Climate Resolve
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Memorandum

Date: July 23, 2020
Subject: Climate Resolve's Support for Just, Healthy, and Resilient Communities - Electrification and Fuels

CLIMATE RESOLVE'S POSITIONING

Climate Resolve opposes the extraction and use of ALL fossil fuels – and this includes natural gas. We support 100% renewable electrification of both transportation and the built environment. In the past, our organization accepted funding from SoCalGas; however, as of fiscal year 2019-2020, the Climate Resolve Board of Directors formally moved to no longer receive funds from the company. Our position on biomethane is largely articulated by this recent article on the subject. In sum, biomethane is no substitute for shifting to 100% renewable electricity, but California should also beneficially capture and destroy biomethane by using it both to support grid reliability and to fuel niche power applications that currently cannot be electrified with renewable energy. The following memo provides a more detailed description of Climate Resolve's position:

1. Climate Resolve advocates for a just, healthy, resilient future for frontline communities in Southern California, particularly those that the State has characterized as Disadvantaged Communities (DACs) and Disadvantaged Vulnerable Communities (DVCs). With that purpose, we promote the efficient use of renewable power for both transportation and the built environment. The transformation of our economy to 100% renewable electrification will reduce our greenhouse gas emissions, mitigate climate change, improve local air quality, and strengthen public health. There may be niche roles for renewable fuels, but electrification powered by renewable sources is the overarching goal.

2. The combustion of fossil fuels in both transportation and the built environment creates local public health impacts. Diesel exhaust from trucks contributes to asthma, heart disease, and cancer, particularly among residents of DACs and DVCs. Diesel emissions needlessly kill thousands of Californians every year – and diesel should be phased out as quickly as possible. In addition, the burning of natural gas by home cooking stoves creates toxic indoor air pollution and should eventually be phased out as well.

3. Climate Resolve acknowledges that the shift from fossil fuels to 100% renewable electrification will not happen overnight. The development and market penetration of new technologies takes time. Climate Resolve supported the passage of California's Senate Bill 100 (de Leon), which established the ambitious goal for our state to use

100% zero-emission energy sources for electricity by 2045. This goal includes both renewables and carbon-free energy from nuclear power.

Climate Resolve continues to advocate for 100% renewables and for phasing out all fossil fuels, including natural gas. In accordance with this advocacy, we are also pragmatists. We acknowledge that the use of certain transition fuels and technologies in the near-term may be environmentally preferable to fossil fuels. Over the past few years, our understanding of the pros and cons of these stepping stones has grown. Climate Resolve is a science-based organization that regularly evaluates and updates its positions to align with advancements in scientific and engineering knowledge.

4. For example, biomethane, which is also known as Renewable Natural Gas (RNG), is an alternative to fossil natural gas that currently offers a substitute for arguably a small percentage of California's total gas consumption. Biomethane is a form of methane, a greenhouse gas that is chemically identical to fossil natural gas and is 84 times more potent at trapping heat in our atmosphere than carbon dioxide in the first two decades after its release. It is biogenically produced as biogas from decaying organic matter such as waste water treatment sludge, food waste, animal manures, landfill gas, dead trees, and municipal solid waste through a process called anaerobic digestion. California's biogas pollution is a significant greenhouse gas problem that contributes to global climate change.

We need to take greater steps to reduce, capture, and destroy this biogas before it reaches our atmosphere. California's SB 605 (Lara) and SB 1383 (Lara) provide key steps in the right direction to do so. (Fugitive emissions of fossil natural gas from both natural seeps and man-made leaks should also be captured and destroyed.) There are mature processes to capture, clean, and upgrade the biogas to become usable biomethane. Compared with allowing biogas to escape into the atmosphere, the capture, upgrade, and use of biomethane for certain applications is considered to be a net negative emitter of greenhouse gas emissions.

5. Biomethane can be used as a fuel for both fuel cells and combustion engines to generate electricity. These uses of biomethane still emit carbon dioxide and other pollutants. However, depending on the end use, emissions from the use of biomethane are significantly less bad for public health and the climate than emissions from the use of fossil fuels.

6. Biomethane may be used to displace some fossil natural gas in California's combined-cycle power plants that we use in combination with renewable resources to balance loads on our electricity grid. Climate change is creating greater peak demand and placing increasing stress on the grid. We hope that demand-side management and battery storage may solve this load balancing challenge. Until the grid can be balanced by renewables and storage alone, Climate Resolve believes that we should replace fossil natural gas with biomethane at power plants to the extent reasonably possible. It

is technologically feasible for combined-cycle power plants to burn biomethane. The power plants will thereby destroy the biomethane, but still release carbon dioxide into the atmosphere, which is a net favorable tradeoff for the environment.

We recognize that these environmental benefits may come with costs: Biomethane is currently more expensive than fossil natural gas for power plants, which may cause an increase in electricity rates. Through utility programs such as the California Alternate Rates for Energy (CARE), the Family Electric Rate Assistance (FERA), and the Low-Income Discount Program (LIDP), policymakers must ensure that eligible utility customers receive subsidized electricity rates that insulate them from any increase to power costs from biomethane fuel usage by power plants.

7. Biomethane may also be used to displace fossil fuels for certain heavy industrial process heat applications in California. About ten percent of global greenhouse gas emissions come from the combustion of fossil fuels to produce high-temperature heat for making industrial products, such as cement, steel, glass, and petro-chemicals. Currently there is no clean alternative to generate the high temperatures required to create these products. As this article describes, “What’s green isn’t very feasible, and what’s feasible isn’t very green.”

8. We must rapidly end the use of diesel fuel by trucks and other vehicles. Diesel emissions along major truck routes disproportionately impact the health of residents in DACs and DVCs. It is an environmental justice issue. Climate Resolve actively promotes the transition of all vehicles to electrification with renewable power. We support the recent zero-emission position of the California Air Resources Board requiring that truck manufacturers transition from diesel trucks and vans to electric zero-emission trucks beginning in 2024; that all short-haul drayage fleets in ports and railyards must be zero-emission by 2035; and that “last-mile” delivery trucks and vans must be zero-emission by 2040. However, the heavy-duty (HD) electric truck market is at an early stage. It may take 20 years for the required grid infrastructure and HD electric truck market penetration to reach maturity.

Climate Resolve stands with the residents of frontline communities, who need elimination of diesel emissions today and cannot wait 20 years to eliminate the devastating health effects of diesel emissions. Therefore, we have promoted the use of biomethane as a near-term, less-polluting transitional fuel than diesel for the trucking industry. Stimulated by California’s Low Carbon Fuel Standard, biomethane from landfill gas supplies a majority of the compressed natural gas used for transportation in the state.

9. There are arguments for continuing to use natural gas and, by extension, biomethane within homes in order to foster resilience during Public Safety Power Shutoff events and unplanned grid outages. Throughout California, electricity service is certainly less reliable than we need. When the power goes out, gas still allows residents to operate

gas appliances, such as gas stoves to cook meals. However, some so-called gas appliances, such as gas furnaces and tankless water heaters, require electricity to operate, too. Moreover, replacing gas stoves with electric cooktops would reduce indoor air pollution exposure and improve public health.

Consumer switching to electric stoves will take time: Purchasing an electric stove is expensive; during these difficult economic times, consumers may be unable or unwilling to pay for a new electric cooktop when they already have a gas stove; and until recently, there has been a lack of consumer knowledge about the health benefits and merits of cooking with electricity, not to mention the strengths of induction stoves. We applaud the Sacramento Municipal Utility District (SMUD) and the Bay Area Regional Network (BayREN), which includes the counties of the Association of Bay Area Governments, for their residential rebate programs that support the shift to all-electric homes, including electric stoves. Climate Resolve strongly encourages Southern California utilities and the Southern California Association of Governments to follow Northern California's leadership in an effort to provide rebates for all-electric home retrofits, including electric stoves, with outreach programs that prioritize residents of DACs and DVCs.

Electric stoves and all-electric homes will improve indoor air pollution and health outcomes for residents of frontline communities, but the primary responsibility to shift to 100% renewable electricity should fall on residents of wealthy neighborhoods. Frontline communities produce among the lowest per capita greenhouse gas (GHG) emissions in Southern California. Conversely, wealthy neighborhoods are our region's biggest residential polluters. For example, a recent comprehensive analysis of residential carbon footprints shows that an average resident of Beverly Hills is responsible for producing four times as many GHG emissions as a resident of South Los Angeles. Brentwood is apparently worse. The report explains:

> "High-emissions neighborhoods are primarily high income or extremely high income...Despite the polycentric urban form, per capita emissions in Los Angeles are monocentric in space with the highest emissions on the mountainous west side of Los Angeles. This area contains all 10 neighborhoods with the highest per capita GHG emissions."

This concentration of residential emissions is a climate equity issue. The residents of our region's high income and extremely high income neighborhoods should look at the facts and invest in all-electric home retrofits to both reduce their GHG emissions and breathe easy, or our regional policymakers should make them do so.

Climate Resolve is encouraged that public opinion in California appears to be shifting toward widespread support for building decarbonization, including electric stoves. During the timeframe it may take for most Californians to switch to electric stoves and other electric home appliances, such as heat pumps, we may also see the growth of photovoltaic solar with battery storage to power all-electric homes when the grid goes

down. Solar power with battery storage should provide a more resilient, beneficial solution to the problem of our unreliable grid than gas does.

10. Injecting hydrogen into gas pipelines may also help to decarbonize California's gas supply. The California Hydrogen Business Council recently stated the following:

> "Hydrogen produced from renewable and zero carbon sources is the only solution for producing decarbonized gas at mass scale. Renewable hydrogen can be made from organic feedstocks, and the most promising pathway for high volume production is to power electrolysis with renewable electricity to split water into hydrogen and oxygen. Renewable hydrogen can be blended in limited quantities into the existing gas supply to lower the greenhouse content of delivered gas, or it can be mixed with CO2 to make renewable methane, which can enter seamlessly in unlimited quantities into the existing gas infrastructure, making possible the complete decarbonization of the gas system without having to invest in expensive retrofits. At the same time, electrolysis can help absorb excess renewable electricity that would otherwise be wasted, making a 100% renewable or zero carbon electricity future more possible. Renewable hydrogen and its derivatives stored in the gas network can provide the only known solution for long duration seasonal storage at the terawatt hour scale."

If 100% renewable energy is used in the hydrolysis process to decarbonize pipelines at scale, we have heard from experts that the total impact on the state's freshwater supply may be comparatively minimal. Nonetheless, our clean drinking water is already competing with the irrigation of cattle-fed crops. Water rates are rising and water poverty is growing. Climate Resolve is mindful that climate change exacerbates droughts and that hydration is essential for human resilience against extreme heat from climate change, which disproportionately impacts residents of DACs and DVCs. Any plan to use water to generate hydrogen for pipeline decarbonization must not place a greater water cost burden on California's residents.

11. The rest of the world is looking to California to lead the way on climate change solutions. We must reduce, capture, and destroy our state's biogas pollution. Climate Resolve sees potential benefits in using biomethane to displace fossil natural gas and diesel in the short-term that may reduce harm to our environment and public health. Any proposed use should also protect our state's most vulnerable residents from increasing costs for both energy and water.

Climate Resolve will continue to advocate for a just, healthy, resilient future for frontline communities. Our team will ensure that our policy positions remain aligned with fact-based advancements in scientific and engineering knowledge.

If you would like to discuss any of these points with us, we would look forward to speaking with you.