

# THIRD IEF-EU ENERGY DAY



26<sup>th</sup> February 2019 – Riyadh – Saudi Arabia

## The Economies of New Energy Technologies in Europe and the Gulf Region

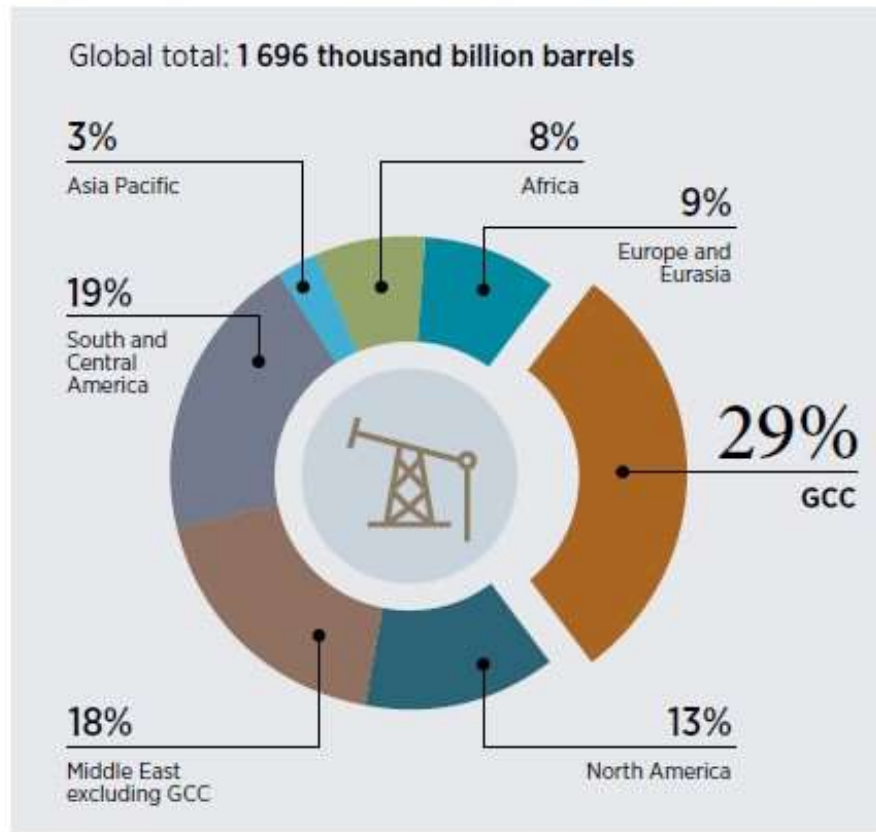
### GCC Regional Perspective

**Ahmed Al-Ebrahim**

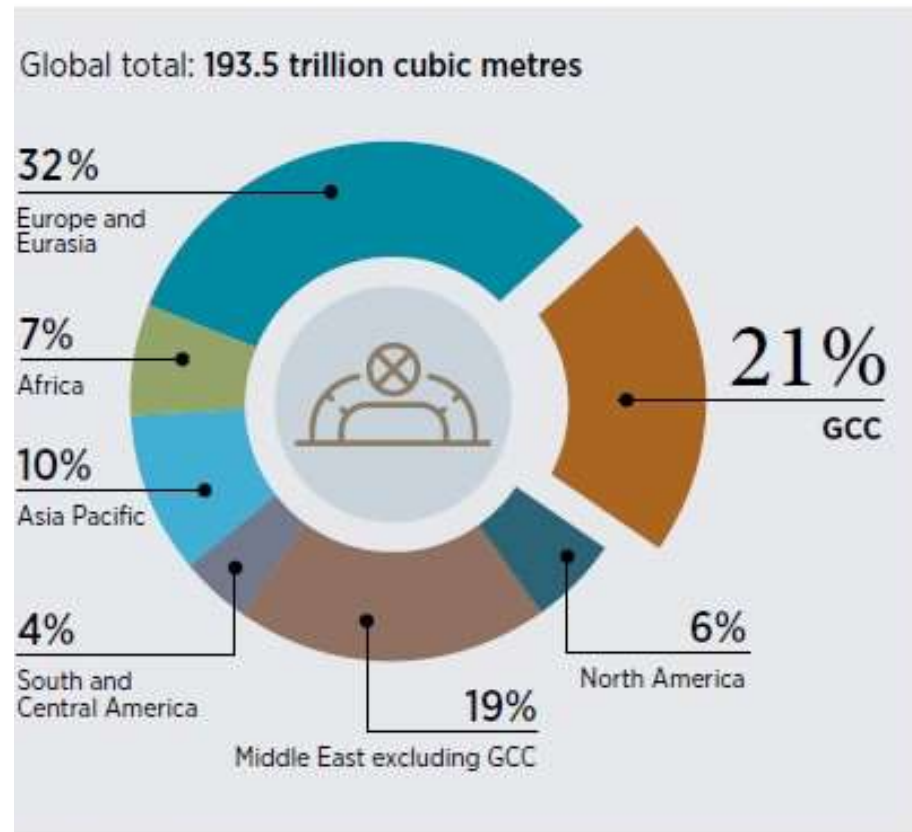
CEO - GCC Interconnection Authority

# GCC holds 29% of Global Crude oil reserves and 21% of Global Natural Gas Reserves

**Figure 1.1** Crude oil reserves by region in 2017 as a share of world total **Figure 1.2** Natural gas reserves by region in 2017 as a share of world

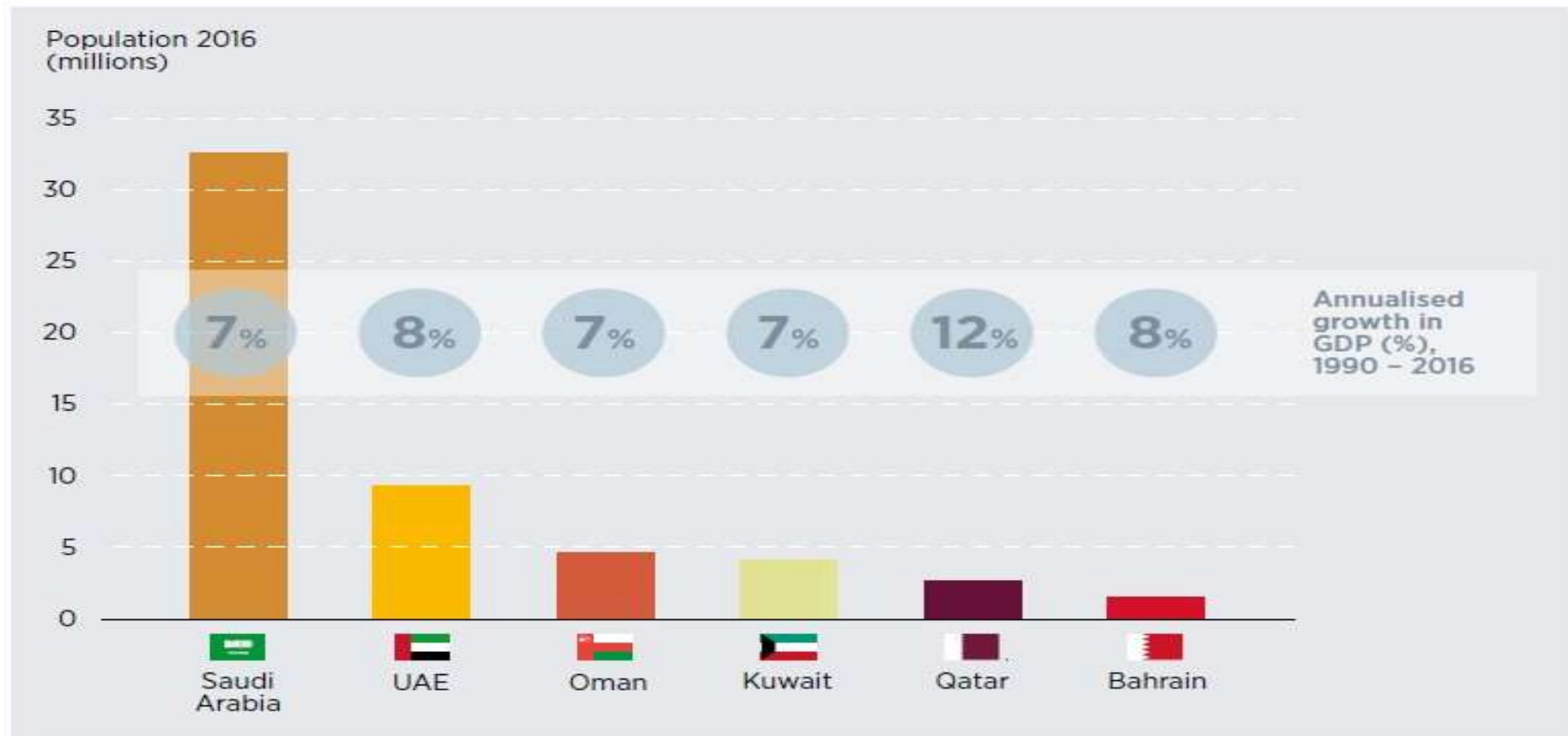


Source: BP, 2018.



Source : IRENA Renewable Energy Market Analysis – GCC 2019

# GCC Growth in GDP amongst highest in the world

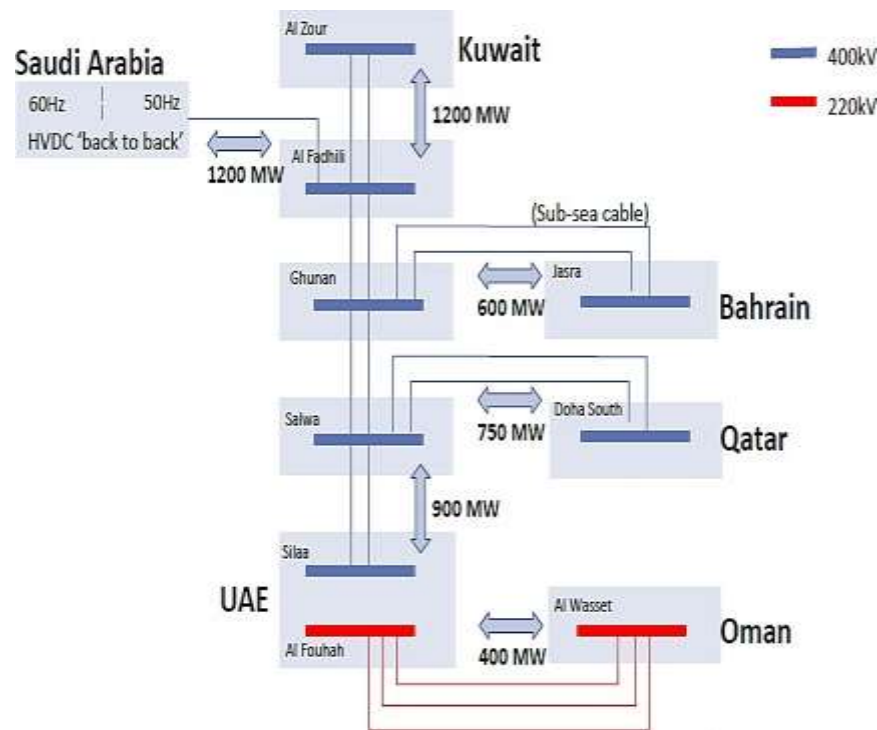


Source: Based on World Bank, 2018; IEA, 2018b.

Source : IRENA Renewable Energy Market Analysis – GCC 2019

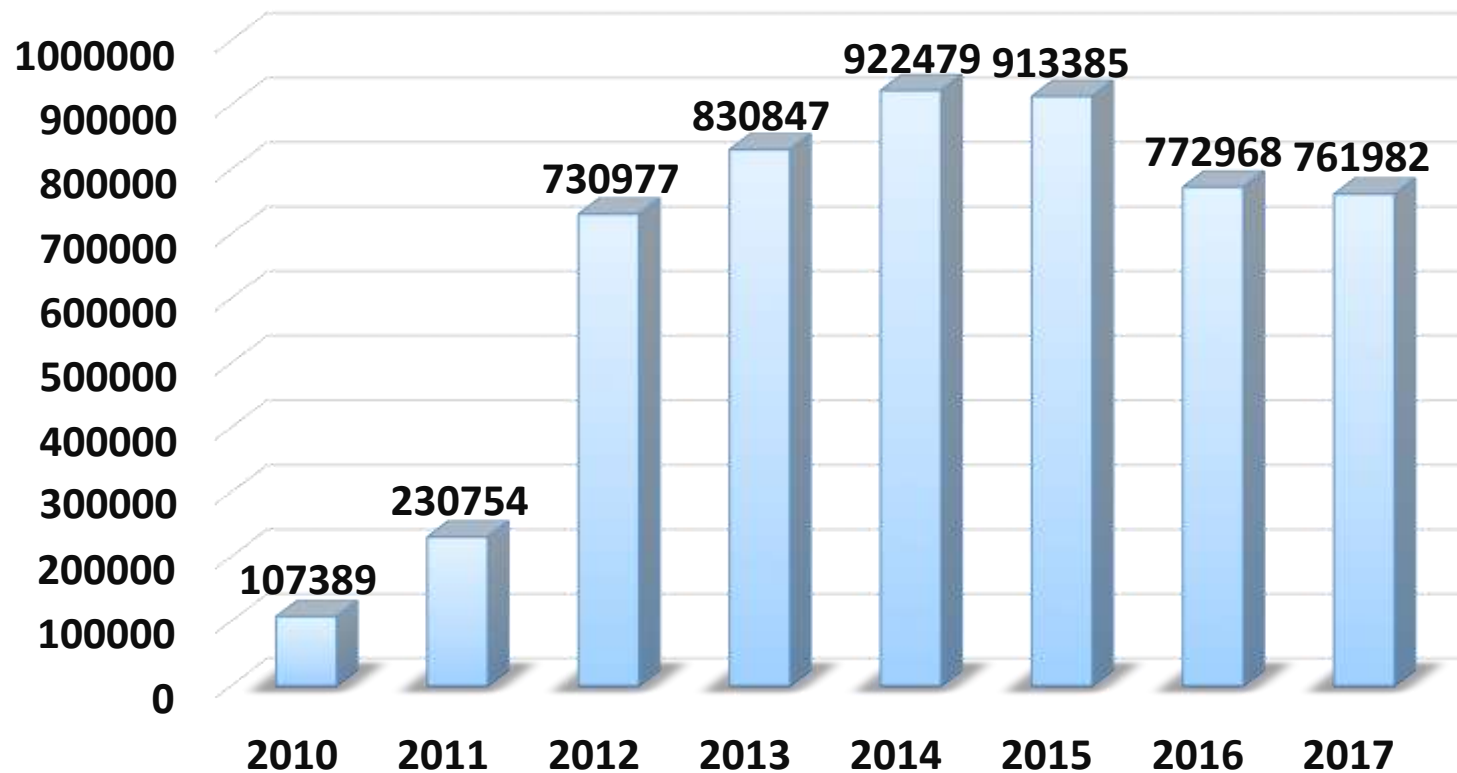
# The GCC Interconnector – A Unique Structure

- A Regional Backbone Structure to support Energy Security
- Coordinated Operation - sets Operational Rules and targets
- Coordinated Planning – sets Generation and Interconnector expansion targets



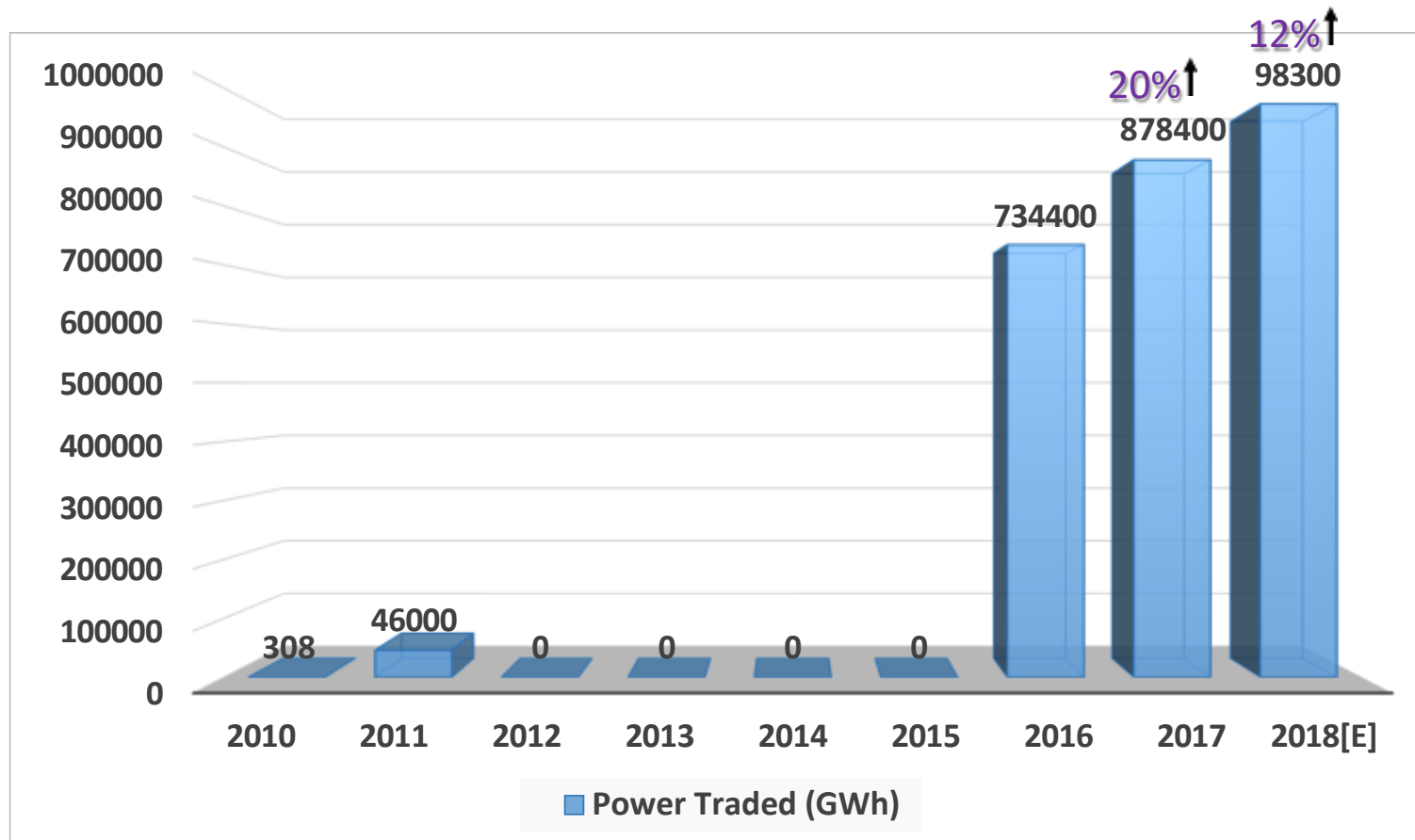
# Energy Security through Consolidated GCC Grid

Volume of Power **Exchanged** on the GCC  
Interconnection 2010 – 2017



# Developing the Regional GCC Electricity Market

Volume of Power Trade on the GCC Interconnection  
2010 – 2018





# Rapid and far-reaching Global changes : the Energy Transition

Renewable CO2-free energy



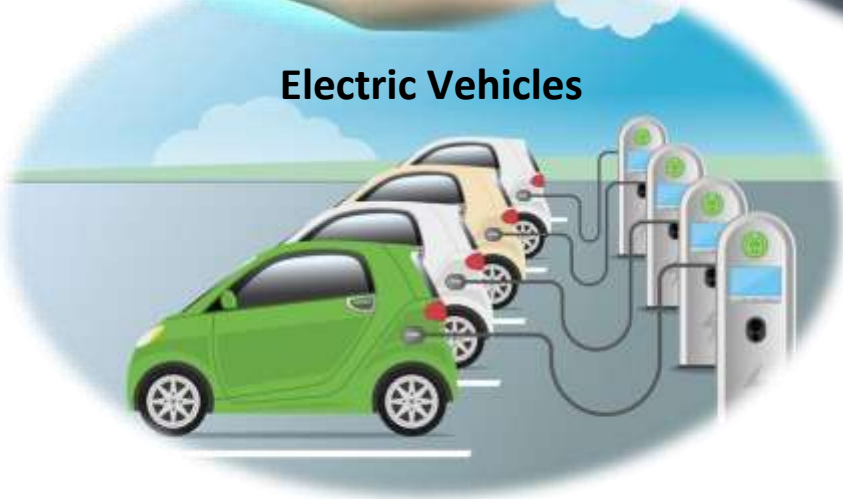
Batteries and storage technologies



Hydrogen Storage



Electric Vehicles



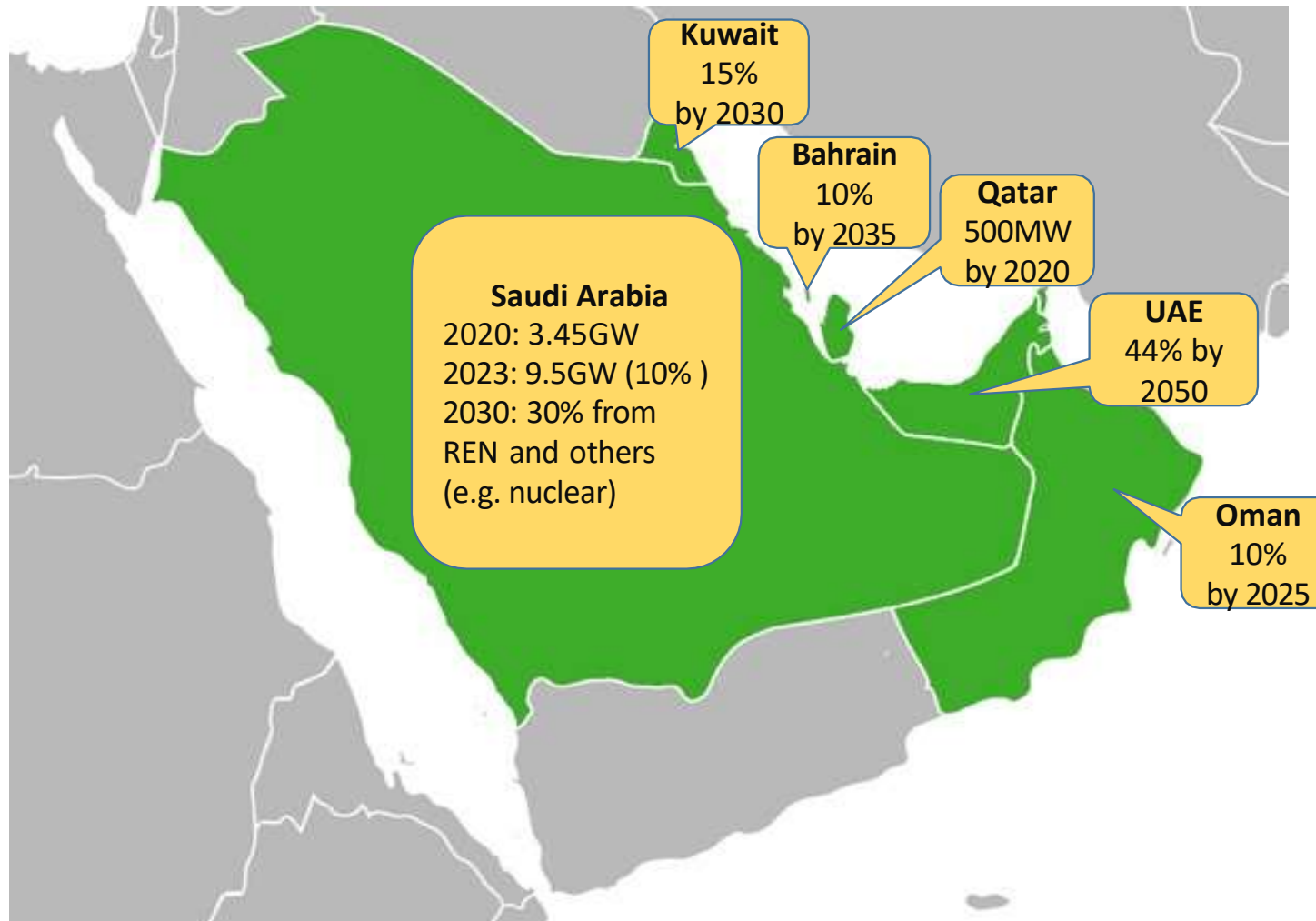
CONSUMER



PROSUMER



# Large Scale Deployment of Renewables in the GCC

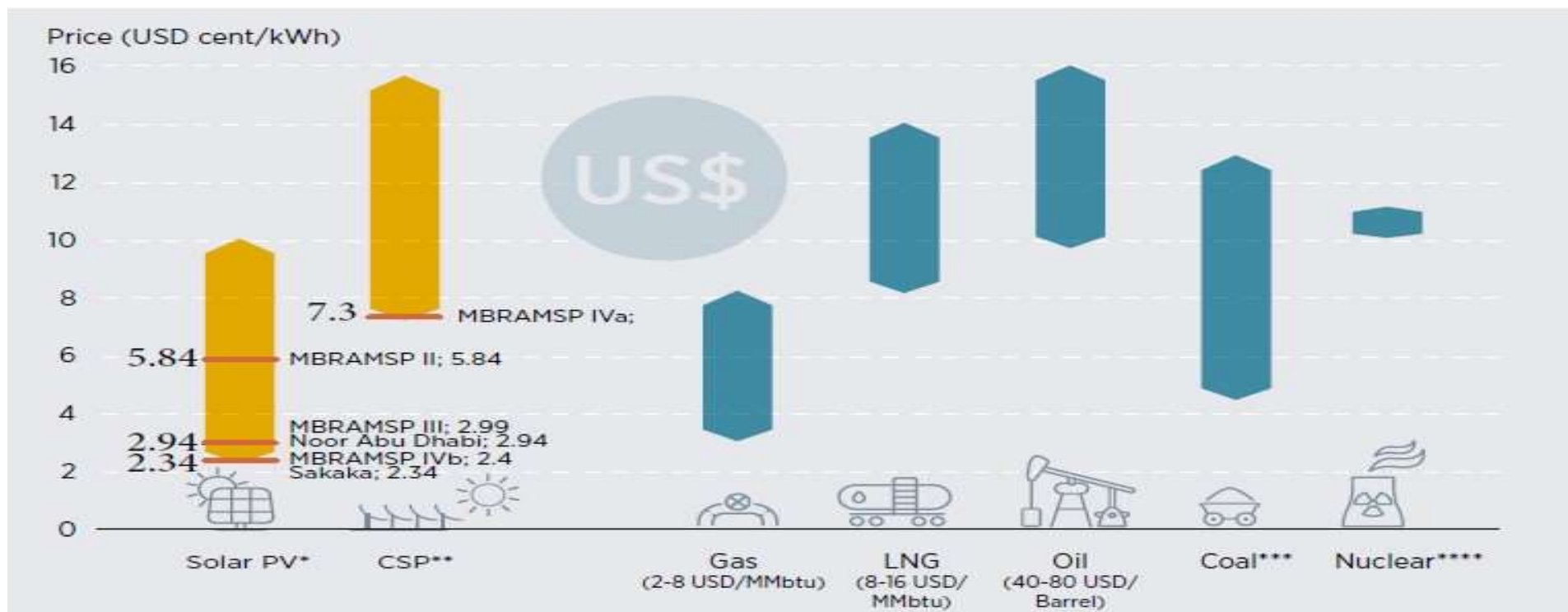


## Issues: How to integrate?

- Need for Storage
- Need for energy exchange
- Need for Interconnections



# Price of Utility-Scale Electricity Technologies in the GCC



Sources: Derived from Mills, 2018; Channell et al., 2015; Manaar, 2014; Scribbler, 2015.

\* Low = price for 300 MW Sakaka solar PV; and High = a conservative assumption based on project data and expert opinion

\*\* Low = price for 700 MW MBRAMSP IVb in Dubai; and High = price for Morocco's Noor II

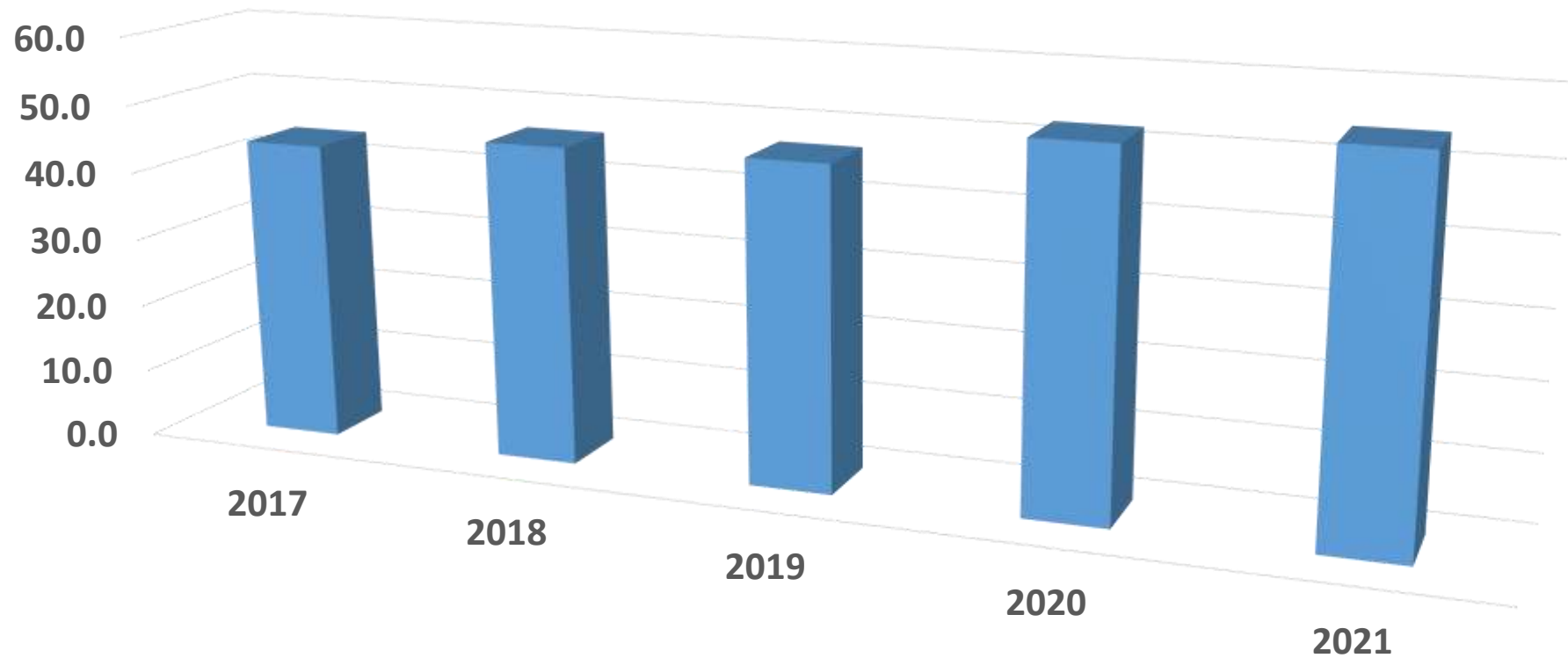
\*\*\* Low = price for the Hassyan Clean Coal Power Plant; and High = estimate for coal with CCS

\*\*\*\* Estimated range for nuclear power based on (Mills, 2012) and (Scribbler, 2015)

Source : IRENA Renewable Energy Market Analysis – GCC 2019

# **GCC Excess Generation Capacity Available For Export During Winter Months**

GW



# **GCC grid Expansion Opportunities: Exploring interconnections to Promising corridors**

## **Corridors towards Europe / Turkey**

- Complementary seasonal diversity between Europe / Turkey and GCC .. Excess renewable (solar) energy in GCC
- Jordan being a hub for interconnecting to neighbouring system : Iraq, Syria, Egypt, Turkey
- Egypt : Interconnect with Europe thru Euro-Africa 2000 MW Interconnection
- Iraq : HVDC backbone towards Turkey

## **Corridors towards Africa : Ethiopia**

- Complementary Solar Energy (Saudi Arabia) / Hydro (Ethiopia) with storage capabilities

## **Corridors towards Asia : India , Pakistan**

- Complementary seasonal time diversity between south-east Asia and GCC .. Excess renewable (solar) energy in GCC  
Excess Wind energy potential in Pakistan & Afghanistan



## GCC – Jordan – Egypt - Euro-Africa Interconnection

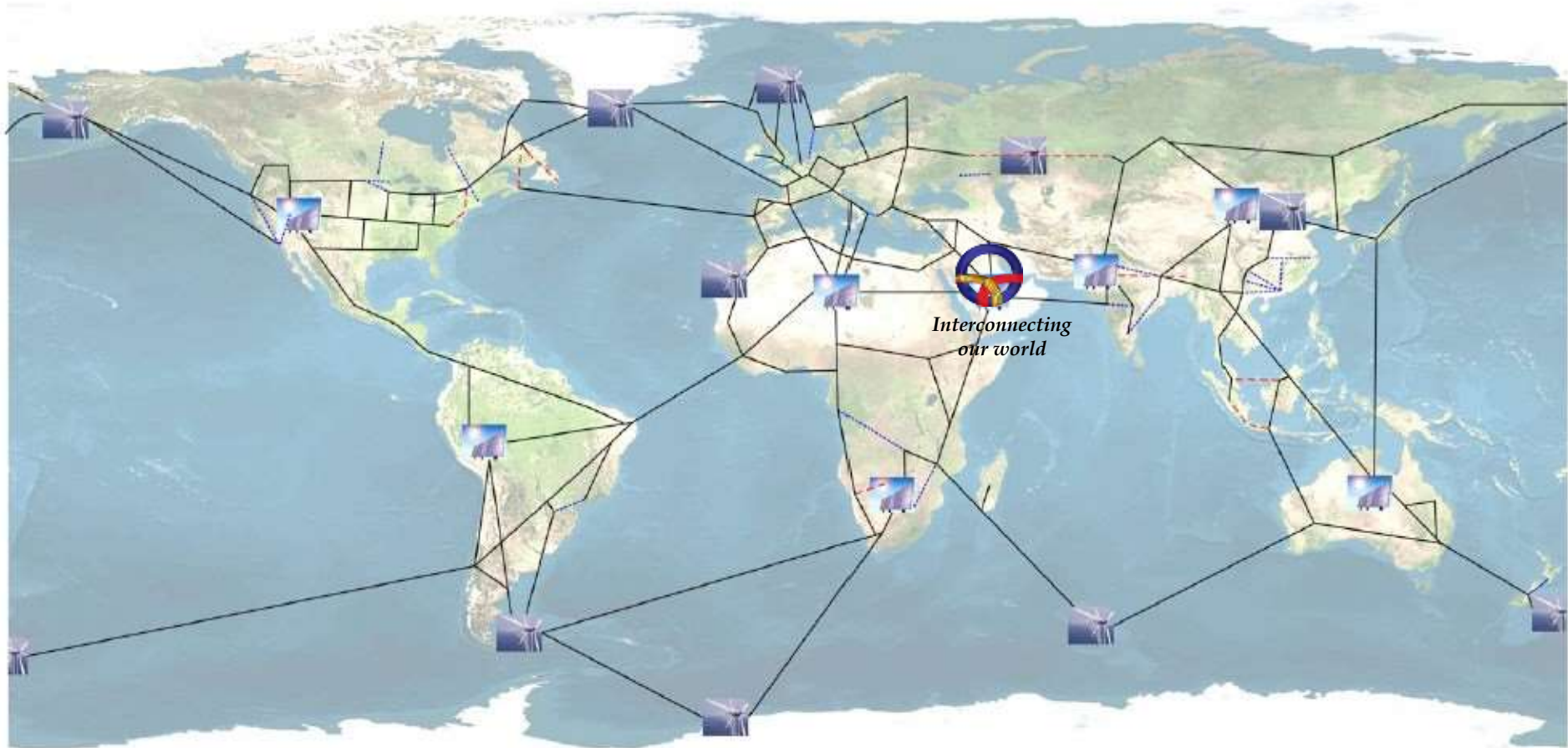


2000 MW HVDC link from GCCIA back-bone grid to Jordan then Egypt to link with Euro-Africa Interconnector will create an Electricity Highway (E-Highway) between GCC & Europe



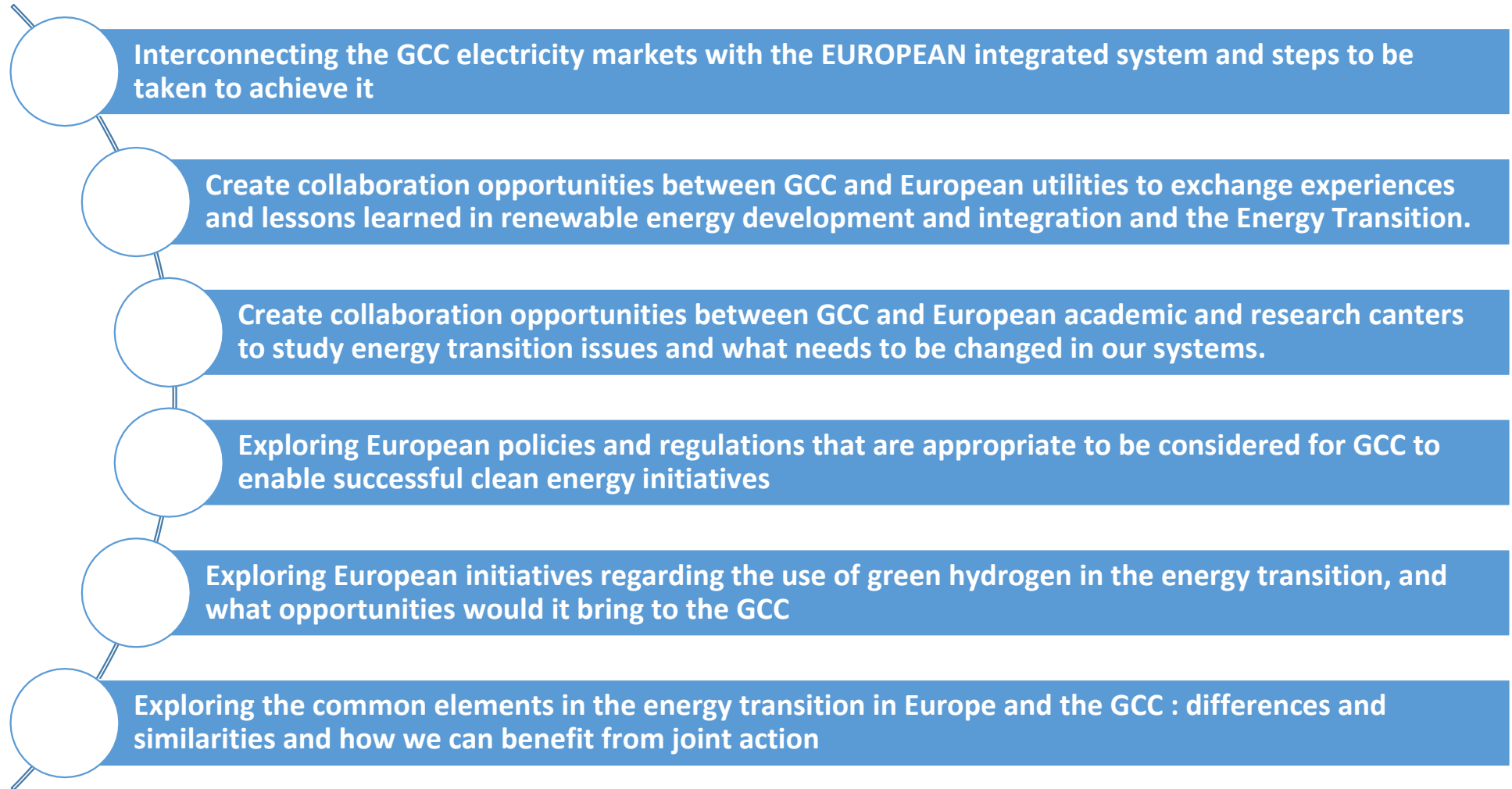
# THE GLOBAL GRID

- Interconnecting the unconnected grid to global grids.
- Integration of the Renewable Energy Sources





# Prospects for GCC Euro Cooperation



# Thank You

**GCC Interconnection Authority**

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*Interconnecting our world*

