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Assessment of Resource Adequacy of the Cal-ISO Control Area

Overview

This resource adequacy assessment is based on an estimate of generation reserves identified in power flow simulations. It is not based on traditional resource planning techniques which utilize probabilistic analysis to estimate the expected amount of load lost. This assessment is designed to provide an order of magnitude analysis of resource adequacy.

The basic method for calculating the generation reserves, in this assessment, was to subtract the total Cal-ISO control area load from the total control area resources. Control area resources are the sum of the generation capacity inside the control area and the total transmission import capability into the control area.

Cal-ISO Control area load:

An estimate of Cal-ISO Control area load was obtained from the 2004 and 2007 Summer Peak power flow cases. The load in the power flow was based on a 1 in five year load forecast. The Cal-ISO Control area load includes all PTO and Muni customer load, pumps and transmission losses in the Cal-ISO control area. Table 1 shows the Cal-ISO control area load for 2004 and 2007.

Cal-ISO control area generation capacity:

Existing generation capacity in the Cal-ISO control area was estimated from the 2004 Summer Peak base case data. All participating generation, QF's, and muni generation inside the Cal-ISO control area was included in the Cal-ISO control area generation capacity. Capacity from QF's less than 100 MW and Geysers units was based on the generation output in the base case. These units are typically not dispatchable. Table 1 shows the existing Cal-ISO control area generation capacity.

Cal-ISO control area Import Capability

Import capability into the Cal-ISO control area was estimated from the 1999 Summer AC/DC nomogram and the 1999 Summer SCIT nomogram. Import capability for all PTO's and Muni's inside the Cal-ISO control area was included in the estimate. The Cal-ISO control area import capability is included in Table 1. The import capability was estimated as the sum of the COI import capability, Cal-ISO Control Area Portion of the SCIT import capability (excluding Path 26 and North of Lugo), and expected maximum imports from LADWP into the Cal-ISO control area. Table 2 shows the details of the calculation and the values used.

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Table 1: All values in MW.

	2004	2007
Existing Generation Capacity	45950	45950
Import Capacity	9690	9690
Total Resources	55640	55640
Load	51654	54870
Reserves	3986	770
Max Load Responsibility	51654	54870
Min Load Responsiblity	41964	45180
Min Reserve Ratio	8%	1%
Max Reserve Ratio	9%	2%

Table 2: All values in MW

Item	Amount	Calculation Notes
COI Capacity	4000	Include all
SCIT Capability	13000	Include 62%
Path 26 and N of Lugo	2800	Subtract all (internal SCIT paths)
Mohave	1570	Subtract all (Mohave located outside of SCIT)
LADWP to Cal-ISO	2000	Include all
ISO Import Capability	9690	

Reserve Ratio

The **reserve ratio** is the ratio of the reserve resources (reserves) divided by the load responsibility. **Reserves** are estimated by subtracting the total load from the total resources. **Load responsibility** is calculated by subtracting net firm imports from total load. The minimum load responsibility is estimated by assuming all imports are firm, and the maximum load responsibility is estimated by assuming that all imports are non-firm. Minimum reserve ratio is based on the maximum load responsibility and maximum reserve ratio is based on the minimum load responsibility.

Minimum Required Reserve Ratio

The WSCC Power Supply Design Criteria serves as a reference point for the required reserve ratio. Because of the many simplifying assumptions of this analysis, it should be considered a ballpark estimate of the level of resource adequacy. Assuming that 20% of the generation is hydro, the minimum required reserve ratio is approximately 13%. However, because generator capacities provided in power flow cases are typically nameplate values and many of the generators have been derated, the reserve ratios calculated here are optimistic. According to this assessment, resource availability is 5% deficient in 2004 and 12% deficient in 2007. One final observation is that reserves are decreasing at a rate of about 2% to 3% per year which is about 1000 MW per year. This

would suggest that the addition of approximately 1000 MW per year starting in 2002 or earlier is needed to maintain resource adequacy.