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Staff Discussion Paper

Activity and Program Based Benchmarking For Electricity Distributors

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1 Introduction

In its *Report of the Board: A Renewed Regulatory Framework for Electricity Distributors* (RRF), the OEB signaled its intent to evolve its performance benchmarking to allow for a more meaningful review of utility operations in key areas to support the OEB's objective of ensuring that utilities deliver cost effective outcomes that are valued by customers. The OEB has been relying on benchmarking as an effective means of assessing cost effective performance since 2006, to encourage continuous improvement and has been evolving its approach and use of benchmarking since that time.

As a first step in the evolution signaled in the RRF, in 2013, the OEB introduced total cost benchmarking (TCB) into its rate setting as a means of recognizing distributors' overall cost performance. TCB considers overall operating and capital costs at the aggregate level and is used in the OEB's incentive rate-setting mechanisms. The OEB also developed an electricity distributor Scorecard relying mostly on existing data and measures such as reliability and financial performance, while introducing some new customer-based measures, such as safety and customer satisfaction. The scorecard was intended to build on the annual Reporting and Record keeping Requirements (RRR) process by providing a dashboard on individual utility performance that could easily be understood by customers and would be made publicly available. The OEB recognizes that much more detailed benchmarking is required to facilitate assessment of utility performance that ensures cost effective service delivery and long-term value is being received by energy customers.

The OEB has articulated its commitment to modernizing its approach to regulation to keep pace with the evolving sector while becoming more customer centric, both in the RRF and more recently, in its Strategic Blueprint. The Blueprint sets out a number of strategic objectives for the sector, including, ensuring that "utilities are delivering value to consumers in a changing environment". In its 2017-2020 Business Plan, the OEB identified the development of a program-based benchmarking framework as a key initiative towards achieving this strategic goal. The initiative was launched by letter dated October 10, 2018 and is known as the APB, the activity and program based benchmarking framework.

The OEB has determined that it is time to introduce program/activity level benchmarking to better support the assessment of utility cost structures, the monitoring of utility performance, and the review of regulatory applications. The OEB expects its expanded use and reliance on utility benchmarking at an activity level will encourage continuous improvement in utility performance and result in more cost-effective delivery of services valued by customers, a key objective of the RRF.

The APB framework will provide information beyond current benchmarking. The information will assist the OEB and stakeholders in understanding trends in the cost-effectiveness and efficiency of individual utility performance year over year in significant operational and customer service areas. APB will also allow for comparisons of a utility's performance relative to other utilities in the sector thereby incenting overall continuous improvement. APB's focus on key activities will help identify the best performing utilities in the Province with the expectation that the sharing of best practices can lead to improvements across the sector.

APB will also facilitate improved regulatory assessment of a utility's overall performance in investment planning, the cost effectiveness of its operations and continuous improvement in meeting the customer focused outcomes identified in the RRF, resulting in a more robust assessment of utility cost structures, value to customers, and the setting of just and reasonable rates. Appropriate and robust benchmarking used effectively, can increase the efficiency of the regulatory process.

The OEB intends to implement APB for all rate-regulated entities over the next five years starting with the electricity distributors. The OEB has chosen to proceed with the electricity distribution sector first given the number of entities and the diversity of size and operations, as well as the significant experience at the OEB with benchmarking in the electricity distribution sector which provides the basis for an effective APB framework development. In subsequent phases, APB will be implemented for electricity transmitters, gas distributors and Ontario Power Generation. The OEB expects the framework for APB developed in Phase One will provide a basis for subsequent phases. This OEB Staff Discussion Paper (Discussion Paper) is a key first step in developing APB for electricity distributors.

1.1 Developing an Ontario APB Framework

Pacific Economics Group Research LLC (PEG) was asked to identify potential methodologies that could be used to benchmark activities/programs and to assess data availability. PEG has prepared a *Report to the Ontario Energy Board on Activity and Program Benchmarking of Ontario Power Distributors* ("PEG Report") that includes a high-level summary of their review of precedents for APB in other jurisdictions, a discussion of methods that are useful in APB and data issues that are pertinent to developing the APB framework. PEG has also provided an illustrative proposal for an APB framework the electricity distribution sector.

Midgard Consulting was retained to undertake an analysis of distributors' capital accounts and distribution system plans (DSPs) to identify activities or accounts that would be significant to a distributor's operations and delivery service to customers. The results of their work are provided in *Ontario Energy Board: LDC Capital/DSP Programs Review – Benchmarking Candidates* ("Midgard Report").

The OEB also benefitted from input received from the Stakeholder Working Group it convened. The Stakeholder Working Group included representatives from electricity distributors, residential, institutional and industrial consumer groups. Three workshops were held to receive early feedback on the initiative, and specifically the preliminary identification of possible activities and programs for performance benchmarking.

Valuable insights were gained from the workshops and have helped staff in preparing this Discussion Paper.

The Discussion Paper, the reports from both consultants and the materials presented at the Stakeholder Working Group workshops are available on the OEB website.

1.2 Key Elements of an APB Framework

The objective of APB is to establish a framework to enable the comparison of utility cost performance in specific capital and OM&A activities/programs, thereby further helping OEB assess utility efficacy at delivering value to customers. The critical elements to be considered in developing the APB framework are:

- The activities/programs to be benchmarked – Which are the key operational and customer services activities/programs that provide the most value for benchmarking?
- Scope of benchmarking portfolio – What is the optimal number and combination of programs/activities to be benchmarked? Should they be prioritized and phased in? How? In order to make the initiative manageable and to gain a better understanding of the benchmarking results, is there value in initially benchmarking a smaller number of programs and activities?
- Benchmarking methods – What methods should be used? Are they easy to understand and best fit the requirements of APB based on data availability and the selected activities and programs? How?
- Data considerations – What are the optimal data requirements for pursuing benchmarking at the program/activity level?

OEB staff, with the assistance of the consultants, have conducted research and analysis and have identified a set of proposals on each of the critical elements for APB. The results are presented and discussed in detail in this Discussion Paper.

It is recognized that the APB model will evolve, with iterative improvements leading to increased utilization of the results. In the near term, APB can be utilized as a screening tool in supporting the reasonableness assessment of the programs by comparing programs' performance across utilities. During the initial stages of APB introduction for distributors, it is likely the focus will be on using the results to inform regulatory assessments and support performance analysis of the sector. APB can be an important tool to support the OEB's strategic goal of Regulation Fit for Purpose by identifying how proportionate reviews of distributor's applications can be undertaken.

Effective use of APB can provide benefits to all stakeholders. Achieving these benefits, requires broad stakeholder acceptance of the APB framework.

1.3 Structure of the Discussion Paper

The Discussion Paper is structured as follows:

- Section 2 discusses current benchmarking in Ontario regulation and the OEB's desire to implement benchmarking at a program/activity level. This section also covers the benefits and the critical elements of APB. A brief jurisdictional review is presented.
- Section 3 discusses OEB staff's proposals for developing a preliminary list of potential activities/programs for APB.
- Section 4 discusses considerations for using different methodologies for APB benchmarking along with some illustrations.
- Section 5 discusses the collection, analysis and reporting of data needed for APB.

At the conclusion of each section specific questions have been included as a means of identifying key issues OEB staff would like to get input on.

2 Activity and Program based Benchmarking (APB)

2.1 The OEB's Current Approach to Benchmarking

Benchmarking is a process of assessing and comparing an organization's performance on specified parameters to itself (i.e. continuous improvement), a standard, or across similar organizations. The pursuit of benchmarking is expected to help in discovering best practices of best performing organizations which may be adopted by other organizations. Benchmarking identifies the opportunities to adapt processes to improve an organization's performance.

The OEB has long used benchmarking of regulated utilities for these purposes and specifically introduced benchmarking into its rate setting process in 2006. With the inclusion of total cost benchmarking in the RRF Report, the OEB signaled that benchmarking models will continue to be an essential component to inform rate setting processes.

While there are various benchmarking studies pursued by the utilities independent of the OEB that make their way into utility rate applications, the OEB currently relies primarily on its TCB model to monitor utility cost performance. The model uses econometric estimates to benchmark distributor costs. The TCB model is run annually, using the distributors' data reported to the OEB under the Reporting and Record-keeping Requirements (RRR), to determine an efficiency ranking of all the electricity distributors. The model predicts each distributor's total costs, and the distributor's actual costs are compared to the econometrically derived predicted value. The results inform the OEB's annual assignment of stretch factors to the distributors for the purpose of setting the efficiency incentive for distributors whose rates are set by one of the OEB's incentive rate mechanisms.

TCB considers high-level total OM&A and capital costs to estimate overall cost efficiency ranking. It does not estimate a utility's cost efficiency in individual programs or activities. By benchmarking cost performance at a program/activity level (as is the case with APB), results can reveal potential best practices and identify specific underperformance to promote cost improvements in targeted areas. Put another way, a limitation of TCB is that it does not provide utilities or regulators with specific enough benchmarking information to identify areas for improvement, whereas APB is well-positioned to do this.

2.2 APB Description

APB relies on benchmarking of utility performance based on a specific set of activities or programs targeted at customer service and operational efficiency. APB seeks to provide information on a utility's cost performance at a level that will allow identification of best practices in key programs, peer cost comparisons and assessment of year-over-year continuous improvement based on key activities and programs. The benchmarking of activities and programs will complement the OEB's total cost benchmarking for electricity distributors, creating a mechanism that complements the total cost to customers against ensuring that valued services are delivered efficiently using best practices.

APB is done at a granular enough level to benchmark utility-critical activity and/or program performance. APB seeks to understand a utility's cost performance and allows cost comparisons with peers plus assessment of year-over-year continuous improvement in the selected activities and programs that are known to drive the quality of customer service and utility operations efficiency.

For the purposes of this Discussion Paper, OEB staff defines an activity as the granular level of activity (operating, maintenance, and administration (OM&A) or capital) identified by a financial account. A program is a set of related activities undertaken by a utility to deliver a specific service, and potentially involving both capital and OM&A accounts.

2.3 Jurisdictional Review

A jurisdictional review was undertaken to ascertain whether activity/program benchmarking is used by other regulators and, if so, in what context it is used within their regulatory frameworks.

A number of jurisdictions employ benchmarking in utility regulation, however only two employ forms of activity or program-based benchmarking. The Australian Energy Regulator (AER) and the United Kingdom's Office of Gas and Electricity Markets (Ofgem) both use benchmarking as a key tool in their regulation of distributors, and both have developed forms of activity-based benchmarking to inform their regulatory decisions.

These two jurisdictions were the most informative for the OEB, particularly in considering issues such as: the general nature of the activities to be benchmarked; how to use benchmarking in rate regulation; the benchmarking methods to be used; and data requirements to facilitate APB.

The following provides a high-level summary of both regulators' approaches, while a more detailed jurisdictional review is discussed in PEG's report.

The AER uses cost benchmarking extensively for electricity distribution regulation, for both OM&A costs (OPEX) and capital expenditures (CAPEX). Data are submitted annually by the 14 distributors using a standardized template which is supplemented by a written explanation of how the data are consistent with the AER's reporting requirements. Econometric methods are used to benchmark OPEX and compute multifactor productivity indices. The benchmarking results have been used in rate applications to assess cost performance based on a distributor's OPEX efficiency in the base year, as part of setting the revenue requirement determination.

The total CAPEX investment of a distributor is subdivided into four categories based on the primary driver of the work. For some categories, analysis of CAPEX can be in the form of how many plant additions are needed, and the cost incurred per addition (or essentially the unit cost). For others, trending of the amount of CAPEX invested over time helps to screen for areas of investment which require more detailed examination in the revenue requirement setting process.

Ofgem has relied on benchmarking to assess utilities cost forecasts. When first implemented in its RIIO (Revenue = Incentives + Innovation + Outputs) regulatory framework the benchmarking results factor heavily into distributors' final revenue requirement. Instead of separating OPEX and CAPEX, Ofgem's approach is to look at the total cost. Similar to the approach used by AER, Ofgem analyzes the investment request for certain types of work by considering the overall cost divided by the volume of work, thereby creating a unit cost metric. This metric is then benchmarked for a utility against the median value for the industry during the period in question. CAPEX volumes are also appraised.

From the jurisdictional review it can be inferred that there is perceived value in pursuing benchmarking at the program level. The other key observation is that the approach will evolve from the experience of utilizing multiple benchmarking methodologies and the iterative process of the improving quality of data and interpretation of results.

2.4 APB Benefits

APB provides the ability to compare utility cost performance in selected programs that are meaningful to utility operations and service to customers. Benefits can be seen from three perspectives – Customers, Utilities and the OEB.

Customer's Perspective

- Increased transparency about cost, performance and comparisons can help customers better understand their local distributor's operations.

- Continuous improvement in cost performance in the programs benchmarked may lead to lower rates for customers.
- APB encourages cost responsibility, and this creates capacity for utilities to review and meet the expectations for customer service and energy reliability.
- A well-defined transparent framework with consistent data gathering, analysis and reporting may increase customer confidence in the energy regulation.

Utilities' Perspective

- Comparing program cost performance across utilities can identify utilities that demonstrate high performance in identified areas.
- Identification of high performing utilities facilitates utility sharing of best practices across the various programs.
- Continuous improvement, as utilities compete to be high performers, can improve productivity and the profitability of their operations.
- APB can focus regulatory processes on targeted areas for detailed review. This has the potential to reduce the duration of a regulatory review and provide greater certainty for the utilities, and to increase efficiency in the regulation of the sector.
- With increased transparency in reporting and continuous improvement, there is potential for utilities to enhance customer satisfaction.

OEB's Perspective

- A key objective of the OEB is to encourage continuous improvement by the utilities in achievement of outcomes valued by customers. APB supports this objective by encouraging efficiencies in utility operations, while meeting customers' expectations for reliable service.
- Consistent performance reporting on key programs will allow the OEB to compare the utilities' performance in those programs.
- APB can be used as a screening tool to allow the OEB to focus its review on issues of the greatest importance, facilitating more proportionate reviews of rate applications. APB provides benchmarking at a granular and targeted area and

complements the current total cost benchmarking by balancing the focus on total cost to the customer with an assessment of significant activities and programs that deliver value to the customer. Together they facilitate a more comprehensive assessment of utility performance.

2.5 Potential Uses of APB in Ontario Utility Regulation

The potential uses of APB are varied, from being utilized only as an information tool, to being utilized as a tool for rate-setting purposes. Some of the potential uses in the regulatory process are discussed below:

<u>Monitoring utility performance</u>

- Performance results allow the comparison of performance across utilities in targeted programs. Complementing that comparison, performance year-over-year for a utility leads to an understanding of that utility's performance trends.

<u>Rate-making</u>

- Performance analysis can support the review of investments and expenses requested for targeted programs in future rate applications.

<u>Performance Incentives</u>

- Similar to the current determination of the utility efficiency incentive based on total cost benchmarking, incentives (positive and negative) can be designed to encourage improved performance in targeted programs.

<u>Policy development</u>

- Specific program performance across the industry will support in the development of regulatory policies, as needed, in targeted programs.

In the context of rate-setting, APB results will inform the OEB and other stakeholders of the areas that may require detailed review in rate applications, facilitating proportionate reviews, as well as other regulatory investigations. APB can also support OEB assessment of utility ability or readiness to adapt to the changing needs of Ontario customers with the evolution of the sector. As an information tool, APB can guide individual distributors to seek increased cost efficiencies through adoption of best practices exhibited by the best performing distributors.

2.6 Critical Elements of an APB Framework

OEB staff suggests the following are critical elements of an effective benchmarking framework, as depicted in Figure 1 below.

- *Activities/programs to be benchmarked* – The activities/ programs to be targeted for benchmarking need to be selected based on specific approaches and criteria to provide an evidentiary base for the use in the regulatory process and to achieve acceptance by stakeholders. It is not necessary to benchmark all activities of the utilities to understand the performance of utilities at the granular level of cost. In fact, a smaller list of critical programs allows for better implementation of the benchmarking initiative. Consistent definitions of the identified programs will be required. Approaches to the identification of appropriate activities/programs and a preliminary list of activities/programs is discussed in the next chapter of this Discussion Paper.
- *Granularity of the analysis* – Increasing the granularity of data, to measure at the activity or program level, is likely to adversely affect the accuracy of the results due to inconsistency in distributors' allocation of costs and reporting. The optimum level of granularity should be chosen to maximize the value to all stakeholders and this is discussed in section 3.
- *Benchmarking methods* – Various methods can be used for this level of benchmarking including unit cost analysis and econometric modeling. The selection of method(s) will be based on the ease of use, the best fit to the requirements and the value to customers, utilities and OEB. In the development stage of the framework, the use of more than one methodology may be appropriate. The different benchmarking methods for APB in Ontario are discussed in section 4.
- *Data considerations* – Utilities currently report various financial and operational information through the OEB's reporting and record-keeping process. This

information is used for TCB and in the production of scorecards and yearbooks. While APB plans to leverage these current data, there may be some additional data requirements once specific activities/programs are identified. The APB framework development will need to consider the value of the gathering additional data against any reporting incremental reporting efforts for the utilities. This is discussed in section 5.

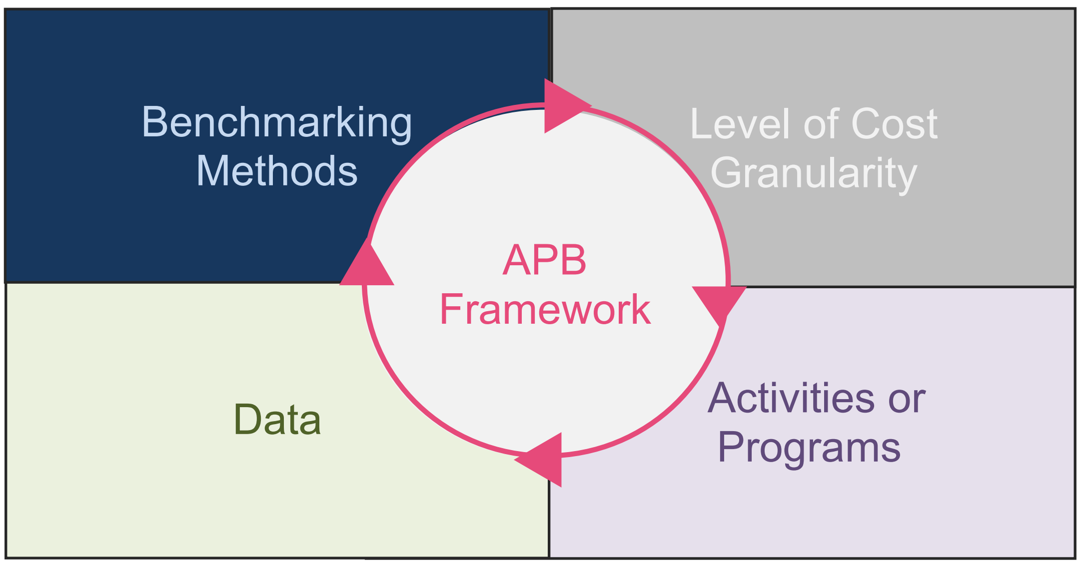

Figure 1: Elements of the APB framework

The next few sections will focus on these critical elements providing a structure for the development of an effective APB framework that balances the efforts and the benefits of APB.

Issues for Comment

Question Number	Question
Q.1	What other elements, if any, should the OEB consider in its development of an APB framework?

3 Identifying Potential Programs/Activities

3.1 Background on Potential Program/Activity Identification

The key enhancement of APB over TCB is the identification of specific areas of top performance, best practices and areas for improvement in utility performance. The identification and selection of the right programs/activities from utility operations can provide the information needed to identify opportunities for operational efficiencies and support improved service to customers. The programs/activities must be well-defined items that have a significant impact on quality of service to customers. For the purpose of this exercise, the OEB staff defines an activity as a granular level of utility service identified with a financial account (OM&A or capital) and a program as a set of related utility activities or services resulting in material or significant work, which may be captured through one or more financial accounts.

The expectation is not to benchmark all programs/activities but to focus on those that contribute significantly to improvement in customer service and the operations of the distributors. The selection of the programs should consider: the significance of the programs in meeting the objective of delivery of safe and reliable service; materiality of the operating expense(s) and/or capital investment(s); the ease of data collection and reporting by distributors; and uniformity and comparability of the results between distributors.

To support discussion with stakeholders on the development of the benchmarking framework staff has developed several proposed lists of activities and programs To develop the examples, staff undertook analysis of the information filed with the OEB by distributors to identify potential program and activity candidates culminating in a preliminary list for benchmarking.

The identification of potential programs/activities is best determined through detailed analysis of information distributors report through the Reporting and Record Keeping

Requirements (RRR) as it represents the distributors' actual expenses and costs and provides a robust basis for benchmarking. OEB staff also considered the use of RRR data to be of key importance to limit the need for new reporting by distributors of cost data in support of this initiative. During working group discussions there was consensus on the need to rely on accounting data for the purpose of APB benchmarking to ensure the activity/program comparisons represent actual and verifiable costs.

Staff also considered the other source of information the OEB has from distributors regarding their operations which is the rate rebasing applications both cost of service and custom IRs. Distributors provide their forecasts of expenditures related to both operating and capital plans. Both these sources of detailed information provided a good basis for identifying potential activities and programs for APB that are significant and meaningful in terms of utility operations and delivering customer service.

To ensure the examples of activities/programs reflect the criteria for APB, and the changes in the sector and customer expectations, two additional screens were applied to the lists of potential activity/programs derived from the accounting and applications data analysis. The first screen considered the emerging issues and challenges facing the distribution sector and the second screen considered the desired outcomes articulated by the OEB in the RRF.

Accounting data in reported utility accounts provides reliable information to support benchmarking and therefore has been used as the starting point for identifying potential activities/programs. The data are tied to the financial information in the audited financial statements of distributors and provides a good basis for benchmarking under an APB framework. The cost details of the data are already broken down into granular levels to support activities/programs identification.

The data contained in rate applications includes activities and programs put forward for OEB cost review. However, rate application data is based on utility forecasts and is therefore less comparable across distributors and less reliable for benchmarking purposes. A review of data in rate applications nevertheless served to identify and highlight the activities/programs that may be important cost drivers in, or significant to, the operations of the distribution system and customer service from the distributors' perspectives.

The analysis of the distributor information, applying quantitative and qualitative criteria, as well as the two additional screens described above, resulted in four lists (or groups) of different activities and programs. To narrow down the list to a more reasonable number, further criteria were applied to identify a single list of preliminary activity/program candidates for potential benchmarking. The Stakeholder Working Group was supportive of the preliminary list as a good start for an initial APB benchmarking program. The preliminary set of activities/programs included in this Discussion Paper and the approaches used to identify them are for discussion purposes and it is expected they will evolve as a result of stakeholder feedback through the consultation process and increased analysis of data.

The approach developed by OEB staff is based on existing information provided by distributors and their existing operations. However, as APB is implemented, it is expected that the activities/programs benchmarked should change to reflect any material changes in the sector, so that the programs targeted continue to reflect the significant activities and programs in the evolving sector.

3.2 Approach to Identifying a Preliminary List of Programs/Activities

The discussion in this section provides an overview of the different approaches OEB staff used to develop a preliminary list of activities/programs for discussion purposes. The four approaches as shown in Figure 2 provide different ways of identifying the significant operational activities of utilities and those programs most relevant to delivering customer value.

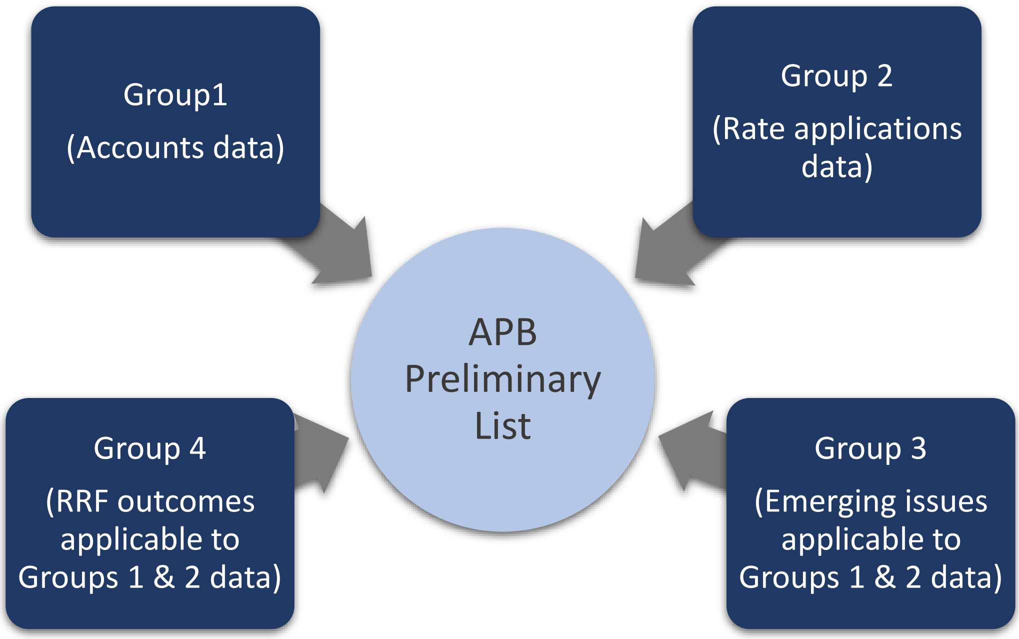

Figure 2: Overview of four approaches (shown as four groups) used to identify Activities/Programs

Group 1 – Analysis of Accounts Data

Uniform System of Accounts (USoA) trial balances are reported by distributors annually as part of the RRRs and provide an important and reliable source of financial information used in the production of the OEB yearbooks, benchmarking studies and rate applications. This accounting data provides a good baseline of account level details for both capital assets and OM&A expenses. The accounts were specifically created to reflect the distribution business and to provide insight into the level of spending on OM&A and capital. In the case of capital asset accounts, the gross asset values were used as the associated accumulated depreciation for specific asset accounts are not reported.

To identify potential activities/programs, trial balance account data was analyzed using the aggregate figures of account balances for the entire electricity distributor sector for capital assets and OM&A expenses for the most recent six years (2012-2017). In order to consider only accounts of significance, as a starting point, a materiality factor was applied to the aggregate account balances to identify accounts greater than 1% of the six-year average for both capital cost and OM&A. A summary of the results is provided in Tables 1 and 2. From the tables below, it can be seen that the size of the amounts in the accounts rapidly falls after a small number of accounts. Hence, the application of a 1% materiality threshold ensures that the exercise results in the selection of a reasonable number of programs having meaningful and significant cost implications.

In this analysis, the general administrative, management and executive salaries and expenses accounts were excluded as they were indirect expenses incurred to support many activities or programs and general administration related costs. As such, they were not identifiable with a specific activity or program. It should be noted though that the direct compensation expenses incurred would have been captured in the associated program/activity costs.

No.	Account Description	Average ($ M)	% of Total OM&A
1	Line operation and maintenance	190	12%
2	Overhead Distribution Lines and Feeders - Right of Way (Vegetation Management)	161	10%
3	Maintenance of General Plant	130	8%
4	Billing	124	8%
5	Meter Expense	81	5%
6	Miscellaneous Distribution Expense	66	4%
7	Operation Supervision and Engineering	62	4%
8	Distribution Station Equipment	50	3%
9	Bad Debt	49	3%
10	Collection	48	3%
11	Customer Premises - Operation Labour	45	3%

12	Outside services	44	3%
13	Load dispatching	39	3%
14	Maintenance Supervision and Engineering	36	2%
15	Poles, Towers and Fixtures	29	2%
16	Regulatory Expenses	29	2%
17	Maintenance of Buildings and Fixtures - Distribution Stations	17	1%
18	Office Supplies and Expenses	17	1%
19	OMERS Pensions and Benefits / Employ. Pensions and Benefits	17	1%
	Total	1,234	78%

Table 1: OM&A Benchmarking – Dollar value per USoA category

No.	Account Description	Average ($ M)	% of Total Capital
1	Poles, Towers and Fixtures	4,713	19%
2	Line Transformers	3,898	16%
3	Overhead Conductors and Devices	3,397	14%
4	Underground Conductors and Devices	3,387	14%
5	Underground Conduit	2,188	9%
6	Distribution Station Equipment	1,919	8%
7	Meters	1,326	5%
8	Buildings and Fixtures	871	4%
9	Computer hardware	823	3%
10	Services	696	3%
11	Transportation Equipment	496	2%
12	Land Rights	268	1%
13	System Supervisory Equipment	240	1%
	Total	24,222	97%

Table 2: Capital Benchmarking – Gross Asset dollar value per USoA category

To put the significance of the identified activities/programs in perspective, OEB staff looked at the total expenditure they represent across the six year horizon. Total OM&A expense for all distributors in Ontario averaged $1.58 billion per year over the last six-years. The OM&A accounts identified from this analysis consist of 19 accounts comprising $1.2 billion (or 78% of total OM&A). The total gross capital accounts over the same period averaged close to $25 billion per year. The identified gross capital accounts consist of 13 accounts comprising $24 billion or 97% of total gross assets.

The activities/programs identified through this approach meet the criteria identified for choosing APB activities and programs. The use of accounting data ensures the costs accuracy which in turn increases the OEB's and ratepayer confidence in the APB results. By relying on USoA categories, the activities/programs identified are applicable across all distributors meaning they can support sector comparisons and best practice identification. Finally, the use of RRR data means that current reporting can be used to implement APB minimizing any additional reporting.

Group 2 – Review of Rate Applications

A distributor's rate application contains detailed information about the distributor's proposed spending on activities and programs As a second approach to identifying significant activities/programs, OEB staff reviewed 30 recent rebasing applications covering a five-year test year period from 2014 to 2018. A list of potential activities/programs was compiled based on the criteria of forecast cost requested (test year) for rate recovery greater than $10 million in aggregate (i.e., in all 30 applications), for capital expenditures and OM&A expenses. The resulting list was then divided into classifications of Primary (if three or more distributors had similar cost requests) and Secondary (if less than three distributors). This analysis allowed for the identification of activities/programs that may be material and common across the sector as evidenced in rate applications.

The total OM&A requested by the 30 distributors over the five-year period was $1.4 billion. The Primary classification resulted in $1.2 billion or 86% of the total. Table 3 below is a high-level summary of the total OM&A costs from the review of the 30 rebasing applications.

Category	Primary Total ($ M)	Secondary Total ($ M)	Total 30 Distributors ($ M)	% of Total
Operations	272	159	431	30%
Administration	201	18	218	16%
Customer Service	338	18	356	26%
Maintenance	380	5	386	28%
Grand Total OM&A	**1,191 (86%)**	**200 (14%)**	**1,391**	**100%**

Table 3: OM&A Benchmarking – Dollar value per DSP category

The results of the OM&A analysis identified 16 activities/programs comprising $1.2 billion (or 90% of total OM&A). A summary of the OM&A programs/activities is provided in Table 4.

No.	Cost Item	Total Cost ($ M)	% Total of OM&A*
1	Line operation and maintenance	186	13%
2	Computer software	150	11%
3	Vegetation Management	147	11%
4	Customer Service	141	10%
5	Billing	132	10%
6	Operations Support	107	8%
7	Engineering & Operations Administration	72	5%
8	Meters	54	4%
9	Health & Safety	39	3%
10	Facilities	38	3%
11	System Control/Control Centre Operations	31	2%
12	Supply Chain	23	2%
13	Regulatory and Compliance	23	2%
14	Collection	21	2%
15	General Expenses & Administration	20	1%
16	Bad Debt	18	1%
	Total	1,202	90%

Table 4: OM&A Summary of programs/activities

The analysis of capital expenditures in the 30 applications was aligned to the four categories outlined in the OEB's DSP filing requirements[1]. These are system access, system renewal, system service and general plant. In the review of capital investments, the asset life cycle as depicted in Figure 3 below was incorporated into the analysis to understand important interrelationships between the four DSP categories and the drivers for incurring capital investment costs.

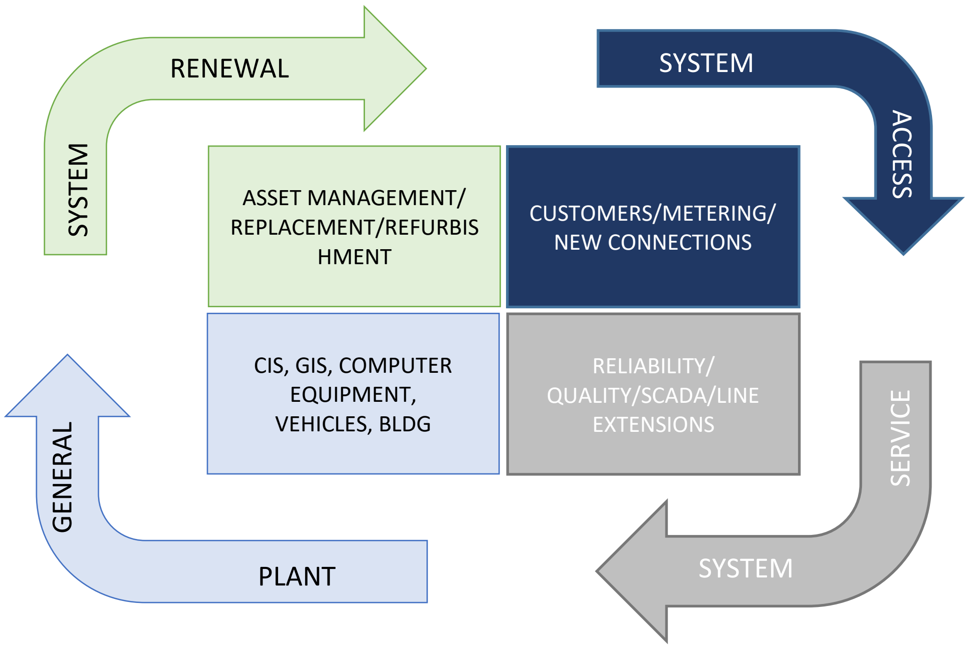

Figure 3: DSP CAPEX Categories and Key Cost Drivers

The total capital expenditure investment (forecast) in the 30 rebasing applications was $1.7 billion. The Primary classification analysis (if three or more distributors had similar cost requests) resulted in a total of $1.3 billion (or 78% of the total forecast capital spending). System Renewal and System Access were the largest shares at 44% and 25% respectively. Table 5 below provides a high-level summary of the capital investment costs from the review of rebasing applications.

[1] Ontario Energy Board Filing Requirements For Electricity Distribution Rate Applications - 2018 Edition for 2019 Rate Applications - Chapter 5 Consolidated Distribution System Plan

Category	Primary Total ($ M)	Secondary Total ($ M)	Total 30 Distributors ($ M)	% of Total
System Access	281	152	433	25%
System Renewal	679	74	752	44%
System Service	84	96	181	10%
General Plant	305	51	356	21%
Grand Total Capital	**1,349 (78%)**	**373 (22%)**	**1,722**	**100%**

Table 5: CAPEX Benchmarking – Dollar value per DSP category

This approach identified 24 activities/programs comprising capital costs of $1.6 billion or 91% of the forecast capital investments in the 30 rebasing applications. A summary of the results is shown in Table 6. The Group 2 results also meet the selection criteria of costs being greater than $10 million in aggregate and being in a primary classification, however the fact that they are based on forecasts does limit the reliability and may impair acceptance of the results.

No.	Cost Item	Category	Total Cost ($ M)	% Total of Capital
1	Line renewal/conversion (U/G and O/H)	System Renewal	323	19%
2	New services	System Access	187	11%
3	Facilities	General Plant	120	7%
4	Poles, Towers and Fixtures	System Renewal	95	6%
5	Computer hardware	General Plant	92	5%
6	Distribution Station Renewal	System Renewal	90	5%
7	Expansion	System Service	81	5%
8	Storm management	System Renewal	74	4%
9	Vehicles/transportation	General Plant	70	4%
10	Meters	System Renewal	52	3%
11	Reactive	System Renewal	38	2%
12	SCADA	General Plant	34	2%
13	Distribution Station Equipment	System Service	29	2%
14	Equipment and Tools	General Plant	28	2%
15	Distribution Asset	System Renewal	25	2%
16	Distribution Automation	System Service	25	2%
17	Others (8 items)		~209	~12%
Total			1,572	91%

Table 6: CAPEX Summary of programs/activities

Group 3 – Emerging Issues in the Ontario Energy Sector

The activities and programs identified through the review of accounting data and rate rebasing applications in Groups 1 and 2 were subjected to a qualitative analysis based on emerging issues affecting the distribution sector. This analysis was used to assess the relevance and significance of the activities/program that were identified in Groups 1 and 2 against emerging trends and changing customer expectations. The assessment against emerging issues is relevant for APB, as the current materiality of costs might be low for the activities/programs at this stage but the impact of the evolution of the sector could mean that their significance could be much higher in the future, or visa-versa.

OEB staff relied on the OEB's Strategic Blueprint, Ontario's 2017 Long-Term Energy Plan (LTEP), IESO LTEP Implementation Plan, and The Conference Board of Canada[2] to identify trends and emerging challenges, including anticipated changes in customers' expectations. The industry risks and trends identified by these sources include:

- Increasing cyber security risk
- Aging infrastructure
- Changing supply and demand patterns
- More extreme weather (e.g., climate change)
- Increase in embedded generation facilities (increasing complexity in system protection and control)
- Growth – population and infrastructure (increased electrification of vehicles)
- IESO market renewal
- Technological innovation
- Changing distribution network use by customers (including distributed energy resources)

[2] Canada's Electricity Infrastructure: Building a Case for Investment

The emerging issues were compared to the activity/program candidates identified in both Groups 1 and 2 to determine relevance and impacts, if any. For example, the increasing cyber security risk may be relevant to hardware and software (IT system) identified in Group 1 and thus was selected for inclusion in the Group 3 list. A summary of the results of this analysis is provided in Table 7. The results of the emerging issues screen provide a measure of significance the identified activity/program to both utility operations and customer service. However, the value from this exercise is as more of a check on the results from the prior two tests, rather than as an identification of programs for benchmarking purposes. The description of the accounts below are mapped to the USoA descriptions as much as possible, to maintain connection to actual costs and RRR data.

No.	OM&A	Capital
1	Vegetation management	Line renewal/conversion (U/G and O/H)
2	Meter Expense	Poles, Towers and Fixtures
3	Line operation and maintenance	Line Transformers
4	Supervision	Distribution station equipment
5	Distribution Station Equipment	Meters
6	Load dispatching/SCADA	Computer hardware / software
7	Maintenance of Poles, Towers and Fixtures	New services (System access)
8	System Control/Control Centre Operations	Distribution Automation
9		System Supervisory Equipment – SCADA
10		Embedded generation/Renewable generation

Table 7: Emerging Issues mapped to Groups 1 and 2 and their significance to these activities/programs prioritized

Group 4 – RRF Outcomes

The four performance outcomes of the RRF (customer focus, operational effectiveness, public policy responsiveness and financial performance) and their associated performance categories and measures in the Scorecard are the basis for the OEB's regulatory assessment of all distributors and other rate-regulated utilities. Staff tested the alignment of the activities/programs identified in both Groups 1 and 2 with RRF outcomes to assess their relevance to achieving desired outcomes. In this analysis, to determine their prioritization, the RRF outcome-based measures were mapped to the activities/programs in Groups 1 and 2. Specific linkages to impacts on service to customers were considered in assessing the activities/programs. A summary of the results is shown in Table 8. The results from this analysis identifies several activities/programs which should be of greater significance to the utility given the direct impact in providing reliable and quality service to customers. Similar to the analysis under Group 3, this list provides a check on the relevance of the activities and programs identified in the first two groups.

No.	OM&A	Capital
1	Billing	Line Renewal / Conversion (UG and OH)
2	Line Operation and maintenance	Poles, Towers and Fixtures
3	Distribution Station Equipment	Distribution Station Equipment
4	Bad Debt	Meters
5	Collections	Computer Hardware / Software
6	Maintenance of Poles, Towers and Fixtures	New Services
7	Line Transformers	System Supervisory Equipment – SCADA
8	System Supervisory Equipment	Embedded Generation / Renewable Generation

Table 8: RRF outcomes mapped to Groups 1 and 2 and their significance to these activities/programs prioritized

3.3 Preliminary List of Activities/Programs for Benchmarking

The next step was to identify a preliminary list of activities/programs that would meet the OEB's overall needs for APB, meaning they are significant and can be measured accurately to support robust benchmarking. The selection of an activity or program for the preliminary list was based on the frequency of it appearing in the four lists. For the preliminary list, an activity or program was selected if it appeared in at least three of the four groups, provided that these included both of Groups 1 and 2, due to their cost details and data availability. The requirement to be in the first two groups meant that the data is cost, or expense based, and already collected by distributors or could be collected as it is used in reporting to the OEB. The fact that an activity or program also showed up on multiple lists provides an indication of its relevance in terms of utility operations and customer service. The use of multiple approaches has also strengthened the expectation that the activity/program would be comparable across distributors. The preliminary list of activity/program candidates is shown in Table 9 below. It consists of 19 programs/activities - 11 OM&A and 8 capital.

No.	OM&A	Capital
1	Vegetation management	Line renewal/conversion (U/G and O/H)
2	Billing	Poles, Towers and Fixtures
3	Meter Expense	Transformers (including line transformers)
4	Line operation and maintenance	Distribution station equipment
5	Operation Supervision and Engineering	Meters
6	Distribution Station Equipment	Computer hardware / software
7	Bad Debt	New services
8	Collection	System Supervisory Equipment - SCADA
9	Maintenance Poles, Towers and Fixtures	
10	System Control/Control Centre Operations	
11	General Expenses & Administration	

Table 9: Preliminary list of activities/programs

Identification of activities/programs that are of significance for utility operations is the cornerstone to a successful implementation of APB. The approach followed to arrive at this preliminary list, is just one approach. However, staff has relied on known data and used a range of approaches to try and develop a robust preliminary list. Overall, this benchmarking exercise is about achieving the best performance possible from the utility at the best overall cost to customers. The reasonableness check of the preliminary list is the materiality of these identified activities/programs. Materiality is critical as these programs need to be of significance both in achieving reliability and quality in service, and sufficiently material to have an impact on the overall utility cost to serve. They must also be material to the utility's management in order to be a driver of change in the utility sector. The use of the four different approaches to arrive at this preliminary list supports a more robust implementation of APB and bodes well for the list from a reasonableness stand point.

The reported costs for the preliminary list of activities/programs are shown in Table 10. The OM&A costs shown are the average annual costs over a six-year period. The capital costs shown are the average gross capital balances over the same period except for those identified as originating from rate applications (i.e., Group 2).

OM&A	Group 1 Avg. OM&A Cost ($ M)	Capital	Group 1 Avg. Capital Cost ($ M)
Vegetation management	161	Line renewal/conversion (U/G and O/H)*	322
Billing	124	Poles, Towers and Fixtures	4,713
Meter Expense	81	Transformers (including line transformers)	3,898
Line operation and maintenance	190	Distribution station equipment	1,919
Operation Supervision and Engineering	62	Meters	1,326
Distribution Station Equipment	50	Computer hardware / software	823
Bad Debt	49	New services*	187
Collection	48	System Supervisory Equipment - SCADA	240

Maintenance Poles, Towers and Fixtures	29		
System Control/Control Centre Operations*	31		
General Expenses & Administration*	20		

** denotes average costs associated with 30 Applications in Group 2*

Table 10: Costs associated with preliminary list

3.4 Review of capital expenditures in Distribution System Plans

The information currently reported by the utilities for the capital expenditure relative to the information filed for operating costs as part of the RRR process is less detailed. For example, there is no information available to determine the net book value, age and remaining useful live of capital assets. Given the challenges this poses for APB, Midgard Consulting was retained by the OEB to complete an independent review of capital expenditures and DSPs to identify potential candidates of capital expenditure activities/programs for APB benchmarking. In the review, Midgard analyzed how distributors structured their DSPs beyond the level specified in Chapter 5 of the OEB's filing requirements for electricity distributors.

Midgard also reviewed the results of staff's analysis of the recent rebasing rate applications and identified common themes or drivers for investment, common programs or groupings of activities, and which major assets were common to the programs. Midgard found that most of a distributor's capex investment was within the System Renewal investment category, and that this has increased over the last five years due to aging asset demographics of Ontario distributors' equipment[3].

The review indicated that the major asset classes that fall within the System Access, System Renewal and System Service investment categories and sub-categories of the

[3] Midgard Report (page 5 section 2.1): The median age of LDC assets is older relative to the median age of similar assets from prior year filings.

DSPs are consistent across the distribution sector since these asset classes are integral to the operations of all distributors. This ensures that there will be comparability across the sector, a key criterion for selecting APB activities/programs. In addition, Midgard noted that because distributors have begun adopting asset management programs, there is a growing collection of new asset-specific data available such as inventories, age, and condition assessments.

Midgard has recommended asset-level benchmarking based on the consistency of assets between distributors. For some assets, they recommended benchmarking at a sub-category level (e.g. poles by type - wood, concrete, steel and composite). However, it was noted that more detailed and consistent asset data is required to facilitate such sub-category asset-level benchmarking.

Table 11 below lists Midgard's recommended benchmarking asset categories. Five of the seven asset categories are identical to the capital programs included in the preliminary list in Table 9, confirming OEB staff's initial assessment. These five asset categories are poles, conductors, transformers, meters and general plant.

Asset Categories	Asset Sub-Categories
Poles	Wood
	Concrete
	Steel
	Composite
Conductors	Overhead
	Underground
	Submarine
Transformers	Pole Top
	Pad Mounted
	Vault

	Transmission to Distribution Transformers (69 kV - 230kV / 13.8 kV - 44 kV)
	Sub-Distribution Power Transformers (13.8 kV - 69 kV / < 12 kV)
Switchgear	Circuit Breakers/Reclosers
	Switches
Meters	N/A
Voltage Regulators	N/A
General Plant	N/A

Table 11: Midgard Report recommended asset categories and sub-categories for benchmarking

3.5 Illustration of Activity and Program Candidates under Benchmarking Framework

The first component of the APB framework is identification of suitable programs/activities for benchmarking. The next important element is to assess the granularity of the activities/programs to determine what level of cost disaggregation is suitable for benchmarking.

The previous section describes the approaches to developing a preliminary list of programs/activities for APB. To visualize the identified preliminary list of programs/activities for APB including Midgard's recommendations and their relationship to TCB level of benchmarking, an illustrative example is shown in Figure 4 below.

This illustration depicts four levels of cost disaggregation below the current total cost benchmarking (i.e., the highest level of aggregation).

- Level 1 - Disaggregated categories of costs consist of total O&M expense and total capital expenditure.
- Level 2 - Further disaggregated costs such as distribution operations, maintenance, or administration expenses, and billing and collections expenses.

- Level 3 - The preliminary list of activity and program candidates is shown in level 3.
- Level 4 – Midgard's recommended sub-categorization of assets by types (e.g., wood, concrete, steel and composite poles) are shown in light-blue shade. The OEB does not currently gather volume data or the itemized capital expenditure data needed for benchmarking in level 4.

Staff suggests that programs/activities identified in level 3 are the relevant programs/activities for the current benchmarking initiative (i.e., the preliminary list). The costs at levels 1 and 2, shown in the illustration, are more granular than the total costs level considered in the current total cost benchmarking. Although levels 1 and 2 are not activity or program based, they can provide valuable information about utility cost performance and hence can be included in the current benchmarking initiative. Hence, the benchmarking will progress from TCB to APB by including costs levels in 1, 2 and 3. Staff believes these levels can be benchmarked largely based on current information available from distributors and some additional data that is discussed in more detail in section 5.

With regard to benchmarking to level 4, in Figure 4, the data for benchmarking at the asset sub-category level is not currently available. Staff proposes an exploratory approach be taken to assess the costs and benefits of benchmarking at this level given the data limitations that would have to be overcome.

Since benchmarking is dependent on having the necessary data in place, it is acknowledged that flexibility is required in the development of benchmarking for identical activities/programs. A staged approach will be considered whereby the benchmarking of activities/programs requiring additional data would be done at a later time once sufficient data are gathered (for example, poles by various types which require cost and volume data). Programs in this group are shown as asset sub-categories in the light blue shaded box under capital expenditures in Figure 4 below.

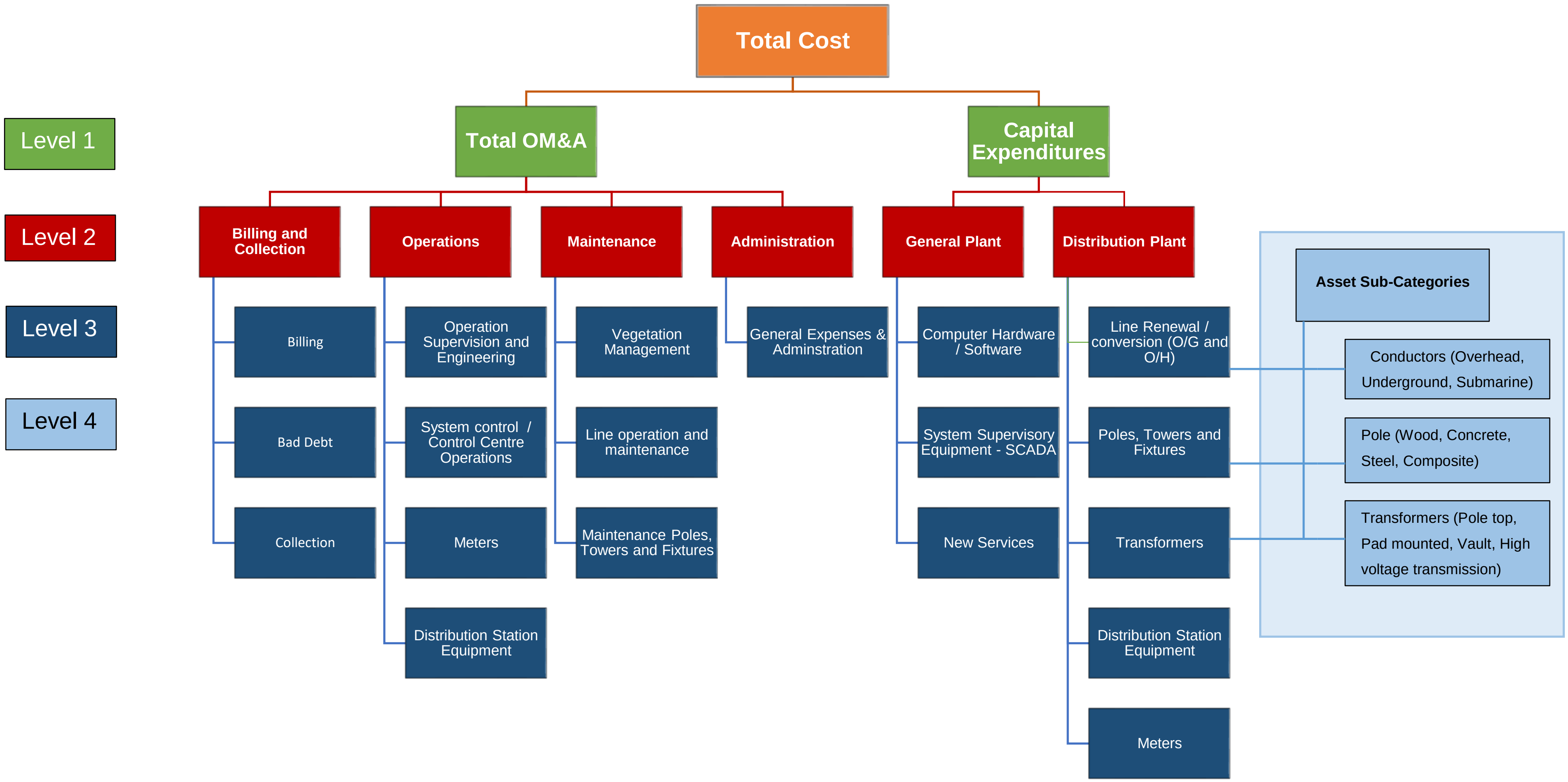

Figure 4: Hierarchy of potential APB benchmarking framework. Preliminary list of programs and activities are shown in Level 3 (blue).

A breakdown of the preliminary programs and activities account level costs are provided in Appendix 3.

3.6 Short listing the Preliminary List

Staff is proposing that the APB be implemented incrementally with benchmarking of a targeted set of programs and activities relying on existing RRRs and reported data to allow the OEB and stakeholders to gain and understanding the benchmarking results. This approach will provide time to assess the value derived from APB; allow for the collection of data needed for future use (e.g., cost and volume data for asset sub-categories of poles and transformers); and for improvements in reported data quality to ensure robust benchmarking results. As greater experience is gained the activities/programs can evolve to take advantage of additional data and a better understanding of the significant activities and programs that are drivers of utility performance.

Reducing the number of activities/programs to 10 from 19 may allow a more focused implementation while the process matures, and lessons learned can be applied to future refinements. Table 12 below provides a preliminary short list of activities/ programs to be included. The six OM&A and four capital activities/programs represent about 40% of the six-year average total OM&A expenses and 47% of the six-year average total gross capital account balances, respectively. During the workshops, the Stakeholder Working Group was supportive of this incremental approach.

OM&A	Group 1 Average Costs - OM&A ($ M)	Capital	Group 1 Average Costs – Gross Capital ($ M)
Vegetation management (Right of Way)	161	Poles, Towers and Fixtures	4,713
Billing	124	Transformers (excludes station transformers)	3,898
Meter Expense	81	Distribution station equipment	1,919
Line operation and maintenance	190	Meters	1,326

Distribution Station Equipment	50		
Maintenance Poles, Towers and Fixtures	29		

Table 12: Short list of Preliminary Activities/Programs for Benchmarking

To ensure a smooth transition to the use of APB staff suggests activity/program based benchmarking should be implemented in a phased approach.

- First, implement the benchmarking of up to ten target activities/programs (such as those listed in Table 12 or activities/programs informed by the stakeholder consultations).
- Second, implement the benchmarking of a full portfolio of target activities/programs reflecting priority programs customers value (e.g., the remaining nine shown in Table 9) and select asset sub-categories (e.g., types of poles or transformers) by which time data would be available for benchmarking. A depiction of this is shown in Figure 4 (in levels 3 and 4) above. The list likely to be refined based on stakeholder consultations.
- Finally, implement adjustments to the benchmarking models from lessons learned to enhance the results. By this time results should also improve due to better reported data including proper itemization of cost classifications in the accounts.

Issues for Comment

Question Number	Question
Q.2	What level of cost disaggregation is suitable for benchmarking at an activity/program level?
Q.3	Does the preliminary list provide a set of activities / programs for benchmarking that are meaningful in terms of utility operations and customer service?
Q.4	Should the OEB purse a phased approach for benchmarking activities and programs? Why?

4 Benchmarking Methods

4.1 Benchmarking Methods

Once a set of activities/programs have been identified the appropriate methodology for benchmarking must be selected. There are many theoretical and practical considerations, including, data requirements to select a method(s) that yields the most accurate results and serves the users' need to understand and interpret the results. The PEG Report provides a detailed discussion of benchmarking methods that can be used in the APB framework including the advantages and disadvantages associated with each. The following section summarizes key points about each method in order to set the context for a discussion of the considerations for developing benchmarking models for the activities and programs identified for the Ontario distribution sector.

The methods discussed and assessed here and in detail in the PEG Report include three well-established approaches to statistical cost benchmarking:

- Unit Cost Analysis
- Cost/Volume Analysis
- Econometric Modeling

PEG indicates that any of these methods can be used for activity/program level benchmarking. However, the accuracy of results varies depending on the complexity of the calculations and the quality of data used. As PEG explains, one of the objectives in any type of benchmarking is to ensure there is comparability of the results across the sample, in this case, all electricity distributors. Staff is of the view that the nature of the activity/program, the quality of the data and the intended use of the benchmarking should be assessed to determine which method(s) is best suited for these purposes. Having said that, staff notes that utility data and performance should drive results, not the model (i.e., a top performer in one model should be a top performer in any comparable model), even if different methods are used.

Unit Cost Benchmarking

Benchmarking methods that use unit cost metrics are easy to understand and interpret. A unit cost *index* is the ratio of a cost index ("*Cost*") to a scale index ("*Scale*") that can be stated as *Unit Cost = Cost/Scale*[4]. The simplicity of a unit cost measure based on a ratio is appealing and has practical application in cost management. However, a comparison of distributors' costs may not be meaningful if there are large differences between utilities in their cost drivers. Unit cost benchmarking typically produces simple scale metrics, such as cost per customer or cost per kilometers of line. The accuracy of the results can sometimes be improved by the use of scale variables such as multidimensional scale indexes as indicated in the PEG Report.

The advantages of unit cost benchmarking are: results are easy to compute if the scale metrics are simple; requires no custom peer groups; and needs no specialized knowledge of econometrics. The results are easily understood by the customers considering its simplicity, allowing them to evaluate the cost trends. Unit cost benchmarking is commonly used by distributors in internal studies and for cost management. Disadvantages are that unit cost do not control for all cost drivers; and custom peer groups and/or multidimensional scale indexes may be needed to improve benchmarking accuracy.

Cost/Volume Analysis

Although unit cost indexes are very useful benchmarks, certain types of costs may be more easily benchmarked by deriving cost on a per unit basis. Cost/volume analysis is a modified version of unit cost analysis that determines a benchmark by dividing the actual costs for a specified asset by the quantities of the same asset employed or placed in service for a particular period[5]. Examples in the electricity distribution sector are the costs associated with the quantities of pole and transformer replacements undertaken by a distributor in a given year divided by the number of poles and transformers replaced in the year. This metric specifically derives the cost per pole or

[4] PEG Report – Page 20
[5] PEG Report – Page 21

cost per transformer on an annual basis, which can then be compared across years for assessment of continuous improvement and compared across the sector for identification of the best performers.

In addition, the sub-categorization of an asset into its various types, such as poles (e.g., concrete, steel, or wood) or transformers (pole top, pad mounted, vault, or distribution station) provides further insights about cost performance. This provides enhanced metrics to address cost variability within an asset class together with the volume of the activity. Midgard recommends benchmarking certain asset sub-categories[6]. The usefulness of benchmarking at this level of "sub-categorization" of assets needs further consideration since there will be a need for new data to accomplish this type of benchmarking.

Advantages of cost/volume analysis are that: no knowledge of econometrics is required; it is used by Australian and British regulators (e.g., average cost/pole used in benchmarking), and used in many "internal" utility benchmarking studies. Similar to the unit cost benchmarking, cost/volume analysis is easily understood by all stakeholders including the customers. The limitations are: requires 'volume' information for the identified programs/activities in addition to the 'costs' information. Depending on the selected programs, the volume information may not be currently collected by the OEB.

Econometric Benchmarking

Econometric benchmarking techniques are used to estimate economic models to learn how various factors affect the outcome of interest or to forecast future events. This method predicts a distributor's cost using variables that measure the business conditions they face estimated statistically using econometrics and compares it to the actual incurred cost.

[6] Page 11, Table 3

Econometric benchmarking is already used in Ontario for the total cost benchmarking and it can reflect many business conditions applicable to distributors without the need for custom peer groups. It can be used to support development of scale variables for use in unit cost benchmarking to increase the reliability and accuracy of results. The disadvantages of this methodology is largely the fact that it requires complex econometric modelling and thus creates the perception of it being a “black box” which can reduce the acceptance and credibility in the results. The complexity of the modelling may also discourage its use in cost management as knowledge of econometrics is needed to understand and interpret results.

4.2 Benchmarking based on Complementary and Flexible Approaches

The expectation of APB is that it complements the current TCB approach used by the OEB. APB benchmarking processes are intended to simple to develop and the results easy to understand and to use by all the stakeholders. The resulting benchmarking information needs to find application in many processes – utilities need to be able to incorporate best practices for efficient operations; customers should be able to interpret the value provided by the utilities; and the OEB can integrate benchmarking results into rate-making and encourage continuous improvement.

The methodology to be utilized for APB must be driven by the fit with the benchmarking requirements and provide results that will achieve the OEB’s objectives in implementing APB. While econometric modeling is used currently to benchmark distributors’ total cost to set their stretch factor assignments for use in the annual rate setting under the IRM process, from the perspective of simplicity and applicability of methodologies, the unit cost methodology (including cost/volume analysis) is a better method for more granular cost benchmarking. As discussed by PEG, indexing and scale variables can be applied to improve the accuracy of the results from unit cost methodology. The simplicity of these methods is appealing as the results are more widely understood, accepted and implementable in the application of cost management by distributors.

In the initial stages of establishing the APB framework, OEB staff suggests the use of a combination of both unit cost and econometric benchmarking to provide complementary and flexible approaches. A key benefit of this approach is that unit cost benchmarking can provide the necessary information to drive utility behavior while econometric modeling can provide a reasonability check on the results of the unit cost benchmarking. OEB staff has noted that the AER in Australia, in its annual benchmarking reports, publishes the results of both category and econometric analysis.

In order to facilitate the benchmarking of as many activities/programs as possible and the interpretation of benchmarking results, staff proposes using unit cost benchmarking as the primary method under APB. Econometric models can play a supporting role to enhance unit cost accuracy and usability. This approach may promote greater acceptance of the benchmarking results and the utilization of two methods adds confidence to the benchmarking process. Under this approach, for example, both unit cost and econometric models can be used to separately benchmark the activity and program candidates in the preliminary list or short list. In addition, unit cost benchmarking can be easily performed for the other OM&A expenses and capital assets / expenditures not included in the preliminary list. Figure 5 below depicts the complementary benefits of these two methods.

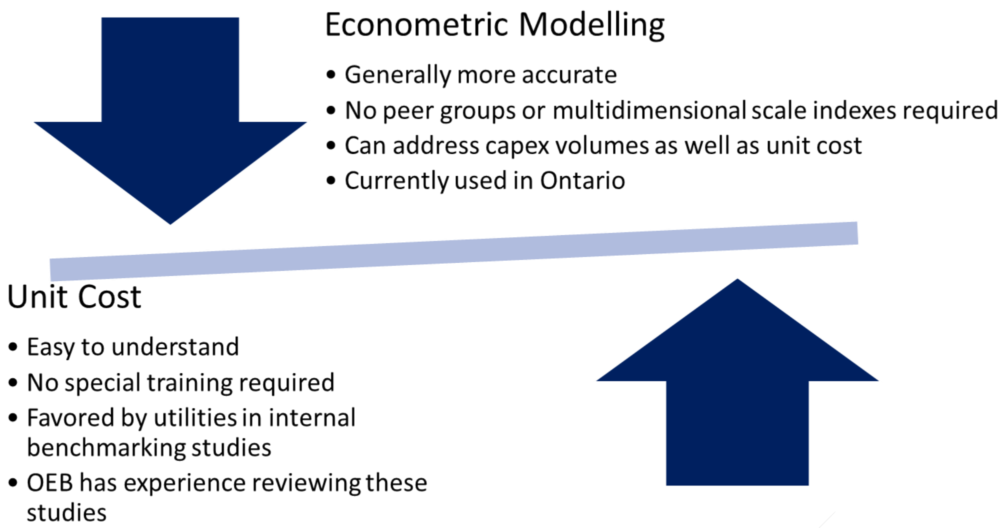

Figure 5: Econometric Modelling and Unit Cost their Collective Benefits

Illustration

As discussed above, OEB staff is proposing the use of both unit cost (including cost/volume) analysis and econometric modeling for benchmarking the selected activity/program candidates, with the emphasis on the unit cost method. However, for each activity/program there will need to be an assessment of the related data and output to determine the appropriate use of the two methodologies to ensure robust results. An example evaluation of the specific methodology for benchmarking a program is shown below. The pole replacement program is used to depict the three potential benchmarking methods: unit cost, cost/volume and the econometric method for hypothetical Utility A.

<u>Illustrative Example</u>

Utility A

Benchmarking Methods and Results for

Poles Replacement Program

For the Period Ended December 31

Unit Cost

For utility A, the benchmarked capex spent on poles per km of route length is **$50,000 per km** assuming an average of 10 poles per km. This compares to an industry average of **$45,000 per km** and places utility A in **quartile 2** of the industry.

The benchmarking is based on unit cost methodology. Of the three scale variables - customers, capacity and route length - the route length was considered the major driver and hence was used as the normalization factor.

Unit Cost - Multidimensional Index

For utility A, the benchmarked annual capex for pole replacement is **$48,000 indexed** compared to an industry average of **$46,000** in the recently concluded year. Again utility A is in **quartile 2** of the industry.

The benchmarking is based on multidimensional index methodology that includes the use of several important utility sector scale variables – customers, route length and capacity.

Cost- Volume ratio

For utility A, the benchmarked capex spent on poles is **$5,000 per pole** in the recently concluded year**.** This compares to an industry average of **$4,500 per pole** and utility A falls in **quartile 2** of the industry. This benchmarking method can also apply to the type of pole (i.e., poles sub-categories).

The benchmarking is based on cost-volume ratio. The utility reported the annual capex spent on poles and the # poles replaced during the period.

<u>Econometric benchmarking</u> For utility A, the benchmarked annual capital expenditure for pole replacement is **$9 million** (i.e. econometrically estimated using business conditions affecting the subject utility) compared to an actual spend of **$ 10 million** in the year**.** Utility A is in **quartile 2** of the industry. *The benchmarking is based on econometric modeling that considers the explanatory variables and the business conditions of utility A.*

Issues for comment

Question Number	Question
Q.5	What benchmarking method(s) should the OEB use to benchmark activities / programs? Why?
Q.6	What is the preferred method that will be well understood by customers and other stakeholders?
Q.7	What benchmarking method(s) provide(s) the best indication of performance that allows distributors to understand the results, and provide(s) the opportunity to undertake the appropriate action to improve their performance? Why?

5 Data Considerations

The value that APB can provide includes enhancing the regulatory process and assisting distributors to improve cost efficiency outcomes. Activity/program benchmarking is expected to inform the OEB and stakeholders about cost performance by individual distributors and for the overall sector that otherwise would be unknown or undiscovered. To achieve this type of benchmarking result the availability of specific and detailed information related to the selected activities/programs is necessary. The quality of data, in terms of accuracy and consistency across the sector, is essential to the robustness of any of the methodologies used for APB. Better data quality further enhances comparability which promotes more widespread use and acceptance of the benchmarking results.

5.1 Optimizing Use of Existing Data

It is expected, as activity/program benchmarking progresses, there would be a need for more granular level of information. It is fortunate that for many years distributors have reported detailed information to the OEB. The utility sector in Ontario already submits to the OEB financial and operational information annually through the RRR process. Another source of information is the data filed through the rate applications. As indicated earlier, OEB staff has reviewed the data reported from these two sources for the purpose of identifying a preliminary set of activities/programs, in order to leverage the existing data and minimize additional reporting requirements.

Generally, staff is of the view that there is a sufficient level of data reported in the current RRR to support the benchmarking of OM&A activities/programs. A limited amount of new data to develop scale variables may be required to facilitate robust APB benchmarking results of OM&A activities/programs.

However, this is not the case for capital expenditure activities/programs. As discussed in section 3, the accounting data for capital assets, which is reported on a gross asset basis, does not support detailed activity/program assessments.

The OEB's DSP filing requirements set out the minimum information required to assess distributor applications of planned capital expenditures on distribution systems and other infrastructure. The DSP which is filed by a distributor as part of a rebasing application includes documentation related to a distributor's asset management process and capital expenditure plan. Chapter 2 of the filing requirements requires distributors to provide information of the average life of assets in relation to any requested change in depreciation accounting policy.

The DSP filing requirements specify the inclusion of an overall summary of capital expenditures over the past five historical years, including the last OEB-approved amounts, as well as the bridge year and the test year. To facilitate the gathering of capital asset/expenditure data for the APB initiative, one idea would be to have distributors report the data contents from their DSPs and prescribed filing requirements as part of the annual RRR submissions. This would mean consistent information requirements to support the data needs for benchmarking capital activities/programs and the information requirements for use in rate applications.

5.2 Data Requirements for Benchmarking Activities / Programs

Based on staff and PEG's review of the RRRs, the majority of the data required for the benchmarking of the preliminary list of activities and programs can be derived from existing data reported by distributors. To understand whether data is available to support the types of activity and program benchmarking identified in our preliminary list, OEB staff requested the 12 distributors on the Stakeholder Working Group to complete a survey. The purpose of the survey was to gauge data availability at the distributor level, based on the current records maintained by distributors, can support potential reporting necessary for benchmarking the preliminary list. The questionnaire and the survey results are available on the OEB's website.

The survey results indicated that distributors are able to on an annual basis provide additional data related to capital spending, information filed as part of a DSP. The survey also showed that distributors can provide information on scale variables (e.g., MVA capacity) to support unit cost analysis. Based on the survey some challenges exist, depending on the programs, regarding the information on business conditions and specific cost/volume information.

A summary of potential additional data necessary for APB that distributors currently maintain is as follows:

- Capital expenditures (historic and forecast) by categories in the DSP
- Fixed asset continuity schedules (e.g., asset accounts for costs and accumulated depreciation by opening balance, additions, disposals, closing balance, net book value)
- Scale variables (e.g., MVA of substation capacity and Km of conductors)
- Capital asset details: plant age, remaining useful life and asset condition

Based on the discussions at the Working Group and the survey results new data would need to be collected for the purposes of benchmarking some of the preliminary list of activities and programs including:

- Data for cost-volume analysis of assets (the costs and volumes replaced per year for specific asset programs), which may include
    - Poles, conductors, transformers and switchgear
- Data for cost-volume analysis of asset sub-categories, which may include
    - Poles by wood concrete, steel and composite
    - Conductors by (Overhead, Underground and Submarine)

  - Transformers (Pole Top, Pad Mounted, Vault and Transmission to Distribution Power Transformers (69 kV - 230kV / 13.8 kV - 44 kV) Sub-Distribution Power Transformers (13.8 kV - 69 kV / < 12 kV)
  - Switchgear (Circuit Breakers / Reclosers Switches)
- Km of conductors (OH and UG) and Km of route (pole-km) (OH and UG)

5.3 Quality of data

Reporting consistent and accurate data is critical to achieving robust benchmarking results, including comparability that is accepted by all stakeholders. Since 2015, the quality of reported data in the distribution sector has improved arising from the strengthened self-certification requirements for the RRRs. OEB staff has also undertaken detailed data quality assurance reviews to improve data quality. The RRRs provide a good baseline of quality data to support APB. However, there is need for improvements to reporting and data quality to ensure reliable benchmarking in the longer term. At the activity/program level of benchmarking, reporting errors can be more detrimental as they directly affect the cost of the item being benchmarked. At an aggregate level, such as total OM&A, a cost itemization error in one category would not impact the overall result. Benchmarking results based on data inconsistencies or errors may result in incorrect conclusions about program efficiencies or utility performance.

OEB staff acknowledges that there are key accounting and reporting issues that affect the quality of data used for benchmarking and that utilities need to ensure they follow the rules and policies associated with these. These include the following:

- Capitalization and depreciation
- Fully Allocated Cost and Burden; and
- Classification / Itemization

The correct application of accounting rules and reporting requirements are paramount so that the underlying data used in benchmarking produce reliable and comparable results.

5.4 Summary

The approach to data requirements for the initial implementation of APB can be summarized as follows:

- The process should leverage information from the existing RRR process and rate applications.
- Accurate and consistent data reporting is a necessity.
- The process can rely on additional data that utilities gather but not necessarily report to the OEB.

The OEB will continuously review and rationalize the data requests for APB and for other reporting requirements. To support the evolution of APB utilities may be requested to start gathering some new information in order that the benchmarking of select programs can be pursued in the future.

Issues for Comment

Question Number	Question
Q.8	What data considerations should the OEB take into account?
Q.9	Should the OEB undertake to start collecting new data now to support future benchmarking under the APB framework (e.g. data associated tree trimming and asset sub-categories such as by type of poles or transformers)?
Q.10	What are the potential gaps in data gathering and what are the suggested mitigation solutions?

6 Transitional use of APB in OEB Processes

The OEB wants to move quickly with the implementation of a framework given the benefits of this type of benchmarking to the regulatory process, the opportunities it presents to incent continuous performance improvement within the distribution sector, and the value it can deliver to utility customers. While speedy implementation is desirable, the OEB recognizes some of the limitations and the importance of taking a measured and progressive approach to moving to this next phase in the evolution of regulatory reliance on performance and cost benchmarking. In the near term, APB can be utilized as a screening tool in supporting the reasonableness assessment of the activities/programs by comparing performance across utilities. There is value in APB, even in the early stages of maturity, as it has the potential to identify broad efficiency concerns relating to critical programs/activities and it can be an important tool for increasing regulatory process efficiency by identifying those distributors where increased scrutiny is not required.

OEB staff recognizes the need for an evolving APB framework. The OEB has relied on undertaken benchmarking beginning since in 2006, evolving it several times to include more robust techniques and in 2008 and 2012, and now with this initiative. This is a similar approach to that taken by the AER that recently released its fifth benchmarking report recently in which it acknowledges the ongoing reviews and refinement of the elements of its the benchmarking methodology and data.[7] As acceptance of the results of APB increases and the value is seen by all stakeholders, APB has the potential to play a greater role in utility operations, regulatory processes and customer reviews.

Issue for comment

Question Number	**Question**
Q.11	What transitional issues need to be addressed?

Annual Benchmarking Report – Electricity Distribution Network Service Providers, AER, November 2018.

Appendix 1 –Issues for Stakeholder Comments

Question Number	Question
Q.1	What other elements, if any, should the OEB consider in its development of an APB framework?
Q.2	What level of cost disaggregation is suitable for activities/programs benchmarking?
Q.3	Does the preliminary list provide a set of activities / programs for benchmarking that are meaningful in terms of utility operations and customer service?
Q.4	Should the OEB purse a phased approach for benchmarking activities and programs? Why?
Q.5	What benchmarking method(s) should the OEB use to benchmark activities/ programs? Why?
Q.6	What is the preferred method that will be well understood by customers and other stakeholders?
Q.7	What benchmarking method(s) provides the best indication of performance efficiency to allow distributors to understand the results, and provides the opportunity to undertake the appropriate action to improve their performance? Why?
Q.8	What data considerations should the OEB take into account?
Q.9	Should the OEB undertake to start collecting new data now to support future benchmarking under the APB framework (e.g. data associated tree trimming and asset sub-categories such as by type of poles or transformers)?
Q.10	What are the potential gaps in data gathering and what are the suggested mitigation solutions?
Q.11	What transitional issues need to be addressed?

Appendix 2 – Breakdown of preliminary list level costs

Total OM&A

The Grand Total OM&A cost is: **$845 million**

Activities and Programs for Benchmarking and Account Number		6 Year Average ($ M)	Percentage of Total OM&A
Overhead Distribution Lines and Feeders - Right of Way (Vegetation management)		**161**	**19%**
5135	Overhead Distribution Lines and Feeders - Right of Way	161	19.1%
Billing		**124**	**15%**
5315	Customer Billing	124	14.7%
Meter Expense		**81**	**10%**
5065	Meter Expense	39	4.6%
5175	Maintenance of Meters	8	0.9%
5310	Meter Reading Expense	34	4.0%
Lines and feeders operation and maintenance		**190**	**22%**
5020	Overhead Distribution Lines and Feeders - Operation Labour	26	3.1%
5025	Overhead Distribution Lines and Feeders - Operation Supplies and Expenses	8	0.9%
5030	Overhead Subtransmission Feeders - Operation	.841	0.1%
5040	Underground Distribution Lines and Feeders - Operation Labour	8	0.9%
5045	Underground Distribution Lines and Feeders - Operation Supplies and Expenses	9	1.1%
5050	Underground Subtransmission Feeders - Operation	.083	0.0%
5090	Underground Distribution Lines and Feeders - Rental Paid	.025	0.0%
5095	Overhead Distribution Lines and Feeders - Rental Paid	1	0.1%
5125	Maintenance of Overhead Conductors and Devices	90	10.7%
5130	Maintenance of Overhead Services	10	1.2%
5145	Maintenance of Underground Conduit	2	0.2%
5150	Maintenance of Underground Conductors and Devices	27	3.2%

5155	Maintenance of Underground Services	8	0.9%
Operation Supervision and Engineering		**62**	**7%**
5005	Operation Supervision and Engineering	62	7.3%
Distribution Station Equipment (all voltages)		**50**	**6%**
5014	Transformer Station Equipment - Operation Labour	2	0.2%
5015	Transformer Station Equipment - Operation Supplies and Expenses	1	0.1%
5016	Distribution Station Equipment - Operation Labour	13	1.5%
5017	Distribution Station Equipment - Operation Supplies and Expenses	7	0.8%
5112	Maintenance of Transformer Station Equipment	4	0.5%
5114	Maintenance of Distribution Station Equipment	23	2.7%
Bad Debt		**49**	**6%**
5335	Bad Debt Expense	49	5.8%
Collections		**48**	**6%**
5320	Collecting	48	6.0%
5325	Collecting- Cash Over and Short	.004	0.0%
Maintenance of Poles, Towers and Fixtures		**29**	**3%**
5120	Maintenance of Poles, Towers and Fixtures	29	3.4%
System Control/Control Centre Operations		31	4%
N/A	Group 2 derived*	31	3.7%
General Expenses and Administration		20	2%
N/A	Group 2 derived*	20	2.4%

Gross Capital

The Total Gross Capital amount is: **$13,427 million**

Activities and Programs for Benchmarking and Account Number		6 Year Average ($ M)	Percentage of Total Gross Capital
Poles, Towers and Fixtures		**4,713**	**35%**
1830	Poles, Towers and Fixtures	4,713	35.1%
Line Transformers		**3,898**	**29%**
1850	Line Transformers	3,898	29.0%
Distribution Station Equipment (all voltages)		**1,919**	**15%**
1815	Transformer Station Equipment - Normally Primary above 50 kV	612	4.6%

1820	Distribution Station Equipment - Normally Primary below 50 kV	1,307	9.8%
Meters		**1,325**	**10%**
1860	Meters	1,325	9.8%
Computer hardware and software		**823**	**6%**
1611	Computer Software merged with Account 1925	618	4.6%
1920	Computer Equipment - Hardware	205	1.5%
System Supervisory Equipment - SCADA		**240**	**2%**
1980	System Supervisory Equipment	240	1.8%
Line renewal / conversion (U/G and O/H)		**322**	**2%**
N/A	Group 2 derived*	322	2.4%
New Services		**187**	**1%**
N/A	Group 2 derived*	187	1.4%

*There were no equivalent USoA accounts regarding these activities. The values for these Group 2 activities were derived from forecast costs in rate applications.