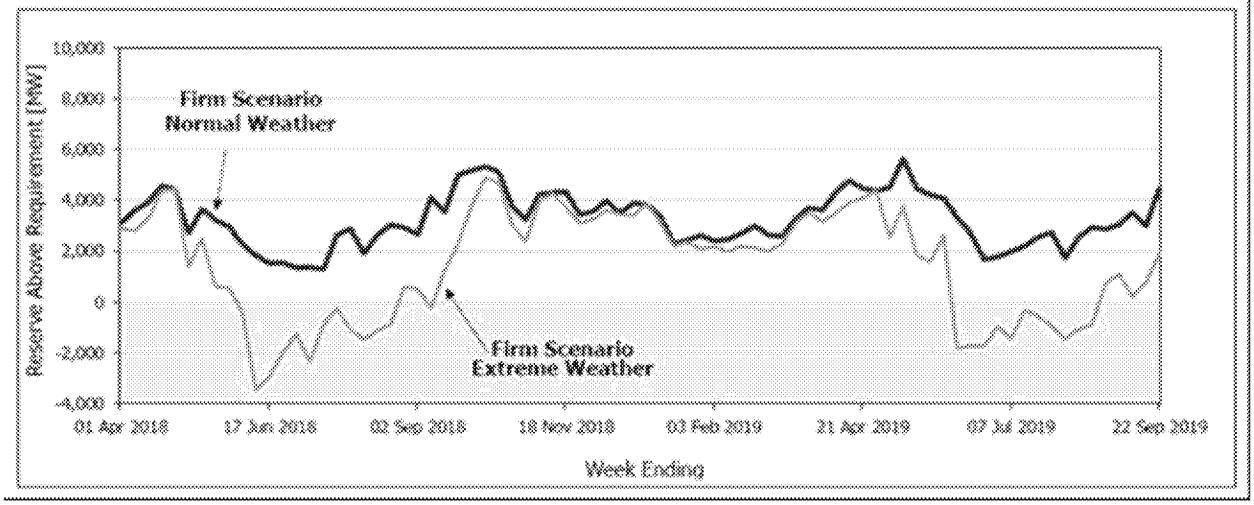
Figure 4.1: Normal vs. Extreme Weather: Firm Scenario RAR



It is important to note that it is only the extreme weather forecast that illustrates some period when there is negative reserve requirments. According to the methodology paper published negative reserve requirements may only mean higher risk levels for the respective weeks. Whenever negative Reserve Above Requirement values are identified, the possible control actions to restore the reserves to required levels are considered and assessed. The types of control actions would include some of the following:

- Cancel outages
- Obtain Imports from neighbouring jurisdictions
- Real Time – Transmission Limit adjustments
- Emergency Activation OR etc.

The Normal Weather scenario illustrates positive reserve requriements. As noted below the reserve above requirements is devoloped based on the following considerations:

- The amount of generator deratings;
- Planned and long term unplanned generator outages;
- Generation constrained off due to transmission interface limitations;
- Any capacity imports or exports backed by firm contracts;
- Any imports identified by market participants to support planned outage requests to the IESO; and
- The assumed amount of price responsive demand.

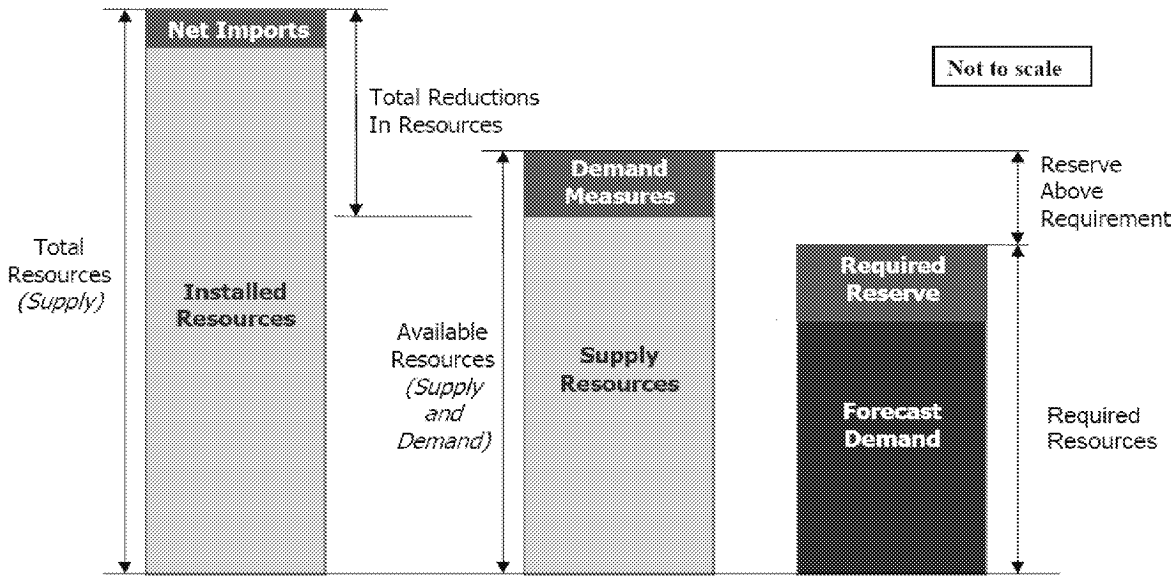
Source Reference

Published methodology for the 18-month outlook: http://www.ieso.ca/-/media/files/ieso/document-library/planning-forecasts/18-month-outlook/methodology_rtaa_2018mar.pdf?la=en

Excerpts from the 18 Month Outlook methodology document regarding the Required Resources

The Required Resources are the amount of resources needed to supply the Ontario Demand and meet the Required Reserve as shown in Figure 3.1. The Reserve Above Requirement is the difference between Available Resources and Required Resources. The Required Reserve is a planning parameter that, depending on the type of assessment, takes into account the uncertainty associated with demand forecasts or generator forced outages in a probabilistic or deterministic approach.

Figure 3.1 Reserve Above Requirement



Available Resources

For each planning week, the expected level of Available Resources is determined, considering:

- The amount of generator deratings;
- Planned and long term unplanned generator outages;
- Generation constrained off due to transmission interface limitations;
- Any capacity imports or exports backed by firm contracts;
- Any imports identified by market participants to support planned outage requests to the IESO; and
- The assumed amount of price responsive demand.

The expected level of Available Resources is calculated using the outage profile associated with the "maximum outage day" in each planning week, i. e. the day with the maximum amount of unavailable generating capacity in that week. Although the weekly peak does not always occur on the maximum outage day, such coincidence is assumed for the determination of Available Resources.

For a specific outage assessment in the 18-month timeframe, imports of up to 700 MW may be considered as available plus any imports that generators have confirmed they will make to support a planned outage

request, according to the applicable market manuals.

Reserve Above Requirement

The adequacy of the Available Resources to meet the demand over the study period can then be assessed in an arithmetic calculation illustrated in Figure 3.1. The Reserve Above Requirement is obtained by subtracting the Required Resources (equal to the peak demand plus Required Reserve) from the Available Resources.

It should be noted that negative Reserve Above Requirement values in some weeks do not necessarily mean a violation of the NPCC resource adequacy criterion. This may only mean higher risk levels for the respective weeks. Whenever negative Reserve Above Requirement values are identified, the possible control actions to restore the reserves to required levels are considered and assessed.