The Backbone: Construction of a Regional Electricity Grid in the Arabian Peninsula¹

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Abstract

This article studies the production of a power grid across six Gulf Cooperation Council (GCC) countries, known as “the backbone,” which has been conceptualized as an answer to power outages. First it analyzes how experts working with and around the GCC Interconnection Authority (GCCIA) advance claims to a regional territorial imagination. Second, it shows that the construction of the grid not only indicates a shift in the material arrangement of wires and substations, but also necessitates new understandings of transparency and a new formula for the electricity price, facilitating the cutting of government subsidies along with additional price increases. Third, it interrogates how electricity is consumed in the region. Policy-makers expected that electricity price increases would lead to lower rates of consumption. Yet after price hikes were instituted, analysts reported how they had no impact. Users behaved in ways that the grid’s engineers did not anticipate. Overall the article shows how various actors conduct “boundary work,” that is, how they set limits between the political, the financial and the

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technical while producing the backbone. The article explores how this boundary work helps stabilize a particular sociotechnical imaginary of energy security in the GCC, masking anxieties associated with a future beyond oil.

Keywords: electricity; regional grid; Arabian Peninsula; infrastructure; GCC; pricing

Energy Security in the Gulf

In June 2010, a Saudi man walked barefoot on an electric wire, drawing attention to the power cuts affecting the southwest of the country.² By climbing up a pole and straddling the wires, he foregrounded that they did not transmit electricity, and that it would take time for utilities to be restored. “The residents are fed up with the repeated power cuts that have been causing moral distress and material losses,” he responded when asked by reporters. This solitary act was reminiscent of a September 2008 protest, when hundreds of citizens gathered outside the state-owned electricity company in the northern town of Qubba to demand action to end frequent power cuts.³ The outages mostly took place during summer afternoons, when demand peaked due to air conditioning use. In an August 2014 op-ed for the English language UAE newspaper *The National*, an energy expert wondered what would happen in the case of more pervasive outages: “During last winter’s rain, I suffered a power cut. That meant evenings by candlelight, atmospheric at first but tedious after a while, and no Internet or tap water (the pump wouldn’t work). Fortunately, the weather was cool and air conditioning unnecessary. This made me reflect

² Habib Toumi. “Saudi walks on electric wire to protest power cuts,” 2010, *Gulf News* <http://gulfnews.com/news/gulf/saudi-arabia/saudi-walks-on-electric-wire-to-protest-power-cuts-1.637474>

Last accessed March 5, 2017

³ Al-Jazirah Newspaper. ‘Residents of Qubba gather to demand electricity’, 2008. <http://www.al-jazirah.com.sa/2008jaz/sep/7/fe16.htm>.

on a more serious scenario – a major interruption to electricity and water supplies across the country.’’⁴

Figure 1 Saudi Man Walks on Electric Wire. Gulf News.

One of the world’s richest regions in oil and gas reserves, the Gulf Cooperation Council (GCC) countries – namely Saudi Arabia, the United Arab Emirates, Kuwait, Qatar, Bahrain and Oman – have been confronting relatively short power outages, particularly on the Gulf coast.⁵ As

⁴ Robin Mills. “UAE energy security lies in diversification,” *The National*, 2014
<http://www.thenational.ae/business/energy/uae-energy-security-lies-in-diversification> Last accessed March 5, 2017

⁵ On Saudi Arabia’s historical relationship to its territories on the Gulf coast, see Jones, Toby Craig. *Desert Kingdom: How Oil and Water Forged Modern Saudi Arabia*. (Cambridge, MA:

The National op-ed points out, the outages have mostly been limited to the moments when demand peaks, such as summer afternoons. By comparison to other places in the world, these outages are perhaps trivial. For instance, residents of Lebanon have reported experiencing up to 20 hours of power cuts every day.⁶ Yet the outages have been significant in demonstrating that the GCC might be vulnerable in terms of its power capacity, and therefore in its ability to provide services to citizens. The sustenance of Gulf monarchies has relied on an implicit social contract between ruling families and their citizens, wherein the state remains a distributor of wealth, a position enabled by oil revenues.⁷ In this context, citizens have perceived subsidized fuel, electricity and water prices as a right. To residents of Gulf countries, power outages have shown that electricity infrastructures are unstable, leading them to make demands on state actors. The outages have also mobilized government representatives in six Gulf countries to contemplate regional solutions to this shared problem. In responding to outages, and in planning for future energy security, decision-makers in Gulf countries took unprecedented steps, investing in the production of a regional electric transmission network, while starting to deregulate their power markets to enable exchange across the peninsula. These transformations constitute what some have called an austerity program, where the GCC states try to carve out new forms of revenue to

Harvard University Press, 2010). For an older review of electricity in the Eastern Province of Saudi Arabia, see: Jamal Al-Zayer and Abdulla A. Al-Ibrahim. "Modelling The Impact of Temperature on Electricity Consumption in the Eastern Province of Saudi Arabia." *Journal of Forecasting* 15 vol. 2 (1996): 97-106.

⁶ "Lebanon power cuts lead to protests." *Utilities Middle East*, 6 Aug. 2012. Infotrac Newsstand, go.galegroup.com/ps/i.do?p=STND&sw=w&u=uarizona_main&v=2.1&id=GALE%7CA298695278&it=r&asid=f408c1cf24edc57a04963169335b3b91. Accessed 4 Mar. 2017.

⁷ For more information on the social contract in the Gulf, please see: Kristian Coates Ulrichsen. *Insecure Gulf: The End of Certainty and the Transition to the Post-Oil Era*. (New York: Columbia University Press, 2011). Also see Jones, *Desert Kingdom*.

compensate for decreasing oil prices.⁸ The production of a regional grid and the eventual marketization of electricity allow GCC states to export electricity while doing the groundwork for the removal of energy subsidies.

This article examines one of the ways in which energy security is defined and practiced in the GCC, and studies the production of an integrated power grid across six countries, known as “the backbone.” The interconnected GCC grid has been conceptualized as an answer to power outages in the Gulf. The idea for the project was conceived in 1986 by a GCC committee in cooperation with the Kuwait Research Institute and King Fahd University of Petroleum and Minerals. In 1990, the GCC committee collaborated with Gulf Investment Bank and Canadian based SNC-Lavalin to assess the financial viability of the project. These efforts resulted in the establishment of a transmission network operator, the Dammam-based organization Gulf Cooperation Council Countries Interconnection Authority (GCCIA). Yet the construction of the grid only started in 2001. The GCC states approved full-scale development in 2004, awarding seventeen tenders to international corporations. Commercial operations began in 2009 under the supervision of GCCIA.⁹ Altogether, the backbone consists of 3300 kilometers of overhead lines, seven 400 kV substations, and 37 km of submarine cables (between Saudi Arabia and Bahrain). It facilitates exchange among the six GCC countries: Saudi Arabia and Kuwait are each able to export or import up to 1200 MW from the grid, while the UAE, Qatar and Bahrain are able to trade 900 MW, 750 MW and 600 MW respectively. Oman has the lowest interconnection

⁸ See for instance, *The National* on austerity: GCC budget deficits forecast to peak next year <http://www.thenational.ae/business/economy/gcc-budget-deficits-forecast-to-peak-next-year> Last accessed March 5, 2017

⁹ Hassan K. Al-Asaad and Ahmed A. Ebrahim. “The GCC Power Grid: Benefits & Beyond” 2008, *Oil, Gas & Energy Law* 3 Available at http://www.gccia.com.sa/Data/PressRelease/Press_13.pdf Last accessed October 30th 2016

capacity, only exchanging 400 MW with the rest of the grid. In total, the project cost about \$2.1 billion dollars, an amount that has been shared by the six nations, with Saudi Arabia and Kuwait taking on more than two thirds of the sum.¹⁰

In an article published in 2006, Daniel Yergin, energy scholar known for *The Prize*, suggests that the usual definition of energy security is simply “the availability of sufficient supplies at affordable prices.”¹¹ Yet the term stretches back into the nineteenth century, and emerged in relation to mechanized warfare’s dependence on coal.¹² Currently, the term ‘energy security’ embraces a number of different – and often contradictory – elements (Metcalf 2013). For instance, Mazen Labban argues that the emphasis on homeland security and terrorist threats in the US “undermines energy security understood in its traditional sense as reliable oil supplies at reasonable and stable prices.”¹³ The varying meanings of energy security at times prevent the production of rigorous policy instruments. In engaging with this multiplicity of meanings, Abraham S. D. Tidwell and Jessica M. Smith note how energy security “is best understood as a sociotechnical imaginary, a collective vision for a ‘good society’ realized through technoscientific-oriented policies.”¹⁴ For Tidwell and Smith “energy security orients policy

¹⁰ Tawfiq Aljohani and Abdullah M Alzahrani, “The Operation of the GCCIA HVDC Project and Its Potential Impacts on the Electric Power Systems of the Region” *International Journal of Electronics and Electrical Engineering* 2, no. 3, (2014): 207-213

¹¹ Daniel Yergin, “Ensuring energy security,” *Foreign Affairs* 85, no 2, (2006), 70-71

¹² Alexander E Farrell, Hisham Zerriffi, Hadi Dowlatabadi, “Energy Infrastructure and Security.” *Annual Review of Environment and Resources* 29, no 1, (2004): 421-469

¹³ Mazen Labban, “The geopolitics of energy security and the war on terror: the case for market expansion and the militarization of global space” in *Global Political Ecology*

¹⁴ Abraham S. D. Tidwell, and Jessica M. Smith, “Morals, materials, and technoscience: The energy security imaginary in the United States.” *Science, Technology, & Human Values* 40, no 5, (2015), 692

action by enrolling a well-ordered ‘moral’ resource-efficient society within the overarching paradigm of unfettered economic growth as supplied through the state-aided advancement of energy technoscience.”¹⁵ They refute an ontological analysis, and instead contextualize energy security within particular sets of social relations.

In contemporary GCC, energy security is linked to practices and discourses around the marketization of electricity – bringing together previously unrelated elements to form an interconnected regional electricity infrastructure, which then allows for the pooling and exchange of resources across the peninsula, eventually enabling the uninterrupted use of air conditioning at minimal expense.¹⁶ Similar to water policies, electricity policies favor supply-based reforms rather than demand-based ones, aiming to increase electricity production rather than promoting a decrease in consumption.¹⁷ Generating more electricity in a context where about seventy percent of electricity is consumed by chilling technologies, decision-makers ensure the availability of infinite air conditioning to consumers without necessarily making amendments to how residents of Gulf countries cool their air.

Recent scholarship investigates the particularities of electricity infrastructures, analyzing how they impact social life in diverse geographies, such as the US, Mongolia and Tanzania.¹⁸ In these accounts, authors note how electrical energy looks and feels the same regardless of where it is generated. Yet it must be used as soon as it is generated – the supply of electricity in a network

¹⁵ Tidwell and Smith, “Morals, materials, and technoscience,” 689

¹⁶ For a description of marketization, see Çalışkan and Callon, “Economization, Part 2”

¹⁷ For water provision in the Arabian Peninsula, see Günel, “Infinity of Water”

¹⁸ For some examples of this scholarship, please see: Bakke, *The Grid*, Boyer, “Anthropology Electric,” Gupta “An Anthropology of Electricity from the Global South,” Mohsin “Wiring the New Order,” and “Lighting ‘Paradise’,” Özden-Schilling, “The infrastructure of markets,” Sneath “Reading the Signs by Lenin’s Light,” Winther, *The Impact of Electricity*

should match demand at a given time. While other commodities use existing infrastructures like roads or ports for their transport, electricity needs its own unique network, which makes its movement costly. Grid operators and utility companies work with power plants in balancing supply and demand.

In creating greater energy security for the region, GCCIA seeks to establish and operate a market for commercial trading of electricity. Currently, the organization uses the grid mainly to bridge shortages in power. Its representatives explain how the backbone has protected the Gulf states from major interruptions in the period between 2009 and 2017, indicating that the grid achieved its first goal of emergency energy provision. To them, this means that the grid is ready for the next stage, activating energy trade among GCC countries. As Laura El-Katiri suggests in an Oxford Institute for Energy Studies report, “The interconnection of the GCC countries national power grids is intended to become the backbone for systemic regional electricity market cooperation that will enable the sharing of reserve and generation capacity for the GCC countries.”¹⁹ There are plans for developing the grid beyond the GCC. For instance, conversations have been underway between GCCIA and Turkish electricity authorities.²⁰

However, marketization, the very mechanism policy-makers seek to use for stabilizing their electricity supply, creates incentives for the Gulf states to cancel subsidies, putting a higher price on electricity and risking a form of instability borne out of high price tags. Policy-makers shift the issue of electricity supply from a technical question to a financial question, displacing

¹⁹ Laura El Katiri, “Interlinking the Arab Gulf: Opportunities and Challenges of GCC Electricity Market Cooperation” *The Oxford Institute for Energy Studies*, 2011 <https://www.oxfordenergy.org/publications/interlinking-the-arab-gulf-opportunities-and-challenges-of-gcc-electricity-market-cooperation/> Last accessed November 1, 2016, p. 1

²⁰ On these conversations, see: “President of the GCCIA to Al-Riyadh: We are studying an exchange of electricity with North Africa and Turkey.” <http://www.alriyadh.com/1562949>

the problem. In this new market, residents of the Gulf may have trouble accessing power, not because of technical setbacks, but because they may not be able to pay. In this context, access to power is not only mediated by the physical infrastructures of the electricity grid but also dependent on the social and political infrastructures that constitute electricity price. The marketization of electricity creates and exposes new inequalities among inhabitants of Gulf countries.

Studying the distribution, governance and consumption of electricity provides windows into understanding one of the ways in which energy security is defined and experienced in the GCC today. It shows how various actors conduct boundary work, creating limits among the technical, financial and political aspects of the project at different points of discussing or building it.²¹ For instance, sociologist of science Thomas Gieryn defines boundary work as an “attribution of selected characteristics to the institution of science (i.e., to its practitioners, methods, stock of knowledge, values and work organization) for purposes of constructing a social boundary that distinguishes some intellectual activities as ‘non-science.’”²² In the context of the backbone, the boundary work is not about delineating limits between science versus non-science per se, but rather about creating the conditions for the separation and exclusion of the political, the financial and the technical. This separation, mobilized by actors at GCCIA, also helps stabilize a particular imaginary of energy security in the Arabian Peninsula. Through their boundary work, GCCIA representatives effaced the anxieties associated with low oil revenues and the possible political transformations that low oil revenues could generate in the region. For

²¹ For boundary work, see Bowker & Star, *Sorting Things Out* and Gieryn, *Cultural Boundaries of Science*

²² Thomas Gieryn, “Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional ideologies of Scientists,” *American Sociological Review* 48, no 6, (1983), 782

them, both privatization and securitization of energy promoted what one of my interlocutors called “political neutrality,” allowed GCC states to be beholden to one another, and made concrete their decades-long political alliances.

This article has three aims. First it seeks to analyze the construction of the regional grid in the Arabian Peninsula, foregrounding how technics and politics come together in finalizing the project, despite some actors’ refusal to recognize this co-production (Jasanoff 2004). It underlines how the grid advances claims to a regional territorial imagination, already present in GCC charters. Second, the article attempts to show that the construction of the grid not only indicates a shift in the material arrangement of cables and substations, but also necessitates new understandings of transparency and a new formula for the electricity price, and facilitates the cutting of government subsidies. Given this coevolution, I attend to the production of the grid and the production of markets concurrently. Third, it interrogates how electricity is consumed in the region. Experts writing about the Gulf expected that an increase in electricity price would lead to lower rates of consumption. Yet soon after price hikes were instituted in some GCC countries, analysts observed that they had no impact. Air-conditioners, the largest consumers of electricity, continued running at the same rate.

The Backbone

The experts at GCCIA call their regional grid “the backbone.” In an interview, Ziyad, a strategy professional who holds a degree in economics from a Canadian university and who has been working with GCCIA since 2003, explained to me that this name describes how all GCC countries establish a connection to one central electric spine, rather than becoming part of a mesh

and entering the grid by relying on each other's material infrastructures.²³ Ziyad said, "What we mean by the backbone is that all six countries are connected to one [central] link. It has a different topology. See, it's different from say Europe or Central America, where one country is linked to the other country. Ours is not like that." By relying on a shared backbone, GCC countries demonstrate that they are financially committed to each other, protecting each other's interests while making commodities such as electricity available for a shared market platform. They show how the production, export and consumption of energy hold them together. The production of this integrated power grid across six GCC countries emerges as a site for the articulation of novel forms of cooperation.

While the GCC countries are not the same in terms of political, social, and geographic make-up, they have been characterized by their dependence on fossil fuel production and export. In various charters, they have called for stronger links among member states, setting common goals for the future. For instance, an article in the updated 2001 economic agreement suggests that the six member states will "adopt integrational policies for the establishment of the infrastructure projects such as seaports, airports, desalination plants, electric power stations, and roads. These policies should aim to facilitate trade exchange between member states, realize common economic development, and interlink their economic activities."²⁴ Such infrastructure projects create opportunities for investing fossil fuel revenues domestically inside the GCC. Yet

²³ The names are pseudonyms. I thank my interlocutors for their thoughts.

²⁴ The Cooperation Council for the Arab States of the Gulf (GCC) Secretariat General: The Economic Agreement Between the GCC States Adopted by the GCC Supreme Council (22nd Session; 31 December 2001) in the City of Muscat, Sultanate of Oman Available at <http://www19.iadb.org/int/intradebid/DocsPdf/Acuerdos/GCC%20The%20Cooperation%20Council%20for%20the%20Arab%20States%20of%20the%20Gulf%20GCC%20Secretariat%20General.pdf> Last accessed October 30, 2016

given the growing size of the projects, the GCC governments have been obligated to pool their resources to finish these projects. A recent Rand Corporation report on GCC's territorial cohesion points out that regional infrastructure projects will intensify integration, and list completed or ongoing developments: "GCC states have allocated tens of billions of dollars in regional transport and industrial infrastructure, including the development of a GCC power grid uniting the power transmission and distribution systems of the region. A GCC Railway Network and new interstate highways, which are currently under construction and anticipated to cost nearly \$100 billion from 2011 through 2020, could link all six GCC member states for the first time. GCC-wide efforts to develop infrastructure to reduce the risk of food insecurity are also underway." The report also warns decision-makers in GCC countries as to the riskiness of these ventures: "However, the sheer scope of these regional infrastructure projects pose questions as to their feasibility, and failed infrastructure projects risk becoming symbols of mismanagement and waste."²⁵ In order to evade such symbols, GCC countries must keep their collaborations intact.

The backbone serves as a material realization of these considerations, and helps advance a particular territorial imaginary. Scholarship on the production of maritime trade networks, underwater cables or the Panama Canal demonstrates how transnational infrastructures emerge through deliberate negotiations of technology, politics and geography, and illustrates how they might produce new territorial imaginations.²⁶ For instance, in his book *Another Reason*, Gyan Prakash analyzes how British colonial forces in India established modern infrastructures, and

²⁵ Jeffrey Martini, Becca Wasser, Dalia Dassa Kaye, Daniel Egel, and Cordaye Ogletree. "The Outlook for Arab Gulf Cooperation," 2016. https://www.rand.org/content/dam/rand/pubs/research_reports/RR1400/RR1429/RAND_RR1429.pdf Last accessed August 14, 2018, p. 51-52

²⁶ For some examples of this scholarship, see Carse, *Beyond the Big Ditch*, Gilroy, *Black Atlantic*, Starosielski, *The Undersea Network*

posits that such infrastructures not only helped create a unified territory, but also linked India to the global capitalist economy.²⁷ In the context of the GCC as well, the construction of infrastructure not only assists with deepening territorial cohesion and regional integration, but also enables the expansion of markets.

Yet the backbone is primarily a way of sharing resources to satisfy GCC's growing electricity needs. Since its founding in 1981, GCC's electricity consumption has increased nearly tenfold, mainly due to rapid population, commercial and industrial growth. Between 2003 and 2013 electricity consumption growth rates were higher in the GCC than anywhere else around the world.²⁸ Saudi Arabia accounts for about half of GCC's consumption. UAE and Kuwait follow Saudi Arabia. Oman, Bahrain and Qatar consume less than their neighbors.²⁹

Institutionally speaking, the backbone is managed by a board of twelve delegates, with two members representing each country. Although each GCC country has different stakes in the project, every member carries the same institutional weight.³⁰ The chairmanship of this board rotates alphabetically every three years. Yet the planning committee and the operations committee, which consist of what Ziyad called "parties of the power trade," members of utility companies that have direct affiliations with the GCCIA, carry out most of the decision-making,

²⁷ Gyan Prakash. *Another Reason: Science and the Imagination of Modern India* (Princeton: Princeton University Press, 1999).

²⁸ IRENA. 2016. Renewable Energy Market Analysis. GCC Region. http://www.irena.org/DocumentDownloads/Publications/IRENA_Market_GCC_2016.pdf Last accessed March 7, 2017

²⁹ El-Katiri, "Interlinking the Arab Gulf"

³⁰ While each GCC member carries the same weight in making decisions, their ownership patterns differ. Saudi Arabia owns bulk of the project, as it invested 32% of the total capital.

and forward all recommendations to the board of directors. The Saudi Electricity Company (SEC) represents Saudi Arabia. The Abu Dhabi Water and Electricity Corporation (ADWEA) and its subsidiary the Abu Dhabi Transmission and Despatch Company (TRANSCO) represent the UAE. Its Electricity and Water Authority (EWA) represents Bahrain. Qatar General Electricity and Water Corporation (KAHRAMAA) represents Qatar. Their ministries of energy represent Kuwait and Oman. In addition to these three bodies, GCCIA runs the Advisory and Regulatory Committee, a temporary regulator consisting of members of regulators from countries that have regulators.³¹ GCCIA planned to rely on this temporary regulator until a formal, permanent regulatory body was established.

Inhabitants of the Gulf have not always been willing to share electricity. For example, when British authorities attempted to produce a unified electrical grid in the Trucial States in the early to mid-1960s, Dubai and Sharjah each wanted their own. In private communications in March 1966, British colonial officers wondered why the residents of Sharjah did not wish to receive electricity from a plant located in Dubai: “It would be interesting to know if the prejudice is conditioned solely by motives of local prestige and by genuine Ghafiri-Hinawi rivalry, jealousy of Dubai’s obvious but quite logical economic expansion, or whether those concerned really feel that they might be at the mercy of Dubai in the sense that the latter could cut off the supply or up the charges as a matter of whim.”³² The officer contemplated whether the historical rivalries that existed between these two major tribes manifested themselves in infrastructural

³¹ A regulatory body is an agency that regulates, licenses, and supervises the generation, transmission, distribution, sale, export, and importation of electrical energy. If a GCC country does not have regulators, they send representatives from another government body to sit on this committee. For instance, Qatar does not have a regulatory body.

³² Overseas Development Ministry archives folder OD 34/70 192 and 193 in Kew. Thanks to Matthew Maclean for directing me to the ODM archives.

ways. But regional integration now has benefits beyond eliminating power outages. In the context of Abu Dhabi, for instance, such integration may allow the Emirate to sell electricity produced in the Barakah nuclear power plant to its neighbors, generating a new revenue stream.³³ Some forecasts indicate that Abu Dhabi's Korean-built nuclear power plants may satisfy 24% of the GCC's electricity needs by 2040, utilizing the grid to sell this electricity to Kuwait, Qatar and Bahrain.³⁴ Tribal differences, such as the Ghafiri-Hinawi rivalry that the British officers suspected, seem to matter less as the grid becomes a profitable market for participating actors, allowing Gulf capital to move across borders effortlessly. At the same time, shared infrastructures become mechanisms for physically and politically binding these actors, and avoiding violent conflicts.

³³Caline Malek, "UAE's first nuclear power plant could begin operating by May," 2017. *The National* <http://www.thenational.ae/uae/20170122/uaes-first-nuclear-power-plant-could-begin-operating-by-may> Last accessed September 4, 2018

³⁴Yousef Almulla, "Gulf Cooperation Council (GCC) countries 2040 energy scenario for electricity generation and water desalination," 2014. KTH Industrial Engineering and Management. Unpublished Master's Thesis. <https://www.diva-portal.org/smash/get/diva2:839740/FULLTEXT01.pdf> Last accessed March 6, 2017

Figure 2 Conceptual Diagram of the Backbone. GCCIA Website.

The backbone was built in three stages. The first phase of the project concentrated on what is known as the North Grid, connecting Kuwait, Saudi Arabia, Bahrain and Qatar, and started operating in early 2009. At a cost of \$1.1 billion, this phase was the most expensive and the most complicated. Consisting of 900 kilometers of cables, the first segment of the project enabled a 400 kV AC interconnection among Bahrain, Kuwait and Qatar, three countries that share the common 50 Hz electric frequency.

Yet the GCC countries had to be inventive in connecting the seemingly incompatible Saudi grid to the rest of the region. Because American engineers built Saudi Arabia's electricity infrastructures in the early 1930s, the country uses 60 Hz electric frequency, and is different from the rest of the Middle East and Europe, which rely on the 50 Hz standard.³⁵ In ensuring

³⁵ Most parts of the world have standardized their electricity supply to either 60 hertz (U.S. and most of the Americas) or 50 hertz (Europe and most of Asia). For more information on the 50 versus 60 hertz standardization, please see: Hughes, Thomas *Networks of Power*. There are limited sources on grid construction in Saudi Arabia. Thomas Lippman's *Inside the Mirage*

Saudi Arabia's connection to the region, GCCIA had to construct the world's largest HVDC converter station, which permits sharing 1800 MW of electricity between networks that do not share a frequency. Located in Al Fadhili, an area known for its sand storms and high temperatures, approximately 100 km northwest of Dammam, the converter was built to remain in standby mode, awaiting a possible emergency, and only transmitting power between the two systems if one system suffers from a major loss. Despite problems with cooling the plant in a scorching environment, GCCIA believed that this location was efficient because of its proximity to Bahrain, minimizing the costs of laying submarine cables.³⁶ The converter also had a secondary function: It would not only allow electricity flows between Saudi Arabia and the rest of the GCC, but would also act as a buffer. In explaining the converter's significance, a Saudi electrical engineer told me how the famous New York blackout of 2003 could have been avoided

briefly discusses Aramco engineers' impact on electrification in the region. A GCCIA representative wrote to me in an email: "There really isn't any source but it is well known here that all Gulf states are running on a 50Hz system (British colony), and Saudi is running on the 60 Hz system due to the American presence in the early 30s." The only other country that uses 60 Hz in the Middle East and North Africa region is Libya. For American involvement in Saudi Arabia, see Vitalis, Robert. 2006. *America's Kingdom: Mythmaking on the Saudi Oil Frontier*. Stanford: Stanford University Press.

³⁶ Areva T&D (now Alstom Grid) supervised the construction of the converter between 2006 and 2009. Other parts of the grid were awarded to other international companies through competitive tenders. A report on the grid notes: "The six GIS substations were awarded to ABB. The back-to-back HVDC facility was awarded to Areva Cogelex. National Contracting Company was awarded the two overhead transmission line packages (Al Zour to Fadhili and Salwa to Doha) straddling the borders Kuwait/Saudi Arabia and Saudi Arabia/Qatar. HEC-MEEDCO was awarded two overhead transmission line packages in Saudi Arabia (Al Fadhili to Ghunan and Ghunan to Salwa & Ghunan to Ras Al Qurayyah). The submarine and land cable from Saudi Arabia to Bahrain (Ras Al Qurayyah to Al Jasra) was awarded to Prysmian/Nexans. The Control Centre, protection and telecommunication package was awarded to Areva-Cogelex. The overall supervision of the Project, and to act as Owner's Engineer, to assist the GCC Interconnection Authority, was awarded to SNC-Lavalin." Please see Al-Mohaisen, A., L. Chausse and S. Sud, 2007. "Progress Report on the GCC Electricity Grid System Interconnection in the Middle East," IEEE Power Engineering Society General Meeting, Tampa, FL, 2007, pp. 1-7.

if there had been such a converter in the grid – the converter would have confined the blackout to the zone where the infamous tree fell and caused an outage, precluding its expansion.

In August 2010, the UAE newspaper *The National* reported that Saudi Arabia would transform the operations of its grid in its entirety, switching from its current 127 volts to 230 volts, and bringing it in line with the rest of the GCC. The switch was expected to take about 25 years.³⁷ In an email exchange with Ziyad from GCCIA, I suggested that their organization seems to be performing the role of a corrective agent, and uniting Arab countries whose infrastructures were separated due to historical contingencies. Ziyad wrote back immediately. “Well in a ‘technical’ way yes, but not political !! [sic] Nevertheless, we are keen on expanding the role of the GCC Grid by connecting to other neighboring power pools (i.e.) Turkey, Entso-e (Europe) and the eastern Arab countries (Mashreq), and Yemen.” By underlining that they were not political actors, he indicated that these countries had always been allies, and wished to stay away from debates on governmental policies. As an employee of GCCIA, Ziyad did not conceptualize himself to be doing political work.

The second and third phases of the backbone were more straightforward. The second phase concentrated on what is known as the south grid, and consisted of strengthening and linking the electric systems of the UAE and Oman. GCCIA was not directly involved in the completion of this phase. Instead, the national power companies of the UAE and Oman handled the project. The third and final phase of the backbone, which was completed in July 2011, aimed at connecting the northern and southern grids through a corridor from Salwa (Saudi Arabia) to Silaa (UAE) then to Shuwaihat (UAE). Overall, the second and third phases of the project cost

about \$437 million, and for the first time, enabled electricity exchange across the GCC. In December 2014, *The National* reported that electricity generation capacity across the grid was 50GW for a population of almost 50 million people in six GCC countries.³⁸

Figure 3 Approximate Route and Layout of the Backbone. GCCIA Website.

³⁸ Dania Saadi. "Power swap on cards for Gulf countries," 2014, *The National* <https://www.thenational.ae/business/power-swap-on-cards-for-gulf-countries-1.654525> Last accessed August 10, 2018

Figure 4 Three Phases of Construction. Alstom Brochure, revised by the author.

Scholars analyzing the establishment of the GCC as a political body have argued that its formation in 1981 was mainly security driven, despite such concerns being largely absent from the initial charters. However, Adam Hanieh demonstrates how the establishment of this international body helped expand what he calls “khaliji-capital,” in other words Gulf capital, across national borders by refuting the dominant approach that security concerns (mainly the attempt to protect Gulf monarchies from internal and external threats posed by the growth of leftwing and Arab nationalist movements as well as events like the Iran-Iraq war and the Iranian revolution) were the primary impetus behind the formation of GCC.³⁹ He specifies the role of power generation in market formation and expansion, enumerating the energy privatization

³⁹ Adam Hanieh. “Khaleeji-capital: Class-formation and Regional Integration in the Middle-East Gulf” *Historical Materialism* 18 vol. 2 (2010): 35-76, also see Adam Hanieh. *Capitalism and Class in the Gulf Arab States* (New York: Palgrave MacMillan, 2011).

projects that have taken place across the region since 1998. According to him, these projects are expected to cost more than US\$100 billion, making GCC one of the most important power markets in the world.

Yet in thinking about power generation and the future of the region, policy-makers in the Gulf do not see securitization and market formation as two separate endeavors. Rather security concerns and market expansion appear to be the two sides of the same coin. For instance, Ziyad, the strategy expert from the GCCIA, described in an interview how the production of a grid and a common electricity market generates what he called “political neutrality” for the countries that form the GCC, where they cannot engage in military acts against each other and where they enhance securitization against other possible violent attacks on their infrastructures, mainly by creating a common network and a common market. Ziyad explained, “This grid politically signifies the true solidarity and union and cooperation between these six member states. It’s the first of its kind really. And it’s quite impressive to see that they’ve actually succeeded in forming a grid that proves that they are one. They are now very very eager on looking at other similar projects, such as a water grid, or railway transportation and interconnection as well. They’re all looking into that, and it’s possible that they’ll form something similar.” He continued, “The outcome advantage of a power grid that links member states helps prevent political differences between them that could lead to, God forbid, wars. If I get into a war with a neighbor then I’m going to lose a lot because we are gaining a lot from this power grid. It acts as a neutralizer of any political differences between member states...Let’s hope that we have a power grid that will link all nation states of the world, because that would contribute towards removing any intentions for any differences between members that could lead to wars, God forbid.” In establishing the regional electricity grid GCC countries not only produced material evidence for

their political alliance, but they also generated a shield that protects them from one another and from possible attacks by outsiders. Ziyad hoped to universalize this model, and imagined a global grid that would spread this political neutrality to the rest of the world. In the meantime, the attempt at building an electricity market facilitated an extension of khaliji-capital, possibly increasing revenues from electricity generation.

Relations between GCC countries are not always seamless, however. Most notably, in June of 2017, Saudi Arabia, the United Arab Emirates, and Bahrain, three members of the GCC, severed diplomatic ties with Qatar, arguing that Qatar backed Islamist groups like the Muslim Brotherhood and ISIS. Many commentators argued that this crisis was the result of a longstanding rivalry between Saudi Arabia and Qatar.⁴⁰ Soon after the diplomatic crisis erupted, I contacted Ziyad to ask him how the GCCIA understands the recent controversies in the GCC, and how it responds to them. He wrote back immediately: “It is a very sensitive subject which I prefer not to talk about. Here at GCCIA we do get questions of such, but we immediately refuse to respond due to its political nature.” Ziyad labeled the crisis “political,” and did not explain how it would impact the technical operations of the backbone.⁴¹

⁴⁰ For a summary of the crisis, see: Kristian Coates Ulrichsen. “Qatar: The Gulf’s Problem Child,” 2017 *The Atlantic* <https://www.theatlantic.com/international/archive/2017/06/qatar-gcc-saudi-arabia-yemen-bahrain/529227/> Last accessed August 17, 2017

⁴¹ Taha, a Saudi graduate student in Electrical Engineering at a US university, wrote to me in an email: “I have tried to search if the blockade affected GCCIA operation, but there is not any reference to this topic in both English or Arabic references, academic or non-academic. I do recall that Qatar released a statement that 45% of UAE energy is based on its gas, and that if they wanted that area to be dark, they could stop the gas shipments to UAE, but they did not out of brotherhood and respectfulness as they said. I did not verify this information, but I do know that UAE depends on gas for nearly 50% of its generation supply, so Qatar claims might be true!” For Taha, the crisis did not have any impact on the ground.

Tariq, a Saudi electrical engineer who has published articles on the technical development of the regional grid, but who nevertheless has very little impact on decision-making about electrical infrastructures, explained to me what politics means in this context by giving another example. Saudi Arabia was interested in combining its grid with Egypt, he suggested, especially because this interconnection of infrastructures and markets would have been financially rewarding. “Egypt has its peak hours during the night, they usually have a lot of lighting, lots of tourism during the night, whereas in Saudi Arabia the peak hour is in the late afternoon,” Tariq described, “It was going to be a hugely successful collaboration between the electric utilities in the two countries. But after Dr. Morsi, Mohammed Morsi, came to power in 2012, our government in Saudi Arabia decided to shut the project down. They expected that Egypt would have destabilization in its political power... I know that my government, they do not like the Muslim Brotherhood party in Egypt, so even before any problems or executive orders took place, they shut down the project for good.” The rise of Muslim Brotherhood pushed the Saudi authorities and the remaining GCC countries to reconsider their engagement with Egypt, and created incentives to work with the Turkish electrical authorities instead. It seemed like the much sought after “political neutrality” would be easier to achieve in cooperating with Turkish power companies. A connection to the Turkish power grid would act as a bridge, allowing GCC countries to sell electricity in Europe. Ziyad, the representative from GCCIA, added that one eventual goal of the project was to export electricity to Syria and Iraq, untapped markets that will need electricity when the war ends and post-conflict reconstruction starts. “Once the situation in the Middle East settles down, specially in Syria and Iraq...with those countries coming out of turmoil, it would be quite obvious that they will be very much hungry, power hungry in order to be able to rebuild their countries and economies again. GCC and

Turkey can both play a role in selling power to those countries,” Ziyad concluded, anticipating another layer of market expansion.⁴² After the Muslim Brotherhood was deposed in 2013, a connection to the Egyptian grid became viable again, evidencing how technics and politics could never be divorced.⁴³

Initially Ziyad did not want to speak of politics in the making of the backbone, doing boundary work to bracket off what he called the political, and only referring to “political neutrality.” But after the diplomatic crisis with Qatar, he labeled the issue political, and did not want to discuss how it impacts their day-to-day operations. Tariq was able to talk about what politics might mean more freely, perhaps as a result of his distance from the project and his lack of institutional involvement with GCCIA. He emphasized that the material expansion of the project necessitated certain political relations. The boundaries of the grid were dynamic, changing based on the regional political alliances. Nevertheless, they impacted how the experts working on the project conceptualized its costs and benefits, leading them to rethink the possible impact of electricity distribution.

Producing an Electricity Market in the GCC

⁴² Adam Hanieh argues that “trade relationship between individual GCC states and the international sphere cannot be understood solely through the lens of national space. Rather each Gulf state needs to be located within a regional system, which interacts with the global economy as a whole and is then articulated internally through a network of intra-GCC trade.” The backbone evidences such internationalization through regionalization. See Hanieh, *Capitalism and Class*, 127-128

⁴³ Gulf electricity-sharing grid looks at growing to Turkey
<http://www.hurriyetdailynews.com/gulf-electricity-sharing-grid-looks-at-growing-to-turkey.aspx?pageID=238&nID=72325&NewsCatID=348> Last accessed February 15, 2017

Originally intended to secure power for the Gulf countries while creating a common electricity market, the backbone eventually instigated other calls for transformation in the GCC.⁴⁴ The possible marketization of electricity required the production of not only physical infrastructure consisting of cables, wires and substations, but also a new means of information exchange and a new price formula, while leaving out subsidies, long understood to be critical in the region.

Currently, electricity markets in individual GCC countries are not unbundled, meaning services such as power generation, transmission and distribution are not marketed and charged for separately. In early 2017, Tariq, the Saudi electrical engineer who shared his expertise on the grid with me, described the transformation in Saudi Arabia by saying that they “are witnessing right now the biggest deregulation maybe in the whole world, after the late 1990s when the US deregulated its public utilities.” The government of Saudi Arabia made the necessary changes to its legal context to allow for unbundling, and introduced the Electricity Law in 2005. Although the Saudi Electricity Company (SEC) currently holds all power companies, the process of unbundling is evolving.⁴⁵ For Tariq, it was important to analyze the contemporary formation of electricity markets. He had authored a report for SEC, and was watching them adopt some of the measures that he outlined there. “Aramco has been supplying oil to SEC, and now the government has decided that Aramco can supply oil to them at the international price. They used

⁴⁴ The fiber optic cables that make up the grid can be leased to telecommunication companies, generating additional revenues.

⁴⁵ Alessandro Rubino, Maria Teresa Costa Campi, Veronica Lenzi and Ilhan Ozturk. *Regulation and Investments in Energy Markets Solutions for the Mediterranean* (London: Elsevier), 2016. also see TA Alaqeel and S. Suryanarayanan. “Examining Some Prospect Scenarios for the Electricity Grid Infrastructure Modernization in Saudi Arabia,” 2014 North American Power Symposium (NAPS), Pullman, WA, 2014, pp. 1-6.

to supply SEC at \$6-5 a barrel, they're going to need to supply them now at \$30 or \$35 a barrel...Honestly, [the electricity price] is going to be very high... we are talking here about maybe a 300 percent increase, 200-300 percent," he concluded. A pioneer in the region in regards to power sector liberalization, Abu Dhabi has adopted significant structural and legal changes since 1998, and privatized majority of its power generation.⁴⁶ As opposed to Abu Dhabi, Dubai still retains a high level of vertical integration.

Making electricity markets is a process of bringing together previously unrelated materials, which enables the conception, production and circulation of power. In studying the construction of markets, the generators, converters and the air conditioners that make up the physical infrastructure of grid and the regional coalitions, electricity prices, and diplomatic crises should be analyzed by taking their interlaced natures into account. As Jane Bennett (2010: 25) suggests, "the electrical grid is better understood as a volatile mix of coal, sweat, electromagnetic fields, computer programs, electron streams, profit motives, heat, lifestyles, nuclear fuel, plastic, fantasies of mastery, static, legislation, water, economic theory, wire and wood – to name just a few of the actants." In this process, while certain elements are drawn in, others are cut out, demarcating the boundaries of exchange.

In addition to the infrastructures I described above, the GCC electricity market fostered a call for transparency, whose absence has long been cited as one of the main reasons for low

⁴⁶ Andrew Ward, "The Legal Framework for Privatization in the United Arab Emirates," in *Privatization and Deregulation in the Gulf Energy Sector*, pp. 39-55. Abu Dhabi: The Emirates Center for Strategic Studies and Research, 1999

trading activity in the GCC.⁴⁷ In studying another transnational energy infrastructure – the Baku-Tbilisi-Ceyhan pipeline – Andrew Barry concentrates on the production of transparency, analyzes the documents that were published with the intention of making the pipeline a matter of public concern, and shows that transparency was also a means of prioritizing certain types of information over others.⁴⁸ In the context of the regional grid and electricity market, however, this question was reversed, as the commentators writing about the grid searched for means of making information available. GCCIA provided documents on its website in Arabic and English, but these documents only described the basic features of the project. If the GCC countries wished to reap the benefits of a shared market, white papers advised, they would have to change how they did business.⁴⁹ Consultants to the project understood electricity professionals not only as builders and regulators but also conveyors of information, and expected them to perform a function similar to what Özden-Schilling (2016: 71) in the context of post-deregulation American electricity markets calls “database work,” defined in her case as “generating, cleaning, and collating data,” eventually making their work publicly legible.⁵⁰ Analysts saw transparency as a significant element of marketization.

The second call was about pricing. Prices are not stand-alone economic figures that mirror objective supply and demand relations.⁵¹ Rather, they reflect the preferences of the actors

⁴⁷ See for instance GCC markets weakened by lack of transparency: study <http://www.thenational.ae/business/markets/gcc-markets-weakened-by-lack-of-transparency-study> Last accessed August 17, 2017

⁴⁸ Andrew Barry. *Material politics: Disputes along the pipeline*. (Chichester: Wiley Blackwell, 2013)

⁴⁹ El-Katiri, “Interlinking the Arab Gulf,” 26

⁵¹ Jens Beckert. “Where do prices come from? Sociological approaches to price formation” *Socio-Economic Review* 9 vol. 4 (2011): 757-786.

constructing the price and influence the behavior patterns of those who are consuming the commodities at hand. In other words, price is a composite, and as Jane Guyer emphasizes, consumers are often told how “all prices are fictions – literally the results of narratives of creation, addition, and subtraction.”⁵² Transformations in material infrastructure specifically impact the making of prices, sometimes in unexpected ways.⁵³

After the production of the backbone, regulators collaborating with GCCIA had to produce a formula for the electricity price, which would protect the interests of GCC countries, while ensuring the creation and efficiency of a regional market. Keep in mind that electricity has mostly been provided at highly subsidized rates or for free to consumers in GCC countries. As the Oxford Institute for Energy Studies suggested, the new pricing model for “scheduled capacity transfers of electricity [would be] based on a formula that includes a fixed or variable percentage of total volumes traded, as a wheeling charge payable to the transmission system operator (the GCCIA) plus a variable indexed shadow fuel price reflecting the actual generation costs in each country, rather than the price charged to the domestic electricity customers in that country.”⁵⁴ By taking into account actual generation costs in each country, as opposed to the tariffs charged to domestic consumers, the new price would help create an effective market for regional trade among GCC members. But while doing so, it would challenge the energy subsidies that the GCC governments have granted their citizens, and have significant social implications for the countries involved.

⁵² Jane I. Guyer, “Composites, Fictions and Risk: Toward an Ethnography of Price.” In *Market and Society: The Great Transformation Today*, 204

⁵³ For this point, see Besky, “The Future of Price”

⁵⁴ El-Katiri, “Interlinking the Arab Gulf,” 25

GCC member states have long subsidized their utility sectors, making below international market prices available for residential and commercial consumers as well as power generators.⁵⁵ Yet a regional market would challenge this arrangement. First, the export of electricity priced at levels based on subsidized fuel price would pull prices down drastically and prove uneconomic. Second, if they used the lower price that they used for domestic consumption, the GCC countries would end up exchanging subsidies with each other and make welfare available for each other's citizens. This condition would be even more undesirable if the grid were to grow, including Turkey and Europe within its scope. Due to these reasons, the price for regionally exported electricity had to be based on the actual costs incurred by exporting countries, including the opportunity cost of not having exported the fuel used for power generation to international markets.⁵⁶ In the case of agreements on long-term supplies of electricity, the pricing formula would also include an additional capacity charge paid to the exporting country or utility for the medium to long-term provision of additional capacity.⁵⁷

The production of a new price formula would have effects beyond the electrical transmission network, transforming the terms through which GCC countries constructed economic relations with their citizens and their non-citizen residents. The electricity price would call into question GCC citizens' perception that subsidized cheap fuel, electricity and water

⁵⁵ Although electricity prices have increased, the governments in the GCC are still covering the bills. Please see: "Qatar government foots \$642m bill for home electricity each year" <https://dohanews.co/qatar-government-foots-642m-bill-for-electricity-each-year/> Last accessed February 20, 2017

⁵⁶ By emphasizing how price should reflect actual costs of generation, these consultants join a global debate on electricity retail. For instance, critics of dynamic electricity pricing argue that charging different prices for electricity at different times of the day challenges the attempt to make costs explicit. Thanks to Canay Özden-Schilling for this reminder.

⁵⁷ El Katiri, "Interlinking the Arab Gulf" offers a rigorous discussion of this pricing scheme.

prices is a right. It would reorganize the social contract that the GCC governments appeared to have with their constituents, facilitate conversations on the elasticity of electricity consumption, and generate new challenges for policy-makers. The formula would act upon the transmission network, and embed economic action in social life in a radically different way.

The Subsidies Conundrum

Given their shared dependence on fossil fuel production, export and consumption, the GCC economies are sensitive to transformations in oil markets, and the governments have been making plans to decouple economic welfare from oil prices.⁵⁸ This dependence is most starkly evidenced by a search for alternative revenues, especially during periods when oil prices are low. An important transformation occurred in 2015, when the GCC countries eliminated energy subsidies, sums of money granted by the governments to ensure that energy prices remain low, and began to implement electricity and water pricing reforms. Frank Kane, writing for the UAE newspaper *The National*, reported how “the UAE will extend its economic diversification strategy by removing further subsidies on energy.”⁵⁹ Suhail Al Mazrouei, the UAE’s Energy

⁵⁸ See for instance, Government of Abu Dhabi. 2008. “The Abu Dhabi Economic Vision 2030.” Also note Hertog’s observation on the nature of economic diversification projects: “Much of the diversification in the GCC since the early 2000s has been state-driven, often by state-owned enterprises reliant on sovereign guarantees and capital injections and supported by heavy state infrastructure spending. This “diversification” strategy has ironically deepened the state dependence of local economies in many sectors. These capital-intensive diversification policies are likely to suffer first in an age of prolonged austerity.” See Steffen Hertog, “The GCC Economic Model in the Age of Austerity,” in *The Gulf Monarchies Beyond the Arab Spring: Changes and Challenges*, eds. Luigi Narbone and Martin Lestra (Florence: European University Institute, 2015), p. 10 www.ecouncil.ae/PublicationsEn/economic-vision-2030-full-versionEn.pdf Last accessed October 30, 2016

⁵⁹ Frank Kane. “UAE to cut remaining energy subsidies, minister says” 2016 *The National* <http://www.thenational.ae/business/economy/uae-to-cut-remaining-energy-subsidies-minister-says> Last accessed August 17, 2017

Minister, spoke to an audience at the World Economic Forum in Davos, explaining that they “need to think about major reforms to make the budget less dependent on the oil price, and to build an economy that is vibrant but also taking advantage of the lower oil prices.” The GCC countries sought alternative sources of revenue, which would especially help during periods of low fossil fuel prices. They began curbing public spending, initiating what some have called an austerity program,⁶⁰ while simultaneously supplementing diminishing oil revenues by exploring previously unexplored sources of income, and looking into privatizing certain key infrastructures.⁶¹

The GCC countries have accordingly implemented energy pricing reforms, promoting price increases, and in some cases, affecting a wide range of fuels.⁶² In August 2015, the UAE fully liberalized its gasoline and diesel prices, introducing a pricing mechanism where domestic prices are set on a monthly basis and remain directly linked to international prices.⁶³ Soon after this move, in January 2016, Abu Dhabi announced electricity would cost 31.8 fils

⁶⁰ Mark Townsend. “New Reality in The Gulf: Austerity Nations slash subsidies in the face of cheap oil and regional conflicts,” 2011 <https://www.gfmag.com/magazine/december-2015/new-reality-gulf-austerity> Last accessed March 1, 2017

⁶¹ Hertog, “The GCC Economic Model in the Age of Austerity”

⁶² For an analysis of the price reforms please see “Striking the Right Balance? GCC Energy Reforms in a Low Price Environment” <https://www.oxfordenergy.org/publications/striking-right-balance-gcc-energy-reforms-low-price-environment/> Last accessed November 11, 2016

⁶³ For now, subsidies for natural gas remain in place. For more information on the elimination of energy subsidies, please see Griffiths Steve and Tim Boersma. 2016. “Reforming Energy Subsidies: Initial Lessons from the United Arab Emirates” Brookings Institute <https://www.brookings.edu/research/reforming-energy-subsidies-initial-lessons-from-the-united-arab-emirates/> Last accessed February 17, 2017

(USD0.09)/kWh for expatriates living in villas and using more than 200 kWh/day.⁶⁴ In this context of disappearing subsidies, Kuwait set itself apart by retaining its original strategies. In January 2015, when the Kuwaiti government increased diesel, kerosene, and aviation fuel prices, political opposition forced the government to reinstate the old prices.⁶⁵ In April 2016, when the Saudi state unleashed its first round of electricity price increases, some citizens used social media to express their discontent. The government responded by firing the Minister of Electricity and Water, but did not change its policies on subsidy reform, arguing that they needed to restructure the economy by generating new revenue streams.⁶⁶ Saudi Arabia announced it would institute new price increases in 2017, cutting not only its energy and water subsidies, but also possibly eliminating the subsidies for bread and tripling its price.

While price increases would ensure that the domestic energy charges remained among the cheapest in the Middle East, cutting subsidies and putting a higher price on electricity and water would nevertheless induce a fundamental shift in the GCC countries' relationships to their citizens.⁶⁷ As the Kuwait case demonstrated, the production of a larger electrical grid, and the following price increases could trigger protests. White papers argued that low energy and water

⁶⁴ A flat rate is applied for consumption of up to 200 kWh/day. The fact that cost-reflective prices only begin at a very high consumption of over 200 kWh/day demonstrates that there is space for promoting efficient electricity usage. For a comparison, consider how an average American household consumes roughly 30 kWh/day:
<https://www.eia.gov/tools/faqs/faq.cfm?id=97&t=3>

⁶⁵ MEES (2016), 'Kuwait Delays Implementation on Planned 22% Subsidy Cut', 5 Feb, 59(5).

⁶⁶ Carey Glen and Zaid Sabah. "Saudi King Fires Water Minister After Complaints Over Tariffs," 2016 *Bloomberg* <https://www.bloomberg.com/news/articles/2016-04-24/saudi-king-fires-water-minister-after-complaints-over-tariffs> Last accessed March 6, 2017

⁶⁷ Environmental professionals have been pushing for the increase of electricity and water prices for some time, mainly with the intention of lowering consumption. For an overview of consultants demanding higher water prices, see Günel, 2016.

prices were fundamental to social contracts in the region. An Oxford Institute of Energy Studies report on subsidies wrote, “Low energy prices have been a central element of the implicit social contract between the rulers and the citizens, and are seen by many as one of the methods of rent distribution.”⁶⁸ A Chatham House report linked the question of electricity to issues of access and poverty, making class a matter of concern: “Exclusion from access to electricity is very sensitive, whether it is the result of lack of physical supply because the absence of grid supplies is not offset by small-scale generation, or the result of prices that are too high for certain groups of consumers.”⁶⁹ A more recent Chatham House report noted how “Along with the fiscal constraints created by lower oil prices, [a] cyclical downturn in opposition activism has given the Saudi authorities a window of opportunity to push through unpopular economic policies. Since 2014 the government has imposed a number of austerity measures that have been dramatic by Saudi standards, including hikes to water prices.”⁷⁰ These analysts wondered if a price hike would lead to social and political instability in the region, and questioned what a new social contract may look like.

During a telephone interview in early 2017, I asked Ziyad, the GCCIA employee I mentioned above, if he agreed with these reports and if he feared future political instability in the

⁶⁸ Bassam Fattouh, Anupama Sen and Tom Moerenhout. “Striking the Right Balance? GCC Energy Reforms in a Low Price Environment,” 2016
<https://www.oxfordenergy.org/publications/striking-right-balance-gcc-energy-reforms-low-price-environment/> Last accessed February 17, 2017, p. 2

⁶⁹ Glada Lahn and Paul Stevens. “Burning Oil to Keep Cool - The Hidden Energy Crisis in Saudi Arabia,” 2011. Chatham House
<https://www.chathamhouse.org/publications/papers/view/180825> Last accessed August 25, 2017, p. 20

⁷⁰ Jane Kinninmont. “Vision 2030 and Saudi Arabia’s Social Contract Austerity and Transformation,” 2017. Chatham House
<https://www.chathamhouse.org/sites/files/chathamhouse/publications/research/2017-07-20-vision-2030-saudi-kinninmont.pdf> Last accessed August 26, 2017, 5

region due to the elimination of subsidies. He evaded the question by saying how “this was getting too political.” For him, this discussion would sidestep a conversation that more or less remained an exchange of facts about the historical progression of the backbone, and enter a slippery and ambiguous zone. Yet when studying such debates, it is important to ask why they deserve to be labeled political and how this label transforms the ways in which the debate evolves. Electricity price “was getting too political” mainly because it was recognized as a significant and possibly destabilizing actor. Given historical and geographic power relations that produced the Gulf, this recognition was perhaps not so surprising.

The status of electricity price as “political” underlined that the capacity of the electrical grid as an infrastructure in particular, and the permanence of the GCC in general was not taken for granted. The work on anthropology of infrastructure has shown how, as Nikhil Anand puts it, “citizens are formed through the historic, political, and material relations they make” with infrastructures, and that “these relations constantly have political effects that exceed human intentionality, thought, and action.”⁷¹ In this context, various consultants and policy makers worried that the austerity measures and resulting price increases would impact the meaning of citizenship in a dramatic way, leading to a de-legitimation of the governments in power. The new grid had perhaps eliminated the technical problems associated with electricity provision, but a hike in electricity prices could create instability, impacting the political and economic relations that the GCC countries had cultivated with their citizens since their establishment. Electricity price became political because it was a force that could potentially create volatility and disturb an existing equilibrium. By doing boundary work, and labeling electricity price political, and

⁷¹ Nikhil Anand. *Hydraulic City*. (Durham: Duke University Press, 2017), 7-8

therefore off limits for our conversation, Ziyad also masked a larger anxiety about the future of the GCC monarchies beyond oil.

In January 2018, eleven Saudi princes responded to the elimination of water and electricity subsidies for members of the royal family by staging a protest in Riyadh, and were put in the maximum-security al-Hayer prison. The transformations that Mohammed bin Salman has been spearheading, including attempts to generate new streams of revenue through programs such as a value-added tax (VAT), have attracted attention from the media. VAT would be applied to a range of commodities, including water and electricity bills. “There are people with different opinions, but overall in the long run it’s a beneficial thing to reduce subsidies,” Ziyad said, and added that he did not wish to speak about the issue any longer by repeating, “that’s getting really political.”

Taha, a Saudi PhD student in Electrical Engineering at a US university, who has published articles about electricity in the GCC region and who does not participate in policy making about electricity in Saudi Arabia, alerted me to the new cash transfer program that Saudi Arabia has developed to safeguard its political stability in the absence of subsidies. Taha followed the transformation of policies closely, as he tried to assess the possibility of a future for himself in Saudi Arabia. He agreed that this was a politically significant issue, which would impact individuals differently. The “Citizens Account Program” which the Saudi state would roll out in 2017 as it cancels subsidy programs would be a way in which citizens would remain protected from increasing energy prices. The government would provide direct financial support to households affected by the new measures. “In exchange for the increasing prices in electricity rates, the government is going to provide support,” Taha said, “if they’re a low income family, they’ll receive more help in order to cope with the difference in prices...Many people have no

knowledge about how electricity is produced and distributed, it is going to be very difficult to explain to them why you are increasing prices.” Still, Taha agreed, this would produce new divisions within Saudi society. Based on 2016 estimates, Saudi population constitutes 20 million nationals and 11 million non-nationals.⁷² The power and water subsidies had provided cheaper resources for all residents of Saudi Arabia, but the Citizen Account Program would only benefit citizens, forcing immigrants to abide by the new price increases. “I expect that quite a big chunk [of foreigners] will leave the country, and they have started to do it, but there can be a mass emigration,” Taha concluded.

Reports have also come out on the effects of price hikes in the UAE. It is important to note that energy economists have mainly authored these reports, as their centrality in the conversation further evidences the shift from the technical to the financial. Soon after the price increases were instituted, think tanks inside and outside the Gulf started analyzing the impact of the hikes on consumption. Some argued that electricity and water prices were not elastic. The majority of the people in the GCC considered electricity and water fundamental necessities, and would not lower or regulate their consumption in correlation with prices. Earlier in the 2000s, Abdul Razak Al-Farisa, an economist from the UAE University, pointed out how “for the income and price policies to be effective, they have to include an element of shock; the changes have to be significant.”⁷³ Yet a 2015 study from the King Abdullah Petroleum Studies and Research Center (KAPSARC) underlined the dangers of assuming low price elasticity for energy

⁷² See the Kingdom of Saudi Arabia General Authority for Statistics Mid-2016 Chart on Population by Age Groups, Gender and Nationality (Saudi/Non-Saudi) https://www.stats.gov.sa/sites/default/files/estm_pop_2016_4.pdf Last accessed February 17, 2017

⁷³ Abdul Razak F Al-Farisa. “The demand for electricity in the GCC countries” *Energy Policy* 30 vol. 2, (2002), 123

demand in the region. There was little empirical evidence to analyze how different household types may respond to fluctuations in price.⁷⁴ Another study by Steve Griffiths and Tim Boersma from Masdar Institute argued that in the short run demand would remain generally inelastic, while over the long run it would be influenced by increases in price.⁷⁵

Although decrease in volumes of consumption had not been the ostensible goal of electricity price hikes, environmental professionals hoped for this effect.⁷⁶ However, the debates that followed the elimination of subsidies challenged the notion that economic interests would dictate new frugal consumption patterns. For instance, discussing clean energy in the UK, Joshua Reno argues how carbon price “seeks to motivate individuals through financial incentives [rather than merely force compliance].”⁷⁷ For Reno, “such policies rely on assumptions about how individuals can be motivated to act in accordance with policy directives. Economic interests, it is thought, can be harnessed as a political mechanism to bolster green virtues; the assumption being that the actors in question possess a desire for wealth that can be channeled into reform.”⁷⁸ The case of electricity and water pricing in the GCC, however, showed that these assumptions might not always hold, and proved how the idea that higher prices will lead to lower consumption

⁷⁴ KAPSARC. 2015. “Models for the economies and energy systems of GCC countries: Current development and a path forward” <https://www.kapsarc.org/.../models-for-the-economies-and-energy-systems-of-gcc-co> Last accessed February 17, 2017

⁷⁵ Griffiths and Boersma, “Reforming Energy Subsidies”

⁷⁶ Gengler and Lambert also note how the removal of subsidies and the related price hikes “undoubtedly stemmed from perceived fiscal necessity far more than from a redoubled concern for the environment.” See Justin Gengler and Lambert, Laurent A. 2016. “Renegotiating the Ruling Bargain: Selling Fiscal Reform in the GCC” *The Middle East Journal*, 70 vol. 2 (2016): 321-329.

⁷⁷ Joshua Reno. “Motivated Markets: Instruments and Ideologies of Clean Energy in the United Kingdom.” *Cultural Anthropology* 26 vol. 3 (2011): 389–413, p. 390

⁷⁸ Reno, “Motivated Markets,” 390

patterns is rooted in a particular social context. In some ways, the perceived inelasticity of water and electricity consumption in the GCC demonstrated that consumers make calculations based on values that may not always be directly linked to price, and which may not be reconfigured as “green virtues”. In this sense, the perceived inelasticity of the electricity price showed how consumers’ interests were not given. Rather, they were calculated by relying on culturally anchored frames of meaning.⁷⁹

Reflecting on this inelasticity, energy economists Attalla and Hunt commented that if policy-makers wished to lower consumption they “would need to improve the efficiency of appliances and increase energy using awareness of consumers, possibly by education and marketing campaigns.”⁸⁰ In this way, energy economists would attach electricity consumption to a particular materiality and challenge the abstraction of electricity as an invisible good. Another possible solution was to raise prices, as Attalla and Hunt proposed, “so high that expenditure on electricity becomes such a large proportion of income that the price elasticities increase (in absolute terms).”⁸¹ Energy economists therefore challenged the existing formula for electricity price, and proposed an update, which would register the value of a price shock – an explicit force that would shake people out of their old habits. This meant that price would no longer be purely attached to the material features cited above: “a fixed or variable percentage of total volumes traded, a wheeling charge payable to the transmission system operator (the GCCIA) plus a variable indexed shadow fuel price reflecting the actual generation costs in each country, rather

⁷⁹ Donald MacKenzie, *Material Markets: How Economic Actors Are Constructed* (Oxford: Oxford University Press, 2009)

⁸⁰ Tarek N. Atallaa and Lester C. Hunt. “Modelling residential electricity demand in the GCC countries” *Energy Economics* 59 (2016), 157

⁸¹ Atallaa and Hunt, “Modelling residential electricity,” 157

than the price charged to the domestic electricity customers in that country.” Instead, it would include a new abstraction – the potential of a price shock. While the energy economists thought of these moves together, conceptually the two proposals were contradictory – first, they wanted to raise awareness of material conditions among users, and second, they included a new component in the price formula, which was detached from the material conditions of producing electricity.

Conclusion

This article intended to provide windows into one of the ways in which GCC policy-makers conceptualize energy security, specifically by investigating the production of the backbone. In response to increasing electricity consumption in the region, decision-makers in the GCC, such as GCCIA employees, have concentrated on satisfying demands through supply-side policies, focusing on the construction of a regional electricity grid and market. In essence, these innovations have shifted the question of electricity provision from technical to financial – decision-makers imagined that the new grid would enable Gulf countries to share electricity across the region, eliminate power cuts, and facilitate a restructuring of electricity markets. After the construction of the regional grid, in an era of low oil revenues, electricity price emerged as an incipient matter of concern for various actors in the region, such as energy economists and environmental consultants, making this displacement from technical to financial more explicit. In this new configuration, questions of political stability, which were once associated with the availability and sturdiness of physical infrastructures,⁸² are made financial – triggering countries like Saudi Arabia to transfer cash directly to their citizens.

⁸² See Jones, *Desert Kingdom*

Scholars have long paid attention to questions of the production and maintenance of infrastructures, exploring the social relations they engender.⁸³ Following this lineage, this article demonstrates how the backbone reorganizes market and society relations in the Gulf, and analyzes how the material operations of electricity technologies are entangled with political processes. In doing so, it investigates the political rationalities that motivate decision-makers to build a regional grid, while also pointing to how the presence of a grid gives birth to political rationalities of its own making. Yet in addition to these technopolitical relations, the production of the grid unveils imaginations regarding a future without oil revenues in the Arabian Peninsula, indicating how life without oil revenues would generate new types of citizenship, calling into question existing social contracts.⁸⁴ Beyond their functional qualities, it is important to note that infrastructures serve as affective devices, in this case symbolizing ruling families' anxieties about such possible political transformations.

A common definition of energy security is “the availability of sufficient supplies at affordable prices.” An analysis of the construction of the regional electricity grid and the related attempts at creating an electricity market demonstrates how energy security in the GCC is about the reformulation and reconstitution of a sociopolitical network with renewed economic terms, which may eventually challenge existing social contracts.

⁸³ For examples of this scholarship, see Barry, *Material politics*, Callon, *Laws of the Markets*, Latour, *Aramis, or the Love of Technology*, Mitchell, *Carbon Democracy*

⁸⁴ On post-oil politics in the Gulf, see Günel, *Spaceship in the Desert*, and Limbert, *In the Time of Oil*

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