

COMPARISON OF PRODUCTION FORECAST – REGULATED HYDROELECTRIC

1.0 PURPOSE

This evidence presents period-over-period comparisons of regulated hydroelectric production forecasts for 2010 - 2015. This evidence supports the approval of the regulated hydroelectric production forecast presented in Ex. E1-1-1.

2.0 PERIOD-OVER-PERIOD CHANGES – TEST PERIOD

2015 Plan vs. 2014 Plan

The total regulated hydroelectric production forecast for 2015 is four per cent (1.2 TWh) higher than the forecast plan for 2014 (Ex. E1-1-2 Table 1).

Total production from the Niagara Plant Group and Saunders is forecast to increase by six percent (1.2 TWh) primarily due to higher flows forecast for the Niagara and St. Lawrence Rivers in the 2015 Plan. The annual means of monthly flows forecast for 2015 were five to seven per cent higher than those forecast in the 2014 Plan.

The production forecast plans for the newly regulated hydro plants were similar for the two years.

2014 Plan vs. 2013 Budget

The total regulated hydroelectric production plan for 2014 is two per cent (0.6 TWh) higher than the 2013 Budget (Ex. E1-1-2 Table 1).

Total production from the Niagara Plant Group and Saunders is forecast to increase by three percent (0.6 TWh). Forecast production by the Niagara plants for 2014 is 0.5 TWh more than 2013 Budget production. The forecasted increase is mostly due to the Niagara Tunnel which was assumed to come into service in August 2013. The Niagara River flow forecast for 2014 is only marginally higher (less than one per cent) than that forecast in the 2013 Budget. Forecast production for R.H. Saunders for 2014 is 0.1 TWh more than the 2013 Budget as

the St. Lawrence River flow forecast for 2014 is about two per cent higher than that forecast in the 2013 Budget.

The production forecast plans for the newly regulated hydro plants were similar for the two years.

3.0 PERIOD-OVER-PERIOD CHANGES – BRIDGE YEAR

2013 Budget vs. 2012 Actual

The total regulated hydroelectric production budget for 2013 is five per cent (1.5 TWh) higher than actual production for 2012 (Ex. E1-1-2 Table 1). There was essentially no change in total production expected from Niagara and R.H. Saunders as production increases forecast for the Niagara Plant Group for 2013 are offset by production reductions forecast for R. H. Saunders. The increase in production forecast for 2013 is primarily attributable to the newly regulated hydro plants.

Forecast production by the newly regulated hydro plants in 2013 is 1.6 TWh more than actual production achieved in 2012. Production from these plants was lower than normal in 2012. Annual mean flows for 2012 were generally below normal and ranked as lower quartile for several river systems. Surplus baseload generation likely inhibited production at some sites as well.

R. H. Saunders budget production for 2013 is forecast to be 0.3 TWh lower than 2012 production due to a decrease in the St. Lawrence River flow forecast for 2013. The annual mean of forecast monthly flows for 2013 is five per cent lower than the 2012 annual mean flow.

The annual mean of Niagara River monthly flows forecast for the 2013 budget is eight per cent lower than the 2012 annual mean flow. However, 2013 budget production for the Beck plants is forecast to increase by 0.2 TWh over 2012 actual production, based on the Business Plan assumption that the new tunnel would be placed in-service by August 2013. Budget production for DeCew Falls for 2013 is forecast to increase by almost 0.1 TWh over

2012 actual production. Production at DeCew Falls was curtailed during the fall of 2012 due to extended unit outages at Decew Falls NF23 and operational strategies to manage Niagara flow entitlement (Beck and DeCew).

4.0 PERIOD-OVER-PERIOD CHANGES – HISTORICAL PERIOD

2012 Actual vs. 2012 Board Approved

The total regulated hydroelectric production during 2012 was nine per cent (2.9 TWh) below the 2012 Plan (Ex. E1-1-2 Table 1). Production from the Niagara Plant Group and R. H. Saunders was 1.4 TWh below plan while production by the newly regulated hydro plants was 1.6 TWh below plan.

Production at the Sir Adam Beck plants was 0.7 TWh below plan for 2012 due to lower Niagara River flow (2 per cent below forecast plan flow) and production losses associated with surplus baseload generation (See Ex. E1-2-1). Production at DeCew Falls was 0.2 TWh below plan. Production at DeCew Falls was curtailed during the fall of 2012 due to extended unit outages at Decew Falls NF23 and operational strategies to manage Niagara flow entitlement (Beck and DeCew). Production at R. H. Saunders was 0.4 TWh below plan during 2012 due to lower St. Lawrence River flow. The annual mean of St. Lawrence River flow for 2012 was eight per cent lower than the annual mean of the forecast plan flow.

The variance in production by the newly regulated hydro plants (1.6 TWh) is generally attributable to below normal flow in 2012. The annual mean flow for several river systems ranked as lower quartile. Production at some stations may have been inhibited by surplus baseload generation as well.

2012 Actual vs. 2011 Actual

The total regulated hydroelectric production for 2012 was five per cent (1.7 TWh) lower than actual production achieved in 2011 (Ex. E1-1-2 Table 1). Production during 2012 was 0.7 TWh lower for the Niagara Plant Group, 0.4 TWh lower at R. H. Saunders, and 0.6 TWh lower for the newly regulated hydro plants.

1 Production decreased by 0.5 TWh at the Sir Adam Beck plants during 2012 due to lower
2 Niagara River flow and an increase in production losses due to surplus baseload generation
3 (See Ex. E1-2-1). The annual mean flow for 2012 for the Niagara River was four per cent
4 lower than that for 2011. Production at DeCew Falls during 2012 was almost 0.2 TWh lower
5 than 2011. Production at DeCew Falls was curtailed during the fall of 2012 due to extended
6 unit outages at Decew Falls NF23 and operational strategies to manage Niagara flow
7 entitlement (Beck and DeCew). The production decrease of 0.4 TWh at R. H. Saunders was
8 due to lower St. Lawrence River flow. The annual mean of St. Lawrence River flow for 2012
9 was nine per cent lower than the annual mean flow for 2011.

10
11 The production decrease of 0.6 TWh for the newly regulated hydro plants in 2012 was
12 attributable to lower production from plants located in the eastern part of the Province.
13 Production from the Madawaska River plants in 2012 was 28 percent (0.3 TWh) lower than in
14 2011 and production from the Ottawa River plants decreased by seven per cent (0.3 TWh),
15 primarily due to lower river flow. Annual mean flows for the Madawaska and Ottawa Rivers
16 were lower in 2012 than 2011, with the Madawaska River mean flow ranking as lower decile.

17
18 **2011 Actual vs. 2011 Board Approved**

19 The total regulated hydroelectric production during 2011 was 4 per cent (1.3 TWh) below the
20 2011 Plan. Total production from the Niagara Plant Group and R. H. Saunders was 0.3 TWh
21 below plan while production from the newly regulated hydro plants was 0.9 TWh below plan.

22
23 Production at the Sir Adam Beck plants during 2011 was slightly lower (0.2 TWh) than the
24 2011 Plan, although the annual mean Niagara River flow for 2011 was marginally higher
25 (one per cent) than the annual mean of the forecast plan flow. Production was below plan in
26 January and February, when actual flow was lower than forecast, and in April and May, when
27 production losses increased due to surplus baseload generation. R.H. Saunders production
28 during 2011 was 0.1 TWh lower than the 2011 Plan. The annual mean St. Lawrence River
29 flow for 2011 was very similar to the annual mean of the forecast plan flow for 2011.
30 Simultaneous outages of multiple units for replacement of transformer and unit protection

1 and control equipment impacted production at R. H. Saunders during 2011. As a result of
2 these outages, increased St. Lawrence water transactions occurred with NYPA in 2011.

3
4 Production from the newly regulated hydro plants during 2011 was 0.9 TWh below plan with
5 the variance occurring primarily in the Northeast and Northwest. Generally, river flows in the
6 Northeast and Northwest were below normal in 2011, with annual mean flows for several
7 river systems ranking as lower quartile. River flows in the eastern part of the Province during
8 2011 were about normal.

9
10 **2011 Actual vs. 2010 Actual**

11 The total regulated hydroelectric production for 2011 was 7 per cent (2.1 TWh) greater than
12 2010 production (Ex. E1-1-2, Table 1). Production by the Niagara Plant Group and R. H.
13 Saunders accounted for 0.6 TWh of the increase, while production from the newly regulated
14 hydro plants increased by 1.5 TWh from 2010 - 2011.

15
16 Production at the Sir Adam Beck plants was similar for the two years, although the annual
17 mean Niagara River flow for 2011 was seven per cent higher than the mean for 2010.
18 Production during January and February 2011 was lower than the output during the same
19 months in 2010 due to lower flow, whereas production from July to October in 2011 was
20 greater than the output during the same months of 2010 due to higher flow. Production was
21 similar for the two years for the months of November and December, although Niagara River
22 flow during these months was much higher in 2011 than 2010. Insufficient water conveyance
23 capacity limited additional production increases at the Sir Adam Beck plants when Niagara
24 River flow was high, because the extra water could not be conveyed to the plants. Production
25 during 2011 was also inhibited due to surplus baseload generation, particularly during the
26 months of April and May. (See Ex. E1-2-1). Production at DeCew Falls increased by 0.1 TWh
27 in 2011, as the four generating units at DeCew Falls ND1 returned to service following
28 completion of penstock replacement. DeCew Falls ND1 was out of service for all of 2010.
29 The 0.4 TWh increase in production at R. H. Saunders during 2011 was attributable to higher
30 St. Lawrence River flow. The annual mean St. Lawrence River flow for 2011 was 10 per cent
31 higher than the annual mean for 2010. Simultaneous outages of multiple units for

1 replacement of transformer and unit protection and control equipment at R. H. Saunders
2 inhibited additional increases in production during 2011. Increased St. Lawrence water
3 transactions occurred with NYPA in 2011 as a result of these outages.

4
5 Production from the newly regulated hydro plants increased by 1.5 TWh in 2011 compared to
6 2010. Production from the Ottawa River plants accounted for 1.0 TWh of the increase as
7 Ottawa River flow returned to normal after being well below normal in 2010. The annual
8 mean Ottawa River flow for 2010 ranked as lower decile. Production from the Northeast
9 plants increased by 0.6 TWh in 2011 over 2010, as river flows, although still below normal,
10 increased from the very low levels experienced in 2010. The annual mean flow for the Abitibi
11 River in 2010 was the lowest recorded in the past 50 years, while the annual mean for the
12 Montreal River for 2010 ranked as lower decile.

13
14 **2010 Actual vs. 2010 Budget**

15 The total regulated hydroelectric production for 2010 was nine per cent (2.8 TWh) lower than
16 the 2010 budget forecast prepared in 2009.

17
18 Niagara Plant Group production was similar to budget, while R. H. Saunders production was
19 0.4 TWh below budget due to St. Lawrence River flow being eight per cent lower than the
20 2010 Budget forecast.

21
22 Production from the newly regulated hydro plants was 2.4 TWh below budget as dry
23 conditions existed throughout much of the Province in 2010. Annual mean flow for many of
24 the river systems ranked as lower decile for 2010.