From:	Court Olson
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Please file the attached testimony.

Court

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Hello Ladies and Gentlemen of the WUTC:

Since time was short in the PSE IRP hearing yesterday in Renton, I'm following with more detailed written testimony now.

Thank you for considering these comments.

I'm hopeful that you have time to read these full comments. I start with a summary in bullets format.

SUMMARY:

1. Buildings account for a very high percentage of energy consumption. They are the demand side of utility services. The federal DOE says buildings consume 81% of the electricity on our national grid. Buildings likely consume an even higher percentage of the distributed natural gas.
2. I have decades of experience in overseeing the design and construction of commercial buildings. I have significant experience with high performance buildings. I've long promoted and managed a wholistic approach to deep energy efficiency in new and existing buildings.
3. PSE's 2017 IRP forecasts for electricity and gas demands before DSR (i.e. conservation) measures are consistent with my estimates based solely on population growth and past consumption patterns. However, such projections ignore new developing trends in energy consumption.
4. PSE's flat forecast for electricity demand after DSR is OK for the first ten years, but should probably stay flat for the last ten years as well.
5. PSE's forecast for gas demand after DSR falls well short of the conservation potential, and it ignores progressive building design trends toward tighter buildings, more insulation, and the use of electric heat pumps.
6. Public awareness of the causes of climate change, and calls for government action to eliminate fossil fuels are increasing. "Green" building design dynamics are increasing focus on energy efficiency and energy self-sufficiency. I expect the need for utility delivered energy will level off and likely decline within 20 years.
7. New state legislation, new executive actions, as well as new UTC polices are needed to keep utility companies viable. PSE (like other utilities) is not adequately forecasting or planning for this changing landscape.

THE IMPORTANCE OF ENERGY EFFICIENCY IN BUILDINGS

1. Buildings account for a very high percentage of energy consumption. They are the demand side of utility services. The federal Department of Energy says that buildings consume 81% of the electricity on our national grid. Buildings likely consume an even higher percentage of the distributed natural gas.
2. Over the past twenty years building owners, designers, and builders have become increasingly aware of the need for high energy efficiency. The US Green Building Council was formed less than twenty years ago. LEED certification began in the year 2000. Since then the USGBC and

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other progressive building industry certification groups have increasingly focused on improving energy efficiency. The highest level of LEED certification, i.e. "Platinum", requires very high attention to energy efficiency. Today, the popularity for achieving LEED Platinum or similar high efficiency certifications –e.g. Passive House certification and the International Living Future "Net Zero" certification—continues to grow in the building industry.

3. Demand for ultra-high energy efficiency or "net zero" buildings will likely become the norm within the next twenty years. The slightly higher initial cost for high efficiency construction is quickly offset by the lifetime savings in building operations. The added benefits of higher occupant comfort and low environmental impact help in the justification. Increasing popularity of energy efficiency in new buildings will cause a ripple demand for efficiency improvement in existing buildings; otherwise older buildings will cease to attract occupants.
4. Reports and guides published by DOE research laboratories estimate that there is an average potential to reduce energy consumption in buildings by 50%. This assertion was substantiated by a study published in 2011 by NEEA and the New Buildings Institute which showed that deep efficiency measures taken in eighteen different existing commercial buildings around the Northwest had resulted in energy savings varying from 28% to 79%. The mean savings was 46%.

PERSONAL BACKGROUND

1. I was a regular participant at the 2017 PSE IRP Advisory Group meetings.
2. I manage a small consulting firm that helps commercial building owners plan, design, and construct projects. I'm typically hired as the owner's representative to solicit and manage design and construction firms. I sometimes engage up to a dozen subconsultants in my work. Though my firm has a small business profile, I'm well connected in the building industry and I stay up to date on Northwest building trends.
3. I have significant experience with high performance buildings, and I stay current on energy efficiency research.
4. I've long promoted and managed a wholistic approach to deep energy efficiency in new buildings and existing building remodels. In 2006 I facilitated the achievement of LEED Platinum certification for one of my clients. This was the first LEED Platinum building in Washington State. In 2007 I assembled an ad-hoc group of building industry professionals that eventually mushroomed into the passage of transformative state legislation. Consequently, state law now requires the tightening of our state energy code every three years. By 2031 new buildings must use 70% less energy than the 2006 code allowed.
5. Last year I started up a group of Bellevue residents which is encouraging the City to develop a climate action plan. We've advised that the plan should include energy efficiency policies.
6. Also last year I formed and chair a task force of the Zero Net Carbon Building Alliance (now called the Shift Zero Building Alliance). This task force of building professionals seeks to get Property Assessed Clean Energy (PACE) legislation passed in the 2019 state legislative session. If passed, such legislation would make it easier for building owners to finance deep energy efficiency renovation projects. (More than 20 states already have such programs).

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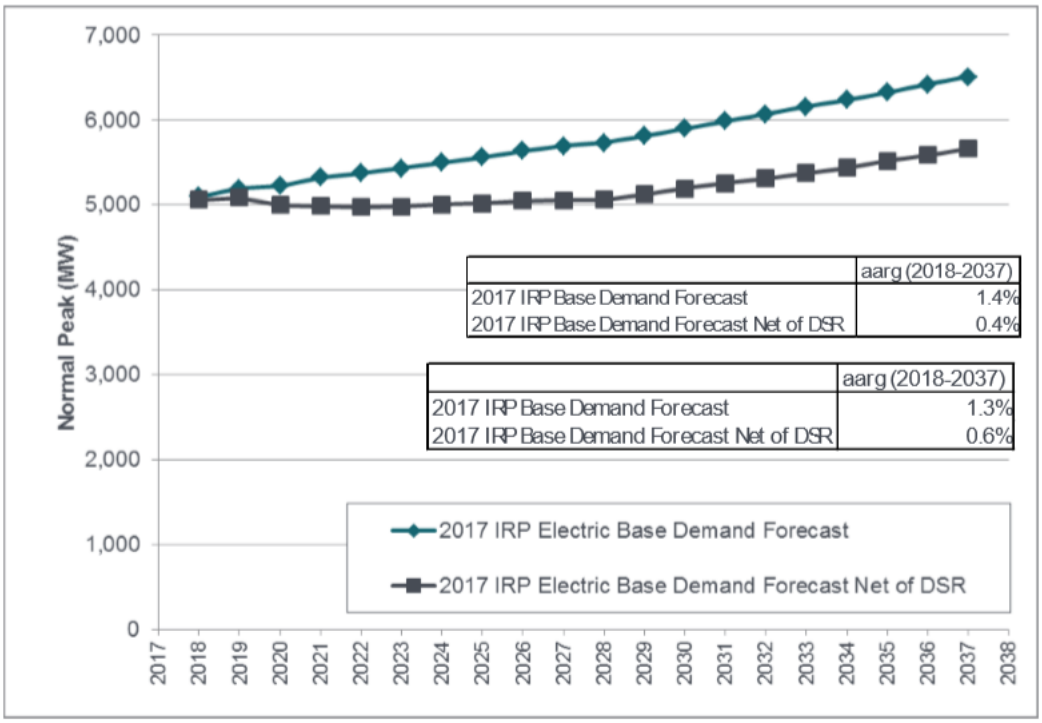
ELECTRICAL DEMAND FORECAST

1. The chart below shows the Peak Base Electric Demand Forecast from the 2017 PSE IRP. Since peak demand sets requirements for production and transmission infrastructure, it is a key chart to review. I take exception to the lower line which is PSE's plot of peak electrical demand after DSR (or conservation measures) are considered. I don't think that projection is realistic.

Figure 5-7: Electric Peak Base Demand Forecast (MW), before DSR and after applying DSR



2. After DSR electrical demand growth will likely be flat or negative for the first ten years. However, PSE has not presented sound reasoning for the rise in the last ten years. The only possible justification for a rise in ten years that I'm aware of might be the increased popularity of electric vehicles. However, electric vehicles are not the reason PSE gives for the demand rise. When questioned in an IRP Advisory Group meeting, PSE said they have not considered EVs in their 20-year demand projection. (How odd.) As I read it, PSE appears to expect their energy efficiency program will run out of steam ten years down the road, so they expect little more conservation. This is very disappointing. PSE's efficiency program in recent years (like programs implemented by most other utilities) has been largely skimming off the "low hanging fruit" opportunities of efficiency. The switch to LED lighting has been a big piece, along with better controls and a few other limited measures that are relatively easy to implement. There is a lot more "higher hanging fruit" to be picked. PSE has not been incentivizing a wholistic approach to deep energy efficiency improvements which would capture the "higher fruit". Instead they've

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only offered incentives for certain isolated components of a building. Reports from PSE and other practitioners suggest that such incentives have typically promoted energy savings of 10 to 25%. Research suggests that a wholistic incentive approach can promote energy savings of 40 to 60%. If PSE would incentivize a wholistic approach on existing buildings, we'd likely see more dramatic energy savings.

3. There are several good reasons to pursue deep energy efficiency in existing buildings:
    a. At least 75% of the existing building stock will still be with us in 25 years.
    b. Energy efficiency improvement costs are typically fully recovered in operating expense savings during the life of a building.
    c. EE improvements create local jobs and thereby boost the local economy.
    d. EE improvements do not require additional generating or transmission infrastructure.
    e. EE improvements reduce the consumption of energy fuels.
    f. EE improvements typically improve the comfort and health of building occupants.
4. In a January 2017 private meeting with a few executives I urged PSE to try a wholistic incentive approach to deep energy efficiency in existing buildings. Last summer, a PSE representative told me that PSE would test that approach in a 2018 pilot program. I attended the roll out of that program on January 29th. The wholistic pilot incentive will be offered to just five existing buildings applicants. However, the minimum efficiency improvement target to qualify for acceptance into the pilot program is only a 15% efficiency improvement. This is a very low bar. Projects that target this level of efficiency are not likely to achieve the higher potential of 40 to 60 percent savings. To encourage greater savings, I suggested that PSE wait and not award pilot project status to any applicants until a number of applications had been received; that way they could choose the five applicants with highest energy savings targets. Unfortunately, the PSE pilot program manager said "no" to this suggestion. She said that PSE wants to get five pilot projects underway ASAP. They will, therefore, be awarding to five candidates that meet the minimum 15% goal as soon as they receive acceptable applications. Given this rushed pilot program approach, it seems that PSE is not well focused on achieving deep energy efficiency. Their wholistic pilot approach may have low efficiency outcomes. That result might encourage PSE to assert that the wholistic approach does not achieve higher outcomes than their current incentive program does. I have to wonder if this isn't their unspoken goal for the pilot program.

GAS DEMAND FORECAST

1. The chart below shows the Peak Base Gas Demand Forecast from the 2017 PSE IRP. Again, I take exception to the lower line in this chart where PSE projects peak gas demand after DSR (or conservation measures) are taken into account. The chart shows that PSE predicts just a 6.9% conservation savings over twenty years. I think that a conservation savings of more than three times that could be achieved with a strong conservation effort. Furthermore, I have two reasons to expect gas consumption will peak and then start to decline over the next twenty years.

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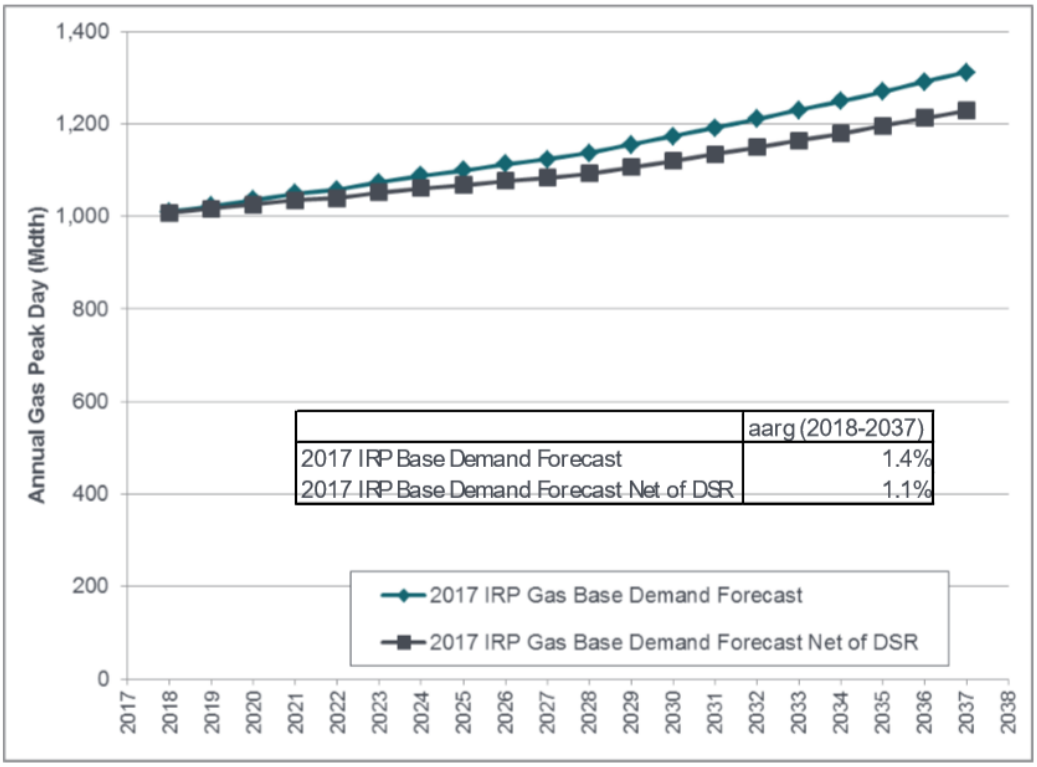
Figure 5-21: 2017 IRP Gas Peak Day Base Demand Forecast, Before DSR and after applying DSR



2. For a while, gas consumption will rise because PSE is not aggressively pursuing gas conservation. In fact, PSE is still actively incentivizing conversion to gas appliances. (This is happening while there are newer electric induction stoves available that are more energy efficient than gas). PSE's limited energy efficiency incentives significantly avoid incentivizing other gas savings, too. PSE doesn't offer savings to the conversion from gas heating to heat pump heating, which is cleaner and more efficient. Even though there are significant energy and cost savings, PSE hasn't been incentivizing conversion from a gas hot water heater to a heat pump hot water heater either. (Hot water is a significant residential energy load.) If PSE would implement a wholistic energy savings incentive approach, more gas heating savings would be likely realized from significant improvements to existing building envelopes, too.
3. Due to growing consumer interest in saving the planet from fossil fuels and fuels waste, at some point gas consumption will begin to fall. As climate focused building owners become better informed, they will increasingly opt out of using gas. Architects are becoming increasingly savvy about alternatives to gas fuel, too. Progressive designers are thinking more and more about clean energy sources today, and they're designing much tighter, better insulated, and more fuel-efficient buildings, too. As energy conservation and fossil fuels elimination get increasing attention, less and less gas will be used to heat new and renovated buildings. In short, gas is on its way out of the building market. At some point in the next twenty years, gas demand will likely peak and then start to decline.

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COMMENT ON LONG TERM DEMAND TRENDS

Many progressive designers and some owners are with greater frequency advocating for "net zero" or "net zero ready" buildings. Today, LEED Gold has become the norm in today's building market after being a lofty goal perhaps just ten years ago when LEED certification was still new. Now, either LEED Platinum (which requires the achievement of very high energy efficiency) or "net zero" energy appear to the lofty goal in today's building market place. One day soon, perhaps in ten years, perhaps longer, these levels of achievement will likely become the norm, like LEED Gold has become today. In a more distant future, perhaps fifty years, we shall have largely self-sufficient or nearly self-sufficient buildings dominating the built environment. This ultra-high energy efficiency trend will eventually cause electric grid demand and gas demand to decline. That trend is good reason to put a serious pause on any new utility transmission or power generation developments today. The times are a changing. Buildings will be different. Traditional utility services are about to become just a backup to new building energy systems, rather than the primary source of energy. Public climate concerns and the economics of cheaper building operations will demand it.

THE NEED FOR NEW POLICIES AND DIFFERENT INCENTIVES FOR UTILITY SERVICE

I don't wish to get into all of the new laws, policies and programs that are needed to slow climate change. However, energy efficiency trends clearly require a change thinking about how utilities are compensated, so that they remain a viable part of our economy. I'm not expert enough to suggest the specific changes that are needed, but I realize that they must be substantial. Clearly, mere connection to electric grid service must be well compensated. Over the next twenty years the electric grid demand from new buildings will be much lower than it has ever been. There will be need for phasing in new utility compensation policies as more and more such buildings are built. Also, gas service will either be eliminated altogether in new buildings, or dramatically reduced. Perhaps gas service connection fees will need to increase, too.

Then there is the question of renewable fuels for utilities power sources. Public demand for clean energy is becoming very loud. Private utilities in the near future must make a rapid transition to those clean fuel sources, or face public take over in some shape or form. That is in the twenty-year horizon, too. PSE hasn't yet faced up to that trend which will soon boil over.

What can the UTC do? If I was a betting man, I would put money on the UTC having already started to think about changing utility oversight policies where it can, and lobbying for new legislation. We need leadership from the UTC, the state legislature, and the executive branch that will help utilities and our economy keep up with the change in energy demand that is now starting to grow.

I conclude with best wishes for your success in staying ahead of this accelerating transition!

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I hope that this narrative has helped you to better foresee the changing landscape in the buildings industry.

Sincerely,

R. Court Olson, MSCE, LEEDap bd+c, CCM, DBIA

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