

**Review on  
Electricity Tariff in Peninsular Malaysia  
under the Incentive-based Regulation Mechanism  
(FY2014-FY2017)**

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**Suruhanjaya Tenaga**  
**19<sup>th</sup> December 2013**



## **OVERVIEW ON INCENTIVE-BASED REGULATION CONCEPT AND IMPLEMENTATION**

## The move towards better regulation:

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**Suruhanjaya Tenaga is moving towards the Incentive-based regulation (IBR) in order to strengthen the following:**

**the economic regulatory framework for regulating TNB;**

**the tariff setting mechanism and principles for tariff design;**

**incentive mechanisms to promote efficiency and service standards;**

**the process of tariff reviews; and**

**the creation of regulatory accounts and its annual review process.**

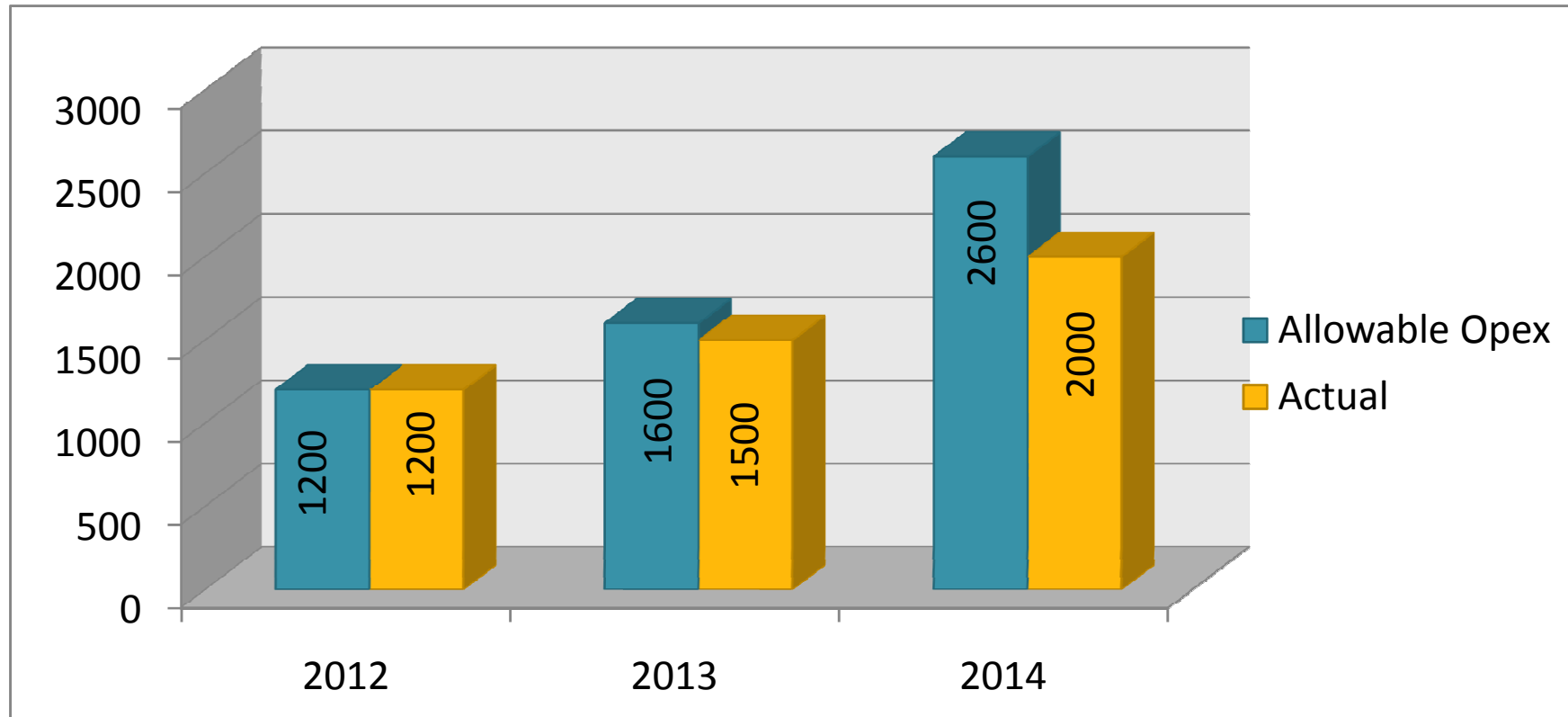
11 Regulatory Implementation Guidelines were developed for the implementation of IBR

## What is incentive-based regulation (IBR)?

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- A mechanism or methodology for the electricity tariff determination, focusing more efficiency gains and a structured process in tariff evaluation
- An effective mechanism that being used globally, sometimes called as performance-based regulation
- Only the efficient cost (CAPEX and OPEX) in electricity supply will be accounted in the tariff calculation
- Setting key performance indicators for the utility
- Introduction of incentives or penalties on the operational performance
- Efficiency gains will be shared between consumers and utility

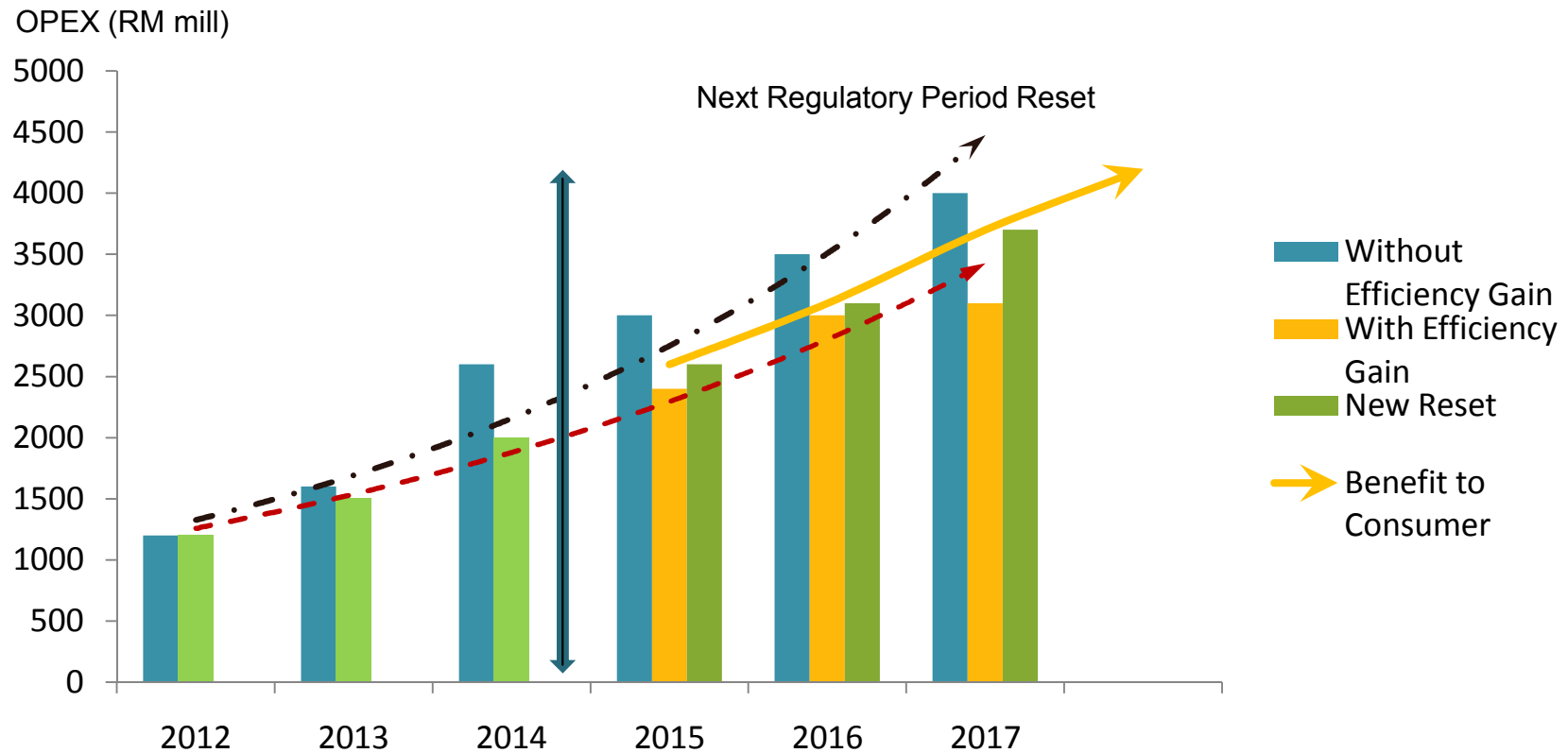
## How will an efficient utility benefit from IBR?



If the utility manages to effect further savings:

- Total saving over 3 years – RM 700 million
- All the savings will accrue to the utility

## How will these benefits be shared with consumers?



- The efficiency carry-over allows utility to keep the benefit of gains for three years (before the next regulatory period starts)

## Incentive-based Regulation benefits in terms of service quality

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Wide recognition that a trade-off exists between:

- The Service Quality **and** the Cost of Service

Generally higher service quality costs more; lower expenditure will over time lead to reduced service quality levels

Under incentive regulation, there is an incentive to maximize profit. Profits can be increased by reducing service quality.

**Hence, the Regulator also has a societal obligation to regulate service quality to ensure:-**

- Profits are not taken at expense of quality
- All customers receive a reasonable quality of service (not only those where it is profitable)
- Acceptable service levels are maintained

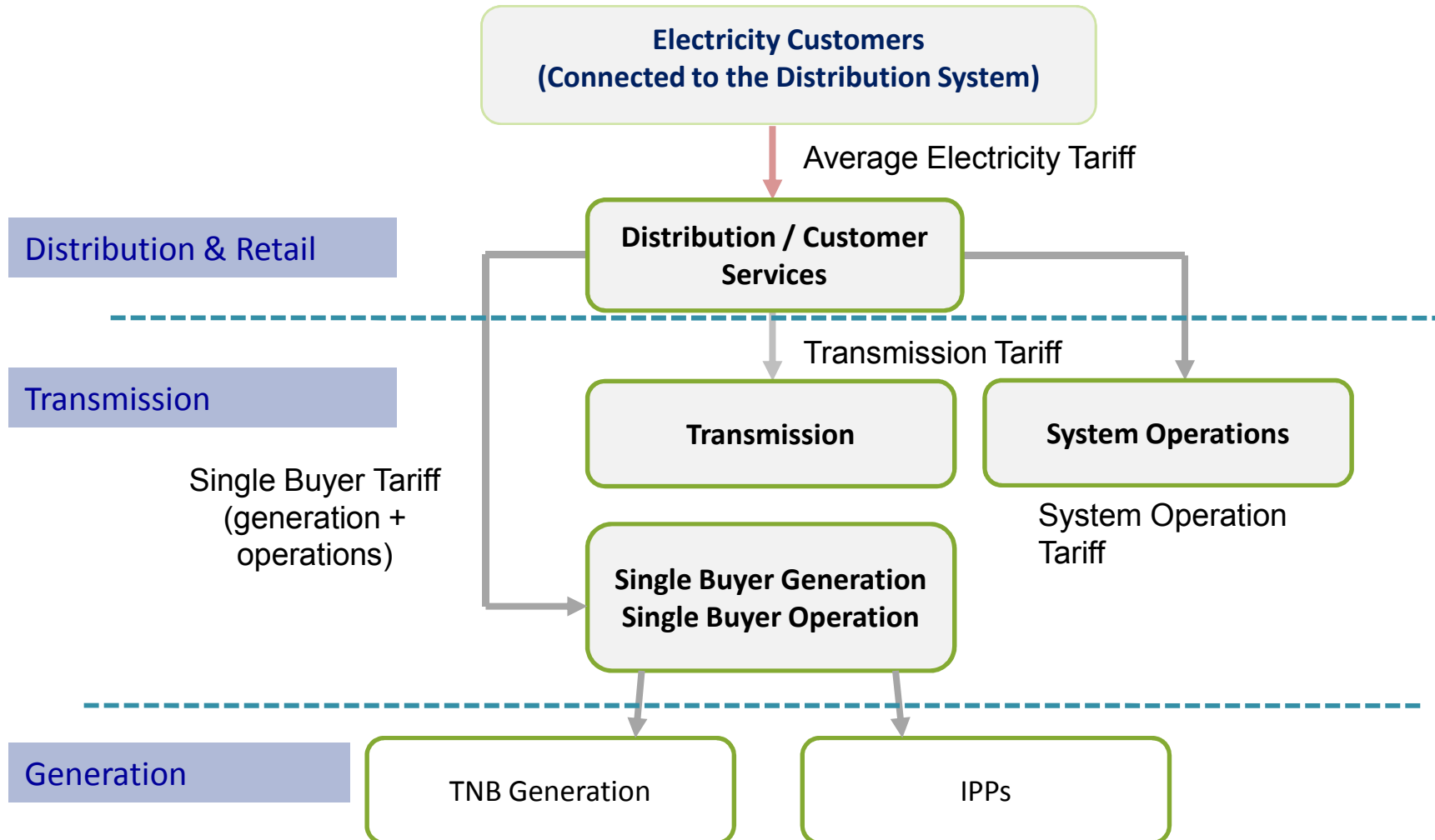
## Salient Components of IBR

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- Separation of TNB business entities' accounts
- Determination of reasonable return to licensee (WACC of 7.5%)
- Imbalance cost pass-through mechanism for uncontrollable costs (changes in forecast vs actual cost of generation)
- Setting of performance targets with incentive/penalty mechanism by regulator
- Efficiency sharing scheme between utility and consumers in the next tariff review
- Structured tariff determination and decision-making process
  - Regulatory period from 2014 – 2017
  - Establishment of regulatory accounts and reporting mechanism



# TNB Business Entities under the Incentive-based Regulation Mechanism (Accounting Separation)



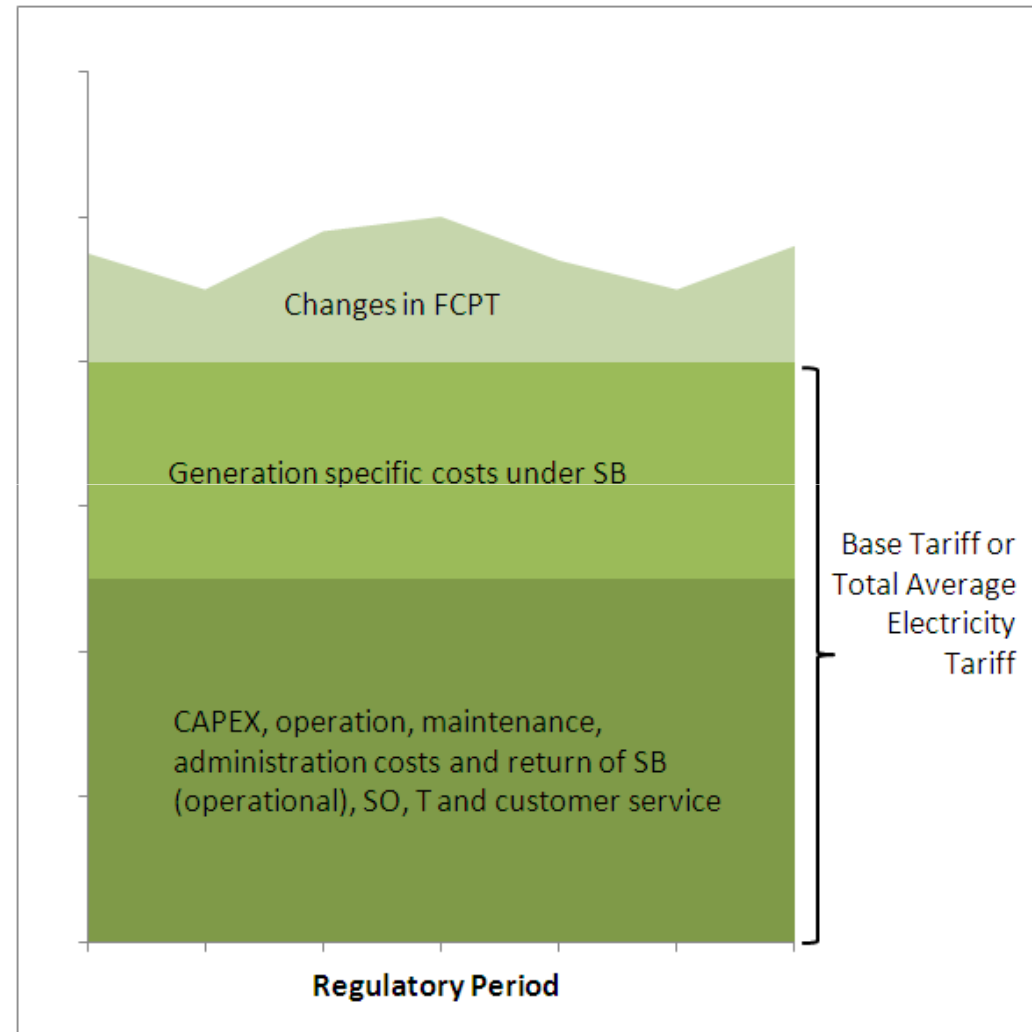
## Electricity Tariff Review = Base Tariff $\pm$ Imbalance Cost Pass-Through (ICPT)

### Base Tariff is set to reflect:

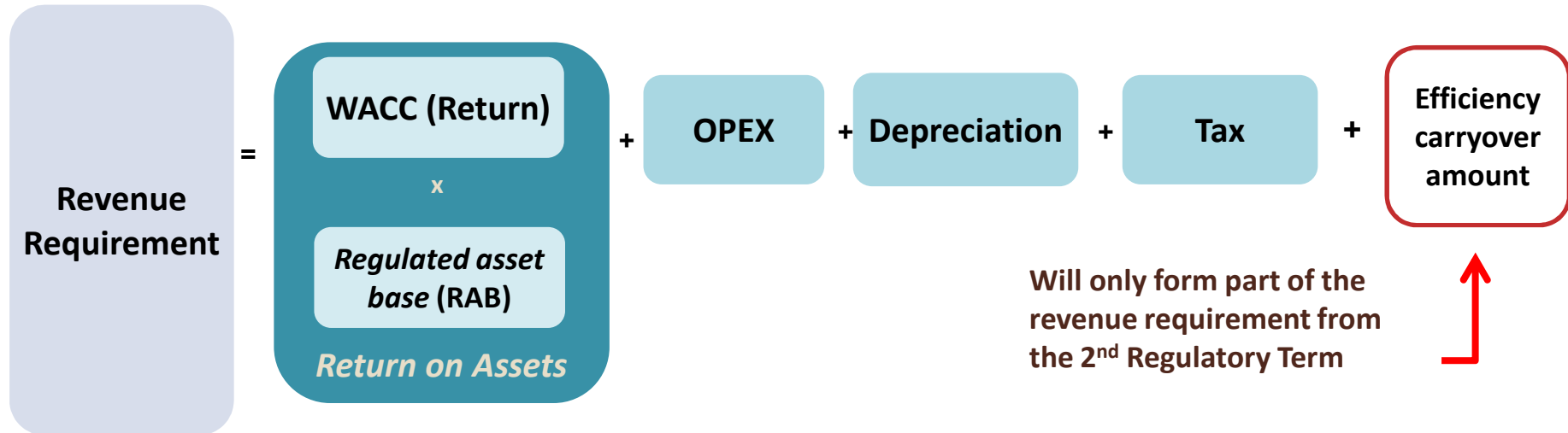
- the construction cost of transmission and distribution system;
- Base fuel and purchasing cost;
- Operation, maintenance and administration costs;
- with certain assumptions related to fuel prices, inflation rates (or CPI), exchange rates.

### ICPT:

- adjustment to reflect the change in uncontrollable costs from Base Tariff i.e change in fuel and purchasing cost



# Revenue Requirement Building Block Model Under the IBR Framework

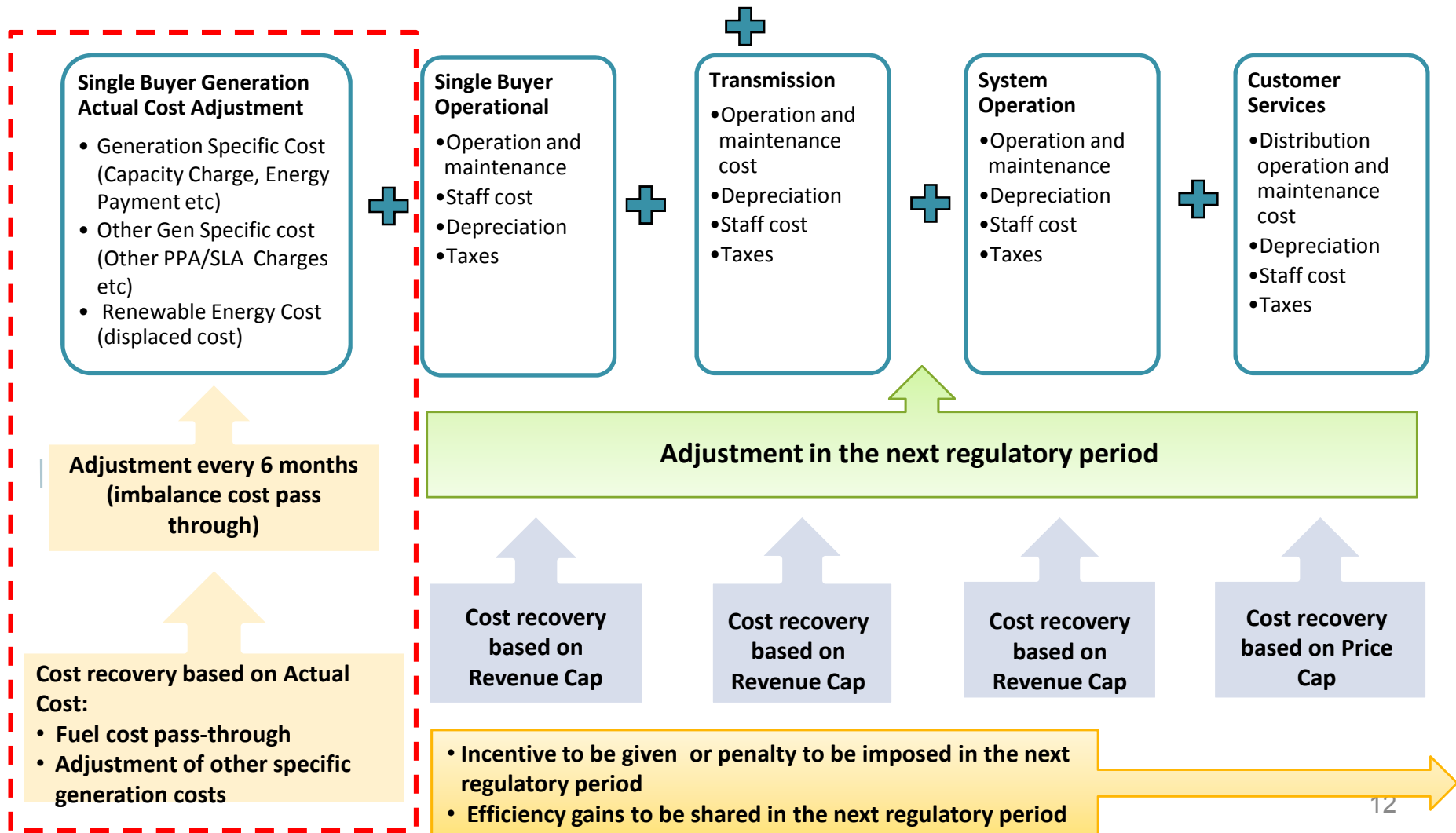


## Efficiency

- testing for efficiencies through benchmarking and trend analysis
- review of historical cost performance
- efficiency and prudence of asset management policies
- consistency with capex and sales forecast

# Summary of Tariff Setting Framework under IBR

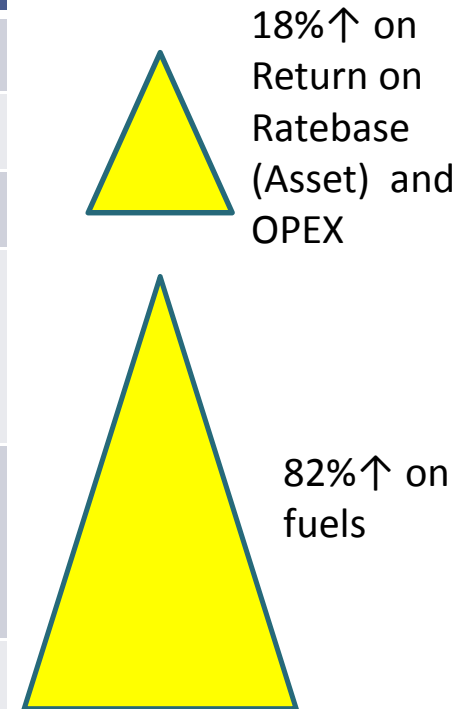
$$\text{Revenue Requirement} = \text{WACC} \times \text{Regulated Asset Base}$$



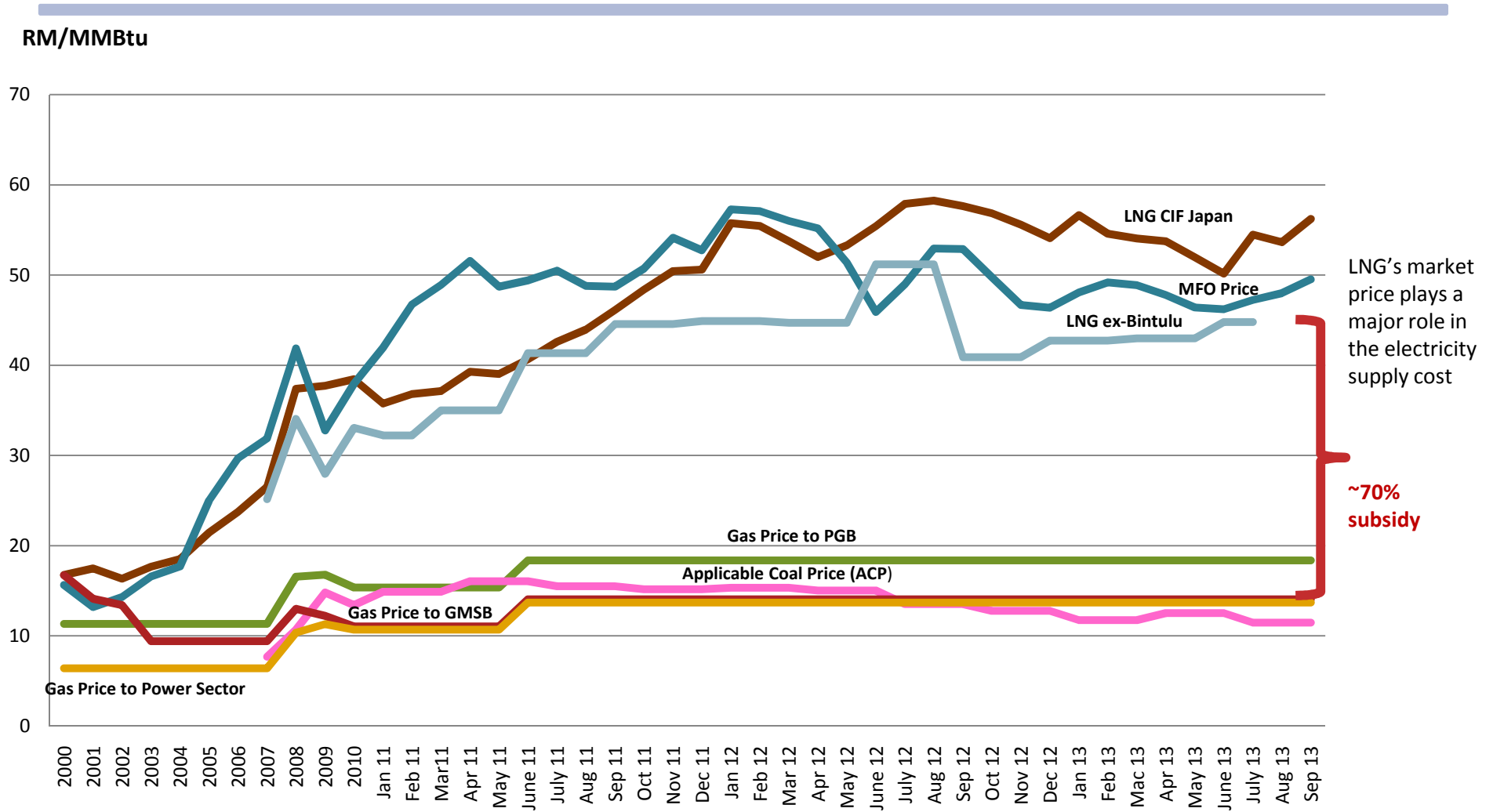
## Decision on Electricity Tariff Review in Peninsular Malaysia

Average electricity tariff rate in Peninsular Malaysia to be increased by **4.99 sen/kWh (14.89%)** from **33.54 sen/kWh** to **38.53 sen/kWh**, from **1<sup>st</sup> January 2014**, to cover:

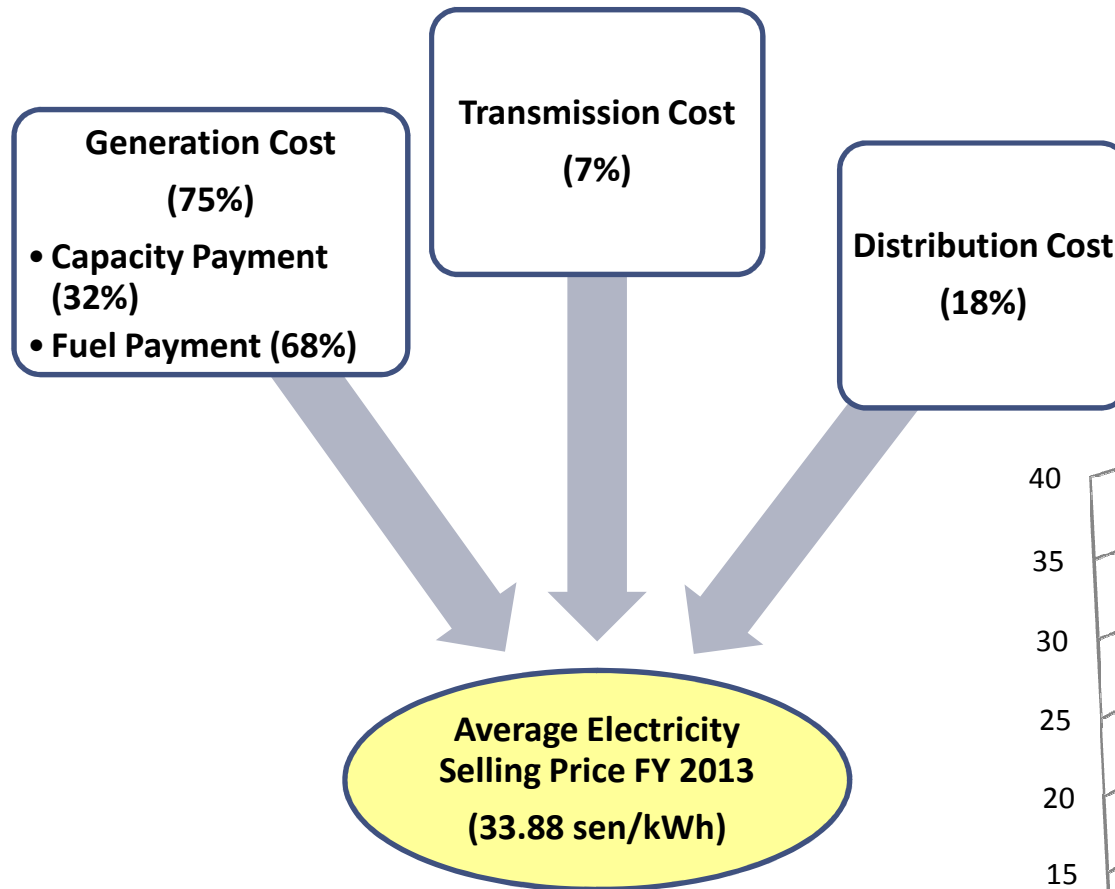
Tariff Components	sen/kWh	% increase
Current Tariff	33.54	
TNB Base Tariff	0.90	2.69
Fuel Components:		
<ul style="list-style-type: none"> <li>• Piped gas regulated price (from RM13.70/MMBtu to RM15.20/MMBtu @1,000 mmscfd)</li> </ul>	0.51	1.52
<ul style="list-style-type: none"> <li>• Coal (market price) (from USD85/tonne to USD87.5/tonne CIF@CV 5500kcal/kg)</li> </ul>	0.17	0.51
<ul style="list-style-type: none"> <li>• LNG RGT market price at RM41.68/MMBtu</li> </ul>	3.41	10.17
<b>NEW AVERAGE TARIFF</b>	<b>38.53</b>	<b>14.89</b>



## Average Fuel Price Trend In RM/mmBtu as of Sept 2013



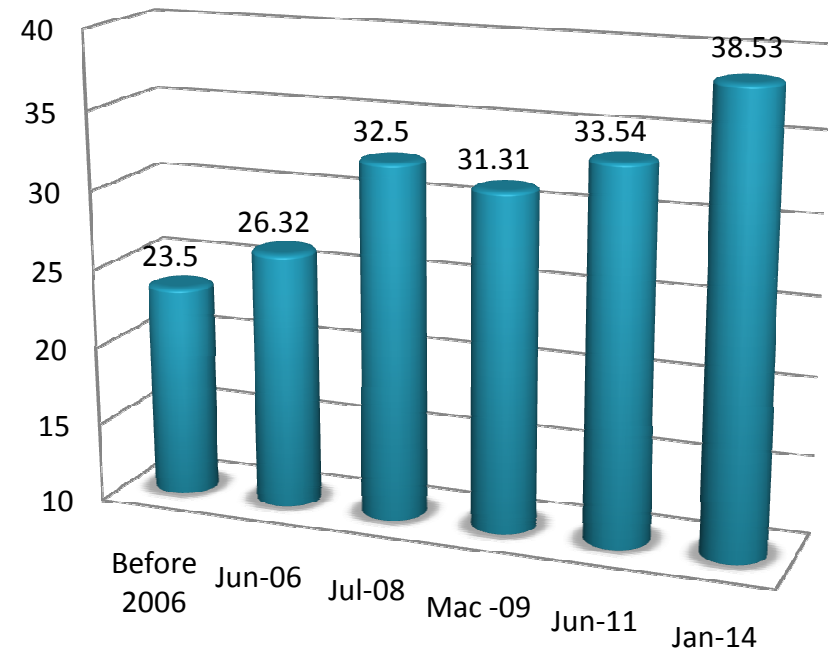
## Cost Components in Electricity Tariff TNB FY 2013 (Historical)



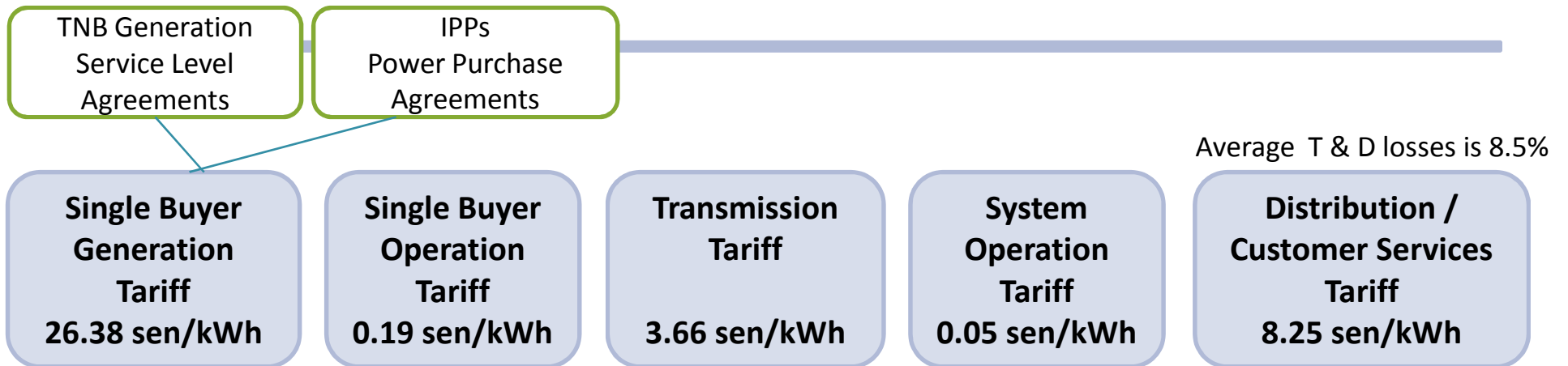
Fuel Price (gas and coal) is regulated by the Government in current tariff setting

Capacity Payment is minimised via the competitive bidding process

Average Electricity Tariff (sen/kWh)



## Electricity Tariff Structure as of 1<sup>st</sup> January 2014 under Incentive-based Regulation (IBR) mechanism



**Imbalance Cost Pass-Through**  
in every 6 months  
(cost variation of forecast vs actual cost procuring electricity)

Subject to  
Government  
Approval

i.e.

Fuel Cost : natural gas, coal, LNG  
and distillate

Renewable energy displaced cost

All costs incurred by the SB under the PPAs and  
SLAs ( incentive or bonus payments, liquidated  
damages, savings etc)

**Average Electricity Tariff : 38.53 sen/kWh**

**Average Domestic  
Tariff**  
31.66 sen/kWh

**Average Commercial  
Tariff**  
47.92 sen/kWh

**Average Industrial  
Tariff**  
36.15 sen/kWh

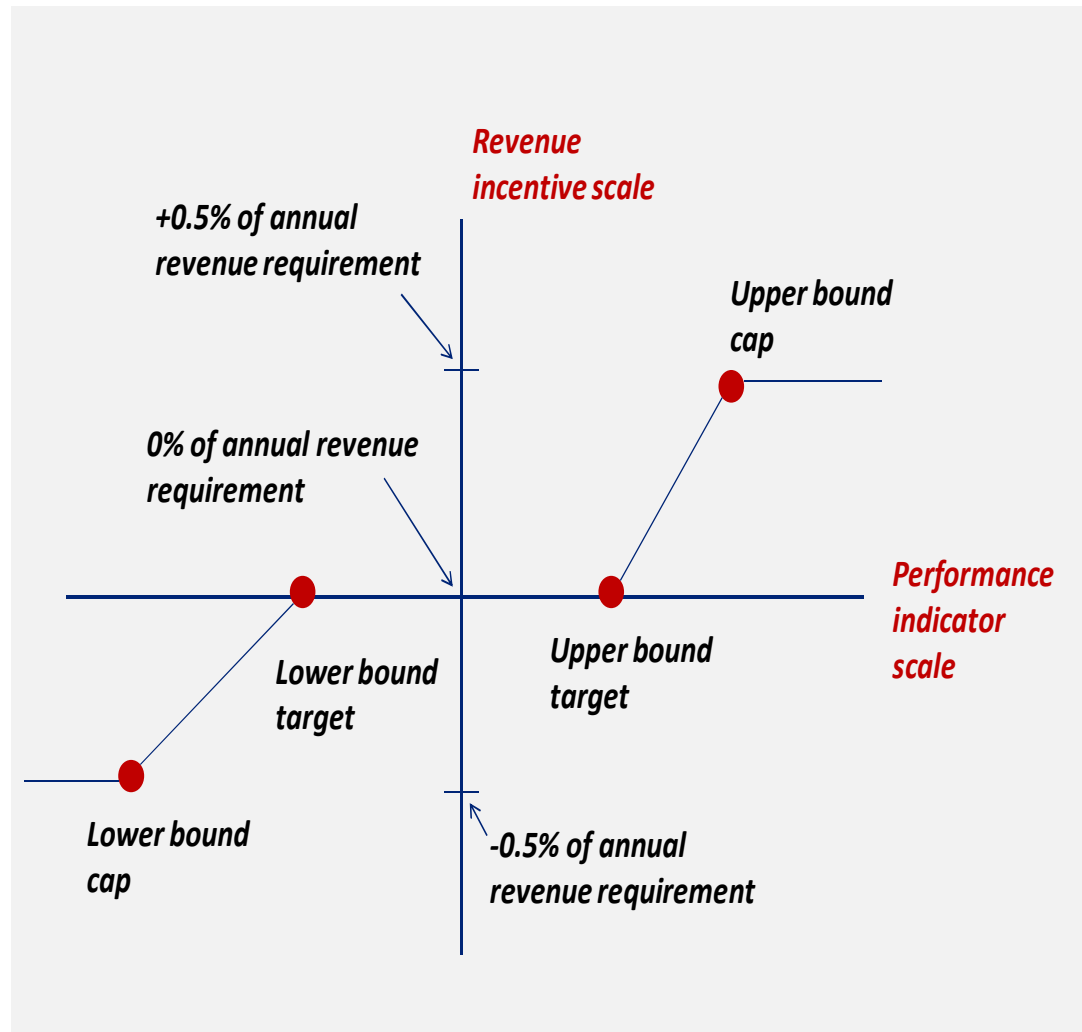
**Average Overall  
Tariff**  
38.53 sen/kWh





# PERFORMANCE INCENTIVE SCHEME

# INCENTIVE SCHEME



## Actual performance compared to target

- Incentive / penalty capped at  $\pm 0.3\%$  to  $0.5\%$  of annual revenue requirement
- No incentive or penalty if performance between the upper and lower bound targets

## Example : Total incentive or penalty caps for TNB business entities

Business entities	Total Incentive and Penalty Cap	Example : Amount of Incentive or Penalty Cap Annually	
		Revenue Requirement	Total Incentive /(Penalty) Cap
		RM	RM
Customer services / Distribution	±0.3% ARR	10,670,937,304	32,012,812
Transmission	±0.3% ARR	4,345,455,379	13,036,366
System Operator	±0.5% ARR	56,954,047	284,770
Single Buyer Operation	±0.5% ARR	336,151,090	1,680,755
	<b>Total</b>	<b>15,409,497,820.39</b>	<b>47,014,704</b>

ARR = aggregate revenue requirement

**Equivalent to 0.045 sen/kWh incentive or penalty**

Note: Single Buyer operation ARR only refers to revenue required for operation of Single Buyer

\*excluding power procurement costs of both IPPs (PPA) & TNB Plants (SLA)

Code	Performance Incentive Scheme	Unit	Weightage (%)	Lower Bound Target	Upper Bound Target
<b>Customer Services</b>					
CSPI1	System Average Interruption Duration Index (SAIDI)	Mins./cust./year	50	70	55
CSPI2	Average of Minimum Service Level Compliance Performance	%	25	84.11	94.11
CSPI3	Weighted Average Guaranteed Service Level (3, 4 and5)	%	25	86.32	95.50
<b>Transmission</b>					
TXPI1	System Minutes	Minutes	40	5.1	1.5
TXPI2	System Availability	%	30	99.04	99.48
TXPI3	Project Delivery Index	Delayed month	30	5.47	0
<b>System Operator</b>					
SOP11	Wide Area Loss of Supply Event	No. of wide area system blackout incident	25	1	0
SOP12.1	Voltage Limit Compliance	%	25	90	96
SOP12.2	Frequency Limit Compliance	%	25	90	96
SOP13	Dispatch Adjustment	%	25	0.4	0.2
<b>Single Buyer</b>					
SBPI1	Dispatch Deviation	%	25	0.4	0.2
SBPI2	Compliance to Timely Settlement of Generators' Invoices	%	25	99.55	99.85
SBPI3	Compliance to Malaysian Grid Code	%	25	98.10	100
SBPI4	Compliance to Single Buyer Rules	%	25	95.00	100 20



# **FAIR RATE OF RETURN AND WEIGHTED AVERAGE COST OF CAPITAL (WACC) DETERMINATION**

## Suruhanjaya Tenaga's Approach

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- In reaching the recommendation on whether TNB's capex and opex forecasts are efficient and prudent, we:
  - analyzed TNB's revenue requirement proposal, tariff setting and other supporting information
  - analyzed data and information provided by TNB during the review process
  - analyzed forecast of total capex and opex, in terms of:
    - Meeting expected demand
    - Complying with all applicable regulatory obligations and requirements
    - Maintaining the quality, reliability and security of supply
  - considered initial views expressed by KeTTHA
  - conducted consultation sessions with TNB's working level
  - compared with data/information submitted under license conditions
  - considered consistency of TNB's proposal with government policies

## Fair Rate of Return (ROR)

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**Fair ROR** is a level of profit that utility is allowed to earn as determine by the Suruhanjaya Tenaga based on the following consideration:-

- Maintain **service to its customers**;
- Maintain and expand the infrastructure **to provide the services to customers**. The return should be able to attract capital from investors. Low return - insufficient capital for growth - consumer unable to receive sufficient level of electricity service;
- Make a fair payment **to capital providers** i.e interest to bondholders and adequate dividend to shareholders
- conforms to the **return of similar investments**.
- Promote **efficient used of energy**, prices should reflect marginal costs;
- Ensure the **utility's long-term stability**.
- Ensure **fairness to all stakeholders**. The utility could get capital to provide services to consumer and at the same time the capital providers receiving fair profits on their investment.

## How Average Rate Base (ARB) is Determined

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- The objective is to identify the amount of appropriate capitals/assets and working capital that are ***prudently required*** by the utility company in order to provide the regulated services.
- ST use Original or Historical approach to determine the value of the Rate Base (RB).
- The figures is adjusted to exclude consumer contribution and consumer deposit from RB
- The ARB is calculated by taking the average of the opening and closing value of the rate base/assets



## Determine the Fair Rate of Return

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The fair Rate of Return is base on Weighted Average Cost of Capital (WACC) which are determine using Capital Assets Pricing Model (CAPM).

### 1. Risk free rate – Yield of MGS

The risk-free rate of return will be used as a floor of acceptable levels of expected return from any given investment. Any equity investment should exceed the risk-free rate of return. There is no reason for investor to take any investment with inferior to Risk free rate.

### 2. Market premium to reflect the risk of the utility's as compare to the risk free rate.

## Regulatory WACC for TNB Under IBR (FY2014-2017) is 7.5%

WACC Parameters	Actual market Parameters	TNB's Proposal	Recommendation
Stock <sub>TNB</sub> Beta	0.92[1]	1.435	1.435 [[4]
Market Return ( $R_m$ )	8.8%[2]	12.3%	8.8%
Risk free ( $R_f$ )	4.0%	4.0%	4.0%
Market Risk Premium ( $R_m - R_f$ )	4.8%	8.3%	4.8%
Debt Margin ( $D_m$ )	2.19%	2.24%	2.24%
Tax Rate	25.0%	25.0%	25.0%

### Weighted Cost of Capital Calculation

Capital Structure	Actual market Parameters			TNB's Proposal			Recommendation		
	Cost	Capital Structure	Weighted Cost	Cost	Capital Structure	Weighted Cost	Cost	Capital Structure	Weighted Cost
Cost of Equity ( $K_e$ )	8.38%	60.5%	5.1%	15.91%	45.0%	7.16%	10.85%	45.0%	4.88%
Cost of Borrowing ( $K_b$ )[3]	6.18%	39.5%	1.8%	6.24%	55.0%	2.57%	6.24%	55.0%	2.57%
<b>Weighted Cost of Capital</b>			<b>6.9%</b>			<b>9.7%</b>			<b>7.5%</b>

Note:

[1] Based on beta for the period 2004-2012

[2]  $R_m$  - Market return of 10 yrs KLSE Index

[3] Average Gearing (2004-2011) is 39.5%

[4] Adjusted to reflect optimal gearing.

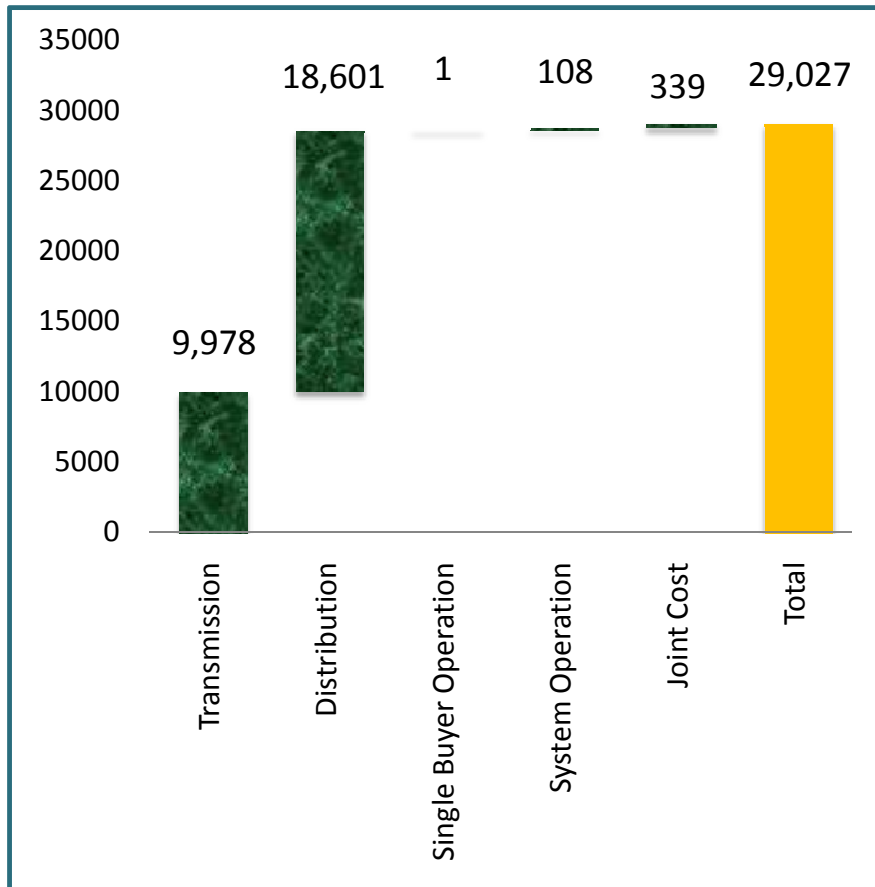




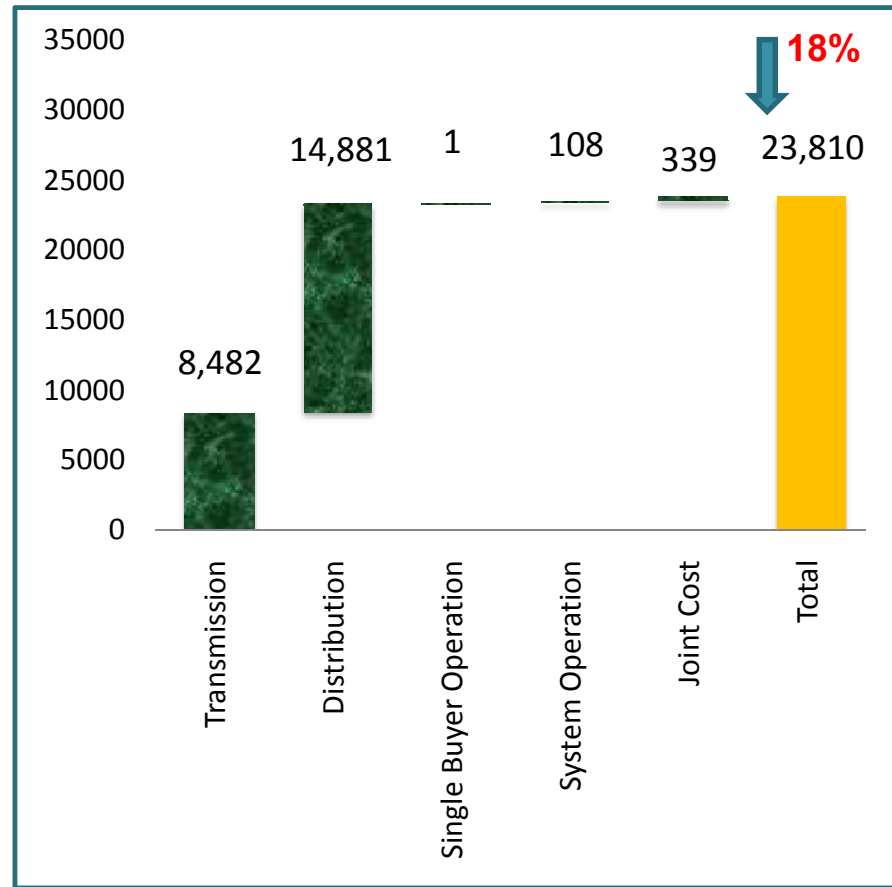
# **IBR - REVIEW OF TNB'S PROJECTED CAPEX AND OPEX**

# Review of TNB Capital Expenditure Proposal (RM Million)

## Initial Proposal

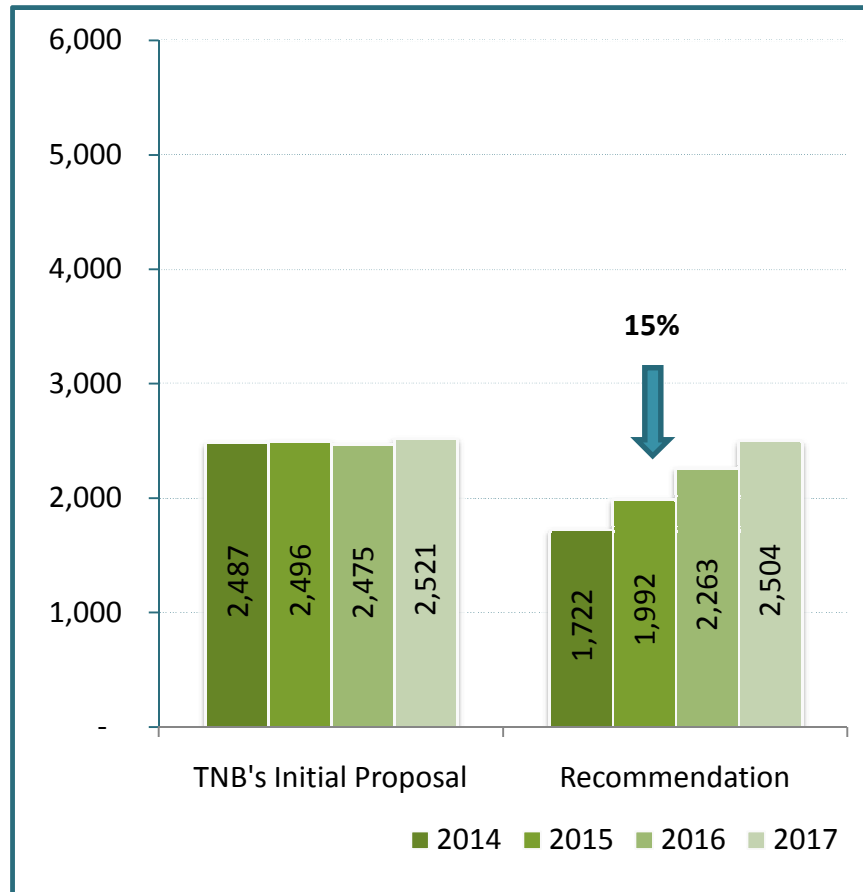


## Recommendation

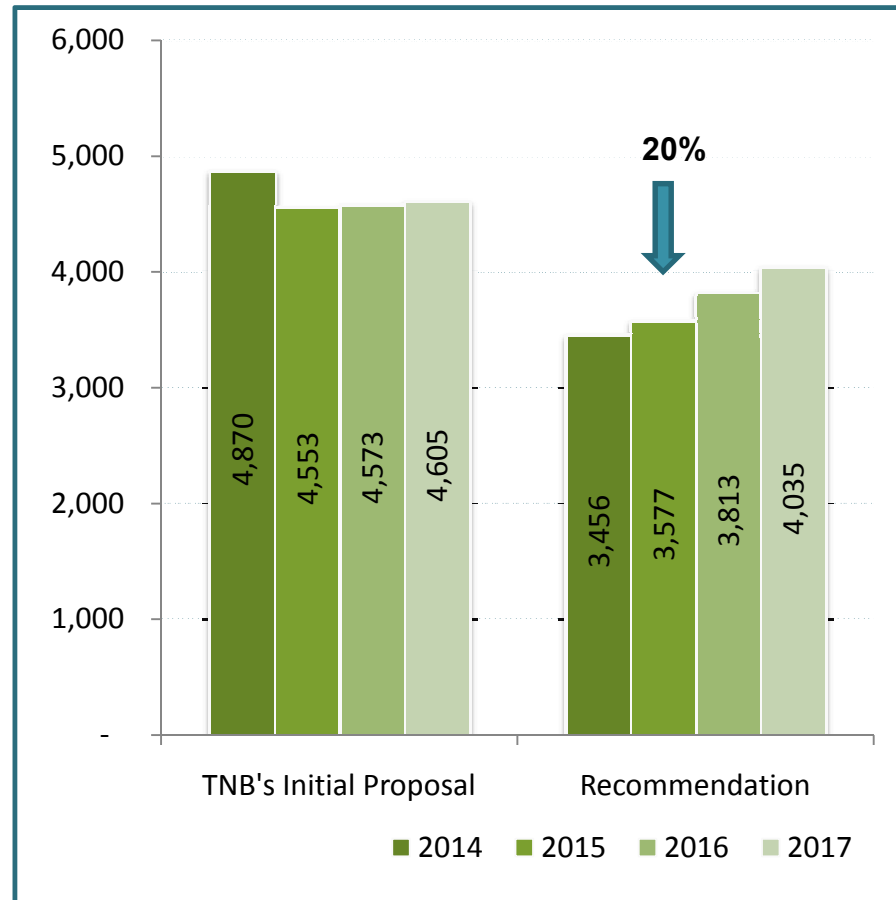


## Capital Expenditure 2014-2017 (RM Million)

### Transmission Capex

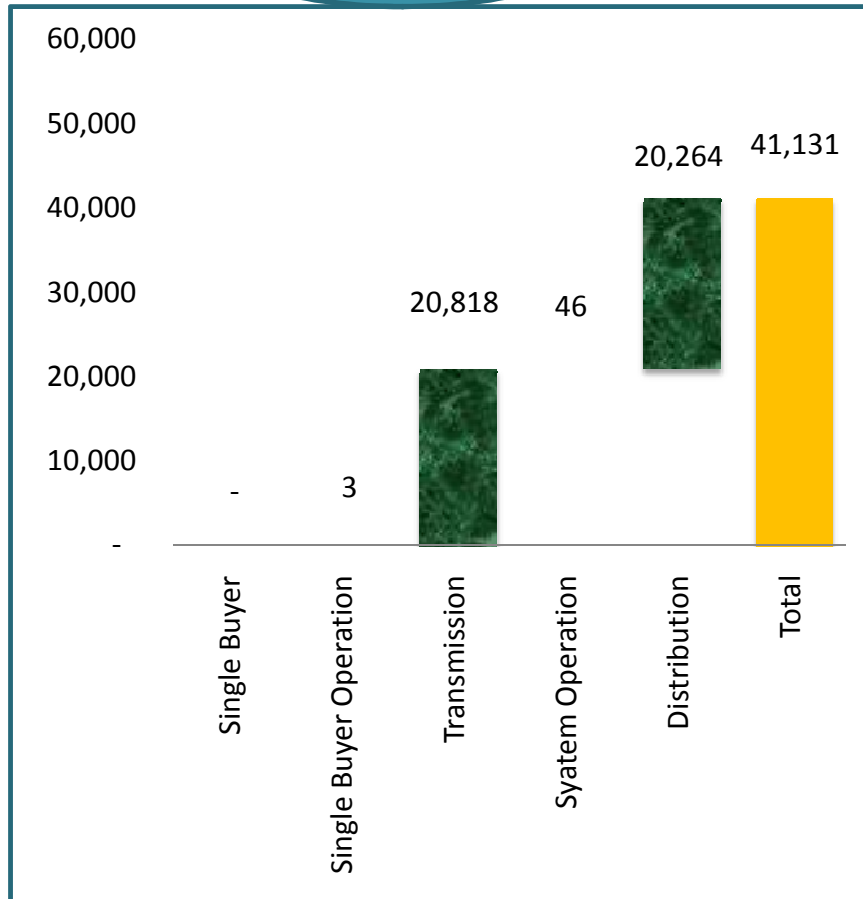


### Distribution Capex

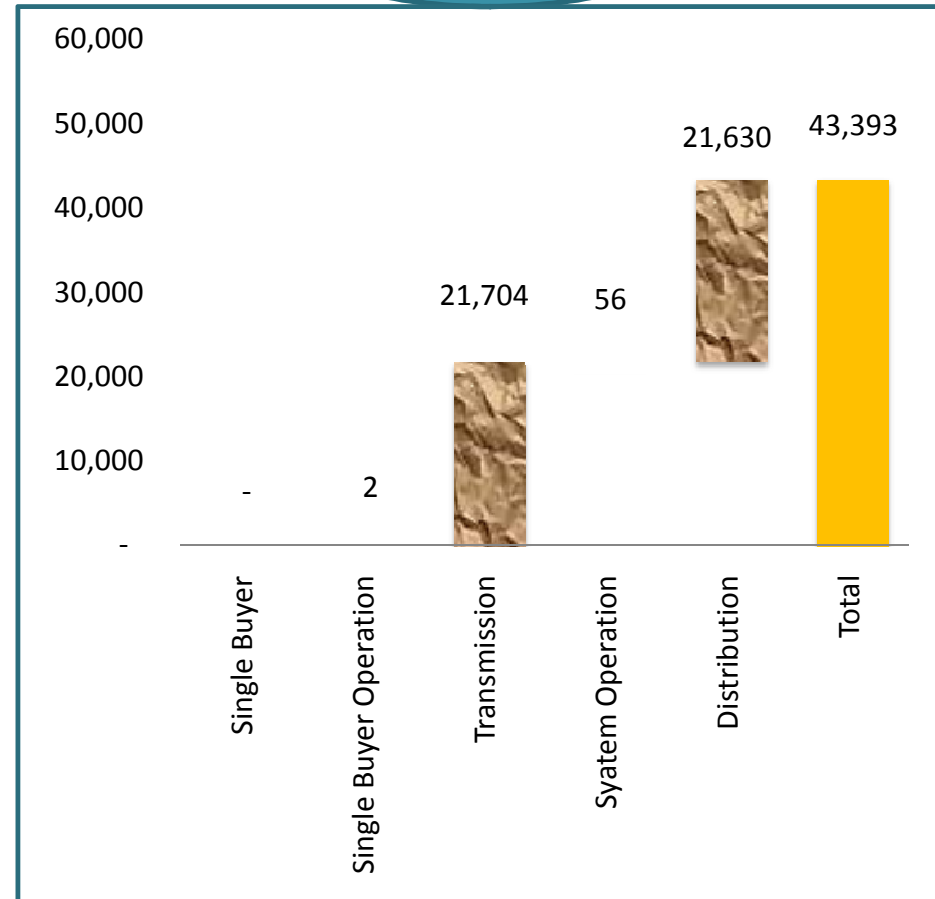


## Average Rate Base (RM Million)

2014

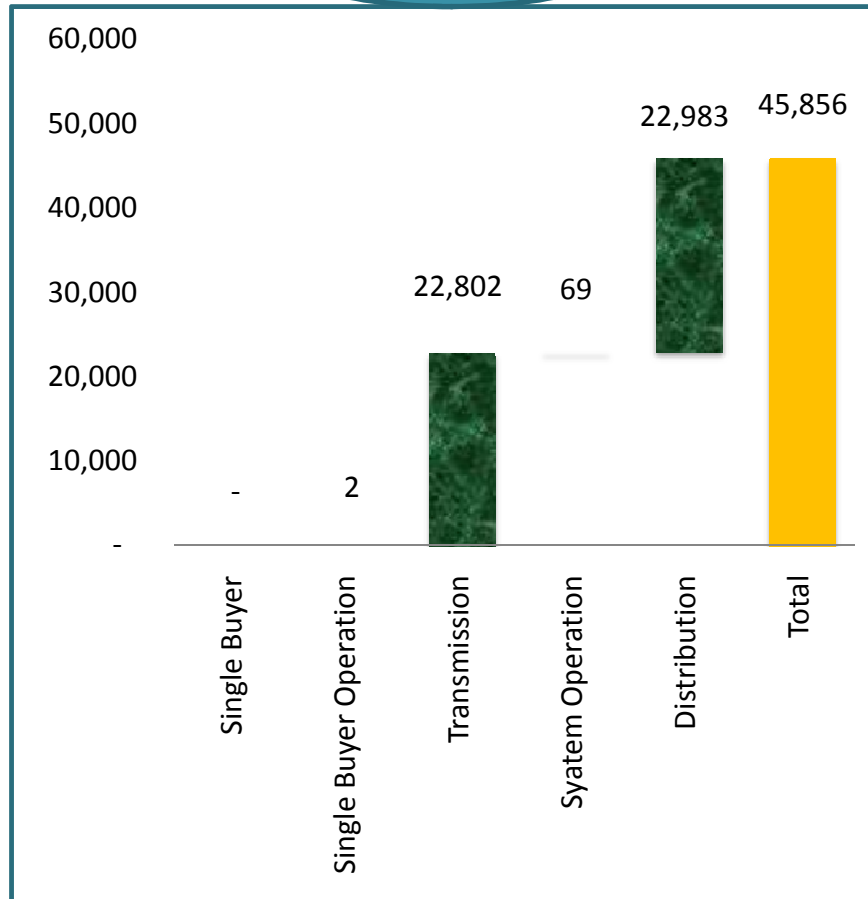


2015

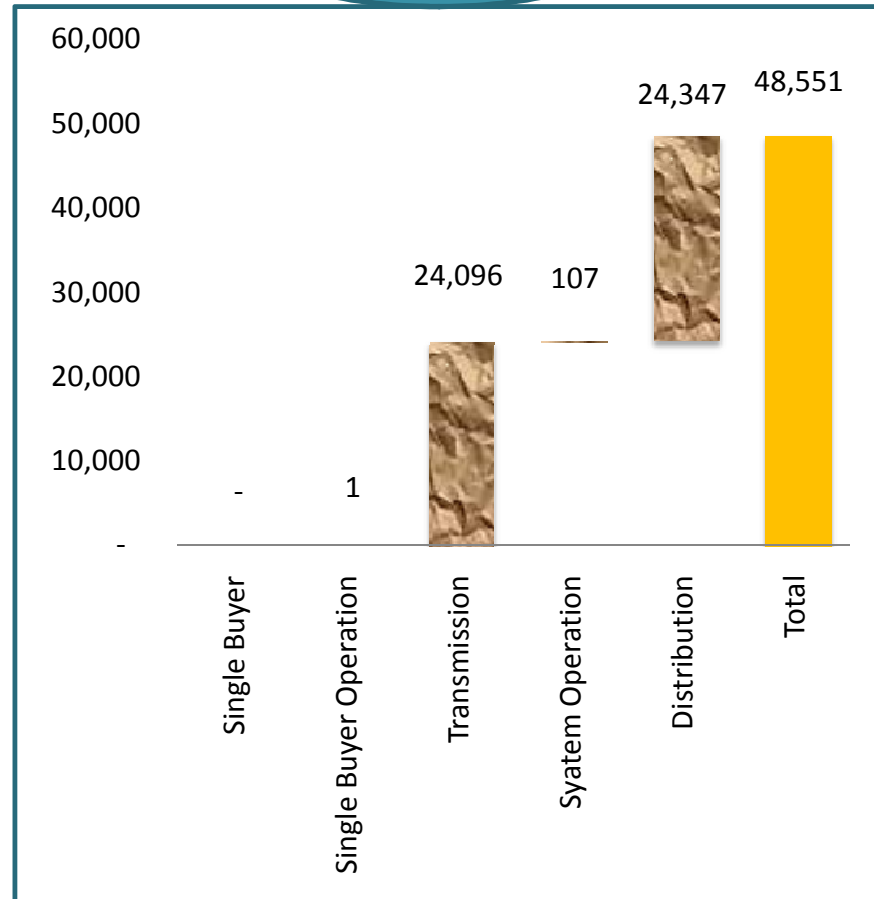


## Average Rate Base (RM Million)

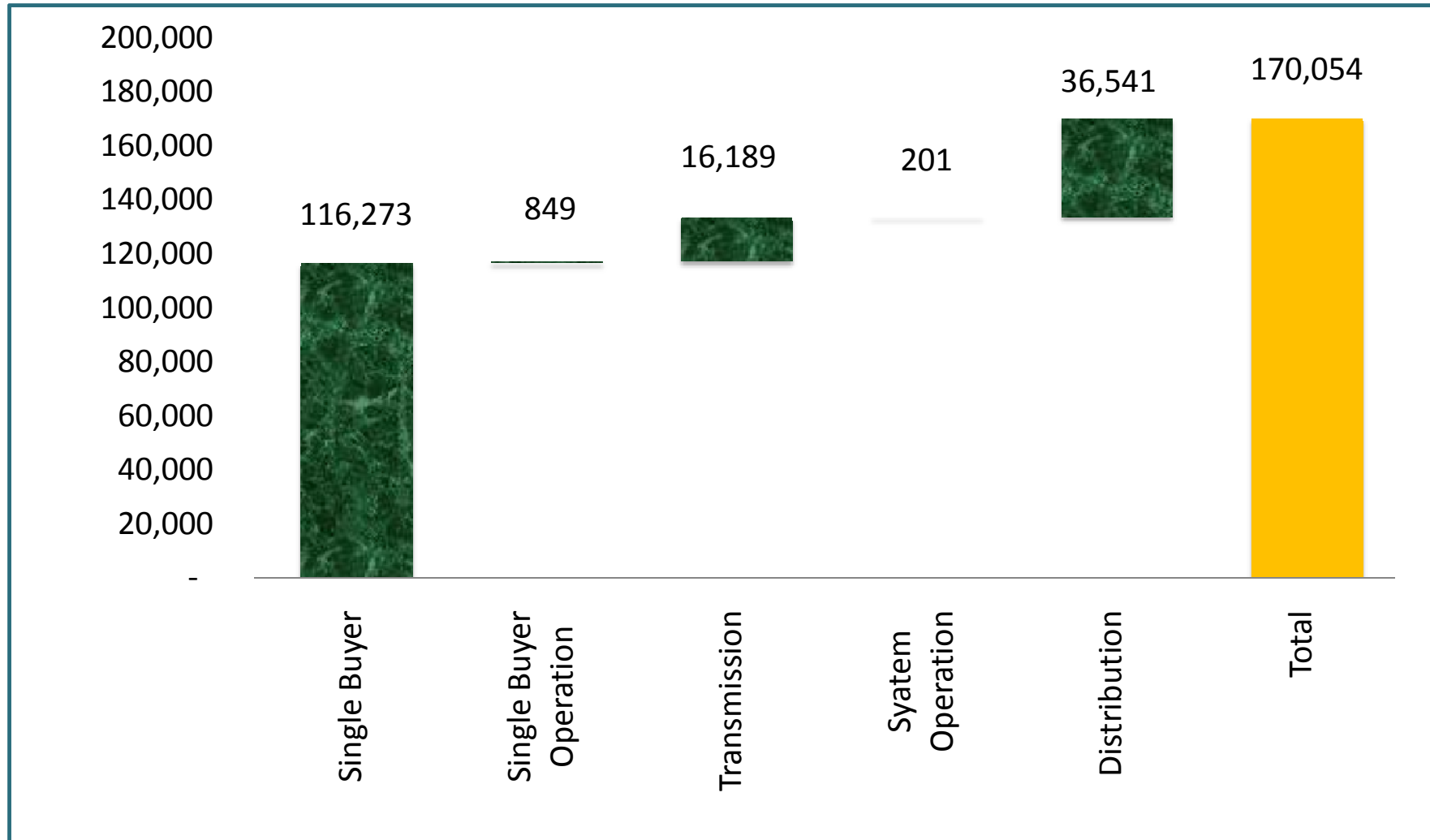
2016



2017

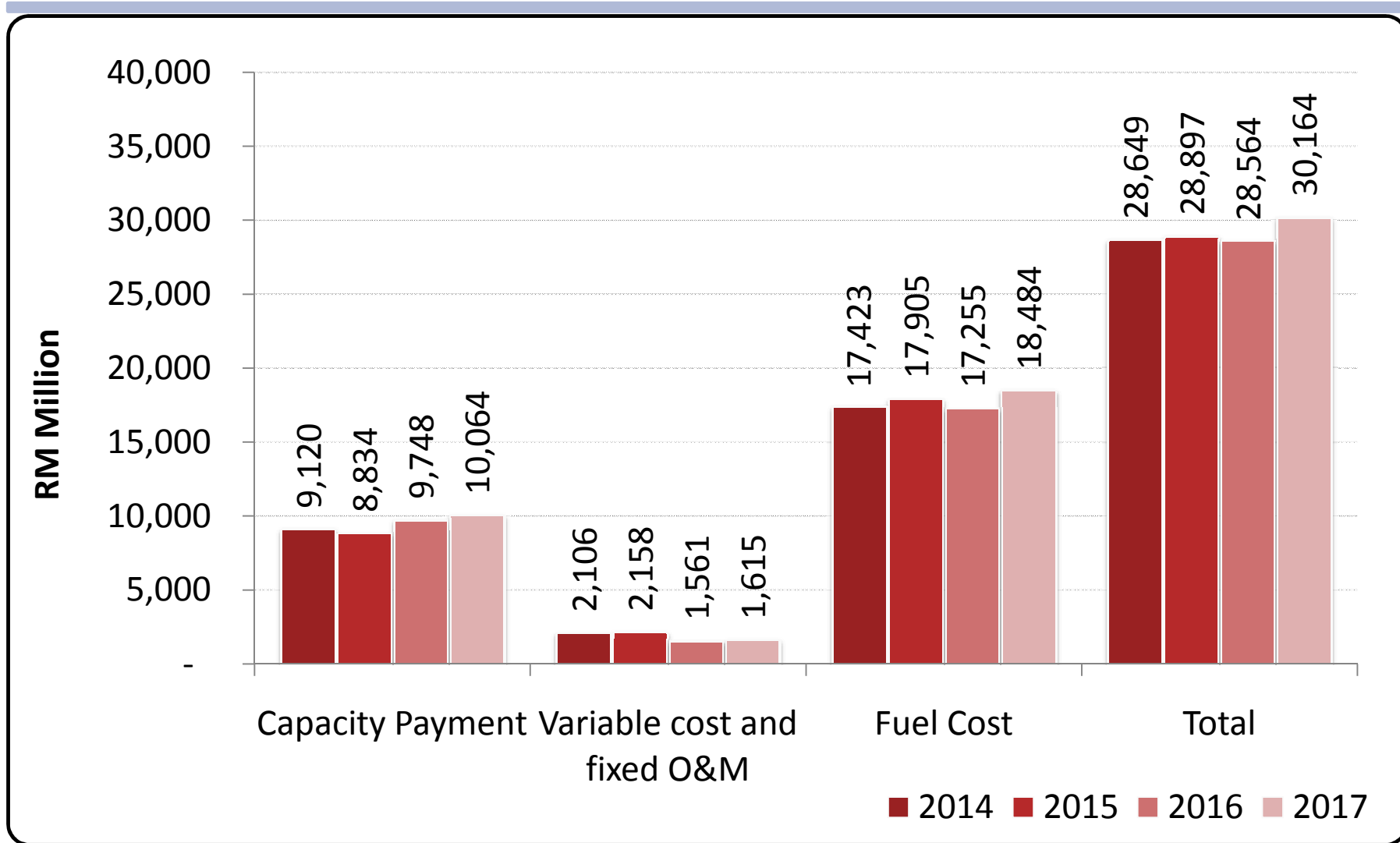


## TNB's Revenue Requirement 2014-2017 (RM Million)

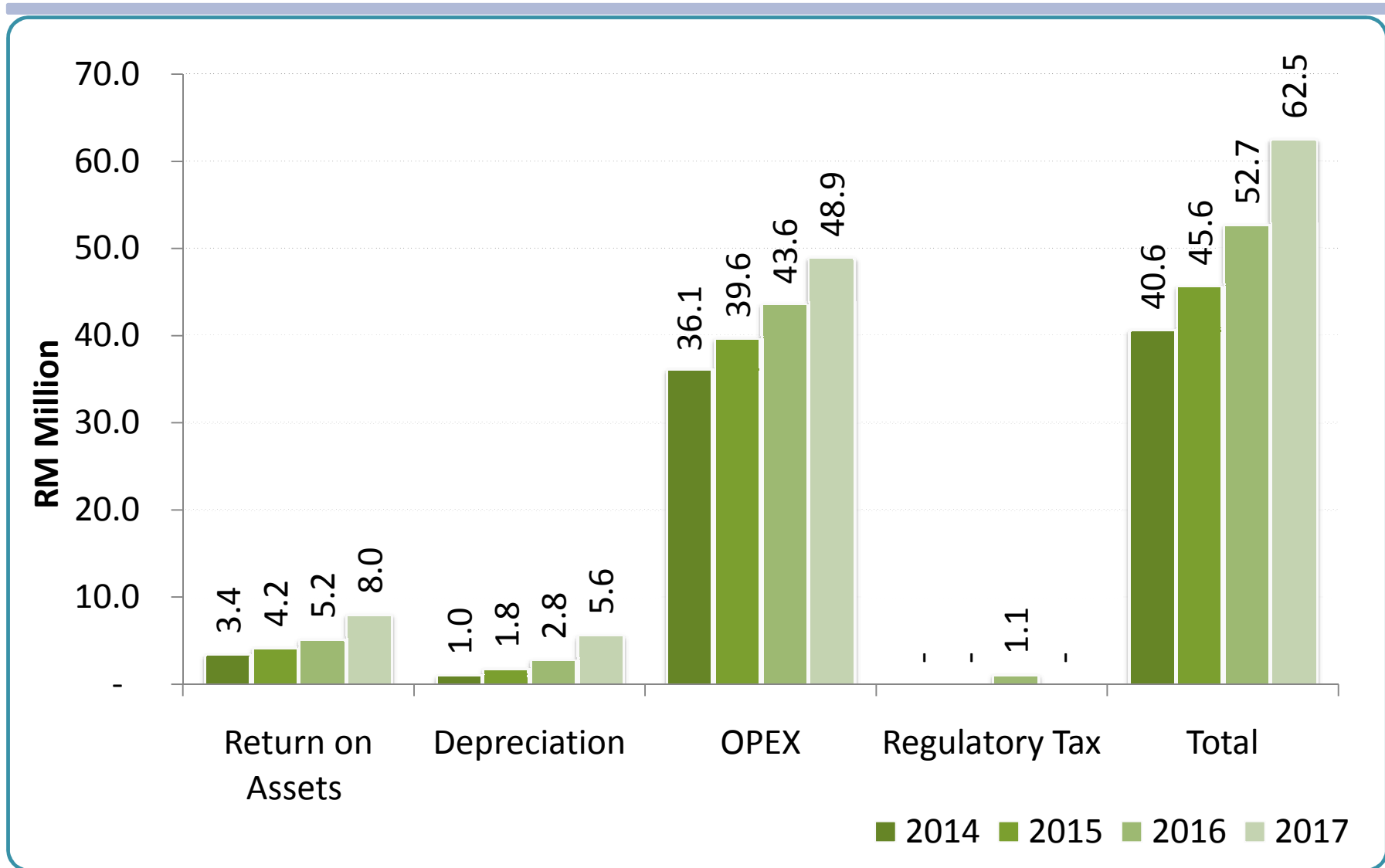




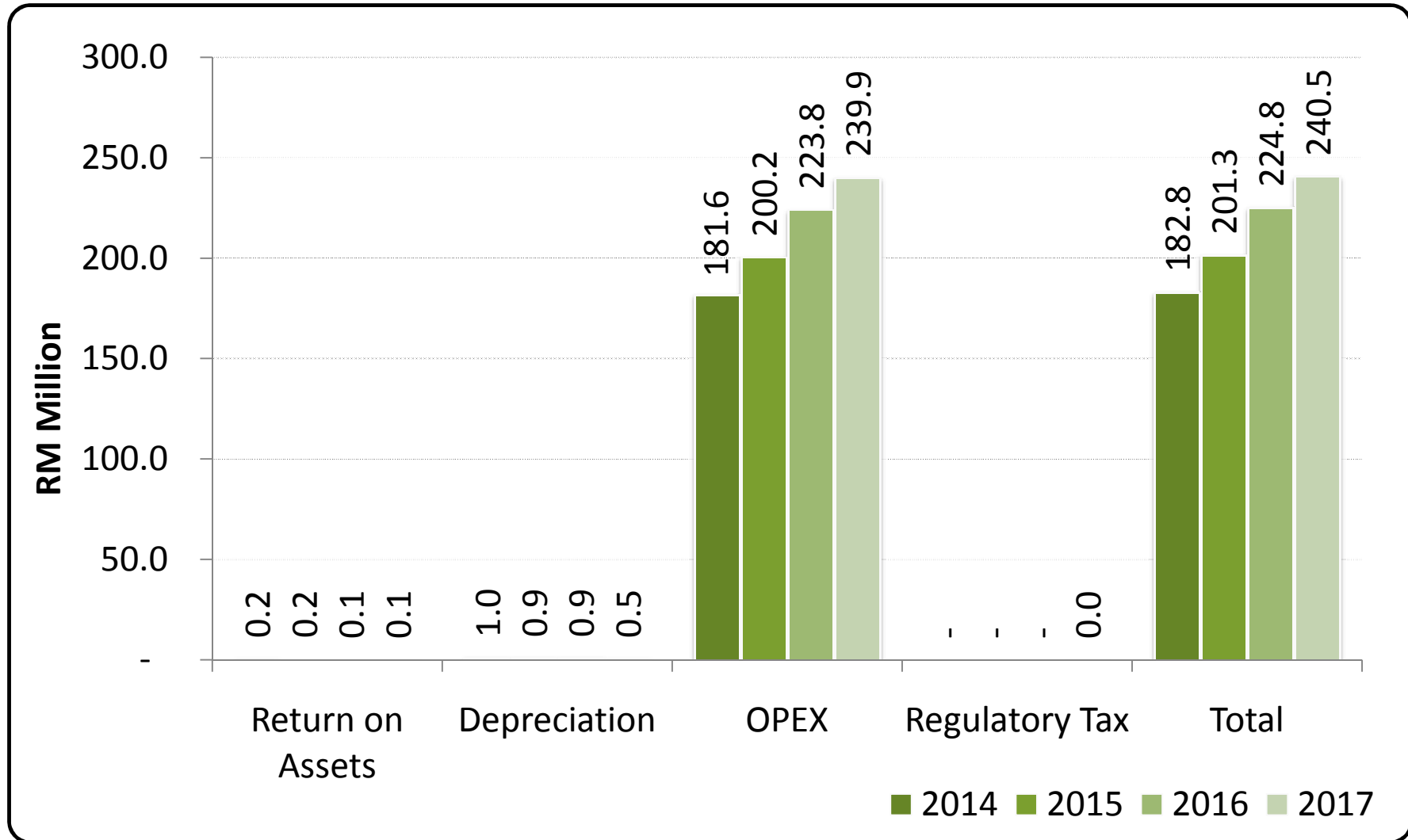
## Single Buyer Revenue Requirement (RM million)



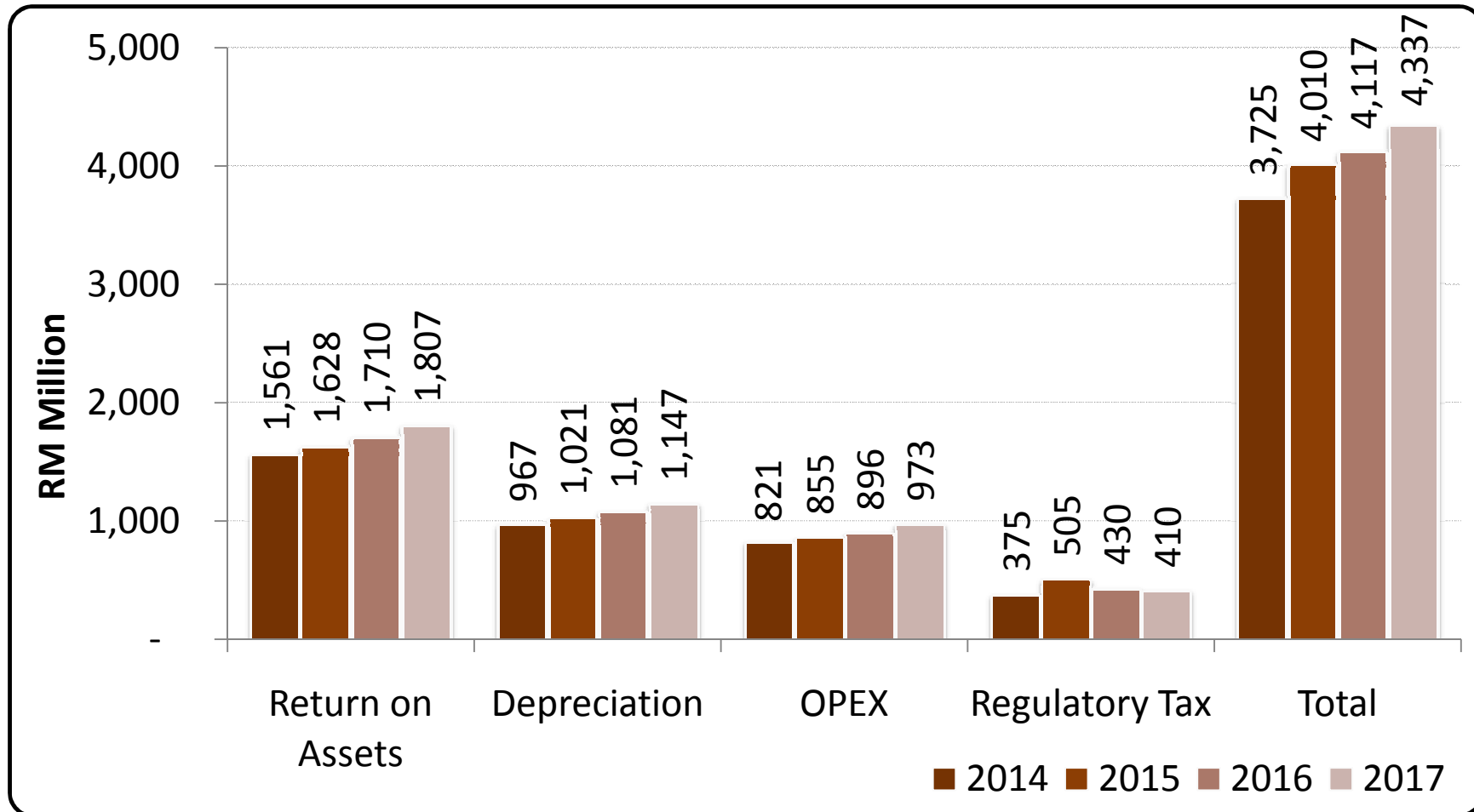
## System Operation Requirement (RM million)



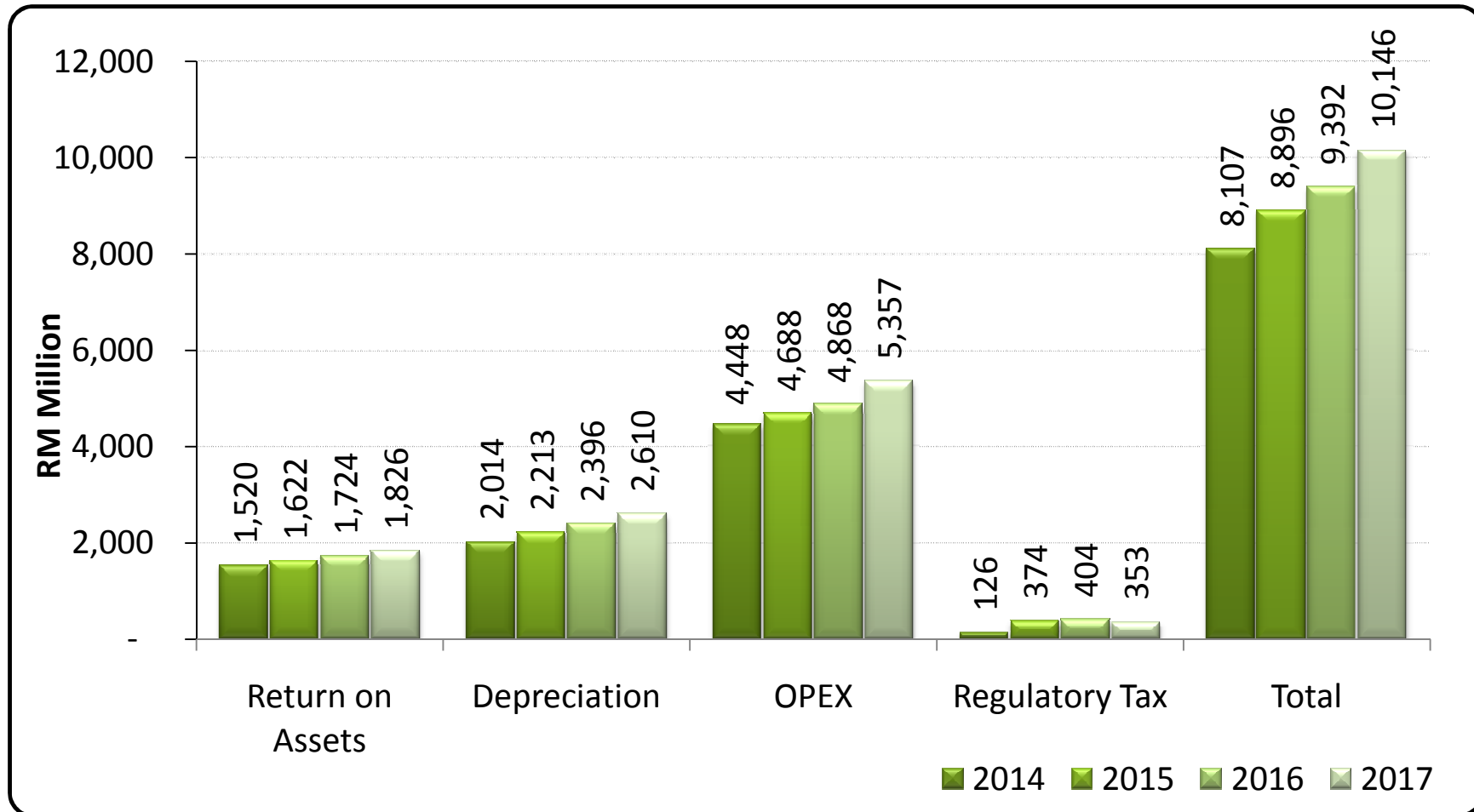
## Single Buyer Operation Requirement (RM million)



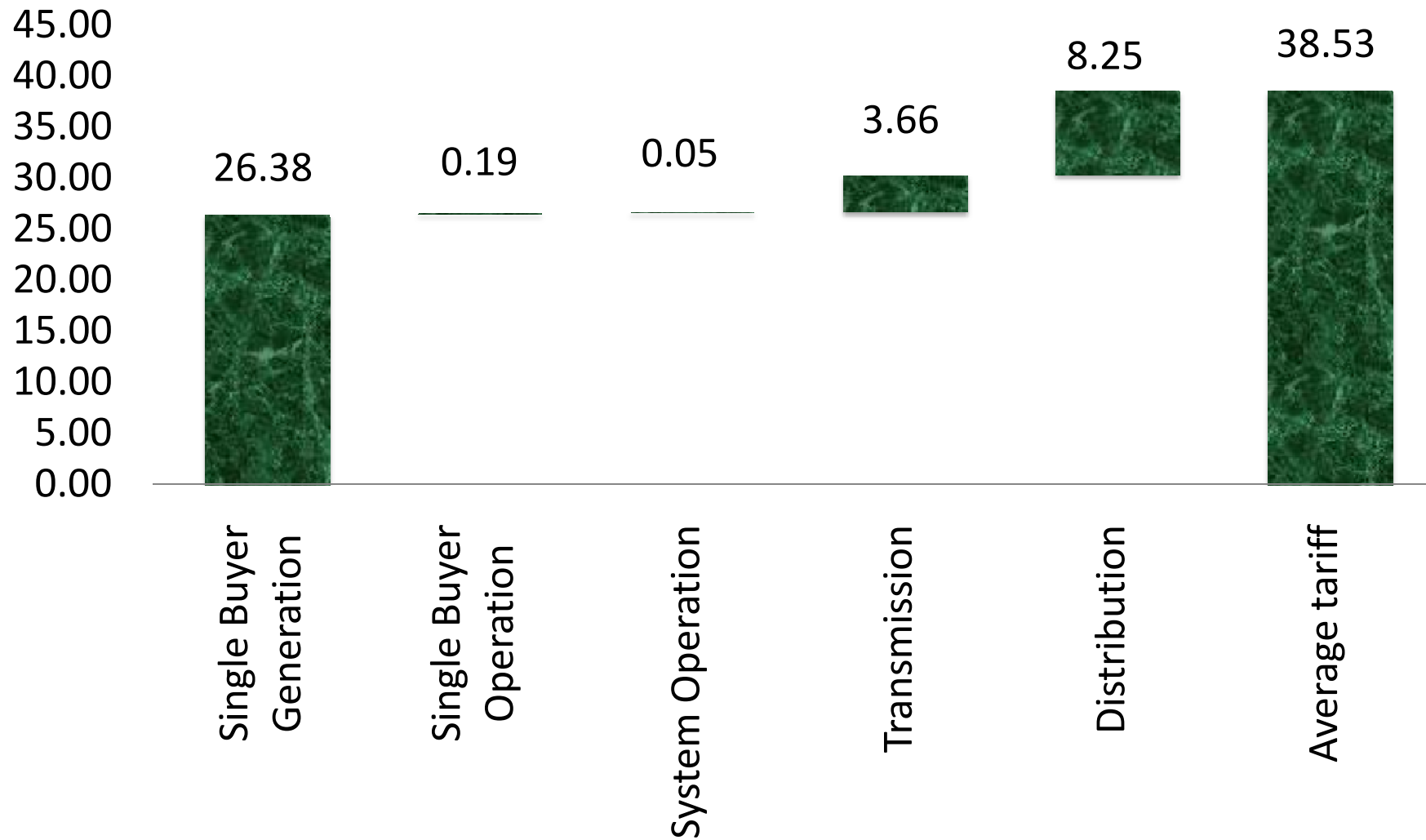
## Transmission Revenue Requirement (RM million)



## Distribution Revenue Requirement



## Conclusion : Average Tariff in sen/kWh





**Thank you**