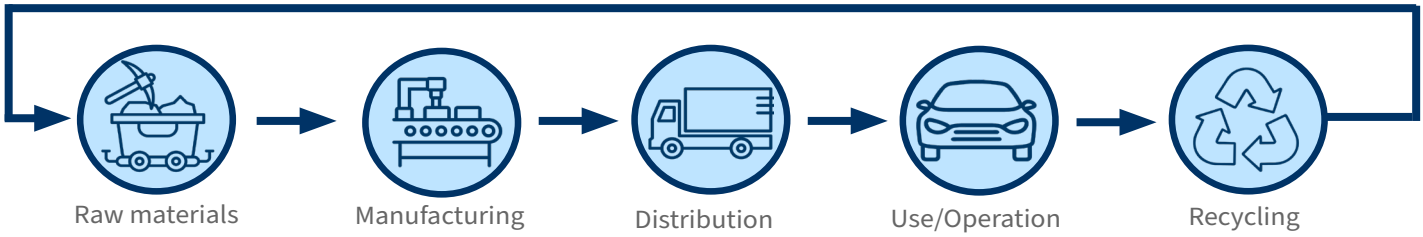
LIFECYCLE EMISSIONS STUDY FACT SHEET FOR MINNESOTA

GREAT PLAINS INSTITUTE

October 2026

WHAT IS LIFECYCLE ANALYSIS?

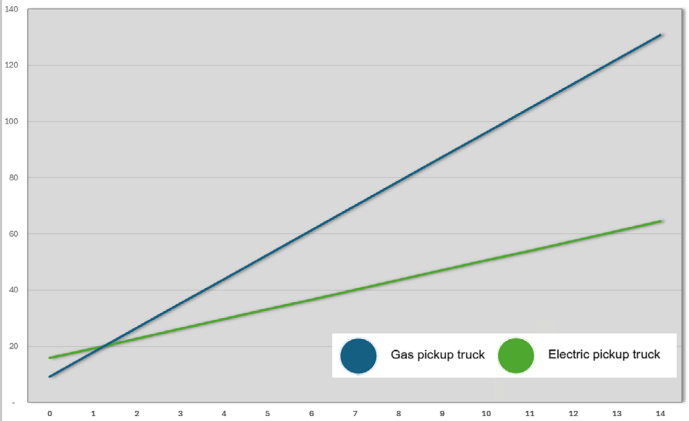
Lifecycle analysis measures total emissions across a vehicle's entire life, from extracting raw materials to disposal and recycling.



LIFETIME EMISSIONS EXAMPLE: ELECTRIC VS. CONVENTIONAL PICKUP TRUCKS UNDER DIFFERENT SCENARIOS

Today's grid (without battery recycling)

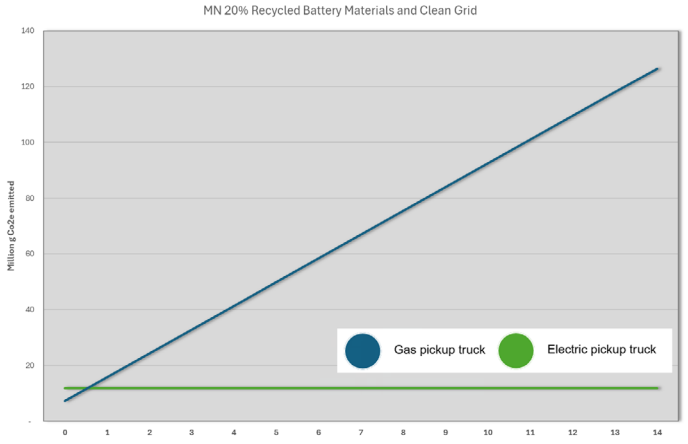
LIFETIME EMISSIONS FROM AN ELECTRIC PICKUP TRUCK VS. CONVENTIONAL PICKUP TRUCK IN MINNESOTA[1]



15 months: The time it takes for an electric pickup truck to pollute less than a gasoline one.

Future clean grid (2040+ w/ battery recycling)

LIFETIME EMISSIONS FROM AN ELECTRIC PICKUP TRUCK VS. CONVENTIONAL PICKUP TRUCK IN MINNESOTA IN A FUTURE SCENARIO[2]



6 months: The time it takes for an electric pickup truck to pollute less than a gasoline one.

Electric pickup trucks in Minnesota produce up to 90% less greenhouse gas emissions compared to conventional trucks when powered by a 100% clean grid, with battery recycling and 20% recycled battery components.

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Understanding Electric Vehicle (EV) Emissions

WHAT CONTRIBUTES TO EV EMISSIONS

Battery manufacturing

EVs have higher upfront emissions due to battery production. As battery recycling improves, these emissions will decrease significantly, as seen in the Future Clean Grid scenario.

> **The future:** 20% battery recycling by 2030 (International Energy Agency forecast)[3]

Production of electricity used to charge an EV

The cleaner the electricity grid, the lower an EV's operational emissions. As Minnesota transitions to renewable energy, these emissions will decrease even further, as seen in the Future Clean Grid scenario.

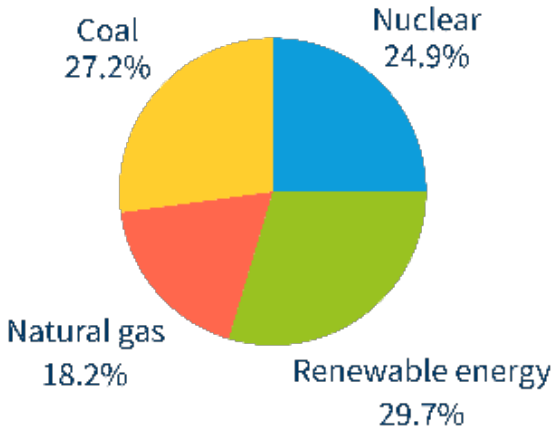
> **Minnesota's commitment:** 100% clean electricity by 2040[4]

EMISSIONS REDUCTIONS USING TODAY'S ELECTRICITY MIX

Using Minnesota's current electricity mix, all EV types show significant emissions reductions compared to conventional ones:

- Electric pickup truck: **50%** less emissions
- Electric SUV: **52%** less emissions
- Electric sedan: **55%** less emissions

MINNESOTA'S CURRENT ENERGY MIX[5]



> **The future:** Lifetime emissions depend on the sources of electricity used to power each stage

SOURCES

1. Argonne National Laboratory, "R&D GREET (Research & Development Greenhouse gases, Regulated Emissions, and Energy use in Technologies) Model 2025," accessed April 14, 2026, https://greet.anl.gov/.

2. Argonne National Laboratory, "R&D GREET Model 2025."

3. International Energy Agency, Global EV Outlook 2024: Moving Towards Increased Affordability (International Energy Agency, 2024), https://iea.blob.core.windows.net/assets/a9e3544b-0b12-4e15-b407-65f5c8ce1b5f/GlobalEVOutlook2024.pdf.

4. Minnesota Department of Commerce, "Governor Walz Signs Bill Moving Minnesota to 100 Percent Clean Energy by 2040," February 7, 2023, https://mn.gov/commerce/news/?id=17-563384.

5. "Emissions from Electric Vehicles," US Department of Energy Alternative Fuels Data Center, accessed April 13, 2026, https://afdc.energy.gov/vehicles/electric-emissions.

CHECK OUT THE FULL LIFECYCLE ASSESMENT!