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## Impact of Regional Conflicts on Energy Security in Jordan

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### ABSTRACT

This paper presents a study which analyzes the energy security in Jordan in light of several regional conflicts for the period (1960-2011). We apply an event study method to assess the direct and indirect effects of six regional conflicts on the energy sector in Jordan based on a proposed energy security framework developed from an infusion of frameworks found in literature. The conflicts include the 6 days war, Lebanese civil war, Iraq-Iran war, First Gulf war, Iraq Invasion, and Egyptian revolution. It was found that the energy sector in Jordan is too sensitive to the regional conflicts due to the lack of diversity of energy suppliers throughout the period of study. Other aspects taken into consideration included strategic storage adequacy, supply chain protection, economic integration, energy demands and prices. The study concludes with a proposed energy policy aiming the reduction of those effects.

**Keywords:** Energy Policy, Energy Politics, Energy Security, Jordan, Geopolitics, Middle East Conflicts

**JEL Classifications:** C82, D62, D74

### 1. INTRODUCTION

The term “Energy Security” has become more significant in political, economic and scientific discussions in the recent years (Ragulina et al., 2019). Literature shows increased focus on Energy Security definition, and on the indicators and quantitative methodologies to measure it (Ang et al. 2015;). The International Energy Agency (IEA) definitions for energy security focus on the continuity of energy supply and affordability of the prices. However, there is no unanimous definition for the energy security term as it differs according to the policies followed by the country or organization, and on where in the society the definer sets (Bogoviz et al. 2019).

Barrett et al. (2010) discussed Energy Security in a Multi-Polar World. It was concluded that energy security involves actors at the international, regional, national, local, and individual levels, and states must have an adequate regulatory power and oversight or they can lose control of their energy industries. This makes

geopolitics one of the externalities that affects Energy Security and could lead to a potential loss of economic welfare (Bohi and Toman, 1996; Samawi et al., 2017). The 1973 Arab oil embargo, gave the Energy Security another political dimension since the importer/exporter relation could be used as a political weapon. As response the International Energy Security system was revised to reduce the effect of such weapon on the industrialized countries (Graf, 2012). The first decade of the 21<sup>st</sup> century witnessed geopolitical development such as; war in Iraq in 2003 and Russia – Ukraine gas crises that contributed highly in highlighting the issue of Energy Security (Löschel et al. 2010).

Developing an efficient, rational and adaptive energy sector in the middle of highly dysfunctional and inefficient political relations is the core challenge for each country. Failure in adaption has caused problems in countries as in the case of Iraq, Dominican Republic and Ukraine (Stark et al., 2010). The effects of Intra-states and Inter-state conflicts on Energy Security exceed the disputants to neighboring countries and sometimes more to farther countries,

(Luciani, 2011; Gordon and Recio, 2019), since it may alter the energy market through its effects on international and national oil company (Bae et al., 2017).

Fossil Fuel energy resources are scarce in Jordan (Matar and Bekhet, 2015). With the energy mix in Jordan heavily depending on this type, Jordan imported 97% of its energy demands in the first decade of this century, mainly from Saudi Arabia, Iraq, and Egypt (MEMR, 2011). The security of energy supply is critical issue for energy importing countries, (Doukas et al., 2011) and with the location of Jordan in a conflict hot spot, the dependence on energy imports becomes more challenging (Ayasreh et al., 2017; Almuhtady et al., 2019). Since the 60's of the last century, conflicts had repeatedly erupted affecting Jordan from all aspects.

This paper aims at studying the direct and indirect effects of regional conflicts on the Energy Security in Jordan. The conflicts include the 6 days war (1967), Lebanese civil war (1975), Iraq-Iran war (1980-1988), First Gulf war (1990-1991), Iraq Invasion (2003), and Egyptian revolution (2011). The main argument of this paper is that Jordanian Energy sector is too sensitive to the regional geopolitics, and what increased this sensitivity was the Jordan dependency mainly on a single energy supplier at most times. To examine this hypothesis, an energy security framework will be developed for Jordan based on the literature, then the impact of each conflict on Jordanian energy security will be analyzed using a comparative approach between the status before and after the conflict in relevance to this framework. The conflicts' impact on the demands will be determined analytically by calculating the average energy growth rate for 5 years before the conflict. Then linear extrapolation is used to anticipate the demands in the years after the conflicts. Those demands are compared with the actual figures. After that, the learned lessons of those conflicts effects are reviewed to suggest policies adaptable to the repeating energy challenges.

## 2. ENERGY SECURITY FRAMEWORK

The suggested framework was drawn from a framework developed by Andy Stirling (as cited in Barrett et al., 2010) that

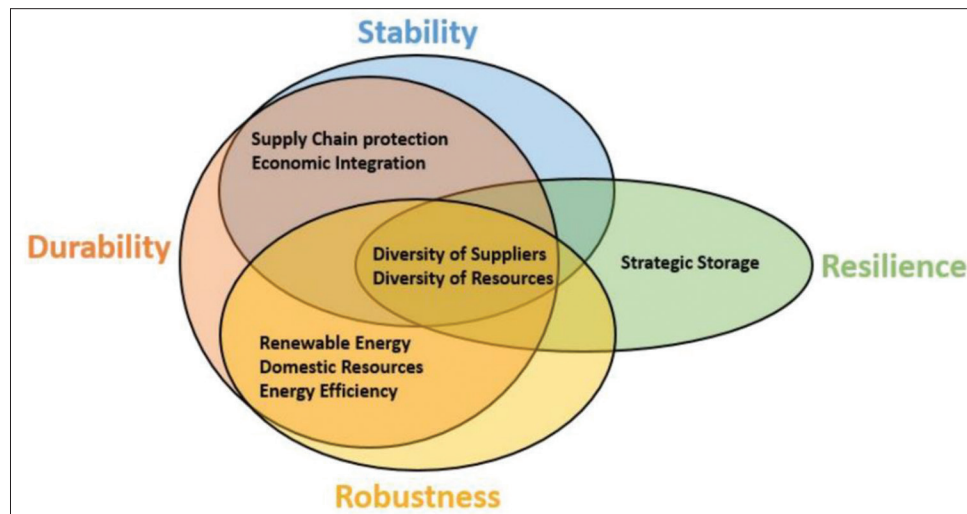
identifies four properties for energy system security, which are stability, durability, resilience and robustness. The diversity of energy sources (suppliers) and resources must be the heart of any energy security framework (Yergin, 2006; Doukas et al., 2008; Barrett et al., 2010; Bogoviz et al., 2019). This diversity assures stability, durability, resilience and robustness of the framework. As energy importing country, the diversity of the supplies must be protected by a sufficient economic integration, i.e., interdependency, with energy exporter in addition to the physical protection of the whole supply chain, especially, in light of the growth threat of terrorism (Yergin, 2006; Seliverstov, 2009). These two principles will assure stability and durability of the supplies.

The Resilience of the framework must be extended by adequate strategic storage that provides a buffer against shocks and facilitates recovery after disruptions (Yergin, 2006, Doukas et al., 2008; Pysar, 2019). However the durability and robustness of the system cannot be achieved without planes to develop the domestic energy resources, renewable energy and enhancing the energy efficiency and conservation (Yergin, 2006; Doukas et al., 2008; Hrayshat, 2007; Ragulina et al., 2019). The partnership with the private sector will enhance the robustness of the system; hence it increases the competitiveness and efficiency of energy market (Yergin, 2006; Doukas et al., 2008). The suggested framework is illustrated in Figure 1.

### 2.1. Conflict Analysis

The conflicts selected for this study were chosen due to their direct or indirect impact on the Energy sector in Jordan. These conflicts directly affected the major, and sometimes the only, energy supplier for Jordan at the time, which held key impacts to the energy sector in Jordan. Those suppliers include Trans-Arabian pipeline (TAPline), Iraq and Egypt. Figures pertaining to the imported oil and petroleum products were collected from the Jordanian Petroleum Refinery Company (JPRC) annual reports. JPRC had signed 50 years monopoly agreement to import Oil and Petroleum products in 1958. The agreement was later on substituted by a service agreement starting from 2009.

Figure 1: Proposed energy security framework



## 2.2. Six Days War (1967)

The Israeli occupation for Julan Heights at the end of this war made more than 25 miles of the TAPLINE, the only source for the Jordanian crude oil, under Israel control. The geopolitical rivalries between Syria and Israel caused several problems for ARAMCO over the transit fees. This developed into a “pointing finger” contest in terms of the stolen quantities from the line and led to cease the operation of the TAPLINE many times. Additionally, the TAPLINE became a seductive target for the Palestinian groups, the pipeline was blown up in Jordan in 1971 causing a decrease in the imported oil quantities in that year. Those two events threatened the TAPLINE and hence severely affected the supply chain protection in the energy security framework.

In terms of its effects on Jordanian energy demands, it fell down directly after the 6 days war. As shown in Figure 2, the imported crude oil in 1967 decreased by 10% from the previous year, and by 26% from the predicted demands considering the growth in the previous years. This occurred because Jordan lost a considerable populous part of its land in that war despite the large numbers of refugees moving from the West Bank to the East Bank. In general, even the 6 days war decreased Jordan’s energy demands; it adversely affected the security of energy supply by decreasing the protection of the only energy source for Jordan, the TAPLINE.

## 2.3. Lebanese Civil War (1975)

During that conflict, Palestinian groups in Lebanon blew up TAPLINE many times. This forced ARAMCO to cease the operation of the pipeline in Syria and Lebanon and stop the oil exporting through Saida port. This made Jordan the only customer for the TAPLINE, rendering its operation infeasible due to the relatively small Jordanian energy demands compared to TAPLINE capacity. This moved Jordan from the interdependency status with Saudi Arabia to a totally dependent status on Saudi Arabia.

Later on Saudi Arabia had forced Jordan to pay the running cost of the TAPLINE which was around 25 million US \$/year

(Little, 1990) as a consequence of the Iraq-Iran war explained in the next Section. Moreover, since there were no other customers, it was easy for Saudi Arabia to cease the operation of the TAPLINE completely in 1990 in the wake of Jordan’s conservative tendency to support Iraq in the First Gulf War.

In addition to that impact, the second year of the Lebanese civil war witnessed the reallocation of a large number of Palestinian refugees from Lebanon to Jordan. This caused 37% increase in the energy demand in 1976 in comparison to the previous year, and 20% in comparison to the predicted demands considering the growth in the previous years (Figure 3). Therefore, the Lebanese Civil War not only increased the Jordanian energy demands, but also due to lack of supply chain protection it had affected the economic integration principle by changing the nature of the relation with Jordan only energy supplier, and led Jordan to more energy insecurity.

## 2.4. Iraq-Iran War (1981-1988)

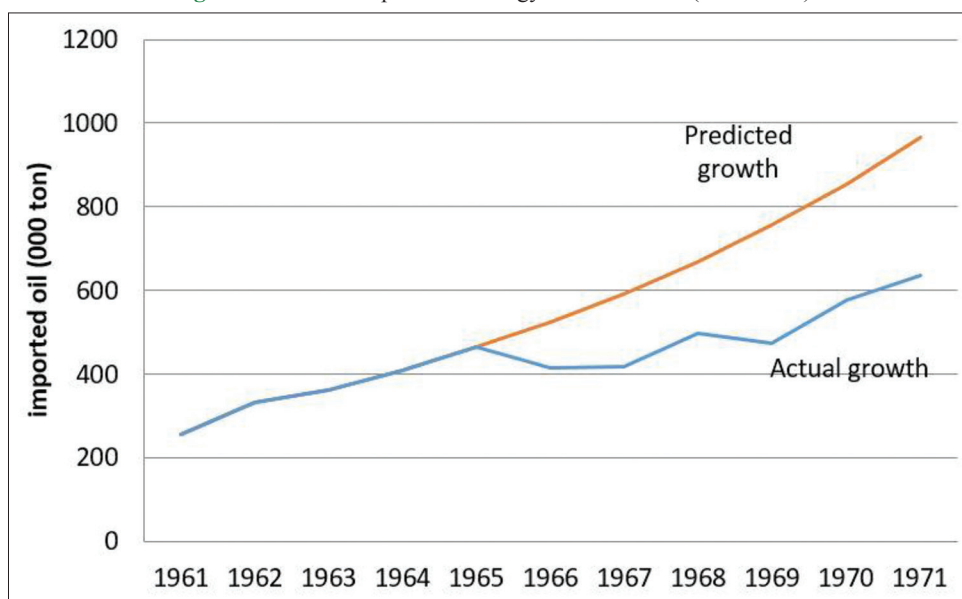
Khomeini’s revolution in Iran and Iraq-Iran war fueled the increase in oil prices that reached unprecedented limits due to market fears on supplies (Figure 4). This global wide impact affected Jordan and doubled its energy bill. Despite that, Iraq – Iran war, increased the energy security in Jordan because it was the first time in its history that Jordan diversifies its energy suppliers.

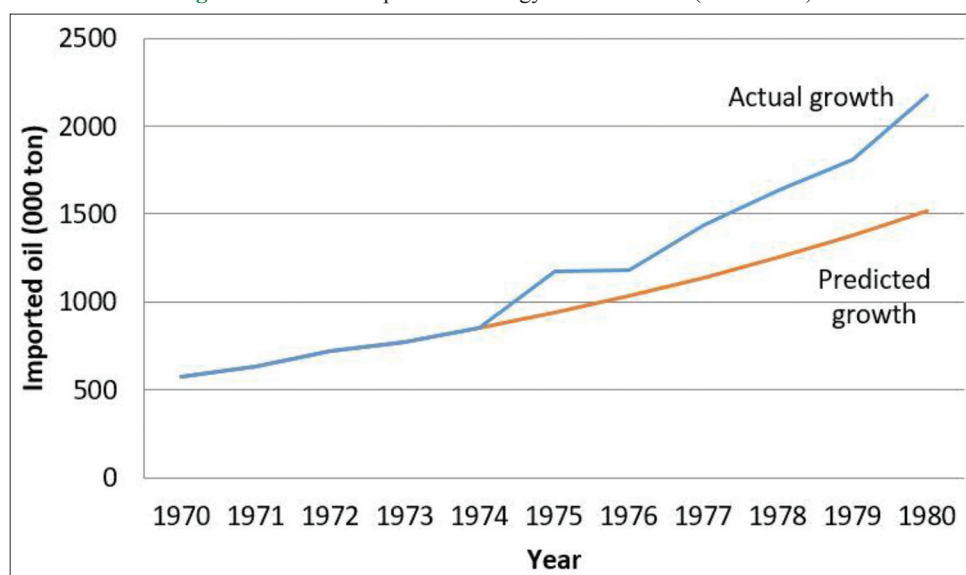
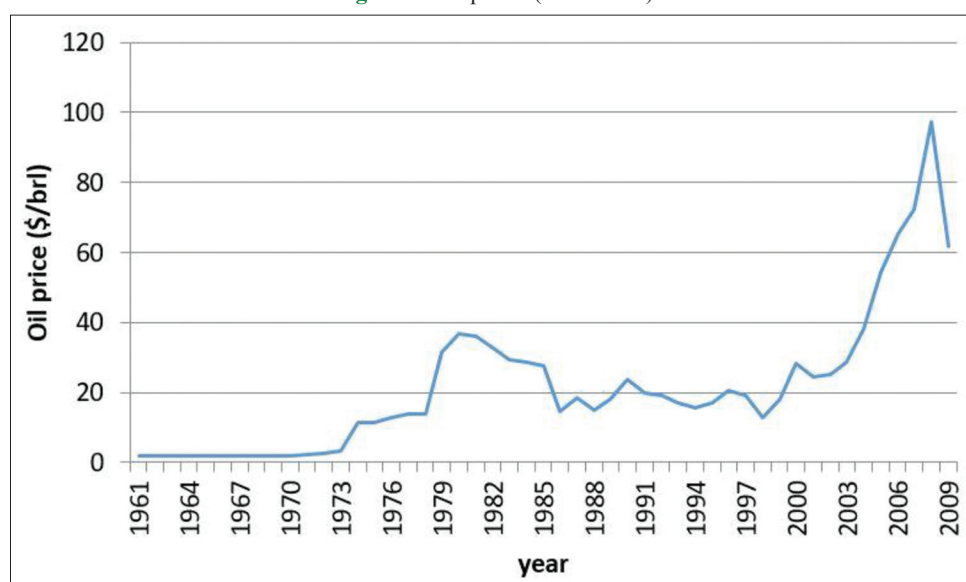
In 1984, Jordan started to import crude oil, fuel oil, and liquefied petroleum gas from Iraq in preferable prices. Some of those quantities are paid by goods, and the terms of payments were very attractive to Jordan, so it decreased the quantities imported from the TAPLINE. Saudi Arabia increased the prices of the exported oil to Jordan, and the TAPLINE operated with its minimum operating capacity. While it seemed as if Jordan had acquired a new strategic source for crude oil, it was the start of losing the older one.

## 2.5. First Gulf War (1990-1991)

This conflict had affected “the diversity of suppliers” principle and returned Jordan to one energy supplier status. In 1990, TAPLINE

Figure 2: Actual and predicted energy demands from (1961-1971)



**Figure 3:** Actual and predicted energy demands from (1970-1980)**Figure 4:** Oil prices (1961-2009)

operation reached to its final chapter when Saudi Arabia used it as a political weapon by ceasing its operation in response of Jordanian decision to support Iraq (Uli, 1990). The imported crude oil quantity decreased in 1991 by 13% from previous year. Iraq compensated the shortage and the situation became stable again in 1992. Jordan succeeded to minimize the impact of this weapon due to the diversity of supplies mentioned in previous section.

In addition, due to the embargo acted on Iraq after this war, the economic integration between Jordan and Iraq reached unprecedented level (Hammad and AlMamani, 2013). Through the last decade of the 20<sup>th</sup> century, 4000 trucks were transferring oil from Iraq to Jordan, and transferring goods back to Iraq (Al Hawamdeh, 2003).

## 2.6. Iraq Invasion (2003)

The invasion of Iraq was a turning point in the Jordanian energy sector; it left Jordan without its only supplier for crude oil and

petroleum products. Unlike the previous conflict, Jordan was not ready for such loss. Even the quantities were compensated from Saudi Arabia but the prices and conditions were not the same. Saudi Arabia rejected all the Jordanian requests to re-operate TAPLINE. Energy cost increased and left the Jordanian government with no choice except increasing the prices of petroleum products in the following years causing an inflammation in the Jordanian economy.

In general, Iraq Invasion did not affect the diversity of the suppliers principle because even Jordan lost Iraq it earned Saudi Arabia, so the number of suppliers remained one. Nevertheless, the economic integration principle was adversely affected leading to an increase in imported energy prices. In response to that, Jordan devised an energy strategic plan that aims at increasing the share of its domestic energy resources in the national energy mix (Hrayshat, 2007).

## 2.7. Egyptian Revolution (2011)

By the end of 2010, Jordan had generated 80% of its electricity demands using the Natural Gas (NG) imported from Egypt through the Arab gas line (MEME, 2010). Egypt was a reliable NG supplier for Jordan. Instead of securing another LNG supplier, Jordan had plans to increase the amount of imported NG from Egypt, that have formed 12% of its energy mix, and to build NG piping network to provide the residential, industrial, and commercial sector by NG in Amman and Zarqa (MEME, 2010).

At the beginning of 2011, Arab spring which brought down many regimes in the Arab World hit Egypt. The lawlessness following the end of Mubarak's era affected the protection of the NG pipe going to Jordan and Israel which was blown more than ten times. The consequences on the electricity generation sector in Jordan were catastrophic due to the lack of resilience presented in form of adequate NG strategic storage. In January 1, 2012, Jordanian Minister of Energy, Qutaiba Abu Qura, announced that Jordan loses 4 million US\$ daily as a result (Petra, 2012).

## 3. DISCUSSIONS

Table 1 summarizes the impacts of the selected conflicts on the Jordanian energy security based on the developed framework. The table shows that Jordan Energy sector is too sensitive to the regional conflicts. The effects of this sensitivity became more serious due to lack of diversity in energy suppliers that could lead to catastrophic economic consequences (Iraq invasion). The diversification is essential because even the most reliable supplier can be hit by a force majeure (Egyptian revolution). It also decreases the impacts of using energy supplies as a political weapon (First Gulf war). Jordan lost Energy suppliers due to some conflicts; Saudi Arabia in First Gulf War and Iraq in Iraq Invasion, and won new suppliers due to other conflicts; like Iraq in Iraq–Iran war and Saudi Arabia in Iraq Invasion.

The above analysis also illustrates the importance of supplies immunization by both economic integration and supply chain protection. The economic integration principle strongly shapes the nature of the importer/exporter relations and can be affected by the conflicts. For example, Lebanese civil war changed the relation between Jordan and Saudi Arabia from Interdependency relationship to make Jordan totally dependent on Saudi Arabia. While the Iraq – Iran war and First Gulf War enhanced the economic integration between Jordan and Iraq, which is the preferable case for any energy importer.

On the other hand, it was shown that the energy supply chain is considered as attractive targets in conflicts. Attacking energy supply chain could be a result of either nationalist backlash (6 days war) or the raise of terrorism (Egyptian revolution). Adequate strategic storage provides a buffer against sudden interrupt of energy supplies resulted from such attacks (6 days war) or any shocks resulted from political decision (1<sup>st</sup> Gulf war). Lack or inadequate resilience in energy system can lead to catastrophic impacts (Egyptian revolution).

In terms of the conflicts' impact of the energy demands, the change follows directly the change in population increasing with taking in refugees (Lebanese civil war) or a mass return of expatriates (1<sup>st</sup> Gulf war), or decreasing through losing populous lands (the 6 days war). While the effects on the prices can be country-exclusive like the case when Saudi Arabia asked Jordan to pay the operational cost of the TAPLINE in 1984, or world-inclusive related to the fluctuating oil prices in the global market, like the one seen during the Iraq-Iran war.

To avoid repeating the same mistakes, analysis upwards suggests a necessary adoption of energy policy for Jordan which targets the following aspects:

**Table 1: Impact of regional conflicts on Energy Security, demands, and Prices**

	Diversity of suppliers	Adequate strategic storage	Supply chain protection	Economic integration	Domestic resources	Demands	Prices	Energy security
6 days war	No effect	No effect	Decreased. TAPLINE converted to a target for Palestinian groups.	No effect	No effect	decreased	No major effect	Decreased
Lebanese war	No effect	No effect	Decreased. TAPLINE was bombed many times	Decreased. Totally dependent on Saudi Arabia	No effect	Increased	Increased. Jordan had to pay TAPLINE operation cost	Decreased
Iraq–Iran war	Earn new source (Iraq)	No effect	No effect	Increased. Strong Economic Integration with Iraq	No effect	No effect	Increased. Still Iraq offers oil to Jordan in preferable prices	Increased
First gulf war	Lost TAPLINE	No effect	No effect	No effect	No effect	Increased	No major effect	Decreased
Iraq invasion	Earn new source (Saudi Arabia) Lost Iraq	No effect	No effect	Decreased. Totally dependent on Saudi Arabia	Jordan put plan to utilize domestic resources	No effect	Increased. Jordan lost the preferable prices used to get from Iraq	Decreased
Egyptian revolution	Lost NG from Egypt)	NG storage not adequate	Decreased. The gas line was bombed many times	No effect	No effect	No effect	No major effect	Decreased

1. Direct continuous decrease in the share of the imported energy through utilizing the domestic energy resources like Oil shale and Renewable energy.
2. Expanding energy supply network and diversifying it focusing on establishing an interdependent relationship with energy exporters to make those exporters more reliable.
3. Increasing strategic storage to decrease the direct effects of interruption in the supply and the fluctuation of prices.

#### 4. CONCLUSION

Due to the high dependency on the importing energy, the energy sector in Jordan is too sensitive to the regional conflicts. The effects of this sensitivity became more serious due to lack of diversity in energy suppliers. The energy supply network could be changed due to conflicts. Energy supplies must be immune by both economic integration and energy supply chain protection. Enhancing the economic integration with the suppliers is a preferable case for any energy importer. Energy supply chain is considered as an attractive target in conflicts and energy supplies can be used as a political weapon. Therefore, strategic storage increases the resilience of energy systems, and provides a buffer for supplies interruptions resulted from the conflicts.

The energy demands could increase or decrease due to regional conflict because of the change in population. The regional conflicts also have country-exclusive effects on energy prices when the exporter asks the importer to cover new costs (or lost revenues), or world-inclusive effects due to the fluctuation in energy prices worldwide. To reduce such effects, it is suggested that Jordan must adopt policies that increasing the share of local resources on its energy mix, widening and diversifying its energy network, increasing its energy strategic storage, and building and interdependent relationship with energy exporters.

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