Agora Verkehrswende

Driving the Wheels of Change

The *Verkehrswende*, Five Years On: Taking Stock of the Achievements and Shortcomings of Forward-Looking Transport Policy in Germany

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With the signing of the Paris Agreement in 2015, calls in Germany grew louder for a *Verkehrswende* – that is, for a fundamental turning point in transport policy. This wasn't the first time that Germans had demanded forward-looking thinking in transport. "The car must not rule the city", Konrad Adenauer, the then-mayor of Cologne and later the first Chancellor of the Federal Republic of Germany, wrote in 1930.[1] Expressing similar sentiments, Hans-Jochen Vogel, Munich's mayor from 1960 to 1972 and later the Urban Development Minister, stated that "the advance of motorised transport has quickly diminished the pleasant aspects of city life and has taken an increasing toll on life, health, and wealth."[2]

The scientific community, for its part, has long been aware of the negative effects of ubiquitous motorisation. In September of 1973, the newly formed German Advisory Council on the Environment (SRU) dedicated its first report to the deleterious impact of cars on the environment. Among their many recommendations was "to limit the amount of parking in inner cities" and "to introduce taxes that encourage the use of electric vehicles."[3]

The report's proposals could have been written today, though the Advisory Council on the Environment did not speak of a *Verkehrswende*. This now-common neologism was first used in 1995, according to the Association for the German Language (GfdS).[4] Nevertheless, several weeks after the council published its report, historical events sparked revolutionary change in transport. In October, Egyptian and Syrian troops launched a surprise attack against Israel on the holy day of Yom Kippur.[5] After Israel's successful counteroffensive, OPEC imposed an embargo on countries they perceived as supporting the Israeli cause. As OPEC reduced production, the price of oil skyrocketed, in part due to market panic. Conserving energy soon became something of a civic duty in Germany. Governments banned cars on Sundays, and Germany even introduced a 100 km/h speed limit for the autobahn, a highway system best known for its absence of speed limits.

Had the term been in circulation at the time, some observers might have proclaimed a *Verkehrswende* was underway. But the halcyon days of bicycle traffic unrestricted by cars and horseback riding in inner-cities were numbered. Cars soon reconquered the streets, and car-free Sundays receded to the realm of memory.

While the oil crisis of 1973 triggered lasting efforts within Europe to reduce dependency on foreign petroleum imports – including new fuel taxes and vehicle efficiency standards – it did not lead to a fundamental reorganisation of the transport sector. Accordingly, the start of the *Verkehrswende* is perhaps more accurately dated to 2016, the year that Stiftung Mercator and the European Climate Foundation founded the

1 Quoted in Heiner Monheim and Rita Monheim-Dandorfer, *Straßen für alle* (Hamburg: 1990), 56
2 Ibid., 61.
3 Der Rat von Sachverständigen für Umweltfragen (SRU): *Auto und Umwelt*. Report from September 1973, 3 and 5.
4 See https://gfds.de/wende/ [German language only]. However, in a prescient editorial from 1994, Folkert Kiepe, the deputy director of the Association of German Cities (DST), made the case for a "turning point [*Wende*] in transport policy" (Folkert Kiepe, "Für eine Wende in der Verkehrspolitik," *Der Städtetag*, 1994, p. 657 f.
5 See for the following: "Als die Scheichs den Ölhahn zudrehten", in: Der Spiegel, 25.11.2018.

transport-policy think tank Agora Verkehrswende. The decision to launch the think tank was directly related to the major news event of the prior year: In the fall of 2015, the story broke that automobile manufacturers, particularly Volkswagen, had manipulated software in diesel vehicles to circumvent nitrogen oxide emission limits. The ensuing scandal caused a public crisis of confidence not only in the auto industry but also in government regulators, who in 2011 already possessed technology capable of determining that nitrogen oxide emissions were up to 14 times above the legal limit.[6] In the fallout from the scandal, a number of cities banned diesel vehicles in order meet the EU's air quality requirements, thus further fanning the flames of the debate.

Climate action heats up

In December of 2015, as the diesel engines so loved by Germans were being excoriated in the press, the world community signed the Paris Agreement, avowing to keep global warming well below 2°C. From the very beginning it was clear that achieving this goal would require comprehensive policy action – including fundamental change in the transport sector, which is responsible for around one-fifth of global CO_2 emissions.[7]

In November 2016, the German government passed its 2050 Climate Action Plan. It was the first piece of German legislation to contain targets for each sector of the economy. By defining such targets, policymakers aimed to reduce the tendency for stakeholders in subareas of the economy to "pass the buck" and wait for others to do the heavy lifting. In transport, the plan called for emissions reductions of 40 to 42 per cent relative to 1990 levels.[8] For researchers at Agora Verkehrswende, the Climate Action Plan presented an opportunity to develop and advocate strategies tailored to the transport sector.

Politically and conceptually, there was nothing standing in the way of a radical realignment. And yet, political turbulence erected a road block to the *Verkehrswende* just as forward-looking transport policy was gathering steam. Donald Trump, a vehement denier of anthropogenic climate change, became the 45th president of the United States. He proceeded to sabotage climate efforts, announcing his intention to withdraw the US from the Paris Agreement. On the domestic front, Trump also took a range of counterproductive actions, such as reducing the mandatory increase in fuel economy standards from 5 per cent to 1.5 per cent per year.[9]

Given Trump's hijacking of US climate policy, many observers began to place hopes in China, the world's largest emitter of greenhouse gases. The Chinese had previously garnered significant attention for their early promotion of battery-electric vehicles. Indeed, not just environmentalists, but also automobile manufacturers, pay close

6 https://publications.jrc.ec.europa.eu/repository/handle/JRC62639
7 https://ourworldindata.org/co2-emissions-from-transport
8 BMU: Klimaschutzplan 2050 – Klimaschutzpolitische Grundsätze und Ziele der Bundesregierung
9 https://www.brookings.edu/policy2020/votervital/what-is-the-trump-administrations-track-record-on-the-environment. The relaxed standards applied only to new vehicles starting in 2021.

attention to China for one simple reason: it is the largest market for motor vehicles in the world.

As major beneficiaries of the fossil fuel economy, Volkswagen and other German automobile manufacturers came under intensive fire from a political movement that was demanding rapid, comprehensive and effective policy action to ensure fulfilment of the commitments made under the Paris Agreement. Ultimately, the school strikes launched by Fridays for Future achieved in mere months what the environmental movement had failed to do for decades. During 2017, media coverage of the climate crisis was extensive, with scientists around the world highlighting the risks of catastrophic climate change.

Following Germany's 2017 federal elections, the Christian conservatives nearly formed a government with the Greens, but the Free Democratic Party (German: *Freie Demokratische Partei*, FDP), the third partner in the planned coalition, stepped away from the negotiating table, in part due to disagreements about climate and transport policy. Ultimately, the conservatives partnered once again with the Social Democrats. Their subsequent coalition agreement, which used the term *Energiewende* thirteen times, did not speak of a *Verkehrswende* per se, but did seek to align transport policy with the targets of the Paris Agreement. In particular, the agreement called for the promotion of electric vehicles and the doubling of rail passengers by 2030.

Unfortunately, Germany's transport policy debate was significantly side-tracked by unresolved issues from the previous legislative period. In 2015, German policymakers had introduced a controversial highway toll system for trucks. Four years later, in 2019, the European Court of Justice ruled the system was in violation of European law because it effectively acted as a discriminatory tax on foreign vehicles. As a result, it was necessary to unwind the contracts that had been signed to develop the toll infrastructure. The Federal Audit Office found that procurement and budgetary law had been violated as the contracts were initially awarded,[10] and a parliamentary committee was formed to investigate the matter.

Developing a platform for transport policy

The abortive truck toll and the VW emissions scandal conspired to distract all attention from the future of transport policy. To avoid additional conflict, Germany's coalition partners decided in March of 2018 to place all questions of transport policy in the hands of a new task force, the National Future of Mobility Platform (NPM), which was to serve as a "centre for discussion on strategic decisions in the domain of mobility."

Tellingly, the conservative Minister of Transport, Andreas Scheuer, was slow to establish the platform, allowing months to pass after the initial decision. In the interim, the OECD, in its June report on Germany's economy, complained that "the transport sector lacks an

10 See "Verträge zur Infrastrukturabgabe" (bundesrechnungshof.de)

overarching policy strategy."[11] And two months later, Federal Chancellor Angela Merkel used the word that Scheuer had been shy to utter in public. "We need a *Verkehrswende*", Merkel said during an interview in late August.[12] It took another three weeks before Scheuer finally put the creation of the NPM on the agenda of the Federal Cabinet.

That summer, Agora Verkehrswende published its first comprehensive study on climate action in the transport sector. The study concluded that raising the tax on diesel to match that on gasoline would cut emissions by 3.7 million tonnes, and that a speed limit of 130km/h (80 mph) on the autobahn would reduce emissions by another 1 to 2 million tonnes.[13] Praised as "crack team of experts"[14] by the German news magazine *Der Spiegel*, Agora Verkehrswende was an obvious choice when it came to selecting the members of the NPM, and was assigned to Working Group 1 (Transport and Climate).

The efforts of Working Group 1 amounted to little, however. After it emerged that the group was considering a higher diesel tax and a general speed limit for the autobahn, the Minister of Transport issued a statement asserting that such policies ran 'contrary to human understanding'. Not surprisingly, Scheuer's words were interpreted by some as an official decree prohibiting certain ideas.[15] "We want to get citizens excited about the opportunities of future mobility," Scheuer told *Die Welt*. "Demands that trigger outrage, impose burdens, or endanger our prosperity [...] I cannot accept".[16]

For all of Scheuer's bluster, it is only proper that vehicle owners bear the cost of the harm they impose in terms of environmental damage and air pollution. Moreover, taxes to dissuade undesirable behaviour are considered more effective than subsidies for desirable behaviour. However, this insight was not given due consideration within the NPM, and the first report of the Working Group 1 had few tangible repercussions.

The political effort to transform the transport sector in Germany thus encountered repeated obstacles. One important success, however, occurred shortly before Christmas of 2019, when Germany's climate law went into effect. Among other things, it made the emissions targets for each sector binding. In the international arena, various developments since 2019 have also proven positive, even if media attention has been focused on the Corona pandemic:

- On 1 December 2019 the Christian conservative Ursula von der Leyen became president of the EU Commission.

- On 11 December 2019 the EU Commission submitted a plan for a European Green Deal, which has the goal of net zero emissions by 2050.

11 OECD economic reports: Deutschland 2018 | READ online (oecd-ilibrary.org)
12 ARD, *Bericht aus Berlin*, broadcast 26 August 2018.
13 https://www.agora-verkehrswende.de/fileadmin/Projekte/2017/Klimaschutzszenarien/Agora_Verkehswende_Klimaschutz_im_Verkehr_Massnahmen_zur_Erreichung_des_Sektorziels_2030.pdf
14 *Der Spiegel*, "Tempo! Tempo! Tempo!", 24 March 2017.
15 Kritik nimmt zu: Scheuer werden Denkverbote vorgeworfen – Autogazette.de
16 https://www.welt.de/politik/deutschland/article187341664/Gegen-jeden-Menschenverstand-Scheuer-lehnt-Tempolimit-und-hoehere-Dieselsteuer-strikt-ab.html

- On 12 December 2019 the European Council – representing the EU heads of states – issued a public statement supporting "the creation of a climate-neutral EU by 2050, in accordance with the targets of the Paris Agreement".

- On 3 November 2020, Joe Biden defeated Donald Trump in the US presidential election.

- On 20 January 2021, the first the day of his administration, Joe Biden announced the US would rejoin the Paris Agreement.

- On 17 April 2021, chief negotiators from the US and China, the world's two largest greenhouse gas emitters, agreed to ignore their geopolitical differences and act in concert against global warming.[17]

- On 21 April 2021 the European Union augmented its climate targets, adopting a 55% reduction target for 2030.[18]

- On 29 April 2021 the German Constitutional Court ruled on an array of complaints against the climate law. The judges found parts of the law to be in breach of the German constitution because of the "absence of regulation for the continuation of the reduction targets for the period after 2030." The court's full ruling suggests that the earlier the society starts to abandon CO_2-intensive practices, the lower the associated negative impacts. If Germany waits, "people will have to switch to climate-neutral behaviour all at once, likely bringing enormous restrictions to individual liberty."[19]

Spooked by the court's ruling – and the Green party's growing popular support – the conservative-led Federal Cabinet proposed an intensified climate law, which has since been adopted. Germany is now seeking to achieve a 65% reduction in emissions by 2030, and full climate neutrality by 2045. Moreover, the transport sector is now obligated to limit 2030 emissions to 85 million tonnes (versus the 164 million tonnes released in 2019).

Radical is the new normal

In December 2020, the EU Commission presented its Strategy for Sustainable and Smart Mobility, an official document with an unusually candid tone: "Overall, we must shift the existing paradigm of incremental change to fundamental transformation [sic]."[20] In this way, political demands previously considered fringe have become mainstream. To be sure, the

17 https://www.state.gov/u-s-china-joint-statement-addressing-the-climate-crisis
18 https://ec.europa.eu/clima/policies/eu-climate-action/law_en
19 Bundesverfassungsgericht: Entscheidungen – Verfassungsbeschwerden gegen das Klimaschutzgesetz teilweise erfolgreich, siehe RN 121 und 249
20 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0789&from=DE

strategy is an admirable expression of political will. Yet emissions continue to remain far too high in the EU[21] – and globally.[22]

Even within Germany, progress in reducing transport sector emissions has been minimal. While it is true that German GHG emissions in transport fell by 16 million tons between 2015 and 2020, this was almost entirely the result of the COVID lockdowns. Without the pandemic, Germany would have made zero progress in reducing its transport emissions – not only in relation to 2015, but also relative to 1990.

Looking beyond GHG emissions, some progress has been made. In 2015, nearly 60% of Germany's air quality monitoring stations registered excessive nitrogen dioxide (NO_2) concentrations. In 2020, less than 5% did so.[23] Other indicators in the transport sector have been improving, but not nearly enough. For example: traffic fatalities remain high (2,719 in 2020 versus 3,046 in 2019)[24]; one in eight people are exposed to harmful noise emissions at night[25]; and air pollution from transport continues to exert negative impacts on human health.[26]

The EU Commission recently commissioned a study to calculate the external costs of transport – that is, the losses that accrue to society and the environment from traffic jams, vehicle accidents, noise pollution, particulate emissions, habitat loss, and damage to the climate. The study concluded that transport costs Europe some 840 billion euros annually, equivalent to 5.7 per cent of GDP. One fifth of these external costs are borne by Germany, and road traffic is the main culprit, particularly passenger vehicles.[27] There are simply too many cars on the road – and they continue to multiply.

However, it would be short sighted to judge progress made in transforming the transport sector sheerly on the basis of a few indicators. A more rigorous approach would be to assess the issue using the classification system that Agora Verkehrswende originally helped to develop. The transport policy of the *Verkehrswende* consists of two distinct pillars: the *transition to sustainable mobility*, which predominantly involves improving the overall efficiency of transport activity, e.g. by shifting demand between transport modes; and *clean-energy transition in transport,* which involves decarbonising the sector, predominantly by replacing combustion engines with climate-friendly alternatives.[28]

21 https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer
22 https://www.iea.org/data-and-statistics/charts/transport-sector-co2-emissions-by-mode-in-the-sustainable-development-scenario-2000-2030
23 https://www.umweltbundesamt.de/presse/pressemitteilungen/finale-daten-zur-stickstoffdioxid-belastung-2020
24 https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/04/PD21_170_46.html
25 https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/daten-zur-umwelt_umweltmonitor-2020_webfassung_bf.pdf
26 https://www.umweltbundesamt.de/galerie/luftqualitaet-2020
27 https://op.europa.eu/en/publication-detail/-/publication/9781f65f-8448-11ea-bf12-01aa75ed71a1 See also the associated Excel tables.
28 https://www.agora-verkehrswende.de/12-thesen/

The rise of electric vehicles

The decarbonisation of transport has made remarkable strides in recent years. In 2016, for example, electric vehicles were an absolute rarity on the streets. Yet in 2020, some 7% of newly registered cars in Germany were battery-electric vehicles. To be sure, the total number of electric cars in the German vehicle fleet remains small, comprising just 0.6% of the 48 million cars on the road in January of 2021. However, this share more than doubled in recent years, thanks to government purchase incentives and an improved selection of vehicle models.[29] Commenting on this trend, the Federal Motor Transport Authority noted that "electric vehicles have become mainstream."[30]

Of course, battery-electric vehicles (BEVs) can also be responsible for significant emissions if the electricity used to manufacture and power the vehicle is not emissions free. Indeed, the extent to which electric vehicles actually produce emissions savings was previously a point of heated debate, given the need to account for the share of fossil fuels in the power mix and the energy inputs of battery production. Thanks in part to a study undertaken by Agora Verkehrswende, however, this debate has been put to rest: BEVs currently cause fewer emissions than their fossil-fuel counterparts, despite the incomplete decarbonisation of the German power sector.[31] Yet another fear voiced by industry observers was that the limited availability of raw materials needed to manufacture batteries would prevent the widespread adoption of electric vehicles. However, rigorous empirical research commissioned by Agora Verkehrswende ultimately dispelled this concern.[32]

Nevertheless, all-electric drive trains still have disadvantages compared to conventional combustion engines. In particular, electric vehicle batteries become weaker with increasing use, reducing their maximum range. This makes the vehicle owner ever-more reliant on public charging infrastructure – which is far from widely available in Germany and the EU.[33] The European Court of Auditors, for example, has complained that "driving electric vehicles within the EU is difficult."[34] While long-distance trips only represent a small share of the trips taken by vehicle owners, they are responsible for the lion's share of vehicle emissions.[35] Unfortunately, long-distance trips are not a strong suit of electric vehicles, meaning they cannot serve as a substitute for this type of travel – at least not yet.[36]

By contrast, plug-in hybrid electric vehicles (PHEV) do not suffer from the range constraints imposed by inadequate charging infrastructure. In Germany, consumers can take advantage of a government rebate when purchasing such vehicles. Although not as high as the rebate for all-electric vehicles, it can still amount to €6,750 euros (€4,500 government rebate +

29 Federal Motor Transport Authority: Jahresbilanz – Bestand (kba.de)
30 KBA: Press release no. 01/2021 of 06.01.2021
31 https://www.agora-verkehrswende.de/fileadmin/Projekte/2019/Klimabilanz_Batteriefahrzeugen/32_Klimabilanz_strombasierten_Antrieben_Kraftstoffen_WEB.pdf
32 https://www.agora-verkehrswende.de/fileadmin/Projekte/2017/Nachhaltige_Rohstoffversorgung_Elektromobilitaet/Agora_Verkehrswende_Synthesenpapier_WEB.pdf
33 http://dipbt.bundestag.de/dip21/btd/19/267/1926716.pdf
34 Special Report 05/2021: Infrastructure for charging electric vehicles: more charging stations but uneven deployment makes travel across the EU complicated (europa.eu)
35 http://www.mobilitaet-in-deutschland.de/pdf/MiD2017_Ergebnisbericht.pdf, p. 73
36 The average range of a BEV is 352 km https://jato.blog/en/fear-of-range-increasingly-difficult-to-justify

€2,250 manufacturer rebate).[37] The government subsidises the purchase of PHEVs because their official emission statistics are admirably low.[38] However, new research shows that under everyday driving conditions, their true emissions can be two to four times as high.[39] Is another "Dieselgate" perhaps lurking around the corner?

Agora Verkehrswende has called for government support for PHEVs to be scaled back in line with their actual contribution to climate protection. Unfortunately, this recommendation has fallen on deaf ears – much like Agora's calls to restrict company-car tax benefits to drive systems that are truly climate friendly (i.e. excluding PHEVs). Similarly, policymakers have ignored exhortations to reform the vehicle efficiency label that went into effect in 2011. The label's misleading categories have been a source of ongoing confusion for consumers.[40] For example, a vehicle that emits 116 grams CO_2 per kilometre (and is thus graded with a "C") falls under the same efficiency category as a considerably heavier vehicle that emits 187 grams per kilometre.[41]

While electric vehicles have become ever-more efficient over the past five years, conventional vehicles remain as polluting as ever. In 2015, newly registered vehicles in Germany emitted 156.6 grams CO_2 per kilometre on average. In 2020, this figure was 151.9 grams.[42] The carbon footprint of newly registered diesel cars has even increased, rising from 157.8 grams in 2015 to 172.2 grams in 2020.[43]

As the climate continues to heat up, relegating gas guzzling cars to the dustbin of history has never been more important. Thankfully, current and planned regulatory measures suggest their days are numbered:

- The Fuel Emissions Trading Act (BEHG) imposes a gradually increasing carbon tax on gasoline and diesel fuel from 2021 onward.

- The ceiling on average fleet emissions in the EU will be reduced by 15% in 2025 and by as much as 37.5% in 2030 (compared to 2021). For the first time, fleet limits will also apply to heavy commercial vehicles from 2025 onward.

- The EU will further tighten exhaust emission standards (Euro 7) in 2025.[44]

37 https://www.adac.de/rund-ums-fahrzeug/elektromobilitaet/kaufen/foerderung-elektroautos
38 For example, BMW X5 xDrive45e: 39–27 grams CO_2 per km / Mercedes Benz A 250e sedan: 35–31 g/km / VW Golf GTE: 34 g/km
39 https://theicct.org/news/press-release-PHEV-usage-sept2020
40 https://www.agora-verkehrswende.de/veroeffentlichungen/?tx_agorathemen_themenliste[produkt]=1967&cHash=42c76c63e726fc5a54bc450b243269b9
41 The German auto owners association ADAC also finds the label categories misleading:https://www.adac.de/rund-ums-fahrzeug/auto-kaufen-verkaufen/neuwagenkauf/co2-label-pkw-effizienzklassen
42 2020 figure according to the Federal Motor Transport Authority (KBA), based on the Worldwide Harmonized Light Duty Test Procedure (WLTP). The 2015 figure was revised upward by KBA from 129.4 to 157.8 to account for differences between the NEFZ and WTLP test procedures. ICCT conversion factor: CO_2 emissions from new passenger cars in Europe: Car manufacturers' performance in 2019 (theicct.org)
43 https://www.kba.de/SharedDocs/Publikationen/DE/Statistik/Fahrzeuge/FZ/2020_monatlich/FZ8/fz8_202012_pdf.pdf;jsessionid=222E067AA41B464A34FD083830A24830.live21322?__blob=publicationFile&v=10
44 This text was written shortly before the announcement of the EU Commission's Fit for 55 package. According to new planning, the EU is seeking a 55 per cent cut in vehicle CO_2 emissions by 2030 (in relation to 2021 levels). By 2035, newly registered cars must be emissions-free.

To date, German policymakers have ignored calls to peg vehicle registration taxes to CO_2 emissions, which is common practice in various European countries.[45] To be sure, the German automobile lobby has long been a major player in domestic politics. However, the days when the major German automobile manufacturers could set the agenda in Berlin now appear to be over, as policymakers have been pressuring car manufacturers to seize the winds of change and focus on electric vehicles. The results of this effort have been mixed. Volkswagen, for example, recently announced that by 2035, it will stop selling combustion engine cars – yet only within Europe. Such ambition – diluted, as it were, with an acknowledgement that the company would continue to invest in conventional combustion technology – is perhaps not surprising coming from Volkswagen, given its role in the diesel emissions scandal.[46]

Experts agree that phasing out conventional vehicles is crucial. Yet this only represents one aspect of transport-sector decarbonisation, for the operation of an electric vehicle is only emissions-free when it is fuelled with renewable electricity. As the German government has so far failed to recognise the scope of the necessary renewables expansion, this is a highly salient issue. Specifically, the German government expects total power demand of 580 TWh in 2030, of which 65% – or 377 TWh – will be covered by renewables. While the 580 TWh figure represents an increase from current consumption (which stand at just over 500 TWh today),[47] this forecast is not compatible with the monitoring reports issued by the Energy of the Future expert commission, which foresees a "significant increase" in electricity demand, in part due to the widespread adoption of electric vehicles, but also due to growing electrification in all areas of life.[48] Given the flagging pace of renewables expansion, if power demand were to rise higher than 580 TWh in 2030, this would severely jeopardize the already optimistic 65% renewables target.

All of this leads to an inescapable conclusion: To slash emissions across all areas of the economy, installed renewables capacity must be expanded not just quickly, but also massively. Agora Verkehrswende has repeatedly made this point in the press. In mid-June of 2021, the Federal Minister of Economics finally conceded that one should presume a considerably higher level of power demand in 2030, and stated that his ministry would re-crunch the numbers.

From the top of the heap … to down and out

Munich is Germany's most densely populated city, with 4,800 inhabitants per km^2 (roughly equivalent to that of London). In 1990, local environmental activists founded an initiative to ban cars from Munich's streets by the year 2000. Almost 20 years earlier, the then mayor of the Bavarian capital had said: "The car is murdering our cities."[49] Today, Munich may not be

45 https://www.agora-verkehrswende.de/fileadmin/Projekte/2018/Fiskalische_Instrumente/14_Fiskalische-Instrumente_WEB.pdf
46 https://www.merkur.de/wirtschaft/vw-marke-verbrenner-ausstieg-diesel-benziner-em-uefa-arena-zellmer-interview-volkswagen-wolfsburg-zr-90826056.html
47 https://www.bmwi.de/Redaktion/DE/Downloads/I/integrierter-nationaler-energie-klimaplan.pdf?__blob=publicationFile&v=4, p.49
48 Stellungnahme zum achten Monitoring-Bericht 2011 (bmwi.de), p. 22
49 https://www.abendzeitung-muenchen.de/muenchen/hans-jochen-vogel-schlacht-im-hofbraeuhaus-art-547854

car-free, but in December of 2020, 5,542 fewer passenger cars were registered in Munich than in the same month one year prior.[50] The city council has also taken up the call to fight congestion, vowing to make the city centre largely car-free.[51]

Munich is not the only city in which the reputation of cars is rapidly diminishing. The Urban Mobility Platform, a forum for dialogue between the automobile industry and German cities, is demanding "less space for motor vehicle traffic".[52] Similarly, the influential German Association of Cities (*Deutscher Städtetag*) has voiced its support for the transformation of the transport sector,[53] [54] and has even called on Agora Verkehrswende to assist with the preparation of a position paper.[55] Another sign of the times is Hamburg's 2020 formation of an independent department of government for transport and sustainable mobility.

Concurrent with these developments, pressure for change has also been growing from below. Among the many grassroots movements for sustainable transport in Germany, pro-bicycle initiatives are particularly numerous. In Berlin, a local cyclist association successfully petitioned the municipal government to give priority to eco-mobility in transport planning – that is, to walking, cycling, and public transport. Support for car-free cities is also growing stronger. Four out of five Germans think that not enough is being done to make "everyday journeys convenient without a car", while two out of three Germans think less urban space should be allocated to motor vehicles, and more to cyclists and pedestrians.[56] The remaking of public space in a manner that puts the spotlight back on people – that is, an urban *Verkehrswende* – is a topic whose time has clearly come.

While many factors have contributed to this sea-change in German public opinion, the importance of the role played by Agora Verkehrswende should not be underestimated. From the very beginning, the work of Agora Verkehrswende was designed with a practical purpose in mind. One part of Agora's applied mission is the Agora Network for Transforming Urban Transport (ANUV), which brings together a range of experts from the public and private sector. The reports issued by the ANUV inform the decisions of urban transport planners and other city officials.

One of the network's key topics is public space. In dense urban areas, public space is a valuable commodity, yet huge swathes of the urban realm are reserved for parking vehicles – despite the fact that privately owned vehicles are only used for an average of 46 minutes each day. In large German cities, almost half of all cars are parked on public roads.[57] And space allocated for parking cannot be used for other purposes, such as walking or cycling. Indeed, a decision in favour of a new parking lot simultaneously means a decision against a park, playground, or other form of communal space.

50 Mitteilung Auskunftsbüro Statistisches Amt München (29.04.2021)
51 https://www.muenchen.de/verkehr/autofreie-altstadt-stadtrat-plaene.html
52 https://www.plattform-urbane-mobilitaet.de/files/content/positionspapier/PUM_Thesenpapier_2020.pdf
53 https://www.staedtetag.de/positionen/beschluesse/praesidium-nachhaltige-mobilitaet-verkehrswende-kommunaler-sicht
54 https://www.staedtetag.de/files/dst/docs/Dezernat-5/2021/RS_HGF_Anlage_Verkehrswende_Monitoring_fin.pdf
55 Nachhaltige städtische Mobilität für alle: Deutscher Städtetag (staedtetag.de)
56 https://www.umweltbundesamt.de/sites/default/files/medien/421/dokumente/factsheet_zentrale_ergebnisse_umweltbewusstsein_2020_0.pdf
57 http://www.mobilitaet-in-deutschland.de/pdf/MiD2017_Ergebnisbericht.pdf, p. 76

In September 2018, Agora Verkehrswende published an assessment of the legal options available to local government to reclaim the streets from cars. By empowering cities to repurpose urban space formerly reserved for motor vehicles, the report sought not only to advance climate protection efforts, but also to improve the quality of urban life.[58] The annual cap on fees for resident parking permits was subsequently abolished in 2020. (The cap had stood at 30.70 euros since 1993.) This was an important victory in the effort to rebalance the allocation of public space between cars and people. Yet how German cities will take advantage of this newly won freedom remains to be seen.[59]

The uses of public space

The project of remaking the transport sector has evolved into something much larger than a mere effort to adopt new energy technologies. And this should come as no surprise, for the transport sector plays an important role in all of our lives, and any effort to reshape it inherently raises a range of political issues, including the proper use of public space, the external costs of air pollution, and equal access to mobility. In other words, the *Verkehrswende* is also about improving public transport networks, about increasing shared vehicle use, and about encouraging alternatives to privately owned vehicles – such as e-scooters, a technology Agora Verkehrswende investigated in detail in 2019.[60]

To be sure, the transformation of the transport sector has made enormous strides as a topic of political discussion in recent years. Yet in practical terms, the actual scope of transformation that has materialised to date has been limited. The Association of German Cities recently took stock of the progress made in fulfilling its 2018 call for change. The results are not particularly encouraging. A significant problem is that car owners "do not see a true alternative to private vehicle use", the monitoring report concludes. [61]

For nearly half of the German population, travelling to the nearest urban centre by car is over 30 minutes faster than taking public transport. And for 10% of the population, travel by car is over 60 minutes faster.[62] If public transport systems were to maintain fleets of self-driving cars, private vehicle ownership could become unnecessary, particularly in rural areas. However, it may take many years for fully autonomous vehicles to reach market readiness.[63]

Against this backdrop, it is perhaps not surprising that the number of vehicles continues to rise nationwide. Over the past five years, the number of registered cars in Germany has risen by more than 3 million, reaching 48.2 million. At the same time, the number of bicycles on

58 https://www.agora-verkehrswende.de/fileadmin/Projekte/2018/OEffentlicher_Raum_ist_mehr_wert/Agora_Verkehrswende_Rechtsgutachten_oeffentlicher_Raum.pdf
59 https://difu.de/nachrichten/bewohnerparken-in-den-staedten-wie-teuer-darf-es-sein
60 https://www.agora-verkehrswende.de/fileadmin/Projekte/2019/E-Tretroller_im_Stadtverkehr/Agora-Verkehrswende_e-Tretroller_im_Stadtverkehr_WEB.pdf
61 https://www.staedtetag.de/files/dst/docs/Dezernat-5/2021/RS_HGF_Anlage_Verkehrswende_Monitoring_fin.pdf
62 https://www.bbsr.bund.de/BBSR/DE/veroeffentlichungen/sonderveroeffentlichungen/2017/rob-2017-final-dl.pdf;jsessionid=7BF395E24F227289E098C289A084A725.live21322?__blob=publicationFile&v=1, p. 114
63 https://www.agora-verkehrswende.de/fileadmin/Projekte/2020/Automatisiertes_Fahren/Agora-Verkehrswende_Auto-tankt-Internet.pdf

Germany's roads has also grown, leading to greater road congestion and more cycling accidents, with the number of bicyclists killed in traffic accidents increasing nearly 20% since 2010.[64]

While some progress has been achieved in terms of legal reform, there is still a lot of work to do, for example:

- Germany's road regulations were recently amended to make it easier to park electric vehicles. However, a city's ability to restrict of road use – for example, to make car-free zones – is only possible "when absolutely necessary due to special circumstances." Furthermore, Germany has yet to introduce a speed limit on the autobahn, despite majority support amongst the population for such a measure.[65].

- Recent amendments to the Passenger Transport Act remove "ridepooling" from a legal grey area by defining on-demand transport on certain routes as a form of public transport. This is anticipated to improve the availability of transport in rural areas. Furthermore, municipalities now have the ability to limit the number of rental cars operating in the city when rental car traffic is expected to worsen congestion or reduce demand for public transport.

- The Federal Ministry of Transport now funds seven "endowed professorships for cycling." The Ministry also recently adopted an updated National Cycling Plan. In addition to creating a seamless national network of bike paths, a key goal in the coming years is to promote bicycle use for daily commutes, in part by creating protected bike lanes on busy streets.[66] By increasing the number and length of journeys made by bike, Germany hopes to achieve annual emissions savings of 3 to 4 million tonnes of CO_2 in relation to 2017 – provided, of course, bicycles are actually used as a substitute for cars.[67] Usage-based road tolls could help to promote increased reliance on bicycles, yet policymakers are not actively considering such a measure, nor have they avowed to enshrine the National Cycling Plan into law.

Nevertheless, one of the declared goals of the National Cycling Plan is to shift transport demand from the car to eco-friendly alternatives. The plan is thus a fitting addition to the long list of similar declarations of intent.

64 https://www.destatis.de/DE/Presse/Pressemitteilungen/2020/08/PD20_N049_46241.html
65 https://www.automobil-industrie.vogel.de/umfrage-mehr-zustimmung-zum-tempolimit-a-980759 and https://www.umweltbundesamt.de/sites/default/files/medien/421/dokumente/factsheet_zentrale_ergebnisse_umweltbewusstsein_2020_0.pdf.
66 https://www.bmvi.de/SharedDocs/DE/Anlage/StV/nationaler-radverkehrsplan-3-0.pdf?__blob=publicationFile
67 However, the magnitude of emissions reductions that can be achieved by shifting transport demand from cars to bikes is limited; see https://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/4451.pdf and https://www.vcd.org/artikel/es-braucht-dringend-einen-fahrplan

Encouraging a shift in demand: A perennial concern of transport policy

The goal of shifting demand from one mode of transport to another is a perennial concern of transport policy. Germany's ruling coalition in 1998, for example, had the goal of "shifting as much traffic as possible from road and air to rail and water." In their 2009 coalition agreement, the CDU and FDP sought to promote increased reliance on "rail and waterborne transport." In 2018, similar pledges were once again made, with the CDU and SPD aspiring by 2030 to double the number of rail users while also shifting a significant share of freight traffic from road to rail.

Achieving the goals set forth by the current coalition agreement would require significant transport policy interventions. And while their fulfilment would mean considerable emissions savings – namely, an eight million tonne reduction in passenger transport emissions, and a six million tonne reduction in freight transport emissions[68] – this still would not be sufficient to reach the broader emissions goals for the transport sector, given simultaneous growth in transport demand, particularly in freight transport. Indeed, demand growth will almost totally offset these savings.

This conclusion originates from an Agora study that was conducted prior to COVID – and the pandemic-induced 50% decline in public transport passengers.[69] The Agora study presumed that in 2030, passenger transport demand would only be slightly above its 2016 levels, and that freight transport demand would have increased by approximately one third.

Predicting the future has never been easy, and the pandemic has only magnified our sense of uncertainty about events yet to come. The chip crisis and other supply chain bottlenecks have thrown the risks of just-in-time production into stark relief. Accordingly, it no longer seems inevitable that globalisation will continue apace, with demand climbing inexorably higher. Will manufacturers seek to reduce their dependency on far-flung suppliers in coming years? As 3D printing becomes ever-more advanced, how will it impact global trade? And what will be the lasting impacts of the current shift to remote work?

Whatever the future may hold, the transformation of transport will not happen as a matter of course. Deliberate planning and action are needed – and, to this end, a targeted regulatory framework is required. Given the long time frames required to plan and construct new infrastructure,[70] the regulatory arrangements for decarbonised transport need to be in place by 2025 at the latest – that is, they need to be adopted during the coming legislative period. In Germany the transport sector is currently governed by a motley patchwork of laws and ordinances. While German energy law is clearly subjugated to the overarching goal of making utility systems reliable, affordable, consumer friendly, efficient, and environmentally friendly, in the transport sector, there is no higher organizing principle or mechanism to ensure coherent nationwide policy. Accordingly, the gap between political avowals and reality on the

68 https://www.agora-verkehrswende.de/fileadmin/Projekte/2017/Bahnpolitische_Weichenstellungen/35_Railmap_lang_WEB.pdf, p. 33 f.
69 https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/04/PD21_172_461.html;jsessionid=E382C827B5E2E0C15BC076833A12B51D.live731
70 https://dipbt.bundestag.de/dip21/btd/19/274/1927459.pdf

ground continues to grow ever wider. The absence of strategic direction is evident based on Germany's climbing traffic jam statistics.[71] (The total duration of reported congestion was 521,000 hours in 2019; this figure fell 51% in 2021, but only due to the pandemic.) It has long been known that building new roads rarely solves the problem of congestion, because it merely encourages greater private vehicle use (a textbook example of induced demand, or Say's law). However, transport policymakers continue to disregard this fact.[72]

This disregard is not attributable to lack of political will or professional incompetence. Nor is it due to a lack of human resources, given the nearly 22,000 employees of the Ministry of Transport, more than half of whom work for the Federal Waterways and Shipping Administration.[73] Instead, the cause is an inadequate regulatory and legal framework: As observed nearly 50 years ago by German environmental officials, there is simply no "overarching planning authority" in the transport sector.[74] In a similar vein, a recent study by the Federal Environment Agency concludes that "the targeted planning and implementation of push & pull measures is not possible under the current legal framework. To cope with challenges in the transport sector, a law is needed to coordinate transport-related goals, strategies and measures within various departments of government."[75]

Indeed, the absence of such a law is the greatest roadblock to further progress in the Verkehrswende, a recent study concludes: "We require a federal mobility law that obliges political actors to develop long-term strategies for the transport sector that are equally oriented towards economic, social and ecological goals."[76] Fortunately, the need for such a law is now recognized in many quarters, and potential solutions are being explored.[77]

Five years ago, the term *Verkehrswende* was totally unknown in Germany's corridors of power. Yet the word now rolls easily over the lips of thought leaders from across the political spectrum.[78] In recent months Germany's states have even been seeking to outdo each other in terms of climate policy, adopting increasingly ambitious targets for climate neutrality.[79] According to the coalition agreement between the SPD, the Greens and the FDP, Rhineland-Palatinate is to become climate neutral "in a corridor between 2035 and 2040,"[80] while Baden-Württemberg is to become climate neutral "by 2040 at the latest," according to the agreement between the Greens and the CDU."[81] Staunchly conservative Bavaria, for its part,

71 https://presse.adac.de/meldungen/adac-ev/verkehr/staubilanz-2019-staus-werden-weniger-dauern-aber-laenger.html and https://www.adac.de/verkehr/verkehrsinformationen/staubilanz
72 Anthony Downs, A. (1962): The law of peak-hour expressway congestion. Traffic Quarterly Vol. 16, 1962, 3, pp. 393-409. Online here: https://babel.hathitrust.org/cgi/pt?id=uc1.$b3477&view=1up&seq=461
73 https://www.bundesrechnungshof.de/de/veroeffentlichungen/produkte/beratungsberichte/entwicklung-einzelplaene/2019/12
74 SRU: Auto und Umwelt. Gutachten, September 1973, p. 2
75 https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2020_11_19_texte_213_2020_personenbefoerderung_tb_2_0.pdf
76 https://www.agora-verkehrswende.de/fileadmin/Projekte/2019/Mobilitaet_in_Deutschland/Agora-Verkehrswende_Baustellen-der-Mobilitaetswende.pdf
77 https://www.vcd.org/bundesmobilitaetsgesetz/
78 https://www.cducsu.de/themen/wirtschaft-und-energie-haushalt-und-finanzen/ohne-verkehrswende-keine-klimawende
79 https://www.spd-rlp.de/wp-content/uploads/2021/05/Koalitionsvertrag-2021-2026.pdf, p. 12; https://www.baden-wuerttemberg.de/fileadmin/redaktion/dateien/PDF/210506_Koalitionsvertrag_2021-2026.pdf, p. 25
80 https://www.cducsu.de/themen/wirtschaft-und-energie-haushalt-und-finanzen/ohne-verkehrswende-keine-klimawende, p. 12
81 https://www.baden-wuerttemberg.de/fileadmin/redaktion/dateien/PDF/210506_Koalitionsvertrag_2021-2026.pdf, p. 25

aims to become climate neutral by 2040.[82] And climate neutrality is simply not achievable with half measures – it necessarily entails the reorganization of the transport sector, among other things.

It is a comparatively simple arithmetic task to estimate the size and composition of the vehicle fleet that would still be compatible with climate protection targets. However, it is a much more difficult task to achieve political consensus for fundamental change, not least given the need to allocate burdens fairly. After all, the matter at hand involves changing the daily mobility routines of many millions of people. Adopting policy measures that effectively promote positive transformation without provoking mass discontent will be a major challenge in the years ahead.[83] The debate that erupted following proposals for a higher CO_2 price on gasoline or diesel fuel points to the resistance that can emerge when abstract commitments to climate protection are to be backed up with actual policies.

Nevertheless, awareness for the necessity of transformation has grown enormously over the past five years. The *Verkehrswende* has gained momentum – whether it reaches a critical mass will be determined over the next five years.

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82 See Bavaria Minister President Markus Söder's tweet of 4 May 2021: "Klimaschutz daheim. Der Klimawandel ist nach Corona die nächste pandemische Herausforderung. Wir wollen in Bayern vorangehen und bis 2040 klimaneutral sein. Moore sind dafür die besten natürlichen CO_2- und Wasserspeicher."

83 https://www.agora-verkehrswende.de/fileadmin/Projekte/2021/Faktenblatt_Klimaschutzmassnahmen_sozial/55_Faktenblatt_Klimaschutzmassnahmen_sozial.pdf