

Why We Need More Carpools & Vanpools

(June 20, 2022 – Final Draft)

Summary: We know that all effective actions must be taken to reduce Greenhouse Gas (GHG) emissions. Most transport-related actions require 1-2 *decades* to take full effect, while GHGs accumulate in the atmosphere. One action that could produce reductions in 1-2 *years* is increased carpools and vanpools for trips to work. This is a GHG-reduction opportunity “*hiding in plain sight.*”

1. What is the Problem?

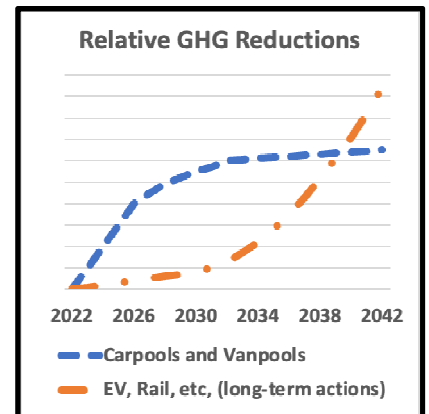
The **BIG** problem is **global warming**, of course. We must take all effective steps to reduce GHGs, as soon as possible. In many nations, **transportation** generates a large portion of Greenhouse Gases (GHGs); for example: 29% in U.S. and 20% in Germany in 2020¹. Commuting (repetitive trips to work) represents about 28% of transportation mileage in the U.S. There are other important transportation problems:

- **Traffic congestion** results in large economic losses. Based on value of time, the annual loss is estimated at \$53 billion in the U.S., £8 billion in the UK, 3.5 billion € in Germany² and \$NZ1.3 billion in the city of Auckland, NZ³.
- **Health impacts of air pollution** generated by vehicles are recognized as a major problem in many areas. It causes difficulty breathing and worsens existing respiratory and cardiac conditions. The OECD estimates that 700,000 people die each year, in OECD countries alone, from transport-related air pollution⁴.
- **Gasoline and diesel price spikes** have strong economic and political consequences. In 2022, because of hostilities in Ukraine, gasoline prices increased up to 50% in many nations, creating hardship for commuters.
- **Equity** for people with no access to a car or who cannot drive, but who need to travel to a job, or to get a job. Increased carpooling and vanpooling can be one part of the solution to all the above problems.

2. What are the Benefits of Increased Pooling?

Carpools and vanpools have contributed toward solving most of these problems for over 45 years. **But they can make even greater contributions, and can do so with start-up times of months, rather than the years or decades** needed for other valuable GHG measures. And they can do this with relatively low cost per unit of reduction. Proven techniques, plus new technologies, create new opportunities for quick and cost-effective GHG reductions. The importance of quick start-up is demonstrated *conceptually* in the figure to the right.

Major mitigations such as electric vehicles, expanded rail transit, and land-use changes, may produce large GHG reductions but require long start-up times (15-30 years) before yielding major reductions (see red line in graph). In contrast, pooling may yield lesser benefits in total (see blue line) but they can begin very quickly (1-3 years) and continue. Because most GHGs persist in the atmosphere for well over 10 years, near-term reduction of GHGs have a strong, cumulative effect for over a decade, while long-term mitigations are added.



Carpool and Vanpool programs can produce meaningful GHG reductions:

- One study identified a very large **potential** market for commuter carpooling: “According to Waze data, close to two-thirds of drivers have at least one other regular Waze driver with a perfectly matching commute...”⁵
- Another study estimated a GHG reduction of 68 million tons per year, if one passenger were added to every 10 vehicles in the U.S.⁶
- A multi-national study estimated a 3%-5% reduction in total petroleum fuel use for an aggressive “Carpooling Infrastructure and Programme” across four International Energy Agency (IEA) regions, yielding a reduction of “more than one million barrels of oil per day” across all IEA countries. The same study estimated “over 100,000 barrels per day for a “small programme to inform public, match riders.”⁷

Examples of demonstrated reductions of GHG, congestion, air pollution, and user costs include the following.

- a. **Worksite-based carpool programs** – Many large and medium-size employers help their employees to find carpools and vanpools, and often other commuting options. One example is ARUP, in Birmingham, UK. In 2015, 76% of staff drove alone; but with strong top-management support and use of new technology, that dropped to 29% in four years.⁸ Many employers also collaborate with a regional program serving their worksite(s). In multi-tenant office buildings, property managers provide incentives and carpool-matching services to staff of tenants. In large business parks, Transportation Management Associations (TMAs) provide a range of commuting options, including carpools and vanpools.⁹
- b. **Regional and statewide carpool programs** – Most urban areas and some states in the U.S. have Travel Demand Management (TDM) Programs, which facilitate carpools, vanpools, and other alternative modes. For example, the state of Connecticut has run a TDM program since 2005 with almost 50,000 users and has eliminated over 91,000 tons of GHG emissions.¹⁰ Another notable example is the “Commuter Connections” regional TDM program in the US National Capitol Region, which offers a wide range of services and incentives.¹¹ The overall program yielded GHG reduction of 311,000 Tons of CO₂ per year.¹²
- c. **Vanpool programs** – Company-sponsored vanpools at Gulf Oil in the 1970’s had up to 50% of the employees in vanpools. In 1977, TVA had 35% of their commuters using express buses and vanpools.¹³ In the early 1980’s, there were over 20,000 vanpools at over 300 companies in the U.S.¹⁴

3. What exactly are “Carpools” and “Vanpools”?

- a. There are multiple opportunities for commuters to **carpool**:
 - Most *commuter* carpools consist of two people who work at the same location. Other carpools are made of household members, neighbors, friends, or new acquaintances through churches and other social connections, or from a carpool app or pooling service.
 - A person who needs their car can always drive. Those who do not need to drive, or cannot drive, can be a rider, and may share costs.
 - Carpool arrangements can operate full-time or part-time, or even “as-needed.”
- b. There are many variations of commuter **vanpools**:
 - Most vanpools consist of 7-15 people who commute together in a van, minivan, large car, or SUV.
 - The most-common vanpool serves one worksite, but it could also serve several nearby destinations.
 - Riders can be picked up at home, or at a meeting point (e.g., park-and-ride lot, church lot, etc.).
 - Vanpools can be supported by incentives such as: subsidies, preferential parking, work-schedule flexibility, and other encouragement. Regional agencies can also support vanpools via startup assistance and subsidies (e.g., L.A. Metro subsidized 1,200 vanpools with \$400/month each, in 2018).
 - Vanpool vehicles are commonly leased, but they can also be owned by employers and also by individuals. There were many such “owner-operated” vanpools on the HOV lanes in Northern Virginia, in the 1970’s.
 - Vanpool riders often subscribe full-time, but some operate on a space-available basis.
 - For high-demand commuter corridors, “bus pools” can be effective (e.g., Google, in the San Francisco area).
 - Most vanpools serve long-distance commutes (20-60 miles one-way), yielding very large GHG reductions.

4. How Can We “Make It Happen”?

Here’s one innovative example: Recent research on a busy corridor in California found that half of commuters were willing to travel as passengers “if the deal were right,” and one-quarter were willing to drive and provide rides¹⁵. At a regional scale, this suggests commuter traffic volumes could be cut in half with the right combination of enablers and incentives for increased pooling.

A wide range of actions, by many possible parties, can help increase carpools and vanpools:

- a. **Policies** – At national, state, and local levels, new policies can emphasize pooling as a mechanism to reduce vehicle travel and resulting emissions. Such policies should enable financial and other incentives to make pooling

more attractive and remove barriers such as taxation on income from sharing rides to/from work. Financial incentives should be exempted from income tax. Government funding should be provided for applied research and especially for pilot projects to test emerging concepts to increase pooling¹⁶. At the employer level, de-subsidized parking has proved successful at MIT, Stanford, and some private companies.

- b. **Programs** – With urgency, policies at all levels should enable programs that encourage expansion of pooling – both route-specific and area-wide. This could include cash incentives for passengers, conversion of roadway lanes to HOV only, additional incentives for HOV3+ on HOV2+ lanes, expanded park-and-ride lots, and perhaps bonus incentives for electric carpools. HOV lanes can provide highly effective pooling incentives; in the 1970’s the “Shirley Highway” 2-lane, HOV4 facility in Northern Virginia carried up to 22,000 people in the peak hour, with half in carpools and vanpools.¹⁷ *Cultural* messaging (like for recycling and against smoking) should communicate the social benefits of pooling.
- c. **Projects** – Existing pooling efforts should be expanded; new projects should be created using available government grants and private funding. Innovative programs should be launched to test new ideas (e.g., direct cash incentives to carpool/vanpool passengers, etc.). In the Washington DC area, an individual “part-time vanpool entrepreneur” launched a commuter-vanpool operation that grew to 60 vehicles in 1988.
- d. **People** – Develop pooling “champions” or utilize social media Influencers. This might include stipends to students who successfully cause new carpools or vanpools to be created. It could simply be peer recognition within social or religious groups. In a corporate environment, an important ingredient for successful pooling efforts is strong support from top management (plus unions in some contexts). Enlisting the support of Influencers on social media platforms (e.g., TikTok, Instagram) can help reach new audiences who are young and willing to contribute to the cause of fighting climate change by pooling occasionally with friends and colleagues.

5. **Do Your Part!**

- a. **Federal Governments** –
 - i. Federal DOTs should establish new policies and staffed units to focus on maximizing *person*-throughput rather than vehicle-throughput on highways, plus other ways to reduce emissions from transport.
 - ii. Federal DOTs should revise the overall infrastructure planning and investment paradigms to shift funding from construction and towards pooled-ride services.
 - iii. Federal DOTs should collaborate with peer departments – energy and environmental – to establish stringent energy efficiency and air-pollution measures to reduce GHG emissions from the transport sector.
 - iv. Federal Governments should intensify international cooperation in R&D and establish regular consultation on best practices and policies.
- b. **State & Local Agencies** –
 - i. Should leverage new federal policies and programs by providing matching funds and program offices.
 - ii. Should create new policies, programs, and projects to promote pooled rides.
 - iii. Should rapidly assess and remove regulatory barriers or constraints to pooling.
- c. **Major Employers** –
 - i. Should, at a minimum, provide employees with *personalized* carpool-matching and vanpool information.
 - ii. Should offer incentives to carpoolers (e.g., preferred or free parking, adjustable schedules, etc.).
 - iii. Should offer incentives to vanpoolers (e.g., reimbursement for reducing parking spaces leased).
- d. **Property Owners/Managers** (managers of office and residential multi-tenant facilities) –
 - i. Should, at a minimum, provide employees and residents with carpool-matching and vanpool information.
 - ii. Should offer incentives to carpoolers and vanpoolers (e.g., preferred parking, guaranteed-ride-home, etc.);
- e. **Environmental Advocates** – should highlight the Ridesharing Institute’s *Pooling Imperative*¹⁸ and the potential for increased pooling to help governments and businesses achieve their emissions-reduction targets.
- f. **Media** – should highlight the Ridesharing Institute’s *Pooling Imperative* and draw attention to agencies and organizations that encourage pooling; provide analysis of their impacts; follow up to ensure the efforts are delivered; and hold them accountable for success or failure.

¹ <https://www.umweltbundesamt.de/galerie/treibhausgasemissionen-2021>

² INRIX 2021 INRIX Global Traffic Scorecard, <https://inrix.com/scorecard/>

³ The Congestion Question, July 2020, New Zealand Government, retrieved from
<https://www.transport.govt.nz/assets/Uploads/Report/TheCongestionQuestionMainFindings.pdf>, page 9 on 18 March 2022

⁴ OECD: The Cost of Air Pollution: Health Impacts of Road Transport, 2014, retrieved from
https://issuu.com/oecd.publishing/docs/highlights_cost_of_air_pollution_pr/2?ff&e=3055080/12038194 on 18 March 2022

⁵ Cohen, M. C., Fiszer, M.-D., Ratzon, A., & Roy, S. (2021). Incentivizing Commuters to Carpool: A Large Field Experiment with Waze. *Manufacturing & Service Operations Management*, 22 pp. Retrieved from <https://doi.org/10.1287/msom.2021.1033>.

⁶ Jacobson, S. and D. King. 2009. "Fuel saving and ridesharing in the US: Motivations, limitations, and opportunities" *Transportation Research Part D: Transport and the Environment*. Volume 14, Issue 1.

⁷ International Energy Agency. 2005. "Saving Oil in a Hurry." OECD, Table E-1.

⁸ Clabburn 2021: Liftshare for work ARUP Action, CoMo UK Shared Transport Conference 7 & 8 December 2021 <https://como.org.uk/conference/> Session 6: To the suburbs and beyond: the role of shared transport away from the urban core, Ali Clabburn statement starting at 29:11 min of 1:33:41 h https://www.youtube.com/watch?v=CbY70sgR9_s

⁹ <https://www.vtpi.org/tdm/tdm44.htm>

¹⁰ Connecticut Governor's Council on Climate Change, Building a Low Carbon Future for Connecticut, December 18, 2018

¹¹ *Commuter Connections* newsletter, Summer 2021, page 5. Metropolitan Washington Council of Governments. See: <https://www.commuterconnections.org/wp-content/uploads/Summer-2021.pdf>

¹² "Commuter Connections Program Transportation Emissions Reduction Measure Analysis Report, 2014-2017." Metropolitan Washington Council of Governments. November 2017.

¹³ Wegman, F.J., and Chatterjee, A. Cost Effectiveness Analysis of TVA Employee Transportation Incentive Program. May 1977.

¹⁴ Deitrick, S., Bream, C., and Beach, S. Impacts of Vanpooling in Pennsylvania and Future Opportunities. Univ. of Pittsburg. December 2010.

¹⁵ See: https://transweb.sjsu.edu/mctm/research/utc/1817_Congestion-Clearing-Payments-Passengers

¹⁶ Such as Congestion-Clearing Payments to Passengers and Hotter Lanes, see https://transweb.sjsu.edu/mctm/research/utc/1817_Congestion-Clearing-Payments-Passengers, and <https://journals.sagepub.com/doi/abs/10.1177/03611981211011651> respectively.

¹⁷ Extending the Shirley Highway HOV Lanes - A Planning and Feasibility Study, JHK & Associates for VDH&T, March 1982.

¹⁸ See <https://bettertransport.info/pool/index.htm>