

# *Centre Energie - Centre for Energy*

## **The prospects for nuclear power in Saudi Arabia**

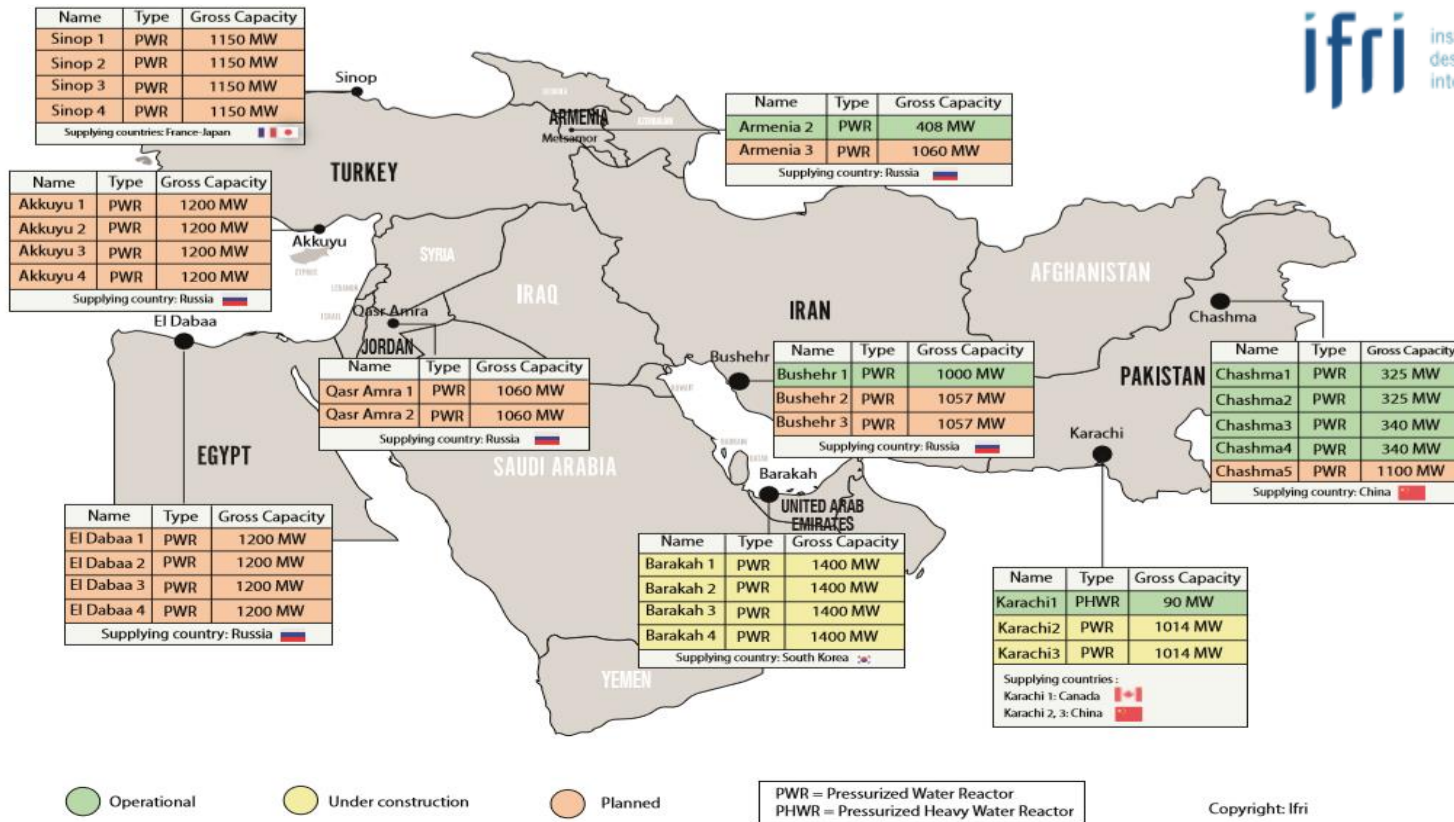


**Marc-Antoine Eyl-Mazzega**

Director, Centre for Energy

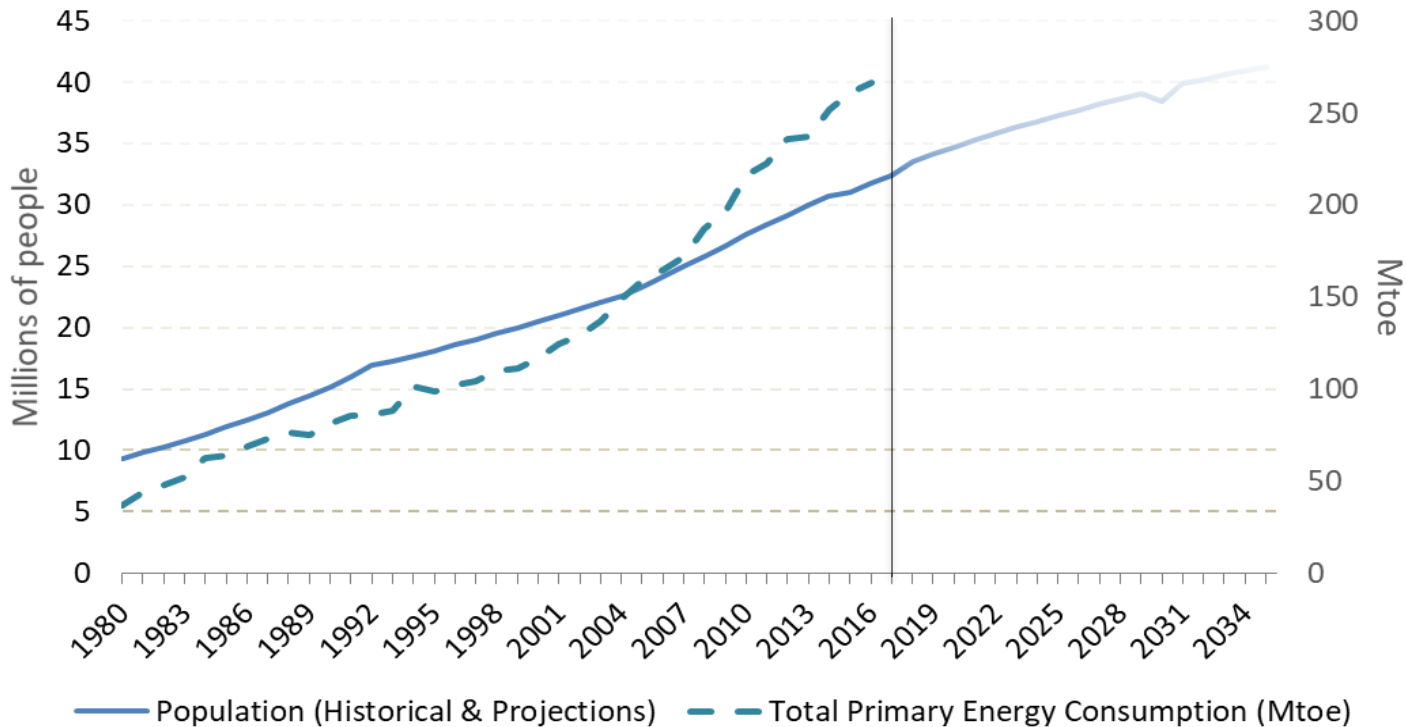
Paris Energy Club- Rueil, 20/04/2018

# Regional context: NPP projects popping up everywhere, 17.6 GW announced for Saudi Arabia



# Perfect conditions: growing population, growing energy demand...

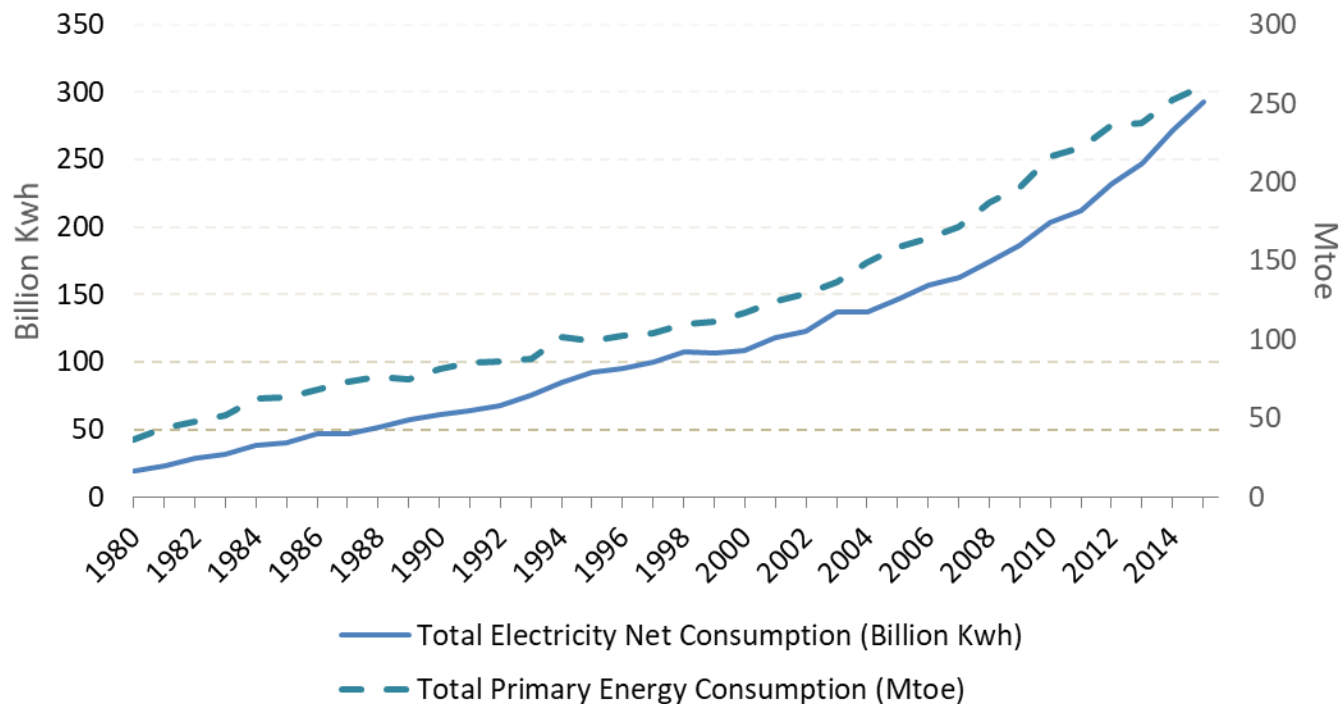
Evolution of TPES and population, 1980-2034E



Sources: IMF, UN World Population Prospects 2017, BP Statistical Review 2017

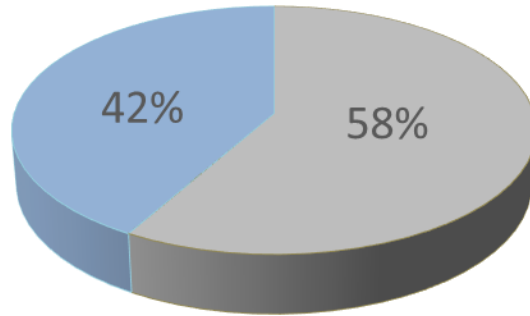
# Electricity sector key driver of energy demand

Evolution of electricity consumption and TPES, 1980-2015



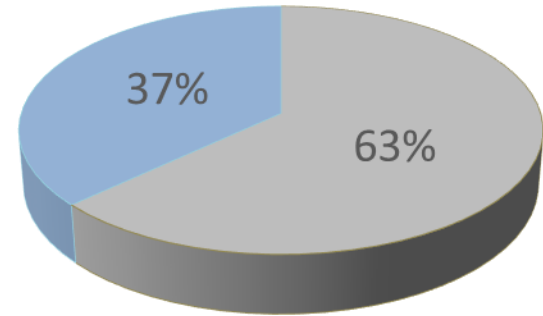
... energy mix increasingly reliant on oil... if not for the Paris Agreement, lower demand would free up oil for exports

Energy mix, 2000



Oil Gas

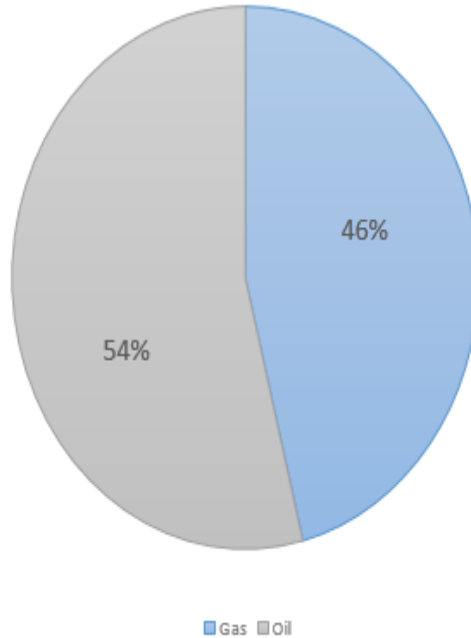
Energy mix, 2016



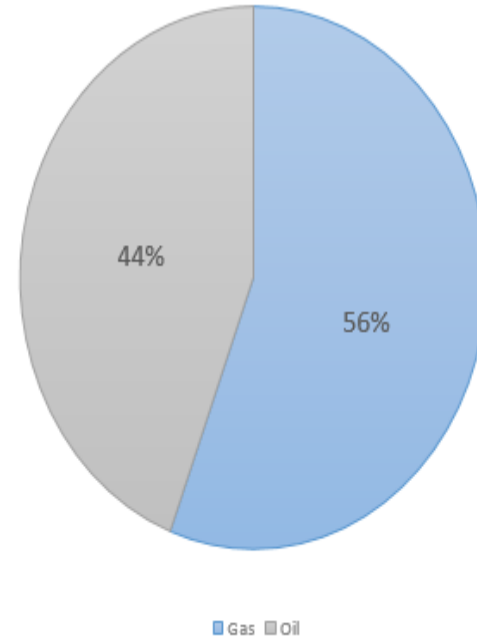
Oil Gas

# Gas increasingly used for power generation as production has ramped up... Will shale gas or imports prevail?

Power generation mix, 2000

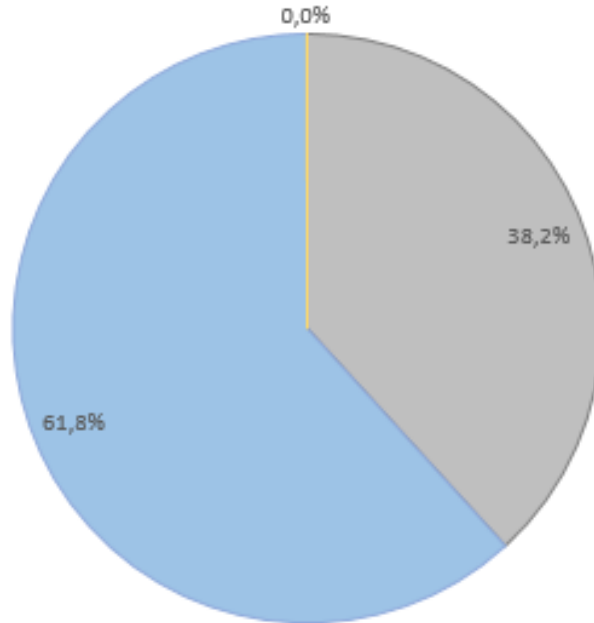


Power generation mix, 2016

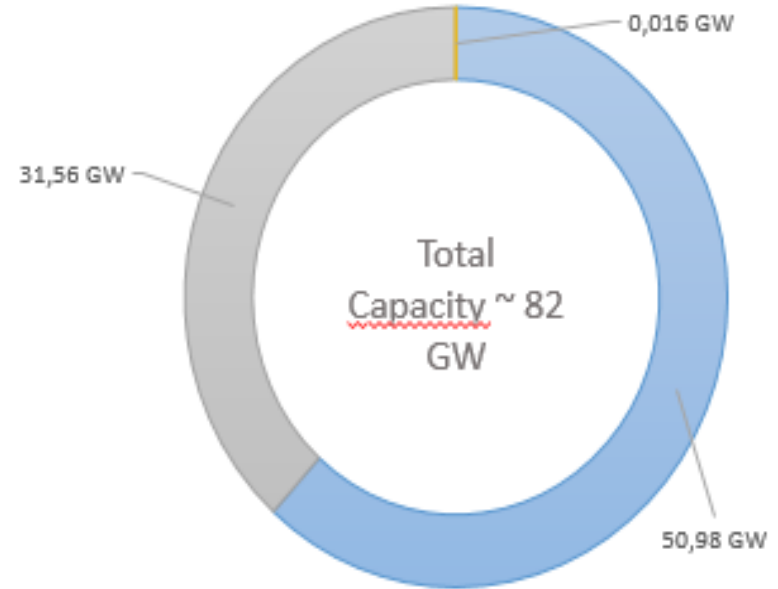


## 31 GW of oil fired power generating capacity...

Installed electric power capacity by fuel in %, 2017    Installed electric power capacity by fuel in GW, 2017 (including desalination)



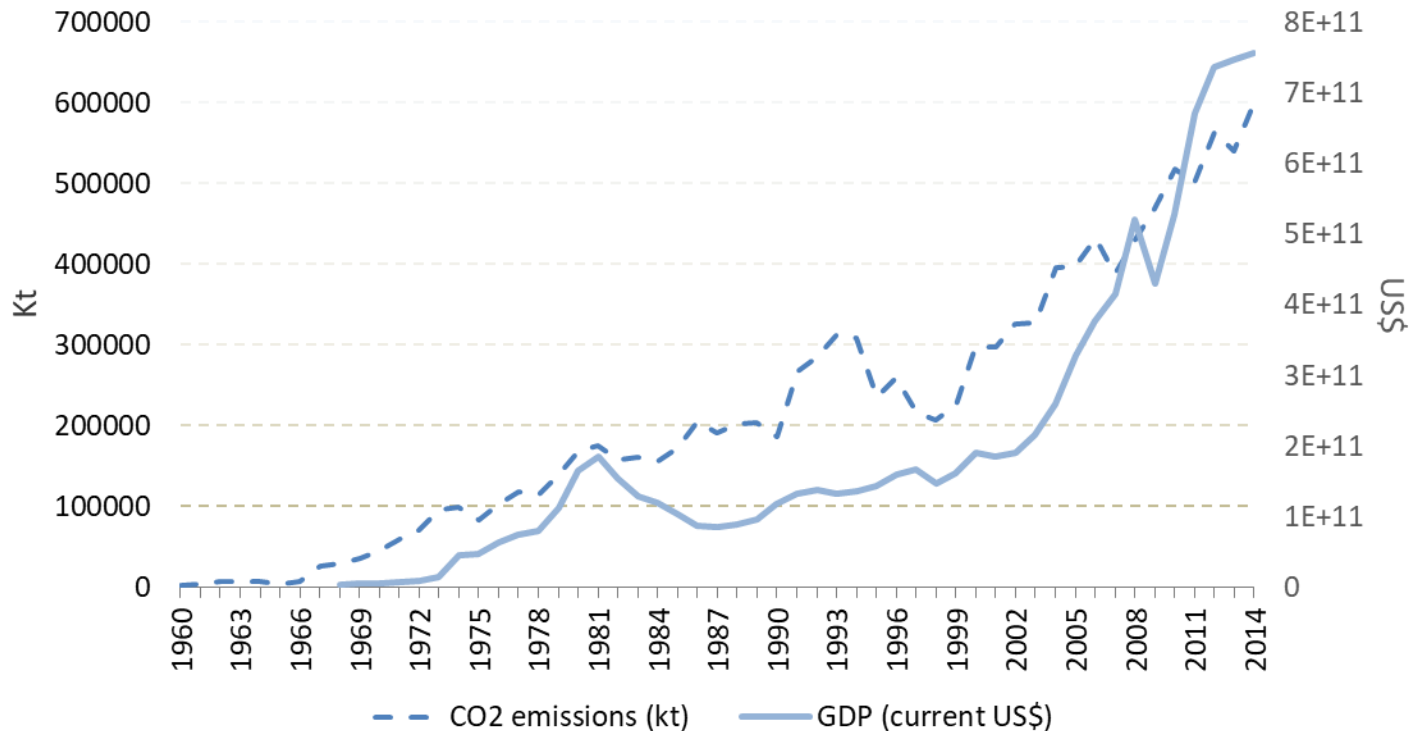
Oil    Natural Gas    Solar



Natural Gas    Oil    Solar

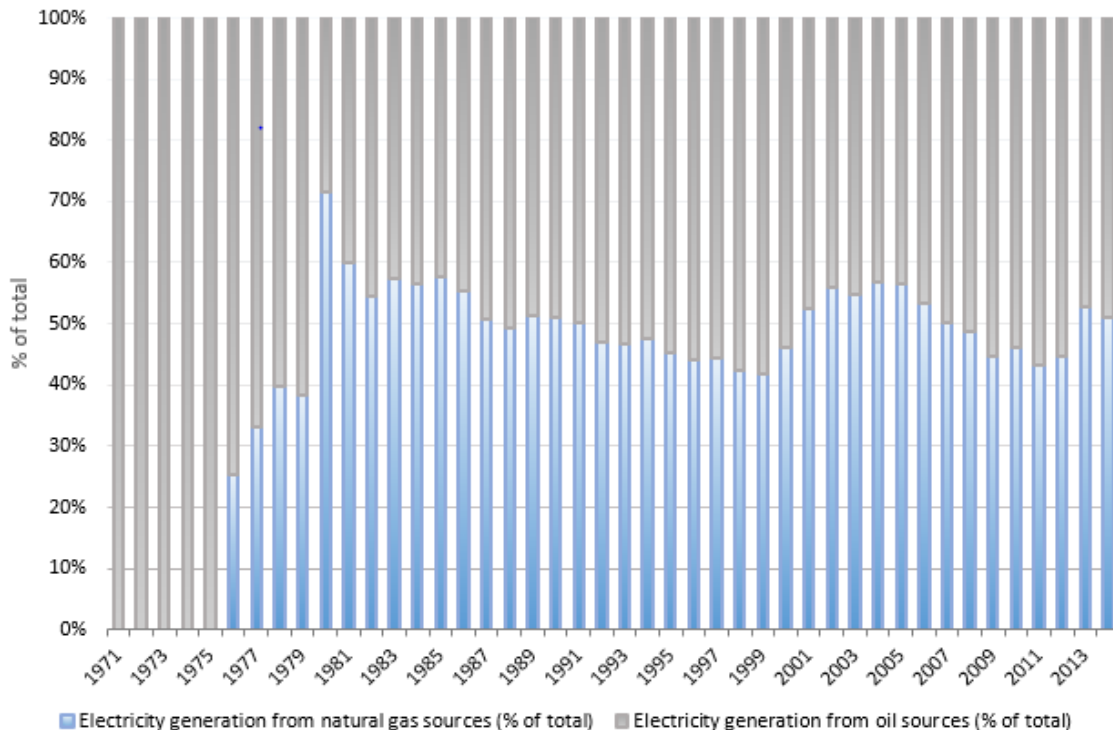
# Growing CO2 emissions

Evolution of CO2 emissions and GDP, 1960-2014



# Increasing gas fired power generation will require becoming a net gas importer ... and comes with risks

Electricity generation by sources, 1971-2015



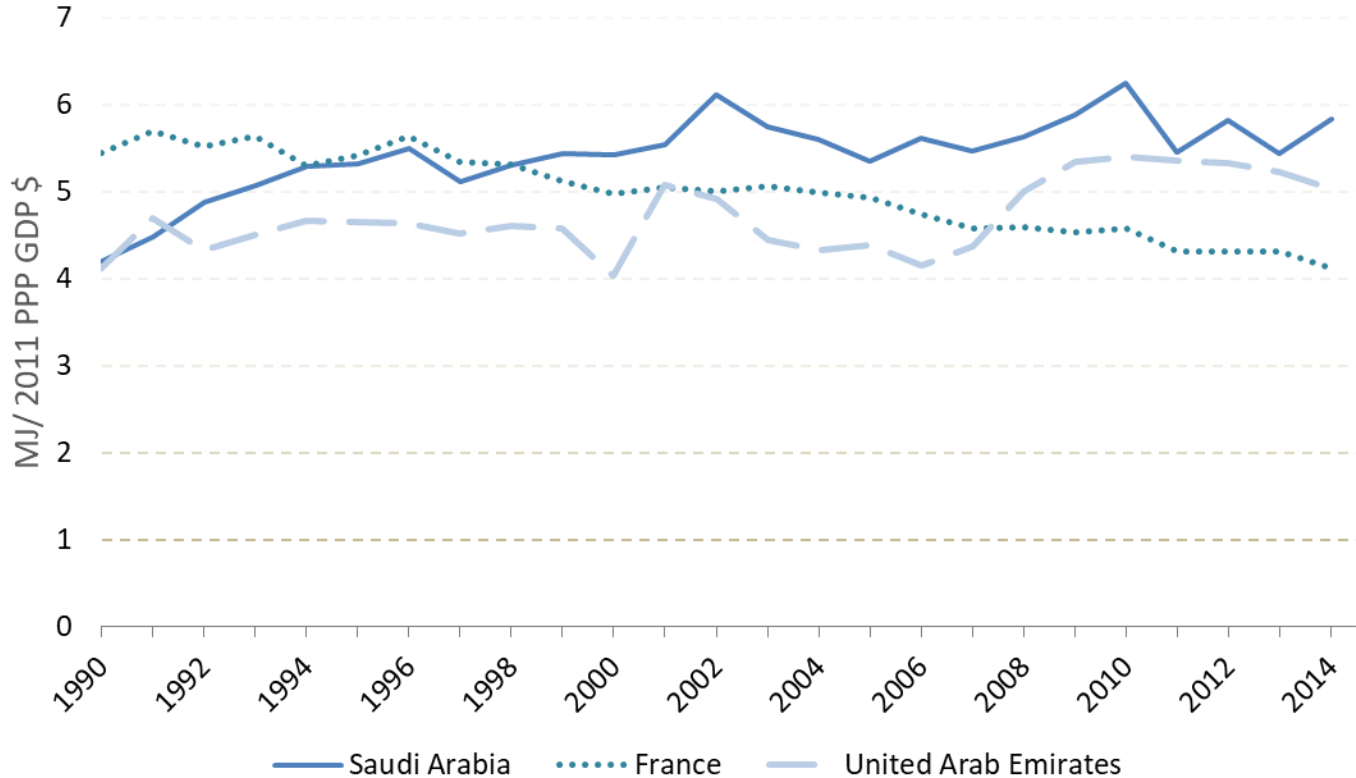
Production of natural Gas in 2016 = 109,4 Bcm

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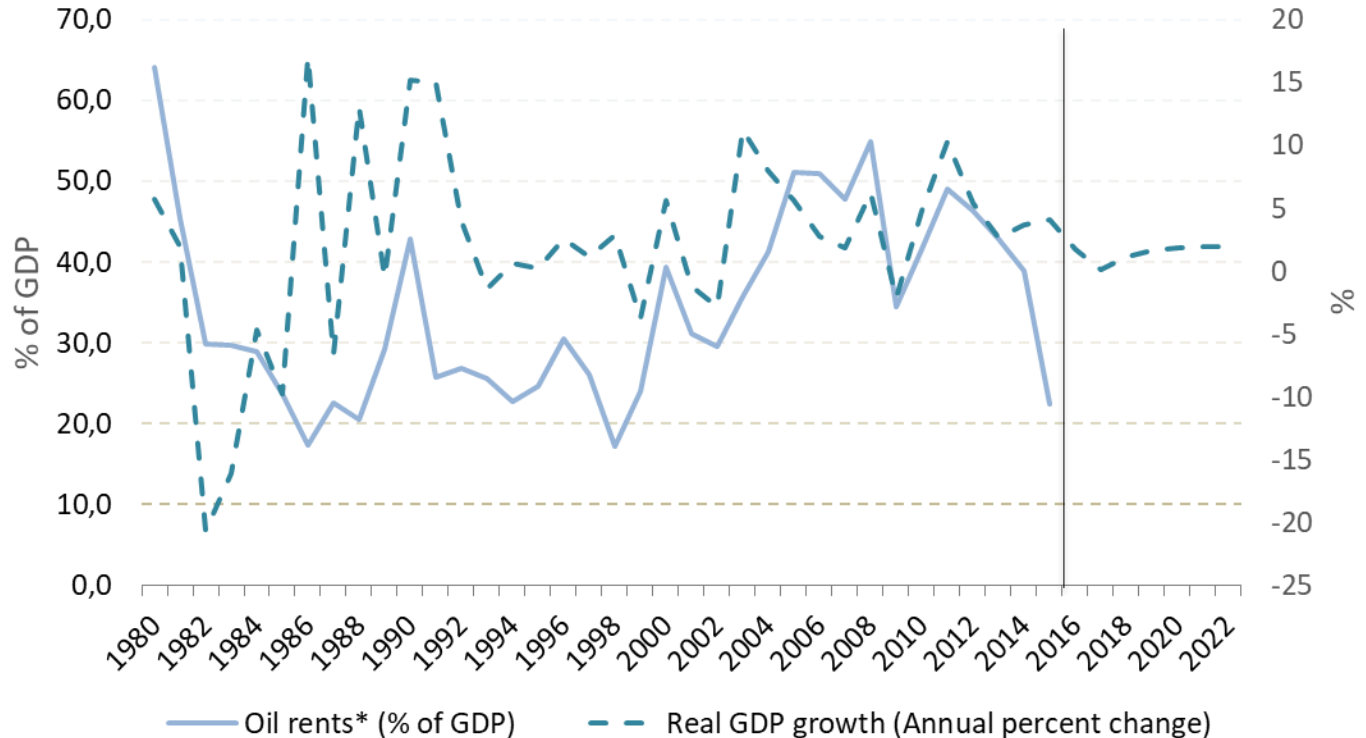
# Improving the energy intensity has never been a priority, could change though following efforts in the UAE

Comparison of the energy intensity of France, Saudi Arabia and the UAE, 1990-2014



# The financial challenge: golden years are over, can the Aramco IPO fill the coffers?

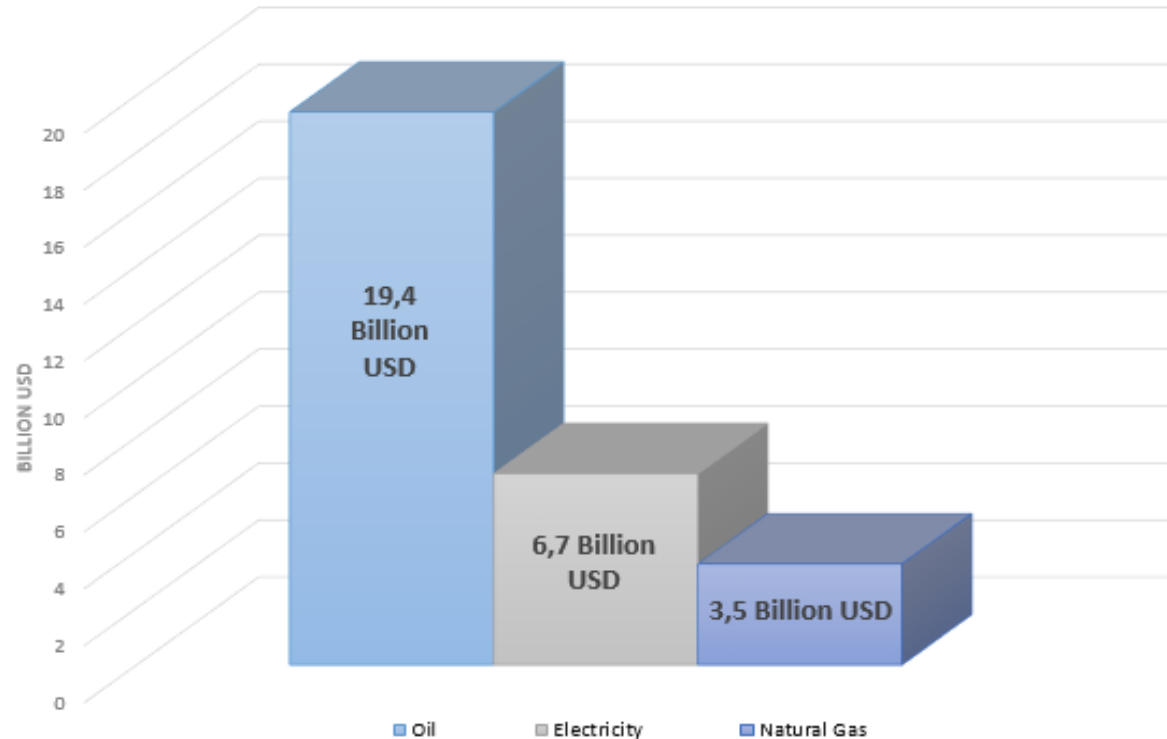
Evolution of the oil rent and GDP growth, 1980-2022E



Sources: World Bank World Development \* Difference between the value of crude oil production at world prices and total costs of production Indicators, IMF

# Energy subsidies still very high, but progressively diminishing and to be almost entirely removed by 2025

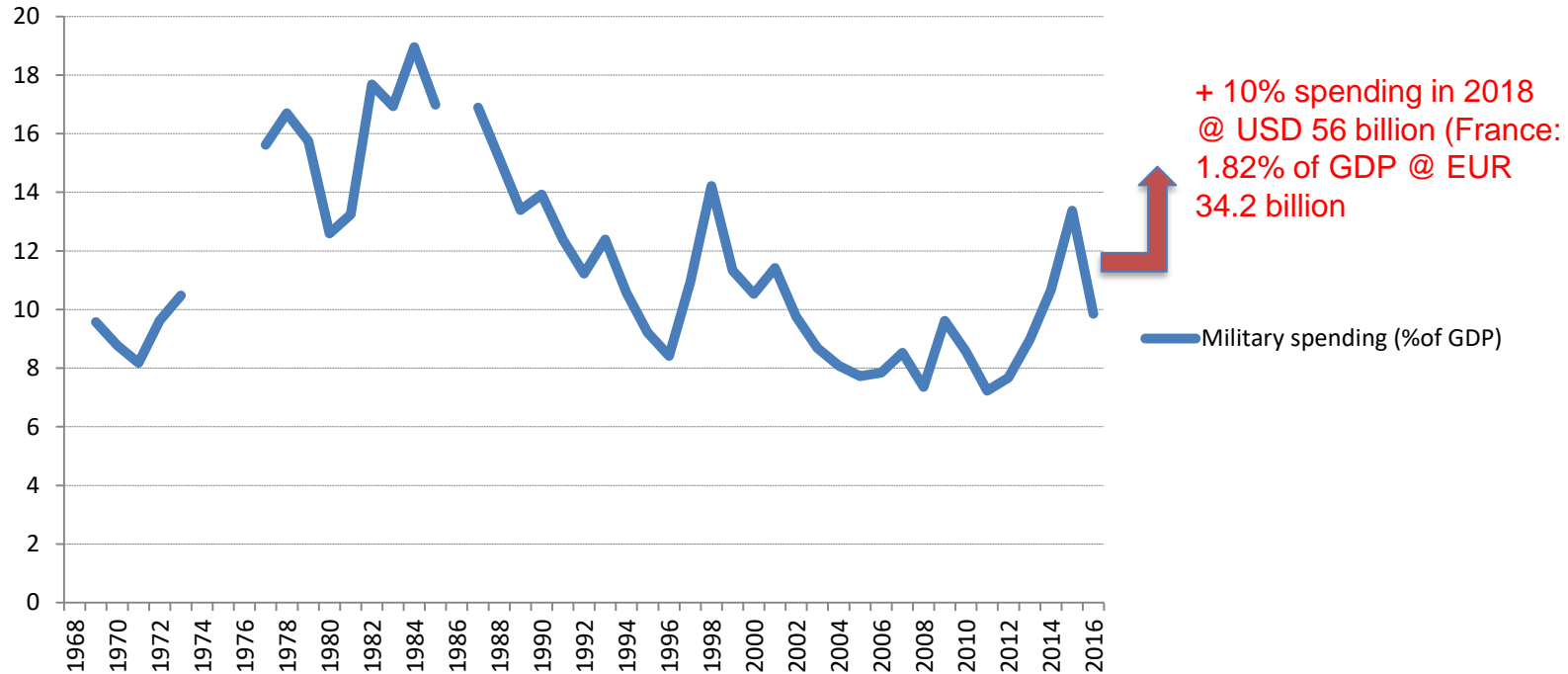
Estimate of energy subsidies, 2016



Source: IEA Statistics

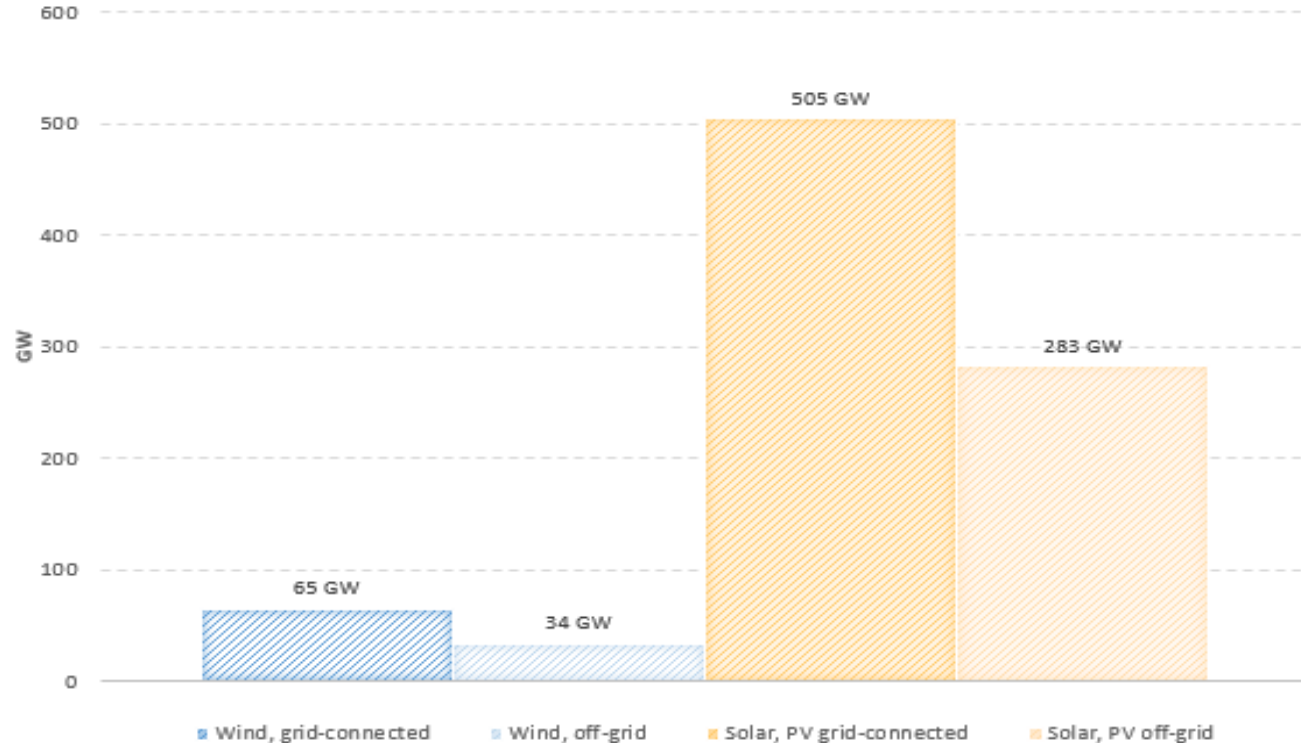
# Increased military spending – and regional tensions -or NPPs?

Evolution of military spending in % of GDP, 1968-2016



# IRENA: a lot more can be covered by renewables, so does Softbank and its 200 GW solar project (...35 MW end 2017)...

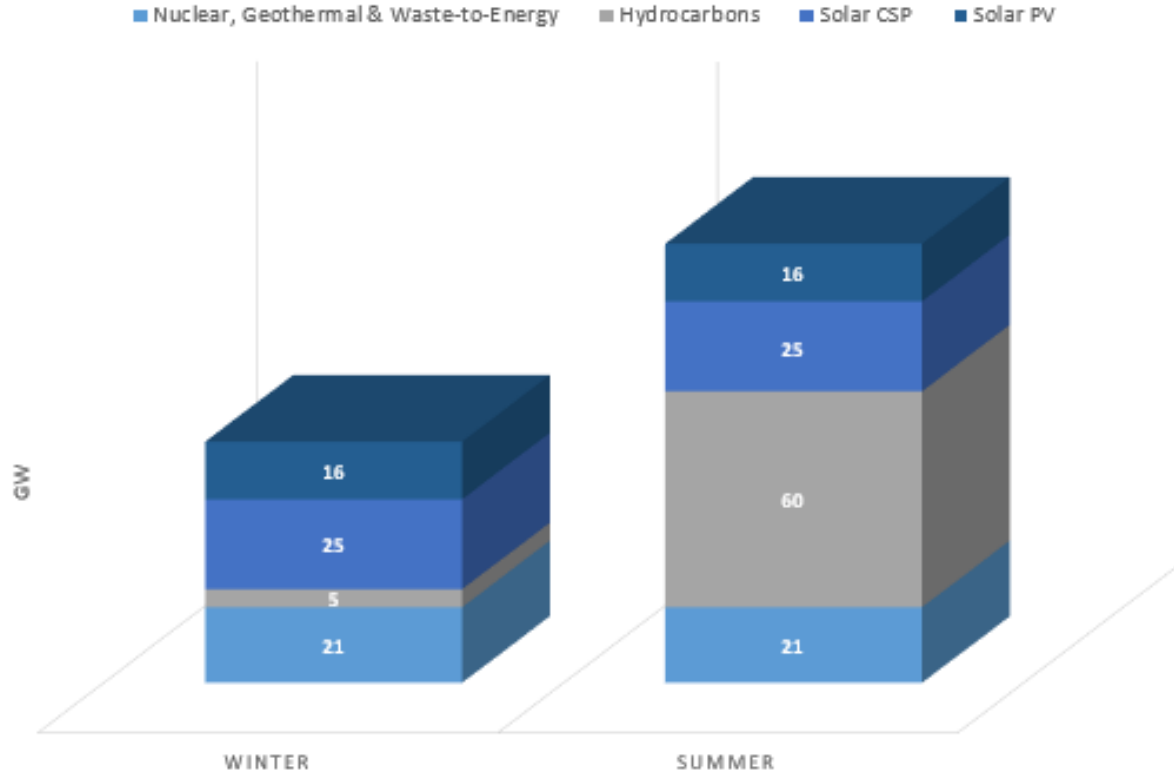
Total technical potential (GW) for the GCC, 75km from the grid



Source: IRENA Investment Opportunities in the GCC 2016

# Prospects: very low-carbon winter electricity generation, 50-50 summer generation mix ? How about EE?

Potential longer term energy mix, summer and winter (GW)





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# Centre Énergie – Centre for Energy

[eylmazzega@ifri.org](mailto:eylmazzega@ifri.org)

27, rue de la Procession, 75740 PARIS CEDEX 15  
Tél. +33 (0) 1 40 61 60 00 • Fax : +33 (0) 1 40 61 60 60  
[www.ifri.org](http://www.ifri.org)