

## DATA, BENCHMARKING AND RATIONALE – BC Hydro Service Plan 2016/17 to 2018/19

BC Hydro relies on various data sources for relevant and accurate reporting of its Performance Measures. This includes, but is not limited to, internal financial records, external research findings, and association indexes. The Performance Measures have unique requirements for source data and accompanying considerations.

Since the 2015/16-2017/18 Service Plan was released, BC Hydro has:

- Updated its mission - To provide our customers with reliable, affordable, clean electricity throughout B.C., safely.
- Identified four goals and supporting strategies to fulfill the goal statement - customers will experience reliable and responsive service; their rates will continue to be affordable; we will fulfill the province's leading commitment to clean and renewable power; and our workforce and the public will be safe.
- Introduced two new performance measures and reduced the overall number of performance measures from 21 to 12.

### Goal 1: Set the Standard for Reliable and Responsive Service

BC Hydro will reliably meet the electricity requirements of customers and respond to their evolving expectations by planning and investing in the system to meet future needs and by consistently improving our service.	
Description of Performance Measure	Rationale/Benchmarking Activities
<b>SAIFI</b> is a utility standard measure of how many sustained interruptions (longer than one minute) an average customer will experience over the course of a year.	<p>SAIFI &amp; SAIDI: Annual targets are based on a number of factors including long-term historic reliability trending, current year performance, previous years' investments and future years' investment plans.</p> <p>BC Hydro measures reliability under normal operating conditions, because we cannot predict uncontrollable, major weather events.</p> <p>Annually, BC Hydro participates in Transmission and Distribution benchmarking surveys conducted by First Quartile Consulting, and the Distribution Service Continuity survey conducted by the CEA.</p> <p>Our reliability targets are based on specific values; however performance within a 10 per cent bandwidth of our targets is considered acceptable given the wide range of variations in weather patterns and other uncontrollable elements that can significantly disrupt the electrical system.</p> <p>Key Generating Facility Forced Outage Factor: A forced outage occurs when a generating unit is unable to start generating or doesn't stay on line as long as needed. Forced Outage Factor is defined as the total forced outage time in a period relative to the total number of hours in the same period (usually one year). Annually, the Forced Outage Factor can be relatively volatile and through applying the historical five year rolling average it can smooth the range to provide a more stable measure for which targets can be set. Therefore, the strategy is to keep the Force Outage Factor below 2% of the total number of hours per year. This measurement will show the trend of how the assets are performing and aligns with how asset management investments decisions are made to maintain asset reliability that is reflected in a low forced outage factor. This information is commonly benchmarked with other electric</p>
<b>SAIDI</b> is a utility standard measure of the total outage duration (measured in hours) experienced by an average customer over the course of a year.	
<b>Key Generating Facility Forced Outage Factor</b> measures when a generating unit starts when needed and stays on line as long as needed. Seven key generating facilities are tracked for total forced outage time in a period relative to the total number of hours in the same period (usually one year).	
<p><b>Customer Satisfaction (CSAT)</b> is the percentage of customers – residential, small and medium-sized businesses and key accounts – who are satisfied or very satisfied with BC Hydro (as measured on a four-point verbal scale) in five equally weighted areas:</p> <ul style="list-style-type: none"> <li>• Providing reliable electricity;</li> <li>• Value for money;</li> <li>• Commitment to customer service;</li> <li>• Acting in the best interest of British Columbians; and,</li> <li>• Efforts to communicate with customers and communities.</li> </ul>	
<b>Progressive Aboriginal Relations Designation</b> is the achievement of a rating by an external auditor against specific criteria as established by the Canadian Council of Aboriginal Business. This audit helps BC Hydro to assess whether it is achieving its 20 year goal of establishing relationships with First Nations built on mutual respect and that appropriately reflect the interests of First Nations. The audit assesses four key areas - Aboriginal employment, business development, capacity development and community engagement.	

	<p>utilities for comparative performance assessment.</p> <p>CSAT: BC Hydro maintains a minimum threshold target of 85 per cent for CSAT to ensure we have strong customer support. BC Hydro benchmarks against leading regional service providers and other electric utilities in an effort to better understand our performance relative to customer perceptions and understand what is needed to be a leader in our industry and the province.</p> <p>Benchmarking results to date demonstrate BC Hydro compares well against both nonelectric utility service providers and other electric utilities.</p> <p>PAR: BC Hydro has successfully attained a gold-level designation from the Canadian Council for Aboriginal Business which is valid for a three year period. BC Hydro's next submission for certification will be in 2018/19.</p>
<b>Measurement</b>	
<p>SAIDI/SAIFI - The data gathered to measure our reliability measures is collected and validated in a process that starts with operational staff recording the start and end time of each power outage as well as the cause. Based on the location of the outage, the number of customers impacted is calculated automatically. This information is collected in a centralized database that allows outage records to be reviewed by managers each day to ensure accuracy. Outages that impact a significant number of customers or involve lengthy repair times require a formal outage report to be written by an engineer and approved by management. With smart meters, outage performance measures will be calculated automatically.</p> <p>Annually, circuits are benchmarked to prioritize investment for sustained reliability improvement on the worst performing circuits. On a monthly basis, the most significant outages are reviewed to ensure accuracy of data, effectiveness of restoration actions, and to better understand vulnerabilities. As a second check for accuracy, trends in recent performance measures are compared against past results and forecast performance. The Reliability Improvement Team reviews the monthly performance measures and takes action when actual performance deviates from forecast.</p> <p>Key Generating Facility Forced Outage Factor – BC Hydro has seven key generating facilities which are defined as plants with installed capacity greater than 200 MW. Together they provide 90% of the average annual electricity generated by BC Hydro's facilities. The measure aims to keep the Forced Outage Factor below 2% for the total number of hours generated per year. This measurement will show the trend of how the assets are performing and aligns with how asset management investments decisions are made to maintain asset reliability that is reflected in a low forced outage factor.</p> <p>CSAT - Customer Satisfaction is measured through a survey.</p> <p>PAR - The Progressive Aboriginal Relations program is an externally validated certification program (three year period) through the Canadian Council for Aboriginal Business.</p>	

## Goal 2: Ensure Rates are Among the Most Affordable in North America

BC Hydro customers will continue to have low, predictable rates while we efficiently manage our costs and make important investments to maintain and expand our system.	
Description of Performance Measure	Rationale/Benchmarking Activities
<b>Competitive Rates</b> measures BC Hydro's residential rates against other utilities across North America. The analysis is from the annual Hydro Quebec report, Comparison of Electricity Rates in Major North American Cities.	Pursuant to Rate Comparison Regulation under the <i>Clean Energy Act</i> , issued on June 28, 2011, BC Hydro provides an Electricity Rate Comparison Annual Report to the Minister of Energy and Mines and to the British Columbia Utilities Commission.
<b>Project Budget to Actual Costs</b> measures actual costs of capital projects that were put into service compared to original approved full scope	BC Hydro regards Project Budget to Actual Costs as an important measure for evaluating its performance in delivering capital projects and compare actual costs to full

implementation budgets (excluding project reserve funds) over a five-year period.	scope implementation budgets (excluding project reserve funds).
<b>Measurement</b>	
<p>The competitive rates measure is based on survey information taken from the annual Hydro Quebec report, <i>Comparison of Electricity Rates in Major North American Cities</i>, which compiles monthly bills and average prices of 21 Canadian and U.S. Utilities. BC Hydro calculates a relative index for each usage level within the residential category and then calculates an average of the index to create an overall ranking. The rankings of the 21 participating utilities are then divided into quartiles to determine BC Hydro's ranking.</p> <p>Project Budget to Actual Costs is measured using a five year rolling data set of actual costs compared to original approved full scope implementation budgets excluding project reserve funds, for capital projects that were put into service during the period. The data set includes Generation, Substation and Transmission Line projects. Distribution is excluded as typically these projects are much lower in cost and are customer, program or maintenance driven.</p>	

### Goal 3: Continue British Columbia's Leading Commitment to Renewable, Clean Power

<p>BC Hydro will strengthen its legacy of renewable, clean power and energy conservation investments by implementing its energy conservation plan and by identifying and securing new competitively priced energy and capacity options to meet future customer needs.</p>	
<b>Description of Performance Measure</b>	<b>Rationale/Benchmarking Activities</b>
<p><b>Energy Conservation Portfolio (New Incremental GWh/year)</b> Reflects the annual new incremental electricity savings resulting from the energy conservation portfolio including programs, codes and standards and conservation rates.</p>	<p>New Incremental Energy Conservation Portfolio Energy Savings (GWh/yr) replaces the previous Cumulative Demand Side Management Energy Savings. BC Hydro continues to implement its plan to achieve or exceed the <i>Clean Energy Act</i> target to meet at least 66% of incremental demand from 2008 to 2020 through conservation. This new metric is a better reflection of performance within the operating period because it is based on the new incremental energy savings from programs, codes and standards and conservation rates that are implemented within the period. In some cases, the implementation date for anticipated codes and standards can shift, which will cause actual incremental energy savings to vary from the targets that have been set for the period.</p>
<p>The <b>Clean Energy</b> measure represents a minimum threshold generation output in accordance with the B.C. Government's requirement that at least 93 per cent of electricity generation in the province be from clean or renewable resources (i.e. from biogas, biomass, energy recovery generation, geothermal, hydro, solar, tidal, wave, wind, or other potential clean or renewable electricity sources recognized by the B.C. government.) Consistent with B.C. regulation, this measure does not include electricity to serve demand from facilities that liquefy natural gas for export.</p>	<p>The Clean Energy target aligns with the objectives set forth in the 2010 <i>Clean Energy Act</i>. BC Hydro does not compare its results for this this performance measure against other utilities.</p>
<b>Measurement</b>	
<p>BC Hydro undertakes a comprehensive approach to estimating energy conservation savings. Depending on the initiative, there can be up to four distinct areas of activity that ultimately contribute to the confirmation of energy conservation savings estimates: technical reviews of programs and energy conservation projects; site inspections on a sample of projects; measurement and verification of project performance; and evaluation of programs, conservation rates, building codes and product standards.</p> <p>The Clean Energy performance measure represents the minimum threshold generation output in accordance with the B.C. Government's requirement that at least 93 per cent of electricity generation in the province be from clean or renewable resources. The generation data is reviewed and verified internally at BC Hydro for reliability, consistency and data integrity.</p>	

## Goal 4: Safety Above All

BC Hydro's number one priority is ensuring its workforce goes home safely every day and that the public is safe around our system.	
Description of Performance Measure	Rationale/Benchmarking Activities
<b>Zero Fatality and Serious Injury</b> is a measure of a "Level 1 Injury Incident" where there has been a loss of life or the injury has resulted in a permanent disability (for which a disability pension has been received or is expected).	The measure of Zero Fatality and Serious Injury is unique to BC Hydro and is not benchmarked against other Canadian Electricity Association (CEA) member utilities.  The CEA does report on fatalities. BC Hydro had one of the four fatalities among CEA members in the five-year period from 2009 to 2013. We also have had eight on the job employee fatalities since 1999.
<b>Lost Time Injury Frequency (LTIF)</b> is a standard CEA measure and is defined as the total number of employee Lost Time injuries per 200,000 hours worked. Lost time injuries are those where the employee was absent beyond the day of injury.	Both Severity and LTIF measures are, as defined in the CEA Standard, generally harmonized with the U.S. Occupational Safety and Health Administration Standards for safety statistics.
<b>Timely Completion of Corrective Actions (%)</b> defined as the percentage of safety corrective actions closed within 30 days of the original scheduled due date on an annual basis, with an aim to improve over time.	BC Hydro benchmarks its Severity and LTIF performance against available CEA composite results.  Timely Completion of Corrective Actions - The purpose of this measure is to track corrective actions that have been put in place from safety incidents (injuries and near misses) to improve our safety performance. It demonstrates that we are a learning organization with a focus on improving practices in a timely way from identified deficiencies that have a direct impact on the safety of our workforce. By implementing this measure, we will see systemic deficiencies corrected and our workforce will experience lower frequency of recurring issues. The CEA does not report on the timely completion of corrective actions.  BC Hydro will continue to benchmark its safety results against CEA participants in 2016/17. In parallel, BC Hydro will explore opportunities to use other benchmarking associations.
Measurement	
Zero Fatality and Serious Injury / LTIF - The data source for all safety performance metrics are incidents reported through the Incident Management System. To ensure accuracy and reliability of the data, each incident is reviewed to ensure that it meets the CEA reporting criteria, the correct level and type has been assigned, and the appropriate calendar days lost have been assigned to lost time injuries. This approach does exclude a small number of accepted WorkSafeBC claims that do not meet the CEA reporting criteria.	
Timely Completion of Corrective Action Plans - This measure tracks the percentage of safety corrective actions closed within 30 days of the original scheduled due date on an annual basis. The target is to increase the percentage of corrective actions completed within 30 days of the original due date by five percent per year for each of the next three years.	