Submission from Norway with views for Mitigation Work Programme in 2023

Submission from Norway with views for the second global dialogue relevant for the topic accelerating just energy transition in transport systems under the mitigation work programme.

Norway welcomes the chosen topic for the work programme, *accelerating just energy transition in transport systems*. Norway believes the topic will facilitate productive discussions to identify how we can urgently scale up mitigation ambition and implementation in this critical decade. We also welcome the opportunity to provide our views on opportunities, best practices, actionable solutions, challenges and barriers relevant to the just energy transition in transport systems.

In the dialogues it is important to facilitate active participation from non-party stakeholders. The mitigation work programme should not only be for Parties but should also foster inspiration, information and guidance for other stakeholders, including local communities, industry etc. to increase their ambition and implementation. We welcome the heightened limit of digital participants from 2 to 4, and hope even more can be done to give opportunity for expert voices to be heard.

Parties have resolved to pursue further efforts to limit the temperature increase to 1.5 °C. Transport is one of the major sources of emission in many countries, and require substantial system ystemic changes, including reskilling and education, technology switching, instrastructure changesplanning and retrofitting, and increased use of electricity as well as alternative energy carriers.

The scientific evidence need to be the backbone of all discussions. The IPCC WGIII report gives a solid foundation to build the discussions upon. The dialogues should also draw upon relevant work already undertaken under the UNFCCC and the Paris Agreement.

Specific views, input and experience related to the topic

Norway welcomes the topic and subtopics chosen by the co-chairs. The work program should not exist in a vacuum and in isolation from other work already undertaken on the topic and subtopics chosen by the co-chairs, but use all relevant work undertaken by the UNFCCC Subsidiary Bodies and Constituted Bodies under the UNFCCC, including the Technology Executive Committee, the Forum on Implementation of Response Measures and its Katowice Committee on the implementation of response measures and the Paris Committee for capacity building, as well as the FWG LCIPP. Building on this work will ensure uniformity, conformity, and compliance with decisions across activities implemented under the Paris Agreement. We appreciate that the co-chairs in the June dialogue, drew upon the relevant work conducted under the Technology Executive Committee and its chairs as fasilitators.

The role of IPCC WGIII report in the dialogues

In addition to the work already undertaken as referred to above, the WGIII report provides valuable starting points for the dialogues. The IPCC WGIII report chapter 10 outlines several mitigating options for transport across segments.

In order to illuminate opportunities, best practices, actionable solutions, challenges and barriers relevant to the topics of the dialogues, we have highlighted some of the options presented by the IPCC report that we believe can contribute to accelerate just energy transitions in transport systems. We have outlined general challenges and opportunities linked to these options that can inform relevant actors on how these solutions can be implemented. Finally, we give some concrete examples from our national context.

Zero emissions road transport

The IPCC WGIII report chapter 10.4 discusses Decarbonisation of Land-based Transport, highlighting different technology options for decarbonisation. Norway is a relatively small car market with about 2,9 million passenger cars. Nevertheless, since 2011 Norway has been the third largest market in the world for battery electric vehicles, according to Bloomberg.

Last year almost 80 per cent of all new passenger cars sold in Norway were fully electric, with a further 9 % hybrid. Norway has a goal that all new cars sold in Norway will be electric by 2025. The most important policies to get here have been economic: strong tax incentives, as well as reduced rates for toll roads, parking and ferries.

- Challenges:
 - Deploy new infrastructure to support Electric vehicles, including reliable low-carbon grids and charging stations
 - A rapid electrification of passenger vehicles may require strong economic measures to overcome price differences, as well as other barriers to adoption.
 - Reskilling of mechanics, different skills are required to maintain and fix a traditional car compared to an electric or hydrogen vehicle
 - Hydrogen is an explosive gas and proper HMS training of people at filling stations will be important.
 - Changing employment opportunities as gas stations are replaced with charging stations.
 - Strong tax incentives combined with increased share of electric vehicles will lead to a substantial decline in tax revenues.
 - Looking beyond CO2-emissions, electric vehicles and conventional cars have approximately the same external marginal damage cost to society. Taxing the external costs from the use of electric vehicles can be challenging.
- Opportunities:
 - After many years of developments and improvements, in most segments the technology of EVs is now cost competitive compared to the conventional alternatives in many countries.
- Example:
 - The overall goal for Norway has been and still is to make sure that choosing an EV is an attractive and economically viable choice. As battery costs continue to fall and the number of available models increases, this is now the case maybe even without strong government incentives.
 - Emissions of greenhouse gases from fossil fuel vehicles is subject to CO2-tax of approximately € 84 per tonne CO2-eq. in 2023 The CO2-tax gives strong incentives to choose Zero Emission Vehicles.
 - In addition, Norway has had targeted EV policies since the 1990s. Norway early on introduced a broad package of incentives for EVs and charging infrastructure, both tax and user incentives.

- The total tax incentives for electric vehicles are very strong and are equivalent to a CO2-tax of 1 000 1 500 euro per ton CO2. For comparison, the price of emission allowances in the EU ETS is currently around 90 euro per ton CO2. As a result, we have seen a significant increase in the share of electric vehicles. In 2022, almost 80 per cent of new passenger cars are battery electric.
- Revenues from car related excise duties has fallen from around NOK 80 billion in 2007 to NOK 40 billion estimated in 2023. In addition, VAT revenues have been reduced as a result of the zero-rate for electric vehicles. The tax incentives have significant negative impact on the fiscal leeway for government budgets.
- At the early stages of market maturity, it was particularly important that these were predictable and long/medium term. Economic measures are further discussed below under a separate heading.
- Reduced prices for electric vehicles has increased the total sale of cars, enhancing pressure on roads and infrastructure and gives incentive to move from public transport and bicycle to car
- Electric vehicles were allowed to use the bus/public transport lanes (to be spared from traffic in rush hours). When many people drive their electric cars the result has in some cases been queues in the public transport lane– which then reduces the attractiveness in using public transport services.
- A critical component has been the availability of charging stations. In December last year the government presented a charging strategy. The strategy addresses challenges and what needs to be done to ensure sufficient charging infrastructure going forward.
- EV does not fully solve the issue of local pollution of particles as the EV cars from wear and tear of tires and of the tarmac, will still need to be addressed.

Maritime

The IPCC WGIII report chapter 10.6 discusses Decarbonisation of Shipping, and shows that shipping has particular challenges in decarbonisation, with a strong dependency on fossil fuels without major changes since AR5. Despite improvements in carbon intensity of ship operations, growth in transport volumes has resulted in continued growth in GHG emissions. The report lists mitigation options, from battery-stored electricity, to biofuels and synthetic fuels.

Global actions for emission reductions from international shipping are negotiated in the International Maritime Organisation. The adoption of the revised IMO GHG strategy shows the willingness of the maritime sector to do its part in the decarbonisation globally, and Norway is working actively to ensure a swift follow up in line with the agreed timeline and content of the revised GHG strategy.

Nationally, Norway has implemented several policies to incentivize decarbonisation of shipping, including climate taxes (discussed below), and support to innovation and technology development.

- Challenges:
 - Environment, air quality, human health, acidification of oceans.
 - Succeeding in the switch from conventional fossil fuel driven vessels to sustainable zero or near-zero emission fuels like hydrogen, ammonia and methanol. This requires both the development of infrastructure, technology and safe procedures for the use of hydrogen and ammonia both on the ship side and on the shore side, which again

requires large investments both from the private and public sector if we want to succeed.

- Hydrogen is a volatile and explosive gas, it demands strict safety regulation, protocols and education for the people handling them.
- Ammonia is very poisonous and must be handled with care.
- Opportunities:
 - Reducing domestic emissions from shipping.
 - Providing solutions for emission reductions for a sector that stands for around 3% of global GHG emissions.
 - Supporting the energy transition on the shore side through the establishment of demand from the ships for sustainable zero emission alternatives.
 - Reducing local air pollutants that are responsible for human health complications.
- Example:
 - Norway's strong maritime links make this sector a priority. We have longstanding
 maritime traditions, with a large commercial fleet, a large offshore fleet serving the
 offshore sector and also a large network of ferries and passenger speed boats due to
 our topography along the coast.
 - The maritime industry is an important industry in Norway, meaning that the sound transition of this sector is also important for value creation, securing jobs and for the continued development of our local communities along the shores.
 - Through national requirements for climate friendly technologies, combined with public support schemes, Norway is on the path towards decarbonisation of the ferry sector. Today, around 1/3 of the around 250 domestic ferry links are decarbonised, mainly through battery electrification. Such technology requirements in public procurements will generally increase the cost of the procurement, though we do not have an estimate for this effect.
 - In the offshore segment, public support schemes combined with emission taxation has resulted in the investment in battery installation in several vessels. We see the beginning of the same development in other parts of the sector, e.g. vessels supporting the aquaculture industry.
 - Further, through the active use of public-private partnerships aimed at piloting low and zero emission solutions, we ensure that good and mature pilot projects can be taken forward to realisation, with support from public schemes.

Aviation

The IPCC WGIII report chapter 10.5 discusses Decarbonisation of Aviation. The report notes that the scope for reducing CO2 emissions from aviation through improved airplane technology or operations is limited and unable to limit emissions. Aviation therefore requires employment of alternative lower-carbon fuels to reduce emissions sufficiently.

Norway is a long country, with a spread-out population. Challenging geography characterised by steep rocky mountains, fjords, and limited flat ground means that in many cases aviation plays an important role in communication between communities. These routes are often not short-distance, carrying a limited amount of passengers.

- Challenge:
 - Aviation has long development cycles, especially for new technologies, and widescale deployment of zero emission technology will take a very long time. Given the

time-scale to decarbonise, choosing viable infrastructure and technologies is challenging.

- The IPCC WGIII report notes the limited availability of bio-fuels, both globally now and for future growth. It also highlights the challenges of land-use change to biofuel production, which can both increase GHG emissions, and endangers biodiversity.
- Sustainable airline fuels have challenges in costs. Synthesising fuel from electricity is technically possible, but costly compared to current fuel prices.
- Opportunities:
 - The IPCC WGIII report suggests that flights of light planes carrying up to 50 passengers may be able to use electric power.
- Example:
 - Norway's already established infrastructure and demanding topography make it a good arena for testing and development of low and zero-emission aircraft.
 - The government and aviation industry in Norway take a broad range of measures to mitigate CO2-emissions from the sector.
 - A central subject in Norway's upcoming aviation strategy is how the government can facilitate the transition to zero and low emissions aircraft on the network of short-field regional airports in Norway. We know that the planes operating on the distances today are due for renewal in 2035 (latest), and that the current operator has been clear that they want to avoid purchasing conventional technology.

Economic measures to incentivize mitigation in transport

Figure 10.1 in the IPCC WGIII report shows that transport greenhouse gas emissions have increased across almost all regions since 2000. The report notes that economic and population growth has outpaced fuel economy improvements, especially in countries starting from a low motorisation rate. Further, the report notes the need for enabling conditions, detailed in Chapter 10.8.

- Challenge:
 - Greenhouse gas emissions represent a cost for society as a whole, which is not directly apparent to the emitter.
 - Build-out of transport systems with greenhouse gas emissions give path dependence, and can lock in solutions that are not compatible with a future net-zero world.
- Opportunity:
 - Cross-sectoral economic policy instruments (climate taxes) form the basis for decentralized, cost-efficient and informed actions.
 - Increased revenue for the government.
- Example:
 - The main instruments of Norwegian climate policy are taxes on greenhouse gas emissions and emissions trading. This has proved a strong contributing factor to the growth in electric vehicles in Norway.
 - Taxes on GHG-emissions were first introduced in 1991 and today GHG-taxes and emission allowances (EU ETS) cover close to 85 per cent of greenhouse gas emissions in Norway and 99 percent of emissions from transportation.
 - The Norwegian government has announced publicly a plan to increase the CO2-tax gradually to 2030. In 2030 the tax will reach a level of over € 200 per tonne.

 In the assessment of policies and measures, cross-sectoral effects and long-term effects on technology development and deployment should also be taken into consideration.

Technological development

The IPCC WGIII report chapter 10.3 discusses the technological landscape and highlights the varying Technology Readiness Levels both across and within transport segments. Development of technologies must be supported and accelerated through systems of innovation that promote renewable energies.

- Challenge:
- While broad measures like carbon pricing incentivize research, development and innovation, nascent markets for new technology might not respond in time for accelerated transition. These might lag, creating a barrier.
- Opportunity:
 - Promotion of innovation can help develop markets for nascent technologies.
- Example:
- Norway has several innovation programs that cover the development chain from basic research, innovation, scale-up of new technologies, and early market introduction. This helps make new technologies commercially viable.
- Enova SF is a state enterprise that contributes to reducing greenhouse gas emissions, development of energy and climate technology and a strengthened security of supply. Enova establishes instruments with the aim of achieving lasting market changes, to help efficient energy and climate solutions be preferred without support.