



Meeting Summary

Climate Action Plan Task Force

City of Bellingham

July 17, 2019

6:30 PM, 210 Lottie Street

Attendees. Task Force members: Lynne Murphy, Rick Nicholson, Mark Schofield, Jill MacIntyre Witt, Charles Barnhart, Erin McDade, Christine Grant, Don Goldberg. Staff/Consultants: Renee LaCroix, Clare Fogelsong, Mark Gardner, David Roberts.

Major Topics

The Task Force heard and discussed presentations on recent legislative changes in Olympia affecting the energy landscape, and on energy supply modeling and issues.

Recent Legislation. Clare Fogelsong presented information on number of bills affecting energy that passed this legislative session. Many of the provisions will help localities in their efforts to reduce greenhouse gas emissions. Staff highlighted the following elements:

- Engrossed Substitute House Bill 1428
 - Clarifies fuel mix reporting language used by utilities to report to customers.
- Second Substitute House Bill 1444
 - Updates appliance efficiency and design standards
- Engrossed Second Substitute Senate Bill 5116 -- Energy Independence Act
 - Eliminates coal sourced electricity by 2025
 - Transitions the state's electricity to 100% carbon neutral by 2030.
 - Transitions electricity to 100% renewable by 2045
 - Focus is on job creation, ensuring all customers benefit, reliable electricity, and no unreasonable costs.
 - It allows the UTC to pursue flexible rate structures to balance power rates with the public interest, under the following criteria:
 - Equitable distribution of energy benefits and reduction of burdens to vulnerable populations and highly impacted communities
 - Long-term and short-term public health, economic, and environmental benefits and the reduction of costs and risks
 - Energy security and resiliency
 - No customer or class of customer is unreasonably harmed by increased cost of electricity
 - An electric utility may satisfy up to 22 percent of its compliance obligation through 2025 with alternative compliance, including making a compliance payment or using unbundled renewable energy credits
 - There is a cap for cost increases of 2%

- Requires investor owned utilities to submit plans with targets for energy efficiency, demand response and renewable energy
- Penalty monies will go to low income weatherization and structural rehabilitation assistance
- Requires energy assistance to low income households
- House Bill 1257
 - Focus on energy efficiency and renewable energy incentives
 - Creates commercial buildings performance standards
 - Energy efficiency must reduce use of natural gas
 - Requires gas companies to acquire all available and cost-effective conservation measures, and gas companies must offer a renewable natural gas option to customers
 - Gas companies are expected to meet a proportionate share of the state's greenhouse gas reduction goals
 - Requires the UTC to establish renewable natural gas acquisition targets
 - Permits cities to adopt additional residential energy code requirements
 - Requires the state building code council to adopt optional efficiency appendices.
 - Requires electric charging capability at all new buildings that provide on site parking, up to 20% of total parking

Brandon Houskeeper, Manager of State Government Affairs for PSE, noted that the legislature defined the cost cap at 2% and added alternative compliance measures. Regarding HB 1257, PSE implemented efficiency measures a number of years ago and the legislation codifies to some extent what was already happening. It also added a carbon planning aspect so that companies are required to identify the most cost-effective efficiency measures.

Power Supply Planning. Dan Aas of E3, a consultant to utilities, public sector entities and non-profits in long-term power planning, summarized the results of three studies they have completed in the last three years on ways to achieve reliable decarbonized electricity in the Pacific Northwest. E3 is an energy and environmental economics consulting firm doing work on distributed energy resources such as solar batteries, and electrification of transportation and buildings.

Four pillars of decarbonization include efficiency and conservation, electrification, low-carbon electricity, and low carbon fuels. Electrification is pivotal to achieve decarbonization, and electricity loads will go up as buildings and cars are electrified. All scenarios involve retirement of coal generation and a shift to hydro and solar. Coal is removed relatively soon, and eventually much of the natural gas generation is replaced by wind and solar.

Scenarios model a 90% reduction in greenhouse gas emissions in the power sector relative to 1990, and an 80% reduction economywide, which is consistent with a 2 degree C temperature stabilization target. Policies that directly target carbon reduce emissions the most. This accelerates the retirement of coal. When renewables are expanded without retiring coal, the effect is to displace hydro and gas generation with a lower overall reduction. All scenarios they have looked at show the region transitioning away from coal to one that is largely renewables and hydro. In the long term, emissions from gas drop substantially.

We need to be able to meet peak loads. Utilities need to plan for meeting peak loads, for example meeting heating load over a set of days where temperatures are very cold. About half of current generation capacity is from hydro, about one third from thermal sources (coal and gas), and the rest from zero carbon resources such as wind nuclear and solar, plus imports from outside the region. A

number of studies have shown that there is a deficit in resource adequacy in our region. There is a need for 5 gigawatt of new capacity even without any retirements of existing plants by 2030 because of load growth. With planned coal retirements by 2030, another three gigawatts will be required. If all coal is retired, 16 gigawatts will be needed, equivalent to three or four big power plants being added.

Sources vary in their capacity factor, or the amount of time they are generating potentially maximum power. Capacity factors vary from about 95% for some fossil fuel plants, to about 50% for hydro, 12% for solar, and 7% for wind. The last increment of renewables needed to ensure reliability can be very expensive because the capacity factors are low. In a peak load year, in certain weeks we could see high load, hydro curtailments because of drought, and a low generation rate from renewables. Under this scenario, 2 or 3 days could see insufficient resources under a high renewables scenario. Wind and solar have low capacity – sometimes the wind does not blow or the skies are cloudy. For hydro, droughts can reduce capacity, and water supply demands for other uses can constrain availability. There can be period of both low wind and low sun, a problem that has been identified in Germany.

Looking toward 2050, we can look at a series of scenarios that go from 60% carbon reduction to 100%. There is a relatively steady needed increase in overall generating capacity through a 98% reduction scenario, but there is a step change in generating capacity needed for the removal of the last 1% increment of carbon. In terms of cost, removing the final 1% requires an additional \$100-170 billion of new investment. This is very high relative to the social costs of carbon.

Keeping some gas in the mix lowers to need for renewables curtailment as there will be less excess renewables capacity that is often not needed. Costs go up if there are large curtailments. Storage can help but storage gets discharged during periods of prolonged low renewable energy production.

In E3's analysis, 90% GHG reductions or greater exceed most estimates of the societal cost of carbon, which generally range from \$50-\$250 per ton, although some new estimates are higher. Achieving the last 1% of renewables may cost \$11,000 to \$16,000 per ton of carbon abated, which is higher than any social cost of carbon calculation.

Takeaways include the following:

- The electric sector is a key driver of economywide decarbonization
- Reliability is key, and achieving adequate capacity is key to reliability
- Natural gas can play a key role in reliability even while its use steadily declines over time
- Potential sources to replace gas for reliability are not currently commercially available

Ben Farrow, Manager of Electric and Natural Gas Development for PSE, noted that the company has been working on capacity issues for many years especially in light of planned coal plant retirements. The company has been looking at how to provide low carbon alternatives while maintaining reliability. With the passage of the Clean Energy Transformation Act, Washington will go from 15% renewables requirement to 100% renewables, to include other non-emitting sources such as hydro and nuclear. The Act established four large goals and a number of mechanisms to enable the transition, along with cost protections and customer protections. PSE does a resource plan every two years. The next one will be out in January 2020 and the new plan will incorporate the new legislative requirements. The company will file a Clean Energy Implementation Plan to indicate how PSE will meet the new requirements, with the first due January 2022. Key enablers in the legislation include some changes in how utilities are regulated, and some regional studies are planned, including one on how energy markets function under the new law given that different states trade energy yet have different regulatory targets. There will

also be a study of what the transmission picture will be with the new mix of distributed and centralized resources. There are also requirements saying that costs should not fall disproportionately on particular customers, especially lower-income customers. PSE has assembled an implementation team to look at policy and resource planning to comply with the new law.

Questions and Discussion. The Task Force posed questions to the presenters. Questions and responses are briefly summarized below.

- *What is the role of demand response and why does it have such a small impact in the scenario?* Only part of the load is manageable through demand response and some loads, such as the need for a lot of power during winter cold spells, cannot be met through demand response.
- *How do we compare to other regions in use of demand response?* That comparison was not put together for this analysis. Some other organizations have looked at this.
- *Does future demand growth estimates take into account efficiency as well as population growth?* Yes, the Northwest Power Planning Council's plans are used to estimate efficiency in some of the scenarios and the load growth assumptions also draw upon other studies after efficiency is taken into account. Electrification of buildings and transportation is also included. Some scenarios are also run assuming that certain alternatives are more widely available, such as biogas. For biogas, the capacity to fill the gap is not there.
- *Models are complicated and useful but you get out of them what you told the computer to do, and there could be a failure of imagination or to consider a number of alternative scenarios. Did you consider the energy imbalance market? We can trade energy with California. Also, building excess capacity in renewables is not a problem and it is cheap.* There are always assumptions and limitations in any study and there are many different ways to delivery new capacity, but the magnitude of what is needed is very large so incremental changes in available technology will not alter the picture much. For power planning purposes with mission-critical criteria we need new approaches to prove themselves before we start relying on them.
- *Assumptions that technology and costs will stay the same is not valid. Storage in particular will likely follow the same exponential cost reductions of other energy technologies.* The scenarios do build in substantial cost declines for renewables and storage. Storage response capacity is typically in the four to six hour range. When we are talking about days of insufficient capacity there is not a battery available today that can fill that need.
- *Pumped hydro for storage is available and is cheap but right now companies can't make money on it with today's electricity prices.* There are limits in where you can build pumped hydro.
- *Was this study paid for by PSE? PSE is a large natural gas provider -- does that influence the findings? Also, off-grid solutions are not taken into account.* The study was paid for by several utilities including PSE and Avista. E3 works for a diverse set of clients including utilities, public sector entities, and non-profits and does not present different information depending on the audience. Off-grid renewables would face the same capacity issues that utility-scale renewables face.
- *Why is there such a disparity in the different studies of capacity demand?* E3 is looking at these to analyze the sources of the different predictions. Some studies do not take into account all the coal retirements that are planned or anticipated. There are also different assumptions about load growth.

Discussion of energy demand analysis. Task Force member Charles Barnhart provided some early estimates of energy demand and outlined the type of information necessary to calculate the increases in electricity demand in Bellingham from conversion to electrified transportation and buildings. First, we

need to know how much energy Bellingham is using today in transportation, buildings, and industry. For vehicle electrification, we can start with the fact that Bellingham has 700 million vehicle miles traveled per year. You need about .3 kilowatt hours to drive an electric vehicle based on a Tesla Model S. To power those vehicles with electricity takes about 25 megawatts. Capacity factor for wind is about .2 so we would need about 125 megawatts of renewables for electrification of vehicles in Bellingham. To put this in context, that is about half the capacity of the new PSE wind project that is about 250 megawatts. That is a very crude example of the type of work that is needed so we'll have to get various input data from the Work Groups to complete this task, particularly for things such as heating. A standard gas hot water heater is about 60% efficient and requires 300 KG of Co2 per megawatt hour of thermal energy. With electric resistance, you can cut emissions by about a third with PSE's grid. A gas tankless heater is about at parity with electric resistance. If you have an electric heat pump water heater, emissions are reduced even more. Electric heat pump water heaters are about 75% efficient. Heat pump water heaters will continue to emit less carbon as the grid gets cleaner. Renewable gas sources are minimal and there are not enough cows to make this work.

Task Force discussion included the following points:

- There are cost differences for the various technologies and the Buildings Work Group has those and will present that in the future. Some costs will be able to be financed, such a rolling those into the cost into a new mortgage.
- There was a requirement in the past to get rid of oil tanks, and homeowners were able to roll that cost into their mortgage.
- Some homeowners still see gas appliances as a benefit.
- The buildings group is also looking at incentives and financing to make things a lot more manageable. We may be able to offer homeowners options for lowering carbon or offsetting emissions.
- Education can affect people's choices of technology.
- Housing costs are a critical issue and new requirements will increase housing costs.
- All the measures will be subject to a feasibility analysis including looking at financial burdens and social equity. The full Task Force will discuss and then approve recommendations. All measures will then go forward to the Council for further discussion and deliberation.

Energy supply and renewables work planning. Mark Gardner noted that this discussion was scheduled later in the year because we wanted to first get a handle on what the electricity demand estimates from the buildings and transportation groups would be, and also wanted to understand legislative changes that will affect what is in the grid. We still need to identify what energy supply changes locally or nearby are needed – for example, what is the role of community solar, what is the role of renewable energy credits or green power in the mix, etc. Lynn Murphy and Jill MacIntyre Witt expressed an interest earlier in the year in helping to lead that discussion in a Work Group that can identify presentations or information needed. All Task Force members are invited to participate and Jill and Lynn may reach out to other members of the community. Clare Fogelson will help staff that group. PSE has some recommendations on programs and services that might help meet our goals and could present in August. Other topics could include presentations on local potential for wind, solar, and energy storage. Measures will be brought into a form similar to the other sections and will undergo a triple bottom line analysis. Some of the criteria we discussed earlier in the Task Force for a TBL methodology may be useful to bring back.

Reports from Transportation and Buildings Work Groups. The groups have not met since the last meeting but the chairs plan to meet soon to talk about additional work and to refine recommendations. The buildings group is assembling information on costs, which will need to be transmitted to Charles Barnhart for the marginal cost analysis.

Other business. Lynn Murphy proposed that the group approve the meeting notes before they are posted. We will try to do this electronically as the intent is to get the notes posted on the web page as soon as possible after each meeting. The next meeting will be in the Council Chambers on August 7 starting at 6:30 PM.

Silfab Solar, based on Bellingham's waterfront, celebrated a doubling of their production capabilities at an event attended by the Governor. They have increased their panel efficiency and will likely keep expanding. This contributes to the triple bottom line by creating jobs, bringing money into the economy, and reducing greenhouse gas emissions.

The City is organizing an "ALL IN For Climate Action" week September 23 through 29th and invites involvement in this campaign to help implement the current Climate Action Plan. The week is scheduled to align with the United Nations Climate Action Summit and Climate Week. Requests from groups to participate need to be in by August 15. People who want to get involved can get more information at the following link: <https://www.cob.org/services/environment/climate/Pages/climate-action-week.aspx>

Public Comments. Members of the public provide comments or asked questions (in italics) and Task Force members provided the following responses.

- *The City should pass a resolution to declare a Climate Emergency.*
- *The City is missing 30% of the housing supply needed to comfortably house the people we have in the City and County. For every \$1000 increase in the price of a home, 85 families are priced out of the market. Looking at the financial costs of proposals is important.*
- *I bought a gas stove and heard that we will not be able to keep our gas stoves.* Task Force members noted that while recommendations are not yet set, there are not currently any proposals under consideration that would require people to remove existing gas cooking stoves.
- *If we get to 2050 and Bellingham has achieved zero carbon, do we know what impact that will have on the global problem? China and India and Korea are large producers and don't share our passion for reducing carbon.* Task Force members and staff noted that most countries are making efforts to reduce emissions, and China is in many respects a global leader in low-carbon technologies such as solar energy and electric cars. Currently the U.S. is about 4% of the world's population but we are using 25% of the world's resources. Unfortunately, the current U.S. administration is trying to pull the U.S. out of the Paris Accord but many cities and states are still moving forward. There are local benefits from these changes such as job benefits, air quality benefits, healthier homes, etc.
- *If our community can make the transition away from fossil fuels and diversify our energy supply it puts the community on the best footing in terms of avoiding fossil fuel disruptions and having new infrastructure. We can be a leader for other communities.*

The meeting adjourned at approximately 8:30 PM. The next meeting will be on August 7 at 6:30 PM in the City Council Chambers, 210 Lottie Street.