

Amendment of the Site Certificate for the Carty Generating Station

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Subject: Technical Comments, NWCMTF-2of4-Rev-1

From: NW Climate Methane Task Force
(<http://nw-climate-methane-task-force.org/downloads/NWCMTF-2of4-Rev-1.pdf>)
Sierra Club, Portland Chapter Out for approval
350PDX Out for approval
Engineers for a Sustainable Future Out for approval

Technical Comments to PGE Carty Station Site Certificate Amendment

1. Carty Unit 1 and Unit 2 appear unjustifiable as clean energy projects when UN IPCC standards for GWP from 2013 are factored with current natural gas life cycle data.
2. Upstream methane leakages and releases from logistics infrastructure supplying Unit 1 and Unit 2 are not quantified with publicly accessible data from owners and operators of the natural gas supply chain, precluding direct due diligence calculations of global warming damage associated with Carty natural gas operations.
3. Peer reviewed technical reports conducted by third-party NGO experts put methane leakage and release at 5% of delivered product (some report 12%).
4. It is possible to conduct simple checkbook calculations to determine the amount of natural gas supplied, the amount of upstream methane released, and the consequences bearing on Oregon GHG goal attainment.
5. We conclude from simple calculations that Units 1 and 2 represent potentially stranded assets as the cost of renewable energy generation declines, resulting from high volume production efficiencies, and as economic externalities are offset for example by the social cost of carbon.
6. Our findings are to be shared with PGE and the Oregon Global Warming Commission.
7. Activist organizations are expected to endorse the significance of these findings as they relate to the root cause of declining climate.

Principal Findings

Anthropogenic CO2 and CO2e

- ... have been tracked for over 40 years
- ... have never yet declined year on year
- ... have been misrepresented to the extent that many people think we have all century to eventually reverse climate trends
- ... are acknowledged in new budget math concluding that no new wells can be added to produce burnable carbon

<https://newrepublic.com/article/136987/recalculating-climate-math>

Measurements

- ... show absolutely no evidence that any or all climate policies have yet been effective
- ... of natural gas releases to the environment during the life cycle of production, processing and delivery are not reported by owners nor operators nor industry advocates

Calculations

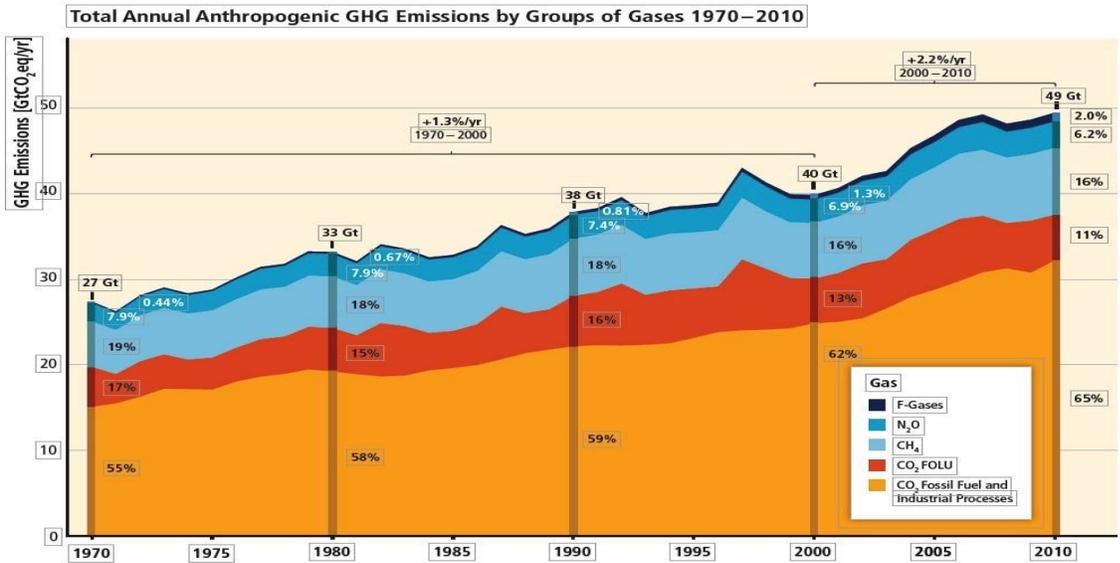
- ... are difficult to conduct without critical industry measurements of their leaks and releases of CH4
- ... rely on third party measurements from multiple sources
- ... show that the Boardman replacement at Carty Station, due to evolving climate standards and previously under-reported upstream CH4 releases from natural gas infrastructure, does not reduce GHG emissions
- ... show that Unit 2 does not improve GHG emissions over coal
- ... show that the 2015 Oregon GHG Inventory miscalculates fugitive methane CO2e

Details:

Anthropogenic CO2 and CO2e. The IPCC reports 40 years of anthropogenic CO2 together with anthropogenic methane CO2e for the 40-year period, 1970-2010 in their report, “Summary for Policymakers.”

https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf

There is no evidence that climate policies deployed during this time period have had any effect to turn down the upward CO2e trend line that continues today. For convenience, Figure SPM.1 is repeated here.



The lengthy caption for this figure states the basis for the data as depicted. “Emissions are converted into CO₂-equivalents based on GWP100 from the IPCC Second Assessment Report.”

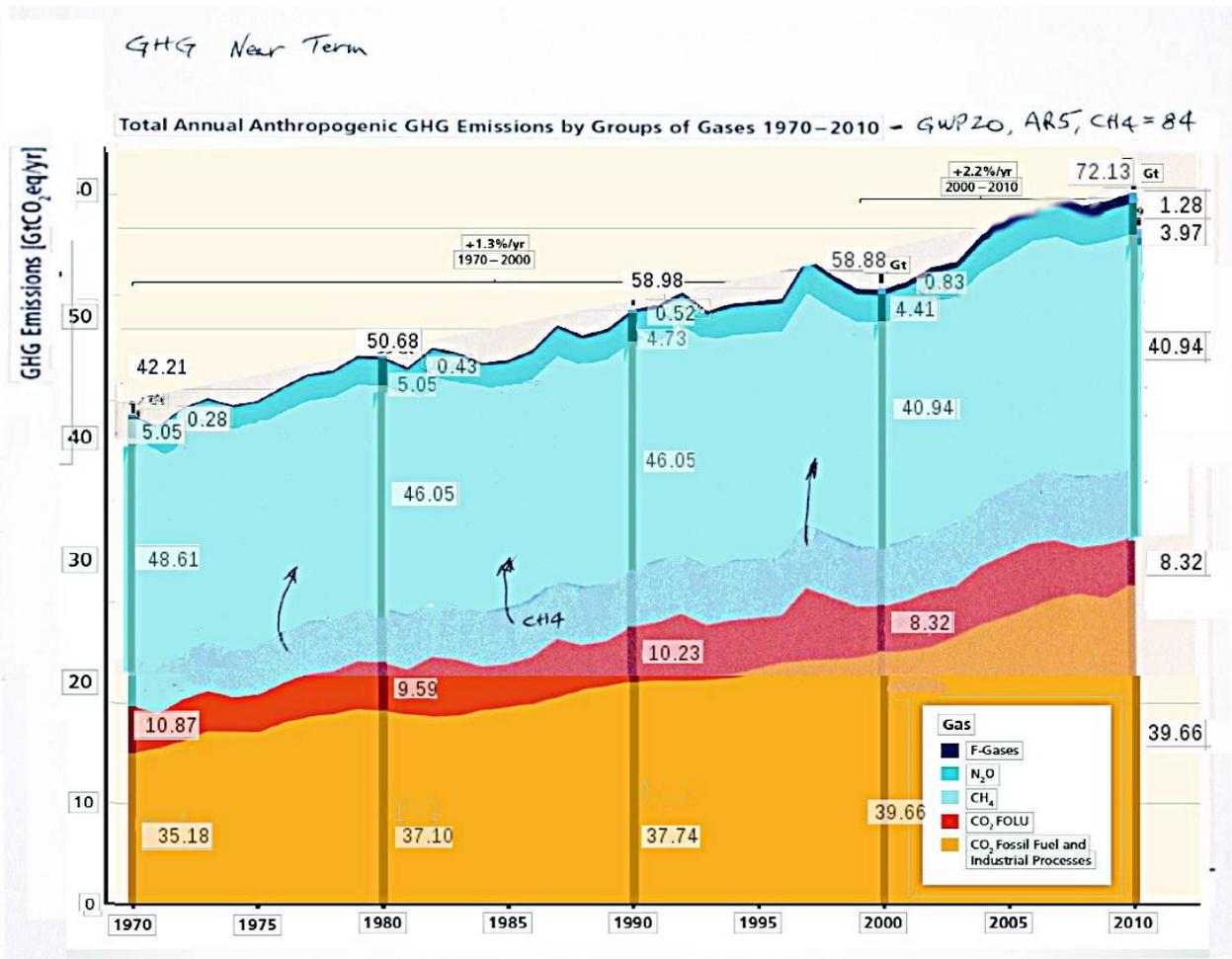
By looking at the table of GWP standards reported in the previous Comment MCTF-1 we see that GWP100 from 1996 was GWP100 = 21. We would agree with employing GWP100 assuming we have all century to contain CO₂e. Relying on the IPCC AR5 standard for GWP20 to modify Figure SPM-1, a depiction of the near-term effects of methane involves adjusting the blue methane bar by GWP100/GWP20 = 84/21 = 4x. Such a depiction by IPCC or any other source has not been found.

The last biggest mistake. Consequently the blue methane bar reported in SPM.1 is one-fourth its true height. A pasted-up correction to figure SPM.1 is given in the following graphic and depicts the impact of the current near-term GWP20 standard regarding the root cause of climate change.

Who knew that for the last 50 years anthropogenic CO₂ has actually been second to the real driver of climate change, CH₄. Due diligence suggests that Oregon climate goals must accurately account for the impact of CH₄ in Oregon.

Although briefly acknowledged by the Oregon Global Warming Commission report to the Legislature, fugitive methane released to the environment is not identifiable in the 2015 GHG Inventory. Curiously, in accounting for methane, the factor reported by OGWC is GWP100 = 28. Again, who thinks we have all century to intercept potentially irreversible damage to seasonal weather patterns, life cycles, crop cycles, water distribution, shorelines, population distributions, economies, oceanic food chains, fisheries, insect cycles, pandemics, plus unknowns currently inconceivable. We regard Oregon’s insistence on GWP100 as an inventory standard to be a significant error, comparable to the error in Figure SPM.1 corrected below.

Full disclosure: we are unable to locate other reports correlating the conclusion that anthropogenic CH₄ emissions exceed fossil fuel and industrial CO₂ emissions.



Measurements. Atmospheric CO₂ has been and continues to be measured, plots are readily accessible and they show no signs of decline, ever.

http://scrippsco2.ucsd.edu/history_legacy/keeling_curve_lessons

Nevertheless it is reassuring to know that CO₂ is absorbed and recycled as O₂ in natural carbon sinks. The US West Coast forests from California to Southern Alaska are regarded as the densest carbon sink on the planet.

Neither are the measurements of CH₄ in Earth's atmosphere in decline.

<http://www.scientificamerican.com/article/debate-rises-over-real-source-of-higher-methane-emissions/>

Natural gas industry owners and operators do not report measured methane leaks and releases, and instead are allowed by government agencies such as the US EPA to provide mere estimates. We are still looking for a CH₄ sink like forests are for CO₂. For this reason CH₄ deserves immediate and imperative attention.

Replacing Boardman

The Oregon Environmental Quality Commission decided in late 2010 for early closure for this baseload plant despite planned operation through 2040. This action allowed [PGE](#) to install \$60

million to \$90 million of pollution controls rather than the \$500 million that would have been required under the Clean Air Act. Boardman Coal was slated to close or convert to an alternative, renewable source of fuel by 2020. Power dispatch capability is 600-megawatts, producing 3,628,000 metric tons CO₂ annually.

Carty Natural Gas Plant

The Carty Unit 1 Plant replaces Boardman and is designed for a 30-year lifespan, producing 440 megawatts of base load from natural gas, tapping into the TransCanada gas pipeline 25 miles away in Ione with a run of 20-inch-diameter pipeline buried four feet underground. Renewable natural gas is available from the refinery at the nearby Port of Morrow. The Carty plant was completed in July 2016.

Natural gas, consisting of primarily methane, is widely recognized as a fossil fuel that burns cleaner than coal, producing only 50% of coal CO₂ per megawatt. Carty NG will emit less CO₂ to the environment than coal.

$$440\text{MW} / 600\text{MW} \times 3,628,000 \text{ tons} \times 50\% = 1,330,000 \text{ tons}$$



Any Natgas-Fueled Installation
[Turbine compressor, elect gen, cogen],
LNG Distribution Center (Tacoma, WA), etc

Compute the amount CH₄ needed to run the facility.

Start with expected amount of CO₂ being produced.

CO₂ Prod x molecular wt ratio of CH₄/CO₂ = CH₄ fuel delivered

Example: Carty Cogen Plant, 1,330,000 metric tons CO₂ annually

1,330,000 metric tons x (16/44) = 483,600 metric tons CH₄ annually

Compute the amount of CH₄ leakage upstream prior to delivery

Range of estimated leakage is 1% to 9% (industry does not provide measurements)

483,600 metric tons x 5% = 24,180 metric tons lost to climate annually

[Aliso Canyon Accident total release = 94,500 metric tons of CH₄;

http://www.arb.ca.gov/research/aliso_canyon_natural_gas_leak.htm]

Compute equivalent CO₂ (CO₂e) of leaked CH₄

The standard warming potential for CH4 is 84x CO2 for the 20 years after release
 24,180 metric tons x 84 = 2,031,000 metric tons CO2e
 CO2e exceeds CO2 produced by a factor of 1.5 (same as 150%).

Ending Demand for CH4. With a 12-year half-life, we can expect a significant drop in CH4 concentration, mitigating its dominant role in driving adverse climate change in less than 20 years following the start of CH4 intervention. To have a beneficial effect in 2050, CH4 containment would need to be complete in 2030. Allowing ANY increase in natural gas demand appears unconscionable, prima facie.

Amending the site certificate for the Carty Generating Station for additional natural gas baseload generation, given the generally unrecognized but clearly dominant role of CH4 in OUR out-of-control climate crisis, just adds to the crisis. We know that methane leaking from natural gas infrastructure will render state of the art, highly efficient generation stations no better than coal. Just go by the numbers.

Similar calculations for all Units

