

20-Year Analysis

ATC launched the 20-Year Analysis Initiative in 2005. The primary goals of the 20-Year Analysis Initiative are to determine the long-term needs of our system, and to gain confidence that the capital investments proposed to be made over the next ten years are in alignment with these needs. This initiative has multiple objectives including:

- ❑ evaluating the robustness of the projects that are listed in the 2005 10-Year Assessment,
- ❑ evaluating the long-term needs of our system and determining if the 10-Year Assessment projects are aligned with these future needs. This evaluation therefore includes the possible recommendation to revise the expansion plans from the 10-Year Assessment to ensure an adequate framework is provided for future system requirements,
- ❑ determining any reliability benefits that the Access Initiative alternatives provide from a long-term system performance perspective,
- ❑ evaluating the impact that specific generation retirements would have on system reliability and system expansion needs and
- ❑ identifying specific locations within our system where the future siting of new generation may provide significant system performance benefits.

Because this initiative is so closely tied with the 10-Year Assessment, we determined that the 20-Year Analysis should immediately follow the 2005 10-Year Assessment. This would ensure that the same 2014 study case used in the 10-Year Assessment would be the starting point for the 20-Year Analysis. It also would ensure that the 20-Year Analysis could utilize the most recent 10-Year Assessment project list in its review of those projects and future system needs.

Therefore, the 20-Year Analysis recently was initiated, subsequent to the analyses performed for the 2005 10-Year Assessment. The 20-Year Analysis will progress through the coming months, including looking toward the 20-year horizon while targeting the objectives listed above.

Due to the fact that the 10-Year Assessment analyses recently were completed, the study results to date are limited to a review of reliability benefits that the various Access Initiative alternatives provided in 2014 and 2016. The latest information can be found at <http://www.atcllc.com/IT2c.shtml>.

It is anticipated that the complete results from the 20-Year Analysis will be presented in the next 2005 10-Year Assessment Update. However, as intermediate results become available they will be provided to stakeholders, and feedback will be solicited. We feel the involvement of stakeholders will be important in assuring that the 20-Year Analysis provides valuable insight into the future system needs, including addressing the impact of the retirement or addition of generation.

Model building

The study cases used in the 20-Year Analysis are based on the 10-Year Assessment's summer peak 2014 base case. This case includes proposed and provisional system reinforcements needed to address system deficiencies in 2014. Study cases will be developed in two-year increments, continuing out to 2024 (i.e. 2016, 2018, etc.).

For each study case, two year's load growth within our system will be applied to the previous case to create the correct projected load for the new case. The most recent load projections provided to us by our customers indicate a 2009-2014 (five-year) load growth rate of 1.994 percent and a 2013-2014 (one year) load growth rate of 2.009 percent. Therefore the proposed load growth rate to be used in the 20-Year Analysis is 2.0 percent per year. We recognize that load projections 10 years and beyond are tenuous and difficult to quantify. However, the best information available indicates an expected rate of approximately 2 percent per year. In addition, as part of the 20-Year Analysis, load sensitivity analyses will be performed to determine the impact on future system performance and therefore system needs for both low-growth and high-growth scenarios (rates to be determined).

The latest load projections reveal an expected load within ATC of 16,702 MW in 2014. Using a growth rate of 2.0 percent per year, the load growth for the first year (2014 to 2015) will be 334 MW, while the two year increase in 2016 will be 675 MW. The total load growth within ATC from 2014 to 2024 is projected (using 2.0 percent per year growth) to increase to 20,360 MW, a 10-year increase of 3,658 MW.

The 2016 study case therefore includes the modeling of a 2.0 percent increase in load within ATC. However, that modeling also includes different load growth rates for each control area within ATC, based on the 2013-2014 projected load growth of each of those control areas. In addition, within each control area each load substation will be increased by its individual non-coincident peak growth rate, then all the loads within that control area will be scaled to the desired peak load value for that control area. This methodology will ensure that:

- 1) the overall load growth within ATC is 2.0 percent per year,
- 2) the load growth within each control area is consistent with its latest forecasts, and
- 3) specific regions within control areas are correctly increased at a higher or lower rate depending on their latest projected growth rates.

Each two-year load growth will be supplied by importing power from outside ATC to create the next study case. Each control area will import enough power to supply its increased load and losses. This methodology of importing the increased load/demand effectively will stress the system and avoid masking possible transmission problems in this worst-case scenario. Since the initial two-year study cases only import the increased demand, transfer capability limits eventually will be reached. Therefore, one of the Access Initiative

alternatives (to be determined) will need to be added to the future cases to allow that increased import.

We recognize, however, that the addition of generation within the ATC footprint may have a significant impact on system performance and corresponding transmission expansion needs. Therefore, additional study cases for each two-year time frame will be created with the addition of generation to supply the additional load instead of imports. The generation will be modeled to exactly meet this load obligation, with the various possible sites to be determined by ATC. The sites will be analyzed from a system performance perspective, looking for those sites to provide the most transmission benefit. Because analyzing numerous generation sites is a time-consuming and tedious process, and because the 20-Year Analysis is not intended to be a generation site screening study, the number of generation locations reviewed will be limited to a reasonable number yet to be determined.

Each future two-year case will be developed in this fashion, with one set of cases importing the increased load and another set of cases adding generation to address the load requirements. This will provide a broad perspective of future system needs. It should be stated, however, that as the 20-Year Analysis progresses, certain study methodologies may change depending on study requirements and stakeholder input. For example, the number of generation/import possibilities and load sensitivities may create an unmanageable number of scenarios to analyze, which could require a reduction in the number of scenarios to allow the study to progress in an organized fashion.

Assessment of proposed reinforcements

As each future study case is evaluated, the proposed and provisional 10-Year Assessment projects included in the models will be evaluated to determine the robustness of those projects. We anticipate that additional projects will be needed beyond the 10-year horizon to meet the growing load. However, it is possible that we will identify a different project or set of projects that will more efficiently address all the long-term system deficiencies than with multiple projects every few years.

In addition, we plan to evaluate the reliability benefits of the Access alternatives in each of the study cases. This evaluation will be performed for the all-import, generation addition, and generation retirement cases.

Generation retirements

We will review the impact that specific generation retirements may have on system reliability. Various generation retirements will be evaluated to determine if additional transmission needs are observed due to the retirements. The generation retirements to be selected for evaluation will be determined as the study progresses, and will be based on a variety of factors, including age of units, generation location within the transmission network and stakeholder input.



Development of plans to meet longer-term needs

As mentioned earlier, it is possible that in the course of evaluating the proposed and provisional projects in the 10-Year Assessment a more robust or efficient project(s) may be identified to address the long-term system needs. The 20-Year Analysis intends to identify those changes, but whether the original project(s) ultimately is revised or replaced will require some judgment and not just the results of the 20-Year Analysis.

Summary

We acknowledge the inexact nature of the 20-Year Analysis and the results should not be construed as another Assessment where detailed project lists are developed for budgeting or business decision making purposes. However, the diverse spectrum of scenarios evaluated will provide insight into future system needs and the impacts of certain changes to our system (load growth uncertainty, generation changes, etc.). The results also may be used as part of the decision-making process in the Access Initiative, and, in certain instances, may result in changing our current expansion plans.