

Commentary

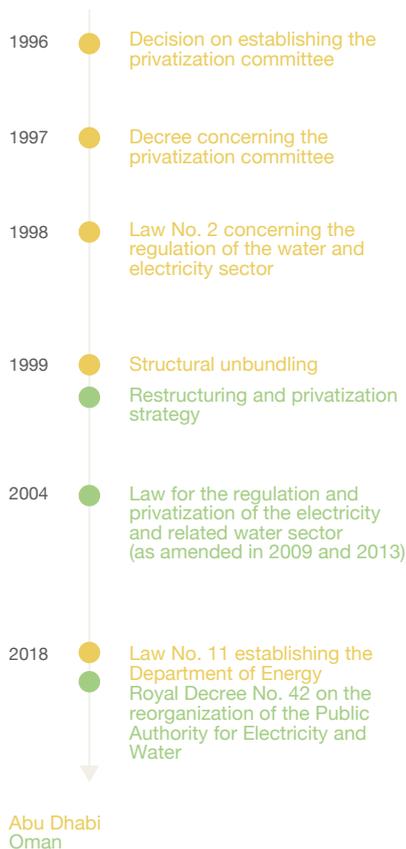
Electricity Sector Reforms in Abu Dhabi and Oman: What Have We Learned?

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Key reform milestones



Drivers for electricity reform

Chile was the first country to reform its electricity sector. The reform program was first mooted when Chile's National Energy Commission was established in 1978; it took off with the enactment of the country's Electricity Sector Law in 1982. This law is still cited as landmark legislation in the electricity industry. Since then, many countries have implemented reforms to revamp their electricity sectors, such as the unbundling, privatization and independent regulation in England and Wales in 1989. While micro-objectives may differ from country to country, the overall goals of electricity sector reforms have been to create financially stable industries, improve their efficiency and competitiveness, and make industry conditions conducive for private sector participation.

Reforms in Europe were pushed through the European Union's (EU's) directives on common rules for internal (EU member countries') electricity markets. The expected welfare benefits of developing and integrating internal electricity markets drove these reforms. The EU's first Directive in 1996 encouraged member states to progressively unbundle and liberalize their electricity markets. However, the approach provided some degree of freedom and discretion to EU countries in how they reformed their electricity sectors. The second EU Directive in 2003 and the third in 2007 further strengthened the EU's energy policy objectives and accelerated the transition toward a pan-European integrated electricity market. Economic integration among Gulf Cooperation Council (GCC) countries was one of the basic objectives outlined in the GCC Charter of 1981. However, it required a clear articulation of the need and associated benefits of integrating national electricity (or energy) markets. In the absence of GCC-wide energy policy objectives (similar to the EU's pan-European goals), reforming the electricity sectors of GCC countries are sovereign decisions.

Unlike in developed countries, reforms in developing countries are mostly driven by recurring electricity shortages, poor access, and the inability of their vertically integrated electricity supply industries, often state-owned, to add the needed generation capacity and support grid expansions. In several cases, multilateral organizations and other international financial institutions included the implementation of reforms as a precondition for giving any financial assistance to electricity sectors. This was not the case in GCC jurisdictions. As the electricity infrastructure of fossil fuel-based economies in the Gulf region was largely funded by their respective governments, developing Abu Dhabi and Oman's electricity sector, for example, was less reliant on external borrowing. Moreover, both these jurisdictions had adequate generation capacity when electricity reforms were pushed through.

Oman's economy expanded significantly during the 1980s and 1990s due to its growing petroleum and service sectors. From 1980-2000, its electricity demand increased by an average of 11.23% annually. Abu Dhabi's rising population and its growing economy were the main factors for the increase in the emirate's peak demand. Oman and Abu Dhabi's rapidly rising electricity demand required more investment in their generation capacities, and both administrations realized the need to engage the private sector in developing their electricity industries. However, the need for efficiency improvements through competition, private

sector participation and independent regulation was an equal, if not more important, driver. Oman also intended to provide more transparency around the design and allocation of its electricity subsidies through sector reforms.

Policymakers in both territories expected private sector participation would reduce the burden on them to fund the development of their respective power sectors and bring in more expertise. This, in turn, would lead to improvements in the quality of services, better resource utilization and reductions in the per unit cost of electricity supply. Thus, the decision to restructure the electricity sectors in Oman and Abu Dhabi was driven by three key objectives – to enhance competition and efficiency, to increase transparency and accountability in business operations, and to strengthen the governance and regulation of the sector. Abu Dhabi and Oman introduced electricity reform laws in 1998 and 2004, respectively. This commentary analyses the developments in Oman and Abu Dhabi's electricity sectors. The legal and structural reforms introduced by Abu Dhabi in 2018 are not included in this analysis.

The main features of market liberalization and development

According to the textbook definition, liberalization refers to the reduction or elimination of government controls over industry functions. This could mean opening up the electricity sector to private sector participation, easing the barriers to entry for new players, and increasing the sector's efficiency and productivity through competition and independent regulation. Countries predominantly start their reform journey from a vertically integrated monopoly structure with combined functions under state ownership. They progress toward an unbundled industry structure, sometimes alongside a centralized purchasing agency, or wholesale competition, and eventually to retail competition.

Prior to Abu Dhabi and Oman's reforms, both jurisdictions' electricity industries were managed by government departments (Abu Dhabi's Water and Electricity Department, and Oman's Ministry of Housing, Electricity and Water). Like many other administrations that have embarked on reform programs aimed at revitalizing their electricity sectors, the initial focus of Abu Dhabi and Oman's reform strategies was on private participation in generation. This is because private participation in generation is often considered less difficult to implement than private participation in retail. Other sector-wide structural and regulatory changes were also introduced to achieve the intended objectives of Abu Dhabi and Oman's electricity sector liberalization. The key elements of electricity market reform implemented in Abu Dhabi and Oman, and their rationales and expectations, are briefly summarized below.

- 1. Allowing private sector participation in electricity generation**
– Private sector participation in electricity production (and water desalination) was encouraged as an alternative to government-financed plants and to drive efficiencies. Following the liberalization of their electricity sectors, nearly all of Abu Dhabi and Oman's power generation capacity is now owned and operated by the private sector. In Abu Dhabi, the government (through its subsidiaries) holds majority equity stakes (up to 60%) in the independent power producers (IPPs) and independent

Improving competitiveness, efficiency, consumer benefits and replacing government investments were the key privatization drivers.

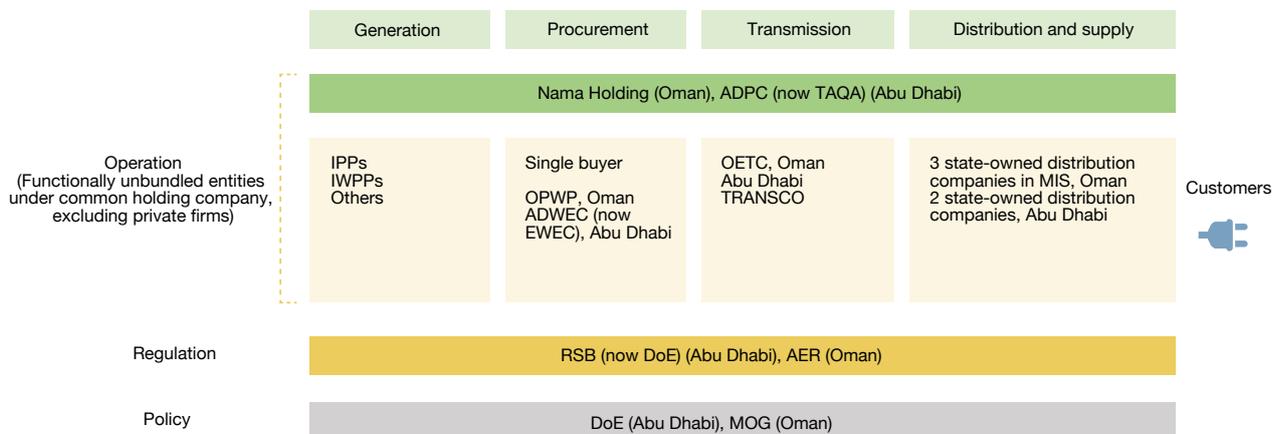
As generation is less challenging than the distribution/supply segment, allowing private sector participation in generation was a natural choice.

Electric utilities were vertically separated into generation, transmission and distribution functions.

water and power producers (IWPPs). When plants were first restructured in Oman, the government allowed the private sector to retain between 60%-65% of the shares in IPPs and IWPPs. This shareholding pattern signalled a higher commitment from Oman to free up public resources for use in other developmental priorities compared with Abu Dhabi. Maintaining self-sufficiency in electricity generation through competitive tendering has been a core strategy in both administrations' supply-side planning.

2. Restructuring the electricity industries to improve efficiency and enable competition – The reform strategies of Oman and Abu Dhabi also included separating competitive and non-competitive business segments. The core functions performed by the incumbent utilities were split, separating functionally unbundled and regulated generation, transmission and distribution and supply companies. However, all successor companies were placed under a common electricity (and water, in the case of Abu Dhabi) holding company. In Oman, this was Nama Holding, and in Abu Dhabi this was either directly via the Abu Dhabi Power Corporation, or indirectly via the Abu Dhabi National Energy Company or TAQA (Figure 1). The holding companies in both jurisdictions were assigned the mandate of implementing their respective policies, including those relating to the privatization of the electricity (and related water) sector, managing the administrations' ownership of the wholly owned subsidiary companies and financing their business activities. In 2018, as part of new reform initiatives and Abu Dhabi's consolidation of emirate-owned entities, ADWEA was folded into the emirate's newly established department of energy (DoE).

Figure 1: Abu Dhabi's and Oman's (Main Interconnected System) post-reform electricity industries.



Source: KAPSARC.

3. Creating a centralized purchase agency to manage the transition – Abu Dhabi and Oman both adopted a market structure based on a ‘single buyer’ model. One centralized agency in each jurisdiction was made responsible for procuring electricity from all producers in accordance with the power purchase agreements (PPAs), or power and water purchase agreements (PWPAs), and selling it to the state-owned distribution companies. The agency responsible for this in Abu Dhabi was the Abu Dhabi Water and Electricity Company (ADWEC) (now Emirates Water and Electricity Company [EWEC]), and the Oman Power and Water Procurement Company (OPWP) in Oman. Private producers were wary of the perceived market risks of a setup where retail electricity rates were kept low and subsidized. As such, the adoption of a single buyer model along with guaranteed long-term ‘take-or-pay’ provisions (a two-part payment mechanism comprising capacity and energy payments) were expected to address the concerns they had of possible under recovery of their fixed costs. In Abu Dhabi these provisions were guaranteed from 20 to 25 years, while in Oman the guarantee extended to 15 years for IPPs and 20 years for IWPPs. Attracting more private generation companies to enter the market allowed time for the electricity sector to gradually develop before transitioning toward a competitive wholesale market. This also favored the single buyer model.

4. Regulating the sector through an independent agency – As restructuring and privatization introduces new functions, service providers and expectations, it is important to have a neutral body to regulate the functioning of the sector and balance the competing interests of stakeholders fairly and transparently. Accordingly, the reform strategies included creating an independent regulator: the Regulation and Supervision Bureau (RSB) in Abu Dhabi and the Authority for Electricity Regulation (AER) in Oman. Both Abu Dhabi and Oman introduced legislation to regulate the sector, provide oversight, prevent market failures and achieve their policy objectives. In Abu Dhabi, this was Law No. 2 on the Regulation of the Water and Electricity Sector (amended in 2007 and 2009), and the Law for the Regulation and Privatization of the Electricity and Related Water Sector in Oman. Both regulators were given the authority to adjust prices to reflect the cost of supplying electricity to consumers. Rather than (annual) cost-plus or rate-of-return regulation, the RSB and AER adopted performance-based regulation (a multi-year revenue cap using consumer price index [CPI-X] regulation in Abu Dhabi and retail price index [RPI-X] regulation in Oman) to incentivize the efficient performance of regulated companies. This also helped to assist the two administrations' transition to competitive markets. As part of recent legislative and structural changes in Abu Dhabi, the regulatory functions of the former RSB are now undertaken by the newly established DoE. In addition to overseeing Abu Dhabi's electricity, water and wastewater sectors, the DoE's mandate now includes the production, processing, storage, transmission, distribution, supply, sale and purchase of natural gas, petroleum, and related by-products.

A single buyer model was chosen for its simplicity and to encourage prospective private investors.



Establishing an independent regulator was a central tenet of delivering a well-functioning market.



Oman is exploring privatizing network businesses.

A more liberalized and competitive wholesale electricity market is not going to be a far-fetched dream.

Energy diversification strategies have both local and global dimensions.

5. Expanding the scope of privatization to include transmission and distribution – Alongside encouraging private sector entry into new power generation projects, Oman and Abu Dhabi also divested their ownership of existing generating plants to maximize the value of the parent companies. The government of Oman is contemplating partly privatizing its transmission and distribution business. It plans to sell up to 70% of its stakes in the country's four main electricity distribution companies (Muscat, Majan, Mazoon and Dhofar), and 49% of its stake in the Oman Electricity Transmission Company (OETC) by 2020. If these plans are realized, Oman will be the first country in the GCC and middle east and north Africa (MENA) region to have privatized its transmission business, widely considered a natural monopoly in the electricity value chain. The distribution segment is usually considered difficult to privatize. The privatization move aims to enhance resource utilization, attract foreign direct investment, reduce costs and share the transmission segment's profits among Oman's citizens.

6. Enhancing competition in the wholesale electricity supply through the spot electricity markets – After implementing the reform strategies outlined above, Oman intends to put in place a new arrangement for the procurement of electricity through the spot electricity markets by 2020. Initially, this will only be for the Main Interconnected System (MIS). All existing electricity producers will have the option to join the spot market when their current contracts expire. This move is expected to increase competition in the power generation market and to provide a mechanism to make additional capacity available which might otherwise be inaccessible to third parties.

7. Diversifying Oman and Abu Dhabi's energy mixes to support energy security and environmental objectives – The structural and regulatory reforms in Abu Dhabi and Oman's electricity markets aimed to develop viable, efficient and competitive electricity industries. Both jurisdictions also redefined their electricity policies to fulfill their visions of ensuring long-term energy and environmental sustainability. Abu Dhabi's growing reliance on natural gas imports for power generation and its wish to improve its environmental credentials have made energy diversification an important priority for the emirate. Oman has also pursued a strategy of diversifying its energy resources to relieve the pressures on the Sultanate's already constrained natural gas resources and to enhance its long-term energy sustainability. Both Oman and Abu Dhabi are committed to increasing the share of renewable energy capacity in their energy mixes (7% of generation capacity by 2020 in Abu Dhabi, and at least 10% of electricity output by 2025 in Oman). As such, clean energy is becoming an important part of both administrations' energy strategies. Plan Abu Dhabi 2030 acknowledges the need to use the emirate's available hydrocarbon resources cautiously and to explore the use of non-hydrocarbon resources. Oman's National Energy Strategy 2040 aims to release the domestically produced gas committed to electricity generation to stimulate the country's industrial and

economic development. Abu Dhabi is also developing a 5.6 gigawatt (GW) nuclear power plant to meet its economic needs and environmental goals.

Key lessons for policymakers from the reforms in Abu Dhabi and Oman

Abu Dhabi and Oman were among the few jurisdictions in the Gulf region to implement reforms aimed at facilitating stronger economic growth and improving competitiveness. Legislation and regulation are two tools often used to achieve public interest goals. The success of the liberalization process in Abu Dhabi and Oman is widely attributed to clear and comprehensive reform legislation, and effective regulatory oversight through an independent regulator. The important takeaways from their reform experiences are detailed below.

- 1. Well-drafted legislation offers better chances of advancing reform** – Well designed and clearly articulated legislation can help remove legal and economic barriers to investments in the electricity sector. The Electricity Law No. 2 of 1998 (Abu Dhabi) and the Sector Law of 2004 (Oman) provided a solid foundation to support both jurisdictions' reform agendas. These laws presented new designs for their electricity sectors, defined the public-private ownership arrangements, and clearly articulated the powers and functions of various successor entities, including the sector regulators. Clear distinctions between policy, planning and regulatory roles also minimized the possibility of any serious potential jurisdictional conflict between the successor entities and the administrations. The laws also included several provisions to encourage private sector engagement, which contributed to creating a stable and predictable market for private investments (both domestic and foreign). Aligned with the reform objectives, both laws encouraged the competitive procurement of power and sought to promote competition among market players. Oman's electricity law also defined potential areas for market liberalization, indicating policymakers' aspirations and the likely scope of future reforms. This was a noteworthy feature of its Sector Law and enabled the market to predict the sector's developments with greater accuracy. Abu Dhabi's electricity law also envisaged similar developments (e.g., bypass sales: the sale of water or electricity by providers of production capacity to persons other than the Abu Dhabi Water and Electricity Company). However, this has not yet materialized.

- 2. Regulatory independence, transparency and consistency can signal a fair and stable long-term regulatory regime** – Traditionally, governments or governmental organizations have been given powers to regulate utility services when provided exclusively by government-owned companies. However, when reform programs are designed to encourage larger private sector involvement, the government's continued functioning in dual roles, i.e., as both the regulator and owner of state-owned companies, becomes untenable. As a result, creating a neutral sector regulator has become one of the central institutional issues of privatization



A good reform blueprint is no substitute for good legislation.

The independence, mandate and the active involvement of regulators have played crucial roles in supporting and achieving both administrations' reform agendas.

Bringing greater accountability was designed to foster high-quality regulation.

reforms. The RSB (now DoE) in Abu Dhabi and AER in Oman were established with a clear and adequate mandate to regulate the respective sectors at arm's length from the administrations. The main features of the RSB and AER's regulatory governance that helped them establish credibility in the industry were their independence, accountability, transparency and consistency.

Independence – Both the RSB and AER were made independent regulatory bodies, overseeing the laws governing their respective electricity sectors. There was no direct representation from the regulated companies or either administration in these regulatory bodies. Even in the most politically sensitive task of determining consumer tariffs, regulatory decisions were based on the core principles of economic regulation. However, as any amendments to consumer tariffs in both Abu Dhabi and Oman require the approval of their respective governments, both administrations had the discretion to indicate their preferences for keeping consumer tariffs within a specified level for any consumer category by providing a commensurate subsidy.

To add more credibility to the decisions of the AER, no government employee or adviser can be appointed a member of the AER by the Council of Ministers. The autonomy of regulators was also safeguarded by their financial independence from the government. The operations of the AER and RSB were not funded through the government's budget but were self-financed through levies or license fees for regulated firms. Regulated firms were allowed to pass the costs of these to their customers (i.e., ratepayers instead of general taxpayers) through tariffs. The AER and RSB also enjoyed significant autonomy in determining their internal governance mechanisms, voting processes and reporting requirements.

Accountability – Accountability ensures regulatory bodies take effective decisions without undermining their independence. Both the AER and RSB were designed to be accountable to two administrative branches, the executive and the judiciary. In Abu Dhabi, the RSB was accountable to the Abu Dhabi Executive Council (equivalent to a cabinet for the Emirate of Abu Dhabi) on matters that fell under its jurisdiction. In Oman, the AER reports to the Council of Ministers for its accomplishments and failures, and it is also subject to the scrutiny of the State Audit Institution. Furthermore, the decisions of the AER can be challenged by licensees in the respective court of law or arbitration.

Transparency – Regulatory bodies must be shown to be independent and transparent to all stakeholders. Maintaining a fair degree of transparency in regulatory decisions and widely sharing information also helped the RSB and AER in building their trust among stakeholders. The RSB was required to maintain a public register containing all information of public interest regarding the issuance, exemption, modification, revocation or surrender of licenses. This information is publicly available. Oman has also implemented a similar public register. Besides this, the

RSB published and the AER still publishes all major decisions and follows a public consultation process before finalizing their decisions. The details of any objections, suggestions and views from the public and regulators are also documented and are accessible to the public. The regulators (now the DoE and AER) also maintain and provide other information, including comprehensive annual reports, price control calculations, time series data on a large number of parameters, regularly updated long-term planning documents, methodological and consultation papers, regulations, and codes, among other items. This information is publicly available.

Consistency – Firms interested in doing business in Abu Dhabi and Oman are more likely to construct their expectations around the history of the regulator’s decisions. Thus, maintaining consistency can help to signal future regulatory decisions and retain, or even enhance, investors’ business confidence. For example, Law No. 2 of 1998 (Abu Dhabi) required the RSB to act in as consistent a manner as practicable when making regulatory decisions. Both laws (Abu Dhabi’s Law No. 2 of 1998 and Oman’s Sector Law of 2004) also mandated regulators to treat cases consistently and not to discriminate between regulated firms, unless the law required it. Furthermore, regulators are obliged to minimize any regulatory burden, and they must consider the costs and benefits of regulatory decisions.

3. Building regulatory capacity and responding to emergent challenges is crucial for achieving positive reforms –

Newly established bodies tasked with regulating, creating and maintaining a sustainable, self-sufficient electricity sector need to have a sound understanding of the sector’s technical functioning, as well as its economic, social and environmental impacts. To do this, new regulators need to develop the requisite expertise and regulatory tools. In the initial years of the RSB’s regulation of the electricity sector’s new structure, it focused heavily on establishing the economic principles on which the sector would operate, including the multi-year price controls for network companies, bulk-supply tariffs, and the structure and calculation of transmission pricing. The RSB also employed well-qualified staff experienced in utility regulation in other countries. It placed significant importance on developing in-house competencies for sector regulation. It also had a preference for using external advisers only where this was more cost-effective than retaining staff. The AER in Oman followed a similar approach, and it has been able to maintain a small team of highly qualified staff.

The RSB and AER also demonstrated their forward-looking visions by responding to emerging challenges driven by technological innovations, evolving environmental and social priorities, and global events. Their initiatives included (a) developing regulatory frameworks to encourage smart and electric mobility, and (b) revisiting economic, legal and technical aspects of the current regulatory framework to help integrate renewable energy. The key regulatory objective of both the RSB and AER

A wealth of information about the performance of regulated activities in Abu Dhabi and Oman is publicly available.

Ensuring consistency in regulatory decision-making is enshrined in the laws of Abu Dhabi and Oman.

The RSB and AER attached great importance to developing in-house competencies.

The need to understand emerging challenges was not overlooked.

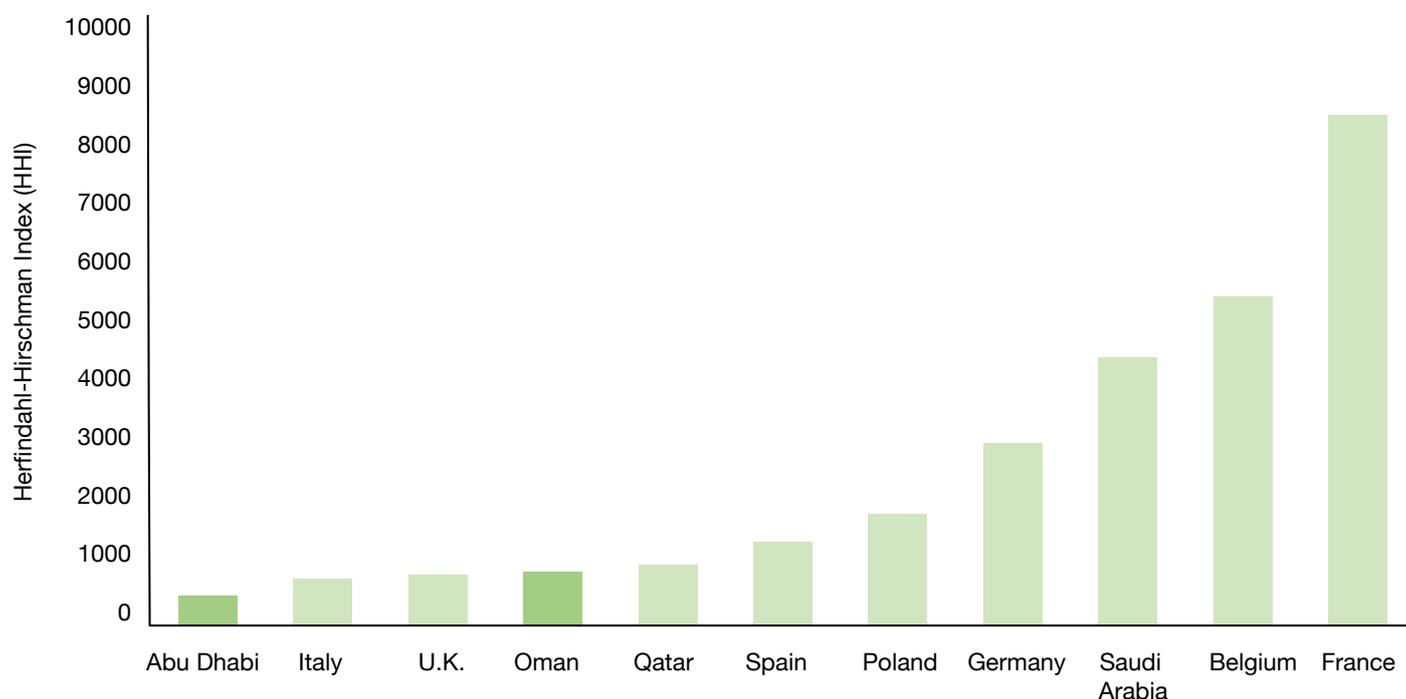
Putting a threshold on market share was a conscious decision to prevent any potential market abuse.

was to drive improvements in sector efficiency through appropriate regulation. PowerWise in Abu Dhabi and Yaseer in Oman have used public awareness campaigns to champion sustainable energy consumption.

- 4. Focusing on facilitating competition while controlling the monopolization of regulated I(W)PPs** – The liberalization of Abu Dhabi and Oman’s electricity sectors placed significant emphasis on private sector participation in electricity (and water) production. The private sector now owns nearly all the electricity generation capacity in both jurisdictions. This successful reform outcome has been widely attributed to the political support and business-friendly environment created by the coordinated efforts of regulators and policymakers. Furthermore, the mandatory floating of at least 40% (previously 35%) of the shares of generation projects on the Muscat Securities Market (MSM) also helped to develop Oman’s local stock market and benefited the wider community.

The involvement of the private sector is assumed to improve operational efficiencies compared with publicly run projects. However, if checks and balances are not put in place, the possibility of a monopolized market dominated by a limited number of private players remains. To avoid such an outcome, Abu Dhabi’s and Oman’s reform strategies included applying a market share threshold to safeguard against any market abuse. In both territories, applicants for any new capacity, or those wishing to expand their existing capacities, are not allowed to collectively own more than 25% of the market capacity without the regulator’s prior review and consent. The 25% threshold is a trigger for a regulatory review to ensure that a breach of the threshold will not result in a less competitive market. This policy has helped develop less concentrated markets in both jurisdictions. The Herfindahl-Hirschman Index (HHI) is one of the regulatory tools used to assess market power concentration. An HHI of below 1,800 indicates a less concentrated (and potentially competitive) wholesale electricity market. Abu Dhabi and Oman both have low HHI scores, providing the conditions for potentially competitive markets. However, firms in these jurisdictions only have to compete while entering the market.

Figure 2: Herfindahl-Hirschman Index for GCC and European Union member states wholesale electricity markets.



Source: (i) Computed by KAPSARC for GCC member states for 2018, and (ii) collated from various sources for European wholesale electricity markets, for various years between 2015-2017.

5. Multi-year price controls with incentive schemes improved the cost efficiencies and quality of service in the network businesses – From 1999, the RSB developed and applied a regulatory framework through a transparent consultative approach based on multi-year price controls for Abu Dhabi’s transmission and distribution businesses. However, it was constrained by the availability of timely and robust data and forecasts. Upon its establishment, the AER adopted a similar framework. Multi-year price controls, coupled with performance and output-based incentives, provided a strong driver for these businesses to reduce their costs. This could lead to a reduction in the unit costs of electricity and water and, hence, customer tariffs and/or subsidy requirements. It could also improve the quality of service provided by these companies and their system operations.

6. Retail price reforms have moved slower than expected – Abu Dhabi and Oman have made significant progress in unbundling and reforming their electricity sectors and introducing higher and, in some cases, cost-reflective tariffs for various consumer categories over the past two decades. However, electricity tariffs in these jurisdictions are still heavily subsidized for many residential consumers. The RSB and the AER enjoyed a great degree of regulatory and organizational autonomy in determining tariffs. However, any amendments to consumer tariffs required the approval of their respective jurisdictional administrations.

The pace of retail price reform has lagged behind developments in the wholesale electricity market.

The slow pace of price reforms in the retail segment highlights the challenges faced by regulators in aligning consumer tariffs with market prices or cost recovery levels.

While the wholesale electricity value chain is moving toward a more competitive market, price levels in the retail segment remain heavily regulated and below the cost of service. Achieving and sustaining the desired reform outcomes is contingent upon aligning consumer tariffs with market prices or cost recovery levels and calibrating the pace and scope of reforms in the electricity sector. However, the decision to raise consumer tariffs has always been a decision taken by the authorities. Once they decide to raise consumer tariffs, such as in Abu Dhabi in 2015, the tariffs tend to rise rapidly to reflect costs. As always, tariff reforms require careful impact assessments and timing, given their potential impact on economic growth.

Key takeaways

There is no one-size-fits-all approach to electricity market reforms. Reform design and implementation processes require customization to suit local needs. The experiences of Abu Dhabi and Oman's electricity market liberalization and privatization indicate the important drivers for successful market reform. Political commitment and support, combined with well-drafted legislation, help create a conducive atmosphere for market reform. An independent, transparent and consistent regulator plays a critical role in establishing a fair and stable long-term regulatory regime. Advances in technologies, market structure and emergent challenges require more regulatory capacity. Other factors, such as market share, must also be addressed to prevent any potential market abuse. Proper price reform is a crucial component of achieving market reform objectives.

About the commentary

This commentary series is part of KAPSARC's continuing effort to disseminate our work on Regional Electricity Market Integration in the GCC within the Energy Transitions and Electric Power Research group.

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