T4<2° | Transport For Under Two Degrees

Transport for under two degrees – the way forward

10 key insights for the decarbonisation of the transport sector

POLICY BRIEF

Commissioned by:

Federal Foreign Office

Implemented by:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

WORLD ECONOMIC FORUM

Agora Verkehrswende

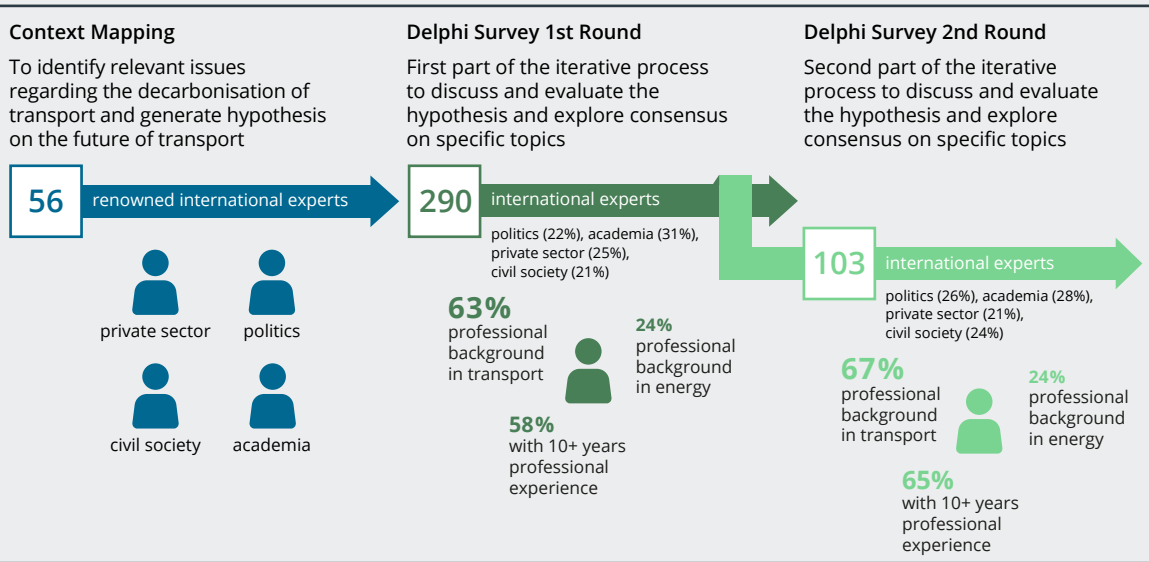
Project background

The transport sector is the fastest growing source of greenhouse gas emissions at present. It accounts for approximately one quarter of global greenhouse gas emissions and hence figures prominently in efforts to transform the energy economy and protect the climate. Without a scaled-up global mitigation effort, it will not be possible to reach the climate targets of the Paris Agreement. A low-carbon transformation of the global transport sector is the next necessary step in the global energy transformation.

Germany's Federal Foreign Office has commissioned the project "T4<2° – Transport for under two degrees", a global foresight study on the decarbonisation and transformation of the transport sector to identify challenges and opportunities for a sustainable, low-carbon transport sector. The findings provide decision-makers with a clear vision and specific recommendations on how to achieve decarbonisation of the sector and orchestrate international efforts for a global transport system transformation.

For this end, the study applied methods of strategic foresight: In particular, these foresight methods comprised context mapping in the form of a systematic literature review on international transport scenarios and 56 qualitative interviews with international senior experts primarily from the transport and energy sectors. Subsequently, a two-stage Delphi survey was conducted. A Delphi survey is a structured, iterative group facilitation technique that has been developed as a systematic, interactive forecasting method. 290 international experts participated in the first round of the survey; 103 experts took part in round two. The project was implemented between March 2018 and February 2020. The findings of context mapping and Delphi survey have been synthesised and interpreted and specific implications for policy and international cooperation have been developed.

Figure 01 | The methodological design and expert background



Representation based on the results of the T4<2°-Delphi survey

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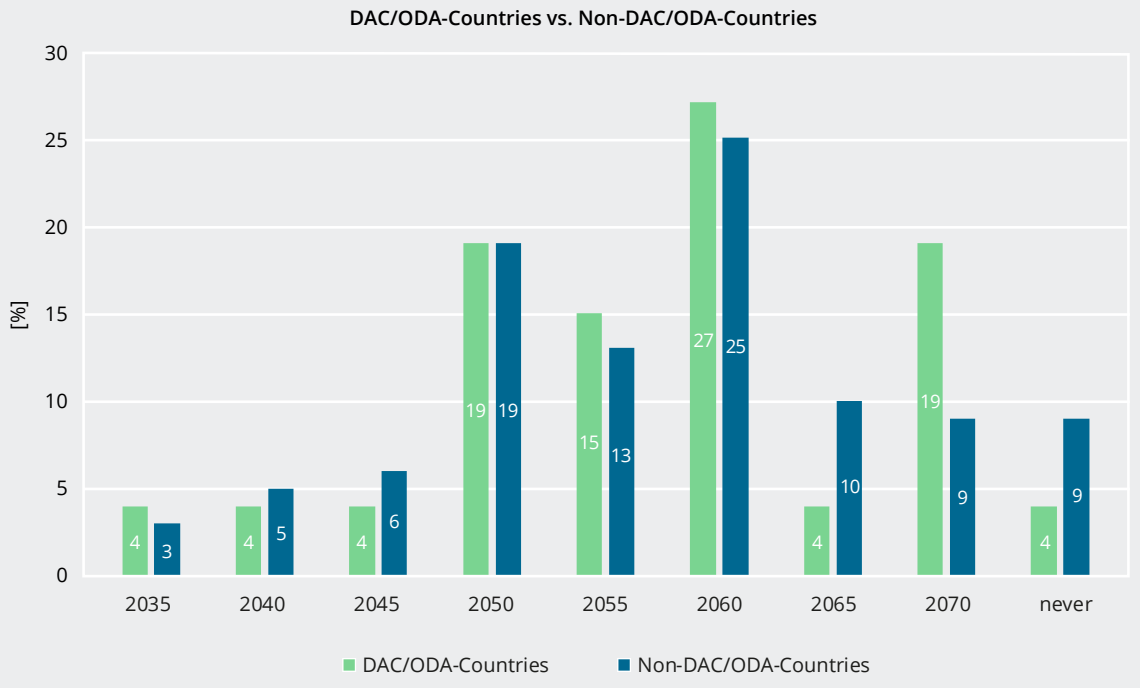
The study provides 10 key insights:

1

A full decarbonisation of the transport sector requires higher ambition in order to reach the goals of the Paris agreement: A full decarbonisation must happen by 2050, as projections show[2]. This means that the current level of ambition in countries world-wide – as estimated by the experts in this study – has to be raised to achieve these goals. The study moreover concludes that developed as well as developing countries should work on the same timeline. This gives rise to the question whether the so far discussed differentiated timelines in the Paris Agreement are necessary or useful for the transport sector. The surveyed experts do not expect that the transformation will slow down economic growth – to the contrary, they estimate that it will create more jobs than it may eliminate. In order to ensure that the transport sector effectively contributes to overall sustainable development, its decarbonisation needs to be accompanied by policies fit to reduce social divides and global development gaps.

1 See for example Partnership on Sustainable, Low Carbon Transport (SLoCaT). (2018). Transport and climate change. Retrieved from www.slocat.net/wp-content/uploads/legacy/slocat_transport-and-climate-change-2018-web.pdf

Figure 02 | By when will the transport sector be decarbonised?

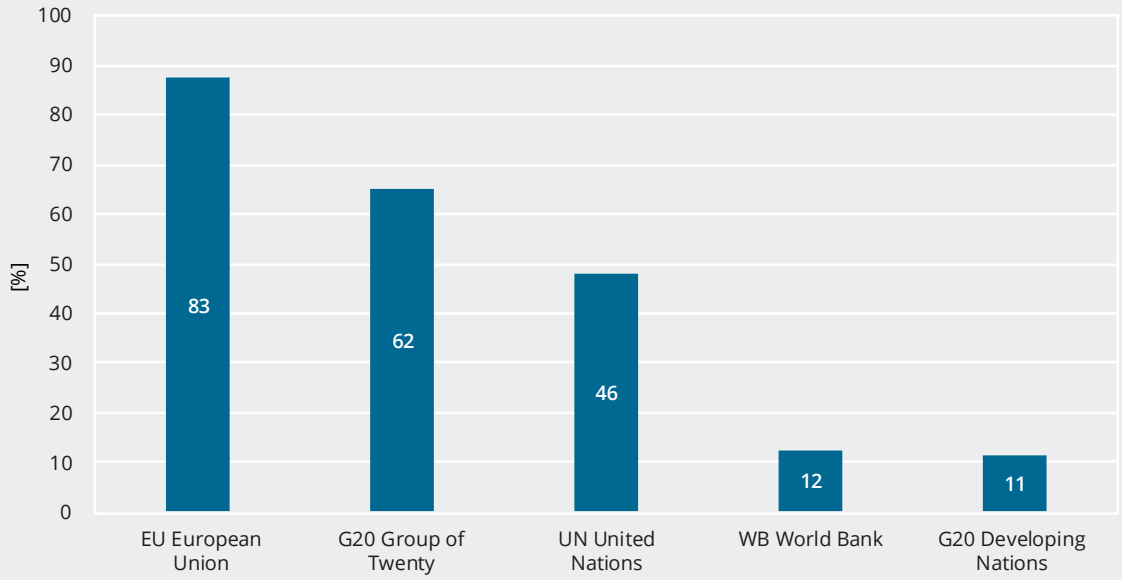


Representation based on the results of the T4<2°-Delphi survey

2

Energy and transport but also trade are the crucial fields of international governance that require more coherent and coordinated action: According to the surveyed experts, these three sectors need to be better integrated at an international level to achieve the decarbonisation of the transport sector. While the energy sector will have to provide sufficient renewable energy for the transport sector, governance of the trade sector will have to provide the frameworks for a level playing field and the reduction of overall transport demand. Within the transport sector, international governance should strive for coordinated and coherent policies regarding emissions reduction and low-carbon technologies. Among the international organisations, the European Union (EU) will play a leading role in these efforts, according to the experts.

Figure 03 | The most influencial international organisations for the success of the global transport transformation



Representation based on the results of the T4<2°-Delphi survey

3

Electricity from wind and solar will be the leading energy carrier for transport: Experts overwhelmingly agree that the transport sector will mainly be powered by electricity from renewable sources. For land-based passenger and freight transport, directly used electricity from renewable sources will be the dominating energy carrier. Aviation and maritime transport on the other hand are expected to require the highest ambition, as the currently available options in these sectors still oppose the goal of decarbonisation. Therefore, more action is required in these areas in order to replace fossil energy carriers with synthetic fuels based on renewable energy. The expansion of the production of electricity from wind and solar needs to be extended and accelerated accordingly to make the transport transformation a success.

4

Public transport, active modes of transport, shared mobility services as well as sustainable urban planning will be the backbone of climate-friendly urban transport. Therefore, investments in public transport along with the promotion of cycling and walking have to be prioritized. To break the expected and continued dominance of the individually owned car, policies are needed to promote sharing and pooling. Sustainable city planning is essential to reduce transport demand in the first place and set the prerequisite for efficient and just mobility systems.

5

The development of alternative drive technologies demands increased attention in rural areas without ruling out new mobility options. While rural areas in developed countries are highly car-dependent, rural areas in developing countries are faced with a considerable lack of access to mobility. Experts expect that cars will still play an important role in rural transport in 2050. Alternative drive technologies will be crucial to meet this demand. At the same time, alternative mobility solutions are needed to reduce car dependency and reduce spending on new car infrastructure in favour of mobility systems that support decarbonisation and promote equal access.

6

Digitisation and autonomous driving need a comprehensive political framework in order to support the decarbonisation of the transport sector: The majority of experts see a potential for digitization to support the reduction of greenhouse gas emissions, even though this is expected to be linked to a significant increase in energy demand due to data processing. Thus, the exploitation of this potential must be linked to strong international governance. The majority of the experts see a significant role of autonomous vehicles (AVs) in road passenger transport, although there is no clear position that they will dominate the market by 2050. In general, the potentially negative effects through increased urban sprawl and transport volumes as well as higher energy demand are seen as relevant concerns which also proves the need for political governance.

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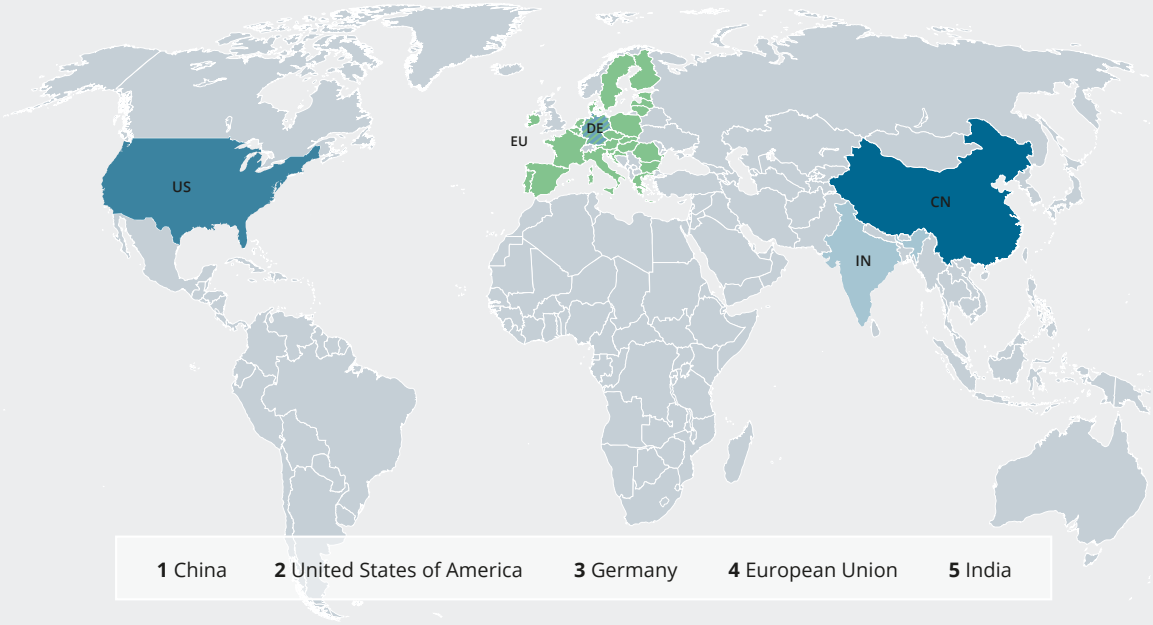
7

The political task of promoting the successful structural change in the automotive and fossil fuel industry will require more efforts by policy makers. Vested interests of incumbent industries – particularly the automotive and fossil fuel industries – are by far the biggest challenge to the decarbonisation of the transport sector, as the study reveals. The defining task for policymakers is actively supporting the structural change in these industries in order to manage their transformation.

8

Countries with large incumbent industries, economic weight and political power have to play the key role in order to ensure the success of transport decarbonisation. Experts see China, the United States (US), Germany, India and the EU in general as the key players to drive the transition. While countries without fossil oil resources would greatly benefit from transport decarbonisation, those with a high dependency on fossil fuel exports or automotive industries must support a structural shift in order to secure their long-term market competitiveness. This affects Russia, Saudi Arabia and the US, but also China and Germany. Furthermore, the experts point out that a shift in demand from fossil fuels to scarce metals such as cobalt or lithium, as well as rare earths needed for the sector's electrification does not necessarily decrease the risk of geopolitical conflict related to the unequal distribution of resources.

Figure 04 | The five most influential countries for the success of the global transport transformation



Representation based on the results of the T4<2°-Delphi survey

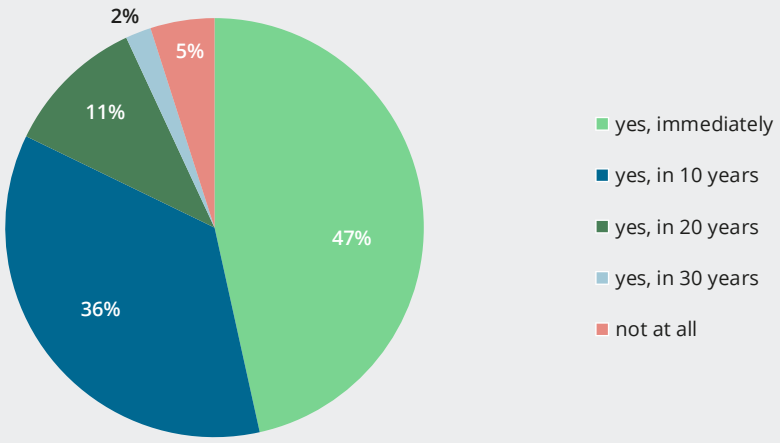
9

New technologies and mobility solutions can only unfold their full potential for decarbonisation if policy makers also focus on a change in mobility behaviour. A lack of suitable technology is not expected to be a challenge. The success of the decarbonisation of transport will first and foremost depend on how the technology will be adopted. Most of the experts suggest that policy-makers should focus more on regulation of behaviour in addition to regulation of technology.

10

Decision-makers have to prioritise regulatory action over incentivisation and hereby provide a sound political framework, in order to ensure long-term investment security for public funding as well as private capital: A lack of regulation was identified as the second biggest challenge to the transformation of transport after vested interests of incumbent industries. Fuel pricing and a forced phase-out of vehicles with combustion engines are seen as the most effective measures to support transport decarbonisation. Regulation needs to be complemented with investment, especially in public transport. Experts expect that sufficient funds will be available for the transformation of the transport sector. A combination of public and private sector money will have to be mobilised. This requires national and local governments to provide the right framework to make investments in sustainable mobility attractive to private investors. Reorienting public money currently spent on fossil fuel subsidies is as urgent as providing cities with greater financial autonomy, and supporting developing countries with sustainability-oriented, policy-based lending.

Figure 05 | A politically forced phase-out of incumbent and fossil fuel-driven technologies is needed in order to decarbonise the transport sector by mid-century



Representation based on the results of the T4<2°-Delphi survey

Implications for policy and international cooperation

The findings of this foresight study provide a rich depiction of a possible future with a decarbonised transport system. The extensive material collected through context mapping and a Delphi survey indicates where global ambition is heading and where shortcomings need to be addressed. It also shows that foreign policy and international cooperation could play a vital role in decarbonising transport by

1. strengthening global governance in transport and across sectors,
2. intensifying bi- and trilateral cooperation with key actors,
3. building political momentum through dialogue on key topics.

In order to develop strategies for foreign policy and international cooperation, these fields of action should be analysed more carefully in future studies. The present study can help to outline some of the possibilities and opportunities.

Strengthen global governance

The study emphasises that a full decarbonisation of the transport sector requires higher ambition in order to achieve the goals of the Paris agreement. This will need all relevant actors to collaborate and a variety of ambitious measures to be implemented. Countries should strive for multilateral and regional agreements and frameworks. These can showcase positive effects, build up momentum and serve as a catalyst for broader action for others to follow. International cooperation and foreign policy will have to play a crucial part as facilitators of these actions.

Many levels, structures and organisations are already in place that are dealing with transport issues on an international level, from, for example, the European Union (EU), the G7, the G20 G20 and the United Nations (UN) to International financial Institutions (IFIs) as well as urban mobility policy and city networks. In order to achieve a coherent and coordinated international approach, a mapping of existing organisations would be necessary to analyse which actors are already focusing on decarbonising transport and to identify their focus area. Furthermore, it needs to be evaluated which role the decarbonisation of transport plays in the Sustainable Development Goals (SDGs). On this basis the question should be discussed whether a new clustering of tasks will be necessary within the existing organisations or whether new organisations will be needed for certain tasks (see for example the discussion about the foundation of a UN organisation for transport).

Intensify bi- and trilateral cooperation

The decarbonisation of the transport sector must become a cross-sectoral topic within economic and political partnerships on bi- and trilateral levels. Feasible solutions and benefits of action, joint projects and structural support in key areas should be highlighted to advance the dialogue for mutual benefit.

Particular attention should be given to:

- Dialogue with **fossil fuel exporting countries:** These countries will have to make profound changes to their economic systems. Modernisation initiatives should be encouraged.
- Partnerships with countries that have been assessed, besides Germany and the EU, as the most decisive for the transformation of transport: **China,** the **US** and **India.**
- **Enabling less motorised countries** to leapfrog carbon-intensive technologies, thereby

reducing the dependency on fossil fuels and preventing lock-in effects.
- **Promoting economic cooperation in the transport industry** by innovative industrial partnerships and networks for Research and Development (R&D) as well as the development and harmonization of industry standards, for example with regard to automotive industries, electric mobility, new mobility services, hydrogen and power-to-x-technologies, aviation and maritime industries.
- **Actively raising the issue** of transport transformation in bi- and trilateral cooperation.

Cooperation and dialogue that supports the transport transformation could focus on the following topics:

1. defining a strategy for a policy-driven **fossil fuel phase-out,**
2. redirecting **funding** towards low-carbon solutions,
3. implementing and harmonising **CO_2 pricing mechanisms,**
4. promoting the extension of **electricity production from renewable sources** for direct usage as well as for the production of hydrogen and other power-to-x fuels,
5. mitigating the negative effects of **biofuels,**
6. ensuring the availability and socially as well as ecologically responsible production of **scarce metals and rare earths** needed for zero-emission technologies such as traction batteries, particularly cobalt and lithium,
7. identifying options to reduce the transport demand caused by trade policies and supply chains, and
8. agreeing on suitable pathways for decarbonisation in **aviation and maritime transport.**

Finally, raising awareness for the necessity of a transport sector transformation and transparently communicating its advantages and the necessary changes are essential to promote acceptance and mobilise widespread stakeholder support. With embassies as multipliers, foreign policy has a strong network to disseminate information, stimulate national networks and get partners involved. Sharing national and local experiences will strengthen the dialogue on solutions for the future of transport as part of international advocacy work for the global transformation of the transport sector.

The Covid-19 pandemic has shown that there is potential for swift systemic change within the mobility sector whilst at the same time highlighting certain weaknesses of the transport system. This has underlined the relevance and urgency of the main findings of this study. The transition towards a decarbonised, socially and economically sustainable transport sector must start now, not only to tackle climate change but also to strengthen societal and economic resilience and prepare for future crises.

Imprint

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Commissioned by

Federal Foreign Office
11013 Berlin | Germany
T: +49 (0)30 1817-0 | F: +49 (0)30 1817-3402
poststelle@auswaertiges-amt.de
www.auswaertiges-amt.de

Implemented by

Agora Verkehrswende
Anna-Louisa-Karsch-Str. 2
10178 Berlin | Germany
T: +49 (0)30 7001435-000 | F: +49 (0)30 7001435-129
info@agora-verkehrswende.de
www.agora-verkehrswende.de

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn | Germany
T: +49 619679-0 | F: +49 619679-1115
info@giz.de
www.giz.de

In cooperation with

World Economic Forum (WEF)
350 Madison Avenue, 11th Floor
New York, NY 10017 | USA
T: +1 212 7032300 | F: +1 212 7032399
forumusa@weforum.org
www.weforum.org

Steering Committee

Christian Hochfeld (Agora Verkehrswende)
Mike Enskat (GIZ)
Christoph Wolff (WEF)

Project Lead

Marena Pützschler (Agora Verkehrswende)
Cornelia Hörtner (GIZ), Johannes Uhl (GIZ)

Authors

Christian Hochfeld (Agora Verkehrswende),
Marena Pützschler (Agora Verkehrswende),
Matthias Wanko (Agora Verkehrswende),
Alexander Jung (Agora Verkehrswende until 02/2020)
Mike Enskat (GIZ), Cornelia Hörtner (GIZ),
Christian Mettke (GIZ), Johannes Uhl (GIZ),
Mark Major (Growing Markets),
Stefanie Sohm (Growing Markets)
Christoph Wolff (WEF), Mary Loane (WEF)

Editorial Office: Alison French
Design: Juliane Franz, Agora Verkehrswende
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Contractors:
Methodological advisor and moderation
Ingo Kollosche, Institute for Futures Studies and Technology Assessment (IZT)
Technical Partner for the Delphi Study
Sebastian Abel, Institute for innovation and technology (iit)
Michael Nerger, Institute for innovation and technology (iit)
Simone Ehrenberg-Silies, Institute for innovation and technology (iit)

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You can access the full report "Transport for under two degrees: the way forward" via this QR-Code.

www.t4under2.org/

T4<2° | Transport For Under Two Degrees | The Global Foresight Project on Transforming Mobility by Mid-Century

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Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn | Germany
T: +49 619679-0
F: +49 619679-1115
info@giz.de
www.giz.de

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New York, NY 10017 | USA
T: +1 212 7032300
F: +1 212 7032399
forumusa@weforum.org
www.weforum.org

Agora Verkehrswende

Agora Verkehrswende
Anna-Louisa-Karsch-Str. 2
10178 Berlin | Germany
T: +49 (0)30 7001435-000
F: +49 (0)30 7001435-129
info@agora-verkehrswende.de
www.agora-verkehrswende.de