Memo re: Condensed Analysis of Metrobus Fleet Plan
From: The Metro Electric Bus Coalition
Date: April 22, 2022

The Metro Electric Bus Coalition's 14-page analysis of the Metrobus Fleet Plan found significant inaccuracies and outmoded data, indicating that the Metro staff did not provide the previous Metro Board of Directors the information it needed to make an informed decision about the future of the Metrobus fleet when it approved the plan last June. We are calling on the current board to reconsider the plan in light of the facts presented below and accelerate Metrobus's transition to an all-electric fleet to protect public health and the climate. Public transit agencies should be leaders in electrifying the transportation sector, but Metro is lagging behind other major transit agencies across the country as well as smaller bus fleets in our region.

How Should the New Metro Board Revise the Metrobus Fleet Plan?
Only two members of the current Metro Board were directly involved in discussions that led to the Metrobus Fleet Plan the board approved last June. In light of the fact that the board was misinformed when it approved the plan, our coalition is asking the newly constituted board to direct the staff to revise the agency's electric bus procurement schedule, which—as it now stands—would condemn the D.C. region to decades of bus carbon and toxic pollution.

The coalition recommends that Metro do the following:

- Stop buying fossil fuel buses after the last of the fossil fuel buses are delivered from its 2018 contract with New Flyer, move expeditiously to complete its electric bus pilot project, and then, during its next five-year procurement cycle beginning in fiscal year 2024, buy only electric buses and install electric bus charging infrastructure at all of its bus garages. If it does so, it will be able to electrify nearly 50 percent of its fleet by 2030 and its entire fleet by 2040.

- Cancel its plans to 1) increase the percentage of compressed natural gas (CNG) buses in the fleet, 2) build a new CNG fueling facility at the Shepherd Parkway garage, and 3) expand the Bladensburg garage's capacity to fuel more CNG buses.

- Cancel plans to install new diesel-related storage tanks and infrastructure at the Northern Bus garage and only house electric buses there after the renovation is complete.

- Initially deploy electric buses at garages in low-income and environmental justice neighborhoods to ensure the buses benefit area residents who are disproportionately harmed by smog and other transportation-related air pollution.

In February, the Washington, D.C., Council unanimously passed a resolution that endorsed virtually all our coalition's recommendations, including our recommendation that Metro electrify "at least 50 percent of its bus fleet by 2030." Last year, four dozen elected officials, including four U.S. House members and more than 30 Maryland state legislators, also urged Metro to replace half of its fleet with electric buses by the end of this decade.

Below is a condensed version of the analysis, which the Metro Board received on April 15.

Metro's Procurement Plan Lags Behind Peer Transit Agencies (Slide 25)
Metro, with its nearly 1,600 buses, has a 2045 target date for a 100-percent, electric bus fleet. By contrast, both the Los Angeles County Metropolitan Transportation Authority, which has 2,320 buses, and Houston Metro, which owns more than 1,230 buses, plan to have an all-electric fleet by 2030. Their timetable coincides with the Biden administration American Jobs Plan goal to electrify 50,000 transit buses by then, which would cover approximately 80 percent of the public transit buses in the United States. Other major transit agencies also have adopted a more ambitious timetable than Metro for electrifying their fleets. King County (Seattle) Metro (1,600 buses) has targeted 2035, while the Chicago Transit Authority (1,864 buses) and New York City Metropolitan Transportation Authority (5,920 buses) fleets are scheduled to be all-electric by 2040.

The UN Intergovernmental Panel on Climate Change recently issued a report that said that to keep average global temperatures from going up any more than 1.5 degrees Celsius—the Paris climate agreement pledge—global carbon emissions will have to drop about 45 percent by 2030. If Metro sticks to the current Metrobus Fleet Plan, however, more than 80 percent of its buses will still be running on fossil fuels at the end of this decade—the same year LA and Houston buses will be fully electric.

Metro Staff Failed to Provide Complete Picture of Regional Sustainability Efforts (Slide 7)
Smaller transit agencies in our region are also moving more quickly than Metro. The entire D.C. Circulator bus fleet will be electric by 2029. In Maryland, the Maryland Transit Administration plans to convert half of its fleet to electric by 2030 and Montgomery County plans to electrify all of its school buses and Ride On buses by 2035. And in Virginia, Fairfax County and Alexandria bus fleets also plan to be fully electric by 2035.

Metro Staff Cited Outdated Data on the Number of Electric Buses Nationwide (Slide 19)
The presentation the Metro staff gave to the previous board last June stated that there were only 500 electric buses in service at the time with an additional 500 on order. According to Calstart, at the end of 2020—six months before the Metro staff gave its presentation—there were 2,703 battery-electric buses on U.S. roads or on order. At the end of 2021, Calstart reported there were 3,364 battery electric buses on the road or on order. Lowballing the number of electric buses in service and on order falsely implies that transit agencies are showing little interest in them.

Metro Staff Understated Electric Bus Reliability (Slide 22)
A recent study, published by the Department of Energy's National Renewable Energy Laboratory (NREL) in June 2021, reviewed the performance of 2014 and 2016 model year electric buses owned by Foothill Transit in Southern California. Foothill Transit bought its first electric buses in 2010, making it the first public transit agency to offer electric bus service. NREL found that, on average, Foothill's 2014 35-foot electric buses were available 80.6 percent of the time and its 2016 40-foot electric buses were available 76.1 percent of the time. Both averages exceeded what the Metro staff reported. The per-bus availability for Foothill's electric buses ranged from 67 percent to 88 percent, the high end putting them on par with what the Metro staff found for the conventional diesel bus average. It is important to keep in mind that

although the NREL study came out last June, the buses that provided the data were built in 2014 and 2016. A new electric bus is better than one from six or eight years ago.

Metro Staff Grossly Overstated the Cost of Electric Bus Infrastructure (Slide 29)
The Metro staff contended that it will cost about $400,000 *per bus* for charging infrastructure. A fast charger, which costs about $495,000 according to the National Renewable Energy Laboratory, can serve a number of buses over the course of a day, not just one. Meanwhile, a depot charger, typically used for overnight charging, costs $50,000, according to NREL. While transit agencies can use a depot charger for one bus, platooning techniques would enable them to charge more than one.

Metro Staff Overstated CNG Benefits to Justify Expanding CNG Bus Fleet (Slides 36 & 46)
The Metro staff asserted in its June 2021 presentation that increasing the percentage of compressed natural gas (CNG) buses would *lower* overall Metrobus greenhouse gas (GHG) emissions. In slides 36 and 46, the Metro staff claimed that CNG buses emit approximately 28 percent less GHG emissions than conventional diesel buses. Left unsaid was that calculation pertained to tailpipe and other operational (including braking) emissions—what Metro calls "local emissions"—not lifecycle emissions. A lifecycle analysis, also called a well-to-wheel analysis, assesses overall global warming emissions from a specific fuel, including each stage of its production and use.

According to Andrew Burnham, principal environmental scientist at the Department of Energy's Argonne National Laboratory, his lab's "data show that a fossil compressed natural gas transit bus has about 6 percent lower [lifecycle] GHG emissions versus diesel." Burnham also verified that CNG buses emit nearly the *same level* of lifecycle carbon emissions as conventional diesel buses in many circumstances, as the Washington Post reported last August, due to "methane leakage and relative fuel economy."

Likewise, CNG buses are no better than conventional diesel buses when it comes to toxic local emissions. They still pose a threat to public health. A 2016 study comparing CNG with diesel buses conducted under actual traffic conditions, for example, found that, compared to conventional diesel buses, CNG buses emit 90 percent less nitrogen oxides but 71 percent more carbon monoxide and 2,320 percent more hydrocarbons, including methane. (It also found that CNG buses emit 11 percent *more* carbon dioxide.) Similarly, Argonne Laboratory calculated that CNG buses emit 95 percent fewer nitrogen oxides and 37 percent fewer volatile organic compounds than diesel buses, but 1,050 percent more carbon monoxide.

Renewable Natural Gas is Not a Realistic Solution
The Metro staff plan also relies on renewable natural gas (RNG), or biomethane, as a low-emission fuel for its CNG buses and assumes that the agency could reduce 80 percent of its GHG emissions through 2030 by using CNG and RNG. More than 90 percent of the reduction would ostensibly come from RNG. What the staff presentation failed to mention is there is a limited supply of RNG and it is more expensive than fracked natural gas.

According to a 2019 American Gas Foundation (AGF) study, even after ramping up production, RNG—which comes from municipal solid waste landfills, wastewater treatment plants, livestock

farms, food production facilities and organic waste management operations—could only replace 6 to 13 percent of total natural gas demand. It would never be able to replace the methane currently used in homes, buildings and power plants, much less expand the amount of CNG used as transportation fuel, and Metro would be competing with others for relatively small quantities.

The AGF report also estimated that RNG would be at least two to five times more expensive than fracked gas—and the price of fracked gas is currently at a 13-year high.

Methane Leaks Undermine CNG's Potential Benefits

Methane leaks, which a 2021 study estimated at 3.3 to 4.7 percent from well pads to urban gas customers, offset the potential benefits of CNG over diesel. At all points during natural gas's extraction, distribution and use, leaks pose a significant climate risk because methane is more than 80 times more potent a global warming gas than carbon dioxide during the first 20 years after its emitted.

Leaks are widespread in D.C. Beyond Gas DC, a coalition spearheaded by the Sierra Club, recently found nearly 400 methane leaks across all eight wards over a 24-hour period. More than a dozen of them were "potentially explosive."

Washington Gas methane accounts for 23 percent of D.C.'s total greenhouse gas emissions, according to the coalition report, which cited a D.C. Department of Energy and Environment estimate that upgrading current pipeline infrastructure would cost as much as $4.5 billion.

Current Electric Capacity Exists to Power a Fully Electric Fleet

The Metro Board's concerns about the agency's ability to procure the electricity needed to operate an electric bus fleet, and to do so with clean, renewable energy, are overblown.

First, there is ample capacity today to power a fully electrified Metro bus fleet. In fact, as of two years ago—before the Metro staff presented its plan—there was more than enough capacity to electrify *all* of the country's public transit buses. According to a December 2020 CalStart report, "If all of America's 65,000 transit buses are electrified, this would draw 3,342.85 MW [megawatts]. In 2019, average power draw for the United States was 471,105.25 MW, and the United States has 1.1 million MW of utility-scale electrical generation capacity. As a result, the United States has enough generation to power these buses."

Pepco filed an electrification study in August 2021 with the Public Service Commission that found that if the District's decarbonization goals are met largely through new electrification initiatives across all sectors, including transportation, peak demand will grow at an average annual rate of 1.4 percent between 2021 and 2050. Given that the company managed annual peak demand growth rates in its D.C system between 1950 and 2020 well in excess of 2 percent annually, it is confident that it will be able to handle the load growth from electrifying Metro's bus fleet.

Metro Should Not House Diesel Buses at the Northern Bus Garage Again

The Metro staff's June presentation mentioned its plans for the Northern Bus Garage, which has been closed for renovation since May 2019, only in passing, but last September Metro confirmed

that it will build its first all-electric bus garage at the site. The renovation, according to Metro, will take four to four-and-a-half years, so the earliest it will reopen would be in late 2026, and more likely not until mid-2027. The press release Metro issued in September also acknowledged that the garage "will open with a mix of the current Metrobus fleet [diesel and/or diesel-electric hybrids] and new battery-electric vehicles, transitioning to 100 percent electric as Metrobus' electric bus fleet expands."

To service diesel and diesel hybrid buses at the renovated Northern Garage, Metro plans to spend an estimated $5 million to $8 million on new infrastructure, including storage tanks that can hold 1,000 to 25,000 gallons of oil, diesel fuel, transmission fluid or antifreeze. Given Metro will own 138 electric buses in 2028 and 188 electric buses in 2029, according to the procurement schedule the Metro Board approved last June, it could hypothetically house 150 electric buses at the Northern Garage by no later than 2029, just two years after reopening it. Does Metro plan to house fewer than 40 diesel and/or diesel hybrid buses at Northern for only two years after spending as much as $8 million on infrastructure that would become a stranded asset?

If Metro sticks to its plan, it should hold off reopening the Northern Garage for at most two years until it can fill it completely with electric buses. Conversely, if Metro only purchased electric buses going forward, it could easily fill it with 150 electric buses when it reopens in mid-2027.

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The Metro Electric Bus Coalition includes: ANS (formerly Audubon Naturalist Society), D.C. Environmental Network, Earthjustice, Electric Vehicle Association of Metropolitan Washington, Faith Alliance for Climate Solutions, Green Latinos, Greenpeace USA, Loudon Climate Project, Maryland Legislative Coalition, Moms Clean Air Force, Northern Bus Barn Neighbors, Northern Bus Garage Community Environment Committee, Sierra Club D.C. Chapter, Sierra Club Maryland Chapter, Sierra Club Virginia Chapter, and Union of Concerned Scientists.