

# Performance Based Regulation of Philippines Electricity Distribution Companies

## REGULATORY TRAINING COURSE

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

### SESSION 4A: LOAD FORECASTING



# Overview

This presentation will consider:

- Reasons growth forecasts are required;
- Drivers and indicators of growth;
- Forecasting methodologies; and
- The ERC review of utility growth forecast.

# Reasons for Growth Forecasting

## CONSUMER NUMBERS

- Growth in consumer numbers is one driver of energy and demand growth.
- Consumer numbers are also a significant OPEX driver, particularly of consumer management costs.

## ENERGY CONSUMPTION

- Energy consumption forecasts are used to convert the allowed annual required revenue to a maximum average price.
- A high energy forecast will result in a lower MAP and thus lead to low utility revenue.

## PEAK DEMAND

- Peak demand is the main driver of growth related CAPEX.
- A low demand forecast may mean that insufficient revenue is provided to fund required capital expenditure



**Hence growth forecasts should be accurate – not an area where a utility should try and “game” the regulator.**

# Drivers and Indicators of Growth

Primary drivers of growth are:

- Population growth;
- Economic growth;
- Total electricity price – inverse relationship.

Indicators of probable growth rates:

- Historical utility growth rates;
- Regional population growth forecasts;
- Regional economic growth forecasts;
- Electricity price trends;
- Regional growth forecasts prepared by DOE and TransCo.

# Forecasting Methodologies

## Econometric Modelling

- Quantifies the relationship between electricity consumption and its underlying drivers.
- Models the change in consumption resulting from forecast changes to underlying drivers.
- Involves sophisticated multivariate analysis.
- Approach still limited by the accuracy of the underlying driver forecasts.

## Energy Utilisation Index

- Based on forecast consumer numbers, disaggregated by consumer type.
- Assumes average annual consumption for each consumer type does not change.
- Derives forecast consumption on the basis of forecast consumer numbers.
- Not accurate for very large consumers – their consumption is normally individually forecast and overlaid on the underlying EUI estimate.

# Forecasting Methodologies (cont'd)

## Trending

- Assumes historic growth trends will continue into the future;
- Forecast is developed by developing a “curve of best fit” to represent historic growth and projecting this curve into the future;
- It is normal practice to then “unscientifically” modify this curve to take into account the forecast connection or removal of significant point loads and also the influence of anticipated changes to underlying growth drivers from historical patterns.

## Forecasting Demand Growth

- Demand is related to energy consumption through the load factor;
- Load factor is primarily driven by demographic factors. Hence utility influence is limited and rapid change unlikely.
- Hence demand growth should generally track energy growth.

# ERC Review of Growth Forecasts

- ERC does not mandate forecasting methodology and will accept forecasts that use less complex forecasting tools, provided such forecasts are consistent with other available information.
- The ERC review will essentially be a “sanity check” to ensure that forecasts are consistent with past trends and the forecast trends in the underlying drivers.
- The utility forecast will be compared with DOE and TransCo regional forecasts and with forecasts of regional economic and population growth.
- There is evidence that:
  - DOE and, to a lesser extent, TransCo forecasts have tended to be higher than actual outcomes.
  - Current growth rates are trending lower than historic levels because electricity prices are increasing as per EPIRA subsidies are progressively removed.



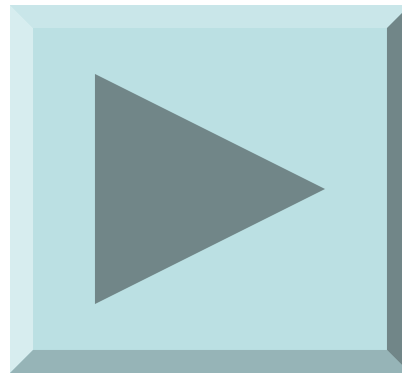
# ERC Review of Growth Forecasts (cont'd)

ERC may adjust growth forecasts if:

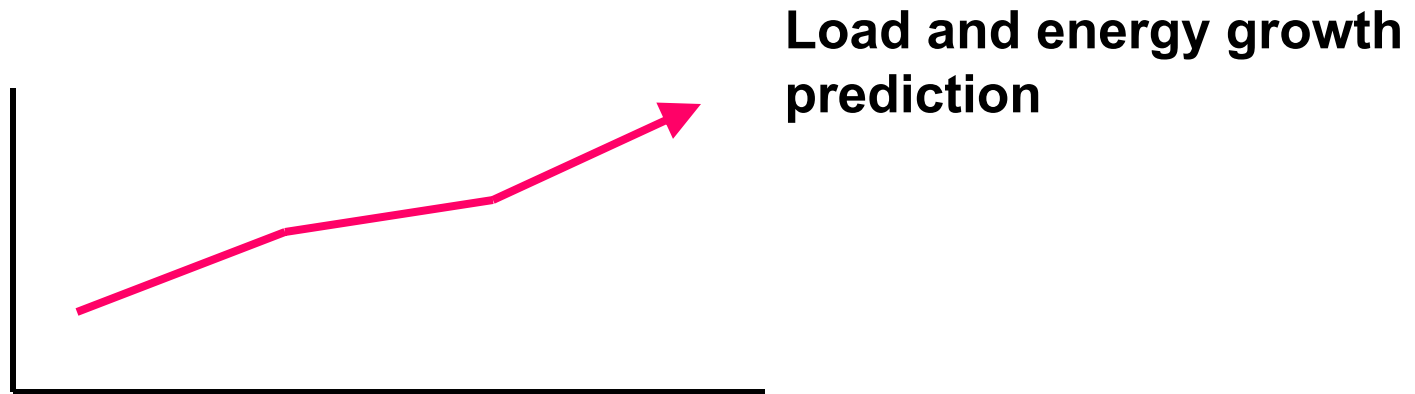
- The forecasts show significant deviations in any year from an underlying trend and deviation this is not adequately explained;
- The forward growth rates are significantly different from historic growth rates and this difference is not adequately explained;
- The projected growth rates are inconsistent with forecast changes in underlying regional drivers;
- The project growth rates are significantly higher than the regional growth forecast prepared by TransCo or DOE; or
- The demand forecast implies a sudden and significant change in network load factor.

# Thank You

Any more questions?

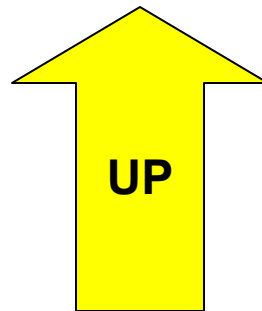


# So is it better to be optimistic when predicting load growth ?

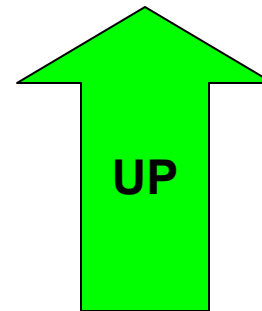


So that must mean ....

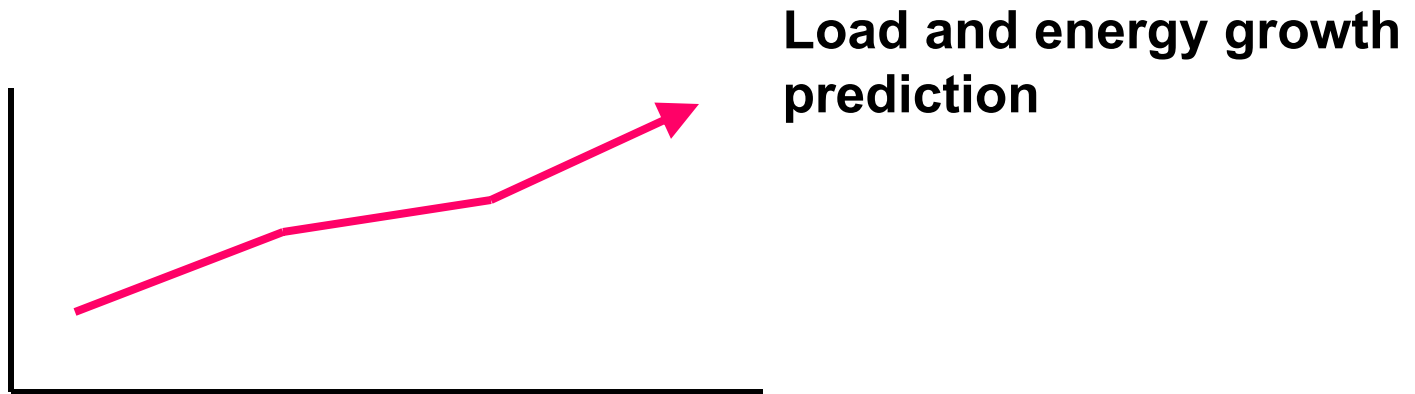
**CAPEX**



**OPEX**



# So is it better to be optimistic when predicting load growth ?



And a happy utility .... (?)



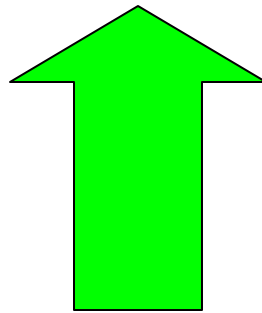
# So is it better to be optimistic when predicting load growth ?

But remember....

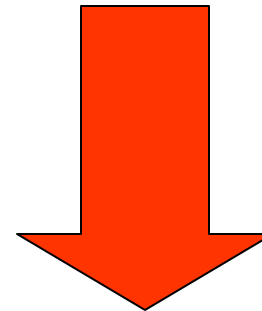
$$MAP = \frac{\text{Allowed Revenue}}{\text{kWh sold}}$$

So ....

kWh



MAP



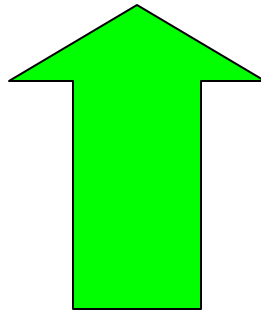
# And if you don't sell the units you predicted...

- Under a price cap-
  - Your revenue will fall below that forecast
  - You will have no chance to recover this (not covered under  $K_t$  factor)



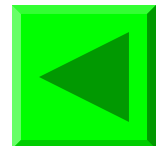
## Conversely, if you predict low...

MAP will go up



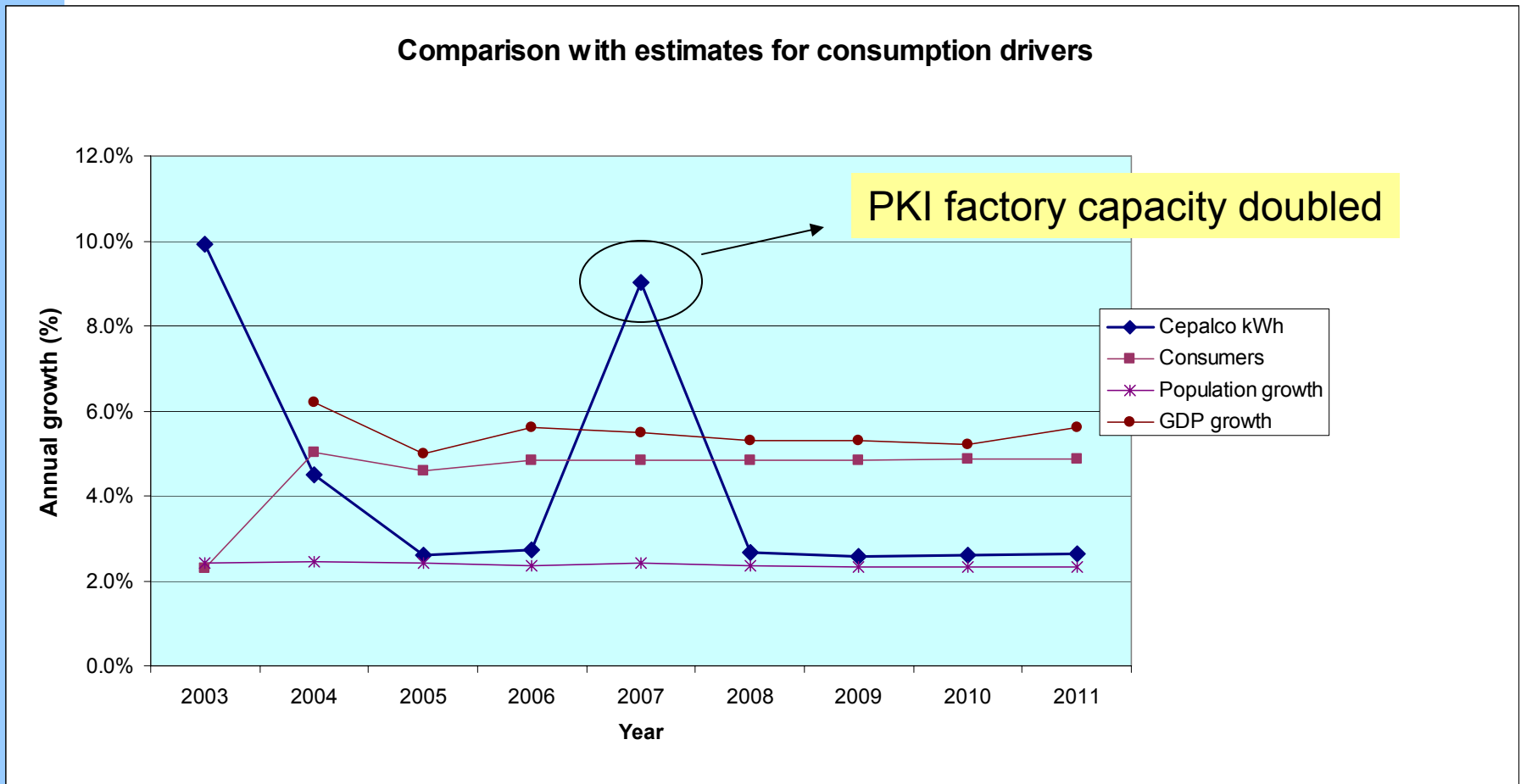
but

- Capex allowance will be compromised
- Opex allowance will be reduced
- Optimization may be more severe



# Look at for example Cepalco's approved energy forecast

## Annual growth



### Comparison with regional demand growth estimates

