

MEDIA STATEMENT
WATER REQUIREMENTS OF CLIMATE MITIGATION MEASURES:
EARLY ESTIMATES NOW AVAILABLE

Preliminary estimates of the water requirements of certain measures required to reduce greenhouse gas emissions and to sequester carbon already in the atmosphere were presented at COP 28 today. This information is intended to raise awareness of the critical links between the availability of water and implementing various Paris Agreement climate mitigation measures. At the national level, policymakers will need to assess the water requirements according to local conditions.

The water required for clean energy measures such as liquid biofuels, wind and solar, hydrogen and hydro-power as well as for forests and wetlands and other natural systems to absorb more carbon is being estimated. All of these measures are necessary to limit global warming to 1.5 degrees as sought by the Paris Agreement.

At the global scale, by 2030 just the clean energy mitigation measures considered are estimated to need around 900 cubic kilometres of water annually, which equates to approximately a third of the water withdrawn by irrigation globally¹. The actual volumes of water required for clean energy measures will depend on local conditions.

New freshwater requirements for clean energy, sequestration and other Paris Agreement measures will be offset to some extent by less water being required from the 'old energy system' as the world transitions towards a clean energy future. They will also be offset to the extent that sea water or brackish water can be substituted in a cost effective and environmentally acceptable manner.

The preliminary analysis also shows the relative 'water efficiency' of various mitigation measures. For example, green hydrogen production saves approximately 68 tonnes of carbon emissions for every million litres of water used, whereas in contrast liquid biofuels could achieve 5 tonnes of carbon emissions reduction for the same amount of water, while electrification of light duty vehicles could save 1.7 tonnes of carbon emissions for the same amount of water.

Poorly managed wastewater, and water in wetlands, and artificial reservoirs and irrigation systems are also a major source of direct emissions of greenhouse gases, especially methane and nitrous oxide. Improved management of these waters will also be critical towards emission reduction targets globally.

Presenting early estimates at COP 28 in Dubai, United Arab Emirates today, Professor Greg Leslie, for the [International Universities Climate Alliance \(IUCA\)](#), said preliminary figures were being presented as early as possible now, ahead of further analysis being undertaken, in order to create awareness of the critical links between water and climate objectives. "These early estimates, ahead of a final report in 2024, should assist policymakers at this COP 28 and beyond to consider water as a critical part of the climate solution."

"Less attention has been given to the role water plays on facilitating and sometimes limiting climate action. We hope that this subject will have more extensive coverage in the IPCC's seventh assessment cycle during this critical decade for climate action," said Professor Jim Skea, Chair of the Intergovernmental Panel on Climate Change (IPCC).

¹ <https://www.fao.org/3/I9253EN/i9253en.pdf>

Professor Petteri Taalas, Secretary-General, WMO, for the UN-Water Expert Group on Water and Climate Change (co-led by UNECE, UNESCO and WMO), and as a member of the [Water and Climate Leaders' group](#), said a key message from this project was the need to achieve better integration between water and climate policies and practice as called for in the Water and Climate Leaders' [Call to Action on Water for Climate Solutions](#). "Achieving climate goals is fundamentally dependent on sustainable water management just as achieving water goals is fundamentally dependent on stabilising the global climate through success in reducing greenhouse gases" he said.

Mr James Grabert, Director of the Mitigation Division of the UNFCCC said the key follow up was needed at the country level, with countries considering water requirements as they prepared their nationally determined contributions.

The [UN-Water Expert Group on Water and Climate Change](#) is undertaking a study on the water requirements of climate mitigation measures, in collaboration with the [International Universities Climate Alliance \(IUCA\)](#). This follows a [Technical Workshop](#), held in Bonn on 13 June 2023, which set out to identify what is known and not known about the dependency of Paris Agreement targets on the sustainable management of water resources. The study is being led by the co-coordinators of the UN-Water Expert Group, namely the Water Convention secretariat, hosted by the United Nations Economic Commission for Europe (UNECE), United Nations Educational, Scientific and Cultural Organization (UNESCO), and World Meteorological Organization (WMO).

The preliminary findings of the study were presented today at COP 28, which is currently meeting in Dubai, United Arab Emirates. A sample of these early estimates for the clean energy measures has also been released today. Discussions on the policy implications of these first results will happen at a high-level event on watering the clean energy transition at the COP28 on 5 December at 5 p.m. The final report will be used to prepare a UN-Water Analytical Brief on this topic which is expected to be launched at the 2024 Bonn Climate Conference in June 2024.

Further information about the preliminary results on clean energy measures are in the [Annex](#).

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About International Universities Climate Alliance (IUCA)

The IUCA brings together leading universities from across 25 countries with critical capability in climate research. Universities are uniquely placed to share knowledge and expertise in climate science, climate change adaptation and mitigation. We believe it is through collaboration that we can create greater insight and action.

Facilitating knowledge sharing and best practice approaches allows our members to establish a global perspective on localised challenges. Enabling informed policy-making and supporting global efforts to lower carbon emissions and increase the rate, scope and impact of climate action.

About UN-Water

UN-Water coordinates the United Nations' work on water and sanitation. There is no single United Nations Agency, Fund or Programme dedicated exclusively to water issues. In fact, over 30 United Nations organizations carry out water and sanitation programmes because these issues run through all of the United

Nations' main focus areas. UN-Water is a 'coordination mechanism'. It is comprised of United Nations entities (Members) and international organizations (Partners) working on water and sanitation issues. The UN-Water Expert Group on Water and Climate Change Supports cooperation and coordination of efforts and messages of UN-Water Members and Partners on water and climate. It contributes to raising awareness on the importance of water in climate change adaptation and mitigation and vice versa as well as knowledge on good adaptation practices.

ANNEX

SAMPLE OF PRELIMINARY ESTIMATES

Important Note: The below sample of preliminary estimates is shown here ahead of further analysis due to be released in 2024. This sample of early estimates is being provided to create awareness of the critical links between water and climate objectives. These early estimates encompass a diverse range of assumptions and will undergo further refinement ahead of the 2024 final report.

PART 1: PRELIMINARY ESTIMATES WATER DEPENDENCIES OF CLEAN ENERGY MEASURES TO 2030						
(1) Measure	(2) Water required for...	(3) Clean energy produced GJ/y (a)	(4) Climate benefit GtCe/y (b)	(5) Water required GL/y (c)	(6) Water efficiency of GHG reduction m³/tCe (d) = (c)/(b)	(7) Tonnes of carbon removed per million liters tCe/ML
Use of bioenergy to produce liquid biofuel	Growth of biomass, fermentation and refining	1.1x10 ¹⁰	0.8	400000	500	5
Hydrogen in Decarbonisation of industry via fuel switching	Electrolyser demand + cooling water demand	1.8x10 ¹⁰	0.4	5850	14.6	68.4
Use of geothermal energy to generate clean electricity	Water required per year for operation of the geothermal plant	1.1x10 ⁹	0.5	532	1.0	939.8
Use of solar and wind energy to generate clean electric power	Pumped hydro for dispatchable energy supply by 2030	6.08x10 ¹⁰	4.1	5207	1.3	787.4
Use of batteries in electric light duty vehicles	Mining and processing lithium, copper, cobalt and rare earth elements and battery manufacture	1.05x10 ⁸	0.8	480000	605	1.7
Use of nuclear energy to generate clean thermo-electric power	Cooling systems per year for operation of nuclear plant	1.42x10 ¹⁰	0.9	16366	18.2	55