Export Availability of Pipeline Gas and LNG from North Africa and the Middle East

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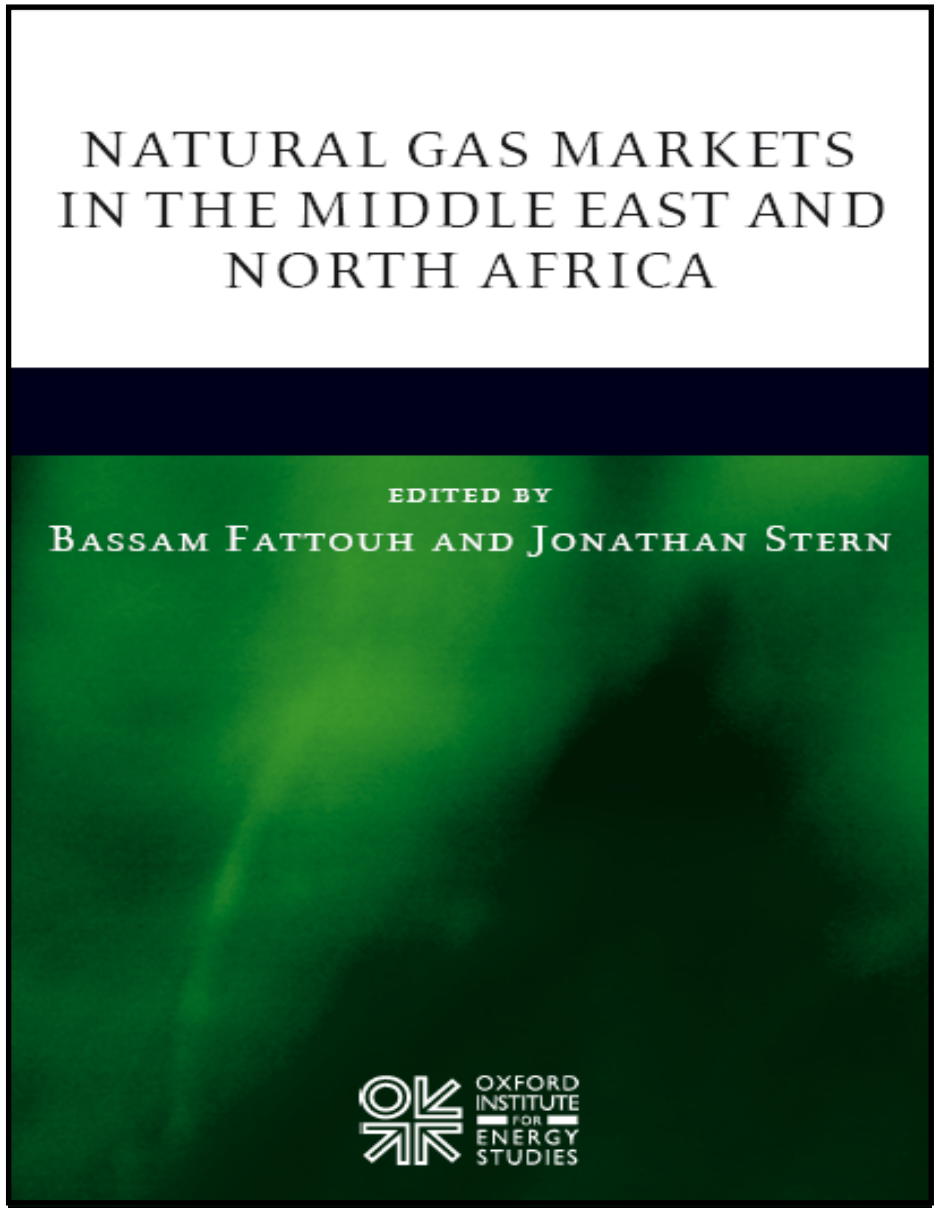
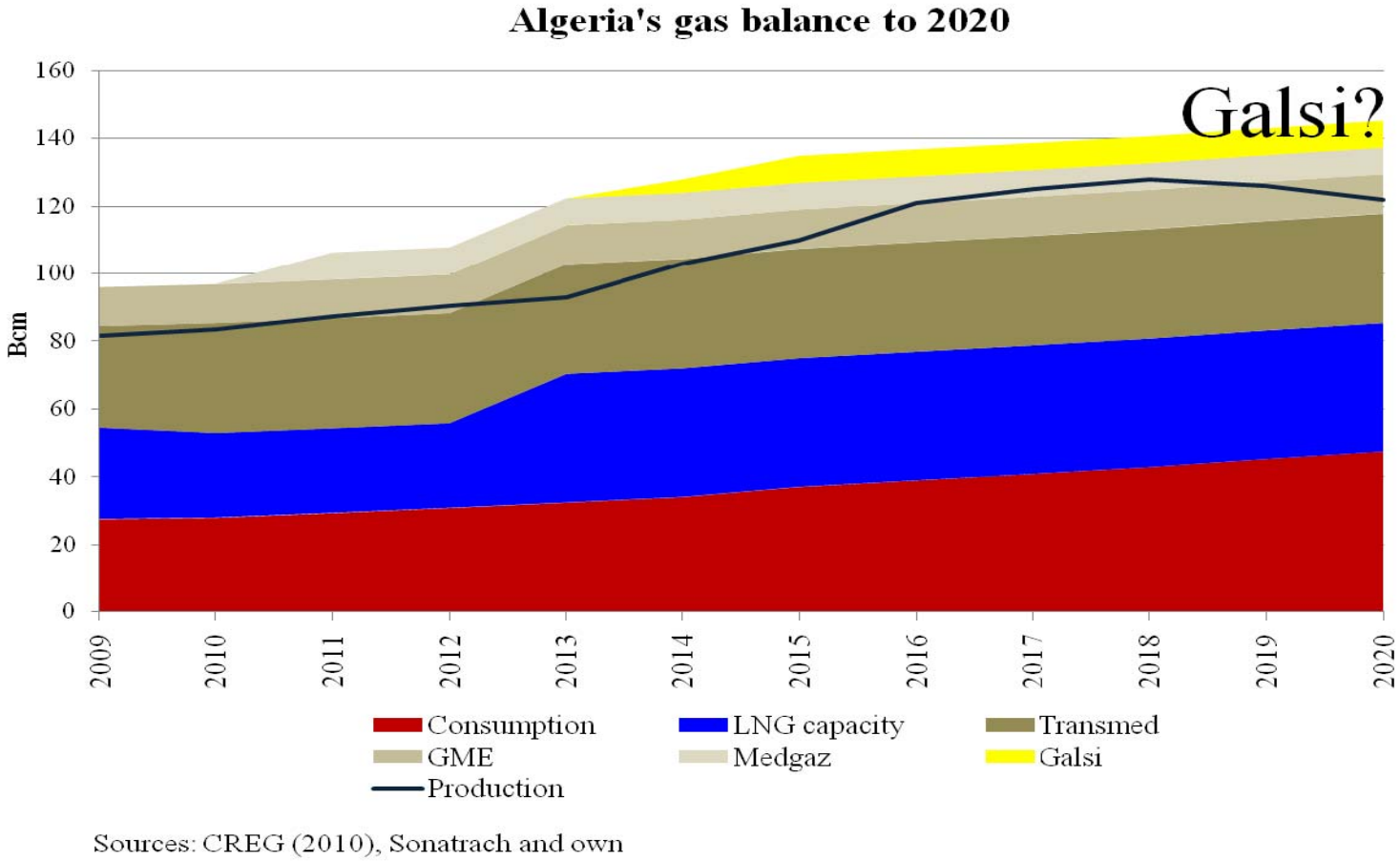


Twin Tasks of the Book

1. To look at the problems and prospects of the gas markets of the Middle East and North Africa because of the growing importance of natural gas in the energy balances of all countries in the region
2. To examine the prevailing assumption in much international energy literature that the region will become an ever-larger source of internationally traded gas

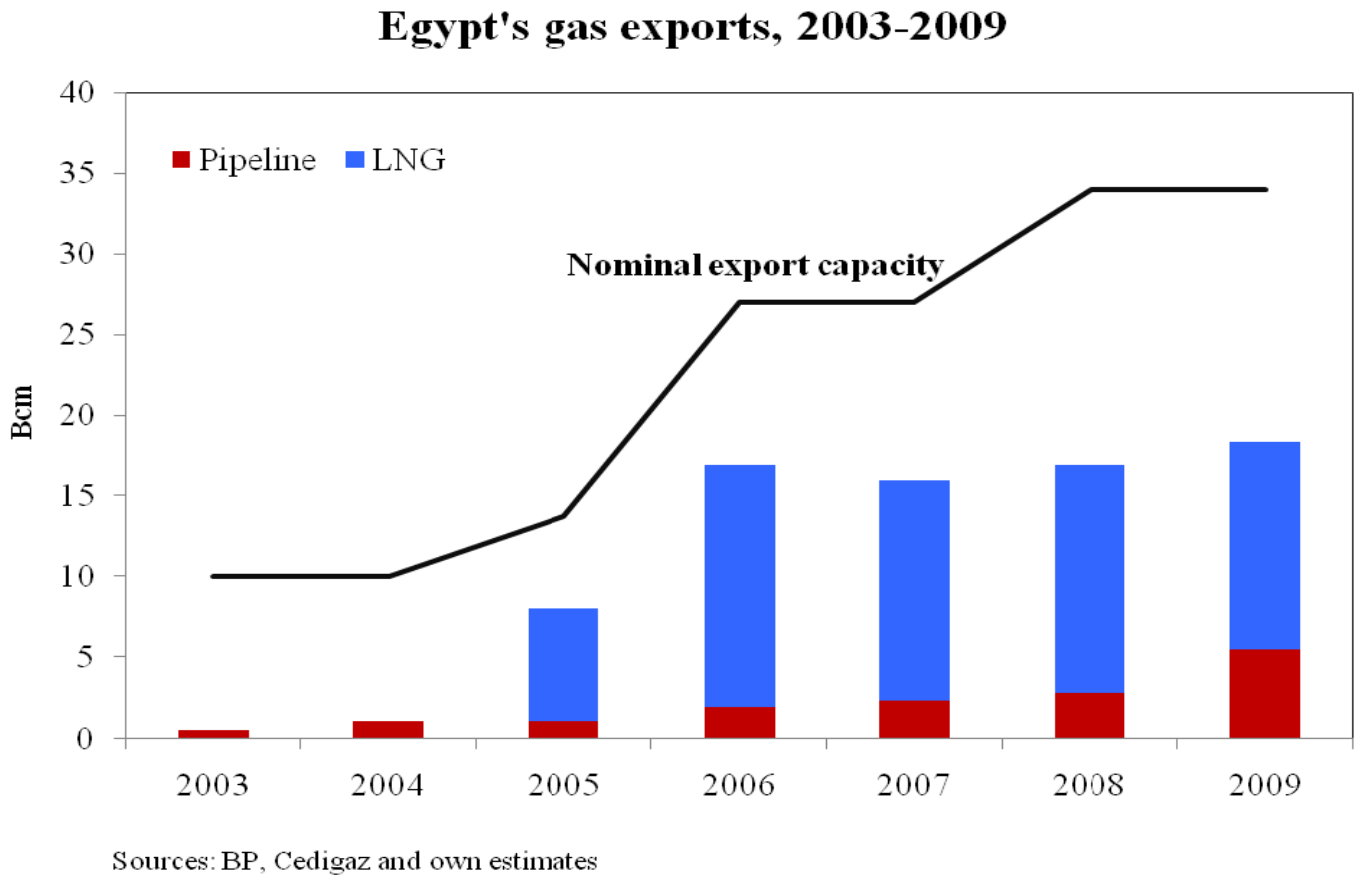
Algerian gas export availability to 2020



Sources: CREG (2010), Sonatrach and own

Exports plateau until 2013/14, increase to 2018, then decline; split between LNG and pipeline is uncertain; what rationale for going ahead with Galsi?

Egyptian gas exports: stalled prior to revolution



Sources: BP, Cedigaz and own estimates

Export facilities were running well below capacity, pipeline exports to Israel/AGP may not recommence, LNG export will depend on domestic demand

Libyan gas: disappointing before 2011

- **EPSA-IV first-round concessions expired in 2010, with no significant reserves found.**
- **Majors were pushing ahead with drilling plans, offshore and onshore, in the hope of tapping into Libya's gas potential, but the only commercial finds so far have been made by independents (Hess and Verenex).**
- **Shell postponed Brega LNG revamp plans before unrest.**
- **Upstream investment terms are largely to blame for Libya's disappointing post-sanctions exploration campaign.**

Gas development prospects were poor before political unrest. Greenstream pipeline exports, cut off in February, may restart in a few months if facilities undamaged. Post-Ghadaffi future will probably be one of very slow progress for gas

GULF GAS TRADE: a bleak picture

- Saudi Arabia – no imports/no exports; no likely change but imports are possible
- Kuwait – already importing and likely to increase
- Abu Dhabi – net importer
- Dubai – LNG imports began end-2010
- Bahrain – likely to start LNG imports soon
- Oman – exports of LNG may decline

With the exception of Bahrain, all of these countries have major reserves of gas

Iraqi Gas Exports: unlikely any time soon

UNCERTAINTIES:

- **New hydrocarbon law: content and timing?**
- **Domestic politics: impact of new coalition government?**
- **Security situation especially after US withdrawal**
- **Domestic gas demand: how much growth, how quickly?**

CONSEQUENCES:

- **Very slow progress in contracting/developing gas for export**
- **Likely opposition to exports until domestic demand is satisfied**

Current focus is on pipeline gas exports to Turkey/Europe; but Syria, Jordan, Lebanon and Kuwait are closer and need gas. LNG exports – not before 2020??

Iranian gas exports: perpetual promise unfulfilled

PIPELINE GAS:

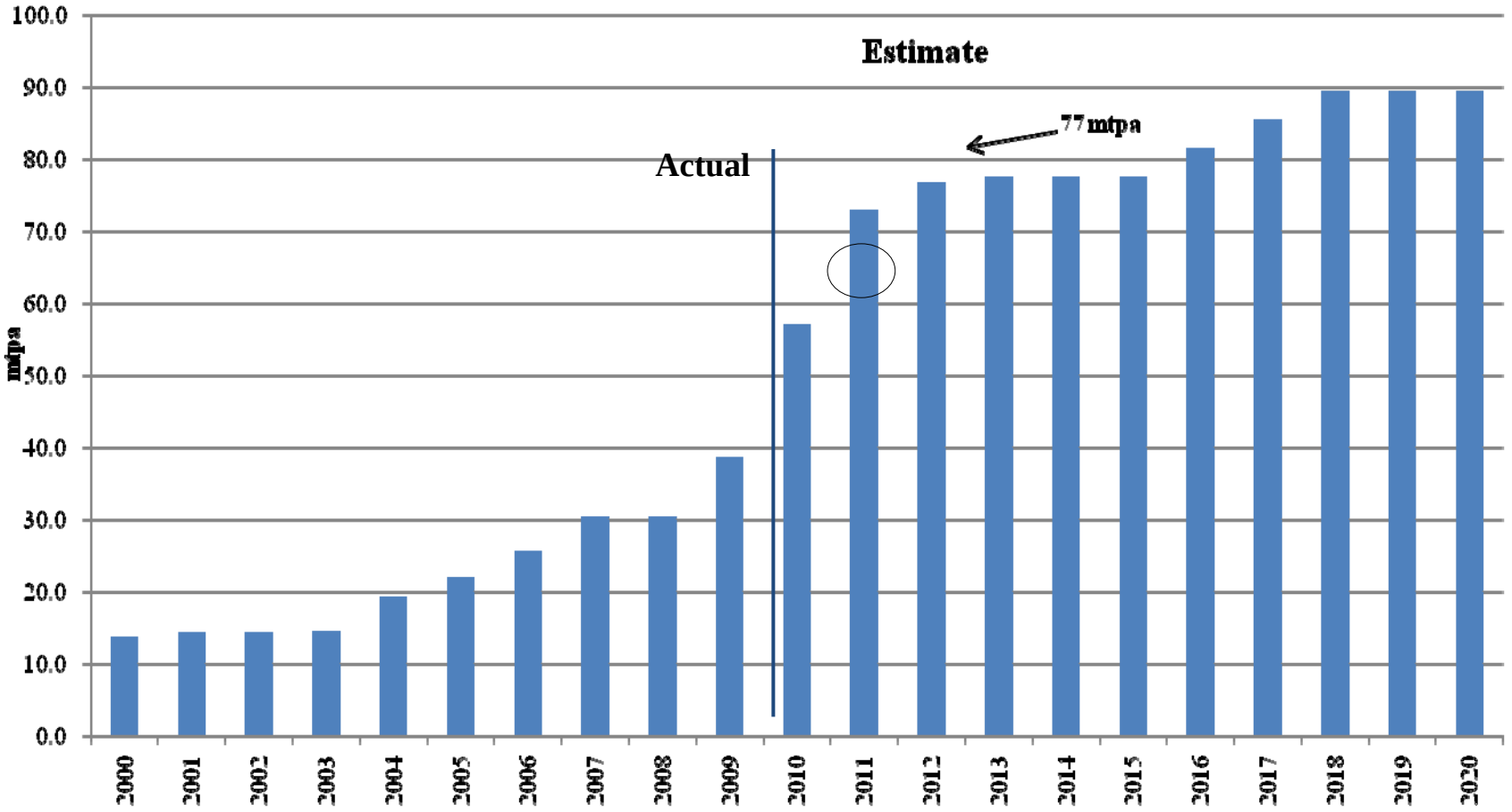
- Exports to Turkey have been problematic but lower domestic demand may allow increase to contracted volumes of 10 Bcm/year
- Pakistan exports problematic due to domestic demand and pricing

LNG:

- 28-36 Bcm/year are possible BUT..
- none will start before 2020 unless Chinese are willing/able to develop a project independently of foreign technology and equipment

Import from Turkmenistan likely to exceed pipeline exports to Turkey and Armenia until at least 2015

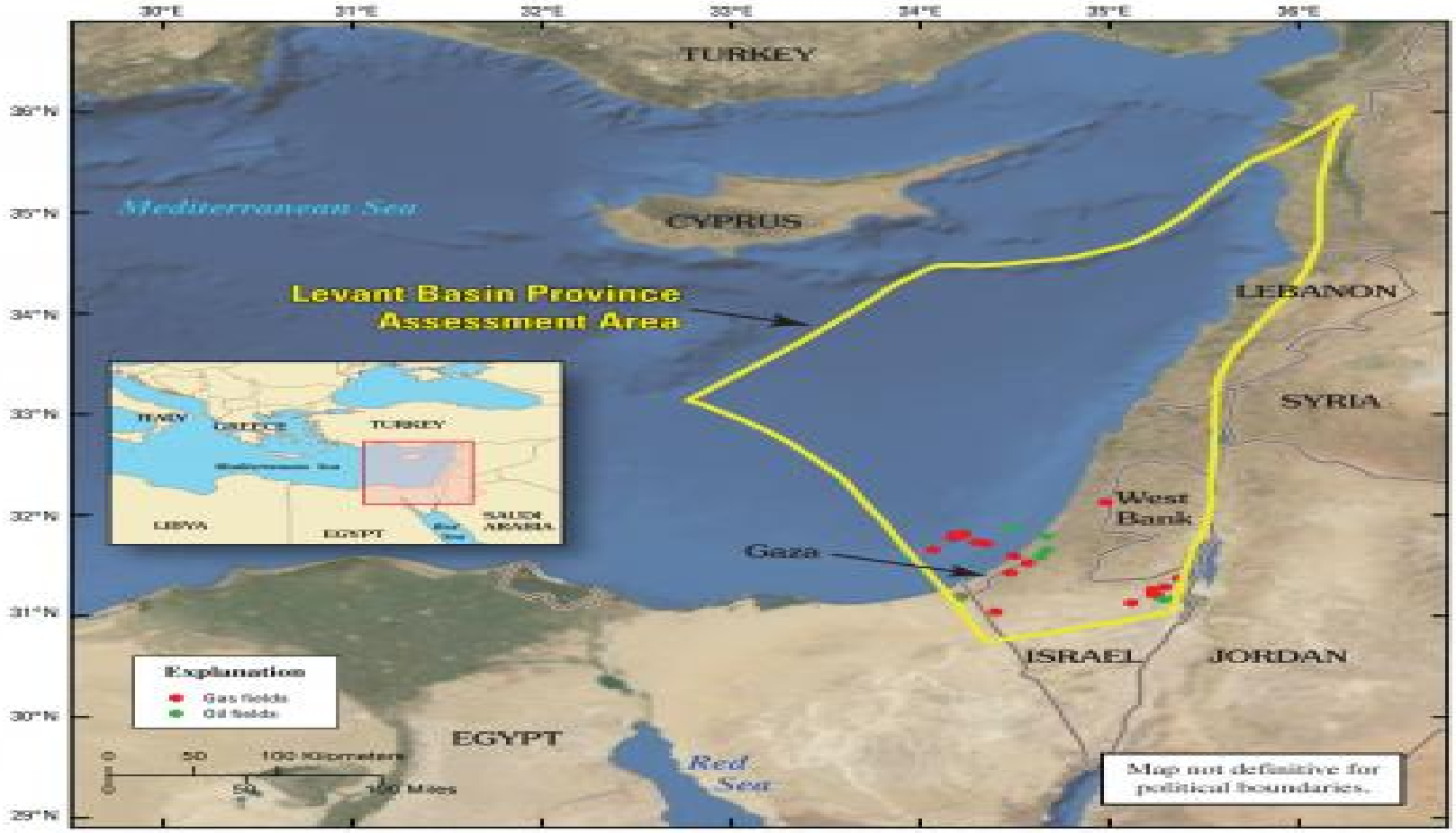
Qatari LNG Exports (mtpa): a huge success story



Source: Oxford Institute for Energy Studies - Natural Gas Markets in the Middle East and North Africa". March 2011

Exports to rise to 104 Bcm by end 2012; debottlenecking can increase this to 120 Bcm by 2018 (assuming moratorium relaxed)

Israel (Cyprus) gas discoveries: a game-changer?



Up to 4.5 Tcm of gas reserves, but how will they be brought to market and when?

Main Gas Import/Export Changes: 2015-2020

COUNTRY	MAIN CHANGES TO IMPORT/EXPORT STATUS
Algeria	Slow increase in exports levelling off post 2015
Egypt	Pipeline exports will be phased out, imports are possible
Libya	Very slow development of export potential
Israel	Imports cease before 2015, exports possible thereafter
Iran	Remains net importer until at least 2015; future uncertain
Iraq	Small net exporter by 2020, probably to Mashreq
Saudi Arabia	Status quo (could become an importer before 2020)
Kuwait	LNG imports likely to increase
Bahrain	Will need to import LNG
Oman	Net exports likely to fall unless more reserves developed
Mashreq: increasing imports; Yemen, Palestine, no significant change	
Qatar	Substantial increase in exports

Aside from Qatar, Algeria and (maybe) Israel and Iraq, the export picture is very bleak

Conclusion: MENA gas exports to 2015/20

Poor prospects for rapid and large incremental exports due to:

- **rapidly increasing demand (partly due to low domestic prices) everywhere**
- **moratoria on new projects (Qatar, Egypt)**
- **many countries (including exporters) becoming importers (UAE, Oman, Kuwait, Bahrain)**
- **Incremental supply needed domestically/ regionally (S. Arabia and Iraq)**
- **Politics to continue trumping "rational" decisions**

Despite large reserves, no significant increase in exports beyond Qatar and Algerian projects

What Can Be Done: Supply Side Actions

Promote/attract more investment in the upstream:

- Improvement of upstream investment terms
  - → Politics/"resource nationalism"
- Reduce bureaucracy and institutional inefficiency/instability
  - → NOCs "hostages" of government politics

Increased regional trade:

- → Concerns of energy security (Qatar-Saudi Arabia, Iran and the rest of region)
- → Commercial terms/expectations

Develop alternative sources of energy: solar + nuclear

- → Timescale/know-how/safety/politics
- → Costs/subsidies/pricing policies

What Can Be Done: Demand and Price Actions

Feedstock (and power) pricing policy:

- **Policy of maintaining low gas prices at $0.5-1.5/MMBtu is unsustainable (prolonging distortions and inefficiency);**
- **Subsidies need to be gradually removed – Iran has made the boldest efforts yet – politically very painful;**
- **Failure to do so will result in worsening supply crisis, further curtailment of exports and increase in subsidies (Qatar excepted);**

Reconsider petrochemical expansion plans:

- **How much added value to the economy/employment?**
- **Looming global petrochemicals glut?**

By 2015, prices need to be raised to cost-based levels, and by 2020 to international levels; if not rationing gas (and power) will be the only alternative

Thank You

OIES GAS PROGRAMME RESEARCH IN PROGRESS:

The Transit Dimension of EU Energy Security, Katja Yafimava

The Pricing Debate over Russian Export to China, James Henderson

Will there be an Unconventional Gas Revolution in China by 2020? Fan Gao

The Pricing of Internationally Traded Gas, ed. Jonathan Stern

The Iraqi Gas Sector: prospects and development challenges, Hakim Darbouche

US Natural Gas at "20" and Henry Hub at 2020: $3 or $10? Michelle Foss

Gas Price Volatility in the UK and North America, Sofya Alterman

Interaction of LNG and pipeline gas pricing: does greater connectivity equal globalisation? Howard Rogers

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