Report on the Environmental Impact of Purchasing a New EV Van vs a Secondhand Van

Introduction

As we seek to reduce our carbon footprint and adopt greener practices, the choice between purchasing a new electric vehicle (EV) van or a secondhand internal combustion engine (ICE) van requires careful consideration. While EVs are often promoted as the environmentally friendly option, the overall carbon impact of vehicle production, use, and disposal must be taken into account. This report explores why purchasing a new EV van may generate more carbon emissions and be less sustainable than buying a secondhand van.

Carbon Footprint of Manufacturing a New EV Van

Manufacturing any vehicle requires significant resources and energy. However, EV production has a particularly high carbon footprint due to the following factors:

1. **Battery Production**: The production of lithium-ion batteries, a key component of EVs, is highly resource-intensive. Mining lithium, cobalt, and nickel requires vast amounts of energy and water, generating significant carbon emissions and environmental degradation.
2. **Manufacturing Energy Demand**: Producing an EV requires more energy than an equivalent ICE vehicle due to the complex processes involved in battery and electronic system production.
3. **Supply Chain Emissions**: The global supply chains of EV manufacturers contribute to emissions through transportation, component production, and assembly processes.

Carbon Impact of Buying a Secondhand Van

Purchasing a secondhand van extends the life cycle of an existing vehicle and reduces the demand for new vehicle production. Key sustainability benefits include:

1. **Avoiding Embedded Carbon Emissions**: By reusing an existing vehicle, the carbon emissions associated with its initial manufacturing are spread over a longer period, reducing its overall environmental impact.
2. **Reduced Resource Extraction**: Opting for a secondhand van prevents additional mining and resource extraction needed for new vehicle production.
3. **Lower Total Carbon Footprint**: If a well-maintained secondhand van is used efficiently, its total emissions—including production and operational use—may be lower than those of a newly manufactured EV van.

The Operational Carbon Footprint

While EVs produce zero tailpipe emissions, their environmental benefits depend on the energy mix used for charging. In areas where electricity is generated from fossil fuels, the carbon footprint of operating an EV may be higher than expected. On the other hand, a secondhand ICE van can be used with improved fuel efficiency measures, alternative fuels, or retrofitting to lower emissions.

End-of-Life Considerations

The disposal of EV batteries poses additional sustainability challenges. Battery recycling is not yet widely available, and improper disposal can lead to toxic environmental impacts. In contrast, a secondhand van that is used to the end of its functional life and then responsibly scrapped or repurposed can be a more sustainable option.

Factor	New Electric Van	Secondhand Diesel/Petrol Van
Manufacturing CO_2 Emissions	High initial emissions due to battery production (approx. 20-24 tonnes CO_2) = 0.26 tonnes per 1,000 miles	No new manufacturing emissions; reuse reduces overall carbon footprint
Operational CO_2 Emissions	Zero tailpipe emissions, but indirect emissions from electricity generation (varies by grid mix)	Significant CO_2 emissions (approx. 150-200g CO_2/km for diesel, 120-170g CO_2/km for petrol)
Lifetime CO_2 Impact	Lower over time if powered by renewable energy; breakeven with diesel in ~2-4 years	Higher lifetime emissions, but extending the vehicle's use avoids the impact of new vehicle production
Battery and Resource Use	Requires lithium, cobalt, and nickel mining, which has environmental and ethical concerns	No new resource extraction, reducing demand for rare materials
Longevity & Maintenance	Lower maintenance needs due to fewer moving parts, longer lifespan of drivetrain	Requires more frequent servicing, potential for high repair costs
End-of-Life Disposal	Battery recycling is improving, but still a challenge	Easier to recycle conventional vehicle components; may need to be scrapped sooner

Overall Environmental Impact	Better long-term sustainability if charged with clean energy	More sustainable in the short term due to avoiding new manufacturing emissions

Summary

• A brand-new electric van has higher upfront CO_2 emissions due to manufacturing, particularly battery production. However, over its lifespan, it significantly reduces emissions if powered by renewable energy.

• A secondhand diesel or petrol van extends the life of an existing vehicle, avoiding new manufacturing emissions, but it will continue to emit CO_2 and pollutants during use.

• The best choice depends on usage patterns—if the council can charge using renewable energy and plans to keep the vehicle long-term, an electric van is the more sustainable option. If short-term use or financial constraints are key, a secondhand van may be a better interim solution.

• To purchase outright either a secondhand diesel or petrol van - £10,000 vs an EV van - £50,000

Example from H* Town Council

A new EV is estimated to generate 46% (10 tonnes) of its total carbon footprint before it leaves the factory (LowCVP, 2015). These figures are based on the NEDC 10-year lifetime estimate of 150,000km driven, whilst our van covered only 11,000km in four years, suggesting a 10-year service would produce 4 tonnes of carbon, meaning 71% of its carbon footprint would be generated in production.

We concluded that it is more environmentally sound for us for the time being to continue to buy good second-hand vans that already exist than cause the manufacture of a new electric van, simply because the net gain on CO2 relies on an EV replacing 150,000km of diesel driving. We could never be better off on CO2 emissions buying a new EV, until EVs are the only choice or good second-hand ones become available.

Apart from being greener, it is also hugely cheaper to buy second-hand than lease or buy new. We bought our 2012 Renault Kangoo in 2016 for £5,038 and in January 2024 disposed of it for £3,450, so depreciation of just £200 a year.

Conclusion

While EVs offer long-term environmental benefits in terms of emissions reduction, the higher carbon footprint of manufacturing a new EV van must be considered. Extending the life of an existing vehicle through the purchase of a secondhand van can reduce overall emissions and resource consumption, making it a more sustainable choice in many cases.