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EDA INSIGHT

RESEARCH & ANALYSIS

DECEMBER 2018

Regional Electricity Cooperation in the GCC

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Executive Summary

♦ The members of the Gulf Cooperation Council (GCC) have been experiencing tremendous growth in their domestic demand for energy, including electricity, throughout the past decades. In order to safeguard secure energy supply, all of the GCC members have invested significantly in their electricity generation capacity over recent decades, and continue to do so at significant scale.

♦ Increasing cross-border cooperation on electricity by developing a regional market for electricity trade across the GCC could play a significant role in helping GCC members build and manage their electricity generation capacity in order to ensure future demand growth is met by capacity that is both adequate and economical.

♦ The GCC countries already have infrastructure in place that interlinks their national power grids, the GCC Interconnection Grid, which began operations in 2009. Expanding the use of the interconnection to form a more integrated regional power pool and commercial trade could result in multiple benefits for all GCC members, including:

- o Increased power system stability;
- o Potential diversification of importing countries' energy mix;
- o Increased efficiency and lower costs in the power sector; and
- o Promotion of regional integration and cooperation in the pursuit of long-term economic stability throughout the GCC.

♦ The option to extend the interconnection beyond the GCC holds additional benefits, including a yet wider

pool of electricity that could also help promote various development goals in the GCC's neighbours, particularly Egypt and Yemen.

♦ Developing a shared electricity pool, or commercial market space beyond occasional electricity exchanges in the region will require dedicated work and collaborative efforts that string together domestic energy policy and foreign policy. Factors that will support the idea of a progressively interconnected commercial trading market for electricity in the GCC include:

- o Diversification of the regional energy mix, in particular towards renewable energy;
- o Harmonisation of national regulations and institutional structures in support of creating a market for electricity;
- o Grid capacity expansion as more trade ensues;
- o Possible future unbundling of national power sectors, that is, the separation of generation, transmission and distribution with the possibility to include more competition, including through private suppliers, and hence consumer choice;
- o Expansion of the grid beyond the GCC, as a measure to increase the available electricity pool and to serve wider development objectives towards southern neighbours; and
- o Political support.

♦ Making progress on this agenda requires the political will to do so, which is not a given in the context of wider intra-GCC dispute. However, an option to be considered is to expand trade gradually by building it first between two or more countries and expanding the resulting power pool as more countries become ready to join.

The Issue

The members of the Gulf Cooperation Council (GCC) have been experiencing tremendous growth in their domestic demand for energy, including that of electricity, throughout the past decades.

Rapid economic and population growth and industrial expansion have led to very high living standards and some of the world's highest income rates per capita. Electricity consumption in the six GCC member countries – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE) – has nearly tripled since the early 2000s alone.¹ Economic and demographic growth over the next ten to twenty years are likely to continue to spur demand for electricity as the basis of modern-day life.

In order to safeguard secure energy supply, all GCC countries have invested significantly in their electricity generation capacity over recent decades, and continue to do so at significant scale. An increasingly important focus in current and future energy and utility sector planning has therefore been ensuring that the available electricity generation capacity is not only sufficient, but also economical. Additional emphasis has also more recently been placed on sustainable energy solutions that contribute to a sustainable use of natural resources.

This EDA Insight argues that increasing cross-border cooperation on electricity by developing a regional market for electricity trade between GCC countries could play a significant role in helping GCC member countries make progress towards all these goals. In addition to making greater use of shared reserve power, a more elaborate GCC market for electricity could allow utilities to buy electricity from where it is produced at the lowest cost at any given point in time.

This could not only contribute to lower-cost energy supply but could also provide an important motor for new electricity generation projects that make use of economies of scale and contribute towards the diversification of sources of energy supply in the GCC. This is particularly the case for renewable energy.

If an interconnected market for electricity were to be further expanded beyond the GCC, other neighbouring countries could add to the size, diversity and stability of the pool. A larger and increasingly diversely interconnected grid could also help meet development goals in poorer countries of the region, including secure access to clean energy and decarbonisation.

The paper first discusses the opportunities presented by intensifying transboundary cooperation in the sphere of

electricity within the GCC, viewed from the perspective of the UAE. It then identifies those factors necessary to reap the benefits of closer GCC electricity collaboration, with specific reference to UAE foreign policy.

A Brief Background to Transboundary Electricity Cooperation in the GCC

Transboundary electricity cooperation is not a new idea in the GCC. An interconnected grid across the GCC emerged as a concept as early as 1981 at the time of the creation of the Council. The GCC's objective of fostering the economic security of all six member states through mutual cooperation included the possibility of cooperating in the sphere of energy and through joint infrastructure. In addition to talks about better transport links such as a region-wide railway link and a regional gas pipeline, discussions also included the possibility of an interlinked GCC-wide electricity grid for the purpose of energy security. The subsequent option of commercial trade in electricity was also explored.²

Studies in 1982 and 1986 confirmed the technical and economic viability of a GCC-wide power grid and resulted in a draft design of a regional interconnector, similar to its current technical format, which was launched in 2009.³ Attention and politico-economic priorities shifted away from electricity trade during the 1980s and 1990s, but the idea of systematic cooperation over electricity resurfaced during the 2000s.

At this time, the biggest political selling point of an interconnected region-wide electricity grid was one of short-term supply security and grid stability: the primary purpose of the interconnector, reflected in its design, was to serve as a mechanism to prevent electricity outages while reducing costs for spinning power, that is, the operating reserve available to system operators.⁴

The realisation of the interconnection of the GCC countries' electricity grids saw a major boost in the mid-2000s, with funding and high-level political endorsement secured for the US\$3bn project to go ahead. The end of the two Gulf wars and the recovery of oil prices after the price slumps that occurred during the 1980s and 1990s both had freed policy attention back to the domestic sphere. At the same time, domestic demand for electricity was rising rapidly across the GCC. It was decided that the costs of the grid would be divided across phases and between the countries participating, according to the expected national share of the grid's capacity.

Today, the GCC Interconnection Grid connects the national grids of the six GCC member states, with a current total capacity of 2,400 megawatts (MW). It began operations in 2009, when initially four members linked their national grids. The two remaining countries joined in 2011 and 2013. (See Figure 1.)

Besides the grid's designated primary purpose of serving as a security mechanism to share spinning power and for occasional *ad hoc* transfers of electricity, there has been considerable interest in utilising the grid for commercial trade – either scheduled, firm energy or in the context of a regional power pool, or spot market. The GCC Interconnection Authority (GCCIA) has positioned itself as one of the most important advocates of regional power trading.⁵

At the opening of the UAE's link to the Grid in April 2011, energy ministers and regional heads described it as both an emergency tool and a backbone for future trade.⁶ Most recently, in November 2017, a six-month trial period for spot trading was initiated, with the aim of developing a commercial platform from this experience.⁷

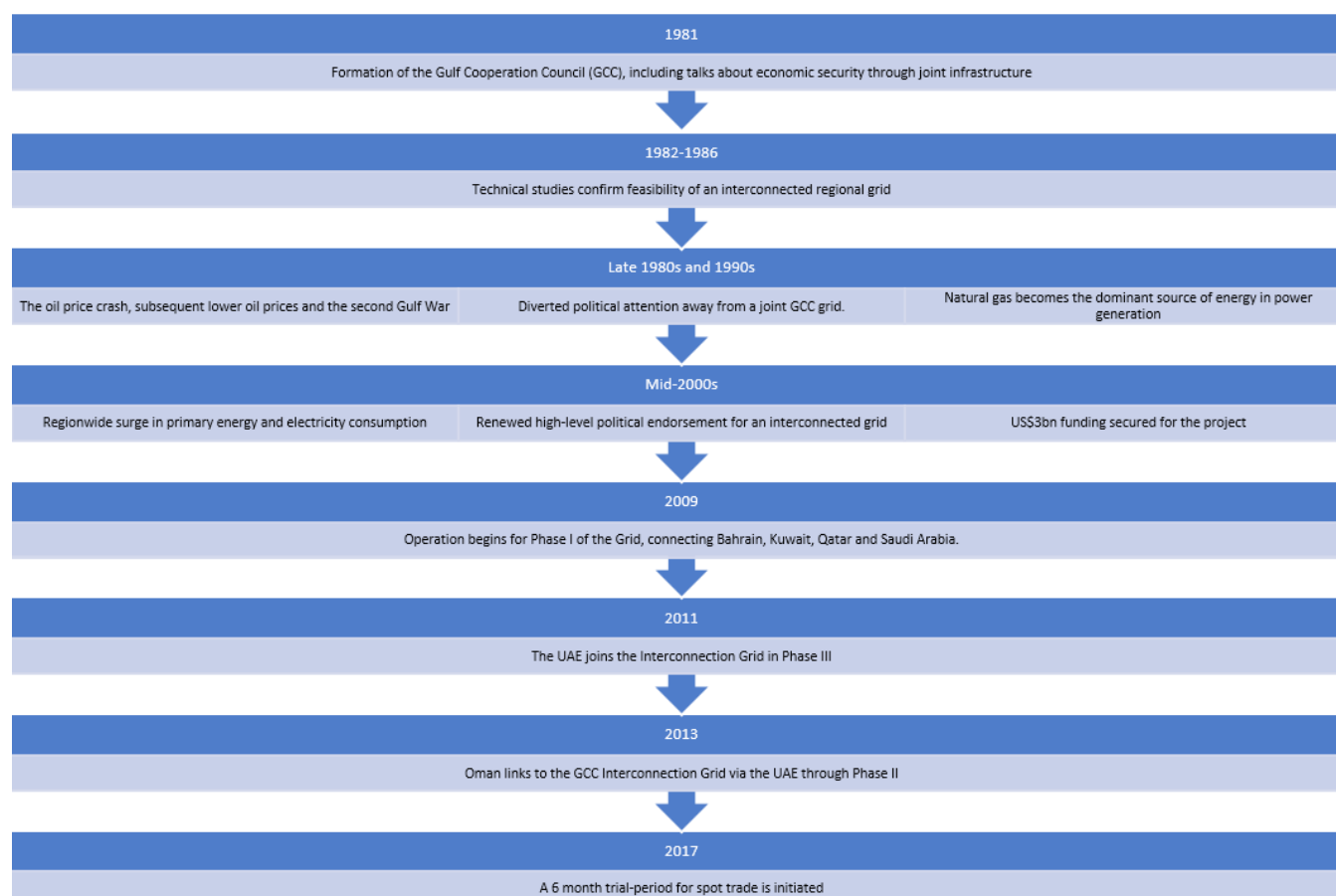
Benefits of Increasing Electricity Cooperation in the GCC

There is a wide range of benefits and opportunities associated with intra-regional electricity cooperation for all countries involved, in particular: increased power system security; energy mix diversification; higher efficiency and lower costs; and promoting regional peace and stability through closer energy market integration and stability. These are examined in more detail below.

Increased Power System Security

Larger, interconnected power systems are more secure, because they pool electricity generation capacity, and reserve capacity/spinning reserves. At the most basic level, an interconnected trans-national grid can help mitigate against power shocks. Larger, interconnected systems can also help reduce investment costs for national utilities into additional reserve capacity (see also Box 1).

Figure 1. Timeline for the GCC Interconnection Grid



Since it began operations, the GCC Grid has successfully helped avoid power interruptions, and the sharing of reserve generation capacity through the grid has resulted in considerable operational savings for all members.⁸ The GCCIA estimates that total economic savings made by GCC countries from the Grid between 2011 and 2016 alone amount to some US\$2.2bn, already exceeding capital and operational costs.⁹ Savings from the Grid over the next 23 years could amount to around US\$30bn.¹⁰

Box 1: Main Types of Electricity Exchanges between Interconnected Partners

- **Firm energy sales**, a continuous exchange of base load energy, and in some cases, interruptible supply at pre-determined peak times.
- **Backup exchanges** for emergency support.
- **Marginal exchanges** of spinning reserves, or the operating reserve available to system operators.
- **Occasional exchanges**, in which no guaranteed capacity is given. These arrangements are designed to take advantage of excess availability at advantageous marginal costs.
- **Compensation exchanges made in kind** to compensate for financial losses caused by lags between the supply and the payment for the electricity delivered.

Source: World Bank. 1995. *International Power Interconnections*.

A larger, interconnected power system is also more robust and able to accommodate a more diverse energy mix, in particular variable renewables, such as solar and wind energy.¹¹ Preliminary results from an examination of the European electricity market confirm the importance of cross-border electricity trade in increasing the effective capacity factor – or efficiency – of intermittent plants in the context of a growing share of intermittent renewables in the power sector.¹² This is of particular importance in light of several GCC members' policy commitments in recent years to renewable energy, which could result in a significant rise in variable energy connected to the national grids over the coming years in the UAE, Oman and Saudi Arabia.¹³

Energy Mix Diversification

An interconnected electricity grid, in particular one that involves substantial trade in electricity across borders in the GCC, could become an important tool for countries to diversify their primary energy mix. This argument is of particular relevance to the smaller GCC member countries, whose domestic market or land size is not sufficient to support the systematic deployment of alternative energy sources, in particular renewable energy. Electricity market size and current project pipelines for renewable energy in the GCC suggest that most surplus electricity generated from alternative energy sources over the coming decade could come from Saudi Arabia and the UAE.

Saudi Arabia is the GCC's largest market for electricity, accounting for over 50% of all installed capacity in the GCC.¹⁴ While the country currently has only a negligible amount of alternative energy installed as part of its energy mix, it targets 3.45 gigawatts (GW) of renewable power generation capacity by 2020 and 9.5 GW by 2023 (10% of power generation capacity by that time), as stipulated in the Saudi Vision 2030 plan from 2016.¹⁵

This does not yet include plans announced in March 2018 to deploy as much as 200 GW of solar power generation in the country by 2030.¹⁶ Overall, Saudi Arabia plans by 2030 to produce 70% of its power from natural gas and 30% from renewables and other sources (mainly nuclear power).

The UAE is the GCC's second largest market for electricity, with its own ambitious targets for the addition of new electricity generation capacity, most of which is to come from clean energy sources. The country's Energy Strategy 2050 aims to increase the share of clean energy in the energy mix 50% by 2050 and reduce the carbon footprint of power generation by 70% compared to a business-as-usual trajectory.¹⁷ Abu Dhabi also has a separate target of 7% of power-generating capacity from renewable sources by 2020,¹⁸ while Dubai aims to have renewable sources account for 7% of its power-generating capacity by 2020, 25% by 2030 and 75% by 2050.¹⁹

As in the case of Saudi Arabia, surplus power generated in the UAE, for instance from solar power during the day, could be exported to neighbouring countries, who in turn would benefit from access to low-cost, clean energy.

Box 2: Why Solar Power Suits the Case for Cross-boundary Electricity Trading

Variable renewable energy, in particular solar but also wind power, are attractive energy technologies in view of the potential for accelerated cross-boundary electricity trading in the future. The variability of solar power without storage means electricity is produced only when the sun shines, with a peak at midday. This could help cover the midday electricity demand peak in the GCC economies. Solar power furthermore benefits from economies of scale, meaning that larger projects tend to help push down costs.

At times of peak production, solar power may generate substantial amounts of surplus electricity which comes in at marginal cost. The region's recent world record low cost bids for new solar photovoltaic (PV) and Concentrated Solar Power (CSP) in the UAE and Saudi Arabia have further demonstrated the potential for significant cost savings through solar technology in the region. Neighbouring countries could thus benefit from low cost solar power generated in another country.

The expansion of the interconnection system from the GCC states to neighbouring countries, and the parallel acceleration in renewables deployment in these countries could further increase the pool of low-cost source of electricity. Areas with high renewable resource potential and different load curves and time zones, such as Jordan, Yemen and Egypt, could be added to the grid, and diversify the geographic distribution and local consumption patterns of variable renewable energy.

Source: author; IRENA. 2019. *Regional Market Analysis: The GCC 2019*, forthcoming.

Higher Efficiency and Lower Costs

Transboundary electricity cooperation holds significant potential for efficiency gains and, consequently, substantive cost savings. Such efficiency gains can result from: reductions in national requirements for investment in reserve capacity and spinning power; savings in operating costs as a result of the structural differences of load profiles; and savings in investment and operating costs.²⁰

A fully open, integrated and competitive regional power market would eventually mean electricity is sourced from where it is cheapest to produce at any given point of time, irrespective of the country in which it is being produced. Such a market could further help drive projects that benefit from economies of scale: serving a large regional market rather than merely the market of one single country could further bring down investment and generation costs and result in lower electricity costs for final consumers.

This could in particular become an incentive for the development of large-scale alternative energy projects with the prospect of supplying more than one market, in particular in renewable energy. Solar and wind power technologies benefit from economies of scale, and from site-specific factors such as the availability of low cost land and capital, implying the option to import such energy could benefit countries that would otherwise face higher technology costs.²¹

Promoting Peace and Stability through Regional Energy-Sector Collaboration

In line with the original objectives behind the first ideas of cross-border electricity cooperation at the time of the foundation of the GCC, intensifying electricity trade between GCC members remains a potent tool in fostering regional peace and collaboration. By eliminating national boundaries for electricity markets, all GCC members can benefit from lower costs and more efficient power systems through cooperation and trade of electricity.

From a UAE perspective, fostering greater integration of GCC electricity markets would also be in line with its national objectives, including of promoting regional peace and stability, and of working together to accelerate the use of clean and affordable energy throughout the region. Extending the GCC Interconnection Grid beyond the six GCC members could in this context further these objectives, by promoting access to secure electricity and clean energy to other neighbouring countries (see Box 3).

Policy Recommendations

In order to harvest the mutual opportunities that increasing transboundary trade in electricity could entail, the GCC economies will need to adjust power

markets in order to create incentives for cross-border electricity trade; that is, to create a market for electricity as a transboundary trading product. While the grid's function as a short-term supply security mechanism for the sharing of spinning power and occasional electricity exchanges does not require such reform and can rely entirely on political agreement, an effective transboundary electricity marketplace does depend on the availability of certain market-creating conditions.

The challenge involved is considerable, not only because parallel policies need to be implemented multilaterally, as no market space of this kind can exist with only a single participating country. The first and foremost requirement for the creation of a viable market for electricity between GCC countries is political agreement on, and implementation of necessary market-building policies.

Following this first pillar, progress on a number of other enabling factors will help the GCC members establish an increasingly dynamic market space, including: diversifying the regional energy mix; harmonising national regulations and organisational structures; unbundling national power sectors; and expanding grid capacity. Expanding the grid beyond the GCC could add further diversity to the regional power pool's energy mix and expand the times of available surplus capacity available for trade. Each of these are discussed below in more detail.

Diversifying the Regional Energy Mix

While one of the eventual benefits of enhanced electricity cooperation in the GCC can be the diversification of the region's energy mix, the deployment of alternative energy systems is still at the very beginning. Renewable

Box 3: International Experience in Transboundary Electricity Trade

Historical experience has created incentives for the creation of interlinked electricity systems across a number of countries and regional blocs with the objective of increasing system reliability. The gradual development of these systems has seen a number of different outcomes that reflect regional preferences for different types of electricity exchanges (see Box 1 above). Some examples of regionally interconnected systems, which feature varying degrees of energy trade, include:

- **The European Network of Transmission System Operators (ENTSOE)**, which represents 43 electricity transmission operators (TSOs) from 36 countries across Europe. It was given legal mandates by the EU's Third Package for the Internal Energy Market in 2009 to assist in the development of a pan-European electricity transmission network in line with European Union energy policy goals.
- **The Central American Electrical Interconnection System (SIEPAC)**, created in 2012, is an interconnection of the electricity grids of six Central American countries: Panama, Costa Rica, Honduras, Nicaragua, El Salvador and Guatemala.
- **The Southern African Power Pool (SAPP)** was formed in 1995 to create a competitive electricity market between the 15 member states of the Southern Africa Development Community (SADC).
- **The West African Power Pool (WAPP)**, launched in 2000 comprises, 14 of the 15 member countries of the Economic Community for West African States (ECOWAS): Benin, Côte d'Ivoire, Burkina Faso, Ghana, Gambia, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

Besides the GCC Interconnection Grid, two more sub-regional interconnection projects exist within the Arab region:

- **The Maghreb regional interconnection** includes Morocco, Algeria and Tunisia, and was initiated in the 1950s. Morocco was connected to Spain in the late 1990s, and Morocco, Algeria, and Tunisia are now all synchronised with the pan-European high-voltage transmission network.
- In 1988, the **eight-country regional interconnection EIJLLPST** (Egypt, Iraq, Jordan, Libya, Lebanon, Palestine, Syria, and Turkey) was set up. Initially, the network included the electricity grids of Egypt, Iraq, Jordan, Syria, and Turkey, and was later on joined by Lebanon, Libya and the Palestinian Authority.

Source: Sources: [Entsoe](#), 2018, website; [SIEPAC](#), 2018, website; [SAPP](#), 2018, website; UN ESCWA. 2019. *Energy Vulnerability in the Arab Region*. Forthcoming.

energy currently contributes less than 1% to the region's primary energy supply.²² An effective and dynamic marketplace, or pool for electricity beyond energy that fills a gap in national generation capacity, depends crucially on the availability of surplus electricity produced at lower marginal cost than those produced inside an importing country.

Typically, such surplus capacity at lower cost is generated either by making use of economies of scale of larger power projects aimed at producing electricity for a wider market beyond the national one; or through the use of alternative energy sources, for instance variable renewable energy. A combination of both factors – large-scale projects that make use of economies of scale for a larger regional market that are fuelled by alternative energy sources – presents an ideal scenario for regional trade. They also strengthen the argument in favour of accelerated diversification of energy mix in countries such as Saudi Arabia and the UAE, which have the capacity to engage in such large-scale alternative energy projects.

Renewable energy – specifically solar and wind power – fulfils this role particularly well, given its attribute of being a variable source of energy whose production peaks at certain points of time;²³ the marginal cost of surplus electricity generated thus falls, therefore creating a business case to export the surplus at low cost to neighbouring countries, which in turn benefit from importing electricity rather than burning more costly resources such as natural gas.

Overall, GCC countries with a more diversified technology mix in power generation can thus be expected to increasingly become net-exporters, whereas countries with a less diversified technology mix can be expected to become primary importers of electricity from a transnational market for electricity.

Harmonising National Regulations and Organisational Structures

The efficient utilisation of interconnectors' capacity necessitates that interconnected countries harmonise their operating standards.²⁴ This involves the creation of institutions and market mechanisms that enable the formation of a cross-border price for electricity through a market space. Utility and wholesale prices for electricity and fuels supplied to power generators have throughout the GCC been kept at regulated, and often artificially low levels, for many decades.

While reform of domestic energy pricing has been ongoing throughout the GCC to varying degrees, existing

cost and price frameworks still present an obstacle to cross-border trade.²⁵ At the generation point, required further reforms would include the elimination of cost discrimination between different sources of fuels by charging utility companies cost-reflective prices for fuels historically supplied at minimal cost.

This will help to provide incentives to utilities to invest in new generation capacity, including renewables, on the basis of lowest marginal cost. Related to pricing reform, it will be also imperative to ubiquitously deploy modern metering and smart grid infrastructure, without which any meaningful development of cost-reflective charges for electricity is impossible.²⁶

Beyond domestic power sector structures, intensifying intra-regional electricity trade will involve agreement over cross-border allocation mechanisms, regulation competence, the harmonisation of transmission charges, cross-border tariffication (the structure of and payment modalities for electricity traded commercially), network congestion management (managing over-capacity or demand at peak trading times), handling of long-term contracts, interconnection reinforcement, and differences in gate-closure times (for instance caused by differences in time zones). Regulatory measures may need to be put in place nationally to ensure transmission charges do not significantly exceed delivery costs in order to avoid penalizing electricity distributors for electricity imports.²⁷

Future unbundling of national utility sectors, or the unbundling of generation, transmission, distribution and retail sales towards liberalised domestic electricity markets, as further discussed below, will require further regulatory elaboration of national law with regards to transmission costs from imports. Further domestic market liberalisation will also entail the need to make further regulatory changes, in particular related to trade-licensing in the case of distribution companies. Such structural changes will raise their own challenges, but will ultimately offer more choice to consumers, with the ultimate goal being to drive down costs and increase the efficiency of the wider electricity system.

Grid Capacity Expansion

Adequate transmission capacity is essential for power trading to occur.²⁸ The GCC Interconnection Grid's current capacity is sufficient for its current purposes, namely the safeguarding of emergency and *ad hoc* power exchanges. More systematic, commercial trade in electricity will however require significantly larger grid capacity along the interconnector line for smooth functioning.

Investment in upgrading grid capacity will need to be made timely and effectively, both in preparation of the progressive expansion of electricity exchanges, and periodically in response to an evaluation of interconnector capacity sufficiency, by the transmission system operator (TSO, in this context, the GCCIA). This makes early agreement on expanding transmission capacity integral to facilitating the development of a regional market for electricity trade.

Unbundling National Power Sectors

Electricity sectors in the GCC have historically served important strategic purposes that have led to state-controlled utility provision. Today's electricity markets in the GCC therefore remain dominated by a single, vertically integrated, state-owned utility that controls generation, transmission and distribution. Abu Dhabi and Oman have seen some change in the separation of monopoly transmission and distribution, while other GCC members have seen varying degrees of private sector participation in generation through private-public partnerships (PPPs). However, even these have continued to be conducted with a single buyer model, meaning a single state-controlled utility buys the power and distributes it to consumers.²⁹

However, many other countries have in more recent decades found that the restructuring of their power sectors has introduced more flexibility into the operations of the entire sector.³⁰ Such reforms include the introduction of competition between distribution companies in the end-user segment, allowing consumers choice over their supplier on the basis of cost. They also include additional elements such as utility companies generating a larger share of their electricity from clean energy sources. Observers have in the past agreed that, while not a prerequisite, liberalising and unbundling national power sectors could present an important step to support a well-functioning cross-border market for electricity.³¹

In many international cases, the character of regional trading markets reflects institutional structures of national utility markets. In the context of fully liberalised national utility markets, transboundary electricity markets involve a large number of buyers and sellers – multiple power generation companies per country, often competing with their national peers for the lowest cost electricity offered by sellers from other countries.

In the GCC, where utility markets remain heavily dominated by public utility companies that remain the single buyer of electricity at national level, current national utility market structures do not yet allow for

such competitive trading. Instead, more limited trade between each country's single buyer might be a more realistic scenario in the short-term, until national utility markets evolve further over the coming decade.

Expanding the Grid beyond the GCC

Beyond the core grid area, the expansion of the GCC interconnection system to neighbouring countries could hold many benefits to all sides involved. Options to expand the grid in view of future commercial trading could be further studied, with further steps to be taken identified.

The two foremost options to expand the GCC Interconnection Grid in the future are the links to Egypt, on the one hand, and Yemen, on the other. Egypt would offer all GCC countries a partner with a large domestic electricity market, and, importantly for the economics of electricity trade, a market with a large, and considerably more diversified energy mix than in the GCC, as well as substantially differing load and consumption patterns from the GCC itself.

There are also other long-term policy objectives that could be promoted on the basis of using and expanding a regional market for electricity beyond the GCC. The GCC members, in particular Saudi Arabia and the UAE, have been pursuing a strong foreign policy interest in collaborating with Egypt and in promoting its economic growth and development.³² In 2016 alone, the UAE paid over US\$2.42bn in foreign assistance to Egypt, including around US\$20.4m for the development of the country's electricity transmission and distribution network.³³

Trading electricity with Egypt would fit in with these policy goals, as Egypt's electricity market is large and diversified, and has significant potential for further uptake of renewable energy and substantially different load patterns from the GCC. Electricity trade with Egypt could furthermore provide a powerful incentive to policymakers in Egypt to promote investments in large-scale energy projects, including in the area of clean energy, which the UAE firmly supports.

Yemen, on the other hand, is a country in profound political disarray. It is among the world's least developed countries, with a per capita GDP 45 times smaller than that of the UAE.³⁴ The country was suffering from severe socio-economic challenges even before the current crisis, ranging from lacking access to essential services such as food, over healthcare to education and socio-economic opportunities for large portions of the population.³⁵ Lacking access to energy and water adds to these pressures for Yemen's population, with only

around 50% of the country having access to the national electricity grid. The ongoing political conflict has added further strain on fuel, electricity and food supplies.³⁶

Linking Yemen to the GCC grid could be a powerful tool to support state-building efforts in a post-conflict context, assuring secure electricity supplies for Yemen's population at a time of peace-building, while supporting the Yemeni government in its endeavour to expand access to electricity to a growing part of its population. The UAE has been a large donor of development aid to Yemen for many years, with a total of over US\$1bn paid in foreign assistance in 2016 alone, with Yemen being among the UAE's top three supported least developed countries (LDCs).³⁷ The majority of the current flow of assistance is currently in general budget assistance, but also entails significant allocations to humanitarian aid, including water, sanitation, energy generation and supply.³⁸

In a post-conflict reconstruction context, investing in an electricity interconnection could prove a worthy investment into the country's long-term socio-economic development, by helping the government provide its citizens with secure, stable electricity.

Political Support

Political support is an essential driver for the creation of market structures, the institutional and legal framework to support cross-boundary electricity trade, and hence for regional collaboration on electricity. Others have argued that, despite increasingly favourable views of trading electricity over the GCC grid, 'there appears to be insufficient political momentum to move this concept forward in any case'.³⁹

The creation of a truly functioning, regional market for electricity depends on the will of policymakers to make regional electricity market integration a political priority. This entails debate and strategic decision-making around national and international priorities in the areas of national energy security, economic policy, environmental sustainability and the geopolitics of regional integration.

At the same time, intensifying electricity trade also involves concessions with regards to national energy self-sufficiency, an issue that has historically been of concern because electricity – unlike other types of energy – cannot be stockpiled and stored for times of unplanned supply disruptions.

Political will and commitment are also required at national level to engage in policies that help prepare domestic electricity sectors that are able – and have

the right incentives – to engage in electricity trade with neighbouring countries. Effective, smooth cross-border electricity trade will require institutional adjustments, in particular the creation of minimal market incentives for buyers and sellers across countries to trade with each other.

In the GCC context, this raises a number of questions over parallel structural policy adjustments in the domestic market sphere, for instance in view of the pricing of different fuels supplied to power generators, and the unbundling and introduction of competition into power provision inside the GCC members' domestic markets.

Understandably, it is more difficult to make progress on the agenda given the current state of disputes within the GCC countries. In the cases where there are political barriers to making progress on the agenda, one option is to first make progress among a smaller number of countries. From a technical standpoint, electricity trade can occur between any two countries connected to the grid, with the exception of Oman which is linked to the Interconnection Grid via the UAE.

The joint Saudi-Emirati Coordination Council announced in early 2018, for instance, includes bilateral plans to increase cooperation over the use of the Interconnection Grid between the two countries.⁴⁰

In the longer term, an interconnected, well-functioning regional market for electricity presents enormous benefits, both in the sphere of economics and in promoting international cooperation. The coming years will hence demonstrate whether and how much this potential will be utilised towards the objective of supporting regional political and economic stability in and beyond the GCC.

Box 4: Additional Information

(a) General readings

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