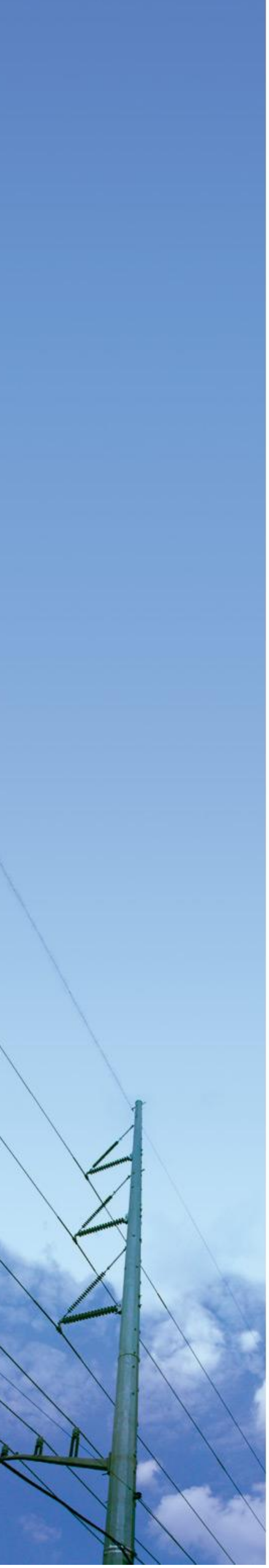

ITP Year 20 Assessment Scope

January 6, 2010

Approved by TWG January 5, 2010

Endsored by ESWG January 5, 2010

Southwest Power Pool

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Overview

This document presents the scope for the 2010 Integrated Transmission Planning (ITP) Year 20 Assessment. This analysis will be conducted on the year 2030. This document is expected to be reviewed by the Transmission Working Group (TWG) and the Economic Studies Working Group (ESWG) in December 2009, with approvals from the Market Operations and Policy Committee (MOPC) and the Board of Directors (BOD) in January 2010. Note that this document is only for the 2010 iteration of the Year 20 portion of the ITP study. It is expected that a new scope will be presented for the next iteration of the Year 20 Assessment prior to its inception in 2012. In 2011 there will be a 10-year planning study that uses the results of this ITP Year 20 Assessment as described in the ITP Planning Process document dated October 29th, 2009 and available at http://www.spp.org/publications/ITP_Process_Final_20091029.pdf.

Objective

The objective of the *ITP Year 20 Assessment* is to develop a recommended EHV backbone (345 kV and above) transmission plan for a 20 year horizon. The success of the design is dependent on the ability to provide a *robust system* which acts as an *enabler* to transmission usage and generation access. The assessment will identify a *versatile system* capable of providing a *cost effective deliverability to market solution* for a broad range of possible resource futures.

Modeling

1. Economic

The analysis for the *ITP Year 20 Assessment* (hereto referred to as "the Study") will consist of engineering models to facilitate the development of long range transmission plans. One set of models will be the economic models used to come up with a market based resource dispatch used in the analysis. These models require certain assumptions as to generation resources, parameters and locations (detailed in the following sections). The output of these models will allow engineers to determine the appropriate transmission needed from an economic perspective. This output can also be used to determine deliverability of the resources to market used in the analysis when taken into post processing type tools.

The major assumptions needed to construct the economic models are detailed below and contain, but are not limited to: market structure, load forecasts, resource forecasts and parameters, transmission topology, renewable assumptions, fuel pricing and availability, congestion monitoring points (i.e. flowgates), etc. Once these assumptions are input into an economic model, the model will develop a security constrained unit commitment (SCUC) and security constrained economic dispatch (SCED). This dispatch of generation will be deliverable to the market in the footprint to the extent of the modeled flowgates.

The following sections will detail the parameters to be used in the economic portion of modeling.

a. Market structure

The Study will take place on a time horizon of 20 years from the start of the study, i.e. 2030. SPP anticipates having in place a Day 2 market structure in place by that time, as the market structure is currently under development. Additionally, SPP also anticipates having in place a single balancing authority for the footprint. As such, the Study will consider these as baseline assumptions for the analysis.

b. Load forecasts

The Study will require load forecasts for both SPP as well as areas outside of the SPP footprint. SPP staff will query its members for appropriate load forecasts to use in each of the pricing zones for the modeling footprint. Additionally, SPP staff will reconcile this data with the futures survey information that was submitted by the respective states through the Cost Allocation Working Group futures survey conducted November 2009.

For load forecasts for entities outside of the SPP footprint, publicly available data will be utilized as the source of the 2030 load forecast, where available. Where not available, publicly available information on projected load growth will be extrapolated to develop a good representation for load expected in the study timeframe.

c. Generation resource forecasts

The Study will be conducted on a set of futures (described in the Futures section of this document below). For each of these futures, a resource set will need to be determined to use in the analysis. A Request for Proposal (RFP) for this section of the Study will be sent to choose a consultant to assist in this part of the analysis. That being considered, SPP staff and stakeholders still need to determine what parameters are used for new generation sited within and outside the SPP footprint for the Study.

The ESWG will be the primary point of contact to develop a list of prototype generators to be used as a generic set representing the future resources in the study (for example, CT Gas, CC Gas, ST Coal, ST Nuclear, Wind, Hydro, etc). The ESWG will work to determine a set of values for the following data types including, but not limited to, and using publically available data when applicable:

- Capital Cost
- Variable O&M
- Startup Cost
- Min Up
- Min Down
- Ramp Rate
- Heat Rate

While the focus of this analysis is to meet the transmission needs for the SPP system, it is also necessary that resources assumptions be developed to meet future load and generation requirements outside the SPP footprint. The analysis simulates energy transactions between SPP and its surrounding areas on a dynamic basis. The assumptions used for the eastern interconnect can have significant impact on the results seen for the SPP footprint. Generation for each of the modeling futures will be matched to both SPP and the rest of the grid in a comparable fashion. As such, a possible source of generation data outside of SPP would be publicly available studies such as the Eastern Wind Integration Transmission Study (EWITS).

d. Topology

The focus of the Study is to develop a comprehensive, robust transmission expansion plan to meet the requirements of the SPP footprint under various generation futures. Currently, SPP publishes a BOD approved transmission expansion plan called the SPP Transmission Expansion Plan (STEP). The STEP is a 10 year transmission plan, including some long range transmission analysis.

Therefore the starting point for the Study will be the 2010 Model Development Working Group (MDWG) model set and include the 2009 STEP Appendix A projects with appropriate justification. These transmission projects will be added to the base case and all future cases used in the analysis.

Additionally, transmission facilities needed to interconnect prospective generation to the transmission system will be added to all cases.

e. Generation

The generation parameters (Startup cost, Min up, Min Down, etc.) will be updated as part of ESWG's yearly economic model review as will be detailed in the ESWG Manual.

f. Renewables

Renewable generation in the footprint will be required under various generation futures. Renewable generation allocation requirements will be determined by SPP staff and stakeholders. Renewable generation, for the purpose of this study, includes qualified hydro, wind, solar, bio-fuel, etc.

Certain renewable generation, primarily wind, hydro and solar, operates as energy resources that require generation profiles be developed to model the synchronized output curves for individual wind plants as well as for the aggregate wind fleet. These output curves should also be synchronized with load data to preserve statistical relationships between wind output and load. SPP staff will use the National Renewable Energy Laboratory (NREL)'s database of synthetic wind plant output data as the primary input for the wind farm hourly maximum output capabilities used in the Study. This data will be sent to ESWG to review for the appropriate expected output of the select renewable wind resources. Profiles for any hydro or solar generation data will be developed on an as needed base by the working group. The economic dispatch model should try to realistically model renewable generation curtailment, based on historical market behavior, expected market conditions and reliability requirements.

The expected location of future renewable generation should not be based entirely on the location of current renewable generation and proposed renewable generation in the current interconnection queue. To take into consideration the fact that where additional transmission is built, future renewable generation will likely be developed in area.

g. DC Ties

DC ties connect the SPP to the WECC and ERCOT systems. For the base case, SPP will use historical DC tie useage profiles as a best approximation for the respective DC tie. SPP staff will work with DC tie operators to determine the appropriate DC tie profiles to be used in the futures cases developed.

Additionally, the analysis will consider the possibility of adding additional DC ties to the SPP footprint in the analysis. Though not a primary focus for this analysis, this could provide the footprint with greater access to the ERCOT and WECC markets.

h. Fuel

The price assumptions for fuels will be a large driver for the Study. A starting point for the base case analysis will be an extrapolation of the current Department of Energy (DOE) fuel projections with appropriate review and adjustments made by the ESWG. Additionally, sensitivity analysis can be conducted on appropriate futures to determine the sensitivity of the fuel assumptions to the respective transmission plans developed.

2. Powerflow

Powerflow models will be required for the Study for both the economic and reliability assessment. These models will serve as an input into the economic modeling program to develop a market based economic dispatch for the system.

Analysis conducted from a deliverability and reliability standpoint will be conducted using output from the economic models as a starting point. These models will be taken to post processing tools in order to conduct a limited assessment on further underlying impacts. This assessment is detailed in sections below.

a. Load

The load density and distribution for the powerflow model will be reviewed by the MDWG. Resource obligations will be determined for the footprint taking into consideration what load is industrial, non-scalable type loads and which load grows over time. Special care will be taken to consider the recent economic down turn and how a recovery could affect large industrial loads in the Study. The MDWG, TWG and ESWG will provide collaborative feedback into the determination of this impact.

b. Generation Resources

The generating resources used in the analysis will be added to the powerflow appropriately. Each future will contain a different subset of generation resources and correspond to a respective powerflow case. Care should be taken to consider appropriate generation outlets needed for future, potential generation and this transmission outlet should be added to the powerflow case. The Study is not focused on generation outlet issues, but considers regional transmission congestion corridors and solutions.

c. Topology

The topology used in the powerflow models will be the same as that used in the economic model as described in section 1.d.

d. Transactions/Interchange

Transactions for the powerflow model will be provided through the MDWG model development process. The economic program will establish an interchange between the modeled areas for every hour of the year (8760). This interchange will be used in all subsequent economic analysis.

Futures

Note: The futures to be used in the Study will be reviewed by the ESWG, CAWG, SPC, RSC and MOPC. As such, the futures listed in this scope document below are awaiting feedback. The futures set will be updated at the conclusion of reviews by the listed stakeholder groups.

1. Base Case

a. Overview

The base case will consist of no changes to established operating and planning policies and procedures already set for the study time frame, absent approved transmission upgrades which eliminate or mitigate existing practices. This case will be a baseline transmission expansion consistent with no dramatic changes to the current political climate. However, it will include planning requirements to meet existing renewable energy targets absent a federal renewable standard.

b. Objective

The objective of the base case is to develop a baseline to use in the Study. This case will be used as a backdrop to develop the other futures used in this analysis and serves as a reference case for comparison purposes.

c. Assumptions

The assumptions for the base case are that no major changes occur to established policies of the utilities and state and federal authorities for the study time frame. There will be no major change in resource mix, fuel prices, renewable targets, etc.

d. Resource mix

The resource mix used for the base case will be an extrapolation of current resource plans and policies that are established in the SPP footprint today. A resource planning tool will be used to develop the appropriate resource mix for the base case. These resource plans will be reviewed and modified, as appropriate, by stakeholders through the ESWG.

2. Renewable Electricity Standard

a. Overview

The Renewable Electricity Standard (RES) case will consider a federally mandated, twenty percent (20%) RES. This case will consider that the requirements for the SPP footprint are provided by the region. SPP staff will work with stakeholders through the ESWG and CAWG to determine a reasonable representation for each state and utility plan considering the resource allocation for this future allowing, for example, that if a state wishes to locate all of its renewable requirements in-state.

b. Objective

The RES case will be used to determine what type of transmission backbone will be required to meet a federal RES of 20% for the SPP footprint. As such, the focus of this analysis will be to deliver these renewable resources to the market in SPP in the footprint and assumes all load in the SPP be required to meet this RES. Primary consideration will not be given to the delivery of energy outside the SPP footprint; however, a robust plan should be developed that could leverage this potential option for future expansion.

c. Assumptions

The driving assumption for the RES future will be a potential 20% federal RES for the footprint wherein energy efficiency is not counted as renewable for the purpose of this study. A driving factor for the transmission plan developed for this case will be the siting and location for the renewable resources in the footprint. These assumptions will be developed leveraging the state surveys conducted by the CAWG as well as input from stakeholders through the ESWG.

The expected location of future renewable generation should not be based entirely on the location of current renewable generation and proposed renewable generation in the current interconnection queue. To take into consideration the fact that where additional transmission is built, future renewable generation will likely be developed in area.

Care will be taken to avoid providing competitive advantage to one group of generation resources over another; therefore, the generation future should be broad and general to provide for the regions needs. Specific generating resources, beyond current commitments, will not be targeted for development. The assumptions used for wind locations will be high level, considering only interconnection to the EHV backbone grid.

d. Resource mix

The resource mix for this future will contain a 20% renewable energy portfolio of generation in the resource mix. Any generation developed beyond that assumption will be developed using resource planning tools and reviewed and modified, as appropriate, by stakeholders through the ESWG.

3. Carbon Mandate

a. Overview

Current carbon policy is in the process of being determined in the form of Environmental Protection Agency (EPA) regulations and is also being considered by federal authorities, as such, this study recommends that a carbon price methodology be used for the purpose of this analysis.

b. Objective

The Carbon Mandate future will be used to determine a transmission expansion necessarily to deliver resources to the market under a carbon mandate.

c. Assumptions

For the purpose of this analysis the carbon mandate future will be conducted using a $54/ton (real) $80/ton (2030 nominal) for the price of a CO_2 emissions. A sensitivity will be conducted to consider a $15/ton (real) $22/ton (nominal).

d. Resource mix

The carbon mandate future will use the base case as a starting point, and then apply a carbon price to the simulation. A resource planning tool will be used to develop the appropriate resource mix for the base case. These resource plans will be reviewed and modified, as appropriate, by stakeholders through the ESWG.

4. Base Case + Energy Efficiency and Demand Response

a. Overview

A resource future to be considered in the Study will be an energy efficiency policy. This policy will consider a peak shaving demand reduction as well as a conservation (i.e. lower load growth) policy. This future will be considered on top of the base case for its starting point.

b. Objective

The energy efficiency future will be used to determine the impact of an energy efficiency policy in conjunction with the base case. This will allow staff to determine the extent to which an energy efficiency policy will modify transmission expansion for the SPP footprint.

c. Assumptions

The energy efficiency future will consider an additional four percent (4%) peak-shaving demand response beyond existing for the peak summer months (June through August). Additionally, the case will consider an energy efficiency measure of one-quarter of a percent (0.25%) reduction in the rate of load growth per year through 2030.

d. Resource mix

The resource mix used for the energy efficiency future will be an extrapolation of current resource plans and policies that are established in the SPP footprint today with the addition of an energy efficiency policy. A resource planning tool will be used to develop the appropriate resource mix for the base case. These resource plans will be reviewed and modified, as appropriate, by stakeholders through the ESWG.

5. Combination Futures

a. Overview

The following combination futures will also be considered: 1) Renewable Electricity Standards (RES) with Energy Efficiency (EE); 2) Carbon Mandates (CM) with EE; 3) RES with CM; and 4) RES with CM with EE.

b. Objective

The combination futures will determine any changes in resource mix for combinations of the non-base case futures. These different arrays of resources will allow staff to determine from all eight futures (4 single futures and 4 combination futures) which futures are likely to make the largest differences for transmission expansion for the SPP footprint.

c. Assumptions

The combination futures will be based on the combined assumptions for the single futures included in each of the four combinations.

d. Resource mix

The resource mix used for the combination futures will be developed using a resource planning tool to develop the appropriate resource mix for each of the combinations. These resource plans will be reviewed and modified, as appropriate, by stakeholders through the ESWG.

Metrics/Techniques for transmission planning

This analysis will focus on cost-effective delivery of energy to market. When discussing deliverability, it is important to recognize several factors that need to be considered when developing long-range transmission plans. First, a long-range plan needs to address both reliability and economics. A system designed purely for economics (i.e., a reduction in production cost) may not be the most reliable, and a system designed to just meet the minimum reliability requirements may not support delivering the most economic resources to the market. Second, the long-range plan must consider a variety of possible future outcomes. While many of the futures are addressed in the prior sections, it is assumed that SPP will be moving to a day-ahead market for power in the coming years. In order to help facilitate that market, the transmission plans developed herein will consider the effect of the upgrades on the resources participating in that market. So, the analysis will consider both reliability and economics, by focusing on the delivery of energy to market.

There are several key points to the concept of deliverability. *Basic deliverability* is the deliverability required in the long-term firm transmission service process. In those studies, a new resource is added to the model, and existing resources are displaced (in merit order) to accommodate the new resource. Upgrades may be required of the new resource in order to deliver its capacity to load. However, deliverability from a specific resource to a specific load is difficult to implement in a year 20 plan because that level of specificity is not available much past 5 years into the future. Thus, in a year 20 plan deliverability to the SPP market is used instead of to specific loads.

Improved deliverability can be thought of in terms of the ability of the transmission system to deliver energy from a resource to the SPP market in such a way that the differences between LMP at the resource and at the loads (i.e., congestion between resources and loads) is reduced when compared to basic deliverability.

Several factors may be used as a measure of deliverability. Among those are:

- Thermal loading: If the dispatched generation is not causing any N-1 overloads, then the generation is deliverable to the load. For this measure of *Basic deliverability*, the dispatch is based on new resources that have not been designated to meet a specific load being dispatched to meet all loads along with designated resources being dispatched to meet their loads.
- Market price equalization: When the spread among Locational Marginal Prices (LMPs) throughout the SPP footprint draw closer together (equalize) there is reduced congestion, indicating that lower-cost resources can better deliver their power to load in the SPP market. For this measure of *Improved deliverability*, the market dispatch is a security-constrained economic dispatch.
- Shadow prices: Similar to market price equalization, shadow prices are an indicator of congestion on the transmission system. A reduction of shadow price is indicative of lower-cost resources being able to better deliver their power to market.

Several factors, which may or may not include the ones discussed above, either individually or as a group, may form the basis of a metric that defines deliverability in terms of a cost-benefit.

Other metrics will be considered in this analysis as well. Those metrics will be developed by the ESWG as the Study process moves forward.

Analysis

This document makes reference to several specific software tools, including PROMOD and PROMOD Analysis Tool (PAT). It is SPP's intent to use these specific tools. However, if during the course of the analysis it becomes apparent that those tools are not capable of performing the analyses required, Staff may seek out other tools to perform the analysis.

1. Flowgate selection

a. Objective

To review the existing list of flowgates and to determine what (if any) flowgates need to be added or deleted from the list of constraints (event file) for the economic model runs to be done as a part of the Study. The flowgate study should determine what additional flowgates are needed in the models with the additional load and resources.

b. Assumptions

- The initial flowgate list will be the then-current NERC Book of Flowgates (BoF)
- Flowgate studies will be run over 8760 hours (1 year)
- Flowgate studies will be performed on each future case
- For the flowgate analysis, contingencies 345 kV and up in SPP, including autotransformers stepping down from 345 kV and up, will be selected
- For the flowgate analysis, monitored elements 115 kV and up in SPP will be selected
- A minimum of one iteration will be performed in the flowgate study
- Unless other information is available, the flowgate ratings will be selected based upon the Rate A (normal rating) and Rate B (emergency rating) in the powerflow model.
- This analysis will focus on a 2030 economic model

c. Methodology

The primary tool to be used in this analysis is PROMOD Analysis Tool (PAT). PAT allows the user to take the output from PROMOD (including load, commitment, dispatch and topology) and perform transmission analysis on that data on an hourly basis.

This analysis will be separated into two parts, one for the Base Case, and one for the Futures cases. This separation will be done because the Base Case should be prepared in advance of the Futures cases. The methodology will be the same for both studies.

To perform this analysis, a PROMOD run on each future case will be performed to establish a basis for the PAT analysis. Once the PROMOD runs have been completed, a DC contingency analysis will be performed in PAT using the assumptions listed above. The results of the contingency scan will be reviewed for potential flowgates. The following parameters will guide what should be selected as a flowgate:

1) More flowgates leads to slower runtimes of PROMOD, so the number of flowgates needs to be limited to a reasonable number.

2) Large occurrence (#) of violations

3) Large amount (MW) of violations

4) Limiting elements of higher voltage

5) No existing flowgate in the vicinity of the limiting element

Based upon the transmission upgrades that are added to the base models, some flowgates may become superfluous and should be removed. A review of the upgrades versus the current flowgate list will be performed to identify those flowgates to be removed.

Once a set of additional flowgates or flowgate changes have been selected, these flowgates will be added to PROMOD, and another complete run of PROMOD will be performed. The flowgate study will then be repeated using the new PROMOD data as the input to PAT. This second pass will determine if the flowgates selected address the necessary issues, or if additional flowgate changes are needed. If necessary, this process will be repeated until a satisfactory list of flowgates is arrived upon.

The flowgate lists will be reviewed by TWG prior to implementation. Justification will be provided for any addition of flowgates to or deletion of flowgates from the original BoF list used in this analysis.

d. Output

- A list of flowgates (in the form of a PROMOD Event File), to be used in the economic model going forward from this point.

- Results of a basic N-1 contingency scan on the PROMOD models.

2. Project congestion analysis

a. Objective

This analysis will identify what problems exist in the model with regards to congestion, and other metrics as determined. Possible solutions will be identified for those problems, and those solutions will be evaluated to determine what benefits are projected. The projects that project higher benefits will be selected and grouped into a portfolio for each future.

b. Assumptions

- After identifying problems, projects that potentially fix these problems will be analyzed in PAT using a subset of hours for each future.
    - 256 hours (out of 8760) will be evaluated
    - Those hours will be selected at random, with a mixture of 50% on-peak and 50% off-peak[1] hours, those hours being 25% Winter, 25% Spring, 25% Summer and 25% Fall.
- Projects identified in prior studies but not approved will be reviewed to determine if they will provide benefit in the designated future.
- Projects evaluated will be 345 kV and above.
- Projects will focus on deliverability within the SPP footprint.
- This evaluation will be done for each future case.
- This analysis will focus on a 2030 economic model

c. Methodology

Following the selection of flowgates, a new run of PROMOD will be performed to establish a basis for this portion of the analysis. The results of PROMOD will be reviewed to identify areas of congestion using, but not limited to, the following metrics:

1) Locational Marginal Price (LMP)
2) Shadow Price
3) Congestion Cost

[1] On-peak and off-peak as defined by the SPP Tariff Schedule 1

4) Number of hours congested

5) Flowgates

Once the problem areas have been identified, potential solutions will be developed, according to the objective for the Study. For example, identification of energy flows from resource long areas to resource short areas required to equalize LMPs (i.e., to reduce congestion) over the entire year with the objective of designing the transmission upgrades that would provide the transfer capability for achieving various percentage levels (e.g., 60%, 75% and 90%) for these energy flows. These solutions will be presented to stakeholders for review. After solutions have been identified, they will be evaluated in order to determine what benefits they may provide. The projects will be modeled in PAT, and then evaluated to determine their effect on the outputs listed above.

The projects will then be studied to determine which projects could be grouped together in order to provide benefits to the entire footprint. This analysis will be performed by examining combinations of projects in PAT to determine which combinations are mutually beneficial.

d. Output

- One group of transmission projects (a transmission plan) for each future.
- Preliminary benefit information for each plan

3. *Cost-Effective Portfolio planning*

a. Objective

To analyze the selected transmission projects in more detail, and to calculate benefits for those projects, as defined in the metrics. This phase of the analysis also focuses on optimizing those projects and the groupings.

b. Assumptions

- An economic model run will be performed for each project in its associated future case, as well as the project groupings.
- This analysis will focus on a 2030 economic model

c. Methodology

Projects (both individually and in groups) will be placed in the economic model, and a full PROMOD run will be performed. The results from the PROMOD run will be analyzed and benefit metrics will be calculated. Based upon the results, projects and/or groups may be revised in order to optimize the plan. The proposed plans and benefits will be presented to stakeholders for review. Based upon feedback, the projects and/or groups may be revised.

d. Output

- Detailed benefit calculations for each project/project set
- Refined transmission plan for each future

4. Project correlation/Robustness test

a. Objective

To analyze the selected transmission plans to determine what projects, among all those analyzed, are the most flexible to the various futures examined in this Study.

b. Assumptions

- Cost effective projects as determined in step 3.

c. Methodology

The transmission plans established in the prior phase will be evaluated to determine which projects are the most flexible (i.e., those projects which would provide benefit in all futures evaluated). To analyze the projects for flexibility, several tests will be performed. Those tests will include, but not be limited to,

1) Examination of all of the projects will be performed in order to identify candidates for the recommended transmission plan.
    a. Projects that appear in all four plans will be given priority for inclusion in the final plan.
    b. Projects that appear in multiple plans, but not all four plans as well as projects that are unique to each of the four futures will be evaluated with respect to what additions or changes would be required in order to meet basic deliverability needs in all four futures;
2) Alternative candidate transmission plans developed from 1) a and 1) b above will be evaluated with respect to their costs and benefits in each of the futures.

Based upon the results of those analyses, the selected projects will be grouped into a recommended transmission plan. Once that plan is established, benefits will be calculated for that project set in order to illustrate the benefits this project set provides in each future. SPP staff will provide the results of this analysis to stakeholders for review.

d. Output

- Detailed costs and benefits calculations for the recommended project set for each future.
- One transmission plan (the “recommended” set of projects)

5. Limited Reliability Assessment

a. Objective

Recognizing that the majority of the analysis described herein focuses on economics, a reliability assessment of the transmission plans will be performed to identify the impact they may have upon system reliability.

b. Assumptions for Linear Analysis

- One summer peak model for each of the four futures will be selected for this analysis.
- The summer peak model will be extracted from the economic data (using its load, commitment and dispatch).
- Contingencies to be evaluated are 345 kV and up in SPP and 1st tier companies, including autotransformers stepping down from 345 kV and up.
- Monitored elements will be those 115 kV and up in SPP and 1st tier companies.
- This analysis focuses on thermal loading.
- This analysis is not intended to be a thorough reliability evaluation of the year 20 model.

c. Assumptions for AC and FCITC Analyses

- These analyses are intended to be a more thorough reliability evaluation of the year 11 peak model at all voltages down to 100 kV. Based on the results of these analyses, this information will be used to refine EHV designs from a reliability perspective.
- As a proxy analysis to assess the reliability impacts in relation to the ongoing STEP effort, each group of alternative EHV options will be evaluated in the year 11 (2021) summer peak STEP model.
- Transmission reliability analyses will be completed for each EHV group. These studies will include the results of normal conditions and all single contingency (N-1) analyses.
- Contingencies 100 kV and up will be conducted in SPP and 1st tier companies.
- Monitored elements will be those 100 kV and up in SPP and 1st tier companies.
- AC Analysis focuses on criteria violations including both thermal loading and voltage.
- Mitigation plans will be developed for all criteria violations at 100 kV and above based on contingencies 100 kV and up. Other mitigation plans may be developed for lower voltage contingencies below 100 kV in SPP as time permits.
- A transfer capability (FCITC) benchmark assessment will be performed

- Stability analysis will be performed using the year 11 summer peak STEP model.

d. Methodology

The limited reliability assessment will study the impact of the proposed transmission plans on the existing transmission system.

At present, a year 20 powerflow model has not been developed. Due to the lack of an available AC model, a year 11 powerflow model will be substituted as a proxy for the year 20 model so that both voltage and thermal concerns can be evaluated. In order to be sure that the various futures and year 20 load levels are considered, analysis will also be performed on the year 20 cases.

In order to capture more aspects of the reliability assessment, it will be divided into two portions. The first will be performed on the year 20 economic model using the assumptions above. This analysis will simulate the year 20 load levels and dispatch. The analysis will consist of a DC contingency analysis, with and without the identified transmission plans.

The second portion of the analysis will be performed on a year 11 powerflow model. This analysis will consist of an AC contingency analysis, with and without the identified transmission plans. Additionally, a transfer capability (FCITC) will be performed on the year 11 powerflow model, with and without the identified transmission plans.

Those issues within SPP that are not addressed in this assessment will be passed to the 10 Year ITP Study for further evaluation.

6. Other considerations

a. External plans

In the development of transmission plans for the SPP footprint, Staff will review expansion plans of neighboring utilities and Regional Transmission Organizations (RTOs). Based upon that review, Staff may take into account other external plans. Also, SPP participates in the transmission planning process at other organizations, and the ITP may be presented as input to those processes. Some of the plans/processes include, but are not limited to:

- Eastern Wind Integration and Transmission Study (EWITS)
- Strategic Midwest Area Transmission Study (SMARTransmission)
- MISO MTEP and Regional Generation Outlet Study (RGOS)
- Eastern Interconnection Planning Collaborative (EIPC)
- Xcel Energy/SPS Long Range Plan
- TVA PoleStar
- High Plains Express
- Merchant projects like Santa Fe, Plains and Eastern Clean Line, Tres Amigas, etc.

b. Seams impacts

Consideration of the potential impacts of the transmission plans on neighboring systems that may be affected by the ITP will be accounted for as well. For those neighbors that SPP has a Seams agreement with, coordination will be done in accordance with that agreement. For those without an explicit agreement, those neighbors will be contacted in order to discuss the potential impacts of the ITP on their systems.

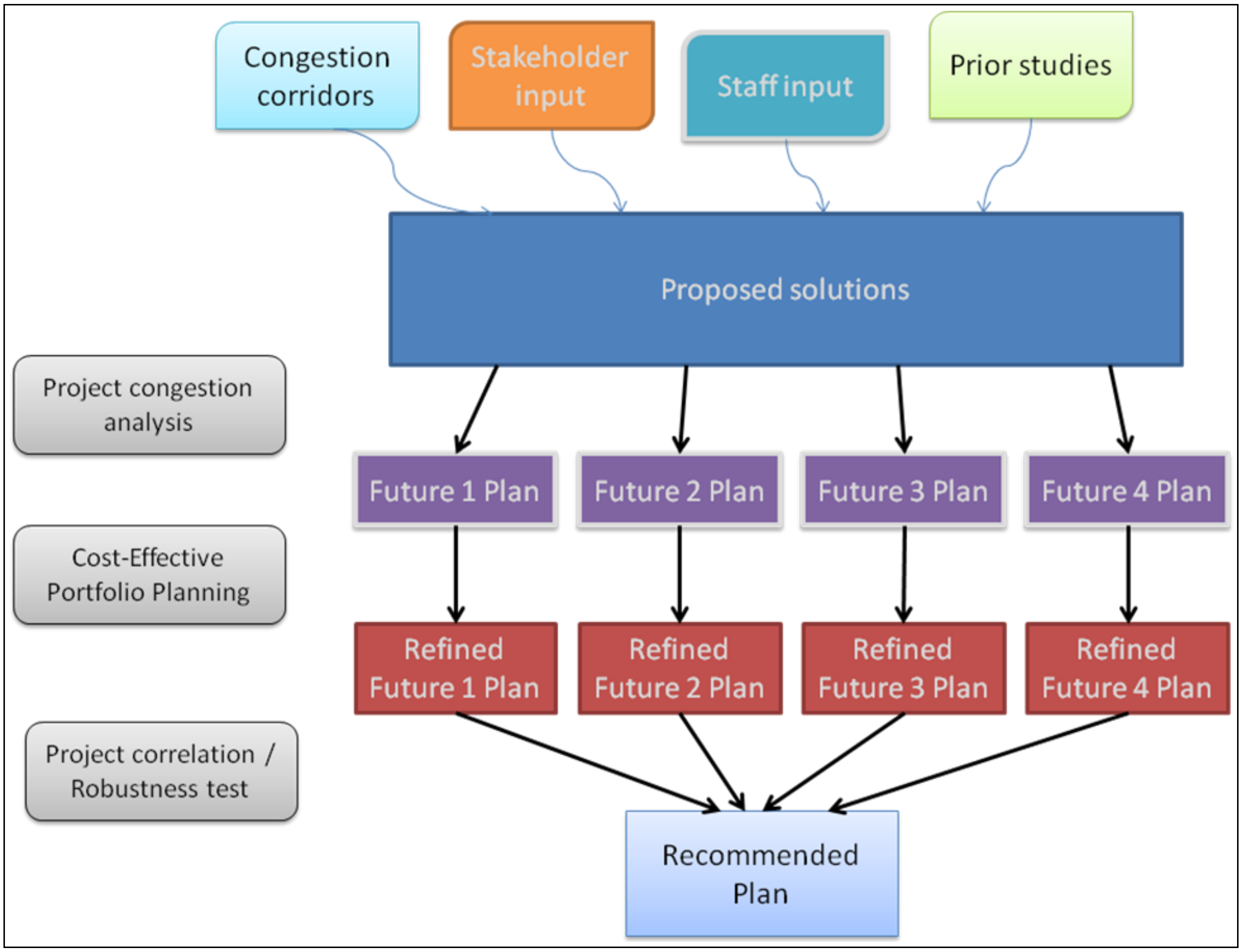

Figure 1 - *ITP Year 20 Assessment* Transmission Project Flow

Results/Deliverables

1. Report

The results from the ITP Year 20 Assessment will be compiled into a report detailing the findings and recommendations of SPP Staff. This report will be incorporated into the STEP Report that is published on a yearly basis.

2. Recommended Year 20 Plan

This assessment will define a set of transmission upgrades that will be needed to meet the futures defined in this document. From these futures a recommended transmission plan will be developed as detailed in the sections above in this scope. The recommended plan will be focused upon the objective of the Study: To develop a recommended EHV backbone (345 kV and above) transmission plan for a 20 year horizon. The success of the design is dependent on the ability to provide a *robust system* which acts as an *enabler* to transmission usage and generation access. The assessment will identify a *versatile system* capable of providing a *cost effective deliverability to market solution* for a broad range of possible resource futures.

Note: The metrics used to measure these qualifications will be developed in the 1st Qtr 2010 by the ESWG.

3. Staging and timing of project implementation

The transmission plan that is developed will be reviewed to determine what projects provide the most immediate benefit to the region. As such, a project implementation plan will be developed for the recommended transmission plan from the ITP Year 20 Assessment. The plan will provide staging and timing considerations to convey the appropriate order of implementation (issuance of ATPs and NTCs) to be used to realize the plan.

Stakeholder Interaction

1. Working groups

a. TWG /MDWG

The TWG will be responsible for the following items:

1) Transmission topology inputs to the models
2) Flowgate review
3) Limited reliability assessment
4) ITP Report
5) Seams impacts
6) Load Forecasts

b. ESWG

The ESWG will review be responsible for following items:

1) Economic modeling assumptions
2) Futures
3) Futures Resource review
4) Metrics
5) Congestion analysis
6) Economic Model Results
7) Cost-Effective Portfolio Planning
8) ITP Report

c. CAWG

The CAWG will be responsible for the following items:

1) Futures
2) Cost and benefit allocation
3) Cost-Effective Portfolio Planning

d. MOPC

MOPC will approve the following items:

1) ITP Report
2) Metrics approval
3) Futures review

e. BOD/RSC

The BOD/RSC will approve the following items:

1) Policy-driven decisions
2) Futures
3) Cost and benefit allocation

2. ITP Workshops

ITP Workshops will be general meetings of the SPP members, stakeholders and affected parties wherein SPP Staff will present portions of the ITP concepts, analysis and results.

Winter Workshop – January/February timeframe

- Discuss scope, techniques, concepts and tools to be used in the ITP Year 20 Assessment
- This workshop will be focused on educating the members about the upcoming study.

Spring Workshop – May/June timeframe

- Present and discuss proposed solutions during Project Congestion Analysis

Summer Workshop – August/September timeframe

- Discuss transmission plans and preliminary analysis results

Fall Workshop – October/November timeframe

- Discuss recommended transmission plan and final analysis results.