NSPI's renewable energy targets

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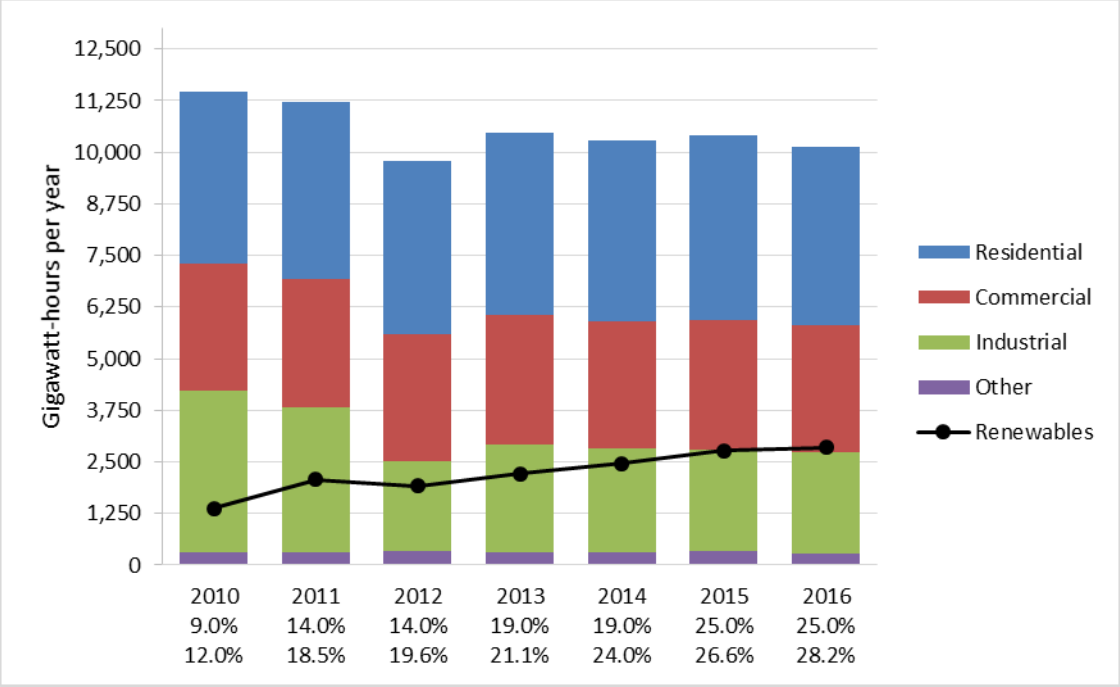
5 May 2017

Last Friday, Nova Scotia Power announced that in 2016, 28% of the electricity demand in the province had been met from renewable sources. This exceeded Nova Scotia's regulations requiring that NSPI meet at least 25% of its electricity demand from renewable sources in 2016.

This is a considerable achievement, considering that in 2010 (the first year of the regulations) only 12% of NSPI's electricity was generated from renewables, most of which came from its existing hydroelectricity facilities.

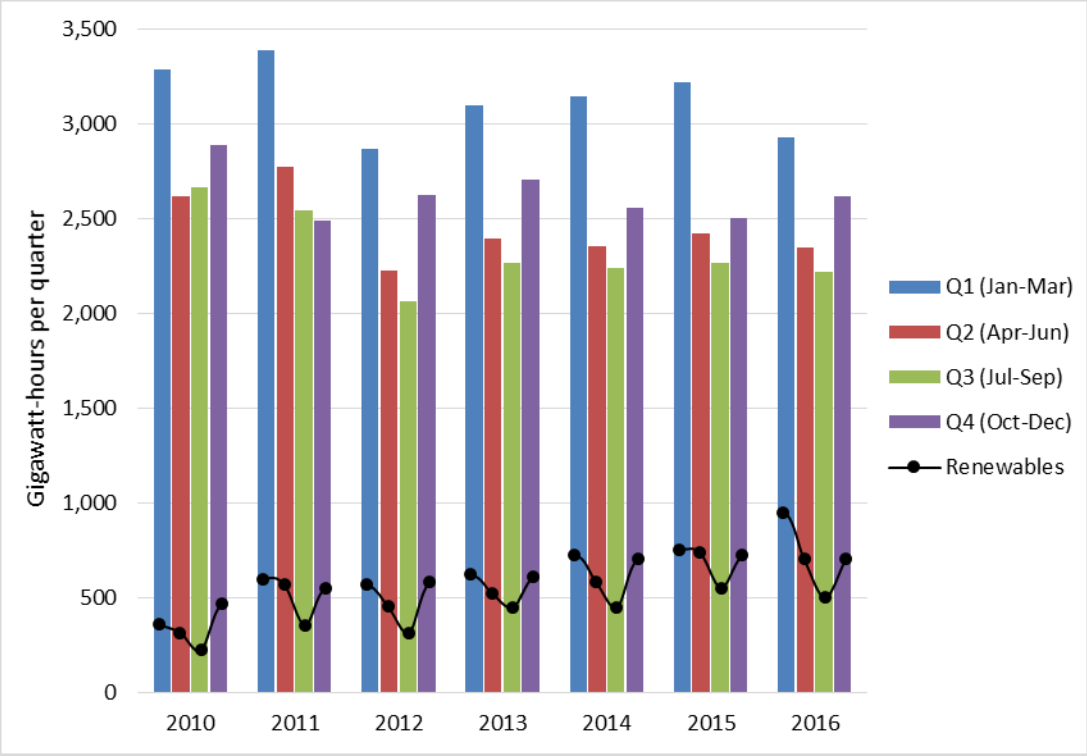
In fact—as the following graph of NSPI's sectoral electricity demand and volume of electricity generated from renewables shows—since 2010, NSPI has consistently surpassed the targets specified in the regulations. (The label under each bar indicates the year, the target-ratio percentage, and the actual-ratio percentage; for example, in 2014, the target was 19% and the ratio of renewables-demand met by NSPI was 24%.)



Although NSPI has exceeded the renewables-demand ratio every year since 2010, the value of the ratio can be misleading. For example, the ratio increased from 18.5% in 2011 to 19.6% in 2012, not because of an increase in renewables (production from renewables actually fell by 156 gigawatt-hours in 2012), but because the industrial sector declined by almost 1,420 gigawatt-hours.

Similarly, despite the increase in renewables between 2015 and 2016 being the smallest to date (only 86 gigawatt-hours), the ratio still increased from 26.6% in 2015 to 28.2%. In this case, the increase was the result of an almost 300 gigawatt-hour decline across all sectors. If demand in 2016 had been the same as in 2015, the ratio would have increased to only 27.4%.

NSPI's renewables-production and demand both vary by season. For the most part, there is a reasonably strong correlation between the two, as is apparent from the following figure: production and demand are usually highest in Q1, declining in Q2, lowest in Q3, and rising in Q4. (The fourth quarter decline in 2011 was the result of changes in industrial-sector demand.)



With respect to 2016, the electricity produced from renewables in the first quarter was about one-third of NSPI's total electricity production for that quarter (more than the first quarter in any other year); however, this fell to less than 25% of NSPI's total production in the fourth quarter (the lowest fourth quarter production of any of the other years).

Such seasonal swings in renewables production—and demand— illustrate some of the challenges NSPI must address when integrating variable renewables (notably wind and hydroelectricity) into its energy mix.

Between now and 2020, NSPI is required to continue meeting the 25% minimum renewables-demand ratio. Barring an unexpected decline in renewables production or an unforeseen increase in demand, NSPI should remain above the minimum.

This means that there is little incentive for NSPI to increase its use of renewables before 2020.

In 2020, the renewables-demand target increases to 40% and is expected to be met by electricity from Muskrat Falls.

Maintaining the 40% target beyond 2020 will be associated with a new set of challenges for NSPI. In the short-term, demand could rise if the use of heat pumps increases and electric vehicles become more affordable. Over the longer-term, climate change could affect seasonal

weather patterns, potentially reducing the availability of renewables and increasing demand during the summer months for air conditioning.

This article originally appeared in AllNovaScotia.com on 5 May 2017.