

From: Ken Garber
To: Planning
Subject: Village of Ann Arbor (1710 Dhu Varren) carbon emissions
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To the Planning Commission:

I am writing about the Village of Ann Arbor site plan (1710 Dhu Varren Road). When you last saw this project in 2022, the proposed gas heating for the apartment component was highly controversial, because gas heat for new construction was at direct variance with the A2ZERO climate action plan and because of the large scale of the project. See <https://www.mlive.com/news/ann-arbor/2022/09/its-like-pulling-teeth-ann-arbor-officials-growing-frustrated-with-developers.html> . It's unclear whether Robertson Brothers is still proposing gas heat for the 480 apartments in the current site plan. If not, great--an all-electric Village is definitely preferred, and is consistent with other recent multifamily residential projects. But if gas is still proposed, the following data may be useful.

Greenhouse gas emissions from gas HVAC: The "Consumers Energy All-Electric Multifamily Design Guide" (October, 2021) cites a 52.9 kBtu per square foot energy from gas consumption for new mid-Michigan low-rise multifamily buildings. Multiplied by the Village's (480 apartments only) 442,804 square feet gives 23,424,331 kBtus, or 234,243 therms. Applying a 13kg per therm greenhouse gas conversion factor (takes into account upstream methane emissions and leakage) yields 3,045 tons CO₂e (CO₂ equivalent) annual emissions from these 480 gas heated apartments.

Greenhouse gas emission from electric HVAC: Assuming high efficiency HSPF2 10 (10 BTU/watt-hour) heat pumps, those same 23,424,331 kBtus required for heat would consume 2,342,433 kWh of electricity annually. Multiplied by the greenhouse gas conversion factor for DTE Electric of 0.000629 metric tons CO₂e/kWh (2023 figure, calculated by Carissa Ebling of OSI), these 480 electrically heated apartments will emit 1,471 metric tons CO₂ equivalents annually. That's less than half the emissions from using gas HVAC. And these emissions, unlike gas emissions, will fall over time as DTE's electricity generation mix moves away from fossil fuels in favor of renewables.

Utility costs: While an HSPF10 heat pump is roughly four times as efficient at converting energy into heat than a 95% efficient gas furnace, in Southeast Michigan heat pumps do result in higher utility costs than furnaces, due to the exceptionally high DTE residential electric rate and an artificially low gas rate (which does not take into account the social cost of carbon). A cubic foot of natural gas contains about 1,040 BTUs of energy. Using 95% efficient gas furnaces, it will take about 246,568 ccf (hundred cubic feet) of gas to supply the necessary 23,424,331 kBtus to heat the Village's 480 apartments. At the current DTE residential gas rate of about \$0.90/ccf, the total gas utility cost will be \$221,927 a year, or \$39 a month per unit. The equivalent electric heat utility cost, at DTE Electric's current rate of \$0.20/kWh, would be \$468,487 a year, or \$81 per month per unit. These are "back-of-the-napkin" approximations.

Conclusion: Heating the Village's 480 apartments with gas would result in additional CO₂e emissions of more than 1,500 metric tons a year over electric heat, with the difference growing over time as DTE Electric cleans up its energy mix. Gas heat would however result in somewhat lower utility costs for apartment residents, at current rates.

Best regards,
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