



DEPARTMENT OF  
**ECONOMIC AND  
SOCIAL AFFAIRS**

Side Event  
HLPF  
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# Report on Sustainable Water and Energy Solutions addressing Climate Change

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Report on Sustainable  
Water and Energy  
Solutions Addressing  
Climate Change

2021



- The Report presents an overview of relevant issues about the strong interrelationship among water, energy and climate
- The Report explains the importance of following an integrated approach to water and energy and its positive impacts on climate change
- The Report includes descriptions of selected technological areas and innovative systems that represent sustainable water and energy solutions addressing climate change
- The Report seeks to inform the ongoing debate on water, energy and climate change with a view to facilitate information exchange
- This Report is an output of the Global Sustainable Water and Energy Solutions Network prepared by the UNDESA Secretariat



# Energy, Water & Climate Change



- Understanding the interlinkages among water, energy and climate is crucial
- Energy from fossil fuels is a major driver of climate change
- Transforming the energy sector is key for mitigating climate change
- Increase in Solar PV and wind in energy generation will reduce water use
- Energy systems can be impacted by water stressors resulting from climate change
- Energy systems could also play a role in adaptation to climate change

# Water, Energy & Climate Change



- Water resources subject to greater variability due to climate change
- Adaptation is indispensable for the water sector to offset effects of floods and to diminish water stress
- Climate change can degrade important ecosystems and can compromise water infrastructures
- Climate change mitigation can be supported by Integrated Water Resource Management
- Wetlands hold the largest carbon stocks among terrestrial ecosystems
- Conservation/regenerative agriculture allows more retention of water, carbon and nutrients

# Sustainable Water and Energy Solutions



## Systems using water for Energy

- Hydropower
- Offshore Wind and floating solar PV
- Cooling systems in thermoelectric plants
- Geothermal
- Bioenergy
- Ocean Energy
- Hydrogen

## Systems using energy for Water

- Water Supply
- Waste water treatment
- Desalination

## Decentralized water & energy supply systems

## Water-energy end use efficiency

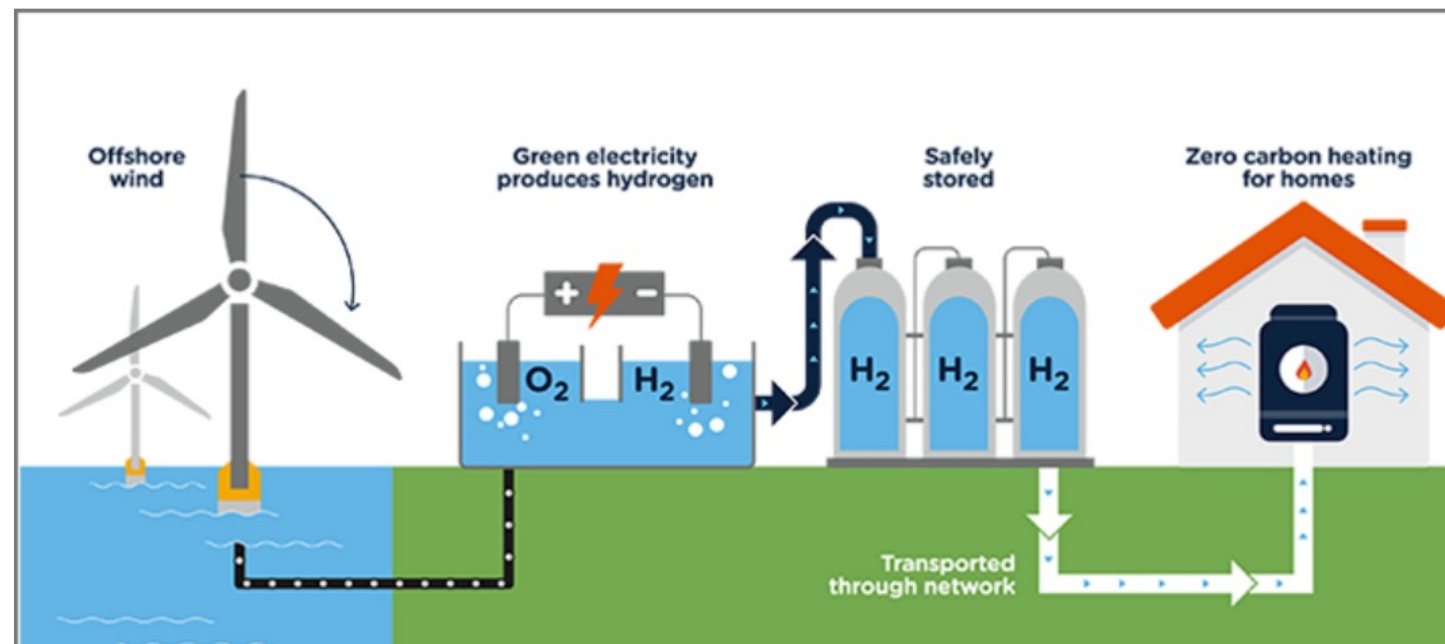
## Innovative sanitation systems

# Offshore Wind



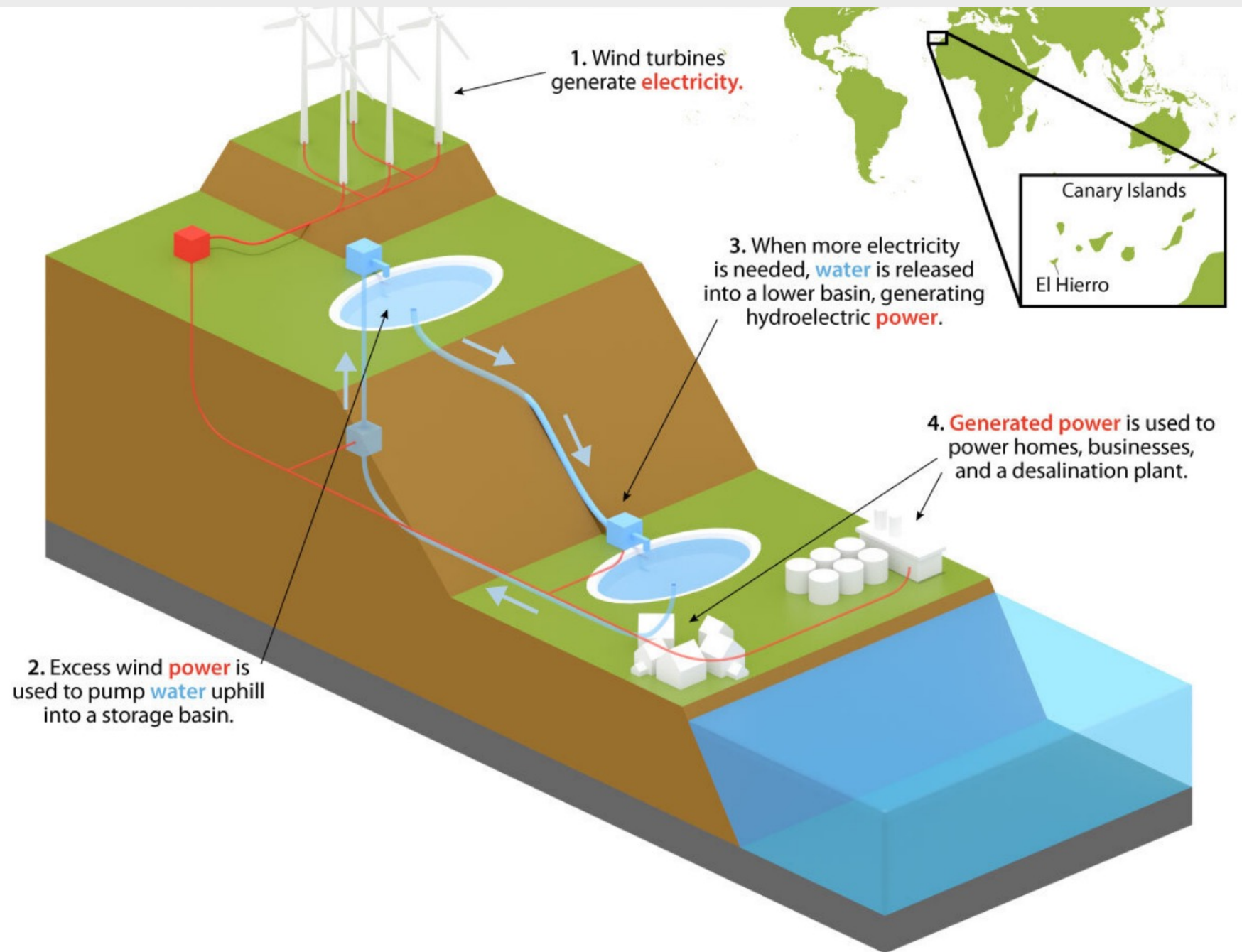
- Offshore Wind plays an important role in combating climate change
- A low-carbon energy source effective for cutting down GHGs
- Takes advantage of the large wind potential in offshore locations avoiding the use of land
- Cost has declined dramatically in the last decades
- Much smaller impact on the environment than conventional fossil fuel power generation
- A significant source of job creation in the future
- New York state is building a major offshore wind farms with a capacity of 9,000 MW to be ready by 2035

# Green Hydrogen



- Green hydrogen is produced by electrolysis that separates water into hydrogen and oxygen using electricity from renewable sources
- Great future potential for its ability to reach hard-to-decarbonize sectors such as heating and transportation
- Potential uses for steel and cement production, heavy duty transport, aviation and shipping without GHG emissions
- It can help balance intermittent renewables and reduce air pollution in cities
- In 2020, Japan opened one of the largest green hydrogen plants with a 20 MW solar array that runs a 10 MW electrolyzer

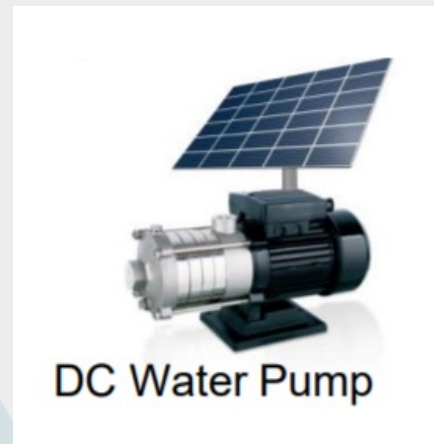
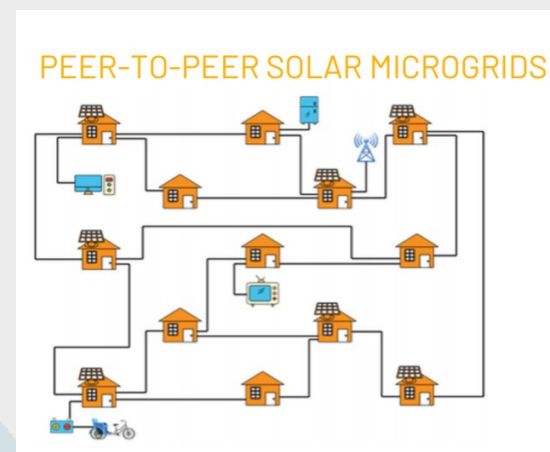
# Desalination, Renewable energy and Storage



- Desalination using Renewable Energy represents a Sustainable Water and Energy Solution and a key enabler of growth and prosperity for countries facing critical water shortages
- It can be combined with pumped storage
- El Hierro in Canary Islands has a combined system that allows sustained renewable electricity for the island and water desalination using wind and water-pumped storage, reducing the need for diesel fuel
- The system avoids 24,000 tons of CO2 emissions and the use of over 7,000 tons of diesel fuel each year



# Decentralized water and energy supply Systems



DC Water Pump

- Off-grid integrated water and energy solutions are playing an increasing role in isolated communities supporting the world objective of “Leaving No One Behind”
- Innovative systems following the concept of “Energy and water in a box” are being developed for isolated areas and for areas affected by catastrophic events
- Micro-grids for isolated villages that provide electricity and water represent a valuable alternative for isolated communities.

# Conclusions



- Countries could greatly benefit from implementing integrated approaches to water and energy
- As the impacts on climate change become more evident, policy makers need to realize the importance of an integrated approach to water and energy
- Many sustainable water and energy solutions could effectively address important climate change objectives
- Water-Energy Solutions: A necessary response for a more resilient and sustainable recovery from COVID-19



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# Thank you

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