Key PBR Data and Implementation Issues

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Transition to PBR: How to Start?

Key Provisions of PBR Plans

Attrition Relief Mechanism (ARM)

Basic Form	Rate caps or revenue caps?
ARM Design	Indexing, forecast, or hybrid?
If indexing,	
Inflation measure	Macro or industry specific?
Productivity treatment	Index, econometric, or hybrid?

Benefit sharing

Plan term	3,4, or 5 years
Earnings sharing	Yes or no? Symmetry Deadband Sharing
Stretch Factor	None Standard 0.5% Linked to benchmarking
Plan Update	No provision Rate case Option for extension Efficiency carryover mechanisms

Efficiency Carryover Mechanisms

Basic Idea

Rates not trued up 100% to cost in plan update proceedings

Company keeps some benefits of long term performance gains
loses some costs of poor productivity growth

Benefits Encourage long term performance gains
Discourage opportunistic timing of expenses

Precedents

Britain	Water utilities
Victoria, Australia	Gas & electric power Dx
National Grid	MA, NY, RI
New England Gas	RI

Key Provisions of PBR Plan (cont'd)

Service Quality

SQ indicators (*e.g.* SAIDI, SAIFI)

Monitoring or award/penalty mechanism ("APM")?

If APM,

Benchmarks	Company specific or statistical?
Symmetry	Awards as well as penalties?
Deadbands	
$$$ at risk	

Key Provisions of PBR Plan (cont'd)

Marketing Flexibility

PCI applies to each rate element
>>> No rate design freedom

PCI applies to Actual Price Index ("API")
a revenue-weighted average of rate elements

1 index for each service
>>> Rate design freedom

Indexes for two or more *baskets* of services

>>> Change relative rates for services

Optional rates and services

Transition to PBR: How to Start?

First Steps

Distributors presumably entitled to rates approved in recent rate cases

Distributors commence PBR with new rate case to set "castoff" rates after current "plans" expire

Rate cases can be staggered so that 1-2 each year (*e.g.* CA "rate case plan)

These can be facilitated by interim PBR plans (*e.g.* Ontario "IRM2")

Transition to PBR: How to Start?

PBR Rulemaking

Generic hearing could consider guidelines for PBR filings

e.g. Ontario's "Natural Gas Forum" Hearing

AUC then issues PBR guidelines document

Commentary possible on each plan design issue mentioned

Possible Outcomes

1. Each utility free to file what it pleases *e.g.* Ontario gas

PBR Rulemaking (cont'd)

Possible Outcomes (cont'd)

2. Each utility develops own plan subject to minimal conditions

- 4+ year rate plan
- Indexing, all forecast, or hybrid ARMs
- Rate cap or revenue cap
- Capex covered by indexing, fixed, or otherwise incented

3. Develop standard plan *option* for gas & electric
(*a la* Ontario electric)

4. Mandatory approaches for gas & electric utilities

"Baby" PBR

"Old School" California hybrid approach to ARM design is good transitional approach

O&M expenses	Revenue cap index
Capital Cost	COS forecasts used for capital cost
	Focus on capital budget
	Rate of return subject to index-based adjustments

"Baby" PBR (cont'd)

Capex budgets	Several methods for setting plant addition budgets - Multi-year forecast - Average of recent historical values - Forward test year Budgets typically adjusted for construction cost inflation
Precedents	Traditional California approach, Hawaii Fortis BC, Terasen Gas

Baby PBR: Pro

Uses indexes where indexing least controversial, most needed (O&M expenses)

traditional ratemaking principles where these work best (utility plant)

Accommodates capital spending surges

Accommodates separate ROR adjustments

Baby PBR: Con

Complicated!

Data Requirements

Input price and productivity research using *Alberta* data involves imposing data requirements

8-10 years of data on distribution operations

- O&M salaries & wages
- O&M pensions & benefits
- Plant additions
- Volumes, customers & corresponding revenue shares

Ideally, 5-30 *additional* years of data on distribution plant additions, net plant value for first sample year

Alternative: use American data

Benefit Sharing Mechanisms & Incentive Power

Sharing of plan benefits is understandable concern of stakeholders in PBR plan design

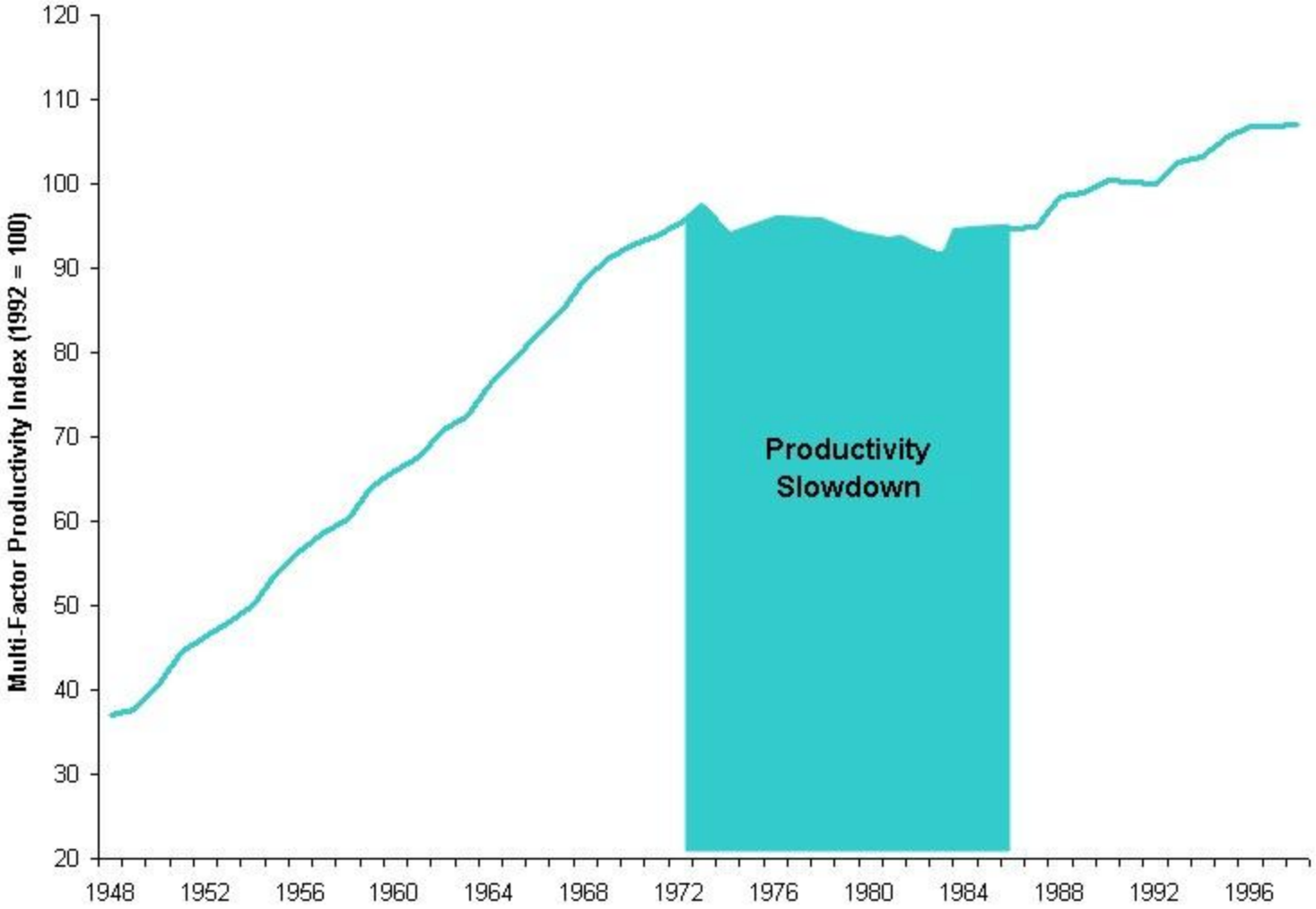
Salient options

- Stretch factors
- Earnings sharing
- More frequent rate cases

Sharing can weaken performance incentives, reduce size of "pie" available for sharing

PEG Research has developed incentive power model to compare incentive impact of alternative regulatory systems

Productivity Trend of Electric, Gas, and Sanitary Utilities



Benefit Sharing Mechanisms & Incentive Power

Model Assumptions

Model parameterized to resemble large energy distributor

- $500 million annual cost
- Capital intensive technology
- 5% annual depreciation rate
- 7% WACC
- 30% income tax rate
- Utility cares about profits but some value assigned to effort
- Chooses cost performance strategy that maximizes NPV of objectives

Model Assumptions

Company faces steady stream of cost reduction opportunities

- O&M and capex
- Up front costs for sustained cost reduction
- Mix of payback periods (1, 3, & 5 years)
- Opportunities depend on initial efficiency
- Opportunities calibrated to produce 1% annual productivity growth with 3 year regulatory cycle

Realistic portrayal of regulatory system

- Periodic rate cases base new rates on recent cost
- Rate case cycle 1-5 years
- Earnings sharing options
- Various plan update options

Plan Update Options

1.Conventional rate case

<u>Efficiency Carryover Mechanisms</u>

2. Rates based α% on 1 year extension of ARM,
   $(1 - \alpha)$% on historical cost

3. Rates based α% on external cost benchmarki
   $(1 - \alpha)$% on historical cost

4.Company has option for new revenue requirement based on revenue cap formula

X =1, 2 etc.

Incentive Power Model Results

Rate Case Cycle	Other Provisions	Long term **P**roductivity Growth %
2 years		0.66
3 years		0.90
5 years		1.41
5 years	50/50 ESM	1.01
3 years	25/75 ARM extension ECM	1.66
3 years	25/75 Benchmark ECM	2.29
3 years	X = 2% rate option plan	2.71

Integration of Benchmarking

Benchmarking Basics

Benchmarking: Performance evaluation using comparisons to benchmarks that embody performance standards

Key Performance Indicators (KPIs)	Variables that measure company activities (*e.g.* Unit Cost)
Benchmarks	Values for these indicators that reflect a performance standard (*e.g.* Unit Cost^{Peers})
Appraisal Mechanism	Method for comparing values of indicators to variables to benchmarks *e.g.* Unit Cost^{Northstar}/Unit Cost^{Peers}

Benchmarking Basics (cont'd)

Performance Standards

Benchmarks can reflect alternative performance standards

- Industry average
- Top quartile
- Best practice (frontier)

Best practice standard hardest to implement *accurately*

- Data anomalies
- Short run, unsustainable nature of top performances

Business Conditions

Performance indicators (*e.g.* unit cost) depend on

- Utility Performance — effort, competence
- Business conditions (KPI "drivers")

Variation in KPI data depends *chiefly* on variation in business conditions

>>> Accurate benchmarks "control" for external business conditions

Comparisons to benchmarks then measure performance

Comprehensiveness

Scope of benchmarking is key threshold issue

Comprehensive: Pro

Total cost matters most in long run

Capital cost is important in capital-intensive businesses (!)

Don't have to divvy up common costs (*e.g.* A&G expenses)

Don't need controls for excluded inputs

Comprehensiveness (cont'd)

<u>Non-Comprehensive: Pro</u>

Total cost includes *old* capital

Can't be controlled

Hard to benchmark — Data requirements; Plant vintage issues

Focus on *controllable* costs (*e.g.* O&M and capital spending) & service quality

Identify areas of strength and weakness

International Benchmarking

International: Con

Different business conditions

Different reporting guidelines

Different system characteristics (*e.g.* substations)

Hazardous input price comparisons

International: Pro

Large sample permits development of sophisticated econometric models

Uniform Systems of Accounts

Statistical benchmarking aided by uniform systems of accounts

- FERC Form 1 (electric utilities)
- FERC Form 2 (gas transmission)
- Ontario
- Alberta

Data quality aided by clear instructions

Arbitrary classifications will still occur

Econometric Benchmarking Models

Basic Idea

Formulate KPI model

$$\text{Cost} = \beta_0 + \beta_1 \text{Price}_{\text{Labor}} + \beta_2 \text{Customers} + \beta_3 \text{System Age}$$

Price, Customers, etc. — business condition variables

$\beta_0, \beta_1, \beta_2$ — model parameters

Estimate parameters w/ data on utility operations

Basic Idea (cont'd)

Cost can be projected using

- Econometric parameter estimates (*e.g.* b_0, b_1)
- Business conditions for subject utility

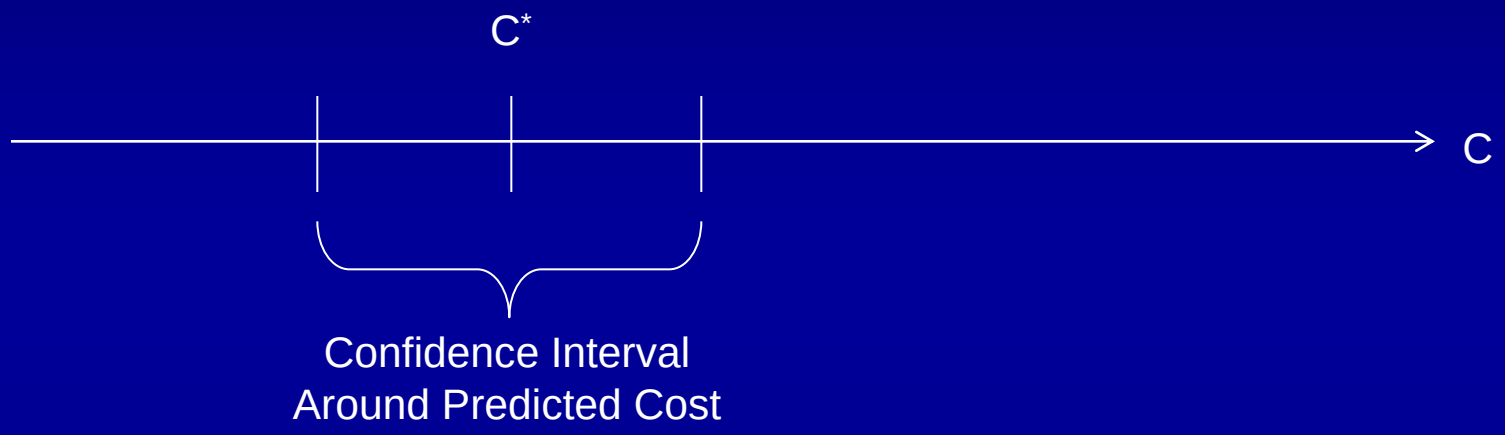
$$Cost_{Projected} = b_0 + b_1 Price_{Labor}^{Northstar} + b_2 Customers^{Northstar}$$

Compare to company's actual or forecasted (*e.g.* forward test year) cost

$$Performance = Cost^{Northstar}/Cost_{Projected}$$

Statistical Tests of Efficiency Hypotheses

Confidence interval can be constructed around model's prediction



If C^{Actual} lies in interval, performance **NOT** "significantly" different from model projection

Case Study: Ontario Power Distribution

PEG recently prepared an econometric benchmarking study of power distributor O&M expenses in Ontario.

- 85 companies
- 3 years of data
- Heterogeneous operating conditions

Econometric Model of OM&A Expenses

VARIABLE KEY

N= Number Retail Customers
V= Total Volumes
M= Total Kilometers of Line
W= Input Price Index
UN= Percent of Distribution Lines Underground
CG= 10 Year Customer Growth / Output Index
CS= Canadian Shield (binary)

EXPLANATORY VARIABLE	PARAMETER ESTIMATE	T-STATISTIC[1]
N	0.491	15.28
NN	-0.115	-6.21
V	0.366	11.37
VV	0.093	5.55
M	0.094	4.83
MM	0.008	0.92
MCS	0.005	2.18
Constant	16.341	862.73
Trend	-0.002	-0.35

EXPLANATORY VARIABLE	PARAMETER ESTIMATE	T-STATISTIC[1]
W	1.399	7.24
WW	-0.372	-0.12
UN	-0.096	-8.08
CG	-0.106	-13.54
CS	0.011	2.27

Other Results

Rbar-Squared	0.983
Sample Period	2002-2006
Number of Observations	410

[1] The critical value for the t statistic is around 1.648 for a 90% confidence level and two-tailed hypothesis tests.

Performance Rankings Based on Econometric Benchmarks

	Years Benchmarked	Actual/Predicted[1]	Percentage [A-1][1]	P-Value	Cost surplus (savings) in $	Rank[1]
Hydro Hawkesbury	2004-2006	**0.598**	-0.402	0.000	-470,827	1
Tay Hydro Electric Distribution	2004-2006	**0.632**	-0.368	0.000	-464,009	2
Chatham-Kent Hydro	2004-2006	**0.725**	-0.275	0.003	-1,945,711	3
Cambridge and North Dumfries Hydro	2004-2006	**0.742**	-0.258	0.005	-2,589,805	4
Renfrew Hydro	2004-2006	**0.749**	-0.251	0.006	-260,072	5
Hydro 2000	2004-2006	**0.765**	-0.235	0.010	-65,148	6
Northern Ontario Wires	2004-2006	**0.770**	-0.230	0.012	-512,873	7
Kitchener-Wilmot Hydro	2004-2006	**0.776**	-0.224	0.014	-3,218,542	8
Grimsby Power	2004-2006	**0.778**	-0.222	0.014	-420,832	9
Lakefront Utilities	2004-2006	**0.785**	-0.215	0.018	-443,597	10
Hydro One Brampton Networks	2004-2006	**0.794**	-0.206	0.022	-3,895,857	11
Oshawa PUC Networks	2004-2006	**0.810**	-0.190	0.033	-2,032,863	12
Hydro One Networks	2004-2006	**0.822**	-0.178	0.045	-78,297,965	13
Lakeland Power Distribution	2004-2006	**0.826**	-0.174	0.048	-430,332	14
Hydro Ottawa	2004-2006	**0.833**	-0.167	0.056	-8,162,619	15
Festival Hydro	2004-2006	**0.838**	-0.162	0.062	-654,324	16
Barrie Hydro Distribution	2004-2006	**0.845**	-0.155	0.071	-1,506,001	17
Hearst Power Distribution	2004-2006	**0.847**	-0.153	0.073	-110,682	18
Welland Hydro-Electric System	2004-2006	**0.875**	-0.125	0.122	-552,629	19
Kenora Hydro Electric	2004-2006	**0.885**	-0.115	0.144	-161,218	20
Rideau St. Lawrence Distribution	2004-2006	**0.910**	-0.090	0.206	-128,882	21
Niagara-on-the-Lake Hydro	2004-2006	**0.913**	-0.087	0.214	-142,051	22
Horizon Utilities	2004-2006	**0.915**	-0.085	0.220	-3,255,643	23
Waterloo North Hydro	2004-2006	**0.923**	-0.077	0.242	-729,295	24
Peterborough Distribution	2004-2006	**0.923**	-0.077	0.243	-483,456	25
Orangeville Hydro	2004-2006	**0.923**	-0.077	0.243	-143,643	26
West Nipissing Energy Services	2003,2004,2006	**0.924**	-0.076	0.244	-56,159	27
Halton Hills Hydro	2004-2006	**0.926**	-0.074	0.251	-334,420	28
Atikokan Hydro	2004-2006	**0.929**	-0.071	0.263	-49,682	29
E.L.K. Energy	2002-2004	**0.931**	-0.069	0.267	-131,454	30
Espanola Regional Hydro Distribution	2004-2006	**0.938**	-0.062	0.289	-54,946	31
Newbury Power	2004-2005	**0.940**	-0.060	0.326	-2,868	32
Peninsula West Utilities	2004-2006	**0.956**	-0.044	0.346	-196,411	33
North Bay Hydro Distribution	2004-2006	**0.966**	-0.034	0.380	-183,799	34
Burlington Hydro	2004-2006	**0.984**	-0.016	0.443	-185,699	35
Middlesex Power Distribution	2004-2006	**0.984**	-0.016	0.444	-22,963	36
Innisfil Hydro Distribution Systems	2004-2006	**0.991**	-0.009	0.469	-26,101	37
Tillsonburg Hydro	2002,2006	**0.996**	-0.004	0.488	-5,798	38
Ottawa River Power	2004-2006	**0.997**	-0.003	0.488	-6,667	39
Enersource Hydro Mississauga	2004-2006	**0.998**	-0.002	0.491	-100,205	40
London Hydro	2004-2006	**1.003**	0.003	0.489	70,876	41
PUC Distribution	2004-2006	**1.008**	0.008	0.474	52,651	42
Cooperative Hydro Embrun	2004-2006	**1.009**	0.009	0.468	3,053	43
Milton Hydro Distribution	2004-2006	**1.017**	0.017	0.442	65,737	44
Wellington North Power	2004-2006	**1.017**	0.017	0.441	16,190	45
Terrace Bay Superior Wires	2003-2005	**1.019**	0.019	0.434	5,376	46
Clinton Power	2003,2005,2006	**1.027**	0.027	0.408	10,710	47
Veridian Connections	2004-2006	**1.029**	0.029	0.402	545,928	48
Parry Sound Power	2004-2006	**1.030**	0.030	0.399	28,190	49
Woodstock Hydro Services	2004-2006	**1.032**	0.032	0.391	96,927	50
Haldimand County Hydro	2004-2006	**1.033**	0.033	0.388	172,794	51
Greater Sudbury Hydro	2004-2006	**1.036**	0.036	0.380	319,816	52
Newmarket Hydro	2004-2006	**1.037**	0.037	0.376	180,320	53
Norfolk Power Distribution	2004-2006	**1.048**	0.048	0.341	179,839	54
COLLUS Power	2004-2006	**1.052**	0.052	0.328	138,852	55
Wasaga Distribution	2004-2006	**1.054**	0.054	0.323	80,474	56
Orillia Power Distribution	2004-2006	**1.057**	0.057	0.315	171,210	57
Toronto Hydro-Electric System	2004-2006	**1.057**	0.057	0.314	8,600,504	58
St. Thomas Energy	2004-2006	**1.058**	0.058	0.311	173,770	59
Brantford Power	2004-2006	**1.060**	0.060	0.304	392,575	60
Guelph Hydro Electric Systems	2004-2006	**1.071**	0.071	0.275	578,563	61
Kingston Electricity Distribution	2003-2005	**1.072**	0.072	0.272	379,684	62
Sioux Lookout Hydro	2004-2006	**1.076**	0.076	0.262	70,887	63
West Perth Power	2003-2005	**1.091**	0.091	0.223	40,369	64
Fort Erie (CNP)	2004-2006	**1.092**	0.092	0.222	352,619	65
Powerstream	2004-2006	**1.095**	0.095	0.215	3,441,512	66
Bluewater Power Distribution	2004-2006	**1.097**	0.097	0.210	808,780	67
Grand Valley Energy	2004-2006	**1.110**	0.110	0.182	20,032	68
Oakville Hydro Electricity Distribution	2004-2006	**1.111**	0.111	0.180	1,129,620	69
Fort Frances Power	2004-2006	**1.111**	0.111	0.180	103,831	70
Thunder Bay Hydro Electricity Distribution	2004-2006	**1.121**	0.121	0.159	1,178,525	71
Chapleau Public Utilities	2004-2006	**1.177**	0.177	0.078	75,185	72
Dutton Hydro	2004-2006	**1.181**	0.181	0.074	25,769	73
Eastern Ontario Power (CNP)	2004-2006	**1.182**	0.182	0.073	192,248	74
Westario Power	2003,2004,2006	**1.183**	0.183	0.072	712,095	75
Port Colborne (CNP)	2004-2006	**1.195**	0.195	0.060	502,135	76
ENWIN Powerlines	2004-2005	**1.197**	0.197	0.098	3,623,405	77
Whitby Hydro Electric	2004-2006	**1.202**	0.202	0.055	1,209,064	78
Niagara Falls Hydro	2004-2006	**1.202**	0.202	0.054	1,337,195	79
Midland Power Utility	2004-2006	**1.209**	0.209	0.049	295,650	80
Essex Powerlines	2004-2006	**1.251**	0.251	0.026	1,213,957	81
Centre Wellington Hydro	2004-2006	**1.252**	0.252	0.025	291,458	82
West Coast Huron Energy	2004-2006	**1.309**	0.309	0.010	307,530	83
Erie Thames Powerlines	2004-2006	**1.335**	0.335	0.006	1,067,189	84
Brant County Power	2004-2006	**1.432**	0.432	0.001	964,216	85
Great Lakes Power	2004-2006	**1.544**	0.544	0.000	2,674,315	86

[1] Lower values imply better performance.

Unit Cost Benchmarking

Unit Cost

Ratio of cost to an output quantity measure

$$\text{Unit Cost} = \text{Cost}/\text{Output Quantity}$$

Output index can be multidimensional

>>> Crude control for differences in operating scale

Performance measured by comparison to peers

$$\text{Performance} = \text{Unit Cost}^{\text{Northstar}} / \text{Unit Cost}^{\text{Peers}}$$

Peer Groups

Unit cost comparisons require peer groups

For benchmark to be fair, cost pressures of peer group must be similar to subject utility

- Operating scale
- Input prices
- *Other* business conditions must be similar (*e.g.* input prices, undergrounding, forestation)

Peer Groups (cont'd)

Econometrics can guide peer group selection

- What are relevant cost drivers?
- What is their relative importance?

Peer groups should have at least 3-5 members

>>> Choose most relevant peer group with at least 3-5 members

Unit Cost & Productivity Metrics

Case Study: Ontario

PEG calculated unit cost indexes for Ontario power distributors

Three output measures: customers, deliveries, circuit km

Peer group selection guided by econometric research

Unit OM&A Cost Indexes (Continued)

	Average OM&A cost[1]	2002	2003	2004	2005	2006	Average of Last 3 Available Years[2]	Average / Group Average[2] [A]	Percentage Differences[2] [A - 1]	Implied Cost Surplus (Savings) per year[2]
Mid-Size Southern Medium-High Undergrounding										
Chatham-Kent Hydro	$5,142,308	0.682	0.676	0.712	0.703	0.712	0.709	**0.720**	-28.0%	-$1,441,214
Festival Hydro	$3,382,003	0.793	0.745	0.761	0.734	0.820	0.772	**0.784**	-21.6%	-$732,185
Peterborough Distribution	$5,818,420	0.810	0.754	0.815	0.793	0.900	0.836	**0.849**	-15.1%	-$878,680
Welland Hydro-Electric System	$3,879,904	0.825	0.912	0.988	0.849	0.791	0.876	**0.890**	-11.0%	-$428,111
COLLUS Power	$2,801,949	0.849	0.812	0.858	0.854	1.027	0.913	**0.927**	-7.3%	-$203,343
E.L.K. Energy	$1,788,169	0.960	1.013	0.859	NA	NA	0.944	**0.959**	-4.1%	-$74,146
Woodstock Hydro Services	$3,087,875	0.857	0.928	0.951	0.962	0.997	0.970	**0.985**	-1.5%	-$46,250
Wasaga Distribution	$1,572,540	0.790	0.836	0.908	1.002	1.071	0.994	**1.009**	0.9%	$14,377
St. Thomas Energy	$3,169,519	0.800	0.835	0.901	0.983	1.117	1.000	**1.016**	1.6%	$50,296
Kingston Electricity Distribution	$5,666,409	0.945	1.039	1.028	0.951	NA	1.006	**1.022**	2.2%	$123,388
Niagara Falls Hydro	$7,945,520	0.992	1.021	1.021	1.078	1.107	1.069	**1.085**	8.5%	$676,755
Westario Power	$4,615,081	0.991	1.142	1.160	NA	1.004	1.102	**1.119**	11.9%	$549,880
Bluewater Power Distribution	$9,176,340	1.004	1.082	1.049	1.068	1.201	1.106	**1.123**	12.3%	$1,129,658
Essex Powerlines	$6,057,329	1.061	0.959	1.067	1.185	1.163	1.138	**1.156**	15.6%	$943,610
Erie Thames Powerlines	$4,255,980	1.080	1.275	1.318	1.374	1.318	1.336	**1.357**	35.7%	$1,519,969
GROUP AVERAGE							**0.985**			
Large City Southern Medium-High Undergrounding										
Hydro Ottawa	$40,973,904	0.862	0.781	0.657	0.609	0.738	0.668	**0.733**	-26.7%	-$10,943,087
Veridian Connections	$19,517,364	0.971	1.141	0.943	0.841	0.886	0.890	**0.976**	-2.4%	-$458,970
Toronto Hydro-Electric System	$158,946,624	0.886	0.919	0.949	0.893	0.887	0.910	**0.998**	-0.2%	-$267,171
ENWIN Powerlines	$22,496,714	1.344	1.226	1.230	1.127	1.176	1.178	**1.292**	29.2%	$6,575,146
GROUP AVERAGE							**0.911**			
Large City Southern High Undergrounding										
Hydro One Brampton Networks	$15,003,912	0.597	0.582	0.534	0.532	0.578	0.548	**0.754**	-24.6%	-$3,697,545
Horizon Utilities	$35,303,064	0.659	0.776	0.699	0.826	0.729	0.751	**1.034**	3.4%	$1,182,831
London Hydro	$22,064,690	0.750	0.736	0.729	0.733	0.802	0.755	**1.038**	3.8%	$843,159
PowerStream	$39,783,600	0.650	0.741	0.768	0.791	0.718	0.759	**1.044**	4.4%	$1,736,186
Enersource Hydro Mississauga	$40,596,044	0.755	0.756	0.786	0.819	0.862	0.822	**1.131**	13.1%	$5,321,326
GROUP AVERAGE							**0.727**			
Mid-Size GTA Medium-High Undergrounding										
Barrie Hydro Distribution	$8,198,603	0.609	0.741	0.649	0.548	0.605	0.601	**0.750**	-25.0%	-$2,047,843
Cambridge and North Dumfries Hydro	$7,461,787	0.648	0.638	0.692	0.627	0.617	0.645	**0.806**	-19.4%	-$1,447,940
Kitchener-Wilmot Hydro	$11,147,972	0.609	0.624	0.620	0.635	0.695	0.650	**0.812**	-18.8%	-$2,099,182
Guelph Hydro Electric Systems	$8,746,005	0.768	0.857	0.804	0.765	0.771	0.780	**0.974**	-2.6%	-$227,516
Waterloo North Hydro	$8,712,183	0.847	0.819	0.821	0.775	0.794	0.796	**0.995**	-0.5%	-$45,924
Oshawa PUC Networks	$8,730,236	0.911	0.985	0.969	0.714	0.727	0.803	**1.004**	0.4%	$31,002
Milton Hydro Distribution	$3,976,535	0.882	0.833	0.811	0.820	0.801	0.811	**1.013**	1.3%	$50,147
Burlington Hydro	$11,296,827	0.754	0.787	0.812	0.800	0.872	0.828	**1.034**	3.4%	$387,839
Newmarket Hydro	$5,067,834	0.856	0.962	0.917	0.832	0.862	0.870	**1.087**	8.7%	$440,689
Oakville Hydro Electricity Distribution	$11,341,493	0.813	0.902	0.901	0.850	0.915	0.889	**1.110**	11.0%	$1,246,416
Halton Hills Hydro	$4,183,650	0.967	0.873	0.894	0.829	0.991	0.904	**1.130**	13.0%	$542,725
Brantford Power	$6,903,747	0.782	0.893	0.955	0.932	0.828	0.905	**1.130**	13.0%	$900,304
Whitby Hydro Electric	$7,208,252	0.928	0.999	0.895	0.918	0.964	0.925	**1.156**	15.6%	$1,123,983
GROUP AVERAGE							**0.801**			
AVERAGE: ALL COMPANIES	**NA**	**0.989**	**1.039**	**1.040**	**1.061**	**1.104**	**1.070**	**1.000**	**0.000**	**NA**

[1] Last three years of available data.
[2] Lower values imply better performance.

Performance Rankings Based on Unit Cost Indexes (Continued)

	Average / Group Average[1] [A]	Percentage Differences[1] [A - 1]	Implied Cost Surplus (Savings) per year[1]	Efficiency Ranking[1]
Haldimand County Hydro	**1.038**	3.8%	$205,059	55
London Hydro	**1.038**	3.8%	$843,159	56
PowerStream	**1.044**	4.4%	$1,736,186	57
Ottawa River Power	**1.050**	5.0%	$99,852	58
Clinton Power	**1.063**	6.3%	$25,864	59
Newbury Power	**1.067**	6.7%	$3,011	60
Niagara Falls Hydro	**1.085**	8.5%	$676,755	61
Newmarket Hydro	**1.087**	8.7%	$440,689	62
Atikokan Hydro	**1.092**	9.2%	$59,987	63
Oakville Hydro Electricity Distribution	**1.110**	11.0%	$1,246,416	64
Cooperative Hydro Embrun	**1.118**	11.8%	$39,520	65
Westario Power	**1.119**	11.9%	$549,880	66
Bluewater Power Distribution	**1.123**	12.3%	$1,129,658	67
Halton Hills Hydro	**1.130**	13.0%	$542,725	68
Brantford Power	**1.130**	13.0%	$900,304	69
Enersource Hydro Mississauga	**1.131**	13.1%	$5,321,326	70
Fort Erie	**1.154**	15.4%	$649,376	71
Kenora Hydro Electric	**1.155**	15.5%	$192,524	72
Essex Powerlines	**1.156**	15.6%	$943,610	73
Whitby Hydro Electric	**1.156**	15.6%	$1,123,983	74
Centre Wellington Hydro	**1.168**	16.8%	$243,902	75
Brant County Power	**1.178**	17.8%	$570,779	76
Eastern Ontario Power	**1.207**	20.7%	$261,744	77
Chapleau Public Utilities	**1.223**	22.3%	$111,484	78
West Coast Huron Energy	**1.250**	25.0%	$328,442	79
ENWIN Powerlines	**1.292**	29.2%	$6,575,146	80
Port Colborne	**1.320**	32.0%	$1,057,653	81
Erie Thames Powerlines	**1.357**	35.7%	$1,519,969	82
Dutton Hydro	**1.372**	37.2%	$63,871	83
Grand Valley Energy	**1.431**	43.1%	$88,266	84
Great Lakes Power	**2.008**	100.8%	$7,655,513	85

[1] Lower values imply better performance.

[2] Hydro One Networks has no peer group and is not included in this analysis.

IRM3 Stretch Factor Decision

Performance in O&M benchmarking studies determined stretch factors for IRM3

Table 3: Stretch Factor Values

Group	Benchmarking Evaluations	Stretch Factor Value
I	Statistically superior and in top quartile on OM&A unit cost comparison	0.2%
II	In middle two quartiles on OM&A unit cost comparison	0.4%
III	Statistically inferior and in bottom quartile on OM&A unit cost comparison	0.6%

Supplemental Report of the Board, EB-2007-0673, September 2008

Benchmarking Conclusions

Benchmarking has potential uses in PBR plan design

X factor

Benchmarking methods evolving

Good benchmarking requries good data

Good data currently unavailable in Canada

May make sense to focus on PBR for now