



## UTILITY PROVISION & REGULATION

A rethink of the national electricity tariff regime - pay what you consume, direct or cross subsidization or hybrid policy?

Ghana Mining and Energy Summit 2017  
Accra International Conference Centre  
June 1, 2016



**Samuel Sarpong, Executive Secretary  
Public Utilities Regulatory Commission**

# PRESENTATION OUTLINE

- Overview Power Sector and Tariff Policy
- Cost Reflective Tariff and Subsidisation
- Self Generation and Subsidisation
- Way Forward

# OVERVIEW POWER SECTOR AND TARIFF POLICY

# Changing Power Sector

- The focus of the Electricity reforms is to establish competitive environment for economical and financial viability of the power sector.
- The prices at every stage of the value chain of the sector should reflect marginal cost.
- With the advent of the Power Sector Reforms and various policy initiatives thereof, it has now become mandatory for the utility providers to gradually reduce the cross subsidy and move the tariffs towards the “Cost of Supply”.
- In Ghana tariffs for residential consumers have been subsidised through subsidies and subventions or through cross subsidisation by other consumer categories, primarily the consumers using electricity at high voltages.

# Extracts of Tariff Policy

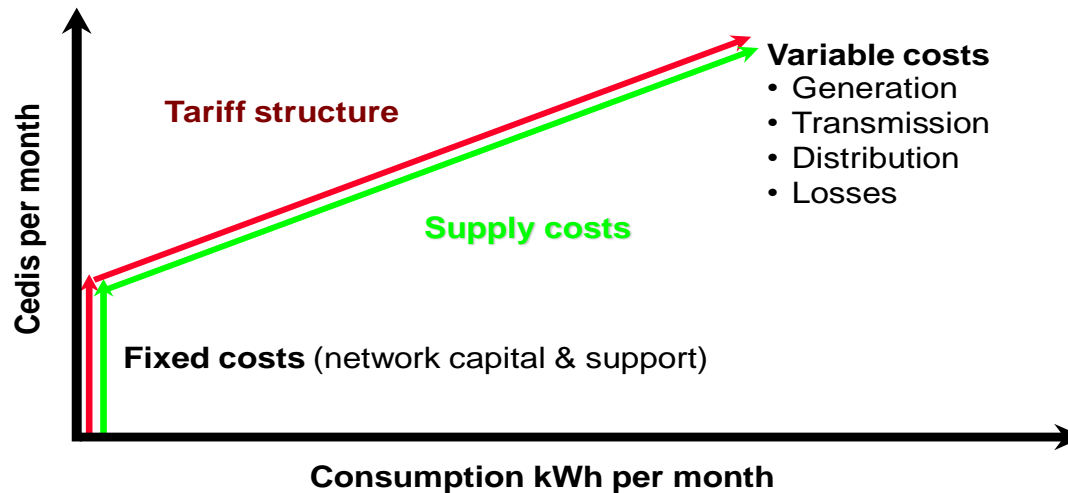
- The Tariff Policy aims at:
  - Ensuring availability of electricity to consumers at reasonable and competitive rates while ensuring financial viability of the sector and also attracting necessary investments.
  - Promoting consistency and predictability in regulatory approach
  - Improve on transparency in tariff setting, and introduce a new tariff policy that will reclassify consumer categories in order to protect lifeline and strategic industrial consumers.
  - Reduce significantly some of the levies and taxes on the tariffs.
  - Allocation in the national Budget for subsidies to assist lifeline consumers of electricity.
  - A move towards cost reflective tariffs
    - Ensuring that tariffs for various categories of customers should be, as far as practicable, equal to the costs imposed by that category of customers on the system. This is what is currently understood as Cost of Service (CoS) -

# COST REFLECTIVE TARIFF AND SUBSIDISATION

# What is cost reflective tariff?

- Each customer class pays a tariff that is closely aligned with the cost of providing supply to that particular customer class.

In the ideal tariff the **tariff structure** should follow the **cost curve** closely.



# Cost of Supply

Costs below derived from the approved revenue requirement including allowed return on assets (may not therefore reflect true cost)

- Energy cost
  - Cost of generating electricity, including the costs of the power station, the fuel and water
  - This will include generation and any energy purchased by the regulated utilities
- Transmission costs
  - Cost of Electricity Transmission Utility, including costs of network > 33 kV including the costs of capital, operations, maintenance, refurbishment and ancillary services
- Distribution costs
  - Cost of distribution utilities split between network and retail (customer service and administration) costs.
  - The network costs include capital, operations, maintenance and refurbishment.
  - Retail costs cover the cost of metering, billing, administration and customer services.

Cost of supply impacted by .....

Load profile and voltage

Transmission zone and capacity

Voltage and capacity

Size of the customer



# Cost Reflective Tariff Structure

A cost reflective tariff structure to recover electricity costs will typically contain:

- A signal to reflect time and seasonal variance of the cost of energy.
- The network costs.
- Differentiation to take into account:
  - The voltage of the supply.
  - The electrical (technical) losses.
  - Reactive energy support.
  - The density of the network to which customers are connected.
  - The load factor/profile.
  - Retail charges that reflect the size of the supply and the services being provided to the customer.

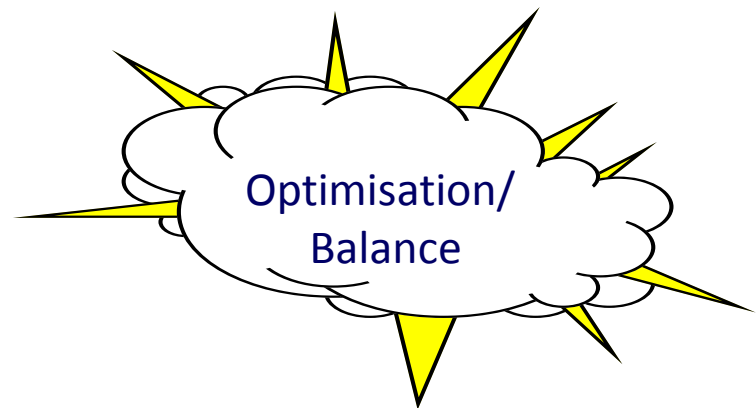
# Tariff Structures with Subsidisation Consideration

- Once a cost reflective tariff is calculated, tariff simplicity and affordability considerations are to be taken into account for the design of the final tariff to be applied
- Subsidies in electricity tariffs affect the tariff applied.
- Have inter - class subsidies where one tariff class subsidises another tariff class based on socio-economic considerations driven by Government Policy.
- Subsidies resulting from market oriented reform (LI 1937)
  - Zonal based tariff versus standardised tariff for power generation wrst location / zone
  - Ancillary Services Charge (e.g. Reactive Power Charge) in deregulated environment
- Direct subsidy by government
  - Budget revenues
  - Taxes and levies
  - Infrastructure investment as grantsCan have large welfare impact (through budget allocations).

# Tariff Structuring Considerations

## What balance do we try to achieve?

- **International precedents**
- **Cost reflectiveness**
- **Fairness to customers**
- **Implementable and sustainable**
  - Complexity
  - Administrative burden
- **Pricing signal for efficiency**
- **Customer response**
  - Affordability
  - Stimulate growth
  - Competitiveness with other energies
- **Revenue impact to utility**
- **Consistency across tariffs/customers**

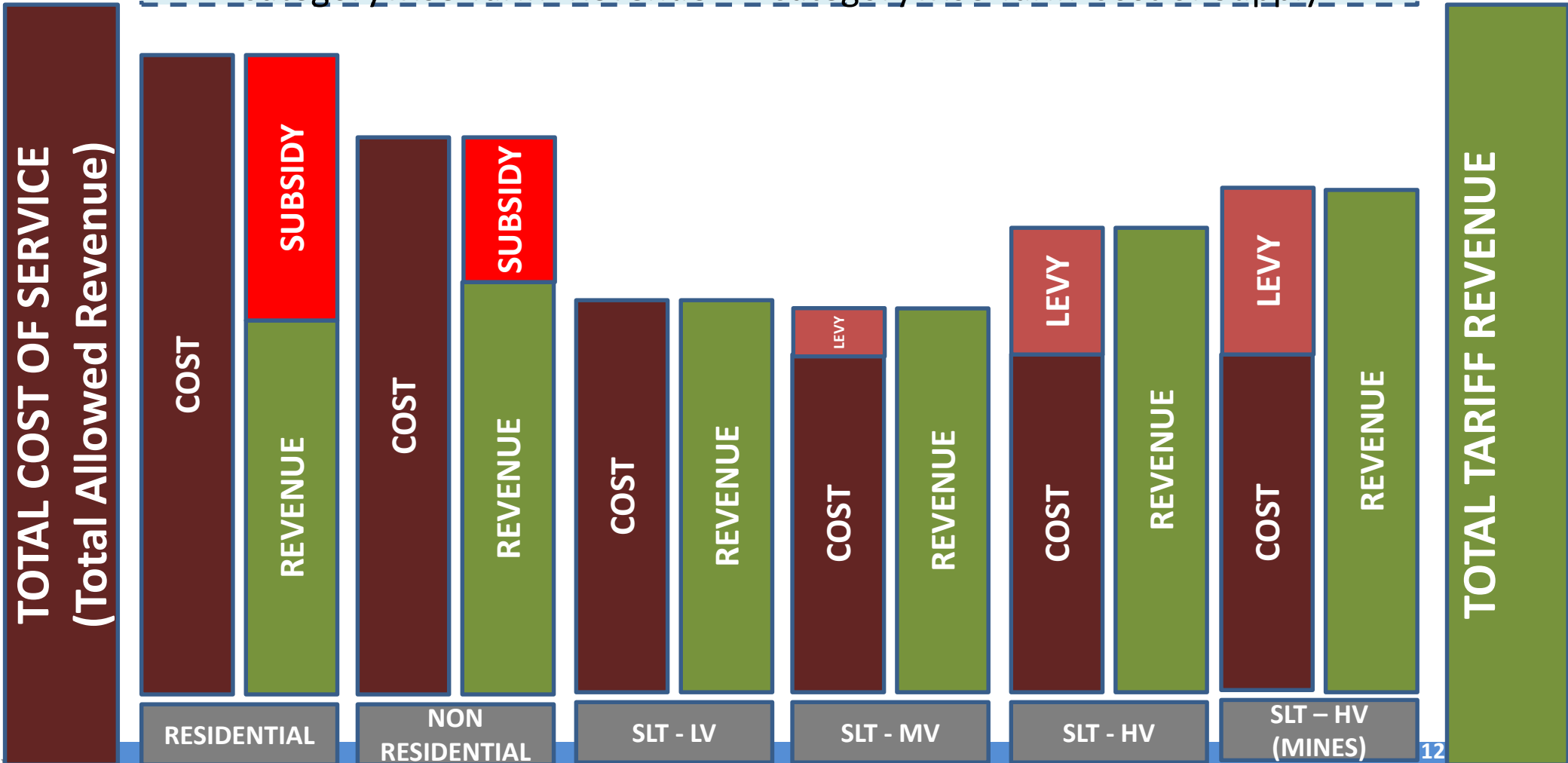


# Tariffs should recover Total Cost of Service including Regulated Return

Total Tariff Revenue = Total Cost of Supply

But

Categorywise Tariff Revenue  $\neq$  Categorywise Tariff Cost of Supply



# Assumptions and Parameters for Electricity Tariff Calculation

Inputs to the tariff – forecasts of load, capacity, fuel costs, investment, levels of losses, customer numbers, O & M costs and other economic and technical data.

## Generation:

Life cycle cost (RoRAB),  
GenMix, FuelMix, O&M,  
Depreciation & RoRC

## Transmission:

RoRAB, O&M,  
Depreciation & RoRC

## Distribution:

RoRAB, O&M,  
Depreciation & RoRC

### VRA

Legacy Hydro  
Thermal

### Existing IPPs –

PPAs

### New IPPs –

CONE (GT/CC)

### Pricing

### elements:

1. Capacity
2. Energy
3. Ancillary Services

### GRIDCO

#### TSO / ISO / MO

Transmission Wheeling  
Charges  
System Dispatch  
Market Operations

### ECG

#### NEDCO

Distribution Wheeling  
Charges  
Asset Maintenance  
Retail of Power

## DSC

Distribution Service Charge

## TSC

Transmission Service Charge

## BGT

Bulk Generation Tariff

**Final End User  
Tariff**

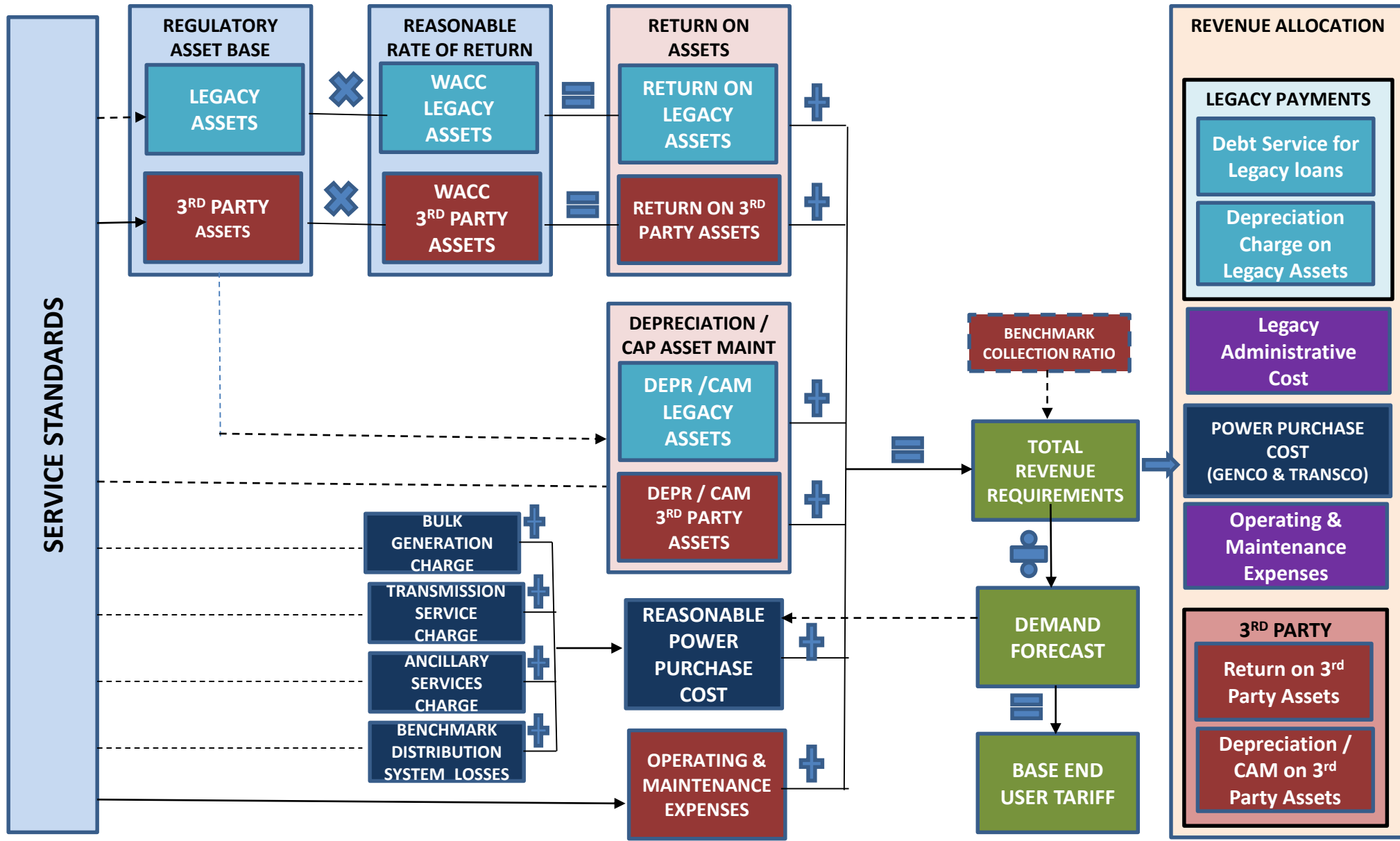
# Tariff Calculation

- Tariff Constructed as a Building Block
  - Demand Forecast
  - Generation Availability
  - Generation Costs
  - Imports
  - Transmission Costs
  - Distribution Costs
  - Supply Costs
  - Loss Costs
  - Depreciation

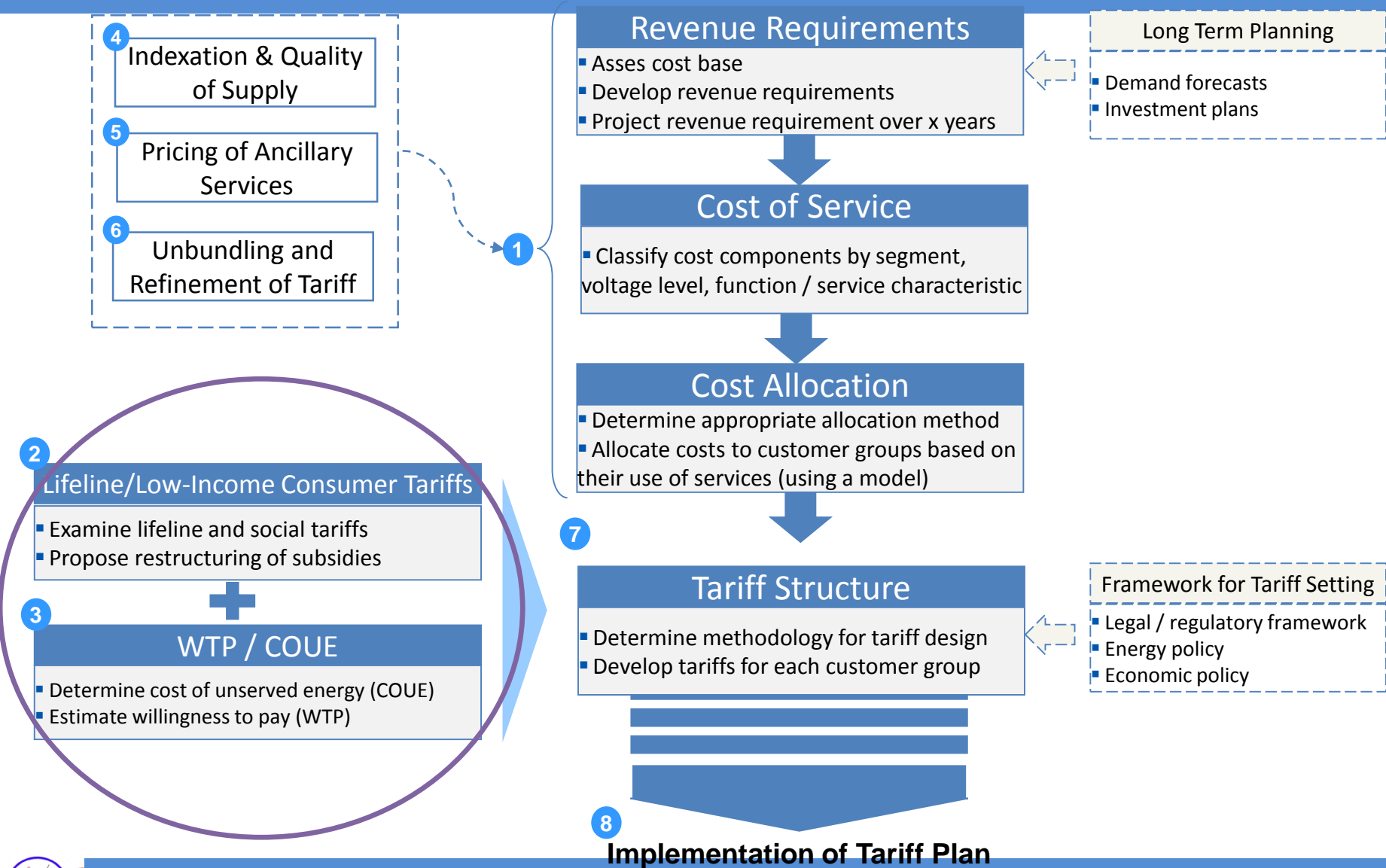
*\*\*\*Subsidies + Exports + Costs of unregulated customers are subtracted from allowed costs*

# OVERVIEW OF ELECTRICITY RATE SETTING GUIDELINES

## ELECTRICITY DISTRIBUTION UTILITIES UNDER ECG CONCESSION



# Development of Cost Reflective Tariff Structures (MCC Tariff Plan)





# SELF GENERATION AND CROSS SUBSIDISATION

# Introduction

- Self generation is the production of electricity for own use with a captive power plant installed usually on one's own premises. It may be owned by the consumer, or by a third-party under a power-supply contract.
- Self-generation is increasingly attractive to commercial and industrial electricity customers.
  - The decreasing cost of solar panels, and increasing consumer demand to meet Renewable Energy Purchase Obligation are increasing the uptake of solar PV.
  - Reliability concerns are more important for some customers:
    - Self-generation eases concerns about power outages.
- Utilities must tread carefully as large customers consider self-generation

# Flexible rate design can help in managing self-generation customers

- A standard tariff for high load factor customers, (e.g., > 85%)
- Real time pricing
- Ratcheted demand charges which act as a disincentive for customers to self-generate
- Explicit exit fees and departing load charges
- Standby tariffs that allow customers to be grid connected for backup or meeting peak demand

# Standby rates are a common solution for billing partial requirements customers

- Self-generation customers are considered a “partial requirements” electricity customer because they do not need all of the same services as a traditional “full requirements” customer
  - For example, when a self-generation customer experiences unexpected demand or an outage, they must rely on the utility’s connection to the grid
- Standby charges are special rates designed to collect only those costs which the partial requirements customers impose on the grid
  - For example, a standby rate can be applied to self-generation customers to compensate the utility for providing backup energy

# Avoiding cross-subsidies is the primary justification for standby rates

- Self-generating customers impose costs on the grid when they draw energy from it
- The utility has to maintain generation, transmission and distribution capacity in order to be able to provide that energy when it is demanded
- If rates for self-generating customers do not reflect these costs, then the utility will pass these costs to other customers, who do not self-generate, creating a cross-subsidy
- This potential cross-subsidy can be eliminated with well designed standby rates.

# Standby charges are designed to compensate utilities for one or more of the following services

	<u>Service</u>		<u>Situation</u>
1.	Backup power	■	unplanned generator outage
2.	Maintenance power	■	scheduled generator maintenance or repair
3.	Supplemental power	■	onsite generation does not meet energy needs under normal operation
4.	Economic replacement power	■	utility energy costs less than onsite generation
5.	Delivery	■	delivery of energy associated with any of the services above



# Way Forward

Although cost-reflectivity is important for the Electricity Industry, achieving cost-reflective tariffs in a heavily subsidised environment may negatively affect pro-poor government policies.

Upon completion of the tariff plan studies

- Transitioning our existing network tariffs to reflect total efficient costs, thereby removing cross subsidies between existing network tariffs and between classes of customer.
- Network tariffs make up about 50 - 60 per cent of retail bills, their transition will clearly have a significant influence the pace of change in retail tariffs.
- Gradual transition our existing tariffs towards full cost reflectivity over a period of time to be established (say 5 – 10 years) in order to minimise the impact.
- An understating of the level of service grade the poor need based on their economic circumstances.
- Introduce a range of new tariffs focused on using prices to signal more efficient use of electricity - Time of Use (ToU) tariffs followed by demand based tariffs.



**THANK YOU**