SYRIA CIVIL WAR and ENERGY BALANCES

Oğuzhan AKYENER

1 – INTRODUCTION

Hence being a neighbour of Iraq, Syria is usually expected to be a huge oil and gas reserves bearing country. Due to this perception, some of the analysts claim that, the aim of controlling the country's energy resources is one the most important reason of the ongoing civil war.

Definitely there is some volumes of oil and gas in Syria. However, how can we put the energy into such a complicated equation in such a civil war? What can be said about the energy potential of the country and what is the current situation?

While having a short outlook into the current energy status of the country, it is obvious that, due to the civil war, energy infrastructure severely damaged. As a result of lack of infrastructures and finance, naturally oil and natural gas production also felt sharply. Most of the existing surface facilities damaged due to the attacks. There is not an official and secure environment or routes for crude sales. Nearly %95 of the oil production fields are under control of a terrorist organization PYD. With the operatorship of some Russian and US oriented private companies, PYD is producing around 70 000 bbl crude oil per day. Most of this volume is sent to Iraqi KRG. Nearly all the gas producing fields are under control of Esat forces. Production levels felt around %50. However, hence being a more stable environment in Hums Province, governmental structures could manage to continue the gas production.

Nearly all the refinery activities were exhausted due to existing infrastructures were damaged. Russia and Iran are planning to construct a new refinery for Esat government but currently, only some small-scale distillation operations can be continued with the under the stair facilities.

In addition to oil and gas, electricity distribution systems also suffered a great damage.

In such an environment, it is not possible to make consistent approaches since there is no clear information about population, industry, consumption and other related data. For this reason, instead of dealing with the country's general unknowns, the oil and natural gas potential, locations of the fields and existing black oil sales will be analysed in this study.

2 - OIL and GAS POTENTIAL

There are many different interpretations and calculations regarding the oil and natural gas potential of Syria. Because even in the pre-civil war period, there is not enough verified data about the discoveries, tests and productions. Moreover, within the timeline of civil war, it became impossible to get any trustable data about the fields.

Within this concept, before trying to analyse the hydrocarbon potential of the country, it will be useful to briefly explain the terms such as; proven oil reserve, amount of oil in place, and oil potential.

Proven oil reserves; refers to the part of a field that can be produced at maximum level considering technical and economic conditions. Of course, it is important that this level of production is quantified and made acceptable by taking into account the drillings, tests performed and the extensions of the site verified by geophysical / geological / petrophysical models.

In addition, not even all proven reserves at a planned site will be available for production at all times. Because the development plans, investment amounts, other technical-economic-financial-technological-logistic factors will affect the production plans. In addition, as the field is started to be developed, new data will reveal some aspects of the existing model and some of the unknowns and previously predicted assumptions will naturally be changed.

The amount of oil in place indicates the estimated volume of oil a field contains in the pores of the underground reservoir. However, even under the best conditions, most of the amount of oil in place is technically unproducible. The average producible amount of oil in the oil fields around the world varies between 5% and 35%. These rates may be much lower due to their petrophysical and petrochemical properties.

In addition, in an oil field, the reservoir to having high H_2S ratios, high gravity of the oil, being the reservoir is deep, and the field being in offshore will technically and commercially limit the production scenarios. And these factors will also increase the production costs.

When Syria's oil fields are examined in general terms, they:

- Are usually composed of small structures,

- Contain heavy oil,

- Have big problems such as existence of high H_2S levels,

- Have reservoir levels (in general terms) around at a depth of 2500 - 3000 meters.

Considering the low oil prices, this situation does not reveal any appetite. Because only a small part of the oil amount determined in place can be produced under difficult conditions with high costs.

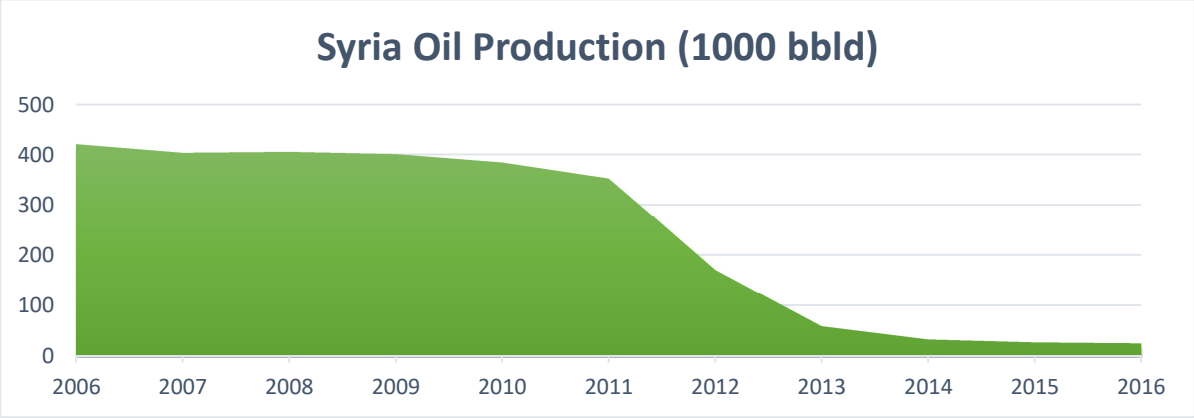
That’s why, on the contrary of the Iraqi similitudes, the scenarios and the resources are very different in Syria.

While checking the declared data from some international organizations, for example, according to EIA data and BP's Review Statistical Review of World Energy 2017”report, Syria has:

- 2.5 billion barrels of proven oil reserves,

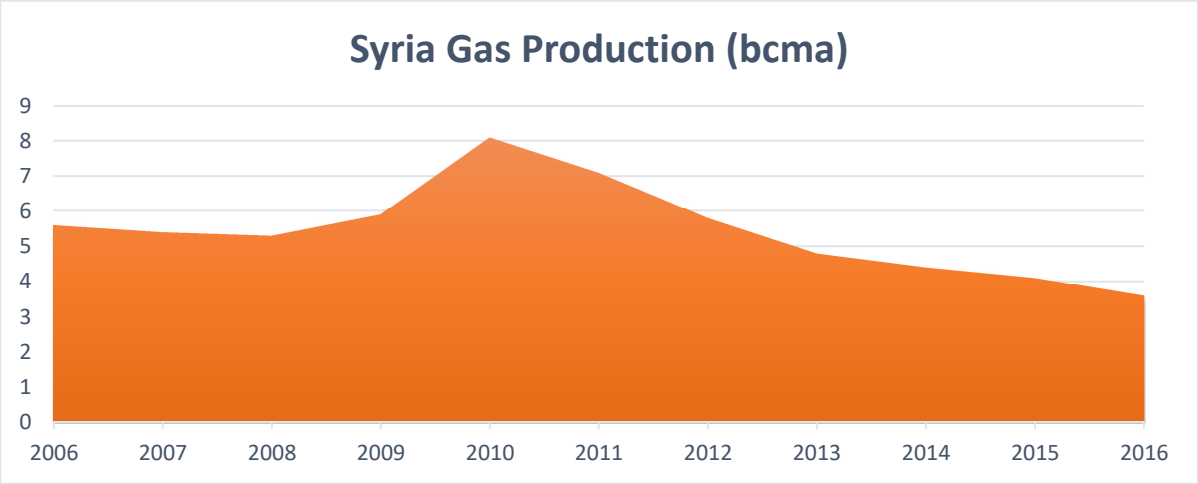
- And a proven gas reserve of around 300 billion m3.

The country's total oil and gas production is also graphed below, by using the data in BP's Review Statistical Review of World Energy 2017”report. As it can be seen from the first graph, oil production, which used to be around 400 000 barrels per day, has decreased to 40 000 bbld due to the civil war.



Graph 1: Syria Oil Production (1000 bbld)

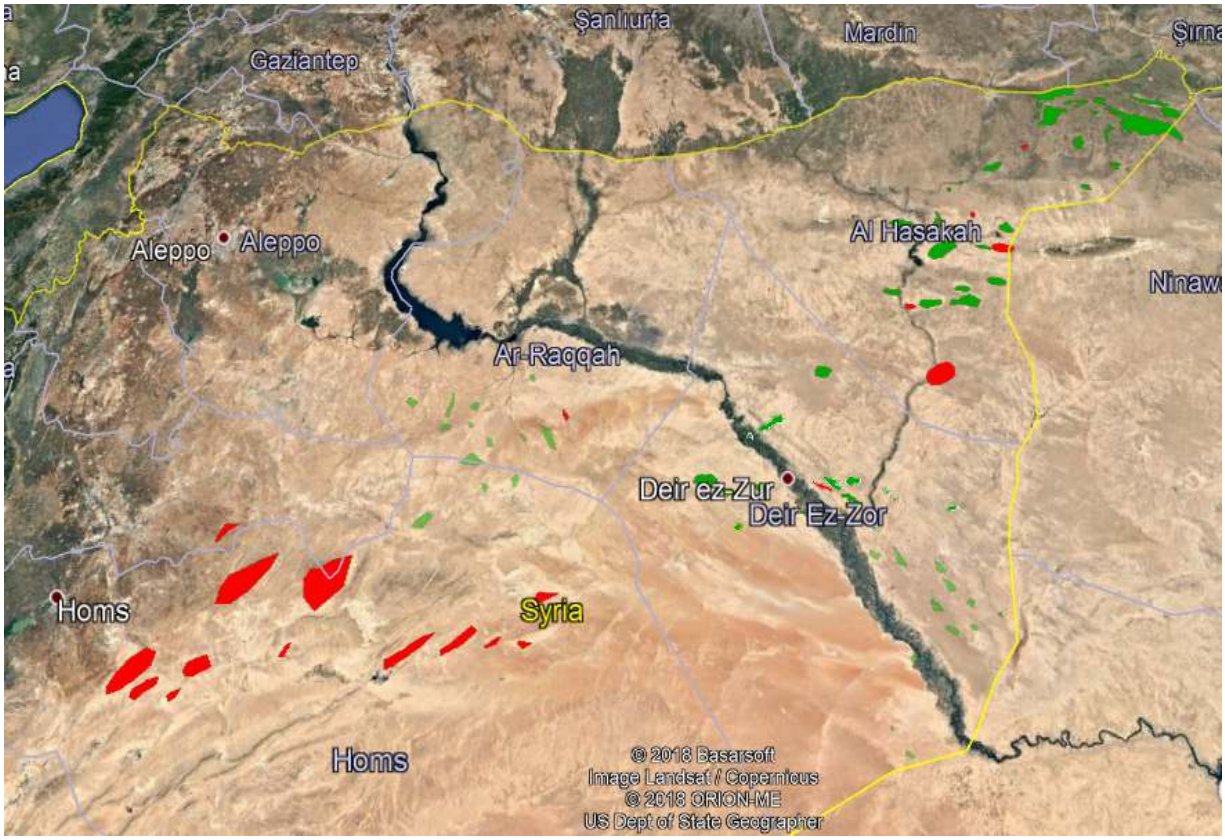
As can be understood from the next graph, gas production in Syria has fallen around %50 levels (by comparing the peak levels in 2009's) to 4 bcma.



Graph 2: Syria Gas Production (bcma)

However, as mentioned above, the data obtained after 2011 were created in the light of the many assumptions and existence of unknowns. In other words, it should be considered that even the data in BP's related report can express (somehow) approximate levels and cannot give concrete and clear figures.

Now, the map of Syria below shows the locations of the known (discovered) oil and gas fields.



Map 1: Syria Discovered Oil and Gas Fields

As can be seen from the map;

- The oil and gas belt continues from the North East of Syria to the South West.

- Of course, this approach can only be admissible through the locations of the discoveries.

- Al Hasakah province can be seen as the highest potential region in Syria.

- Then Deir Ez-Zor province takes the second place.

- The province of Raqqa has relatively small but has some discovered oil and gas fields.

- The province of Humus, which provides a significant portion of Syria's gas production, is also the region with the largest gas resources.

As can be seen from the locations of the due fields,

- Gas producing fields remained under the control of regime forces. For this reason, the country's gas production has not experienced big collapses as in oil.

- The majority of the oil producing fields used to be under the control of DAES and then DAES left the floor to the other terrorist organization PYD.

- Therefore, oil production decreased by 90% in the country.

- It is known that nearly 95% of the current oil production is made by PYD.

- (With the reference of our local contacts) It is known that nearly half of PYD's production is operated by Russian and the other half by US-based companies, and most of this production is transferred to Northern Iraq KRG management.

- Hence the sustainability of production is much more difficult in gas, rather than oil fields, security and stability issues becomes much more important. While nearly all the gas fields have being under control of the regime forces, that's why, gas production of the country could continue. If DAES or PYD could occupied the gas bearing zones, then the gas production will completely be come to an end for the invaded regions.

In the current situation, Syria's energy infrastructure was severely damaged. Due to instability, lack of investment and related equipment, necessary maintenance works cannot be carried out.

As of 1 February 2018, a cooperation agreement was signed between Assad regime and Russia for the restoration, improvement and construction of the related energy facilities (at least in areas covered by the regime forces). In this context, it is planned to repair the electricity generation and distribution infrastructure, railways, ports, natural gas production and transportation facilities and the refinery in Humus in cooperation with Russia.

In addition, Assad's other ally, Iran, is also planning to build a new refinery in the region. However, plans and commitments cannot find a suitable path to be followed. That's why there are usually delays mainly due to financial issues.

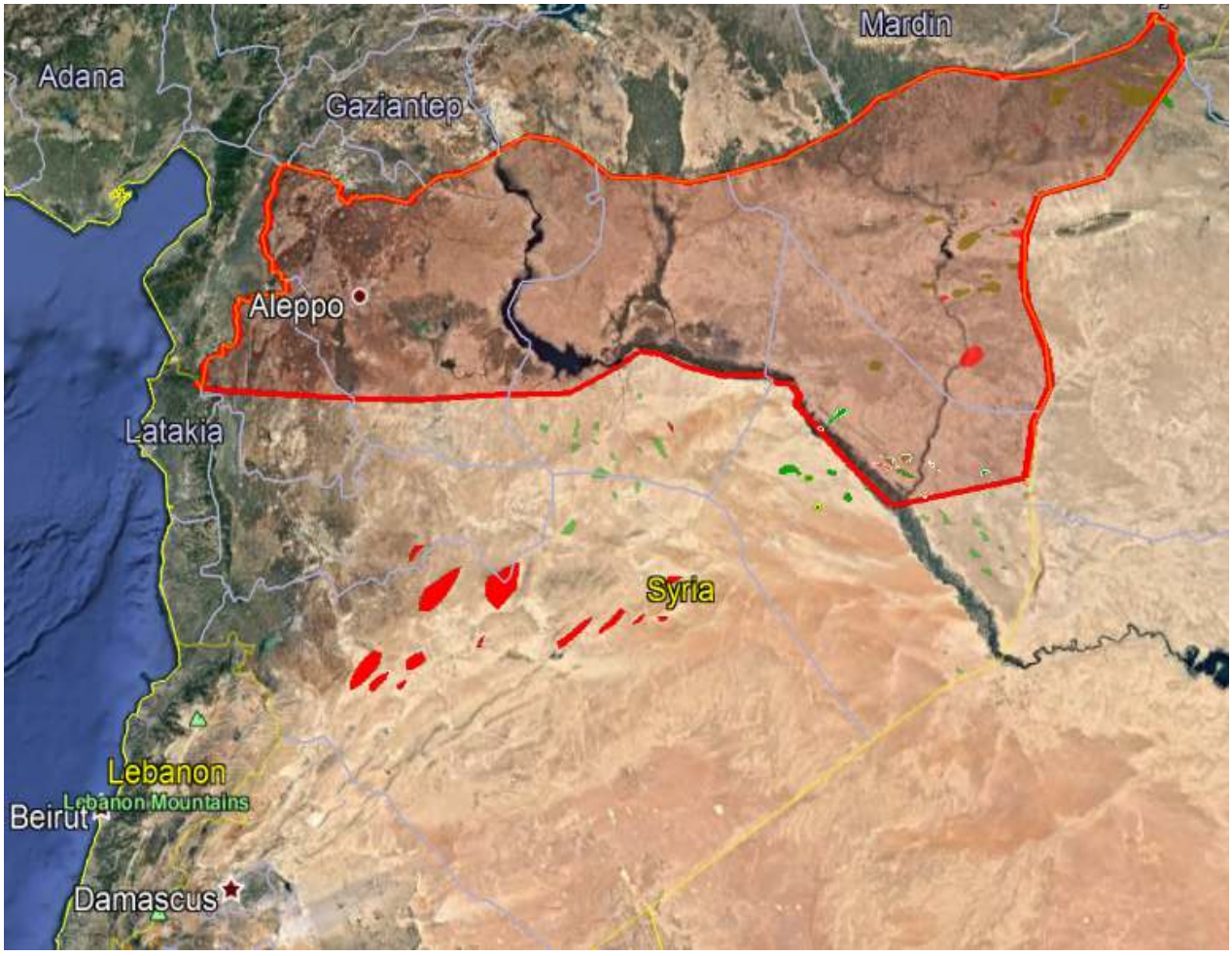
After giving brief information about the general energy status of the country, oil and gas resource potential will be discussed in the following sections by dividing the Syria into two regions.

2.1. - OIL AND GAS POTENTIAL IN THE SOUTHERN SIDE OF SYRIA

The map below shows the official borders of Syrian side of Ottoman Halep Province. As can be understood from the map, the region consists of Aleppo, Al Hasakah, some parts of Ar-Raqqah and Deir-Ez Zohr provinces of today's Syria.

In this study Syria is divided into two regions, as Ottoman Halep and the remaining southern part. This division is due to Turkey's possible future claims and targets related with the region. Hence, Ottoman Halep region is also a part of "Misak-ı Milli Declarations" of Turkey.

With this concept, by starting from the Southern Side of Syria, as can be seen from the map below,



Map 2: Ottoman Halep Province and the Southern Part Borders and Oil and Gas Fields

- This region consists of the nearly all the gas fields in Humus, oil fields in Ar-Raqqah and oil and gas fields in southern Deir Ez- Zor provinces of Syria.
- Some of these fields are; El Mazra, El Mahaş, El Karata, Eşşola, Tayyem, An Nisan, El Faid, Ebu Rabah, Bilas, Cerife, Kumkum, El Haşim, Eşşair, Palmiya, Arak, Necip, Jihar, Dobayat, El Hay, El Kalah, Dibissan, Safiye, Seyit, Memlük, El Madar, Halime, Amele, Vahap, Tuveynan, Tel Abyat, Fahdeh, El Halil, El Hüseyin, Saran, Azrak, Melih, Tanak, Serhat, Galban, Yunus, El Varid, Ömer, Hamar, Akbaş, Bargut.

The total reserve capacities of these fields are much lower than the Ottoman Halep side. Usually the structures are smaller and mainly the structures are bearing gas resources.

Estimated total oil reserve in this part is around 1 billion bbl. And for gas, reserves are around 250 bcm.

2.2. - OIL AND GAS POTENTIAL IN OTTOMAN HALEP PROVINCE

The northern side, where can also be called as the Ottoman's Halep Province, is the richest zone according to oil and gas potential of Syria. Map below shows the borders and the existing oil and gas fields in/of this region.

Map 3: Ottoman Halep Province Borders and Oil and Gas Fields

As can be understood from the map, oil and gas discoveries are starting from the Deir Ez-Zor region and continuing with the North-East direction. In addition to these discovered fields, there are wells in the direction of Aleppo province, which continue to the west and where oil signs were seen during the drilling activities. However, even though they contain potential, it is not realistic to make a concrete interpretation since the generated geophysical models and well test data are not available.

Almost all of the oil and gas fields discovered in this region are under the control of the PYD. In some fields Russian (state-funded) private enterprises and some US companies operating the producing fields on behalf of PYD. Usually the produced volumes are sold to the KRG with around Brent - 15 USD/bbl ranges. There are two reasons why it is sold far below current oil prices. They are, first this is the illegal black sales and the second reason is crude is heavy and bearing H_2S.

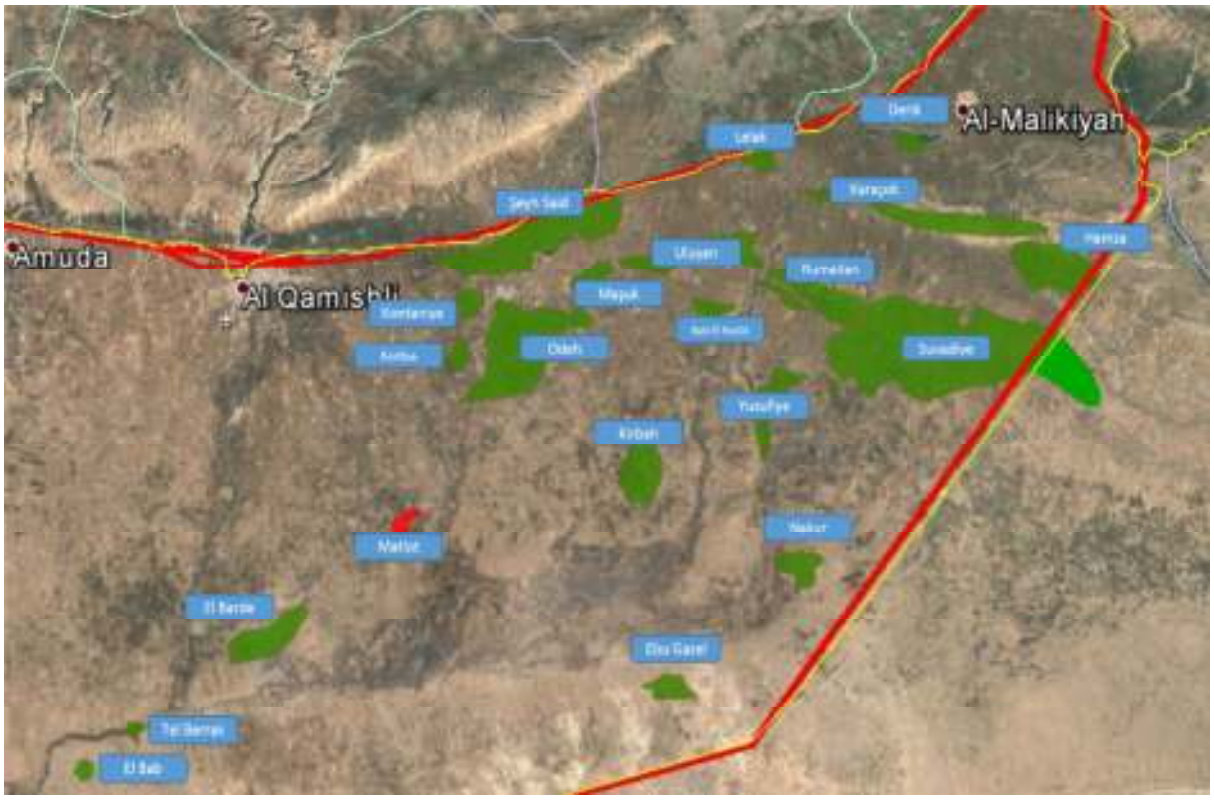
Due to the current uncertainties and impossibilities, investments to increase the production for existing old fields and facilities cannot be realized. For these reasons, production continues at the

lowest levels under difficult conditions. However, with the recovery of the region and the dissolution of the political-security risks, it is a fact that production can regain the level of 400 000 barrels / day in a short time and may even exceed this level with new investments.

So if Turkey does not cease to PYD to occupy this area, these resources in the region, are enough to meet all the costs of the terrorist activities and the USA's costs in the region. In addition, such volumes of energy may financially enable a new terrorist state to be established in the region. By the way, hence the fields usually contain heavy oil and the targeted reservoir depths are around 2500 - 3000 meters, production is difficult and costs are high.

Moreover, there are some potential areas to explore existing in the region. But in such an insecure and instable environment, it is not sensible to invest such long term exploration activities in the region.

Now, in larger scale maps, the names and the reserves of the due fields in the Halep province are going to be examined below;



Map 4: Oil and Gas Fields Locating Between Kamışlı to Malikiye

Here in the table below, the due oil and gas fields' (showing on the map above) estimated reserves are given:

Name of the Field	Estimated Reserves (million bbl)
Derik	8
Lelak	7
Karaçok	436
Hamza	145
Suvadiye	2550
Rumailan	150
Tel Garab	11
Uluyan	40
El Kairat	6
Bab El Hadid	13
Yusufiye	35
Şeyh Said	117
Maşhuk	650
Badran	8
Odeh	100
Kontaniye	12
Kotba	11
Şamu	1
Kirbah	33
Nakur	30
Ebu Gazel	27
Matlot	5
El Barde	25
Tel Berrak	3

El Bauab	3

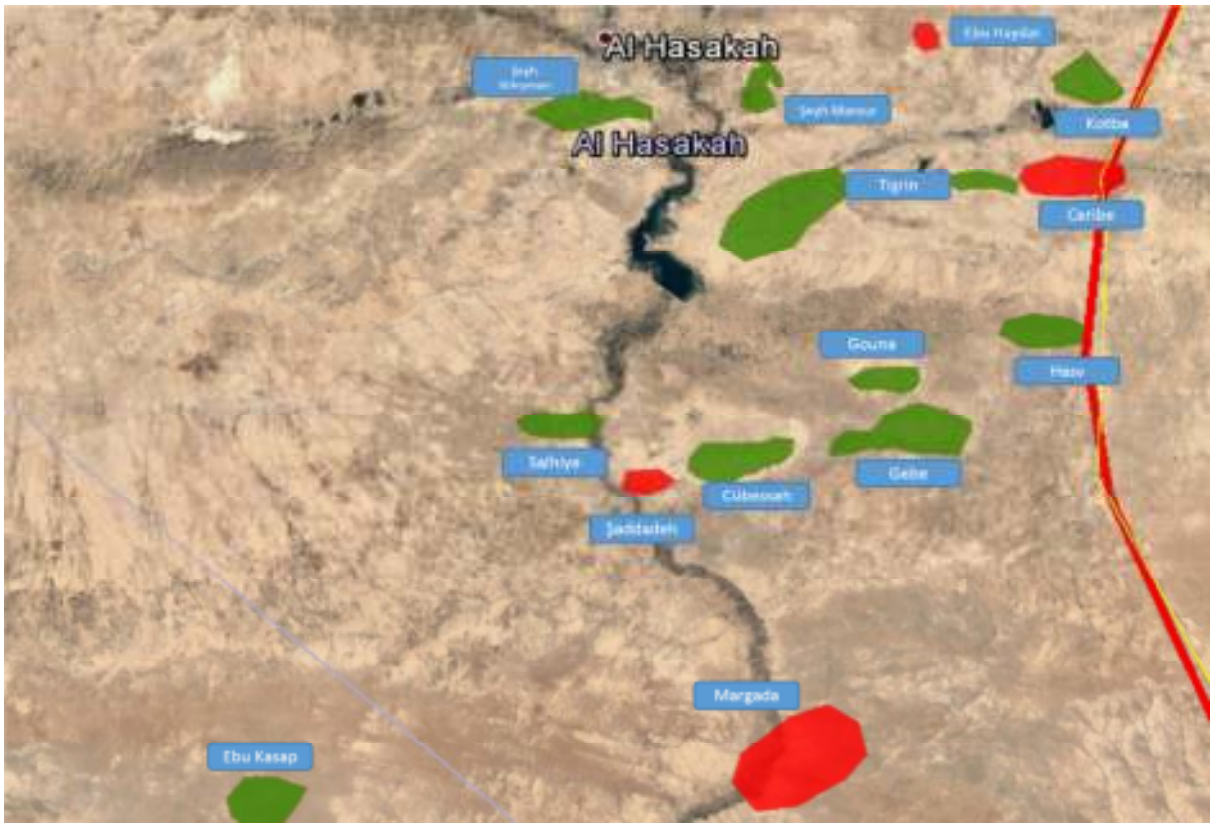
Table 1: Reserves of the Due Oil and Gas Fields Locating Between Kamışlı to Malikiye

As can be seen from the table, it is estimated that there are (totally) approximately 4.5 billion barrels of oil (equivalent) reserves in 25 fields in this region. The oil reservoirs in these fields are generally at shallow depths of around 1 to 1.5 km. The depth increases in the south-west direction. The oil contained in the majority of the fields is of high gravity. That is, the recovery rates expressed are low. However, with appropriate techniques and investments, these rates and reserves can be carried to higher levels.

Only one of the fields is a gas - condensate field.

Existing production facilities in about 11 of these 25 sites are available. Only some of them require well completion and plant maintenance operations. However, all but six of them have serious problems in the transmission pipelines. Even under the current conditions, (within a secure and stable environment) around 173 000 barrels / day can be produced from these fields considering the situation of the related facilities. This ratio can be increased to at least 500 000 barrels / day with the commissioning of all fields and using some production enhancing techniques.

The fields around Al Hasakah city are shown on the map below.



Map 5: Oil and Gas Field near Al Hasakah City

The estimated reserves of the due fields shown on the map above are given in the table below.

Name of the Field	Estimated Reserves (million bbl)
Şeyh Süleyman	45
Şeyh Mansur	40
Ebu Haydar	7
El Hol	75
Ceribe	40
Tişrin	411
Hasv	70
Gouna	145
Gebe	200
Cübessah	200

Şaddadeh	15
Salhiye	65

Table 2: Reserves of Oil and Gas Field near Al Hasakah City

It is estimated that there are 1.3 billion barrels of oil (equivalent) reserves in a total of 12 fields in this region.

4 of the due fields are gas - condensate.

Existing production facilities in about 5 of these 12 fields are available. Under these conditions, 30 000 barrels / day oil can be produced considering the situation of the related facilities. This ratio can be increased to at least 150 000 barrels / day with the development of all fields and using some enhancing techniques.

The reservoir depths in this region go up to 3000 meters. As mentioned above, the depth increases in the south-west direction.

Finally, when we look at the sites in Deir Ez-Zor region;

Map 6: Oil and Gas Field in Northern part of Deir Ez-Zor City

The estimated reserves of the due fields shown on the map above are given in the table below.

Name of the Field	Estimated Reserves (million bbl)
Margada	30
Ebu Kasap	100
Derro	28
Raşid	50
Atilla	140
İsbah	270
El Tabiye	200
Cafra	130
Yimken	30
Raseyn	70
Şahel	55
Gavari	35

Tablo 5: Reserves of the due Oil and Gas Field in Northern part of Deir Ez-Zor City

It is estimated that there are 1.1 billion barrels of oil (equivalent) reserves in 12 fields in the remaining part of this region within the borders of Ottoman Halep Province. (Note: Margada and Abu Kasap sites seen on the map were included in the previous calculations.)

Only one of the above fields is a gas - condensate field.

Existing production facilities in about 5 of these 12 fields are available. Under these conditions, considering the status of the related facilities, oil production of around 90 000 barrels / day can be achieved. This ratio can be increased to at least 300 000 barrels / day with the development of the fields and using some enhancing techniques.

In other words, it is estimated that there are a total of 6.9 billion barrels of oil equivalent reserves in 48 fields discovered in Ottoman Halep province. It is possible to achieve a production capacity of approximately 210 000 barrels / day using the existing infrastructures. But to be able to reach such levels, the region initially needs a secure and stable environment.

While making the reserve estimations presented in this section, the available technical data of the related fields have been analysed by making some comparisons and by using some private – technical data from the local experts. By the way, an optimistic approach has tried to be followed.

Note: The greatest difference between the (internationally) proven total reserves and the estimated total reserves in the region is mainly due to the fact that nearly all the discovered fields have some identified data but which are not shared with the international authorities.

As a result of a non-optimistic approach, the total reserves of the region decreases to 1.7 billion barrels when the explored but not developed fields are excluded from the estimates. In such case only the proven and internationally identified amount of reserves can only be taken.

However, even in the optimistic scenario, the figures are expected to rise to much higher levels with new investments and studies.

Estimates made up to now and the reserve figures revealed, include fields that have been taken into production, defined by many data and usually the borders of the structures have been verified by seismic interpretations. But the potential in the region is not limited to these.

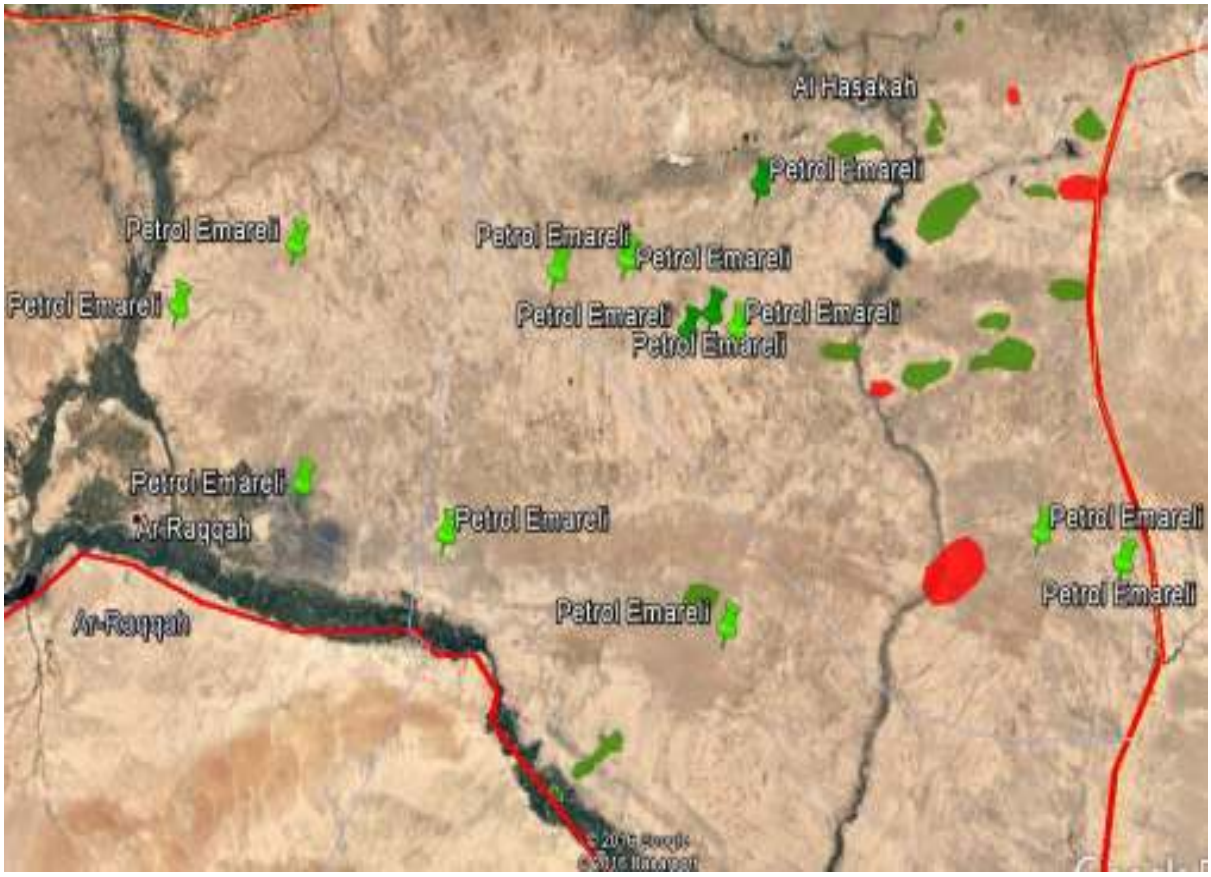
In addition to the unproven fields that have been discovered, there are also some other potential areas in the region. There are seismic data, interpretation results, structures and wells. But usually, the results of these wells are not as clear as the ones drilled in the due fields above.

For those possible potentials; usually seismic studies are not available, seismic data may not be interpreted or there is no information about the seismic processes. And secondly, at the best, there are some oil showed wells which are thought to have been drilled on general geological estimates.

The locations of these wells can also contain potential and are worthy of examination.

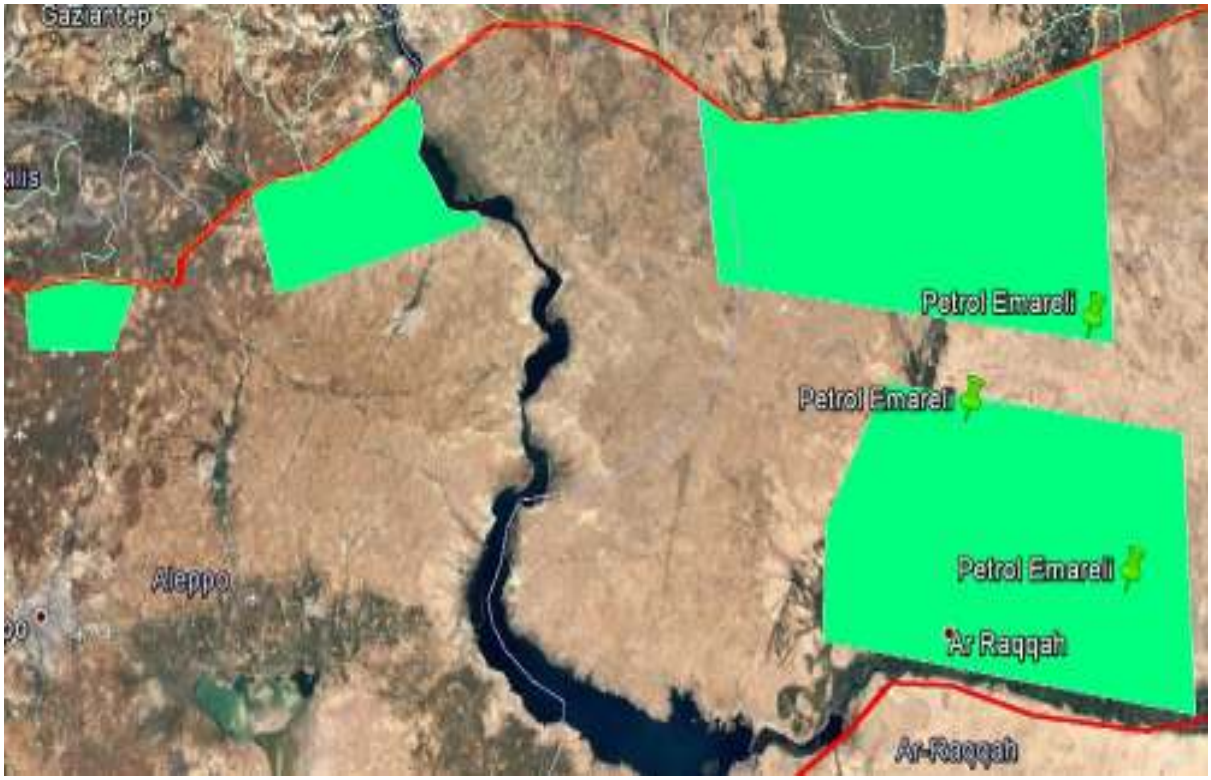
The locations of those that can be identified from the relevant wells are also indicated on the map below.

As can be seen, there are 13 identified oil wells that can provide important evidence to start exploration activities.



Map 7: Some Oil Showed Exploration Wells in Northern Syria

Finally, as a result of the interpretations carried out by the TESPAM team on the region, the areas that can be considered as potential for exploration are shown in the map below.



Map 8: Potential Areas for Exploration in Northern Syria

In addition to these areas shown on the map above, Afrin can be accepted as another potential research location for exploration studies.

As a result, it can be understood from this point that although the region does not have enough resources potential valuable to drain the mouths of the global players, it has enough oil to allow the establishment of a new (terrorist) state in the region.

In other words, what needs to be understood here is that Syria cannot be confused with Iraq by the hydrocarbon resources it has. The fact that a country has oil reserves does not mean that the country is subject to non-intrusive attacks due to presence of energy. The process and the balances need to be analysed together with many factors that can be effective. Otherwise, the comments made by linking everything to energy will not be consistent and appropriate.

As can be seen, even under the best scenario, the level of resource potential in Syria is too low to be taken into account when compared to neighbouring countries such as Iraq. Nevertheless, this potential is important for Syria and the region. But it does not attract the attention of the whole

world. Moreover, by considering the reservoir / chemical properties and quality of oil and production difficulties and increasing costs, this situation will not attract investors' interest even during low oil prices.

3 - BLACK OIL TRADE IN THE REGION

As mentioned in the chapters above,

- The vast majority of the discovered oil fields have already remained under the control terrorist PYD.
- Many of these fields are old and mature. Usually oil is heavy, reservoirs are deep (around 3000m.) and contain H_2S. Which means it is not easy to continue the production with lack of knowhow, equipment, finance and logistics. That's why, in such difficult conditions, under the operatorship of some Russian and American companies, PYD can hardly continue the production of some fields within available minimum levels.
- Neither the foreign operators nor PYD do not make noteworthy volumes of investment to the due fields. Hence, the future of the region is not predictable. Mainly due to lack of investment, production levels in due fields are continuing decreasing.

In this sense, the volume of oil production in the region ranging from 50 000 to 80 000 barrels per day which can be evaluated within the scope of the financing of terrorism. So, this black finance continues by the hands of Russian and American companies and security teams. Around a 70 000 bbld volume is still continuing to be sold illegally by PYD to the KRG.

Hence being the quality of oil is low and the trade being illegal, the price is around $ 15 / barrel lower than Brent market. In this concept, while assuming:

- An average of 70 000 barrels per day of sales to KRG;

- Annually average Brent price is $ 67 / barrel,

- Then the PYD's sale price is around $ 52 / barrel,

So, it can be understood that KRG has an oil income of $ 3.6 million per day. Then again by assuming that 20% of this revenue is spent on operating and transportation costs, 40% is for US or Russian operator companies in the due fields, and the remaining 40% is for PYD;

- The amount left to PYD is around $ 1.5 million per day.

- This amount reaches $ 45 million in a month, which is quite sufficient to finance a terrorist organization.

- When this monthly budget is adjusted to 12 months, it amounts to approximately $ 550 million, which corresponds to the amount of budget the US has allocated for the PYD in 2019.

- Related US and Russian companies, which earn the same rates, contribute to the financing of their countries' disguised activities in the region with a portion of their income.

In addition to these facts, it is also claimed (by the local experts) that during the DAES period the due fields was being operated again by some private US and Russian companies. So, after DAES to complete its function and withdrawing from the region, the same system was continued with PYD.

While focusing on how this black oil being sold;

For the oil produced;

- A small portion is thought to be given to the regime forces for some exchanges with arms, health equipment and etc.
- The majority is sold to the KRG. Within this sale;
    - Some portion is paid as demanded weapons, fuel for the vehicles, medicines and other demanded products,
    - The remaining part is paid as cash.
    - Money taken from KRG initialy is used for field operating costs and the remaining is shared between the operator companies (US or Russia originated) and PYD.

From KRG, this black categorized oil usually are added (mixed with) to the current production volumes and sold to the world markets.

4 - ROLE of ENERGY IN THE SYRIA BALANCES

As it can be understood from the above chapters, although there is substantial volumes of reserves, energy is not the most important element (or cause) in the balances in Syria civil war.

In other words, it is certainly not consistent to argue that there is energy behind the causes of the continuing unrest. In this context, neither the alleged enormous resource potential of Syria nor the conspiracy theories established on Syria does not reflect the truth.

Syria is very different from its neighbour Iraq in terms of the quality, quantity and value of its hydrocarbon resources.

Nevertheless, Syria's oil reserves (although generally poor in quality and difficult to produce) are sufficient to finance terrorism by the help (incoordination) of due Western actors in the region and to implement a terrorist state that they intend to.

So, in terms of energy, Syria is not at the level that could cause the global external actors to clash with each other, but it can enable these actors to establish a terrorist state in the region.

5 - CONCLUSION

Nearly all the global powers, directly or indirectly intervened the continuing war games in Syria. The civil war has been continuing since March 2011. The chaos have resulted in heavy civil losses and more tragic situations. The due global war players' acts only increased the demolition levels of continuing unrest in the country. As the world experienced this similar table in Iraq, Afghanistan, Libya, and Somali and so on.

Turkey had to struggle with more than 4 million refugees before it finally decided to play an active role in favour of Syrian civilians. Turkey has been sheltering millions of civilians from war-torn villages and cities of Syria. Europe has managed to stop refugees from entering their lands. They have even taken extreme cautions and measures to stop refugees. Turkey, on the other hand, opened its borders for the aggrieved civilians, who had to leave their homes due to terrorist threat and unacceptable living conditions. Turkey had analysed the current conditions of residing millions of refugees and found out that it would better to reside refugees in their own lands instead. The right course was to take action in the continuing Syrian conflict and Turkey did so. The plan was

simple: The land belonged to Syrians and they had to be reinstated in those lands as free men as they were before the civil war. Turkey's military intervention was a must and the most righteous. At this point, each step Turkey takes forth in Syria has a high importance as far as national and regional safety and Turkey's global aims go. This is why, it makes sense to combine and correctly analyse the dynamic game that consists of multi-players and multi-variables, such as;

- Historical background,

- Demographic, social and religious properties,

- Structures, strategies, partnership, relations and political approaches of all due domestic and international actors,

- Possible effects of global and regional dynamics,

- Possible results of the different Syria scenarios in the global and regional dynamics,

- The role of energy, resource potentials, possible infrastructures,

- Acts and properties of due terrorist groups in the region.

Otherwise, without considering some of the related issues in the balances, all the analyses may be coherent and deceiving.

From all sights, honestly, it will be able to be understood that, if there is a right to intervene the chaotic situation in Syria for only a single state, that will undoubtedly be Turkey!

Turkey initially is fighting to avoid a terrorist state in the region. Secondly, the people suffering directly or indirectly due to the unrest in Syria are Turks' Brothers and neighbours. Thirdly, Turkey has a land border of 911 km with Syria. And had to accept the nearly most of the immigrants running away from the civil war. Socially, commercially, economically and from the sight of security Turkey paid huge wages.

While the others are exploiting the energy resources of the country and with these trades, are financing their illegal activities and also the terrorist groups in Syria, Turkey is showing how to set up a scrupulous and secure environment in the cities such as Afrin, El-Bab and Cerablus.

Energy is not the most important item in the Syria balances however, there are enough volumes of reserves for some of the Western powers to found a terrorist state in the region! This means more chaos, more blood and more unrest!

Only Turkey may show to the global view; how the due resources can be utilized for the peace and serenity of the local people!

In this respect Turkey has to continue its resolute activities in the region up to setting up such a secure and healthy environment.

Finally, with its more 1000 years of experience and relations in the region and the locals' (in the northern Syria) commitment and sympathy, Turkey will be the winner in these war games.

By taking these approaches into consideration, in this paper estimated resource potential, current situation of energy infrastructure and the ongoing black oil sales in/of Syria is tried to be analysed.