United Nations Conference on Trade and Development

Global Commodities Forum

13 – 15 September 2021, Geneva and Barbados (online)

Renewables and water desalination

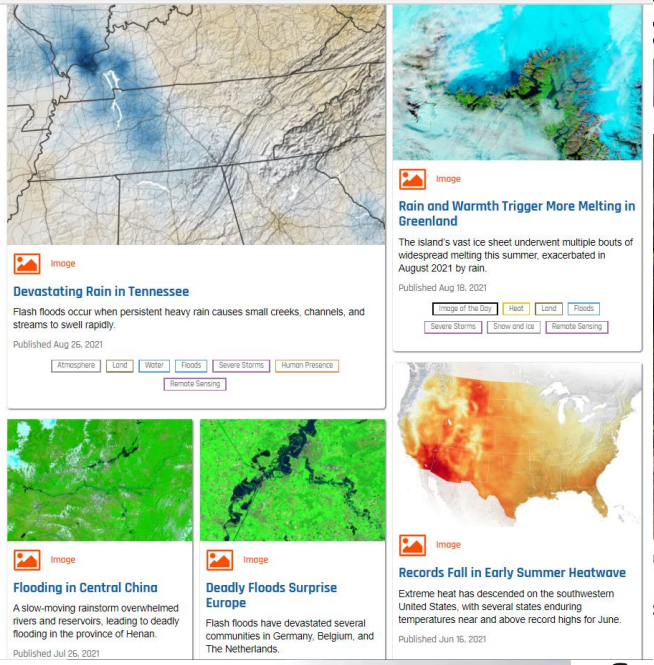
By

Andre Langwost, President, Eurosolar France

Renewables and Water desalination

- **Andre Langwost, Eurosolar France**
- **13 September 2021**

https://earthobservatory.nasa.gov/topic/floods



Image

Devastating Rain in Tennessee

Flash floods occur when persistent heavy rain causes small creeks, channels, and streams to swell rapidly.

Published Aug 26, 2021

Atmosphere | Land | Water | Floods | Severe Storms | Human Presence | Remote Sensing

Image

Rain and Warmth Trigger More Melting in Greenland

The island's vast ice sheet underwent multiple bouts of widespread melting this summer, exacerbated in August 2021 by rain.

Published Aug 18, 2021

Image of the Day | Heat | Land | Floods | Severe Storms | Snow and Ice | Remote Sensing

Image

Flooding in Central China

A slow-moving rainstorm overwhelmed rivers and reservoirs, leading to deadly flooding in the province of Henan.

Published Jul 26, 2021

Image

Deadly Floods Surprise Europe

Flash floods have devastated several communities in Germany, Belgium, and The Netherlands.

Image

Records Fall in Early Summer Heatwave

Extreme heat has descended on the southwestern United States, with several states enduring temperatures near and above record highs for June.

Published Jun 16, 2021

ermany's deadly floods were up to 9 ti ecause of climate change, study estim

By Angela Dewan, CNN

Updated 0930 GMT (1730 HKT) August 24, 2021

ooding in July damaged the main road leading through the Ahr river valley in Germany.

ondon (CNN) — Record rainfall that triggered deadly floods in Western Europe in July was ian-caused climate change, according to a

nd 15 -- mostly in Germany, though dozens

Spain faces threat of water crisis

By Lola Hierro | El País – Planeta Futuro | translated by Sam Morgan

11. Dez. 2015

The Aldeadávila Dam on the Douro River evacuates water due to excessive rainfall in 2010. [Raiden32/Flickr]

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In the last 20 years, Spain has lost 20% of its fresh water. If the effects of climate change continue unabated, this figure will rise to 25% by 2021. EURACTIV's partner El País – Planeta Futuro reports.

In addition to losing more of its fresh water, floods and droughts will increase in the coming years. These are the main conclusions of the Spanish ecological group, Ecologists in Action, which presented two reports at the COP21 climate summit.

Sudan floods caused by heavy rain damage thousands of homes

Flooding in Sudan. (Twitter)

Sudan | Khartoum

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AFP, Khartoum

Published: 08 A

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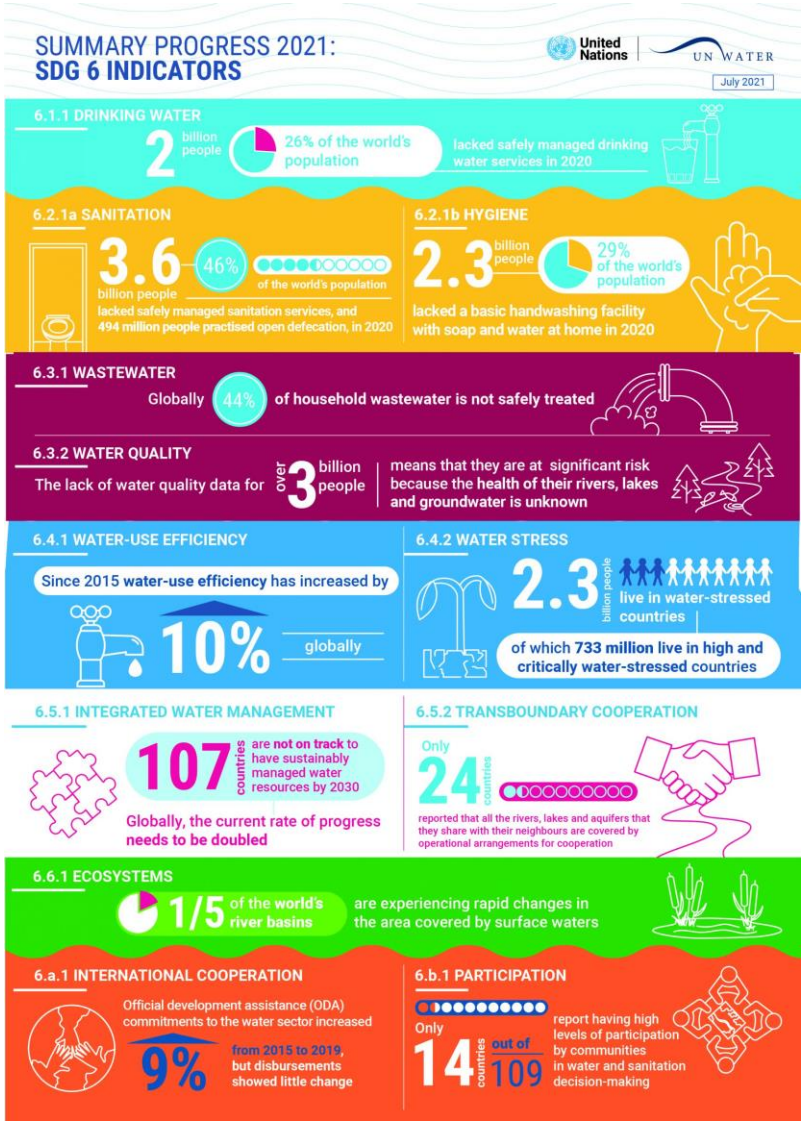
NEWS | August 20, 2020

Study: 2019 Sees Record Loss of Greenland Ice

By Pat Brennan,
NASA's Jet Propulsion Laboratory



PGA_brief_Infographic-scaled.jpg (1825×2560) (unwater.org)

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Water Scarcity

Water scarcity can mean scarcity in availability due to physical shortage, or scarcity in access due to the failure of institutions to ensure a regular supply or due to a lack of adequate infrastructure.

Water scarcity already affects every continent. Water use has been growing globally at more than twice the rate of population increase in the last century, and an increasing number of regions are reaching the limit at which water services can be sustainably delivered, especially in arid regions.

Drought in Niger in 2011. Photo: WFP/Phil Behan

Challenges

Water scarcity will be exacerbated as rapidly growing urban areas place heavy pressure on neighbouring water resources. Climate change and bio-energy demands are also expected to amplify the already complex relationship between world development and water demand.

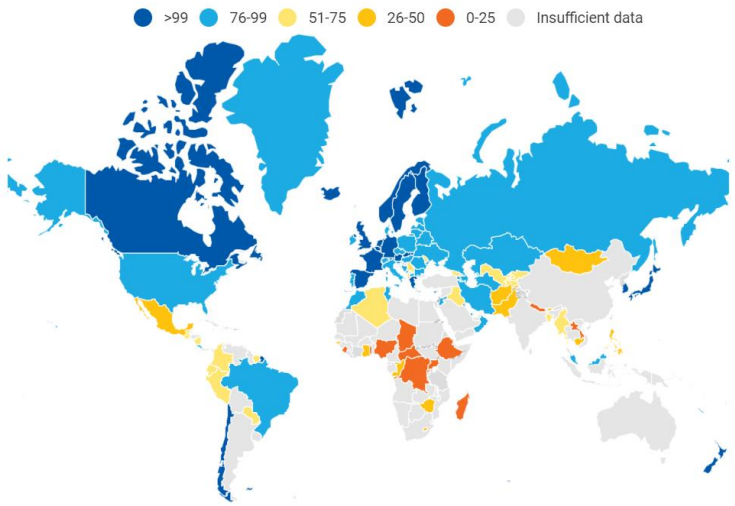
FACTS AND FIGURES

- 72% of all water withdrawals are used by agriculture, 16% by municipalities for households and services, and 12% by industries. (UN-Water 2021)
- When a territory withdraws 25% or more of its renewable freshwater resources it is said to be 'water-stressed'. Five out of 11 regions have water stress values above 25%, including two regions with high water stress and one with extreme water stress. (UN-Water 2021)
- 2.3 billion people live in water-stressed countries, of which 733 million live in high and critically water-stressed countries. (UN-Water 2021)
- 3.2 billion people live in agricultural areas with high to very high water shortages or scarcity, of whom 1.2 billion people – roughly one-sixth of the world's population – live in severely water-constrained agricultural areas. (FAO, 2020)
- Today, 1.42 billion people – including 450 million children – live in areas of high or extremely high water vulnerability. (UNICEF, 2021)

Scarcity | UN-Water (unwater.org)

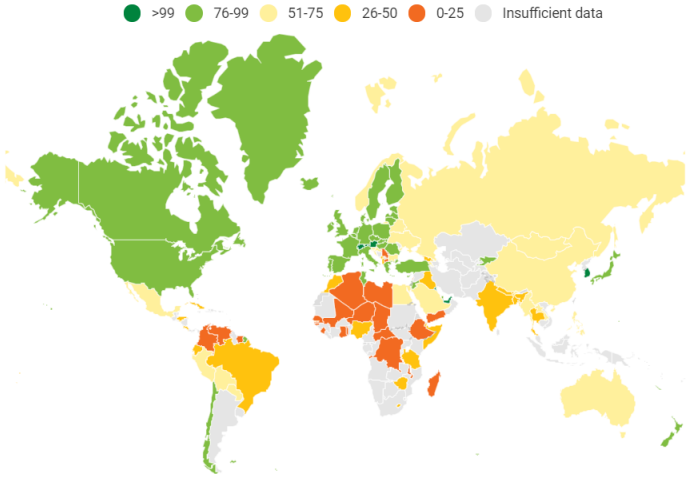
In 2020, 138 countries had estimates for safely managed drinking water

Proportion of population using safely managed drinking water services, 2020 (%)



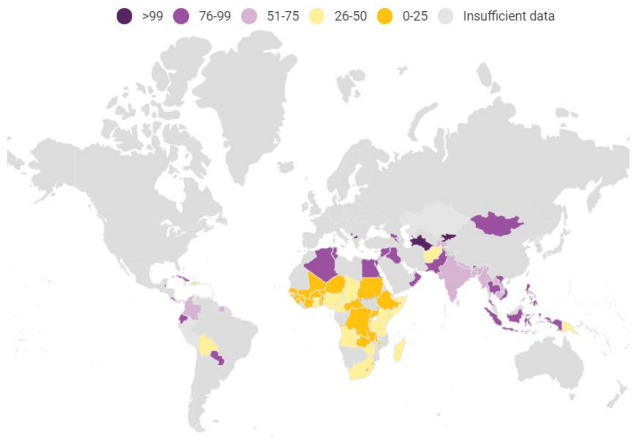
In 2020, 120 countries had estimates for safely managed sanitation

Proportion of population using safely managed sanitation services, 2020 (%)



In 2020, 79 countries had estimates for basic hygiene services

Proportion of population with basic handwashing facilities at home, 2020 (%)



- **Source**: WHO/UNICEF JMP (2021), Progress on household drinking water, sanitation and hygiene 2000-2020: Five years into the SDGs
- Progress on household drinking water, sanitation and hygiene, 2000-2020 - UNICEF DATA

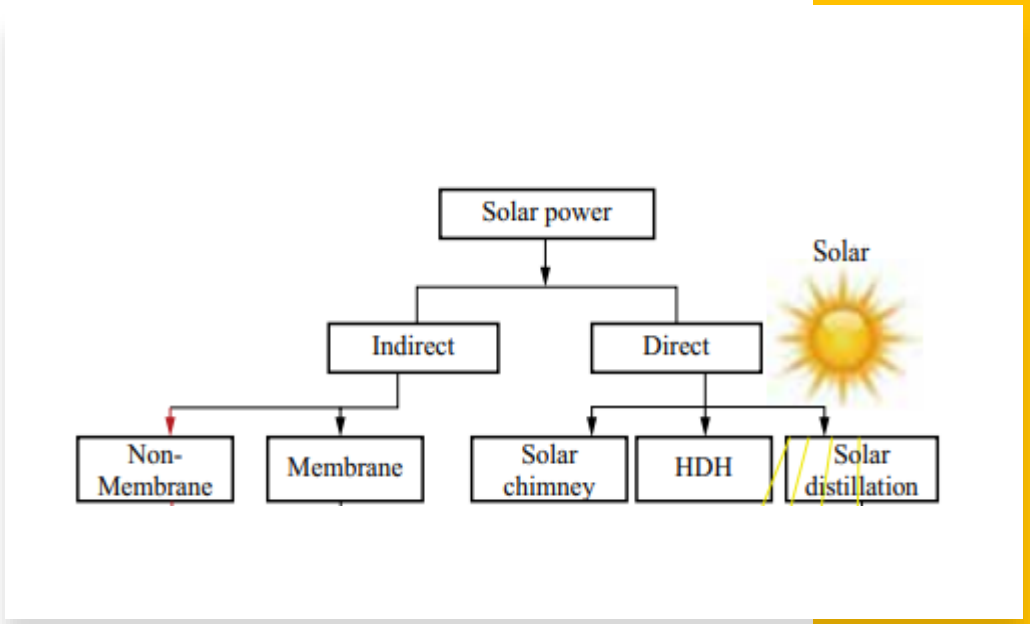
The Facts

- “A global transition to 100% renewable energy across all sectors – power, heat, transport and desalination before 2050 is feasible…The energy transition is not a question of technical feasibility or economic viability, but one of political will.”
- By 2050, water desalination will be nearly 40 times the amount of 2015. This will require substantial desalination capacities and some water storage. Desalination will account for approximately 4% of total primary energy demand in 2050, which can be fully met with renewables.
- Eurasia, the Middle East and North Africa, SAARC with India, Northeast Asia and North America will demand 91% of the global energy used for desalination. Europe, Southeast Asia, Sub-Saharan Africa, and South America share just 9%.

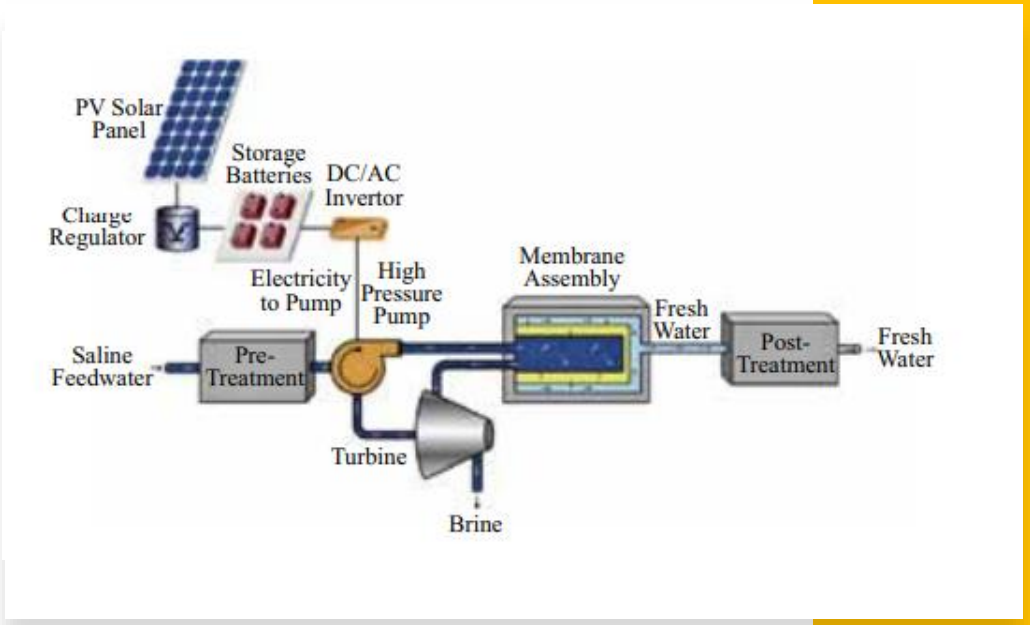
- New Study: Global Energy System based on 100% Renewable Energy | Energy Watch Group

Different systems of water desalination

- Schematic of solar power coupled with desalination



- Operating principle of the solar-powered reverse osmosis (RO) system

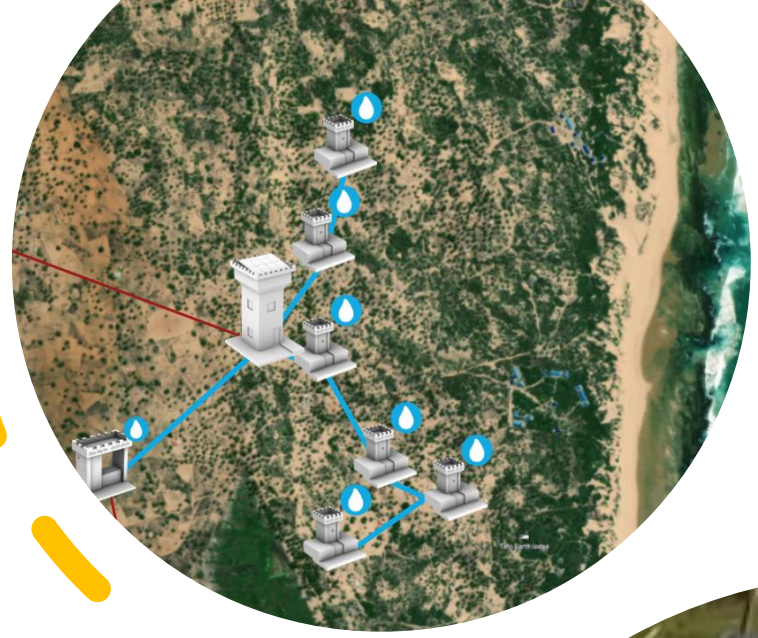


Source: „ Sustainably integrating desalination with solar power"

https://www.sciencedirect.com/science/article/pii/S2096511719300404

Project examples from Africa: Pembane, Mozambique

„Dirty water holes are now a thing of the past in Pembane. The fountain raises solar-powered clean fresh water into a 10-meter-high reservoir and distributes it from there over a radius of 1.5 kilometers via a water network to the village, to eight easily accessible kiosks, the Fontenarias: Clean water for 6000 people”



[ENTERIA - Energizing Projects]

Waterkiosk, Kenya and Tanzania

Several installations already commissioned in hospitals in Mombasa County, Kenya in March 2021. A total of 23 systems will be installed in the East African country. Boreal Light also plans to install five desalination units in neighbouring Tanzania. Of the 28 kiosks, *“seven will have a capacity of 10 m^3 per hour and will be powered by 60 kWp solar photovoltaic systems. The other installations will have a capacity of 3 m^3 per hour, with 11 kWp solar systems,”*

Technology: Reverse osmosis system directly on solar panels – no batteries, grid or diesel needed

- Africa’s largest solar desalination solution brings COVID-19 relief (h2oglobalnews.com)
- KENYA: Boreal inaugurates a new solar-powered water desalination system | Afrik 21
- The Smarter E Award 2021, Outstanding Project Award Winner WaterKiosk project of Boreal Light GmbH - YouTube

Large Scale Water desalination

- **Sorek: Israel, 2013**
- seawater treatment capacity of 624,000m³/day, Feed water for the process is taken from two open sea intake heads located around 1.15km offshore, seawater reverse osmosis (SWRO) process providing water to Israel's national water carrier system.
- Large-Scale Desalination | WWD (wwdmag.com)


Sorek plant was built on the Mediterranean coast, about 15km south of Tel Aviv, Israel.

- **Al Khafji Saudi Arabia, 2017**
- first large-scale solar-powered desalination plant, located in Al Khafji north-eastern Saudi Arabia, capacity 60,000m³/day of desalinated seawater providing a regular supply of water to the region throughout the year. New Solar Saline Water Reverse Osmosis (Solar SWRO) desalination method using ultra-filtration (UF) for the pre-treatment process.

Key elements of success:

- Good team of specialists to work in a team for a good holistic solution, integrating as well „annex-needs“: A larger PV-System, battery/ and or water storage could help neighbouring structures
- There is no „one-solution fits all“
- Solar PV is easiest and cheapest energy source for local energy production: Large variety of storage facilities available: Battery storage, thermal storage (heat, i.e. hot water, cold, i.e. cooling containers)

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