NDC-TIA China Annual Workshop – Planning and Major Policies for Peaking Carbon Dioxide Emissions from Transportation and Carbon Neutrality

EXECUTIVE SUMMARY

The NDC-TIA China Annual Workshop was hold on Nov. 23rd, 2021. It's a fully online workshop, organized by the International Council on Clean Transportation (ICCT) and Vehicle Emission Control Center of Ministry of Ecology and Environment (VECC). **Ms. CUI Mingming** - the deputy director of Mobile Source Division of Department of Atmospheric Environment from MEE and **Ms. Miriam Gutzke** - the counselor from German Embassy in China gave keynotes for the workshop, **Mr. YIN Hang** - deputy director of VECC gave the summary statement. The workshop moderated by **Mr. Sebastian Ibold** - the project director of Sino-German Cooperation on Low Carbon Transport from GIZ, and **Mr. MA Dong** – the deputy director of Low Carbon Transportation from VECC.

The workshop was attended by invited speakers from

- Ministry of Ecology and Environment (MEE),
- German Embassy in China,
- Climate Action Directorate-General (DG CLIMA) of European Commission,
- Joint Research Centre (JRC) of European Commission
- National Center for Climate Change Strategy and International Cooperation (NCSC)
- China Automotive Technology Research Center (CATARC),
- Transportation Planning Research Institute of the Ministry of Transport (TPRI),
- Tsinghua University,
- Beijing Transportation Development and Research Center (Beijing TDRC)
- World Resources Institute (WRI)
- Agora Verkehrswende

As well as 60 participants from government agencies, public institutes, automotive OEMs, Universities, research institutes and NGOs.

China is in a critical stage of developing its 14th Five-Year Plan (FYP) and creating a sectoral roadmap for peaking CO_2 emissions from transportation. Further, the National Action Plan to Peak Carbon Emissions by 2030 released by China's State Council in October 2021, green and low-carbon transportation is also a critical component. Against this backdrop, ICCT and VECC organized this workshop which intends to share knowledge and foster dialogue on the vision, macro-level planning, key policy instruments, and research activities toward decarbonising transportation in Germany, Europe, and China.

The workshop is organised as part of the **National Determined Contribution Transport Initiative for Asia 2021 Event Series – Decarbonising Transport**. The event series aims at contributing knowledge and international best practices on transport sector decarbonization to the development of strategies related to China's recently set targets of 2030 carbon dioxide emission peaking and 2060 carbon neutrality. The previous events including:

- European Green Deal and the Fit for 55 Package from a Transport Perspective
- Climate Targets and Impacts in the Transport Sector in the European Union and China
- Workshop on provincial transport-related GHG decarbonization experience exchanges

Part of presentations are available on the site.

About the NDC Transport Initiative for Asia - China Component

The NDC-TIA China component provides capacity building and global policy exchanges to Chinese partners. GIZ coordinates the China component, which is being jointly implemented together with the World Resources Institute (WRI), the International

Council on Clean Transportation (ICCT), and Chinese domestic research agencies and institutes. The implementation is further supported by the German transport think tank Agora Verkehrswende.The goal of the China component of the project is to support the Chinese partners on national and sub-national levels on the essential technical research and capacity building needed for elaboration of medium- and long-term emission reduction strategies and major emission reduction policies for GHGs and air pollutant mitigation in the transport sector.

For more information please review the NDC-TIA website:
(https://www.ndctransportinitiativeforasia.org/)

THEME 1: CLIMATE MACRO-LEVEL PLANNING AND GOALS FOR TRANSPORTATION

Keynote – Ms. CUI Mingming:

China's transportation sector needs to further improve regulations, inspections, and technologies for continuing responding to the dual challenges of air pollution and climate change

Ms. Cui Mingming, the deputy director of Mobile Source Division of Department of Atmospheric Environment from MEE, first delivered a speech for the conference and emphasized on the latest developments in China's mobile source management and key plans during the 14th Five-Year Plan (FYP) period. Director Cui said that, in order to promote triumph in the uphill battle for prevention and control of pollution and win the battle to protect blue sky during the 13th FYP period, China adheres to the principle of overall planning of roads and vehicles, accelerates the construction of a modern environment management system, and has achieved positive progress, e.g., the emission standard has been fully upgraded to China 6, 14 million vehicles with excessive emissions have been phased out ahead of schedule, the low-sulfur gasoline and diesel have been promoted thoroughly, the significant results have been achieved in transportation structure adjustments, new energy vehicles (NEV) have been vigorously promoted, and the modern regulatory system has been continuously improved.

During the 14th FYP period, China will continue to actively promote the prevention and control of pollution from mobile sources, and to take fighting against exhaust pollution from diesel trucks as an important task to improve environmental air quality. At the same time, the transportation sector will also contribute to achieving the ambitious goals of carbon peaking and carbon neutrality and enhancing China's NDC rate, in this way to achieve synergies in pollution reduction and decarbonization. China's transportation sector will continue to optimize the adjustment in transportation structure, reinforce administration and supervision, strengthen industrial and international cooperation, and strive to scientifically upgrade regulations and standards. Director Cui added, **hope NDC-TIA project can provide precious experience of developing standards and regulations for synergic reduction of air pollutants and GHG emissions**, as well as advanced lessons to other Asian countries.

Keynote– Ms. Miriam Gutzke :

EU and China are both holding great ambitions and clear strategy in transportation decarbonization

Ms. Miriam Gutzke, the Counselor of German Embassy in China, also delivered a speech for the conference and stressed the common challenges facing China and Germany and the low-carbon transition strategy. In the European Union, the transportation sector accounts for nearly 30% of greenhouse gas (GHG) emission and

is also the main source of air pollution at the city level. Despite the enormous potential to reduce emissions, the decarbonization in the transportation sector is still very difficult. We even found that, on the contrary, emissions in the transportation sector had increased from 2019 onwards. For China, the transportation sector is also a tremendous source of pollution and GHG emissions, and its carbon dioxide emissions account for 10% of the nationwide total emissions.

Miriam also mentioned that both EU and China have set ambitious goals and strategies. In order to achieve 90% carbon neutrality by 2050, we have also introduced a "Fit for 55" plan, i.e. reducing the emissions from motor vehicles by 55% by 2030. The EU will also establish new carbon emission trading systems, including a system for the transportation sector. China has also announced that it will achieve carbon peaking by 2030 and strive to achieve carbon neutrality by 2060. Recently, China has also proposed a "1+N" policy package, including 40% of vehicle energy consumption from clean energy. Looking forward to the implementation of this series of policies in the future.

Mr. MA Dong :

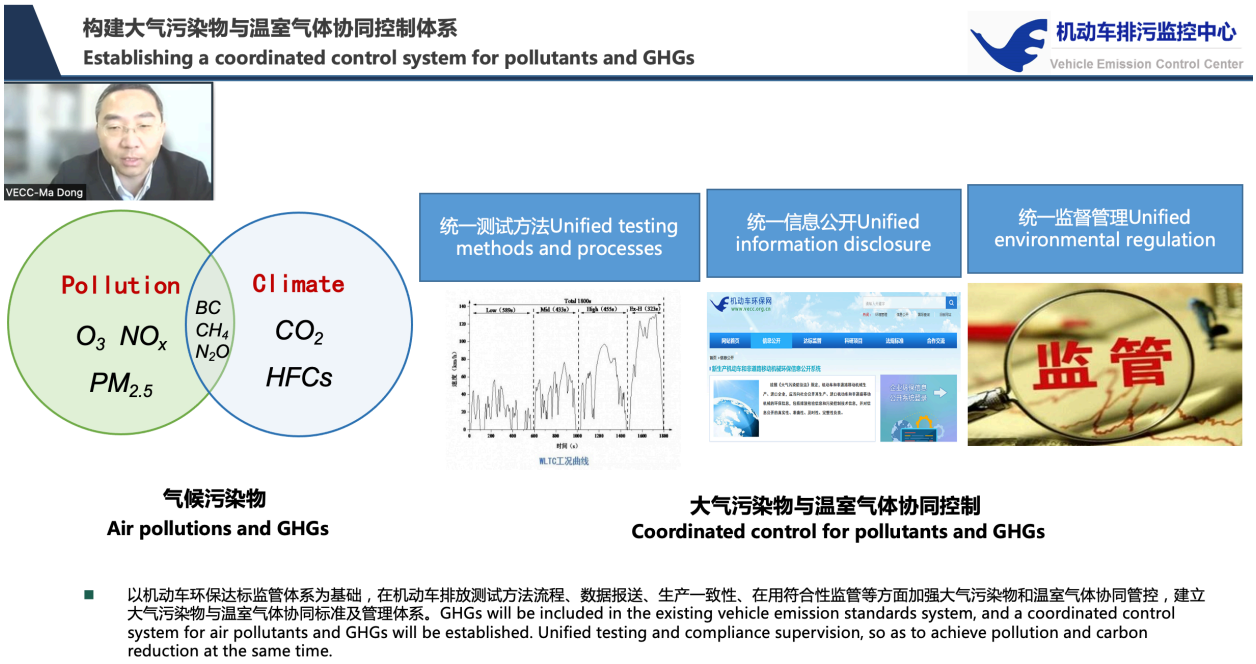
Great achievement has been made in Chinese Transportation decarbonization, further enhancements and improvements are still requested

Mr. Ma Dong from VECC introduced the reviews, strategies and policies in terms of the synergistic control of pollution reduction and decarbonization in the transportation sector in China. Since 2000, the pollutant emissions from individual vehicles have been reduced by more than 95%. While the vehicle ownership is growing rapidly, the pollutant emissions have been effectively controlled. Since 2005, the overall fuel consumption of the fleets has also shown a downward trend, where the average fuel consumption of passenger cars has been reduced from 7.3L/100km in 2013 to 5.6L/100km in 2020. Since 2019, the China 6 fuel standard has been put into effect nationwide, thus the sulfur content has been reduced to 10 ppm, indicating that the development trend of more cleaner fuel becomes more and more significant. In addition, the transportation structure has been optimizing continuously, and the supervision system has also been strengthening and improving constantly.

Mr. Ma Dong expressed his thoughts on future work under the dual goals and challenges of air pollution and climate change, and emphasized that the synergistic emission reduction is the top priority:

- Complete the regulation system, develop air pollutant and GHG synergic control standard and inspection system, including synergic testing of pollutant and GHG emissions, integrated data disclosure system and compliance inspection system.

- Pay attention to the real-world road emissions, further striengthen the emission standards, and accelerate the promotion and application of NEVs;
- Pay attention to low-carbon fuels, promote the transition of transportation energy structure and reduce vehicle full life-cycle emissions;
- Strengthen standard establishment and air pollutants and GHG emission reduction administration in such sectors as non-road machinery, vessels and railways.
- Strength the improvement of transportation and passengers travel modals structures, increase the transport efficiency.



- 以机动车环保达标监管体系为基础，在机动车排放测试方法流程、数据报送、生产一致性、在用符合性监管等方面加强大气污染物和温室气体协同管控，建立大气污染物与温室气体协同标准及管理体系。GHGs will be included in the existing vehicle emission standards system, and a coordinated control system for air pollutants and GHGs will be established. Unified testing and compliance supervision, so as to achieve pollution and carbon reduction at the same time.

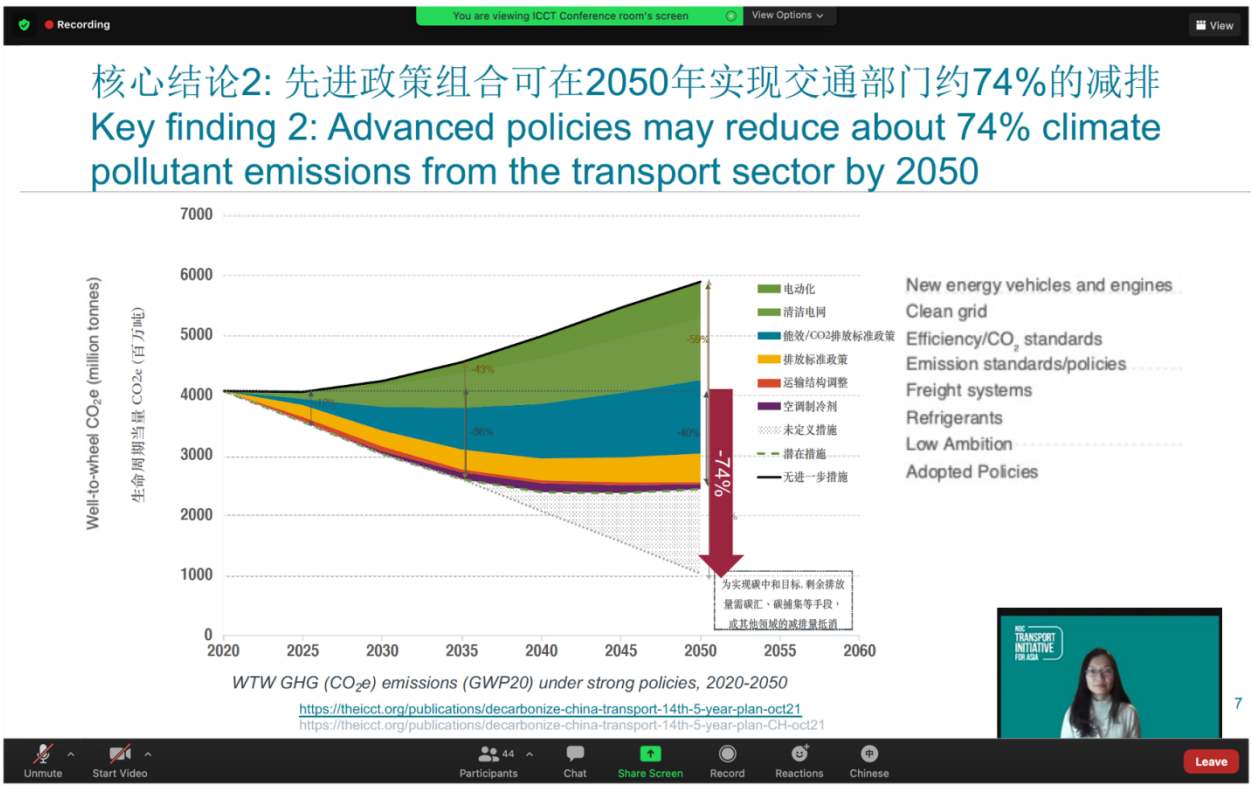
Ms. HE Hui: *China's transportation sector shows great potential for over 70% carbon emissions reduction by 2050*

Director He Hui from ICCT elaborated the opportunities and potentials to decarbonize China's transportation sector during the 14th FYP and in the medium- and long-term and reached three key conclusions. First, the policies already in place or under planning are not sufficient to achieve sustainable and long-term emission reduction. Second, with the combination of advanced policies, we can achieve a reduction of about 74% of climate pollutants emissions from China's transportation sector by 2050. Finally, this series of policies will also bring considerable benefits in reducing emissions of air pollutants.

Director He Hui further introduced five key policy pathways:

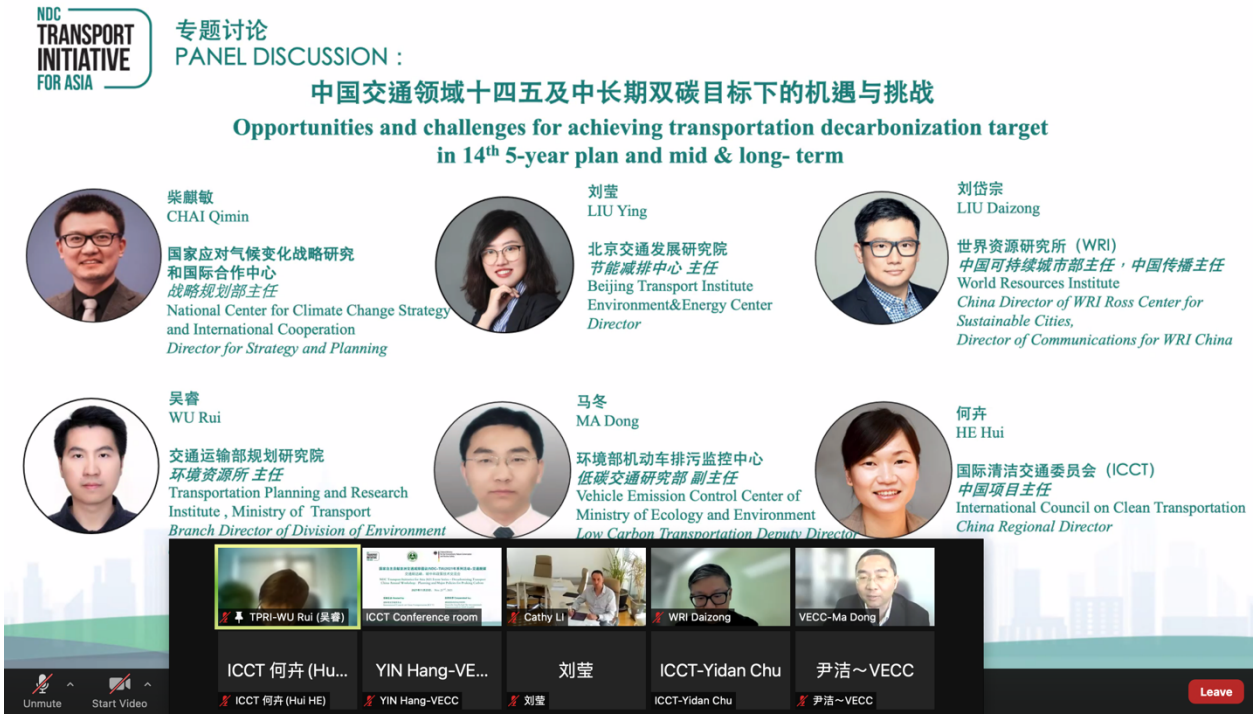
- China can consider establishing short-medium-long-term goals of reducing emissions of climate pollutants in the transportation sector in due time. It is feasible to achieve a reduction of more than 70% emissions by 2050.

- Based on current international experience, energy efficiency and GHG emission standards are powerful policy tools for reducing carbon emissions from the transportation sector.
- Electrification is the most cost-effective way to achieve long-term decarbonization goals.
- Air pollutant emission standards can bring many synergistic emission reduction effects, reducing short-lived climate pollutants while improving air quality.
- The adjustment and optimization of the freight transportation structure can bring additional emission reduction.



PANEL DISCUSSION – Experts group:
Low-carbon transportation and low-carbon future is our common wishes

Under the moderation of Mr. Sebastian Ibold, the group of 6 invited experts from different department and institute had a meaning discussion on **Opportunities and challenges for achieving transport decarbonizing target in 14th 5-year plan and mid-long term**.



Mr. CHAI Qimin: *The cooperation between governmental departments and the complementation between policies are critical*

- Since the 12th FYP period, China has been engaging in the breakdown of decarbonization indicators, especially the carbon intensity control, and concurrently in the breakdown of total carbon emission target;
- Taking into consideration the local factors such as resource endowment, development stage, economic characteristics, and industrial structure characteristics, “one size fits all” should be avoided when implementing these policies;
- With respect to implementation of various policies, the characteristics of current development stage of the local level should be taken into account; enhancing the efforts to emission reduction, while taking into account the local energy security, industrial chain supply security and other related issues.

Mr. WU Rui: *Comprehensive considerations are necessary to ensure a high working quality towards the targets*

- China has achieved a remarkable progress in promoting low-carbon power propelled vehicles; the penetration rates of new energy buses, taxis and private passenger cars are also gratifying. The transition to low-carbon power propelled heavy-duty trucks and the replacement in different applications by scenarios will also be one of key tasks in the future.
- In February 2021, the Chinese government released the "National Comprehensive Three-Dimensional Transportation Network Plan", indicating that China will witness a systemic and intensive process in the future. A safe, convenient, efficient, green and cost-effective transportation is the key point of future development.
- Encourage transportation-related business sectors to focus on decarbonization and promote reforms in various related fields. On the basis of meeting the needs of the civilians and the social and economic development, achieve carbon peaking and carbon neutrality in a high-quality manner.

Ms. LIU Ying: *Well-developed policy tool package can great support locals to achieve the low-carbon development target.*

- Five aspects should be taken into account to achieve the implementation of a package of solutions, i.e. construction of policy toolkit, infrastructure improvement, industrial energy transition, mobilization of social atmosphere, and technological progress.
- Beijing has established several core strategies for the transition to "dual carbon" (carbon peaking and carbon neutrality), which involves three major structural issues, i.e., energy structure, transportation structure, and mobility structure.
- To support the NEVs development, Beijing is focusing on the adoption and integrated plan of the power system. There are a lot of explorations and innovations in the private sector such as some battery swapping stations for taxis, heavy-duty trucks, etc.
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Mr. LIU Daizong: *Key connections needed between national and local works and plans*

- Firstly, we need to focus on the integration of different department in local level. The establishment of a relatively efficient governance system requires the integration of all relevant departments, so as to promote the air pollutants and GHG emission reduction in the transportation sector;
- For the development of specific plans at the government level, definite project levels or action levels are required; the local governments need to effectively interpret and communicate the national-level policies to the relevant local departments;
- A well-developed roadmap is required to provide clear steps to assist in the achievement of medium- and long-term goals, and demonstration projects are required to promote the implementation.

Mr. MA Dong: *Air pollutant and GHG emissions reduction are the common target for each ministry and industry*

- The MEE, the NDRC and the MOT have the same goals, that is “dual carbon” and “Beautiful China”;
- In order to achieve the goal of zero emission, the attention should be paid not only to the emissions at the user end, but also the emissions throughout the life cycle, including the production and recycling of the vehicle, to encourage all relevant fields to reducing emissions jointly.
- From the perspective of environmental protection, the synergistic control of air pollutants and GHG emissions should focus on two aspects or two types of vehicles: first is the control of conventional vehicles, to continue improving the energy efficiency; second is promote NEVs, accelerate the ICE vehicles replacement with NEVs.

Ms. HE Hui: *China achieved great development in NEVs under continuous challenges*

- In China, the development of NEVs is not limited to motor vehicles, but has penetrated into non-road fields, which indeed demonstrates the strategic insight and the pioneering advantages. China's deployment of the entire industry and supply chain has been very successful.
- However, the NEV development still faces many challenges, e.g., the NEV share in the ordinary consumer market is still at a relatively low level compared to developed countries. Additionally, regional development is also uneven in China.
- The COP26 Conference held in Glasgow showed a clear signal that more and more countries around the world have announced the development goals and roadmaps for light-duty vehicles and heavy-duty vehicles. China needs to maintain its position in the “fast lane” in the future international competition landscape, as well as develop a mid- and long-term roadmap towards zero emission as soon as possible.

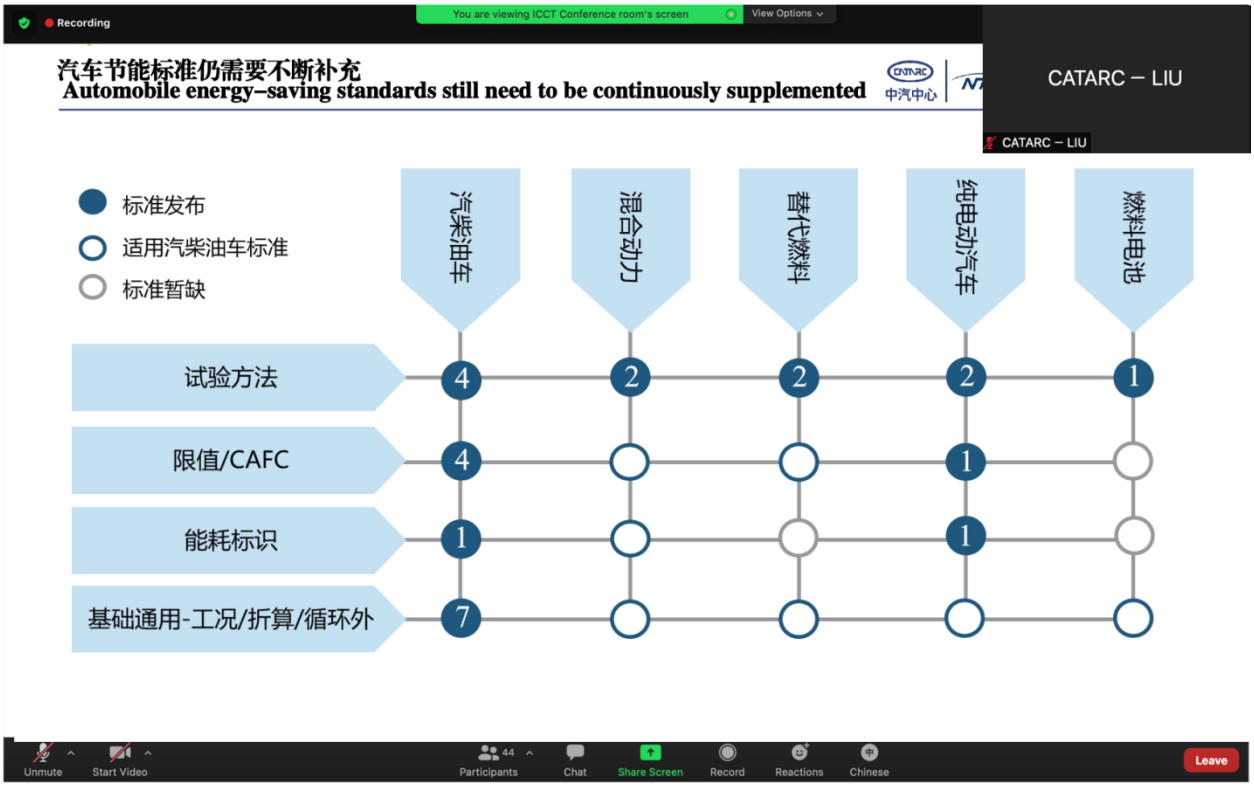
THEME 2: KEY VEHICLE REGULATIONS PROGRESS TOWARD MOTOR VEHICLE DECARBONIZATION

Mr. LIU Shaohui: Energy efficiency of China's automotive can be in line with the advanced international level

Director Liu Shaohui from the Standards Institute of CATARC introduced the latest development of China's motor vehicle fuel consumption standards. Director Liu said that, China has developed various fuel efficiency standards for light-duty and heavy-duty vehicles in the past 20 years based on the development status of automotive industry. And in 2019 we initiatively proposed the energy consumption standards for electric vehicles around the world. To date, China has established a relatively mature automobile standard system.

Current progress of key projects:

- China's Stage-5 fuel consumption standard for passenger cars has been implemented in 2021; the average fuel consumption of passenger cars is forced to reach 4L/100km by 2025.
- China's Stage-6 fuel consumption standard (to be enacted from 2026 to 2030) should aim to address two major issues, i.e. how to continuously reduce the fuel consumption of conventional gasoline and diesel vehicles and how to promote the NEV development.
- Currently, we are engaged in the Stage-IV "fuel consumption test methods for heavy-duty commercial vehicles" and "China automotive test cycle" to support the Stage IV fuel consumption standard, which is expected to be implemented in 2024 or 2025. The Stage IV fuel consumption of commercial vehicles will be tightened by about 15% compare to Stage III, and the intensity will reach the same international level

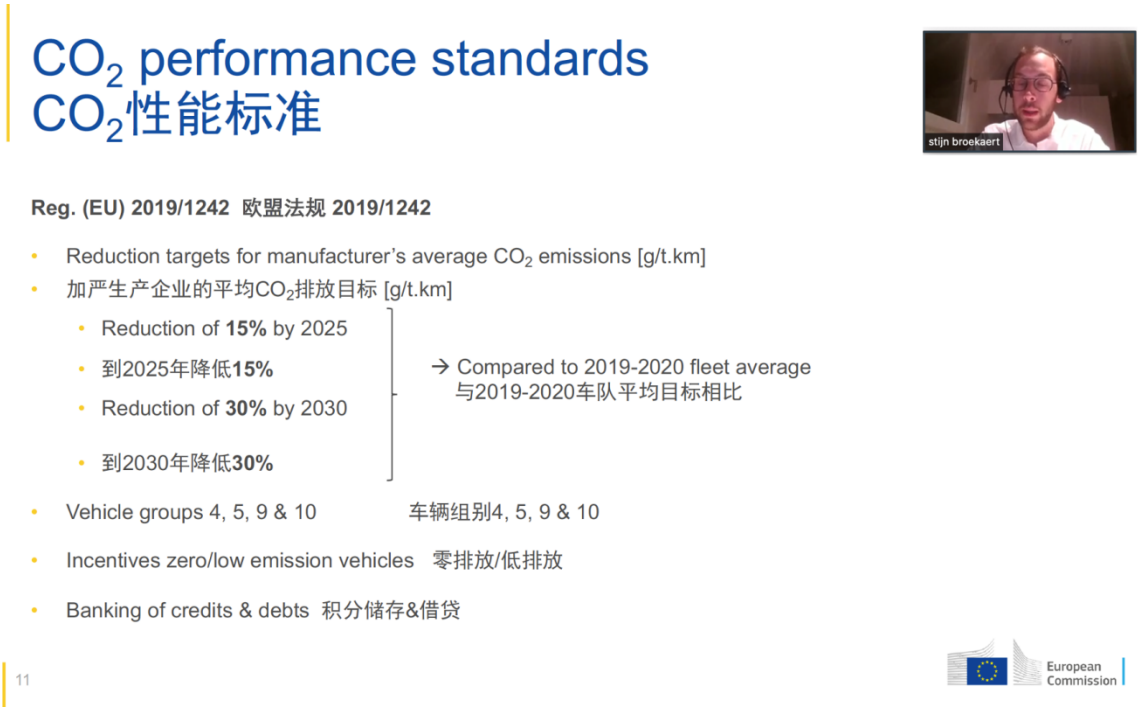


Mr. Stijn Broekaert：

Lots of works need to be done for improving EU HDV regulation

Dr. Stijn Broekaert from the EU Joint Research Center (JRC) introduced the latest development of the EU's VECTO software for heavy-duty vehicles. The VECTO software is a simulated calculation tool and is mainly used to calculate vehicle energy demand, energy consumption and carbon dioxide emissions. He highlighted the recent important updates, including:

- Manufacturers are required to create the vehicles' VECTO data, provide the consumers with the consumer information form displaying the simulated results of fuel consumption and CO_2 emissions, and incorporate them into the vehicle conformity certificate.
- The third amendment to the Regulation 2017/2400 will take effect in 2023. This regulation will cover most types of the medium- and heavy-duty vehicles as well as hybrid and battery electric vehicles. In addition, we will also consider the hydrogen fuel internal combustion engines in VECTO.
- Regulation 2019/1242 stipulates that the emissions from medium-duty vehicles would be reduced by 15% by 2025 and 30% by 2030. Our emission reduction goal is based on the average emission value during the period 2019-2020, and this value is precisely set based on the real-world emissions.



Filip Fançois:

"Fit For 55"can bring challenges but great benefits to EU member states

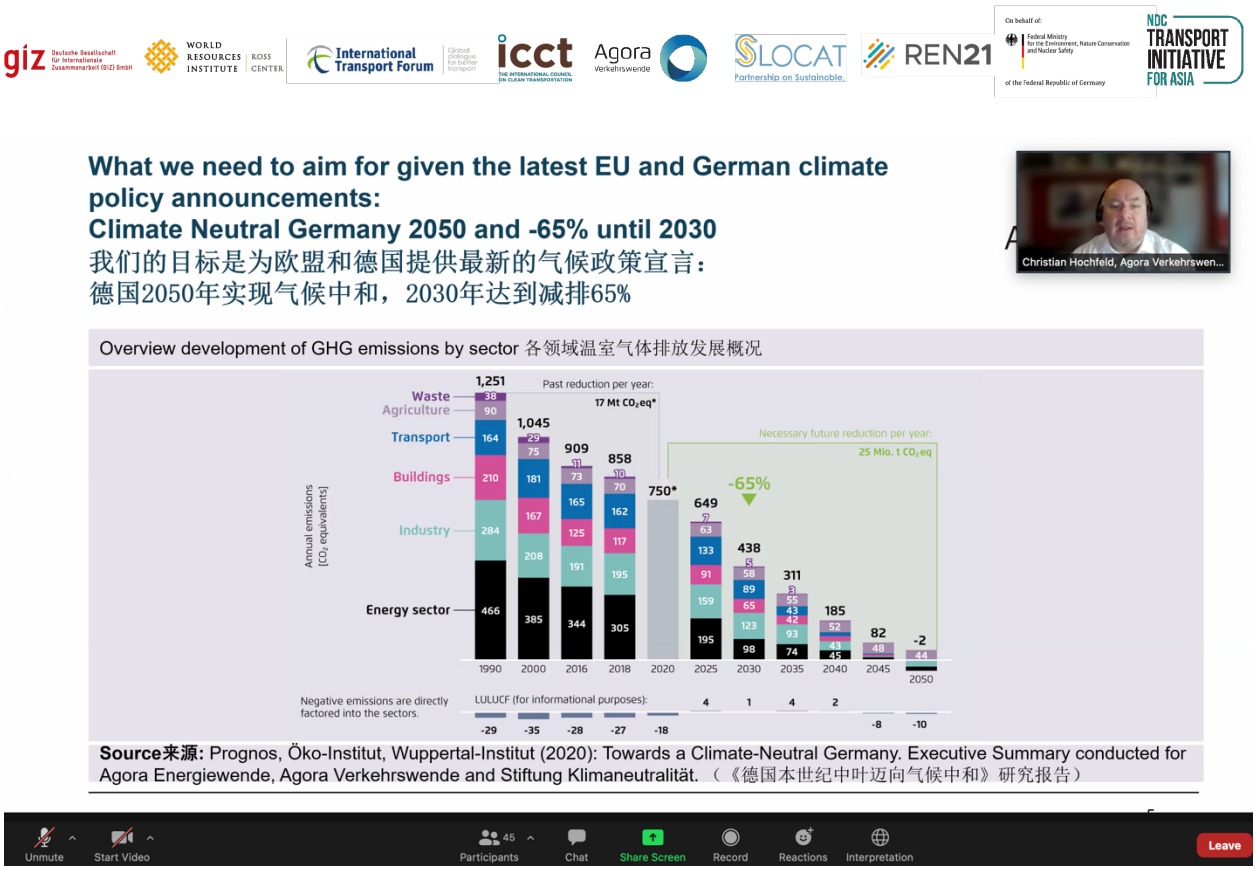
Dr. Filip Fançois from the DG CLIMA introduced the amendment to the European carbon dioxide emission standards for passenger cars and vans under "Fit For 55 package". He mentioned that, in order to achieve zero emissions (i.e. carbon neutrality) by 2050, a roadmap must be designed, including major policies and measures, fuel consumption and carbon dioxide emissions. The "Fit For 55 package" covers all sectors, where the information closely related to the transportation sector is described as follows:

- The EU's carbon emission trading system (ETS) would incorporate a new sector, i.e. transportation sector.
- With respect to the current policy, the limit for emissions from passenger cars is 95g/km and from vans is 147g/km (NEDC test cycle) before 2024; the emissions from passenger cars and vans would be reduced by 15% by 2025, and after 2030, the passenger cars and vans would be reduced by 37.5% and by 31% respectively (WLTP test cycle, compared to 2021 baseline).
- In the proposal to amendment, the emissions from passenger cars and vans would be reduced by 55% and 50% respectively after 2030, and by 100% after 2035. two incentive measures are prepared for zero-emission and low-emission vehicles.

Mr. Christian Hochfeld: *Germany is determined to achieve decarbonization goals rapidly*

Mr. Christian Hochfeld from the Agora introduced the progress of Germany achieving carbon neutrality goals and the enlightenment to the transportation sector. He said that, Germany would soon adopt a four-year development plan on transportation decarbonization, and a long-term plan towards the middle of this century. Further, Germany adopted a new environmental protection proposal in May 2021, aiming for 65% emission reduction by 2030, compare to 1990. The proposal information closely related to the transportation sector is described as follows:

- By 2045, the transportation sector would achieve near-zero emissions by means of a significant reduction in energy consumption and the large-scale electrification, and aiming to generate 50% of its new electricity from renewable energy sources.
- Germany needs 15 million electric vehicles to achieve the carbon neutrality by 2045, thus Germany needs to set a much higher goal than the "Fit for 55". This goal needs to be supported by a combination of appropriate fiscal and taxation systems, e.g. ownership taxes on individual and corporate vehicles, fuel taxes, and energy taxes, etc.
- How to achieve the goals of all transportation sectors (airplanes, vessels and roads) being powered by renewable energy, and how to realize the transition to electric buses and increase the share of public transportation mobility are the topics to be discussed in the future.



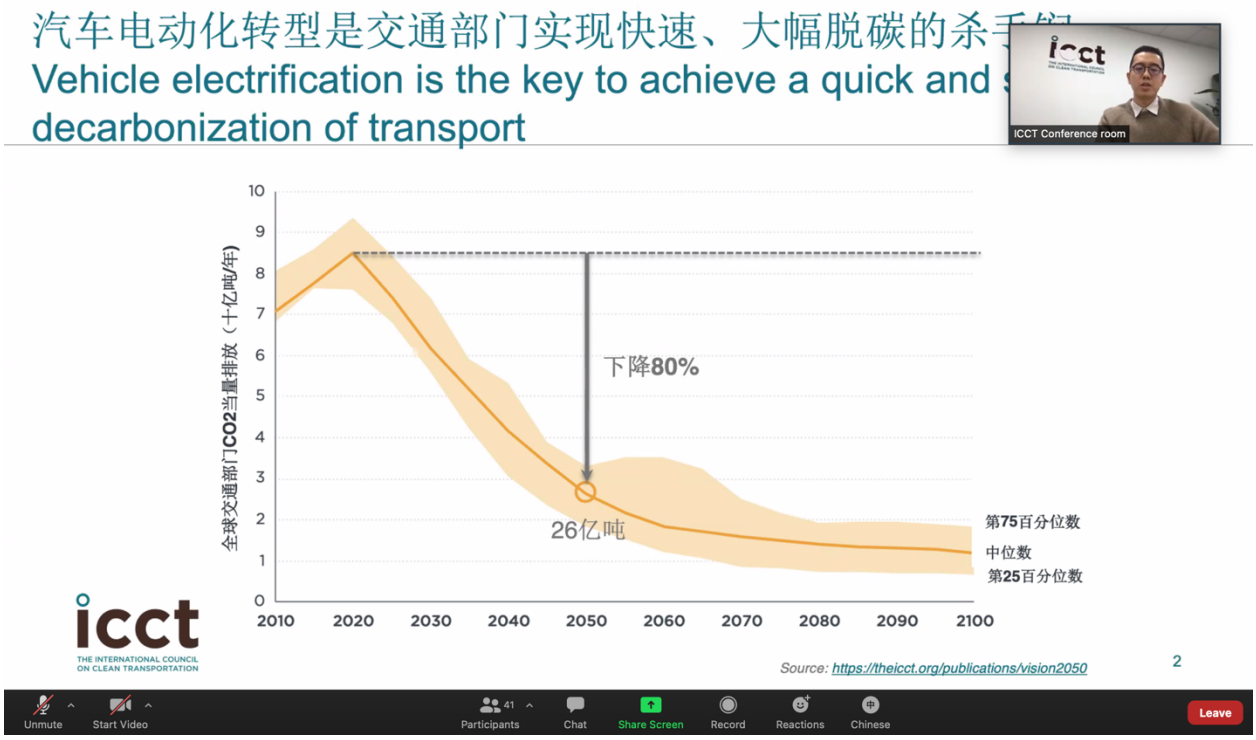
THEME 3: LATEST DEVELOPMENTS AND KEY POLICIES OF ZERO EMISSION VEHICLES

CUI Hongyang: *Zero-emission zone is an important step to achieve electrification transition and transportation decarbonization*

Researcher Cui Hongyang from the ICCT introduced the global zero emission goals for motor vehicles and an overview of zero emission zone policies. In order to cope with climate change and to accomplish the 1.5°C temperature control goal, the transportation sector needs to be decarbonized rapidly and substantially. According to our latest research, the GHG emissions from transportation sector needs to be reduced by 80% in the next 30 years globally. This is a very challenging task and requires a combination of various measures. One of the most important or extremely important measures is transition to vehicle electrification:

- Vehicle electrification is the key to achieve quick and substantial decarbonization of the transportation sector. By October 2021, over 30 countries or state/provincial governments have put forward the goals of fully electrifying passenger cars; although the electrification of heavy-duty vehicles is relatively difficult, the global is accelerating to reach a consensus.
- During COP26, 28 countries announced that 100% of new passenger cars and vans would be zero emission vehicles (ZEV) by 2040; 15 countries pledged that 30% of new medium- and heavy-duty buses and trucks would be ZEVs by 2030, and 100% of new medium- and heavy-duty buses and trucks would be ZEVs by 2040.
- Compared to many existing electrification incentives, the zero-emission zone policy has prominent advantages. It can not only promote the electrification of new vehicles, but also accelerate the replacement of vehicle stocks, thereby

accelerating the transition to zero-emissions for the whole fleet.



Felipe Rodríguez: *Promote the deployment of zero emission heavy-duty vehicles from three aspects of demand, supply and infrastructure*

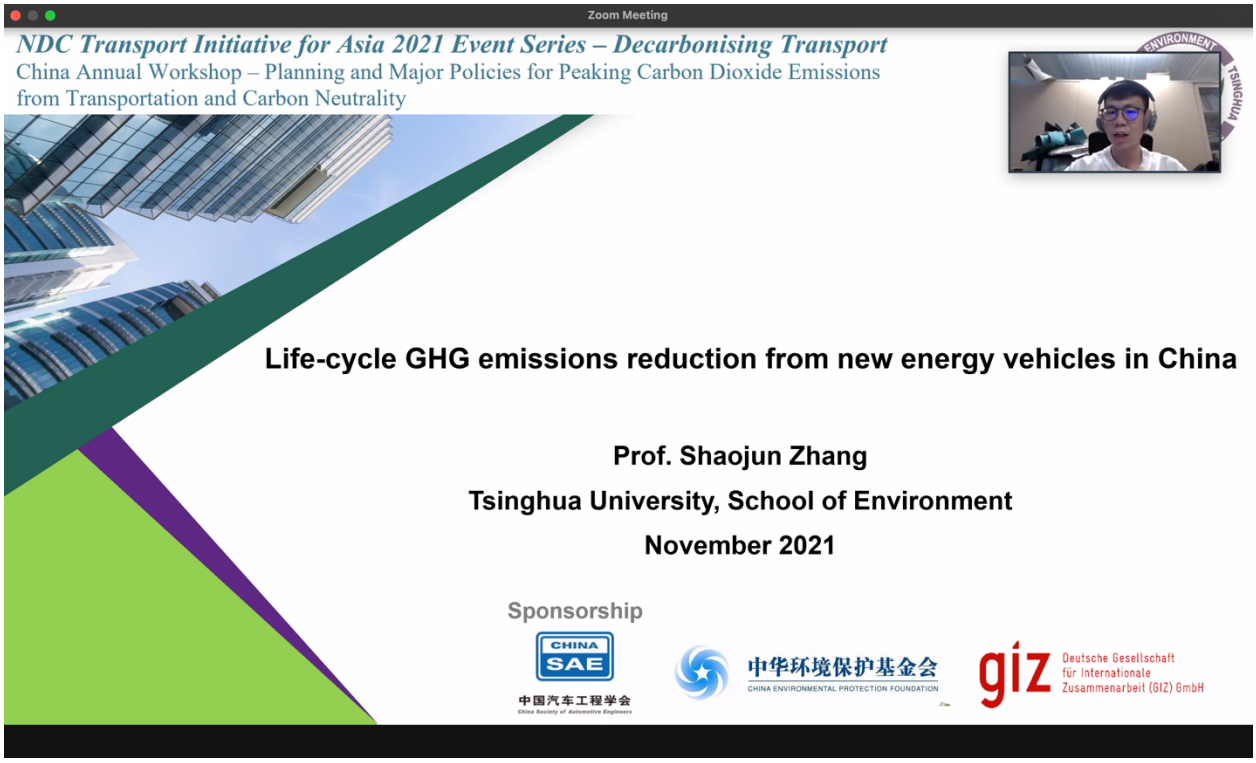
Mr. Felipe Rodríguez, the heavy-duty vehicle project leader from the ICCT, introduced the development and policies on low-carbon and zero-emission of medium- and heavy-duty commercial vehicles in China. The GHG emissions from heavy-duty trucks have been increasing year by year; in order to achieve the 2050 target, it is necessary to reduce the emissions from heavy-duty trucks as soon as possible. As many experts said that ZEVs are very important; although China is optimistic about the development of ZE-HDVs, the efforts are not enough yet, and conversely after 2016, the sales of ZE-HDVs have been declined. Therefore, the policy intervention need to be further strengthened.

- Place emphasis on setting long-term ZE-HDV sales targets and translating targets into administrative requirements; meanwhile, introduce appropriate laws and regulations, such as stricter GHG emission standards.
- The introduction of administrative and fiscal taxation policies from the demand side can accelerate the total cost of ownership (TCO) parity of ZE-HDVs, such as purchase subsidies, fleet operation subsidies and usage subsidies.
- For tractor trailers, the road toll fees account for a high proportion in their TCO for its operational characteristics with lots of long-distance transportations. Our study indicated that a 75% exemption of road tolls can help ZE-HDVs to achieve TCO parity at least 8 years earlier.
- The infrastructure construction subsidies and other policy tools such as zero-emission zones can effectively support the deployment of ZE-HDV fleet.

ZHANG Shaojun: *The electrification of light-duty vehicles has the advantage of reducing emissions throughout the life cycle, while the low-carbon hydrogen fuel should be prioritized for heavy-duty vehicles*

Associate Professor Zhang Shaojun from Tsinghua University introduced the benefits of reducing GHG emissions from NEVs throughout the life cycle in China. Professor Zhang introduced the cutting-edge research on characteristics of emissions throughout the life cycle, carried out by his research team, in the fields of passenger cars and hydrogen fuel cell long-haul trucks respectively.

- The fuel-cycle emissions from electric passenger cars depend on China's power generation structure. Currently, China's average carbon emission is about 590 g/kWh, and is estimated to be lowered to about 360 g/kWh by 2030. The Northwest Power Grid can achieve 50% emission reduction in the future.
- The material-cycle emissions from electric passenger cars consist of three parts, i.e. vehicle body materials, battery, and recycling. The factors such as reasonable recycling of materials and improvement of battery energy density can bring significant emission reduction benefits in the future.
- From the perspective of entire life cycle, the emissions from electric vehicles have been reduced by more than 30% nationwide compared to gasoline vehicles. Even for the North China power grid, which has the highest coal-fired power, the emissions can also be reduced by 10%-15%.
- Currently, the emissions from hydrogen production processes through water electrolysis and coal are still higher than those from diesel. In the future, low-carbon hydrogen energy must be used for transportation decarbonization.



YIN Hang: The 14th FYP is a critical period for China to improve the ecological environment quality

Yin Hang, the deputy director of VECC, made a summary of the conference. He emphasized that, during the 14th FYP period, China's ecological civilization construction has reached a critical period in which the decarbonization is the core and special attention should be paid to synergistic control of pollution reduction and decarbonization to realize the improvement in ecological environment quality from quantitative to qualitative changes. He hope that, through this meeting, we can find a more effective and convenient path to reduce pollution and carbon emissions in the transportation sector and achieve the "dual carbon" goal, and make greater contribution to improving air quality and coping with global climate change. He also made three recommendations:

- Synergistic control of regular pollutants and GHGs is of great importance to China. We need to accelerate the establishment of GHG emission standards towards carbon neutrality based on existing air pollutant emissions standards and fuel consumption standards
- Strengthen the cooperation between government departments, the public and the sectors. Cooperative researches can contribute to scientific upgrading of the national standards and regulations, and comprehensively enhance China's capacity in transportation decarbonization.
- Pay attention to the demonstration effect of local-level practices. Pilot projects like those in Beijing and Guangdong can effectively promote public engagement and accelerate green transportation transition.

ACTION ITEMS

During the meeting period, participants were very engaged in the vitural meeting and contributed lots of questions. The areas of interests are identified below with the major response by invited experts:

Q:
How would Beijing decarbonize its transport sector and set more ambitious goals?
A:
In Beijing, the annual growth rate of carbon emissions from transportation sector (excluding air and railway transportation) has declined from 8%-10% during the 11th FYP to 3% during the 13th FYP period. However, according to the "dual-carbon" goal, the annual growth rate requires to be reduced to 10%, which is a major change in the development direction. The previous low-carbon measures should be continued basically, but must be strengthened, so as to achieve the transition goals fundamentally. This is our consensus. As we can see from Beijing's data, more than 50% of the contribution to reducing emissions basically depends on the promotion of NEVs and the optimization of energy structure. This is an important means.

Q:
What are China's development strategies of zero-emission vehicles and the measures to achieve zero emissions throughout the life cycle?
A:
Nearly 70% of electricity is generated from coal in China, so NEV is not a zero-emission technology from the perspective of life cycle. When we are promoting zero emissions, or when we consider carbon emissions, we must consider it from the perspective of life cycle. Therefore, we should take into account the national macro-level strategies and the fields of national energy transition, when formulating policies, and we should force or promote the transition of energy industry by means of zero emissions in the transportation sector.

Q:
How does the EU consider the life-cycle emissions when formulating the GHG standards?
A:
The current legislation is aimed at tailpipe emissions, because in the past 10-15 years, we've been trying to distinguish responsibilities, that is, different interested parties assume different responsibilities. For example, who is responsible for tailpipe emissions? The answer is the vehicle manufacturers definitely. This is a very direct link and we can find the cause and effect relationship. Meanwhile, the EU has also regulated the sectors involved in fuel and energy production by means of the carbon emission trading system (ETS). Under the ETS, we have a package of policies to achieve comprehensive emission reduction. In addition, the EU also regulated different sectors such as battery production and fuel quality by means of legislation.

Q:

What is the basis for the local governments to make choice and to do when they establish or choose from these policies for transportation decarbonization and promoting zero-emission vehicles?

A:

The key point is environment goals, including air quality goals and climate change goals. In fact, many Chinese cities actually have set their own air quality goals. After the national-level "dual-carbon" goal is introduced, I think that, during the 14th FYP period, all provinces and cities would establish their own "dual-carbon" goals based on local conditions. Only under these goals can we have a good answer as to what kinds of zero-emission policies should be formulated for a city, how strict it should be, and at what speed the transition should be made. Of course, during this process, such factors as characteristics of population distribution, characteristics of traffic flow, and characteristics of emission levels, can also be taken into consideration.

Q:

What is the development status of hydrogen fuel?

A:

With respect to hydrogen fuel cell, our short-term goal is to reach 1 million units by 2035. Based on this goal, we need to estimate how much hydrogen and coke oven gas we have, and how much we can produce hydrogen by using renewable energy sources. The coke oven gas and hydrogen production by using renewable energy sources are relatively clean technology paths in the near future. It is expected to have an annual output of 2 to 3 million tons. However, the hydrogen demand may reach 20 million tons per year in the long term, possibly by 2050. At that time, if we still cannot meet the annual output target of 20 million tons after we have tried to produce hydrogen using curtailed wind & solar energy or from coke-oven gas, China will have to produce hydrogen exclusively from renewable energy sources.

Q:

The actual income of truck drivers in China is very low, so they have a negative attitude towards the electrification of trucks, because the initial investment is relatively high, and there is no additional benefit during the subsequent operation period. What's your point?

A:

First of all, the freight transportation sector has a very low profit margin indeed at a level of break-even or meager profit basically. There is a certain risk in transition to zero-emission vehicles. Additionally, the risk of initial investment is very high. During the subsequent operation stage, the additional purchase cost needs to be compensated slowly by means of price difference between fuel and electricity, which would take a long time. So we have to provide some additional incentive policies, which should be driven by large fleet operators. If a vehicle manufacturer wants to sell such kind of vehicles, it would consider how to encourage people to buy vehicles, so we encourage transition and reduce the potential risks.

From the perspective of drivers, I have heard some interesting stories. Here, the driver is not the vehicle owner, but just a driver. He actually likes to drive this new energy vehicle, because he doesn't need to afford the cost and he can enjoy the cleanness and low noise, thus it is difficult to quantify additional benefits by money. But this issue is

indeed quite challenging. We will conduct in-depth discussions and research on this issue in the future to find out what kind of business model applies and how to rationalize the relationship between the driver and the vehicle owner.

Additional information and materials about the conference will be available on the official websites of ICCT and NDC-TIA.