Eastern Plains Transmission Project

Comparative Analysis Summary Book

February 2007

Siting and Comparative Analysis

This document describes changes to the preliminary alternative corridors based on scoping comments, summarizes the comparative analysis for each route, and identifies proposed and alternative routes for each transmission line.

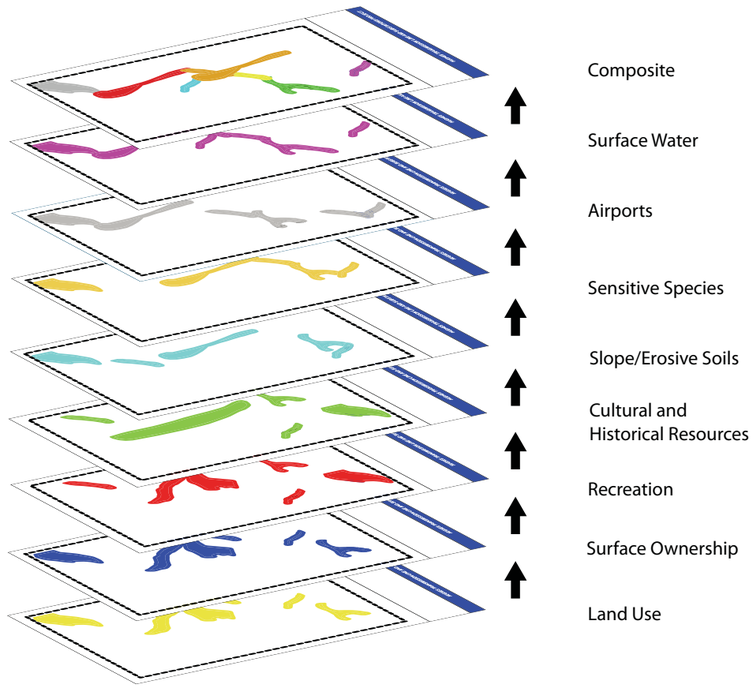
Definitions:

Study area – the broad area analyzed for routing opportunities for each transmission line.

Corridor – a swath within a study area evaluated for land uses and resources. Corridors often intersect and rarely represent unique routes. Corridors were 3 miles wide during preliminary planning and later were reduced to 1 mile for final planning. Each study area contains multiple corridors to maximize routing options.

Route – a path from one end of a proposed transmission line to the other. Routes are composed of several segments with their associated corridors. Every corridor contains one or more routes.

Segment – one part of a route, with its associated corridor. The start and end points of a segment are intersections (nodes) with other segments or the end points of one or more routes (at substations).



Summary of Results

The Eastern Plains Transmission Project would consist of 15 new high-voltage transmission lines connecting eight existing substations and four new substations across 17 counties in eastern Colorado and 10 counties in western Kansas.

Siting these transmission lines required integration of many factors from environmental concerns to engineering specifications.

As a starting point, Tri-State conducted a corridor study to add to its existing system planning studies. The corridor study identified areas for each proposed transmission line, as well as a set of preliminary corridors.

To validate the preliminary corridors and begin the process of identifying alternative routes for each transmission line, EDAW staff mapped opportunities and constraints across each study area using geographic information systems (GIS) data, as well as aerial and ground reconnaissance.

This process generated preliminary alternative corridors which were displayed to the public at scoping meetings in August and September 2006.

EDAW staff used comments generated during scoping to refine each segment of each transmission line. In some cases, new segments were created and other segments removed from consideration based on the scoping comments.

The refined individual segments were combined to create a set of alternative routes for each transmission line. As many as 42 alternative routes were developed for each transmission line.

The potential effects of each alternative route were assessed across 47 resource criteria in seven categories (listed on next page). EDAW staff compiled the results of this analysis in a set of comparative matrices (one for each transmission line). The comparative matrices allowed the characteristics of individual routes to be quantified and ranked.

Western used the results of the comparative analysis to aid identification of a proposed route for each transmission line, as well as preliminary identification of the best alternative routes to be carried forward into the EIS.

The proposed and alternative routes identified in this document are expected to change based on the results of the February 2007 public meetings and comments received during this period.

Comparative Analysis Criteria

Wildlife

- Length within big game (antelope, mule deer, white-tailed deer, elk) severe winter range, winter concentration areas, or production areas (miles)
- Length within turkey production or roosting areas (miles)
- Length within great blue heron nesting or roosting areas (miles)
- Length within bald eagle habitats (nesting, roosting, or winter concentration) (miles)
- Length within lesser and greater prairie chicken over all range or production areas (miles)
- Length within raptor (other than bald eagle) nest buffers (miles)

Water Resources

- Crossings of perennial streams, lakes, wetlands, riparian areas, seeps, springs (number)
- Length within floodplains (miles)
- River/perennial stream crossings (number)

Vegetation

- Length within untilled landscapes (miles)
- Length requiring removal of trees (miles)

Land Use

- Length in prime farmland, including prime farmland when irrigated (miles)
- Length in irrigated agriculture (miles)
- Length in dryland agriculture (miles)
- Length in rangeland (miles)
- Length following existing linear features (miles)
- Structures in (not at edge of) irrigated agriculture fields (number)
- Residences within 500 feet (number)
- Residences within 0.5-mile (number)
- Structures (including residences) to be acquired/relocated (number)
- Length within or adjacent to existing or planned subdivisions (miles)
- Landowners affected (number)
- Length within 5,000 feet of a private airport, 7,000 feet of a public airport (including DIA), or 12,000 feet of Pueblo airport (feet)
- Existing oil and gas wells within 200 feet (number)
- Existing communications towers within 200 feet (number)
- Length within conservation areas or easements, stewardship trust lands, recreation areas, wildlife areas, state parks, or other non-wilderness designated areas (miles)
- Length crossing state lands (other than designated areas considered above (miles)
- Length crossing BLM lands (miles)
- Length within 0.5-mile of town or municipal boundaries (miles)
- Length within 0.5-mile (foreground) of a designated scenic area or route

Cultural Resources

- Designated or eligible NRHP sites, landmarks, or monuments within ROW (number)

Geology and Soils

- Length crossing slopes greater than 15% (miles)
- Length within soil types characterized as highly erodible (wind) (miles)
- Length within soil types characterized as highly erodible (water) (miles)
- Length within soil types characterized as sandy (miles)
- Length within soil types characterized as having low reclamation potential (miles)
- Length within soil types characterized as having low reclamation potential (miles)

Engineering Criteria:

- Length (miles)
- Structures (number)
- Angle structures, total (number)
- Transmission line (115-kV or higher) crossings (number)
- Interstate, U.S., or state highway crossings (number)
- Railroad crossings (number)
- Length of new roads to be constructed (miles)
- Length of existing access (miles)
- Length of overland access (miles)

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Western Area Power Administration

Frequently Asked Questions

What is the matrix used for?
The comparative matrices allowed the characteristics of individual routes to be quantified and ranked. Western used the results of the comparative analysis to aid identification of a proposed route for each transmission line, as well as preliminary identification of the best alternative routes to be carried forward into the EIS.

Why are there more than one number one rankings?
Some routes tied numerically for 1st rank, but only one was chosen as the proposed route.

Why are there so many different alternative routes for the Rolling Hills to Burlington, Midway to Big Sandy, and the Big Sandy to Green Valley transmission lines?
There are several alternative routes for these corridors because of the different constraints that need to be avoided in these study areas. Extensive rural residential development is the primary concern in the Midway to Big Sandy and Big Sandy to Green Valley area. Conflict with agricultural operations is the primary concern in the Rolling Hills to Burlington area. In addition, having many alternative routes provides future flexibility in the face of rapidly changing land uses.

Why do some sections of the matrix have incomplete data?
Data do not exist for some of the criteria in some areas.

Are the criteria weighted? Does any one criteria count more than another?
No, the rankings are not weighted, although avoidance of homes and other effects to landowners was often used as an overriding factor in the event of a tied rank. Weighting criteria introduces a significant subjective factor into an objective process. Individuals often have different opinions on the weighting factors that should be assigned to criteria. Instead, we identify overriding factors that are used to break tied ranks, or in some cases, select proposed routes that are not as highly ranked.

How were the criteria chosen?
Criteria for a comparative analysis or opportunities and constraints analysis are identified for resources that are potentially affected by a project. The process begins with typical criteria, then the list is modified based on agency and stakeholder contacts, public comments, and the presence of unique or important resources in a study area. Availability of accurate data is also considered when identifying criteria.

When routes have tied for 1st rank, how do you determine the proposed?
The proposed route is identified based on a direct comparison of one or more criteria that have been identified as overriding factors, typically based on level of public and stakeholder comment. For the Eastern Plains Transmission Project, the number of residences close to a proposed transmission line is considered the most important overriding factor. Where this factor is equivalent between two alternative routes, other criteria are examined to choose a route that has the lowest overall effects to important resources.

What is meant by length of existing access? What is overland access?
Existing access is the length of centerline within 200 feet of an existing road. Overland access is the length of centerline more than 200 feet from an existing road, except where slope is greater than 15 percent.

How do you get the ranking numbers? What data are used to calculate these rankings?
Step 1: Determine the potential effects of each route for all criteria. GIS data are used to calculate the potential effects of each segment. Then, the effects of each segment that make up a route are added together to determine the potential effects of the routes.
Step 2: Rank the routes for individual criterion. For each criterion, the effects of each route are ranked. For most criteria, lower effects rank better (lower rank, with 1 being the best). For some criteria (e.g. length following existing linear features), higher effects rank better. This step provides a measure of the relative effects of each route on each individual criterion.
Step 3: Rank the routes against each other for each category. The ranks of each individual criterion in a category (e.g. Land Use) are added together. The resulting scores are then ranked between routes. This step provides a measure of the relative effects of each route on an entire category of criteria.
Step 4: Rank the routes against each other using the entire matrix. The ranks for each category are added together to create a composite score. The composite scores are then ranked among routes. This step provides a measure of the relative effects of each route for all criteria in all categories. The route with the lowest composite score is considered to have the least overall effect. The ranks derived in this step are used in combination with other factors to identify proposed and alternative routes.

What is meant by angle structures?
Angle structures are special towers (generally constructed of stronger materials and often larger structures) that are used where the transmission line turns.

What is meant by low reclamation potential of soils? What characteristics does this entail?
Low reclamation potential highlights soils where re-establishment of plant cover after disturbance may be difficult or require additional measures to ensure success. Problems with difficult reclamation can be caused by high salinity/alkalinity, poor water availability, texture (too much sand or clay), or other factors. Low reclamation potential is a composite of several different soil properties, including soil texture, electrical conductivity, exchangeable sodium, pH, available water, and saturation water.

What is meant by siting opportunities and constraints?
Opportunities describe conditions favorable for transmission line siting. For example, roadways provided an opportunity to co-locate a transmission line with existing rights-of-way and access. Constraints represent conditions unfavorable for transmission line siting. For example, concentrated residential areas limited the land available for transmission lines.

What is a stewardship trust land?
Stewardship trust lands (Colorado only) are specific state lands that have been designated based on outstanding natural resource or other values as important from a conservation perspective.

What do you do with the results?
Western used the results of the comparative analysis to aid identification of a proposed route for each transmission line, as well as preliminary identification of the best alternative routes to be carried forward into the EIS.

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