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IRAN'S OIL & GAS
POTENTIAL AND CHALLENGES

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EXAMINING IRAN'S OIL & GAS INDUSTRY

- Doom and gloom, or shining success and growth?
- In this presentation:

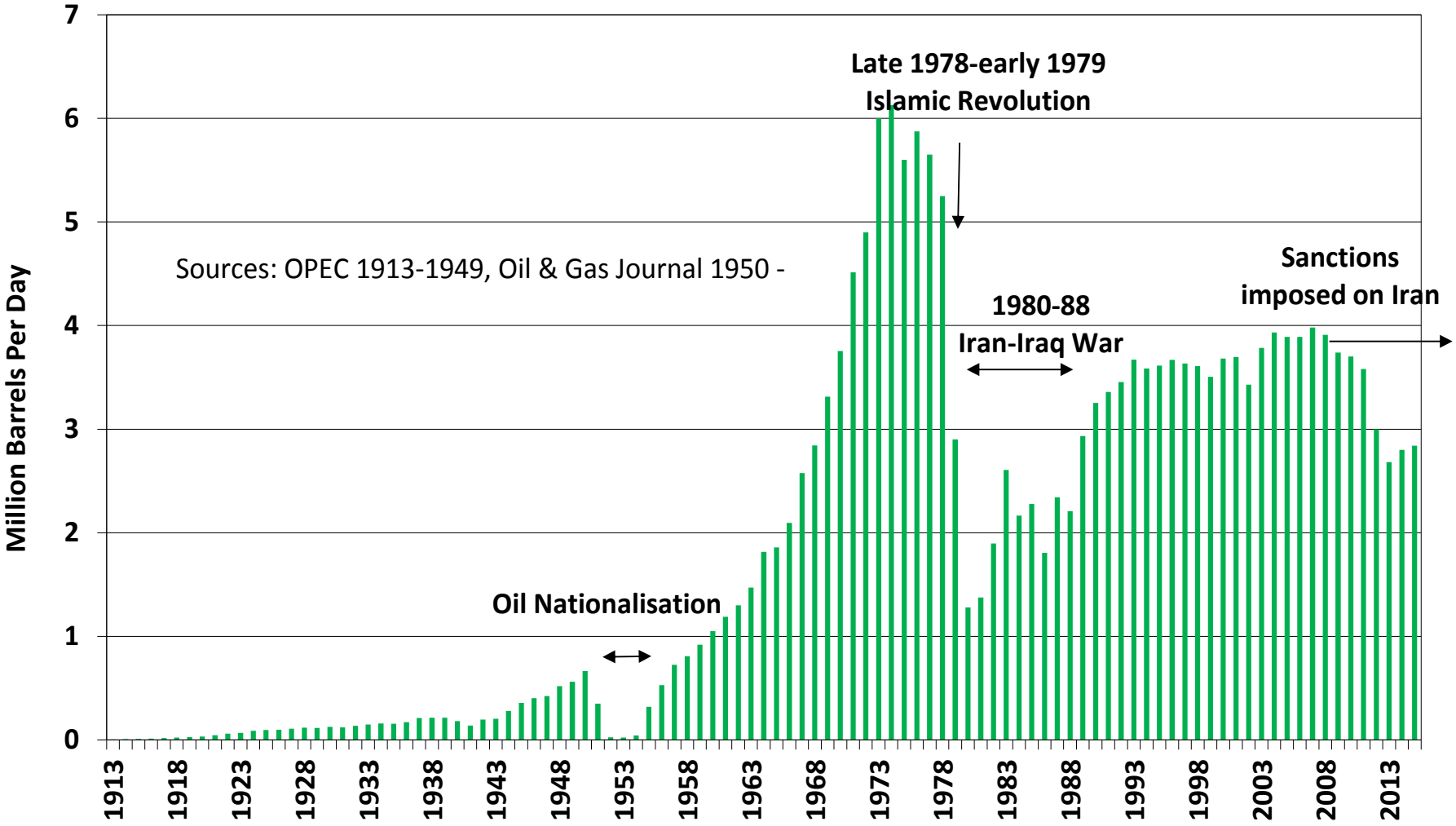
  The historical context

  An overall view

  Considerable potential

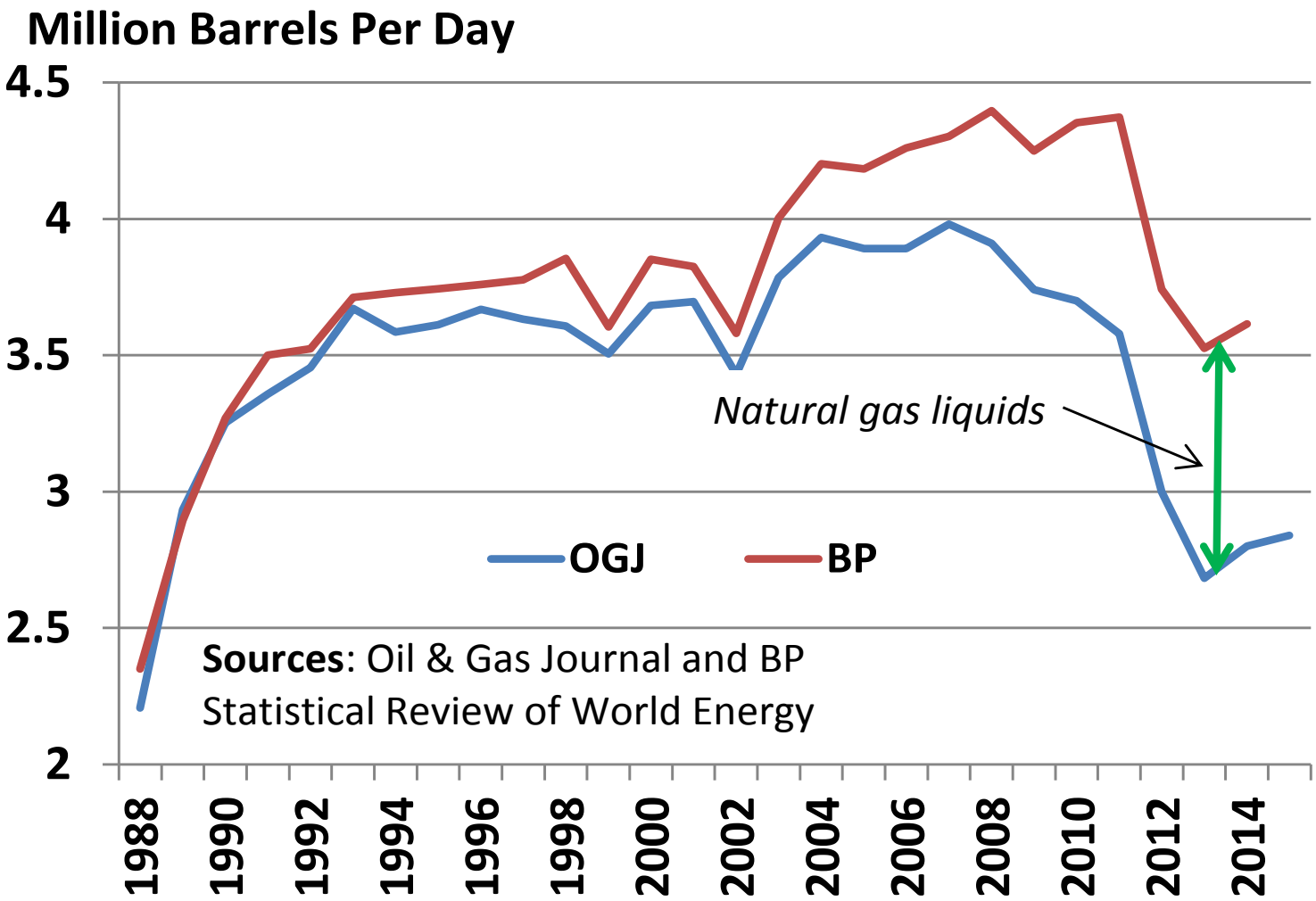
  Challenges

IRAN'S OIL PRODUCTION 1913-2015



IRAN'S OIL PRODUCTION 1988-2014 (from two sources)

IMPORTANCE OF LIQUIDS FROM GAS FIELDS



MORE ON NATURAL GAS

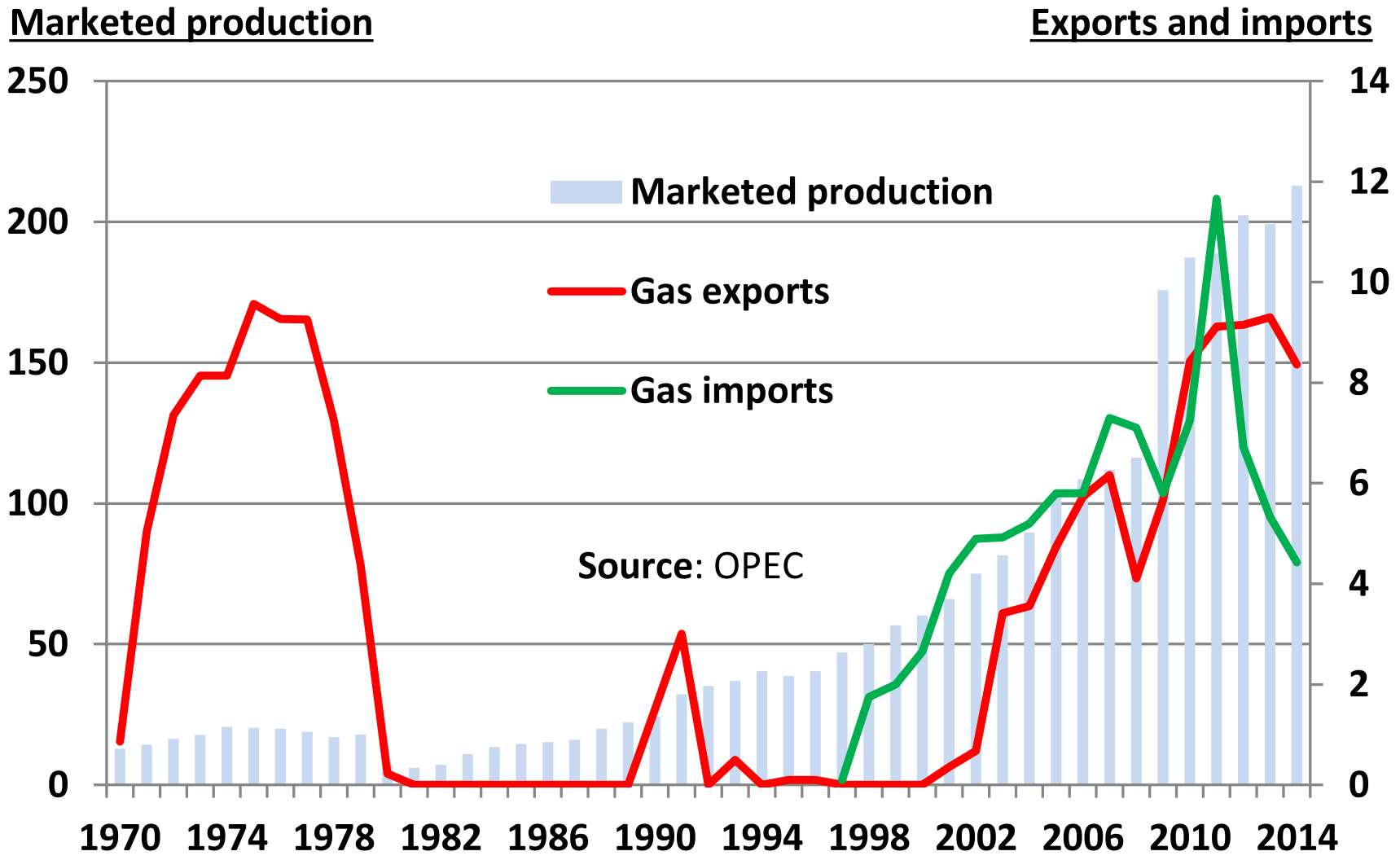
NATURAL GAS RESERVES - IRAN & SOME OTHER COUNTRIES (end 2014)

	Trillion cubic metres	***Percent world total***
Iran	34.0	*18.2%*
Russian Federation	32.6	*17.4%*
Qatar	24.5	*13.1%*
Turkmenistan	17.5	*9.3%*
Nigeria	5.1	*2.7%*
Algeria	4.5	*2.4%*

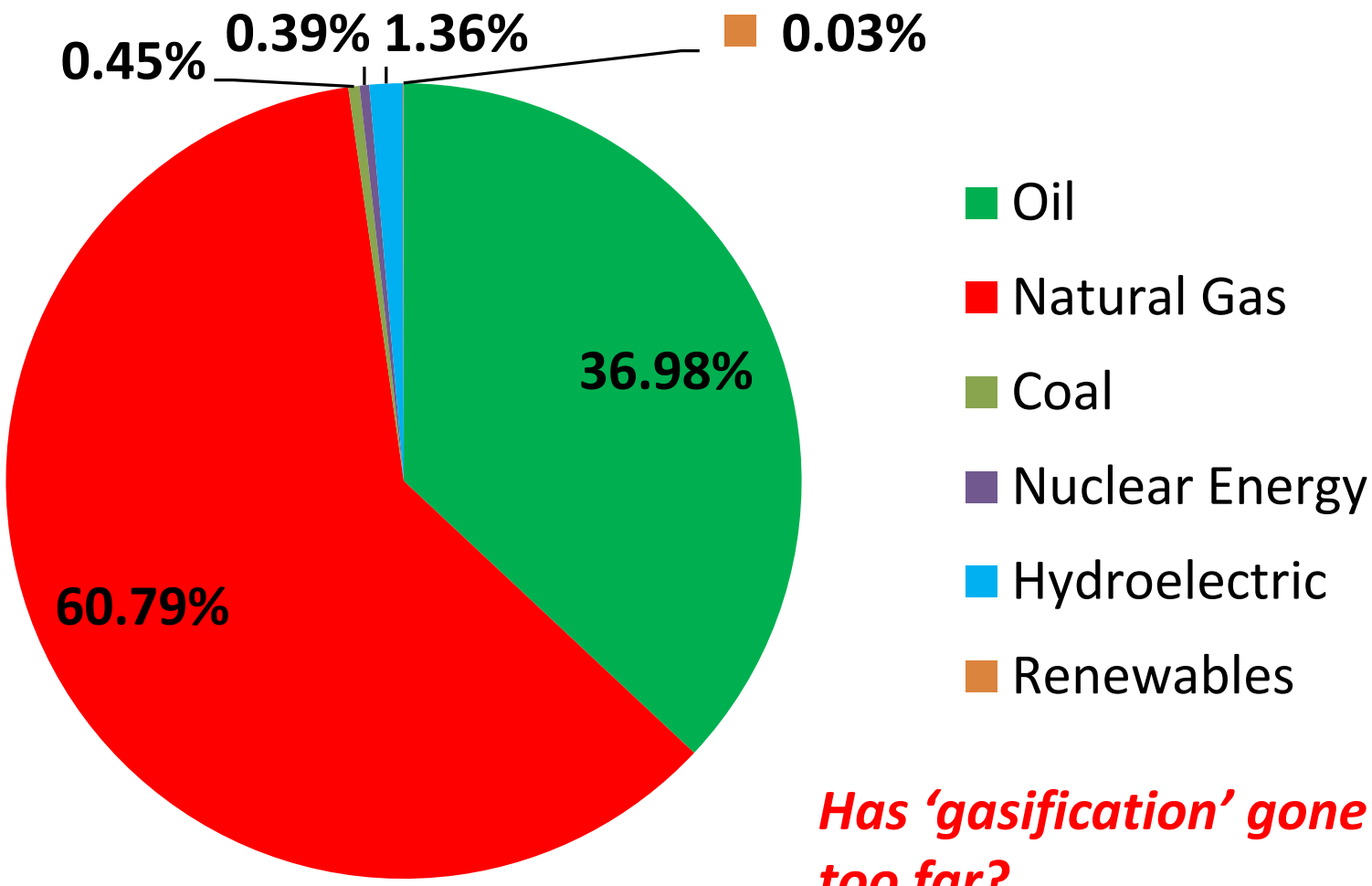
Source: BP Statistical Review of World Energy

IRAN: NATURAL GAS PRODUCTION, EXPORTS & IMPORTS

(BILLION CUBIC METRES PER YEAR)



IRAN: 61% OF PRIMARY ENERGY CONSUMPTION IS NATURAL GAS (2014)

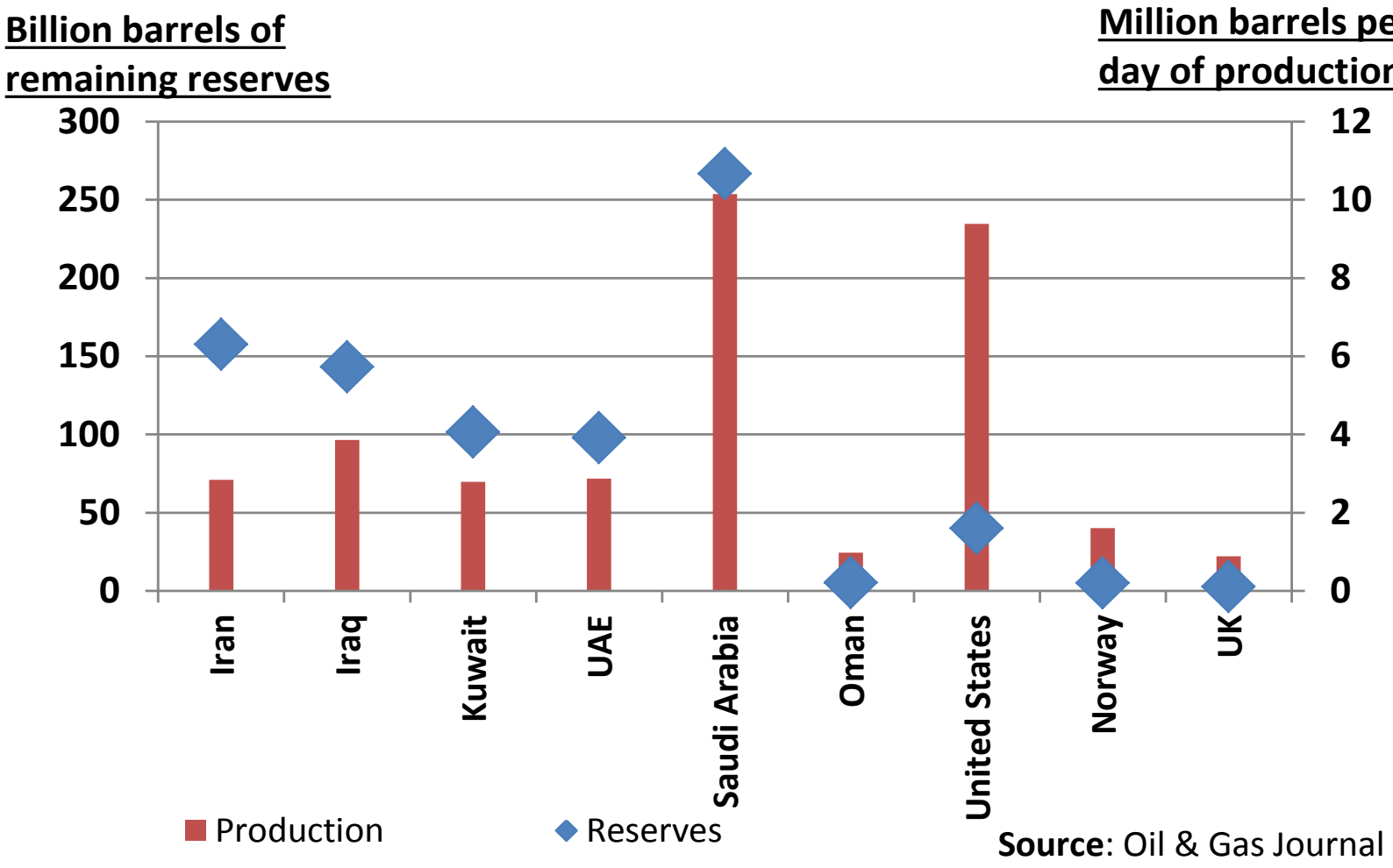


Has 'gasification' gone too far?

Source: BP Statistical Review of World Energy

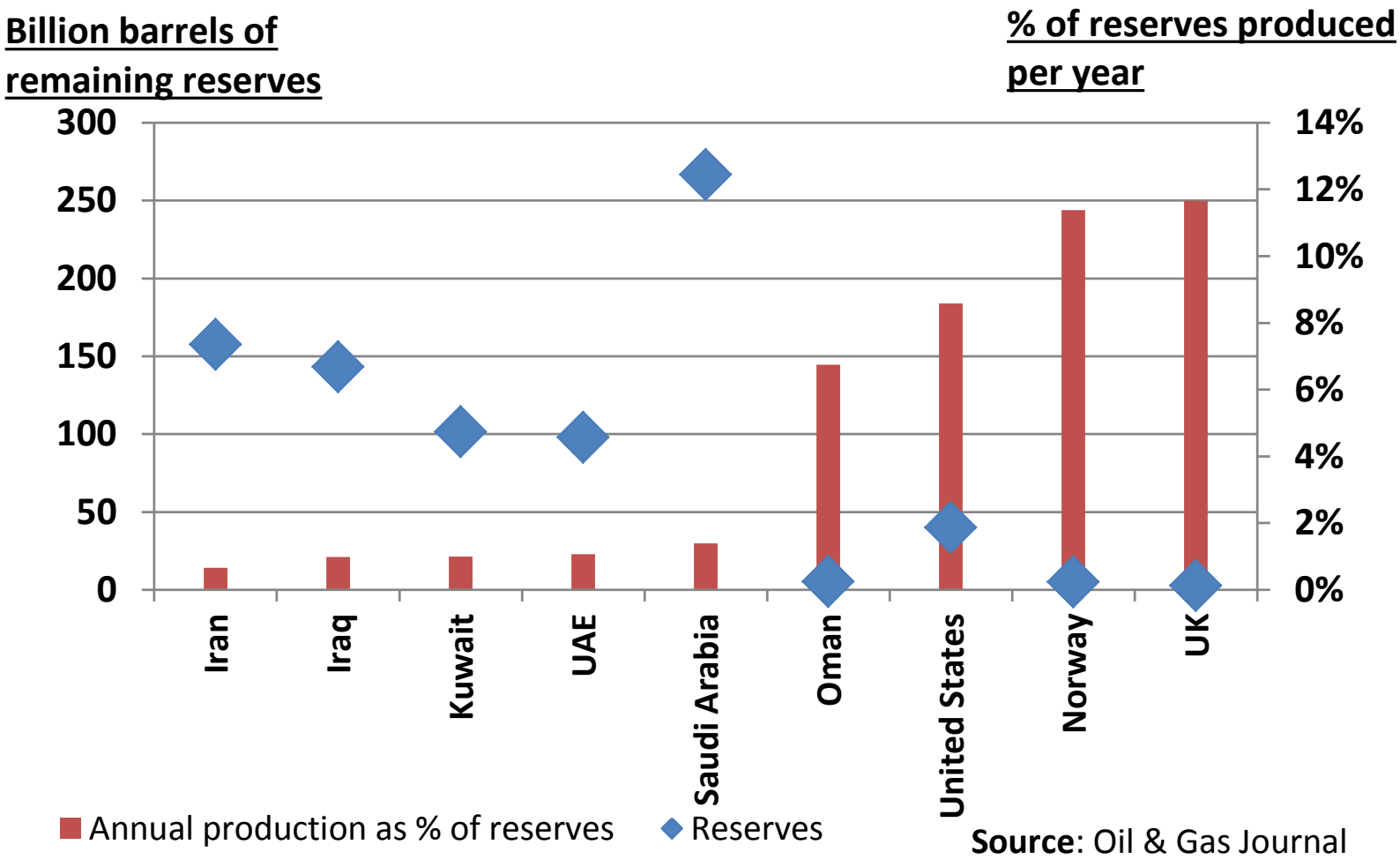
IRAN’S OIL & GAS PRODUCTION POTENTIAL

OIL RESERVES & PRODUCTION - 2015



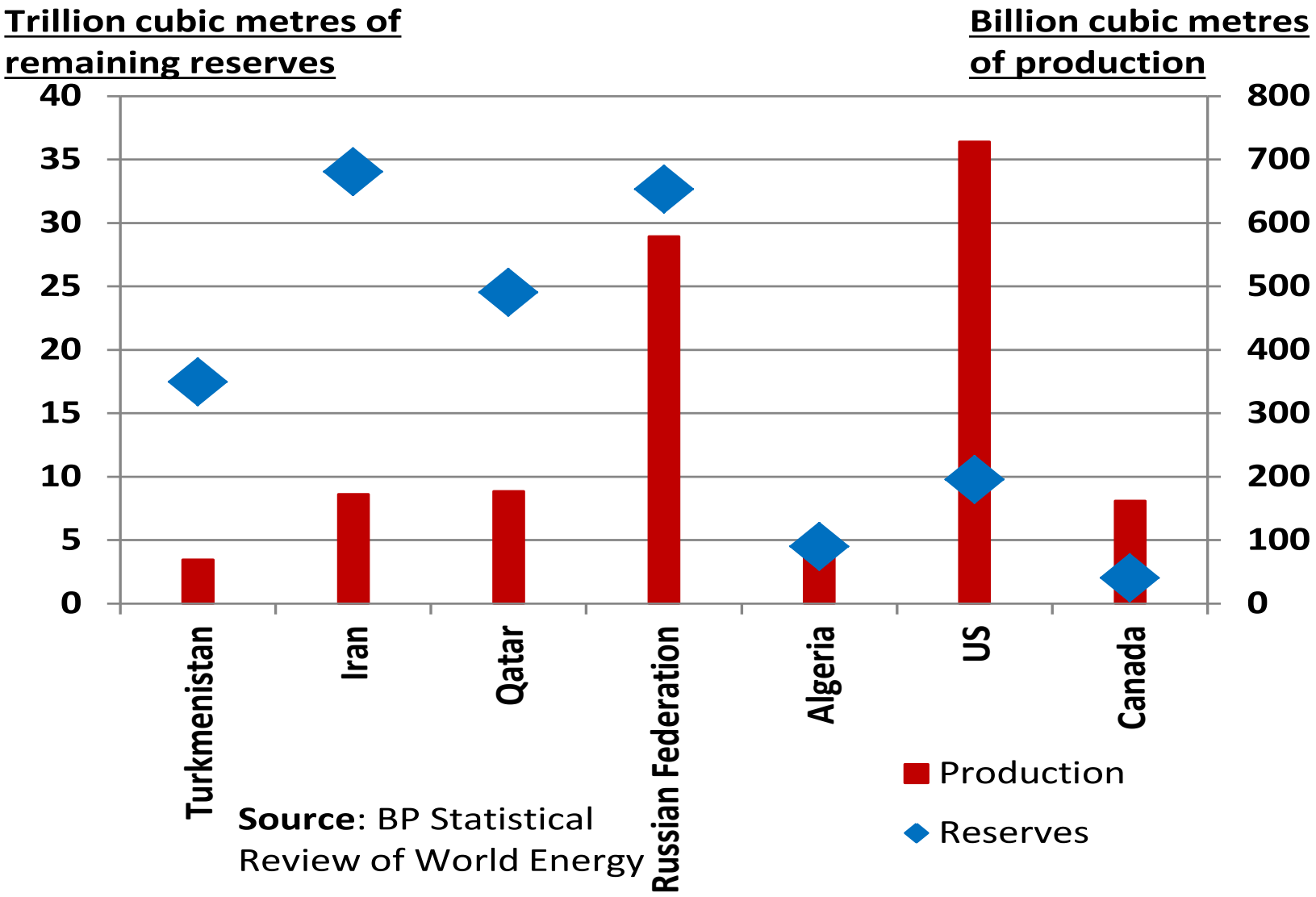
Source: Oil & Gas Journal

OIL RESERVES & PRODUCTION (% of reserves) - 2015



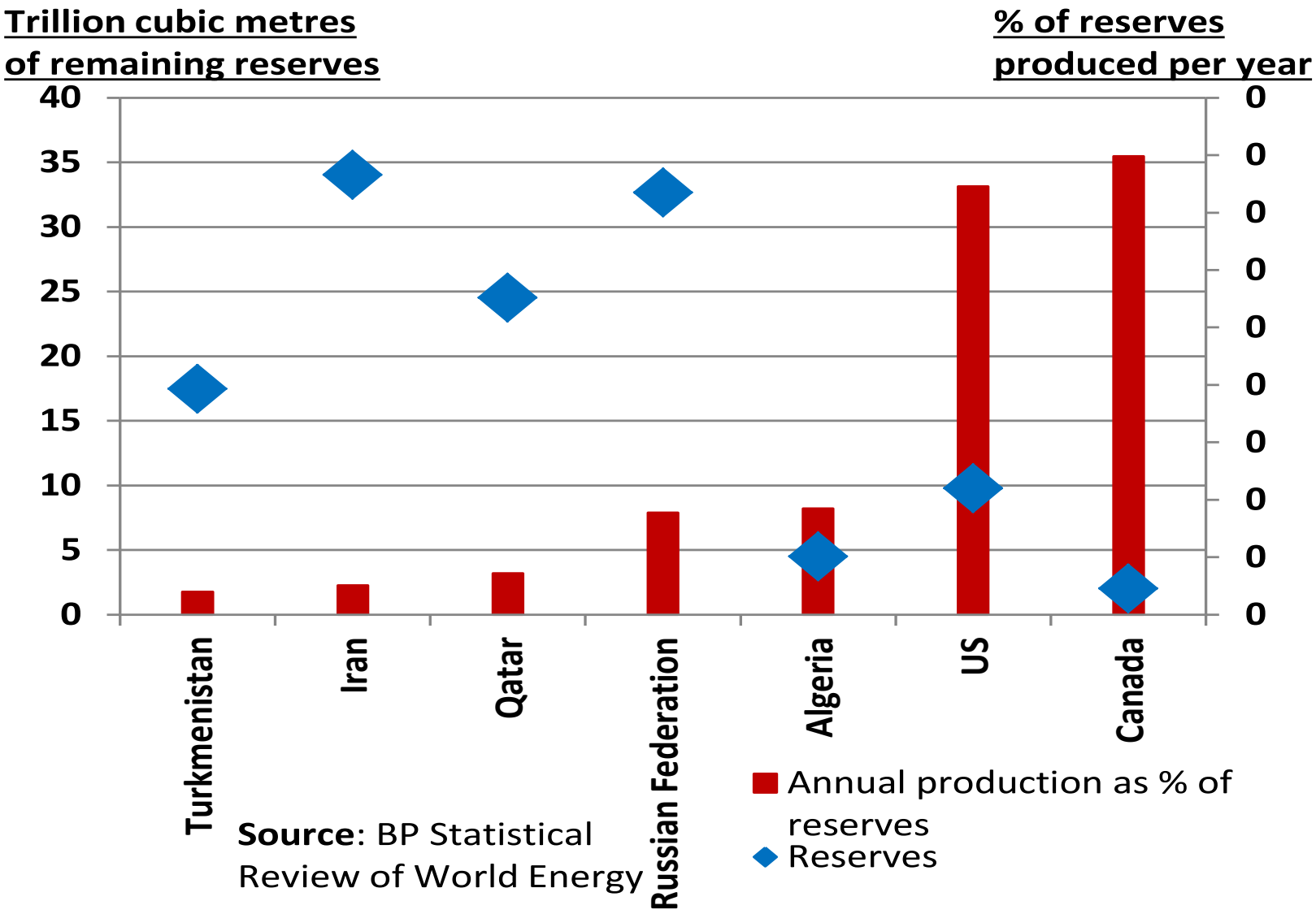
Source: Oil & Gas Journal

NATURAL GAS RESERVES & PRODUCTION - 2014



Source: BP Statistical Review of World Energy

NATURAL GAS RESERVES & PRODUCTION (% of reserves) - 2014



HOLDERS OF HIGH RESERVES (including IRAN) PRODUCE AT RELATIVELY LOW RATES IN COMPARISON WITH HOLDERS OF LOW RESERVES

IRAN HAS THE POTENTIAL TO INCREASE ITS OIL AND GAS PRODUCTION

IRAN OIL & GAS

SOME CHALLENGES

DEVELOPMENT WORK IN OLD FIELDS

Example of an old field: **Forties Field** in the UK sector of the North Sea

Discovered in 1970, first production 1975, reached **520 thousand barrels per day (tbpd)** in 1978.

By 2003 had produced more than 2 billion barrels and production had declined to **40 tbpd**. BP estimated field decommissioning in 2013.

Apache took over in 2003. In 2013 Forties was the second largest producing field (after Buzzard).

Forties Field is expected to produce beyond 2030 (**20 years longer** than the 2003 estimate)

IRAN'S OLD OIL/GAS FIELDS

Average **well production** 16,000 bpd (early 1970s) down to 2,000-3,000 bpd (recent).

Remaining reserves of Iran's old fields: about **30 billion barrels**
(cf. current reserves of **Kazakhstan with 1.6 mbpd** production)
Efficient production of the old reserves requires systematic field/reservoir monitoring, detailed studies & analysis, implementation of IOR, EOR, ….e.g. expansion of gas injection.
Development projects in old fields are profitable, but they are:

capital-intensive and **'expert-intensive'**

EXAMPLE OF TECHNICAL CHALLENGES IN OLD FIELDS

*'**The elderly** need much greater medical care and treatment than the young', especially those that did not pay attention to their health, diet and life style when they were young'!*

Most Iranian oil fields have **fractured reservoirs** with low permeability in the matrix and high production from the fractures; decades of 'primary' production (falling reservoir pressure, declining production and significant quantities of oil trapped in matrix blocks); **years of NIOC / Consortium debate**: water or gas injection!

GAS INJECTION INTO OIL FIELDS

Example:
Haftkel, on stream **1928**, peak production 200,000 bpd, had fallen to 14,000 bpd in **1976** when gas injection commenced; resulted in the expansion of the oil column, production rose to 34,000 bpd by the **mid-1990s**; estimated extra recoverable oil **500-600 million barrels** (Saidi SPE 1996).

However, an oil field gas-injection programme is a **billion Dollar project** and should not be blindly implemented in all Iranian oil fields. Detailed reservoir studies, proper monitoring and planning are necessary for each of the reservoirs in each of the fields and should also evaluate water-injection and other IOR/EOR methods. These projects are **CAPITAL & EXPERT INTENSIVE**!

EXAMPLES OF OLD PRODUCING IRANIAN OIL FIELDS STILL HOLDING CONSIDERABLE RESERVES

Onshore: Aghajari (1939), Ahvaz (1961), Bibi Hakimeh (1964), Gachsaran (1941), Karanj (1965), Kupal (1971), Mansuri (1974), Marun (1966), Parsi (1966), Rag-e Safid (1966) & others.

Offshore: Abuzar (1976), Dorud-Kharg (1964), Salman (1968) & others.

(figures in brackets): year of first production

SHARED FIELDS

The Islamic Republic of Iran has **priority for developing cross-border fields**. The preferred method of developing shared fields is ***unitisation***, though many problems will be faced:

Different (foreign) **companies** operating in the neighbouring country

Different regulatory regimes on the two sides

Political differences between governments

Better chance for **fields on the Iraqi border**?

DEVELOPING OIL/GAS FIELDS SHARED WITH NEIGHBOURING COUNTRIES

Some examples of fields shared with:

Iraq: Azadegan, Danan, Dehloran, Khorramshahr, Naft Shahr, West Paydar, Yadavaran, Yaran

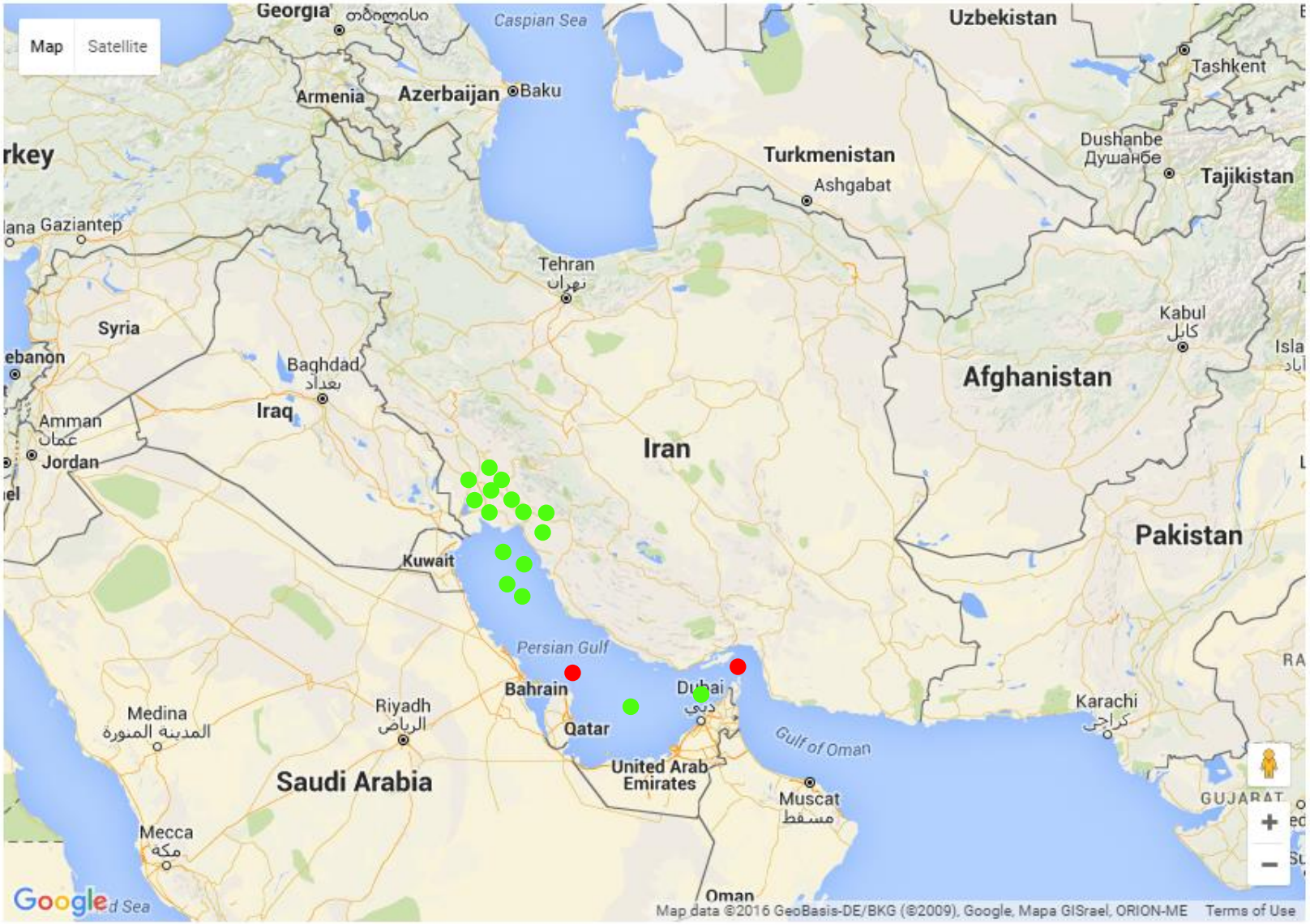
Kuwait & Saudi Arabia: Arash, Esfandiar, Foruzan

Oman: Hengam

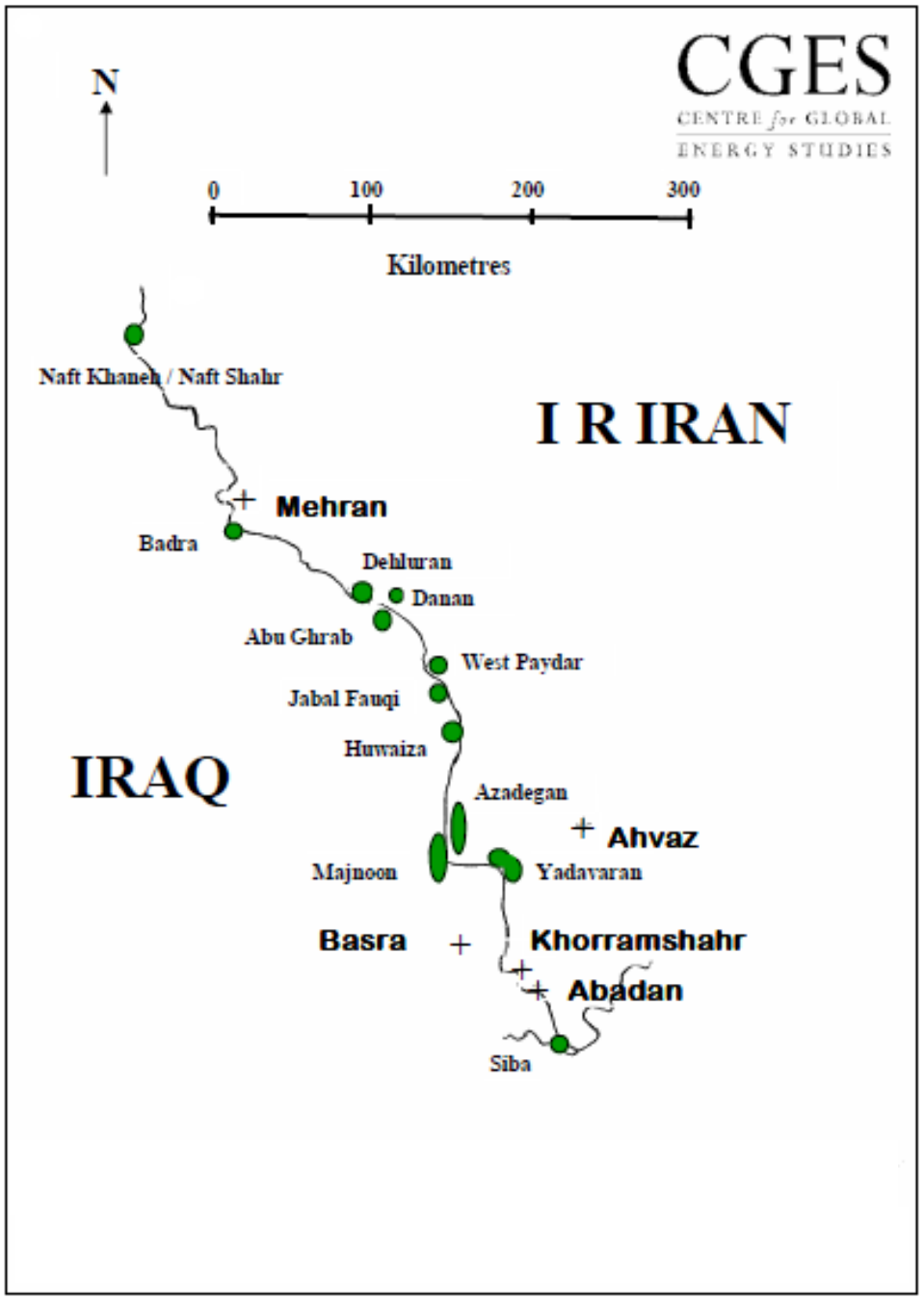
Qatar: South Pars

The UAE: Salman, Nosrat

SCHEMATIC LOCATION MAP - some ‘old’ and cross-border fields



SCHMEATIC LOCATION MAP OF FIELDS ACROSS IRAN-IRAQ BORDER



Source: Takin ‘Stealing Iraq’s Oil – is the Iraqi press right?’ (CGES 2008)

EXAMPLE OF A FIELD ON THE IRAQI BORDER

Majnoon (on the Iraqi side):
Several billion barrels of recoverable reserves, multi-reservoir field, requiring complex production systems and heavy investment. Foreign companies are Shell (operator) and Petronas. Operations started 2009, first export of oil 2014.

Azadegan (on the Iranian side):
We are far behind.

IRAN PETROLEUM CONTRACT
(a new contract model)

Has been under preparation since 2013.

Is expected to be a **major improvement** on the former Buy-Back model.

It is still to be finally approved.

Already negotiations and provisional agreements are being made with international oil companies.

More than **50 projects** are said to be offered, investment requirements: **$100-$300 bn**

LEGACIES FROM THE FORMER OIL CONCESSIONAIRES OPERATING IN THE MIDDLE EAST

In the Middle East and in Iran, public opinion is still strong about the excesses of the old '**oil concessionaires**', their unfair practices, acting almost as 'a state within the state', influencing governments, etc.

Foreign operators, their management and staff still face **resentment**. They should emphasise their professional responsibility, technical expertise, provision of capital, long-term commitment and the expectation of a 'win-win' outcome from their involvement in Iran.

SOME OTHER CHALLENGES

Politicisation of Iranian hydrocarbon industry and repeated personnel changes since the Revolution

Breaking the National Iranian Oil Company & 'Privatisation'

Many **sanctions** still remain

Finalisation of the new 'Iran Petroleum Contract'

THANK YOU FOR YOUR ATTENTION