Opportunities for Pan GCC Natural Gas Grid

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Natural Gas in Bahrain

- Average consumption in 2016 was about 1.4 BSCFD (excluding oil field use approx. 0.6 BSCFD).
- All the production is being consumed locally by 3 main sectors: oil field use, power & water, and industry.
- Like other GCC member states, gas demand growth is driven primarily by power sector, where there is marked seasonal demand for air conditioning.
- Natural gas is a primary source of energy for Bahrain.
- Bahrain have been producing natural gas from Bahrain field (one of the oldest fields in the region) since 1970s.
- Bahrain Field is meeting current gas demand but holds comparatively limited gas reserves.
Bahrain LNG Import Terminal is being developed to complement indigenous gas resources in meeting the increase demand of gas.

Selected configuration is FSU with on-jetty regasification facilities & separate berths for FSU & LNG carriers (Double Berth).

Terminal capacity: 400 mmscfd expandable to 800 mmscfd of gas.

The terminal is scheduled to be completed in early 2019.
Establishing Sustainable Energy Unit (SEU)

The SEU was established in 2013 to develop sustainable energy policies and targets and their implementation. Both National Energy Efficiency Action Plan and the National Renewable Energy Action Plan have been endorsed in October 2016.

What are they?

National Energy Efficiency Action Plan (NEEAP) and National Renewable Energy Action Plan (NREAP) are national policy documents produced through a consultative process by the SEU in partnership with UNDP. The documents set overall targets, and detail initiatives to meet those targets resulting in national savings.

Why?

- Realize tangible energy savings
- Meet growing demand of energy and ensure sustainability of resources
- Create sustainable energy market
- Reduce environmental cost and carbon intensity

Countries with NEEAP or similar programs
Target renewable energy share by 2020
Target renewable Energy share by 2030
Countries with sustainable energy institutions
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Natural Gas Supply Situation in GCC

Kuwait
- Development of LNG import terminal in 2009 (FSRU with onshore terminal underway).

Saudi Arabia
- Some power plants depend on liquid fuel fired generation.

Bahrain
- LNG Import Terminal is being developed.

Qatar
- Qatar may have surplus gas supplies.

UAE
- Piped natural gas supplies from Qatar to UAE (Dolphin) since 2007.
- First LNG import terminal at Dubai operational since 2010.
- Plans to install a land based and FSRU at Abu Dhabi in future.

Oman
- Oman has been LNG exporter.
- Piped natural gas supplies from Qatar through UAE (Dolphin).
- Oman Iran pipeline is being considered.
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Since its inception GCC has been promoting Infrastructure Projects with the aim of Regional Integration

GCC Power Grid
- The Gulf Cooperation Council Interconnection Authority (GCCIA) was formed for this purpose
- By 2011, the grid interconnection was completed in a phased manner
- Power trading made possible

GCC Gas Grid
- Concept first mooted in the 90s
- Dolphin Energy Ltd. established in 1999 and the Dolphin pipeline currently links Qatar to the UAE and Oman
- If all the GCC members agree, the GCC grid can be completed by the middle or later part of the next decade

GCC Railway Project
- Expected to be ready by the early part of the next decade

Water Connection Project
- Integration of water supply system
- Planned to be partially operational by 2020

Gulf Cooperation Council (GCC)
Created in 1981 as a regional intergovernmental political and economic body comprising of six member states, viz., the UAE, Bahrain, Kuwait, Saudi Arabia, Oman and Qatar
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GCC Gas Grid Background, History and Current Status

**Background**
- The idea of the gas grid was first mooted in the 90s
- Dolphin Energy Limited was created to implement the Dolphin Gas Project and link Qatar, the UAE and Oman in a unique, strategic energy initiative

**History**
- Dolphin is the only significant cross-border pipeline in the GCC
- GCC Interconnection Authority (GCCIA) was created in 2001
- All GCC states’ power grids have been linked together

**Current Status**
- The task that now remains is the extension of the Dolphin pipeline westwards & northwards connecting Bahrain, Saudi Arabia and Kuwait
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Possible structure to the GCC Gas Grid

- All GCC member states have existing national level gas grids in place
- As a result, one way of developing a regional gas grid could be to construct short interconnections among existing grids
- However, potential challenge with this structure is the variation in the gas pipeline size and pressure throughout the network
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GCC Gas Grid Rationale

1. Qatar can supply natural gas to the other GCC’s states to meet demands

2. The grid can be utilized to carry natural gas from existing and proposed LNG import terminals in GCC states.

3. The grid aids in cross-border regional (pan GCC) trading of natural gas over the grid

4. The grid could help Qatar weather against global LNG supply glut & depressed prices (through secured GCC markets)
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GCC Gas Grid Benefits (1)

Security of Supply

- An interconnected gas grid reduces the risk of LNG supply disruptions.
- In such instances, an interconnected gas grid within the region can provide security of gas supplies to all member states.

Regional development

- A regional gas grid can channel gas to the most needed sectors (e.g. power & water).
- Can help alleviate the natural gas shortage in some of the GCC states.
- Can lead to industrial growth, economic diversification, increase in employment, etc.

More efficient utilization of gas infrastructure including LNG

- A gas grid can fully monetize existing LNG import terminal infrastructure.
- Major benefit that can be derived will be the saving in terminal infrastructure capital and operating costs and other direct and indirect costs associated with an LNG import terminal.
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GCC Gas Grid Benefits (2)

**Strategic storage of natural gas**

- To ensure security of supplies in case of any operational or environmental emergency.
- Such underground locations could be depleted gas fields, salt formations or depleted aquifers within the GCC.

**Importing gas and exporting power**

- To deliver natural gas to power plants located in a gas deficit region within the GCC.
- Power generated using such gas traded over the grid can result in substantial savings while enabling the prospect of exporting any surplus generation within the GCC.

**Real-time gas balancing & development of traded markets**

- A gas grid can also serve to cater to gas demand uncertainty within the countries that it caters to.
- Short term gas surplus in country A can be used to fill out short term deficit in country B.
- Short term trading of gas to balance the regional markets on account of demand profile variations.
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Potential Main Overcoming-Challenges

International Right of Way

Often countries are unwilling to allow the development of international pipelines where they perceive themselves only as transit states and these projects as bilateral in nature with little benefits for them.

Geo-political Challenges

In case the GCC grid is fed using regional gas sources, the GCC members may have a perceived fear of over dependence on a single supply source.

Gas Quality & Interchangeability

End-user gas burner specifications and technologies vary greatly within the GCC.

Gas Pricing

Low domestic pricing may attract gas consumers but suppliers may be wary of the “discounted” price expectations by the member states.
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Examples of successful regional gas pipeline grids (1)

**US Natural Gas Pipeline Grid**
- North American gas market is deep, liquid, but far from homogeneous.
- Its diverse and complex nature leads to benefits along the full value chain – from upstream producers to downstream consumers.

**Europe**
- Interconnector pipeline connects gas grids of UK with that of continental Europe.
- It provides bi-directional transport capability to facilitate energy trading in both UK and continental European gas markets.

GCC can use some key learnings from the North American gas pipeline grid and of UK with continental Europe.
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GCC Gas Grid Development Can be the Right Step towards Regional Progress

With existing and operating gas pipeline (Dolphin) in place, the GCC states can capitalize on the opportunity to expand the pan GCC gas grid.

GCC member states can manage to overcome the challenges to achieve a gas pipeline network integration.

Lessons from the continental European/ North America pipeline grids can be adopted to GCC gas grid development.

The GCC gas grid can be developed in phases, similar to GCC power grid implementation.