



# A New Global Energy Map: On the Road to COP28

**Dr. Nasser Saidi**  
**The 10<sup>th</sup> CEBC Annual Summit**  
**Dubai, 31 January 2023**

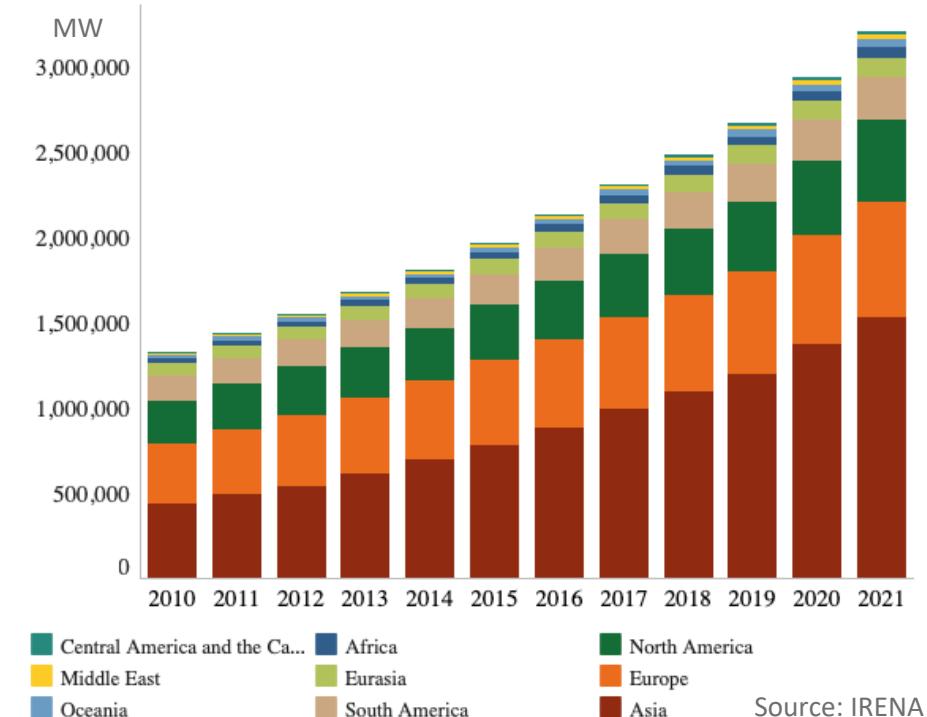
**Our 10<sup>th</sup> Annual Summit brings together leaders in the clean energy sector from across the MENA region and global stage to discuss the Energy Transition, highlight the solutions required to advance the region in this field, with a focus on Climate Finance, Future Mobility, Clean Hydrogen, and Energy Efficiency**

# Emergence of a New Global Energy Map

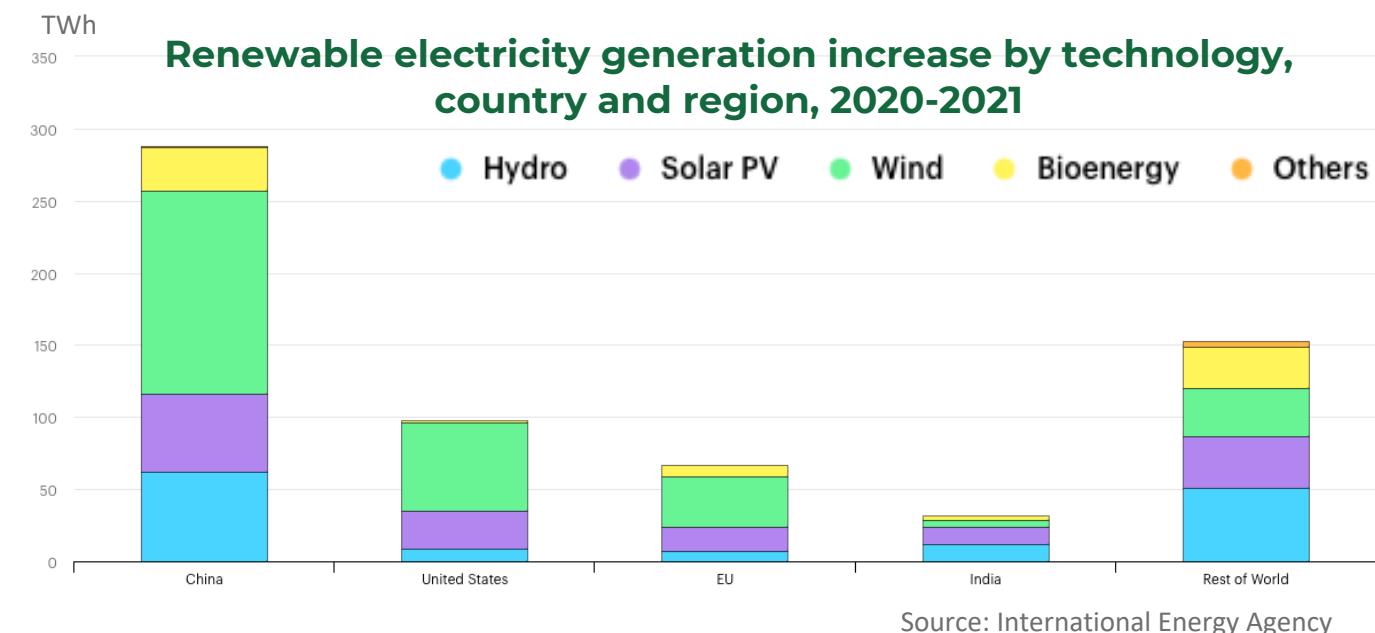
**Global Energy Crisis + Investments in Renewable Energy & Climate risk-resilient infrastructure will draw a new Global Energy Map**

- **Increase of renewables' share** in the global energy mix: 28% in 2021 (2010: 20%)
- **Capacity of renewables in the UAE escalated:** 2,540 MW in 2020 from 13 MW in 2011
- **Cost of renewable power generation fell** in 2021: -13% yoy for solar PV & offshore wind power & -15% for onshore wind power
- **Technological innovation is accelerating adoption & integration of clean energy systems**

**Renewable energy installed capacity by region, 2010-2021**



**Renewable electricity generation increase by technology, country and region, 2020-2021**

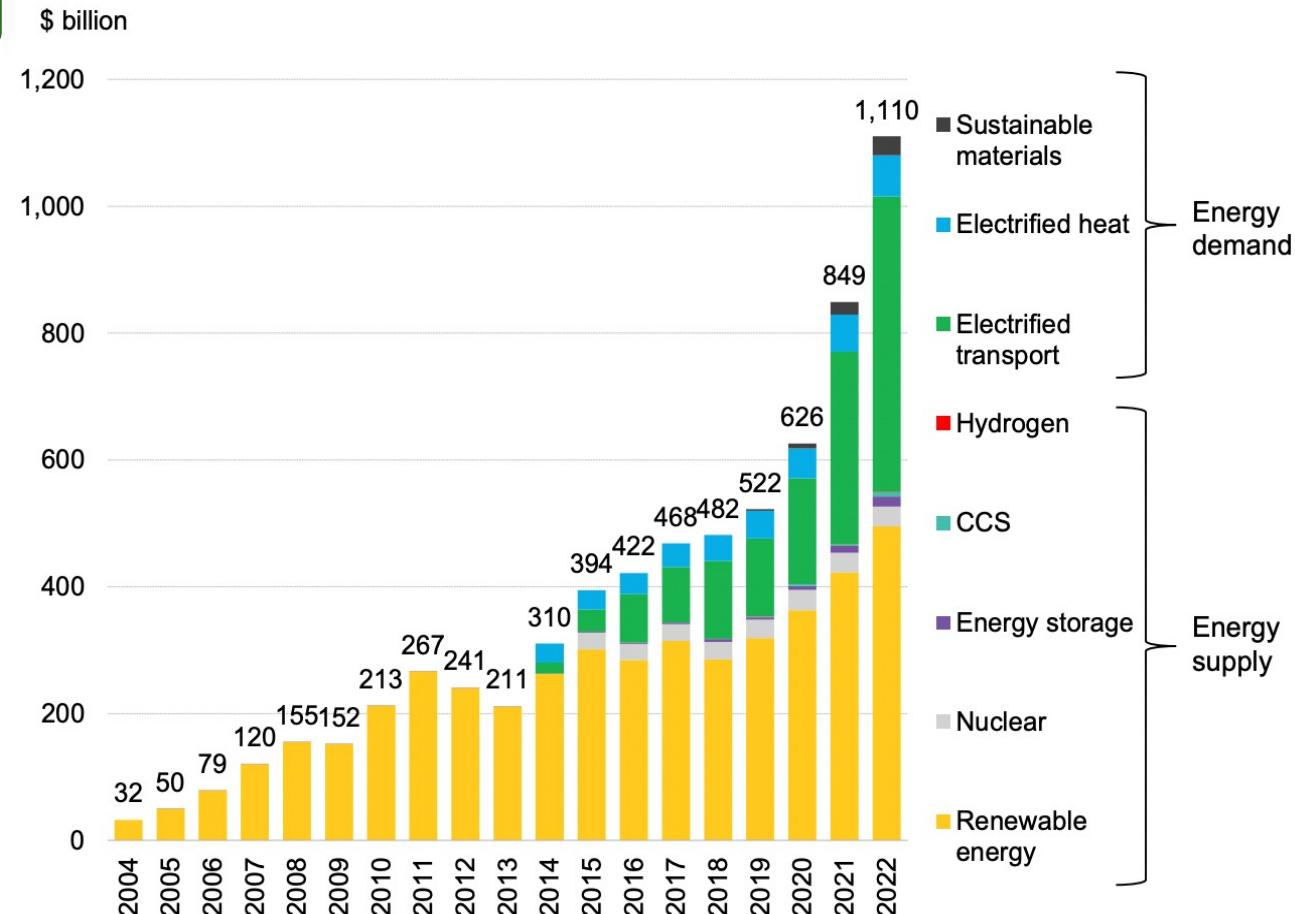


# New Global Energy Map requires massive financing

## Financing the energy transition

- **Energy transition annual global investments topped USD 1trn in 2022:** almost every sector achieved a new record level of investment in 2022 (*transition investment matches fossil fuels for the first time*)
- To meet the Paris Agreement's goals and NZE targets, strategies and initiatives, **more than solar and wind is necessary.**
- **Renewable energy & electrified transport** together accounted for more than 85% of total investments
- **Hydrogen**'s share was just 0.1% of the total; but it is the **fastest-growing sector** with investment more than tripling over 2021.
- **Increased involvement of institutional investors necessary** to reach commercial feasibility
- **Multiple market instruments** are available to the private sector for financing: Green Bonds, sustainability-linked, ESG funds & VC

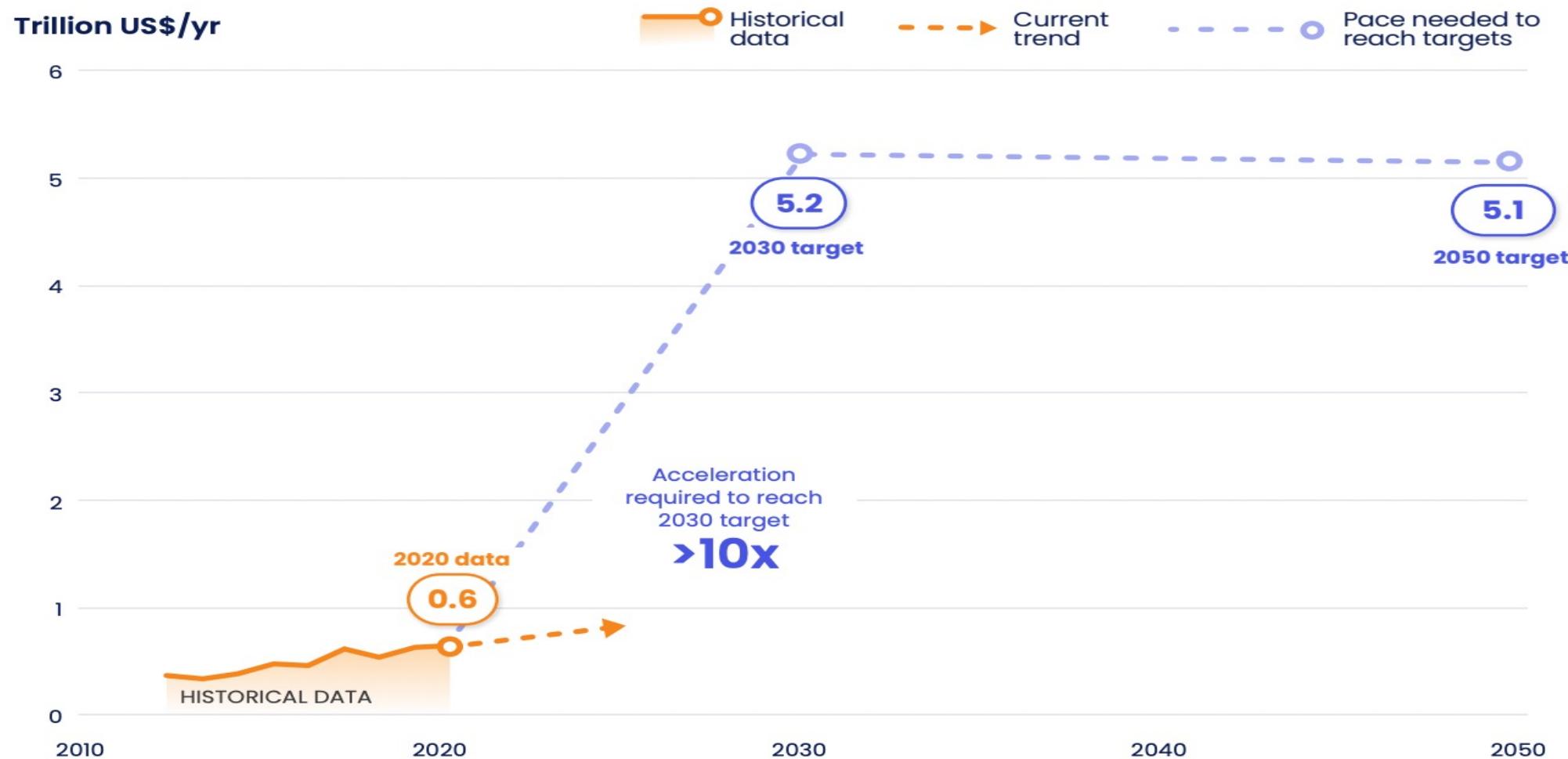
Global investment in Energy Transition by Sector



Source: BloombergNEF Energy Transition Investment Trends 2023

# New Global Energy Map requires massive financing

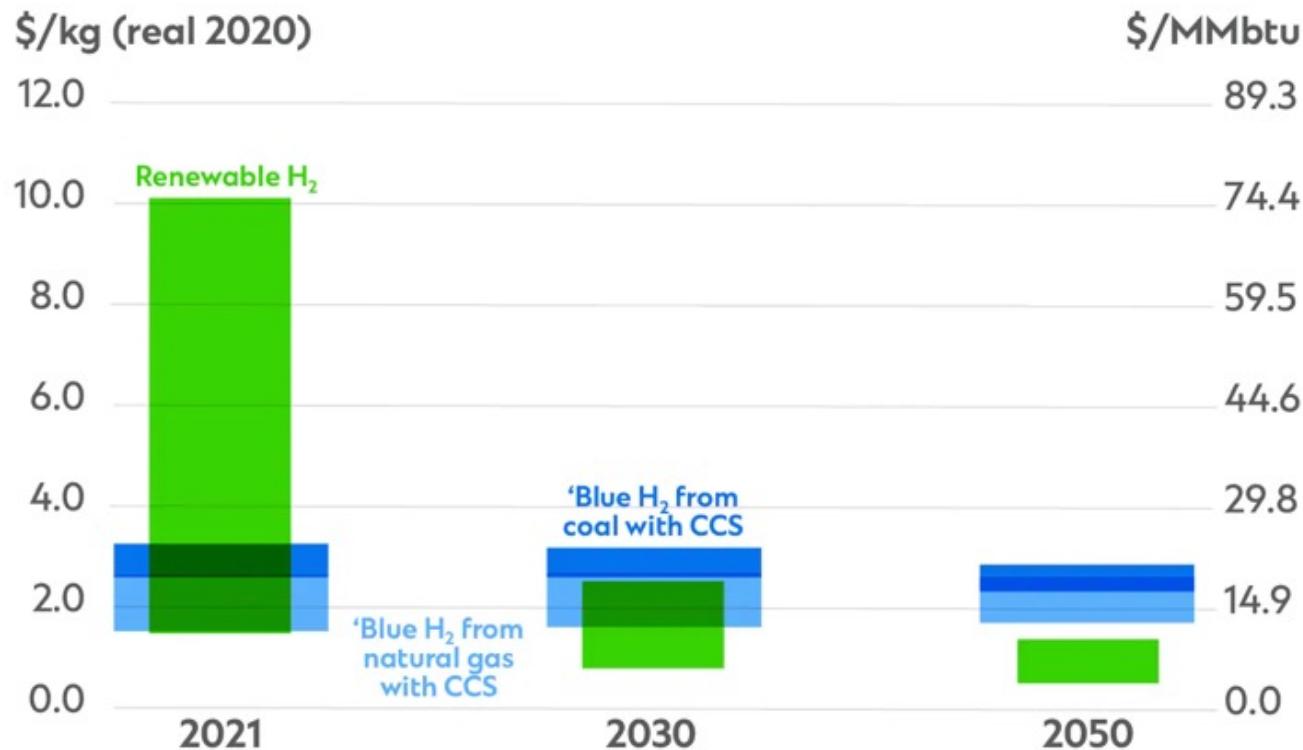
**Historical progress toward 2030 and 2050 targets for Global Total Climate Finance  
(public and private, domestic and international)**



Source: Systems Change Lab State of Climate Action 2022

# Emergence of a New Global Energy Map: Hydrogen

## Forecast global range of leveled cost of hydrogen production from large projects



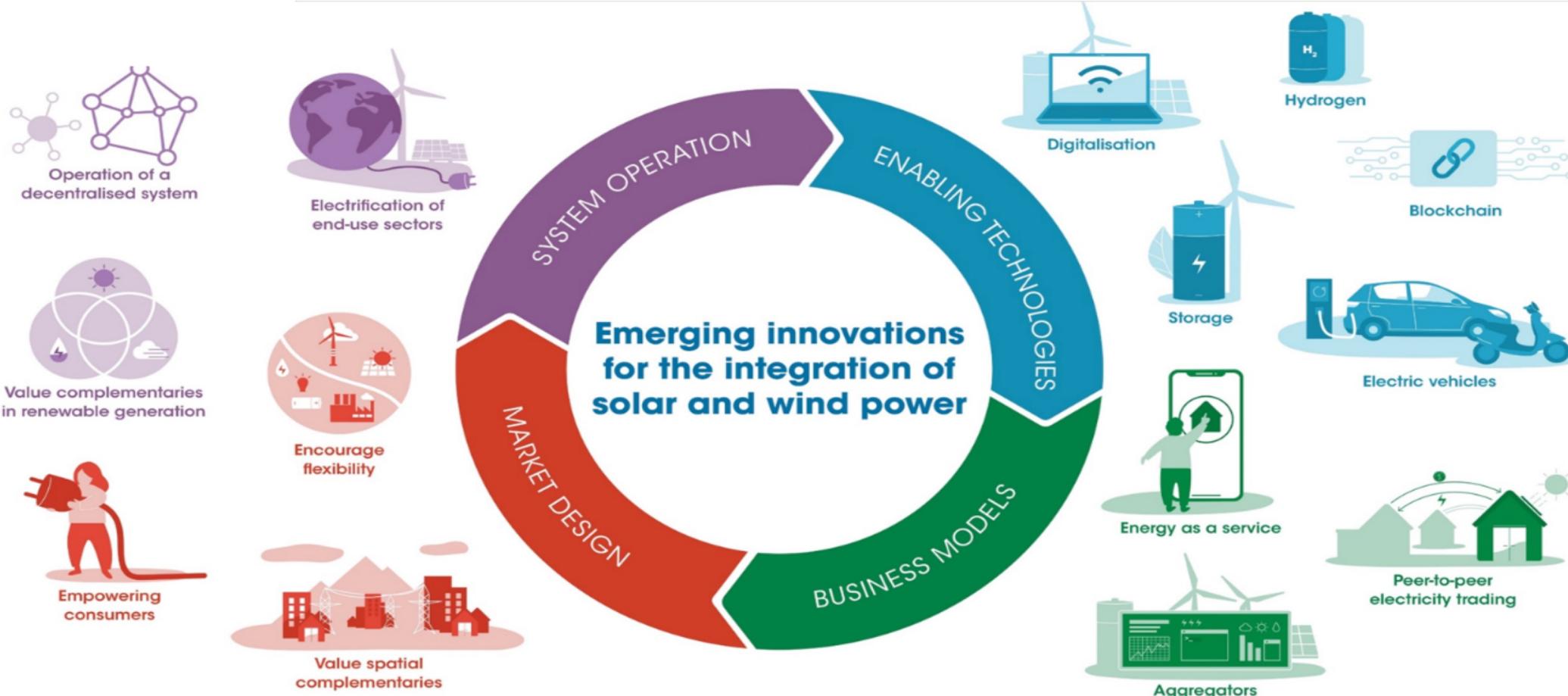
Source: BloombergNEF. Assumes optimistic electrolyser cost scenario

## Potential of hydrogen in contributing to the energy transition is growing... infancy

- **Utilization of hydrogen is growing**
- Declining renewable energy costs => **greater interest in green H<sub>2</sub> production**
- **Green hydrogen is estimated to be** produced for \$0.70 - \$1.60 per kg in most parts of the world **by 2050 - a price competitive with natural gas!**
- **New alliances are forming** to develop green hydrogen projects; global H<sub>2</sub> export and import hubs will emerge
- Large nations like the US, Canada, China, and Russia may establish **domestic (in-country) trading**

# Emergence of a New Global Energy Map

## The four main pillars supporting increased flexibility of the Renewable Energy Transition



Source: IRENA

# Blockchain & AI applications in the energy sector

## Blockchain potential positive impact on energy firms

Smart contracts & smart meters to implement automated billing

Use ML to determine energy consumption patterns

Potential to disrupt operations like wholesale market management, commodity trading & risk management

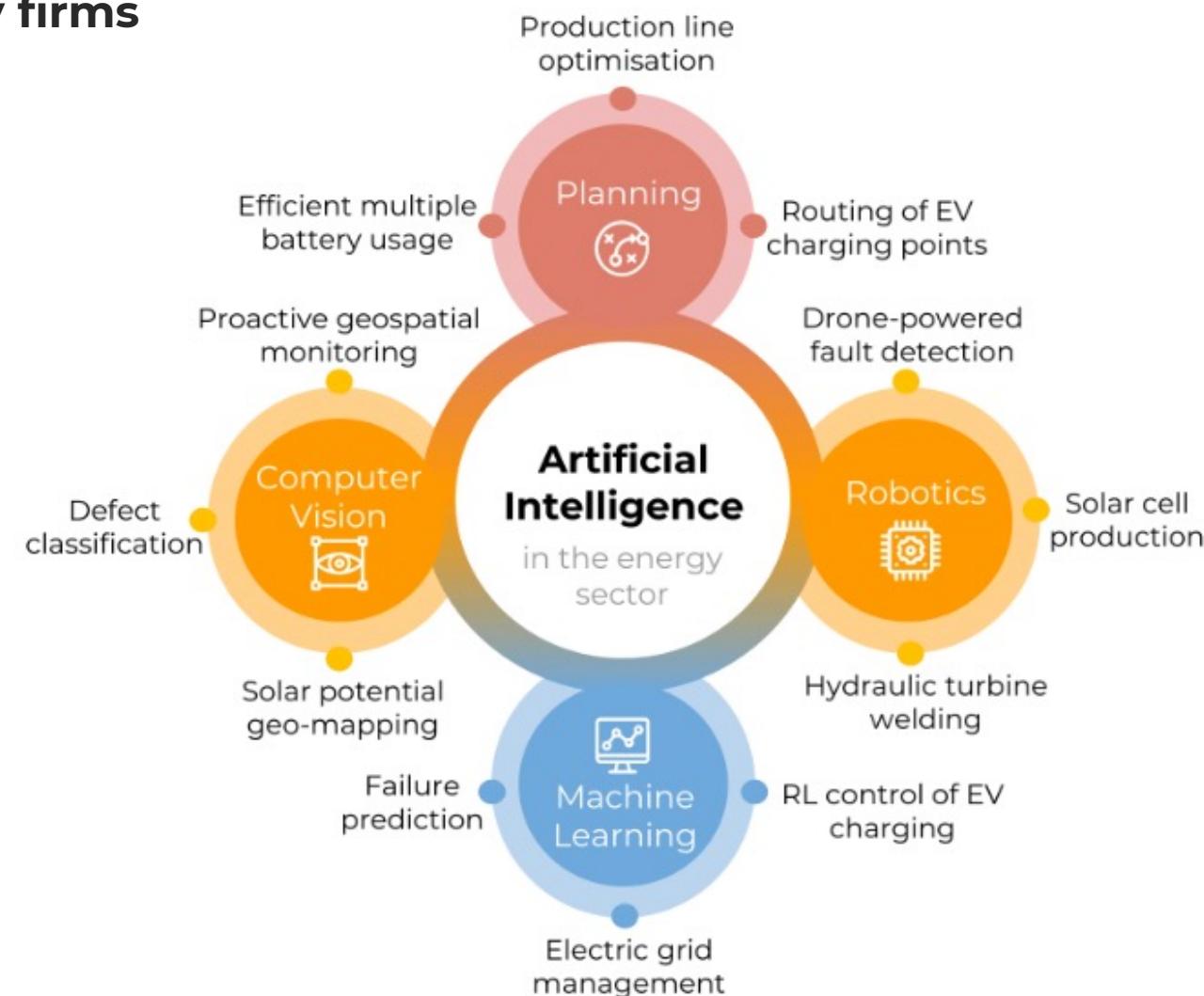
Automation: improve the management of decentralized energy systems & microgrids

Smart grid applications and data communication

Grid governance, security and identity management

Resource sharing

Transparency: immutable records & transparent processes



Source: A 3D indicator for guiding AI applications in the energy sector, May 2022  
[https://www.researchgate.net/publication/360751292\\_A\\_3D\\_indicator\\_for\\_guiding\\_AI\\_applications\\_in\\_the\\_energy\\_sector](https://www.researchgate.net/publication/360751292_A_3D_indicator_for_guiding_AI_applications_in_the_energy_sector)

# Emergence of a New Global Energy Map: Geopolitics & Policies

## Geopolitics

- **Global energy markets shocked and energy security** threatened => greater push for energy transition
- US-China confrontation is leading to increased **global fragmentation** and energy supply chain disruptions
- **Lack of consensus on how fast the transition should and can take place**, in part because of its potential economic disruptions
- **Widening divide between advanced and developing countries**: investment is concentrated in advanced economies and China. Except in China, clean energy spending in emerging market & developing economies is stuck at 2015 levels: growing risk of two speeds and growing gaps.

## Need Energy Transition Policies to back ambitions

- **Energy efficiency policies**: performance requirements and standards, mandatory and voluntary building energy efficiency codes
- **Transport system transformation; EV policies**
- **Energy subsidies reforms** and structural changes
- **System integration of renewables**
- Clearer **guidelines & opportunities to finance credible transition plans**
- **Market-based policy instruments**: carbon taxes, electricity markets, compliance and voluntary carbon markets

### GCC will be at the centre of a transformed, new Global Energy Map

Ongoing energy “linkages” with Asia + new links with Europe for natural gas & green/ blue hydrogen  
Potential GCC electricity grid (powered by RE), extending all the way into Europe, Pakistan and India

**GCC region will be at the centre  
of a new, transformed,  
Global Energy Map**

# Energy transition in the GCC region & combating climate change

MENA faces high climate risks but has immense clean energy potential

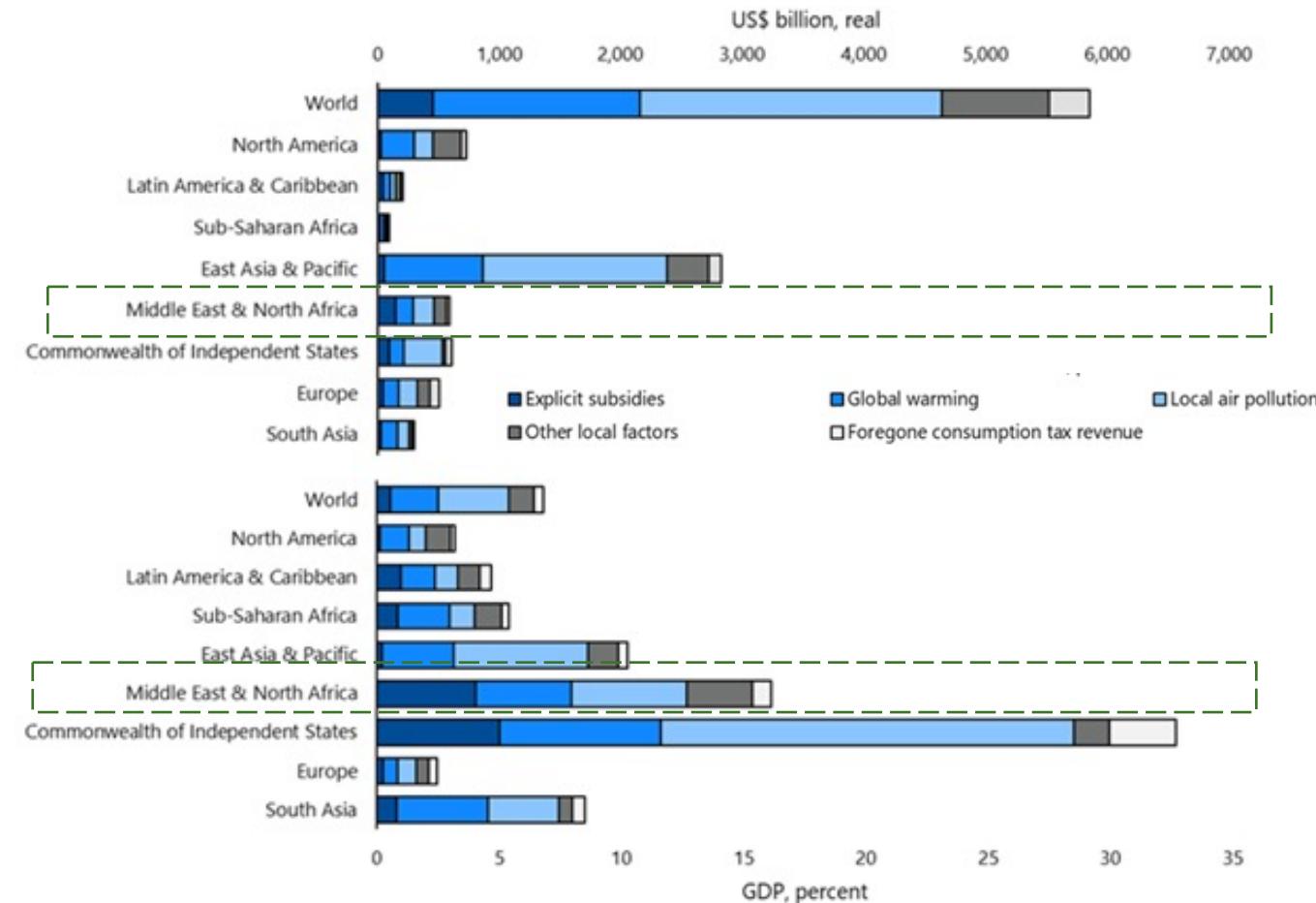
- Region must **focus on the 'sustainable' element of the energy trilemma** (reliability, affordability, and sustainability)
- Expansion** of renewables **must increase by a factor of 10 to 14** for a consistent energy transition

**GCC as part of energy transition will increasingly be exporting renewable energy-based energy:**

- Linking GCC grids with Europe and across the Arabian Gulf and Red Sea;
- Supplying electricity produced by renewable energy

This will require **integration of power grids + development of a power supply market + enhancing the grid** with advanced technology

**Size of fossil fuel subsidies by region**  
Total subsidies relative to regional GDP stands at 16% in MENA



Source: IMF

# Energy transition in GCC region & combating climate change, requires comprehensive Climate Strategies

## Need Climate Strategies & policy reforms:

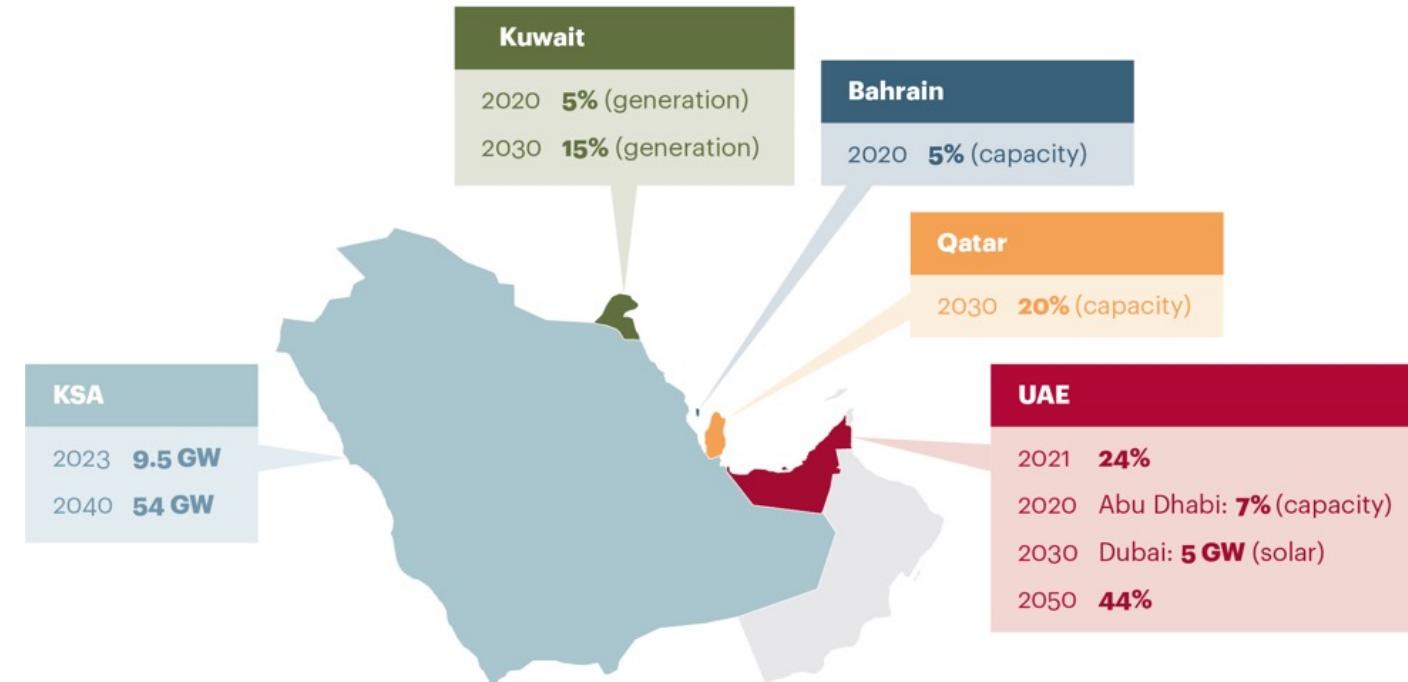
- Climate Strategies should supersede NZEs (UAE by 2050, KSA and Bahrain by 2060)
- Phase out fossil fuel-based subsidies
- Remove regulatory & other barriers to private sector (i.e. strategies enabling emerging technologies: H2, CCUS, water tech, sustainable mobility etc.)

## Thinking beyond current policies:

- Leverage the growing strategic relationship with China
- Integrating energy transition policy with foreign aid (funding incorporation of renewables, research, and climate action initiatives)

To meet increasing demand for electricity, the Gulf countries are investing in renewables

### GCC renewable targets

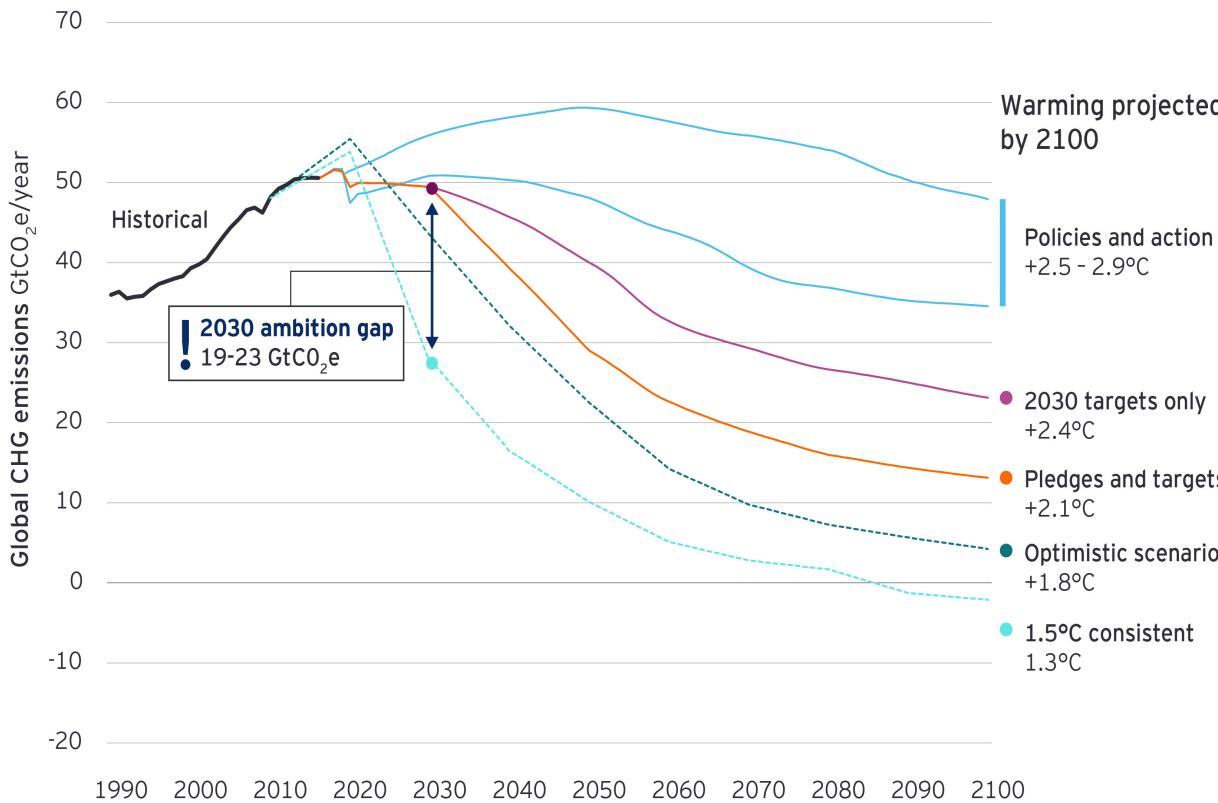


Sources: IRENA; News, A.T. Kearney analysis

# Climate Change & the Water Challenge

# Climate Change Crisis Accelerating in the Middle East: Water Wars?

2100 Warming Projections  
Emissions and expected warming based on pledges and current policies



**Rising temperatures:** over the past three decades, temperatures in the Middle East have already risen by 1.5°C, **twice the global increase of 0.7°C**

By 2050, average summertime temperatures could exceed 30°C in half the region's countries!

Much of the region lies in harsh climate zones: **global warming is exacerbating desertification, water stress & rising seas.**

**Negative impact on GDP:** a temperature increase of 1 °C in 5 of the hottest countries (Bahrain, Djibouti, Mauritania, Qatar & UAE) results in an immediate decline in per capita economic growth of around 2 percentage points.

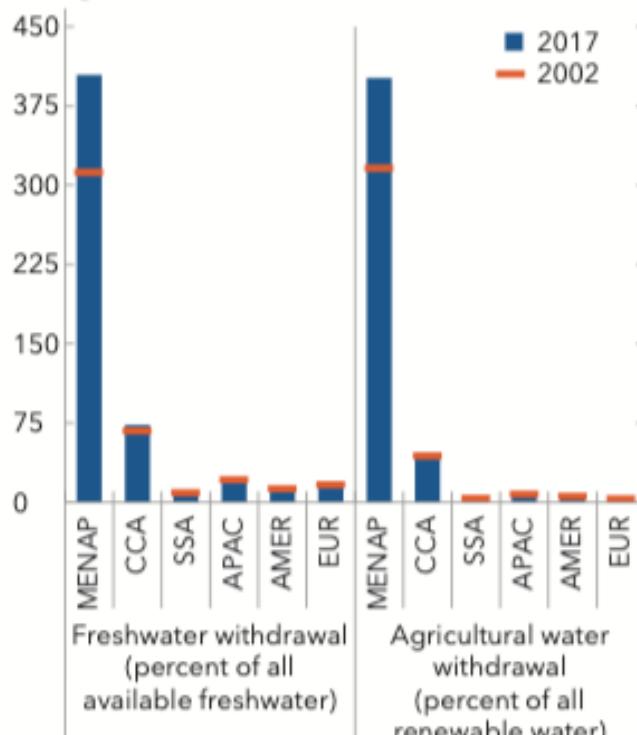
**Climate adaptation is an urgent priority for the region.** Policies range from boosting public investment in resilient infrastructure, increasing role of pvt sector, strengthening social spending, standards for climate data & disclosure..

Did you know that **22.3 million people worldwide were internally displaced globally due to extreme weather events in 2021?**

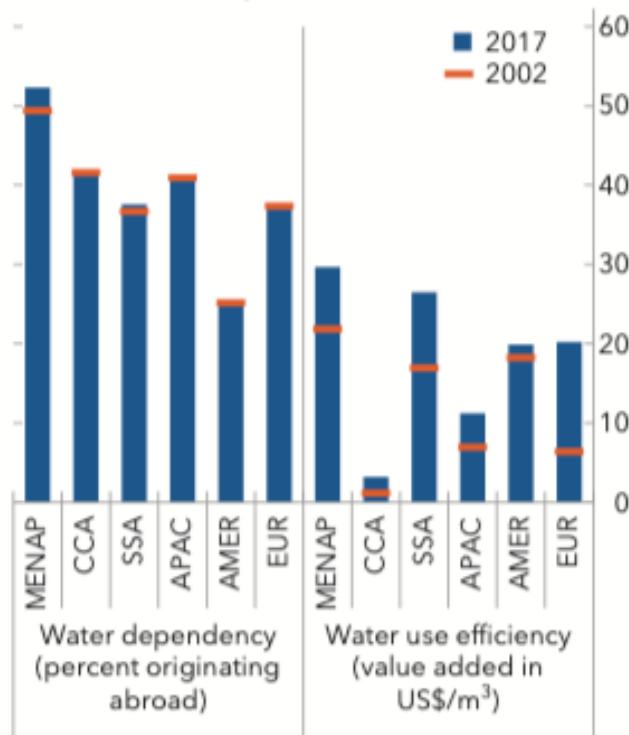
# The Water-Energy-Food nexus in MENA: a major challenge

## Water Stress Factors, 2002 and 2017

### 1. Freshwater Withdrawal and Agricultural Use



### 2. Water Dependency and Use Efficiency



Sources: FAO; and IMF staff calculations.

Source: "Feeling the Heat: Adapting to Climate Change in the Middle East and Central Asia", IMF.

- **Water scarcity is a unique challenge** in Arab countries due to declining water quality, climate change & lack of freshwater
- Water scarcity + rising costs of groundwater exploitation => **projected drop in agricultural production & productivity. Consequences for food security & self-sufficiency**
- **Water scarcity also impacts electricity generation:** investments in less water intensive electricity generation technologies (solar & wind) required to cope with groundwater depletion & surface water scarcity
- Challenge is made more difficult with **water production being substantially energy intensive**. Did you know that **desalination in the GCC** countries account for 43% of global capacity?
- **High population growth & fossil fuel dependence hinder trade-offs between the three sectors**

# The Rise of ClimateTech in the MENA region

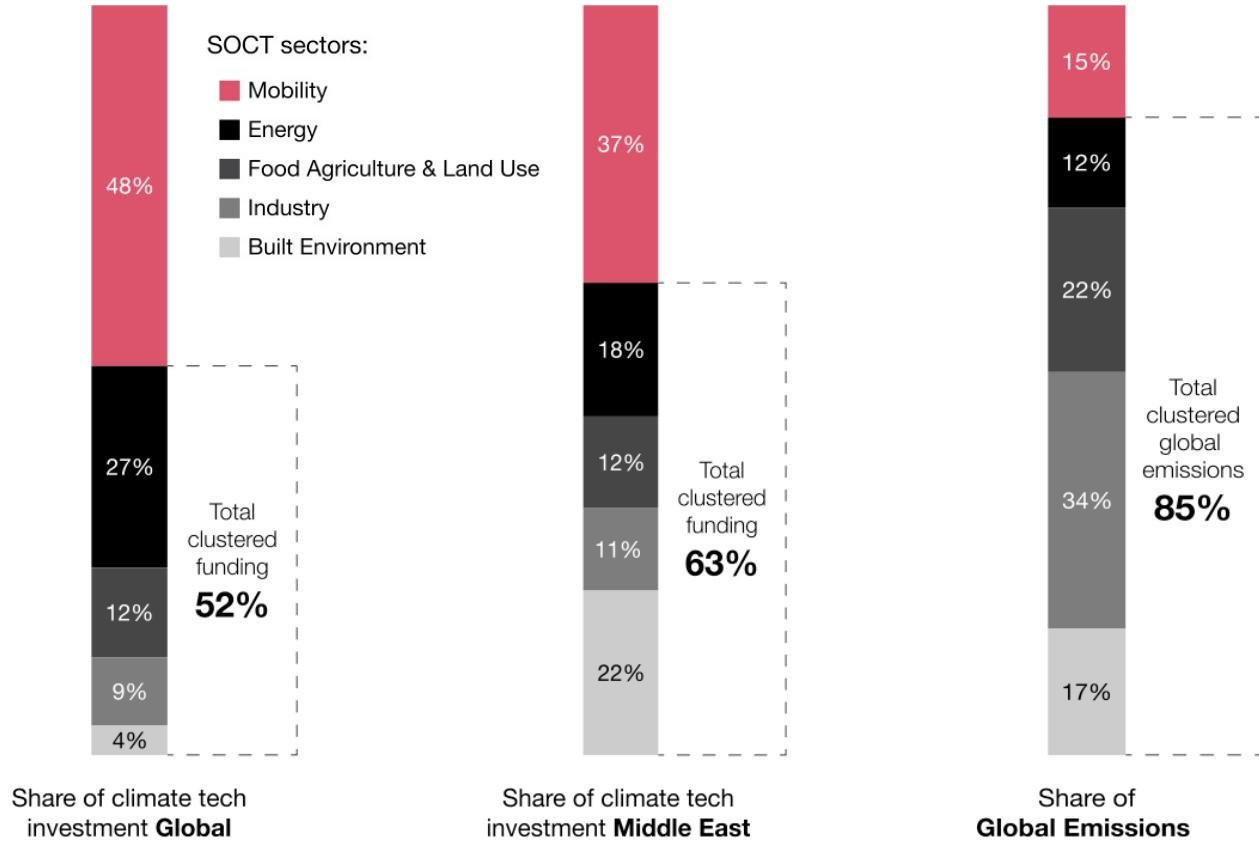
## Building a climate tech ecosystem in the MENA region

- Attracting **VC investment in the region into climate tech**: desalination, water reuse, energy and grid, food, adaptation, mobility & transport
- **As of H1 2022, 12 Middle East countries invested \$1.6 billion in climate tech**
- **UAE & Saudi Arabia are leading climate tech** investment in the region despite a decline globally

## Recent partnerships in the UAE to support climate tech

- Hub71, Abu Dhabi's global tech ecosystem, partnered with Masdar City to enable their startups to have access to its technology ecosystem and R&D hub
- Hub71, partnered with Siemens Energy to support Abu Dhabi's clean/climate tech startups to develop innovative technologies

Share of climate tech investment Global v share of climate tech investment Middle East v Global Emissions share



Source: PwC State of Climate Tech 2022, PwC analysis of Pitchbook data. This data is based on information available as at 8 November 2022.

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