TABLE OF CONTENTS

2.0 PURPOSE AND NEED

2.1 TWE Project Objectives and Needs

TransWest's primary goal is to provide the transmission infrastructure and capacity necessary to reliably and cost-effectively transmit up to 3,000 megawatts (MW) of electric power from Wyoming to the Desert Southwest. TransWest's objectives for the Project are to:

- Allow consumers access to renewable energy sources and contribute to meeting national, regional, and state energy and environmental policies, including state-mandated renewable energy portfolio and greenhouse gas reduction targets;
- Meet increasing customer demand with improved electrical system reliability;
- Allow consumers access to domestic energy sources and contribute to complying with national energy policy;
- Provide system flexibility and increased access to the grid for third-party transmission users;
- Expand regional economic development through increased employment and enlargement of the property tax base; and
- Maintain the standard of living associated with highly reliable electricity service.

While meeting these broad objectives, TransWest would work within the following Project-specific objectives:

- Provide for the efficient, cost-effective, and economically feasible transmission of approximately 20,000 gigawatt hours per year (GWh/yr) of clean and sustainable electric energy from Wyoming to markets in the Desert Southwest region. This estimate is based on 8,760 hours per year of 3,000-MW transmission capacity.
- Meet NERC Reliability Standards and WECC planning criteria and line separation requirements.
- Maximize the use of designated federal utility corridors and existing access roads to the extent practicable to minimize adverse effects of the Project.
- Maximize co-location of the Project with existing linear infrastructure generally and, in particular, existing transmission infrastructure to the extent practicable to minimize adverse effects of the Project.
- Provide these benefits in a timely manner to the Desert Southwest region and the broader Western U.S. to meet the region's pressing environmental and energy needs. TransWest has identified a need for the Project by the expected in-service date of 2015 or as soon as the regulatory reviews can be completed.
- Provide for flexibility and maximize the use of infrastructure to increase future transmission capacity by configuring the Project to allow for future interconnection with the IPP transmission system near Delta, Utah.

2.2 NERC Standards and WECC Criteria

The Reliability Standards used within the electric utility industry for the bulk power electrical grid are developed by the NERC. The WECC develops Regional Criteria that supplement the NERC Standards. The West-Wide Energy Corridor (WWEC) Final Programmatic Environmental Impact Statement includes a comprehensive overview of this subject in Chapter 2, Section 2.6.3, *What Steps Are Being Taken To Ensure The Reliability of Bulk Electricity Transmission* (DOE et al. 2008). The overview includes a description of how NERC and WECC regulate the industry through a wide series of standards that address all facets of the bulk electricity transmission grid, including design, planning, operations, infrastructure and cyber security, communication, coordination and operational safety.

These reliability standards affect the technical aspects of the TWE Project in several ways. Reliability standards limit the operational capacity of any single transmission system element based on a complex contingency analysis that considers the impact to grid operations following various events (e.g., equipment failures, line outages).

Reliability standards affect the TWE Project ROW requirements and separation requirements from other high voltage lines. As a single transmission system element, the TWE Project is effectively limited in capacity to approximately 3,000 MW.

The contingency analysis required for new transmission projects such as the TWE Project involves examining several types of events including the loss of "Adjacent Transmission Circuits" and the loss of multiple transmission lines within a corridor.

WECC's Regional Criteria addresses separation distances based upon the location of a project from Adjacent Transmission Circuits. WECC requires a minimum separation distance between high voltage transmission lines. The WECC Regional Criteria specifies that to avoid being rated as Adjacent Transmission Circuits, or common transmission system elements, circuits must be separated by "at least 250 feet between the transmission circuits" (WECC 2012). The applicability of this portion of the Regional Criteria is for circuits greater than or equal to 300 kV. The loss of multiple lines within a corridor involves analyzing impacts after a line outage of the TWE Project transmission line and any other transmission line(s) within the corridor. The most likely event would be the loss of the TWE Project and an adjacent transmission line.

The likelihood of having a line outage of two transmission lines is even higher at places where transmission lines cross one another. The mechanical failure of the top line would typically cause the line below to also fail. The practicality of needing transmission lines to cross is recognized in the standards; however, the number of crossings needs to be minimized to reduce the likelihood of such an event.

Reliability analysis examining the scenario where multiple lines are lost including the TWE Project has shown this loss will have a significant impact on transmission grid performance, including local and widespread transmission grid blackouts. This reliability analysis has found that the higher the capacity of the line lost along with the TWE Project, the more severe the transmission grid performance consequences. The reliability analysis also demonstrated that it is not feasible for the TWE Project and another transmission project to use common structures for any portion of the route.

TransWest has developed minimum line separation requirements based on the "tower height" dimensions adopted by WECC in 2012. This tower height dimension takes into consideration both the height and width of typical transmission line structures and is meant to prevent a tower failure of one

line from impacting the adjacent line. Application of the NERC and WECC reliability standards and preliminary transmission system contingency analyses indicate that the proposed Project transmission line centerline should be optimally no closer than 250 feet from parallel transmission line centerlines rated 230 kV and above. The 250 foot separation criteria will allow for safe and reliable operation of the Project, as well as more efficient use of designated and existing utility corridors and will reduce the extent of the disturbance associated with access roads and other potential impacts caused by construction in a new transmission corridor.

2.3 Renewable Energy and Transmission

The TWE Project will provide the transmission infrastructure and capacity necessary to reliably and cost-effectively deliver approximately 20,000 GWh/yr of clean and sustainable electric power generated primarily from renewable wind energy resources in Wyoming to the Desert Southwest. Another major benefit of the TWE Project is to facilitate the states of the Desert Southwest in their ability to meet their renewable energy needs and Renewable Portfolio Standards.

Wind and solar have been cited in numerous studies as the most economic large scale resources that can be used to meet the Nation's demand for renewable and clean energy. However, developable solar and wind resources are typically found in remote areas located far from urban centers where the demand is the greatest. Thus, transmission infrastructure is required to enable renewable energy development that will meet both the demand for energy and environmental policy objectives.

In its July 2008 report entitled "20% Wind Energy by 2030, Increasing Wind Energy's Contribution to U.S. Electricity Supply" (DOE 2008), the DOE recognized the challenge of bringing wind energy to market. According to the DOE report:

> "If the considerable wind resources of the United States are to be utilized, a significant amount of new transmission will be required. Transmission must be recognized as a critical infrastructure element needed to enable regional delivery and trade of energy resources, much like the interstate highway system supports the nation's transportation needs…Significant expansion of the transmission grid will be required under any future electric industry scenario. Expanded transmission will increase reliability, reduce costly congestion and line losses, and supply access to low-cost remote resources, including renewables."

In discussing required improvements to the nation's transmission infrastructure necessary to achieve 20% wind energy by 2030, the DOE report concludes:

> "The 20% Wind Scenario would require widespread recognition that there is national interest in ensuring adequate transmission. Expanding the country's transmission infrastructure would support the reliability of the power system; enable open, fair, and competitive wholesale power markets; and grant owners and operators access to low-cost resources. Although built to enable access to wind energy, the new transmission infrastructure would also increase energy security, reduce GHG emissions, and enhance price stability through fuel diversity."

The electrical demand for the Desert Southwest region is also expected to increase over the next ten to twenty years. According to the U.S. Census Bureau, the western United States has experienced a population growth of approximately 10 percent from 2000 to 2006. The Bureau expects the growth in population to increase by 33 percent between 2006 and 2030. The Bureau's latest projection of population growth between 2000 and 2030 for the combined area of Arizona, California, and Nevada is nearly 50 percent (U.S. Census Bureau 2005). Arizona and Nevada were identified as the fastest growing states during this period (U.S. Census Bureau 2005a).

Population increase is a key driver in the projected increase in electrical demand, although it is not the only factor. The amount of electricity used per person is also expected to increase as the scope and expectation for the uses of electricity increases. The per capita increase is due to the continued electrification of day to day life, including the expanded deployment of air conditioning, computers, high-definition televisions, and potentially, electric powered automobiles. While this upward tendency on per capita electricity usage is countered by conservation efforts in the form of energy efficiency standards, utility programs, and individual responsibility, overall per capita electricity usage is still expected to increase (Global Environment Fund 2008). Therefore, even accounting for conservation programs, the electricity demand is expected to increase on the order of two percent per year in the Desert Southwest region (ICF International 2009).

The increase in overall forecasted electric demand in the Desert Southwest region will require the addition of 55,000 GWh/yr of renewable energy by 2020 to satisfy projected Renewable Portfolio Standards (RPS) requirements. Even with significant gains in energy efficiency and/or slower than expected growth, the need to access new renewable resources remains. For instance, if overall demand for electricity is 15 percent below the forecasted levels for 2020, the estimated requirements for additional renewable energy would only change from 55,000 GWh/yr to 45,000 GWh/yr (ICF International 2009).

2.3.1 Relevant State Laws and Regulations – Renewable Energy Resources and Standards

Arizona, California, Nevada, and Utah have adopted renewable energy standards, commonly referred to as RPS. These states have enacted legislation that requires utilities to meet a portion of the overall customer energy supply with renewable energy resources by specific dates. Each state has adopted programs that vary in the portion of overall renewable energy required, the deadlines, and the type of resources that can be utilized. Beyond the legislated RPS, California, which has a 20 percent renewable energy requirement by 2010, has recently adopted a policy to increase the requirement to 33 percent by 2020. A brief summary of each state's RPS requirements follows.

California. California's RPS was initially established by the State of California legislature in 2002. In 2011, the State of California legislature enacted [Senate Bill 2] that codified a 33% Renewable Portfolio Standard by 2020 that would apply to all utilities, including publicly-owned municipal utilities.

Arizona. In November 2006, the Arizona Corporation Commission (ACC) adopted final rules to expand the state's Renewable Energy Standard (RES) to 15% by 2025. In June 2007, the state attorney general certified the rule as constitutional, allowing the new rules to go forward and they took effect 60 days later. Investor-owned utilities serving retail customers in Arizona are subject to the standard.

Utilities subject to the RES must obtain renewable energy credits (RECs) from eligible renewable resources to meet 15% of their retail electric load by 2025 and thereafter. Of this percentage, 30% (i.e., 4.5% of total retail sales in 2025) must come from distributed renewable resources by 2012 and thereafter.

Nevada. Nevada established a RPS as part of its 1997 restructuring legislation. Under the standard, NV Energy (parent company of Nevada Power, Sierra Pacific Power, and Sierra Pacific Resources) must use eligible renewable energy resources to supply a minimum percentage of the total electricity it sells. In 2001, the state increased the minimum requirement by two percent every two years, culminating in a 15% requirement by 2013. The portfolio requirement has been subsequently revised,

most recently by Senate Bill (SB) 358 of 2009, which increased the requirement to 25% by 2025. In addition to solar, qualifying renewable energy resources include biomass, geothermal energy, wind, certain hydropower, and waste tires (using microwave reduction).

2.3.2 Greenhouse Gas Reduction Goals

In addition to RPS mandates, states and the federal government are also considering various Greenhouse Gas (GHG) reduction policies. Several western governors, including the governors of California, Arizona, and Utah, formed the Western Climate Action Initiative in 2007 to jointly reduce regional GHG levels. A regional goal has been established by the members of the Initiative and details of the economy-wide (e.g., electricity, transportation, industry) program is being developed. GHG reduction policies are also being considered at the federal level. This need for additional renewable energy could be greater depending on how GHG reduction is implemented by utilities (DOE 2008; ICF International 2009).

2.3.3 Wyoming's Abundant and Cost Effective Resources

According to the National Renewable Energy Lab (NREL), Wyoming has one of the densest concentrations of high class wind energy potential in the country (NREL 2006, 2008). NREL data shows that over 50 percent of the best quality (Class 6 and 7) wind capacity in the continental United States is located in Wyoming. This Class 6 and 7 wind resource has an energy potential of 235,000 GWh/yr. Wyoming's Class 4 and above wind resource has a potential of 944,000 GWh/yr. Wind and other energy developers have been very active in Wyoming.

The existing transmission capacity available to export electric energy from Wyoming is fully committed. These constraints led to the recommendations for transmission expansion along similar routes as the TWE Project from the Western Governors Association (WGA), the Rocky Mountain Area Transmission Study (2004), and the Clean and Diversified Energy Advisory Committee (WGA 2006). In addition to wind resources, Wyoming has a number of other natural energy resources that could also be developed for production of electricity and transmitted on the infrastructure to be constructed pursuant to the TWE Project to the growing markets in the Desert Southwest region. The WGA and DOE have identified over 14,000 MW of high quality developable wind resources within Wyoming (WGA and DOE 2009).

Two recent studies, one by the Western Electricity Industry Leaders, have looked specifically at regional renewable energy alternatives, including remote resources supplied through new transmission infrastructure, to meet the needs of the Desert Southwest region. Wyoming wind resources were identified as one of the most economic alternatives to meet a portion of the overall needs (NREL 2006, 2008). The TWE Project will cost effectively provide up to 20,000 GWh/yr of the estimated 55,000 GWh/yr need for renewable energy need in the Desert Southwest region.