The motion was carried by a vote of 12 to 0. (Those voting in favor were Mr. Davidson, Mr. Stoner, Mr. Gates, Mr. Brubaker, Mr. Nickels, Mr. Laing, Mr. Morrison, Mr. Miller, Mr. Earling, Mr. Kinley, Ms. Choe and Ms. Sullivan.)

Mr. Morrison thanked the board for its consideration of this matter.

Least Cost Planning

Mr. Laing introduced Mr. Richard Watson, Northwest Power Planning Council, and previous Director of the Washington State Energy Office. He said Mr. Watson is here to address the RTA on the proposition of least cost transportation planning. This issue is one that has been brought up from a variety of sources in recent comments to the board, he said, including a letter referred to earlier in today's meeting. He thanked Mr. Watson for being here today.

Mr. Watson gave the following presentation, utilizing slides and a handout (copy on file):

> Thank you for the opportunity to be here today. I would like to explain what this presentation is not intended to do: This is not an attempt by the Northwest Power Planning Council to become involved in transportation planning. We have our hands full.
>
> The origin of the paper distributed today and the presentation to be given is the result of our being approached last summer by the Bullitt Foundation, asking us to look at our experience in planning the region's electrical systems and to examine whether or not there were any parallels between what we experienced and the problems facing transportation. This was a labor of love; many nights and weekends were utilized in this work. These are the personal opinions of myself and Mr. Edward Sheets, and not those of the Northwest Power Planning Council.
>
> Objectives:
>
> 1) The first objective is to describe the key elements of electricity least cost planning done by the Northwest Power Planning Council and the public utilities.
> 2) The second objective is to examine parallels with/application to transportation planning.
> 3) The third objective is <u>not</u> to draw conclusions about the appropriate transportation mix for the Puget Sound region. This will be the result of the least cost planning process.
>
> What is least cost planning? It is a planning framework that facilitates evaluation of alternative strategies for meeting a goal. It integrates consideration of different kinds

of resources: supply side and demand side. The experience we have had in the area of electricity has had a significant effect on the debate that has gone on. It has shifted the debate from choice of resources on to the quality of information an analysis and important policy issues. Because people understand how decisions will be made, a lot of the controversy is removed.

Elements of least cost planning:
. Define the goal;
. Deal explicitly with uncertainty;
. Evaluate all measures--supply and demand;
. Consider total costs;
. Identify least cost strategy;
. Create action plan;
. Involve the public at all stages; and
. Use good policy judgment.

What is the goal? The goal is to meet service needs at the lowest total cost to the society. There is no intrinsic demand for electricity, but there is a demand for the service it can provide. What services do we need and what is the least cost way to apply them? What is the comparable idea for transportation that is broad enough to encompass the full spectrum of alternatives? Are we meeting the access needs at the lowest total cost? Are we carrying out transfers of information? Is there an intrinsic need for transportation? There is an intrinsic need for the transfer of information. Transportation will be the major part of all of this, but defining the goal is intended to leave the spectrum open for all kinds of options.

Measurement: Measuring access is difficult. It is probably important to say we have an appropriate degree of humiliation. We think it is harder to perform this planning for transportation than for electricity. It comes down to the appropriate measures. For electricity we measure the total kilowatt hours; in transportation this measure could be trips and trip miles. We have not had to deal with the "peak" situation for electricity, but in transportation that is how the problem is viewed. We are starting to deal with it in electricity planning. Location of facilities is typically dealt with at a regional level; utilities worry about that. Corridor planning is central to the transportation issue. The most important difference is we rely on physics and economics; transportation relies more on human behavior, which is a more difficult proposition.

Dealing with Uncertainty: The basic premise here, as Mr. Madsen will recall, is the Washington Public Power Supply System (WPPSS) experience. That premise is that the future is uncertain and almost any single forecast made for demand is likely to be wrong and expensive. The lesson that has come out through the least cost planning

framework is that the best plans should be flexible enough to perform well over a wide range of possible futures. Demand has been a primary uncertainty. There is also uncertainty about resource performance, fuel costs and environmental regulation. The idea is to bind them and deal with them in an explicit way. In transportation, the same list of uncertainties is probably applicable. It is probably harder to forecast demand, but there are large opportunity costs associated with guessing wrong. I think it is important to deal with the uncertainties.

Evaluate All Measures: We try to be as comprehensive as possible in looking at measures that can help build a strategy to meet your goal. Supply and demand side measures are evaluated. We compare the performance and cost on an equivalent basis and create "supply curves" to guide selection of strategies. An important point here is you have to deal with the achievable potential and not theoretical potential. If everyone in Bellevue were to install compact fluorescent lights in their homes, demand would go down; this is a theoretical potential. Is it achievable? No. The same concept applies to transportation.

Chart: There are a number of different kinds of measures the Council considers in putting together a strategy. Included are everything from improvements in efficiency of transmission systems to more efficient water heaters to nuclear power plants, solar panels and wind farms. The chart on page five lays out how much energy savings we can achieve from these measures and the cost of doing so.

Comparison of Alternatives: In electrical supply we are talking about building power plants. The electrical supply can be met with coal-fired power plants, gas turbines, wind farms and building-scale photovoltaics. The transportation supply is met with freeways, rail systems, buses and bikeways. What we do to maximize efficiencies of the through part on that system is the system management activities you do in transportation. These include traffic light synchronization, ramp metering and smart highways.

Demand Management: We are interested in moving demand off the periods when generation capacity is limited or when transmission and distribution system capacity is limited. The time of day rates send a signal that is appropriate. Direct control of appliances is another possibility. The parallel for transportation would be congestion pricing, parking charges/elimination of parking subsidies and flex time.

Efficiency: In terms of electricity, efficiency is increasing the useful output per unit of energy (conservation). This is done in two categories: technology and policy. It goes beyond the technology but also the policies that will be necessary in order to have those technologies adopted. In transportation, having more persons per vehicle trip is the definition of efficiency. You have to have technology, such as HOV lanes,

but you also have to have the policy measures that make utilization of those technologies efficient.

Demand Substitution: Some electrical utilities do not like to think about it, but perhaps we should be substituting the use of natural gas for electricity. Perhaps in transportation, substitution of access to telecommunications proximity can be utilized. There is a policy determination. There is software and hardware, and you have to consider both; one won't work without the other.

Total Costs: In electricity we deal with the direct cost to build a plant. There are also costs to install conservation measures and indirect costs to the environment. We try to take all of these into account. In our circumstance and in transportation, we do not look at each measure on a stand alone basis. We have to look at a system as a whole. Transportation has the same set of category of costs. The difficulty transportation faces and we do not face is the question of personal values. What is the value of time and the value of having access to your own vehicle?

This chart (page eight) is an attempt to look at categories of costs. Time cost is one of the major costs you will deal with and we do not. There is also a cost that transportation cost planners are used to dealing with: personal values have to be dealt with in some way.

Development of Resource Portfolio: We look at the existing system and bring in forecasts of demand. There is a range of possible demands. We bring in information about cost and the available supply of alternatives, other key planning uncertainties and analyzing the portfolio of resources we bring together to see which provide what we need at the lowest cost. The results is a resource portfolio that will meet our needs in the future with the least total cost. Equally important is the action plan needed to bring that into being.

Portfolio of Resources: It is not one thing that does the job; it is a mix of resources that meets the total need at the lowest cost and has the flexibility to do so in a wide range of futures. In electricity we found diversity has some real value to deal with uncertainty. We also came up with ideas we call "options" as a way of dealing with risk.

Options Concept: We chose a profile of expenditures in building a small hydroelectric facility. There is six year lead time from inception to completion. In the old days we were talking about coal and nuclear power plants with 10 to 12 years lead time. When you have to commit large dollars a long time in advance of the actual need, there is a lot of risk. We observed that preconstruction costs account for half of the lead time and one-tenth the cost of a construction project. If you can

"option" the resources through this preconstruction activity, then when you are closer to actual need you can make a decision whether to hold the project for later development, continue or fold entirely because something better has come along.

Action Plan: The plan is to identify barriers to the strategies you have defined. What is it? Who has to do what for the plan to be successful? I think the Northwest Power Planning Council finds itself in a situation very similar to many of you; the direct authority to make some of the things happen is not there. There is a problem of securing cooperation of relevant policy makers. We have had to deal with county councils, city councils and state legislatures to implement building standards, etc. Transportation faces the same kinds of challenges.

Public Involvement: We utilize public involvement early, often and continuously. We think it builds understanding and support for the kinds of measures we are proposing. Advisory committees with input on the data information analysis that goes into the plan are utilized. Issue papers are circulated widely to gather input. A draft plan goes out for review before we arrive at the final plan. What we have found is that public participation is facilitated by a least cost planning foundation.

Other Considerations: The planning process is a continuous process because change is continuous. Is a process of adaptive management. There is no substitute for good policy judgment; this is not a mechanical process that has no heart to it. It is probably hard to make low income weatherization make sense from a least cost planning standpoint unless you bring in values when we have to deal with low income people. There are probably similarities in dealing with provision of transit services to low income people.

Lessons Learned: The value of flexibility in adapting to an uncertain future, such as smaller scale, shorter lead times, "optioned" development, is important. Conservation makes up about half of the resources for the Northwest; this did not exist before the least cost planning approach was brought into being. The value of an agreed upon planning framework has been important in developing the constituency for action.

Conclusion: Electricity and transportation planning face similar problems: high capital costs, capital constraints; uncertainty; and conflicting interests. Transportation planning is more difficult, but it is not impossible. Least cost planning is not a panacea either for electricity or transportation, but it has lead to action on a broader range of alternatives. It can point to some significant benefits to the economy and the environment.

(Mr. Rice arrived at this time.)

Mr. Laing said Mr. Paul Matsuoka of staff has a short presentation related to the level of transportation planning activities within our region where least cost planning might be applied.

Mr. Matsuoka made the following statements:

I would like to thank Mr. Watson for taking the time to come here from Portland to explain the least cost planning foundation used successfully in energy planning.

Least cost planning has been successful in the energy field. They should be congratulated for their work in this area. Staff believes least cost planning sounds like a good idea. Who can be against achieving specific objectives with the least cost? I want to convey some major points we think you should think about in how this applies to transportation.

1) Staff would like to state its support for demand side measures.
2) We would like to state our concern that we do not think least cost planning can be rigorously done, as it was in the area of energy planning, in the time frame before the ballot measure.
3) Even if the region agreed least cost planning should be undertaken in a major way, there is some question whether the RTA is the appropriate institution to take on the work.
4) There are lessons that have been learned in energy that we can benefit from.
5) We would like to explore how we might pursue this further in subsequent RTA meetings.

First, I would like to address the planning done thus far. Proponents say we focus too much on the supply side; I think they are probably right. We have focused on the supply side because transit agencies have little or no authority over the demand side, such as land use management, parking policies, etc. Our methods include forecasting demand, evaluating alternatives to meet demand, and implementing the preferred alternative. We focus on supply options but we are supportive of the demand side in a policy sense. Typically our forecasts do not boost ridership, assuming we will be successful in some of the TDM. Last week Mr. Aubrey Davis talked about the process where the FTA only allows us to take into account policies that are "on the books." This region has done a lot of planning, but because these policies are not yet "on the books", their impact cannot be included in the forecasts.

Because the forecasts do not reflect the TDM increases in ridership, they give the misperception that we do not care about TDM. The JRPC cared a lot and the existing plan devotes a chapter to the subject. A key point here is that some elements of transportation act similarly to energy conservation because some things reduce the

entire demand for trips, like telecommunicating, but most TDM results in more demand for investments like the Regional Transit Project. That is why we have supported TDM measures.

We have discussed this with least cost planners and came to the following conclusions. The energy application was complicated and took over a decade; they continue to make refinements. I do not think the energy methods are directly transferrable to transportation because of the human behavior issues mentioned. I think the transportation application will be much harder; it will require a great deal of staff time and it will be data intensive.

This leads staff to the conclusion there it would not be possible to develop realistic models prior to the ballot measure. In addition, if the region were to agree that least cost planning should be done, is the RTA the right institution to undertake such planning? The Northwest Power Council did least cost planning and the Bonneville Power Administration (BPA) implemented the results of the work. In past meetings, the Board had a discussion of its role within a larger transportation arena. Should the RTA, or some other institution, be responsible for least cost planning? Is the RTA an analogy to the Power Council or more of a BPA?

If least cost planning cannot be emulated within a short period of time, what policies ideas might be gleaned from it? One of the key lessons learned by the energy industry was the importance of demand side resources and conservation. I think the TDM can benefit from that level of recognition because it will help solve transportation problems and fill up the seats we provide in our project. This goes back to linking software and hardware. The RTA could go back and look at the strength of TDM in the System Plan.

The second conclusion is the need for flexibility to adapt to uncertain futures. In energy, this has meant reliance on smaller, more incrementally developed, investments. The RTA might decide to link plan and rail implementation so that we link implementation of the project with some land use supportive actions.

How should the RTA follow up? Staff would return to the Board in January or February to address some further information regarding the "what" and the "who" of least cost planning. In response to the "what" question, staff would come back with all the transportation measures that might be considered. What is in the plan? What programs should be supported more in the plan? What are the barriers to implementation?

> "Who?" Who is doing much of the transportation and TDM planning and who is responsible for implementing these measures? What role does the RTA see itself playing among those who need to take action to implement demand management?
>
> In looking at your work program early next year, does the plan need strengthening on the demand side? Do you think phasing of the plan and rail elements might be tied more explicitly to TDM actions? I hope you will get into discussion of issues you want to address in the next few months. Is least cost planning something you wish to pursue?

Mr. Laing said the presentations and observations of staff are intended to be fodder for the Board's discussion.

Mr. Davidson asked is least cost planning a philosophy or something you broke in and did? I presume you named it after you did it by designing something that seemed to work, he said. Mr. Watson responded:

> We named it two different things: least cost planning and integrated resources planning. It is not a specific set of models. It is an overall framework for dealing with the input and output from models, as well as the policy judgments you have to make. When the Northwest Power Planning Council began its work in 1981, it had from Congress a two year period in which to develop the region's first plan. If not, the whole concept of a regional planning body appointed by the Governor would be out the door. We completed a plan in two years; it was clearly not at the level of sophistication and analytical precision that we might bring today, but the basic framework was one you would recognize. It lead us to basically the same general place.

Ms. Choe said I would like to extend my appreciation to Mr. Watson for attending today's meeting. There is a lot of food for thought and further discussion that may go beyond staff's initial observations, she noted. One of the things I found missing in your analogy is the expectation that certain kinds of transportation planning can be used to leverage economic development, she said. Can you address how something like economic development or land use would fit into your model?, she asked. How might this be analyzed in terms of least cost planning analysis?, she asked.

Mr. Watson asked is Ms. Choe speaking of the secondary benefits of economic development associated with least cost planning? Ms. Choe said yes.

Mr. Watson said I do not see why this couldn't be brought into the least cost planning framework. Our approach starts from a need for energy services, he said; we then try to find the least cost way of reaching the goal. In the modeling sense, he said, we do think

about the secondary economic benefits that might be associated a proposal, he said. Economic development and activity interests are clearly there, he said; they don't fall out of the model per se, but they are part of the judgment.

Ms. Choe said the term "least cost" can be misleading; as Mr. Watson mentioned, the least cost alternative may not be the most preferred because of personal values. Mr. Watson said it will always be necessary to make policy judgments on things that don't fall neatly into a cost/benefit framework. You can, he said, with some risk, assign dollar values to some things, such as time. Very rarely do we put to ourselves as decisionmakers those kinds of trade-offs, he said. An alternative may have a certain cost, he said, but it may also impede a person's access to their single occupancy vehicle. How much is that trade-off worth to you?, he asked.

Mr. Morrison said the State Senator from this district has said people want to return to nature, but they do not want to return to nature on foot. How much least cost planning was built into the JRPC process?, he asked. Mr. Matsuoka said there is an entire chapter in the plan devoted to support of demand side resources. The issues are to support the idea of looking at the possibility of congestion pricing, support of parking policies, support of land-use planning in the region, he said. Those are things people recognize would only strengthen ridership forecasts, he stated. There was a very crude estimate of how much additional ridership might be achieved, he continued, but as Mr. Davis pointed out last Friday, we were unable to use those enhanced ridership figures with the ERP or the FTA because they are not policies on the books. There is a policy sense of supporting the TDM, he concluded, but we do not have the ridership to back it up.

Mr. Morrison asked if brown-outs were occurring from 6:00 to 9:00 a.m. and 3:00 to 7:00 p.m., would you build Grand Coulee Dam? Mr. Watson said not necessarily. Mr. Morrison is providing this as the only option, he said; are there other options and what are their relative costs? Let's look at broader options, he said, and choose a solution that gets us there at the least possible cost. It may be Grand Coulee Dam, he said, or it could be something different.

Ms. Sullivan said the King County Council was very insistent on including least cost planning as part of its resolution in joining the RTA. I would like to thank Mr. Watson for attending today's meeting, she said, and I want to follow-up on Mr. Matsuoka's comment regarding the timeline. We have a lot of analysis that has gone on to date in developing information for the JRPC, etc, she stated. I would like your opinion whether least cost planning, if used as a framework for the analysis of that data, must slow down the process dramatically or could we integrate it fairly swiftly?, she asked. Mr. Watson said I cannot say precisely how much time this would add to the process. I can only make a guess, he said; a lot of the bits and pieces of information are there. It is a question of organizing the information in this kind of framework, he said. Whether or not it can be done in this

framework is something I don't know, he added. What is perfection?, he asked. Our first plan was a lot cruder than our subsequent plans, he stated. Applying the framework with the kinds of information we had at that time was valuable to us, he said, and we had time constraints as well. I cannot judge the staff's job, he said; they are more familiar with transportation planning than am I.

Ms. Sullivan asked is the critical part of the least cost planning the collection of data? Or is it the time it takes to conduct the analysis? Should we look at phasing this?, she asked. Should we look at a demonstration project? Could we decide today to undertake least cost planning?, she asked. Mr. Watson asked do you mean a demonstration project of least cost planning? Ms. Sullivan said yes.

Mr. Watson said I am not qualified to answer this question. My "gut" tells me we could use information we have and put it in a least cost planning framework that may lead to some insights for the Board. Will it be perfection?, he asked; the answer is no. Will it give you some better insights?, he asked; the answer is maybe.

Mr. Rice said I have two concerns about Mr. Watson's model. When you take least cost planning from electricity to transportation, he said, you are assuming the measures you took are things we should be measuring. I am sure the debate over what elements make up least cost planning will be very difficult for us, he said. The example I am focusing on is the sense of conservation and its relationship from electricity to transit. If you ask me, he continued, I could say it is dealing with rubber tires and not rail and concentrating resources in certain ways. What is conservation as you define it in transportation?, he asked. Mr. Watson said it is the most efficient use of the system which means more people miles per vehicle mile. With electricity, he said, we are talking about more BTUs of heat or lumens of light per unit of electricity. That part of the comparison is the one I am most comfortable with, he stated, and I think there is a clear analogy between electricity and transportation.

Mr. Rice asked do you think it covers all modes? One of the difficulties is the multi-modal operation, he said; this would not be a system made up of rail only. Mr. Watson said I cannot tell you I have this all thought out. There are some difficult conceptual things, he said; this is not an either/or proposition. It is reaching an appropriate mix for the appropriate parts of the region that will make sense, he noted.

Mr. Davidson said along the same lines I was thinking about the Puget Sound Regional Council (PSRC) who has some of the broad authority. They could do the least cost planning because they have this ability. We may think in those terms also, he said, but maybe the PSRC would think in the terms of the tradeoffs.

Mr. Laing made the following statements:

I think Mr. Davidson is right. The PSRC has distributed their proposed work program for preparing a metropolitan transportation plan. It seems it is the ideal regional place to talk about least cost planning, in that it does not apply to the level of planning for the particular implementing measures we do. I think it is reasonable to ask staff to put on the agenda a briefing or a presentation on the Regional Council's transportation planning work program related to least cost planning. With that would be a proposed aggressive application of least cost planning to our own effort, allowing us to see the relationship to each other. It seems you can take the concept of least cost planning and apply it to any segment of the types of systems we are talking about. You could take it as a way of determining phasing of the elements in the system plan. It seems that is an appropriate application of it. We have talked about the need to discuss phasing options. It seems least cost planning is one approach. Staff was asking for direction. I am suggesting one way to do that would be to tell them we want to see the least cost planning in the context of the regional planning effort underway and an aggressive analysis of least cost planning applied to our work. From that we could have the basis of our own decision on its application.

Mr. Madsen made the following comments:

I do not disagree with Mr. Laing. I don't know if least cost planning applies to our job. I am familiar with the work done by Mr. Watson. I suggest it is a strategic framework within which you evaluate things. As it applies to electricity it may not apply to transportation, but it is a framework within which we can look at things. I would request that if we are going to take this approach, we look at how we set up that strategic framework and how we drive this board to the policy decision we have to make today and a week from now and a month from now. Mr. Watson has laid out a framework within which we can do this. If we are going to do this, we should look at how to strategically lay this out. Least cost planning may be a way to aid us, but we are not comfortable that it is the answer.

Mr. Laing commented as follows:

I agree that least cost planning is a tool. Mr. Madsen's comments are a perfect lead in to the next agenda item, which is the completion of the workshop which began last Friday, in which we are asking ourselves certain questions, the answers to which are the basis for completing a work program. What decisions are we expecting ourselves to make in the next week or month leading up to March? Until we complete the work program, we have not set our marching orders. I look at least cost planning as a tool for carrying out the work program and evaluating the decisions.

Mr. Rice made the following statements:

> Until we understand what the full system is, it is hard to make an evaluation of its elements. I think until we say we want a plan and these are the modes, I think it is easier to look at least cost planning and see if those elements are right or wrong. Trying to do this incrementally before we have that framework seems difficult to me. You could probably apply least cost planning to each of those alternatives and get better data but we have to determine if these are the elements that make sense and then do that evaluation instead of building the system through least cost planning.

Mr. Laing said I think we are thinking upon the same line. It seems to me that by looking at the regional transportation plan framework we can see where our planning effort fits with other planning efforts that include least cost planning technology, such as commuter trip reduction.

Mr. Madsen said it may be worthwhile to allow Mr. Watson to leave today's meeting so he can catch his plane back to Portland.

Mr. Laing asked are there other questions before Mr. Watson leaves? I would like to thank Mr. Watson for attending today's meeting, he stated.

Mr. Kinch said whether or not we ultimately adopt the least cost planning proposal, I feel it is critical to deal with the public's perception that this entity is utilizing "most cost" planning. This is something we should be conscious of as we move ahead, he said. Whether we adopt the least cost planning proposal as it was presented today, he said, that perception should be put out to the public. We need to tell the public that this regional transit concept is being dealt with with costs in mind, he said, and it is not just an open checkbook.

Mr. Nickels made the following remarks:

> This was an interesting discussion. I think it would be useful to sort out the role today versus the role of the RTA once the plan is submitted and approved. It seems it would be useful to go through what the JRPC did and the list of elements. While the JRPC didn't call it least cost planning, many of those things took place and those evaluations were made. If some were missed, fine. It seems we have a more focused job in front of us, which is to take a plan given to us, refine it and put it before the voters so we can move ahead. There will be many decisions made and we need to build in flexibility for the future RTA that is in fact constructing the systems so that when they go through what we called alternatives analysis, they employ some of the techniques of least cost planning. I would hate for us to get off on a rethinking and

reengineering of the planning process. We need to be comfortable with the plan and not redo it.

Mr. Laing said describing how least cost planning is a factor in phasing is part of our discussion.

Mr. Morrison said in the interest of public involvement, there are people with an interest in this issue. We might ask them how they would apply these concepts, he said, knowing the work schedule we have in front of us and the time limitations involved.

Mr. Bruce Kendall and Mr. Dick Nelson said they would be happy to respond to this presentation.

Mr. Miller said I appreciate the presentations made today. I think least cost planning is an essential step for us to take, not only in insuring the work done by the JRPC, but in evaluating each of the elements and how they are intermixed in the system plan. One statement made today stood out in my mind, he said, and that is the influence of personal values and cost in the intermix. Least cost planning is one element in making our decision, he said; the influence of personal values on that decision has to be weighed. This plan will go to the public, he stated, and they must feel they are getting the best value for their dollar and that the plan meets their personal needs. Least cost planning is not the only overriding issue, he stated.

Mr. Laing said there has been a request that we conclude today's business meeting prior to breaking into small groups to continue our workshop. Mr. Nickels said this makes sense.

Task Force Reports

Rules Committee

Mr. Laing said I would like to remind Board members there is a mission statement being circulated. I have received some responses, he said, and others have indicated they are working on their suggestions. The Rules Committee will take this up upon receiving input from the Board members, he noted.

Finance Committee

Mr. Nickels gave the following report:

The RTA has no funds. I met with staff and confirmed that this is tr

The first task for the Finance Committee will be to designate a treasurer. This wi