

WORKSHOP ON DESIGNATION OF NATIONAL INTEREST ELECTRIC TRANSMISSION BOTTLENECKS

July 14, 2004 • Salt Lake City, Utah

DRAFT PROCEEDINGS



“Transmission bottlenecks affect national interests by increasing the cost of electricity to consumers and the risk of transmission system reliability problems in various regions throughout the United States. Relieving transmission bottlenecks is a regional issue. DOE will work in partnership with FERC, States, regions, and local communities to designate significant bottlenecks and take actions to ensure that they are addressed.”

National Transmission Grid Study, May 2002



EXECUTIVE SUMMARY

In May 2002 the *National Transmission Grid Study* recommended that the U.S. Department of Energy (DOE) "...determine how to identify and designate transmission bottlenecks that significantly impact national interests." In September 2002, the Secretary of Energy's Electricity Advisory Board said national interest bottlenecks are those that:

- Jeopardize national security; or
- Cause widespread harm to the grid; or
- Create a risk of significantly higher rates or other costs for consumers.

On July 14, 2004, DOE sponsored a "*Workshop on the Designation of National Interest Electric Transmission Bottlenecks (NIETBs)*" in Salt Lake City, Utah. More than 100 people – representing state public utility commissions, regional electricity organizations, federal power marketing administrations, electric power companies, and electric industry trade associations – participated in a series of panel presentations and discussions to address general issues, problems, and concerns associated with national interest bottlenecks, and offer ideas about criteria, methods, and data for DOE to consider in designing a NIETB process.¹ Specifically, four main topics were covered:

- Criteria for identifying potential NIETBs and the design of an NIETB process that would add value to existing transmission planning and approval processes;
- Types and availability of information needed to support such a process;
- Approaches for ensuring that the process serves regional and state needs; and
- Suggestions for next steps and appropriate roles for DOE.

The Department plans to draw upon the results of the discussions - as well as public comments to be provided in response to a notice recently published in the Federal Register² - in developing NIETB plans and

¹ Copies of the agenda, presentations, and the list of participants can be downloaded from www.electricity.doe.gov/bottlenecks. The agenda and list of participants are also provided in Appendices A and B, respectively.

² See Federal Register Volume 69, Number 140, Page 43833, Thursday July 22, 2004. Comments are due by 5 pm EDT September 20, 2004. A copy of the notice can be downloaded from www.electricity.doe.gov/documents/nietb_fnoi.pdf

strategies. A summary of themes, issues, and suggestions from the July 14th meeting is provided below. Other materials related to NIETB are posted on www.electricity.doe.gov/bottlenecks. The Department welcomes public review and comment on any and all of the materials related to NIETB.

THEMES FROM THE DISCUSSION

- Due to a variety of factors, America's electric transmission system is becoming increasingly congested. While solutions are generally available that would remedy transmission congestion, institutional, financial, and market barriers often interfere with implementation of them. Additional efforts are needed by local, state, regional, and national officials to coordinate electric system planning and operations, particularly when there is a need to site and construct new electric transmission facilities.
- Transmission planning and operations is extremely complex. Many considerations need to be accounted for in identifying transmission bottlenecks and deciding what to do about them. Technical issues involve modeling power flows on the grid and determining transmission requirements to balance generation capacity and load growth. Financial issues involve economic analysis of costs and benefits for raising capital and ensuring cost recovery. Regulatory issues involve determining shared responsibilities for oversight and the protection of public and private interests. All of these issues need to be addressed properly for transmission projects to proceed in a timely and cost-effective manner.
- Awareness is rising among the Nation's electric system planners and operators about the existence or potential for bottlenecks on the electric transmission system. Data collection and modeling of local and regional conditions on the grid is underway by the North American Electric Reliability Council, Independent System Operators, Regional Transmission Organizations, Power Marketing Administrations, and others to assess loads and resources and identify areas of grid congestion and possible remedies. These activities could benefit from greater inter-regional coordination, including efforts to standardize and integrate data, models, and assumptions.

MAJOR ISSUES IDENTIFIED

- At what point do congested electric transmission lines or corridors “significantly impact national interests”? Data and criteria need to be clearly defined. For example, the magnitude of the additional economic costs to consumers induced by the transmission bottleneck is an important criterion. Another is the nature of the affected loads, including facilities that are used for national security, or public health and safety. Still other important criteria are the geographic extent and economic impacts of potential outages, and whether multi-state regions could be affected. The more subjective the criteria, however, the more difficult it would become to ensure the credibility and transparency of the NIETB selection process
- What is the appropriate level of “transparency” for the data and process used for identifying electric transmission bottlenecks? Because there are so many stakeholders and affected parties, the planning and siting of transmission facilities is usually a public process. Achieving general agreement among the stakeholders is often a prerequisite for moving forward. State and federal laws typically require notice and comment proceedings, with emphasis on public input and community awareness activities. However, with increasing concerns about the protection of critical infrastructure and homeland security, publicizing the specific location of significant bottlenecks or related facilities may not be desirable. Also, in certain cases it may be necessary to limit public access to protect the proprietary interests of transmission companies, enable the proper functioning of competitive markets, and facilitate developers’ access to capital markets for project funding.
- What are the most appropriate role(s) for DOE in facilitating identification and solution of NIETBs? Are there ways to proceed that would add value to local, state, and regional activities? For example, many observers believe that coordination needs to be improved among the several federal government agencies involved in electric transmission issues. The Federal Energy Regulatory Commission oversees multi-state organizations and wholesale power transactions. The federal Power Marketing Administrations (e.g., Bonneville Power Administration and Western Area Power Administration) own and operate thousands of miles of transmission lines. Federal land management agencies affect the development and maintenance of transmission projects through their land-use planning policies and processes.

SUGGESTIONS TO DOE

- **First: Do no harm.** By becoming more aware of existing planning, analysis, and modeling activities, DOE can properly focus on activities to fill gaps, augment, integrate, and add value. Standard metrics for transmission congestion that account for both reliability and economics are critical. Better methods for quantifying congestion costs would be helpful.
- **One size doesn't fit all.** Each region is different and faces an assortment of electric system configurations, resource endowments, cost structures, demand conditions, and reliability issues. The NIETB process should be flexible and capable of adapting to changing needs and circumstances.
- **Keep it simple.** Electric transmission is an extremely complex topic. Data, analysis, and modeling involve sophisticated engineering and economic concepts that are often difficult for the non-specialist. NIETB metrics, criteria, and process design should be as simple and straightforward as possible.

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INTRODUCTION

A U.S. Department of Energy-sponsored workshop on the Designation of National Interest Electric Transmission Bottlenecks (NIETBs) was held on July 14, 2004, immediately following the conclusion of the 2004 National Association of Regulatory Utility Commissioners (NARUC) Summer Committee Meetings in Salt Lake City, Utah. The workshop was free-of-charge and open to the public.

The Department sought public input on implementing the recommendation from the *National Transmission Grid Study* that DOE “determine how to identify and designate transmission bottlenecks that significantly impact national interests.” The purpose of the workshop was to learn what stakeholders believe to be the major issues associated with the designation of NIETBs, and how they believe the NIETB process should be designed to maximize its benefits to the users of the grid and to electricity consumers. The meeting was also intended to raise awareness about NIETBs and identify potential roles for DOE in identifying and mitigating them. Another purpose of the meeting was to obtain a better understanding of the types and availability of data that will be needed to identify NIETBs and obtain suggestions about criteria/methods to consider in identifying NIETBs.

David Meyer, Senior Advisor in the Office of Electric Transmission and Distribution at DOE, provided a welcome and introduction, summarized below:

- We are following up on a recommendation in the May 2002 *National Transmission Grid Study* that DOE identify critical national interest bottlenecks and aid in mitigating them.
- I don’t have to tell you that blackouts are very expensive. I also don’t need to spend much time on how the power delivery structure is aging.
- We want to begin a dialogue on how to shape an NIETB process to make it add value to existing transmission planning processes and transmission siting processes. Doing that will require some essential information, so we need to identify those data needs and ascertain the availability of that data and information.
- ‘What is the definition of a NIETB?’ is difficult to answer at this point and one of the things that we hope to get out of this discussion.

- We will be issuing a description of a process in the *Federal Register* and inviting comments. It will be a 60-day comment period; it is not a formal rulemaking.
- Beyond this workshop, the proceedings will be on our website (www.electricity.doe.gov/bottlenecks) by mid-August. The *Federal Register* comments will be due about the middle of September. Then we will put a summary of all comments received on the website for public review and comment.
- Thank you; I look forward to hearing your views.

The meeting was not intended to serve as a venue to determine the locations of specific transmission constraints on the system today. NIETBs were not ranked, identified, or selected at the meeting, and no decision was made about how DOE will proceed in identifying them. Specific solutions to known transmission bottlenecks were not discussed, and implementation of proposed Federal energy legislation containing “backstop” siting authority for the Federal Energy Regulatory Commission was not discussed.

A series of panelists provided input on the following three topics:

- Shaping the NIETB Process to Add Value
- Information Needed for NIETB Identification and Possible Sources
- Adapting the NIETB Process to Serve Regional Needs

All participants were provided an opportunity to provide suggestions and comments. The following chapters contain summaries of input received from the presenters and the participants.

DISCUSSION SUMMARY OF PANEL 1 — SHAPING THE NIETB PROCESS TO ADD VALUE

The following focus questions directed the first panel entitled “Shaping the NIETB Process to Add Value”:

- *What suggestions do you have for criteria/methods for the U.S. DOE to use in identifying NIETBs?*
- *How can the NIETB process add value to existing transmission planning and approval processes?*

The following is a compilation of key points from the presenters³ and the participants.

- **Scope** is one criterion that should be used in establishing which reliability bottlenecks may be of national interest. When a large portion of the system goes down, it has a tremendous impact on the economy, making it of national interest.
- **The nature of the load served** should be considered. Like industries tend to locate in the same geographical areas for various economic reasons. A transmission outage that impacts an entire segment of the industry could be a criterion that would be used for designation of a national interest bottleneck.
- **How do you define a reliability bottleneck?** Is there one entity out there that can identify reliability bottlenecks of national interest? Does anyone have a large enough field of vision to do that? Does sufficient knowledge exist right now for an entity to do that? Can economic bottlenecks point us toward reliability bottlenecks?
- Following the blackout in August 2003, NERC provided recommendations to address the coordination problems in the industry today, calling for enhancement for interregional assessments, improving coordination and efficiency. There are a lot of studies out there; at least a dozen interregional studies alone. We need fewer organizations to do more-coordinated studies. **DOE could help by analyzing the results of the regional and interregional studies and**

³ See agenda in Appendix A for details on presenters.

using the criteria to try to establish what the national interest reliability bottlenecks are.

- The studies required to do transmission planning and operations planning are very complex. A lot of data is required; a lot of the methods are still evolving particularly in the area of economics. In published reports of estimates of transmission congestion costs, annual estimates are wide-ranging. There are very different and legitimate purposes for which congestion costs are being calculated. **It would be useful to have more standardization about the way in which congestion costs are reported and measured.**
- Market monitors across the country are collecting reams of data and developing a variety of ways of trying to look at how relieving transmission constraints may increase the competitiveness of the market. This is a developing science and one in which a lot of important work remains to be done. **There is no “one size fits all” or any single solution.**
- **The economics rests on the ability of the reliability rules to allow the market to function.** Relieving the particular reliability limits, in effect, allows the transfers to increase but it is only an increase until you reach the next limit. It is not an unlimited expansion. Limits mean that you cannot ensure delivery; you will have to curtail transactions that you would otherwise like to see take place, and that’s where these economic impacts results.
- In the transmission siting process, **it is critical that information be exchanged among all the people that need it.** System data is one category of information needed. You have to not only know what is going on in your system, but in the systems around you.
- The data that we need for planning focuses on what customers are going to do. Generation changes are important, as are the effects of markets. **The rules of the road—the planning rules—compensate for market uncertainties, but they are not perfect.**
- **Demand resources aid in managing uncertainty** because you can focus some demand resources on areas where there is significant growth or other needs and address some significant potential variabilities in demand by targeting resources to dampen that effect.
- **Communities’ inputs are an important element in transmission planning.** If a developer is unaware of the community’s views as it goes into a transmission project, it is certainly operating at severe

disadvantage. Another category of information that is important: the alternatives to a transmission project. What was tried or considered? Did we try everything that we could to avoid new transmission lines? It is also helpful for states to have the capacity to do independent planning.

- **Enabling non-transmission solutions is important.** In many cases it is hard for distributed generation to actively participate in a marketplace because of regulatory barriers. This is an example of where states might want to consider enabling some of the non-transmission solutions that would help make sure that everything has been covered.
- Federal responsibilities are also important. In the part of the country where Federal lands are an enormous part of the transmission siting project process, **fully engaging the Federal land managers is critical to effective siting.**
- Regional system processes are very useful in highlighting regional needs. There is a lot of data, but processing it and coordinating it is not always done consistently or effectively. **Regional state committees and multi-state entities can be very useful in applying public policy** that is important to inform individual state commissions about the important aspects of transmission siting proposals.
- In the name of homeland security, a lot of information related to transmission siting has been withdrawn from the public domain. Some additional consideration might be needed. **It would be very helpful if the information that can help the states, the public, and the stakeholders deal with transmission siting be made more available to the public.**
- **Planning consistently and continuously with transparency is very important,** as well as communicating all the time with the right people. There should be no surprises.
- Where does DOE plan to go on the **continuum between economic and reliability bottlenecks?**
- An encouragement to DOE: **Do this NIETB designation carefully and in conjunction with FERC.**
- How do you distinguish between a **project of local importance and one of national importance?** Whether it is reliability or economic...where do you draw the line?

- If regional groups are already collecting data and solving problems and addressing needs and issues and coming up with resolutions on a regional level (whether it is within an RTO or a multi-jurisdictional utility), **when does it become a Federal government issue** such that we have to fear a Federal government solution versus us figuring it out on our own?
- **Close coordination with FERC is very important** because I don't know what your solution would be once you identify a bottleneck, but I am concerned about potential distortion of the markets. We are desperately trying to develop markets that will send the appropriate price signals to the transmission-owning companies, generators, and demand responders, and for an outside entity to come in and potentially interfere with the market we are developing would be very troublesome at this point.
- When DOE thinks about the economic impacts, they should note that it is more than just the cost of power. **The value of lost load is one of the criteria that DOE should look at.** When power is not reliable, there is a GNP impact as a result of power outages. The studies from a number of years ago indicated that the value of power was on the order of 80 or 100 or even 120 times as much as people are paying for power, and it has probably increased in recent years. As part of the assessment of whether something is a bottleneck, the issue of what the economic benefit would be of reducing outages should be factored into the assessment.
- If the Federal government is really concerned about security, **designating something as a "national interest" energy transmission project may be foolish** because it would draw a big target on it.
- In the west, there are six or seven different groups doing regional transmission planning. These groups are already coordinating. I wonder and question why DOE would want to get into the middle of interrupting those processes? These are open processes and everyone is looking for the same thing: how can we best analyze the transmission system in a particular region and how can we get the biggest "bang for the buck" in making improvements or having new projects in that region. **How do you think DOE can add value to that process when these are stakeholder processes?** I don't think DOE can add value. These are stakeholder processes. Taking over those processes would not be a good idea.

- DOE might want to think about **looking at some of the international connections** that we have. Perhaps getting the right people together would be of some assistance.
- DOE should **give the regions time to work on the interregional planning**. Though the process is just beginning, DOE should be encouraged to let it proceed for a while before jumping in and designating national interest bottlenecks.
- The word that comes to mind when I think about DOE's role in NIETB is 'catalyst.' People want the regional processes to have the chance to work (whether they are through an RTO, ISO, or other process). Ongoing activities need to be allowed to work, but **maybe DOE could plan a future workshop and bring in a representative from each one of the regions**. That might be one way to get a clear picture and see where the overlaps might be.
- Once you get through determining criteria, it begs the question of what next? How can DOE add value to the existing process? **A cost share with a Federal entity, a group of utilities, or an independent transmission company as an incentive to build to eliminate some of the bottlenecks** is one possibility. MISO is looking at cost allocation right now for some of their regional expansion criteria and benefits. Cost is one of the big issues and state commissions are worried about their ratepayers having to bear additional costs. Cost sharing is certainly one of the benefits and value-added that DOE could bring to the table (though it could take legislation or cost allocation from Congress to do this effectively).
- On criteria and method that DOE could use: **Locational marginal pricing should be an input into your evaluation process**.
- DOE can add value to the existing planning process by piggybacking on existing efforts. We could use leadership. **We could use DOE's involvement directly in the siting process**. DOE could serve as a source of impartial analysis in the siting process...to get involved in the siting process, siting proceedings and other public service commission proceedings. DOE could come in and say 'this is our analysis of this particular bottleneck or this particular project, and we think it might help.'
- **DOE could help improve the analytic tools that are used in transmission planning today**. The POEMS Model is a primitive tool, and even the tools that are being used by the sub-regional planning efforts in the

west are not very robust. We need some help in developing better tools that address issues such as how wind is integrated into the system, how the hydro system operates, what the role of transmission in mitigating market power is.

- **DOE could continue helping with the development and deployment of new transmission technologies.** Use of these technologies is not addressed very well yet in the transmission planning processes currently used in the west. DOE needs to participate in these planning processes to ensure that new technologies are considered.
- A large amount of land in the west is owned by the Federal government, so the **Bureau of Land Management and U.S. Forest Service** need to be active participants in these transmission planning efforts because any extensive new line will cross large amounts of public land.
- **DOE should encourage the Bonneville Power Administration and the Western Area Power Administration to continue to be active participants in transmission planning.**
- On measuring congestion costs: uplift charges, congestion revenue, and system redispatch; is **DOE** heading towards a position on one of these three?

DISCUSSION SUMMARY OF PANEL 2 — INFORMATION NEEDED FOR NIETB IDENTIFICATION AND POSSIBLE SOURCES

The following focus question directed the first panel entitled “Information Needed for NIETB Identification and Possible Sources”:

- *What type of information is needed to designate NIETBs and what is its availability to the U.S. DOE?*

The following is a compilation of key points from the presenters and the participants.

- The NERC Resource and Transmission Adequacy Taskforce (RTATF) recently made eight transmission-related recommendations, four of which could be relevant to this DOE effort. The first of those is recommendation number four, which states that NERC—in conjunction with the region—should periodically sponsor conferences or workshops to provide a forum for sharing planning practices and procedures. **Such NERC forums might be scheduled in conjunction with DOE and NIETB workshops** in order to provide a tutorial background that enhances the participant’s understanding of the issues.
- RTATF recommendation number five calls for NERC to review current inter-regional assessments and, as required, make recommendations to the regions to enhance those assessments and improve coordination and efficiency. Implementation of this recommendation may require the development of a NERC standard. **Any enhancements to the assessment process and scope could take into consideration the needs of the NIETB process.**
- RTATF recommendation number six would require NERC to develop assessment practices and reporting processes to verify that resources identified by load serving entities to meet resource adequacy requirements are simultaneously deliverable to the LSEs’ loads. This addresses the needed linkage between generation and transmission.

- The last NIETB-related RTATF recommendation calls for NERC and the regions to encourage greater regulatory and stakeholder participation throughout the transmission planning and assessment processes, to help ensure informed facility siting and transmission adequacy decisions. **Such broader stakeholder participation would also enhance any NIETB-related processes.**
- **Several data sources to aid in the identification of NIETBs exist.** Seasonal assessments (which can identify potential bottlenecks) are performed by all NERC regions and most of the ISOs and RTOs. Many of these groups also take a longer-term view performing assessments in the five-year planning horizon. In the Eastern Interconnection, which encompasses eight regions, inter-regional assessments are performed to supplement the regional studies.
- **The basic data available to show the existence of bottleneck includes statistics on security-constrained lines.** Probably the most well-known are the NERC transmission loading relief (TLR) data. Data on power flows over major lines (showing how heavily the lines are loaded relative to their security limits) are also available.
- **Model simulations** can be used to determine where a bottleneck exists. A model simulation is where you have a model of the electrical grid and you make assumptions about future demand and the availability of equipment. You then use simulations to try to anticipate where you would run into real problems meeting demand because of problems/constraints in the transmission system.
- **Market data** can be used to determine bottlenecks. One kind of data that is important is wholesale price differences in adjoining areas. Presumably, if there is plenty of cheap transmission, these prices should be equalized out over time. If there is not, then there should be a price difference and that difference can indicate that maybe there is a problem in transmission (however, it could also indicate a variety of other issues). Probably the most sophisticated of these market-based measures are the congestion revenue measures that the ISOs are using.
- **Issues with market data** include the fact that wholesale spot market prices differences can be very informative, but they are really only available at the ISOs. Another problem is that the differences in wholesale prices (even within ISOs) can reflect more than just bottlenecks.

- **Issues with the TLR** include the fact that the TLR essentially says ‘when this line or piece of equipment gets to this level, we have to cut back how much is being generated.’ However, that could be the result of a fundamental constraint, a physical constraint, or it could be a result of the operator’s inability to schedule properly.
- **The size and value of the displacements are generally not available;** NERC knows the size of the displacements and how much the curtailments were, but the values of those curtailments are not clear. The least valuable generation is not necessarily cut back first; there is no value assigned to the order of cutbacks.
- **The problem with security-limited lines is the loads are often transitory;** they respond to market forces in a big way. You may have a really congested point for a short time and that may not be a good basis for going out and searching for the bottleneck. Another issue is whether the security limits themselves are appropriate.
- Another problem is that **line statistics data are either held by NERC or are proprietary.** There is no Federal database that is available for planners or members of the informed public to look at and draw their own conclusions.
- Issues with simulations: Many models could be substantially improved by simply **verifying and updating the data.** The set of assumptions used raises other issues, especially the economic assumptions.
- The POEMS model (used by DOE in the national grid study) is a “pipeline” model. Many engineers are not convinced that it is realistic descriptor of power flows in the country. **“Pipeline” models are difficult to defend.**
- **Assumptions about competition/lack of competition in the models make a big difference.** If you don’t have a competitive industry, then it becomes necessary to deal with administrative charges, administrative rules and what pricing is really going on in the industry, which will make a big difference in simulation. Also, defining the baseline is critical.
- The models require good representations of the grid and contain a lot of information and can be used to show where the grid is vulnerable to physical assault. **Making such information visible could cause national security weaknesses.**

- **The measures we currently have and the data for implementing those measures all have some utility.** None of them—even with ideal data—will identify the appropriate fix. That takes a lot of analysis and real thought on the part of the systems planners and perhaps entrepreneurs who want to come into the system.
- **The value of actually relieving the bottlenecks is critical to your management strategy.** The one very powerful thing about congestion revenue statistics is that they do take that into account and it gives you at least a starting point for sizing your efforts to remove these bottlenecks.
- Transmission planning in the western interconnect is coordinated by the Seams Steering Group Western Interconnect (SSGWI). SSGWI performed a near-term evaluation and looked at the existing and committed transmission and generation that is likely to be on-line by 2008. They used a modeling technique with a dispatch model and looked at where power would flow if there were no transmission constraints. This was the technique used to identify these key corridors. The SSGWI study found that about \$100M per year in unrealized production cost savings is due to existing path congestion. **The bottom line of this SSGWI report was that if we had a west-wide RTO and a capability to make investments of this magnitude, a coal and/or wind scenario is actually lower cost than a heavy reliance on natural gas.**
- The question that I have for DOE is 'what criteria would you use to define what is in national interest' in terms of whether these economic corridors are important to the nation or not. If there is general comfort with the strategy of continuing to rely on natural gas predominately located close to load, so that you don't need transmission, then these pathways are probably not strategic of the national interest. But if there is concern with that and an interest in a more diverse portfolio of generation including low-cost coal and wind, then these corridors probably have some national strategic interest.
- The west has moved now to sub-regional planning and there a number of these organizations are underway underneath the SSGWI umbrella. **The SSGWI database was developed in a collaborative process, public, open process; it can be made available to DOE.** There's work underway now to look at schedule and OASIS limitation reservations because actual flow loadings do not necessarily indicate the total limitations of a path. For the 2013 forecast case, a lot of input data and assumptions are necessary for modeling purposes.

- The dilemma that is faced in trying to identify a national-interest bottleneck is 'when does a problem at a local level justify consideration as a regional problem?' I don't have that answer today. **The real issue is 'how much information do you need, and from what bodies of studies, to make those kinds of determinations?'**
- PJM has recently spent a lot of time on economic congestion issues and found that you can generate massive amounts of information very quickly. Within control areas, there's a lot of coordinated work that pulls together how markets behave, how operations are performed within the control area, and how the planning process looks as the issues that arise, identifies when problems exist, and how you are going to identify that a solution is necessary and economically-justified. We have well over 100 control areas in the U.S. and if you look just at the PJM area, there are a lot of interfaces. We may do a good job within our control area of identifying issues, but when you go to the borders, **how do you know you are doing a good job of identifying the reliability issues or the operability issues or the economic congestion issues between one control area and another?**
- **The traditional balancing of load, transmission, and generation is not handled the way it used to be.** Those roles are now spread out over a lot of different market players and stakeholders and we find ourselves trying to address the balance between the needs of the market, the desires of the market, and the desires to limit a customer's exposure to congestion. If you deal with that on a fairly local level, that really becomes an issue locally.
- The test for this group, I assume, is to identify **'when does a reliability problem get to be big enough that it really is a national interest problem?'** Some of that comes from the coordination among ISOs and RTOs and regions in other parts of the country.
- When looking at these bottlenecks, no matter how you put the information together, you have to **coordinate your planning process with your markets and operations.**
- **LMP is a tool you can use for congestion, but it really doesn't give you the kind of signals that might help value the congestion at that point.** It is, by definition, congestion. But it is not alone enough to determine whether you have an economic problem. You have to know what operational issues are happening at the same time to cause those LMPs to diverge so you know whether you should go out and try to fix it or not. You have to know why you are having congestion that day, and to

what extent that congestion represents a true out-of-pocket cost. Just looking at the LMP can be misleading; you need to understand what operational circumstances cause the LMP to diverge. Whether you're using LMP or any other pricing mechanism, you have to take the prices with all the operational circumstances before you go back and start evaluating solutions.

- **A lot of information exists amongst markets, planning, and operation and you have to pull it all together.** Within control areas, that is fairly easy; across large geographies that is a much bigger challenge.
- **DOE should be cautioned against historical congestion as an indicator.** These things change radically over time, especially when moving into a market situation. We use the number of TLRs that are called on a particular interface as an indication of congestion in our region. Within the last 1.5 years, some of the most congested interfaces have had no TLRs because people have quit asking for service over that path. So there is a bigger picture that has to be looked at when looking at congestion across interfaces.
- **DOE should be sure to put the dollars in context.** For example, \$250M worth of congestion could be background noise in one system, while \$50M congestion could be a dramatic loss to other customers.
- There's a lot of activity going on in this area around the country. **DOE could host a forum** so we could bring all of these different methodologies together and see what everyone's perspective is, and see if there is any commonality of what we're doing that could be applied.
- **What level of sophistication is needed?** Is it a list of all the congested sites in the U.S. or is it the Top 10 worst?
- **DOE could use a nomination procedure rather than a designation procedure.** This may enhance participation and cooperation.
- One of the criteria that DOE should adopt as they use or designate any line is that **the data should be publicly available and transparent.**
- You have to make sure before you start upgrading the system that it is **for uses for which there is a legitimate need and people are going to be willing to pay for it.**
- There has been a tendency to say that in order to do transmission planning, and get the right transmission build, you need day-ahead and real-time markets, LMP, FTRs or CRRs, as a way of planning the

transmission system. The SSGWI experience shows that is not necessary. If you are going to wait until your LMPs are high enough to begin a 10-year siting and construction process, that's going to be a real consumer problem. **It might be better to look at forecasts rather than wait until the daily congestion prices signal that there's an issue.**

- **It is in the national interest to reduce imports from other countries.** We don't have a national energy policy to direct where our supplies should be coming from regarding a national interest perspective. We need a national energy policy.
- **Using the term bottleneck is a misnomer** that implies that the problem is small and located nearby. In the west, we're talking about 500 or 1,000 miles of transmission.

DISCUSSION SUMMARY OF PANEL 3 — ADAPTING THE NIETB PROCESS TO SERVE REGIONAL NEEDS

The following focus question directed the first panel entitled “Adapting the NIETB Process to Serve Regional Needs”:

- *What opportunities do you see for adapting the NIETB process to serve existing or emerging regional needs?*

The following is a compilation of key points from the presenters and the participants.

- **To DOE: Be flexible.** One size doesn’t fit all. Use stakeholder groups to define the national interest transmission bottlenecks. Provide guidance and financial mechanisms. Ensure involvement of the power marketing associations. Be sure to look at reliability, economics, and economic development as measures.
- **Keep it simple, cost-effective, and timely.** The process proposed by DOE appears to be a bit complicated. And as a result, may be too costly and too slow. We suggest that DOE take an oversight role and let the ISOs or RTOs do the constraint analysis.
- **Cost-effective: through an oversight role, DOE should allow the ISOs or RTOs to do the work on a collaborative basis.** The ISOs and RTOs already know where the constraints are because they deal with them every day. They also have the necessary tools to analyze the constraints and develop solutions. Working with the transmission owners, they can get the work done much better and faster than DOE.
- **Timeliness:** as proposed, it appears that the process may take years to complete. **If this NIETB process is going to be helpful and effective, it needs to be completed expeditiously.**
- **If LMP would solve transmission bottlenecks, they would have been solved a long time ago. LMP will only identify a bottleneck; it won’t solve it. You have to build lines or take other actions to solve the problem.**

- **We need to value transmission as more than just a liability; it is also an economic tool.** It is more than just about allowing the lowest-cost fuel source (wind, nuclear, hydro, coal, etc). If you don't have enough of it, you don't have those options. It will arbitrage any of the fuel volatility and hydro effects, mitigate market power abuses, and it can also be an insurance policy against catastrophes.
- **If we don't look at the potential of reducing the demand on the gas system by putting in transmission, we are missing the great value of enhancing the transmission system, especially in the Eastern Interconnect.**
- **We need to approach these bottlenecks in such a way that we do it as a region.** We're headed away from a situation where everything has been socialized and uplifted to a situation where there is going to be at least some participant funding. We don't know exactly how that is going to be implemented. And at the moment, everyone with a transmission project on the way does not want to be the first one. They want to be one of the last ones who are socialized and uplifted and not one of the first ones who are participant-funded. And, at the moment, there's no particular assurance as to how we're going to make that transition. That's one of the stakeholder issues.
- **One technology solution—the installation of back-to-back direct current devices on key parts of the grid—would reduce the risk of another wide-scale blackout, but this solution doesn't take away the need to build additional infrastructure, additional transmission.** The devices allow scheduling of power, so it is a superior alternative. The existing grid capacity can continue to be available. With DC devices that interface, there is no more loop flow because on a DC device you get exactly what is scheduled on it, so there is no unscheduled flow. Loop flow is not a problem in itself; it is a consequence of operating an AC system. Loop flow can be an indicator of insufficient transmission in some part of the grid. It is not just a happy consequence of operating an AC grid.
- An Internet search revealed that the term bottleneck is derived from 'the narrow part of the bottle used to slow down the flow of the liquid.' In the information technology world, a bottleneck is defined as 'a state in which a process that could cause the entire process to slow down or stop.' (With the electrical analogy, 'stop' is a blackout.) To have a bottleneck you need the bottle. **Perhaps 'bottleneck' might be a misnomer for needed transmission.**

- **DOE should take a look at the siting practices in Ohio.** There is no reason for conflict if you involve the public from Day 1.
- It is not in the interest of any consumer to go to Washington to testify in a hearing on the siting of a project in their area. **If DOE can take the FERC concept of the 209 gas language which allows for cooperation and try to modify it and apply it to electricity, that would help resolve what was mentioned as painful siting processes.** Maybe there is some language that we can collectively work on through NARUC.
- In addition to congestion issues, **DOE should consider the stranded resource issues that are involved.** Every region has a different set of criteria. For example, a number of studies have been conducted to confirm the economic value of developing stranded remote coal and wind resource in the upper Great Plains. Perhaps this doesn't fit into a convenient analysis of congestion that one would normally undertake to identify a transmission bottleneck. Thus, different methodologies should be used to determine what a bottleneck is these situations.
- DOE should rely on empowered stakeholders to help move this process along. DOE can serve as a facilitator. DOE has a good start with Path 15 in California. It is unclear if such a public-private partnership is necessarily the pattern that has to be followed everywhere, but that did involve a PMA. A number of PMAs would be integral to the NIETB process. **Bringing together private money and public partnerships would be an ideal leadership role for DOE.**

FINAL THOUGHTS AND NEXT STEPS

For the closing session, participants were asked to provide their “final thoughts” or suggestions for next steps regarding NIETBs and/or the role of the U.S. DOE in identifying and mitigating them. The following is a summary of key points:

- **Perhaps there are three “bins” you could put these critical projects in.** *Bin 1* is a line that everyone wants to build in the industry, but can’t get sited. *Bin 2* is a project that has a partial sponsor but no complete sponsor. *Bin 3* is a line that no one has proposed at all; it is an outcome of a model that says there would be a benefit to customers and it would be in the national interest to build a line from point A to point B. For *Bin 2* and *Bin 3*, a very strong set of actions that no one has contemplated before may be needed by DOE. Or some kind of regional body or an RTO would need to work through all of the studies to develop the necessity, the sponsor, and the proposal that could eventually go to the siting process.
- **One criterion for identifying whether a bottleneck is of a national interest is if it brings in colliding national policies that need to be solved at the Federal level.** If we solved the bottlenecks in PJM, we could get lower-cost coal power from the Midwest into eastern Pennsylvania and N.Y., but that means potentially increasing air quality problems in the Northeast, and we’re under mandates from another government agency to cut back on those. So saving in the energy area could lead to more expenses in another area. (Response: That’s what emission markets are all about: that you value the emissions. Emissions from coal plants will be reduced by 50-70% in the next 10 years, so it’s not going to dramatically change the air quality in the Northeast.)
- This has all been very helpful. This is a very difficult task that DOE has and our company will be very keen on participating. The message for DOE is to think about what these bottlenecks are and how to measure them. Piggybacking on the existing work is the right approach. **DOE should also think about who should build these lines.** Think about what DOE’s role is once it declares something in the national interest. I would hope that the national interest bottleneck is not one that is subject to a monopoly, that it is open for new entry and for others to come in and build the needed infrastructure investments, and rely on the same cost-recovery mechanisms that are afforded to the existing entities. I would like to convey this message to FERC as well.

- One of the most useful things that could be the next step would be to discuss the “then-what” question. Once something has been designated, what does that mean? Will FERC then say that it will be rolled in across a very broad region? Does it mean that the states will give it greater consideration for retail rate cost-recovery or greater consideration for siting purposes? **The next step or “then-what” question really needs to be answered for everyone to be more comfortable about discussing which line should or shouldn’t be national interest.**
- There may be other opportunities for more meetings for people who are doing work on similar things to talk and share information. **DOE could collect various thoughts and ideas around the country;** metrics, for example, in addition to tools.
- **DOE needs to determine what the Federal government would be able to do under a variety of different circumstances and how those actions might play out.** Once DOE decides what it can do in certain circumstances, those answers will largely define the criteria for establishing what qualifies as a national interest bottleneck.

David Meyer of DOE also provided briefing closing remarks. A summary of key points:

- I want to remind you that you have the opportunity to respond to the *Federal Register* notice; there is a 60-day comment period so I hope that you will put your ideas in writing and send them to us.
- I would like to present questions that you can either respond to now or in writing later:
 - o Is the term “bottleneck” (with “national interest” attached) appropriate? As participants have stated here today, in some cases we aren’t talking about bottlenecks, but corridors, pathways, etc. If you have ideas on a less cumbersome term than transmission bottleneck, please let us know.
 - o The second question is one of process. One way in which we might build upon the efforts that have been mentioned and described here is to say that we could invite parties to nominate transmission bottlenecks. If someone wants to nominate a particular need as a possible bottleneck for our attention, I would like to suggest that they cc: the affected regulators and regional organizations to give them the opportunity to express alternative points of view or caveats.
- Thanks to everyone for participating actively in what has been a fruitful discussion.

APPENDIX A — AGENDA

U.S. Department of Energy Workshop on Designation of National Interest Electric Transmission Bottlenecks

July 14, 2004
1:00 p.m.–5:45 p.m.
Reception (cash bar) 5:45 p.m.–6:30 p.m.
Salt Lake City Marriott Downtown
Salt Lake City, Utah

PURPOSES

- To seek public input on implementing the recommendation from the *National Transmission Grid Study* that the U.S. Department of Energy (DOE) “determine how to identify and designate transmission bottlenecks that significantly impact national interests”
- To raise awareness and identify issues/concerns about “National Interest Electric Transmission Bottlenecks” (NIETBs) and potential roles for the DOE in identifying and mitigating them
- To get a better understanding of the types and availability of data that will be needed to identify NIETBs
- To obtain suggestions about criteria/methods for the DOE to consider in identifying NIETBs

NON-PURPOSES

- Not to determine the locations of specific transmission constraints on the system today
- Not to rank, identify, or select NIETBs or decide how the DOE will proceed in identifying them
- Not to focus on specific solutions to known transmission bottlenecks
- Not to discuss implementation of proposed federal energy legislation containing “backstop” siting authority for the Federal Energy Regulatory Commission

The format of this workshop will be a series of facilitated panels. The facilitator will frame key questions and the panelists will present basic

information or perspectives relevant to the NIETB process. After each set of panelists has spoken, the facilitator will summarize the basic issues and take suggestions, comments, or questions from the floor. The last session will be an open discussion aimed at refining key concerns, identifying conclusions emerging from the dialogue, and listing next steps.

PANEL TOPICS

- Panel Topic #1: Shaping the NIETB Process to Add Value
- Panel Topic #2: Information Needed for NIETB Identification, and Possible Sources
- Panel Topic #3: Adapting the NIETB Process to Serve Regional Needs

1:00 p.m. Welcome and Introduction

David Meyer, Senior Advisor, DOE Office of Electric Transmission and Distribution, will begin the discussion with a brief review of:

- The purposes of identifying National Interest Electric Transmission Bottlenecks (NIETBs)
 - o Inadequacy of transmission investment since 1980s
 - o Indices of rising transmission congestion
 - o Impacts of congestion on reliability and consumer costs
 - o Need to raise public and government awareness of the importance of investments to maintain the adequacy and reliability of the transmission system
- Proposed NIETB process
- Effects of designating an interface as an NIETB (under present law)

1:30 p.m. Panel Topic #1: Shaping the NIETB Process to Add Value

- Focus Questions:
 - o *What suggestions do you have for criteria/methods for the U.S. DOE to use in identifying NIETBs?*
 - o *How can the NIETB process add value to existing transmission planning and approval processes?*
- Panel Presentations: Each panelist will make a 10-minute presentation offering a perspective on the focus questions.

Reliability-Related Indicators for Designation of NIETBs

George Bartlett, Director Transmission Operations, Entergy Services, and Chairman, NERC Reliability Assessment Subcommittee

Economic Indicators for Designation of NIETBs

Joe Eto, Staff Scientist, Lawrence Berkeley National Laboratory (LBNL)

Data Needs and Planning, Approval and Siting Processes

Richard Sedano, Principal, Regulatory Assistance Project

- Stakeholder Feedback: The facilitator will lead a discussion to learn the opinions of audience members regarding the focus question and the panel presentations.

2:30 p.m. Panel Topic #2: Information Needed for NIETB Identification, and Possible Sources

- Focus Question:
 - o *What type of information is needed to designate NIETBs and what is its availability to the U.S. DOE?*
- Panel Presentations: Each panelist will make a 10-minute presentation offering a perspective on the focus question.

Transmission Adequacy – NERC Activities

Bernie Pasternack, Director, Transmission Planning, American Electric Power, and Co-chair, NERC Resource and Transmission Adequacy Task Force

Available Data from FERC, EIA, and Other Sources

Doug Hale, Senior Economist, Energy Information Administration (EIA)

Western Perspective

Steve Waddington, Director, PacifiCorp

PJM Perspective

Steven Herling, Vice President, Planning, PJM Interconnection

- Stakeholder Feedback: The facilitator will lead a discussion to learn the opinions of audience members regarding the focus question and the panel presentations.

3:30 p.m. Break

3:45 p.m. Panel Topic #3: Adapting the NIETB Process to Serve

Regional Needs

- Focus Question:
 - o *What opportunities do you see for adapting the NIETB process to serve existing or emerging regional needs?*
- Panel Presentations: Each panelist will make a 10-minute presentation offering a perspective on the focus question.

Transmission for Regional Economic Development from New Resources
Susan Wefald, Commissioner, North Dakota Public Service Commission

Delivering Coal-Fired Generation from Midwest to Eastern Markets
Jacob Williams, Vice President, Peabody Coal Company

Major Bottlenecks Can Be Intra-Regional Too— New England as an Example
Richard Sedano, Principal, Regulatory Assistance Project

Solving Regional Loop Flow Problems
Antonio Sammut, Director System Planning, International Transmission Company

- Stakeholder Feedback: The facilitator will lead a discussion to learn the opinions of audience members regarding the focus question and the panel presentations.

5:00 p.m. Closing Session

- Focus Question:
 - o *What are your “final thoughts” or suggestions for next steps regarding NIETBs, and/or the role of the U.S. DOE in identifying and mitigating them?*
- Stakeholder Feedback: The facilitator will provide a brief summary of key points, messages, and themes from the previous panel presentations and discussions and lead a discussion to learn the opinions of audience members regarding the focus question.

5:45 p.m. Adjourn

5:45 p.m. – 6:30 p.m. Reception (cash bar)

APPENDIX B — LIST OF PARTICIPANTS

U.S. Department of Energy Team:	Bernie Pasternack
Poonum Agrawal	American Electric Power Service Corp
U.S. Department of Energy	
Lawrence Mansueti	Jay Porter
U.S. Department of Energy	American Transmission Company
David Meyer	Sandra Hochstetter
U.S. Department of Energy	Arkansas Public Service Commission
Bill Parks	Tom Bozeman
U.S. Department of Energy	Black & Veatch Corp.
Julia Souder	Don Glenn
U.S. Department of Energy	Bob Lawrence & Associates
Energetics Facilitation Team:	Mike Kreipe
Lauren Giles	Bonneville Power
Energetics, Incorporated	Carl Wood
Richard Scheer	CA Public Utilities Commission
Energetics, Incorporated	John Nunley
Participants:	CTC
Gene Hanes	Jim Tucker
Alabama PSC	Deseret Power
Robert Mattuiz	George Dawe
Allegheny Power	Duke Energy
Edward Pfeiffer	Scott Henry
Ameren	Duke Power
John Sampson	Michael Oldak
American Electric Power	Edison Electric Institute
	Douglas Hale
	EIA

Jack Hawks
Electric Power Supply Association

Pat vanMidde
Energy and Telecommunications
Consultant

George Bartlett
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William Aycock
Entergy Services, Inc.

Steven Naumann
Exelon Corp.

Meesha Bond
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Kevin Kelly
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Laura Nelson
Idaho Public Utilities Commission

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Jim Wilson
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Mirant Americas, Inc.

Marla Larson
Montana Public Service
Commission

Charles Gray
National Association of Regulatory
Utility Commissioners

Joseph Rossignoli
National Grid

Jay Morrison
National Rural Electric Cooperative
Association

Gary Nakarado
National Renewable Energy
Laboratory (NREL)

Rahn Sorensen
Nevada Power/Sierra Pacific

R. Prasad Potturi
New Mexico Public Regulation
Commission

Ellen Vancko
North American Electric Reliability
Council

Susan Wefald
North Dakota Public Service
Commission

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Jamie Austin
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Kenneth Morris
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Judy Jones
Public Utilities Commission of Ohio

Klaus Lambeck
Public Utilities Commission of Ohio

Robert Kondziolka
Salt River Project

Jim Burg
South Dakota Public Utilities
Commission

Brent Gokbudak
Southern California Edison

John Lucas
Southern Company

W. Perry Stowe
Southern Company

Jody Holland
Southwest Power Pool

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State of California Public Utilities
Commission

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State of Minnesota Public Utilities
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Stephen Oxley
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Margaret Hunt
The Edison Electric Institute

James Spiers
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John Hilke
U.S. Federal Trade Commission

Sandra Waldstein
Vermont Public Service Board

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David Shelton
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Western Interstate Energy Board

Matt Schuerger
Wind on the Wires

Beth Soholt
Wind on the Wires

William Bourbonnais
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Dick Byers
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