Texas Streets Coalition

Air Quality

Roads, Air Quality, and Climate Study Group

March 7, 2023

I-35 Central DEIS, Austin

A qualitative analysis of Air Quality and GHG were presented for the I35 Central DEIS:

- Air Quality appendix studies carbon monoxide (CO) only.
- GHG appendix studies carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydro-chlorofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). TxDOT did not do a long-term GHG analysis of project alternatives compared to a No Build scenario. Further, there is a FHWA rule to not increase GHG emissions from transportation.

Expanding I35 will have nearly the same climate impact as building a new coal-fired power plant in the middle of Austin. Megan Kimble, 2023.

1. Air Quality, Appendix P includes only an analysis of carbon monoxide (CO) and ignores the five other criteria pollutants, which are each components of tailpipe emissions, or produced by those emissions.

These criteria pollutants (USEPA, 2018a) have been established by the Clean Air Act (CAA) of 1970 and its amendments, required the United States Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) for ambient air pollutants considered harmful to public health and the environment.

These pollutants must be included in any air quality analysis, as NO_2, $PM_{2.5}$, and PM_{10} are much more dangerous than CO, and for the reasons outlined below. TxDOT is not doing enough for EJ communities by not studying NO_2, PM_{10}, and $PM_{2.5}$. A quantitative analysis and a health impact assessment must be completed for all of the following pollutants, and compared between all proposed alternatives.

As part of its 2019- 2023 Regional Air Quality Plan, the Capital Area of Council defined "near-nonattainment" as having a design value of at least 85% of any NAAQS. Based on this criteria, O_3 remains the only pollutant for which the Austin area is classified as "near-nonattainment"; although, the annual $PM_{2.5}$ levels are close to being within that range and will likely reach non-attainment when the EPA lowers its $PM_{2.5}$ attainment standards, as proposed, from 12 micrograms per cubic meter (µg/m3) to 9- 10 µg/m3. The new standards, once implemented, will bring Austin near or into non-attainment status. The health impacts of these and other transportation-related sources are outlined below.

- Particulate Matter (PM_{10} and $PM_{2.5}$)
    - Sources: Diesel engines emit airborne particles of black soot and metal, known as particulate matter. Most particles form in the atmosphere as a result of complex

reactions of chemicals such as sulfur dioxide and nitrogen oxides, which are pollutants emitted from power plants, industries and automobiles.
    - Health impacts: Particles less than 2.5 micrometers in diameter pose the greatest problems, because they can get deep into your lungs and may even get into your bloodstream. Exposure to such particles can affect both your lungs and your heart. Numerous scientific studies have linked particle pollution exposure to: premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.
- Ozone (O_3)
    - Sources: Tropospheric, or ground level ozone, is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC). This happens when pollutants emitted by cars and other sources chemically react in the presence of sunlight. Ozone is most likely to reach unhealthy levels on hot sunny days in urban environments, but can still reach high levels during colder months. Ozone can also be transported long distances by wind, so even rural areas can experience high ozone levels.
    - Health impacts:
        - Even relatively low levels of ozone can cause health effects. Depending on the level of exposure, ozone can:
            - Cause coughing and sore or scratchy throat.
            - Make it more difficult to breathe deeply and vigorously and cause pain when taking a deep breath.
            - Inflame and damage the airways.
            - Make the lungs more susceptible to infection.
            - Aggravate lung diseases such as asthma, emphysema, and chronic bronchitis.
            - Increase the frequency of asthma attacks.
        - Some of these effects have been found even in healthy people, but effects can be more serious in people with lung diseases such as asthma. They may lead to increased school absences, medication use, visits to doctors and emergency rooms, and hospital admissions.
        - Long-term exposure to ozone is linked to aggravation of asthma, and is likely to be one of many causes of asthma development. Studies in locations with elevated concentrations also report associations of ozone with deaths from respiratory causes.
- Nitrogen dioxide (NO_2)
    - Sources: NO_2 is used as the indicator for the larger group of nitrogen oxides (NOx). NO2 primarily gets in the air from the burning of fuel. NO2 forms from emissions from cars, trucks and buses, power plants, and off-road equipment. In the Austin area, 34% of NOx comes from on-road emissions.
    - Health impacts:

        - Breathing air with a high concentration of NO_2 can irritate airways in the human respiratory system, which can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms. Longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly are generally at greater risk for the health effects of NO_2. Prolonged exposure to high levels of NO_2 can cause irreversible damages to the respiratory system.
        - NO_2 along with other NOx reacts with other chemicals in the air to form both particulate matter and ozone. Both of these are also harmful when inhaled due to effects on the respiratory system.
- Benzene (C_6H_6) is not a criteria pollutant, but is a carcinogenic tailpipe emission.
    - Sources: A result of burning fuels, such as petrol. Benzene is common in unleaded fuel, where it is added as a substitute for lead, allowing smoother running.
    - Health impacts:
        - The World Health Organisation (WHO) and International Agency for Research on Cancer (IARC) classify benzene as a group one carcinogen. The WHO has not set a standard for ambient benzene concentrations, stating that there is no safe level of exposure.
        - Benzene is a carcinogenic substance and high levels of inhalation can severely harm human health. Prolonged exposure to high concentrations of benzene causes leukemia and impacts red and white blood cells. Less severe health impacts can occur at lower concentrations, causing headaches, nausea, drowsiness and even unconsciousness.
- Sulfur dioxide (SO_2)
    - Sources: SO_2 is used as the indicator for the larger group of gaseous sulfur oxides (SOx). Sources of SO_2 emissions include vehicles and heavy equipment. It forms acids when burned, leading to engine corrosion and smog.
    - Health impacts:
        - Short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to these effects of SO_2.
        - SOx can react with other compounds in the atmosphere to form small particles that contribute to particulate matter (PM) pollution.

2. The traffic modeling used to conduct air quality analyses in Appendix P is flawed and projects impossibly inflated traffic volumes for the "No Build" scenario, thus invalidating any comparison of "No Build" to "Modified Alternative 3."

- CAMPO data is inaccurate.

- **Assigned volumes that exceed capacity are serious model errors.** Peak period traffic capacity on I-35 today is just over 200,000 vehicles, and has been for the last 20 years. While it is conceivable that traffic could increase in off- peak hours, it is not possible for traffic on I-35 to increase to 303,700 vehicles per day as claimed. A volume/capacity ratio beyond 1:1 is impossible, and can only be reached if I-35 is expanded. Projections of 330,000 vehicles per day in the "No Build" scenario are impossible, leading to false conclusions that air pollution will not increase in the future. TxDOT is using 330K vehicles for TODAY's estimates, but only 200K vehicles will actually FIT on I-35. Actual traffic levels (ADT) have remained steady, and even decreased a bit, over the last 20 years because I-35 is at capacity (see attached chart, which we should include with our letter).
- **TxDOT typically models demand, which far exceeds actual capacity** (Mobility Investment Priorities Project: Long-Term Central Texas IH35 Improvement Scenarios (Rider 42 report), page 23). It is typical for facilities as congested as IH 35 to be represented in a region-wide model as having traffic volumes much greater than is actually possible. *See Exhibit 3.*
- **The model relies on Static Assignment (STA) algorithm,** which treats road segments as independent and therefore cannot capture queues behind bottlenecks, such as lane merges, at peak hours.

Commented [1]: Refer and/or link to graphic from heyden's email.

- HDR and Alliance Transportation Group data is inaccurate.
  - A compound growth rate of 1.5 per year has been adopted for 2016- 2050, a 66% growth. It purports that five lanes of congested traffic will fit in the existing three lanes of congested traffic under the No Build scenario. This is simply not possible.
  - Texas Transportation Institute modeling assumes an adequate level of service = free flow speed, even if that speed is well above the speed limit. Studies of ir quality should be compared to traffic moving at 45 MPH, a realistic maximum speed at capacity.
  - The data assumes a huge range of speeds, from 3- 67 MPH).

Recommendations

- TxDOT should rerun each of its air quality analyses in the DEIS and compare Modified Alternative 3 scenario to the past 10-15 years of actual traffic data on I-35. The "No Build" scenario used in the DEIS is flawed and does not accurately predict traffic if no project were implemented. Instead of "No Build," TxDOT should use actual traffic data from the last 10-15 years to represent real traffic on I-35 in a future "No Build" scenario.
- TxDOT must include the more modern Dynamic Traffic Assignment (DTA) algorithm in modeling (Norm Marshall, Smart Mobility) to establish a realistic freeway capacity that is not exceeded in forecasts.
- TxDOT must build a feedback loop into their models to check for human rationale, such as whether or not someone would willingly commute 8 hrs per day. The Static Traffic Assignment algorithm typically used by TxDOT does not take into account changes in human behavior based on rational decision making.

- TxDOT must demonstrate their claim with data that a wider freeway with more capacity will improve greenhouse gas emissions because it will lead to less idling in traffic, if they continue to use it as justification for freeway widening projects.
- TxDOT traffic and other modeling results must be transparent, to allow the public to assess the impact of all alternatives. These include transparency in the models and parameters used, as well as all input and output data.

3. Future Electric Vehicles are not the solution to air pollution.

- Electric vehicles pollute in other ways than tailpipe emissions, including brake dust and tire friction. Heavier electric vehicles pollute more, as they increase tire wear and road friction.
    - "Up to 55% of roadside traffic pollution is made of non-exhaust particles, with around 20% of that pollution coming from brake dust." (The Conversation)
    - "Among non-exhaust sources, brake wear can be a significant particulate matter (PM) contributor, particularly within areas with high traffic density and braking frequency." (Environmental Science and Pollution Research)
    - Tire wear contributes microplastics to the environment. (Environmental Research and Public Health)
- Texas' grid is dirty and inequitable. Most energy generation happens near vulnerable communities (TTI webinar).
- Electric vehicles operate within existing electric grids, which are still largely powered by coal in the US. "The US gets about a third of its electricity from coal-fired power, IEA says, and more than 40% of total electricity worldwide comes from burning coal." (The Guardian)
- Electricity generation is "the single-largest source of greenhouse gas pollution in the U.S., at two billion metric tons of CO2 per year." (Scientific American)
- This is also a new front in fighting climate change. Selling electric vehicles won't be enough to cut planet-warming emissions from cars and trucks. People must drive less, which means TxDOT must invest in multiple modes of accessible transportation.