Summary of Inflation, TFP and Benchmarking Issues

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Overview

This presentation summarizes PEG's preliminary findings and work plan going forward on:

- Developing an inflation factor for 4th Generation Incentive Rate-setting (4th Gen IR)
- Estimating total productivity factor (TFP) growth for the Ontario electricity distribution industry
- Developing benchmarking models for 4th Gen IR

The Inflation Factor

Two main decisions for inflation factor

1. Choices for inflation subindices

   Capital input prices
   Labor input prices

2. Method for mitigating volatility in inflation measure

>>> annual inflation in industry price index (IPI) examined in 3rd Gen IR ranged from +7% to -4% between 1989 and 2007; three-year moving average in this IPI ranged from 1% to 5% over the same period

Choice of Capital Input Price Subindex

Board has found that non-labor input price index should be measured by Ontario distribution-specific indices, to the extent practicable

PEG proposes to use this simple but reasonable measure of the capital service price:

$$WKS_t = r_t WKA_{t-1} + d_t \cdot WKA_t$$

Where WKA_t = an index of capital asset prices in year t

r_t = a measure of the rate of return (sometimes referred to as "the opportunity cost of capital") in year t

d_t = depreciation of capital in year t

Choice of Capital Input Price Subindex (Con't)

The formula above captures:

- What is paid to purchase capital assets
- The "return on" capital
- The "return of" capital

This formula excludes:

- Taxes (because of differences in past trends and expected future changes in tax rates)
- Capital gains (because of their volatility)

Choice of Capital Input Price Subindex (Con't)

Capital service price subindex will be computed using:

- The electric utility construction price index for distribution systems as the asset price
- The Board-approved weighted average cost of capital for the rate of return
  - Since 2008, will be assumed to be the same for all companies in a given year
  - Before 2008, will use Board-approved rates for different size categories of distributors
- A constant, geometric rate of decay for the depreciation rate

Choice of Labor Price Subindex

Board has found that labor price inflation should be measured by a "generic, off the shelf" price index

Several options for such an index in 4th Gen IR:

- GDP-IPI
- Average weekly earnings (AWE) in Ontario for hourly & salaried employees
  - All workers
  - Workers in goods-producing industries
  - Workers in manufacturing industries
  - Workers in utility industries
- Analogous measures for average hourly earnings (AHE) in Ontario for hourly employees

Choice of Labor Price Subindex (Con't)

PEG plans to use AWE for hourly & salaried employees in all sectors

For comparison's sake, here is the average 2001-2011 AWE inflation for different industry aggregates:

All industries	2.51%
Goods producing industries	1.92%
Utilities industries	2.72%
Manufacturing industries	1.46%

Mitigating Volatility

PEG's proposed inflation factor will:

- Weight inflation in the capital service price index by capital's share of total distribution cost for the industry
- Weight AWE inflation by the share of OM&A costs in total distribution cost for the industry
- Compute this weighted average on a three-year moving average basis

>>> measuring inflation on a three-year moving average basis:

- cuts the historical volatility (i.e. standard deviation) in this inflation measure by about two-thirds
- Leads to volatility levels similar to those of the annual change in the GDP-IPI, the inflation measure currently used in 3rd Gen IR

Comparison with Alberta

A “composite” inflation factor was approved in 2012 in PBR plans for electricity distributors in Alberta

The Alberta inflation factor was a weighted average of AWE in Alberta (for labor prices) and the Alberta CPI (for non-labor prices)

PEG’s proposed inflation subindex for labor prices is similar what was approved in Alberta, but using the CPI to index non-labor prices would not be consistent with Board findings for an appropriate inflation factor for 4th Gen IR

Total Factor Productivity

PEG will compute an index-based TFP study for the Ontario electricity distribution industry

We will also use the econometric model developed in our benchmarking analysis to develop an alternate estimate of historical TFP growth for the Ontario electricity distribution industry

Output Quantity

Choices for output quantity sub-indices

- Customer numbers
- kWh deliveries
- kW

Subindices will be weighted by their (relative) cost elasticities, as estimated in the econometric model

Main decision regarding output: what choice for kW? (e.g. billed, summer peak, winter peak, annual peak)

OM&A Input Quantity

Changes in OM&A input quantity measured as changes in OM&A expenditure minus the change in the OM&A input price subindex

OM&A input price subindex will be the same as what is used to measure labor price inflation in the inflation factor

Capital Input Quantity

Measuring capital input quantity requires:

- A benchmark capital year
- Measures of capital additions VI_t in each year
- A measure of the depreciation rate d
- An index of distributor plant asset prices WKA_t

>>> Also used for input price index

Capital Input Quantity (Con't)

Main challenge for current analysis is 1989 vs. 2002 benchmark year

PEG would prefer to use the 1989 benchmark year, but this requires:

- Confidence in 1989 – 1997 MUDBANK data on capital additions
- Confidence in ability to interpolate "missing" capital additions data

PEG continues to investigate these issues

Capital Cost

Capital cost is equal to (capital quantity) * (capital service price) and is necessary to weight changes in capital input quantity

To be consistent with capital service price index used in inflation factor, when computing capital cost PEG will:

- Use Board-approved WACC as the rate of return
- Use a constant, geometric decay as the rate of depreciation
- Exclude taxes
- Exclude capital gains

Econometric Benchmarking

PEG will benchmark total distribution cost using econometric methods

The total cost measure will:

- Include capital contributions
- Include payments for LV services

Two options for dealing with differences in HV services

- Exclude HV costs from total cost measure
- Include HV costs but also include HV intensiveness as a business condition variable

PEG will test the business condition variables discussed during the webinar for which we have data to see if they have a statistically significant relationship with electricity distribution costs

Unit Cost/Peer Group Benchmarking

The statistically significant cost driver variables will also determine how peer groups used in the unit cost benchmarking may be defined

PEG will present data on how these business condition variables compare across distributors

Based on analysis of these variables, PEG may propose peer groups that could differ from current peer groups in terms of:

- Number of peer groups
- Cost drivers used to define peer group
- How quantitative comparisons are made among peers in a group