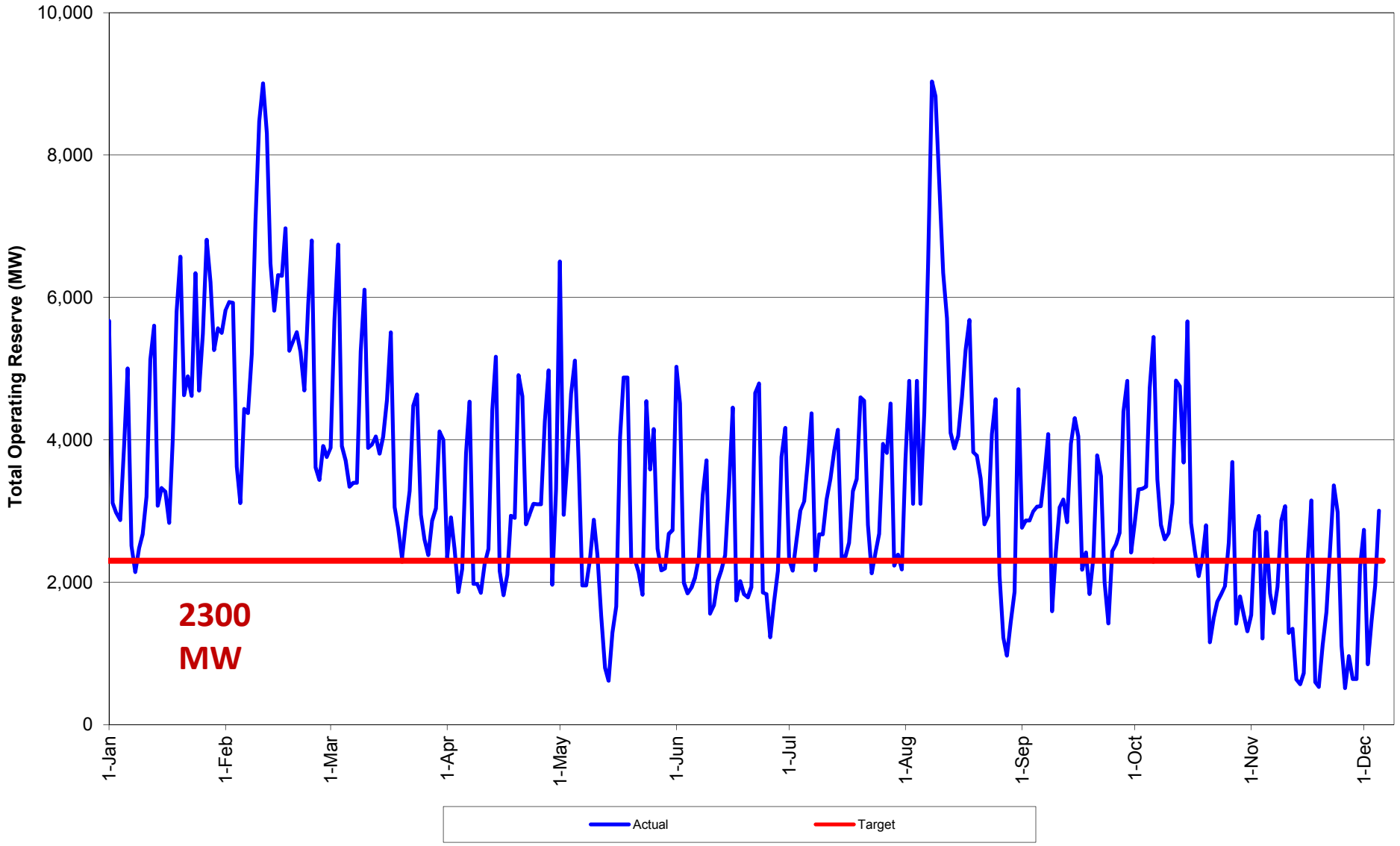
Actual Operating Reserve for 2013



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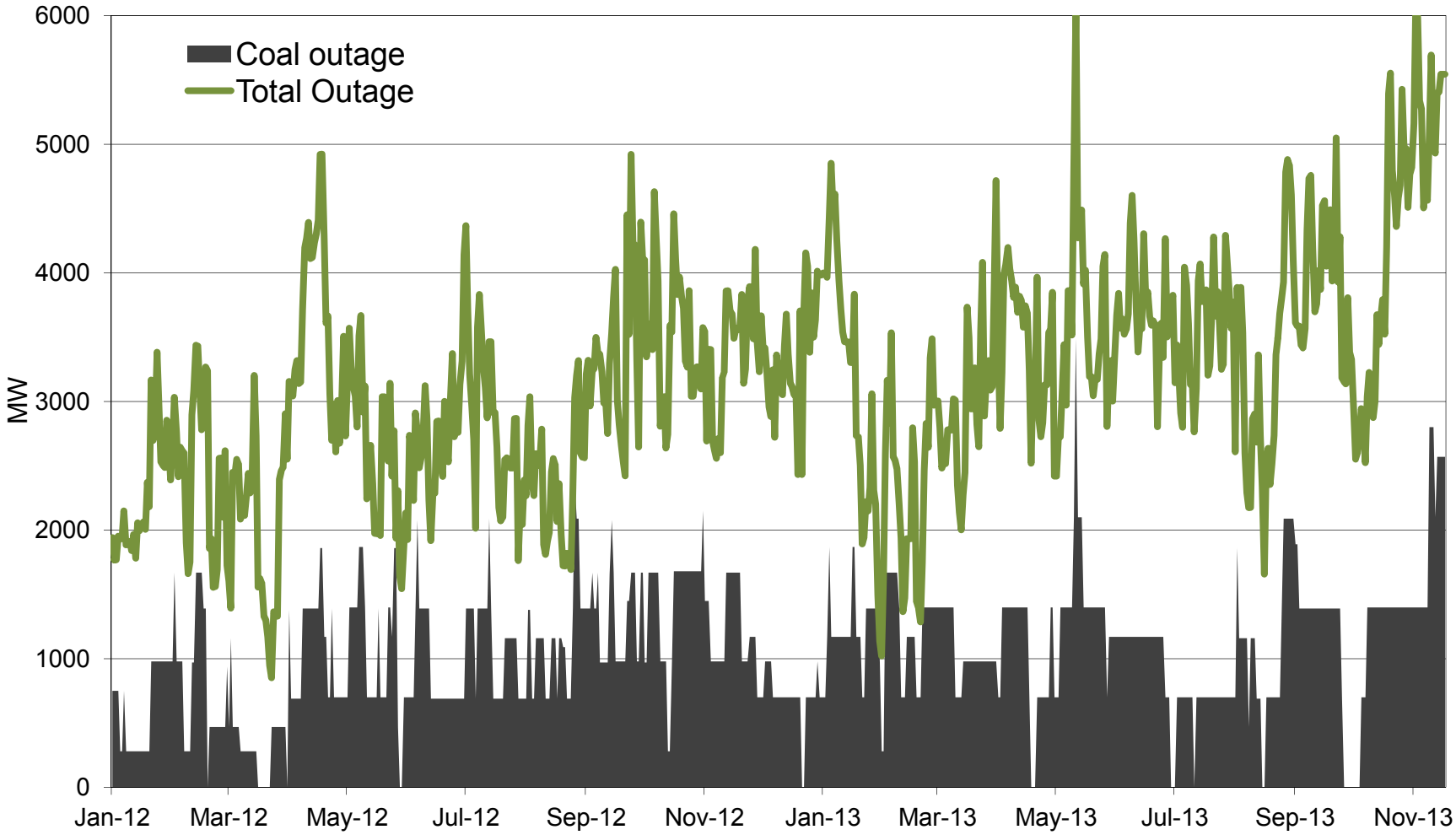
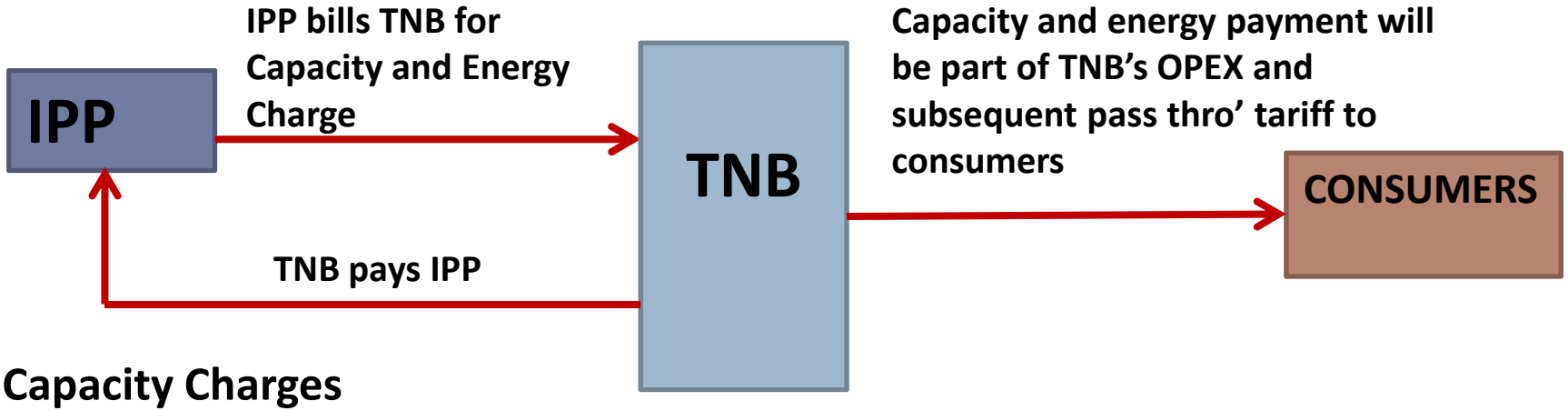
Actual Generator Outages 2013 (Planned and Forced)



2. ARE IPPs ENJOYING GAS SUBSIDIES?

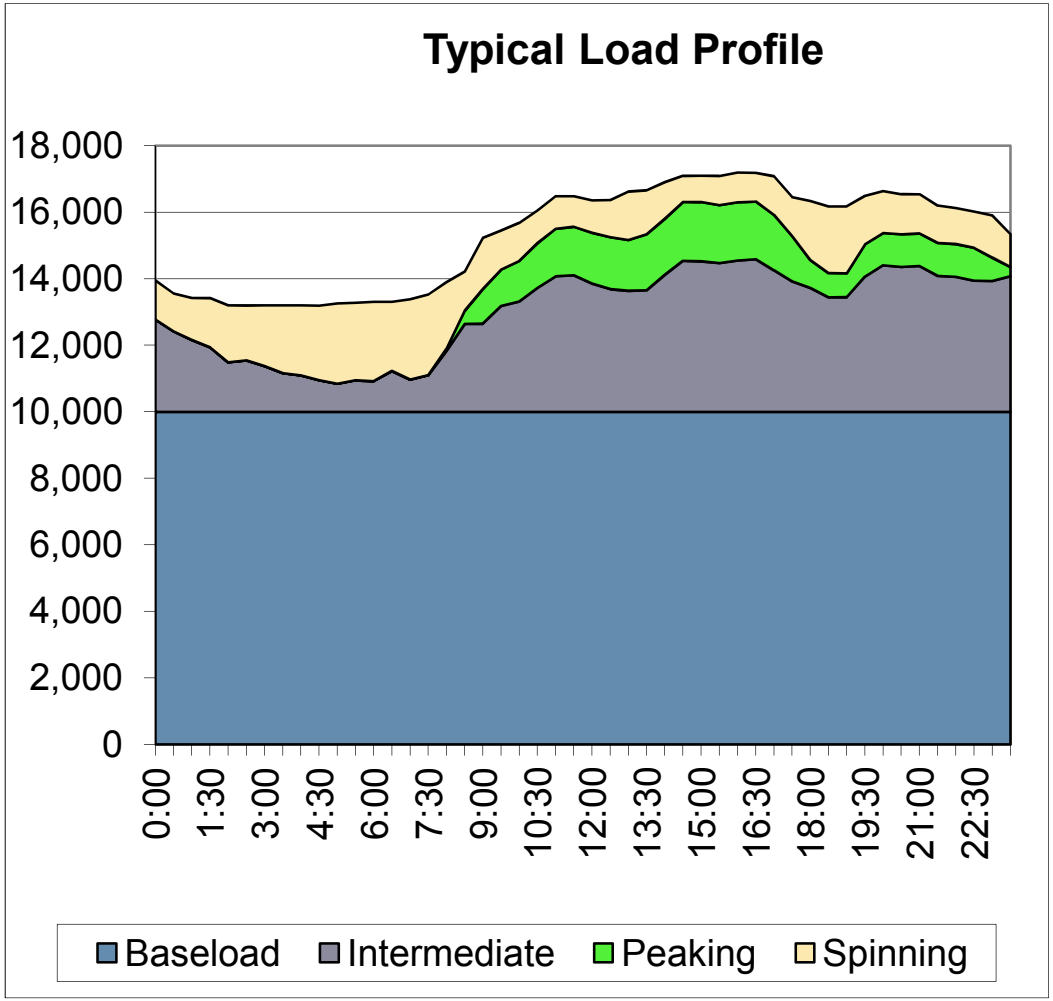


- **Capacity Charges**
  - CRF: to cover development cost, investment cost, principal (loan) & interest payments and return to shareholders
  - FOR: to cover fixed cost such as overhead, License fee, insurance, property tax, quit rent, building maintenance, O&M Operator fee
- **Energy Charges**
  - Fuel: to cover fuels
  - VOR: to cover plant maintenance cost such as spares, services and repairs

$$\text{Energy Charge} = \left(\frac{\textbf{Fuel Price} \times HR \times NEO}{1{,}000{,}000}\right) + (VOR \times NEO)$$

3. WHY DO WE STILL EXTEND 2 FIRST GEN IPPs RATHER THAN BUILD NEW PLANT?

- Duty of less efficient plants as intermediate plant in the whole system
  - Short time usage in the overall system
- Extension is based on overall system security considerations rather than economic consideration alone
  - Capacity already available
  - Mitigation of completion risks of new plants (7092 MW)and lines
    - Manjung 4 (2015)
    - CBPS Repowering (2015)
    - Hulu Terangganu (2015)
    - Ulu Jelai (2016)
    - TNB Prai (2016)
    - TG Bin Energy (2016)
    - Track 3A (2017)
    - Track 3B 2018/2019



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Contribution of IPPs to the Industry

- Windfall Tax at 30% from IPPs Return on Asset in 2008, under Windfall Profit Levy Act 1998
  - **RM483 million collected**

- Gas Billing Mechanism beginning Mac 2011
  - To resolve the unintended gains by IPPs through heat rate efficiency
  - As of Oct 2013, the savings is **RM104.34 million**
  - The savings is transferred to government consolidated fund

- Savings from renegotiation of 1st generation IPPs beginning Mac 2013
  - **RM1.76 billion over the next 4 years** will be collected

- Contribution to the Malaysian Electricity Supply Industries Trust Account (MESITA)
  - Contribution is voluntary and they contribute one percent (1%) of their electricity sale
  - As of year 2013, contribution from IPPs **since 1997 is RM1.12 billion**

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4. TNB RECORDED BILLION OF PROFIT, WHY INCREASE TARIFF?

Where's the profit goes?

TNB registered RM4.14 Billion Profit in FY2013 (RM Million)

Profit Attributable to Shareholders:		4,137
i) To pay dividend to Shareholders	1,390	
ii) Retained in the business for future growth	2,747	

INVESTMENT IN INFRASTRUCTURE FOR FUTURE GROWTH


Generation Plant


Transmission


Distribution


Administration

8,457

SOURCES OF FUNDING FOR FUTURE GROWTH

Internal Funding:		
Retained Profit	2,747	
Net other sources	1,411	8,457
External Funding - Borrowing	4,299	

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5. LOWER ELECTRICITY TARIFF IN THAILAND THAN MALAYSIA?

Factors Contributing to Lower Thailand Tariff

- **Cheaper domestically produced mine mouth lignite for the power sector** (price at about USD18/tonne CV2600 kcal/kg or USD 38 /tonne CV5500 kcal/kg) which contribute 10% of total generation mix (TNB coal benchmark at USD87.5/tonne)
- **Lower reserve margin at 24% compared to 31% in Peninsula Malaysia**
- **Larger electrical system with higher economic of scale for T &D&G infrastructure** (Installed capacity for Thailand is 33,051 MW against Malaysia's 21,749 MW in 2013) enable it to achieve higher economic of scale in its electricity supply cost. Its larger T&D system and infrastructure is also able to reap higher economic of scales.
- **Competitive bidding for power generation plants in Thailand started about 15 years ago**
- **Thailand defined market price of power sector gas (basket: piped gas & LNG) is ~USD7.8/mmbtu (about RM25/mmbtu in 2013).** For Malaysia power sector ,the blended price of power sector gas is RM22/mmbtu (piped gas RM15.2/mmbtu & LNG RM41.68/mmbtu) from 1 Jan 2014

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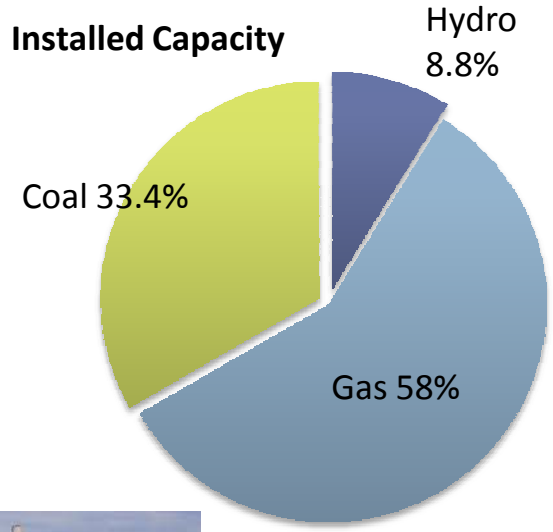
1

Abundant and cheap lignite in Thailand contribute towards lowering the generation cost

Malaysia

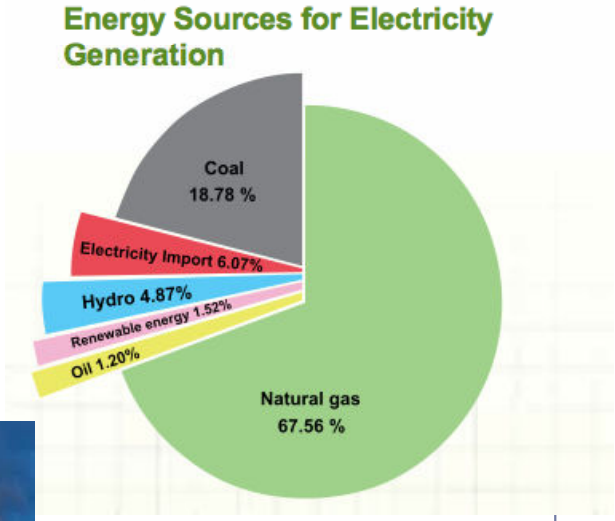
- Coal Price at USD 85 to 88/MT forms 36.1% generation mix



TNB Janamanjung

Thailand

- Cheaper domestically produced mine mouth lignite for the power sector (price at about USD18/tonne CV2600 kcal/kg or USD 38/tonne CV5500 kcal/kg) which contribute about 10%of total generation mix. Another 8% is contributed by imported at market price



Mae Moh Lignite Plant. BangkokPost

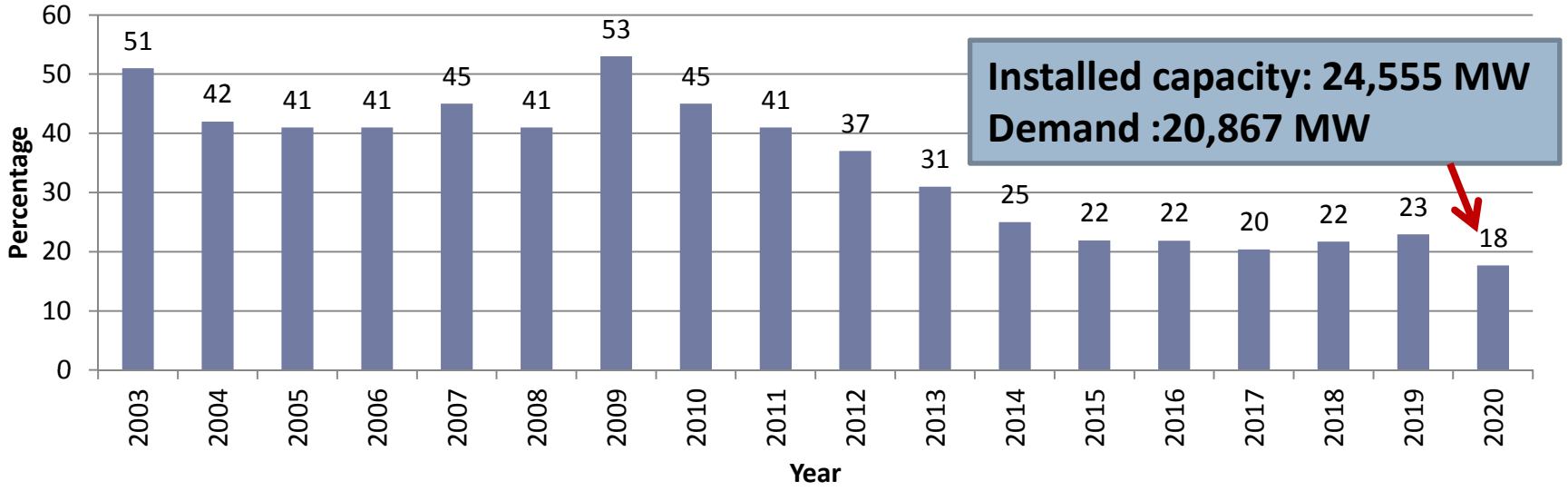
Source: EGAT Annual Report 2012

2

Reserve Margin in Malaysia is a bit higher since our system is smaller compared to Thailand , but will reduce in the long term as system grow

Malaysia

Total generation capacity installed: 21,749 MW (2013)
Maximum Demand: 16,562 MW (2013)



Thailand

Total generation capacity installed: 33,051 MW (2013)
Maximum Demand: 26,598 MW (2013)

- Reserve Margin at about 24%

Source: EGAT Annual Report 2012

Competitive bidding began 15 years earlier than Malaysia contributing towards lower generation costs

Malaysia

- Restricted bidding brown field coal plant (1000MW) in 2010
- Track 1 (Gas fired 1071 MW) in October 2012
- Track 2 (2253 MW CCGT) in Feb 2013
- Track 3A (1000 MW Coal) in August 2013
- Track 3B (2000 MW Coal) in February 2014

Thailand

- First solicitation for bids for IPPs announced in 1997 for 7 PPAs
- The second solicitation for bids for IPPs for base load capacity of 3,200 MW was announced in June 2007

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6. TNB EFFICIENCY IMPROVEMENT

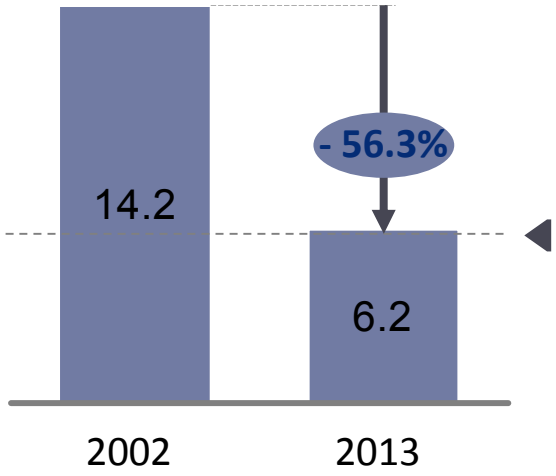
Electricity supply system has improved over the last 12 years

EU average

System Performance Indicators

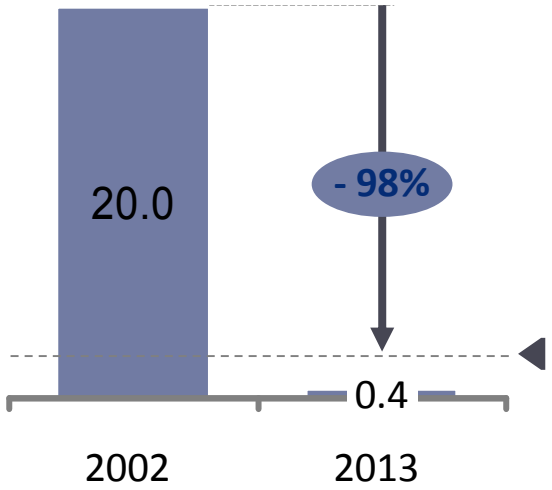
Generation

UOR[1]



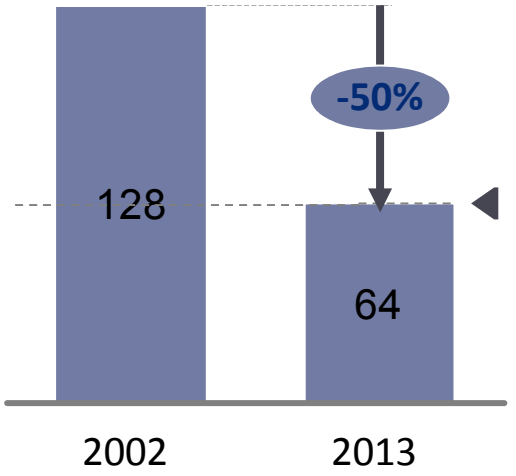
Transmission

System minutes[2]



Distribution

SAIDI[3]



1 Unplanned Outage Rate
2 Transmission sSstem Minutes
3 System Average Interruption Duration Index – minutes/customer/year

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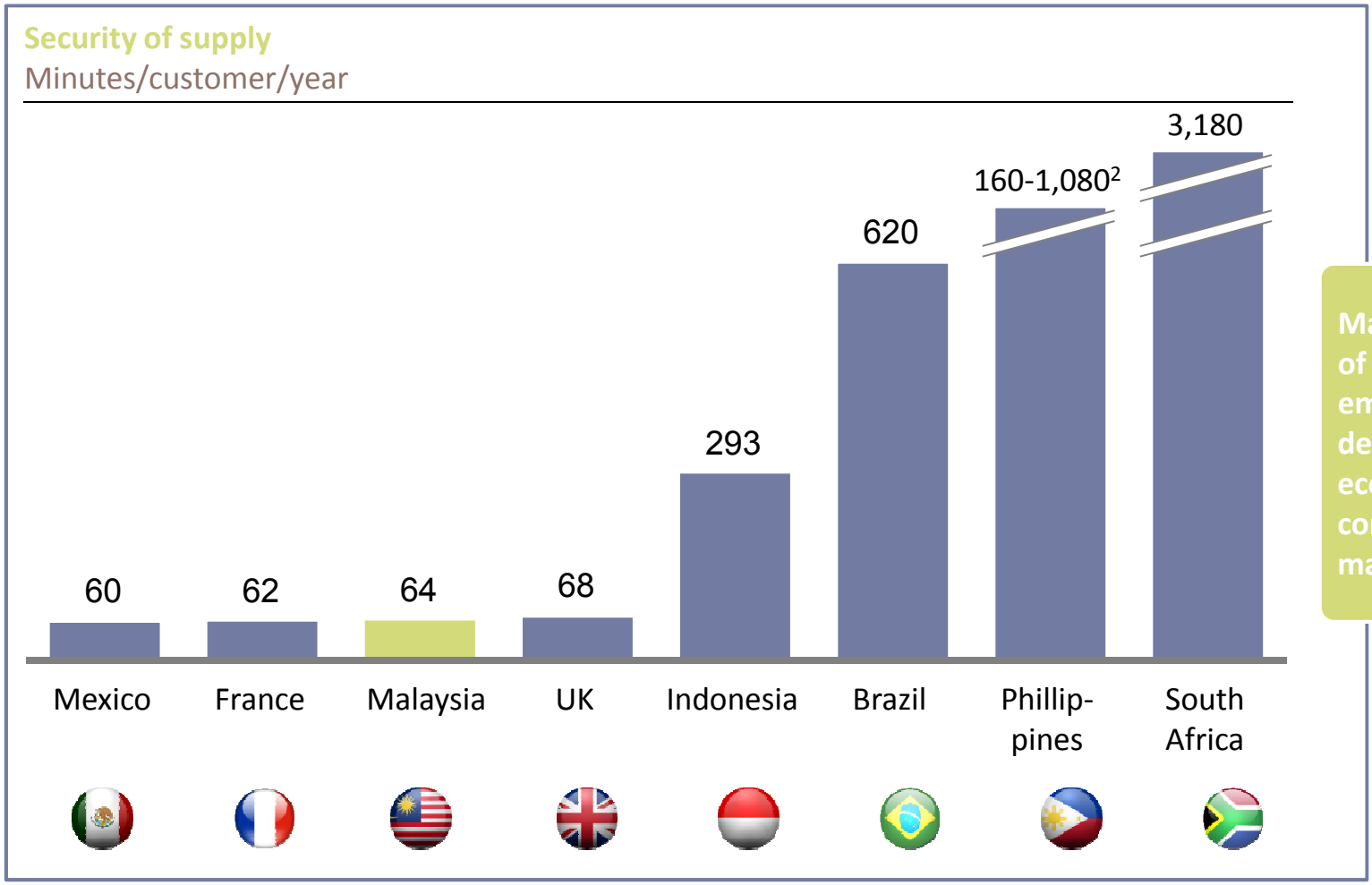
Investment is critical towards ensuring security of supply

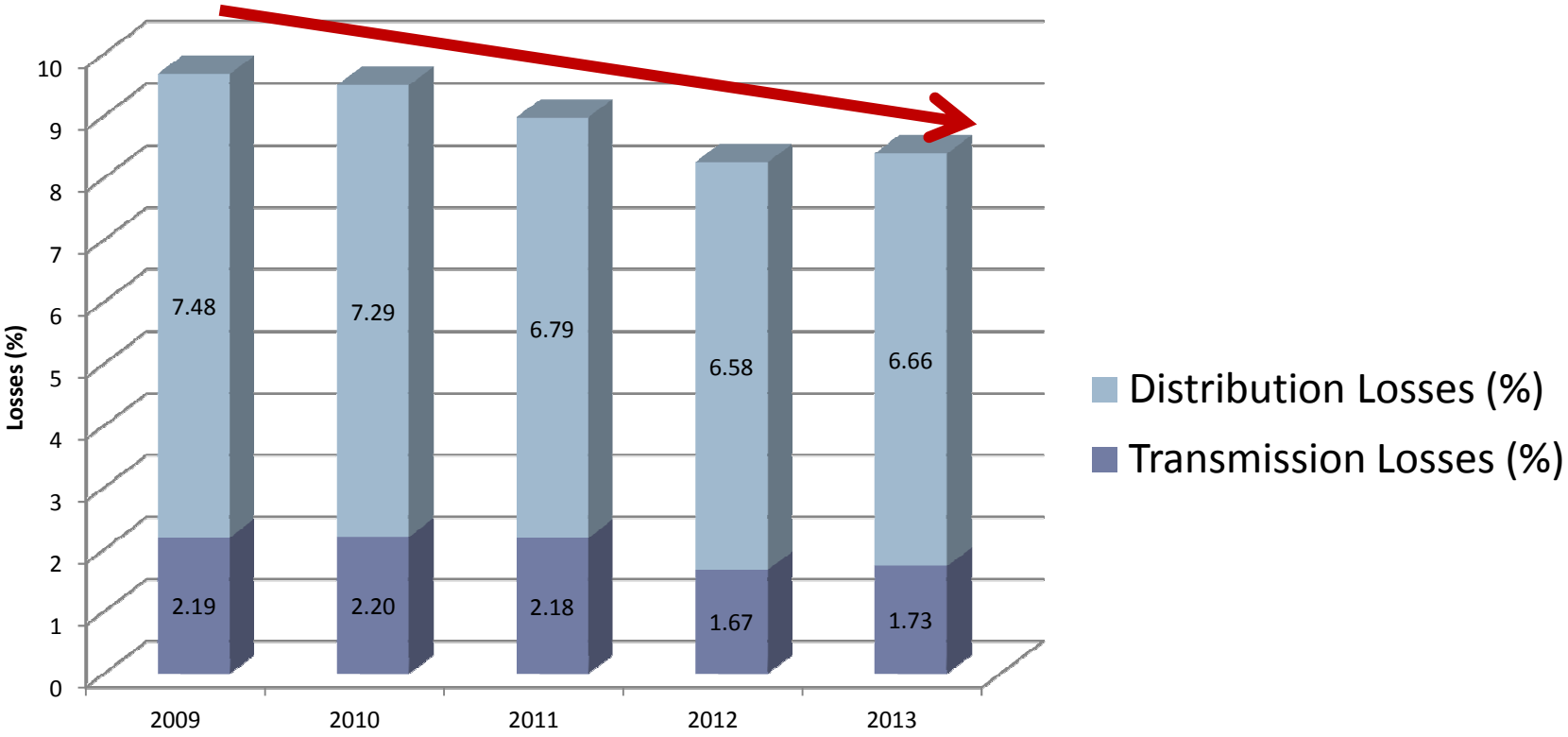
Malaysia is now ahead of many emerging/developing markets and in tandem with those developed markets



1 As indicated by SAIDI (System Average Interruption Duration Index); latest available data
2 Philippines SAIDI is 160 minutes for Meralco in major areas, while rural electrification by cooperatives average at 1,080 minutes

Source: IEA, World Energy Outlook, World Bank

Reduction in losses



A reduction of 1% losses translates to a saving of ~RM 385 million/year

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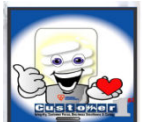
Improvement in TNB's customers services

Initiatives	Customers Experience
7 Day Connection Process	**97%** application within 7 day in KL Barat & Timur. CSI increase from 7.2 to **8.4 – Detailed explanation follows**
Street Lights Repaired 12hrs	National average **< 12 hours** in Nov. 13 . 8 out of 12 States achieved average **< 6 hours**
Convenient service E-Pay @Petronas	**60,000** no. of transaction , RM 6.9 mil, from 790 Petronas outlet (May-Oct. 13)
Extended hours in Klang Valley and install 30 kiosks	**676,800** no. of transaction, RM 953 mil , from 30 payment kiosks (May - Nov.13). Additional 37kiosks by end Dec, 13
3rd Party Certification of Meters	**120,000** new meters issued with EC & SIRIM logo
Easy to Understand & Convenient Bills	**8 mil** customers experience new designed bill since Oct. 13
Multi-Language Agents in Call Centres	**46,053** calls answered in English by Call Center (Sept - Nov. 13)

BEE – 24 hours service supply application without pole

E-Services – Easy to use, on-line bill management

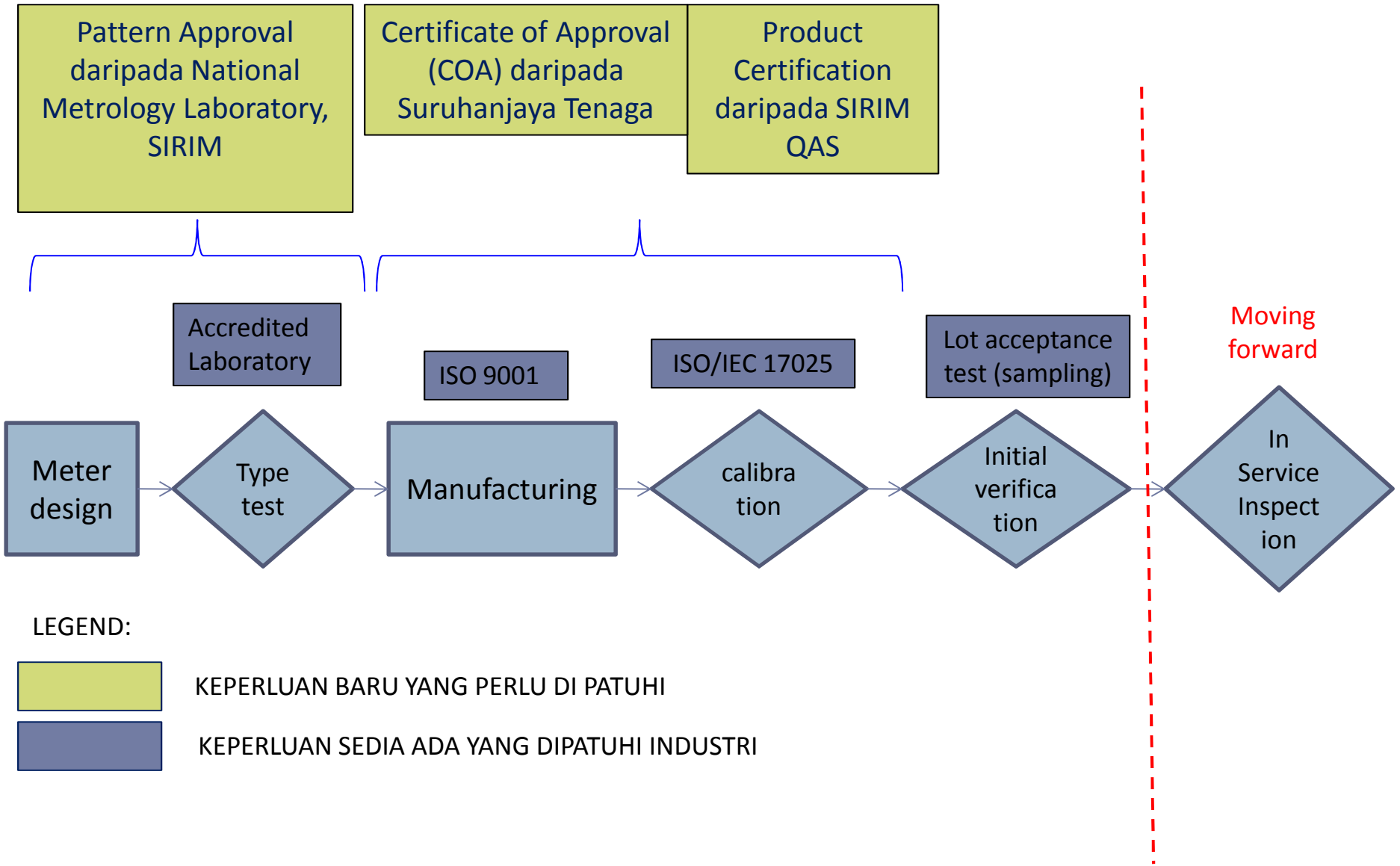
TNB Careline – 24/7 multi-channel communication, OSEC – General Enquiries, CMC – Breakdown & Street Lighting



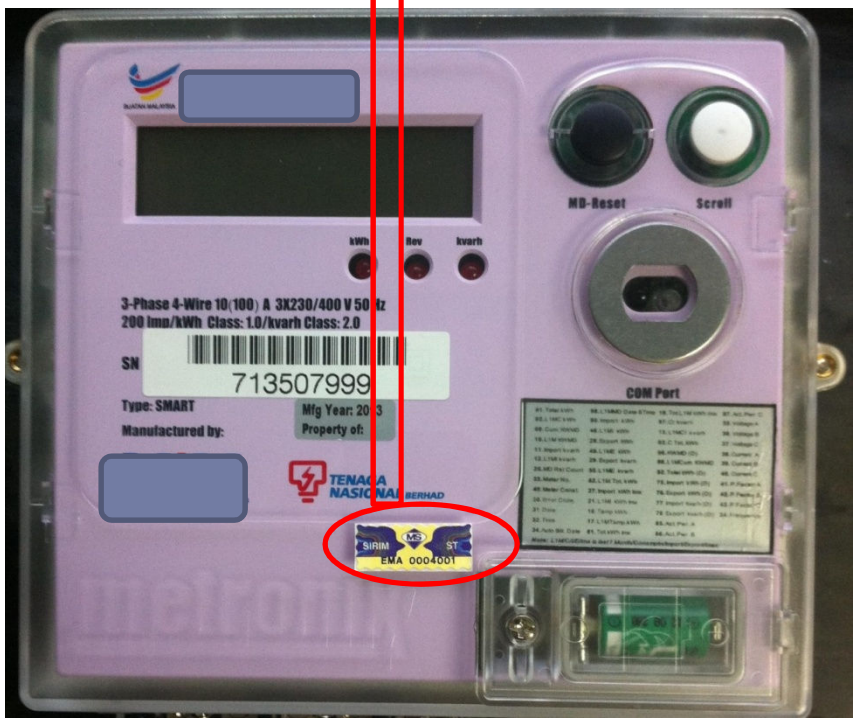
People 1st Program – to improve Service Standards & Practices at Service Counters

MyTNB – mobile solution in line with today's life style, no more queuing, access from arrange of mobile devices, view your account anywhere anytime,locate the nearest PKP, contacts TNB Careline with just a few clicks away

7. Ensuring Meter Accuracy



LABEL FOR THE APPROVED METER




Thank you