Chapter 1 - Identifying Transmission Expansion Opportunities

A. The Cost of Doing Nothing

If the transmission system is not expanded, the most likely generation alternative to meet load growth is to increase reliance on gas-fired generation located near load centers. Dependence on gas-fired generation may subject electricity consumers to substantial price volatility and high prices and leave load serving entities (LSEs) and their customers with limited generation options in the event high, volatile natural gas prices continue in the future.

The analyses presented in this Report suggest that well-considered transmission upgrades, capable of giving LSEs greater access to lower cost generation and enhancing fuel diversity, are cost-effective for consumers under a variety of reasonable assumptions about natural gas prices. This is important because ultimately the capital and operating costs of transmission and generation investments will be recovered from ratepayers.

What is the most prudent strategy to pursue in planning for adequate resources? The RMATS process demonstrates that a do-nothing transmission planning strategy comes at a cost. For example, the all-gas reference case discussed below shows that, if the West were to continue to rely on natural gas as the fuel for future generation additions, west-wide capital and variable operating and maintenance costs in 2013 will be approximately $530 million per year higher than they would be if Recommendation 1 were implemented and nearly $1 billion higher than if one of the export scenarios in Recommendation 2 were also built. Higher natural gas prices would further widen these gaps.

Since existing integrated resource planning processes are most often focused on a single state or a single LSE, the benefits of cooperative regional generation and transmission planning is not being fully realized. The RMATS analyses suggest that long-term coordinated resource and transmission planning on a region-wide basis can identify lower-cost resource options for consumers.

B. Generic Benefits and Costs of Transmission Expansion

The benefits of investment in transmission expansion may include:

- Improved access for utilities to lower cost power.
- Increased ability of generators to diversify fuels used to serve their customers, which can help minimize fuel price risks and broaden access to renewable resources. Adding transmission and diversifying generation away from gas can reduced upward pressure on natural gas market prices.
- Greater liquidity and price competition in power markets, including mitigation of generator market power;
- Tax, revenue and other economic benefits to communities and states where development takes place; and
- Improved reliability and greater flexibility for maintenance and other operational purposes.

The cost of new transmission includes the capital cost of building the line, equipment, and other facility operating and maintenance costs over the life of the assets, environmental impacts from

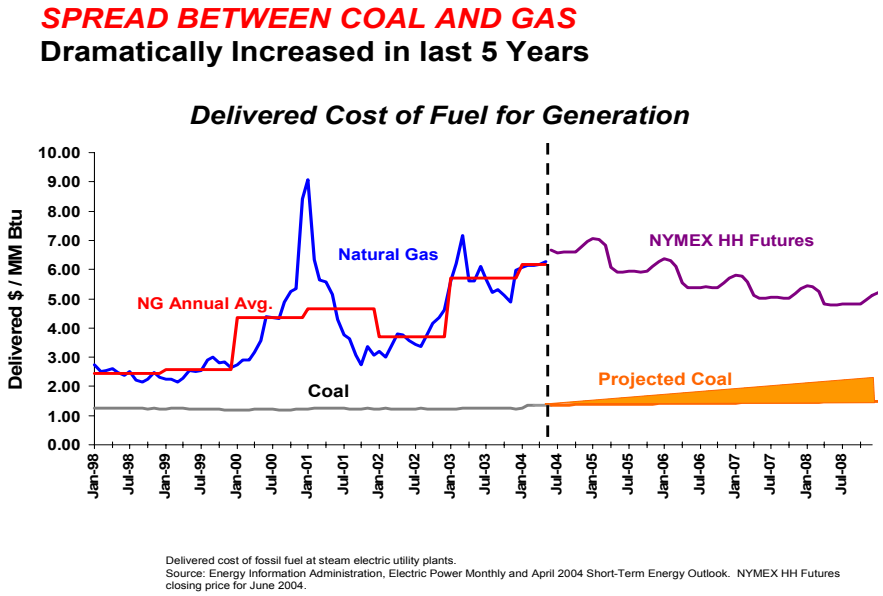
construction of lines, and changes in property values resulting from the location of lines. Although it is commonly assumed that property values decline in the vicinity of a transmission line, they could increase, particularly for industrial properties and wind farm sites benefiting from better access to transmission lines.

Discussion of Types of Benefits and Beneficiaries[1]

Lower Cost Generation: Benefits of accessing lower cost generation flow to utilities and their customers and to certain generators. Figure 1-1 shows the fuel price differentials between natural gas and coal. There is no fuel cost associated with wind generation.

Implementation of the RMATS recommendations would enable greater use of coal and wind resources and significant reductions in fuel costs and other variable operating and maintenance costs on a West-wide basis. This new access to lower cost generation can also reduce net revenues for some existing generators, whose higher cost generation may be displaced.

Figure 1- 1: Natural Gas and Coal Fuel Prices

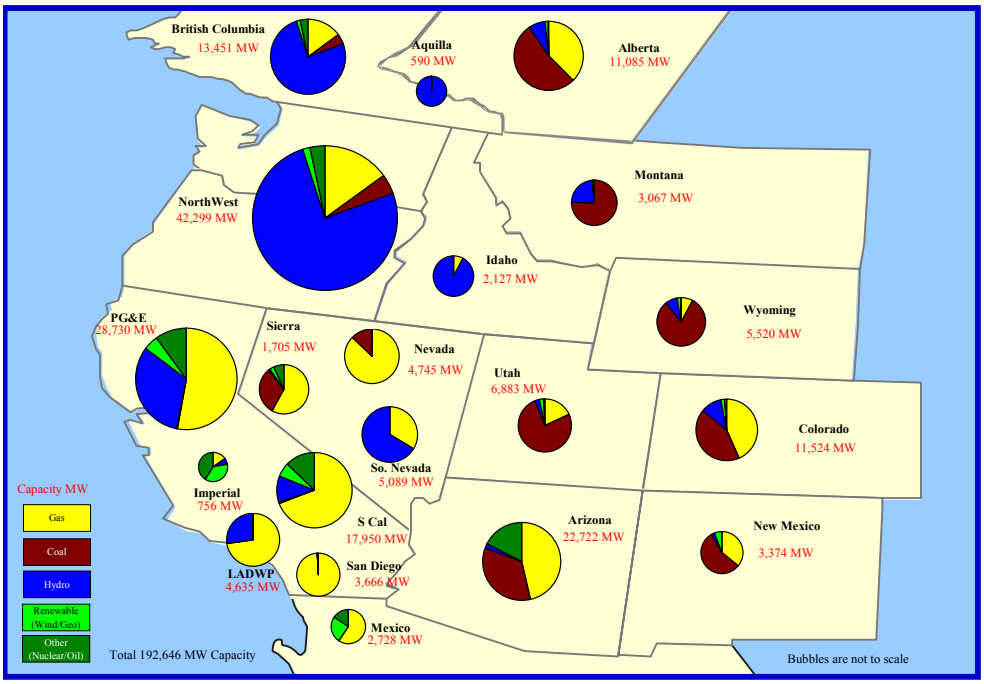


Delivered cost of fossil fuel at steam electric utility plants.
Source: Energy Information Administration, Electric Power Monthly and April 2004 Short-Term Energy Outlook. NYMEX HH Futures closing price for June 2004.

Fuel Diversity: Figure 1-2 shows the current generation mix in the Western Interconnection.

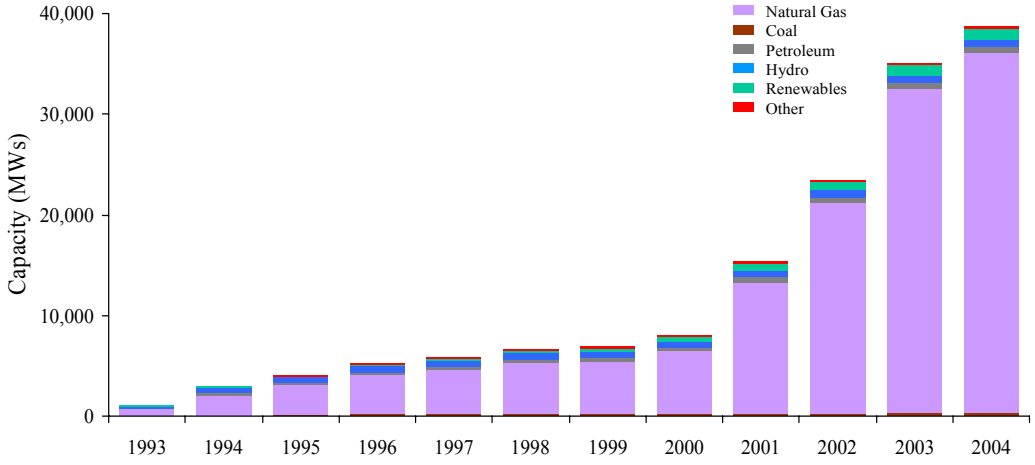
[1] Presumably under FERC Order 888, the benefit of owning transmission to block competitors having access to one's power markets has been eliminated. However, there still may be benefit to the integrated utility in owning the line since the utility will calculate and reserve Available Transmission Capacity on the line for future load growth, thereby providing an advantage over other users of the line.

Figure 1- 2: 2008 forecasted generating resource capacity in the Western Interconnection by fuel type



The interconnection is becoming increasingly dependent on gas-fired generation. Figure 1-3 shows the cumulative generating capacity additions by fuel type in the Western Interconnection over the last ten years. More than 90% of the interconnection is becoming increasingly dependent on gas-fired generation. As a result, natural gas sets the price of electricity in the Western states more than 70% of the time. Figure 1-3 shows that gas-fired generation is often the marginal fuel in the West.

Figure 1- 3: Gas-fired generation accounts for 92% of new capacity over the last 10 years



Western Interconnection Cumulative Generating Capacity Additions by Fuel Type (1993-2004)
Source: EEI

By diversifying fuels, generators can mitigate gas price risks[2]. Added transmission capacity acts as a "hedge" against the risk of upward swings in the forward price of power from natural gas and any other fuel source. The construction of new transmission permits customers to pay a known quantity now to diminish the risk later of high dependency on a single fuel source whose future price is vulnerable to fluctuations in regional and global market conditions.

Transmission expansion will also provide new access to renewable resources, helping to reduce fuel price risks, stabilize customer prices, and meet environmental policy objectives, including Renewable Portfolio Standards.

Fuel diversity benefits of new transmission investments can flow to utilities and their customers. The extent of benefits may depend on the value of reduced fuel prices and fuel price volatility to the generator, the incremental costs to utilities of alternatives for meeting Renewable Portfolio Standards, and environmental policy objectives. Further, limiting the demand for natural gas as a generator fuel may in turn limit upward pressure on gas prices in the wholesale market, including seasonal summer price pressure associated with air conditioning loads.

Enhanced Competition in Energy Markets: In concept, relieving congestion in energy markets will increase liquidity and make competition more robust. This may lead to lower and more stable prices, especially in short-term markets, and may help to mitigate the exercise of generator market power, creating benefits that flow to utilities and their customers within and outside the RMATS region.

Local and State Economic Development: Construction of new power plants provides economic development benefits in terms of jobs and increased tax revenues to the communities and states hosting the plants. Tax revenue benefits for states and localities include increased property taxes, additional franchise and other tax revenues, and increased state and local income taxes, along with secondary and tertiary induced and indirect economic benefits and resulting taxes flowing from the investments. Offsets include increases in utility rates due to higher revenue requirements.

Reliability: All new transmission investments must meet the goal of maintaining or improving reliability and must meet WECC reliability standards. New transmission investment can provide reliability benefits, reduce line losses, allow more efficient maintenance of the system, and enable the use of new technology to provide better information flows and control potential for existing lines, thereby giving system operators more tools to manage the transmission system and address unforeseen problems. New long distance lines may increase reliability beyond that required by WECC, particularly if they have capacity beyond that needed to meet expected loads. These reliability benefits may disappear over time if new flows consume excess transfer capacity. The economic value of reliability investments can be quantified by determining the value of a reduced likelihood of forced outages or diminished service, but are not part of this study.

Quantifying transmission investment benefits and identifying beneficiaries are challenges and matters of judgment. Where construction of a new transmission line is linked to the construction of

[2] The level of future natural gas prices and the volatility of gas prices represent a principle factor in the choice of future generating resources. Recent high prices and extreme price volatility have accentuated concerns about over-reliance on gas-fired generation to meet future electricity demand. Prices and price volatility may be mitigated should LNG be imported to North American on a large scale. Large scale LNG imports, however, raise other energy security issues.

specific power plants, there is greater ability to identify the benefits from fuel diversification and reduced costs to load serving entities. One can also identify the generators that benefit from the new line.

Where additional transmission investment is not linked to construction of specific power plants, it is more difficult to determine the extent to which additional investment will provide fuel diversity benefits and lower power costs to consumers since the types of generation built and the cost of power will be determined by market forces. It would also be more difficult to recover part of the investment from generators in advance of construction. If new lines are built and generators secure transmission service over the lines, revenues charged for use of the lines can offset construction costs.

Benefits of new transmission investment can accrue to:

- Load serving entities and their customers,
- New generators who can now reach markets,
- Existing generators who can reach new markets,
- Communities and states where development occurs, and
- All transmission system users where the transmission investment improves system-wide reliability.

C. Background and History of the RMATS Effort

The modern era in transmission planning in the Western Interconnection began in August 2001 with the release by the Western Governors' Association of a report entitled Conceptual Plans for Electricity Transmission in the West. The report, which was developed in the wake of an electricity crisis that affected prices and supply and held the West in its grip for many months, revealed that new transmission and generation infrastructure located remotely from population centers could produce benefits for consumers throughout the West. This investment strategy was shown to be an effective means of ensuring that growing electricity demands are met with a diverse portfolio of resource options, including renewables and coal, to keep the West from putting excessive dependence on new natural gas-fired generation. The study was conceptual and did not identify specific projects or undertake the detailed work necessary to establish financial viability, obtain approvals, or to site and construct transmission facilities.

In 2001, Western Governors asked the Seams Steering Group-Western Interconnection (SSG-WI) to develop an ongoing proactive transmission planning process for the interconnection. In 2003, SSG-WI released its first report on transmission needs on the west-wide interconnection. The report examined three bookend generation scenarios and necessary transmission. The SSG-WI study effort developed a public database to support transmission expansion analysis. Although the SSG-WI report refined the analysis in the WGA report, it did not provide sufficient detail to enable the development of specific transmission projects. Detailed sub-regional studies are therefore necessary to evaluate specific transmission proposals.

On August 22, 2003, Wyoming Governor Dave Freudenthal and Utah Governor Michael Leavitt announced the formation of the Rocky Mountain Area Transmission Study (RMATS). The Governors found that: "For many years, utilities and other entities have been reluctant to make investments in needed electric transmission infrastructure. This has been due to a number of factors, including protracted uncertainties in the regulatory environment and nascent regional

transmission organizations under development. As a consequence of this lack of transmission expansion, transmission congestion and bottlenecks are increasing. While this is a problem throughout the western interconnect, it is becoming an acute issue in areas of the Rocky Mountain sub region." The Governors directed that a charter be developed for the study that specified goals, principles and operating procedures. The study covers several western states including Colorado, Idaho, Montana, Utah and Wyoming.

In addition to the RMATS effort, there are three other sub-regional transmission planning processes under way in the Western interconnection. The Central Arizona Transmission Study (CATS) (now expanded to include New Mexico and parts of Colorado and Nevada and renamed the Southwest Area Transmission (SWAT) Planning Committee) was the first sub-regional transmission planning process. As a result of the CATS process, transmission projects were identified and at least one is under construction. The Southwest Transmission Expansion Plan (STEP) is examining transmission needs in the Arizona-Southern California-Southern Nevada region. STEP is using the same model and public database used in the SSG-WI process. Finally, the Northwest Transmission Advisory Committee (NTAC) is beginning an effort to examine transmission expansion needs in the Pacific Northwest region. There are also state-specific transmission planning efforts underway, such as the Montana Transmission Advisory Group (MTAG) which was created in March 2004 to bring together the stakeholders within Montana to address transmission issues, including exports from Montana, and to begin to develop action plans to overcome those obstacles.

In response to the directions of Governors Freudenthal and Leavitt, a white paper and draft charter were developed in preparation for the September 26, 2003, kickoff meeting of stakeholders in the RMATS process. Based on stakeholder input received at that meeting, the RMATS Steering Committee adopted a charter on October 14, 2003.

RMATS Charter (excerpts)

PART 1. Goals

a. Secure and commit the resources to the planning process needed to make it a success.
b. Identify technically, financially and environmentally viable generation projects with potential for development in the Rocky Mountain Region in the near future.
c. Identify necessary transmission infrastructure to support such development.
d. Evaluate needs, alternatives, costs and benefits of generation and transmission within the Rocky Mountain states.
e. Identify probable obstacles to the siting and construction of potential transmission projects.
f. Identify necessary financial and technical resources to enhance the successful development of needed transmission.
g. Develop necessary information to facilitate regulatory approvals of new transmission.

PART 2. Principles

a. Include all interested stakeholder individuals and groups in the Rocky Mountain Area Transmission Study.
b. Work together for effective solutions in a balanced, open and inclusive public process.
c. Conduct analysis of generation and transmission alternatives based on data, assumptions, and scenarios developed by participating stakeholders.

d. Consider every need, generation technology and location option that is appropriate for the Rocky Mountain States.
e. Evaluate all potential transmission alternatives within the Rocky Mountain region.
f. Identify the costs and benefits of generation and transmission options for serving electricity needs of consumers that make operational, economic, and environmental sense for the Rocky Mountain states.
g. Cooperate and coordinate with the region-wide SSG-WI planning effort and other regional planning efforts.
h. Cooperate and coordinate with WECC in order to ensure maintaining or improving system reliability.

PART 3. Operating Procedures

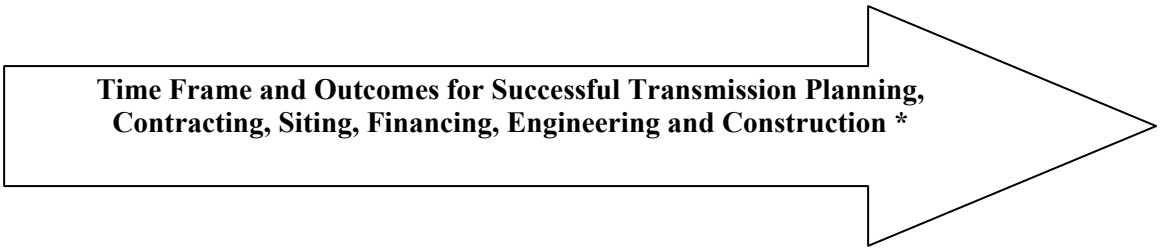
a. The Rocky Mountain Area Transmission Study (RMATS) will be informed and guided by the Enlibra Principles adopted by the Western Governors' Association.
b. The Study will be a front-end planning process that will evaluate needs, alternatives, costs and benefits of generation and transmission within the Rocky Mountain states.
c. The Study will be facilitated by an independent third party facilitator.
d. Three stakeholder meetings will be held to help develop and implement the Study.
e. A Steering Committee will be formed at the kick-off meeting to direct the Study and, as necessary, approve modeling assumptions.
f. Working Groups will be formed at the kick-off meeting to carry out the work of the planning process. Initial expectations are that a Resource Additions Workgroup, a Transmission Additions Workgroup, a Load Forecasting Workgroup and a Report Writing Workgroup will be established.
g. PacifiCorp will perform the technical studies based on assumptions and scenarios developed by participating stakeholders, and provide an in-kind contribution of resources to perform this work.

The planning initiative is the first step of a multiphase process necessary for successful transmission expansion in the Rocky Mountain region. In Phase I, representative generation is identified and specific transmission projects to support such generation are examined and analyzed. Phase I will produce:

- An in-depth understanding of the impacts on system-wide production costs of specific transmission investments in the Rocky Mountain states;
- An assessment of needed regulatory approvals and financial backing for the projects and identification of obstacles to moving forward; and,
- The foundation for future work on siting, obtaining regulatory approvals, contracting, financing, engineering and construction of projects where appropriate (i.e., Phases II and III).

Phase I is intended to provide enough information to interested stakeholders for their further analysis to determine if there is economic interest in pursuing project development. Phase II and Phase III will occur as project sponsors decide to move forward with projects. Figure 1-4 below illustrates the basic elements of the process.

Figure 1- 4: Phases of RMATS Work



Phase I – Planning and Project(s) Definition	**Phase II – Regulatory Approvals, Contracting, Siting, and Financing**	**Phase III – Engineering and Construction**
Time Frame: September 2003 – September 2004	**Time Frame:** To be determined by Project Sponsors	**Time Frame:** To be determined by Project Sponsors
Outcomes: • Specific transmission projects are defined to support resource additions as proposed, including renewables and thermal plants • Impacts of transmission and generation additions are derived, including: generation capacity utilization; path loading duration curves; congestion and power flow implications; and where and how consumers benefit • Indications of interest in subscribing to and financial support for specific projects • Identification of any barriers to project advancement • Development of information necessary to pursue regulatory approvals • Study results incorporated in West-wide transmission studies, including SSG-WI	**Outcomes:** • Siting and permitting of specific selected transmission and generation projects • Where appropriate, sponsoring Governors initiate the State/Federal siting protocol collaboration • Subscription, contracting and financial arrangements put in place on specific projects • Barriers to project advancement are removed, where possible, including Governors' initiative, if necessary	**Outcomes:** • Engineering design and construction of selected projects, subsequent to successful siting, approval and permitting, and removal of any identified obstacles

- Emphasis shifts from the RMATS Planning Effort to project developers when reading from left to right across the Table.

The RMATS Process

An open stakeholder process is the guiding element of the RMATS effort. The September 26, 2003 kickoff meeting was attended by over 150 stakeholders. As a result of this meeting, four working groups (a Load Forecasting Work Group (LFWG), Resource Additions Work Group (RAWG), Transmission Additions Work Group (TAWG), Report Writing Work Group (RWWG)), two work teams (the Cost Allocation and Cost Recovery Team (CACRT) and a Modeling Team), and a Steering Committee were established. Stakeholders populated the working groups and Steering Committee, and PacifiCorp assembled the Modeling Team. As work proceeded, a Regulatory and Operational issues Work Group was created to address transmission reforms that would enable greater use of the transmission system by wind generation. New work group and team members were accepted freely as persons expressed interest in the RMATS process.

The Work Groups and Steering Committee met frequently in conference calls and in person; and all meetings were open to interested parties. Written summaries of the Steering Committee meetings were prepared and have been posted on the RMATS website at http://psc.state.wy.us/htdocs/subregional/steering.htm.

Figure 1-5 shows the chronology of the RMATS Phase I study effort.

Figure 1- 5: Chronology of RMATS Phase I Activities

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Stakeholder meetings													
Steering Committee													
LFWG													
RAWG													
TAWG													
RWWG													
CACRT													

The principal effort of the RMATS work groups and Steering Committee for most of this period focused on the modeling endeavor described in the following chapter.