

## Purpose and Need

The CLRTPG was formed to jointly plan and evaluate the development of a coordinated long-range transmission plan for the CCPG footprint. Previous CLRTPG studies have been performed approximately every two years and cover a ten-year planning horizon. The most recent CLRTPG study covered the 2008-2018 planning horizon.

The 2008-2018 study differed from prior efforts in that it included Senate Bill 07-100 requirements. The study identified the transmission infrastructure necessary to accommodate additional renewable resources and did not represent recommendations or commitments by any particular LSE. As a result, the resources modeled may not have represented the optimal cost-effective resource mix.

## Objectives of the 2010 Study

Develop a coordinated long-range transmission plan based on Loads and Resources submitted by each LSE planning participant:

1. Study two L&R scenarios, one with a high economic forecast and the second with a base economic forecast.
2. Identify potential transmission solutions to serve both the high and low forecasted loads and proposed generation resources.
3. Perform a benchmark analysis of the system and document the minimum transmission system necessary to reliably and cost effectively meet the two L&R scenarios.
4. Identify transmission solutions consistent with previous studies that will facilitate the integration of additional resources beyond the L&R submittals.

## Process

1. Conduct as an open and transparent process.
2. Conduct as a joint planning study with multiple utilities.
3. Comply with all NERC / WECC planning criteria.
4. Efficiently use known transmission corridors.

## Assumptions

1. Each participating LSE evaluates and submits their Load and Resource (L&R) requirements including forecasted loads, resource plans and reserve margins for

year 2020. Each LSE submits L&R data for two scenarios: one representing a base economic forecast with minimal or modest load growth over the ten year period, and a second forecast representing a high economic or more robust load growth and resource need.

2. It is assumed that the LSE L&R submittals will include all renewable generation required for the LSEs to meet the State of Colorado renewable portfolio standards through year 2020.
3. Non LSEs may also submit resource additions for study, however each resource addition must also include a corresponding "load" submittal or appropriate dispatch assumption.
4. The study will determine reliability performance of the transmission system based on steady state analysis for the two L&R scenarios. The study will document any transmission deficiencies for the ten year period and benchmark system performance prior to the implementation of any transmission additions.

## **Base Case**

The study will utilize the WECC case 2019HS1, scaled to 2020 loads, developed for the HPX studies. The case will include all known transmission additions prior to 2020 as determined by each LSE.

## **Methodology**

Power flow analysis will be performed using the National Electric Reliability Corporation (NERC)/WECC planning standards. In general, the following system parameters will be monitored:

1. All busses, lines, and transformers with base voltages equal to or greater than 115 kV in the Colorado power flow areas 70 and 73 will be monitored in all study cases.
2. Post contingency element loadings will only be tabulated when an element rating is exceeded and the loading increase is at least 1% from the normal system loading. If an element was overloaded in the system normal condition and increased no more than 1% in the outage condition, the overload will not be reported.
3. Post contingency voltage violations will be tabulated only if the deviation is more than 0.05 p.u. from the normal system voltage or higher if allowed by local criteria. Base case and contingency low voltage violations will be noted, however

contingency voltage violations will be ignored if voltage change is less than 0.05 p.u.

4. WECC Paths will be monitored.
5. The study will focus on NERC Category A (system intact, N-0) and NERC Category B (single contingency, N-1) performance. Some selected NERC Category C and D disturbances may be performed.

## **Criteria**

The study will adhere to the NERC Standards and the WECC Planning Criteria.

1. All elements should remain within 100% of stated ratings.
2. All voltages within 0.95 and 1.05 under system normal conditions.
3. All voltages within 0.90 and 1.10 under single contingency conditions.
4. Voltages must not vary by 5% under single contingency conditions.

## **Schedule**

Study scope approved at the April 22, 2010 CCPG meeting.

LSE L&R submittals provided by June 1, 2010.

Draft study results issued September 30, 2010.

Final report published November, 2010.