

Al-Saidi, Mohammad

**Article**

## Instruments of energy subsidy reforms in Arab countries: The case of the Gulf Cooperation Council (GCC) countries

Energy Reports

**Provided in Cooperation with:**

Elsevier

*Suggested Citation:* Al-Saidi, Mohammad (2020) : Instruments of energy subsidy reforms in Arab countries: The case of the Gulf Cooperation Council (GCC) countries, Energy Reports, ISSN 2352-4847, Elsevier, Amsterdam, Vol. 6, Iss. 1, pp. 68-73, <https://doi.org/10.1016/j.egy.2019.08.020>

This Version is available at:

<https://hdl.handle.net/10419/243712>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by-nc-nd/4.0/>

6th International Conference on Energy and Environment Research, ICEER 2019, 22–25 July,  
University of Aveiro, Portugal

# Instruments of energy subsidy reforms in Arab countries — The case of the Gulf Cooperation Council (GCC) countries

Mohammad Al-Saidi

*Center for Sustainable Development, College of Arts and Sciences, Qatar University, Doha 2713, Qatar*

Received 16 July 2019; accepted 16 August 2019

---

## Abstract

Energy subsidies can account for a large share of government expenditures in some GCC countries. In light of fiscal imbalances since 2014, these countries have reiterated their intention to decrease subsidies and substitute them with more targeted support systems. This paper briefly outlines the extent of energy subsidies. The scope and the drivers of the subsidy reform agenda are outlined, citing recent literature. Some instruments are explained such as adjustment of electricity or water tariffs, increasing of fuel prices, and compensation of citizens through cash transfers. However, the adopted reforms are not yet comprehensive and do not alter the social contract of rentier states.

© 2019 Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the scientific committee of the 6th International Conference on Energy and Environment Research, ICEER 2019.

*Keywords:* Energy subsidies; Utility tariffs; Arab countries; Gulf Cooperation Council; Energy efficiency; Energy sector reforms

---

## 1. Introduction

Energy subsidies are commonplace across developed and developing countries. Post-tax subsidies accounted for around \$5.3 trillion, or 6.5%, of global GDP in 2015, while they can reach about 13%–18% of GDP in developing countries in Asia, the Middle East and Northern Africa (MENA) region, or the Commonwealth [1]. Such subsidies refer to fossil fuel subsidies that can target fossil fuels or electricity prices, leading to reductions in energy costs for consumers or producers, or a revenue increase for energy suppliers [2]. In this sense, energy subsidies are consumer- and producer-based. They imply any preferential treatment of fossil fuel producers or the fact that consumers are paying low prices in comparison to the full economic costs [3].

While producer subsidies can be hidden and difficult to quantify, the measurement of consumer subsidies is straightforward simply through comparing the prices paid to prices considered to be efficient [1]. Efficient consumer prices should account for the supply cost, but so also should externalities that are usually accommodated through corrective or “Pigouvian” taxes. Other taxes such as value-added taxes (VAT) or general sales taxes (GST) are often added to energy consumer prices to raise revenues. Pre-tax consumer energy subsidies therefore apply when

---

*E-mail address:* [malsaidi@qu.edu.qa](mailto:malsaidi@qu.edu.qa).

<https://doi.org/10.1016/j.egyr.2019.08.020>

2352-4847/© 2019 Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the scientific committee of the 6th International Conference on Energy and Environment Research, ICEER 2019.

---

consumers pay less than the supply cost, while post-tax consumer subsidies apply if the price is lower than the supply cost plus the mentioned taxes. While calculating this so-called price-gap can give an estimate of consumer subsidies, there are other measurement approaches for different kinds of consumer and producer subsidies, e.g., quantifying specific support programs, financial transfers, or externalities [4].

The justification for different forms of energy subsidies varies from one case to another and includes arguments related to political economy, social welfare, and history. The controversial debates involving reforming these subsidies need to be understood in the context of raising fiscal deficits, energy scarcity, and the environmental externalities or damages of energy subsidization. In fact, on a global level, the elimination of post-tax energy subsidies can result in \$2.9 trillion in government revenues and a reduction of carbon dioxide emissions by 20% [1]. The concrete country-level impacts of recent energy subsidy reforms on fiscal imbalances, welfare, and employment have been investigated in several studies in the MENA region (e.g., [5,6]) or the countries of the Gulf Cooperation Council (GCC) (e.g. [7]). The GCC countries represent an illustrative case of the complex political economy of energy subsidies in terms of political drivers, economic costs, and reform needs. This paper outlines the challenge, explains the experiences, and presents the drivers, the reform agenda, and its instruments in the overall context of socio-economic and environmental change in the region.

## 2. Omnipresent subsidies and uneven reforms experiences in the MENA region

The MENA region holds the highest share of global pre-tax energy subsidies, at around \$237 trillion (48%) of global subsidies in 2011, accounting for around 9% of the region's GDP [8]. At the same time, energy resources are abundant, except in some countries such as the net oil-importing countries (Morocco, Tunisia, Egypt, Jordan, and Lebanon). For the other net oil-exporting countries, hydrocarbons represent the main export goods in the region, accounting for more than 80% in half of the MENA countries, and above 60% in the others except for the United Arab Emirates (UAE) [9]. In 2013/14, energy subsidy expenditure accounted for around 20% of government spending in Egypt and 30% in Yemen [5].

In fact, energy subsidies in the MENA region significantly exceed food subsidies (e.g., 0.7% of GDP in 2011), and are divided into subsidies on petroleum products (50% of pre-tax energy subsidies), electricity (26%), and natural gas (23%) [8]. These subsidies can, however, result in serious fiscal troubles in net importing countries, increase vulnerabilities to global oil prices in net exporting countries, and lead to, in comparison to other developing regions, above-average energy intensities of consumption [8]. With a higher energy intensity, higher carbon emissions and environmental damage can be expected. El-Katiri and Fattouh [5] explained some of the adverse impacts of energy subsidies such as revenues losses, underinvestment in energy infrastructure, the relatively higher share of subsidies to the non-poor households, energy smuggling due to price differences among countries, or distortions in local energy markets. Another adverse impact is on the development of renewable energy markets in the region. For example, Poudineh et al. [10] reviewed the obstacles to the deployment of renewables in the region and suggested a combination of market liberalization efforts through a gradual removal of subsidies and the provision of investment incentives for renewables.

Overall, phasing out energy subsidies can have important positive spill-overs on fiscal balances, consumption levels, ecological concerns, and the deployment of clean technologies. In this context, governments in the MENA region have recently started to reconsider energy subsidies. Verma [11] reviewed the history of these reforms, in particular the reform waves in six countries: Iran (2010), Yemen (2010–2014), Jordan (2012), Egypt (2014), Morocco (2013–2014), and Tunisia (2012–14). Some drivers behind these reforms are energy price volatility, the fiscal troubles of MENA countries, a worldwide push for energy subsidy reforms, and the availability of fiscal space for compensating vulnerable groups through welfare transfers [12].

Subsidy reforms in the MENA region are still underway, while some countries have reversed some of the reforms due to resistances and political turmoil. For example, in June 2018, Egypt decided to cut electricity subsidies leading to a rise in tariffs of around 26%, while all subsidies are due to be phased out by 2021–2022. In Jordan, the government had to abandon plans to raise income tax together with increases in fuel and electricity prices due to widespread protests in June 2018, which ousted the cabinet that proposed these plans. Another example is the contribution of subsidy reforms to the rise of the Houthis who took over the government in Yemen in 2014, leading to the intervention of a military coalition led by Saudi Arabia, and consequently the current civil war. Al-Weshali et al. [13] examined how the reduction of diesel subsidies from 40% to 60% in the period after 2011 led to significant revenue losses among farmers and fueled regional political tensions. As a result, these subsidies

were used for mobilizing protests, thus contributing to the armed uprising of the Houthi rebels. Political tensions due to subsidy reforms were also observed in other MENA countries. As a result, energy subsidy reforms were neither comprehensive nor followed through in many cases in the MENA region (see cases in [5,6]).

### 3. Rentier states under pressure — the case of the GCC

The GCC region belongs to the group of world regions with the highest energy reserves and the highest subsidies and intensities. The GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE) jointly hold around 40% of global oil reserves and 20% of gas reserves [14]. Table 1 gives some key data on energy subsidies in the region for the years 2014 and 2016, which represent the core subsidy reform period. Low energy prices affect the energy efficiency scoring of GCC countries. In fact, due to the substantial subsidies on electricity, gasoline, and diesel, the GCC region performs lower in energy efficiency indices than the Levant countries or North African countries in the MENA region [9]. Furthermore, due to the high-energy-intensive manufacturing sectors in the region, energy intensity in GCC countries is quite high, being at least double the OECD average in all countries [15].

**Table 1.** Energy subsidization data in the GCC region in 2016.

Source: International Energy Agency.

Country	Average subsidization rate (%)		Subsidy per capita (\$/person)		Total subsidy as share of GDP (%)	
	2014	2016	2014	2016	2014	2016
<i>GCC countries</i>						
Bahrain	60	38	1697	740	6.7	3.2
Kuwait	81	62	2528	1132	5.1	4.1
Oman	64	–	1775	–	9.0	–
Qatar	69	24	2754	441	3.0	0.6
Saudi Arabia	79	52	2428	992	9.5	4.6
UAE	55	37	1868	793	4.4	2
<i>Other countries</i>						
China	2.2	4	13	27	0.2	0.3
India	17	6	30	10	1.9	0.6
Iran	82	65	994	435	19	9.2

The drivers behind the high energy consumption in the GCC region are related to low prices rendered to citizens by so-called “rentier states”. The tribal rentier institutions of the GCC countries have successfully granted welfare benefits and public services for free or low prices as some forms of “grants by the rulers”. In this special case, energy subsidization is less related to poverty or social welfare aspects and more to the basic social contract of these rentier states [7]. The state involvement is also strong in the water sector through desalination of seawater. For many decades, rulers of GCC states chose to portray their kingdoms as “hydro states” utilizing technology and energy reserves to provide cheap potable water for their citizens (see [16]). As a result, the combination of high water and energy subsidization has long hindered market-based competition and limited ecological modernization in the region [17].

The high energy consumptions and intensities in the region are also caused by the hot and dry climate, which induces energy-intensive water and food production systems [18,19]. In fact, around 4%–12% of total electricity production is used for desalination [20]. At the same time, electricity consumption for desalination will triple in the MENA region by 2030 due to rising demands by growing populations and economies [21]. Furthermore, cooling is the lead sector for electricity consumption in the region, e.g. 80% of total electricity consumption in Saudi Arabia [22]. With population and economic growth, the bill for subsidies is rising, a fact that has driven GCC governments to rethink the lavish energy subsidies by exploring energy efficiency and technological measures to curb the rising emissions, and by initiating measures to decouple economic growth from environmental degradation [23].

### 4. “Common but differentiated” energy subsidy reforms

The energy subsidy reforms in the GCC region started around the same time and are similar in their progression towards a lower level of subsidization. While the UAE ignited the first wave of reforms after the financial troubles of emirates such as Dubai in the aftermath of the 2008/2009 financial crises, other countries followed suit and

**Table 2.** Energy subsidy cuts in GCC countries.

Source: International Energy Agency.

Country	Total fossil-fuel subsidies in million USD		Overall reduction in financial subsidy costs in 2016 as % of 2014			
	2014	2016	Oil	Electricity	Gas	Total
Bahrain	2059	1034	89%	28%	–	50%
Kuwait	5692	4538	74%	21%	1%	20%
Oman	90	84	6%	–	–	6%
Qatar	4465	1010	89%	68%	75%	77%
Saudi Arabia	57116	29661	51%	39%	47%	48%
UAE	15293	7344	94%	55%	30%	52%

enacted important reforms, particularly in the period after the sharp decline in oil prices in 2014. Between 2014 and 2016, most of the reforms were initiated, leading to some cuts in the overall financial burden of subsidies (see Table 2). The set of adopted measures raised gas, fuel, electricity, and water prices in almost all countries, but with differences in the timing and depth of the reforms [24,25]. Energy subsidization still remains high (see Table 1) while the overall level of subsidy reduction can be described as “modest” [25].

The subsidy reforms in the GCC countries were carried out in the face of some protest, but with relatively little overall opposition. In fact, the urgency of the pricing reforms was different in individual GCC countries, while the political economic considerations vary across the countries depending on the level of vulnerability to oil prices, the resource base, and the political participatory arrangements. Fattouh et al. [26] explain that countries such as Oman and Bahrain generally have a lower resource base and serious fiscal deficits. This paved the way for protests demanding economic reforms. Furthermore, Kuwait’s parliament has more power over the energy sector and economic policies than in other GCC countries, resulting in difficulties in implementing structural reforms. This is in contrast to Qatar, where resource abundance together with limited opposition minimized the politicization of the reforms [26]. In fact, Saudi Arabia, as the biggest GCC country and with a very high vulnerability to oil prices, has been under pressure to tackle the rising domestic demand for cheap energy. The energy reforms were thus made a high priority for the political elite who communicated the urgency to the general public, who, at the start of the reform, flooded social media channels with protest, also criticizing high state spending on weapon purchases and the war in Yemen (see [25,26]). As for the UAE, although its economy is more diversified, the situation is similar to Qatar with a high resource base and a very large expatriate population, who took the largest share of the financial burden of the subsidy reductions.

The reduction of energy subsidies in the GCC countries was also accompanied by reforms in the water and food sectors. The impact of these combined reforms extends beyond consumers to affect businesses and industries. [27] examined these impacts, which negatively affected sectors such as agribusiness, logistics, or petrochemicals. For example, in 2016 Saudi Arabia separated the price of methane (sales of gas for power generation) from that of ethane, the price of which increased more than 130%, affecting costs for the petrochemical companies. Furthermore, the agricultural sector is going to endure the costs of increased water and diesel prices. However, this move, together with the decision in Saudi Arabia to phase out water-intensive green fodder such as alfalfa by 2019, is expected to save some overexploited groundwater resources [27].

Apart from these adaptation problems in the transition phase, the subsidy reductions are expected to have a positive impact on the economy and the environmental degradation in the region. For example, Wang et al. [28] reviewed the impact of utility subsidy reform in Abu Dhabi and found an increase in GDP, a reduction in carbon emissions, a decrease in private consumption, a decrease in carbon-intensive production, a decline in utility production, but also a decrease in wages. With the reduction in wages being the only social cost of the reforms, the results indicate that macroeconomic growth and employment were not affected by the higher prices in Abu Dhabi as was the case in other studies on Kuwait, Egypt, or China [28].

In theory, adverse economic or industrial impacts of energy subsidy reforms can be compensated by more targeted redistribution policies. In this sense, Gelan [29] simulated the impacts of subsidy reforms in Kuwait and considered the case where users are compensated for losses through cash transfers. In such cases, the policy reforms yield positive impacts on GDP and household welfare, as the adverse demand-side effects of reforms are limited. Furthermore, in the GCC region, cash transfers to compensate households for price increases are being implemented;

e.g., the Citizen's Account program in Saudi Arabia. In general, however, cash transfer programs in the GCC are on the rise, although they need to be sustained in the long run in order to offer some kind of reliable social protection instrument from price increases for vulnerable households in GCC countries with poverty problems (e.g., Oman, Saudi Arabia, and Bahrain) [30].

Finally, the subsidy reforms in the GCC countries need to be understood in the context of a wider restructuring of the energy sector in line with national strategies advocating economic diversification across the region. This restructuring targets private-sector participation, the level of integration, and also the energy mix. For example, there is a paradigm shift in the GCC towards independent power producers (IPPs) who sell their output to state-owned water and power companies as single buyers (SBs) through power-purchase agreements (PPAs). This new IPP–SB–IPP model allows for the introduction of new energy sources such as renewables without jeopardizing the power, revenues, and control of the state [7]. However, there are still important barriers to wide-scale adoption of renewables including the remaining high level of subsidization, the lack of investments in R&D, the weak supply chains, inadequate regulatory measures, and lack of public support through subsidies [9,10,31].

## 5. Conclusions — Not a “Big Bang”

Two questions arise from this study of the GCC experience, firstly with regard to the comprehensiveness of the energy subsidy reform experience, and secondly to the consequences of these reforms on the underlying social contract of the rentier states. With respect to the first question, the subsidization reforms are tangible, but energy subsidization rates remain high by international comparison. The experience of the GCC region is also heterogeneous. Smaller countries with a larger resource base (Qatar and UAE) were able to reduce the overall economic burden of subsidies to lower levels than in other larger countries (Saudi Arabia). These cuts were also more substantial than in countries with lower resources bases (Oman), or relatively strong political opposition elements (Bahrain and Kuwait). In addition, free access to electricity and water, exemptions from price increases, or preferential treatment through different tariff structures still exist for national citizens in Qatar, and partially in the UAE, which limits the welfare impacts of subsidy reforms. Further missing links include the absence of adequate compensating measures for the private sector as well as ineffective communication campaigns about the benefits and urgency of the reforms [26]. The institutional structuring of the energy sector is also not comprehensive, since incentives and regulatory measures for renewables and private sector participation are not yet in place.

Regarding the impacts on the rentier states, there seems to be a consensus in the literature that rentier politics are evolving, but might not be eroding or diminishing. Rentier states seem to evolve and mobilize new sources of rent through duties, eliminating wasteful practices, involving state companies in sectoral restructuring, and creating more state-provided jobs [7,24]. To conclude, there are some tangible energy-subsidy reforms in the GCC countries. While these reforms seem to be gradual, further research is needed on the welfare impacts of reforms, spill-overs on use intensities and consumption, and the effectiveness of the deployed instruments. In fact, the subsidy reforms in the GCC region represent a unique experience within the wider MENA area by virtue of their having a common sense of urgency and direction while being implemented in the face of few protests. However, these reforms need to be strengthened and accompanied by more long-term redistributive measures or broader, institutionalized welfare mechanisms. Such a reform pathway can help the region to move away from an economic model dominated by state involvement and energy resource abundance towards more diversified and dynamic economies. The success of the restructuring of the energy sector will depend on allowing competition and providing the required incentives for reducing energy intensities and introducing clean technologies.

## References

- [1] Coady D, Shang B, Parry IWH, Sears L. How Large Are Global Energy Subsidies? Washington, D.C: International Monetary Fund; 2015, (IMF Working Papers Working Paper No. 15/105).
- [2] Kojima M, Koplow D. Fossil Fuel Subsidies : Approaches and Valuation. The World Bank; 2015.
- [3] Rentschler J, Bazilian M. Reforming fossil fuel subsidies: drivers, barriers and the state of progress. *Clim Policy* 2017;17(7):891–914.
- [4] Sovacool BK. Reviewing, reforming, and rethinking global energy subsidies: Towards a political economy research agenda. *Ecol Econom* 2017;135:150–63, URL: <http://www.sciencedirect.com/science/article/pii/S0921800916303494>.
- [5] El-Katiri L, Fattouh B. A brief political economy of energy subsidies in the middle east and north Africa. *Int Dev Policy Revue Int Politique Dev* 2017;(7). URL: <http://journals.openedition.org/poldev/pdf/2267>.
- [6] Verme P, Araar A, editors. *The Quest for Subsidy Reforms in the Middle East and North Africa Region: A Microsimulation Approach to Policy Making*. Natural Resource Management and Policy, vol. 42, Cham: Springer; 2017.

- [7] Tsai I-T. Political economy of energy policy reforms in the gulf cooperation council: Implications of paradigm change in the rentier social contract. *Energy Res Soc Sci* 2018;41:89–96.
- [8] Sdravovich C, Sab R, Zouhar Y, Albertin G. *Subsidy Reforms in the Middle East and North Africa. Recent Progress and Challenges Ahead*. Washington DC: International Monetary Fund (IMF); 2014.
- [9] Griffiths S. A review and assessment of energy policy in the middle east and north Africa region. *Energy Policy* 2017;102:249–69.
- [10] Poudineh R, Sen A, Fattouh B. Advancing renewable energy in resource-rich economies of the MENA. *Renew Energy* 2018;123:135–49.
- [11] Verma P. Subsidy reforms in the middle east and north Africa region: A review. In: Verme P, Araar A, editors. *The Quest for Subsidy Reforms in the Middle East and North Africa Region: A Microsimulation Approach to Policy Making*. Natural Resource Management and Policy, vol. 42, Cham: Springer; 2017, p. 3–32.
- [12] Araar A, Verme P. A comparative analysis of subsidies reforms in the middle east and north Africa region. In: Verme P, Araar A, editors. *The Quest for Subsidy Reforms in the Middle East and North Africa Region: A Microsimulation Approach to Policy Making*. Natural Resource Management and Policy, vol. 42, Cham: Springer; 2017, p. 33–62.
- [13] Al-Weshali A, Bamaga O, Borgia C, vanSteenbergen F, Al-Aulaqi N, Babaqi A. Diesel subsidies and yemen politics: Post-2011 crises and their impact on groundwater use and agriculture. *Water Altern* 2015;8(2):215–36.
- [14] British Petroleum (BP). *BP Statistical Review of World Energy*: British Petroleum (BP). 2016, [cited 2018 Dec 14].
- [15] Kaya A, Choucri N, Tsai I-T, Mezher T. Energy consumption and transition dynamics to a sustainable future under a rentier economy. the case of the gcc states. In: Azar E, Abdel-Raouf M, editors. *Sustainability in the Gulf — Challenges and Opportunities*. Abingdon, UK: Routledge; 2017 (Routledge Explorations in Environmental Studies).
- [16] Low MC. Low mc ottoman infrastructures of the saudi hydro-state: The technopolitics of pilgrimage and potable water in the hijaz. *Comp Stud Soc Hist* 2015;57(4):942–74.
- [17] Reiche D. Energy policies of Gulf cooperation council (GCC) countries—possibilities and limitations of ecological modernization in rentier states. *Energy Policy* 2010;38(5):2395–403, URL: <http://www.sciencedirect.com/science/article/pii/S0301421509009872>.
- [18] Al-Saidi M, Birnbaum D, Buriti R, Diek E, Hasselbring C, Jimenez A, et al. Water resources vulnerability assessment of MENA countries considering energy and virtual water interactions. *Procedia Eng* 2016;145:900–7.
- [19] Al-Saidi, M and Jimenez, A and Oezhan, D, editors. *Assessment of Energy use patterns for water and food production in the MENA region*. In: 2016 International Energy and Sustainability Conference, IESC. 2016.
- [20] Siddiqi A, Anadon LD. The water–energy nexus in Middle East and North Africa. *Energy Policy* 2011;39(8):4529–40.
- [21] Isaka M. *Water Desalination using Renewable Energy*: International Renewables Energy Agency, IRENA, Iea-Etsap. 2012, IEA-ETSAP and IRENA© Technology Brief I12.
- [22] Asif M. Growth and sustainability trends in the buildings sector in the GCC region with particular reference to the KSA and UAE. *Renew Sustain Energy Rev* 2016;55:1267–73.
- [23] Al-Saidi M, Elagib NA. Ecological modernization and responses for a low-carbon future in the Gulf cooperation council countries. *WIREs Clim Change* 2018;9(4):e528.
- [24] Krane J. Political enablers of energy subsidy reform in middle eastern oil exporters. *Nature Energy* 2018;3(7):547.
- [25] Krane J, Hung SY. *Energy Subsidy Reform in the Persian Gulf: The End of the Big Oil Giveaway*. Rice University’s Banker institute for Public Policy; 2016.
- [26] Fattouh B, Sen A, Moerenhout T. *Striking the right balance? GCC Energy Pricing Reforms in a Low Price Environment*. The Oxford Institute for Energy Studies; Oxford University; 2016.
- [27] Lahn G. Fuel, food and utilities price reforms in the GCC. A wake-up call for business. In: *Energy: Environment and Resources Department*. Chatham House: The Royal Institute of International Affairs; 2016.
- [28] Wang Y, Almazrooei SAli, Kapsalyamova Z, Diabat A, Tsai I-T. Utility subsidy reform in Abu Dhabi: A review and a computable general equilibrium analysis. *Renew Sustain Energy Rev* 2016;55:1352–62.
- [29] Gelan A. Economic and environmental impacts of electricity subsidy reform in kuwait: A general equilibrium analysis. *Energy Policy* 2018;112:381–98.
- [30] Moerenhout T. *Harnessing Social Safety in a Context of Changing Social Interactions: Compensating Schemes and Subsidy Reforms in the GCC*. The Oxford Institute for Energy Studies; University of Oxford; 2017.
- [31] Mondal MAH, Hawila D, Kennedy S, Mezher T. The GCC countries RE-readiness: Strengths and gaps for development of renewable energy technologies. *Renew Sustain Energy Rev* 2016;54:1114–28.