Southern Oregon Climate Action Now
SOCAN
Confronting Climate Change
https://socan.eco

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Chair Sollman and members of the Senate Committee on Energy and Environment:

I write as cofacilitator of Southern Oregon Climate Action Now (SOCAN), an organization of over 2,000 rural Southern Oregonians who are concerned about the climate crisis and urge statewide action to address it. The mission of SOCAN is to promote awareness and understanding of the science of global warming and its climate chaos consequences and stimulate individual and collective action to address it. Since rural Oregonians occupy the frontlines in experiencing the impact of the drought, shrinking snowpack, wildfires and extreme weather that the climate crisis imposes, we are strongly committed to statewide action. We are also very aware that there are many vulnerable communities, families, and individuals in Oregon who deserve equitable consideration as we develop plans to remedy the climate crisis.

Buildings and Climate Pollution

We understand fully that building operations contribute substantially to both the global and U.S. total carbon dioxide equivalent greenhouse gas (GHG) emissions. Rukikaire and Loran (2022) reported that globally buildings account for 34% of energy demand and some 37% of carbon dioxide emissions. Meanwhile, quoting International Energy Agency (IEA) data, Architecture 230 (2022) reported that buildings contribute 40% of annual global carbon dioxide emissions, of which 27% results from operations and 13% from construction (the so-called embodied carbon emissions in buildings). Meanwhile, Leung (2018) reported that for the U.S., buildings account for 29% of the greenhouse gas emissions annually. She also reported that in commercial buildings, Heating, Cooling and Ventilation account for 30% of the total emissions, while in residential buildings, this value is 38%.

According to the state Department of Environmental Quality DEQ (2022), on an annual basis, residential and commercial buildings occupy second place among sectors in terms of greenhouse gas emissions. It therefore makes abundant sense that substantial effort should be expended on addressing emissions from buildings if we are to take seriously the mission of reducing climate pollution in the state.

In an International Energy Agency report, Fischer (2021) reported an earlier IEA conclusion that: “Energy efficiency represents more than 40% of the emissions abatement needed by 2040….” and suggests the: “currently existing cost-effective technologies are sufficient to double global energy efficiency by 2040.” Meanwhile, as an encouraging note, Sioshansi (2020) concluded: “Making electric motors, lighting a[n]d HVAC more efficient has never been more critical or profitable.” The evidence suggests clearly that promoting energy use efficiency in our buildings can contribute substantially to helping the satet achieve greenhouse gas emissions reduction targets.

The Drawback of Fossil Gas (= Methane or Natural Gas)

The fossil fuel euphemistically called 'natural gas' is a fossil fuel composed of 70 – 90% (API 2021) methane, but when delivered to our homes, it is almost pure methane {Naturalgas.org 2013). Like other fossil fuels, when combusted, either in the power plant to generate electricity or in the home for heating or cooking, the gas produces carbon dioxide. Table 1 reports the pounds of carbon dioxide emitted per million BTUs of energy generated from fossil fuels.

Table 1. Comparison of carbon dioxide emissions (in lbs) per million BTUs (EIA 2022)

Propane	138.63
Diesel / Home Heating fuel	163.45
Kerosene	161.35
Coal (all types)	211.87
Natural gas	116.65
Finished motor gasoline	148.47
Motor gasoline	155.77

Table 1 suggests that in terms of combustion emissions of carbon dioxide, fossil gas is an improvement over other fossil fuels. Unfortunately for the gas companies, this is not the whole story. In all energy resource cases, we must undertake full lifecycle assessment of emissions. In the case of gas, we go to the source and start there. The gas must first be extracted and processed, and then transmitted under pressure through pipelines to target end users. The first catch is that throughout the life cycle, gas leaks. In addition, unlike carbon dioxide which has a half-life of centuries to millennia in the atmosphere, methane has a half-life of only about a decade. The second catch arises from the Global Warming Potential (GWP) of the gas. Methane is over 80 times worse than carbon dioxide as a global warming gas on a 20-year basis and nearly 30 times worse on a 100-year basis (IPCC 2021). It will be readily evident that this means not much methane has to leak to negate the combustion benefit depicted in Table 1.

In the popular press, the focus on what is driving global warming and thus the climate change consequences, carbon dioxide is often identified as the culprit. While carbon dioxide is assuredly the most important driver, it is accompanied by several other gases, notably methane, nitrous oxides and human-generated fluorinated gases. Several years ago, NOAA established an Annual Greenhouse Gas Index (AGGI) reporting the impact of various gases on the overall trend. The AGGI set 1990 as 1, and reports divergence before and after this date of the various GHG concentrations in the atmosphere, and their contribution to the overall impact. (Figure 1).

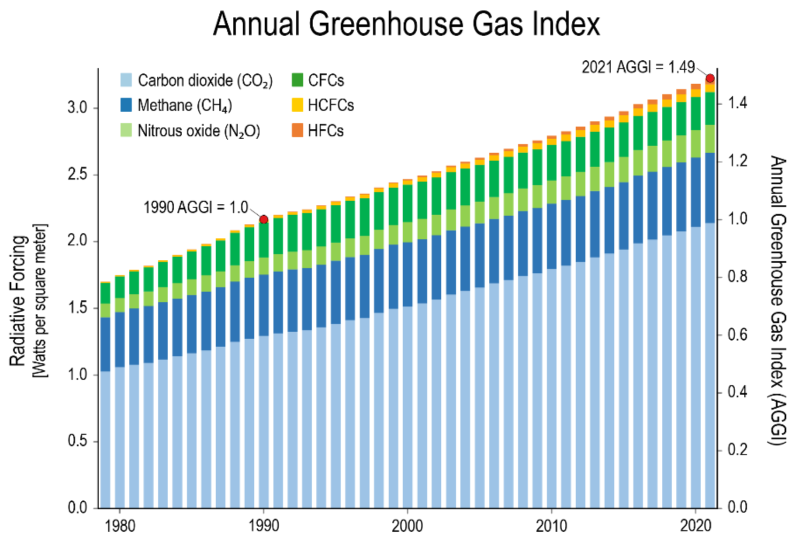

Figure 1. The NOAA Annual Greenhouse Gas index depicting contribution of various gases. (NOAA 2022)

As can be seen, the AGGI in 2021 was 1.49, meaning that the impact of these gases is nearly 50% greater than in 1990. Additionally, of that 1.49 Index value, about 0.49 (nearly 50%) results from gases other than carbon dioxide.

Additionally, among these gases, methane contributes about 8%. The message is clear: we should not ignore gases other than carbon dioxide and specifically should not ignore methane, the major contributor among these other gases.

It was not until the last decade or so that studies of the leakage of methane during the fossil gas cycle were undertaken and its significance revealed. Before this realization, it was probably reasonable to argue that natural gas was the cleanest fossil fuel. That's when the notion of natural gas as a bridge fuel to a renewable energy future was established. Regrettably, we now know this reputation is an illusion. Yet, it has remained a claim by gas companies (e.g., Neslen 2017).

Robert Howarth and colleagues from Cornell University, among others, have been studying this issue for many years. Howarth *et al.* (2011) were among the first to report that the range of methane emissions for conventional gas extraction and processing was 1.7 – 6.0% while that from shale extraction was 3.6 - 7.9%. Howarth (2014) offered the mean for conventional natural gas extraction as 3.8% and that for shale extraction as 5.8% and reported the break-even percentage above which the gas becomes worse than coal as 2.8% assuming the 20-year GWP value for methane. The justification for using the 20-year GWP is simply that, as the Intergovernmental Panel on Climate Change (IPCC 2018) argued net zero emissions is required by 2050, thus the length of time for action is short. This makes the 100-year value meaningless. It also means that, on average, both conventional and shale extraction produce methane emissions that rate their fossil fuel worse than coal in terms of its global warming impact. Thus, the conclusion has to be that methane (natural gas) is potentially worse than coal as a global warming fuel.

In a later report, Howarth (2019) concluded: "shale-gas production in North America over the past decade may have contributed more than half of all of the increased emissions from fossil fuels globally and approximately one-third of the total increased emissions from all sources globally over the past decade." Zhang et al. (2020) concluded that for the largest extraction field – the Permian Basin: "[the] magnitude of emissions is 3.7% of the gross gas extracted." Note that this is confined to Permian Basin emissions and does not include emissions from transmission out of the Basin to the end user. However, even this is substantially greater than the break-even point of 2.8%. Meanwhile, a study on 2018 emissions of methane from the full fossil gas life cycle indicates that it accounts for some 26% of the nation's total methane emissions (Littlefield *et al.* 2022).

Additionally, Hmiel *et al.* 2020 assessed that anthropogenic methane emissions from fossil fuels represent 30% of the global source of the gas.

Assessment of the impact of emissions from fossil gas indicates that it is profoundly not 'the clean fossil fuel' and should be avoided as seriously as coal and oil should be avoided.

In order to maintain their market share and business model, gas companies are attempting to create the impression that they are committed to reducing climate pollution from their product. Unfortunately, the methods that they claim will achieve this goal are, at best, questionable.

A separate issue regarding fossil gas (methane) has emerged as a great concern over recent years: that regards the tremendous negative health impacts that its use in homes imposes on residents, especially, of course, children. Excellent discussions of these costs can be found in Gottlieb and Dyrszka (2017) and O'Rourke *et al.* (2022). Even for those denying the reality of the climate crisis, the health effects alone of continued reliance of fossil gas should warrant its rejection.

Leiserowitz *et al.* (2023) report that the ratio of Americans accepting that climate change is happening versus rejecting it is now about 4:1 (70%:16%) with 58% accepting that it is human-caused and only 27% thinking the cause is natural. It is time for us all to take the crisis seriously and act appropriately. SB870 is another Oregonian step in this direction.

For these reasons, Southern Oregon Climate Action now supports SB870-1, but suggests that it should preclude efforts that rely on fossil gas.

Respectfully Submitted

Alan Journet

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