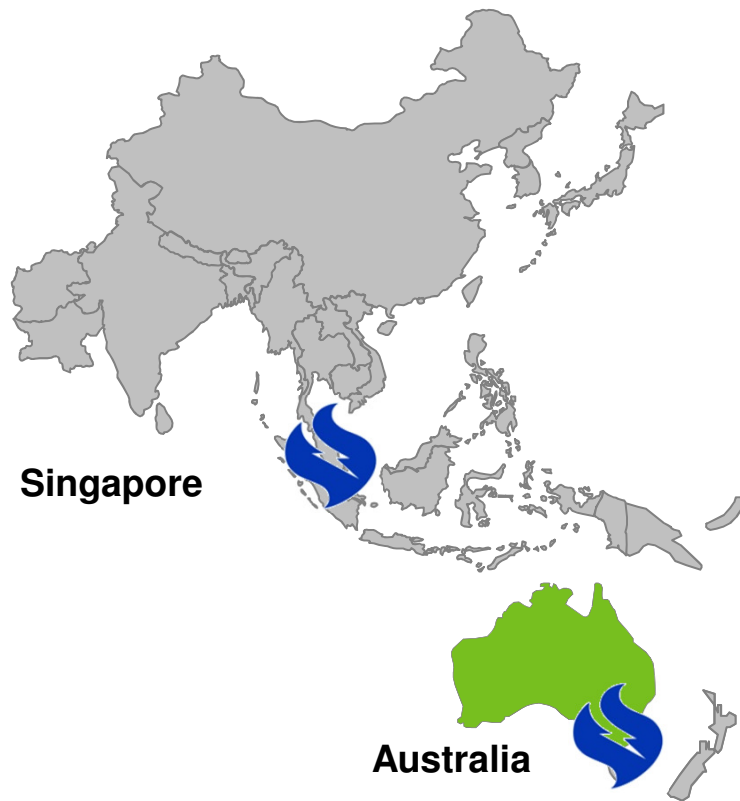


# ***Retail Competition for Electricity Supply in Singapore***

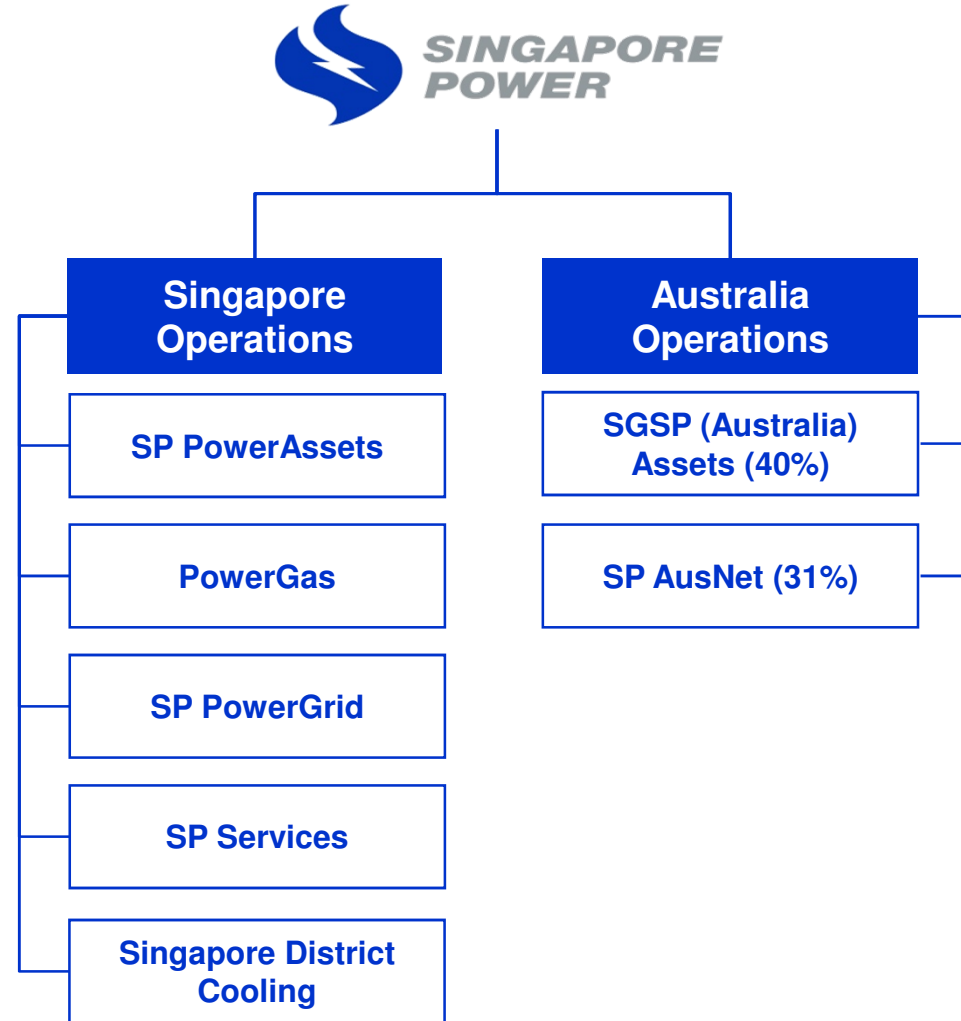
***25 Nov 15***

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# Singapore Power Group

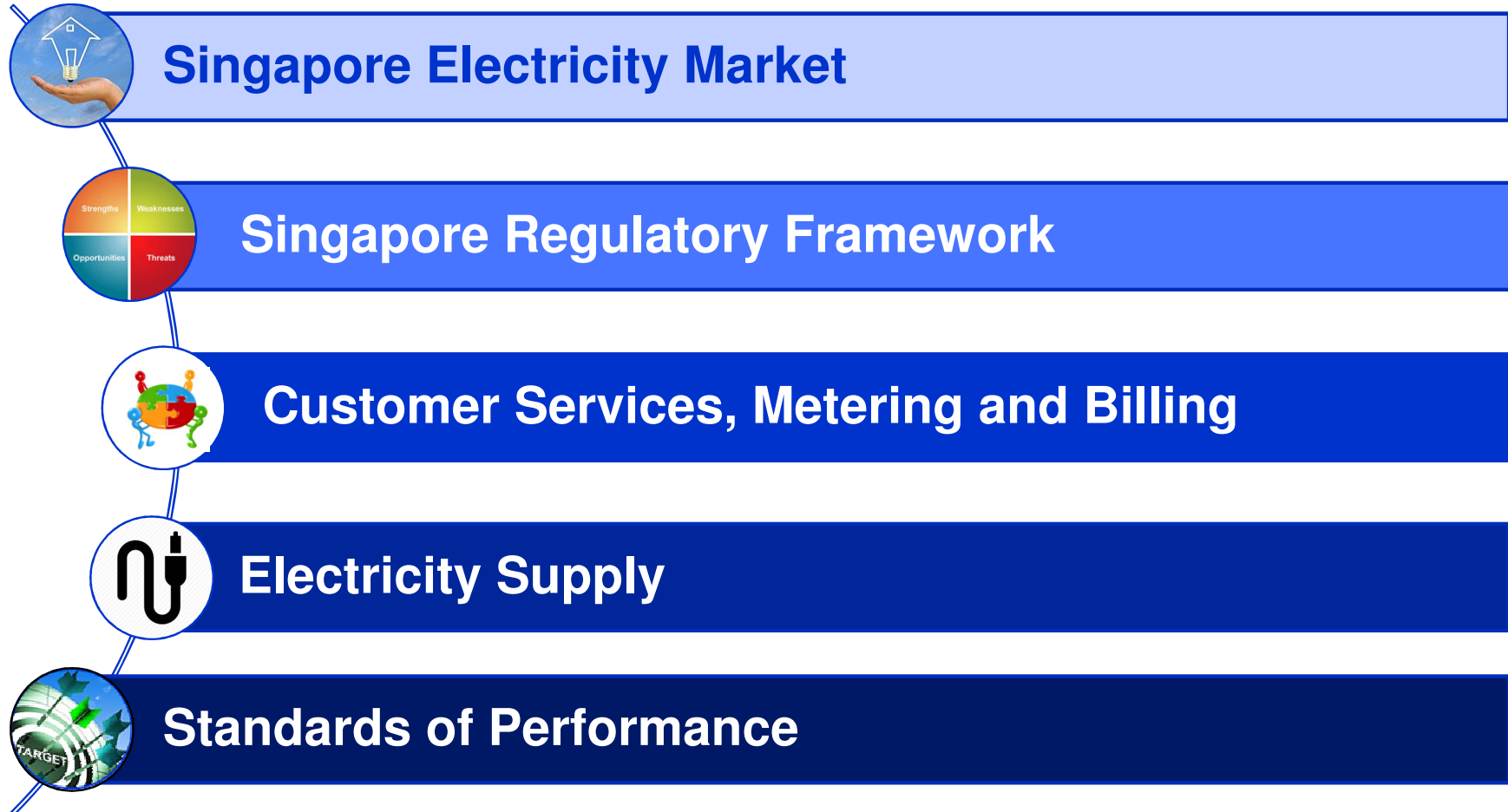


**Total Assets: S\$16B**



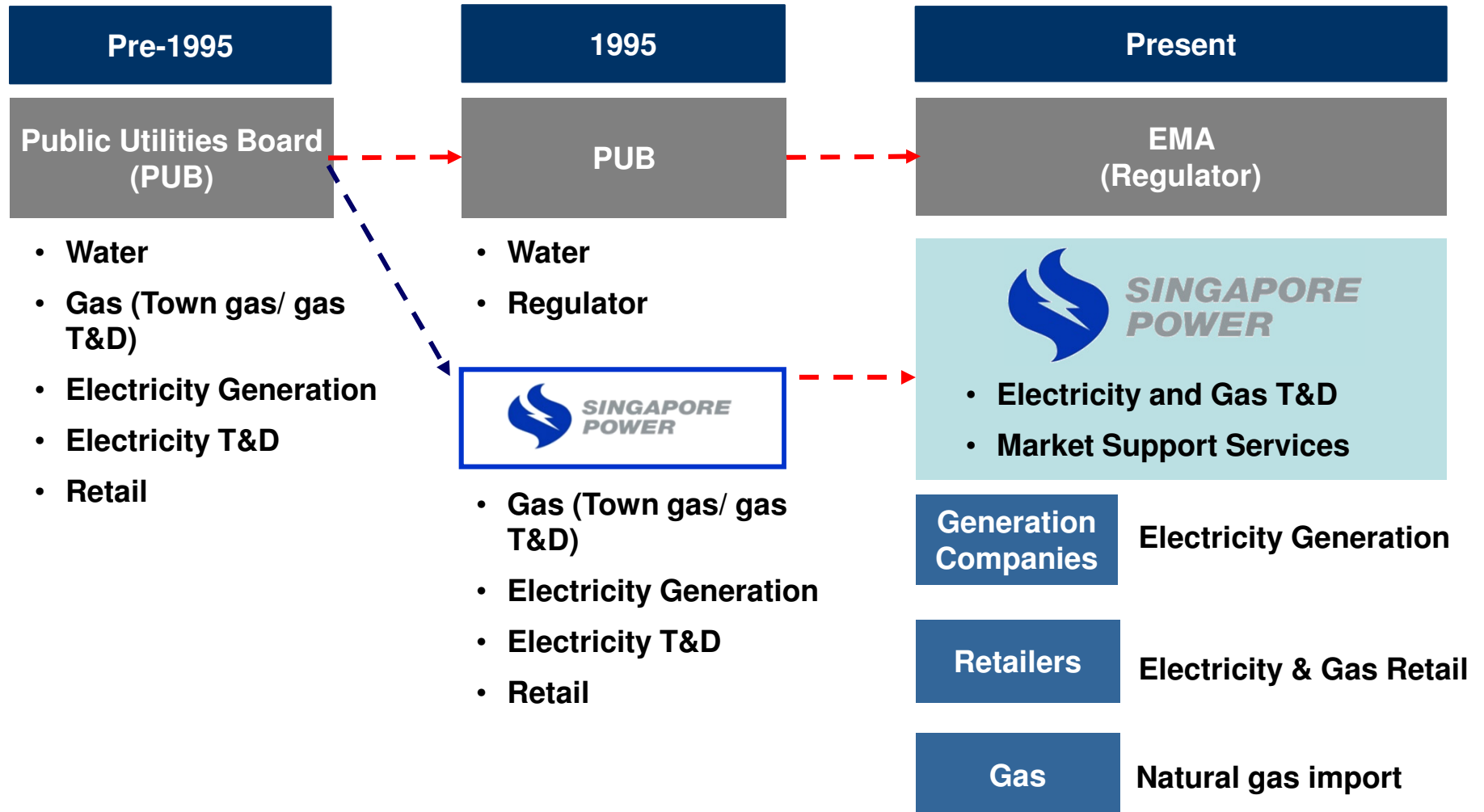
# Presentation Outline

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# **Singapore Electricity Market**

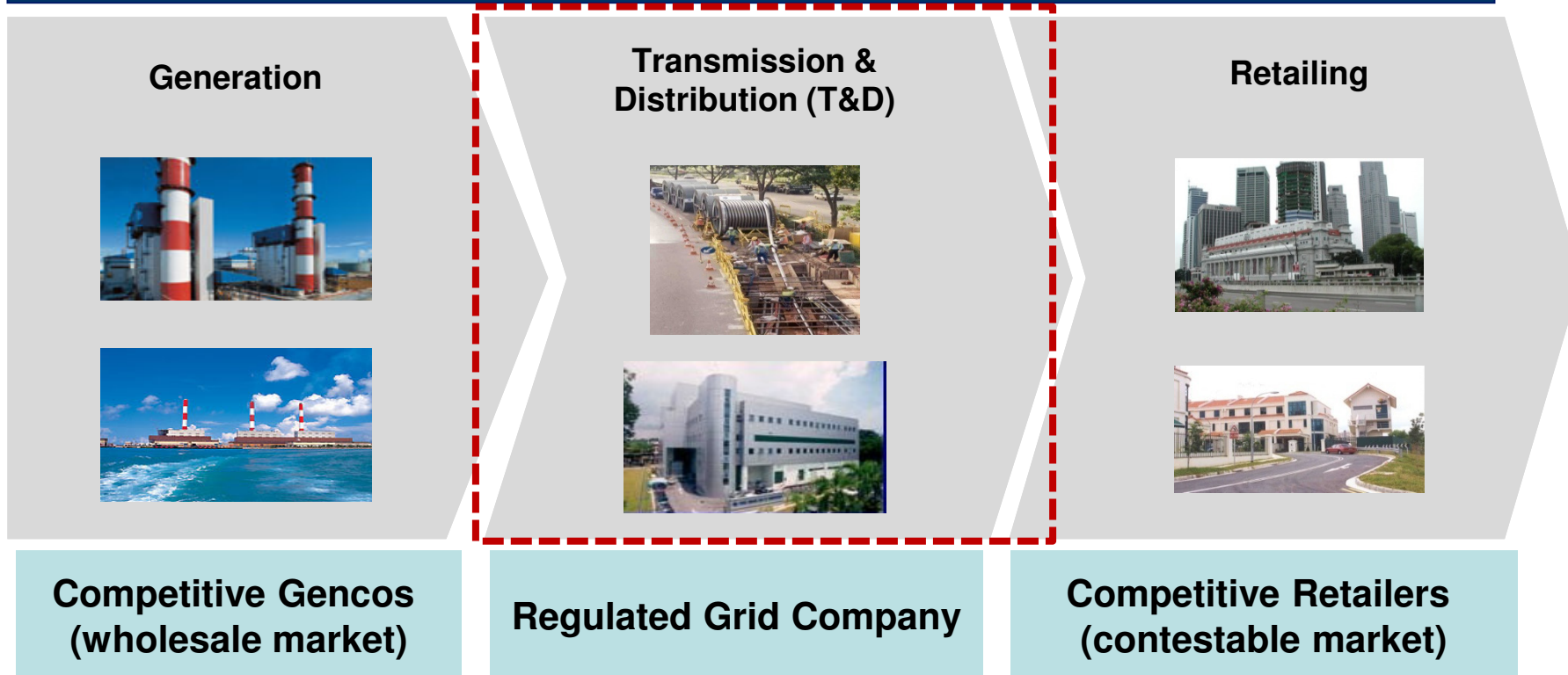
# Industry Restructuring



# Singapore Electricity Market Structure

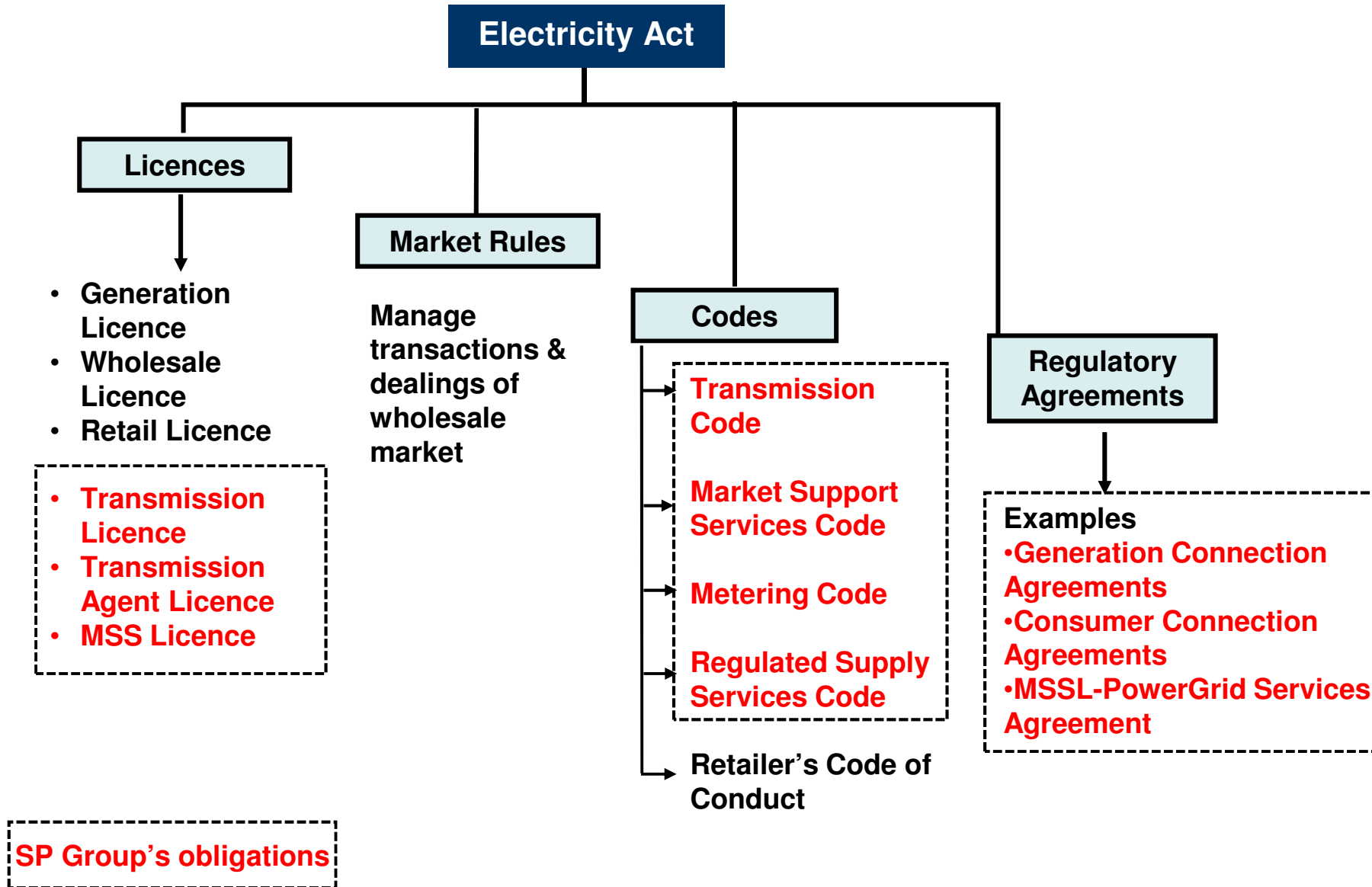
 **Energy Market Authority (Regulator & system operator)**

 **Energy Market Company (Wholesale market operator)**

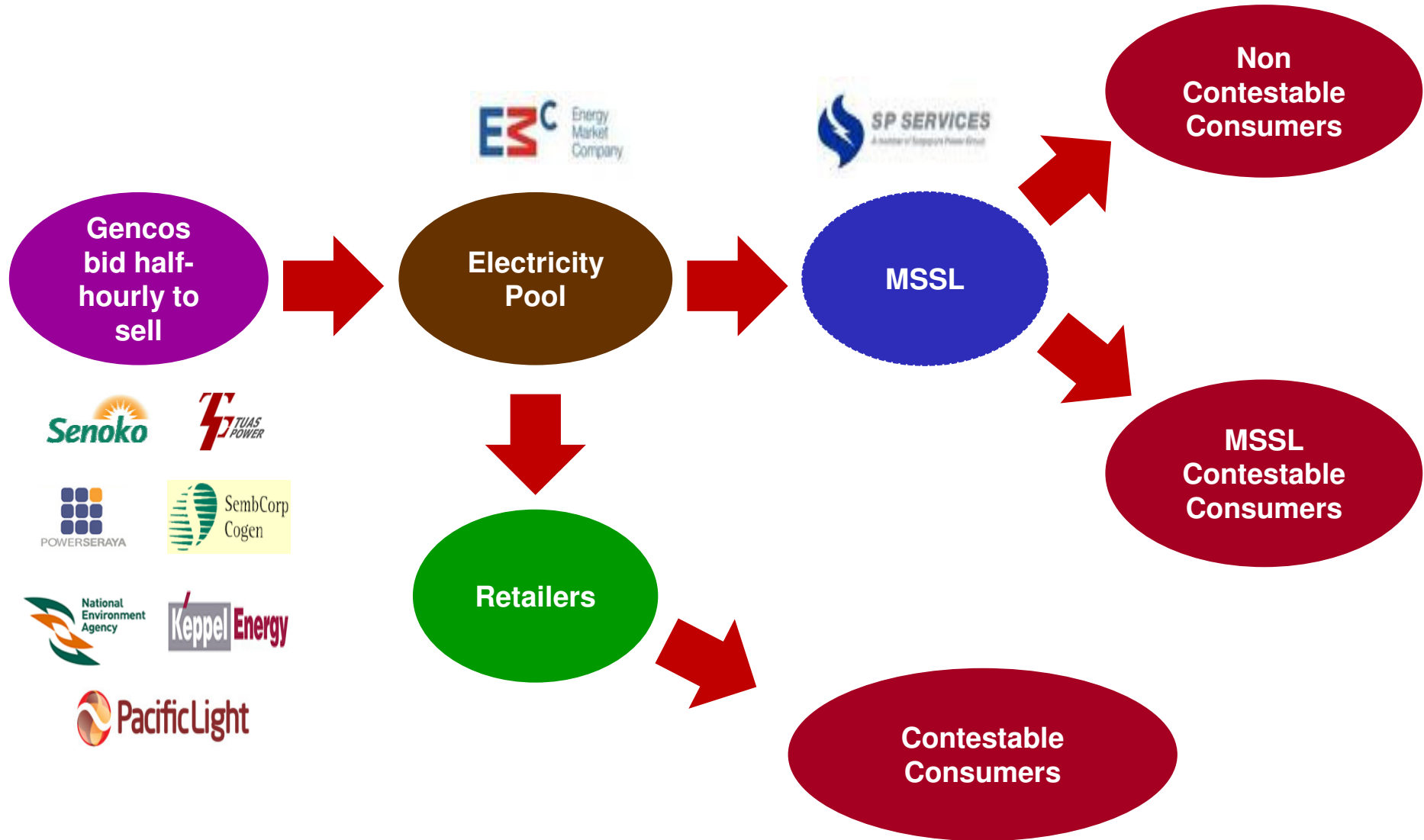


**Competitive sectors separated from monopoly sector**

# Legislative Framework

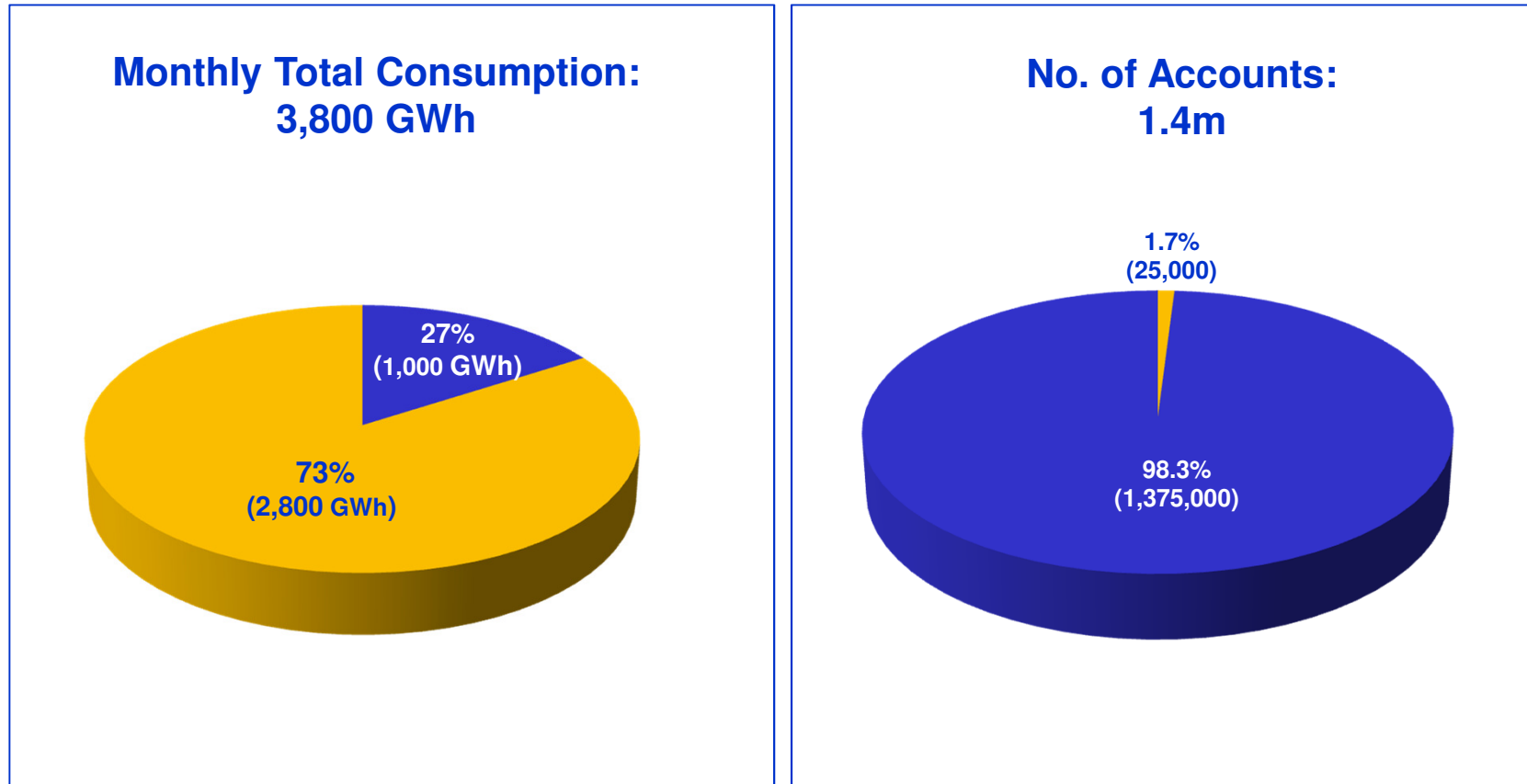


# National Electricity Market





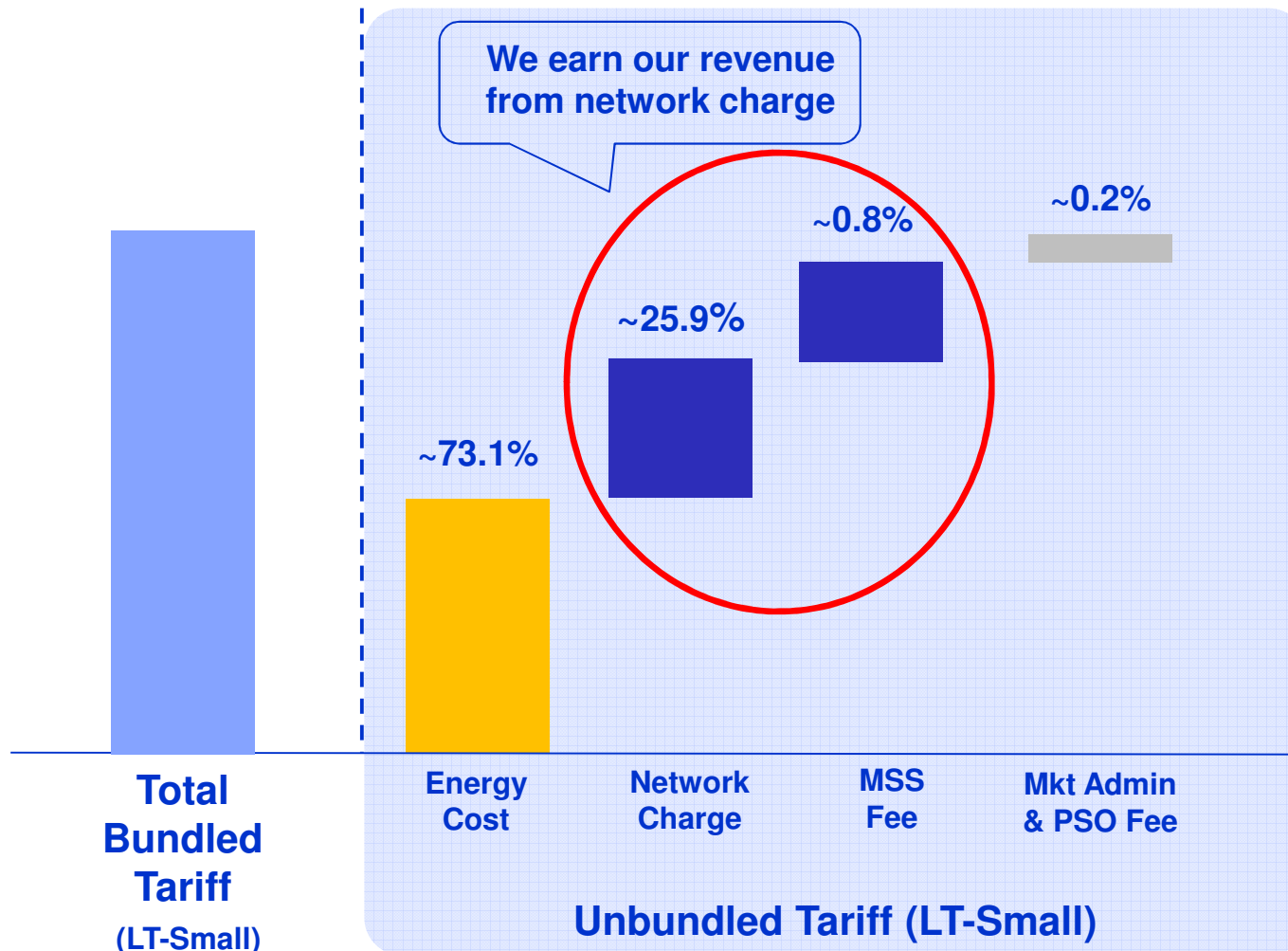
# Consumer Consumption



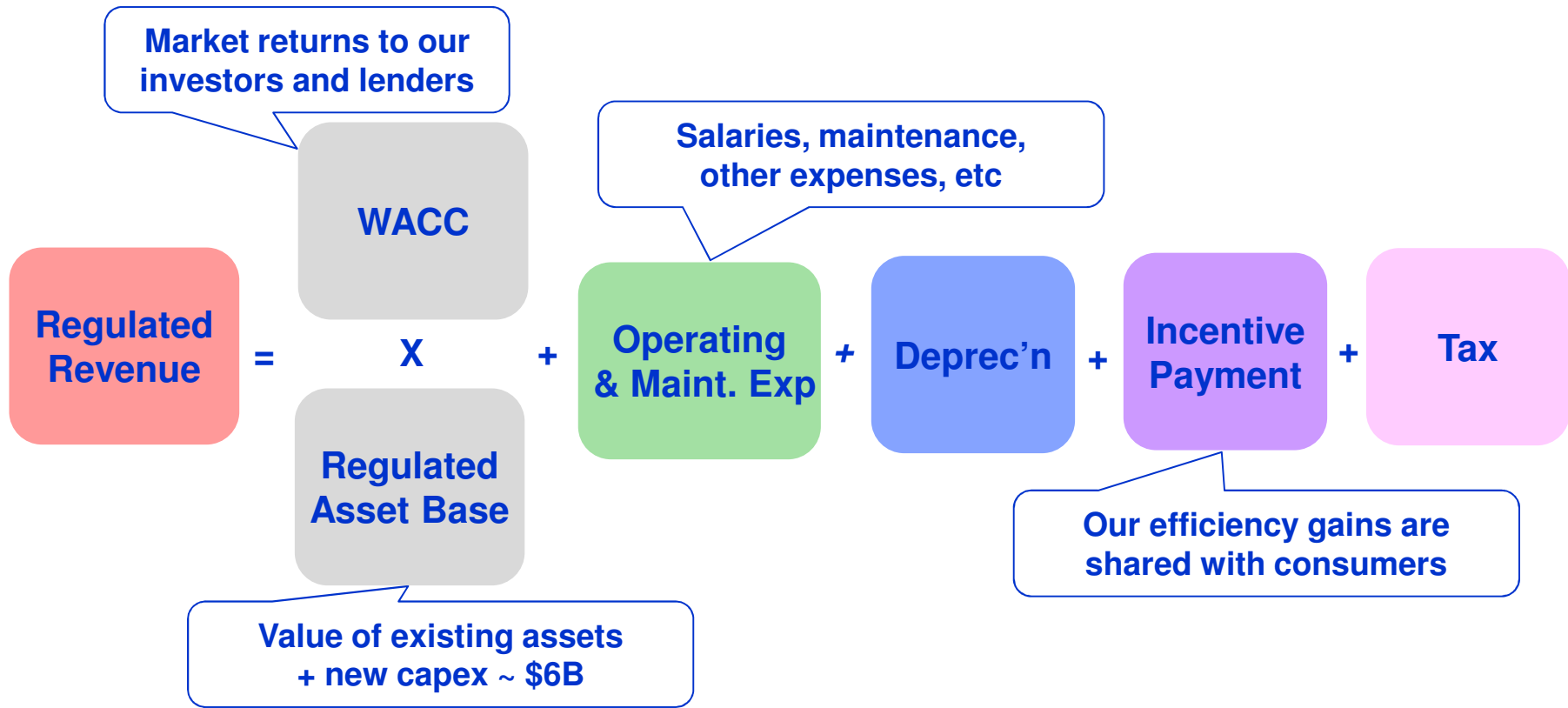
 Contestable Consumers     Non Contestable Consumers

# **Singapore Regulatory Framework**

# Singapore Tariff Composition

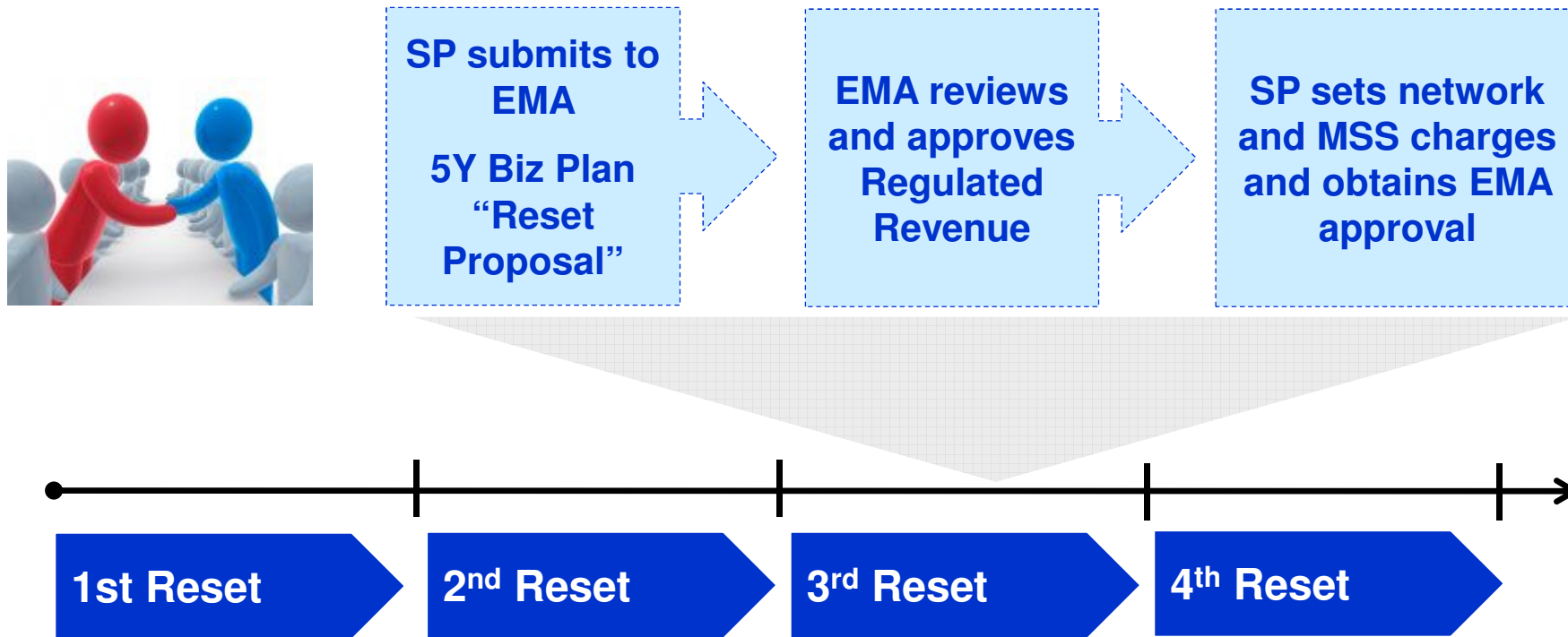


# Network Charge Computation



$$\text{Network charge (¢/kWh)} = \frac{\text{Regulated Revenue}}{\text{5-year Sales Volume Forecast}}$$

# Regulatory Reset Cycle



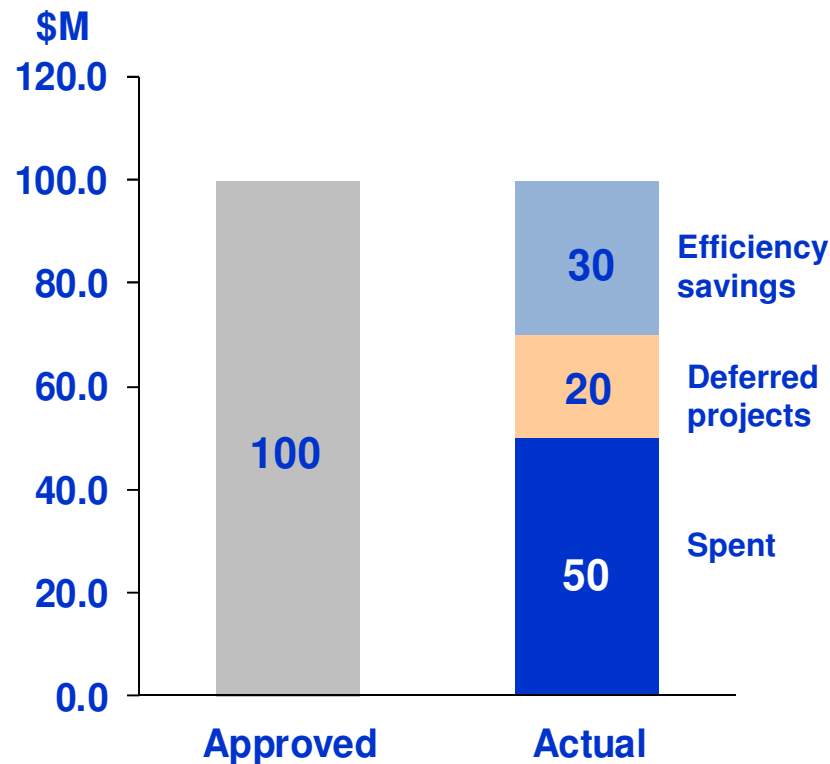
**Tariff components determined by regulator once every 5 years**

# The Customers We Serve

	Customer Number as at 31 Mar 15	Sales Volume FY14/15 (%)	Example of Customers
Ultra High Tension	1	1%	Large industrial customer
Extra High Tension	45	19%	Large industrial customers
High Tension Large	700	37%	Large industrial customers
High Tension Small	600	5%	Small industrial customers
Low Tension Large	19,500	11%	Small and Medium-sized Enterprises
Low Tension Small	1.42 million	27%	Households & Small Businesses
<b>Total</b>	<b>1.44 million</b>	<b>44,866GWh</b>	-

# Efficiency Scheme

## Capex



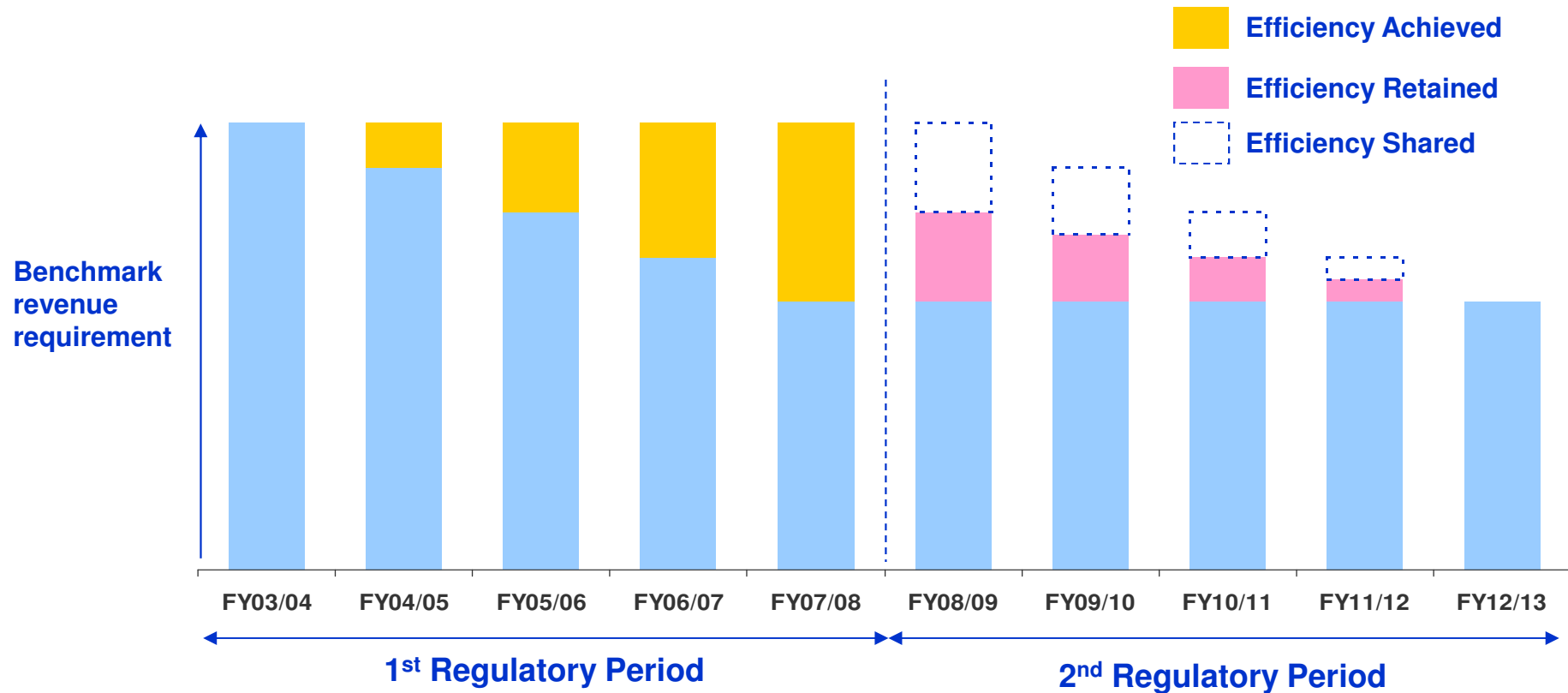
## Example

Approved Capex	\$100m
<u>Actual Capex</u>	<u>\$50m</u>
Difference	\$50m
- Due to deferrals	\$20m
- <b>Due to efficiency</b>	<b>\$30m</b>
Efficiency savings based on 50:50 share in next regulatory period	

**Scheme promotes drive for efficiency and sharing of benefits to consumers**

# Capex & Opex Efficiency Carryover Incentive

- 50/50 share with customers in next regulatory period
  - Capex efficiency = WACC x allowed variances
  - Opex efficiency = allowed variances
  - 40-30-20-10-0 Glide Path





## **Customer Services, Metering and Billing**

# Introduction to SP Services



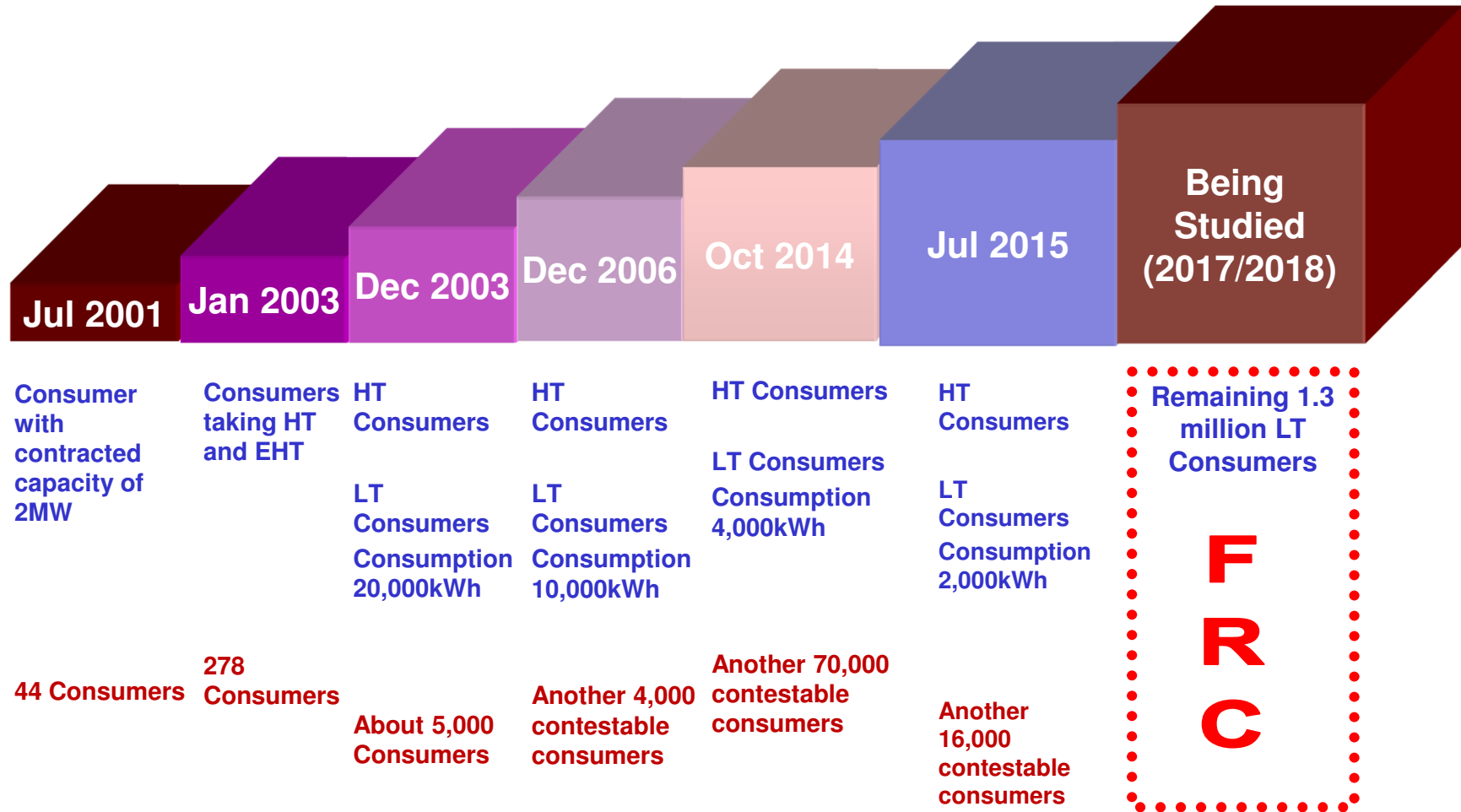
**Provides convenient and cost-efficient customer service**

# Role of Market Support Services Licensee

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# Retail Contestability



# Full Retail Contestability

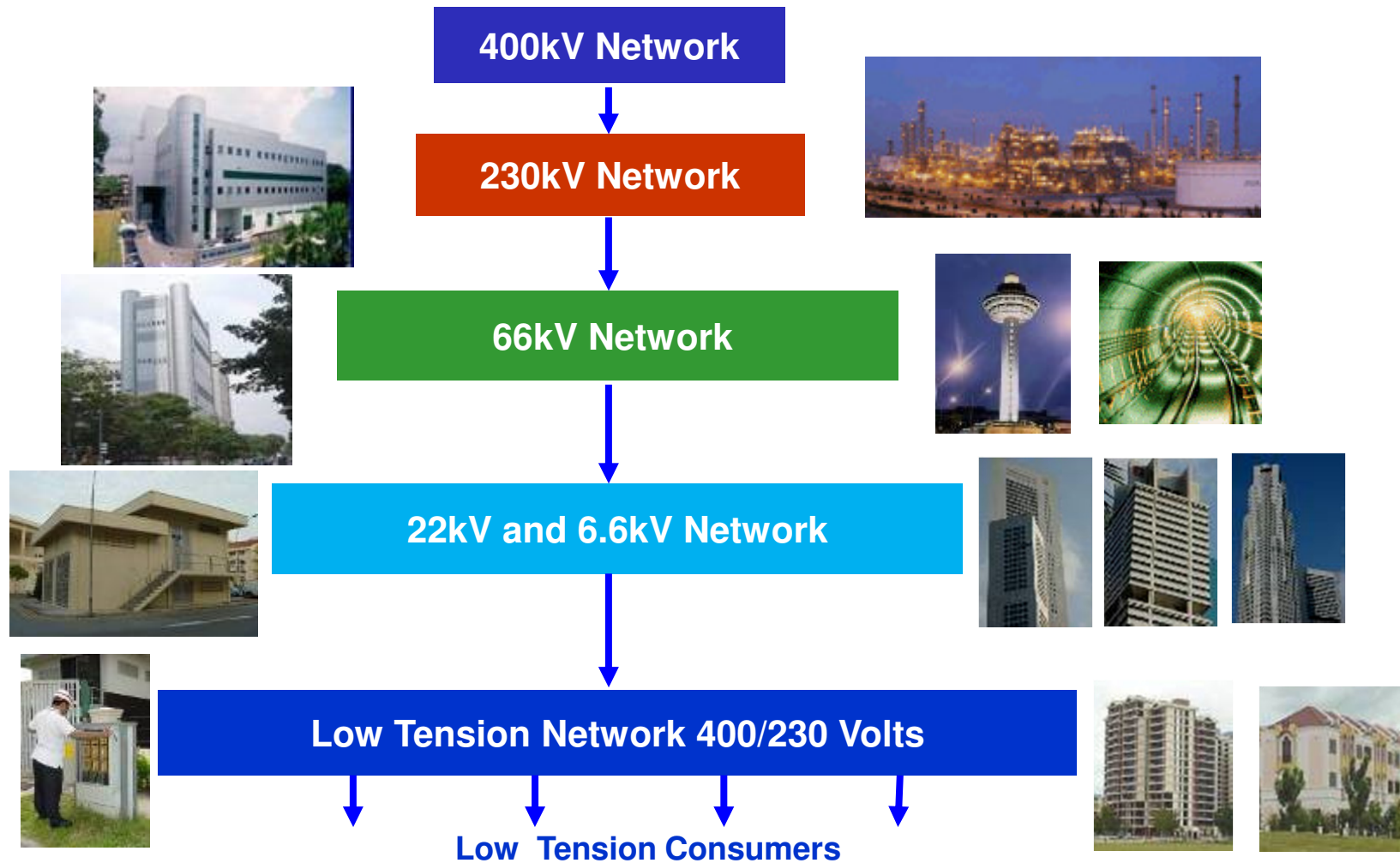
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- Enables remaining 1.3m consumers to buy electricity from retailer of their choice
  - Smart meters to be installed for non-residential
  - Load profiling to be used for settlement for residential
- Small contestable consumers allowed to return to non-contestable status buying electricity at tariffs
- SPS to continue providing metering & billing services & acting as default supplier for non-contestable consumers

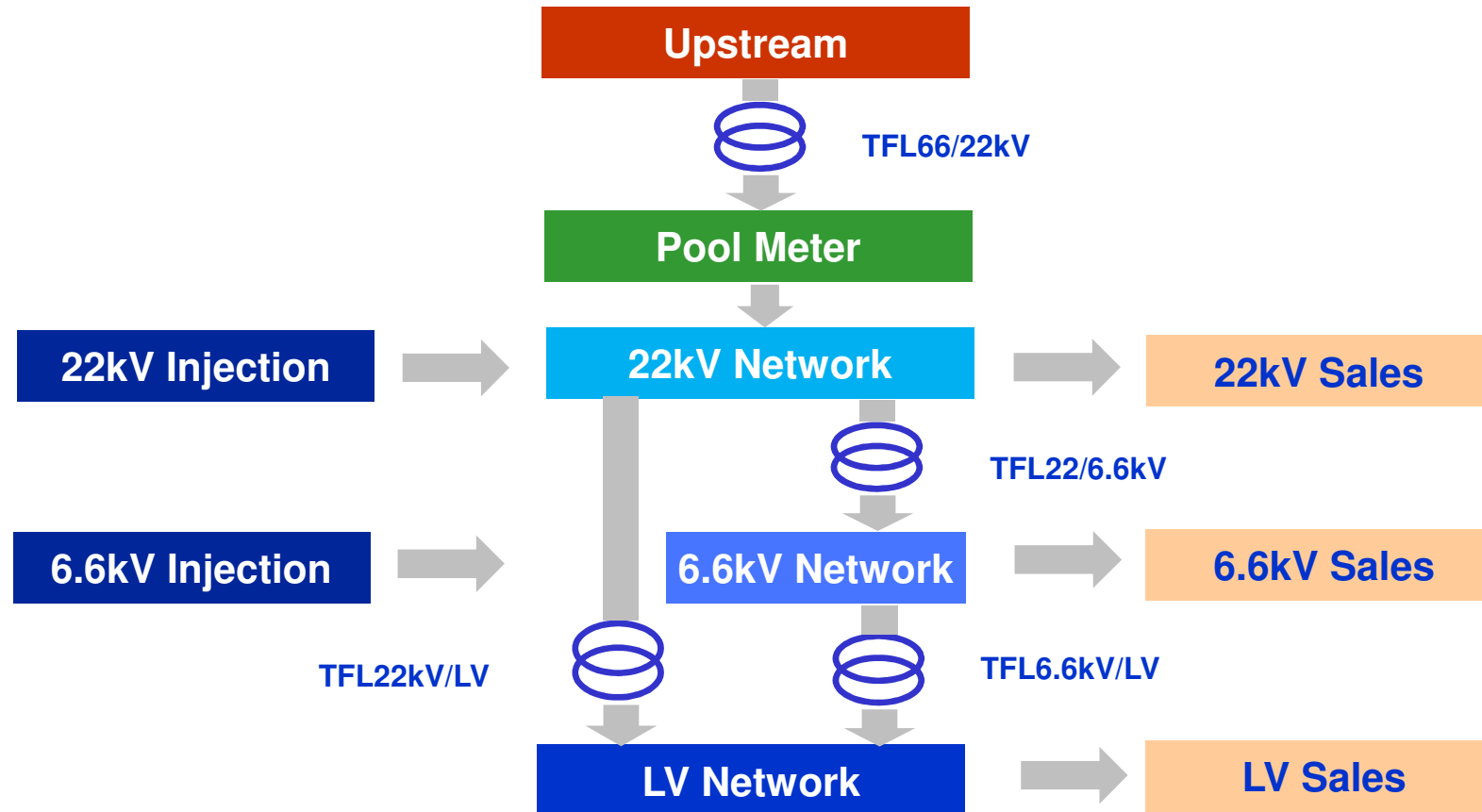
## **Electricity Supply**

# Electricity Network System



**Electricity Transmission & Distribution Assets of ~\$9B**

# Transmission and Distribution Losses

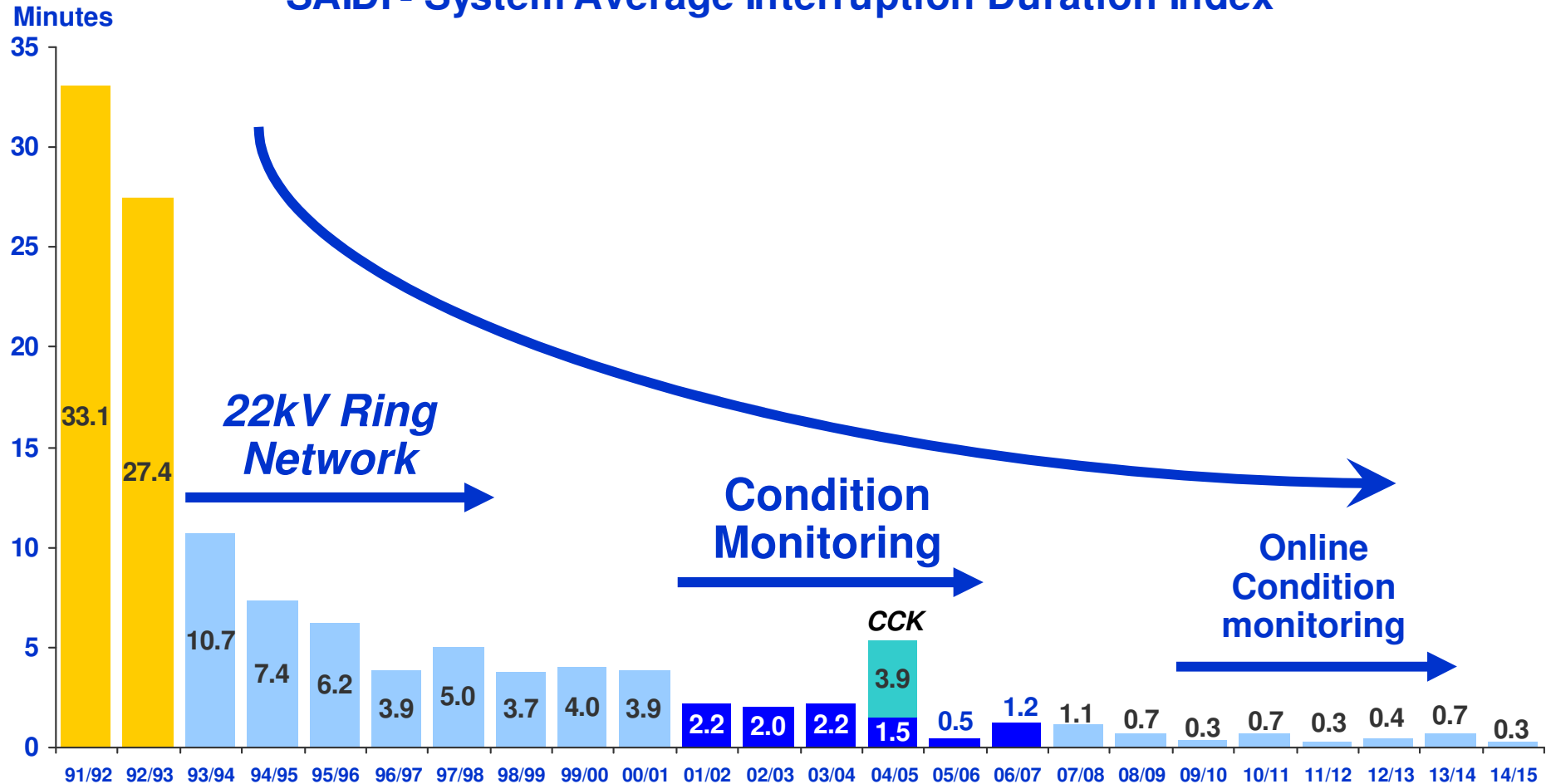


**Losses = Injection – Sales ~ 3%**



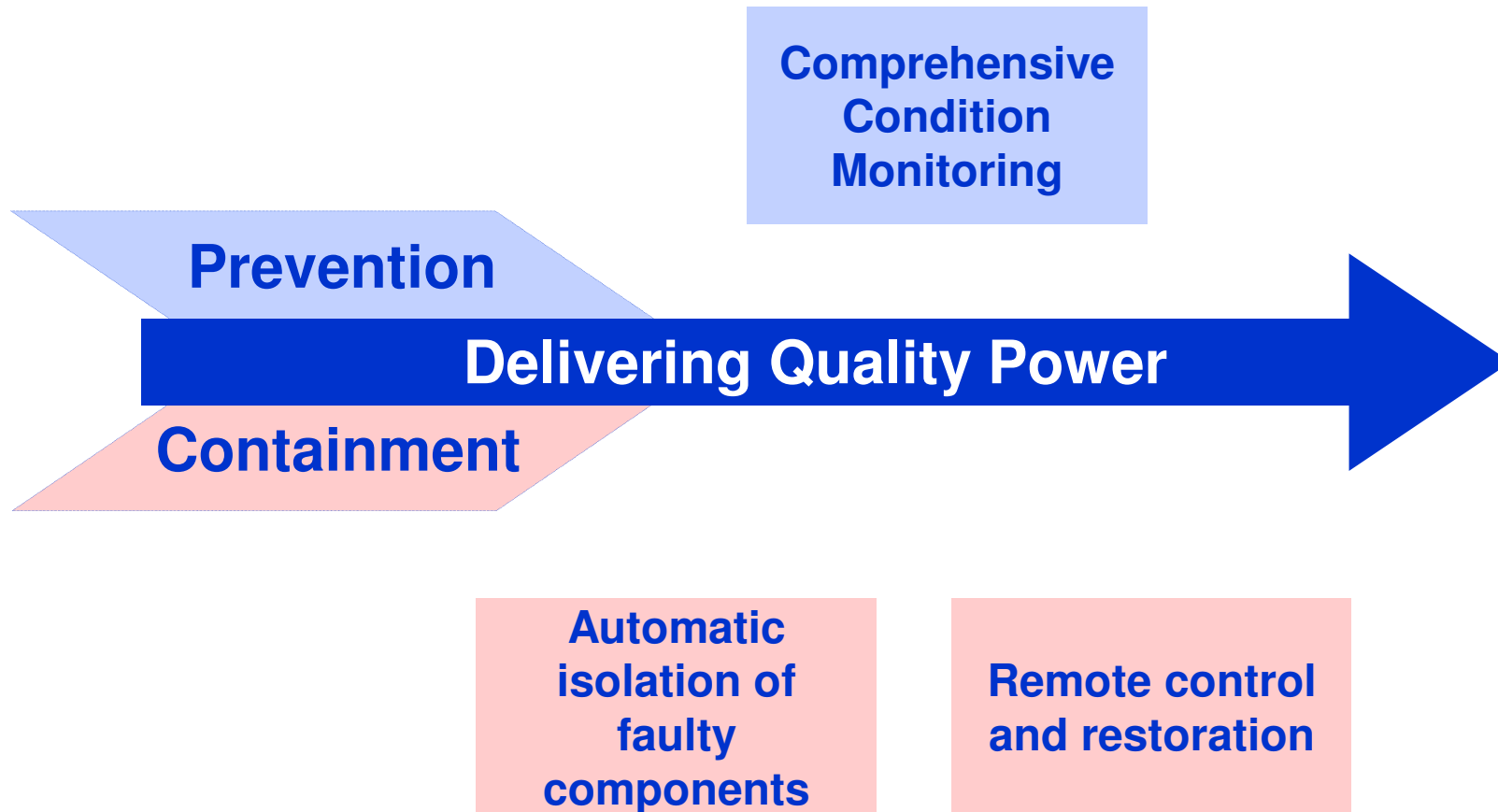
# Quality of Supply

## SAIDI - System Average Interruption Duration Index



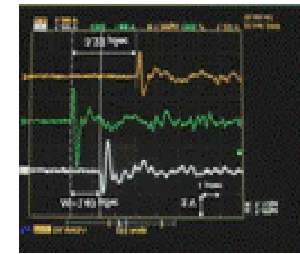
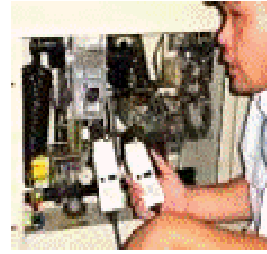
**< 1 minute of outage per customer per year**

# Quality Roadmap



**Two-pronged approach to deliver quality power**

# Network Health Screening

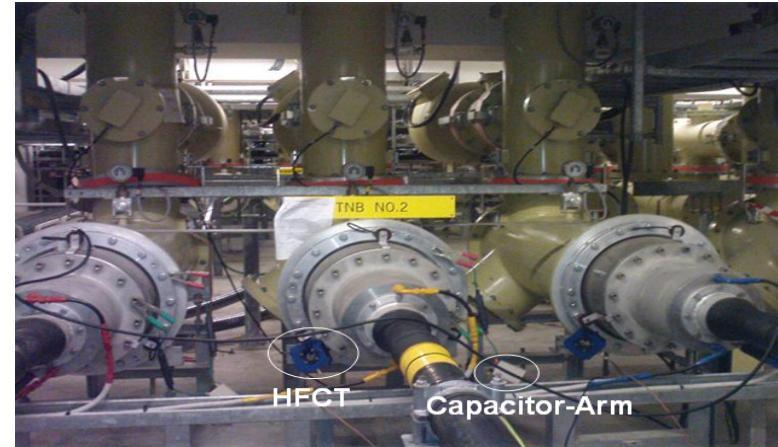


Condition Monitoring Systems	What They Detect
Thermal Scanning	Overheating
Oil Pressure Monitoring	Low pressure
Dissolved Gas Analysis	Abnormal oil contents
Distributed Temperature Sensing	Hot spots
Very Low Frequency Test	Low insulation
Partial Discharge Monitoring	Minute current leakage
Operating Mechanism Monitoring	Abnormal operation

# Technology Applications



**400kV/230kV Potential Transformers  
Zero Sequence Measurement**



**400kV/230kV Cable Terminations  
High Frequency CT & Capacitor-Arm method**



**230kV Cables  
Oscillating Wave Test System**



**Oscillating Waveform Testing Fleet**

## **Standards of Performance**

# SPPA's Regulatory Performance Standards (with Penalty)



Service Dimension	Description	Service Standard	Performance Target
<b>Reliability of Supply</b>	Number of power failure incidents* caused by failure of, damage to, or operation of Licensee's equipment or cables rated at 6.6kV and above, and power transformers rated at 22kV and above	0	100%
<b>Quality of Supply</b>	Number of voltage dip incidents* due to failure of, damage to, or operation of Licensee's equipment or cables rated at 22kV and above	0	100%
<b>Restoration of Supply</b>	Time taken to restore electricity supply for each power failure due to failure of, damage to, or operation of Licensee's equipment or cables rated at 22kV and below	3 hours 2 hours	100% 90%

\* Only incidents where the Licensee is determined by EMA to be at fault will be counted

# SPPA's Regulatory Performance Standards (without Penalty)



Service Dimension	Description	Service Standard	Performance Target
Availability of Supply	Minimum advance notice for planned interruption of electricity supply	7 calendar days	95%
Quality of Supply	Time taken to rectify voltage complaint or limit violation	2 calendar days	95%
	Time taken to correct a voltage complaint that requires network reinforcement	6 months	99%

# SPPA's Regulatory Performance Standards (without Penalty)(cont'd)



Service Dimension	Description	Service Standard	Performance Target
Providing Supply	Time taken to implement electrification scheme requiring new substations after takeover of substation (up to 22kV)	10 weeks	90%
	Time taken to implement service connection requiring cable installation work, after premises to be supplied with electricity is ready to receive cable	6 weeks	90%
Customer Contact	Time taken to reply to a written complaint	7 working days	95%
Metering Services	Time taken to attend to meter problem at site upon notification	8 calendar days	95%





**P**  **WERING**  
**THE NATION**