

## **MODELING OF SPECIAL CASE RESOURCES IN THE INSTALLED CAPACITY REQUIREMENT STUDY NOVEMBER 21, 2003**

### **INTRODUCTION**

The Installed Capacity Subcommittee (ICS) performs a study each year to determine the Installed Capacity Requirement referred to as the Installed Reserve Margin (IRM) Study. The modeling of Special Case Resources (SCRs) first occurred in the IRM study for the period May 2001 through April 2002 (the 2001 Study) that was completed in December of 2000. This paper further describes SCR modeling details in response to recent inquiries arising from this years IRM sensitivity tests. It is important to note ICS focus is on the technical modeling details associated with SCR and not on market issues.

### **HISTORY**

1. In the 2001 Study, 154 MWs of SCRs were modeled as three thermal units. A sensitivity of adding 100 MW of SCRs in New York City resulted in a decrease of 0.1% in the base case IRM due to locational benefit.
2. In the 2002 Study, an additional 361 MW of SCRs were modeled, derated from a total of 515 MWs. In this study, the SCRs were modeled as energy limited resources capable of being called for a total of twenty hours in the months of July and August. **The increase of the 361 MWs resulted in an increase of one percentage point (1%) in the IRM.**
3. In the 2003 Study, the amount of SCRs increased to 560 MWs and the modeling was changed to represent them as Emergency Operating Procedures (EOPs). No sensitivities were done to see the impact that they had on the system if they were removed. However, in this study, a sensitivity of adding 75 MWs of SCRs in New York City showed a decrease in the IRM of 0.2% due to the locational benefit.
4. In this year's study, 652 MWs of SCRs are being modeled as an EOP step. This amount is discounted to 600 MWs in July and August and further reduced in the remaining months to simulate actual performance. The SCR model was based on NYISO recommendation and based on review and approval of ICS and the Executive Committee prior to doing the Study. In this years study SCRs resulted in a 0.3% increase in the IRM.

### **MODELING**

**Overview** - There is no simple way to represent the actual performance of the SCRs in the MARS model. As noted above, over the past four years the ICS has continued to review and improve how this resource should be modeled. It is felt that representing it as an

EOP is a reasonable approach, since the ISO system operator can call on them as needed. It was felt that modeling them as a unit, or as a load modifier, as had been done previously had them called upon more often than appropriate. In modeling them as an EOP, the MARS program calls on them whenever capacity is needed anywhere in NYCA or in neighboring Areas. In the real world, the system operator would only call on them if they will be a benefit to the system based on their location. This is also true when calling for voltage reductions.

It has been observed that there is a 21 hour advance notice requirement for calling the SCRs, but NYSE&G has noted a quicker response when they were called upon. It should be pointed out there is also an advance time requirement for other EOP steps. For example, some of the 5% voltage reductions require advance notification, and some of the steam generating units may require advance notice for them to obtain their DMNC ratings. In the real world, advance notice is possible when a high load due to a heat wave is anticipated, or there is a shortage of capacity due to an unusual high number of units being out of service.

**Comparison Versus Conventional Capacity Resources** - It is important to note that although SCRs are counted by the Load Sharing Entities (LSEs) as capacity, they have a relatively low capacity factor, which reduces their overall value to the system (relative to a conventional resource). Another very significant factor influencing the value of SCR to the system is the location of the SCRs. In a transmission-constrained system like NYCA, resources that are located upstate will not have as much of a benefit as those located downstate.

**2004-05 IRM Study SCR Technical Modeling Description** - In the technical study, IRM is arrived at by taking an existing capacity base and adding load, across all zones, until the LOLE equals 0.100 days/year. For the base case, the existing capacity, including 652 MW of SCRs, equals 38,965 MW. The 'as found' load results in a system peak of 31,890 MW. 1435 MW has to be added to the Zones (non-coincident peaks) to get to 0.100 LOLE. At this point the system peak (given by the MARS model) is 33,273 MW, resulting in  $38965/33273 = 117.1\%$  Installed Reserve Margin.

In the case where the SCR's are removed, the numerator in the above equation is reduced by 652, yielding 38,313 MW of capacity. Keeping the added load the same (1435) yields a LOLE of 0.207 days/year. Just removing the SCR's doubles the risk from 0.100 to 0.207 days/year. In order to determine what the IRM would be without SCR's, the amount of load is reduced until a LOLE of 0.100 days/year is achieved. This occurs when the amount of load added is only 940 MW (to zonal non-coincident peaks), resulting in a system peak of 32,796. The IRM for this case becomes  $38313/32796 = 116.8\%$ .

When resources are added to the system, more load must be added to arrive at 0.100 LOLE. If the resources added are homogenous, the amount of load added will result in no change to the IRM. If the resources added have a higher forced outage rate than the

system, for example, then the amount of load added to get to 0.100 LOLE is proportionally lower, raising the IRM, as in the case with the Flat Rock project. Similarly, since the SCR's are predominately upstate, in zones with little or no risk which due to transmission constraints limit overall support of NYCA, they raise the IRM requirement (in this case by 0.3%). **It is important to note this is consistent with past IRM study results.** If there were more MW of SCR's downstate, the effect would be to lower the IRM. This was seen last year in the case where 75 MW were added to NYC, lowering the IRM by 0.2% due to the locational benefit.

**SCR Modeling in Future IRM Studies** - ICS continually seeks ways to improve technical models to obtain the most accurate representation of the NYCA system and projections of loss of load expectation. ICS will continue to work with the NYISO and General Electric Co. in the coming year to determine the feasibility of developing modeling improvements for SCRs.