

# Development of Competitive Markets

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# Key objectives of the reform

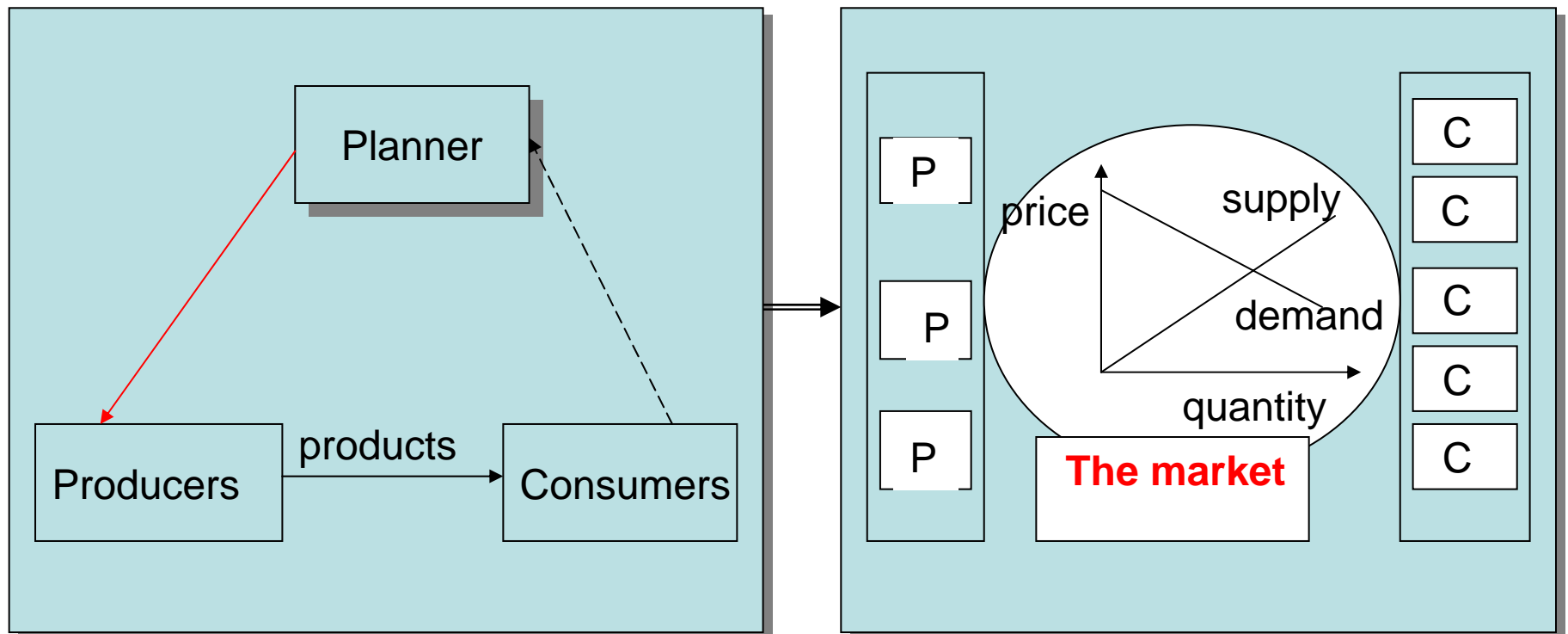
- Encourage efficiency through the introduction of competition, where feasible, and a reduction of monopoly power
- Maintain a reliable supply of electricity for consumers at prices which offer a fair return on prudent investment
- Secure private capital for new investment in generation and distribution

# Two main areas to which introduce competition

- (a) **Wholesale competition:** between producers to supply power to D/R companies and eligible consumers
- (b) **Retail competition:** between authorized retailers to supply power to customers

# Nature of competition (generic)

Central planning  Competitive market



# Pre-requisites for an economically efficient outcome of competition

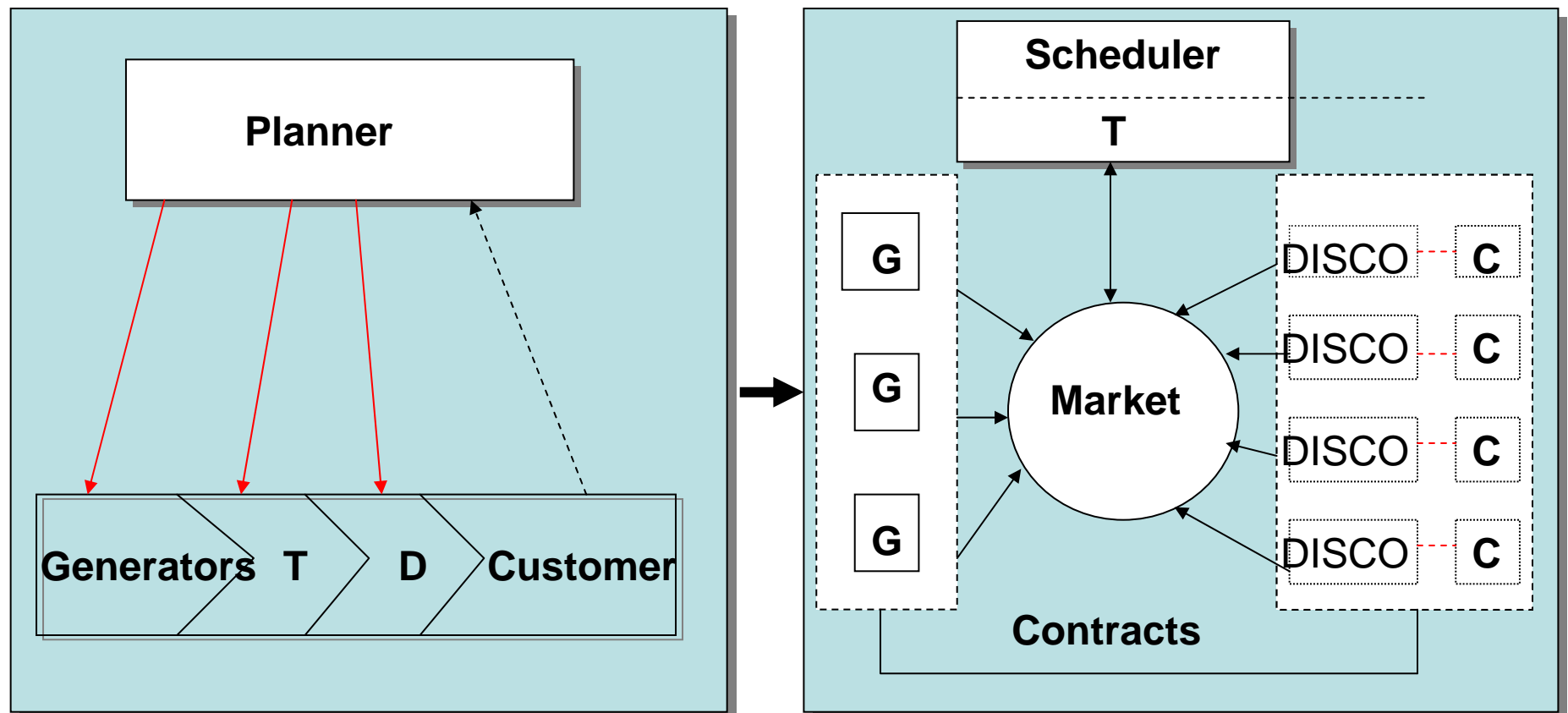
- (a) numerous producers:** otherwise there will be limited competition on price-producers able to dictate prices and earn excess profits
- (b) equal access to technology:** if one producer alone has access to a technology that gives low production costs, that P may not face competition and may earn excess profits

# Pre-requisites for an economically efficient outcome of competition (2)

- (c) **consumer choice and number:** consumers must be free to choose from which producer they buy their goods and services. They must also be many in number; and
- (d) **sufficient liquidity:** there must be sufficient volume traded through the market, or small changes in market conditions will have an exaggerated effect on prices- this will increase the risk to market participants

# Competition in electricity production

Central planning .....> Competitive market



# Pre-requisites for competition in electricity markets

- Need to be sufficient numbers of generators (GENCOs) competing on price using baseload, midmerit and peaking plants;
- Consumers need to be able to choose the producer from whom he purchase. If wholesale competition, “consumers” mean DISCOs and large eligible customers; and
- There needs to be sufficient liquidity in markets for electricity

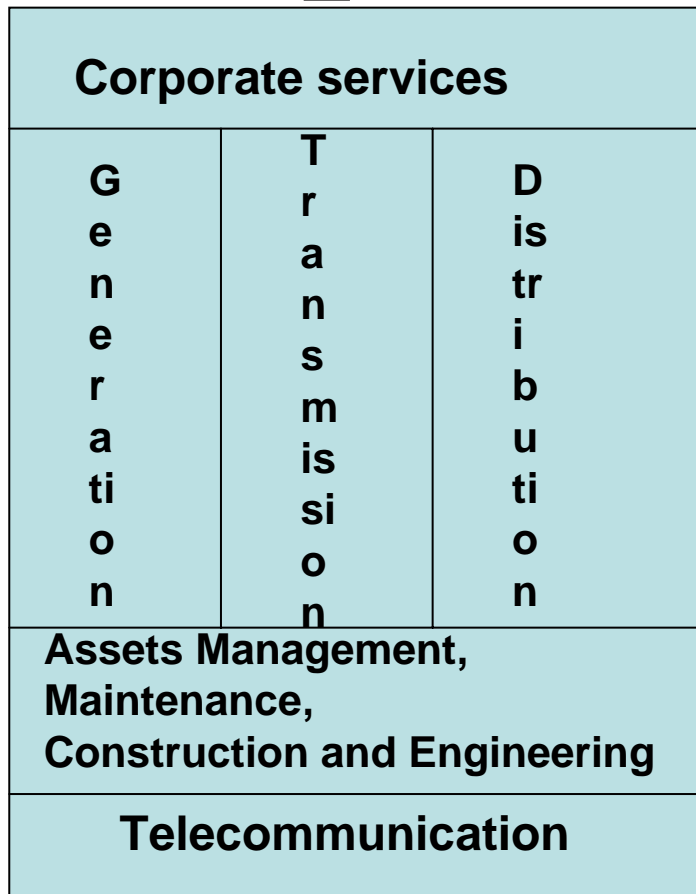


# Why competition cannot be introduced in all areas

- (a) The nature of the electricity network implies that some co-ordination is required- from full scheduling and dispatch to, as a minimum, coordination of schedules and real time control;
- (b) Some elements of the ESI are natural monopoly (e.g. provision of the transmission & distribution networks). There will therefore be a need for some continuing regulation.

# STARTING POINT VERTICALLY INTEGRATED POWER UTILITIES

SHARES OWNED BY THE GOVERNMENT



- **ADVANTAGES**

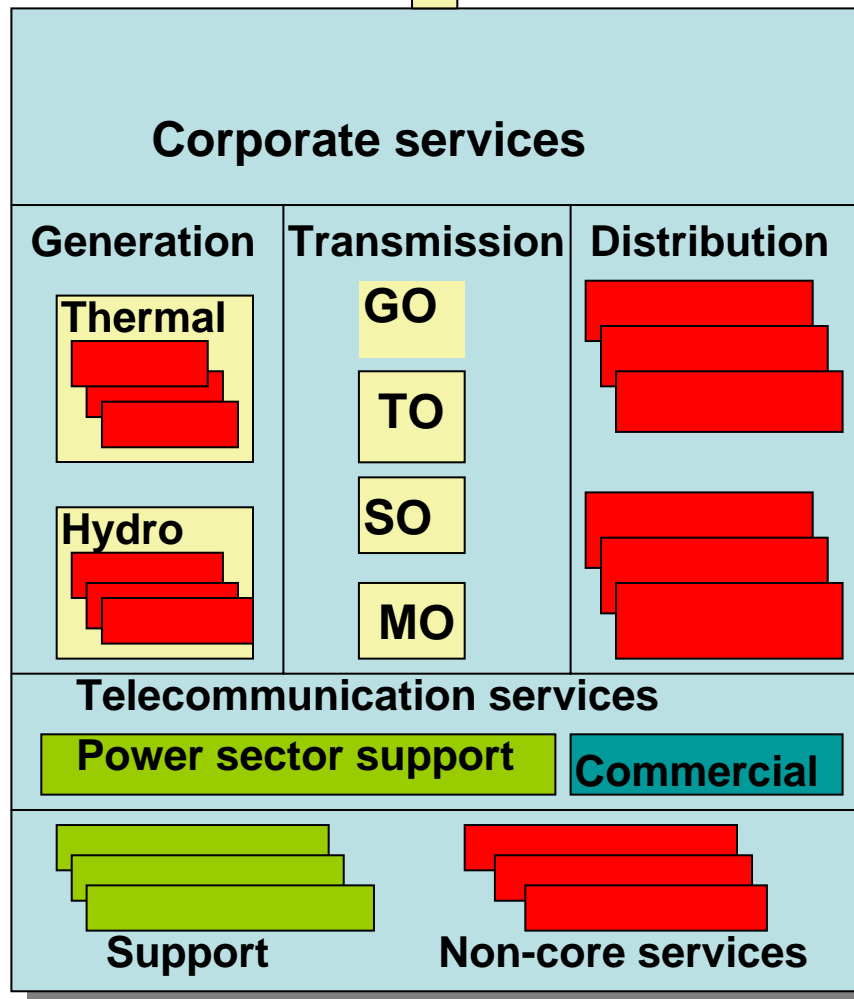
- Simple Organizational Structure
- Large Critical Mass Making it Easier to Absorb Unexpected External and Internal Shocks
- Possibility to Cross Subsidize Operations
- Comfort of a Monopoly

- **DISADVANTAGES**

- Not Exposed to Competition
- Often Inefficient
- Difficult to Segregate Efficient from Non Efficient Operations

# Functional Unbundling within Utility

SHARES OWNED BY THE GOVERNMENT



## • ADVANTAGES

- Soft preparation for corporatization while political process unfold
- Base for internal rationalization before corporatization
- Identification of stranded resources

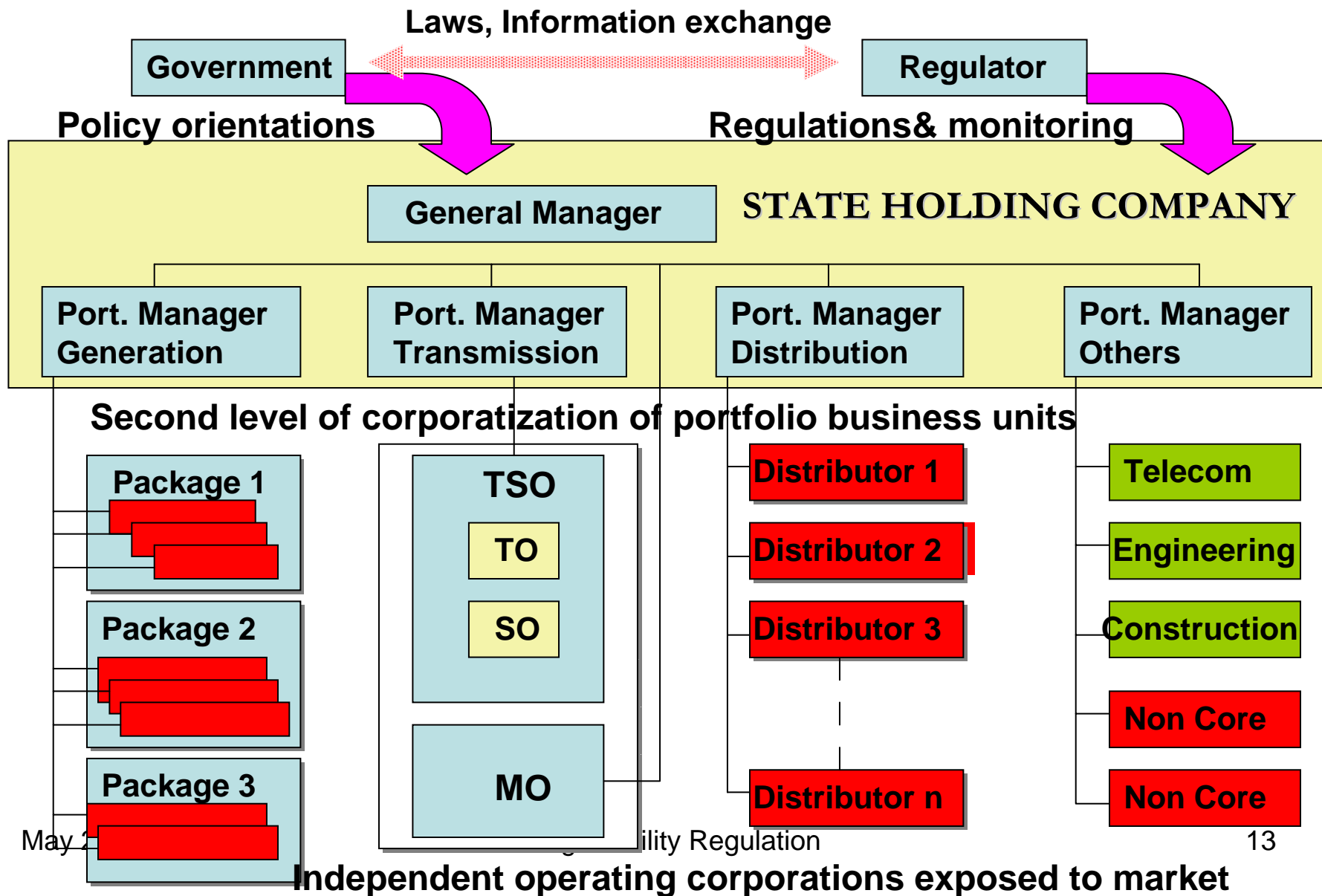
## • DISADVANTAGES

- Performed by current rather than future line managers
- Based on current organizational structure and processes rather new structure and processes
- Use same systems, Software
- Often reproduce the status quo

# **GUIDELINES FOR THE TRANSFER OF ASSETS AND LIABILITIES**

- **Do not overvalue the assets in the short-term to avoid high depreciation values term during the first few years of operation;**
- **The unbundling must be done in such a way so that the new operating companies have a good credit rating to the financial market;**
- **Keep the debt/equity level at a healthy level.**

# Corporatization of Business Units



# Consequences of lower level unbundling

- The monopoly is no longer acting to average internal inefficiencies and absorb impacts;
- Instead, all the volatilities are opened in the market and their effects are impacting on smaller structures;
- The size of restructured operating corporations must not be too small so as corporations to be vulnerable and yield on normal risks in the market

**AND**

# Consequences of lower level unbundling (2)

- Not be too big so as to rebuild new monopolies and loose the benefit of competition
- **The contracting mechanisms and the regulatory framework need to take this new environment into consideration to mitigate risks**

# Roles & Responsibilities- Holding Company

- **system and generation investment planning:** while investments will be executed by subsidiaries, the corporate body should have overall responsibility for investment planning. Normally also investment financing should remain at that level because ILAs and commercial banks will prefer to deal with the parent holding company



# Roles & Responsibilities- Holding Company

- **corporate service to subsidiaries:** provision of those central corporate services which is agreed should continue to be provided on a central bases (e.g. human resources and IT infrastructure)
- **holding company operation:** these activities are likely to include performance monitoring, approval of large investment projects, appointment of senior management teams and interfacing with Government, as a policy maker and owner.

# Roles & Responsibilities- TSO

- **transmission asset owner:** operation, maintenance& development of transmission network. Also undertake Tr. planning& investment
- **dispatch center:** calculation of least cost feasible schedule for each day (based on technical characteristics of each plant) and dispatch generators to operate accordingly. Purchase of ancillary services

# Roles & Responsibilities- TSO (2)

- **operation of the imbalance mechanism:** administration of a mech. to settle imbalances between fixed contract quantities and real output and demand
- **energy accounting & settlement:** account for energy produced by GENCOs and electricity taken by DISCOs. It will need to facilitate settlement of imbalances and any non-firm contract
- **except for losses, TSO will not trade energy**

# Roles & Responsibilities- GENCOs

- operation and maintenance of generation plants, including fuel purchase?(existing long- term contracts)
- establishment of hydro concessions
- undertaking any new generation investment/ rehabilitation
- sale of energy under contract with DISCOs and settling differences through the imbalance mechanism

# Roles & Responsibilities- GENCOs (2)

- sale of ancillary services to TSO as dispatch and transmission company
- support to Government and Holding Co. in development of next Phase arrangements, including the identification of packages of generation branches for privatization

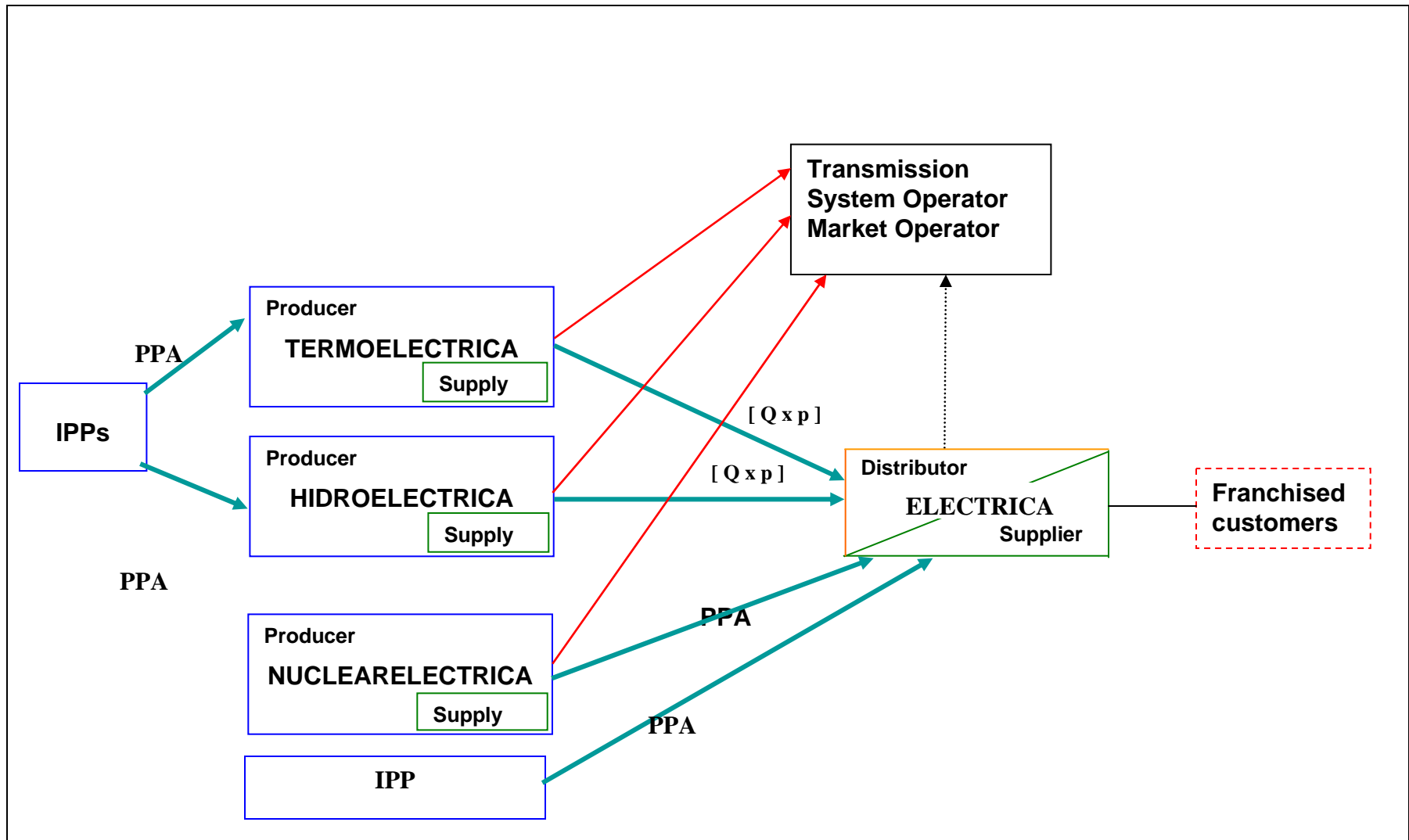
# Commercial arrangements

- Complexity should be kept to a minimum **but**
- It will be some complexity driven by:
  - the unbundling process
  - the target structure of the next Phase should be kept in mind in order to not impede subsequent transition
- It is better to restrict retail competition at some exceptional cases. Any loss of large customers could force prices up for the remainder of the market ( i.e. small customers) or worsen financial position of the Holding Co.

# Commercial arrangements (2)

- energy sale and purchase contracts for thermal and hydro generation
- the settlement of contracts differences and imbalances between scheduled and metered output
- connection to and use of transmission & D
- dispatch
- ancillary services
- Holding Co. corporate services

# Map of Contracts





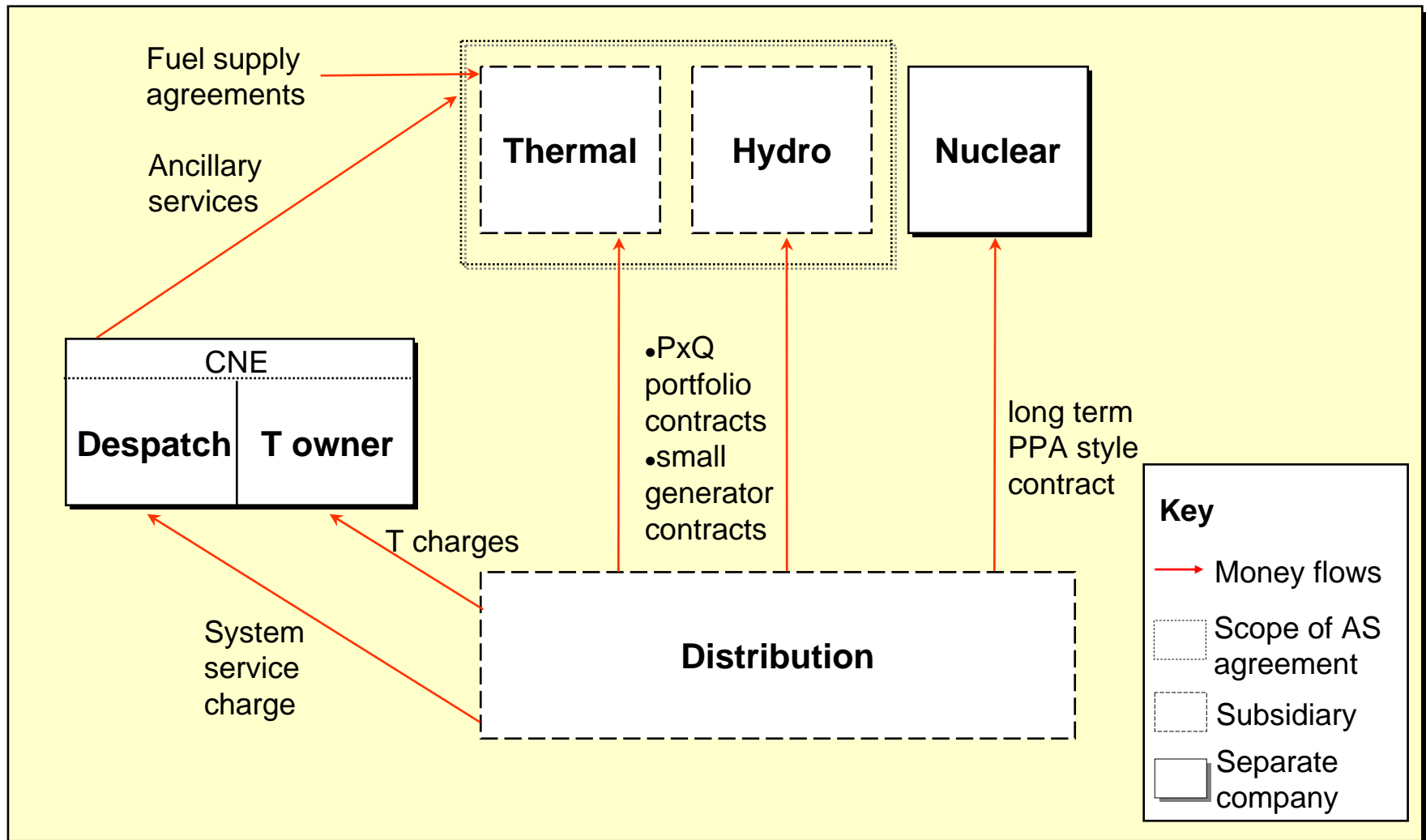
# Energy contracts arrangements

- the main contracts should be **firm portfolio contracts**:
  - not plant specific- embody firm, fix commitments to purchase a specified quantity in each hour at a given price ( $P \times Q$ ).  $Q$  met from any plant mix
  - contract  $Q$  not dependent upon real output
  - quantities in contract profiled to match the expected aggregate and individual DISCO demand and the expected dispatch of generators concerned. Profiles should be derived from historical information and from a view of the future evolution of demand

# Energy contracts arrangements (2)

- for any generating station which is to be rehabilitated with private finance will be needed a more traditional form of plant-specific PPA
  - **large despicable plants**: contracted to the GENCO, better, or alternatively a pre-agreed transition arrang. to contract with DISCOs
  - **non-dispatchable, distribution-connected plants**: contracted direct with DISCO with pre-agreed transition arrang. to continue even in Phase II. Based on **physical delivery**

# Phase I commercial arrangements - contract map for RENEL successor companies



Contracts for provision of corporate services are not shown for simplicity

# Energy accounting & settlement

- **payment for contract differences:** only for portfolio differences between contracts and day ahead **unconstrained schedule** calculated and paid for similar to PX
- **payments for real time imbalances:** differences between scheduled (constrained) volumes and real metered output or demand will need to be calculated and paid for in an appropriate manner

# Energy accounting & settlement (2)

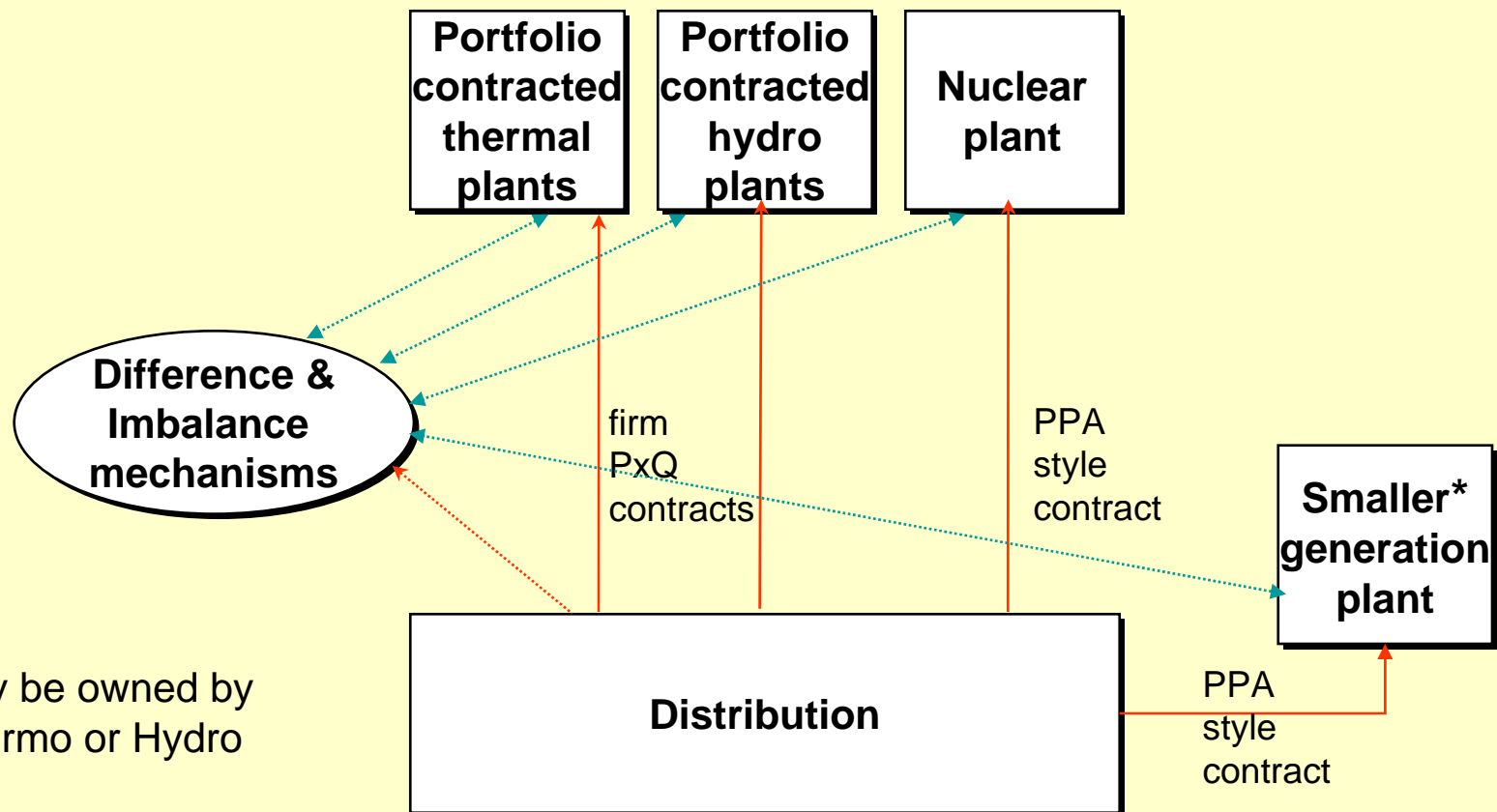
- the mechanism for settling **contract differences** could vary:
  - fixed tariff charged on the differences (i.e. a price set in preceding year at the expected marginal cost of generation in each hour), or
  - tariff which varies according to the marginal cost of generation derived from the dispatch algorithm at the day ahead stage

# Energy accounting & settlement (3)

- the cost of **real time imbalances** could again be recovered:
  - via a fixed tariff set in advance, or
  - at a price derived from the marginal plant called, which may be on the basis of an ancillary service contract
- the full cost of constraints and real time system management could be recovered from all on the basis of a System Service Charge

# Phase I energy contracts and payments

## Portfolio contracts & initial trading mechanisms



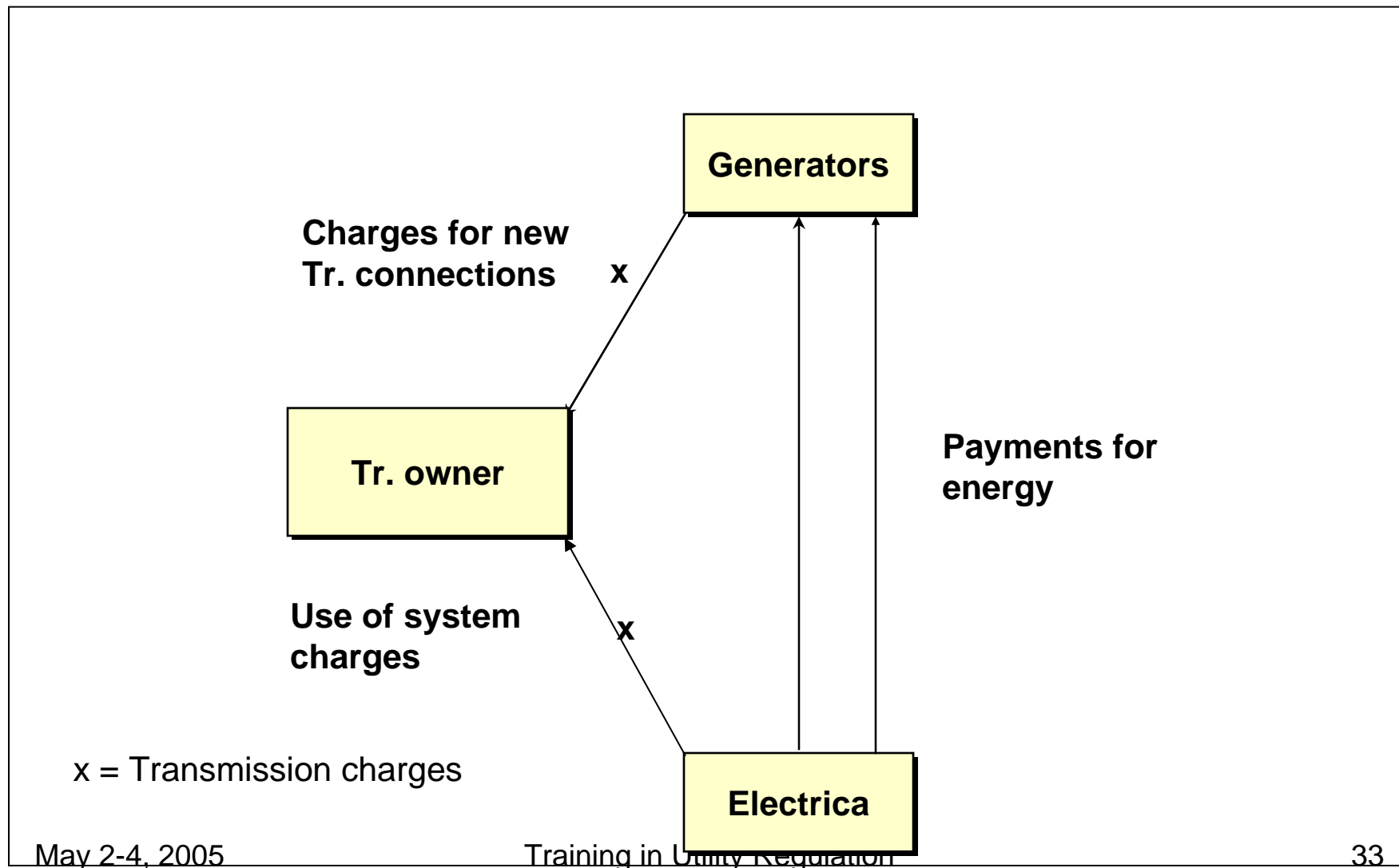
Least cost despatch calculated by plant technical details rather than contracts

# Contractual arrangements for transmission

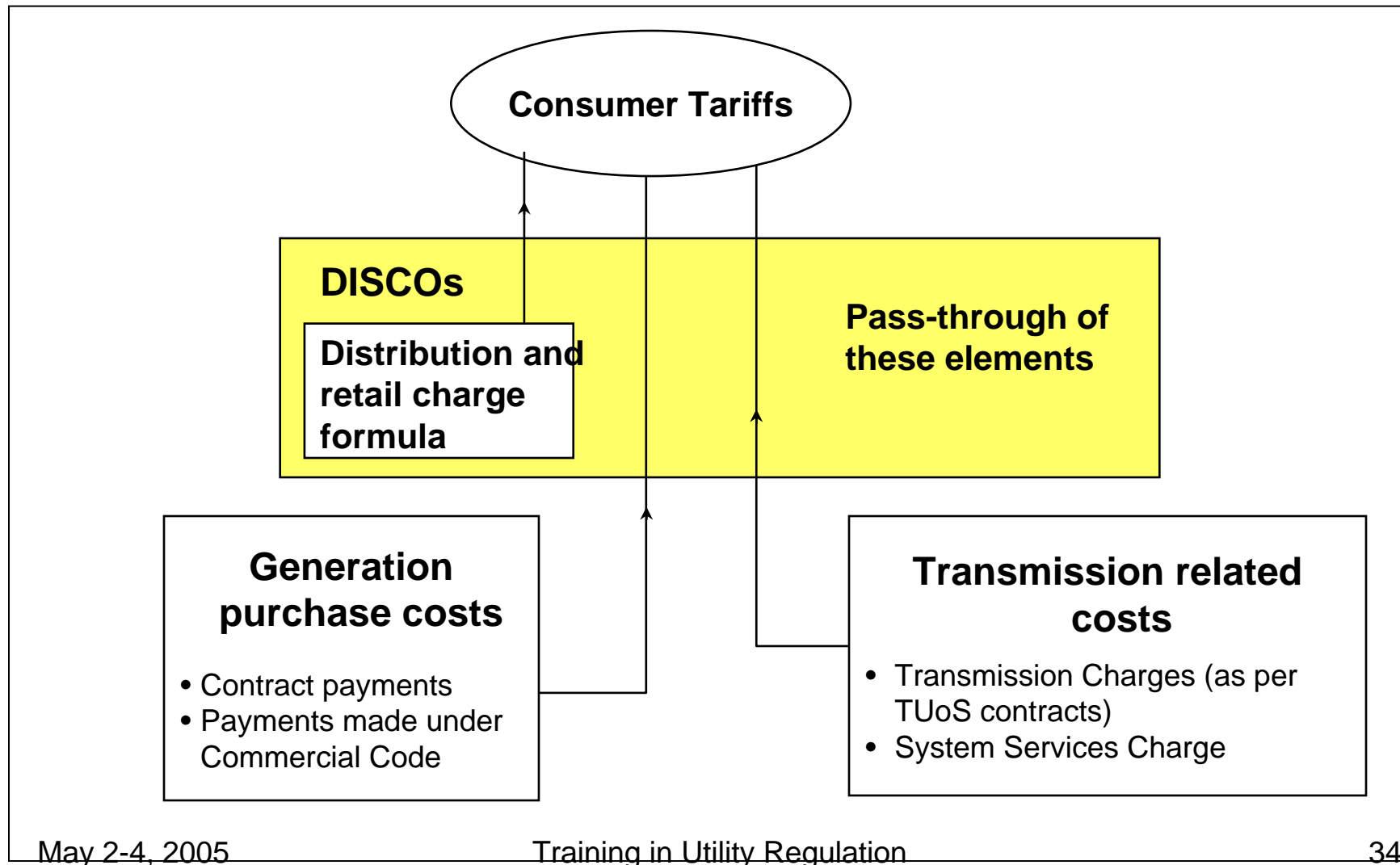
- should cover both connection to and use of the transmission system
- transmission charges could be used to recover dispatch costs
- initial arrangements should not be complex- locational signal later
  - a simple “postage stamp” applied to demand (MW) at time of system stress
  - paid only by DISCOs, rather than G+D



# Framework for transmission charges



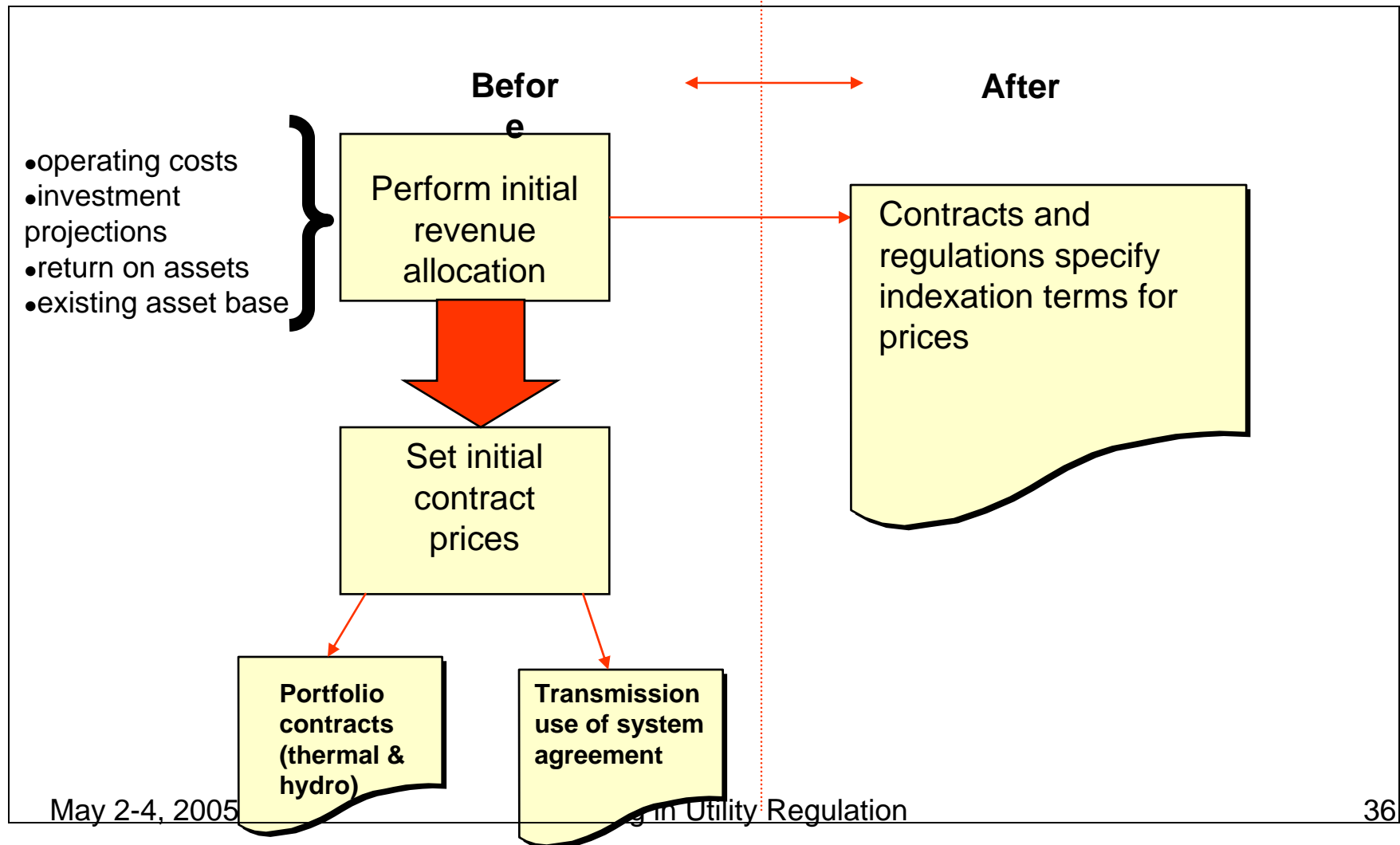
# Final tariff and revenue regulation scheme



# Ancillary services arrangements

- TSO will need to contract with GENCOs (especially Hydro?). The contract will specify, for each GENCO:
  - the ancillary service to be provided
  - the amounts to be paid for the provision of each service- for some of services this may be divided into a fixed charge for availability and an additional charge if service is used/called

# Implementation of the revenue allocation methodology

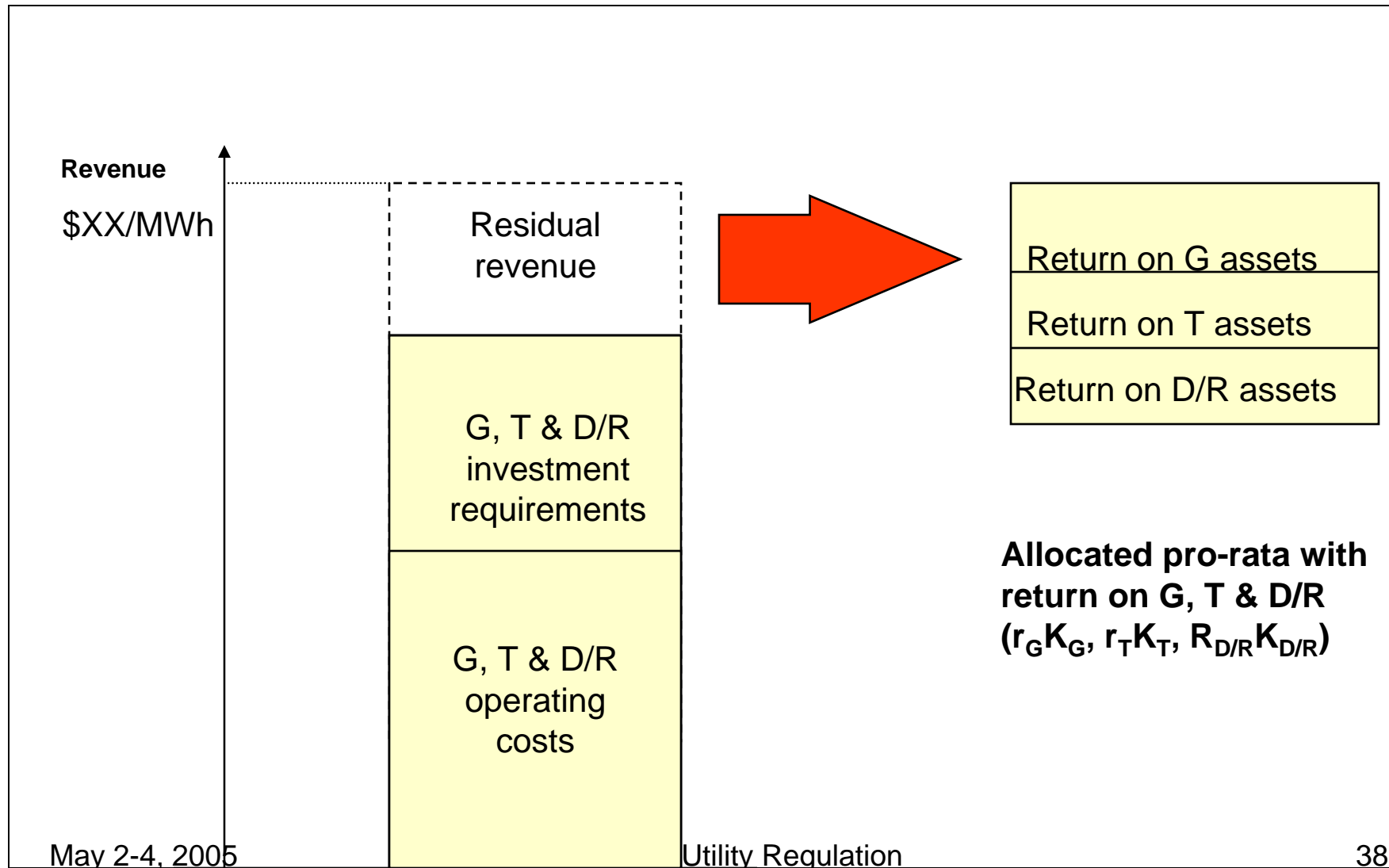


# Revenue allocation by activity

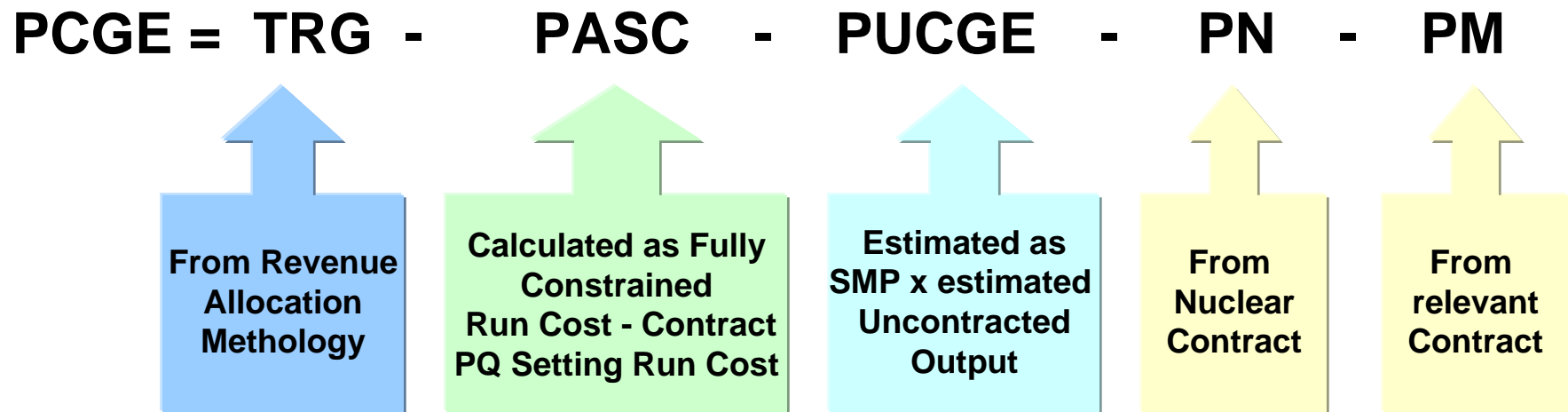
Distribution / Commercialisation		
Transmission		
Transmission constraints		
Small, uncontracted generation, imports / exports		
Ancillary services / reserves		
T H E R M A L	H Y D R O	N U C L E A R

**NB: Not to scale**

# Components of revenue allocation



# Overview of payments to generators



**PCGE** = Payments to generators for contracted energy

**TRG** = Total revenue allocation to generators

**PASC** = Payments to generators for ancillary services and not payments to constrained-on and constrained-off generators

**PUCGE** = Payments to generators for energy from uncontracted plant (small and non-despatchable)

**PN** = Payments to Nuclear

**PM** = Payments to foreign generators for imports net of export revenue

**QUESTIONS?**