

## IN THIS ISSUE

Feature: The Real Case for Driverless Mobility .....	2
Driverless driving versus driverless riding .....	2
Dispatch Central .....	10
Changing or charging a battery in a BEV .....	10
Project 2025: What it is and why it matters .....	18
Connected vehicle security risks for America .....	24
Musings of a Dispatcher: A Ticket to Drive .....	28
Not everyone has a driver's license.....	28

## THE FEBRUARY 2025 ISSUE IN BRIEF

THE AUTOMOTIVE INDUSTRY is arguably today's most important subject of international trade discussions and negotiations. It is more important than oil, steel, semiconductors, energy, rare earth minerals, telecommunications, and artificial intelligence individually because an automobile encompasses all of these components. The importance of the automotive industry could be seen by anyone watching the inauguration of the 47<sup>th</sup> president of the United States on the 20<sup>th</sup> of January, where the major owner and CEO of an American automobile manufacturer, TESLA, who is also the richest person on the Planet (if individuals who control the wealth of entire countries are disregarded), in most part due to the value of the shares he owns in his automobile company, shared the limelight with other very important people gathered behind the incoming president as he spoke. Musk donated hundreds of millions of dollars of his own money to his preferred candidate, and he will be managing the running of a special department aimed at finding trillions of dollars in savings for the government.

Automobile manufacturing is also important because it has been weaponized by China's government's determination to become the largest producing country of motor vehicles, and to become the dominant supplier of these vehicles to every corner of the world. It was well on its way to achieving this goal by becoming the principal supplier of all the necessary components of battery electric vehicles and equipping these vehicles with automated driving and infotainment systems that were dependent on China's information technology infrastructure. There is no question that Elon Musk contributed to China's rise as the primary producer and seller of battery electric vehicles by showing how to build a BEV that people would buy, and by browbeating governments, starting in the U.S. and Europe, into paying consumers to buy them, paying to set up charging stations, and changing laws to prohibit the sale of anything else. Presidential Executive Orders, laws that increase tariffs on Chinese-made cars, bans on Chinese vehicle systems will not make automobiles any less of an important subject in the coming months.

# THE DISPATCHER

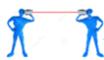
Mobility Industry Insights by Michael L. Sena  
February 2025 – Volume 12, Issue 02

## Feature: The Real Case for Driverless Mobility

### Feature Articles



The real case for driverless mobility



Vehicle-related telecommunications



Automotive artificial intelligence



The business of delivering transport systems



People and transport – the effects of how and where we live, work, and recreate on our requirements for transport



Standardization and regulation of transport systems

### ***Driverless driving versus driverless riding***

THERE IS A DIFFERENCE between being in the *driverless ride delivery business* and being in the *driverless driving delivery business*. A big difference. I argued in the lead article of the January 2024 issue of *THE DISPATCHER* that, contrary to the common thinking about Waymo, it is not in the ride delivery business (driverless or otherwise), but in the driverless driving delivery business. I wrote the article at the time that GM had fired the founder of *CRUISE* and severely cut its funding following an accident in San Francisco in which a pedestrian was injured.<sup>1</sup> I wrote it to highlight the fact that GM's thinking about *CRUISE* was wrong-headed. GM had purchased *CRUISE* in 2016 to try to pump up its anemic stock price, and GM's CEO, Mary Barra, attempted to justify the purchase by saying that *CRUISE* would be adding \$50 billion in revenue to GM by 2030 by operating as a ride delivery company. GM had \$171.8 billion in revenue in 2023. How likely was it that *CRUISE* would generate up to 30% of the company's revenue within the next six-or-so years? Well, GM stopped believing that was going to happen, and canceled further funding for *CRUISE* in December of 2024. Close that chapter.

I did not believe in January 2024 that Waymo was ever going to add \$50 billion to Alphabet's bottom line by delivering rides. Google Search contributed \$175 billion to Alphabet's \$307 total revenue in 2023. YouTube Ads added \$31.3 billion. Waymo and nine other *OTHER BETS* companies chipped in with a combined total of \$1.5 billion, which was a whopping 0.5% of Alphabet's total. It was up from \$1 billion the year before. But the *OTHER BETS* companies lost \$4.1 billion generating that \$1.5. And further, I am convinced that Alphabet is not

<sup>1</sup> A pedestrian was hit by a vehicle that was adjacent to a Cruise vehicle. The struck pedestrian was forced into the path of the Cruise vehicle. The Cruise vehicle continued moving for 6 meters with the struck pedestrian under the the vehicle's carriage.

continuing to fund Waymo's operation in the belief or hope that it will one day be doing anything more than supporting its primary business, which is advertisement brokering. Alphabet has a place cut out for Waymo within the Google structure, I claimed in my January 2024 article, where it would do its bit in a similar way that Google Maps, Waze, Android, Chrome, Nest, and other Google divisions already do.

To say that this argument fell on deaf ears would be an understatement in the extreme. It reminded me of the reaction to a presentation I gave to a group of traffic information system developers in Brussels in February 2016 in which I questioned the safety benefits of driverless vehicles over what was already being done with advanced driver assistance systems (ADAS) to support human drivers, and said that we should not expect to have fully driverless vehicles on sale to consumers in just a few years, as was being promised at the time by car companies, tech companies, and investors. There was weak applause when I finished (I believe they were from a few readers of *THE DISPATCHER* who were present), and no questions. One person, who had an angry look on her face throughout my entire presentation, said: "I'm looking forward to autonomous cars. I hate driving."

#### *How much difference does a year really make?*

And so a year has passed since I wrote my Waymo epistle. What has happened, other than *CRUISE* shutting down? Is there any evidence that Waymo is preparing to leave the *OTHER BETS* division of ALPHABET, INC. and move into the "Alpha Bets" division called Google as a driverless ride delivery business? No. However, there is evidence that it is beginning the reveal its position as a driverless driver delivery business. In early December last year, a good friend and neighbor, who is also a fellow American Swede and a reader of *THE DISPATCHER*, sent me a news release from a company called MOOVE. It was dated 5 December 2024.<sup>2</sup> Here is what it said:

*"Moove, a global leader in innovative mobility solutions, is proud to announce a groundbreaking fleet partnership with Waymo, the global leader in autonomous driving technology (Ed: It did not*



*When Robots Drive  
Will it truly be the end of death and  
delays on our roads?*

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<sup>2</sup> <https://www.moove.io/article/moove-partners-with-waymo>

say Waymo was a leader in autonomous ride delivery business.). This collaboration represents the first commercial partnership of its kind on the Waymo One app. Under the agreement, Moove will **manage and dispatch** Waymo's fully autonomous fleet, beginning with operations in Phoenix in 2025 and expanding into Miami in 2026. Moove will take responsibility for fleet operations, facilities, and charging infrastructure, ensuring the seamless operation of Waymo's all-electric AV fleet. Waymo will continue to offer its service through the Waymo One app, and remain responsible for validation and operation of its autonomous driving technology – the Waymo Driver.

“Ride hailing (Ed: This refers to Transportation Network Companies – See sidebar.) has transformed urban mobility over the past 15 years, yet the core experience has largely remained unchanged. Waymo's safe, reliable, and convenient Waymo One service leads in autonomous technology, and together, we're driving a major shift in urban mobility. We're proud to partner with Waymo, bringing our operational expertise to make this transformation possible. We understand that mobility isn't a 'one size fits all'. While we're expanding into AVs in the U.S., we remain deeply committed to serving our customers around the world where we will continue to provide our unique financing solutions to underserved mobility entrepreneurs.”

Here is what Waymo added:

“We are excited to partner with Moove in Phoenix and later Miami, bringing together their mobility-focused fleet management experience with our growing Waymo One service. Together, we will provide safe, seamless trips for riders, and scale faster and more cost-effectively over time, with safety continuing to lead the way.”

Ryan McNamara, Vice President of Operations at Waymo

There has not been a single reference to this article in the Western press as of the 24<sup>th</sup> of January, not in the usual pundit places or in the AUTOMOTIVE NEWS daily feeds. Is it because no one in the West has ever heard of MOOVE before? It is a Nigerian company (www.moove.io), based in Lagos and founded in 2020. It describes itself as “a mobility fintech<sup>3</sup> that provides revenue-based vehicle financing to mobility entrepreneurs, democratizing vehicle ownership across Africa”.

<sup>3</sup> 'Fintech' is a word that blends the sounds and combines the meanings of two other words, such as motel or brunch (called a portmanteau). The words are 'financial' and 'technology'.

## What Is Ride Hailing

There are three types of taxi service models, including ride-hailing, taxi stands/ranks, and central dispatching. The distinctions are important because they are regulated differently. The term “ride hailing” has been inappropriately appropriated by companies that have been termed for legal purposes “transportation network companies” (TNC), such as UBER, LYFT and DIDI, which “use a digital network to connect a rider to a driver using his or her own vehicle, or a vehicle owned by a third party, to provide a prearranged ride”. TNCs are not classified under for-hire companies.

In the ride-hailing model, such as the ones that were common in large cities like New York, London, and Beijing before ride delivery platform providers like UBER, LYFT, and DIDI entered the market, persons wanting a ride stood on a curb or moved out on the street between parked cars and raised their hands to “hail down” a taxi. The word ‘hail’ is quite versatile. As a noun, it can be “precipitation in the form of small balls of ice”, or an “exclamation of greeting”, as in greeting the king with a ‘hail’. As a verb, it can mean “to precipitate hail”, to “pour down or strike”, or to “summon by calling or waving to pull over or stop”, as in hailing a taxi.

When hailing a taxi, those taxis that are occupied or are on their way to pick up a fare, have their roof light turned off so the ride hailers do not have to waste time trying to convince them to pull over and pick them up.



The company “embeds its alternative credit-scoring technology onto ride-hailing, logistics, and last-mile/instant delivery platforms, which allows access to proprietary performance and revenue analytics of mobility entrepreneurs to underwrite loans.” To make it simple, MOOVE’s business is to help people become drivers for companies like UBER by making it possible for people to own a car, and it monitors the drivers of the vehicles while the drivers are paying for them to make sure the drivers are good credit risks.

### Waymo has been searching for the perfect partner

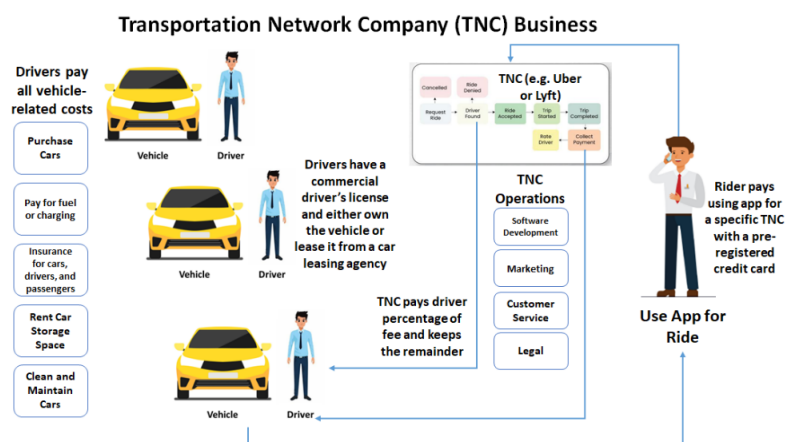
The advantage of the approach that Waymo has taken to technology development is that it has been proving the market concept for driverless riding as it has been proving the technology concept of driverless driving (See sidebar). In 2015, it created a stir when it showed its *Firefly* vehicle without a steering wheel and pedals carrying some riders around Austin, Texas. It quickly retired the *Firefly*. It took four more years for Waymo to be able to deliver driverless rides to “select *Waymo One* riders” in the Phoenix area. A year later, it opened up to the public in Phoenix. By 2023, it was offering the public rides in San Francisco and Los Angeles. Also in 2023, it decommissioned its *Chrysler Pacifica* fleet and moved to *Jaguar I-PACE* battery electric vehicles. All the while, Waymo has been pounding home the message that it is a safe way to travel. It has been showing that people are willing to pay for rides when there is no driver. Waymo delivered four million “fully autonomous rides” in 2024, according to its Year-in-Review web site.<sup>4</sup>

Waymo has way mo’ to go before it catches up to UBER’s almost 10 billion rides in a year, but UBER is still just scaping by financially. It broke even in 2023, with \$20 billion in global revenue from Rides (after paying driver fees) and \$17 billion in Delivery and Freight, but it had \$36 billion in costs. This is without any vehicle-related costs, which the drivers have to cover themselves.



### Proving the Market and the Technology at the Same Time

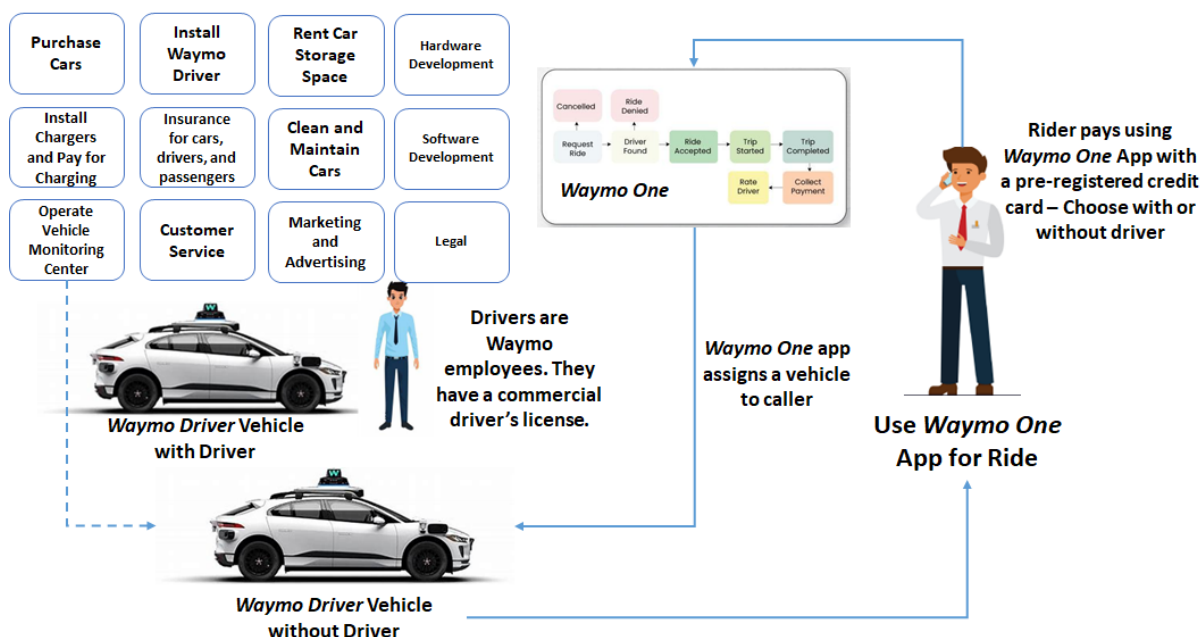
*In 1978 ESSELTE MAP SERVICE USA was established in Boston as a branch office of ESSELTE MAP SERVICE AB, a Stockholm cartographic production and map publishing business. At the time, it was one of the five largest map companies in the world. The others were RAND MCNALLY (USA), KÜMMERLY+FREY (Switzerland), BARTHOLEMW (UK), and Di Agostini (Italy). ESSELTE and all other map companies at the time produced their maps using manual techniques, including a technique developed during World War II by the U.S. cartographic services called peel coat scribing. ESSELTE MAP SERVICE USA was established as a ‘skunk works’, far removed from the main production services operations in Stockholm in the heart of what was then the mini-computer capital of the world, Boston Route 128. I managed EMUSA, as we called it. Our main charge was to find ways of producing maps using every computerized means available at the time. Our second charge was to find customers who would pay to have maps produced without any concern for how their maps were made. It was not either or; it was both. We had to show that the maps made with digital techniques passed customer muster. We did. Four years after we were established, we transferred all the technology and know-how to Stockholm.*



<sup>4</sup> <https://waymo.com/blog/2024/12/year-in-review-2024>

In October 2024, Waymo raised \$5.6 billion in a funding round, which is the division’s largest investment round to-date. During the round, it indicated it would use the funds to expand in both current geographic markets and move into new ones, like Austin and Atlanta, where its customers will be able to access it through the Uber app. It also said that it would be developing “business applications” for its *Waymo Driver*, including food and package deliveries, trucking, and personally owned autonomous vehicles.<sup>5</sup>

### Waymo Proof of Market for Driverless Driving and Riding



Right now, Waymo is bearing all the costs of both a traditional taxi company and a TNC. It buys its cars and pays MAGNA INTERNATIONAL<sup>6</sup> to have its hardware specially installed on those cars at a facility in Michigan it has jointly developed with MAGNA. It pays for the storage, charging, cleaning, and maintenance of all its vehicles, as well as the payment of drivers/safety drivers, and insurance for the cars, the drivers, and the passengers. It operates a 24/7 vehicle monitoring center, develops all of the *Waymo One* and *Waymo Drive* on-board software, and keeps the marketing wheels churning and the legal eagles ready to cover their backs. Even if it charged \$100/ride for every one of its 4

<sup>5</sup> <https://www.theverge.com/2024/10/25/24279330/waymo-funding-round-series-c-amount-alphabet>

<sup>6</sup> Magna Steyr in Graz, Austria, a wholly-owned subsidiary of Magna International, manufacturers the Jaguar I-PACE under license from Jaguar Land Rover.

million driverless rides (which it most probably does not; \$20 might be closer to reality), it would have brought in \$400 million on those 4 million driverless rides. In an earnings call in November 2024, ALPHABET and Google CEO, Sundar Pichai, said that Waymo is now delivering 150,000 paid rides per week (with and without a driver). That's 7.8 million rides per year. Add the 3.8 million to the 4 million, and Waymo would have earned \$780 million on all its rides if it charged \$100/ride (\$156 million at \$20/ride). Peanuts, peanuts, and more peanuts.

#### *Waymo needs to hand over its negatives to partners*

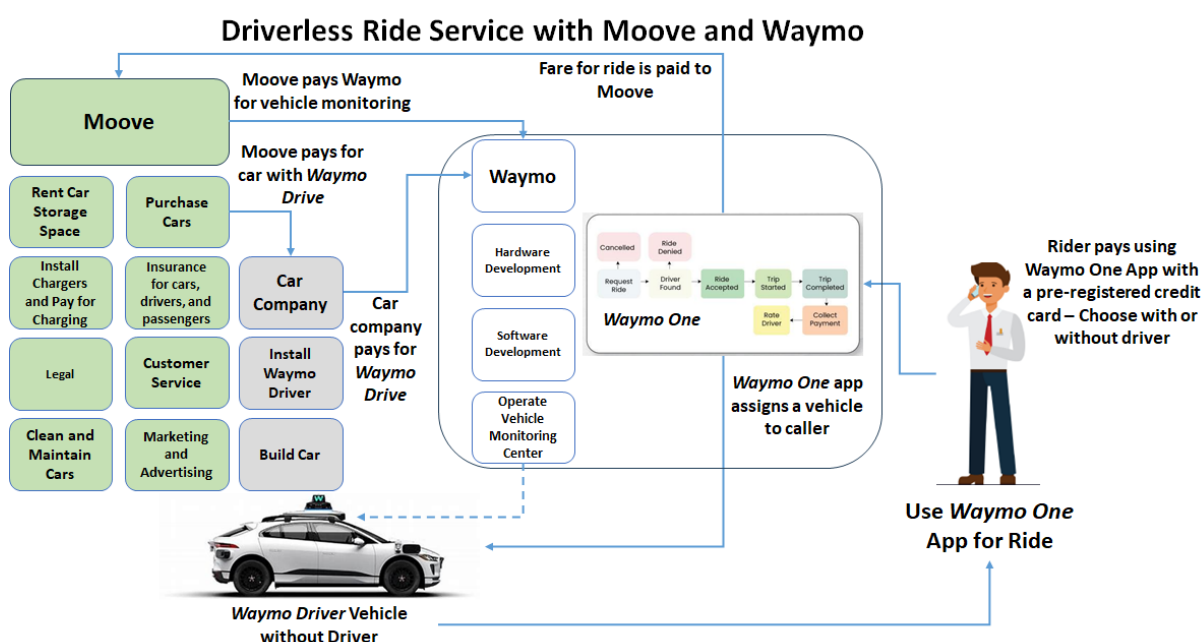
As I said in my January 2024 article, in order to win a ***Get Out of Other Bets*** card, Waymo must install its *Waymo Driver* in as many vehicles as possible, not just vehicles that it purchases itself, and it needs to connect up all those cars to its *Waymo One* service. However, it must do this without buying, retrofitting, and having the operational responsibility for the vehicles, otherwise scaling up just adds higher costs. These costs are too high to bear the weight of operating a combination taxi business and a TNC, even with the cost of the driver taken out of the equation. Those costs must be assumed by a company that can make money by monetizing the difference between what it can earn from buying vehicles equipped with Waymo's driverless equipment and software, and the costs of operating those vehicles to provide rides without a driver.

#### **Are Waymo and Moove a perfect fit?**

MOOVE believes it can accentuate its own affirmatives and latch on to Waymo's positives to create a money-making operation. Can it? Today, MOOVE is a combination of a car broker and a car leaser, buying cars and delivering them to individuals who use the cars to deliver rides. Each person hands over to MOOVE a percentage of what he or she earns from delivering that ride and keeps the rest to pay himself/herself and pay the costs of having and operating the car. Why don't those people just buy a car themselves, without going through MOOVE? Because they do not have the collateral to do so. MOOVE installs software in the vehicle to monitor how much it is being driven and where it is located so that it does not lose its property before it is paid for.

*MOOVE's business is to help people become drivers for companies like UBER by making it possible for people to own a car, and it monitors the drivers of the vehicles while the drivers are paying for them to make sure the drivers are good credit risks.*

Apparently, MOOVE believes that it can build up a fleet of cars which it will own by paying itself as the eventual car owner. It seems that MOOVE has figured out that a successful taxi business is not based on getting someone to pay you to move him from Point A to Point B, but on owning the means of delivering that movement (e.g., horse, wagon, rickshaw, motorbike, car, van), and performing the movement at absolutely the lowest cost. Why doesn't Waymo do exactly that themselves? The simple answer (that has been there in front of us the whole time) is that it is not in that business. Maybe it will acquire MOOVE, or another company that does what Moove does, and it will be in that business. But it is not now.



The diagram above shows what a Waymo/MOOVE driverless ride service business might look like. Waymo delivers the driverless driving components (*Waymo Drive*) to a car company or companies for installation into vehicles bought by MOOVE, and the car company pays Waymo for *Waymo Drive*. Waymo provides the *Waymo One* service, accessible on Google Play as an Android App or other App stores, to book rides, dispatch vehicles, process payments, and monitor those vehicles. This app is tied to all of Google's business operations to generate advertising revenue like all Google apps, and, very importantly, it is tied to the systems in the vehicle that are generating boat loads of data that will be used by Google. MOOVE runs the driverless ride delivery business. MOOVE will take the bulk of the fare for each ride,

paying Waymo a commission for the use of *Waymo One*. It will also pay Waymo for providing vehicle monitoring and problem management.

MOOVE will find ways to insert itself into the Google advertisement value chain to help cover the costs of buying and owning the vehicles. It currently sells ad space on the vehicles it leases today. Since MOOVE will own the vehicles, it can maximize the space inside and outside the vehicles devoted to advertising, tailoring the advertising to each market.

### *A glove that fits many hands*

Nothing about exclusivity has been mentioned in any communications from either Waymo or MOOVE. Any company that believes it can generate a profit from delivering a driverless ride delivery service using Waymo's driverless driving hardware, software, and monitoring service can do what MOOVE is doing. Transportation Network Companies like Uber and Lyft would not appear to be good candidates. They have their own equivalent to Waymo One and no experience with buying and managing vehicles. What about car rental companies, like Enterprise, Hertz, and Sixt? Car rental companies are in the business of buying cars, and they make money by letting people drive them. Like MOOVE, they have any incentive for monitoring the drivers to make sure they are not abusing the vehicles or absconding with them. An advantage they have over Moove is that they already have a vehicle management infrastructure in place for storing, cleaning, maintaining, and fueling vehicles, as well as an operation for disposing of vehicles once they have outlived their usefulness.

Waymo has no doubt already gone through this partner evaluation exercise, had talks with all the usual suspects, and decided where it will begin to develop business relationships like the one it has entered into with MOOVE. When more of these types of agreements become public, the experts who have been talking about Waymo like it was going to be in the taxi-company-for-the-world business will all start to change their tune. They will fall all over themselves to show that they knew all along what they did not understand all along because they never thought about what business ALPHABET, the company that owns Waymo, is in.



*"We are proud to be rolling out Vehicle Advertising in South Africa, Ghana and India, which will allow our customers to leverage the power of the exposure that their vehicles receive to draw an additional income stream."*



# Dispatch Central

The topics covered in Dispatch Central are newsworthy, but I leave it to others to deliver them “as they break”. I give them a little time to settle in, and try to provide an analysis of their impact.



## Changing or charging a battery in a BEV

WHICH IS BETTER? From the perspective of time and energy invested, and considering safety, performance and warranty issues, how does swapping out a depleted battery for a completely charged one compared to charging the battery that is factory-installed in a battery electric vehicle (BEV)? In the old days – and even today in New Jersey – you pulled up to a gasoline pump, rolled down the window, and told the attendant either to “Fill it up”, or how many dollars you wanted to spend. While the gasoline was flowing, the attendant checked your oil and radiator water levels and washed your windshield. You were in and out in three-to-five minutes, depending on whether you had to wait for the attendant to finish with another customer or whether you were filling up an empty tank. The total energy expended by a driver was used to roll down the window and take money out of his wallet or her purse.

Following the advent of the self-service gas station, we have to do the work of the attendant after we have interacted with the payment machine. If the machine cooperates, and there is a free pump when we pull in, we can be in and out in three-to-five minutes. Nobody checks their oil or radiator water levels anymore.

Charging a battery electric vehicle is another story. There are a wealth of options. You can install the equivalent of your own gas pump in your driveway. You can use the equivalent of an oversized parking meter along a street. You can pull into a gas station and use one of the equivalents of a petrol pump set up in a parking area. There is slower and cheaper charging, like the one at your house. There is quicker and expensive charging, like the one at the charging stations. There is even free charging provided by employers to encourage employees to accept a BEV as a company car. How long does it take to charge your BEV? Anywhere from twenty minutes to a couple of days. The “couple of days” is an extreme case. Overnight at home usually does the trick, but you have to install the right gear.

## Now to the battery swapping option

I have tried to think of a good automotive analogy for battery swapping to compare it to battery charging. After considering automatic car washing, I have settled on tire swapping. With drive in/back out car washing there is no interaction with any of the car's components, while there is with tire swapping. In Sweden, we have to remove our summer tires and put on our winter tires by the 30<sup>th</sup> of November and then change from winter to summer tires by the 1<sup>st</sup> of April.<sup>7</sup> The laziest and heartiest (and most frugal) of car owners do this job themselves. Your editor has the tires of his and his wife's car stored at a tire changing specialist. I book times to bring the cars in for the tire swap, get in line, and pull into a bay when it is my turn. From the time I drive into the bay, have the car raised on a lift, the tires swapped, and I drive out the other end, around five minutes have passed. It can take a few minutes longer if there are rookies on the three-person team, two taking off and putting on the tires, and one delivering the tires from storage and washing the ones that have been taken off. I have probably been in and out in under five minutes, but that is unusual. After I pull out, I stop and check the tires to make sure the air caps are tightly on and all the bolts are in place, which takes another minute. Another tire swapping comparison is on a Formula One track. Although it seems totally unbelievable, a tire change can be made in under three (3!) seconds.

Can battery swapping match this range, 3 seconds to 5 minutes? I accept a five-minute tire swap time, with another forty-five minutes added for driving to and from the tire shop where my tires are stored, waiting in line to pay and waiting in line to pull into the bay, because I only do it twice a year. If I had to do it every week or two, I and everyone else who did it would probably look for an alternative. Just as with battery charging, a battery swap – if that is the only option you have with your BEV – will have to be performed every week or two, depending on how much you drive. What is the fastest time it takes to swap out a battery, assuming that the battery swapping stations are as conveniently located as gas/diesel stations or charging stations?

<sup>7</sup> So-called *All Year-Round* tires are allowed during the period 30 November through 31 March if they are specially approved for use in Sweden.



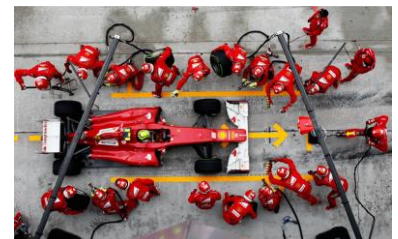
Single bay car wash



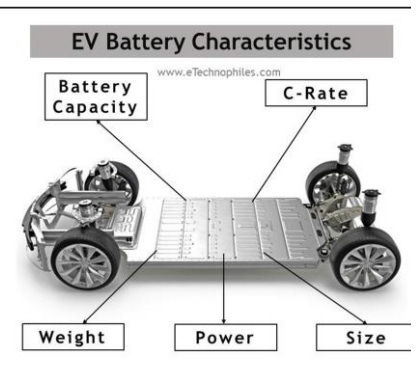
Changing tires



Nio battery changing station



Formula One Ferrari Pit Stop



### Batter swapping 101

I do not have a battery swapping station nearby, so I had to depend on videos to understand how it works in practice.<sup>8</sup> It is already working in practice in China with Chinese car manufacturer NIO and a few others. It is simple in theory: you remove a depleted battery from the vehicle and replace it with a charged one. My first new car was a 1971 British Ford Cortina, which I bought in the U.S. After one year (which is as long as the new car warranty lasted), it developed an electrical problem which caused the battery to discharge while driving. The FORD dealer could not find the problem. They suggested I replace the battery. I bought a new battery at SEARS, and returned it three times as defective, so I replaced the battery myself four times. It was a heavy and messy job, but the lead acid starter battery was a feather compared to a BEV battery pack which weighs substantially more. For example, a Tesla Model S battery with 85kWh (kilowatt-hours) capacity weighs 540kg (1,191 pounds). A 150 kWh Nio ES6 battery pack weighs 575kg (1,268 pounds). So, removing and installing a battery pack will be a job for automatic power lifters, not humans.

The spare batteries need to be stored somewhere and kept charged, and there need to be enough of them to satisfy demand for them. A Tesla Model S battery pack is 72" x 36" x 7" (182.88 x 91.44 x 17.78cm). A Nio ES6 battery pack is 81 x 61 x 7" (206.2 x 153.9 x 18.6 cm). In the image to the right of a NIO charging station with its battery storage room doors open, it shows the batteries on racks, either being charged or ready to install in a Nio vehicle. A robotic mechanism removes the depleted battery and places in a charging rack. It then removes a charged one and bolts it in place while the customer waits in the vehicle, just like I wait in my vehicle while the tire changers do their work.

If you have thirteen batteries and one swapping bay, and you expect to swap out one battery in four minutes (as NIO advertises), you will need to charge each battery in one hour. With fast charging, that is possible, but if you are charging



*This is a Nio battery changing station with the changing bay and adjacent battery storage room. It has thirteen batteries and one open slot for the battery that is taken out of the vehicle*



*The Nio battery ready to be bolted into the car (shown without the car)*



<sup>8</sup> A particularly helpful video was by Jordan Gisicky in the Limiting Factor (<https://www.bing.com/videos/riverview/relatedvideo?q=how+does+nio+battery+swap-ping+work&mid=96E0A5BAF1E10F354FE396E0A5BAF1E10F354FE3&FORM=VIRE>)

during the time period when electricity rates are highest, you will either have to charge your customers more or accept a lower profit. This gets us to the business model.

### Is battery swapping the silver bullet for BEVs?

Battery swapping has a long history, and for some types of vehicles, such as forklifts, commercial vehicles, and 24-hour public transport, it has proved to be a better option to charging. One of the earliest examples was a service offered by Hartford, CT-based HARTFORD ELECTRIC LIGHT COMPANY in 1910-1924 in partnership with a truck manufacturing company called GENERAL VEHICLE COMPANY (GEVECO), which was partly owned by GENERAL ELECTRIC. A customer purchased a truck without a battery from GEVECO. The GEVECO battery service division provided a charged battery to the truck, with the electricity used for charging the battery purchased from HARTFORD ELECTRIC. The customer paid a variable per-mile charge and a monthly service fee. A similar service was offered for MILBURN ELECTRIC CARS in 1917.<sup>9</sup> The internal combustion engine won this early battle for customers, and battery charging and swapping were concentrated in niches where electric vehicles made sense.

In 2007, a company called BETTER PLACE was founded by an Israeli entrepreneur named Shai Agassi with the idea of developing and selling battery switching (the term it used instead of battery swapping or changing) subscription services for electric cars. Its plan was to roll out its services one country at a time, deploying first in Israel then Denmark. It signed an agreement with RENAULT-NISSAN in 2008 to supply the BEVs. Its switching stations, like the one to the right, cost about \$500,000 apiece to build and put into operation. It went through its first round of financing, \$700 million, by 2012, but there were not enough *Renault Fluence Z.E.s* or *Nissan eRogues* sold in either Israel or Denmark to keep the business operating. It filed for bankruptcy in 2013.

TESLA started to build a battery swapping prototype in 2013 (as a hedge in case the BETTER PLACE concept caught on, maybe?). This was at the same time as TESLA began rolling out its *Tesla Supercharger* network. It built one swapping



*A Better Place switching station in Israel around 2012*

<sup>9</sup> [https://en.wikipedia.org/wiki/Battery\\_swapping](https://en.wikipedia.org/wiki/Battery_swapping)

station in California before shutting down the initiative completely in 2015, apparently because of lack of customer interest.

Convenience and time saving have been the promise of battery swapping for electric cars. Instead of having to wait fifteen-to-twenty minutes at best with a DC fast charger that requires a 480-volt connection, or a couple of hours at worst with a 50 kW connection to get you to the next charging station or your destination, you can pop out the discharged battery and pop in a charged one, just like we do with your electric tools and appliances that need to be totally portable, like flashlights, portable clocks, radios, and power tools. Swappers also claim swapped batteries have a longer life and are better maintained because they are constantly being monitored. NIO INC., IMMOTOR, GEELY, and AULTON (all in China), GOGORO (Taiwan), and SUN MOBILITY (India) are the principal BEV battery swapping companies. The swappers' other main selling point is that by removing the cost of the battery from the sale price of the vehicle, and renting it along with a swapping service, the customer can get themselves into a BEV for less. Let's look at NIO.

#### *Nio offers a belt and braces (suspenders) solution*

NIO INC. was founded in 2014 as NEXTEV, a manufacturer of battery electric vehicles. It changed its name to NIO INC. in 2016. It distinguished itself from the hundreds of BEV competitors in China by developing and offering battery swapping in addition to battery charging. It opened its first battery swapping station in China in May 2018. After it nearly went bankrupt in 2020, requiring over a billion dollars in new funding, it recovered and launched its Battery as a Service (Baas) in August 2020 in collaboration with Chinese CATL (CONTEMPORARY AMPEREX TECHNOLOGY CO., LTD), the global leader in battery making.

A customer in China and now in selected countries in Europe, customers can purchase a NIO vehicle with or without a battery. There have been two battery sizes, 75 kWh and 100 kWh. If you purchase the 75 kWh battery with the vehicle, you add \$13,000 to the price, and if you buy the 100 kWh battery, you add \$23,000. If you own the battery you cannot swap it out. You can only charge it, like other BEVs. You can only swap a *Nio* battery if you rent it. The cost to rent the

battery pack is \$180/month (\$2,160/year) for the 75 kWh battery pack, and \$315/month (\$3,870/year) for the 100 kWh battery pack. Included in the rental charge are two battery swaps per month for each battery option. Using an average of 13,000 miles driven per year, or 1,100 miles per month of driving, and an average of 250 miles per charge with a 75 kWh battery and 300 miles per charge with a 100 kWh battery, a customer would need 5 swaps with the 75 kWh battery and 4 swaps with the 100 kWh battery, paying \$10 each for the additional service visits. So, a customer would pay \$2,520 per year for swapping the 75 kWh battery, and \$4,110 per year for swapping the 100 kWh battery. The electricity charging costs for the swapped batteries are included in the rental agreement. Customers who purchase their batteries would pay for the charging, and the costs would vary depending on where and how the charging is performed. The table below summarizes the costs.



### Nio Inc. Battery Purchase and Swapping Charges

	75 kWh	100 kWh	Swapping Charges	Conditions	75 kWh	100 kWh
Own (one-time payment)	\$13,000	\$23,000	Not available	Charging at house charger or at a supercharger	\$720-900/year	\$384-480/year
Lifetime					One-time + 18 years = \$25,960-\$29,200	One-time + 22 years = \$31,448-\$33,560
6 years					\$17,320-\$18,400	\$25,304-\$25,880
Rent/Month	\$180	\$315	\$10/Service 2 services/month included in rental fee	250-300 miles/charge 1100 miles/month	(5-2) x \$10 = \$30	(4-2) x \$10 = \$20
Rent/Year	\$2,160	\$3,870			\$2,160 + \$360 = \$2,520	\$3,870 + \$240 = \$4,110
Lifetime (18 years/22 years)	\$38,880	\$85,160			Battery + Service = \$84,240	Battery + Service = \$175,580
Breakeven (6 years)	\$12,900	\$23,220			Battery + Service = \$28,020	Battery + Service = \$47,880

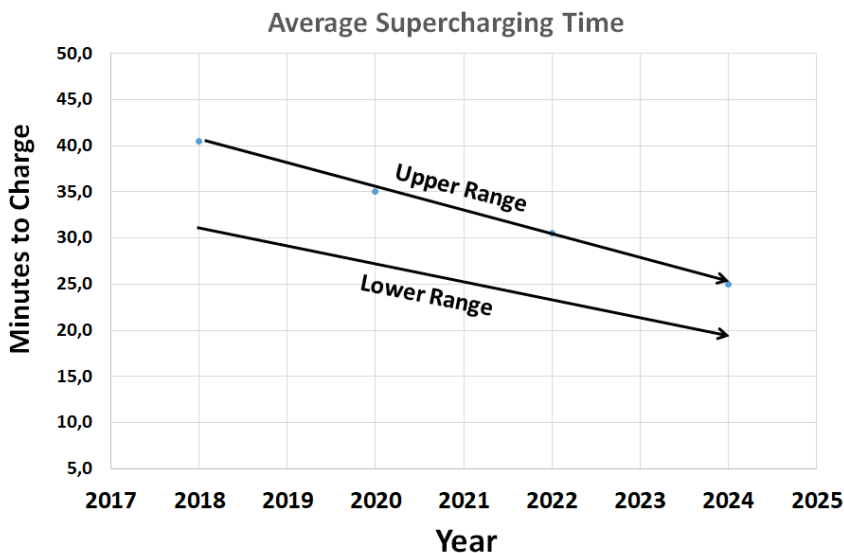
At six years, the costs for the one-time battery purchase are equal to the costs of renting. But that is not the whole story. The real comparison is between the costs of renting plus the costs for swapping. At six years, a customer would have spent more than double the cost of buying each of the battery

options, and just under double the cost when the charging costs are added in. If the customer who rents the battery continues to own the car for the life of the battery, which is 18-22 years, that customer will have spent between three-to-five times more than if he or she purchased the battery to start with. The person who saves money is the one who keeps the car for less than six years and has perhaps put the money he or she would have spent on buying the battery into an investment that rises in value.



### It's not the money; it's the time and convenience

Battery swapping competes with battery charging. It is time saved by the driver which NIO and other battery companies are promoting. When NIO began its journey in 2016, the fastest charging was with TESLA's Superchargers. *Teslas* were being sold Supercharger-enabled, and a customer had free, unlimited Supercharging access. The "free" part ended after 2017. According to information obtained from LIMITING FACTOR video, TESLA's Supercharging speeds have been dropping about 1.5 minutes per year and will likely be under 10 minutes for a full charge within five-to-eight years. One source estimates that by 2027, TESLA will be able to charge for 200 miles of range within four minutes.<sup>10</sup>



If you can pull into a charging station and be in and out in about the same time as it takes to swap out a battery, and a rank of twelve charging points, which cost about the same

<sup>10</sup> ARK Investment Management LLC. (2023).

as one battery swapping station, can charge twelve cars in the time it takes to swap out one battery, which competitor wins the gold medal?

Battery swapping is faster today than charging, but the time gap is closing. On top of that, the swapping option has four problems that battery charging does not have today:

1. A battery station is expensive to build and maintain. It has many moving parts. If any part fails, the battery station is offline until the part is fixed.
2. In order to increase throughput at each station, more batteries need to be stored. More batteries involves more cost, both for building the station and keeping it stocked with batteries.
3. There are no standards for batteries. BEV manufacturers develop their battery packs to work with their different models, which means their weights and form factors vary. If a battery swapping station is going to serve all models for one brand, it will need to stock multiple battery types. In order to try to ensure that what is in stock is what customers want and where they want it, each station will need to have a wide selection, requiring more storage space.
4. Storage and swapping technology and equipment can end up determining the form factor for vehicles, rather than allowing the battery to be designed to follow the requirements of the car model. With BEVs that are charged, the only connection between the battery and the world is the plug, and with one or two standard connections and adapters, there are no limits on what can be done with the battery.

In March 2024, Nio made changes to its sales policies. It lowered the cost of monthly battery rentals by around 25-32% and allowed customers to purchase their batteries at some point after the initial purchase of the vehicle. The company claims that 70% of its customers opt to rent the battery, thereby saving approximately \$10,000 in the purchase price (in China).

## **Project 2025: What it is and why it matters**

WHEN I FIRST read about *Project 2025: Mandate for Leadership – The Conservative Promise*, I was left with the impression that it was the work of an extreme right-wing cabal which was intent on disassembling the government of the United States and replacing it with the Christian equivalent of the Islamic State. I saw before my mind's eye the scene from Walt Disney's 1940 classic film, *FANTASIA*, with thousands of brooms (robots) carrying buckets of water to the tune of Paul Dukas' *THE SORCERER'S APPRENTICE*. Mickey Mouse, as the sorcerer's apprentice, has set in motion a process that spins out of control. The sorcerer (Trump) has given his apprentice powers without proper instructions on how those powers should be used.

When I opened up a copy of the 877-page document and read the *Foreword*, the last chapter titled *Onward*, and the chapter titled *Department of Transportation* edited by Diana Furchtgott-Roth, I understood that what I read about the document was not what the document is about. What it is is a blueprint for what a non-Democratic Party presidential team should do to (re-)establish a conservative philosophical foundation for making decisions about how the country should be led. It is detailed in its descriptions of what its authors view as the problems, and it is specific in its recommendations about what they believe should be done to correct them.

### *Practicing maximum deniability*

When Trump was asked about *Project 2025* before election day, he denied knowledge of it. "I know nothing about Project 2025," he wrote on his social media platform, *TRUTH SOCIAL*, in July. "I have no idea who is behind it. I disagree with some of the things they're saying and some of the things they're saying are absolutely ridiculous and abysmal." Then the cock crowed thrice, after he was elected, when he said, "It is very conservative and very good." He admitted at the end of November in an interview with *TIME* in connection with his being named Person of the Year by that magazine, that "I specifically didn't want to read it because it wasn't under my auspices, and I wanted to be able to say that, you know, the only way I can say I have nothing to do with it is you don't read it." (Ed. - I wrote it as he was quoted as saying it.) Obviously, he did read at least parts of it, and was briefed on its content, otherwise he could



not “disagree with some of the things they're saying” and know that “some of the things they're saying are absolutely ridiculous and abysmal”.

**Project 2025 – Presidential Transition Project** is described as a “movement” by its organizer and facilitator, THE HERITAGE FOUNDATION (See sidebar). HERITAGE produced a book with the title Mandate for Leadership: The Conservative Promise. It was published in April 2023, before Donald Trump was even the presumptive nominee for the Republican Party’s presidential candidate. (Perhaps many of those who contributed to the document believed or hoped he would not be.) It is the compiled work of four hundred individuals who are part of over one hundred organizations in the conservative movement. The book is co-edited by Paul Dans and Steven Groves, both with THE HERITAGE FOUNDATION at the time it was published. Its stated objective is to “take down the Deep State and return government to the people”. Here is a clip from the opening Note:

*“The long march of cultural Marxism through our institutions has come to pass. The federal government is a behemoth, weaponized against American citizens and conservative values, with freedom and liberty under siege as never before. The task at hand to reverse this tide and restore our Republic to its original moorings is too great for any one conservative policy shop to spearhead. It requires the collective action of our movement. With the quickening approach of January 2025, we have two years and one chance to get it right.”*

THE HERITAGE FOUNDATION is not AMERICA FIRST POLICY INSTITUTE, another think tank which was founded in 2021 by a few Trump acolytes and which parrots his views. HERITAGE embraces the full American conservative philosophy, not just the policy compote cooked up by the MAGA minions. It represents the “other guys” not the “bad guys”. It traces its routes back to the Anti-Federalists among the founding members of the Continental Congresses who opposed the Federalists, represented by Alexander Hamilton, James Madison, and John Jay, with George Washington and John Adams counted among its adherents. Federalists believed that a centralized power would effectively bind the states together, fostering unity and stability.<sup>11</sup> Anti-Federalists, led

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<sup>11</sup> <https://www.usconstitution.net/federalists-vs-anti-federalists/>

### The Heritage Foundation

THE HERITAGE FOUNDATION is American conservative public policy research organization, or think tank, based in Washington, D.C. Its mission is “to formulate and promote conservative public policies based on the principles of free enterprise, limited government, individual freedom, traditional American values, and a strong national defense.” Founded in 1973 by two Congressional aides, Edwin Feulner and Paul Weyrich, it provides research and policy recommendations to presidential administrations, Congress, news media, and academic communities.

*Encyclopedia Britannica*

by Patrick Henry (“Give me liberty or give me death.”) and George Mason, and strongly supported by Thomas Jefferson, were certain that a strong central power would undermine individual liberties and states’ rights.

Throughout America’s almost two-hundred-and-fifty-year history, these two groups have tried to garner enough votes at all levels of government at the federal and state levels to move the country in the direction of their beliefs. Over these years, when one group succeeded in gaining an upper hand and began to implement its policies, the American people voted to move the pendulum back in the other direction.

### **What Project 2025 says on transportation.**

Chapter 19: Department of Transportation begins with the following statement about the U.S. DOT:

*"The U.S. Department of Transportation (DOT), with a requested fiscal year (FY) 2023 budget of \$142 billion, was originally intended simply to provide a policy framework for transportation safety, rulemaking, and regulation. However, it has evolved to believe that its role is "to deliver the world’s leading transportation system"<sup>12</sup> – that is, to select individual projects and allocate taxpayer funds in the actual planning, developing, and building of transportation assets. Such a role is held more appropriately by transportation asset owners: primarily states, municipalities, and the private sector."*

The main point of the chapter is that DOT is not doing what it should be doing and is doing things that either should not be done at all or would better be done by the states and the private sector. It says that “instead of being able to focus on providing Americans with affordable and abundant transportation, it has become a de facto grant-making organization, choosing winners and neglecting the real needs of American citizens.” DOT is not just highways. There are eleven major components, including nine modal administrations (FHWA, NHTSA, FTA, FAA, etc.) and two offices, the Office of the Secretary, and the Office of the Inspector General. All of DOT had over 58,000 employees at the end of

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<sup>12</sup> U.S. Department of Transportation, DEIA [Diversity, Equity, Inclusion, and Accessibility] Strategic Plan FY22–FY26, p. 2, <https://www.transportation.gov/sites/dot.gov/files/2022-09/DOT%20DEIA%20Strategic%20Plan.pdf> (accessed March 3, 2023).

2024. I will focus on *Project 2025's* comments on the Department's highway-related activities.

Its policies are disadvantaging the average American citizen by making passenger cars more expensive, both new and used, says *Project 2025*. It is doing this by overreaching on both fuel economy standards and emissions regulations. DOT is compounding the problem by allowing states, beginning with California, to set their own standards. It is working against the Energy Policy and Conservation Act of 1975 (EPCA), both in law and in spirit, by allowing the Environmental Protection Agency (EPA) to set de facto fuel economy standards by tying those standards to emissions regulations. The chapter makes three main points on this topic:

- *In pursuit of an anti-fossil fuel climate agenda never approved by Congress, the Biden Administration (Ed. It blames President Biden for everything that has occurred during the periods between the late 1960s and 2023 when a Republican president was not in the White House, presumably because the authors of the book thought their Republican candidate would be running against him.) has raised fuel economy requirements to levels that cannot realistically be met by most categories of ICE vehicles...forcing the auto industry to transition away from traditional technologies to the production of electric vehicles and compel Americans to accept costly EVs.*
- *Contrary to Congress's design, the Biden EPA has been given preeminence in the regulation of fuel economy through the setting of carbon dioxide emissions limits for new motor vehicles under the Clean Air Act. These EPA rules are the de facto fuel economy requirements that apply independently of NHTSA's (CAFE) standards.*
- *California's special waiver under the Clean Air Act permits the California Air Resources Board (CARB) to issue its own fuel economy directives, and CARB has ordered automakers to phase out the sale of ICE-powered automobiles in California and transition to zero-emissions vehicles by 2035. California is therefore effectively determining fuel economy policies for the entire nation.*

The implication is that the Democrats have been waging a subversive war against cars in general and ICE vehicles in particular. All the regulations "make cars more expensive to produce, making fewer new vehicle options for American families, and fewer new vehicles being sold. That translates into a loss of auto industry jobs for American workers, an increase in traffic deaths and injuries resulting from Americans driving older models, and, eventually, making the U.S.

consumer more dependent on China and other foreign countries”.

The next criticism is directed at federal transit policy, which *Project 2025* says is not considering the full range of mobility options. “Unfortunately, DOT now defines public transit only as transit provided by municipal governments.” A better definition for public transit, the Project authors claim, would be “transit provided for the public rather than transit provided by the public municipality”.

*“The largest expense in transit operational budgets is labor. Compensation costs for transit workers exceed both regional and sector compensation averages. This is driven by generous pension and health benefits rather than by exorbitant wages. Since workers value wages more than they value fringe benefits, this has led to a perverse situation in which transit agencies have high compensation costs yet are struggling to attract workers.”*

Under the section Emerging Technologies, the *Project* says that DOT should be “driving clarity in the government’s role and setting standards for safety, security and privacy without hampering innovation”. DOT, it says, “should oversee the testing and deployment of a wide variety of new technologies, allowing communities and individuals to choose what best fits their needs”. Further, “it is the role of the private sector, not the government, to pick winners and losers in technology development”. The *Project* has a major problem with DOT “pivoting from a voluntary sharing of data to improve safety outcomes to adoption of a more compulsory and antagonistic approach to mandating data collection and publication through a Standing General Order related to automated vehicles”.

Regarding Vehicle-to-Everything connectivity, it states that DOT needs to “represent the transportation community and make the case for needed spectrum to the public and Congress”. Why? Because the Federal Communications Commission removed 45 MHz of the 75 MHz that had been allocated in 1999 to “intelligent transportation systems” by that same Commission and declared that what was left should be used for Cellular V2X, not the Wi-Fi/DSRC-based variant. The recommendation is unclear. It seems to imply that DOT

should ask for more spectrum, but it does not say anything about how it should be used. It should be C-V2X.

Except for the comments on V2X, which, as I said, are unclear, during the past twelve years since I began writing *THE DISPATCHER*, I have leveled the same criticisms which *Project 2025* has directed at DOT. The latest were in the January 2025 issue. (See [The Dispatcher January 2025](#), *Dispatch Central – Toyota hopes the EPA will think again.*) So, even though, as you well know, I voted for fellow Scrantonian, Joe Biden in 2020, I am totally on board with these *Project 2025* observations. That does not make me a Republican or a Conservative on all issues, no more than disagreeing with all of these recommendations would make me a Socialist, a Democrat, or a Progressive. Despite living for the past thirty-three years in a country with Social Democratic policies no matter which parties form the government, I have an American character, specifically one that was nurtured in the American Nation where I was born, raised, and mostly lived, what Colin Woodard calls *Yankeeedom*.<sup>13</sup>

I will end with a quote from Woodward's book that I feel is particularly appropriate for this *Dispatch Central* post:

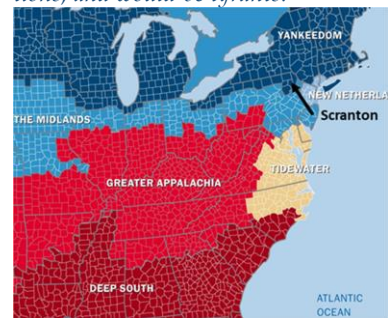
*"We (America) are in aggregate one of the most individualistic political cultures on earth, the legacy of a revolution that was carried out at a time and place when the primary foe of liberty was a monarchical government, its primary beneficiary an enlightened aristocratic elite. Informed by John Locke, we put great faith in human capacity, innovation, and virtue, and remain vigilant against the rise of an overarching government that might deny us our individual potential. Socialism, which would place its trust in an all-knowing government of allegedly disinterested experts to control the economy and shape the social fabric, has always been a political nonstarter in America, whether one lives in community-minded Yankeeedom or on the libertarian frontiers of Appalachia. Many liberal democracies have embraced social democracy to build capitalist-fueled welfare states that invariably top global rankings for wealth, happiness, and social trust; in aggregate, Americans have shown time and again that they don't want such a system.*

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<sup>13</sup> Woodward, Colin. [American Character: A History of the Epic Struggle Between Individual Liberty and the Common Good](#). Penguin Book (2016).

### Yankeeedom

*Founded on the shores of Massachusetts by radical Calvinists as new Zion, since the outset Yankeeedom has put great emphasis on perfecting earthly society through social engineering, individual self-denial for the common good, and the aggressive assimilation of outsiders. It has prized education, intellectual achievement, community (rather than individual) empowerment, and broad citizen participation in politics and government, the latter viewed as the public's shield against machinations of grasping aristocrats, corporations, and would-be tyrants.*



*Scranton and the rest of Northeastern Pennsylvania was settled by Yankees from Connecticut.*

*We are not a nation-state in the European mold: a state governed by a particular nation with a distinct culture and values, like Germany, Austria, France, or Sweden. The United States is a federation comprised of several “nations” that share very little in terms of common ideals, goals, and views on the meaning of freedom. Throughout our history, our component regional cultures have fought with one another over whether freedom was to be understood only in terms of individual or “economic” liberty, or in terms of the promotion of the common good or the “freedom of the community.””*

If the experiment in democracy called the United States continues for another two hundred and fifty years and beyond, it will be because those fights between these two groups continue, and the best ideas that come from each group are accepted and the worst rejected. It will definitely not continue if one or the other group “wins”, as it has in China, Russia, North Korea, and too many other countries on our planet where people live without a choice in how they are governed and who governs them.

### ***Connected vehicle security risks for America***

THE WHITE HOUSE issued a Fact Sheet on the 14<sup>th</sup> of January 2025 titled Safeguarding America from National Security Risks of Connected Vehicle Technology from China and Russia. It opened with the following statement:

*“Today, President Biden is announcing strong and decisive actions to safeguard America from national security risks associated with the exploitation of U.S. connected vehicle supply chains by the People’s Republic of China (PRC) and Russian Federation (Russia). The Biden-Harris Administration is committed to ensuring that our automotive supply chains are resilient and secure from foreign adversary cyber threats...The Department of Commerce has issued a final rule that will prohibit the sale and import of connected vehicle hardware and software systems, as well as completed connected vehicles, from PRC and Russia. This final rule marks the conclusion of a rigorous fact-finding and regulatory process that President Biden launched last year.”<sup>14</sup>*

Connected vehicles, according to the report “are comprised of many connected components and systems, such as Wi-Fi, Bluetooth, cellular, and satellite connectivity, designed to

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<sup>14</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2025/01/14/fact-sheet-safeguarding-america-from-national-security-risks-of-connected-vehicle-technology-from-china-and-russia/>

provide consumers with greater convenience and increase safety for drivers, passengers, and pedestrians”.

#### *What is a “final rule”?*

Do a search on the term “final rule” and you will find a long list of final rules made by the “White House” and the “Administration”. What is it? Is it like an Executive Order, which a U.S. president can issue without involving the Congress? No. According to the a documented prepared by the U.S. General Services Administration, the term “final rule” is part of the rulemaking process.<sup>15</sup> “Rulemaking is the policy-making process for Executive and Independent Agencies of the federal government (e.g., the Environmental Protection Agency). Agencies use this process to develop and issue Rules (also referred to as “regulations”).”

An agency cannot issue a Rule unless granted the authority to do so by law. Laws usually do not define how the law will actually be implemented, but it assigns its implementation to an Agency. That Agency studies different alternatives, determines whether the benefits of the alternative outweigh the costs, and then it will submit an “Advanced Notice of Proposed Rulemaking” to the Federal Register for public review. The Agency evaluates the responses and then proposes a regulation, known as a Notice of Proposed Rulemaking, which is also published in the Federal Register for public review and comment. After the comment period ends, the Agency reviews all of the comments it has received, performs a comments analysis, and decides whether to issue a new rule or withdraw the proposal. If it decides to move forward, the Agency issues a Final Rule.

For the Security Risks Final Rule, the *U.S. DEPARTMENT OF COMMERCE BUREAU OF INDUSTRY AND SECURITY (BIS)*, which is the Agency and Bureau assigned the responsibility of carrying out under **Executive Order 13873, “Securing the Information and Communications Technology and Services Supply Chain.”** EO 13873 allows the *DEPARTMENT OF COMMERCE* to issue regulations that establish criteria by which particular technologies may be included in EO 13873’s prohibitions when transactions involving those technologies 1)

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<sup>15</sup> <https://www.regulations.gov/learn>

pose an undue or unacceptable risk of sabotage to or subversion of Information and Communications Technology and Services (ICTS) in the United States; 2) pose an undue risk of catastrophic effects on the security or resiliency of U.S. critical infrastructure or the digital economy of the United States; or 3) otherwise pose an unacceptable risk to the national security of the United States or the security and safety of U.S. persons.<sup>16</sup>

The Security Risks Final Rule follows a Notice of Proposed Rulemaking (NPRM) published by BIS on September 26, 2024, and an Advance Notice of Proposed Rulemaking (ANPRM) published by BIS on March 1, 2024. The Commerce Department consulted with industry and U.S. allies and partners during the review process. It also convened the First Multinational Meeting to Address Connected Vehicles on the 1<sup>st</sup> of August 2024, held in Washington at which official from nine countries and the European Union to discuss connected vehicle risks.

### **The bottom line on the Connected Vehicle Final Rule**

In summary the Final Rule prohibits the import and sale of cars from China and Russia that have any form of connectivity and/or automated driving systems. Here is the text from the Bureau of Industry and Security document:

*The final rule establishes that hardware and software integrated into the Vehicle Connectivity System (VCS) and software integrated into the Automated Driving System (ADS), the systems in vehicles that allow for external connectivity and autonomous driving capabilities, present an undue and unacceptable risk to national security when designed, developed, manufactured, or supplied by persons with a sufficient nexus to the PRC or Russia. Malicious access to these critical supply chains could allow our foreign adversaries to extract sensitive data, including personal information about vehicle drivers or owners, and remotely manipulate vehicles.*

*At this time, given the complexity of the commercial vehicle supply chain, the final rule applies only to passenger vehicles (defined as those under 10,001 pounds). BIS recognizes the acute national security threat presented by foreign adversary involvement in the commercial vehicle supply chain and intends to issue a separate rulemaking addressing the*

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<sup>16</sup> <https://www.bis.gov/press-release/commerce-finalizes-rule-secure-connected-vehicle-supply-chains-foreign-adversary>

*technologies present in connected commercial vehicles – including in trucks and buses – in the near future.*

*(The) final rule prohibits the import of VCS hardware or connected vehicles containing such hardware, and the import and sale of vehicles containing VCS or ADS software, with a sufficient nexus to the PRC or Russia. VCS is defined as the set of systems that allow the vehicle to communicate externally, including telematics control units, Bluetooth, cellular, satellite, and Wi-Fi modules. ADS includes the components that collectively allow a highly autonomous vehicle to operate without a driver.*

*The rule also prohibits manufacturers with a sufficient nexus to the PRC or Russia from selling new connected vehicles that incorporate VCS hardware or software or ADS software in the United States, even if the vehicle was made in the United States. (Editor – How this affects Volvo Cars, owned by Chinese company Geely, is not clear at this time.)*

*The software-related prohibitions will take effect for Model Year 2027. The hardware-related prohibitions will take effect for Model Year 2030, or January 1, 2029, for units without a model year. Prohibitions on the sale of connected vehicles by manufacturers with a sufficient nexus to the PRC or Russia, even if manufactured in the United States, take effect for Model Year 2027.*

*The rule requires certain importers and manufacturers to submit annual Declarations of Conformity to certify their compliance with the prohibitions. The final rule allows Commerce to issue General Authorizations for certain types of transactions posing lower risk. It also allows regulated parties to seek Specific Authorizations permitting them to engage in otherwise prohibited transactions, as well as advisory opinions to ask BIS for a determination if a prospective transaction may fall within the scope of the rule.*

Chinese car manufacturers have said that they would continue with their plans to sell their cars in the United States in spite of the 100% tariffs the Biden Administration levied on them. They have given the impression they will still be able to make money even with such a high tax because their cars are so inexpensive to make. This Final Rule would seem to close the door completely on Chinese vehicle sales no matter what sticker price they put on their cars. What will the new administration have to say on this topic? As usual, what happens in the sales room is decided at the government negotiating table.



# Musings of a Dispatcher: A Ticket to Drive

## ***Not everyone has a driver's license***



THREE OF US, my sister Joann, our father, and I, were in the car, a powder blue, manual shift *1960 Dodge Dart Seneca*. Our father had moved his automobile brand loyalties from GENERAL MOTORS to CHRYSLER after he began his new job as a draftsman at the *CHRYSLER TANK DIVISION* the year before. It was his first new car, the only one he ever owned. My sister, who would begin her high school senior year in a few weeks, sat in the driver's position. Our father sat beside her. I sat in the middle of the back seat, leaning forward, eager to hear Dad's instructions. It would be two more years before I could take my driver's license in the Dart. (When I got my driver's license, the age to obtain an unrestricted driver's license in Pennsylvania was sixteen. Some time in the 1980s it was raised to eighteen.)



*1960 Dodge Dart Seneca*

My sister had begun driver training in school during the spring of her junior year, but it had not gone very well. Dad was a very good driver, one of the best I have ever known, and he did everything he could to pass his experience on to my sister. However, my sister proved to be a challenge for the driver training teacher and our father. Dad had hoped that he could build up her skills during the summer using the dirt roads in the abandoned coal fields close to our home, where there were no other cars to worry about.

There was something about the combination of the clutch and the accelerator that she was never able to master. During those times that Joann did manage to get the car moving in first gear, releasing the clutch in one, quick pop, she kept it on the road and seemed to be able to steer. But when she tried to slip it into second gear, it always ended up with the car stalling. I remember Dad suggested that she think of the clutch and accelerator pedals as the pedals on a piano. She was a very good piano player and used the pedals deftly. She could not make the transfer.

On this particular hot summer Sunday afternoon, after an hour or so of being close to the same spot where Dad

had turned over the driver's seat to my sister, both my sister and our father reached the same conclusion at the same time: Joann was not cut out to be a driver. Would it have been different if the car were an automatic? We will never know. After that day, Joann decided that she was not going to continue with driving instructions, and that she wasn't going to take her driver's license test. From that point until today, she has taken public transport (COLTS in Scranton), and depended on others for her rides, including our father, her husband, me, after I got my license, her two sons, her friends, and for the past ten years, our cousin who lives close by and is eight years her junior. Since Joann's husband passed away ten years ago, our cousin has been my sister's guardian angel.


My mother never got her driver's license either. There was never a car for her to use or the need to drive. She started working in a garment factory when she was thirteen. It was a mile away, and she walked there six days a week until she and my father married when she was twenty-six. It was during the war. My father was overseas for two years, and they would not own a car for another five years after he returned home. Mom's father was the only one in the extended family who owned a car, and he picked up his two brothers-in-law and a few others on the street where they lived to drive to the coal mine where they worked. On the weekends, my grandmother covered the seats with sheets so they would not get their clothes dirty when they drove to visit my grandfather's sisters and their families. Her brother (who is the father of the cousin who is my sister's guardian angel) bought a car when he started working, but it doesn't seem that teaching his three younger sisters how to drive was on his to-do list. After Mom and Dad married, Mom continued working in dress factories that were within a ten-minute walk from home or a short bus ride away, and Dad drove the car to work, so Mom never felt she needed to drive.

#### *Who isn't driving in America*

According to HEDGES & COMPANY,<sup>17</sup> who claim they have tracked automotive data and statistics for two decades, 91% of U.S. residents of driving age (i.e., 18 years and over),

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<sup>17</sup> <https://hedgescompany.com/blog/2024/01/number-of-licensed-drivers-us/>



which is 239.2 million, had a driver's license in 2024. That is up from 89% in 2020, and 90% in 2021-22. HEDGES & COMPANY used data from the *U.S. FEDERAL HIGHWAY ADMINISTRATION*. California, which is the most populous state in the U.S., has the most licensed drivers, but not the most drivers as a percentage of total population (not just driver-age population). That honor goes to Delaware, which is 45<sup>th</sup> in population, but has 85% of its population with driver's licenses. Four of the top five most populous states, California, Texas, Florida, and Pennsylvania, have the most licensed drivers. Number four in population, New York, has the lowest percentage of its population with driver's licenses, only 58%. That is, of course, the result of 64% of the state's population living in New York City, where owning a car is like having a ball and chain attached to your leg. On average, 68% of a state's population has a driver's license.

There is a large difference in the number of people with a driver's license when considering age. In the 18-19 group, 39.5% have a driver's license; in the 20-24 group, 81% have licenses; in the 25-39 it is 89.9%; in the 40-49 it is 91.4%; in the 50-69 it is 92.6%; in the 70-84 it is 89.3%; and in the 85 and older group it is 69.1%. Considering gender, of all licensed drivers in the U.S., 49.3% are male and 50.7% were female. This is partly due to women living longer than men. In 1960, around the time that my sister was considering becoming a licensed driver, 39% of licensed drivers were female.

The fact that 9.1 out of 10 driver-aged people in the U.S. have a driver's license does not mean that all of them own or drive a car. As we wrote in our book, *The Real Case for Driverless Mobility*, "...In 2018, 79% of drivers with licenses over the age of 75 drove only once per year, according to the AMERICAN AUTOMOBILE ASSOCIATION FOUNDATION FOR TRAFFIC SAFETY. The number of people in the U.S. 75 and older in 2020 was 22.9 million, representing 6.6% of the population. Most of them have stopped driving. In the 16-19 age group, which is 8.5% of the population, or 28 million, 71% drove only once per year. The principal reason for this low figure is the lack of a vehicle to drive, either because they cannot afford one or because the family car is being used by a parent. Then there are the 11 million individuals who had a driver's license, but who lost it due to non-payment of fines

or other reasons.<sup>18</sup> Approximately one in four adults in the U.S. have some type of disability that can affect their ability to drive, including serious mobility problem (11.1%), cognition (10.9%), vision (4.9%), and self-care (3%).<sup>19</sup>

A paper printed in the NATIONAL INSTITUTES OF HEALTH, PMC PUBMED CENTRAL, expanded on the relationship between driver's license suspension and race, ethnicity, and income. It concluded that "the majority of suspensions (of driver's licenses) are for non-driving-related events. Further, these non-driving-related suspensions are most common in low-income communities and communities with a high-proportion of black and Hispanic residents. Although non-driving-related suspensions are also concentrated in communities with better access to public transportation and nearby jobs, additional work is needed to determine what effect this has for the social and economic well-being of suspended drivers".<sup>20</sup>

As in many countries, a valid driver's license or a current government-issued photo ID is required in the U.S. to obtain certain services and to be able to vote. Surprisingly, not all U.S. states require an ID to vote, but the number that are requiring one is growing quickly. It is currently at 36 states. A study completed in 2023 by the UNIVERSITY OF MARYLAND'S CENTER FOR DEMOCRACY AND CIVIC ENGAGEMENT and VOTERIDERS, an organization that is focused on ID education and assistance, analyzed data from a 2020 survey from the American National Election Studies' 2020 Time-Series Study, a survey of voting-age Americans. The researchers concentrated on responses about the possession of non-expired driver's license, a U.S. passport, or other form of valid government-issued photo ID. Here is what they found:

- Nearly 29 million voting-age U.S. citizens lacked a valid driver's license, and over 7 million had no other form of non-expired government-issued photo identification.
- More than 11 million people ages 18-29 did not have a current driver's license, and more than 3 million did not have any unexpired government issued photo ID.

<sup>18</sup> <https://abcnews.go.com/US/vicious-cycle-11-million-live-drivers-license-unpaid/story?id=66504966>

<sup>19</sup> Kornhauser, A, Sena, M. (2024). The Real Case for Driverless Mobility. Elsevier.

<sup>20</sup> J Transp Health. 2020 Sep 14;19:100933. doi: 10.1016/j.jth.2020.100933



- Members of underrepresented racial and ethnic groups were less likely to have a current driver's license or other government-issued photo ID. An estimated 1.86 million black non-Hispanic Americans (6.2%) and 1.86 million Hispanic Americans (6.1%) lack a photo ID, as do 4.5% of those who identify as Native American, Native Alaskan or another race. This compares to just 2.3% of white non-Hispanic Americans and 1.6% of Asian, Native Hawaiian or other Pacific Islander Americans.
- Individuals with a high school degree or less were the least likely of people of all educational levels to have a current driver's license or any photo ID. Over 18.5 million people who did not complete high school or whose highest level of education is a high school degree did not have a driver's license.
- The analysis found a strong relationship between income and lack of a driver's license, with adult Americans who earn less than \$30,000 lacking a driver's license at a rate about five times greater than the highest income category of \$100,000 or more.
- Those who were not registered but who did not vote in 2020 were far more likely to lack a current driver's license and any photo ID.
- Adult Americans who were not registered to vote were three times more likely to lack a driver's license (30%) than those who were registered (11%).

Another research paper by the *UNIVERSITY OF MARYLAND CENTER FOR DEMOCRACY AND CIVIC ENGAGEMENT* contained a section on the reasons why people do not have a driver's license (My sister would be in the first three categories):

- They do not like driving (31%).
- They are not interested in driving (8%).
- They have anxiety about driving (3%)
- Bureaucratic or economic factors (19%) – cost of getting a license (8%); financial/legal difficulties, such as unpaid tickets or fines (4%); lack of time (4%), or lack of required documents (3%)

*If at first you don't succeed*

Fully 35% of people who took their driver's license test in the U.S. between 2020 and 2023 failed to pass.<sup>21</sup> The tests comprise two parts, knowledge, and practical skills (actual driving), and to obtain one's driver's license, both must be successfully completed. Of those who failed, 78.8% passed the driving test while only 61.7% passed the knowledge part. As a comparison, I have found statistics for Sweden, where I

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<sup>21</sup> <https://www.autobodynews.com/news/nearly-35-of-u-s-drivers-failed-license-tests-between-2020-2023>

had to go through the complete driver's license test process when I moved here in 1993. In 2021, 59% of the 251,000 candidates for a license failed the theory/knowledge part, and 52% of 156,375 taking the driving test failed. One of my Swedish nephews just received his driver's license. He passed the theory on the first try, but it took him three tries to pass the driving test. When I took the theory test in 1994, I failed with flying colors. There were forty-six multiple choice questions. Each question might have one, two, three, four, or no correct answers. I got twenty of the questions correct. I took the test in English, and I did not study for it, believing (incorrectly, of course), that having driven for thirty years, I knew the rules. Four years later, after rigorously studying both Swedish and the Swedish driving rules, I took the test in Swedish and got forty-five out of forty-six correct. I then took the driving test and passed. My incentive was that if I did not obtain my Swedish driver's license within four years after obtaining my permanent residence permit, I would not be able to use my U.S. driver's license to drive in Sweden. What would I do then?

Some day, I will have to give up my driver's license, which has been one of my most prized possessions since I was sixteen. I've had five: Pennsylvania, New Jersey, Massachusetts, Florida, and Sweden. I remember driving with my father to the PennDOT Driver License Center to renew his driver's license when he was in his early 80s. The only test he was given was a vision test, and he passed it without a problem. It was his last driver's license. A few years later, he had his one and only fender bender. It was in a supermarket parking lot. He had the damage repaired to his car and decided to give his car to one of his grandsons (the other grandson inherited his other grandfather's car), and from that point until he died at the age of eighty-eight, he did what my sister and my mother did when they needed a ride: depended on others.



## About Michael L. Sena

Through my writing, speaking and client work, I have attempted to bring clarity to an often-opaque world of highly automated and connected vehicles. I have not just studied the technologies and analyzed the services. I have developed and implemented them and have worked to shape visions and followed through to delivering them. What drives me – why do what I do – is my desire to move the industry forward: to see accident statistics fall because of safety improvements related to advanced driver assistance systems; to see congestion on all roads reduced because of better traffic information and improved route selection; to see global emissions from transport eliminated because of designing the most fuel-efficient vehicles.

This newsletter touches on the principal themes of the industry, highlighting what, how, and why developments are occurring so that you can develop your own strategies for the future. Most importantly, I put vehicles into their context. It's not just roads; it's communities, large and small. Vehicles are tools, and people use these tools to make their lives and the lives of their family members easier, more enjoyable, and safer. Businesses and services use these tools to deliver what people need. Transport is intertwined with the environment in which it operates, and the two must be developed in concert.



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