Testimony of Roy Hemmingway
To the Senate Business & Transportation Committee
On HB 4036A
February 22, 2016

I am Roy Hemmingway. I am retired. I am not representing any interest here today. Thank you for this opportunity to testify.

For those of you who do not know me, I was:

- Energy advisor to Governor Bob Straub,
- Energy advisor to Governor Vic Atiyeh,
- Appointed and reappointed to the Northwest Power and Conservation Council by Governor Atiyeh,
- Energy advisor to Governor John Kitzhaber,
- Appointed by Governor Kitzhaber to be Chair of the Public Utility Commission, where Chair Beyer was my distinguished colleague and successor, and
- Appointed by the New Zealand government to be Chair of the Electricity Commission of New Zealand.

When I was not in public service, I consulted for utilities (private and public), utility customers, and other entities relating to energy.

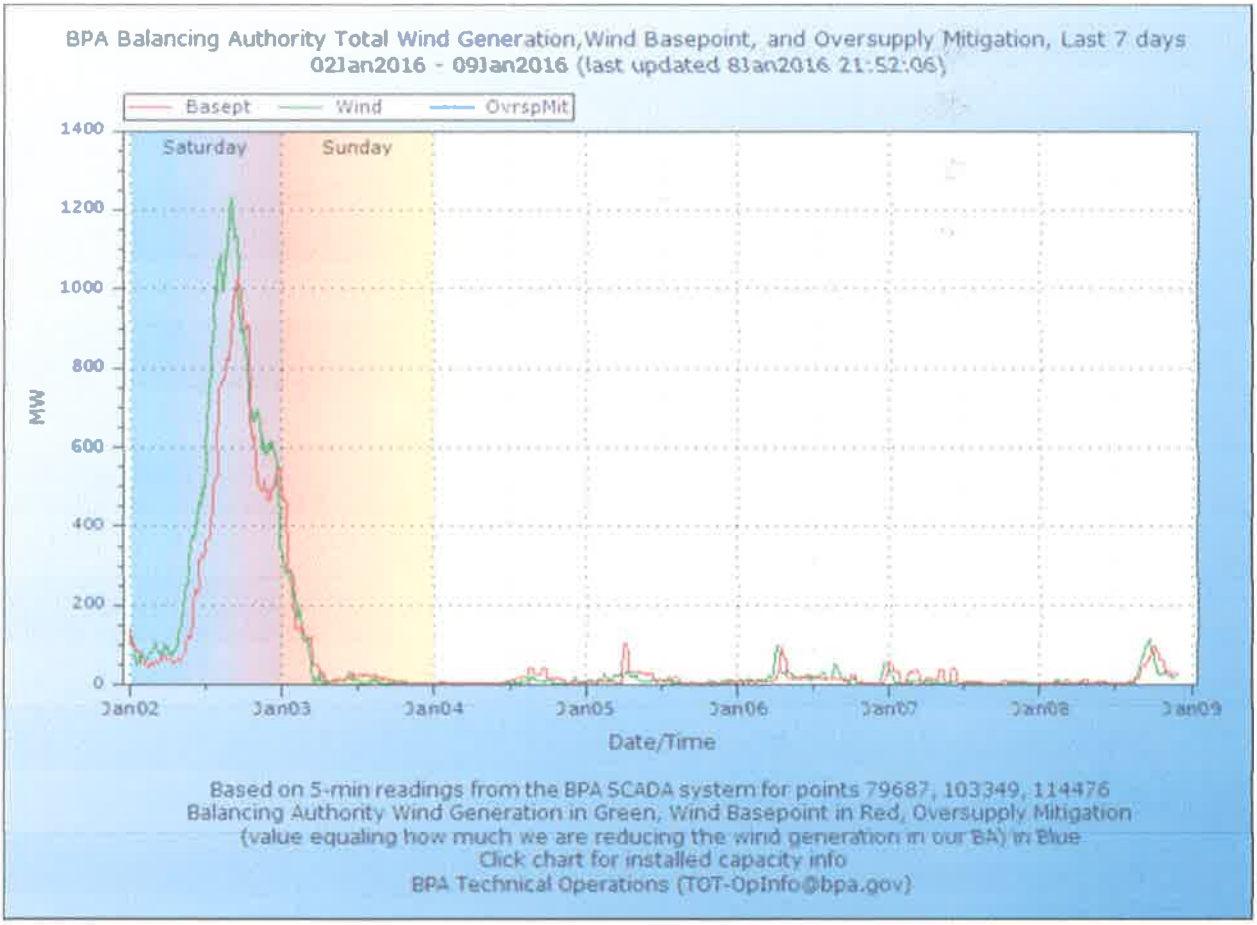
Throughout my career I have followed one basic principle: **follow the analysis**. That is, put aside your guesses and biases and let the analysis guide decision-making. Sometimes, the analysis will lead in surprising and unexpected directions, because electricity is anything if not complicated. When we started the power planning analysis at the NW Power and Conservation Council in 1981, the conventional wisdom was that the Northwest would need to finish the five nuclear plants under construction and build many more coal and gas plants. When we finished two years later, it was clear that only one nuclear plant was needed (it was nearly complete), and energy efficiency would obviate the need for most of those coal and gas plants.

The principal problem with this bill is that there is almost no analysis to support it. You have assertions from the backers that there is analysis, but this analysis has gone through no public vetting process. My guess is that the utilities are feeling this same frustration with completing a robust analysis as the rest of us. Such work is very complex, involving many variables and issues about analytical methodology, and I can't imagine that the utilities have had anywhere nearly enough time to do the job to their satisfaction.

As a result, we are left with speculating about what might be the effect of this bill. I will give you my best guess. First, of course, you have heard that the bill does not shut down any coal plants. The Rocky Mountain plants or their power can be sold to other states. Idaho and Utah, where electricity demand is growing much faster than in Oregon, have no qualms about taking coal-generated power.

Second, this bill mandates the construction of double the amount of renewable resources, which in Oregon will almost certainly be chiefly wind. But wind generation operates only about a third of the time, plus or minus, and so what will happen is the construction of gas-fired power plants to "back-up" the wind generation. "Back up" is probably a misnomer, because the gas-fired power plants are likely to operate more than the wind machines.

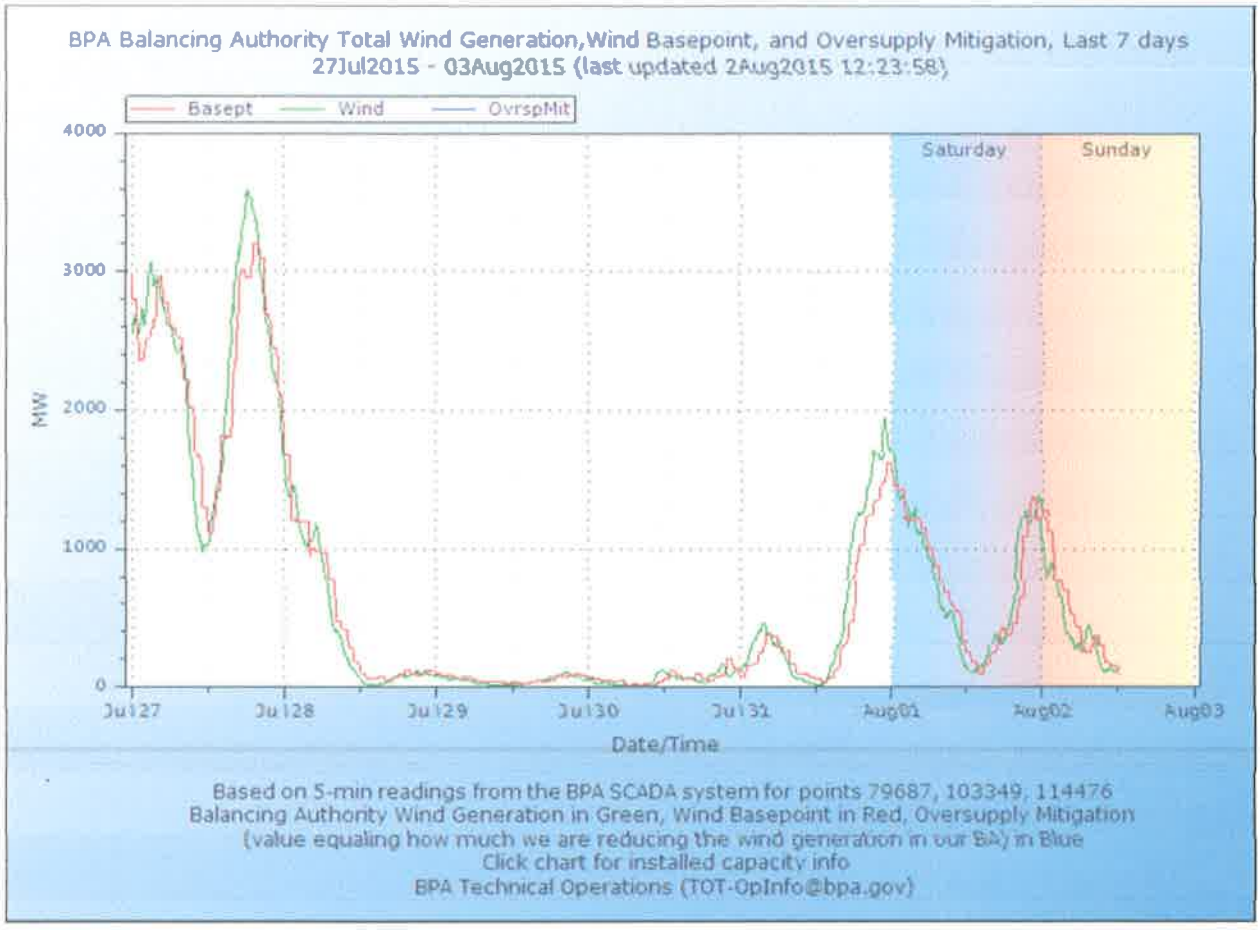
I can illustrate this issue with the following chart:



The green line shows the wind output in the Bonneville Balancing Area during the first week of January of this year. Note that on Saturday there was a modest amount of wind, peaking at about 25% of the nearly 5,000 megawatts of total wind generation capacity in the balancing area. After that, for the remainder of the week, there was virtually no wind generation. If you remember, that week was the only real cold spell we have had all winter, with temperatures below freezing in the Willamette Valley. Schools closed in Portland on Monday and Tuesday due to freezing rain. Wind generation was near zero during that time when electricity demand was at its highest. This occurs during nearly every cold spell.

That pattern of little or no wind generation when it is cold is west-wide. When it is very cold, the wind isn't blowing here, and it isn't blowing anywhere else.

Also, below is a chart of the hottest days last summer, July 29-31, when temperatures exceeded 100 degrees in Portland, and when air conditioning load was high. There was little to no wind generation then, either. Hot and cold events tend to generate stable air masses west-wide, and no wind.



If we double wind generation, we will simply double the amplitude of those peaks when the wind blows. We do nothing to provide wind during those long periods of no wind generation when we need electricity the most. So, what will electricity suppliers do to deal with this problem? They will build and operate gas-fired power plants, which will run during the two-thirds of the time the wind generation doesn't operate. We will, in effect, be building, and paying for, two sets of generators to serve the same electricity demand.

Storage will not obviate this problem. Proposed storage is very short term, in the range of a few hours. It will help California move solar energy towards the

evening peak usage time, but it will not help our main problem in the Northwest, extended times with little or no wind.

Advocates argue that the way to deal with this problem is to diversify where wind is located to sites outside of the Columbia Plateau, where wind generation is concentrated today. Principally, those places are the Oregon Coast and Southeastern Oregon. There are two problems with this idea. First, there is no transmission to those places to support new generation, and building transmission to serve intermittent power plants is very expensive. Second, these places have values that may preclude wind. Who wants to vote to put wind machines on the scenic Oregon Coast? And it is almost certain that if wind generation and transmission are seriously proposed for Southeastern Oregon, there will be a new petition filed for listing the sage grouse as an endangered species that will stop them in their tracks.

My principal concern with this bill is the unknown costs, and our best guess now is that cost to ratepayers will be substantial. PGE at the PUC hearing estimated rate increases as a result of the bill at 1½ per cent per year, over and above all other rate increases. That estimate results in rates being over 40% higher, over and above other rate increases, when this bill is fully implemented. PGE's rates are already about the national average. If this analysis is correct, this would put them substantially higher, around $700 to 800 million higher per year in 2040. The bill provides no protection for ratepayers against these costs, particularly if they are higher than is estimated. Statute requires the PUC to put renewable generation into rates, unless the annual cost would raise rates more than 4%. A 4% annual rate increase would allow rates to increase by nearly 150% by 2040, over and above all other rate increases. A 3% increase would double rates.

By the way, in terms of cost per ton of CO_2 emissions reductions, by PGE's estimates from the PUC hearing, I calculate that cost per ton as around $400. This is way above any estimate of the social costs of carbon or of any proposal for a carbon tax or carbon credits. PGE would be far better off buying carbon credits for its customers than implementing this bill.

I suggest that at a minimum, you decide what would be a prudent, acceptable *cumulative* rate increase over time as a result of this bill, and put that provision into the bill. I have drafted some language to that effect, if you are interested. Is a ten percent rate increase over time because of this bill acceptable? Twenty percent? It is not for me to say. I think that is a policy question the Legislative Assembly is best in the position to address.

Previously, I have looked at increasing the RPS and thought it was technically feasible. The only question was cost. Now, as I think about it more, I am not so sure that moving to a 50% RPS is technically feasible. I find it hard to figure how a resource that generates only a third of the time can generate half the electricity. Also, the ramp rates to bring conventional generation up and down with the wind may not be feasible. And I have no idea how Oregon's electricity system at a 50% RPS will interact with the rest of the West in our interconnected system. Again, I would like to see the analysis done.

Finally, one conclusion from the work of the NW Power and Conservation Council that continues to be valid to this day is: don't make decisions before you need to. The future is uncertain, and locking the electricity system into plans that won't be executed for decades is imprudent, and often very costly. We learned that lesson with all the partially completed nuclear plants that had to be canceled when demand evaporated.

The decisions in this bill do not have to be made now. They can wait at least five years, likely longer. The only impetus for this bill is a threatened initiative that some argue would be "worse" than this bill. When voters hear about the likely rate increases from the initiative, and the fact that no coal plants would be shut down, I doubt that it will pass. If you agree to give this bill full attention in the session next year, when you will have much more information than you do now, I would urge the proponents to hold off on the initiative. I think Oregon and its electricity ratepayers will be much better off as a result.

Global climate change is the most pressing challenge of our time. I favor real, rather than "feel good" symbolic actions to tackle this problem. While this bill would make the most dramatic changes to the electricity system in 35 years, I fear

it delivers largely symbolic benefits for climate change, while causing significantly higher rates to utility customers. I urge holding off on its passage until you have the information to make a prudent judgment.