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RE: Energy Code Proposals EP141 and EM050, Table of Carbon Emissions

As a member of the energy TAG and one of the proponents of the emission standards in the proposed energy code amendment (EP141), I am responding to the letter from the NWGA dated August 9. The position accepted by the Energy TAG in supporting proposal EP141 with a carbon emission table. The table would be used assess the relative efficiency design strategies under the performance path in the WSEC (these emission rates was also used in the EM050 proposal). The issue comes down to the appropriate accounting for electric supply resources that would be deployed to meet the aggregate new load throughout the region.

In the PNW the resource of choice for almost 40 years has been to develop efficiency in the electric end uses throughout the region and use that efficiency to offset the need for new generating resources. In that period the various conservation and efficiency programs have resulted in about 5000 MWa of electric energy resource for the entire system over that period. Since 1982 the region has relied on the Northwest Power and Conservation Council (NPCC) to provide assessments of the available efficiency resource and the need for other generating recourses in the event that efficiency is not adequate.

It is important to distinguish between the marginal emissions of the last unit of electric generation and the aggregate emissions of the total electric generation system. The NPCC is required to use the marginal case since its charge is to manage the incremental additions to the region's electric system. This task requires that as electric load is added a set of priorities for each new unit is considered. This resource stack begins with energy efficiency; adds renewable generating source and then, if these are not adequate, adds incremental combustion resources to meet the remaining load not met by these other sources.

When writing an energy code, a different strategy is required. We are adding load throughout the state in the form of new buildings. This new load is part of the of the regional growth forecast that the NPCC uses to generate their Power Plans. In effect their entire resource stack is deployed to meet this new load. The very last thing on that stack is the combustion turbine that might be needed to meet a portion of this new load. Therfore, the emissions of this last source of generation should be averaged with all the other new resources that are projected to meet this new load.

The 7th Power Plan was published in 2016 and included resource assessments for the period ending in 2035. For this analysis 2026 estimates of load growth and resources requirements were used. This is the most appropriate estimates for the period in which the 2020 energy code would be used. In the Power Plan fraction of new load growth that is met by efficiency is about 90%. A more nuanced analysis, however, notes that the load shapes and the availability of dispatchable resources needed to meet the shortfall in time of high demand is important. When this capacity issue is used, about third of the requirements would be supplied by the gas fired generating resources. It is my assumption that these generating resources would be a combination of combined cycle (CCT) or simple cycle (SCT) gas turbines.

The current carbon intensity of electric generation in Washington was developed by the Washington State Department of Commerce (WSDOC) and presented to the TAG. It considers the current mix of resources that feed the electrical system across the state. This include substantial coal generation (about 15% of all sales) and gas fired generation (about 11% of all sales). The remaining generation comes from hydro-electric generation and various other renewable resources (mostly wind) as well as nuclear. These renewable and nuclear sources are assumed to generate zero carbon. The remaining sources are responsible for all the carbon generated by the current Washington system. The WSDOC analysis showed the current carbon emissions intensity of 0.46 #/kWh delivered. At least 60% of this carbon comes from the coal plants that feed various state utilities. Most of these plants are scheduled to close by 2026; the WSDOC estimates that when that occurs the carbon intensity of the State's electrical system would be reduced to about 0.32 #/kWh.

For electric demand created by the new commercial building sector the combination of these resources would be used not just the last small increment of gas generation needed. To calculate the value settled on by the TAG the use several assumptions:

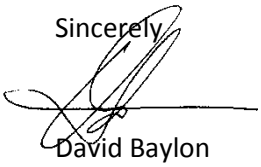
1. The current carbon intensity of the electric system would be reduced by the closing of selected coal power plants but that some gas resources (SCTs) would be required to offset these closures. The carbon intensity of the existing system would fall as a result to 0.38 #/kWh delivered.
2. The existing efficiency and renewable energy plans of the region would provide 66% of the incremental loads that would occur in 2026. Thus, the existing electric system would meet that portion of the load growth.
3. All of the remaining requirements would be met by a combination of gas turbine both SCTs and CCTs. These would operate at an average carbon intensity of 0.95 #/kwh.

Using these assumptions, the range of values for the future carbon intensity of the Washington electric grid (as applied to new electric load) would increase. A range of 0.50 #/kWh and 0.60 #/kwh considers these assumptions. In the final table approved by the TAG a value of 0.55 #/kWh was used. This value is consistent with the plans of the State of Washington and the forecasts of the NPCC. For electricity delivered to meet added electric load in the state over the next 10 years.

Using the emissions table approved by the TAG, the comparison between gas and electric uses provides additional leverage for gas fired and heat pump equipment and penalizes the use of electric resistance for heating and hot water. This is consistent with the legislative goals of RCW 1927a which provides a framework for the advancement of energy codes to the SBCC.

The purpose of this table (in the EP141) is to provide an accounting to be used by buildings applying for a permit under the performance path. This path requires some sophistication and allows trade-offs that are developed by the engineers and designers to meet the needs of the specific project. For this purpose, the impact of a carbon emissions requirement would provide additional guidance as well as design flexibility to the current energy code.

Sincerely,



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