

Submission on the second global dialogue under the Sharm el-Sheikh mitigation ambition and implementation work programme 15–17 October 2023, Abu Dhabi, United Arab Emirates

Introduction

1. This submission is by WMO and UNECE and seeks to draw to the attention of the 2nd Global Dialogue of the *Sharm el-Sheikh mitigation ambition and implementation work programme* the ‘water dependency’ of the energy transition in transport systems, and the potential implications of this for just transition in the transport sector.
2. This submission focusses on the water consumption needs of clean transport systems, which has had little attention to date. As such, this submission does not address the freshwater needs of rivers and lakes used for inland navigation which is also a beneficial modal shift for energy efficiency. These transport systems can be affected by droughts and floods which climate change amplifies and are addressed in other UNFCCC processes, such as the Global Goal on Adaptation.
3. Freshwater is also needed for existing vehicles technologies and fuels, with total amount of water needs over the lifecycle being comparable. Low carbon technologies may have similar or lower water demand than existing technologies¹. However, more research is need and therefore, this submission does not cover the freshwater needed for the production, use and disposal of transport vehicles over their lifecycle.

Key messages, in a nutshell

4. All low and no emissions fuels and power sources for electrification required for the transport energy transition need freshwater, possibly at a large scale. This is the case for biofuels, hydrogen and battery components, and for many clean energy sources of electricity for battery charging.
5. The availability of this water cannot be assumed, particularly in water scarce regions, and must be actively planned for and managed and the potential effects on other water-dependent objectives (such as food security) should be considered in ‘just transition’ strategies.

Water dependencies of clean transport

6. The current state of knowledge of the water dependencies of climate mitigation measures was considered at the [Technical Workshop on Water and Climate Change Mitigation Interdependencies](#) of 13 June 2023, organized by WMO, UNECE and UNESCO as the co-coordinators of [UN Water Expert Group on Water and Climate Change](#). This Expert Group comprises 29² organisations working together to support cooperation and coordination of efforts and messages of UN-Water members and partners on water and climate and to raise awareness on the importance of water in climate change adaptation and mitigation.
7. This workshop found that many clean energy sources for transport seem dependent on freshwater availability, either directly or indirectly. For example:
 - Hydrogen requires water as feedstock and the processing.
 - Biofuels requires water to grow the feedstock crops.

¹ See https://climate.ec.europa.eu/system/files/2020-09/2020_study_main_report_en.pdf (p112)

² AquaFed CDP FAO GCF GWP HR2W IAEA IAH IAHS ICID IFAD IGRAC ILO IWMI Ramsar Convention SIWI Toilet Board Coalition UNCBD UNCCD UN DESA UNDP UNECA UNEP UNESCO UN ESCWA UNFCCC UN-Habitat UNICEF UNU WHO WWC

- Electrification requires batteries using rare earths, the mining and processing of which are highly water dependent.
 - Stabilising the energy grid to support reliable charging infrastructure requires 'dispatchable' power from hydropower, pumped hydro and thermal systems that are also water dependent.
8. Further discussion and assessment of what is known and not known about the water requirements can be found in the [workshop report](#).

Water and 'just transitions': challenges and barriers

9. As water resources provide multiple benefits for society, conditions of water scarcity can cause governments to face difficult choices on how best to allocate available resources. These choices are directly relevant to the just transition pathways. When new water demands arise, such as to support the clean energy transition, governments need to understand the potential consequences for food security, health, the environment and economic development of different water availability and water allocation scenarios.
10. The IPCC has identified this as a risk to the whole energy transition:
"The viable speed and scope of a low-carbon energy system transition will depend on how well it can support SDGs and other societal objectives (high confidence). Energy systems are linked to a range of societal objectives, including energy access, air and water pollution, health, energy security, water security, food security, economic prosperity, international competitiveness, and employment. These linkages and their importance vary among regions." (IPCC6 Working Group 3 (Mitigation) Report Technical Summary).
11. There may also be win-win solutions through water infrastructure and efficiency investments, and technologies allowing cost-effective use of sea water and other substitutes which governments may wish to prioritise.
12. The [International Energy Agency presentation](#) on this topic at the water pavilion at COP 27 explained: "although the need for energy transitions is widely recognized, the role of water in those transitions needs more attention. In this context, just energy and water transitions are strategies that enable these systemic changes to happen in fair and equitable ways to ensure that the costs and benefits of climate action are distributed equitably."
13. The emerging water demand of the energy transition for transport and other sectors creates an intrinsic challenge and potential barrier to a successful transition if not well understood and managed. However, the information now available at a global scale does not inform policymakers of expected water required (in volumetric terms) to implement each measure at the scale required to achieve the Paris Agreement targets; the effects of this demand on other water-dependent objectives such as food security; and examples of water policies and practices able to resolve any required trade-offs.
14. The [Technical Workshop on Water and Climate Change Mitigation Interdependencies](#) highlighted the potential benefits of guidance and support for member States on integrated water resource management policies:
"Managing water trade-offs in conditions of water scarcity requires well developed water management and water allocation policies and practices, yet many countries face water scarcity now (Water Scarcity | UN-Water) and integrated water resource management is only 54 percent implemented globally (SDG 6 Indicator 5.1). The UNFCCC parties should have a deep interest in the achievement of SDG 6 as that may be a key to unlocking progress with emission reduction goals. Also, as with all climate matters, while solutions must be found at the country level, there is an important practical role for multilateral processes in providing procedures, direction, guidance and support to ensure the common purpose is realised."

Opportunities and actionable solutions

15. In many situations, it should be possible to secure water for the new energy demands of the transport sector without limiting other sectors through measures such as innovation in water demand management, water use efficiency better water governance and transboundary water cooperation, and water infrastructure design.
16. To support achievement of climate mitigation objectives globally, the UN-Water Expert Group on Water and Climate Change is seeking to improve understanding of the aggregate water demand of each kind of climate mitigation measure, if implemented at the scale estimated by the IPCC required to achieve the Paris Agreement global warming targets, to understand the relative 'water efficiency' of each kind of measure, and to provide guidance on how to work out these relationships at the national scale. Results of this work will become available over the next 12 months.
17. To assist governments to achieve their transport, climate mitigation and 'just transitions' objectives, this Dialogue could call for the freshwater dependencies of mitigation measures to be further considered in the mitigation work program.