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Jordan's Energy Security: Impact of Dependency on Unstable Foreign Sources on Social Stability and Policy Alternatives

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Spring 2013

JORDAN'S ENERGY SECURITY: IMPACT OF DEPENDENCY ON UNSTABLE FOREIGN SOURCES ON SOCIAL STABILITY AND POLICY ALTERNATIVES



By

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Abstract

Jordan is one the world's most dependent countries in foreign sources for energy production in the world. 96% percent of its energy comes from imports from neighboring countries, while exploitation of domestic resources is practically insignificant. Of the primary imports, crude oil and products are by far the most important resource, with natural gas in second place. This dependency is very problematic for both the Jordanian regime and the society it governs in two main ways. Firstly, the source-countries of these resources are highly unstable, especially in the current context of the “Arab spring.” Their outflow of energy sources is very susceptible to political turmoil, affecting the amount supplied to Jordan. As a result of the Egyptian revolution in 2011, for example, Jordan’s imports of natural gas fell 62% relative to 2010, which forced the government to increase gas prices and increase spending on imports of crude oil to act as a replacement. A second way in which it is problematic, is that even such high levels of imports are not able to meet the entire energy demand of the population. While supply is growing at an average of 4.4% per year, demand is growing at 7.4%. A society that cannot supply its basic energy needs is likely to incur into domestic crisis, as economic progress and human development find themselves severely halted. To address this dependency, Jordan must understand its condition, and then pursue potential options to decrease it. This paper has identified three main ways in which Jordan may do so. First, Jordan must seek to reduce demand. It can pursue this both through rationing in the short term and a change in consumer behavior in the long term. Secondly, it must increase the guarantee of foreign supply. It can do this by both diversifying its sources and increasing interdependence with existing ones. Third, it must seek greater self-sufficiency, which It can do both by developing its Oil Shale sector and its nuclear program.

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International Law and Relations 516
Environmental Studies 537

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وفقكم الله لكل خير ولتكن ايامكم كلها حب وسعادة, وأتمنى من الله ان تكونوا دائما بخير وصحة وعافية.

ولدكم الان



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Introduction

Providing a steady supply of energy resources at reasonable costs is one of Jordan's most pressing challenges. Its energy security –the assurance of adequate energy supplies to maintain the economy running at normal levels– (Willrich, 1975, p.66) as for any other country in the world, is a paramount concern that transcends every level of governance and economic practice. This is necessary for basic economic growth, human development and most imperatively, for the security of standing regimes and the stability of their societies. This is especially true now for Jordan in the context of the “Arab spring”, in which long standing leaders have been forcibly removed for not being able to meet the demands of their populations.

In terms of its needs, Jordan falls under a very specific category. Mason Willrich, an all-times scholar in energy security, finds useful to divide countries regarding on their primary position in the international energy markets. In his view, countries are primarily importing or exporting. Depending on where they fall in this dichotomy, they have certain energy needs, energy assets and a series of possible options they may pursue to increase their security. In this category, Jordan is clearly an importing country, as 96% of its energy supplied by foreign sources.

Table 1 in the following page illustrates the amount of imports, relative to domestic production and even more so to exports this very clearly. As this table illustrates, of a total energy supply of 7457.3 of TOE (Tons of Oil Equivalent), only 281.3 come from domestic production, while a daunting 7029.9 come from Imports. This clearly shows that foreign sources are the absolutely vital, while domestic production covers an almost insignificant portion of the total supply.

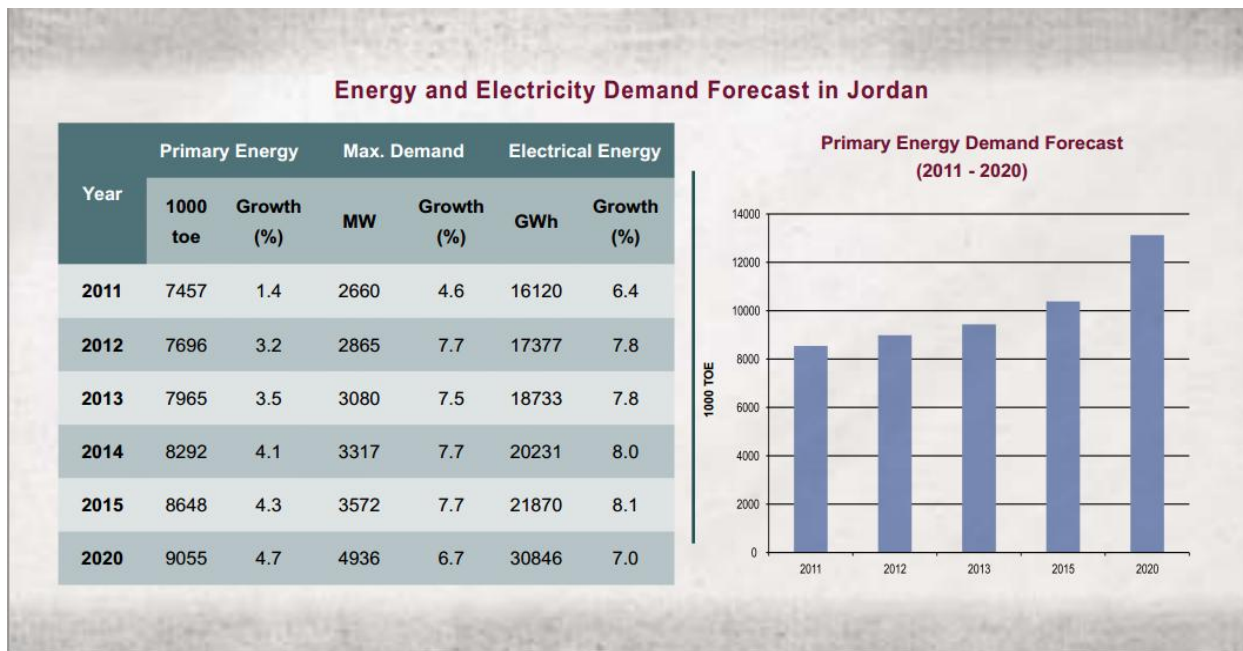
Table 1. Jordan's Energy Balance Sheet (000 Tons of Oil Equivalent) Year 2011.

Jordan Energy Balance (000 TOE) Year 2011													
Sector	Crude Oil	Fuel Oil	Diesel	Gasoline	LPG	Kerosene	Jet Fuel	Other	Total Oil	N. gas	Electricity	Solar Energy	Total Energy
Indigenous Production	0.9								0.9	133.9	16.5	130.0	281.3
Imports	3192.9	652.0	1386.6	425.3	320.6		0.9		5978.3	738.8	312.9		7029.9
Exports											15.4		15.4
Bunkers		2.5	6.1				109.0		117.6				117.6
Stock Changes	-89.1	-101.9	-55.7	-11.8	-6.8	-18.4	6.1	-1.5	-279.1				-279.1
Primary Energy Supply	3282.9	751.4	1436.2	437.1	327.4	18.4	-114.3	1.5	6140.7	872.7	313.9	130.0	7457.3
Oil Sector	-3282.9	839.5	1049.6	708.8	93.0	59.3	341.2	103.7	-87.9				-87.9
Electricity		1284.2	962.0						-2246.2	-872.7	1259.6		1859.2
Transp. & Dist. Losses											325.4		325.4
Cons. Energy Supply		164.2	3.1					45.8	213.1		83.0		296.1
Final Energy Consump.	0.0	142.6	1520.7	1145.9	420.4	77.7	226.9	59.3	3593.5	0.0	1164.0	130.0	4887.5
Industry		137.2	517.0		2.9	6.5			663.7		296.8		960.5
Transport			638.7	1145.9			226.9		2011.4				2011.4
Household			136.9		340.5	68.2			545.6		477.2	113.1	1136.0
Services			121.7		26.5	1.8			150.0		195.6	16.9	362.4
Others		5.4	104.9		50.4	1.1			161.8		194.4		356.2
Non-Energy use								59.3	59.3				59.3
Statistical Differences		0.0	1.5	0.0	0.0	0.1	0.0	0.0	1.6		0.0	0.0	1.6

Source: Ministry of Energy and Mineral Resources Statistics and Publications. Retrieved on April 30th, 2013.

As times passes this becomes increasingly problematic, since domestic demand is growing at a much faster pace than the primary supply. Table 2 illustrates this aggravating condition. While primary supply is growing from 2014 to 2020 at an average of 4.4%, demand will grow in the same period at an average of 7.4%. This means that starting in 2014, and at the current pace, Jordan's energy sector will not be able to meet the demands of the population. This may in damage to economic activities, and high unwanted prices, which, as will be discuss in depth later in the essay, could have serious implications on social stability.

Table 2. Energy and Electricity Demand Forecast in Jordan.

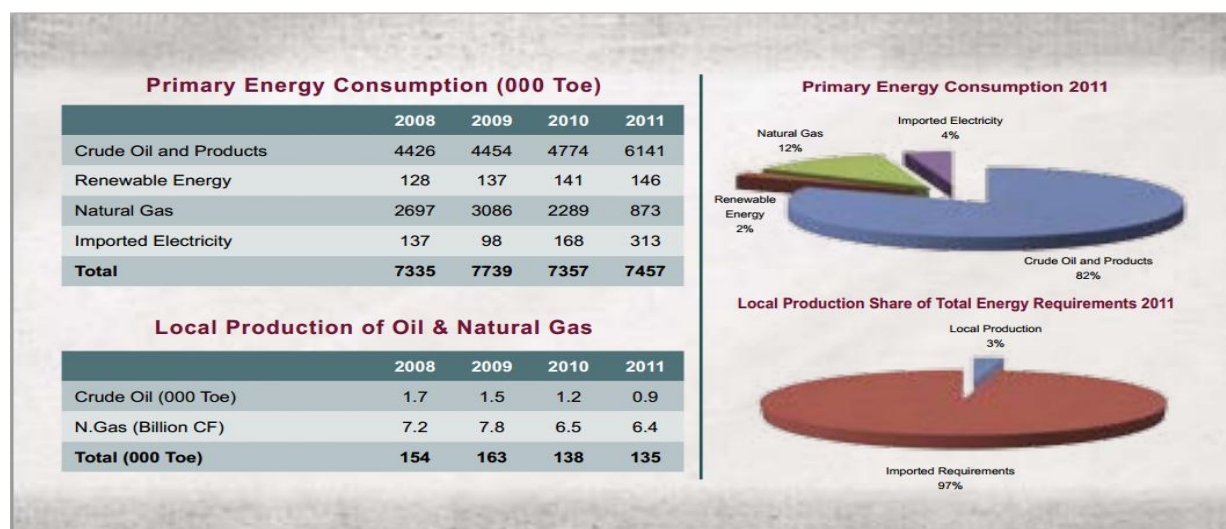


Source: Ministry of Energy and Mineral Resources Statistics and Publications. Retrieved April 30th, 2013.

Of that 7457.3 of energy supplied in 2011, the most recent statistics available show crude oil and products are Jordan's the most utilized resource. This is very clearly illustrated in Table 3. With 6141 TOE, crude supplies 82% of Jordan's energy needs, followed far behind by Natural Gas supplying 12% (873 TOE) and Renewable Energy at a very poor 2% (146 TOE). This proportion, however, although it resembles the role crude oil and derivative products plays in Jordan's economy, it does not accurately represent the role that natural gas has played in years previous to 2011. This is a result of the developments of the Arab spring in the surrounding region, and its direct impact on Jordan's source countries. This is especially true in the case of Egypt, whose internal domestic turmoil has turned the country into a very unstable source of natural gas to Jordan. There is clear change in natural gas consumption on oil before and after 2011, where the effects of the Arab Spring were seen at its clearest in Egypt. The Jordan Investment Trust reports on these changes as follows. "Explosions on the Egyptian pipeline that supplies Jordan with the bulk of its natural gas needs brought about a significant drop in imported gas from 2,152.3bcm in 2010 to a mere 872.7 bcm [about 6141 TOE] in 2011. Because natural

gas is utilized by the Kingdom for the generation of 80% of its electrical power, this drop in natural gas supply had to be replaced with oil product, which drove up the weighting of oil in the energy mix to 80.2% in 2011 from 64.9% in 2010.” (The Jordanian Energy Sector Report, 2012, 3). Table 3 also serves to illustrate the shift. In the years previous to the Egyptian revolution, the natural gas consumption remained at a very stable level. It went from 2697 TOE in 2008, to 3086 in 2009, to 2289 in 2010. However, with 2011 revolts and domestic turmoil, Egyptian exports of natural gas to Jordan felt from 2289 to 873 TOE, a very sharp drop of 62%. As a result, Jordan had to replace as much of it with crude oil and products, increasing its consumption sharply in 2011 relative to the three previous years. Jordan’s oil consumption went from 4426 TOE in 2008, to 4454 in 2009, and 4477 in 2010, to 6141 TOE in 2011, a sharp increase of 28% in the crude oil and products consumption. The 1164 TOE lost due to decrease in Natural was imports from Egypt, were replaced by the 1367 TOE increased in crude oil and products.

Table 3. Primary Energy Consumption before and in 2011.



Source: Ministry of Energy and Mineral Resources Statistics and Publications. Retrieved on 30th of April, 2013.

This dependency on foreign sources shown in table 1, their susceptibility to political disturbances and instability in supply shown in table 3, and their forecasted incapability to increase the supply at a faster rate than domestic demand illustrated in table 2, leaves Jordan at a very weak energy security

position. This posts a series of very significant questions. First, why and how has Jordan developed such high dependency on foreign energy sources, without any sort of significant domestic program? How this dependency affects Jordan's national security and social stability, especially in such volatile contexts such as the Arab spring in the Middle East? And third, what can be done to minimize dependency and increase Jordan's energy security?

To answer these questions this paper first argues that Jordan developed such dependency because of a regional political economy that was very favorable in the short term, but that in the long term strongly discouraged any domestic energy projects and to envision drastic changes in the following decades. Second, this paper proposes that a very high instability of resources supply, results in a constant energy price increases, which then have negative effect on domestic security. These price hikes instigate severe dissatisfaction in the population, which is quick to show their dissent with protests, and even to demonstrate anger and aggression against King Abdullah II. Third, this essay proposes three possible options Jordan may pursue to increase its energy security. The first option is changing domestic consumption to decrease the demand and therefore the pressure on supply. This can be pursued in two main ways, directly through rationing and indirectly through practices to change consumer behavior. Secondly is through strengthening its guarantee of foreign supply, which can be done through diversification to new sources and through increasing its interdependence with its existing ones. Thirdly, Jordan can increase its self-sufficiency. This can be done through the exploitation of its current sources of Oil Shale and the development of a more decisive renewable energy program, specially nuclear and solar energy.

Literature Review

This project has organized the literature in two larger categories, with their internal subdivisions. The two broader categories are first energy security, and second energy production. While the first looks at the relation between the stability energy resources and the varying domestic and international actors

seeking it, the second looks at the more technical elements of energy production, distribution and consumption.

Energy Security

The literature on energy security is mostly concerned with the availability of resources and their geopolitical effects among different state and non-state actors. Among the most prominent works, and by far with the most importance for this project, are “Energy and World Politics” by Mason Willrich (1975), “The International Politics of Natural Resources” by Zuhayr Mikdashi (1976), “Ensuring Energy Security” by Daniel Yergin (2006). In providing a definition and a theoretical framework, however, Willrich's work is certainly the most eloquent and effective, earning the focus of this part of the literature review, and of its use in the larger paper. Other authors serve to provide complimentary literature where Willrich's has fallen short.

In his book, Mason Willrich understands the pursue of energy security mostly in a *realpolitik* perspective, in which the different actors are pursuing the satisfaction of their needs through power plays and in competition with one another and without a major centralized authority, or as realists like to call it “in an state of anarchy”. As Willrich (1975) puts it, “in a world community without any supranational government, national security requires freedom of action and bargaining power.” (p.65). Daniel Yergin (2006) describes this relation between energy and international politics eloquently when he says, “energy security does not stand by itself, but is lodged in the large relations among nations and how they interact with one another.” (p.69).

In providing a definition, all authors seem to agree that energy security is the assurance of sufficient supply of energy to maintain the economy running at “normal” levels relative to standard economic indicators of previous years and at a “politically acceptable” manner. This notion taps into the economic aspect of energy security, but at the mention of “politically acceptable”, it makes an allusion

that it involves the agreement and satisfaction of the people that hold political authorities accountable for the state of their energy resources.

One of the most important contributions of this notion is that it views energy security from the perspective of each individual country. As a result, Willrich (1975) categorizes countries in two major types. As he puts it, “for purposes of analysis it useful to classify countries as energy importers or exporters.” (p.65). Similarly, Mikdashi (1976) says that a useful general analytical framework for interpreting behavior and performance of the parties in resources markets is that of exporters versus importers. However, but authors warn that both exporting and developing countries can be either developing or developed, or that often a country can be exporting in one sector while importing in another one. To address, throughout their work they make further clarifications, specifying the countries stage of development and whether exporting or importing. For this paper, however, their model for a developing importing country matches perfectly the subject of this study, Jordan.

For Jordan’s type the literature defines specific factors that determine a countries energy status. Given their specific set of “energy assets”, such as natural resources, human skills and capital Willrich (1975), Makdeshi (1976) and Yergin (2006) propose a series of measures that countries can take to increase their energy security. The one that all authors emphasize as the most important is diversification of sources. They all agree that having multiple sources minimizes risk, relieves pressures in times of crisis, and allows for a greater degree of independence. As Yergin (2006) puts it, “Multiplying one's sources reduces the impact of disruption is supply from one source by providing alternatives, serving the interests of both consumers and produces. (p.76).

In his framework for increasing energy security, however, Willrich (1975) goes much further than that, and sees diversification as only one of many options and sub-options. For him there are measures that are “designed primarily to limit damage from energy supply interruptions” such as rationing and stockpiling, others that “are intended to strengthen assurances of foreign supply” such as diversification

and building of interdependence, and third, the pursuance of self-sufficiency, such as domestic energy production. (p.77). A researcher seeking to explore possible options to increase energy security for their case study, as it is the case of this paper with Jordan, may find this framework extremely useful.

Energy Production

On this area, the existing work does not provide an academic framework, but rather the opportunity for one. Most of the sources are either raw statistical or official statements by the government and related entities official entities. Just a few pieces that go beyond mere factual data were found, and these are primarily opinion-oriented.

Regarding domestic energy production, early in the process it was very clear that the most prominent discussion is taking place regarding nuclear energy. There are two types of literature on this area. The first one explores the topic from a more objective perspective, analyzing conditions on the ground, and the one that advocates or opposes the nuclear program. Jordan's Updated Master Strategy of Energy Sector in Jordan for the Period 2007-2020 (2007) is perhaps the most comprehensive analysis of nuclear energy potential. Its discussion of this resource revolves around its potential contributions to country's electricity generation. It touches upon the extra electricity produced, the infrastructure necessary to achieve it, the financing to support the project and the expected time frame for the project. As the reports puts "it In order that the economic comparison can be more accurate among all alternatives, the study was conducted for the aid period in addition to studying the nuclear alternative within the alternative of expansion in electrical power generation taking into account all variables occurred to the electricity sector." (Master energy strategy, 2007, p.9). Regarding the infrastructure and timeframe, it mainly discusses the types of generators the program would utilize, as well as the timing for their energy generation. By 2020, the report expects that nuclear energy will represent a 6% of the total energy mix.

Other more informal reports share similar figures, however the Master Energy Strategy is the main point of reference for this matter. “ (Master energy strategy, 2007, p.13)

Interestingly, the vast majority of the publications advocate for nuclear energy. Among the most active intellectuals on this issue is Bahjat Tabbara, whose lack of governmental or sector affiliation makes him a more objective source. Another active member of this discussion is Khaled Toukan, however, his position as the Chairman of the Atomic Energy Commission informs his agenda, as a result is difficult to obtain an unbiased position of his analysis. On the other hand, his position grants a great deal of expertise, which is a very valuable resource. The researcher must be able to find a balance between these two sides.

The main argument these two authors address is the environmental concern. Throughout his articles, Mr. Tabbara makes the claim that increasing energy supply is not an option Jordan can choose not to take, but rather it is a must. The real question is what type of energy. Thus, he argues that nuclear energy is much cleaner option than a greater pursue of fossil fuels and the exploitation of oil shale. As he claimed in his article to the Jordan times *Why Jordan Needs Nuclear Power* (2013) , the over 6 billion tons of carbon dioxide poured into the atmosphere per year do much more damage than 3.5 cubic meters of stored and controlled nuclear waste.

Dr. Toukan’s article *Jordan: Why Nuclear?* makes two important contributions to the literature. The first one is its explanation of raw materials for nuclear fission. His report claims that there are sufficient uranium sources in the country to sustain a nuclear program without needing to rely on imports and falling back into the problem it is trying to address, dependency in foreign resources. He believes, for example that there is over 70,000 metric tons of unexplored uranium oxide. His second contribution is at least a brief allusion to the challenges to nuclear energy. In his view, the main ones are high investment cost, need for skilled human resources, limited water supply, few suitable sites, and a volatile political environment. There are virtually no publications opposing the nuclear program.

The literature regarding Oil Shale is at a different stage than one on nuclear energy. On Oil Shale, it is easier to find factual reports that focus on primarily on feasibility assessment, while it is more difficult to find articles with a specific opinion. The most prominent documents available on this topic are Dr. Jamal Alali's report to the International Conference on Oil Shale (2006) and Engineer Munther S. Besieso's to the 27th Oil Shale Symposium (2007). Dr. Alali is the head of investment and International Cooperation of the Natural Resources Authority in Amman, Jordan. In his report of 2006, Dr. Alali offered a comprehensive document that covers several aspects of Oil Shale use in Jordan, from history, to ways of extraction. First, he offers numerical data on the availability of Oil Shale and the potential benefits it can bring to the country. Among the main advantages he highlights are its large reserves and its presence on thinly populated areas with minimal environmental impact. Moreover, according to his analysis, there are significant Oil Shale reserves in Northern Jordan in the Irbid district, in Central Jordan in the Karak district and Southern Jordan in the Ma'an district. In terms of extraction, Dr. Alali argues that certain favorable conditions such as proximity and soft to moderate overburden rocks make Jordan's oil shale favorable for exploitation. His report also offers a brief explanation of the process of turning oil shale into utilizable energy.

Engineer Besieso is the Senior Technical Advisor to the Ministry of Energy and Material Resources in Amman. In his document, he explains Jordan's Oil Shale Development Strategy and discusses the potential mechanisms to as he puts it, "put Jordan on the path to greater energy independence and make it a pioneer country in commercial applications." (Besieso, 2007, p.1). Eng. Besieso offers an overview of the history of Oil Shale in Jordan, and a more technical explanation on the properties of the domestic resources and their potential for extraction. One of his major contributions perhaps, is the different angle he takes. While Dr. Alali holds the primary concern of this paper, which is decreasing dependency on foreign sources, Eng. Besieso analysis Oil Shale in contrast to Crude Oil. As a

result, he provided greater information on the impact of depleting crude sources, and thus the importance of developing strong oil shale programs.

Regarding the topics of rationing, stockpiling, or changing consumer behavior, as well as diversification and strengthening of interdependence with foreign sources and the impact of energy insecurity on social stability, Jordanian literature is practically inexistent. Only the work of Mohammed Al-Masri of the Jordan University for Strategic Studies seems to address this topic. However, his publications are not available online or upon visit at the university, and Dr. Al-Masri himself was unavailable during the research period. In terms of literature for social stability, this paper relies on news articles that correlate events such as protests and demonstrations with spike in gas and oil prices. Among the best sources for these purposes are the national Jordan Times and regional Al-Jazeera, as well as newspapers with a large international scope such as the New York Times of the United States and Reuters of the United Kingdom.

Methodology

Doing independent field research is one of the greatest opportunities of being in Jordan. After multiple eye-opening lectures with renowned speakers, and a prolonged period of time interacting with Jordanians in their houses, workplaces, the streets and in many aspects of everyday life, I noticed that the most concerning situations are the one with the heavy influx of refugees and the pressure on natural resources for human consumption and energy production. Having identified that, I began studying the literature, as well as narrowing my focus on attention towards these two topics. Throughout my periods of researching and reading, I came to the realization that while the refugee topic is being broadly discussed in varied channels of the media, very little is being said about the energy shortages, their impact on the population, and can the government do to address these issues in the near future. Then is when I decided for the issue of energy production in Jordan.

Largely influenced by my academic and professional path of International Relations, the first project ideas and proposals were very foreign policy oriented. At first, this paper aimed to study Jordan's energy relations with its neighboring countries in terms of their respective resource trading relations. It aimed to study Jordan's relation with them, identify how they were problematic, and provide recommendations on how to address them. Soon after, however, I realized that this project, given its angle and focus, was not the best option because of two main reasons. First, it would have taken away a great opportunity, field research, given its focus on high-level diplomatic relations. Secondly, this approach would not have gotten at the heart of the issue, the impact of foreign energy dependency on Jordanian society.

This dilemma was an obstacle to continue the research, but only temporarily. To solve it, the help of my local advisor was invaluable. He is Dr. Yusuf Mansur, a former UN Development Program regional director, current CEO of a consultant company, and one of the greatest experts on Jordan's economic policy today. Soon after reviewing my original proposal, Dr. Mansur labeled it too broad, with little incorporation of analysis of conditions on the ground. In our meeting, I told him that was a looking to incorporate energy foreign policy with domestic politics, economic conditions, and the potential for improvement of different energy sectors. That is when he reminded of the concept of energy security, and how it combines a series of aspects from all these fields.

After that meeting with Dr. Mansur, it was clear that this project was going to be framed under the theoretical approach of energy security. As a result, the path to follow to understand Jordan's energy condition and how to improve it was apparent. Qualify Jordan's energy security status, determine the factors that shaped it, understand the impact of that condition on the society, and analyze potential ways to address it's the roadmap for the completion of this project.

To complete these steps, several measures for data-collecting were taken. The primary source of information was certainly interviews, with individuals in different parts of the energy security spectrum.

In determining and finding the interviewees, again the role of my local advisor was extremely important. Dr. Mansur's previous and current positions in the professional realms make him a very influential voice, one that is extremely well connected. Right away, he provided me with names and phone numbers of important figures in official positions such as the energy ministry and the ministry of environment, in important actors of civil society and with other very active and published members in the discussion. Other interviewees, such as individuals involved in the energy production sector, members of society concerned with social stability such as various activists were contacted mainly as a result of the initial interviews, which extended my network of informants.

A second extremely important was raw statistical data that was found through official media channels or through the help of local experts. To find it, this project dug deeply into the archives of the Ministry of Energy and Mineral Resources. When the data was only available in Arabic, it was necessary to translate to English. To do so, I used the help of many willing individuals that range from experts in the field, to teachers, to language volunteers to my host family who I was living with during the research period.

As third data-collecting measure utilized in this project was informal participant observation. Innumerable conversations on the topic with different actors from lecturers to household bill-payers, to gas distributors, to taxi drivers to protestors not only provided a greater feeling for the severity of the situation but often led into new directions and in many ways guided this research. Similarly, I had the opportunity to attend conferences regarding the topics this paper addressed.

This diverse methods and sources were all very helpful, especially when they came in combination with one another. To utilize them appropriately, this project created a master interview question set that governed most of the data collecting. It included questions addressing all the different subtopics of the paper, from foreign relations with source-countries to the technical elements of diverse types of energy production mechanisms. The list of these primary questions can be found Appendix 2.

Overall, this combination of research proved very effective. Generally, the interviews provided the initial information, which was then backed up by documentary sources and statistics. Then the data analyzed often provoked new questions and provided new observations, which was then tested against a new set of conversations with informants.

Perhaps one of the biggest problems I encountered while conducting research was scheduling interviews within the provided timeframe. For this project it was fundamental to obtain information and opinions from policy-makers and experts on the field. However, such positions render them very busy, with little time allocated for researchers without media or government affiliations. Fortunately, the name of advisor was very helpful in getting individuals accept to be interviewed. Yet, even when the interview was secured and was taking place, it was constantly interrupted. One of them even had to be cancelled half-way through, given a situation that my interviewee had to take care of urgently. This, however, was not a heavily burdensome obstacle, but rather an important research experience that will be very helpful for conducting field work in the future.

Nonetheless, this research was overall very successful. This is mainly because it comes to address an issue of extreme concern and of pressing timing. Furthermore, it comes to fill a significant gap in the literature, while pulling together diverse sources of information from a whole array of different topics under the umbrella of energy security and national security. As explained in the literature review, most of the written sources provide raw data, technical reports or highly opinionated writings. Drawing on fundamental energy security theoretical frameworks, and on extensive field research, this project has aimed to fill that gap.

Findings and Discussion

This paper seeks to answer three very specific questions regarding Jordan's energy security. First, it explores why Jordan developed such high dependency on foreign resources without pursuing a domestic

program? Second, it analyzes how that dependency impacts social stability? Third what options can Jordan pursue to increase its energy dependency? This section provides the answer to these questions that came as a result of the documentary and field research on the topic.

Origins of the dependency

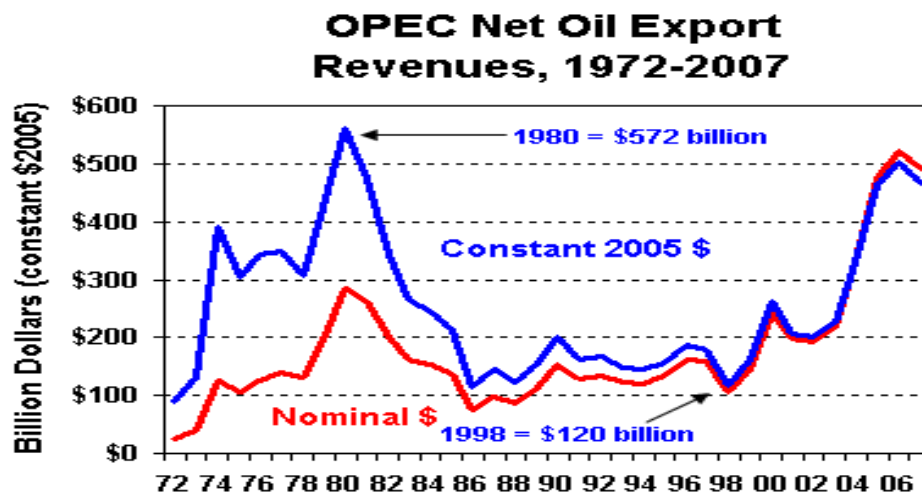
The first finding of this paper is that Jordan's dependency goes way back, and happened as a result of a combination of temporal highly favorable conditions and a lack of long term energy security planning. It can be traced all the way back to the oil boom of 1973. Starting that year, countries of the Gulf, began acquiring large amounts of wealth at a very fast pace. The increased economic growth originated from the oil boom, required the Gulf countries to increase both their regional security as well as their domestic labor force, and they found a way to do so through Jordan. As Drs. Sboul-keating, Wa'ed Shawkat (1993) argue in his analysis of the role of the state in Jordan's development, "one of the most influential consequences of the quadrupling of the oil price in 1973/4 was the strengthened significance of Jordan's strategic location in the security and stability of the Gulf, as well as the use of its labor force in order to overcome the severe labor shortages in particular in Saudi Arabia and Kuwait." (p.122)

Jordan then became very strategically important for the Gulf countries. In order to sustain and improve their security relation, the Gulf countries started providing massive amounts of aid to Jordan, especially in the forms of financial assistance for development of infrastructure. This aid and favorable prices of oil were major incentives for Jordan to focus its energy production on this resource. This seemed very convenient at the moment. The kingdom was acquiring wealth from the remittances of its workers in the Gulf, while its strategic importance was yielding it cheap oil prices and the infrastructure necessary to process it. In other words, Jordan developed "an oil economy without oil." With such favorable situation, concerns for energy insecurity were practically inexistent, and problems in the longer term were not foreseeable. As Mr. Batir Wardam of the Jordan's Ministry of Environment said in an interview, "given a lack of vision that has always affected this country, nobody foresaw the situation going wrong in the near

future.” (B. Wardam, personal communication, April 15, 2013). This lack of forward thinking and the prosperity proved to be very detrimental for Jordan’s energy security. The dependence on aid and remittances rendered Jordan’s development very vulnerable. As Sboul-keating, Wa'ed Shawkat (1993) put it, “These resources provided prosperity and growth without a concurrent development in the produce facilities of the domestic economy.” (122). As energy researcher and observer Mr. Bahjat Tabbara said in an interview with a sense of nostalgic frustration, “That was such an opportunity. We should have started our domestic energy program back then, when we had time and the resources.” (B. Tabbara, personal communication, April 26 2013).

At the beginning of the 1980s, however, the economic situation regarding oil changed drastically. In 1979, the Iranian revolution resulted in Iran’s production of oil to nearly stop. Similarly, the Iraq-Iran war caused Oil supply from both countries to be severely cut. To offset the decline, Saudi Arabia and the OPEC increased production. However, with the stabilization of Oil production in Iran and Iraq after 1980, and the added supply by OPEC, the world found itself in with a huge excess of oil, or as the New York times called it the “Oil glut!... is here” (New York Times, 1891). As natural by the laws of economics, an excess in demand led to a decrease in prices, which then resulted in a radical drop of revenue from Net Oil export. Graph 1 illustrates this decrease in profit from oil for crude net exporting countries. Saudi Arabia and Kuwait, Jordan’s greatest providers of aid, financial assistance, infrastructure development, and most importantly, oil for energy production, were severely affected. As Graph 1 shows, revenue was showing a very positive trend, but in 1980 it started dropping dramatically, clear in the very steep slope of the graph after the point 1980: \$572 billion. This lost in revenue, especially harsh on Saudi Arabia and Kuwait, soon translated into a loss in the assistance to Jordan. As Mr. Tabbara puts it, “starting with the oil glut in the early 1980s the GCC [Gulf Cooperation Council] aid dried up.” (B. Tabbara, personal communication, May 2 2013).

Graph 1. OPEC net oil export revenues 1972 -2007, and the sharp drop in 1980.



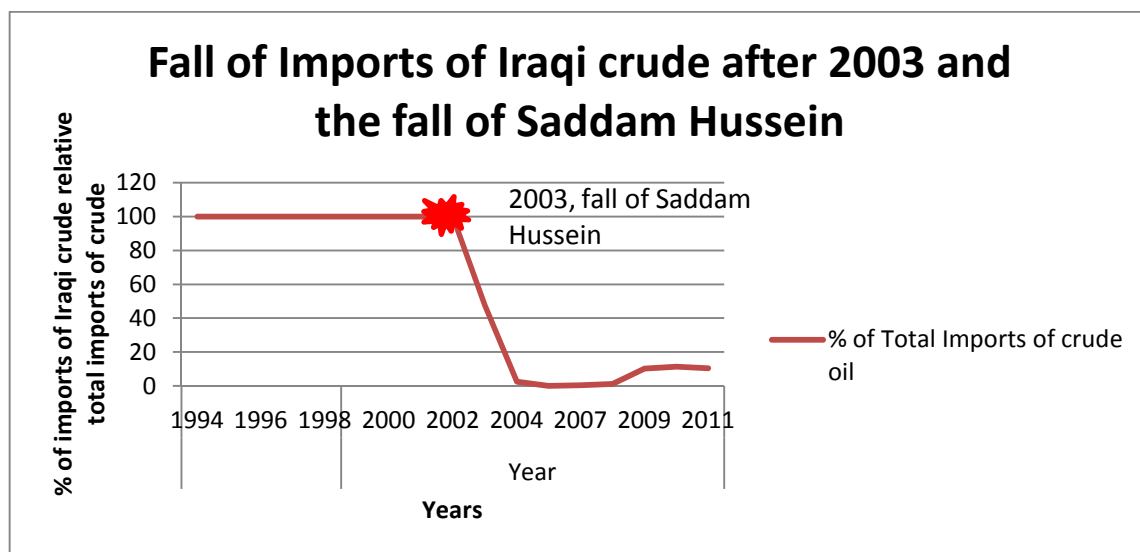
Source: U.S Energy Information Administration Independent Statistics and Analysis. Retrieved May 2, 2013.

However, soon after the glut, Jordan turned to a new source of cheap energy, Iraq. In an interview Mr. Tabbara recalled very well the series of events that marked Jordan's foreign relations with Iraq between the beginning of the 1980s until the Gulf War II. The findings of this discussion go as follow. Starting in 1979 with the newly arrived President Saddam Hussein, Iraq initiated a process of closer alignment with Jordan. President Hussein was seeking for Arab alliances to consolidate and his position in power. To solidify ties with the Jordan, Iraq starting providing heavy economic support and large oil supplies that Jordan so desperately needed. In 1980, when Saddam Hussein's forces invaded Iran, King Hussein supported Iraq, solidifying their ties and alliance. The Iraqi regime needed Jordan for international support, and in return for it, Jordan started receiving oil from Iraq at prices cheaper than the regular world market price. In other occasions, Jordan was able to obtain "oil for goods" trade with Iraq, which made the oil import bills from Iraq even cheaper. As "country-data" reported at the time (1985), "Since 1985, barter agreements with Iraq to trade goods for crude oil have removed some of Jordan's oil bill from the balance sheet." (Jordan Oil and Gas). This exchange of diplomatic support in exchange of cheap oil became especially stronger in the period of 1991 and 2003. In 1991, Jordan did not join the US

led coalition against Iraq, which was perceived by both officials in the west and by Saddam Hussein as alliance to his regime. (B. Tabbara, personal communication, April 26 2013).

In 2003, however, the second gulf war, just as did the oil glut of the 1980s, brought significant changes to the financial assistance for energy supply to Jordan. With the ousting of President Saddam Hussein from Iraq by the US led coalition fell Jordan's source of cheap oil, of which in relied on by virtually a 100%. The new Iraqi government had no political incentives or motivations to continue Hussein's oil deals to Jordan, not only at the same price, but also at the same level of supply. Both conditions led to a severe drop in the import of Iraqi oil, and to a new era of energy security similar to the ones after the end of GCC aid about two decades before. The figures in the following graph illustrate this condition.

Graph 2. Fall if Imports of Iraqi crude after 2003 and the fall of Saddam Hussein after Operation Iraqi Freedom.



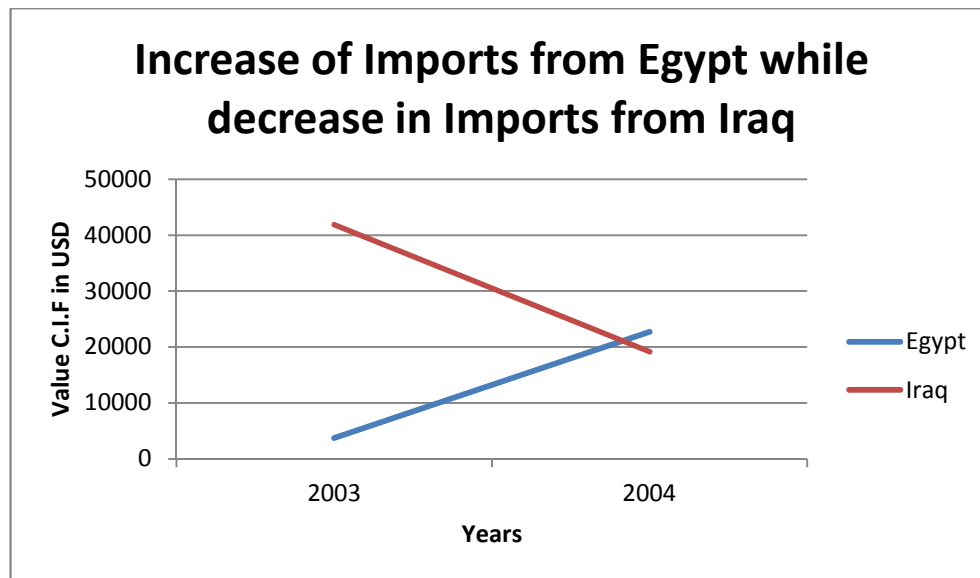
Source: Jordan Department of Statistics. Data Retrieved by Bahjat Tabbara. Original graph by the author.

As the graph makes clear, 100% of Jordan's crude came from Iraq in the period of 1994 to 2002. In 2003, however, the fall of Saddam Hussein changed the oil situation drastically. With him no longer

and in power, and his favorable oil trade to Jordan no longer in place, Jordan's imports of oil from Iraq experienced a severe shock. They went from 100% in 2002, to 47.65% in 2003, to 2.45% percent in 2004, to 0.01% in 2005.

The fall of Saddam Hussein forced Jordan to turn to another source of energy. This time it was Egypt. When imports from Iraq begun decreasing, the import of natural gas from Egypt started increasing almost inversely proportional. The following figure illustrates this shift of the pre and post 2003 Iraq crisis.

Graph 3. Shift of Energy Dependency from Iraq to Egypt.



Source: Data from Jordan department of statistics. Original Graph by the author.

As the lines in this graph shows, the there is almost a symmetrical shift in the dependency of foreign resource. The blue line represents the fall in imports from Iraq, while the blue line represent the increase in imports from Egypt. They are almost exactly inversely proportional, which shows how Jordan transition from Iraqi oil to Egyptian natural gas after the fall of Saddam Hussein.

Since 2003, Natural Gas from Egypt has been extremely useful, especially for electricity generation. However, just as Saudi oil in the 1980s and Iraqi crude in 2003, Egyptian natural gas is a very unstable source. As it has proven since the Egyptian revolution, it is has the potential to be cut off and

leave Jordan in an even weaker energy security position. The government must seek to minimize the dependency on it, because as the next section explains, an energy crisis in which the demands of the populations are not met, could prove very detrimental for the stability of the society and even the security of the regime.

Impact of Energy Dependency on Social Stability

One of the most concerning findings regarding Jordan's energy security, is the potential of the dependency to affect the population directly. In most countries, especially the developed ones, most of the energy is consumed in the industrial sector. As a result, when there are energy shortages or hikes in prices, corporations and factories take most of the damage. In Jordan, however, the situation is very different. Most of the resources imported go to energy production for the sectors most closely linked with the population, transportation and residential, while a relatively small portion goes to industry. The following table illustrates Jordan's particular energy consumption distribution.

Table 4. Distribution of energy consumption per sector in TOE 2011.

SECTOR	Crude Oil	Fuel Oil	Diesel	Gasoline	LPG	Kerosene	Jet Fuel	Other	Total:
Final Energy Consumption	0	142.6	1521	1146	420	226.9	244.9	59.3	3593.5
Industry		137.2	517		2.9	6.5			663.7
Transport			638.7	1146			244.9		2011.4
Residential			136.9		341	68.2			545.6
Services			121.7		26.5	1.8			150
Other		5.4	104.9		50.4	1.1			161.8
Non-Indubitable Uses								59.3	59.3
Variation	0	0	1.5	0	0	0.1	0	0	1.6

Source: Ministry of Energy and Mineral Resources. Original table in Arabic. Data Retrieved by Bahjat Tabbara.

As the table shows, of a total of 3593 TOE consumed in 2011, industry took only 663.7, only 18.5% of the energy share. In contrast, transportation and household, the two sectors that represent the consumption of the masses, took 2557 TOE, for an impressive 71.2% of the total energy consumed.

Mr. Mohammed Asfour, Chairman of the Jordan Green Building Council, one of the leading NGOs in improving residential energy efficiency, described this condition in one of our interviews. Paraphrasing him, “Jordan does not lie on an industrial base. It is what some would call a pre-industrial society, in which energy is necessary for immediate consumption by the larger population. Most of it goes for the lighting the house and cooking food, and to keep the cars running. That is dangerous, because if there is less supply, or the prices are higher, is the people that pay the price. Industry, given their size and resources, are more able to cushion temporal price hikes, however, the household cannot do that. (M. Asfour, personal communication, April 15 2013). This directly affects the population, because as Mason Willrich (1975) once said, “there is no gap between what a society wants and what it is willing to accept or tolerate.” (p.67).

In times of such high civil rest and social volatility in the Middle East, the negative effects of this dependency on matching people demands can turn in to very serious protests with high potential for domestic turmoil, and even danger for the security of the regime. A very serious manifestation of this potential took place in November of 2012. Towards the middle of the month, the government made public a proposal to decrease subsidies in order to meet decreased supply given attacks on the Egyptian pipeline, lower budget deficit and meet standard loan requirements of the IMF. A decrease in subsidies by default raises prices, making gas at the pump and at the kitchen much more expensive. These increases would have stroke right at the population pockets and hearts. Then, the effects that changes in supply in prices can have on social stability and regime security became very clear.

Between the days of the 13th and 15th of November, 2012, newspapers from the country, region, and all over the world reported mass protests in both Amman, and in the surrounding regions. Their most important remark, however, was the unusual aggressiveness of the protests, and their unprecedented targeting of King Abdullah II. In November 13th, the Global Post (2012) published an article entitled “Jordan: Jordanian protests fuel price hikes, targeting King Abdullah”. In their report, they remarked the

increase in violence of the demonstrations, in which public property and even police officers were severely damaged. The article reports, “Two policemen were lightly wounded and a courthouse torched after more than 1,000 people took to the streets in the capital Amman.” Similar violent events were seen in southern city of Maan, as well as the northern town of Sareeh, near the Syrian border. As the article puts it, “In Maan, a Muslim militant stronghold, 500 protesters clashed with riot police who returned fire with tear gas. In Sareeh, in the north close to the Syrian border, protesters burned down a gas station.” (Global Post, November 13 2013).

That same day, the New York Times reported “Riots Erupt Across Jordan Over Gas Prices” and gave special attention to unusual targeting of the king. In cities outside of Amman, chanting of aggressive slogans and even burning of pictures of His Majesty Abdullah II showed the signs of a very angered population. On this matter, New York Times(2012) reports “In Dhiban, a city of 15,000 south of the capital, Amman, protesters burned pictures of King Abdullah II, witnesses said. And in Amman, thousands of demonstrators filled the circle outside the Interior Ministry near midnight, chanting, “The people want the fall of the regime,” echoing similar chants in Egypt and Tunisia, where the Arab Spring began.” (New York Times, November 13 2012).

One day after, on November 14th, the renowned Middle Eastern paper Al-Jazeera (2012) reported on the unusual slogans chanted against the king. In their article “Protests in Jordan after spike in fuel prices”, Al Jazeera remarks chants like “Revolution, Revolution, it’s a Popular Revolution” sung by over 2,000 protesters near the Ministry of Interior, in the circle known as Dwar-Daghaliat, a major round about that leads to the City Center, Abdoun, Arjan, and the key Sharia Istiqlal in each of its respective four different exits. Protesters went beyond words, and targeted pictures of the king to demonstrate their fury after the spike in gas prices, which also resulted in clashes with the police. (Al-Jazeera, November 14 2012). Other important newspapers also highlighted the rare moves against the Monarchy. Also on the 14th, the British Reuters(2012) newspaper reported “Hundreds of protesters chanted against King

Abdullah and the powerful intelligence forces in slogans that personally target the monarch and were unheard of before the wave of Arab Spring-inspired protests hit the kingdom early last year”. (Reuters, November 14 2012). And on the 15th, CNN (2012) published “Hundreds of demonstrators called on the government to reverse its decision to raise fuel and gas prices. Riot police worked to break up the crowd, and most people fled. The protesters who remained chanted for the downfall of the monarchy.” (CNN, November 15 2012).

In an interview, an activist who has chosen to remain anonymous and that participated in these protests recalled the events of those days. In his view “people were very angry. It was like a spark in a puddle of fuel. One day, the government announced the gas was going to be more expensive. The next, we were in the street, singing and fighting. In anger people were not even afraid of criticizing the king. Prices are a very sensitive issue, and last November’s protests were just a sample of what people are capable of.” (Anonymous Activist, personal communication, April 22 2013).

The November 2012 protests served as an example and a warning of the tremendous impact that energy instability can cause, and the danger it could bring to the standing regime. Presenting solutions to prevent futures turmoil, and address Jordan’s energy security is the goal of the next section of findings and discussion of this paper.

Jordan’s options for increasing Energy Security: Policy recommendations

As Mason Willrich (1975) discusses in his book, a net energy importing less developed country can pursue several options for each energy security. This paper has discovered six potential solutions, divided in three specific categories, which may help Jordan improve its energy security condition. All this options were found, discussed, and tested through extensive research as well as the conversation with multiple informants. They hope to provide useful recommendations to address the problem of energy dependency and its impact on social stability discussed in the previous sections.

1) Decreasing demand

The first set of options is aimed at decreasing the demand of energy sources. One of the main pressures on supply is that even when it is interrupted, demand stays steady. Consequently, if demand decreases the need for importing energy sources also goes down, and thus the pressure on the authorities to provide it. As Willrich (1975) argues, “In general, reductions in consumption will diminish the magnitude of energy supply problems and extend the time for solving them.” (p.70). Since, as shown above, most of the energy goes to households and transportation, measures to decrease demand must be addressed at reducing consumption in these sectors. There are two available options in this regard.

In the short term, Jordan can opt for rationing, the establishment of a maximum quota of resources consumed in a specified period of time. This could be especially applied in the residential sector. Mr. Asfour argued that in Jordan this would come in the shape of monthly electricity consumption thresholds that household may not surpass. (M. Asfour, personal communication, April 15 2013) Dr. Mansur said this has done in the past, but in a different way. Instead of announced monthly quotas, there have been mostly random electricity cut offs that would last a few hours, with the restoring of the service immediately after. As he put it, it took place “not in a rationing sense but as cutting electricity from certain areas for a few hours a day.” (Y. Mansur, personal communication, May 3 2013) In his view, although people have not protested, this measure was not welcomed. This is because in order for rationing to succeed, two main conditions must exist. First of all, the people have to be prepared. As Willrich (1975) makes very clear, “the effectiveness of rationing depends on people knowing what they are supposed to do.” (p. 71). Secondly and most importantly, the people have to be able to trust the authorities, which is an extremely difficult requirement in Jordan. Mr. Wardam addressed the importance of this trust in an interview. As he said, “the people will come to understand that as our energy situations gets more complicated, we will all have to make sacrifices. The most important thing here in Jordan, is that the people love their country, and would be ready to make them. The only thing they need is a leadership they

can trust, a government they can follow. They don't have one right now. (B. Wardam, personal communication, April 15 2013.)

Mr. Wardam's statement matches the words of many household heads and bill-payers who gave opinion on the matter through informal conversations. There seems to be a general sense that most people would be very skeptical of rationing, and they would immediately think of the many ways in which corruption could be taking place. Paraphrasing what one of them said, "It would be hard to believe that the government is being honest. If they cut my electricity, is their electricity going to be cut off too? Also, what are they going to do with the electricity?" He then said that if the government would be transparent about it, and explain the situation very carefully to the people, they would be willing to cooperate, just as Mr. Wardam said. (Anonymous Household Head, Personal Communication, May 2 2013). Therefore, rationing may work to decrease demand, as long as the government gets people support for it.

Secondly to decrease demand, Jordan can pursue a longer run measure, changing consumer culture. One of the reasons why demand is so high is because of a very inefficient energy use on the side of the consumer. This is true for both the residential and transport sector. In both, people lack basic energy conservation practices, which unnecessarily raise the need for resources supply. At the household level, Mr. Asfour mentioned in an interview that residents still utilize old or inefficient appliances, which raise the energy bill as well as the energy requirements. Even more detrimental is the lack basic energy conservation practices, such as turning off a switch when leaving a room, or turning off the television when it is not being utilized. (M. Asfour, personal communication, April 15 2013) On the transportation sector, Mr. Wardam said on consumer behavior, "Transportation is one of the biggest consumers of energy. In Jordan there is the culture of buying big cars to "show off". These cars unnecessarily consume much more energy than smaller cars. In the past we were used to cheap oil, so nobody ever saw this as a problem. Now it is." (B. Wardam, personal communication, April 15 2013.)

Changing behavior, however, takes time. In order for it to occur, the government in cooperation with civil society must begin a series of education campaigns. First of all, people must understand the need for changing behavior, just as much as they need it for rationing measures. Second, consumers need to be provided with practical recommendations on how to save energy at their homes and cars, and given practical incentives to do so. Among the leading actors in this matter is Jordan Green Building Council. Their primary goal is to increase residential energy inefficiency, by providing access to better appliances, bulbs and house electricity infrastructure. They also offer regular workshops on how to minimize the energy bill, which provide incentives for changing consumer behavior, and therefore, decreasing energy demand. Find in appendix 3 their flyer for their most recent conference, in both Arabic and English.

2) Strengthening Foreign Supply

The second set of measures is aimed at strengthening the assurance of foreign supply. On this regard, there are two options Jordan may pursue. These are first diversification of sources, and second, building interdependence with existing ones.

Throughout the years and across times, diversification has been the most important measure for energy security. As Winston Churchill said almost 100 years ago, “safety and certainty in oil lie in variety and variety alone.” (Churchill as cited in Yergin, 2006). As more recently, Mason Willrich (1975) put it, “In the first place an energy-importing country may enhance its security by diversifying its foreign sources.” (p.78) In order to do achieve diversification, however, Jordan is going to have to maneuver through a very complicated diplomatic position. As of today, Jordan gets most of its energy resources from the Gulf countries, Egypt and Iraq. The potential sources for diversification include Iran, Russia, and Israel. Tapping into these countries, however, is not as easy as signing a deal. Diversification has significant and unavoidable foreign policy implications.

Currently Jordan finds itself diplomatically in the edge of the east and the west. On the one hand, its strong alliance with the US could allow it access to resources in the position of western or western-allied

country. On the other hand, its strong position as a stable country within the Arab world, could permit it access to non-western resources, such as Iran and Russia. Yet, instead of being able to work deals with both, this cross-point position allows it to do so with neither.

In the case of Israel, they have offered Jordan favorable access to natural gas coming from the relatively recent Tamar field. As the Israeli newspaper Haaretz explained in an article on February 2013, “The gas would be delivered through the Israeli gas pipeline that serves Israel Chemicals” Dead Sea Works plant in Sodom. Extending the pipeline to reach Jordan would not require a large investment.” (Haaretz, February 15 2013). A new source of natural gas would bring enormous benefits to Jordan, and to the regime, allowing it first of all greater stability of sources and more directly significant, a potential decrease of the current prices to the population. Regardless of the serious need for energy, however, the experts do not see as viable option. Through electronic correspondence, Mr. Tabbara explained this delicate condition. When asked about the possibility of Jordan importing gas from Israel, he replied “I very much doubt that Jordan would purchase Israeli supplied natural gas”. Then, after asking him if the peace of 1994 would be enough to justify an agreement and allow Jordan to access Israeli gas, he responded with a very determinate “No way: it wouldn’t.” In his view, “the idea of purchasing natural gas from Israel (or really any large scale purchase) would not be politically acceptable or viable.” This is because “Israel would exercise considerable leverage if Jordan became dependent on Israeli gas: and hence, this is a situation best avoided.” (B. Tabbara, personal communication, May 2 2013).

Dr. Yusuf Mansur agreed with Mr. Tabbara, and on regards with the issue was very clear in his answer. As he wrote, “Importing Israeli gas sounds bad all around and not an option.” (Y. Mansur, personal communication, May 2 2013). The situation with Iran is very similar. As the energy observer also mentioned, “It is interesting that Jordan would not purchase Iranian natural gas either, but this is to not to antagonize US sanctions on Iran, keeping in mind that KSA and other Gulf countries are not entirely on good terms with Iran either.” (B. Tabbara, personal communication, May 2 2013)

Mr. Tabbara, however, did a key remark. In the conversation he said, “I think that as long as alternatives exist Jordan would opt for it.” (B. Tabbara, personal communication, May 2 2013). That means first, that sources for diversification do exist. Currently, Jordan is considering importing gas from Lebanon, Qatar and Iraq, and it must pursue these sources with greater assertiveness and urgency. Currently as well, the Kingdom is constructing a Liquefied Natural Gas (LNG) terminal in Aqaba, which is due by 2014. Such infrastructure will allow it to import from both Lebanon and Qatar, who could then provide gas to Jordan in the form of LNG. Similarly, Jordan must assure the prompt construction and opening of the Iraqi-Jordanian pipeline, in order to relief itself from its dependence on unstable Egyptian gas. Mr. Tabbara’s statement has a second, more delicate implication. By saying, “as long as alternatives exist”, he is implying that diversification could get to be more urgent than international politics. If the energy situation is not improved quickly, pursuing options such as diversification with above sources, Jordan is going to have to make very difficult choices between diplomatic stance and energy security.

Besides diversification, in order to strengthen foreign supply Jordan can increase its interdependence with existing sources. The main purpose of this measure is to deter the exporter country from cutting the supply, by creating ways in which any interruptions from their part would be a self-inflicting damage. This is a particularly pertinent measure regarding Egypt. Currently, Egypt does not incur significant damage on itself when it interrupts the supply to Jordan. Instead, it is quite the opposite, as it sells natural gas at a lower at lower price than what it then has to import to supply its own domestic demand. The renders Jordan at a very weak security position in regards to Egypt.

To increase interdependence, Jordan can utilize the migrant Egyptian workers as bargaining chip. Remittances of these workers represent a major influx into Egypt’s economy. Just as Jordan benefitted from the prosperity of the Gulf Countries between the Oil Boom and the Oil Glut, Egypt could benefit from Jordan’s stability and the economic conditions it can offer to its workers. To do so, Jordan could increase the proximity of its guest workers to the energy production and other sectors through incentives

and policy. As one of the experts interviewed in this paper, “bringing Egyptian workers closer to the fire would help deter Egypt from turning the heat on and switching the gas off.” (Anonymous expert, personal communication, April 15 2013).

A second way to increase interdependence, which Mason Willrich (1975) identifies in his theoretical work, is through promotion of “long-term investments of the exporter country in the importing country”, in this case Egypt into Jordan. Even though this is difficult given Egypt’s own economic instability, Jordan may pursue ways to encourage them for further direct investment. Either directly in energy receiving, processing or distribution, or indirectly in the residential, transportation, or even industry and services sectors, giving Egypt a stake in Jordan’s economic activity would be very beneficial. In that way, Egypt would benefit from Jordan having a steady supply of energy, as it becomes a shareholder on its economic stability.

3) Self-sufficiency and Indigenous Production

The third set of measures is aimed at protecting Jordan’s energy security from the turmoil of foreign markets and international politics. For increasing its domestic production, this paper has identified two different energy sources as the most readily viable options for Jordan. These are Oil Shale and Nuclear Energy. A third option would be renewable energy such as solar and windy. Interestingly, however they did not come across nearly as much in the conversations with local experts.

Oil Shale has enormous potential for Jordan’s energy sector and overall economic activity. Jordan has the 8th largest reserve of Oil Shale in the world. However, it is entirely unexploited, and tapping into this resource would represent enormous benefits to Jordan’s energy security. This is true to the extent that oil expert and energy consultant to the World Bank Mamdouh Salameh (2012) has called it “Jordan’s savior”. This is because of multiple reasons. First of all, it is readily available. Jordan has about 50 billion tones of oil shale, of which the extractable portion will generate around 35 billion barrels.(Jordan Times, May 17 2012). To complements Dr. Salameh’s estimates, the world energy council offers more specific

data on the size of the reserves. According to their 2007 energy resource survey, Jordan has of 52.242 billion tones of oil shale, which can produce 34.172 billion. (World Energy Council, 2007).

Secondly, it will much cheaper than oil and any of the current sources. Regarding costs and balances, Salameh (2012) said “the cost of extracting oil shale in Jordan would be around \$1 billion, which is only 22 per cent of the Kingdom's \$4.8 billion oil imports bill.” Third, given the size of the reserves, the lost cost of extraction, and the alternative it represents to crude, Oil Shale could even turn Jordan in to a net exporter, shifting it negative trading balance. In the article, Dr. Salameh pointed out that “in 2015, when oil shale extraction is expected to start, Jordan may export up to 3,000bpd, ending decades-long negative balance of payments.” (Jordan Times, May 17 2012).

On Wednesday April 24th, a major conference was held in Amman, to bring experts and observers together to discuss the state of oil shale production on Jordan. This event yielded very useful information regarding potential plans for extraction of this resource. Currently, the plan is to produce 40,000 barrels per day of oil-shale based petroleum products, 34.8% of the current 115,000 barrels per day Jordan consumes, already a significant portion. In order to process this Oil Shale, there is a proposal to construct a 460 MW oil shale plant although costs have not been revealed. The company would be mostly managed by Estonians, who currently own up to 65% of the Jordan Oil Shale Company (JOSCO). The concession would last for 40 years. Two other companies, specifically Saudi Oil Shale and Jordanian Kerak Oil Company would produce 15,000 and 10,000 bpd respectively, bringing the total domestic production to 65,000 bpd, reducing by 57% of Jordan’s need of oil imports. (Conference on Oil Shale, Amman, Jordan, April 24th).

Currently, the second most observed option for significant domestic production is Nuclear Energy. Jordan’s master energy plan for 2007-2020 (2007) includes nuclear generation as significant source. Within this time period, the plan highlights the importance of testing the alternative of nuclear energy for electricity generation. As one of its most likely energy development scenarios, it includes the introduction

of “nuclear energy for electricity generation by adding a nuclear generation plant with capacity of 60 MW in the year 2020 to contribute to about 6% of the energy mix for the year 2020.” (p.14). A second plant would be finished by 2025, and by 2030 nuclear energy would provide 30% of Jordan’s electricity. Currently, one experimental reactor is being used for tests in the northern city of Irbid.

This seems very convenient. However, in contrast to Oil Shale, there is a much stronger opposition to the nuclear project. The first set of arguments comes from the Environmental side, from officers in the Ministry of Energy, as well as in members of civil society. On this regard, the main points of debate are use of water, as the nuclear program would need 20 – 30 million cubic meters of water per year, and potential nuclear waste leaks going into the ground. (B. Tabbara, personal communication, May 2 2013). Interestingly, however, the strongest set of arguments, are not environmental. Instead, they are political. Even the environmentalists are more concerned about the latter than the former. They originate, just as most of the new programs in Jordan, from fear of corruption and lack of trust on the government from the different actors of the society. As one of the experts interviewed pointed out, “the environment is of course a concern, however, the main fear comes from the government's unavoidable participation in the nuclear program.” (Anonymous expert, personal communication, April 15 2013). The main arguments in this regard are specifically, fear of failure, waste of money and corruption. Even within the government itself, there is fear that the nuclear program would fail, and result in catastrophic image damage. Other failed programs in the past, such as an attempt to build the “Rapid Bus Transit System”, have had this type of consequence in the past, and officers fear that another great failure would not be tolerated. (B. Tabbara, personal communication, May 2 2013).

According to Mr. Tabbara, despite of this concerns, the nuclear program will still happen. In his view, environmental concerns are not strong enough to detain the project. Regarding the water issue, although there is no clear solution yet, Mr. Tabbara argued that small grey water reactors, capable of use non-pure water for cooling are being considered in the type of plant that would be acquired. Regarding

residual pollution, Mr. Tabbara argued that nuclear energy would come to replace much more polluting options. As he pointed out, while fossil fuels send 6 million tons of carbon dioxide into the atmosphere per year, nuclear energy only produces a total waste of 3.5 cubic meters of waste, which is easily controlled, and with the appropriate containment facility, zero impact to the environment. (B. Tabbara, personal communication, May 2 2013). Regarding the governance issue, all the experts had a harder time providing an answer. In this regard, they agreed that the government must come to realize that there is an urgent need to accomplishing goals, and without transparency and good practices, they will not be able to gain the necessary trust from the people to succeed at them.

Conclusion

In conclusion, Jordan has a very imperative problem with regards to energy security. The domestic demand is growing at a much faster rate than the energy supply. To further complicate the situation, imports are highly unstable given the domestic turmoil in the source countries, of which Egypt is the most daunting case. The reasons for Jordan's dependency on foreign sources and lack of a domestic energy production program date back to the Oil boom of the 1970s, when prosperity in the Gulf Countries made Jordan the recipient of extremely cheap oil and the infrastructure to process it. Although extremely favorable for immediate profit, the extremely low costs discouraged any form of long-term planning and the developing of energy production at home. The excess of supply caused by the Oil Glut of 1980 led to the cut off aid Jordan's sponsors in the gulf, particularly of Saudi Arabia's. Soon after, however, Iraq became Jordan's new provider, and started a new era of dependence. In seek for alliances and greater legitimacy in the Arab World, Saddam Hussein created closed ties with late King Hussein, and provided his government with excessively cheap oil, way below world market prices. Just as in the times of dependency on the Gulf, this discouraged both diversification and self-sufficiency. With the fall of Saddam Hussein in 2003, history repeated itself and Jordan lot its second sponsor. Almost immediately after, Jordan found in Egypt a new source in which to rely on, this time natural gas for energy production.

The events of the Arab spring, however, have turned Egypt into a very unstable source, often cutting or decreasing the supply.

Jordan's reliance on this source causes it incur on drastic and unannounced measures. Of the most concerning ones is the need to hike prices at home. Since most of the energy is consumed in the residential and transportation sector, the most directly affected by change in prices is the larger population. When this happens, especially at the current times of civil unrest, people get heavily angered at their leaders, which often results in heavy domestic turmoil and even security threats to the standing monarchy. In 2012, prices increases led to mass protests, in which for the first time King Abdullah and his reign were targeted.

In order to increase Jordan's energy security and thus its national security, it must immediately pursue options to decrease its dependency. Among the most viable options, Jordan may first aim to decrease domestic demand. This would alleviate pressure on the amount of supply needed, and buys more time for pursuing other solutions. To decrease energy demand, Jordan may implement a well announced and accepted rationing plans in the short term, and change consumer behavior, specially regarding household and automobile energy practices in the long term. Secondly, Jordan may strengthen its guarantee in foreign supply, by seeking to diversify sources as well as to increase interdependence through existing ones. Thirdly, Jordan may increase its domestic energy production, to protect this sector from the storms of international politics and volatile energy sources. To do so, it may pursue the exploitation of its large Oil Shale reserves, as well as to take seriously and accelerate its nuclear energy project.

This topic is of extreme significance for Jordan, for both its regime and its people. The scarcity has always been there, but the volatility of the energy source countries is at its peak, given the current era of the "Arab spring." Fulfillment of its energy needs is the first and foremost priority of any government. Without energy resources, it is not only impossible to prosper, but even to maintain a basic level of habitability. In an era where the people have violently reacted against the governments that haven't satisfied their needs, it is fundamental that Jordan strengthen its foreign policy regarding energy markets,

that it acknowledges the lessons of the past and understands the challenges of the present and future, and also, that it seeks for ways to minimize dependency on external sources and increase its energy security. If successful, therefore, his project would not only benefit the Jordanian government, but also the people that depend on a steady supply of energy for a good quality of life and basic human development.

Limitations and Recommendations for further study

This topic is by far not concluded. A few limitations have rendered less conclusive than otherwise it could have been. The first limitation is the lack of time. A lot of experts that could have been very beneficial to the project said they could have been able to meet a few days after the project was to be submitted. Similarly, must access to energy sites require more time to be granted than what this project was allowed. Visits to sites such as the nuclear experimental reactor in Irbid, processing plants around Amman, and Oil Shale deposits were very extensively pursued by the author, through local connections and directly to their managers, however, they were not granted in time, and thus were not included in this submission. Another significant limitation has been the language barrier. Deeper and more local resources are in Arabic language, especially regarding news coverage of the impact of gas prices on social stability. They include a greater richness of the opinion of the local population as well as of government authorities than international English sources, on which this paper had to rely on for that section.

Another limitation was the sensitive matter of the topic of regime security. As a fourth data-collecting method, applying surveys was considered. It deemed reasonable that conducting surveys would be an excellent way get a feel for the impact of energy insecurity on the population, and how depending on their level of concern regarding the issue there was a greater or smaller likelihood for social instability and domestic turmoil. However, I was quickly advised against this by local advisor. In Jordan, the issue of “regime security” which directly involves the security of King Abdullah II is extremely sensitive. Distributing questionnaires to large amount of unknown individuals that practically ask about their

likelihood to revolt was unsafe, and could have resulted in an undesired encounter with members of the national security apparatus. Thus, the application of the method did not take place.

For researchers willing to work on the topic, I have a few recommendations, first of all, on how to address these limitations. Regarding time, begin contacting informants as soon as an idea about the project exists, even if it is before the allocated time. This will allow for the informants for plenty of time to respond, as well as to set up meetings and interviews. Even if the topic changes later on, each interview provides to very least a very important training of conducting field research in Jordan. Also, just like with the interviews, it is fundamental to begin the process of requesting access to sites as early as possible, as to assure the arrival of permits with time to do the visits and analyze the information collected. For the sources in Arabic language, the researcher must find 2 or 3 willing local helpers, ideally that are regular readers of news, to keep an eye open for sources that may seem useful for the project. Once they are acquired, finding willful translators is a much easier task.

In terms of the topic, more research needs to be done regarding some of the recommendations. Due to page limit constraints, this paper was not able to discuss in detail ways the ways to increase interdependency with Egypt. Moreover, it was not able to explore and elaborate on campaigns and methods to change consumer behavior. Similarly, it was not able to further analyze the debate on nuclear energy as way to decrease dependency, as well as the largely ignored potential for solar and wind energy. Each of these topics of their own would result on a project of considerable size, and even of greater importance to Jordan and its energy security.

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Appendices

Appendix A: Interview Questions

1. Can you tell me about your work and experience on environmental policy and resource management?
2. Each country has a specific set of what can be called “energy assets”, elements such as natural resources, technology, capital, management infrastructure, and overall industrial base. Could you please describe Jordan’s conditions in terms of these aspects?
3. The combination of these assets leaves countries at different levels of “energy security”. Some scholars define this as the adequate energy supplies to keep the economy running at “normal levels”. Would you agree with this definition, and to what extent does Jordan have or has achieved energy security?
4. Furthermore, in terms of Jordan’s energy (in)security, it is a heavy importing-country. A standard figure says that 96% of Jordan’s energy comes from abroad. Natural Gas from Egypt for example, is key for supplying Jordan’s needs. However, most of the source countries are highly unstable, and ridden with conflict and domestic turmoil. To what extent do you think the events of the Arab spring have affected the source countries and thus their supply to Jordan? How unstable are these sources?
5. Certainly such dependency is very risky. Why do you think Jordan developed such high dependency to foreign sources?
6. Has that dependency led to previous energy crises or shortages? What has the government done to handle them?
7. On Domestic consumption, can you please describe consumption distribution among industrial, residential, agriculture, transport and other sectors?
8. Data seems to suggest that consumption takes place heavily in the residential sector. This means that energy and resource management at the household level is very important. Is wasteful or over-consumption at the household a problem in Jordan?
9. To regulate consumption, is energy and resource rationing being done? If yes, in what ways? Is it working? Do you rationing changing to meet new conditions? If not, do you think it would be an effective policy? What would be people's reaction to it?
10. Are there other ways being exercised to regulate consumption?
11. In terms of interdependence, to what extent would you say Egypt is also dependent on Jordan’s gas imports? Or can Egypt cut or change the supply without being nearly as affected as Jordan?
12. How imminent is Egypt's cut of the supply? How is the government preparing for this?
13. We just talked about interdependence, now let's talk about diversification. Are there any other markets that Jordan could tap into? Is Russia a potential market?
14. The third measure is increasing self-sufficiency. Perhaps Jordan’s greatest chance for this is renewable energy? What potential do you see for renewable energy in Jordan, in terms of capital, technology, management, political will?
15. What is your take on nuclear energy?
16. Do you see Jordan’s energy and resources situation improving or worsening at its current course?

Appendix B: Interview Consent Form

Informed Consent Form

TITLE: JORDAN'S ENERGY SECURITY: IMPACT OF DEPENDENCY ON UNSTABLE FOREIGN SOURCES ON SOCIAL STABILITY AND WAYS TO ADDRESS IT

Allan Martinez Venegas, Macalester College

School for International Training—Jordan: Modernization and Social Change

Instructions:

Please read the following statements carefully and mark your preferences where indicated. Signing below indicates your agreement with all statements and your voluntary participation in the study. Signing below while failing to mark a preference where indicated will be interpreted as an affirmative preference. Please ask the researcher if you have any questions regarding this consent form.

I am aware that this interview is conducted by an independent undergraduate researcher with the goal of producing an analytical study on the status Jordan's energy security.

I am aware that the information I provide is for research purposes only. I understand that my responses will be confidential and that my name will not be associated with any results of this study.

I am aware that I have the right to full anonymity upon request, and that upon request the researcher will omit all identifying information from both notes and drafts.

I am aware that I have the right to refuse to answer any question and to terminate my participation at any time, and that the researcher will answer any questions I have about the study.

I am aware of and take full responsibility for any risk, physical, psychological, legal, or social, associated with participation in this study.

I am aware that I will not receive monetary compensation for participation in this study, but a copy of the final study will be made available to me upon request.

I [do / do not] give the researcher permission to use my name and position in the final study.

I [do / do not] give the researcher permission to use my organizational affiliation in the final study.

I [do / do not] give the researcher permission to use data collected in this interview in a later study.

Date:

Participant's Signature:

Participant's Printed Name:

Researcher's Signature:

Allan Martinez Venegas

Appendix C.

Jordan Green Building Council's flyer for most its most recent conference and workshop, first in Arabic, then in English. Source: Jordan Green Building Council Face book Page.

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