Performance Based Regulation of Philippines Electricity Distribution Companies

REGULATORY TRAINING COURSE

Cebu – November 5 & 6, 2007
Baguio – November 8 & 9, 2007

SESSION 1B – THE BUILDING BLOCK AND PRICE-SETTING METHODOLOGY

Overview of this session

- The session will cover:
  - The price-cap formulas
  - The services covered under PBR
  - The building-block approach for determining revenue requirements

The key feature of PBR in the Philippines are:

- A price-cap is placed on distribution services for a 4-year price-path
  - Prices are set ex-ante (forward-looking)
  - Increases are linked to the inflation
  - A smoothed efficiency factor (X-factor) is introduced to:
    - Reflect the improving efficiencies in the price-setting
    - Avoid wide price fluctuations
- Prices based on utilities' revenue requirements, reviewed by ERC
  - Revenue requirement determined with "building block" approach
  - Price-caps take into account projected energy consumption
- Service level incentives are introduced - ensure quality is maintained
  - Price-linked incentive scheme (reward or penalty linked to price-caps)
  - Guaranteed service level scheme (ensuring minimum quality levels)
  - Information disclosure

The price-capped distribution rates relate to:

- Regulated services only:
  - Regulated distribution services
    - Electricity conveyance through distribution network and associated supply and support functions
    - Exclude power purchases and transmission costs
    - Exclude non-regulated services (non-regulated retail, excluded connection services, supplier of last resort services)
  - Distribution connection services
    - Electricity conveyance through distribution connection assets and associated supply and support functions
    - May be excluded in future
  - Regulated retail services
    - Support functions for electricity sales, metering (captive market only), billing & collection
    - Exclude power purchases

The detailed mechanisms of PBR are described in…

- Rules for setting Distribution Wheeling Rates (RDWR), describing:
  - All the price-setting calculations
  - Price-setting procedures
  - Determination of factors on which price-setting is based
  - Treatment of external events
- Issues and Position Paper
  - Published for each entry group into PBR
  - Describes ERC's view on how the RDWR will be implemented
  - Describes timelines and requirements from utilities
  - Is used as basis for consultation with utilities
- Diverse regulatory documents, including:
  - Weighted average cost of capital
  - Working capital and construction work-in-progress
  - Performance incentive scheme

PBR is based on three key formulas:

- The building block formula – calculating the allowed revenue
- The calculation of the smoothing factor (X-factor)
- The annual price-setting (price-cap) formula

- The first two formulas applies during the initial, forecasting phase
- This determines the:
  - Forecast, smoothed price path for the regulatory period
  - Opening price for the regulatory period

- Once a regulatory period commences, there is an annual price reset
  - This is determined with the price-setting formula

The 1st key formula – allowed revenue requirement

$$ARR_t = Opex_t + Tax_{m,t} + RegDepn_t + [(RAB_t + WC_t) \times WACC] + Tax_{p,t_t}$$

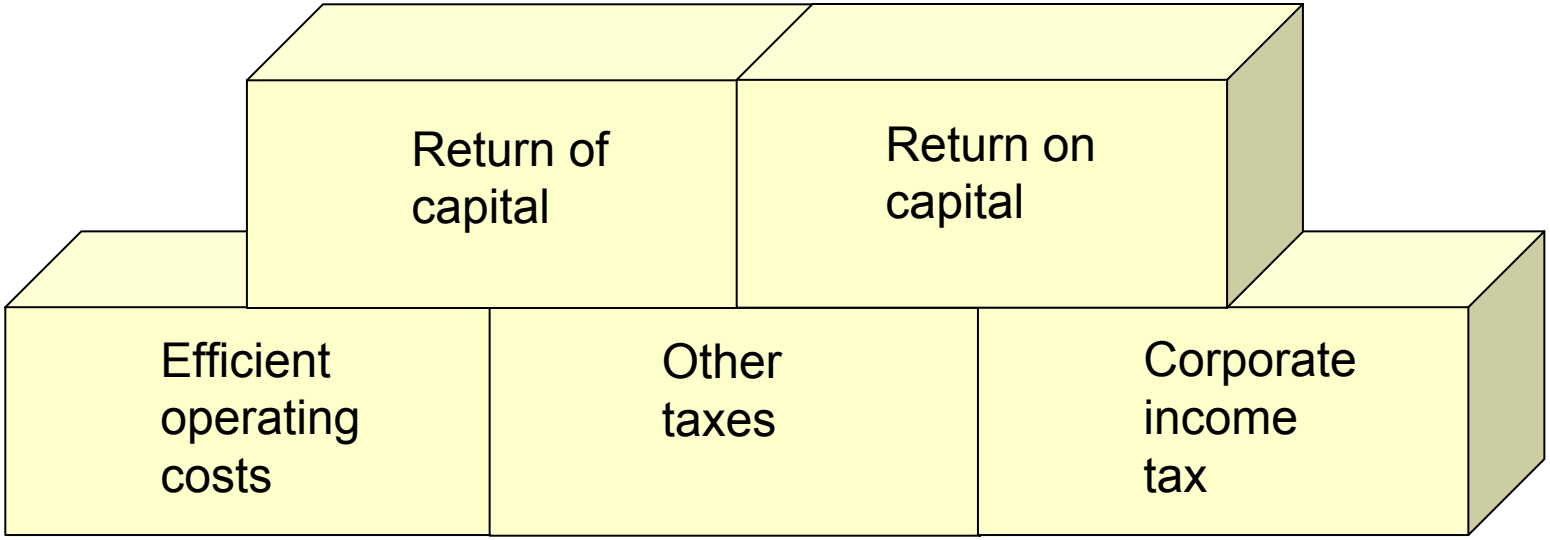
This formula :

- determines the allowed annual revenue requirement for a utility,
- is based on the so-called “building block” principle,
- fully compensates the utility for efficient distribution expenses, and
- compensates investors for efficient investment and associated risk.

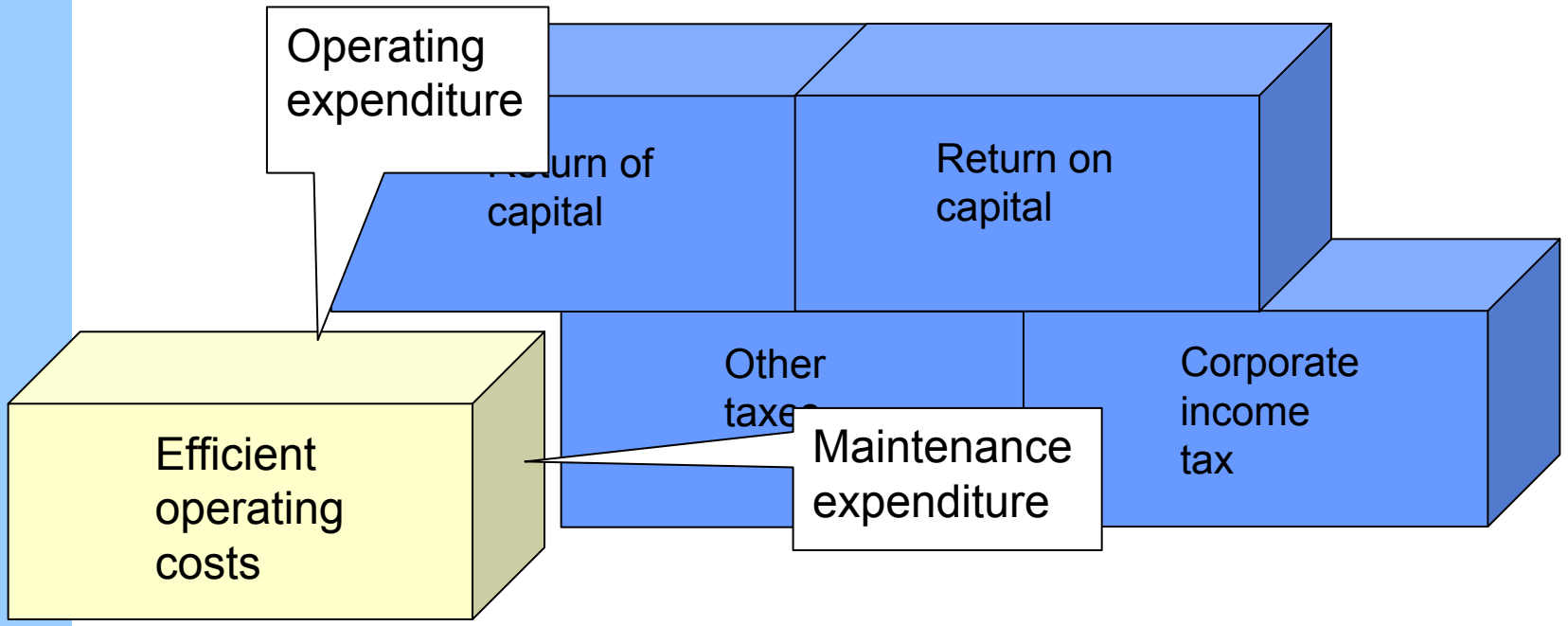
Similar to revenue calculated under existing return on rate base approach, but allows for :

- Optimized depreciated asset replacement cost, instead of historical cost
- Recovery of corporate income tax expense
- Forward looking expenditure, rather than backward-looking

The building blocks for the revenue requirement are …



The building blocks for the revenue requirement are …



Efficient operating costs

– the reasonable operating costs, and

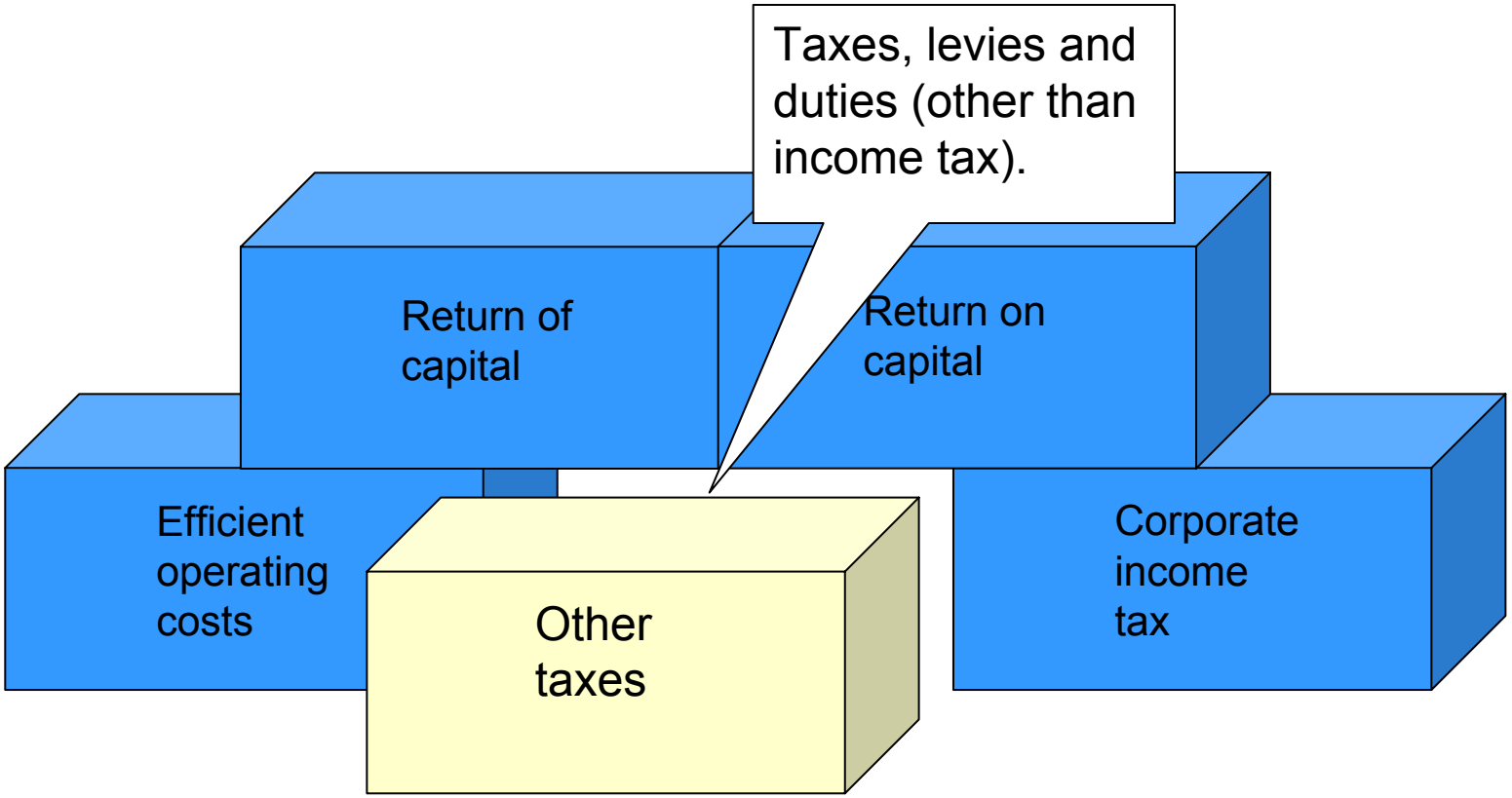
– the reasonable maintenance costs

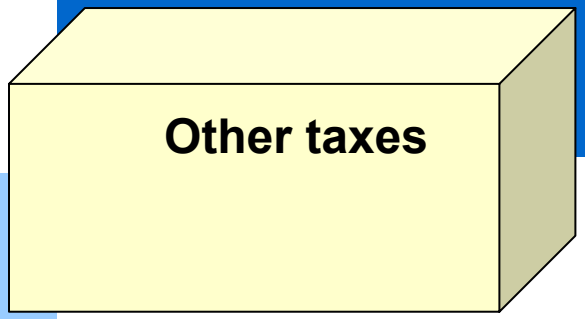
that a utility is entitled to for each year of the regulatory period.

This decision will be based on :

- information provided by the utilities on historical expenditure
- expenditure forecasts provided by utilities
- analysis by independent expert(s) on the information provided by utilities and the levels of efficiency implied
- other information at the ERC's disposal

The building blocks for the revenue requirement are …





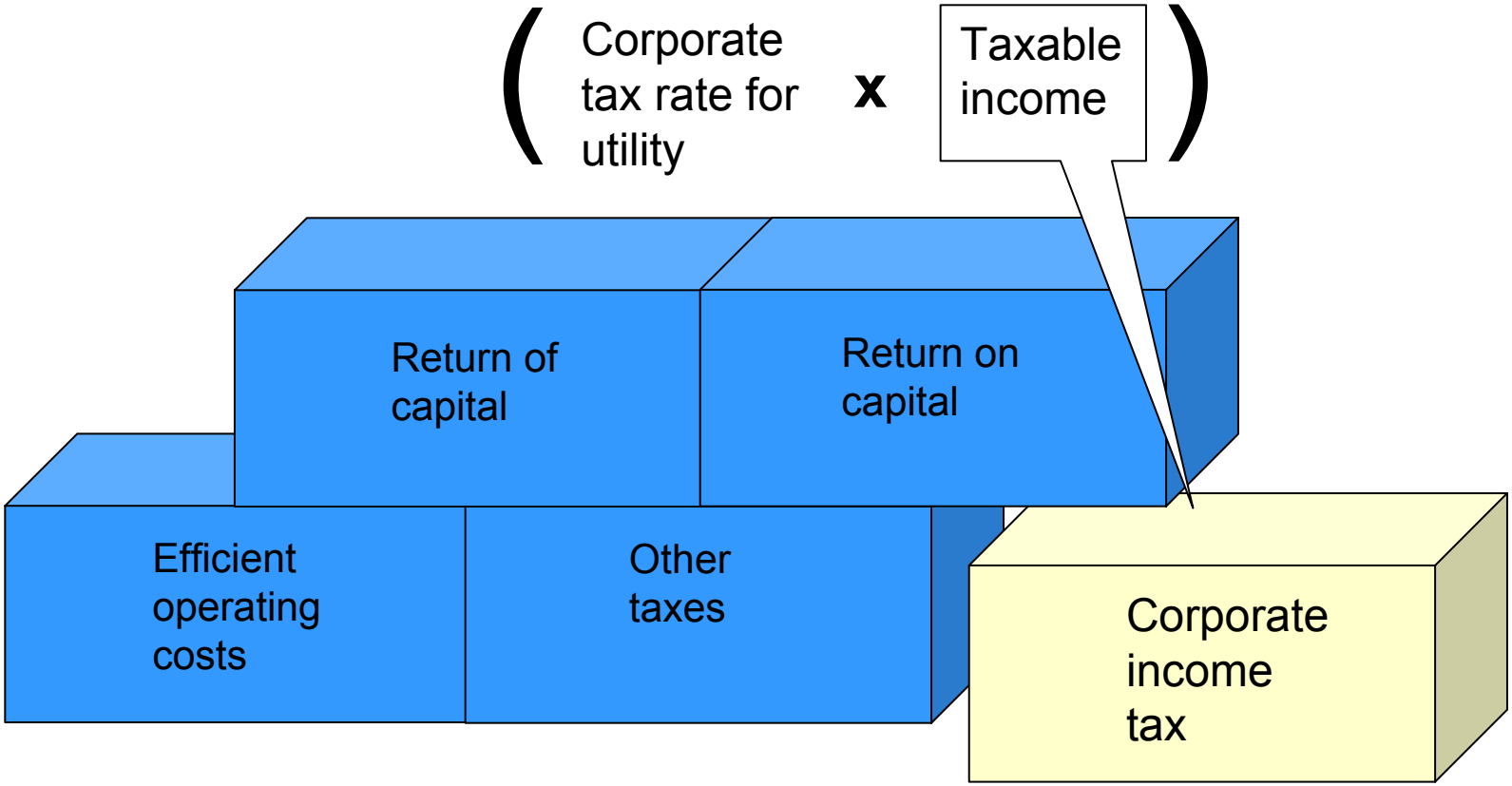
ERC will assess a utility's reasonable and efficient expenses on:

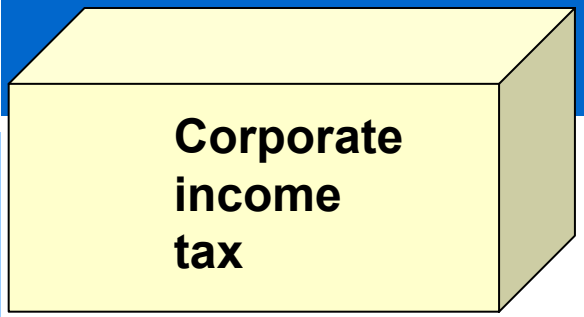
- Business taxes (other than income tax)
- Duties
- Levies (which will include regulatory reset cost)

Review will be based on :

- information provided by the utilities on historical expenditure
- expenditure forecasts provided by utilities
- analysis by independent expert(s)
- other information at the ERC's disposal

The building blocks for the revenue requirement are …

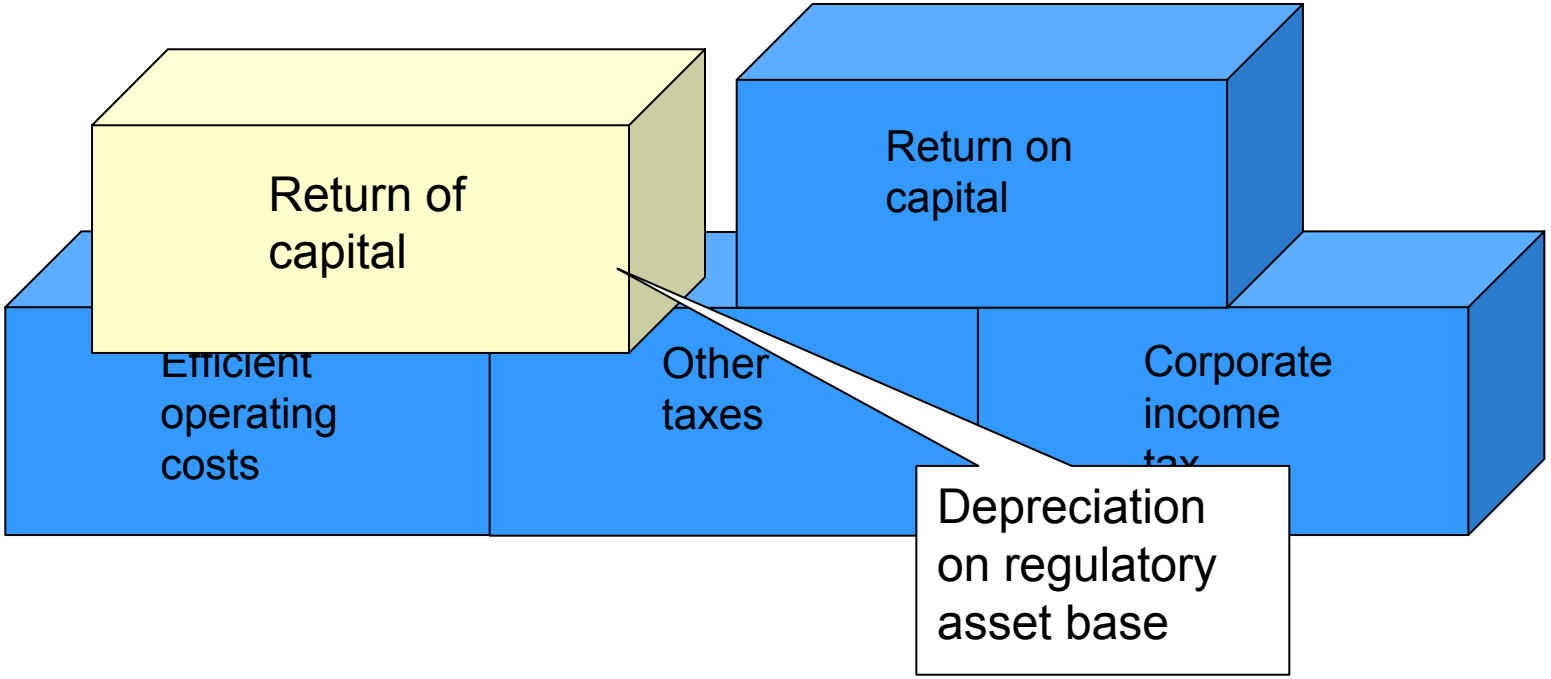


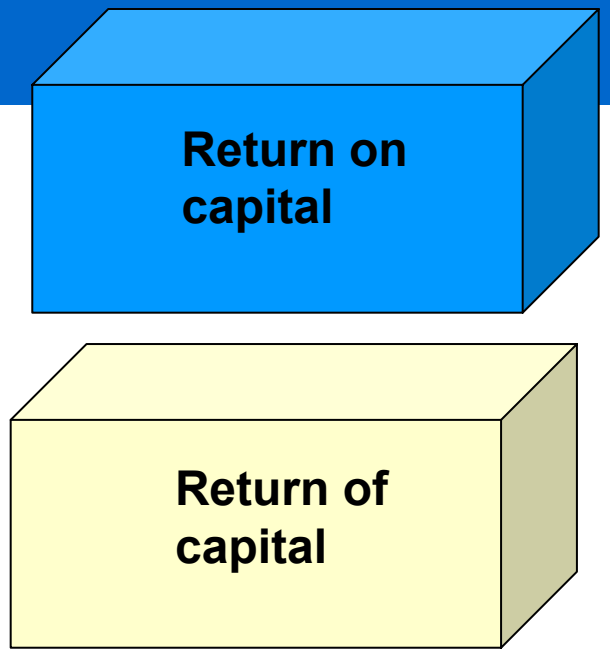


Utilities may recover income tax expenditure, based on:

- Clear separation of expenses and income for the regulated business from other businesses
- Carry-over of tax losses from previous regulatory years
- Estimate of regulatory interest and historical asset base depreciation

The building blocks for the revenue requirement are …



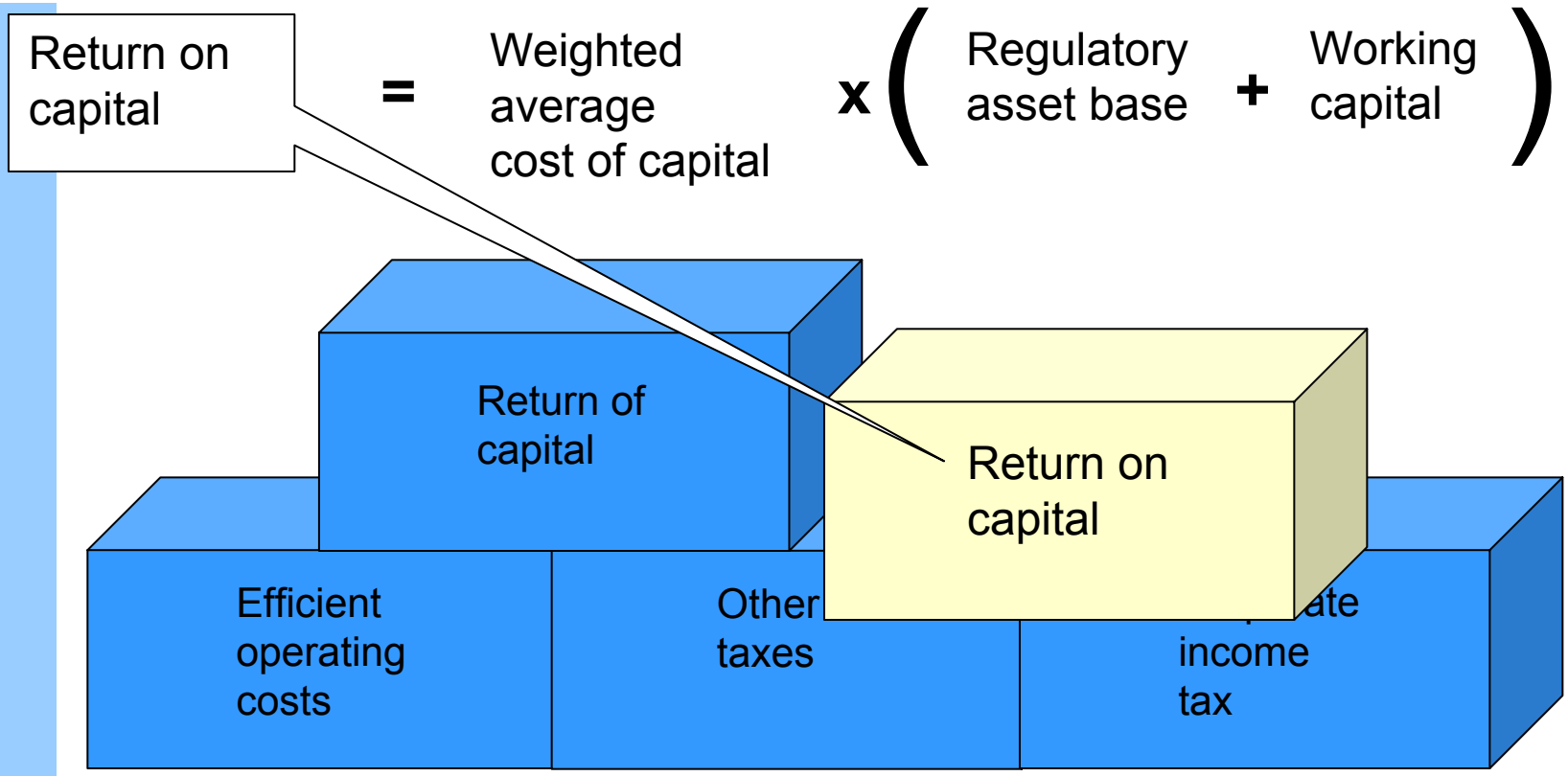


Regulatory depreciation

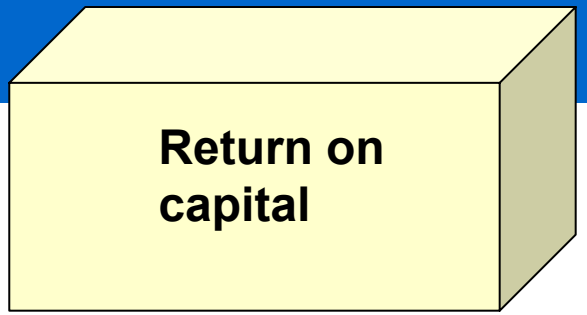
- Based on regulatory life of assets
- Straight-line depreciation
- Treatment of asset at end of standard life, but still in service

Also require historic cost depreciation – for calculating income tax

The building blocks for the revenue requirement are …

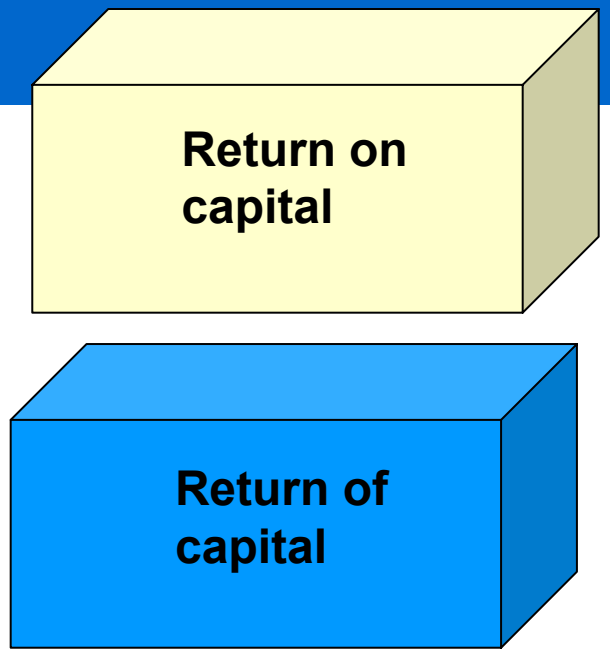


Regulatory asset base



- ERC to determine the value of the rolled-forward optimized depreciated regulatory asset base (RAB)
- RAB going forward will be based on initial opening value and future (efficient) capex.
- ERC will review Capex requirements of utilities, based on:
  - information provided by the utilities on historical Capex
  - Capex forecasts provided by utilities
  - Justification of Capex
  - Analysis by independent expert(s) on the information provided by utilities and the levels of efficiency implied
  - Other information at the ERC's disposal

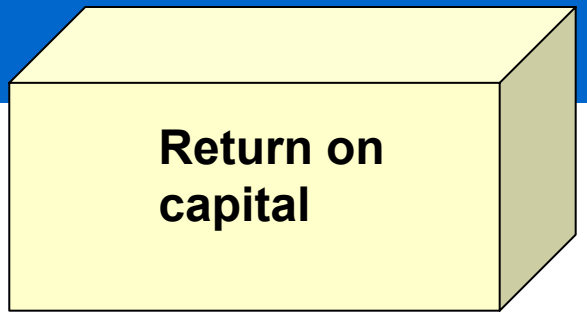
Regulatory asset base



Regulatory depreciation

- As calculated for Return of Capital

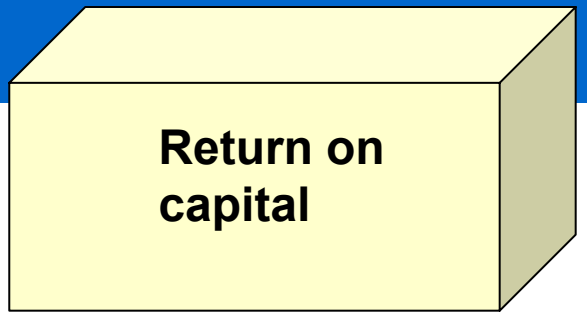
Working capital



ERC to determine working capital allowance

- To compensate utilities for capital tied up in operations
- Based on proportion of Opex

Weighted average cost of capital



ERC to determine regulatory WACC

WACC is a critical, but uncertain parameter, usually contentious

The 2nd key PBR formula : determining the X-factor

$$\frac{ARR_{2008}}{(1+WACC)}+\frac{ARR_{2009}}{(1+WACC)^2}+\frac{ARR_{2010}}{(1+WACC)^3}+\frac{ARR_{2011}}{(1+WACC)^4}$$

$$=$$

$$(MAP_{2007}-P_0)\times\left(\begin{array}{l}\dfrac{(1+Infl_{2008}-X)FQ_{2008}}{(1+WACC)}+\dfrac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)FQ_{2009}}{(1+WACC)^2}+\\[2ex]\dfrac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)FQ_{2010}}{(1+WACC)^3}+\\[2ex]\dfrac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)(1+Infl_{2011}-X)FQ_{2011}}{(1+WACC)^4}\end{array}\right)$$

Note : Years indicated will vary for each entry group into PBR

The formula, besides requiring iterative programming to solve, introduces some further key parameters ;

$$\frac{ARR_{2008}}{(1+WACC)} + \frac{ARR_{2009}}{(1+WACC)^2} + \frac{ARR_{2010}}{(1+WACC)^3} + \frac{ARR_{2011}}{(1+WACC)^4}$$

The starting price for the new regulatory period.

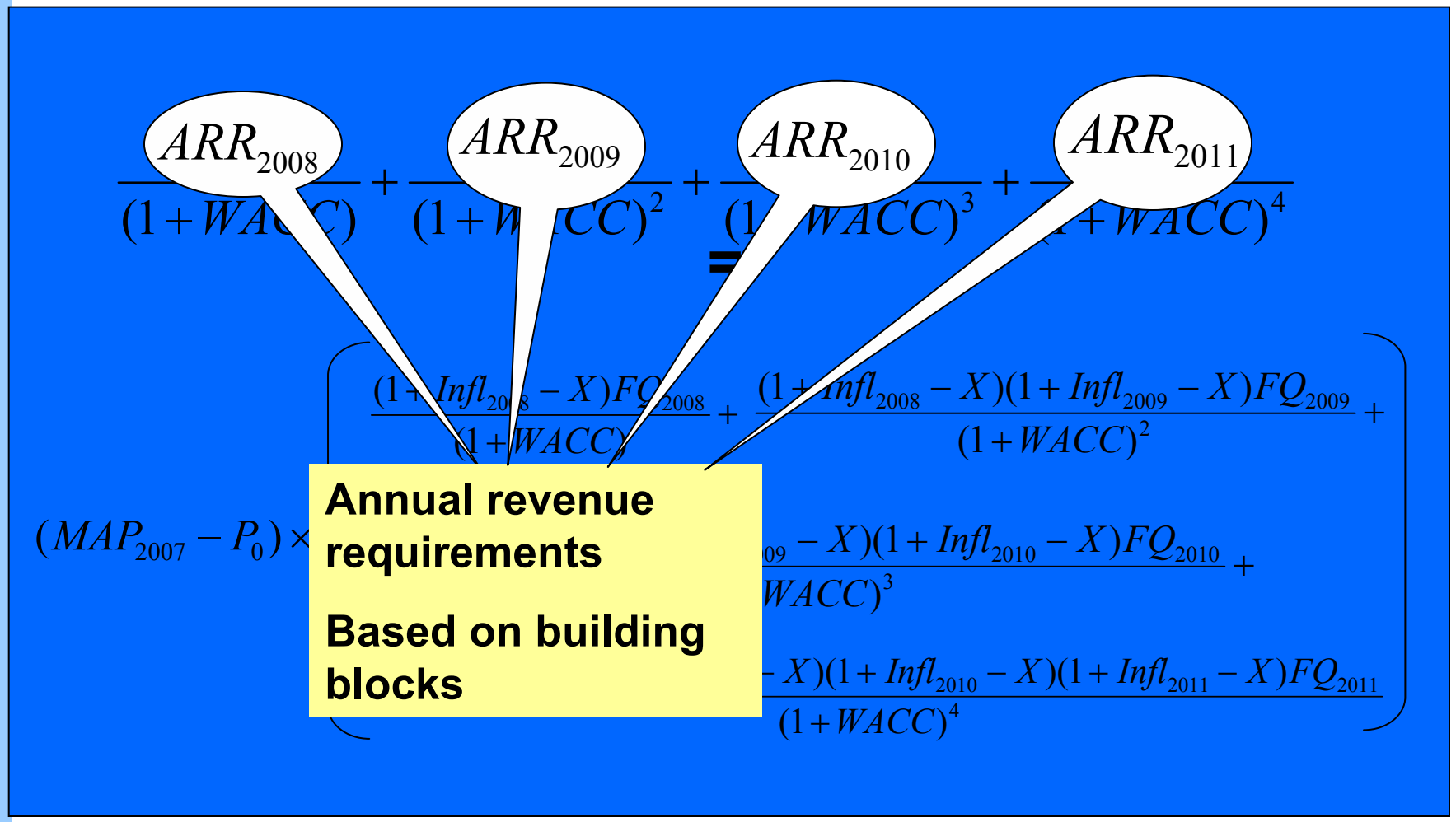
Based on pre-PBR prices and energy consumption.

$$MAP_{2007} - P_0) \times \left(\frac{(1+ \quad \text{009}} - X)FQ_{2009}}{(1+WACC)^2} + \right.$$

$$\frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)FQ_{2010}}{(1+WACC)^3} +$$

$$\left. \frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)(1+Infl_{2011}-X)FQ_{2011}}{(1+WACC)^4} \right)$$

and …


$\frac{ARR_{2008}}{(1+WACC)} + \frac{ARR_{2009}}{(1+WACC)^2} + \frac{ARR_{2010}}{(1+WACC)^3} + \frac{ARR_{2011}}{(1+WACC)^4} =$
$(MAP_{2007} - P_0) \times$
$\frac{(1+Infl_{2008}-X)FQ_{2008}}{(1+WACC)} + \frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)FQ_{2009}}{(1+WACC)^2} +$
$\frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)FQ_{2010}}{(1+WACC)^3} +$
$\frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)(1+Infl_{2011}-X)FQ_{2011}}{(1+WACC)^4}$
Annual revenue requirements
Based on building blocks

and …

Forecast energy consumption levels

$$\frac{ARR_{2008}}{(1+WACC)} + \frac{ARR_{2009}}{(1+WACC)^2} + \frac{ARR_{2010}}{(1+WACC)^3} + \frac{ARR_{2011}}{(1+WACC)^4} =$$

$$(MAP_{2007} - P_0) \times \left(\frac{(1+Infl_{2008}-X)}{(1+WACC)} FQ_{2008} + \frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)}{(1+WACC)^2} FQ_{2009} + \right.$$

$$\frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)}{(1+WACC)^3} FQ_{2010} +$$

$$\left. \frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)(1+Infl_{2011}-X)}{(1+WACC)^4} FQ_{2011} \right)$$

and …

Forecast inflation rates

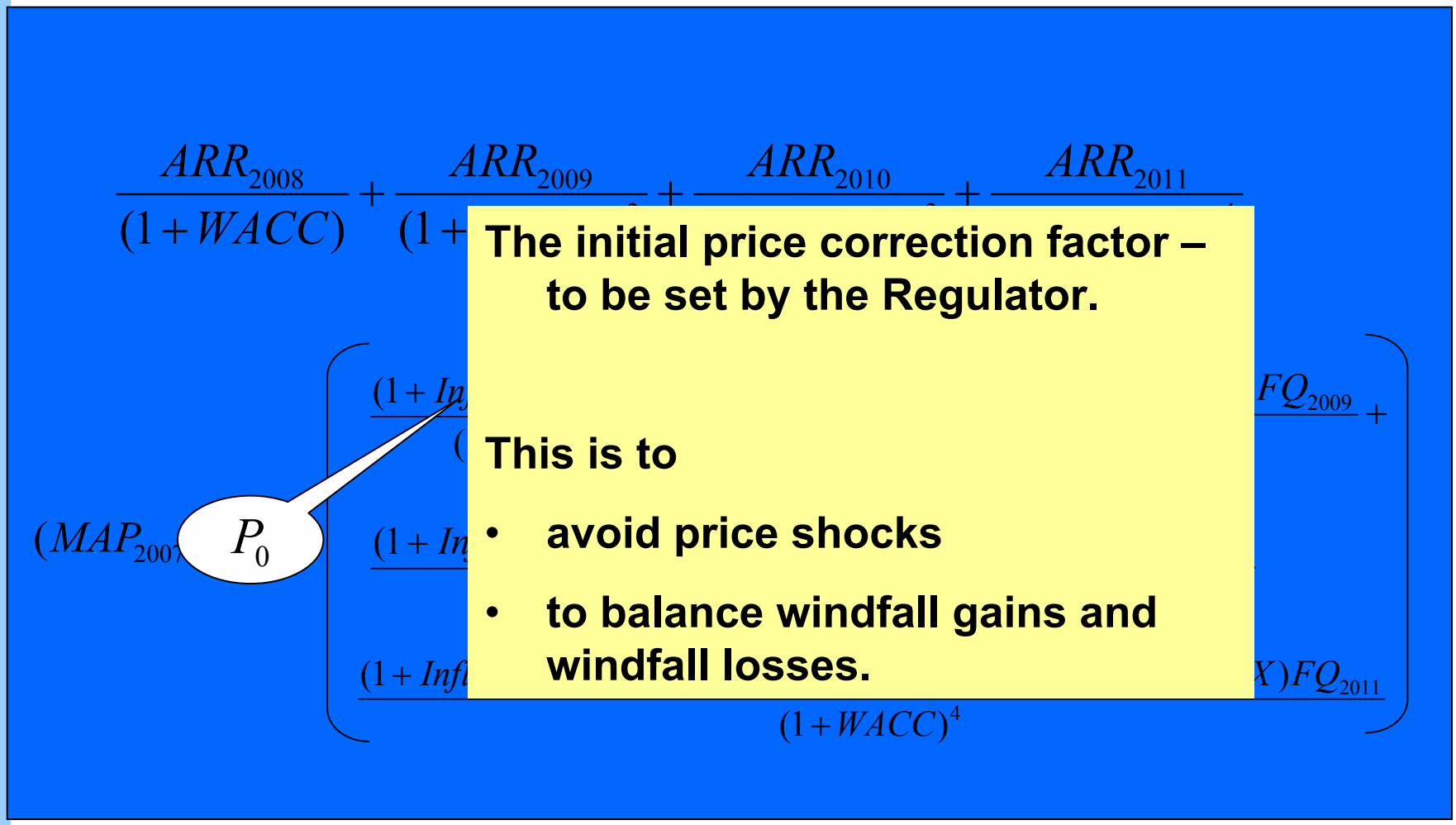
$$\frac{ARR_{2008}}{(1+WACC)} + \frac{ARR_{2009}}{(1+WACC)^2} + \frac{ARR_{2010}}{(1+WACC)^3} + \frac{ARR_{2011}}{(1+WACC)^4} =$$

$$(MAP_{2007} - P_0) \times \left(\frac{(1+Infl_{2008}-X)FQ_{2008}}{(1+WACC)} + \frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)FQ_{2009}}{(1+WACC)^2} + \right.$$

$$\frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)FQ_{2010}}{(1+WACC)^3} +$$

$$\left. \frac{(1+Infl_{2008}-X)(1+Infl_{2009}-X)(1+Infl_{2010}-X)(1+Infl_{2011}-X)FQ_{2011}}{(1+WACC)^4} \right)$$

and finally…



The initial price correction factor – to be set by the Regulator.

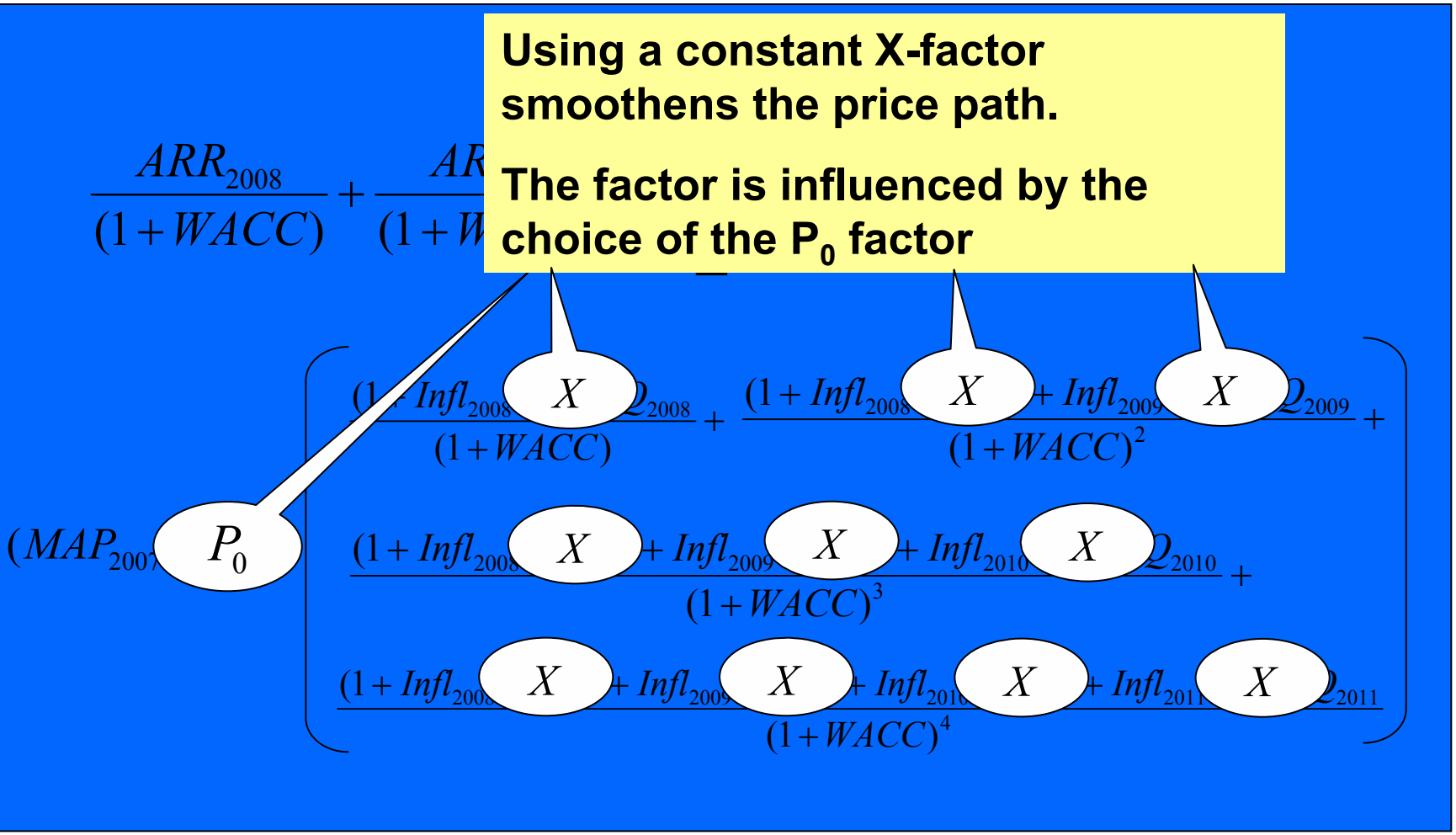
This is to

- **avoid price shocks**
- **to balance windfall gains and windfall losses.**

The X-factor…

Using a constant X-factor smoothens the price path.

The factor is influenced by the choice of the P_0 factor



And for the annual resets - the price-cap formula :

$$MAP_t = [MAP_{t-1} \times \{1 + CWI_t - X\}] + S_t - K_t + ITA_t$$

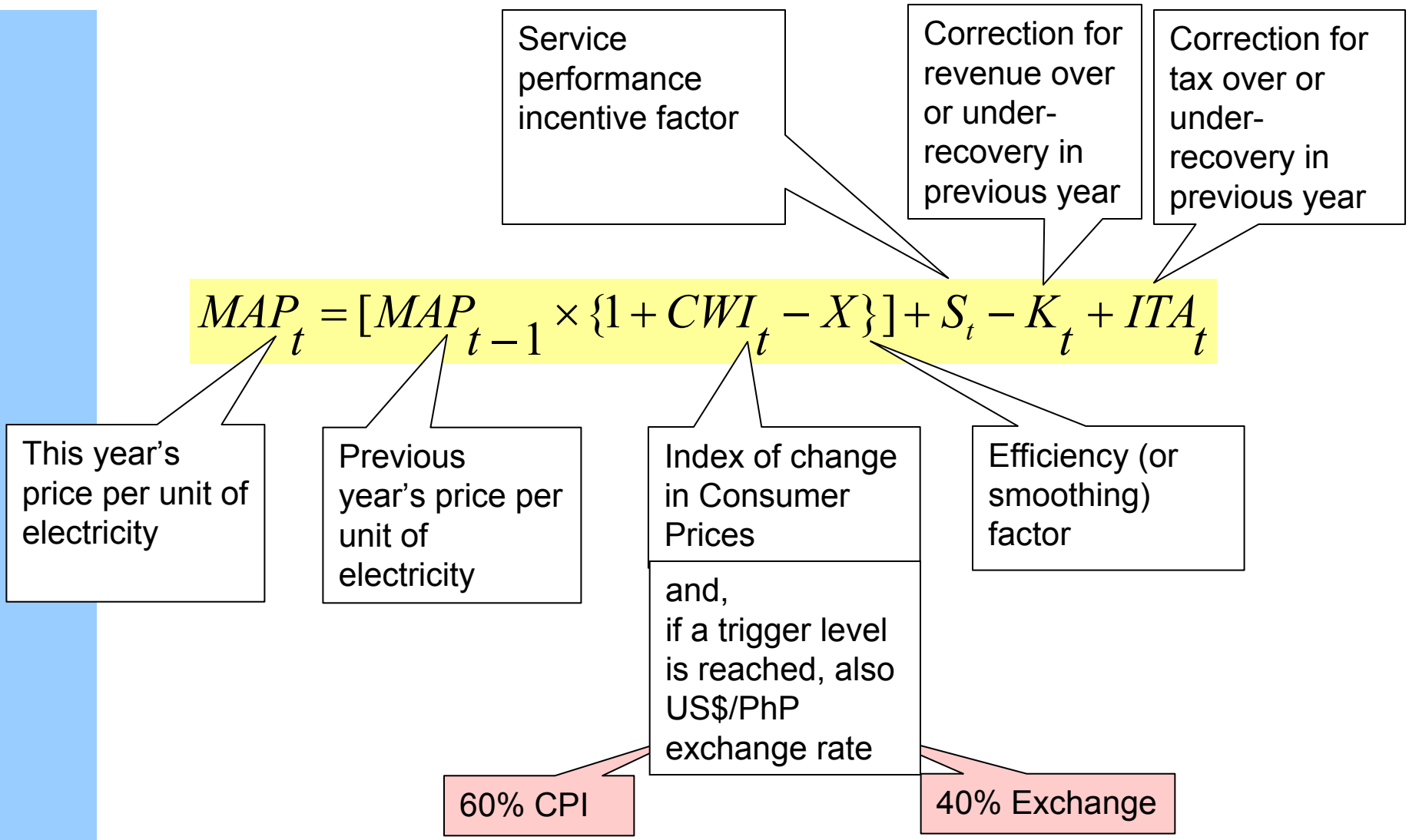
which is a variant of the so-called “CPI-X” form of regulation

It essentially means :

Next year’s price is capped at this year’s price plus an allowance for general cost increases, reduced by an efficiency factor.

MAP_t means the maximum average price (for distribution services) for year t

The price-cap formula, in some more detail :



And finally some other factors influencing future prices:

Efficiency carry-over

- Net efficiency adjustments - incentive to reduce cost below forecasts
- Adjustments carried over for 4 years – ensure incentive is retained
- Adjustments as additional allowed revenue during next regulatory period
- Efficiency adjustments will consider capex and opex
- Adjustments can be negative (performance worse than forecasts)
- Forecasts can be adapted to accommodate significant changes in operating environment (thus not considered efficiency factors)

Factors leading to re-opening of price-caps, or price additions

Force Majeure

- Costs associated with force majeure events can be passed through
- ERC to consider FM claims, after receipt of details and supporting data
- If approved, additional factor added to prices (not part of price-cap)

Tax change events

- Costs associated with tax change events can be passed through
- ERC to consider tax change claims, after receipt of details and supporting data
- If approved, additional factor added to prices (not part of price-cap)

Re-opening of X-factor calculation (with ERC approval)

- Excessive change in CPI or PhP/US$ exchange rate
- Deferred (significant) capital expenditure
- Major unforeseen acquisitions (or Capex)

Thank You

Proceed to next session