NORTHWEST POWER AND CONSERVATION COUNCIL
DRAFT SEVENTH POWER PLAN
PUBLIC HEARING

HELD ON
FRIDAY, NOVEMBER 13, 2015
5:03 P.M.

BEST WESTERN
2811 NORTH 20TH AVENUE
PASCO, WASHINGTON 99301

APPEARANCES

APPEARING ON BEHALF OF NORTHWEST POWER AND CONSERVATION COUNCIL:

Phil Rockefeller, Chair, Washington

Bill Booth, Vice Chair, Idaho

Tom Karier, Member, Washington

NORTHWEST POWER AND CONSERVATION COUNCIL STAFF:

Tom Eckman, Power Planning Director

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MR. KARIER: Good evening and welcome. I'm Tom Karier, I'm a Washington member of the Northwest Power and Conservation Council, and to my right is Bill Bradbury, who is an Oregon member of the Council, and to my left, Phil Rockefeller, who's another Washington member from the west side.

CHAIR ROCKEFELLER: Good evening.

MR. KARIER: And I -- welcome to the Tri-Cities. And, as you know, the Council is working on the Seventh Power Plan and this is a public hearing to take testimony on that tonight.

I have an official statement to read that we read at each of the hearings, and it's -- because we want it to be the same instructions, I'm going to actually read it. So bear with me as I work through this.

Welcome to the public hearing held by the Northwest Power and Conservation Council on the Council's Seventh Northwest Power Plan.

The Northwest Power Act directs the

Council to develop a regional conservation electric power plan and to review that plan every five years. The Council is now engaged in its latest five-year power plan review. As a part of this effort, the Council released the draft revised plan on October 20th for public review and comment.

The Council will be accepting written comment on the draft power plan until December 18th. The Council will also hold public hearings like this one to receive oral comments on the draft plan in all four northwest states over the next six weeks.

If you would like to comment on the draft plan at this hearing, please sign in on the sheet provided for that purpose. It was outside on the table there. And you may also leave written comments with us this evening, if you desire.

Your comments tonight will be recorded, placed in the Council's administrative records for the power plan review and, most importantly, considered by the Council, those of us here as well as those who aren't who will read the testimony. The same is true for all written comments submitted to the Council.

For those of you who intend to testify this evening, your name will be called in the order

you signed up. Please begin your testimony by stating your name and, if you represent an organization, let us know that for the court reporter. If you want your name spelled properly for the record, you should probably tell -- you will need to spell your name as well.

Your full written statement will be included in the official record. In the unlikely event that we have -- well, this is not going to be that unlikely event, so I'll skip that.

We will leave the official record open for a period of 10 days if you want to add written comments to your specific testimony, you can do that within 10 days. All public comments submitted to the Council, including oral testimony, will also be posted on the Council's website as soon as possible.

I think we're talking about a matter of days rather than weeks, but you should be able to see that there. For information on the proposed power plan, I would direct you to visit the Council's website, www.nwcouncil.org. Again, nwcouncil.org. You may submit comments by using the provided comment link, so you can do it there very easily as well.

So that is the opening statement for the

hearing. What we plan to do is give a very short presentation, an overview of some of the highlights of the plan. I think we can do that probably in about 10 minutes usually. And Tom Eckman, our staff, will do that, and then we'll get right into the testimony.

So far, we didn't have very many people sign up and so, after we've gone through the people that have signed up, anyone else is free to make a comment. So you can think about that as we go through this if you have comments or even questions for us.

Tom.

MR. ECKMAN: We'll keep this brief so you folks can provide your comments rather than the staff making comments.

First of all, I'll go through a little summary of why we have a power plan. The principle statutory requirement is that the plan develop a reliable and economical power supply for the northwest for the next 20 years. It has to have in it guidance for Bonneville in particular in its resource decision making. That's its fundamental, core concept.

The major elements of the plan include a

forecast of future need, a resource plan to meet that need, and we update that every five years. So we are in the seventh rotation of that process.

The big finding with this plan, and as it has been in past plans, was energy efficiency and in this case, a demand response by the principle resources that meet most of the energy needs and capacity needs going forward.

Using the wedge charts that we see, on the vertical axis is the amount of annual energy and on the horizontal access is time. We see the green wedge here being energy efficiency. We develop between 2016 and 2035 about 4,500 average megawatts of energy efficiency, some natural gas starting around 2026 comes in on average, with renewable resources, solar and wind, coming in post-2025 or so, largely to meet the states of Washington and Oregon and Montana's renewable resource portfolio standards.

On the capacity side, again, big development going forward is that 4,500 average megawatts of energy efficiency produce winter peak offsets of on the order of 10,000 megawatts or a little bit more. So the principle resource development called for in the plan to meet both

energy and capacity, peak winter capacity is energy efficiency.

Topping that, the next one in the cue is demand response, which is the voluntary curtailment of energy during peak periods of time. Usually reimbursed somehow by the utilities to make sure that the customer turns down their thermostat or turns off their industrial process or something like that.

On top of that, we see some natural gas resources coming on at the tail end and wind and solar PV at the end of that process. Let's go back down. You bypassed those too fast.

Hello, folks. Here we go. Sorry. Wind and solar coming there and you can't see it. Couldn't see it because they went too fast, but now you can see them even while it's there. Why? Because they don't provide much winter capacity.

The wind doesn't blow when it's extremely cold and the sun doesn't shine around here much in the winter. And so we don't see them providing much resource like they do elsewhere in the country where they have a summer peak. We have a winter peak. These aren't running at that period of time.

When we look at load growth over the next

30 years -- or 20 years, this is the net load growth after efficiency, which we started around a little over 20,000 gigawatts -- or 20,000 megawatt hours -- 20,000 megawatts of juice being used in 2016 and we end up pretty much at the same place.

Energy efficiency supplies, on average, most of the load growth. Without energy efficiency, loads would look like this. That's the wedge of energy efficiency we see developing over the next 20 years, about 4,500 megawatts meeting the bulk of load growth and, on average, meeting all load growth through the year 2035.

Another thing that was recognized in the Sixth Plan was there were a lot of opportunities for federal standards. This green -- or this red wedge shows the development of federal standards and the impact on loads that those standards have.

So we had 6,000 megawatts of energy efficiency coming online in the Sixth Plan. If you add the 4,500 to the 1,500 average megawatts we're going from standards, we're back to 6,000. So the answer in the Sixth Plan and the Seventh Plan net load growth is zero after you account for conservation.

If you look through various scenarios,

we've done 20-plus, but we're just going to show you four, this is the existing policy case. This assumes that we don't have any new RPS. We don't have any carbon control standards beyond the regulations now that EPA has promulgated and we don't change cap and trade systems or anything like this. So those are existing policies. That's the net load growth line that we see after energy efficiency.

In the carbon cost risk case, we add carbon costs between zero dollars in the near term up to $50 a metric ton in the long term, and we see basically the same result. The amount of energy efficiency, the amount of renewal development, the amount of other development is pretty much identical in both those scenarios.

If we have low gas prices, which average something under $3 a million metric -- a million BTU going forward, we basically see the same answer. The amount of energy efficiency development doesn't look all that dissimilar to the existing policy case, even when we limit the world to low gas prices.

When we specifically look at lower conservation, buying conservation only up to the

price of wholesale market, this is pretty cheap. We go less. That's the red line. Then we see net load growth actually exceeding where we start by the time we get out to 2035.

But through the first 10 years, through 2030 -- through the first 15 years to 2030, we still meet all load growth with energy efficiency. There's enough cheap conservation out there to do that. It's less costly than going to market.

If we follow that particular principle, however, the cost of that scenario is $14 billion more than doing the 4,500 megawatts. You go up 1,200 megawatts less, we end up paying $14 billion more in other resource development cost.

When we look at the carbon situation, this chart starts at the top with the average emissions for the northwest power system, carbon dioxide, between 2000 and 2012, it's about 55 million metric tons a year by the time we get to 2035.

If we don't retire the coal plants that have already been announced for retirement, that is, Centralia, Boardman and North Valmy, one in Oregon and one in Washington and a unit in Nevada, we get down to 45 million metric tons a year in that scenario and we're building energy efficiency, we're

adding renewals in that scenario, but we're not retiring coal plants. We only -- we're down about 10 million metric tons from those other efforts.

If we take the existing policy, which includes those retirements, we drop another roughly 10 million down to 34 million metric tons. So the existing policy case, assuming that Boardman, Centralia and Valmy close and we build 4,500 megawatts of energy efficiency, gets us down to 35 million metric tons a year of carbon emissions for the power system.

Under the best case that we looked at, maximum carbon reduction down at the bottom, we can get down from 55 to 8 -- to 12 million metric tons a year. That's about an 80 percent improvement through what we know how to do today with the existing technology.

We can get down the rest of the way with technology that may emerge over the next decade or so in terms of renewables, small modular reactors and other non-carbon-emitting resources. That's 80 percent improvement with what we can do today.

When we look at the cost of that, if we try and do it with renewable portfolio standards, it's about a $35 billion incremental cost to get

from 34 to 29. If we take and simply retire -- and simply is in quote here -- simply retire existing coal plants and reduce the amount of generation from natural gas inefficient plants, we can get down to 12 for incremental costs at $20 billion, and this is on a base of about almost $90 billion investment over the next 20 years in the power system. So if you're looking for a payoff, there are other ways to get there, but they are politically problematic.

And the resource strategy that comes about in all this, targeting 1,400 average megawatts of energy efficiency by 2021, as I said, 4,500 by 2035, encouraging the development of demand response. We think that's a cheap way to build capacity when we need resources, when we don't have very good water, that is, there's not much snow, not much rain and the weather conditions get really bad, cold, in particular.

We think there's another alternative that might be going to the market. The desert southwest and California market might be a viable source of that competing winter capacity, but that also has risks and liability associated with it.

Renewable resources. We want to encourage development of renewable resources that have winter

capacity. That would be great. We presently don't have those. So finding technology that moves that in that direction, non-carbon-emitting resources that can provide reliable output like geothermal or wave or some other non-carbon-emitting resource, in terms of renewables, looks like a good goal.

When we look at natural gas, we see principally what natural gas does, particularly existing natural gas -- when we turn off coal plants in this region, existing natural gas plants go up in their yields. And that's a way to reduce carbon at the lowest cost.

We also see a limited need for new natural gas development going forward. As those first charts showed, it's 2025 and beyond before we see much probability of gas development, new gas development.

Regional resource use. We sell a lot of surplus out of this region right now. Calling some of that back to avoid additional generation in this region has some benefits in terms of it meeting adequacy standards, but it also has some cost shifts associated with that.

And finally, we need to expand resource alternatives, both for energy efficiency and

renewables or non-greenhouse gas-emitting resources, enhanced geothermal, wave and SMRs.

And adaptive management. About two and a half years from now or so, the Council will reconvene and do a midterm assessment about how well things are going, and the real world will have materialized by then instead of the fake one we invented and we'll figure out whether we got it right or not. So let's stop there and let you have the floor.

MR. KARIER: Okay.

MR. ECKMAN: Clear off the table.

MR. KARIER: Thanks, Tom.

And, let's see. This would be a good time to turn off your cell phones if you haven't done that already. I just did my two cell phones, so I'll learn.

Last night we had a hearing in Spokane, we had about 35 people, and next door to us was a group called the Flying Irish. And it turns out they're a drinking and running club and they weren't doing running at that time.

(Laughter.)

MR. KARIER: It was difficult to hear people. I'm looking forward to a more quiet evening

for our testimony today. So as I call your name, come on up and take a seat and, again, state your name first and then we'll hear the correct pronunciation of it. And also, again, your organization or spelling for it. So Chad Bartram first. Welcome, Chad. Hi.

MR. BARTRAM: Good evening. My name is Chad Bartram. I'm general manager of Benton PUD located across the river in Kennewick. Welcome to the Tri-Cities.

I want to express our thanks for the Council holding these meetings. I think you've shown a very transparent process, your outreach leading up to the issuance of the plan and your efforts to travel throughout the northwest seeking feedback. So I really do appreciate your efforts here.

By way of context, a little bit about Benton PUD. We have over 50,000 customers. Our customer loads are 204 average megawatts, but we have a summer peak load of 430 megawatts. Power costs represent 60 percent of our -- Benton PUD's total expenditures, and certainly this process has an influence on those.

I have three primary comments relative to

the plan which relate to energy efficiency, natural gas prices and CO2 emissions. First, relative to energy efficiency, the Seventh Plan executive summary states that energy efficiency consistently proved the least expensive and least economically risky resource. We agree.

Benton PUD has a long history of supporting energy efficiency in our service territory. Since 2010, Benton PUD has invested $21 million in energy efficiency projects, and we project that our $21 million investment will result in over $40 million in avoided power purchases over the last several -- or for the next several years.

So while we agree on that larger point on the value of energy efficiency, we note that the plan provides a single point energy efficiency target of 1,400 average megawatts for the region over the next six years. We would suggest establishing a range target as opposed to a point target, recognizing that conservation investments are lumpy and sometimes unpredictable.

At Benton PUD, when working on our -- with customers on large projects, we have found that the planning and implementation sometimes takes years, and the timing of these projects often changes due

to customer budgets and constraints. As such, a range target may be more appropriate.

Relative to natural gas prices, I know that this -- they move up and down. I heard the comments yesterday at the Spokane meeting. We understand that the natural gas price assumptions were based on inputs from the summer or fall of 2014, I believe, which are higher than current forecasts, and since natural gas prices are a key input to the plan, we would recommend that the inputs be updated and more recent information used, if possible.

Finally, related to the renewable portfolio standards and CO2 emissions, as Tom indicated in his presentation, we find it particularly noteworthy that a key finding of the plan is that increasing renewable portfolio standards reduces the smallest CO2 emission reductions and is the highest cost emissions reduction resource strategy.

To date, as we all know, state policy responses within the region have focused on renewable portfolio standards and we certainly acknowledge that the existing investments in renewable generation are a component of the planned

resource portfolio and have had some benefit.

However, looking to the future, increasing state renewable portfolio standards are the most costly and produce the least emissions reductions, so we would encourage the Council to stress that key finding. I'm not sure if that's -- it's maybe a little bit counterintuitive, so we recommend that you stress the key finding to policymakers within the state.

In closing, I would like to quote the plan relative to our hydroelectric system, and it states: The federal Columbia River power system provides low-cost and carbon dioxide-free energy, capacity and flexibility. And in my mind, that's a grand slam. We should not forget that our system of hydroelectric dams is the backbone of our northwest economy. So that concludes my remarks and thank you very much, again, for being here.

MR. KARIER: Thanks, Chad.

Next we have Marc Krasnowsky. Evening, Marc.

MR. KRASNOWSKY: Hello, Tom.

Hi. I'm Marc Krasnowsky, M-a-r-c K-4-a-s-n-o-w-s-k-y. I'm the communications director for the NW Energy Coalition. That's spelled N-W Energy

Coalition. As communications director, I get all het up about things like that.

As you know, the coalition has been deeply involved in the Seventh Plan, as it has been in every plan since we were formed to monitor the plans back in 1981, and I'm not going to bore you all with a whole lot of things that you've heard from us during the process and will hear from us again in our copious written comments.

I would like to say that we're very supportive of the energy efficiency goals, which we would consider to be a floor rather than a ceiling. Energy efficiency is tremendous in terms of saving money for consumers, reducing pollution and creating economic rollovers with a dollar saved that the Council has said creates tens of thousands of jobs over the period.

We also applaud the focus on demand response to meet big needs. We note that in earlier drafts of the draft, there had been a stated goal of 700 megawatts and that a secondary number that -- it was in the 90th percentile, I believe, was 1,100. We would like to see a target reinserted in the final Seventh Plan. We would like to see it, you know, a range of 700 to 1,100 megawatts.

And we're also pleased that -- with the emphasis on low-income and other hard-to-reach sectors getting their fair share of energy efficiency savings. All electricity consumers pay for energy efficiency in their bills and all should be -- should receive benefits from them, even if they can't afford to go out and buy a high-efficiency appliance. We're going to have to do programs so they can do that.

Those are our main points, but on a more personal level, this is my third power plan --I came in on the Fifth and the Sixth -- and it's undoubtedly my last as a member of the NW Energy Coalition. In fact, I would have been retired already, but I wanted to stay through this.

My job allows me to work with the smartest people I've ever met, and I include the staff and Council -- the Council staff and Council members in that. My hope is that going forward, the Council will commit its fantastic computing, modeling and analytical expertise and capacity to addressing a couple of leftover issues in the Seventh Plan.

The first is on salmon recovery. We have produced a white paper, which I think you've all see, which we consider a rough draft of the cost,

strictly the power system cost of taking out the four Lower Snake dams and replacing their power.

We have analyzed the cost of maintaining those dams -- just the power system costs, not the waterway costs -- and subtracted that from the cost of replacing the power with a mix of utility scale solar and market purchases and paying the social cost of carbon for the carbon fraction of the grid purchases.

And when you put all that together and figure it down to the cost per consumer per meter, residential meter, it works out to about a dollar a month, which is, you know, which is pretty reasonable to save, you know, a dozen endangered species, perhaps, but certainly a couple -- certainly the Idaho stocks.

As I said, that's -- we don't have the computing and, you know, all the workability, the time and resources to do a really detailed job of that. We're hoping that the Council will do that and that it will use the best verifiable data to go in there, rather than -- we need to be critical of what the data is because some of the data is really outdated in terms of what the cost for refurbishing and maintaining the existing dams is. So hope

you'll do that.

Finally, I want to -- the capacity issue, the winter peak capacity issue. You know, this is a problem that happens -- that supposedly will arise for a couple hours every couple of years, and it seems that we ought -- that the Council ought to look at this as a challenge to address and overcome, rather than letting it become a rationale for building new fossil that's going to be around for 20, 30, 40 years to address a very short-term problem, a real problem, but a short-term one.

So, let's find solutions to this instead of letting it become that rationale. If we -- as someone last night was saying, you know, I'll put it a little bit different way, you know, when it comes to natural gas plants, if we build them, they will run. And that's not going to help us get to our emissions reductions goals.

So, for the third time, I applaud the Council for what it's done and I look forward to improvements to come in the Eighth Plan.

MR. KARIER: Thanks, Marc. Mike Paoli.

MR. PAOLI: Thank you. Thank you, Chair Karier, Councilman Bradbury, Councilman Rockefeller, ladies and gentleman. I am Michael Paoli, P-a-o-l-

i, Mike, the public information officer for Energy Northwest, representing more than 1,100 employees and 1,300 megawatts of nuclear, wind, hydro and solar generation.

Our CEO, Mark Reddemann, and the staff of Energy Northwest were very pleased to read a draft that reflects a great deal of research and thought toward meeting our region's future energy demands in a responsible and cost-effective manner.

The Council's emphasis on reaching carbon reduction targets, principally through use of existing natural gas combined with efficiency and demand response, reflects Energy Northwest's support for a diverse future energy mix that continues to reduce free general carbon emissions. It is certainly clear to us that increasing state renewable portfolio standards is not a cost-effective means for the region to decrease carbon emissions going forward.

As the owner-operator of the region's only nuclear energy facility, one of 99 in the United States that generate 19.5 percent of our nation's electricity, we certainly support the potential stated in this draft plan for small modular reactors and advanced nuclear energy, the acknowledgement of

our nation's abundant and controllable nuclear energy fuel supply and the awareness of nuclear being immune to both high natural gas prices and climate policy, or the potential thereof for high natural gas prices.

Although back east five nuclear reactors will be completed and online by 2020, providing 5,600 megawatts of capacity that keeps pace with recent nuclear retirements, we will have no need for such large nuclear generation anytime soon here in the northwest. Small modular reactors, however, combined with natural gas and renewables, hold great potential, as the plan states, for incrementally providing generation for the region when demand calls for it.

So we appreciate the hard work and thought that the Council and staff have put into this document, and the opportunity to make public comment here tonight. Thank you very much.

MR. KARIER: Thanks, Mike.

Dora Morfin. Welcome.

MS. MORFIN: Good afternoon. My name is Dora Morfin, M-o-r-f-i-n, and I just want to thank you guys for giving us the opportunity to give our feedback here in the Tri-Cities. And I just want --

I just want to ask you guys to, as you guys finalize the plan, to assure the low-income families that they also have a share in the energy savings. Thank you.

MR. KARIER: Thank you. Is there anybody else in the audience? That exhausts my list that I have here.

Come on up.

MR. VON REIS: Okay.

MR. KARIER: And just have a seat and introduce yourself.

MR. VON REIS: I will. Thank you. My name is John von Reis. The last name is spelled v-o-n R-e-i-s. I used to be substantially involved in power production and conservation and other issues, and now I'm happy to just watch. But I do have a few thoughts that I wanted to express. I became aware of this only very recently. I haven't had a chance to completely read the plan yet, the draft plan, and I apologize for anything that's sort of superfluous.

But in regard to energy transmission, I think the plan should advocate a strenuous effort to thoroughly modernize and harden the transmission system, both within the northwest and in the tie

lines like down to California. You need to modernize to significantly reduce energy losses and probably address directly the likelihood of federal or other funding for this and harden it to reduce vulnerability to attack or upset. That's number one.

Number two, and this is sort of reflecting the remarks from the gentleman who spoke a moment ago, there is history and configuration in this particular region around Hanford and Umatilla of pressure for increased generation capacity from gas and nuclear. And if I understand what I've read in the plan correctly, you're saying that this is largely unnecessary.

It's a significant issue around here, and the final plan needs to be very clear on, I think, the extent to which added generating capacity from conventional sources, including nuclear, is or is not necessary. I think there needs to be a lot of clarity on that point.

Third, again, a certain amount of what I'm concerned about is clarity here. You need to clearly define the uncertainty associated with future storage of energy produced from renewable sources and address the range of consequences that

are dependent on how storage capacity develops and is used. And the likelihood or unlikelihood of success with renewables, to a great extent it's going to depend on storage, and I don't think -- I don't think it's clear, but I think the plan needs to be clear on the range of issues that flow from that.

Two more points. One is that there are a lot of issues that are, let's say, political, cultural or generally economic as opposed to specific power production that pertain to some -- pertain to the decision making on specific issues.

For example, the argument over the removal of the Snake River dams. And it would be good if the plan laid out as clearly as possible the nature of the non-power generation, non-energy efficiency issues that are associated with some of these items that are going to have to be addressed in the future.

Last is that I, for what it's worth, endorse the NW Energy Coalition's remarks regarding addressing peak demand. I think finding ways to flatten the demand curve is very likely preferable to building capacity that is going to be rarely needed, and I agree with what was said on that

point.

Thank you.

MR. KARIER: Thank you, John.

Anyone else in the audience who's moved to speak, come on up. Have a seat.

MR. BROWN: Am I on the list? I thought I was on the list.

MR. KARIER: You --

MR. BROWN: Did you go away from the list?

MR. KARIER: Well, there's both a sign up and then you needed to check in the margin.

MR. BROWN: Oh, I didn't do that.

MR. KARIER: We made it difficult for people by --

MR. BROWN: I'm sorry.

My name is Craig Brown. I'm from Richland. I represent myself, and I'd just like to say a couple of things.

I think it's a good plan. There's no question that the quality of life in the U.S. is and has been directly tied to harnessing inexpensive, abundant electricity. That's why America is America, because of that. So the goal of the power plan should be to continue to provide least expensive, plentiful, on-demand electricity to the

northwest, and I have six points. And they're all on here with some other information.

But, number one, promote energy efficiency. It's already in the plan. Great idea.

Number two, look into demand response. That's in the plan. That should not be a substitute for on-demand electricity, but I think the two are not mutually exclusive. So I think that's okay. It's a good thing to look at.

Number three, maintain existing natural power gas -- gas power plants. That's in the plan. Also, I would say, too, don't phase out coal-fired plants without considering technology for CO@ sequestration. And I give a reference there. There's a couple of, I think, credible professors that say that they can -- there's a way of doing it and adding only one to two cents per kilowatt hour to the cost of coal and be able to sequester most of the CO2. And I give a reference in there.

Number four, add additional capacity by building nuclear power plants and not gas-fired plants. The reason for that, for example, the third generation thousand-megawatt nuke plants are safe, cheaper than wind and solar, have a tiny environmental footprint or they give out very little

CO2 emissions, are very high capacity factor, reliable, relatively low fuel costs, reduced power system operational challenges.

And these will help reduce the uncertainty in fuel costs going forward. If you double the fuel costs of a nuke plant, the electricity costs go up 10 percent. If you double the cost of natural gas, it will just about double the cost of your electricity, and natural gas has had a tendency to make abrupt changes. If something happens to fracking, the price could jump very quickly.

Number five, promote wind and solar as they are. They're alternative power sources that will not be inexpensive. It will cost two to three times more than, for example, a nuke or a coal plant. Obviously, it won't be plentiful. They have very low availability, particularly at night, and they will not be on demand.

If you put to a vote, I believe, to people who would prefer to have more windmills than, for example, another thousand-megawatt nuke plant -- for example, Nine Canyon Wind, I think it has 63 windmills out there now. And in order to provide the same amount of electricity as the Columbia generating station, you'd have to add 2,800

additional windmills. It's a shame to pepper one of the most scenic gorges in the U.S. with windmills that kill multitudes of birds, bats and bees.

And in addition to that, if you were going to put solar -- if you're going to go to photovoltaic solar, you would have to cover an area half the size of the Tri-Cities with those solar panels in order to get the same amount of power from the Columbia -- for example, something like the Columbia generating station. So would we rather have 2,800 more windmills or another nuclear power plant? And who wants that?

And lastly, do not -- do no more than is necessary to meet minimum federal EPA standards relative to CO2 emissions. Appendix M talks about the impact of climate change and the importance of the plan to address that, and I understand, you know, this is not a debate on climate change and obviously you have to meet federal EPA standards for now CO2 emissions, et cetera, but I think there's great risk in assuming that those models that are used -- there's great uncertainty and great risk in using those models to project what's going to be happening out 10 or 20 or 30 years. They're not well benchmarked and there's high uncertainties in

that. And I have some comments on there about Appendix M.

Just let me say that the goal, if we -- the goal is to cut CO2 in the atmosphere, let's see, in half by 2035, okay, if -- cutting U.S. emissions in half by 2035, I think that's what the goal is. Recognizing that the U.S. accounts for about 20 percent of what's being put up in the atmosphere, and if we cut it in half by 2035 or in 20 years, the rate of increase right now is 2 ppm per year, that means by 2035, you'll only reduce the amount of CO2 in the atmosphere 4 ppm. That's it, 4 ppm.

So if you're at 400-something and you implement this plan of the United States, it will only make a 4 ppm difference. That means that you're going to have the same ppm in 2035 in the atmosphere as you would have two years earlier if we did nothing about CO2. So to think that in cutting the CO2 we're going to see changes in 2035 and beyond in the weather in the northwest is wishful thinking, if you just look at the numbers. And I've included that.

So, again, I appreciate the opportunity to say a few words, and everything I've said is in there, and thank you.

MR. KARIER: Okay. Thanks, Craig.

Anyone else? I think what blew up was my microphone. Would anyone else like to testify?

Okay. Well, with that, I have a few closing comments, but first I want to let Bill or Phil give any comments that they have.

MR. BRADBURY: Well, just that I personally really appreciate hearing from folks around the region about what their concerns are relating to developing our needed electricity, and I particularly like to hear that there is, appears to be, fairly broad support for conservation and demand response and then finding other sources for what other -- whatever small amount of additional energy we're going to need in the next 20 years. So thank you very much for your testimony tonight.

CHAIR ROCKEFELLER: And I would second that. It's always helpful to check the substance of what we have come up -- or what our staff has presented against the reality of your experiences collectively.

I'm always impressed by the breadth and depth of knowledge in the community at large. Whenever we have a gathering like this, it's quite remarkable to hear so many people come forward who

have thought about these issues, lived with them and worked with them for years. And so I know there's more expertise out there than I will ever possess, and so I very much value hearing from each of you. Thank you so much.

MR. KARIER: Okay. I'd echo that. Thank you all for coming out on a Friday night and talking about power issues in the northwest. They're important to us and, you know, we want to know what you think about the plan and we're always in the market for good ideas. And our staff has a lot of them, but they don't have a monopoly on good ideas. And so we'll be taking that into account.

Again, your testimony will be transcribed and it will be available for us to read again later and for other Council members to read and for us to consider as we work towards finalizing the plan, which we expect to be done around March in 2016.

The last, final deadline for written comments, I'll remind you, is December 18th. So you want to make sure that if you're planning to do that, get it in by that time.

I also want to -- one last thing is just, there's a number of other Council staff in the room. I want you to just raise your hand so they know who

you are. And as we break here, if you want to talk to any of them about the Council or have questions, feel free to grab them. Also, feel free to contact any of us. You can find our contact information on nwcouncil.org. If you're from Washington or Oregon, call your Council member if you have questions or concerns.

And with that, we're going to close this part of the hearing. What we will do is we're going to leave a smaller group here in case somebody else comes in a little bit later and we don't want to miss their comments. So -- but at this point, we're adjourned. Thank you for coming.

(Whereupon, the Public Hearing was concluded at 5:51 p.m.)

CERTIFICATE

I, Donald Polen, do hereby certify that I reported all proceedings adduced in the foregoing matter and that the foregoing transcript pages constitutes a full, true and accurate record of said proceedings to the best of my ability.

I further certify that I am neither related to counsel or any party to the proceedings nor have any interest in the outcome of the proceedings.

IN WITNESS HEREOF, I have hereunto set my hand this 25th day of November, 2015.

Donald Polen

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$14 11:11 11:13

$20 13:5

$21 17:9 17:11

$3 10:18

$35 12:25

$40 17:12

$50 10:12

$90 13:6

1

1,100 20:22 20:25 24:2

1,200 11:13

1,300 24:3

1,400 13:11 17:17

1,500 9:20

10 5:12 5:14 6:4 11:5 12:3 12:6 31:7 32:24

10,000 7:23

12 12:14 13:5

13 3:3

15 11:6

18th 4:8 35:20

19.5 24:22

1981 20:6

2

2 33:10

2,800 31:25 32:11

20 6:21 9:1 9:9 13:7 23:10 32:24 33:7 33:9 34:15

20,000 9:3 9:3 9:4

2000 11:18

2010 17:9

2012 11:18

2014 18:8

2015 3:3

2016 7:13 9:4 35:18

2020 25:7

2021 13:12

2025 14:15

2026 7:15

2030 11:6 11:6

2035 7:13 9:12 11:4 11:19 13:12 33:5 33:6 33:9 33:11 33:16 33:19

204 16:20

20-plus 10:1

20th 4:6

29 13:1

3

30 9:1 23:10 32:24

34 12:6 13:1

35 12:9 15:19

4

4 33:12 33:12 33:15

4,500 7:13 7:21 9:10 9:20 11:12 12:8 13:12

40 23:10

400-something 33:13

430 16:21

45 11:24

5

5,600 25:8

5:03 3:4

5:51 36:15

50,000 16:19

55 11:18 12:14

6

6,000 9:18 9:21

60 16:22

63 31:22

7

700 20:21 20:25

8

8 12:14

80 12:15 12:21

9

90th 20:22

99 24:21

A

able 5:18 30:18

abrupt 31:10

abundant 25:1 29:22

accepting 4:7

access 7:11

account 9:23 35:13

accounts 33:7

acknowledge 18:24

acknowledgement 24:25

across 16:9

Act 3:25

actually 3:20 11:3

adaptive 15:3

add 5:12 9:20 10:10 30:20 31:25

added 27:17

adding 12:1 30:17

addition 32:4
additional 14:20 30:20 32:1 34:14
address 23:7 23:10 27:3 27:25 32:17
addressed 28:18
addressing 21:21 28:22
adequacy 14:22
adjourned 36:13
administrative 4:18
advanced 24:25
advocate 26:23
afford 21:7
afternoon 25:22
against 34:20
ago 27:9
allows 21:16
already 11:21 15:16 21:15 30:4
alternative 13:19 31:13
alternatives 14:25
am 23:25 29:6
America 29:22 29:23
amount 7:10 10:13 10:14 10:15 10:20 13:3 27:21 31:24 32:8 33:11 34:14
analytical 21:21
analyzed 22:3
announced 11:21
annual 7:10
answer 9:22 10:19
anybody 26:5
anyone 6:9 29:4 34:2 34:3
anything 10:6 26:20
anytime 25:10
apologize 26:20
appears 34:11
Appendix 32:15 33:2
applaud 20:18 23:19
appliance 21:8
appreciate 16:16 25:16 33:23 34:8
appropriate 18:2
area 32:6
aren't 4:21 8:24
argument 28:13
arise 23:4
assessment 15:5
associated 13:23 14:23 27:23 28:17
assumes 10:3
assuming 12:7 32:21
assumptions 18:6
assure 26:2
atmosphere 33:4 33:8 33:12 33:17
attack 27:5
audience 26:6 29:4
availability 31:17
available 35:15
average 7:13 7:15 7:21 9:6 9:11 9:20 10:17 11:16 13:11 16:20 17:17
avoid 14:20
avoided 17:12
aware 26:18
awareness 25:2
away 29:9
axis 7:10

B

backbone 19:16
bad 13:17
Bartram 16:5 16:7 16:8
base 13:6
based 18:7
basically 10:13 10:19
bats 32:3
bear 3:20
became 26:17
become 23:8 23:13
bees 32:3
begin 5:1
believe 18:8 20:22 31:19
benchmarked 32:25
benefit 19:1
benefits 14:21 21:6
Benton 16:8 16:19 16:22 17:7 17:9

17:22
best 12:12 22:21
beyond 10:4 14:15 33:20
Bill 3:9 34:5
billion 11:11 11:13 12:25 13:5 13:6
bills 21:5
birds 32:3
bit 7:24 16:18 19:7 23:15 36:11
blew 34:2
blow 8:19
Boardman 11:22 12:7
Bonneville 6:22
bore 20:6
bottom 12:13
Bradbury 3:9 23:24 34:7
breadth 34:22
break 36:1
brief 6:14
broad 34:12
Brown 29:6 29:9 29:12 29:15 29:16
BTU 10:18
budgets 18:1
build 12:8 13:14 23:16
building 11:25 23:9 28:24 30:21
bulk 9:10
buy 21:7
buying 10:25
bypassed 8:13

C

California 13:21 27:1
Canyon 31:22
cap 10:6
capacity 7:8 7:20 8:1 8:1 8:18 13:14 13:22 14:1 19:13 21:21 23:2 23:3 25:8 27:11 27:17 28:1 28:24 30:20 31:1
carbon 10:4 10:10 10:11 11:15 11:17 12:10 12:13 14:11 19:13 22:8 22:8 24:10 24:15 24:18
case 7:6 10:2 10:10 10:22 12:7 12:12 36:10
ceiling 20:12
cell 15:15 15:16
Centralia 11:22 12:8
cents 30:17
CEO 24:5
certain 27:21
certainly 16:23 18:23 22:15 22:16 24:16 24:23
cetera 32:20
Chad 16:5 16:6 16:8 19:19
Chair 3:12 23:23 34:17
challenge 23:7
challenges 31:3
chance 26:19
change 10:6 32:16 32:18
changes 17:25 31:10 33:19
chart 11:16
charts 7:9 14:15
cheap 11:1 11:8 13:14
cheaper 30:24
check 29:11 34:18
Cities 3:14
clarity 27:20 27:22
clear 15:12 24:16 27:16 28:5 28:6
clearly 27:23 28:15
climate 25:4 32:16 32:18
close 12:8 36:8
closing 19:10 34:5
club 15:21
CO@ 30:13
CO2 17:2 18:14 18:18 30:19 31:1 32:15 32:20 33:4 33:11 33:18 33:19
coal 11:20 12:2 13:3 14:9 30:18 31:15
coal-fired 30:12
coalition 19:25 20:1 20:3 21:14
Coalition's

28:21
cold 8:20
13:17
collectively
34:21
Columbia
19:12 31:24
32:9 32:10
combined
24:12 25:12
comes 7:15
13:10 23:15
36:11
coming 7:16
8:11 8:15
9:19 35:7
36:13
comment 4:6
4:8 4:12
5:23 6:10
25:18
comments 4:10
4:16 4:17
4:22 5:13
5:14 5:22
6:11 6:15
6:16
16:25
18:5 20:9
33:1 34:5
34:6
35:20 36:12
commit 21:20
communication
s 19:24
20:1
community
34:23
competing
13:22
completed
25:7
completely
26:19
component
18:25
computing
21:20 22:18
concept 6:24
concerned
27:22
concerns 34:9
36:7
concluded
36:15
concludes
19:17
conditions
13:17
configuration
27:9
consequences
27:25
conservation
3:8 3:23
4:1 9:24
10:25 10:25
11:8
17:20 26:15
34:12
consider
20:12 21:25
35:17
considered
4:20
considering
30:13
consistently
17:4
constraints
18:1
consumer
22:11
consumers
20:14 21:4
contact
36:3 36:4
context 16:18
continue
29:24
continues
24:14
control 10:4
controllable
25:1
conventional
27:18
copious 20:9
core 6:24
correct 16:3
correctly
27:13
cost 10:10
11:11 11:14
12:23 12:25
14:12 14:22
18:19 21:25
22:1 22:3
22:5 22:8
22:11 22:24
24:17 30:18
31:7 31:8
31:14
cost-
effective
24:9
costly 11:9
19:4
costs 10:11
13:5
16:22
22:4 22:5
31:2 31:5
31:6 31:6
Council 3:8
3:10 3:14
3:23 4:1
4:3 4:5 4:7
4:9 4:20
4:23 5:15
15:4
16:12
19:5
20:16 21:18
21:18 21:18
21:19 22:20
23:6
23:20 25:17
35:16 35:24
36:2 36:6
Councilman
23:24 23:24
Council's
3:24 4:18
5:16 5:21
24:10
counterintuit
ive 19:7
country 8:22
couple
21:22 22:15
23:5 23:5
29:18 30:15

court 5:3
cover 32:6
Craig 29:16 34:1
creates 20:16
creating 20:14
credible 30:15
critical 22:22
cue 8:3
cultural 28:10
current 18:8
curtailment 8:4
curve 28:23
customer 8:7 16:20 18:1
customers 16:19 17:23
cut 33:4 33:9
cutting 33:5 33:18

D

dams 19:16 22:2 22:4 22:25 28:14
data 22:21 22:23 22:23
date 18:21
days 5:12 5:14 5:18
deadline 35:19
deal 24:7
debate 32:18
decade 12:19
December 4:8 35:20
decision 6:23 28:12
decrease 24:18
deeply 20:3
define 27:23
demand 7:6 8:4 13:13 20:18 24:13 25:14 28:22 28:23 30:5 31:18 34:12
demands 24:8
depend 28:4
dependent 28:1
depth 34:23
desert 13:20
desire 4:16
detailed 22:19
develop 4:1 6:19 7:12
developing 9:9 34:10
development 7:21 7:25 9:16 10:14 10:15 10:20 11:14 13:13 13:25 14:14 14:16 14:17
develops 28:1
difference 33:15
different 23:15
difficult 15:24 29:13
dioxide 11:17
dioxide-free 19:13
direct 5:20
direction 14:3
directly 27:3 29:21
director 19:24 20:1
directs 3:25
dissimilar 10:21
diverse 24:14
document 25:18
dollar 20:15 22:12
dollars 10:11
done 10:1 15:15 23:20 35:18
door 15:19
Dora 25:21 25:23
double 31:5 31:7 31:8
dozen 22:14
draft 4:5 4:8 4:10 4:12 20:20 21:25 24:6 24:24 26:19
drafts 20:20
drinking 15:21
drop 12:5
due 17:25
during 8:5 20:8

E

earlier 20:19 33:17
easily 5:24
east 25:6
echo 35:6
Eckman 6:4 6:14 15:12
economic 20:15 28:10
economical 6:20
economically 17:5
economy 19:17
effective 24:18
efficiency 7:5 7:12

7:14 7:22
8:2 9:2 9:6
9:7 9:9
9:19 10:9
10:14 10:20
11:7
11:25
12:9
13:12 14:25
17:1 17:3
17:4 17:8
17:10 17:15
17:16 20:11
20:13
21:4 21:5
21:8
24:12 28:16
30:4

effort 4:4
26:23

efforts
12:3
16:15 16:16

Eighth 23:21

electric 4:1

electricity
21:4
24:23 29:22
29:25
30:7 31:6
31:9
31:24 34:10

elements 6:25

else 6:9 26:6
29:4 34:2
34:3 36:10

elsewhere
8:22

emerge 12:19

emission
18:18

emissions
11:16 12:10
17:2
18:14 18:19
19:4
23:18 24:15
24:19
31:1
32:15 32:20
33:5

emphasis 21:2
24:10

employees
24:2

encourage
13:24 19:5

encouraging
13:13

endangered
22:14

endorse 28:21

energy 7:5
7:7 7:10
7:12 7:14
7:22 8:1
8:1 8:5 9:6
9:7 9:9
9:18 10:8
10:13 10:20
11:7
11:25
12:9
13:12 14:25
17:1 17:3
17:4 17:8
17:10 17:15
17:16 19:13
19:25 19:25
20:11 20:13
21:3 21:5
21:13
24:1 24:6
24:8
24:13 24:14
24:21 24:25
25:2 26:3
26:22
27:2
27:24 28:21
30:3 34:14

engaged 4:3

enhanced 15:2

environmental
30:25

EPA 10:5
32:14 32:19

establishing
17:19

et 32:20

evening 3:6
3:12 4:16
4:25
15:25
16:7 19:20

event 5:9
5:10

everything
33:24

example 28:13
30:22 31:15
31:21 31:22
32:9

exceeding
11:3

exclusive
30:8

executive
17:3

exhausts 26:6

existing 10:2
10:7
10:21
12:4 12:7
12:17
13:2 14:9
14:10 18:24
22:25 24:12
30:10

expand 14:24

expect 35:18

expenditures
16:23

expensive
17:5 29:25

experiences
34:20

expertise
21:21 35:3

express 16:11
26:17

extent
27:17 28:3

extremely
8:19

F

facility
24:21

fact 21:14

factor 31:1

fair 21:3

fairly 34:12

fake 15:7

fall 18:7
families 26:2
fantastic 21:20
fast 8:13 8:16
federal 9:15 9:16 19:12 27:3 32:14 32:19
feedback 16:16 25:25
feel 36:3 36:3
Fifth 21:12
figure 15:8 22:11
final 20:24 27:16 35:19
finalize 26:1
finalizing 35:17
finally 14:24 18:13 23:2
finding 7:4 14:2 18:16 19:6 19:8 28:22 34:13
first 6:17 11:5 11:6 14:14 16:3 16:6 17:2 21:23 34:5
five 4:2 7:2 25:6 31:12
five-year 4:3
flatten 28:23
flexibility 19:14
floor 15:10 20:12
flow 28:6
Flying 15:20
focus 20:18
focused 18:22
folks 6:15 8:14 34:8
footprint 30:25
forecast 7:1
forecasts 18:9
forget 19:15
formed 20:5
forward 7:8 7:21 10:19 14:14 15:25 21:19 23:20 24:19 31:5 34:25
fossil 23:9
fracking 31:11
fraction 22:8
free 6:9 24:15 36:3 36:3
Friday 3:3 35:7
fuel 25:2 31:2 31:5 31:5
full 5:7
fundamental 6:23
funding 27:4
future 7:1 19:2 24:8 24:14 27:24 28:19

G

gas 7:14 8:10 10:17 10:22 13:4 14:7 14:8 14:9 14:10 14:14 14:16 14:16 17:2 18:3 18:6 18:9 23:16 24:12 25:3 25:5 25:12 27:11 30:11 30:11 31:7 31:9
gas-emitting 15:1
gas-fired 30:21
gathering 34:24
general 16:8 24:15
generally 28:10
generate 24:22
generating 27:17 31:25 32:10
generation 13:3 14:20 18:25 24:4 25:10 25:14 27:11 28:16 30:23
gentleman 23:25 27:8
geothermal 14:4 15:2
gets 12:9
getting 21:3
gigawatts 9:3
giving 25:24
goal 14:6 20:20 29:23 33:3 33:4 33:6
goals 20:11 23:18
gone 6:8
gorges 32:2
grab 36:3
grand 19:14
great 14:1 24:7 25:12 28:3 30:4 32:21 32:22 32:22
green 7:11 9:15
grid 22:8
group 15:19

36:10
growth 8:25 9:1 9:7 9:11 9:11 9:23 10:8 11:3 11:7
guidance 6:22
guys 25:24 26:1 26:1

H

half 15:4 32:7 33:5 33:6 33:9
hand 35:25
Hanford 27:10
happens 23:4 31:10
happy 26:16
hard 25:16
harden 26:24 27:4
hard-to-reach 21:2
harnessing 29:21
haven't 15:15 26:18
hear 15:24 16:3 20:8 34:11 34:25
heard 18:4 20:7
hearing 3:1 3:15 3:22 4:13 6:1 15:18 34:8 35:4 36:9 36:14
hearings 3:18 4:9
held 3:2 3:22
Hello 8:14 19:22
help 23:17 31:4
helpful 34:18
het 20:2
Hi 16:6 19:23
high 21:7 25:3 25:4 31:1 32:25
higher 18:8
highest 18:19
highlights 6:2
history 17:7 27:9
hold 4:9 25:12
holding 16:12
hope 21:19 22:25
hoping 22:20
horizontal 7:11
hour 30:17
hours 9:3 23:5
hydro 24:3
hydroelectric 19:11 19:16

I

I'd 29:17 35:6
Idaho 22:16
idea 30:4
ideas 35:11 35:12
identical 10:15
I'll 5:10 6:17 15:17 23:14 35:20
I'm 3:7 3:7 3:19 15:25 16:8 19:6 19:23 19:24 20:6 26:16 27:21 29:15 29:16 34:22
immune 25:3
impact 9:17 32:16
implement 33:14
implementation 17:24
importance 32:16
important 35:9
importantly 4:19
impressed 34:22
improvement 12:15 12:22
improvements 23:21
include 6:25 21:17
included 5:8 33:22
includes 12:5
including 5:15 27:18
increase 33:10
increased 27:11
increasing 18:17 19:2 24:16
incremental 12:25 13:5
incrementally 25:13
indicated 18:15
industrial 8:8
inefficient 13:4
inexpensive 29:21 31:14
influence 16:24
information 5:19 18:11 24:1 30:2 36:4

input 18:10
inputs 18:7 18:11
instead 15:7 23:12
instructions 3:19
intend 4:24
introduce 26:11
invented 15:8
invested 17:9
investment 13:6 17:11
investments 17:20 18:24
involved 20:4 26:14
Irish 15:20
issuance 16:14
issue 23:2 23:3 27:15
issues 21:22 26:15 28:6 28:9 28:12 28:17 35:1 35:8
items 28:17
I've 21:17 27:12 33:21 33:24

J

job 21:16 22:19
jobs 20:16
John 26:13 29:3
juice 9:4
jump 31:11

K

K-4-a-s 19:23
Karier 3:6 3:7 3:13 15:11 15:13 15:24 19:19 23:22 23:24 25:20 26:5 26:10 29:3 29:8 29:10 29:13 34:1 35:6
Kennewick 16:9
key 18:9 18:16 19:5 19:8
kill 32:3
kilowatt 30:17
knowledge 34:23
Krasnowsky 19:20 19:22 19:23

L

ladies 23:25
laid 28:15
large 17:23 25:10 34:23
largely 7:17 27:14
larger 17:14
last 15:18 17:13 21:13 23:14 26:13 28:20 35:19 35:23
lastly 32:13
later 35:15 36:11
latest 4:3
Laughter 15:23
leading 16:14
learn 15:17
least 17:5 17:5 19:4 29:24
leave 4:15 5:11 36:10
leftover 21:22
less 11:2 11:9 11:13
let's 8:12 15:9 15:14 23:12 28:9 33:4
letting 23:8 23:13
level 21:11
liability 13:23
life 29:20
likelihood 27:3 28:2
likely 28:23
limit 10:22
limited 14:13
line 10:8 11:2
lines 27:1
link 5:23
list 26:6 29:6 29:7 29:9
little 6:17 7:24 9:2 16:18 19:7 23:15 30:25 36:11
lived 35:1
load 8:25 9:1 9:7 9:11 9:11 9:23 10:8 11:2 11:7 16:21
loads 9:8 9:17 16:20
located 16:9
long 10:12 17:7
losses 27:2
lot 9:14 14:18 20:7 27:19 28:9 35:11
low 10:17 10:22 31:2 31:17

low-cost 19:13
lower 10:24 22:2
lowest 14:12
low-income 21:2 26:2
lumpy 17:21

M

main 21:10
maintain 30:10
maintaining 22:3 22:25
major 6:25
management 15:3
manager 16:8
manner 24:9
Marc 19:20 19:21 19:23 23:22
M-a-r-c 19:23
March 35:18
margin 29:11
Mark 24:5
market 11:1 11:9 13:20 13:21 22:7 35:11
materialized 15:7
matter 5:17
maximum 12:13
may 4:15 5:22 12:19 18:2
maybe 19:6
means 24:18 33:11 33:15
meet 7:1 7:7 7:17 7:25 11:7 20:19 32:14 32:19
meeting 9:10 9:11 14:21 18:5 24:8
meetings 16:12
megawatt 9:3
megawatts 7:13 7:22 7:23 9:4 9:10 9:18 9:20 11:12 11:13 12:9 13:11 16:20 16:21 17:17 20:21 20:25 24:3 25:8
member 3:7 3:9 3:11 21:13 36:6
members 21:18 35:16
met 21:17
meter 22:11 22:12
metric 10:12 10:18 11:18 11:24 12:3 12:6 12:10 12:14
Michael 23:25
microphone 34:3
midterm 15:5
Mike 23:22 24:1 25:20
million 10:18 10:18 11:18 11:24 12:3 12:6 12:6 12:10 12:14 17:10 17:11 17:12
mind 19:14
minimum 32:14
minutes 6:4
miss 36:12
mix 22:6 24:14
modeling 21:20
models 32:21 32:23
modernize 26:24 27:2
modular 12:20 24:24 25:11
moment 27:8
money 20:14
monitor 20:5
monopoly 35:12
Montana's 7:18
month 22:13
Morfin 25:21 25:23
M-o-r-f-i-n 25:23
MORFIN 25:22
move 18:4
moved 29:4
moves 14:2
multitudes 32:3
mutually 30:8
myself 29:17

N

nation's 24:22 25:1
natural 7:14 8:10 13:4 14:7 14:8 14:9 14:10 14:13 17:1 18:3 18:6 18:9 23:16 24:12 25:3 25:5 25:12 30:10 31:7 31:9
nature 28:15
necessary 27:19 32:14
net 9:1 9:22 10:8 11:2
Nevada 11:23
night 15:18 23:14 31:17

35:7
Nine 31:22
non-carbon-emitting 12:21 14:3 14:5
non-energy 28:16
non-greenhouse 15:1
non-power 28:16
North 11:22
northwest 3:8 3:23 3:24 3:25 4:11 6:21 11:17 16:15 19:16 24:2 24:6 25:11 26:25 30:1 33:20 35:8
Northwest's 24:13
note 17:15 20:19
noteworthy 18:16
nothing 33:18
NOVEMBER 3:3
n-o-w-s-k-y 19:24
nuclear 24:3 24:21 24:25 25:1 25:2 25:6 25:9 25:10 27:12 27:18 30:21 32:11
nuke 30:23 31:6 31:15 31:21
NW 19:25 21:13 28:21
N-W 19:25
nwcouncil.org 5:22 36:5

O

obviously 31:16 32:19
October 4:5
officer 24:1
official 3:17 5:8 5:11
offsets 7:23
Oh 29:12
okay 15:11 26:9 30:8 33:5 34:1 34:4 35:6
o-n 26:14
on-demand 29:25 30:7
online 9:19 25:7
open 5:11
opening 5:25
operational 31:3
opportunities 9:14
opportunity 25:18 25:24 33:23
opposed 17:19 28:10
oral 4:10 5:15
order 4:25 7:23 31:23 32:8
Oregon 3:9 7:18 11:22 36:5
organization 5:3 16:5
ought 23:6 23:6
outdated 22:24
output 14:4
outreach 16:13
outside 4:14
overcome 23:7
overview 6:2
owner-operator 24:20

P

p.m 3:4 36:15
pace 25:8
panels 32:8
P-a-o-l 23:25
Paoli 23:22 23:23 23:25
paper 21:24
particular 6:22 11:10 13:18 27:10
particularly 14:8 18:16 31:17 34:11
past 7:5
pay 21:4
paying 11:13 22:7
payoff 13:8
peak 7:22 8:1 8:5 8:23 8:23 16:21 23:3 28:22
people 6:7 6:8 15:19 15:25 21:17 29:14 31:19 34:25
pepper 32:1
per 22:11 22:11 30:17 33:10
percent 12:15 12:22 16:22 24:22 31:7 33:8
percentile 20:22
perhaps 22:15
period 5:12 8:24 20:17

periods 8:5

personal
21:11

personally
34:8

pertain 28:11
28:12

phase 30:12

Phil 3:10
34:6

phones
15:15 15:16

photovoltaic
32:6

placed 4:18

plan 3:15
3:24 4:2
4:2 4:4 4:5
4:8 4:10
4:13 4:19
5:20 6:1
6:3 6:18
6:19 6:25
7:1 7:4
7:25 9:14
9:19 9:22
9:22
16:14
17:1 17:3
17:16 18:10
18:17 19:10
20:4 20:5
20:24 21:11
21:22 23:21
24:24 25:13
26:2
26:19 26:20
26:23 27:13
27:16 28:5
28:15 29:19
29:24
30:4 30:6
30:11 32:17
33:14 35:10
35:17

planned 18:25

planning
17:24 35:21

plans 7:5
20:5

plant 31:6
31:16 31:21
32:12

plants
11:20
12:2 13:3
13:4 14:9
14:10 23:16
30:11 30:13
30:21 30:22
30:23

please 4:13
5:1

pleased
21:1 24:6

plentiful
29:25 31:16

point 17:14
17:16 17:19
27:20
29:1 36:12

points
21:10
28:8 30:1

policies 10:7

policy 10:2
10:21
12:4 12:7
18:21 25:4

policymakers
19:8

political
28:9

politically
13:9

pollution
20:14

portfolio
7:18
12:24 18:14
18:17 18:23
19:1 19:3
24:17

possess 35:3

possible 5:16
18:12 28:15

post-2025
7:16

posted 5:16

potential
24:23
25:4 25:13

power 3:8
3:15 3:23
3:24 3:25
4:2 4:4 4:8
4:19 5:20
6:18 6:20
11:17 12:11
13:7
16:21 17:12
19:12 21:11
22:1 22:2
22:4 22:6
26:15 28:11
29:23 30:11
30:11 30:21
31:2
31:13
32:8
32:11 35:8

ppm 33:10
33:12 33:12
33:15 33:16

prefer 31:20

preferable
28:23

presentation
6:2 18:15

presented
34:20

presently
14:1

pressure
27:11

pretty 9:5
10:15
11:1 22:13

price 11:1
18:6 31:11

prices
10:17 10:23
17:2 18:3
18:9 25:3
25:5

primary 16:25

principally
14:8 24:11

principle
6:18 7:6
7:24 11:10

probability
14:16

probably
5:5 6:3

27:3
problem 23:4 23:11 23:11
problematic 13:9
process 7:3 8:8 8:12 16:13 16:23 20:8
produce 7:22 19:4
produced 21:24 27:24
production 26:15 28:11
professors 30:15
programs 21:9
project 17:11 32:23
projects 17:10 17:23 17:25
promote 30:3 31:12
promulgated 10:5
pronunciation 16:4
properly 5:4
proposed 5:19
proved 17:5
provide 6:15 8:18 14:4 29:24 31:23
provided 4:14 5:23
provides 17:16 19:12
providing 8:21 25:7 25:14
public 3:1 3:15 3:22 4:6 4:9 5:14 24:1 25:18 36:14
PUD 16:8 16:19 17:7 17:9 17:22
PUD's 16:22
purchases 17:12 22:7 22:9
purpose 4:14
PV 8:12

Q

quality 29:20
question 29:20
questions 6:11 36:2 36:6
quickly 31:11
quiet 15:25
quite 34:24
quote 13:2 19:10

R

rain 13:16
raise 35:25
range 17:19 18:2 20:25 27:25 28:6
rarely 28:24
rate 33:10
rather 5:18 6:15 20:12 22:22 23:8 32:10
rationale 23:8 23:13
reaching 24:10
reactors 12:20 24:24 25:6 25:11
real 15:6 23:11
reality 34:20
really 13:17 16:16 22:19 22:23 34:8
reason 30:22
reasonable 22:14
receive 4:10 21:6
recent 18:11 25:9
recently 26:18
recognized 9:13
recognizing 17:20 33:7
recommend 18:10 19:7
reconvene 15:5
record 5:5 5:8 5:11
recorded 4:17
records 4:18
recovery 21:23
red 9:15 11:2
Reddemann 24:5
reduce 13:3 14:11 24:15 27:2 27:4 31:4 33:11
reduced 31:2
reduces 18:18
reducing 20:14
reduction 12:13 18:20 24:11
reductions 18:19 19:4 23:18
reference 30:14 30:19
reflecting 27:7
reflects 24:7 24:13
refurbishing

22:24
regard 26:22
regarding 28:21
region 14:10 14:19 14:21 17:17 18:22 24:18 25:14 27:10 34:9
regional 4:1 14:18
region's 24:8 24:20
regulations 10:5
reimbursed 8:6
reinserted 20:23
Reis 26:13
R-e-i-s 26:14
REIS 26:9 26:12
relate 17:1
related 18:13
relating 34:10
relative 16:25 17:2 18:3 19:11 32:15
relatively 31:2
released 4:5
reliable 6:20
14:4 31:2
remarkable 34:25
remarks 19:17 27:8 28:21
remind 35:20
removal 28:13
renewable 7:15 7:18 12:24 13:24 13:25 18:13 18:17 18:23 18:25 19:3 24:17 27:24
renewables 12:20 14:6 15:1 25:12 28:3
renewal 10:14
renewals 12:1
replacing 22:2 22:6
reporter 5:4
represent 5:2 16:22 29:17
representing 24:2
requirement 6:19
research 24:7
residential 22:12
resource 6:23 7:1 7:18 7:24 8:22 11:14 13:10
14:5 14:18 14:24 17:6 18:20 19:1
resources 7:7 7:16 8:11 12:21 13:15 13:24 13:25 14:3 15:1 22:19
response 7:6 8:4 13:13 20:19 24:13 30:5 34:13
responses 18:22
responsible 24:9
rest 12:18
result 10:13 17:11
retire 11:20 13:1 13:2
retired 21:14
retirement 11:21
retirements 12:5 25:9
retiring 12:2
review 4:2 4:4 4:6 4:19
revised 4:5
Richland 29:17
risk 10:10
32:21 32:22
risks 13:23
risky 17:6
river 16:9 19:12 28:14
Rockefeller 3:10 3:12 23:24 34:17
rollovers 20:15
room 35:24
rotation 7:3
rough 21:25
roughly 12:5
RPS 10:3
run 23:17
running 8:24 15:21 15:22

S

safe 30:23
salmon 21:23
save 22:14
saved 20:15
saving 20:13
savings 21:4 26:3
scale 22:6
scenario 11:11 11:25 12:1
scenarios 9:25 10:16
scenic 32:2

seat 16:2 26:10 29:5
second 34:17
secondary 20:21
sectors 21:3
seeking 16:15
seems 23:6
sell 14:18
sequester 30:18
sequestration 30:14
service 17:8
seventh 3:15 3:24 7:3 9:22 17:3 20:4 20:24 21:22
several 17:13 17:13
shame 32:1
share 21:3 26:3
sheet 4:13
shifts 14:22
shine 8:20
short 6:1
short-term 23:10 23:11
showed 14:15
shown 16:13
shows 9:16
sign 4:13 6:8 29:10
signed 5:1 6:9
significant 27:15
significantly 27:2
simply 13:1 13:2 13:2
single 17:16
situation 11:15
six 4:11 17:18 30:1
Sixth 9:14 9:19 9:22 21:12
size 32:7
skip 5:10
slam 19:15
small 12:20 24:24 25:11 34:14
smaller 36:10
smallest 18:18
smartest 21:16
SMRs 15:2
Snake 22:2 28:14
snow 13:16
social 22:7
solar 7:16 8:12 8:15 22:7 24:4 30:24 31:12 32:5 32:6 32:7
solutions 23:12
somebody 36:10
somehow 8:6
someone 23:14
sorry 8:14 29:15
sort 26:20 27:7
source 13:21
sources 27:18 27:25 31:13 34:13
southwest 13:20
speak 29:5
species 22:15
specific 5:13 28:11 28:12
specifically 10:24
spell 5:6
spelled 5:4 19:25 26:13
spelling 16:5
Spokane 15:18 18:5
spoke 27:8
staff 6:5 6:16 21:17 21:18 24:5 25:17 34:19 35:11 35:24
standards 7:19 9:15 9:16 9:17 9:21 10:4 12:24 14:22 18:14 18:18 18:23 19:3 24:17 32:14 32:19
start 11:3
started 9:2
starting 7:14
starts 11:16
state 16:2 18:21 19:3 19:9 24:16
stated 20:20 24:24
statement 3:17 5:7 5:25
states 4:11 7:17 17:4 19:11 24:22 25:13 33:14
stating 5:2
station 31:25 32:10
statutory 6:19
stay 21:15
stocks 22:16
stop 15:9
storage 27:24

28:1 28:4
strategy 13:10 18:20
strenuous 26:23
stress 19:5 19:8
strictly 22:1
submit 5:22
submitted 4:22 5:14
substance 34:18
substantially 26:14
substitute 30:6
subtracted 22:5
success 28:3
suggest 17:18
summary 6:18 17:4
summer 8:23 16:21 18:7
sun 8:20
superfluous 26:21
supplies 9:6
supply 6:20 25:2
support 24:13 24:23 34:12
supporting 17:8
supportive 20:11
supposedly 23:4
sure 8:6 19:6 35:21
surplus 14:19
system 11:17 12:11 13:7 19:11 19:12 19:15 22:1 22:4 26:25 31:3
systems 10:6

T

table 4:15 15:12
tail 8:11
taking 22:1 35:13
talk 36:1
talking 5:17 35:7
talks 32:15
target 17:17 17:19 17:20 18:2 20:23
targeting 13:11
targets 24:11
technology 12:17 12:19 14:2 30:13
tendency 31:9
tens 20:16
term 10:11 10:12
terms 12:20 14:6 14:21 20:13 22:24
territory 17:9
testify 4:24 34:3
testimony 3:16 4:21 5:1 5:13 5:15 6:6 16:1 34:16 35:14
thank 19:17 23:23 23:23 25:19 25:23 26:3 26:5 26:12 29:2 29:3 33:25 34:15 35:5 35:6 36:13
thanks 15:13 16:11 19:19 23:22 25:20 34:1
thereof 25:4
there's 11:8 13:16 13:19 29:10 29:19 30:15 30:16 32:20 32:22 32:25 35:2 35:24
thermostat 8:7
they're 15:20 30:1 31:13 32:24 35:8
third 21:11 23:19 27:21 30:22
thoroughly 26:24
thoughts 26:17
thousand-megawatt 30:23 31:21
thousands 20:16
throughout 16:15
tie 26:25
tied 29:21
tiny 30:24
today 12:16 12:22 16:1
Tom 3:7 6:4 6:13 15:13 18:14 19:22
ton 10:12
tonight 3:16 4:17 25:19 34:16
tons 11:19 11:24 12:3 12:6 12:10 12:14
top 8:10

11:16
Topping 8:3
total 16:23
toward 24:8
towards 35:17
trade 10:6
transcribed 35:14
transmission 26:22 26:24
transparent 16:13
travel 16:15
tremendous 20:13
Tri 3:13
Tri-Cities 16:10 25:25 32:7
true 4:22
try 12:24
turn 14:9 15:15
turns 8:7 8:8 15:20

U

U.S 29:20 32:2 33:5 33:7
Umatilla 27:10
uncertainties 32:25
uncertainty 27:23
31:4 32:22
understand 18:6 27:12 32:17
undoubtedly 21:13
unit 11:23
United 24:21 33:14
unlikelihood 28:2
unlikely 5:8 5:10
unnecessary 27:14
unpredictable 17:21
update 7:2
updated 18:11
upset 27:5
usually 6:4 8:5
utilities 8:6
utility 22:6

V

Valmy 11:22 12:8
value 17:15 35:4
various 9:25
verifiable 22:21
vertical 7:10
viable 13:21
visit 5:20
voluntary 8:4
von 26:9 26:12 26:13
vote 31:19
vulnerability 27:5

W

Washington 3:7 3:11 7:17 11:23 36:5
watch 26:16
water 13:15
waterway 22:5
wave 14:5 15:2
ways 13:8 28:22
weather 13:17 33:20
website 5:16 5:21
wedge 7:9 7:12 9:8 9:15
weeks 4:11 5:18
welcome 3:6 3:13 3:22 16:6 16:9 25:21
we'll 6:5 6:14 15:8 16:3 35:13
we're 5:17
9:20 9:21 10:1 11:25 11:25 12:1 12:2 20:10 21:1 21:8 22:20 33:19 34:15 35:10 36:8 36:9 36:12
west 3:11
we've 6:8 10:1
whatever 34:14
Whenever 34:24
Whereupon 36:14
whether 15:8
white 21:24
whole 20:7
wholesale 11:1
who's 3:10 29:4
wind 7:16 8:11 8:14 8:19 24:3 30:24 31:12 31:22
windmills 31:20 31:23 32:1 32:2 32:11
winter 7:22 8:1 8:18 8:21 8:23

13:22 13:25
23:3

wishful 33:20

work 3:20
21:16 25:16
35:17

workability
22:18

worked 35:2

working
3:14 17:22

works 22:12

world 10:22
15:6

worth 28:20

written 4:7
4:15 4:22
5:7 5:12
20:9 35:19

www.
nwcouncil.
org 5:21

Y

yesterday
18:5

yet 26:19

yields 14:11

you'll 23:1
33:11

yourself
26:11

you've
16:12
20:7 21:24

Z

zero 9:23
10:11