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"How to successfully decrease subsidies in the electricity market"

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Content

1 Introduction and Background Information

The Hashemite Kingdom of Jordan runs an economy that is not sustainable, whereby it is extremely dependent on public debt and foreign aid. Furthermore, the state has a history of disbursement of subsidizes for goods and services that can be considered fiscally irresponsible. The International Monetary Fund (IMF) and the World Bank (WB) have extensively recommended a prompt cut in subsidies for various sectors of the economy. Yet in the context of humanitarian crisis and armed conflict in the region, while fiscally responsible, the measures to address subsidy cuts are extremely risky. Such measures may fracture the country's political stability and societal endurance, one that is constantly challenged by the overall inflow of refugees, socio-economic inequality and poverty as well as by a very strong perception of corruption at the governmental level and of state companies. Untapped corruption distance citizens from its duties and responsibilities, collectively internalizing non-compliance behaviors across different socioeconomic classes; unless the non-democratic political class strengthens transparency and justice, displays austerity and conducts a responsible management of state assets.

1.1 Budgetary problems

When analyzing the 2016 budget accounts for total expenses of 8.496 billion JDs (11.983 billion of USD) and total revenues of 7.589 billion JDs (10.704 billion USD), we notice a deficit of 907 million JDs (1.279 billion USD), which equates to 3% of gross domestic product (GDP).[1] A huge portion of what Jordan addresses as "revenues" is in fact, foreign aid (1.148 billion USD). Additionally, the 2016 Budget Law of Government Units, which details additional revenues and expenses, lists total expenses of 2.685 USD billion and assumes revenues of 2.155 billion USD, of which 88 million USD is foreign aid, leaving a deficit of 530 million USD. [2] Furthermore, at the end of 2016, debt increased 5.6%.[3]

Jordan has had a history of reaching high levels of debt, for instance in August 2011, it reached about 57% of its GDP and there is an over-reliance on foreign actors, U.S. aid for Jordan is set at 1.275 billion USD in 2016, not-including military provisions.[4] Yet, recent drifts such as Qatar's decision to freeze aid to Jordan, have made the debt crises more acute, Government officials reported that Qatar's aid termination accounted for almost all of the disparity between its original budget deficit of 970 million USD to a

[1] Carnegie Endowment for International Peace - 2017
[2] Ibid.
[3] Jordan Times - 2017
[4] Ibid.

revised estimate of 1.27 billion USD in 2015.[5] It is clear that Jordan's debt has become unmanageable and there is a necessity to re-asses spending.

1.2 Institutional energy framework and main policy goals

The Ministry of Energy and Mineral Resources (MEMR) has two main objectives: to reduce the country's energy supply cost, and to reduce the dependence on imports of oil.

Jordan's National Energy Strategy envisages 29% of primary energy to come from natural gas, 14% from oil shale, 10% from renewables and 6% from nuclear by 2020.[6] The MEMR expects total energy demand to grow by 5.5%/year between 2008 and 2020. Currently, the electric capacity is mainly thermal with gas combined cycles accounting for about half of that capacity and Jordan is a net importer of electricity (435 GWh in 2014).[7] This is due to the fact that attacks of an Egypt-Jordan pipeline reduced Egypt's contribution to Jordan's electricity from 87 % in 2009 to 14% in 2012. Therefore, Jordan relied on expensive alternatives, which translated to heavy fossil fuel-based imports. One key aspect to take into consideration is that although the potential for solar and wind development in Jordan has been largely documented, Jordan currently holds the 3rd largest reserves of shale gas.[8] In the context of reducing the dependence of imports, the exploitation of these resources will downgrade efforts on reducing energy inefficiency. Additionally this exploitation may post serious questions with regard to environment and social impacts, for which the country currently does not have the regulatory capacity to identify and mitigate. The exploitation of nonconventional oil may represent a substitution from import-dependency risk to environmental risks, addressing energy security partially on one hand, while compromising decarbonisation scenarios.

During the 1990s following advice from international institutions, Jordan conducted the liberalization of the electricity market. The 1996 electricity law permitted the development of production from private producers (BOT, BOO). Later, in 1997, the deregulation of the electricity sector begun with the sale of 51% of public shares in CEGCO, the electricity production company.[9] The Electricity Regulatory Commission (ERC) was created in 2001 with the objective of controlling the electricity sector, ensuring the rights of consumers and resolving complaints between consumers and electricity companies.

In 2002, the General Electricity Law, established the privatisation process for the electricity sector, keeping the MEMR as the main entity to craft policies and the power

[5] Ibid.
[6] Enerdata - 2016
[7] Enerdata - 2016
[8] Enerdata - 2016
[9] Enerdata - 2016

sector's general rules, the law also established the creation of an independent regulatory commission to control electricity prices, set up electricity tariffs, and grant electricity generation and distribution licences. The Government's recent 2016-2017 objectives are to sell stakes in distribution companies, as it currently holds 100% of Electricity Distribution Company (EDCO) and 55.4% of Irbed District Electricity Company (IDECO).[10]

When analyzing Jordanian electrical companies, one can note that regional (particularly from Gulf countries) and international investment (particularly from Korea and Japan) constituted the formation and operation of energy electricity services. To note, the production and distribution of electricity in Jordan is run by the private sector while the transmission is in the hands of the public sector.

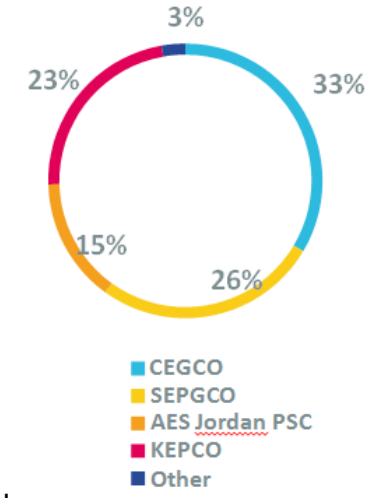
Table 1)

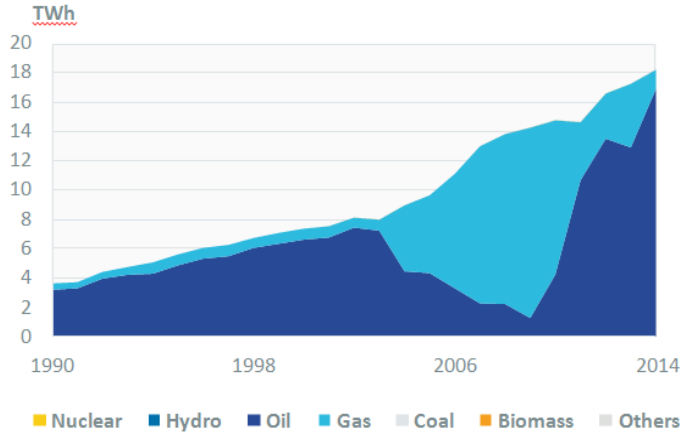
Production, distribution and transmission companies	
CEGCO Electric Generating Company • (Founded in 1999), is the main generator with a total capacity of around 1 400 MW (end 2014) and production of 8 TWh (end 2014). • Currently represents 33% of the country's total power generation. • Since 2011 GEGCO has been controlled by Saudi Arabia's ACWA Power International, which acquired a 51% stake in the company through its subsidiary Enara; the Jordanian Government holds 40% and Social Security Corporation 9%. **SEPGCO, Samra Electric Power Generating Company** • Government-owned company, was created in 2004 to operate the Samra power plant. • The plant has had a capacity of 1 100 MW and accounted for around 26% of power generation (end of 2014). • The initial plant (300 MW) was developed by Black & Veatch in partnership with the Turkish company Gama Enerji. Other partnerships include the Arab Fund for Economic and Social (Shandong Electric Power Construction) and loans from KFAED, the Kuwait Fund for Arab Economic Development.	**National Electric Power Co (NEPCO)** • Is in charge of the transport of electricity, the development of the national network and the interconnection between Jordan and its neighbors. • The electricity is supplied to NEPCO under a 25-year Power Purchase Agreement (PPA) signed in 2012. **There are 3 distribution companies:** • Jordan Electric Power Company (JEPCO) for the east of the country • Irbid District Electricity Company (IDECO) for the north (22.5% of the distribution) • Electricity Distribution Company (EDCO) for the south (Valley of the Jordan, 13.5% of distributed electricity).

[10] Enerdata - 2016

Graph 1) **Graph 2)**

Electricity market share capacity // Gross power production by source (TWh)





Source: Enerdata – 2017

When analyzing Graph 2 we note that Jordan's power production lacks diversity of resources and is heavily dependent on fossil fuels for power production.

1.3 The role of electricity in Jordanian debt and the need of a reform

The National Electric Power Company (NEPCO) has accumulated debt. In 2011, NEPCO represented 17 % of government expenditures and 5.5% of its GDP.[11] Furthermore, in 2013 NEPCO's contribution to the deficit was 1.36 billion USD, over 10% of the regular budget.[12] According to the Minister of Planning, subsidizing electricity tariffs represented the highest cost on the budget, which in 2013 reached 1.321 billion JDs. To note, poor families benefited the least from the electricity subsidy, as their share was only 105 million JD.[13] In contrast, the middle class households benefitted 447 million JD (lower bottom) and 456 million JD (higher bracket), whereas high-income families segments benefitted with 311 JD million.[14] Accumulated electricity debt became 17.8% of GDP in the month of January 2016.[15]

Rather than increasingly seeking for foreign aid to offset debt, the purpose of this document is to provide a better management process of the current electricity subsidy system, with the objective not only to attain better fiscal management but to tackle the

[11] World Bank - 2015
[12] Ibid.
[13] Jordan Times, 2014
[14] Ibid.
[15] Carnegie Endowment for International Peace - 2017

great necessity of capacity building across different electricity institutions such as NEPCO. It is intended that through policy reform, the engagement with electricity consumers will not be a top-down scheme of less or more subsidies today or in the future, but to strongly transmit messages of energy efficiency, smart and environmentally-friendly electricity consumption to slowly build citizen consciousness. For this, engagement with citizen's groups like the Jordan Foundation and Community Based Organizations (CBOs) are instrumental if social unrest and discontent is to be prevented and managed.

2 Policy package and objectives

Household expenditures on electricity in Jordan are significant; for instance in 2013 Jordan households spent an estimated 359 million JDs on electricity. Budget shares of electricity are higher among the poorest households, low-income families spend about 3.5% of their budgets on electricity compared to 2.4% for the richest households.[16] Thus poor households are likely to be the most vulnerable to higher tariffs on electricity. While taking into consideration tariffs and consumption brackets in Jordan (as of 2013, calculated using the 2012 cost recovery tariff from NEPCO) the policy package identifies a threshold of 501 kilowatt/hour per month of electricity consumption per household, to be used in order to differentiate high-consumption and low consumption households. If consumption succeeds beyond the threshold (e.g due to the number of home appliances, television sets, etc) divided by the amount of people in the household, NEPCO can then estimate high consumption per capita. Therefore, the household should pay the unsubsidized real price of consumption.

This policy does not seek to fully eliminate electricity subsidies but to progressively increase tariffs on those with high consumption, while keeping tariffs of low-consuming households, subsidized. Simultaneously, catalyzing investment toward energy cooling & heating solutions could result in substantial energy savings. For instance, investment in solar water heaters to be installed on rooftops can be attained through the disbursement of soft loans. Such measures will decrease consumption and electricity bills per household while creating jobs and developing technical skills among the population.

[16] Atamanov, Jellema and Serajuddin – 2015

Table 2) Policy instruments

<table>
<tr><th>Sustainable Development Goal (SDG) Objective:</th><th>Domestic institutions goals:</th><th>Policy Instrument</th><th>Target population</th><th>Impacts</th><th>Mitigation</th></tr>
<tr><td rowspan="2">Goal 7: "Ensure access to affordable, reliable, sustainable and modern energy for all"</td><td rowspan="2">The Ministry of Energy and Mineral Resources (MEMR) established two main objectives:
• To reduce the country's energy supply cost
• To reduce the dependence on imports for energy
To this we will add:
• Fiscal responsibility</td><td rowspan="5">Price-based instrument:
"Reform in the system of electricity consumption brackets per household"</td><td>High-electricity consumers</td><td>Increase in electrical bills
Distrust toward the government</td><td rowspan="2">Cost reduction financial incentive
"Green Fund"</td></tr>
<tr><td>Middle electricity consumers</td><td>Increase in electrical bills
Distrust toward the government</td></tr>
<tr><td>SDG Indirect Objective:</td><td>Indirect objective</td></tr>
<tr><td rowspan="2">Goal 10 – Inequality reduction
Goal 7 – Sustainable energy</td><td rowspan="2">• Building strong electricity institutions</td><td>Low income electricity consumers</td><td>No increase. Fearfulness expectations of bill increase</td><td></td></tr>
<tr><td>Very low electricity Consumers</td><td>No increase Fearfulness expectations of bill increase</td><td>Off-grid solutions</td></tr>
<tr><td colspan="6">Social engagement strategy and conflict prevention</td></tr>
</table>

Source: Personal elaboration

Table 3) Different scenarios for electricity tariff reforms

Distributi-on	Number of households		KWh per month	Current tariff 2014	Full elimination of subsidies Scenario		New – policy package		
							Scenario 3 Semi-progressive increase in tariffs		Adjustments
	#	%			Final	%	Final	%	
Very-low	8.967	1	1-160	0.033	0.146	341.5	0.036	10	Off - grid solutions
Low	355.443	29	161 – 300	0.072	0.146	102.3	0.09	25	No increase
Middle	620.619	51	301 – 500	0.086	0.146	69.4	0.146	69	Energy – efficiency and green solutions
High	127.452	10	501 – 600	0.114	0.146	27.8	0.228	100	
Very-high	80.494	7	601 – 750	0.152	0.146	- 3.9	0.304	100	
	26.901	2	751 - 1000	0.181	0.146	- 19. 3	0.362	100	
	4.673	0	> 1000	0.259	0.146	- 43.6	0.518	100	

Source: Personal elaboration with data compiled from WB 2015 and NEPCO

2.1 Welfare implications of current electricity tariffs and future reforms

The largest savings from electricity reform will come from the full elimination of subsidies. As it has been largely documented, the government can save the largest amount estimated at 473 million JD, in this scenario. Yet, the key reasons for why eliminating subsidies will not be a good measure, is because it will have a strong impact in the lives of the poor and will exacerbate inequality. The World Bank conducted a study in 2015 that concluded that the full elimination of subsidies in electricity in Jordan will have the strongest negative impact on poor families; poverty is expected to increase by 2.4% points, poverty gap by 0.7% points and inequality by 1.9%.[17] On the other hand, there are also indirect effects tagged to electricity price reform and these vary significantly by household rank. Richer households have consumption baskets weighted more heavily on non-food goods and services, in contrast with poorer households which have consumption baskets weighted towards food, the production of which is not as electricity-intensive. Thus the results between direct and indirect effects vary significantly in the electricity subsidy elimination scenario.

Yet, in scenario 3, which is built on a progressive increase in tariffs (estimation by the World Bank) shows that price increases are higher for higher volume users, and direct

[17] World Bank - 2015

effects rise more quickly across expenditure levels. Conversely, it is important to note, that the overall gain from higher tariffs will be less than 162 million JD for the government as oppose to 473 million JD in the full elimination scenario.

There are two additional adjustments to consider. Scholars as well as policy advisors from the Poverty Global Practice Groups of the WB have suggested that from this amount 70 million JDs have to be transferred back, and the government will only be left with 92 million JD.[18] However, an assessment of the Jordan 2012 "Petroleum Subsidies Reform and Cash Compensation Program" identified key findings that portray an overall mismanagement of the funds.

According to Abdelkrim Araar's research, the wealthier households were the largest beneficiaries of the pre-2012 petroleum product subsidies, which was not the goal of the program. The government introduced complementary cash transfer programs to compensate for the adverse consequences of the cuts in petroleum subsidies and it was supposed to target low-income families. Originally it was designed to reach all households earning less than 10,000 JDs/ year.[19] The cash transfer program, estimated costs were about 320 million JDs per year, which was higher than the estimated 190 million JDs a year in revenues. [20] Households were selected based on self-reported income levels, yet as income is difficult to verify, there were people who understood the system and benefited from the program without necessarily qualifying for it, whereas those families who could have benefitted, did not, due to the costs of transaction involved in conducting administrative procedures as well as lack of awareness. [21] Like with any cash-transfer program, there are questions raised as to how the money used, whether it is to cover family necessity expenses, or perhaps taken by one family member for personal consumption purposes. The mechanisms to identify and prevent deceptions (like lying about income) or detecting corruption can be costly and are often dependent on other types of administrative structures, like the justice system, centralized information management systems and the alike. Furthermore the institutional capacity and societal consciousness to manage cash compensation programs takes time to develop, cannot be done overnight. Its poor implementation can result in great spending with very little impact.

Taking this into account, the policy-package suggests that instead, investment (including the gain from tariff increases among high consumers) be allocated differently. It would be more beneficial to have households that have the lowest amount of consumption (consume less than 160KWh/ month) be taken off the electrical

[18] WB - 2015
[19] Abdelkrim Araar - 2014
[20] Ibid.
[21] Ibid.

network. Whereas those with consumption between 161 -300KWh/month should see no increase in their tariffs (subsidies maintained).

The rapid escalating uptake of off-grid technology solutions, have expedited the competitiveness of renewables. In combination with adequate supportive policies and regulations, the deployment of efficient green technologies can be attained. (Like solar panels with conversion of DC electricity into 230V AC electricity with batteries for small capacity storage[22 and 23.]) Today, fully off-grid solar-PV technologies can be deployed at site for as little as USD 0.15/kWh.[24] What is most important is that they do not require additional expensive transmission and interconnection networks to move the electricity around. Furthermore, Jordan has abundant renewable energy resources to support not only 100% of its current needs, but domestic natural wind and solar resources can provide over 60 times more electricity than the country's projected demand in 2050.[25] Off-grid solution programs can be designed and subsidized by the government in coordination with the International Renewable Agency (IRENA) an entity based in the region and with technological and policy expertise to conduct energy reforms. Through this measure it is intended to provide clean energy for the population, but most importantly to have the country generate its own energy production and to take practical steps toward a transition into less import-dependency scenarios. Providing decentralized off-grid solutions encourages knowledge dissemination, engagement with the consumers and the development of technical abilities among the professionals hired for these projects as well as for the consumers.

In Jordan, people in lowest bracket of consumption are essentially paying for light; they lack heavy home appliances and electronics. Quoting from a Yale Environment 360 article, "the poor already pay for light and they pay a lot, the poorest fifth of the world pays one-fifth of the world's lighting bill — but receives only 1% of the lighting benefits."[26] Electrical networks are expensive to maintain, particularly in developing countries where lack of maintenance leads to loses (Jordan's grid losses oscillates between 11-15%) a 40 Wp (Watts peak) home solar system (with life up to 20 years) can provide these families not only light, but access to cell-phone charging, fans and perhaps computers.[27]

2.2 Addressing the negative impacts of subsidy cuts

In an effort to compensate those affected by subsidy cuts with higher electricity bills, one element of the policy package will include an investment cost reduction financial

[22] Small storage capacity is possible and affordable (ENGIE solutions, Power Smartsolar, TESLA and other companies provide this technology.
[23] Power smart solar – 2015
[24] PV Tech – 2016
[25] Greenpeace 2013
[26] Yale Environment 360 – 2012
[27] Yale - 2012

incentive tool, in the form of a Green-Fund. This instrument, in line with the recently established regulation (Jordan's Renewable Energy & Energy Efficiency Law of 2012, The Sale of Electrical Energy generated from Small RE Systems - Net Metering – Roof Tops and Energy-Efficiency and Solar Code) will catalyze funds from the Jordan Renewable and Energy Efficiency Fund (JREEEF) which receives grants from the Global Environment Facility Trust Fund and with the recently signed 250 million USD soft loan with the World Bank issued in early 2017 to enhance reforms specifically in the energy and water sectors in Jordan.[28] The Fund will provide financial resources in order to install water-heater solar technology on rooftops for high-consumption residencies.

2.2.1 Identifying energy-efficiency potential with direct results in electrical bill cuts

According to a 2016 report on Energy Efficiency Current Trends and Future Perspectives in Jordan, buildings (commercial, public and residential) consume more than 60% of the total electricity used in the country.[29] The potential of energy efficiency in this sector is large, it is estimated that savings could reach between 20 % - 30% of final energy consumption per sector, which would represents a reduction in annual energy cost of about 800 million JDs (172 million JDs in households).[30]

A survey of domestic water heating, published in the International Journal of Mechanical and Materials Engineering, shows that among the four main types of water heating systems in residences, at least 20% still use a diesel-fired boiler, which is expensive and extremely polluting.[31] On the other hand, the National Household Load Survey by USAID-Energy Sector Capacity Building Project of 2015 indicated that 60% of Jordanian households heat their water with electricity and only 13% currently utilize solar energy to heat their water.[32] Thus, it has been concluded that water heating represents one of the major sources of energy waste in the residential sector, whereby high grade electricity is being used at a large scale (32%) in water heating. This emphasizes the potential for low-grade energy applications of solar water heaters, to avoid energy quality losses in electric water heater systems.[33]

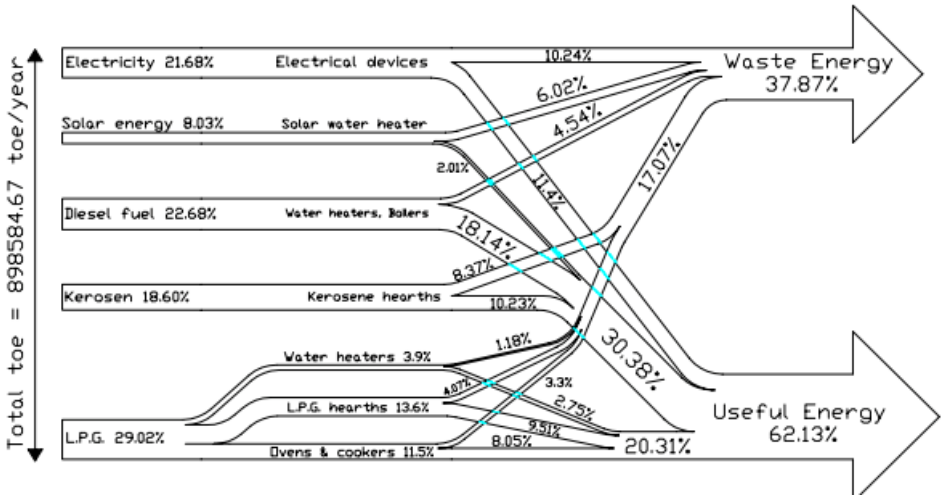
Chart 1)

[28] M. Ghaza - 2016l
[29] Royal Scientific Society - 2016

[30] Ibid.
[31] Odeh a, B. Akash , J. Jaber c, M. Droubi b, S. Touri b, W. Farajallah - 2006

[32] Jordan River and USAID - 2015
[33] Royal Scientific Society - 2016

Type of water heating used in the residential sector



Source: http://aurak.ac.ae/publications/Flow-Chart-of-Energy-Waste-in-Jordan.pdf

Chart 1 energy flow shows the contribution of fuels such as diesel and natural gas to the residential sector, and gives an indication of the energy waste in different processes.

The average daily solar irradiation is about 5.5 kWh/m2 and the annual sunshine duration is about 3000 hours,[34] thus the potential for water heating and space heating is high. A case study in residential sectors, evaluated energy production, life-cycle costs, and greenhouse gas emission (GHG) reductions for various types of renewable energies and shows that Solar Water Heaters (SWH) have been used in Jordan for over 4 decades but with extremely limited applications. A simple proposal of a hot water storage tank capacity of 185L, typical water temperature 60°C, and a collector area is 5.4 m2. is feasible and with recent codes and regulations in place approved between 2012- 2016, the ground is optimum for the development of various business models, SMEs and start-ups as well as re-strengthening those that currently exist such is the case of Global Renewable Energy Systems Co. Hanana Energy (the first and largest manufacturer of Solar Systems in Jordan and the Middle East, operating for over 41 years), Izzat Marji Group, Millennium Systems for Advanced Technologies, Alkan For Solar Systems, Modern Environment Solar Technology Co., Green City Renewable Energy Systems Co., Jordan Central Comany PLC and Nur Solar Systems.

2.2.2 Loan disbursement architecture

As it is common with most countries in MENA, the state apparatus in Jordan is large. This is very clear when analyzing the population who are economically active in Jordan and who are high-electricity consumers, giving their living standards. In Jordan the number one and best paying employer is the government. For instance in 2009, 37.9 % of all workers were employed by the public sector. Meaning that 35-40% of the working

[34] Ibid.

population is in the public sector. Jordan's National Employment Strategy to 2020 revealed that whereas the average monthly wage in 2009 in the public sector was 412 JDs, in the private sector it was only 338 JDs. Furthermore the public sector pays about 150% of what the wages are in the private sector for unskilled as well as semi-skilled levels.[35] Thus, people perceive the public sector to pay better, considering the packages of benefits and job security involved, yearly Jordan receives approximately 218,000 applicants who have passed exams queuing for a job in the CSB. [36] Thus, the implementation of SWHs for energy efficiency will begin at the residencies of government employees. Households will select their company of preference, the government will disburse the payment directly to the company providing the SWH, then the government will subtract payment (at zero interest rate) from monthly paychecks of its employees.

Taking into consideration the Jordan River Foundation pilot project on electricity sector capacity building, the Green Fund will expand through the creation of Community Based Organizations (CBOs). In 2014 it was noted that 70 CBOs have benefitted from loan disbursements by USAID. The Green Fund may expand on this experience to reach high-consuming and moderate consuming households of population that works in non-public sectors and direct loans as well as emulating and improving USAID measurement and verification (EM&V) systems for robust evaluation [37]

Taking into consideration that informal networks in Jordan may interfere in business development (Jordan Ranks 57th place out of 176 countries in the Corruption Perception Index of Transparency International) where favoritism nepotism or bribery, can generate negative impacts and put the objectives of the Green Fund at risk, particularly with institutions that provide public services (as it was the case with millions lost in the Jordanian Phosphate Mines Company that led to a 32-year sentence of its CEO), the process of tendering to grant a handful or one company the long-term provision of the SWH technology installation operation to residencies will not take place. Instead, the JREEEF will launch a process of accreditation, by which different business entities will be "accredited" based on specific criteria including but not limited to: having the heaters be elaborated in Jordan, employing women, among other requirements decided by the Ministry of Energy and the Ministry of Planification and International Cooperation standards in line with the development strategy for labor and business development. Upon accreditation, companies may approach clients who will then select the company of their preference. Upon the presentation of a contract with the client, the JREEF will disburse the funds to the company itself in quotas. With this measure, it is intended to foster competition not only in terms of developing the better operations or functionality among companies but also to encourage SWH companies to manage better marketing strategies by which to reach out the average electricity consumer about the benefits of energy-efficiency and lowering electricity consumption.

[35] Jordanian Minister of Planning and International Cooperation and ILO - 2009

[36] Jordanian Minister of Planning and International Cooperation and ILO - 2009

[37] USAID and Jordan River Foundation - 2014

2.2.3 Expected results, from SWH implementation at a household level

Based on the results of a 2014 report of the Jordan River Foundation's SWH pioneering program whose participating households have a higher income than average,[38] a survey of 1,525 households representing all 12 governorates of Jordan identified key costumer benefits, such as significant savings. Surveyed perceived and average of 36% reduction on their monthly electricity bills. [39] Empirical data shows that the reduction in summer monthly electricity usage was 37 kWh on average across all consumption brackets. In addition consumers considered saving money to be the greatest benefit associated with installing a solar water heater, followed by the reduced time to heat water, and increased comfort and safety.

3 The political economy of electricity reforms

It is expected that the policy package will motivate negative reactions on behalf of all household electricity consumers, across all consumption brackets but particularly among high-consumption households. Taking into consideration off-grid solutions and SWH to improve energy-efficiency, it is also expected that utility companies listed in the introduction of the present document which are a mix of public, private and some that are controlled and partially owned by external entities like Saudi Arabia's (GEGCO) to react aversively. Though in a lesser gravity, the international institutions (WB, IMF, others) may posse external pressure on the feasibility and promptness of the reform, which may cause internal tension at the legislative and ministerial level. In the context of a constitutional monarchy, the legitimacy of the leadership of the country is challenged by the emergence of strong opposition actors, like for example the Muslim Brotherhood. It is highly likely that they may strengthen their rhetoric to gain popularity against the policy-package reform, capitalizing the perception of negative impacts from the population for their own political gain.

Jordan's population is particularly opposed to subsidy reforms in relation to its neighbors and the opposition to reform electricity subsidies is stronger than the opposition to reforms on food subsidies. The social Protection Evaluations of Attitudes, Knowledge and Support (MENA Speaks) 2013 survey, indicates that about 56% of Jordanians were opposed to any subsidy reform be it electricity, food, petroleum products or water.[40] Self-identified lower middle income group is less likely to oppose subsidy reform in comparison to the upper middle and wealthy group. Furthermore, in Jordan Electricity and LPG subsidies appear to be even more politically sensitive than bread subsidies: Only 11% of respondents were open to LPG subsidy cuts and only 7% were willing to consider electricity reforms.[41] These figures illustrate the challenges for the government in dealing with electricity and its relevance to development.

[38] Ibid.
[39] Ibid.
[40] WB- 2017
[41] Ibid.

Electricity service is a private good in its economic nature as it is both a rival good and an excludable good. Yet, electricity enables other activities and services (health, education, productive activities, etc) whereby its interlinkages with development and quality of life makes it perceived as a public service or good. It is this value to consumers which makes regulatory organizations such as the Jordan's MEMR be influenced by politics in its operations and be ineffective in its regulatory and oversight role. Alignment strategies among across utility companies and engaging strategies with the population are needed if this policy package is to be delivered.

In terms of services policy coherence and performance, scholars such as Oda and Tsujita have argued that electricity service provision is liable to political capture by local elites, yet as explained extensively, in the case of Jordan the current subsidy system provides valuable assistance to the poor, but at the same time it is pro-rich and inefficient. There is no perfect recipe for electricity reform but perhaps eliminating subsidies for certain segments of the population progressively, fostering energy-efficiency and providing off-grid solutions for those that consume the least (particularly well-suited for semi-urban areas) not only issues social protection to low-income families but results in other positive outcomes congruent with the development goals for Jordan such as strengthening institutions and civil societies, technology development and supplying clean energy, but also energy security outcomes such as reducing the dependence on imported fuels, diversifying supply, enhancing the national balance of trade and reducing vulnerability to price fluctuations. Which in the context of regional armed conflict is very important. Subsidy reforms, however, are a politically sensitive issue. The Financial Times reported several protests in Amman and Irbid that occurred in the 2012 post-petroleum subsidy reform. Protester's messages were addressed against King Abdullah personally; there were attempts to take down portraits of the King and calls in support of "revolution" that justified the intervention of the riot police. [42] On the other hand, the IMF strongly supported the measures and granted 2 billion USD loan facility to Jordan, in exchange for a promise to curb public spending and raise the price of electricity.[43] Jordan reversed its policy of petroleum product subsidy cuts in 2014 back to 2011 prices and a major reform of the bread subsidy, in 1996 was also overturned following widespread social unrest. Thus, there are several political considerations at hand.

From a fiscal and accountability perspective, the reform may also bring high entry costs and high entry inflows of money that could destabilize the capacity of electricity bill collecting offices, this can also cause a lack of effective oversight by regulatory bodies (particularly where accountability mechanisms are generally weak), and ineffective legal redress, as regulators are subject to political influence. This is likely to happen within NEPCO and the ERC (Jordan's Electricity Regulatory Commission).

3.1 The challenge of collective action and electricity as a common pool resource

[42] The Financial Times - 2012
[43] Ibid.

As it is in the case of public company NEPCO, where accountability for electricity is weak, the supply of electricity services to particular groups and the allocation of subsidies can be used for political advantage. Much of what occurs in Jordan responds to what would be considered as weak governance in the sector. The risks are that the population's notion that a non-democratic regime is imposing a price-based reform may incentivize electricity theft and corruption in the form of preferential treatment to certain well-connected families or patronage. The reality and the expectations of these actions will generate overall population discontent and non-compliance. Thus, the success of the policy-package is not tagged to solar PV technology deployment or to the distribution of the Green Funds but to the institutional capacity of managing such a reform and its risks.

Furthermore, although the electricity market in Jordan has been partially liberalized, the constant flow of grants, soft loans and other type of public (international or domestic) help, may have also hindered financial performance for service providers, as utilities (particularly NEPCO) are led to belief that they will not be allowed to fail. This notion is very common among public companies in the developing world, yet fiscal discipline monitoring is also a way of fostering capacity building. Incentives to tackle maintenance issues, better customer service and even energy efficiency throughout transmissions and networks are not re-enforced because the overall electricity sector is set within an oligopoly and a heavily-subsided environment, which is why it is also important to diversity the sector incentivizing the entry of small solar PV and SWH companies, as mentioned earlier.

For this, it is imperative to conduct communications and alignment strategies, across different institutions and companies. By communicating MEMR's goals and alignment of CEGCO, SEPGCO, AES, KEPCO and NEPCO to run their internal affairs bearing in mind their institutional contribution in attaining MEMR's goals. Collier and Akerloff's research on institutions can issue guidance as to how this can be accomplished. To prevent corruption and mismanagement at the institutional level what is needed first and foremost is behavioral change. Studies on car companies like Toyota and the Toyota Production System (TPS) in the early 1980s highlight an organization in which employees and managers at all levels in all functions are able to "internalize" company's principles and teach others to apply them.[44] At the production plants, workers themselves would stop production lines when they noticed quality failures in assembling parts. Any worker (not only the supervisor) could simply pull a cord when they noticed an inadequacy, which will stop the production line to assess the part. There was enough trust to communicate human errors because the collective challenge of building a reliable car, with no faults, was internalized. Yet how do we manage to reach behavioral change in a company like NEPCO?.

3.1.1 Fitting culture into conventional economics

According to Akerloff-Collier, preferences are endogenous. Consequently a person's behavior is endogenous as well. Narratives and norms explain the perceived constraints

[44] Harvard Business Review - 2014

that also shape behavior. Akerloff's idea of internalization of objectives indicates that the main difference between an effective and a non-effective institution is the motivation of the workforce.[45] In the context of austerity, higher wages are not the most efficient solution for Jordan's organizations as the problem of subsidy-dependency and lack of accountability is more complex and structural. For this we need to understand the organizational culture which typically comes from three mental constructs: identity, norms (that shape behavior) and narratives, the three tend to be mutually reinforcing. NEPCO and the MEMRs workers must manage a narrative of social responsibility toward energy efficiency and fiscal accountability. For instance, at a 2016 Climate Finance Day Conference in November 2016 in Paris, the CEO of Credit Agricole mentioned that he strongly encouraged all of the workers of his organization to understand the importance of the fight against climate change. He requested of worker's to know the basic structure of a green bond, employees across different offices would often quiz each other and the topic was talked about within the organization. It is through an energy efficiency and fiscal accountability discourse that all of the set of norms and checks for the policy package can be explained, understood and applied. The importance of mobile actors (like a CEO, a Minister or a King) and their power to communicate within a social network (like NEPCO or MEMR) is key, meaning that they have to display behaviors congruent with what they are asking of the population. Therefore it is difficult to request from people to change to solar water heater systems or PV panels if the main buildings of the ministries and the Royal Family residencies are not also adjusting to diminish the unnecessary use of electricity. Otherwise the narrative becomes dysfunctional and the outcome is an unmotivated workforce and an unmotivated overall population. Furthermore, the cost of demotivation can be extremely high in the contexts of regional political instability.

In the political context, culture is persistent; it is not easy to change a culture of subsides or electricity over-usage. Thus, the importance of social networks is key to modify disruptive mental constructs, as they tend to protect people's belief systems. For instance, the belief that the government must provide all services for free or at a small cost. Likewise, if there is dysfunctionality within the organization, it's the system that is dysfunctional.

Applying these ideas, was crucial in the success of tax collection reform strategy adopted by the Uganda Revenue Authority (URA). The institution was successful in the collection of taxes and accountability, in the book: "Uganda's Recovery: The Role of Farms, Firms, and Government" Paul Collier says that the strategy deserves recommendation as it enabled a coordinated change in expectations at the level of the institution. Before the reform the system was corrupt and the approach of public tax collectors was "pay me or pay the tax", yet other than building narratives to internalize goals among workers, services were decentralized to the distinct level, with the intention of subjecting also to the scrutiny of local electorates and politicians. The reform also strengthened the role of the justice system at the court level by bringing in foreign

[45] Akerlof and Kranton – Journal of Economic Perspectives – 2005

judges to analyze compliance.[46] This is not to say that these measures will work in Jordan, but simply to point out that reforming institutions and the cultures within them is possible in developing countries for the purpose of public good.

3.1.2 Asymmetry of information and collective action

According to Mcloughlin and Batley, asymmetry of information and the notion of merit goods can lead to market failure. However, it can also lead to barriers toward collective action. Due to this the communication that electricity service is a private good with public benefits (and negative externalities as well) is very important. For this, tackling information asymmetries among the population is crucial. The success of the policy package is in the design and implementation of a successful social engagement strategy with the population. Its key characteristic must be participatory and from the bottom-up. Following the example of the Jordan Foundation and USAID's Community based Organizations (CBOs) for the SWH project; we know that it is important to engage population at the household level. As explained in Ostrom's research of common-pool resource management the common thread to local engagement is that political/governance institutions have to drive collective action initiatives and communities need to sign on once they already exist. In this case it should be the other way around; the population must internalize the concept of energy security and development goals. For this, communication needs to be carried out house by house by volunteers (engaging actors from the Jordan Foundation or Jordan's Friends of the Environment Association and specially new and smaller civil organizations) and with the persuasion of good narratives and good mobile actors within key social networks (school's, community centers, companies and the alike) we must not only transmit information but also **collect** specific concerns of social impacts as well as taking people's suggestions for mitigation strategies. (For instance, monitoring that maintenance of SWHs are conducted, quality of the office for consumer complaints, energy consumption apps for the citizens, etc.). It is expected that the population feels heard, while understanding the complexity and the necessity to collaborate with the policy package and decide to engage further, making information accessible to others with regard to the understanding of electricity and of the policy-package. This has been conducted successfully by agencies such as the AFD in the Soweto Water Project in South Africa, by which for the first time in 2005 people were going to receive the installation of pre-pay meters to measure consumption per household, a project that was extremely controversial. Yet the project raised awareness among residents household by household of the importance of water management and why billing structures and pre-pay meters were necessary for the financial viability of the service. The population was also made aware that the project also entailed the searches for leaks and improvement of the non-renovated water network to reduce water losses.[47]

3.1.3 Distrust and the battle of information

[46] Reinikka and Collier – World Bank 2001
[47] AFD – 2010

It is expected that the Muslim Brotherhood and other opposition groups may emerge to agitate the population and misinformed them about the details and impacts of the policy-package. This is perhaps the most important risk to manage as it can lead to an overall destabilization of the current political structure. Therefore, the communication and engagement strategy by the government must be consistent, timely and executed at the household level, with a powerful reach to mainstream and independent media. However, the WB has also recommended that in the light of the appointment of the Prime Minister in 2013, his role as a motivator actor is crucial. Abdullah Ensour received the specific recommendation of meeting with key stakeholders in and also outside of the Government to include civil societies.

Of a lesser impact is the response of institutions like the Atomic Association in Jordan, as they seek to catalyze funds in their direction, with the overall focus of renewables in the policy reform, they may feel uncertain. Hitherto, it is also important to engage them and explain that the reform is in alignment with the overall 2020 energy goals of the country, in that they are complementary to the integration of nuclear for electricity generation in the decades to come.

It is imperative to communicate that the reform is in no way connected to the refugee crisis that the media often highlights. Although the international community like the Noregian Council is involved in the development of off-grid solutions for refugee camps, it is important to clarify that the reform responds to a greater fiscal structural problem that dates back to the foundations of Jordan as a state. Funds are in no way interlinked, meaning that the Jordanian population should not believe that the subsidy cuts exist to fund any project for the recent inflow of migrants, refugees and asylum seekers.

4 Conclusion

Jordan has to manage the political and social risks of implementing reforms and the overall fiscal and current account crisis that has the potential to destabilize the currency, disrupt relations with important international lenders & development agencies and overall economic deterioration. Handling external and internal pressure can affect the political equilibrium and the distribution of compensation packages of the reform. However these risks although high they can be mitigated. It is imperative of Jordan to run stakeholder analysis and impact risk analysis every 6 months in order to assess the likelihood and severity of each of the possible impacts listed on this document. However, the electricity subsidy reform although it responds to a fiscal crisis, it tackles the status quo of an inadequate electricity service management, which hindrance to the overall development of Jordan has been severe (e.g. contribution of electricity debt, import-dependency, subsidy-dependency, lack of domestic technology development and capacity building), meaning that this crisis provides windows of greater structural reforms that the political class may not have otherwise conducted. The engagement

strategy of the policy-package is a key element with powerful potential of closing the gap of communication between the government and the people, toward a more collectivized take of state goals such as fostering energy security and clean energy access while building high-capacity public and private utilities and bringing innovative ways to educate the masses on electricity consumption and fiscal responsibility.

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