EXECUTIVE SUMMARY

European Parliament

Research for TRAN Committee – Assessment of the potential of sustainable fuels in transport in the context of the Ukraine/Russia crisis

KEY FINDINGS

- Due to the looming food supply crisis, using energy crops that compete with feed and food crops to produce bioethanol or biodiesel is an issue. It is more appropriate to explore the potential of waste-based resources.
- Sustainable biofuels will have a role to play in decarbonising transport, especially in aviation and maritime, under strict sustainability conditions and according to a progressive pathway. However, their quick ramp-up will have limited scope as a viable option to make a substantive contribution to the rapid phase out of fossil energy sources.
- Natural gas use in the transport sector represents a minor fraction of the total EU transport energy demand. Due to various reasons, its role is likely to remain limited, even if some LNG use grows in the shipping sector. Hence, the transport sector's leeway to ease the natural gas supply constraint is negligible.
- Biogas could play a role in decarbonising the transport sector. However, limited sustainable biogas supply will likely need to be prioritized (e.g. industry, power, and buildings).
- In the medium- to long-term (beyond 2030), domestic or imported renewable hydrogen and its derivatives could partially replace fossil energy sources, especially in the aviation and maritime sectors, and possibly in heavy duty road vehicles. However, renewable hydrogen will not contribute at scale, in the short-term, to a fossil fuel phase out.
- Reducing fossil fuel demand through the use of fossil-based hydrogen is not possible, since energy losses are inevitable in the conversion of methane to hydrogen.
- The effectiveness and the extent of the future contribution of hydrogen and its derivatives to the reduction of fossil fuel use and transport decarbonisation depends on progress that can be achieved to stimulate demand, especially in sectors where there are more cost effective options than direct electrification for decarbonisation.
- An increased independence from Russia's fossil fuels should rely mainly on enhanced energy efficiency, behavioural changes, electrification and the diversification of energy supply.

The present document is the executive summary of the study on Assessment of the potential of sustainable fuels in transport in the context of the Ukraine/Russia crisis. The full study, which is available in English can be downloaded at: https://bit.ly/3Rf7deA

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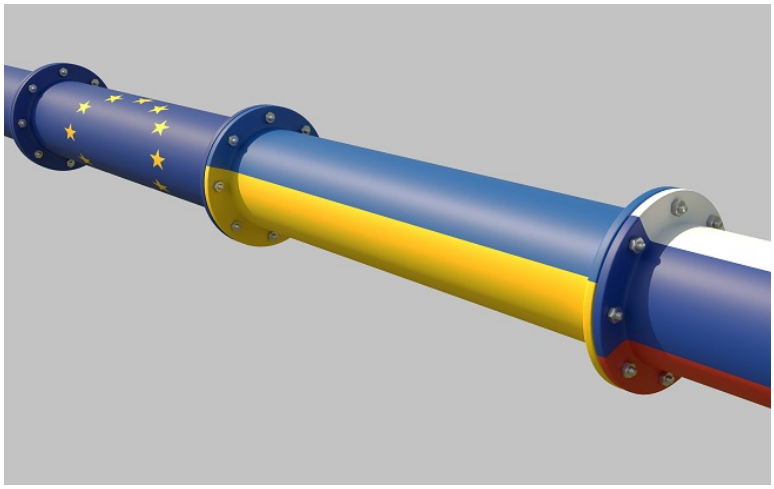

In 2020, the EU's transport sector globally was directly dependent on oil for 90% of its energy needs [Eurostat, 2022], mostly crude oil. In November 2021, prior to the Ukraine/Russia crisis, 34% of OECD Europe's total oil imports were coming from Russia (4.5 mb/d) [IEA, 2022a].

A range of analytical assessments consider that achieving the objectives of the European Climate Law and the Paris Agreement will require a reduction in fossil energy use across all sectors. In transport, these analyses suggest that the current dominance of oil-derived energy carriers like petroleum fuels need to be replaced by electricity, hydrogen, sustainable biofuels and hydrogen-based fuels, on top of an overall reduction in energy use from increased energy efficiency and behavioural changes.

The Ukraine/Russia crisis is causing inflation in the global economy due to the price increases in energy, commodities and services. This is leading to major economic consequences, pointing towards a reduction in global and European economic growth.

These developments are placing increased pressure on the need to reduce European reliance on fossil fuels, starting with those the EU imports from Russia, adding an energy security driver to the climate mitigation imperative. This assessment builds on these considerations to investigate whether sustainable fuels in transport can help address the Ukraine/Russia crisis and contribute to the reduction of EU dependence on fossil fuels. The focus of this analysis is biofuels, methane, and hydrogen and its derivatives.

Biofuels: due to the looming food supply crisis affecting grains and virgin oils, using energy crops that compete with feed and food crops to produce bioethanol or biodiesel beyond the existing RED II framework may be a concern, notably in terms of food supply. It is more appropriate to explore the potential of waste-based resources. Renewed policy targeting faster decarbonisation (especially in aviation) is currently stimulating the development of renewable diesel capacity (mainly with HVO/HEFA plants). These have a better cost-competitiveness performance than other pathways that rely on waste-based feedstocks (lignocellulosic), despite being more limited in scope for waste feedstock supplies. Both biodiesel and HVO/HEFA can be produced from waste oils, largely consisting of used cooking oil (UCO), complemented by animal fat. However, Europe is a major importer of UCO from Asia and the United States, and rapid increases in waste oil use are likely to lead to land use change, compromising sustainability. While sustainable biofuels will still have a role to play in decarbonising transport, especially in aviation and maritime, **they are not expected to make a substantive contribution to the rapid phase out of fossil energy sources in the short-term (to 2030), as a quick ramp up of biofuels is not practicable.** Increased reliance on non-food crops could be an option, but faces clear limitations, both in economic terms and due to sustainability issues.

Natural gas (fossil methane) use in the EU transport sector currently represents a small fraction of total transport energy demand. Due to limited life-cycle emission benefits and significant EU policy action to mitigate greenhouse gas emissions, the role of natural gas in transport is likely to remain limited. However, LNG use in the shipping sector might grow with increased

diversification of supply. Biogas can effectively reduce life-cycle emissions of greenhouse gases in comparison with fossil methane and it has other environmental and circular bio-economy advantages. It could therefore play a role in the transport sector in the future. However, limited sustainable biogas supply will need to be prioritized, in the near term for fuel current major uses of fossil natural gas (i.e. the sectors where gas demand is already locked-in like industry or building). Its role in transport will therefore remain small. **Given the transport sector's low use of natural gas, its leeway to ease supply constraints is negligible**.

Hydrogen and its derivatives: in the medium- to long-term (beyond 2030), renewable hydrogen and its derivatives (e.g. e-ammonia, e-methanol or e-liquids) can help supplant fossil energy sources in all transport modes, especially in the aviation and maritime sectors, and possibly also in heavy duty road vehicles. Hydrogen and its derivatives can be produced domestically or imported, with imports expected to be more competitive, especially for hydrogen derivatives (thanks to lower transport costs). While the EU's existing natural gas infrastructure can technically be repurposed to transport hydrogen, it raises major challenges in terms of hydrogen distribution and end-use devices (as these would need replacements). The successful transition to low-carbon and renewable hydrogen also depends on the existence of large-scale hydrogen market uptake prospects. Existing large-scale users of hydrogen in industry are likely to be the first viable candidates. Transport could follow if hydrogen can compete on cost with other technologies, and/or if alternatives are subject to other constraints. Despite this medium- to long-term potential, **hydrogen has limited scope to contribute significantly in the near-term to massively phase out fossil energy sources**. **Renewable hydrogen will most likely play a role in a decarbonised world. However, renewable hydrogen will not contribute effectively and at scale, in the short-term, to the significant phase-out of fossil fuels**, mainly due to the current lack of available production capacity and import facilities. Deploying the entire supply and conversion chain would require time and progressive development.

Renewable hydrogen will also complement other decarbonisation options in different sectors and for different applications. **The effectiveness and the extent of its future contribution to the reduction of fossil fuel use and decarbonisation depends on progress that can be achieved to stimulate demand, especially in sectors where it would be a more cost-effective decarbonisation option.**

As there is no single solution for all applications, the priority for increased independence from fossil fuels from Russia should be clearly on enhanced energy efficiency, behavioural changes, electrification and the diversification of energy supply. In the very near-term, enhancing energy efficiency will likely require shifts (including behavioural changes) towards transport modes that consume less energy and rely more on electricity. Beyond this initial phase, increased transport electrification is crucial to maximise opportunities for energy efficiency, energy diversification and the abatement of emissions.

Further information

This executive summary is available in the following languages: English, French, German, Italian and Spanish. The study, which is available in English, and the summaries can be downloaded at: https://bit.ly/3Rf7deA

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