



October 9, 2020

To:

Director Laura Watson
Washington Department of Ecology
300 Desmond Drive SE
Lacey, WA 98503

Submitted via Ecology's web portal and email to

laura.watson@ecy.wa.gov

Board of Directors

Michele Bernal-Graves, MS
Treasurer

David Chatfield

Andy Harris, MD

Maxine Fookson, PNP

Elaine McKenzie, RN, MPH
Vice President

Patricia Murphy, ND, LAC
Secretary

Nicki Nabavizadeh, MD

Patrick O'Herron, MD
President

John Pearson, MD

Advisory Board

George Austin

Sonia Buist, MD

Martin Donohoe, MD

Ben Duncan

Charles Gallia, PhD

Brian K. Gibbs, PhD, MBA

Chisao Hata

Charles Hudson

Zeenia Junkeer, ND

Susan Katz, MD

Yukiyo Kawano

Joel Nigg, PhD

Bonnie Reagan, MD

Karen Steingart, MD, MPH

Frances Storrs, MD

Re: Comments on the Draft Second Supplemental Environmental Impact Statement (DSSEIS) for Northwest Innovation Works' Methanol Refinery and Export Terminal.

Director Watson:

It is becoming increasingly clear that climate change is one of the greatest human health crises the world has ever faced. Human-derived greenhouse gas emissions are increasing global temperatures and causing extreme weather events, harmful algal blooms, larger and more catastrophic wildfires, and more. These symptoms of a changing climate impact human health and safety in a wide range of ways, the most recent example being the unhealthy wildfire smoke and evacuations experienced by West Coast residents from California to British Columbia.

Northwest Innovation Works (NWIW) has for years attempted to market itself as a part of the solution to climate change even as they were caught giving contradictory accounts of the end

uses of the methanol that would be refined and exported at their proposed Kalama Methanol facility. Building this refinery and export facility in the small town of Kalama would both exacerbate the climate crisis and cause immediate impacts to the health and well being of Southwest Washington.

Oregon Physicians for Social Responsibility opposes the expansion of transport, storage, or shipment of fracked gas within the Pacific Northwest states on the basis of serious, credible threats to the health of our residents. Our commitment as health professionals to improving the health of the public and achieving equity in health outcomes demands that we clearly and unequivocally communicate the urgent need to transition away from fossil fuels to clean and equitable renewable energy sources.

To this end, we present our comments on the DSSEIS to the Washington Department of Ecology and request that the Shorelines permit for the Kalama Methanol Manufacturing Facility be rejected. Any other permits for this project and permission for this project must be denied as the facility is not in the best interests of the people of the State of Washington nor our fragile planet. We specifically call attention to the adverse health impacts of continued extraction, transport, processing and use of fracked gas, its impacts on catastrophic climate disruption, and omissions, inaccuracies, and faulty assumptions of the DSSEIS as the basis for our urgent request.

We urge Ecology to reject NWIW's proposal for the following reasons:

- **The proposal is inconsistent with the path laid out by the Intergovernmental Panel on Climate Change to reach global carbon neutrality by 2050.**
- **The Washington Tracking Network has identified the communities of Kalama and nearby Longview as among the most vulnerable in the state to the deleterious effects of climate change. The proposal, therefore, violates the tenets of environmental justice.**

- The greenhouse gas life cycle analysis (LCA) relies on a highly speculative market analysis of fossil fuels and plastics, which dismisses out of hand the effects of regulation and facilitates business as usual, which we know will not prevent climate catastrophe.
- The mitigation plan is voluntary and will likely rely on discredited or questionable carbon sequestration or carbon offset schemes.
- Current pipeline infrastructure in the state will not be adequate to handle projected needs. The LCA omits any analysis of the GHG effects of the construction and operation of new gas pipelines
- Multiple air toxins will be emitted by the facility. The cumulative effects on the local population of emissions, especially in combination with PM 2.5, have not been adequately assessed.
- No plans to mitigate the substantial risk of fire and explosion due to earthquake have been identified.
- Labor camps to accommodate the influx of workers for construction pose substantial public health hazards and costs to local residents

Table of Contents:

- [Climate Catastrophe and Environmental Justice](#)
- [Global Greenhouse Gas Emissions](#)
- [Air Pollutants](#)
- [Mitigation](#)
- [Fire and Explosion Risk from Earthquake](#)
- [New Fracking Wells and Pipeline](#)
- [Temporary Labor Camps](#)
- [Conclusion](#)
- [Bibliography](#)

Climate Catastrophe and Environmental Justice

In 2018 the IPCC issued a report that outlined how much carbon emissions needed to be reduced in order to keep global temperature rise to no more than 1.5 °C, the goal of the Paris Climate Agreement.¹ The scientific consensus is that a rise in temperature above 1.5°C would result in catastrophic and irreversible global warming. In order to reach this goal, climate scientists of the IPCC calculated that global carbon emissions would need to be reduced by 45% by 2030. This calculation is what lies behind the prediction that the global community had 12 years (now 10 years) to take the action necessary to put us on the path to carbon neutrality by 2050.²

In 2016 already, independent researchers drew on industry and governmental data sources to make the case that the current growth of fossil fuel production in the US if it continued unabated would prohibit achieving the IPCC goal of 1.5° C global warming.³ This level of growth is precisely what the DSSEIS supports. In other words, even the most optimistic projections of total net global greenhouse gas emissions from the Kalama methanol refinery are inconsistent with reaching a goal of 45% reduction of carbon emissions by 2030.

It is unthinkable for our survival on this planet to plan to extract, transport, process and use fossil fuels for the next 40 years, the proposed lifespan of this facility, when there is overwhelming scientific evidence that we must make drastic reductions in greenhouse gas emissions immediately. Ecology's conclusion flies in the face of common sense, as we are assaulted by multiple public health emergencies: catastrophic climate disruption causing increased heat, droughts, wildfires, floods, unbreathable air, increased illness and deaths from heat, storms, vector borne diseases, a pandemic of lung disease aggravated by air pollution, economic loss, displacement of thousands of people, and loss of water, food, and ecosystem supports. The adverse effects of climate disruption

¹ Masson-Delmotte, Valérie, et al, editors, "Global Warming of 1.5° C," Intergovernmental Panel on Climate Change, 2018,

https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf

² Berwyn, Bob, "What does '12 Years (Now 11 years) to Act on Climate Change Really Mean", Inside Climate News, August 27, 2019,

<https://insideclimatenews.org/news/27082019/12-years-climate-change-explained-ipcc-science-solutions>

³ Mutitt, G. (2016, September). *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel*. Retrieved from Oil Change International:

<http://priceofoil.org/2016/09/22/the-skys-limit-report/>

on human health are numerous, serious, cumulative and increasing as we forego opportunities to change our behavior and reduce greenhouse gas emissions. Figure 1 below from the CDC summarizes health impacts of climate change.

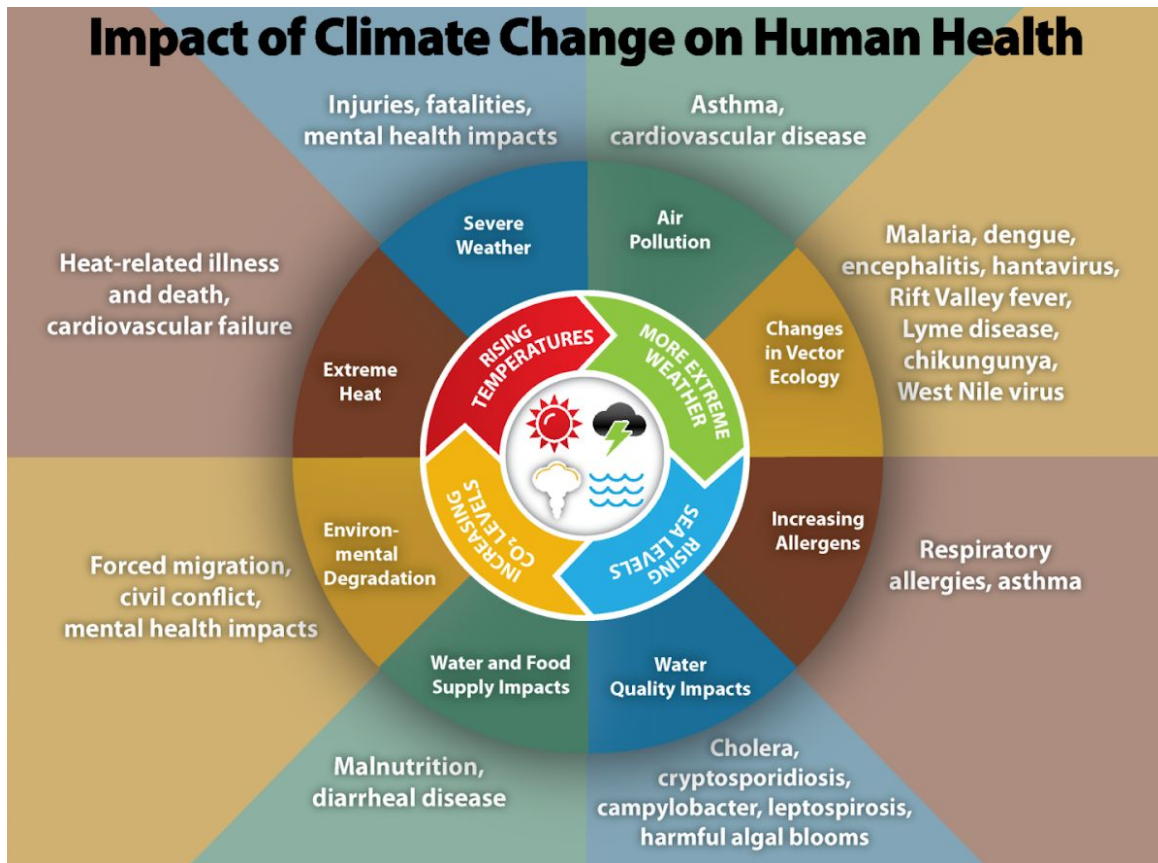


Fig. 1: Impact of Climate Change on Human Health (U.S. Centers for Disease Control and Prevention)

Furthermore, the adverse impacts of climate change will disproportionately affect low income, Black, indigenous, immigrant, houseless and other marginalized communities. Poor and underserved populations are at greater risks of illness and deaths due to heat related illnesses. They are also at increased risk of displacement, loss of jobs, homes and property resulting from the climate impacts of global warming.

Kalama, a small and beautiful rural town with a population of about 2,700 (2018), is nestled on the banks of the Columbia River in Cowlitz County. It is home to a busy and

thriving Port—the economic engine of the town—with miles of riverfront playground, beaches, public parks, and a marina that hosts many shops and restaurants. The Port’s stated mission is “to induce capital investment in an environmentally responsible manner to create jobs and to enhance public recreational opportunities.”⁴

Notwithstanding the fact that the Kalama Methanol refinery would be an eyesore—ugly, smelly and noisy—to this idyllic town and port, its climate impacts would have serious direct and adverse impacts on this vulnerable community, clearly an environmental injustice.

The Washington Tracking Network has identified those communities most vulnerable to climate change based on environmental exposure, environmental effects, population sensitivity, and socio-economic factors. Using this vulnerability index, Kalama has an index of 7 and nearby Longview 10 on a scale of 1-10 where 10 is highest.⁵

The disproportionate impact of climate change on Cowlitz County is related to the significant socioeconomic and health disparities experienced by its residents. These include a lower median income and higher percentage of persons living in poverty than Washington State as a whole. Cowlitz County has a higher age-adjusted mortality and higher mortality from cancer, cardiovascular and lung disease, diabetes and suicide than Washington State as a whole.⁶

The climate impacts to this community include an increase in the region’s wildfires, which not only release more greenhouse gases into the environment but result in air pollution that has both short and long term impacts on health, especially the health of the most vulnerable—children, the elderly, and those with underlying health conditions.⁷

⁴ Port of Kalama, About Page, <https://portofkalama.com/discover-port-of-kalama/about-the-port-of-kalama>, accessed 6 October 2020.

⁵ Oregon & Washington PSR, *Fracked Gas: A Threat to Healthy Communities*. June 2019.

⁶ Oregon & Washington PSR, *Fracked Gas: A Threat to Healthy Communities*. June 2019.

⁷ Oregon PSR, Airborne Particulate Matter and Public Health Fact Sheet (https://www.oregonpsr.org/environmental_health_factsheets)

A warmer climate results in warmer water which destroys salmon and fish habitat, resulting in a loss of important food sources and recreational opportunities. Higher temperatures mean a greater likelihood of water contamination and algal blooms. Heat-related illnesses and death, heat-related violence, drought related food insecurity, heavy rains, flooding, increased allergen-related illness, and vector-borne infectious diseases are all a result of climate change.

Importantly, the stress of all of the impacts of climate change, including displacement, results in anxiety depression, suicide, substance abuse, and violence, worse for those with underlying mental health conditions.⁸ Cowlitz County's suicide rate is already higher than the State as a whole. We all just experienced a taste of how difficult it is to remain inside because of air pollution and grieving the loss of acres of our carbon-sequestering forests and favorite hiking and fishing areas. Others experienced far worse, losing their homes in the wildfires. This is just the beginning of what we are now calling "the new normal."

Environmental injustice as the result of climate change would have an outsized impact on Native Americans. The Affiliated Tribes of Northwest Indians⁹ and the National Congress of American Indians¹⁰ oppose fracked gas projects, sited near tribal lands and major population centers. Although the percentage of Native Americans living in Cowlitz County is about the same as that of the State of Washington, this project would affect their traditional activities, both cultural and economic. The climate effects on fish and salmon habitat would make fishing and other traditional activities along the shoreline of the Columbia River difficult if not impossible.

⁸ Oregon & Washington PSR, *Fracked Gas: A Threat to Healthy Communities*. June 2019.

⁹ Indian Country Today, "Puyallup Battle LNG Facility in Tacoma", August 7, 2017.

<https://newsmaven.io/indiancountrytoday/archive/puyallup-battle-lng-facility-in-tacoma-Uas1XkEDVE-AKmnxc-cU1A/>

¹⁰ National Congress of American Indians. *Oppose the Siting of Liquefied Natural Gas Facilities in or Near Tribal Lands and Major Population Centers* (2018, October). Retrieved from National Congress of American Indians:

<http://www.ncai.org/resources/resolutions/oppose-the-siting-of-liquefied-natural-gas-facilities-in-or-near-tribal-lands-and-major-population-centers>

Of further concern is that there has not been a complete cultural evaluation of the land that would be crossed by the 3-mile Kalama Lateral Pipeline for tribal cultural and burial sites, a violation of tribal rights.¹¹ The spiritual and mental health impacts to tribal members of both the failure to consult with them as well as the destruction of traditional cultural and burial sites cannot be overstated.

The climate-warming effects of the greenhouse gases generated by this project on the residents of Kalama, Cowlitz County and the Native American community is significant, unjust and cannot be mitigated.

Global Greenhouse Gas Emissions

The DSSEIS arrives at the remarkable conclusion that Kalama Methanol will result in a reduction in net global greenhouse gas emissions. The analysis, however, is highly speculative and unsupportable, projecting a future that is simply business as usual and which fails to take into consideration an entire array of contingencies. It excludes any effect of environmental regulation, here or abroad, and relies entirely on market-based assumptions. Its standard of comparison is not the best available technology for production of plastic, but rather the worst. Cloaked in the guise of unimpeachable “science”, it does nothing more than support the gas industry claims that fracked gas is the answer to climate change. It is an odd stance for an agency whose mission it is to regulate the market in the interests of the public it serves.

The DSSEIS includes the key feature of an emission sensitivity model (ESM), the purpose of which is to delineate all possible greenhouse gas (GHG) emission outcomes from Kalama Methanol depending on:

1. alternate scenarios for the production of plastic in China
2. different end uses for the methanol produced, principally fuel

¹¹ Appendix B FERC Kalama Lateral Project Environmental Assessment, Northwest Pipeline LLC. Docket No. CP15-8-000

3. status of the global fossil fuel market and “other external forces”¹²

Many of the problems of previous drafts have been remedied in this analysis. For example, the analysis takes into consideration both the 20 and 100 year global warming potential (GWP) of methane; the GWP value for methane from the most recent Intergovernmental Panel on Climate Change (IPCC 5), and an upstream leakage (fugitive emission) rate as high as 3%. The use of these more conservative variables does not alter the outcome, however. The problems lie in other failures and omissions of the analysis.

To begin with, the ESM assumes that the market for plastics will continue to grow. Industry watchers do not agree. Carbon Tracker Initiative is an independent think tank which analyzes the impact of energy transition on capital markets for potential investors. They note that: “Policymakers in Europe and China are implementing much more stringent regulatory regimes [for plastics] using the five key tools of taxation, design rules, bans, targets, and infrastructure.”¹³ Business Wire reported in 2018 that rising demand for plastics will face “significant new market pressures that threaten the future of plastics demand growth.”¹⁴ In addition, the International Energy Agency predicted that the COVID-19 pandemic will reduce demand for plastic by around 4% in the near term.¹⁵

The oil industry¹⁶ as well as the IEA¹⁷ expect plastics to make up an increasing share of the demand for oil, or more specifically the petrochemicals refined from oil. Due to this,

¹² DSSEIS, 2020

¹³ Bond, Kingsmill, et al, *The Future is not in Plastics*, Carbon Tracker, September 2020, <https://carbontracker.org/reports/the-futures-not-in-plastics/>

¹⁴ Business Wire, “As Global Plastics Demand Expands Rapidly, Sustainability is Key to Future of Plastics Industry, IHS Markit Says,” May 18, 2018. <https://www.businesswire.com/news/home/20180518005048/en/As-Global-Plastics-Demand-Expands-Rapidly-Sustainability-is-Key-to-Future-of-Plastics-Industry-IHS-Markit-Says>.

¹⁵ International Energy Agency, *Global Energy Review 2020*, April 2020. <https://www.iea.org/reports/global-energy-review-2020>

¹⁶ Carpenter, Scott, “Why the Oil Industry’s \$4B Bet on plastics could backfire,” Sept 5, 2020, <https://www.forbes.com/sites/scottcarpenter/2020/09/05/why-the-oil-industrys-400-billion-bet-on-plastics-could-backfire/#46edd08943fe>

¹⁷ International Energy Agency, “The Future of Petrochemicals,” October 2018. <https://www.iea.org/reports/the-future-of-petrochemicals>

all analyses predict that falling demand for plastic will result in downward impacts on both the production and the price of oil. As oil prices fall, feedstock for plastic production in China will gravitate to the cheaper, oil-derived naphtha-based olefin manufacture, displacing methanol. Ultimately this increases the net GHG calculus for Kalama Methanol as methanol is diverted to use as a fuel.

Nowhere is the scenario of reduced demand for plastic considered in the DSSEIS. The analysis does not “consider the possibility of new policies or market shifts to occur in the markets for fossil fuels or plastics. For example, a ban or phase-out of those products could have results that would alter the assessed impacts of the [Kalama Methanol refinery].” As further stated in the DSSEIS, “Scenarios with substantially different global policies (fossil fuel/plastics phase outs or bans for example) are too uncertain to include in this analysis.” (DSSEIS, 2020) However, both investors and forward-looking segments of the fossil fuel and plastics industries themselves are taking into consideration, planning for and even aligning themselves with scenarios that Ecology claims are too uncertain to consider.

In effect, Ecology has chosen to exclude from analysis the very kinds of global changes that are needed to avert climate catastrophe. This is a clear abrogation of its responsibility to the public. It also flies in the face of current global trends. On September 22, 2020, for example, China pledged its intent to acquire 20% of its energy needs from renewables by 2025 and become carbon neutral by 2060.^{18,19} On that same day, General Electric announced it will halt construction of any coal-fired plants.²⁰ One day later the governor of California signed an executive order that will ban the sale of gas-powered cars in the state by 2035.²¹ It is puzzling how Ecology can consider these

¹⁸ Sengupta, Somini, “China, in pointed message to US, tightens its climate targets”, *New York Times*, Sept 22, 2020, <https://www.nytimes.com/2020/09/22/climate/china-emissions.html>

¹⁹ “RMI and ETC Salute China’s Carbon Neutral Pledge, Rocky Mountain Institute, Energy Transitions Commission, September 23, 2020, <https://rmi.org/rmi-and-etc-salute-chinas-carbon-neutral-pledge/>

²⁰ Mufson, Steve and Dennis, Brady, “US companies make new vows to tackle carbon emissions, even as global action falls short,” *The Washington Post*, Sept 22, 2020, https://www.washingtonpost.com/climate-environment/2020/09/22/climate-clock-week/?utm_campaign=w_p_energy_and_environment&utm_medium=email&utm_source=newsletter&wpisrc=nl_green

²¹ Grandoni, Dino, et al, “California to phase out sales of gas-powered cars by 2035”, *The Washington Post*, Sept 23, 2020,

kinds of initiatives as more uncertain than the assumption of ongoing unfettered demand for fossil fuels. Ecology should at least consider the possibility that governments around the world will act to reduce reliance on fossil fuels or reduce the consumption of plastic.

The ESM also assumes that, once it recovers from the current pandemic-induced contraction, the market for methanol will continue to grow unabated for the next 40 years. Underlying this assumption are many more assumptions, even apart from the idea of continuous growth in the market for plastics. The ESM does not consider, for example, the possibility of another pandemic, or serial pandemics. Infectious disease and environmental experts tell us otherwise.^{22,23} The adverse economic impacts of the current pandemic have been profound, particularly on the fossil fuel market. The International Energy Agency (IEA) predicted that 2020 will see a drop in demand for oil, coal and gas of respectively 9%, 8% and 5%.²⁴ Failure of the current pandemic to completely resolve and/or more pandemics to follow would create downward pressure on fossil fuel consumption and price that would profoundly alter the prospects of the methanol refinery as well as the calculus around GHG emissions. As discussed above, industry observers are warning of substantial stranded assets in the petrochemical industry. Kalama Methanol is likewise at risk.

The ESM further assumes global political and economic stability, that there will not be significant trade wars or disruptions in long-standing economic relationships, no significant social or political unrest which would further shape the choices of nation-states, and no significant military conflicts. But authoritarian governments are on

https://www.washingtonpost.com/climate-environment/2020/09/23/california-electric-cars/?utm_campaign=wp_energy_and_environment&utm_medium=email&utm_source=newsletter&wpisrc=nl_green

²² Lustgarten, Abrahm, *How Climate Change Is Contributing to Skyrocketing Rates of Infectious Disease*, Propublica, May 2020. <https://www.propublica.org/article/climate-infectious-diseases>

²³ Vaughan, Carson, *How do climate change, migration and a deadly disease in sheep alter our understanding of pandemics?* ENSIA and Food and Environment Reporting Network, September 3, 2020. <https://ensia.com/features/pandemics-climate-change-migration-globalization-emerging-infectious-diseases-covid19/>

²⁴ IEA, 2020

the rise globally,^{25,26} which will have profound but unpredictable consequences for future spheres of influence, military conflict, global migration, the organization of regional markets, trade relations and a host of other issues, all of which will, in turn, influence the supply and demand for fossil fuels.

An additional factor will be changes related to increasing climate-induced human migration. In 2018 the World Bank predicted that up to 143 million persons could be displaced by 2050.²⁷ A recent report from the Brookings Institute²⁸ notes some of the likely outcomes of this massive migration: “Intensifying intra- and inter-state competition for food, water, and other resources...; increased frequency and severity of disease outbreaks; increased U.S. border stress due to the severe effects of climate change in parts of Central America.” We have already experienced the downward economic impacts of disease outbreaks and conflicts over declining natural resources. These will likely continue into the future.

The ESM also takes at face value NWIW’s current statement of intent to target the plastics industry, a key factor underlying Ecology’s assumption that no more than 40% of methanol will be diverted for use as fuel. NWIW has already demonstrated its willingness to mislead the public about its intentions for marketing the methanol it generates.^{29,30} In addition, for the first SEIS, the lifecycle analysis of methane emissions

²⁵ World Politics Review, *What’s Driving the Rise of Authoritarianism and Populism in Europe and Beyond?*, September 11, 2020.

<https://www.worldpoliticsreview.com/insights/27842/the-rise-of-authoritarianism-and-populism-europe-and-beyond>

²⁶ Beavers, Olivia, *National Security Experts Warn of the Rise in Authoritarianism*, The Hill, February 26, 2019.

<https://thehill.com/policy/national-security/431646-national-security-experts-warn-of-rise-in-authoritarianism-efforts>

²⁷ Rigaud, Kanta Kumari, et al, *Groundswell : Preparing for Internal Climate Migration*. World Bank, Washington, DC. © World Bank, 2018. <https://openknowledge.worldbank.org/handle/10986/29461>

²⁸ Brookings Institute, “The Climate Crisis, Migration and Refugees,” 2019.

https://www.brookings.edu/wp-content/uploads/2019/07/Brookings_Blum_2019_climate.pdf

²⁹ Aizhu, C. (2017, December 4). *China’s CAS Plans Gas-to-methanol plant on U.S. West Coast*. Retrieved from Reuters:

<https://www.reuters.com/article/us-china-usa-gas-methanol/chinas-cas-plans-gas-to-methanol-plant-on-u-s-west-coast-idUSKBN1DZ0BH>

³⁰ Solomon, M. (2019, April 19). *Controversial Kalama Methanol Plant May Be Misleading Public, Regulators*. Retrieved from Oregon Public Broadcasting:

<https://www.opb.org/news/article/methanol-plant-kalama-fossil-fuel-china/>

for Kalama Methanol paid for by NWIW knowingly used outdated metrics to skew the results in its favor. It used the 2007 GWP of 25, (Erickson, 2018) which was scientifically recalculated and updated by the IPCC in 2018 to 34. The NWIW sponsored analysis also employed a methane fugitive emission rate of 0.32%, while the most recent science places the figure as high as 3%, as noted in the DSSEIS. (DSSEIS, 2020)

Apart from its problems with truth-telling and lack of allegiance to scientific integrity, NWIW, like all corporations, is beholden only to its investors and will market its methanol in whatever way it can to turn a profit, even if that means 100% of their product is used as fuel. Given that the plastics industry itself is subject to increasing regulatory demands, the assumption that only 40% of the methanol will end up being used as fuel is particularly untenable.

But most egregious of all is the total lack of consideration in the ESM for true alternatives to the climate-destroying fossil fuels. Coal-based production of plastics in China should not be our benchmark for comparison. Anything better than coal is not the policy that will spare the planet. We should benchmark climate-saving scenarios, for example, a ban on single-use plastics, which alone could reduce the production of plastics by up to 40% with a substantial positive impact on reducing global GHG production. GHG lifecycle analyses of global plastic production and disposal have been estimated to be equivalent to the GHG emissions of 189 500-megawatt coal power plants.³¹

Allowing the Kalama Methanol proposal to move forward locks the community of Kalama into supporting the fossil fuel industry, which is doing immeasurable harm to our planet. In 2016, independent researchers drew on industry and governmental data sources to make the case that the current growth of fossil fuel production in the US, if it

³¹ Hamilton, Lisa Ann, et al, "Plastic and Climate: the Hidden Costs of a Plastic Planet," Center for International Environmental Law, May, 2019, <https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-FINAL-2019.pdf>

continued unabated, would prohibit achieving the IPCC goal of 1.5° C global warming.³² This level of growth is precisely what the DSSEIS supports.

One trend that seems not uncertain is the growth in demand for renewables. The IEA predicted, even in the context of a global pandemic, that solar will grow by 16% and wind by 12%.³³ Carbon Tracker notes that falling costs, improved technology, and growing demand to reduce pollution and avert climate disaster all favor a growth in the market for renewables.³⁴ Allied Market Research, which conducts market research for corporate entities (including Amazon, Google, Dow and Dupont, among others) predicts continuous robust growth in renewables at least through 2025 and cites the rise in government down-regulation of fossil fuels in both developed and developing nations as the chief driver.³⁵ The market relationship between fossil fuels and renewables is complex, but driving the price of fossil fuels down will likely depress the market for renewables, until the price of renewables falls below that of fossil fuels. The most worrisome aspect of a massive influx of methanol from Kalama Methanol into the Chinese market is that it will squeeze out the development or deployment of renewables and delay global transition to carbon neutrality.

The ESM purports to present the sum total of probable market scenarios for fossil fuels stretching into the next forty years. The driving assumption of the analysis is that the market for methanol will continue to grow for the next forty years. However, despite presenting a dizzying array of future scenarios, the analysis makes unsupportable claims about corporate behavior, makes highly speculative assumptions about fossil fuel market trends, and forecloses on the very opportunities we have to save our way of life in the Pacific NW.

³² Mutitt, 2016

³³ International Energy Agency, *Global Energy Review 2020*, April 2020.
<https://www.iea.org/reports/global-energy-review-2020>

³⁴ Bond, Kingsmill, Was 2019 the peak of the fossil fuel era?", Carbon Tracker, May 1, 2020.
<https://carbontracker.org/was-2019-the-peak-of-the-fossil-fuel-era/>

³⁵ Narune, Amit and Prasad, Eswara, "Renewable Energy Market by Type (Hydroelectric Power, Wind Power, Bioenergy, Solar Energy, and Geothermal Energy), and End Use (Residential, Commercial, Industrial, and Others): Global Opportunity Analysis and Industry Forecast, 2018–2025," Allied Market Research, May, 2019. <https://www.alliedmarketresearch.com/renewable-energy-market>

It seems unwise at best and at worst, reckless, to endorse a project that will spew tons of carbon into our air every year for 40 years based on a speculative version of the future. When faced with threats and uncertainty, the prudent response is to reverse harmful practices and instead invest in a renewable and equitable energy future.

Air Pollutants

Toxic air pollutant emissions caused by the Kalama Methanol refinery would include benzene, formaldehyde, acetaldehyde, nickel, ammonia, polynuclear aromatic hydrocarbons and diesel particulate matter. Several of these are known carcinogens. Individually, the estimated amounts released of each toxin would comply with current standards. But, there is no consideration of the cumulative effects of exposure to multiple cancer causing agents from different sources at once. There is no analysis of the increased exposures to these carcinogens when they are absorbed onto fine particulate matter and transported through the lungs to the blood and brain. What is the cumulative effect of exposure to a number of carcinogens combined? One can assume that the risks of cancers are increased. Exposure to even very small amounts of these toxins can increase the risk of cancers in the community as well as among workers exposed at the site and at neighboring worksites. Stating that the levels of exposure are below a certain standard is not the same as saying the risk of cancer is not increased.

According to the 2016 FEIS³⁶ that this DSSEIS supplements, the acceptable source impact level (ASIL) for Diesel Particulate Matter, based on Ecology's 2008 analysis, is 0.00333 micrograms per cubic meter of air which the FEIS states represents a negligible risk. In 2011, the US Environmental Protection Agency estimated the existing diesel particulate matter concentration in the Kalama site census tract at 0.61 micrograms per cubic meter of air. (EPA 2011) This is 183 times the ASIL, so we can assume that existing conditions in Kalama present more than a negligible risk to the health of workers and residents.

³⁶ Final Environmental Impact Statement, Kalama Methanol, Sept 2016.
<https://kalamamfgfacilitysepa.com/>

We know that fine particulate matter (PM2.5) causes serious health problems including cancer, heart and lung disease, neurodevelopmental disorders and problems in pregnancy. Diesel emissions contain finer particles than PM2.5, known as black carbon, and can penetrate further into the lungs and into the bloodstream carrying toxic pollutants. It is also well established that reductions in exposure to black carbon have reduced the incidence of disease.³⁷ During construction and operation the methanol refinery would generate increases in diesel emissions in the Kalama area with increases in disease risk.

Elevated diesel emissions add to the other health threats from climate disruption such as increased extreme heat, storms, droughts, floods, wildfires, threats to our air, water, and food supplies. Amidst a respiratory pandemic we know that exposure to air pollution, and specifically fine particulate matter, increases susceptibility to the coronavirus.^{38,39,40} We know that with climate related ecosystem disruption we are and will be exposed to greater risks of emergent and migrating diseases. We know that poor and underserved populations are at greater risks of illness and deaths due to heat related illnesses. We know that poor and underserved populations are at increased risks of displacement, loss of jobs, homes and property resulting from the climate impacts of global warming. The value of reversing course and denying permits for new fossil fuel facilities is clear not only in eliminating greenhouse gas emissions but also toxic pollutants like diesel which adversely affect our health.

Mitigation

³⁷ Oregon & Washington PSR, *Fracked Gas: A Threat to Healthy Communities*. June 2019.

³⁸ Xiao Wu, Rachel C. Nethery, Benjamin M. Sabath, Danielle Braun, Francesca Dominici. Exposure to air pollution and COVID-19 mortality in the United States: A nationwide cross-sectional study. <https://doi.org/10.1101/2020.04.05.20054502>

³⁹ Petroni, Michael et al 2020 Environ. Res. Lett. 15 0940a9, Hazardous air pollutant exposure as a contributing factor to COVID-19 mortality in the United States

⁴⁰ Tung, Nguyen Thanh et al. "Particulate matter and SARS-CoV-2: A possible model of COVID-19 transmission." *The Science of the total environment*, vol. 750 141532. 5 Aug. 2020, doi:10.1016/j.scitotenv.2020.141532

Mitigation of greenhouse gas emissions is one of the main justifications for allowing the Kalama Methanol project to move forward. Mitigation does not reduce carbon emissions, and we have excellent evidence that we have no more time to allow any increases in those emissions if we are to avert the worst effects of climate disruption. Rather than permitting projects emitting more greenhouse gases and then attempting to offset them with carbon-sequestering or renewable energy projects at best, or purchasing carbon offsets at worst, we must not allow these emissions to begin with. We must increase carbon sequestration and renewable energy to “offset” the greenhouse gases that are already damaging our planet.

The DSSEIS indicates that “The project owner, NWIW, has proposed a framework Appendix D to account for and mitigate 100 percent of these direct and indirect greenhouse gas emissions on an annual basis for the life of the project, which is expected to be 40 years.” We raise the following concerns with this proposal:

1. The “framework” proposed by NWIW is called a Voluntary Mitigation Program Framework. This is not mandatory nor a requirement by Ecology or Cowlitz County for its Shoreline or other permits and relies solely on the corporate goodwill of NWIW. We know that NWIW has a history of misleading the public; there is no reason to trust their promises.⁴¹ We have no reason to believe that, once the facility and the pipeline are built and the facility is fully operational (having been granted the required permits and received grants and tax breaks), NWIW would continue to pay for mitigation.
2. NWIW proposes to mitigate 100% of all direct and indirect greenhouse gases emitted in Washington only. According to the DSSEIS (Table 3.5-14, p. 85), the amount of greenhouse gases emitted in Washington would be from 786,117 MT CO₂e/yr (low estimate) to 1,421, 748 MT CO₂e/yr (high estimate), which is less than 1/3 of the total greenhouse gases emitted by the project, 4.67 MMT CO₂e/yr. This means that there is no plan for mitigation of the majority of

⁴¹ Solomon, Molly, “Controversial Kalama Methanol Plant May Be Misleading Public, Regulators,” *Oregon Public Broadcasting*, 19 April 2019
<https://www.opb.org/news/article/methanol-plant-kalama-fossil-fuel-china/>

emissions, both upstream and downstream, i.e. 1) fracking of gas to power the plant and for use to manufacture methanol, 2) transporting of methanol by ship to China, 3) manufacturing plastics, nor 4) burning methanol as fuel for transportation. Mitigation of less than one third of climate warming gases is not a substantive mitigation plan. Greenhouse gas emissions are a global, not local, problem.

3. The Voluntary Mitigation Program would be “governed” by a Board made up of “state, tribal and local governments, environmental and environmental health nonprofit organizations, and labor organizations.” The accountability lies with the Department of Ecology and Cowlitz County. What does accountability mean? Would the “Framework” be set up such that NWIW would be expected to pay fines if it fails to meet the goals set by the Board? Because mitigation is voluntary and not mandated or required, neither Ecology nor Cowlitz County would have any legal authority to enforce mitigation. If fines were imposed, these would not mitigate the harm of greenhouse gases, and fines are frequently considered by corporations simply to be the cost of doing business.
4. The Board will “award and disperse funding for voluntary mitigation projects or, where necessary, the purchase of carbon credits.” Although Appendix D does provide a methodology for calculating the budget for mitigation based on greenhouse gas emissions, how will the Board assure that NWIW is responsible for fully funding the mitigation work? Will NWIW ask that the Board raise some of the money for these projects or request reductions in fees or taxes from the State or County?
5. No specific projects or strategies were discussed except the purchase of carbon credits from U.S. carbon credit markets or voluntary U.S. carbon registries. Although the DSSEIS states that the priority for projects would be those that would benefit the local area, State of Washington, and the Pacific Northwest, the option for purchasing carbon credits is left open. Carbon registries may be

elsewhere and thus would not be of direct benefit to Washington. Given the ease of this option, it seems likely that NWIW would take advantage of this, such that there would be no direct benefit to local and Washington residents.

6. Even assuming that 100% of the greenhouse gas emissions attributable to Kalama Methanol could be mitigated, including those that occur outside of Washington state, mitigation of greenhouse gas emissions via the purchase of carbon offsets is not equivalent to avoiding the emissions of those greenhouse gases. Carbon offsetting, usually through the preservation of carbon-sequestering forests, is notoriously prone to fraud, unforeseen circumstances, and unreliable accounting of how much carbon dioxide is captured. Researchers have found that carbon sequestration gains from carbon offsets projects are often lost over time or inaccurately measured to begin with.⁴² Even assuming that a forest offset project accurately offsets the emissions of a project like Kalama Methanol, a single forest fire can release nearly all of the sequestered carbon of a forest offset project. A study from the Stockholm Environmental Institute in 2015 found that 75% of the carbon offsets credits issued by the global offsets program Joint Implementation were unlikely to represent real reductions, and that if countries had cut pollution on-site instead of relying on offsets, global carbon dioxide emissions would have been 600 million tons lower.⁴³

Corporations use the promise of mitigation to pretend they are reducing emissions. For example, carbon sequestration often means planting monoculture non-native trees, a

⁴² Song, Lisa and Moura, Paula. "Why Carbon Credits For Forest Preservation May Be Worse Than Nothing," *ProPublica*. 22 May 2019. <https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-dont-work-deforestation-redd-acre-cambodia/>

⁴³ Kollmuss, Anja; Schneider, Lambert, and Zhezherin, Vladyslav. "Has Joint Implementation reduced GHG emissions? Lessons learned for the design of carbon market mechanisms." Stockholm Environmental Institute, August 2015 <https://mediamanager.sei.org/documents/Publications/Climate/SEI-WP-2015-07-JI-lessons-for-carbon-mechs.pdf>

destructive practice leaving forests more vulnerable to disease and wildfires.⁴⁴ We have good evidence that tree farms planted to replace logged forests burn hotter and leave a sterile landscape. It takes many years for newly planted trees to sequester significant amounts of carbon.

Most importantly the climate-changing effects of greenhouse gases cannot be mitigated. How can lost life from wildfires be mitigated? How can lost salmon due to the heating up of rivers and streams be mitigated? How can losses to the economy of the State from droughts, wildfires, floods, reduced snowpack, loss of wildlife and wildlife habitat be mitigated? These losses all result from continued use of fossil fuels including fossil gas, as is proposed for this methanol refinery.

Furthermore, any mitigation that is proposed must be based on demonstrated methods that are known and specified in detail by the applicant for a permit, with specifics about exactly what amounts of emissions each mitigation is known from experience to compensate. The Department of Ecology and the State of Washington cannot accept unsupported promises that may never happen or mitigation methods that fail. Given the uncertainty in the global markets for fossil fuels in the midst of an ever-worsening climate emergency, NWIW's funding mitigation over the course of 40 years, even for its Washington-based GHG emissions, is not based on reality in a market-driven economy. Mitigation must not be left to the voluntary good will of a major international corporation whose primary motivation is profit. Ecology must mandate reliable mitigation as a condition for granting permits, and the mitigation must include 100% of the greenhouse gas emissions generated by this project.

Considering only Washington emissions for mitigation is irresponsible. Washington does not exist in isolation from the rest of the country and the world. As we have seen with the COVID-19 pandemic, each entity that works for its own interests in isolation succeeds only in preventing control of an emergency that does not respect borders and jurisdictions. And, as we hear repeatedly, we are all in this together. If we do not

⁴⁴ Ingalsbee, Timothy. *Incendiary Rhetoric: Climate Change, Wildfire, and Ecological Fire Management*. Firefighters United for Safety, Ethics, and Ecology, 2020 [www:fusee.org](http://www.fusee.org), pg. 10. https://static1.squarespace.com/static/5e2c7d5a807d5d13389c0db6/t/5ecbfda2e8296a24e17436f5/1601670278230/Incendiary+Rhetoric_2020-6.pdf

combine our talents and resources to respond to emergencies as a planet full of people, we will not survive. It is that simple.

Fire and Explosion Risk from Earthquake

The proposed facility represents a substantial safety risk for workers and the Kalama community at large. The facility proposed by NWIW is far larger than what is currently in operation anywhere in the world. The plant would process massive quantities of fracked gas into liquid methanol. The highly flammable methanol would be stored on site in eight tanks, each capable of holding more than 8 million gallons of methanol.⁴⁵ Methanol has a very low flash point, 54 degrees F/12 degrees C, which is the lowest temperature at which its vapors will ignite and the maximum temperature at which the substance can be safely stored. This means that even at ambient storage temperatures, let alone hot weather or hot facility environments, a lot of vapor is produced, creating a high risk of fires or explosions. Methane is also extremely flammable and the combination of two volatile substances at the proposed plant compounds the risk of explosions and fires.

Under normal operating conditions, the risk of fire and explosion would be very low at the plant. However, due to its position on the Cascadia Subduction Zone the area is vulnerable to earthquakes. Experts estimate a 15% likelihood of a magnitude 9 earthquake in the region in the next 50 years⁴⁶ and a 42% likelihood of an earthquake up to a magnitude of 8.0 within the next 50 years.⁴⁷ Kalama, in other words, faces a 15 to 42% chance of experiencing a major quake during the lifetime of the methanol project. An earthquake of magnitude 8 would cause severe and widespread damage. A magnitude 9 earthquake would devastate the Northwest. The most severe impacts,

⁴⁵ Luck, Melissa, "Risk of methanol explosion a hot topic in Kalama," *The Daily News*, Dec 10, 2016. https://tdn.com/news/local/risk-of-methanol-explosion-a-hot-topic-in-kalama/article_45a048f1-438e-52d1-b688-42364bed0c5a.html

⁴⁶ Goldfinger, Chris, et al, *The importance of site selection, sediment supply, and hydrodynamics: A case study of submarine paleoseismology on the northern Cascadia margin, Washington USA. Marine Geology*, 384, 4–46, (2017). <https://doi.org/10.1016/j.margeo.2016.06.008>

⁴⁷ Goldfinger, Chris, et al, Turbidite event history — *Methods and implications for Holocene paleoseismicity of the Cascadia subduction zone: USGS Professional Paper 1661-F*. (2012) <https://pubs.usgs.gov/pp/pp1661f/>

including soil liquefaction, landslides, and tsunamis, would fall on coastal areas.⁴⁸ In case of a tsunami, the immense force of the initial surge would carry marine vessels, other objects and debris inland, smashing coastal buildings and structures.⁴⁹ Weeks of inundation that could follow would compound the damage.

According to the Final Environmental Impact Statement (FEIS) for the Kalama methanol facility, sand and silt below groundwater levels at the site are susceptible to liquefaction. The FEIS estimated that liquefaction could occur as deep as 100 feet underground, which could cause soils underlying the refinery, dock and tank farm to spread and severely damage key infrastructure. The risks of earthquakes for pipelines in wildfire-prone forested areas include not just destruction of infrastructure but unmanageable wildfires in remote areas resulting from the release of gas. The destruction of communities with injuries and loss of life from a major earthquake could be compounded by catastrophic fires.

In an independent worst-case scenario analysis requested by Columbia Riverkeeper, a plane crash, terrorist attack, or a Cascadia Subduction Zone magnitude 9.0 earthquake, could rupture multiple tanks and if sparked, could possibly lead to an explosion in the remaining intact tank.⁵⁰ If catastrophic tank failure were to occur, leaking methanol could catch fire, and the vapor, if trapped, could cause an explosion that could shatter glass as far away as Longview and Rainier, destroy buildings within a six-mile radius and cause serious injuries in Kalama.

The Final Environmental Impact Statement for the Kalama project identifies seismic protections as part of construction plans; however, it states that a “ground improvement plan” will be designed as the project is being built, leaving questions about what such a

⁴⁸ Harvey, H. *Fifty simulations of 'The Really Big One' show how a 9.0 magnitude earthquake in Cascadia could play out*, October 23, 2017.

<http://www.washington.edu/news/2017/10/23/50-simulations-of-the-really-big-one-show-how-a-9-0-cascadia-earthquake-could-play-out/>

⁴⁹ Venturato, Angie, et al, *Tacoma, Washington, Tsunami Hazard Mapping Project: Modeling Tsunami Inundation*. Pacific Marine Environmental Laboratory/National Oceanic and Atmospheric Administration, January, 2007. <https://www.pmel.noaa.gov/pubs/PDF/vent2981/vent2981.pdf>

⁵⁰ Luck, 2016

plan would include and how it might protect workers and the surrounding community from consequences of a severe seismic event.⁵¹ The risk of such an event is hardly trivial. Given the geologic vulnerabilities of the proposed site, a detailed engineering plan for meeting seismic standards should be vetted prior to construction to reassure residents that seismic standards can in fact be met.

New Fracking Wells and Pipeline

The refinery will use up to 320 million cubic feet of gas per day. This is more gas than is used by the region's biggest cities combined (See Figure 2). The amount of greenhouse gas emissions from the wells and pipelines supplying the refinery, i.e. "upstream" sources, are greater than that of the refinery itself. The upstream analysis of greenhouse gas (GHG) emissions comes from the estimates of GHGs generated by fracking and from the pipeline currently bringing gas to Washington. (DSSEIS, p. 80, Figure 3.5-12 below)

The refinery would become a destination for fracked gas produced by the American fracking industry and therefore serve to maintain or expand U.S. fracking operations. Fracking in the United States is already having a serious detrimental effect on health nationwide. One of the health impacts of fracking is potential exposure to the nearly 1 trillion gallons of wastewater brine produced by the U.S. fracking industry per year, nearly 10 times the amount of oil and gas that is extracted from the process of hydraulic fracturing.⁵² This wastewater has high concentrations of naturally-occurring radioactivity, making it especially harmful for human exposure. Radioactive waste material from fracking is already impacting the Pacific Northwest, as evidenced by the February 2020 discovery of 2.5 million pounds of radioactive waste material that was dumped into the Arlington landfill in Oregon over the course of several years.⁵³

⁵¹ Final Environmental Impact Statement, Kalama Methanol, Sept 2016.
<https://kalamamfgfacilitysepa.com/>

⁵² Nobel, Justin, "America's Radioactive Secret," *Rolling Stone*, January 21, 2020,
<https://www.rollingstone.com/politics/politics-features/oil-gas-fracking-radioactive-investigation-937389/>

⁵³ Samayoa, Monica. "2.5M Pounds Of Radioactive Waste Illegally Dumped In Oregon Landfill", *Oregon Public Broadcasting*, 14 February 2020.
<https://www.opb.org/news/article/radioactive-fracking-waste-oregon-landfill-illegal-dump/>

As noted by Columbia Riverkeeper it is likely that “another major fracked gas pipeline into the Pacific Northwest that would be triggered by NWIW’s massive fracked gas consumption.”⁵⁴ (Enclosure 1 Riverkeeper, et.al. Comments December 2018, p. 19-21)

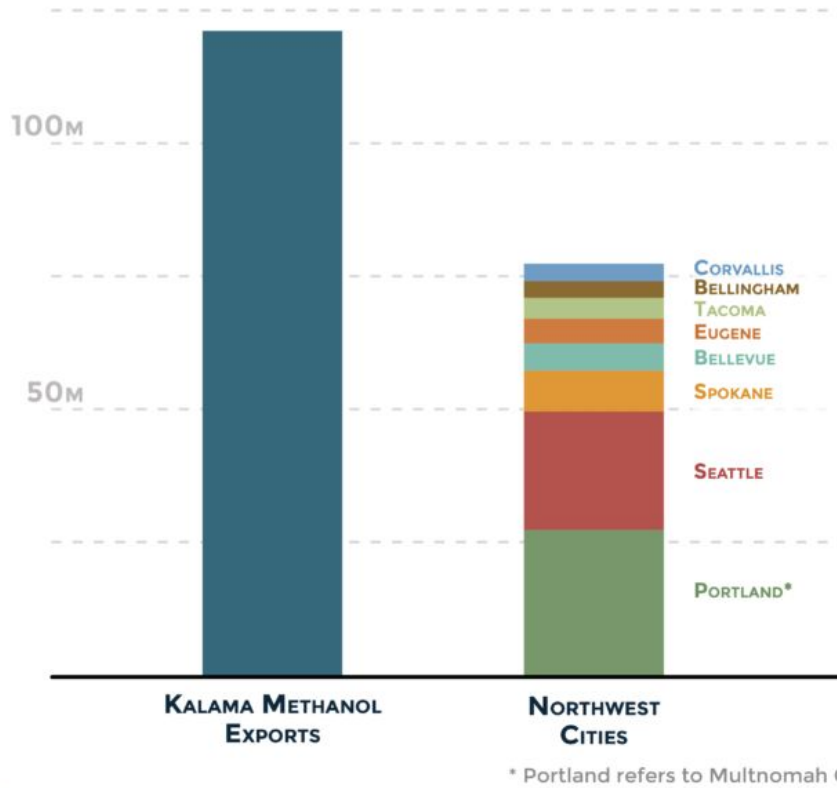
In 2018 the Northwest Industrial Gas Users (NWIGU) told the Oregon Public Utilities Commission that “our region is now experiencing high [gas] prices...not from an actual supply shortage but from an infrastructure constraint” (i.e. limited pipeline capacity into the Northwest). Riverkeeper, et.al. notes that the additional capacity required by the Kalama Methanol Refinery would “push the region over the threshold which a new regional pipeline would be constructed...”⁵⁵ (Enclosure 1 Riverkeeper, et.al. Comments December 2018, p. 19-21) The DSSEIS makes no mention of the probable need for additional gas and pipeline capacity nor is there an estimate of the amount of greenhouse gases that would be emitted from the construction of both new fracking wells and pipeline capacity. This is a serious omission that must be addressed by the DSSEIS. Additionally, the process of constructing a new gas pipeline in Washington State may not be feasible and could cause Kalama Methanol to be delayed or become a stranded asset, based on the history of delays and denials other gas pipeline proposals have recently experienced across the U.S.

⁵⁴ Enclosure 1 Riverkeeper, et.al. Comments December 2018, p. 19-21

⁵⁵ Enclosure 1 Riverkeeper, et.al. Comments December 2018, p. 19-21

The Kalama methanol project would consume far more gas than the region's biggest cities combined.

Annual gas consumption
(millions of dekatherms)



* Portland refers to Multnomah County

Source: Local greenhouse gas inventories, recent years, compiled by Sightline Institute

Fig. 2: Gas Consumption of Kalama Methanol Compared to Northwest City Consumption⁵⁶

⁵⁶ de Place, Eric and DeStephano, Paelina. "What consumes more gas than many of Cascadia's cities combined?" *Sightline Institute*. 2 July 2018. <https://www.sightline.org/2018/07/02/what-produces-more-gas-than-many-of-cascadias-cities-combined/>

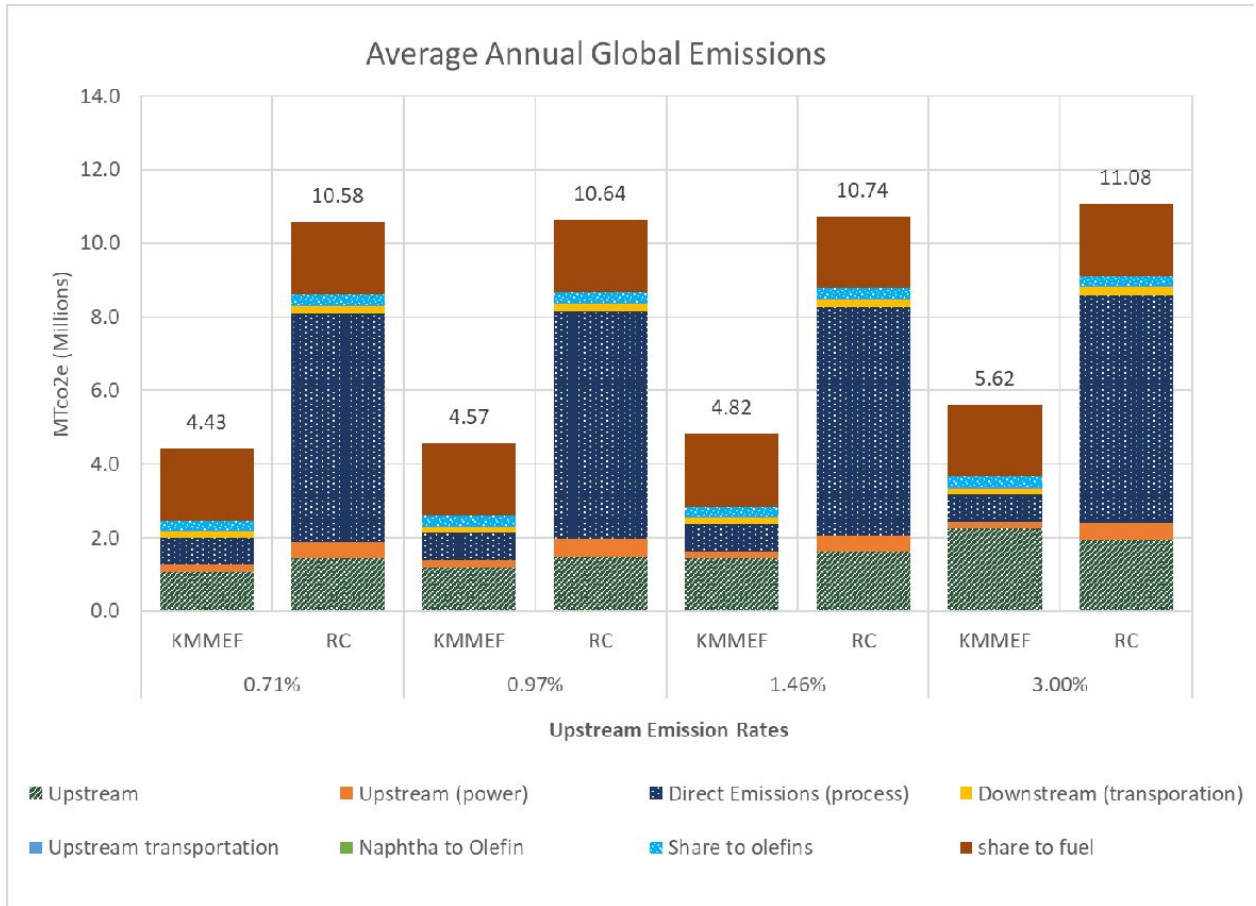


Figure 3.5-12. Average Annual LCA GHG Emission Estimates, with Kalama Methanol the RC Using Upstream Emission Rate of 0.71, 0.97, 1.46, and 3.0 -- page 80, DSSEIS

Temporary Labor Camps

Although the purpose of DSSEIS is to provide an accurate analysis of greenhouse gases generated by this Project, Ecology must consider the impacts to communities directly impacted by the Refinery. Greenhouse gases have no boundaries and vulnerable communities are at much greater risk of the health consequences of climate catastrophe.

Construction of the Refinery would bring a large influx of labor into the Kalama area. Temporary labor camps, so called “Man Camps” are often built to accommodate the

workforce. It has been well documented that the presence of extractive industries in a community place significant burdens on local infrastructure, public services and public health and increasingly on nearby tribal communities through increases in crime, drug use, assaults, kidnapping, sex trafficking, and sexually transmitted infections (STI).⁵⁷ For example, North Dakota has reported a significant increase in cases of HIV/AIDS in the State's western oil fields.⁵⁸

James Anaya, the United Nations special rapporteur, opened the meeting in 2014 of the UN Permanent Forum, stating "It has become evident...that extractive industries many times have different and often disproportionately adverse effects on indigenous peoples, and particularly on the health conditions of women." He detailed the effects on Native American women and girls, including increased rates of STIs and HIV/AIDS, physical assault, and sexual harassment and violence. He additionally noted that "contamination of indigenous lands and natural resources resulting from extractive activities has significant implications for reproductive health, having contributed in many cases to birth defects, delayed child development and disease among community members." In addition, he noted, the full range of health effects are yet to be determined, igniting fears among Native Americans about the unknown intergenerational effects that the contamination will have on their communities."^{59,60}

The epidemic of "Missing and Murdered Indigenous Women," identified by many Human Rights groups, has found that "Native American women are murdered and sexually assaulted at rates as high as 10 times the average in certain counties in the United States—crimes overwhelmingly committed by individuals outside the Native American community. These crimes are particularly likely in remote settings where transient

⁵⁷ Oregon & Washington PSR, *Fracked Gas: A Threat to Healthy Communities*. June 2019.

⁵⁸ Associated Press. "North Dakota HIV/AIDS rate rises with population growth" 13 October 2014. https://billingsgazette.com/news/state-and-regional/montana/north-dakota-hiv-aids-rate-rises-with-population-%20growth/article_a939fed6-f737-5cfb-957f-ab800673f4d7.html

⁵⁹ Oregon & Washington PSR, *Fracked Gas: A Threat to Healthy Communities*. June 2019.

⁶⁰ Anaya, James. Statement: Thirteenth Session of the United Nations Permanent Forum on Indigenous Issues, 2014. <http://unsr.jamesanaya.org/?p=1170>

workers - oil workers, for example - live in temporary housing units called “man camps” on and near Tribal lands.”⁶¹

Therefore, the impact of building new fossil fuel infrastructure, generating massive amounts of greenhouse gas emissions, on vulnerable communities, especially Native American women, would violate the principles of human rights and environmental justice.

Conclusion

The Kalama Methanol project would emit an unacceptably high level of greenhouse gases both inside and outside Washington state that are not mitigable in the ways that the DSSEIS outlines. Impacts on air pollution, water consumption, and environmental justice are also substantial. In order to safeguard the health of current and future Washingtonian generations and the livability of Kalama, the state of Washington must reject this project and move toward a clean, renewable, and sustainable energy future.

Bibliography

Aizhu, C. (2017, December 4). *China's CAS Plans Gas-to-methanol plant on U.S. West Coast*. Retrieved from Reuters:
<https://www.reuters.com/article/us-china-usa-gas-methanol/chinas-cas-plans-gas-to-methanol-plant-on-u-s-west-coast-idUSKBN1DZ0BH>

Appendix B FERC Kalama Lateral Project Environmental Assessment, Northwest Pipeline LLC. Docket No. CP15-8-000

Anaya, James. Statement: Thirteenth Session of the United Nations Permanent Forum on Indigenous Issues, 2014. <http://unsr.jamesanaya.org/?p=1170>

⁶¹ Cultural Survival Website <https://www.culturalsurvival.org/country/canada>

Associated Press. “North Dakota HIV/AIDS rate rises with population growth” 13 October 2014.

https://billingsgazette.com/news/state-and-regional/montana/north-dakota-hiv-aids-rate-rises-with-population-%20growth/article_a939fed6-f737-5cfb-957f-ab800673f4d7.html

Beavers, Olivia, *National Security Experts Warn of the Rise in Authoritarianism*, The Hill, February 26, 2019.

<https://thehill.com/policy/national-security/431646-national-security-experts-warn-of-rise-in-authoritarianism-efforts>

Berwyn, Bob, “What does ‘12 Years (Now 11 years) to Act on Climate Change Really Mean”, Inside Climate News, August 27, 2019,

<https://insideclimatenews.org/news/27082019/12-years-climate-change-explained-ipcc-science-solutions>

Brookings Institute, “The Climate Crisis, Migration and Refugees,” 2019.

https://www.brookings.edu/wp-content/uploads/2019/07/Brookings_Blum_2019_climate.pdf

Bond, Kingsmill, et al, *The Future is not in Plastics*, Carbon Tracker, September 2020,

<https://carbontracker.org/reports/the-futures-not-in-plastics/>

Bond, Kingsmill, “Was 2019 the peak of the fossil fuel era?”, Carbon Tracker, May 1,

2020. <https://carbontracker.org/was-2019-the-peak-of-the-fossil-fuel-era/>

Brown, Oli, “Migration and Climate Change,” International Organization for Migration,

2008, <https://www.google.com/search?client=firefox-b-1-d&q=climate+based+migration>

Business Wire, “As Global Plastics Demand Expands Rapidly, Sustainability is Key to Future of Plastics Industry, IHS Markit Says,” May 18, 2018.

<https://www.businesswire.com/news/home/20180518005048/en/As-Global-Plastics-Demand-Expands-Rapidly-Sustainability-is-Key-to-Future-of-Plastics-Industry-IHS-Markit-Says>.

Carpenter, Scott, “Why the Oil Industry’s \$4B Bet on plastics could backfire,” Sept 5, 2020,

<https://www.forbes.com/sites/scottcarpenter/2020/09/05/why-the-oil-industrys-400-billion-bet-on-plastics-could-backfire/#46edd08943fe>

Cultural Survival Website <https://www.culturalsurvival.org/country/canada>

de Place, Eric and DeStephano, Paelina. “What consumes more gas than many of Cascadia’s cities combined?” *Sightline Institute*. 2 July 2018.

<https://www.sightline.org/2018/07/02/what-produces-more-gas-than-many-of-cascadias-cities-combined/>

Erickson, P. &. (2108, December 27). *SEI Comments on Kalama DSEIS*. Retrieved from Stockholm Environmental Institute:

<https://www.sei.org/wp-content/uploads/2018/02/erickson-lazarus-kalama-comments.pdf>

Grandoni, Dino, et al, “California to phase out sales of gas-powered cars by 2035”, *The Washington Post*, Sept 23, 2020,

https://www.washingtonpost.com/climate-environment/2020/09/23/california-electric-cars/?utm_campaign=wp_energy_and_environment&utm_medium=email&utm_source=newsletter&wpisrc=nl_green

Goldfinger, Chris, et al, The importance of site selection, sediment supply, and hydrodynamics: A case study of submarine paleoseismology on the northern Cascadia

margin, Washington USA. *Marine Geology*, 384, 4–46, (2017).

<https://doi.org/10.1016/j.margeo.2016.06.008>

Goldfinger, Chris, et al, Turbidite event history — Methods and implications for Holocene paleoseismicity of the Cascadia subduction zone: USGS Professional Paper 1661-F (2012). <https://pubs.usgs.gov/pp/pp1661f/>

Harvey, H. *Fifty simulations of ‘The Really Big One’ show how a 9.0 magnitude earthquake in Cascadia could play out*, October 23, 2017.

<http://www.washington.edu/news/2017/10/23/50-simulations-of-the-really-big-one-show-how-a-9-0-cascadia-earthquake-could-play-out/>

Hamilton, Lisa Ann, et al, “Plastic and Climate: the Hidden Costs of a Plastic Planet,” Center for International Environmental Law, May, 2019,

<https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-FINAL-2019.pdf>

Indian Country Today, “Puyallup Battle LNG Facility in Tacoma”, August 7, 2017.

Retrieved from newsmaven:

<https://newsmaven.io/indiancountrytoday/archive/puyallup-battle-Ing-facility-in-tacoma-Uas1XkEDVE-AKmnxc-cU1A/>

Ingalsbee, Timothy. *Incendiary Rhetoric: Climate Change, Wildfire, and Ecological Fire Management*. Firefighters United for Safety, Ethics, and Ecology, 2020 [www:fusee.org](http://www.fusee.org), pg. 10.

https://static1.squarespace.com/static/5e2c7d5a807d5d13389c0db6/t/5ecbfda2e8296a24e17436f5/1601670278230/Incendiary+Rhetoric_2020-6.pdf

International Energy Agency, *Global Energy Review 2020*, April 2020.

<https://www.iea.org/reports/global-energy-review-2020>

International Energy Agency, “The Future of Petrochemicals,” October 2018.

<https://www.iea.org/reports/the-future-of-petrochemicals>

Final Environmental Impact Statement, Kalama Methanol, Sept 2016.

<https://kalamamfgfacilitysepa.com/>

Kalama Manufacturing and Marine Export Facility Draft Second Supplemental Environmental Impact Statement, Washington State Department of Ecology, September 2020, pg 53, <https://fortress.wa.gov/ecy/publications/documents/2006011.pdf>

Kollmuss, Anja; Schneider, Lambert, and Zhezherin, Vladyslav. “Has Joint Implementation reduced GHG emissions? Lessons learned for the design of carbon market mechanisms.” Stockholm Environmental Institute, August 2015

<https://mediamanager.sei.org/documents/Publications/Climate/SEI-WP-2015-07-JI-lessons-for-carbon-mechs.pdf>

Luck, Melissa, “Risk of methanol explosion a hot topic in Kalama,” *The Daily News*, Dec 10, 2016.

https://tdn.com/news/local/risk-of-methanol-explosion-a-hot-topic-in-kalama/article_45a048f1-438e-52d1-b688-42364bed0c5a.html

Lustgarten, Abrahm, *How Climate Change Is Contributing to Skyrocketing Rates of Infectious Disease*, Propublica, May 2020.

<https://www.propublica.org/article/climate-infectious-diseases>

Masson-Delmotte, Valérie, et al, editors, “Global Warming of 1.5° C,” Intergovernmental Panel on Climate Change, 2018,

https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf

Methanol Institute, Technical Data Sheet, (n.d.).

<http://www.methanol.org/wp-content/uploads/2016/06/Methanol-Technical-Data-Sheet.pdf>

Mufson, Steve and Dennis, Brady, "US companies make new vows to tackle carbon emissions, even as global action falls short," *The Washington Post*, Sept 22, 2020,

https://www.washingtonpost.com/climate-environment/2020/09/22/climate-clock-week/?utm_campaign=wp_energy_and_environment&utm_medium=email&utm_source=newsletter&wpisrc=nl_green

Mutitt, G. (2016, September). *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel*. Retrieved from Oil Change International:

<http://priceofoil.org/2016/09/22/the-skys-limit-report/>

Narune, Amit and Prasad, Eswara, "Renewable Energy Market by Type (Hydroelectric Power, Wind Power, Bioenergy, Solar Energy, and Geothermal Energy), and End Use (Residential, Commercial, Industrial, and Others): Global Opportunity Analysis and Industry Forecast, 2018–2025," Allied Market Research, May, 2019.

<https://www.alliedmarketresearch.com/renewable-energy-market>

National Congress of American Indians. Oppose the Siting of Liquefied Natural Gas Facilities in or Near Tribal Lands and Major Population Centers (2018, October).

Retrieved from National Congress of American Indians:

<http://www.ncai.org/resources/resolutions/oppose-the-siting-of-liquefied-natural-gas-facilities-in-or-near-tribal-lands-and-major-population-centers>

Nobel, Justin, "America's Radioactive Secret," *Rolling Stone*, January 21, 2020,

<https://www.rollingstone.com/politics/politics-features/oil-gas-fracking-radioactive-investigation-937389/>

Oregon & Washington Physicians for Social Responsibility (2019, June): *Fracked Gas: A Threat to Healthy Communities*.

https://www.oregonpsr.org/fracked_gas_a_threat_to_healthy_communities

Oregon Physicians for Social Responsibility, Airborne Particulate Matter and Public Health Fact Sheet, https://www.oregonpsr.org/environmental_health_factsheets

Pacific Northwest Seismic Network, *Hazard Maps*, (n.d.).

<https://pnsn.org/outreach/hazard-maps-and-scenarios/hazard-maps>

Petroni, Michael et al 2020 Environ. Res. Lett. 15 0940a9, Hazardous air pollutant exposure as a contributing factor to COVID-19 mortality in the United States

Port of Kalama, About Page,

<https://portofkalama.com/discover-port-of-kalama/about-the-port-of-kalama>, accessed 6

October 2020

Rigaud, Kanta Kumari, et al, Groundswell : Preparing for Internal Climate Migration.

World Bank, Washington, DC. © World Bank, 2018.

<https://openknowledge.worldbank.org/handle/10986/29461>

“RMI and ETC Salute China’s Carbon Neutral Pledge, Rocky Mountain Institute, Energy Transitions Commission, September 23, 2020,

<https://rmi.org/rmi-and-etc-salute-chinas-carbon-neutral-pledge/>

Samayoa, Monica. “2.5M Pounds Of Radioactive Waste Illegally Dumped In Oregon Landfill”, *Oregon Public Broadcasting*, 14 February 2020.

<https://www.opb.org/news/article/radioactive-fracking-waste-oregon-landfill-illegal-dump/>

Sengupta, Somini, “China, in pointed message to US, tightens its climate targets”, *New York Times*, Sept 22, 2020,

<https://www.nytimes.com/2020/09/22/climate/china-emissions.html>

Song, Lisa and Moura, Paula. "Why Carbon Credits For Forest Preservation May Be Worse Than Nothing," *ProPublica*. 22 May 2019.

<https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-do-nt-work-deforestation-redd-acre-cambodia/>

Solomon, M. (2019, April 19). *Controversial Kalama Methanol Plant May Be Misleading Public, Regulators*. Retrieved from Oregon Public Broadcasting:

<https://www.opb.org/news/article/methanol-plant-kalama-fossil-fuel-china/>

Tung, Nguyen Thanh et al. "Particulate matter and SARS-CoV-2: A possible model of COVID-19 transmission." *The Science of the total environment*, vol. 750 141532. 5 Aug. 2020, doi:10.1016/j.scitotenv.2020.141532

Vaughan, Carson, *How do climate change, migration and a deadly disease in sheep alter our understanding of pandemics?* ENSIA and Food and Environment Reporting Network, September 3, 2020.

<https://ensia.com/features/pandemics-climate-change-migration-globalization-emerging-infectious-disease-covid19/>

Venturato, Angie, et al, *Tacoma, Washington, Tsunami Hazard Mapping Project: Modeling Tsunami Inundation*. Pacific Marine Environmental Laboratory/National Oceanic and Atmospheric Administration, January, 2007.

<https://www.pmel.noaa.gov/pubs/PDF/vent2981/vent2981.pdf>

World Politics Review, *What's Driving the Rise of Authoritarianism and Populism in Europe and Beyond?*, September 11, 2020.

<https://www.worldpoliticsreview.com/insights/27842/the-rise-of-authoritarianism-and-populism-europe-and-beyond>

Xiao Wu, Rachel C. Nethery, Benjamin M. Sabath, Danielle Braun, Francesca Dominici. Exposure to air pollution and COVID-19 mortality in the United States: A nationwide cross-sectional study. <https://doi.org/10.1101/2020.04.05.20054502>