

Energy Policy Turkey



FUTURE OF POLICIES AND STRATEGIES

SEPTEMBER 2016
SECOND ISSUE



THE WORLD IS BIGGER THAN 5!

UNITED TURKEY



HEART OF
ENERGY

THE MIDDLE EAST

THAT IS WHAT THE GAME IS ALL ABOUT!

«ENERGY GAME: SYRIA & KURDISH CORRIDOR»
«CHANGING BALANCES IN TURKISH ENERGY GAME BEFORE THE COUP»
«FUTURE OF ISRAEL GAS EXPORT UP TO 2050 & TURKEY»
«POLITICS OF KRG & ENERGY CORRIDOR THROUGH IRAN»

TURKEY'S ENERGY STRATEGIES AND POLITICS RESEARCH CENTER

ENERGY POLICY TURKEY

SEPTEMBER 2016

SECOND ISSUE

FALL 2016

ISSUE 2

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TURKEY'S ENERGY STRATEGIES AND POLITICS RESEARCH CENTER

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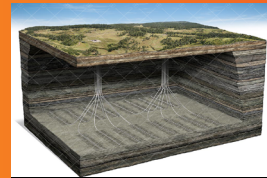
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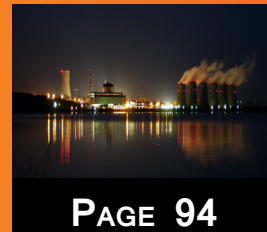
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EDITOR'S VIEW

by Necdet Karakurt

“It should be over-expressed that Ottoman Empire ruled the world by the Unity of different cultures, religions and races. In contrast, today’s powerful states’ unity is based on just religion.”

“Turkish president, Recep Tayyip Erdogan, has seen one side of the coin from 2010 through June 2011 elections, when he noticed that a few of his executives and political mates were, in fact, infidels.”

In the wake of Unity, Turkey decides to take responsibility over the Middle East and lead the Muslims through a better future with pleasant living conditions in a peaceful world, where Muslims have equal rights once more just like on Ottoman times. In fact, it should be over-expressed that Ottoman Empire ruled the world by the Unity of different cultures, religions and races. In contrast, today’s powerful states’ unity is based on just religion.

Perhaps, every other person has an idea or is aware that, in today’s world, the term “Unity” equals to “Christianity”. The rest of the world is prone to be dismantled. This is the logic that belongs to “Crusaders”, who started their duty in 1091. They have been actively doing their best to dig the Middle East and Africa since the World War I, when the Ottomans, successor of the mainly Muslim unity lost the control and Republic of Turkey was born from its ashes. The new Turkish state, after it finally got its freedom from the invaders in 1923, started from the scratch by building a democratic republic over the last remnants of the Ottoman Empire. It has never been easy for Turkey to walk the democracy line in harmony because of either the financial problems or political unrests procreated by the servants of the invaders. The young state struggled through coups, some of which successfully completed and some of them were only left as unsuccessful attempts.

Unfortunately, Turks had to live through a well-written-scenario on 15 July 2016, namely “Attempted Terrorist Coup in Turkey”. The so called master-mind, Fetullah Gulen, is just one of the servants of the crusaders. The country residing such servants is the United States, which basically is the base and a safe-ground, where the crusaders can legally clean up their international mess.

The picture drawn in Turkey on July 15 suggests that each terrorist group is established and financed by the actuators that can be either officials from different governmental institutions and intelligence agencies or just losers (terrorists) that can only survive out in the bushes. It is possible, by using those actuators, to topple presidents and lock the countries by bureaucracy. Let’s not forget the servant media, through which propagandas can be pursued to confuse and enrage the folks against their governments.

Turkish president, Recep Tayyip Erdogan, has seen one side of the coin from 2010 through June 2011 elections, when he noticed that a few of his executives and political mates were, in fact, infidels. Their game was to stop the development of Turkey and lower Erdogan’s popularity. However, they needed Justice and Development Party (AKP) to keep their status and perhaps, get stronger in the government. Which is why they only needed Erdogan to step away and let AKP in their dirty hands. So the whole propaganda about Erdogan being the bad guy mainly came from his own bureaucrats and AKP followers. Erdogan spoke but the bureaucrats did the reverse so that people would be enraged and Erdogan would lose his popularity. That did not happen, which indeed got on the nerves of the gamers and pushed them towards the coup attempt. The coup attempt again returned them empty handed. These days, Turkey have been trying to clean those infidels from the government and its institutions.

What happens next all depends on how well this cleaning process can be practised! However, being optimistic is a must for Turks since the role/responsibility they have been striving for will do the best for the Middle Easterners.



Energy, of course, is still the main actor of all the hassle in the Middle East. The crusaders are feeding over the trade from the energy sources of the region, which, in fact, covers majority of the world's energy resources. Losing the upper hand to Turks is a "No, No!" for them. So Turkey has to be weaker, should never be the dominator in the region, and should be kept out in energy matters.

Turkey has to realize once that the Middle East Unity is the key to establish political and economic stability for Turks and Arabs but to be able to do that, it has to grasp the upper hand in energy trade, consequently in energy researches and related technologies. What good is it if you do not have an efficient company or companies actively working and controlling the energy resources and the trade in the region?

Why is the energy trade so important? The total trade amount in the world totals a bit more than 20 trillion US dollars and more than half of the total amount is accomplished over petroleum and its products, related technology and merchandise. Thinking about Turkey's revenues as about \$190 billion, the amount of money circling around Turkey's borders is over fiftyfold than its current revenues. So why not stand up and have your share from this beautiful glory?

There are certain steps required to be taken such as comprehending the balance in the energy game and how to reverse the balance in Turkey's favour. It is always better to analyse how major countries involved in the Middle East do what they want. For instance: Presidents and ministers travel along with a group of business people whenever they seek to establish great ties with another country. The situation is similar here, too, but the stage they are on is a bit bloody, which is why all those countries move with their military powers to shape and secure certain lands with good natural resources.

Believe me, those businessmen are no civil engineers that talk about rebuilding the damaged houses. They are surely energy companies to aggregate the most attractive

fields that are filled with hydrocarbons. Now that it is clear what to do along with the military incursions in Syria, Turkey should encourage its oil companies to do some detailed research and create a path to the new Syria's energy constitutions and have a possessive role in petroleum and trading laws of the free Syria by adding their knowledge, experience in geoscience and trading.

Turkey can easily be a part of the legislative partner for free Syria, acting as the big brother and filling all the political and bureaucratic gaps in the newly succeeded Syrian government. Additionally, it should open up the path or guide the Turkish industry to new ventures no matter how well internationally competitive the industries are. Correct time for such acts has always been along with the first step taken. So does Turkey have such plans in the future of Syria?

Turkey, at this point, should definitely focus on its energy politics and strategies on behalf of its political and military activities in the Middle East. The focus requires comprehending how the energy game is played in the region, what countries are involved and how their companies proceed behind closed doors. Hence, Energy Policy Turkey would like to illuminate certain moves and actions that will determine the next and following game-changer-steps.

This issue covers up mending relations with Israel and Russia. The buzz about the Eastern Mediterranean gas resources and a possible Egypt-Israel-Cyprus/Turkey gas pipeline is put under investigation. Suggestions for where and how to stand in the Mediterranean were analysed along with the technicalities. The pipeline from Northern Iraq to Iran is also highlighted in detail. Some questions regarding the possibility accountability of such project are answered by examples. Turkey's position and advantages for any pipeline projects to Europe around Turkish borders seem to be all in favour of Turkey. Correct timing, possessive actions and efficient planning will place Turkey in the spotlight, which is why impressive strategies should be engraved in political moves and actions.

"The total trade amount in the world totals a bit more than 20 trillion US dollars and more than half of the total amount is accomplished over petroleum and its products, related technology and merchandise. Turkey's revenues is only about \$190 billion."

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“Status of Caspian Sea requires a great attention as it should be one of Turkey’s goals to get the upper hand in energy game. Finding credible ways for moderating all the parties to set the economic sea borders in Caspian Sea will definitely serve plausible results for the future..”

““Coal” is a matter subject that needs to be handled correctly. Some experts claim that “black gold” is Turkey’s future energy source just because Turkey has some coal reserves. Yes, Turkey has coal reserves but what matters is the coal’s calorific value!”

Status of Caspian Sea requires a great attention as it should be one of Turkey’s goals to get the upper hand in energy game. Finding credible ways for moderating all the parties to set the economic sea borders in Caspian Sea will definitely serve plausible results for the future.

The myth about oil shales is cracked down and analysed for how valuable an energy source it can be for Turkey. Understanding the environmental effects of shale gas business seems to play a key role before going too deep in oil shale reservoirs.

Advice regarding renewable energy sources and getting prepared legally in the future for a balanced move forward approach are practical information that Turkey has to consider as Turkey’s renewable energy potential is quite notable. Nuclear energy has been a turning point for Turkey’s energy future but it is still questionable if the pros weighs heavier than the cons. “Coal” is a matter subject that needs to be handled correctly. Some experts claim that “black gold” is Turkey’s future energy source just because Turkey has some coal reserves. Yes, Turkey has coal reserves but what matters is the coal’s calorific value!

At last, the coup attempt is examined through the energy window. Some questions are raised and tried to be answered as if there is any relationship between countries and their energy initiatives in the region. Even though there is no clear evidence between energy and the coup attempt, all the countries involved in the region seem to stand on their energy foot.





ENERGY GAME: SYRIA & KURDISH CORRIDOR

by Necdet Karakurt and Oğuzhan Akyener

INTRODUCTION

“The balance in Syria has been interchangeable since it is possible to relate each terrorist group with a country. Whenever a country loses the upper hand or tries to settle its political struggles in Syria, a suicide bomber or a terrorist attack in some other countries is put on stage.”

“Turkey, out of all the countries involved in the region, focuses on the civilian rights and perhaps, it is the only country that lacks a powerful energy strategy regarding the reserves in the region.”

A huge lack in the governmental authoritative figures and the head of country being unreasonably selfish and foolish have left Syria in the hands of the hell-hounds, who havoc throughout the country and devastate cities, settlements, and villages, where especially the Arabs and Turkmen live. Terrorism created a realm of chaos in Syria that increased appetite for many powerful countries to play a key role and get the biggest share from the energy resources in the region. The balance in Syria has been interchangeable since it is possible to relate each terrorist group with a country. Whenever a country loses the upper hand or tries to settle its political struggles in Syria, a suicide bomber or a terrorist attack in some other countries is put on stage. For instance; Turkey and France had to suffer from al-Dawla al-Islamiya al-Iraq al-Sham (Daesh) (Energy Policy Turkey condemns Islamic State like implications for this terrorist group and stands firm behind our president Recep Tayyip Erdogan’s naming the group as Daesh) attacks because they opposed to a few critical moves by USA and/or Russia. What is ironically funny about those instances is the fact that so called terrorist group Daesh is only able to operate in Turkey and France. It is well known that Daesh members are from all over the world but if Europe was the only continent of focus, then it would be expected that Daesh could easily attack on Germany or any other European country. The facts prove that the rest of the Europe behaves somewhat in accordance with the mastermind(s) since Daesh is never sending a suicide bomber to those nations.

Another example is cooperation between USA-EU and Democratic Union Party (PYD) / People’s Defense Units (YPG). It

has been proved by Turkey that PYD/YPG is the parallel extension of so called Kurdistan Workers’ Party (PKK), known as a terrorist organization. However, USA and EU tend to close their ears on Turkey’s warnings. Perhaps, in the near future, when the crisis or unrest in Syria ends, those terrorists will start wreaking havoc in today’s supporter countries as history always repeats itself.

Turkey, out of all the countries involved in the region, focuses on the civilian rights and perhaps, it is the only country that lacks a powerful energy strategy regarding the reserves in the region. Terrorist groups like Daesh and PYD/YPG are the puppets of the international assembly and their tasks are to complicate the peace works that have been longed for in the region by either using terrorist attacks at the puppeteer’s will or just with their presence in certain circumstances and places to be involved or who gets what and how. These days, the complexity is going further and deeper that all the puppeteers in the region have even confused themselves as their steps, decisions and statements are conflictive, which makes estimating the future of Syria more difficult.

A well balanced observation with hard-grounds might alert the whole world that the greater Middle East project has been activated in the concept of popular “Ethnical Engineering Process”. The hard-grounds for such project can be elaborated with the current cleansing attempts by the puppets.

The major ethnical cleansing spurt is accomplished by so called president Assad, who has earned the biggest foe of humanity title for the dreadful cruelty tuned by his forces and the hate for his own nation. His orders are a reflection of his puppeteers that wildly claim many innocent lives of Arabs and Turkmen. Kurds, on the other hand, are safe and sound



as they have no casualties from Assad's attacks, which brings out the unknown equilibrium between Assad and PYD/YPG. The Syrian Kurds are, however, no one's enemy as it has been stated especially by USA. Political trick behind PYD/YPG is a part of the ethnical cleaning of the "Kurdish Corridor" that would connect Kurdish Regional Government (KRG) of Northern Iraq to Mediterranean. The Arabs and Turkmen would be eliminated from so called corridor and the governing power would be delivered to Kurds, who can easily be controlled either politically or financially since they have no state experience or toppling an unwanted political figure would only require a twist of one's little finger.

The application of a Kurdish Corridor has never been an easy task, which is why a terrorist organization named Daesh took the stage. The success of Kurds (PYD/YPG) was dependent on its counterpart Daesh. This terrorist organization had to separate and occupy Iraq, Iran, Turkey and Syria so that PYD/YPG by the help of the actuator PKK, could form a military that can place order within the corridor's perimeter. The third, but probably the most dangerous and indigestible one, was Daesh's demolition of culture, ethnicity and religion. The damage Daesh has given to the region, has changed a lot the balances in the region. How successful the ugly game to prepare a Kurdish state/corridor in the region is questionable since the current picture suggests that all the opponents are fighting against Daesh but none of them except the Free Syrian Army (FSA) and Turkey engage actively with Daesh and the fact that Turkey disagrees about PYD/YPG and claims it a terrorist group, which contends USA's vision for the region. There seems to be hard days for USA to clean up its mess in the Middle East or be the state behind a few terrorist puppets that will eventually harm the puppeteer.

So what is the main aim behind a Kurdish corridor in the region? Why is there a necessity for such corridor? Are those great powers really puppeteers and those fighting forces re-

ally the puppets? How real are the conspiracy theories? How can the energy game change the balances and alter the borders of the political influence? Do Kurds have enough experience to cope with the dreadful end of disturbing Turkey, Iran, Iraq and Syria?

THE RELENTLESS AMBITIONS FOR THE MIDDLE EAST

The region and its people have been living through a disaster as many has already lost their lives, homes, lands and families as many of them left for safer countries to only become refugees. The unrest not only has changed the ethnical and cultural distribution but also it has reorganized international ties between allies or enemies. Never-ending ambitions of EU and USA have been a subject of using differentiation techniques to dismantle any possible rising power in the Middle East. They have been successful for over a century but the obvious has come forth and shifting in powers started to recondition the game and changed the rules. Invade, separate and rule to get all the energy related premiums by specifically trained puppets, who are military officials, bureaucrats ranking high in the governmental institutions or just the dictators, who are directly under control of the Western bloc (The puppeteers).

FOREIGN ACTORS

To be able identify the puppeteers and the puppets, regional politics, main actors, their key interests, military actions and their relations with the terrorist organizations should be coherently analyzed on the bases of humanity and changes in the regional balance. Building the case on basic assumptions: USA, Turkey, Russia, Iran, Iraq, Northern Iraqi Government, Israel, Saudi Arabia, UK and France on behalf of EU, and as the terrorist organization PKK can be considered as the key foreign actors in Syria.

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USA

stand in the equation but Iran survived through Russian intelligence.

USA

“If its strategy fails,
“The End” for USA
will rise from the Middle East!”

“Undercompensated
for Iraq invasion due
to early withdrawal.”

“Miscalculated the
Shia population in
Iraq and Iran’s Shia
gains became inevitable.”

- Apparently the most influential puppeteer in the region.
 - Shifts in the power distribution aggravates and loads more pressure.
 - Mastermind of restructuring the Middle East, who is destined for failure.
 - New consensus with Russia altered the balance in the region.
 - Not able to send troops to Syria but encouraging other nations instead.
 - Counting on PYD/YPG (Terrorist groups) that endangers Turkey’s cooperation.
 - Should avoid raising concerns for a Shia-Sunnah or 3rd world war.
- Ability to utilize its contacts and relations with different groups/organizations.
 - Should keep the upper hand commercially and financially to have influence in the region.
 - Inactivated EU in the region after allowing Russian military intervention.
 - Military occupation costs higher as USA’s economy has been fragile and Iraq invasion has not helped at all.
 - If its strategy fails, “The End” for USA will rise from the Middle East!
 - Lost most of its influence over Iraqi government (after Iraq invasion) to mainly Iran.
 - Undercompensated for Iraq invasion due to early withdrawal.
 - Miscalculated the Shia population in Iraq and Iran’s Shia gains became inevitable.
 - Embargoes complicated Iran’s
- Inability to configure and apply plans due to unreliable puppets that can easily change sides.
 - Oppressive support on illiterates to rule in the region is not working anymore.
 - Intelligence agencies’ credibility is quickly overthrown by that of the competitors’.
 - Lost the edge to intimidate the people, and increased the hate against the west.
- Relentless efforts to accomplish “Greater Middle East Project”.
 - Ability to utilize North Atlantic Treaty Organization (NATO).
 - Allied Europe, Israel, Turkey, Sunni Arabs and NATO members against Assad.
 - Deployed military bases in Syria that are serving for the Kurds.
 - Trying to load the war-costs on coalition forces and Russia.
 - Created nearly a state in the middle of nowhere by a terrorist group named Daesh.
 - Naming it an Islamic State was a very bad idea.
 - Aggregating Christians to form so called Islamic fighters is unethical and has to fail.
 - Pressuring Syrians to be refugees was inhumanly.
 - Blaming Turkey for supporting Daesh was immoral.
 - Arming PYD/YPG and Daesh terrorist groups was simply an underestimation of Turkish intelligence.
 - Dropping guns for Daesh and



PYD/YPG using its military cargo planes severely damaged American Intelligence and liability for Turks.

- Childish attempts to overthrow Erdogan yielded a huge failure.
 - Failed the attempts on well-designed slanders against ministers and government institutions.
 - Finding an equilibrium between Arabic countries and Turkey in the concept of Arab Upheaval switched American intelligence to American illegitimacy.
 - MIT crisis, February 2011.
 - Gezi Park events, May 2013.
 - 17-25 December events, December 2013.
 - MIT's trucks event, January 2014.
 - Kobane events, September and October 2014.
 - 28 February event (A great shame served by Feto), February 2015.
 - Live bomb attack on People's Democratic Party (HDP)'s meetings in Diyarbakir, June and July 2015.
 - Murder of two policemen in Ceylanpinar, July 2015.
 - PKK is on stage again with terrorist attacks, September 2015.
 - Daesh is on stage with live bombs, October 2015.
 - Russian bomber downed by a Turkish F-16, November 2015.
 - July 15 terrorist coup attack by the servant Feto, July 2016.
 - Complicated the balances in the Middle East after Central Intelli-

gence Agency (CIA) has failed restructuring Turkish democracy and government.

- Conflicting its constitution, legislations and statements by making the head of the terrorist organization, Feto a USA citizen, and by coming up behind all the terrorist groups in the Middle East and Asia.
- Using its puppets (Bureaucrats, politicians, high rank military officials, press, TVs and social internet sites) in Turkey to raise a campaign against the Turkish government played a key role to unite Turks against USA's aim to work havoc upon democracy and peace in Turkey.
- Greater Middle East Project has become USA's evanescence process.
- Should make it clear to world that United Kingdom (Can a Kingdom be united?) is included in USA's affairs in the Middle East.

TURKEY

- The successor state of Ottoman Empire.
 - Access to the Ottoman soil should be acquired through involving in all the matters regarding the region.
 - Mosul and Kirkuk have to return to the owner, and cannot be left in the hands of infidels.
- The ability, perhaps high potential, of being the most influential actor in the region.
 - Has historical, ethnical, cultural and religious ties with Arabs, Turkmen and Kurds.
 - Should find a way to manipulate the visions of terrorist groups and cleanse the area from the fire-arms.
 - Should use in depth background and knowledge regarding the races and

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“Finding an equilibrium between Arabic countries and Turkey in the concept of Arab Upheaval switched American intelligence to American illegitimacy.”

TURKEY

“The ability, perhaps high potential, of being the most influential actor in the region.”

“Turkey has historical, ethnical, cultural and religious ties with Arabs, Turkmen and Kurds.”



cultures in the region in Turks' favor.

- The lack of political authority within the borders.
 - Distillation of terrorists from military, police and governmental institutions is a hard task but it has to be completed in a timely manner.
 - Should progress faster on adopting a new constitution for a civil democracy.
 - Should correctly inform the voters about what is really happening in and around Turkey.
 - Should reveal the known details regarding puppets and servants of the western bloc in politics and political parties.
 - Should educate opposition parties about the international politics and interests.
- Elimination of economic fluctuations.
 - Should be aware of the traitors appointed on international key roles.
 - Should control foreign investors and ban the economy exhausters that fluctuate exchange rates.
 - Should reevaluate and reconfigure trade options with the neighbors, Arabic Peninsula, other Turkish states, Africa and Far-East countries.
- Focus on investments for technology and create or adapt new technologies to use for trade purposes.
 - Should shy away from seeing the world from the eyes of construction companies.
 - Should finally discover the energy sector from scratch, not from the downstream end.
 - Has to gain the ability and experience to operate in exploration, extraction and trade chain.

- Has to reach the capability of competing with the western, Russian and Chinese energy companies.
- Has to join the sectoral consortiums and lead the way in the future.
- Should adapt latest technologies and be able to create new technologies.
 - Multi-well and cracking technology
 - Transporting electricity directly to customers.
- Has to achieve defining Turkey's international classification.
 - Should make Turks comprehend where the nation stands and reflect the whole new attitude to the world.
 - Should analyze the international balance and find its political and economic place correctly.
 - Should analyze the energy game thoroughly and achieve being the game changer.
- Has to stop terrorism in and around the borders.
 - Should define and concentrate on the roots of the terrorism not on terrorists themselves.
 - Should go against the puppeteers and not just the puppets, servants or actuators.
 - Should keep being a hope for Middle Easterners for their future safety and wellness.
 - Hosting over 2 million of refugees.
- Has to analyze the political games in favor of Turks and Muslims.
 - Should have plans to unite Turkish states, Middle East and Muslim nations.
 - Should decipher and reveal the relentless ambitions of the west and Christi-

TURKEY

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“Should educate opposition parties about the international politics and interests.”

“Should make Turks comprehend where the nation stands and reflect the whole new attitude to the world.”

“Should keep being a hope for Middle Easterners for their future safety and wellness.”



anity over Muslim world.

- Should recover and adapt the Ottoman logic against Protestants, Catholics and Jews.

RUSSIA

- One of the biggest military powers in the region.
- Has a naval base in Tartus (Russia's only naval base in Mediterranean) since 1971.
- Has an air base in Latakia since 2015.
- A strategic ally of Syria since the Soviet Union and supporter of the dictator Assad.
- Trying to not to allow American or European domination in Syria.
 - Attacking strategic and secret USA-EU bases or sites in Syria whenever it finds a diplomatic and political gap left by USA and EU.
 - Definitely not fighting against Daesh as it executes its attacks on so called rebels.
 - Claiming that the components of FSA are Daesh and they are fed by Turkey.
 - A strategic political move of playing the fool.
- Trying not to allow Turkish domination in Syria.
 - Backing Assad and his forces, who always tend to bomb Free Syrian Army's affiliates and civilians in accordance with the ethnical cleaning process.
 - Oppose Turkish presence and deployment of ground troops in the region.
 - Ability to partner with Turkey against USA and EU'S will and actions.
- Known to be, at least partially, having a share over illegal petroleum trade in the

region.

- Strategically aiming to suppress Europe as to mandate its biggest natural gas customer to stay tuned.
 - Giving options or alternative gas routes (SGC, TANAP, TAP, etc.) to EU to reduce their security concerns while still being the major supplier.
 - Trying to intimidate EU for finding alternatives to Russian gas even if it might cost another world war.
 - Against Iran-Iraq-Syria pipeline project.
 - Against Egypt-Lebanon-Israel-Syria-Turkey pipeline project.
- A strategical ally of Iran, where Russia has bases.
 - Using Iran and its ambitions of Shia union and domination in Arabic Peninsula against Sunnis, Turkey and the coalition.
 - Trying to control Iraq and Syria by allowing Iranian military presence in the region.
- Scared of losing its Mediterranean port and influence perimeter in both Arabic Peninsula and the Mediterranean.

IRAN

- Has the urge to rule the Islamic world by subjugating all the Sunnis.
 - Spending all of its hydrocarbon revenues to succeed this illiterate ambition.
 - Evaluated well the American illegitimacy of invading Iraq as it had the ability to lead the Shiites in Iraq and even extended the influence radius over to Yemen.
 - Accomplished Saudi hate and gained a real time enemy.

RUSSIA

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IRAQ

“Enabling its land and air spaces for international military aid to Assad regime.”

“Unable to control NIG and petroleum trade chain over Northern Iraq.”

- On the edge of creating a Sunnah-Shia war.
- Established good relations with Iraq and Assad regime
 - Supports Shia dominated Iraqi government.
 - In good relations with Talabani in Northern Iraq but Barzani is in power.
 - Has military presence in Syria and Iraq against Daesh presence but they are mainly there to help Assad forces to fight against FSA.
 - Has some shares from the illegal petroleum trade trafficked by Daesh since there is no clash between Iranian forces and Daesh militia.
- A strategic ally of Russia, however, is always struggling with USA and EU sanctions.
 - Russian influence probably lacks of high intelligence or Iran’s international affairs is just complex to comprehend.
 - Requires high-tech machinery and equipment to increase hydrocarbon production to support its military activities but has to obey USA and EU.
- Sending/allowing armed Shia forces engaging against FSA in Syria.
- Sending financial support and diesel fuel aid to Assad.
- Enabling its land and air spaces for international military aid to Assad regime.
- Unable to control NIG and petroleum trade chain over Northern Iraq.
- Trying to overpower NIG’s president Barzani with Talabani.
- Taking risks for clashes with Turkey at times by support of Iran and Russia.
- Causing conflicts among the sects living in Iraq.
- Ironically, not able to completely remove Daesh presence from the country and gain the upper hand on its oil reserves and trade.

NIG

“Against PKK and Daesh, which threaten NIG’s presence, and oil reserves and revenues.”

“Has trade agreements with Turkey and provides oil for Kirkuk-Ceyhan Pipeline.”

- Providing significant support both economically and militarily to Syria and Shiites fighting in the region.
 - Leading Hezbollah militia on the side of the Assad forces.
 - Causing instability in Lebanon and Yemen due to ambition of Shia dominance.
 - Planning to get to Israel in the future.
- Under the protection of USA, EU and Turkey.
- Safer and stable comparing to surrounding area.
- Against PKK and Daesh, which threaten NIG’s presence, and oil reserves and revenues.
- Has trade agreements with Turkey and provides oil for Kirkuk-Ceyhan Pipeline.
- Conflicts with Iraqi government.

NORTHERN IRAQ GOVERNMENT (NIG)

UK AND FRANCE (EU)

IRAQ

- Under Shia and indirectly/directly Russian influence.
- Directly supports Syrian regime
- France was the former mandatory ruler of Syria.
- In the ethnical and religious distribution of Syria, France had high influence in the past.



- Both are included in the coalition forces and co-sponsored a UN Security Council resolution for Syria.
- UK is one behind the scene puppeteers over the unrest in Syria.
 - Hiding its involvement by guiding USA to the front-line.
 - History: Same actions staged on Ottoman and the successor, Turkey.
 - Daesh never targets UK, perhaps, terrorists cannot swim across Manche Channel.
 - Eventually, sneaking around will be the end for UK (Ever heard a UNITED kingdom?).
- France called for military intervention after Assad used chemical weapons in Damascus in 2013, UK attended with air strikes in 2015.
- EU and Syria talks on EU-Mediterranean Program were never finalized but EU funded Syria's democracy walk until 2011.
- After the public protests in 2011, EU minimized its involvement in Syria but still takes place in the coalition, and attends air strikes.
- Refugee crisis troubles EU as they had to cooperate with Turkey.
- Daesh attacks in Europe targets France and Belgium.
 - Indicating Daesh aims to discourage France from interfering in Syria since it was the only EU country that proposed sending ground troops after Assad chemical weapon attacks.
 - Threatening EU (for not getting involved in coalition) by plotting attacks on EU's heart, Brussels.
 - Apparent CIA intelligence to leave EU out of Middle East matters by cooperating with Russia to establish a Kurdish Corridor.

PKK

- Named after a political party but resides in the mountains of South-East of Turkey, North-West of Iran and Northern Iraq and has never acted as a political party or has ever attended an election.
- Stands as a shame of the west since its first terrorist attack in the 1980s.
- Used for destabilizing Turkey and dismantling the South-East of Turkey for the so called Kurdistan, however, the casualties from their attacks are mostly Kurds.
- Feeding from the international drug trade and additionally, lately from Daesh controlled illegal oil trade.
- Established PYD/YPG in Syria and having open support from the coalition forces under the task of creating a Kurdistan that reaches Mediterranean.

ISRAEL

- The quietest state in the region as it shows no signs of involvement in the region.
- Scared of Iranian growth around its borders and military intervention on its soil.
- Performs alleged attacks or strikes in Syria at certain times against Shiite militia.
- Directing the west to the Middle East through its intelligence.
- A member of the hidden pact between USA and England that is master mind of July 15 coup attempt in Turkey.

ARAB LEAGUE

- Consisted of Sunni countries adjoined against Iran or Shiite ambitions over the Islamic world.
- Supporting arms for and funding FSA

EU

“UK is one behind the scene puppeteers over the unrest in Syria.”

“Hiding its involvement by guiding USA to the front-line.”

“France called for military intervention after Assad used chemical weapons in Damascus in 2013, UK attended with air strikes in 2015.”

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SYRIA & ASSAD

“Assad has served the country and its people to the hands of foreign actors and become a puppet that will eventually be thrown away like Saddam Hussein.”

DAESH

“It came alive in one night and paralyzed most of Iraq and Syria. It will vaporize again in one night after the Kurdish corridor plot is achieved or halted.”

PYD/YPG

“Its objective is to connect NIG to the Mediterranean with the aggregation of Turkish Kurdistan.”

forces against Assad and Iran.

- Jordan and Saudi Arabia executes air strikes on Daesh.
- Qatar operates training camp run by CIA.

DOMESTIC ACTORS

In comparison to the exterior influencers, domestic ones can be depicted as the dictator, Assad and his military forces, Daesh, PYD/YPG and FSA. It is possible to acquire some key definitions that can be inferred from the action and roles that those countries or organizations shoulder in the region.

SYRIA & ASSAD FORCES

- Assad has served the country and its people to the hands of foreign actors and become a puppet that will eventually be thrown away like Saddam Hussein.
- Assad forces are only operative with the help of Russia and Iran.
- Assad only sees Arab and Turkmen as the threat for Syria. He has no concerns for Daesh.
- Millions of Syrian had to leave the country for security reasons, which is a shame for Assad regime.
- A Kurdish corridor is plotted in North and his only concern is to fight against Sunni rebels, which indicates that he is not worried about a Kurdish state between Syria and Turkey.

DAESH

- A terrorist group in regards with world-wide-acceptance.
- It came alive in one night and paralyzed most of Iraq and Syria.

- Almost each nation in the world fights against it but somehow it still manages controlling large areas in Iraq and Syria.
- Ironically, it controls oil fields and feeds from the oil revenues of Iraq and Syria.
- None of the countries buys oil from Daesh but it is managing to fund its ambitions by oil revenues.
- Serving as a puppet for ethnic, cultural and religious cleaning in the region.
- Cooperates with PKK and PYD/YPG terrorist organizations as USA's arms aid reaches all of them.
- It will vaporize again in one night after the Kurdish corridor plot is achieved or halted.

PYD/YPG

- Accepted as terrorist organizations by Turkey and trusted for fighting against Daesh by USA and EU.
- Its objective is to connect NIG to the Mediterranean with the aggregation of Turkish Kurdistan.
- Hard days awaits PYD/YPG.
 - PKK has gotten a great damage in Turkey and Northern Iraq that signals its end.
 - It will eventually move to PYD/YPG areas to survive, meaning clashes for the authority.
 - FSA and Turkey will fight against it after exterminating Daesh from the region.

FSA

- Consisted of a variety of oppositional forces including al-Nusra Front, which is known as the extension of al-Qaida.
- Possibly a best solution for the future of



stability and democracy in Syria since it represents a diversity of ethnic groups living in Syria comparing to PYD/YPG presenting only Kurdish roots.

- An effective group that has the ability to execute and eliminate Daesh forces and stop Shia influence in the region as Jarabulus operation states this fact.
- Considering Turkish-NIG and Turkish-FSA relations stand firm, changing the plans to save the boundaries for Iraq and Syria in accordance with Turkish intelligence and visions will be the most viable solution in the region.

KURDS & KURDISH CORRIDOR

In order to comprehend the claimed Kurdish corridor in the Northern Syria, ethnical distribution of Kurds, their historical properties, political structures and similar references in the neighboring areas should be studied.

From the historical sight, although there are some unproved claims that Kurds used to be a specific nation with a state in the history, actuality relies on the orientation of Turk-Arab-Persian mixture as they are located in the

middle of Turk-Arab-Persian triangle.

Their non-unified language properties, lack of historical elements (such as literature, arts, music etc.) and tribal systems demonstrates the above ideas are as unavoidable facts.

Up to 1920's, the whole geography used to be under Ottoman ruling. From the Ottoman Empire archives, historically, Kurdish tribes and their struggle with the Armenian societies in the region were clearly punctuated.

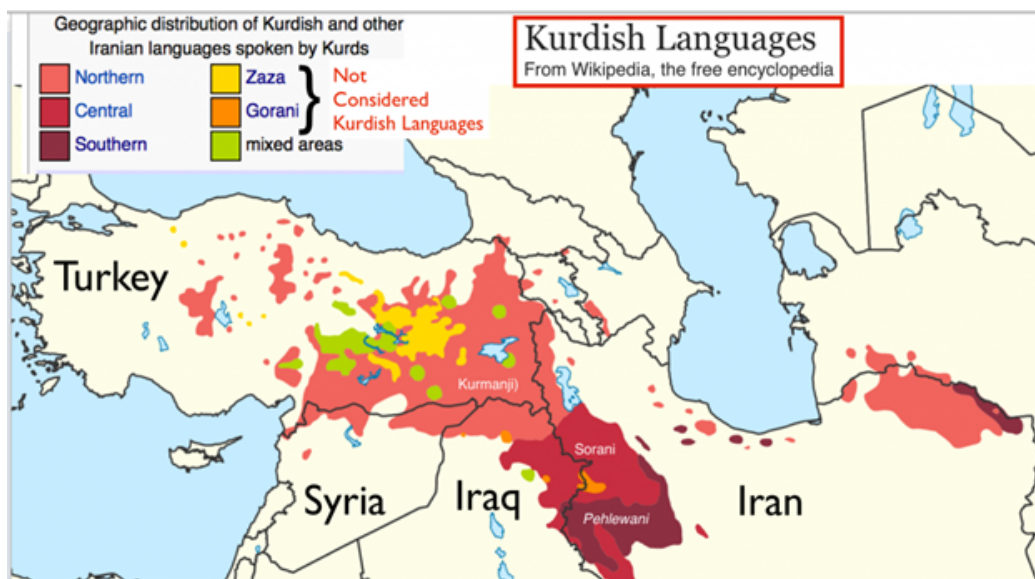
After the Ottoman Era, while the regions were the colonies of Britain and France, Kurdish tribes have been segregated on a chess board among the mandators. In other words, they were used to lessen the influence of Turks in the region so that Kurds can be stationed between the Sunni Arabs & Shia Turkmen and Turks.

This strategy can easily be observed by focusing on the Iraqi region as now, there is a nearly independent Kurdish State in the Northern Iraq.

From the other sight, Turkey lets the state

FSA

“An effective group that has the ability to execute and eliminate Daesh forces and stop Shia influence in the region as Jarabulus operation states this fact.”

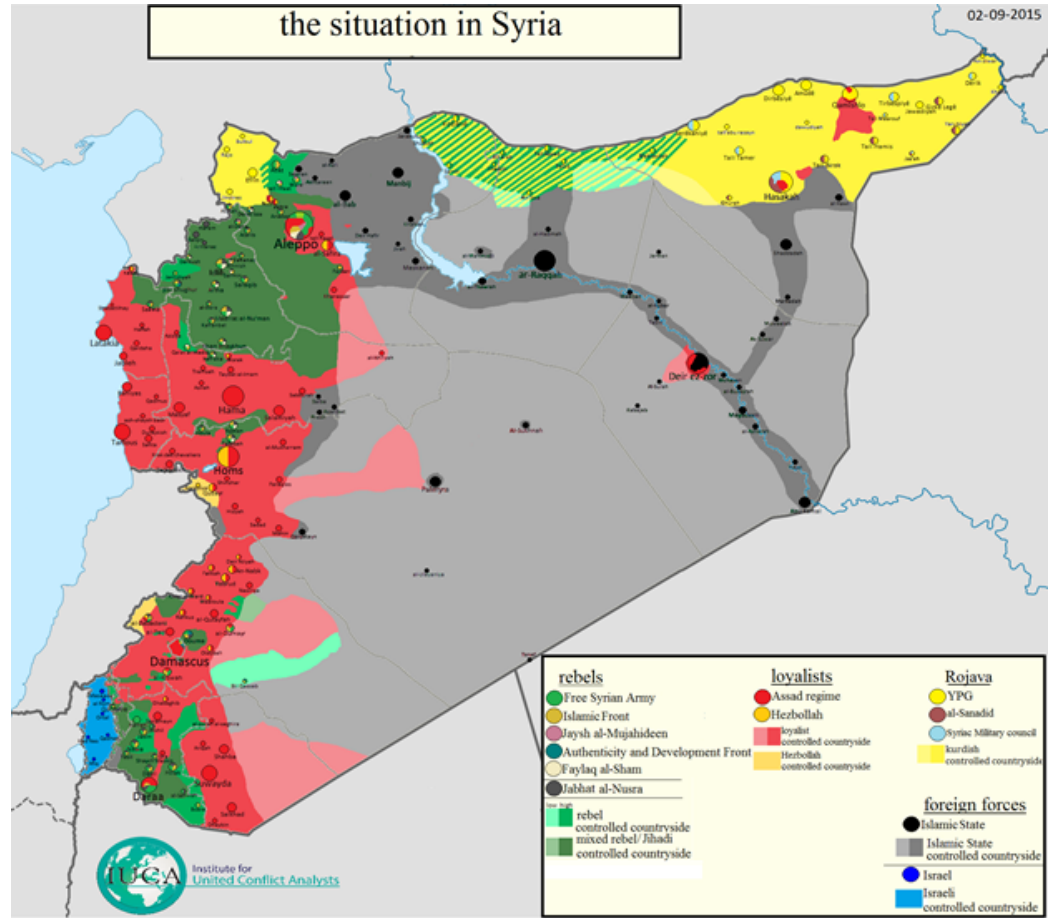


Map 1: Geographic distribution of Kurdish and other Iranian languages spoken by Kurds. Source Wikipedia, https://en.wikipedia.org/wiki/Kurdish_languages.

“Kurds’ non-unified language properties, lack of historical elements (such as literature, arts, music etc.) and tribal systems demonstrates the above ideas are as unavoidable facts.”



“After the start of civil war in 2011, so called Kurdish political parties and militia and terrorists have gained important certain grounds under possession in the region by the support from due international actors.”



Map 2: The current situation in Syria before Turkish military intervention. Source: <http://static.birgun.net/resim/haber-ici-resim/2016/08/23/kuzey-suriye-kafkasyalasilirken-176699-1.jpg>.

“Kurdish groups appear almost all of the Northern Syria, which states the fact they have served their purpose of ethnically cleansing large areas along Turkish border.”

in the Northern Iraq (KRG) to survive by not blocking their only revenue item: oil exports. Behind this strategy lies the fact that Turkey will never leave the current Kurdish ruling party in the hands of Iran.

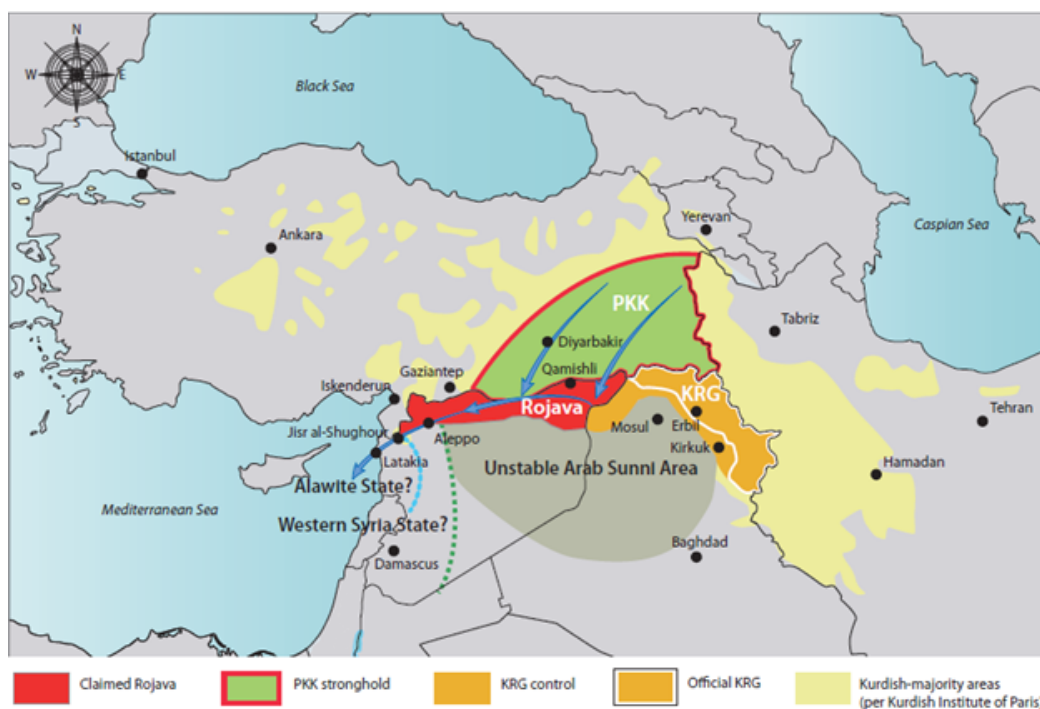
While focusing on Syrian matters, after the start of civil war in 2011, so called Kurdish political parties and militia and terrorists have gained important certain grounds under possession in the region by the support from due international actors. Map 1 displays geographic distribution of Kurdish and Iranian languages in the Middle East including Turkey. This linguistic map is strategically used as population map to mislead the world by stating that Kurds cover a very large area in the region. Behind this logic, there is the Great Middle East Project. Map

2, on the other hand, shows current situation in Syria before Turkish military intervention on Daesh.

It can be observed from Map 1 that Kurds are distributed as clusters over the Northern cities of Syria. By comparing the map with the current situation before Turkish intervention (See Map 2):

Kurdish groups appear almost all of the Northern Syria, which states the fact they have served their purpose of ethnically cleansing large areas along Turkish border.

After realizing the current cleansing projection in Syria, Turkey stood up and warned the international coalition and the terrorist



Map 3: A future Kurdish corridor to the Mediterranean. Source: the Washington Institute <http://www.washingtoninstitute.org/policy-analysis/view/rojavas-sustainability-and-the-pkks-regional-strategy>.

group of PYD/YPG about Turkey’s red line that meant Turkey will never allow Kurdish forces to pass on the west of Euphrates. However, with the commercial and military supports of USA and some other international actors, those Kurdish terrorist organizations were able to overtake Manbij.

15 July terrorist coup attempt aimed at disorientation of Turkey, which will eventually eliminate Turkish interference with the Great Middle East Project. After the 15 July terrorist coup and continuing terrorist attacks in Turkey, Turkish military has justifiably entered the Northern Syria for its own security purposes and to stop such project threatening Turkish borders.

Turkey’s military operation not only targeted the terrorist organization DAES but also its counterparts of the PYD/YPG terrorist organizations, which are allegedly claiming to expel DAES threats but, in fact, making an ethnic cleansing of Arabs and Turkmens in

the region.

Although some authorities are never accepting that there are plans on such a Kurdish corridor in the Northern Syria. Map 3 is prepared by the Washington Institute that outlines PKK and its counterpart PYD/YPG’s ambitions to establish such corridor in Northern Syria. However, the picture drawn on Map 3 gives important clues for the international experts.

As can be observed from the map;

- Rojava (Claimed name of Syrian Kurdistan) is going to be founded by the help of PKK that obsessively aims to establish Turkish Kurdistan in South East of Turkey.
- Achieving those, they both might convince KRG to open its border to Rojava and adjoin the corridor.
- Next step will be pushing for Rojava’s ex-

“15 July terrorist coup attempt aimed at disorientation of Turkey, which will eventually eliminate Turkish interference with the Great Middle East Project. After the 15 July terrorist coup and continuing terrorist attacks in Turkey, Turkish military has justifiably entered the Northern Syria for its own security purposes and to stop such project threatening Turkish borders.”

“Rojava (Claimed name of Syrian Kurdistan) is going to be founded by the help of PKK that obsessively aims to establish Turkish Kurdistan in South East of Turkey.”



“With the Kurdish State in the North and the Daesh in the middle and Southern Iraq, Iran’s ability to completely control the whole Iraq diminished consequently.”

“From the sight of security, Israel may support of weakling neighbors and naturally a weakened and divided Syria. So, it may not be strictly but gently a supporter of such a project.”

tention to Mediterranean costs.

- Succeeding such steps will break Turkey’s direct connection with the Sunni Arab world.

Now, it makes sense to analyze which actors can support or disagree on a Kurdish Corridor & Why?

USA

It is better to remember that history is always enough to estimate the future.

By claiming to bring the democracy to Iraq, USA initially made the country fall into a chaotic environment. Then, USA had to leave the country due to high costs of war and international pressure on barbarous like actions of the US Military in the region. While leaving the country, USA have already shaped and establish a half independent Kurdish State in the Northern Iraq. However, to suppress the Shia hegemony in the region, USA plotted a new al-Qaida based terrorist organization (Daesh) to actuate against the Iraqi Shia government. With the Kurdish State in the North and the Daesh in the middle and Southern Iraq, Iran’s ability to completely control the whole Iraq diminished consequently.

The same scenario was to be followed in the Syria. PYD/YPG has been supported in all aspects to control the Northern Syria. While they turned out not to be as effective as expected, Daesh had to be taken into the equation. Then, again PYD/YPG had to be projected as fighting against Daesh.

The whole information means that USA is the main supporter/plotter of the Kurdish Corridor.

TURKEY

Turkey is the key deterrent actor of such cor-

ridor. Hence, has the rights:

- To protect and cleanse its Southern boundary from the terrorist groups.
- To protect the Muslim and Turkmen societies in the region.
- Never to let such a Kurdish blockage in its influential area.

ISRAEL

From the sight of security, Israel may support of weakling neighbors and naturally a weakened and divided Syria. So, it may not be strictly but gently a supporter of such a project.

RUSSIA & IRAN

It is not logical that it will support such a corridor since it has been a strategic ally of Assad Regime.

NORTHERN IRAQI GOVERNMENT (NIG) & PKK

It has the ability to support such a corridor due to ethnical sights and nationalist ideas. However, it should be noted that NIG keeps its borders closed to so called Rojava.

UK

UK holds its position usually in parallel with USA or vice versa.

As a result, such a corridor is mainly planned and partially brought alive by USA. And now, Turkey has its own strategy to interrupt on restructuring the region by such themes that were plotted in Northern Iraq.

It is clear that, today’s Iraq is not a secure and justifiable country to live as it was proposed



by the invaders (USA and EU). And highly-likely Syria will not be one either even for the Kurds!

KURDISH CORRIDOR FROM THE SIGHT OF ENERGY

Regional energy importers or exporters have to be analyzed while Kurdish corridor is evaluated from the sight of energy politics. In this concept, as exporters (or potential exporters) Israel, Northern Iraq, Central Iraq, Iran and other Gulf Countries will be evaluated. And as the biggest regional importer, Turkey will be identified.

There are some interesting theories regarding Israel becoming a gas and electricity supplier and an energy hub in the region, after achieving its plans on generating a Kurdish corridor starting from Western Iran, adding Northern Iraq and including Northern Syria.

Those theories might be used for psychological manipulations on illiterate societies. However, such claims are inconsistent and can only be considered as a conspiracy theory under current circumstances.¹

To clarify the above claims and the energy sight of a Kurdish corridor:

FROM THE SIGHT OF ISRAEL

- Israel does not have so much export potential and huge reserves, by comparing with the other suppliers' potentials. Around 5 bcma of stable gas export potential between the years 2020 to 2038 cannot be accepted as a very important source of supply for the region.
- There is no so much electricity demand in the due region.
- Electricity export option may not be the best selection to develop its own resources.
- If such a corridor succeeds and (also

partially impossible) Northern Iraqi and Iran oil and gas resources are transported to the Mediterranean coasts through this corridor, that means creating another energy hub in the region, which will shadow Israel's energy hub claims.

- So, from the sight of energy, Israel is not a fan of such corridor.

FROM THE SIGHT OF NORTHERN IRAQ

- KRG is securely, technically and commercially exporting its oil via Ceyhan port through Turkey.
- In addition, KRG is also developing some plans to transport some portion of crude production volumes to Iranian refineries via a new pipeline.
- Then, for such a government to follow such an incoherent, risky, uneconomic and fanciful option by accepting being an enemy of Turkey in the region looks impossible.
- So, KRG may fantastically support such a corridor from the sight of energy. However, in reality, it does not support and take any steps on behalf of such project.
- In addition, while there are existing and cheaper transportation systems, none of the operators would make extra investments to follow another political route.
- And just for Northern Iraq's energy resources, shall any of the actors try to open such a corridor.

FROM THE SIGHT OF IRAN & IRAQ

- Iran does not support politically such corridor claims. And naturally, it never makes a plan (which seems not very economic and politically impossible) to transport her resources through such a corridor.

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"So, KRG may fantastically support such a corridor from the sight of energy. However, in reality, it does not support and take any steps on behalf of such project."



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FROM THE SIGHTS OF OTHER GULF COUNTRIES

- None of the Gulf Countries will consider such an incoherent, risky, uneconomic and fanciful option, while they generally have existing export systems and good political relations with Turkey.

TURKEY

- Politically, commercially, culturally and from the sights of energy politics, Turkey will never allow such a corridor to be created.
- In addition, while it is currently allowing the transportation of Northern Iraq crude via Ceyhan port and in case of such option, crude trade will be re-routed via the terrorist corridor. Again, Turkey will strictly block/prevent the idea.

ADDITIONAL NOTE

- There may be potential, however, currently the Kurdish corridor targeted area is not bearing important volumes of proved energy resources.

As a result, while evaluating from the energy sight, Kurdish corridor seems not directly to be related with energy policy targets.

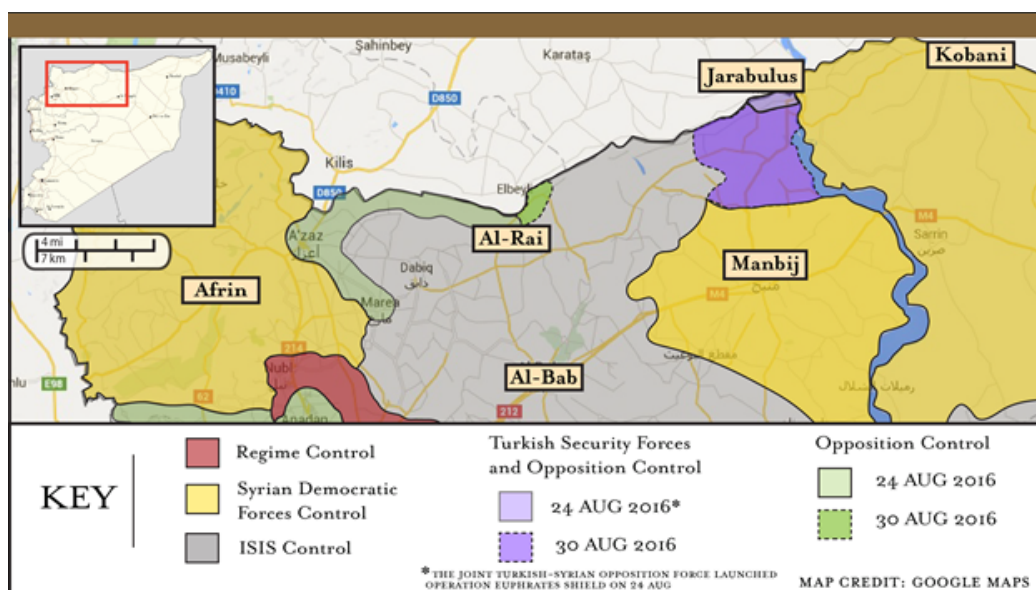
ALTERING BALANCES - TURKISH MILITARY INTERVENTION

The game played over the Middle East encouraged Turkey to take concrete steps in the international war game in Syria. Turkey had to get involved in restructuring Syria using Daesh and PYD/YPG terrorist groups since it was obvious that the main aim of those groups was to redraw the national boundaries and insert a Kurdish state between Sun-

nis and suppress Shia influence in the region. July 15 coup attempt had started the awakening of the Middle East giant as Feto staged the puppeteer's game to dismantle government institutions and agencies, topple Erdogan and the cabinet. The next step would be opening the borders for the terrorist groups located throughout the Southern border of Turkey. Simply, PYD/YPG, Daesh and PKK would have chances to reign in Turkish territory without any resistance from Turkish military and wreak havoc the country to suit the Greater Middle East Project. If succeeded, such actions would result in a smaller but more controllable Turkey since there would be a Great Kurdistan created on most parts of Turkey, Iran, Iraq and Syria soil.

So Erdogan, as the opposer of the idea, had to go and Turkey should have been governed by the puppets, who would just obey the west's orders. Thanks to the great world leader, Erdogan has united Turks and prevented covert actions of puppeteers. The plot against Turkish freedom is doomed to fail consequently because Turks, at any point in the history, had never been enslaved and will never be, either! The west, not being able to swallow that certain fact, still continues to exhibit nonsense covert plans.

The offensive on Manbij was designed for Kurdish gains over Daesh as the plot was to claim the gains of the Kurdish territory by moving Kurdish forces through each direction from Manbij. A turning point for so called Kurdish corridor would be accomplished by connecting Rojava to Afrin to complete the corridor. Erdogan refused to join the Manbij operation unless PYD/YPG militia stayed on the East of Euphrates. PYD/YPG paid no attention to Turkey's calls and operation started in 31 May 2016. Syrian Democratic Forces (SDF) including PYD/YPG militia has led the offensive and when SDF captured the West of the city, the calendar was showing date, 13 July 2016, which is just a day before the 15 July coup attempt in Turkey. If the attempt was successful, the new authority in Turkey would be dealing with interior clashes and chaos, so



Map 4: Military situation in Northern Syria as of 30 August 2016 after Turkish incursion. Source: http://post.understandingwar.org/sites/default/files/Military%20Situation%20in%20Northern%20Syria-30%20AUG%202016_2.png.

there would be no interference from Turkish side over PYD/YPG crossing the Euphrates. However, it was unsuccessful, which meant that the west had to cooperate with Turks in the area. And that (for the west) made everything complicated than it was before.

Following the coup attempt and placing order in the country, Erdogan's first steps were aimed at cleansing government institutions such as from its justice, police and military functions from Feto's secret agents. Erdogan, as a foreseer, started those actions in 2010 after the 17-25 December events as to clear out the questions how fast Turkey were able to detect and detain that many Feto wretches in a short period of time.

The next step had to be the Syrian civil war and PKK-PYD/YPG game played in Syria. Turkey were unable to deploy its troops to Syria due to Russian military threats, which was extremely important to stand firm against USA's ambitions for a Kurdish corridor. Hence, mending relations with Russia and Israel would be a win-win situation. Negotiations and agreements are realized with Russia and Israel. Indeed, Turkish

military entered the Northern Syria, helped and guided FSA against Daesh, and Jarabulus was freed. New situation in the Northern Syria can be viewed on Map 4, where Manbij is also included as a Kurdish controlled territory. PYD/YPG, on the other hand, had to leave Manbij through Turkey's warnings regarding Erdogan's statement that Kurdish presence on the West of Euphrates will never be tolerated. It is quite incomprehensive why the maps still show Manbij as Kurdish territory and additionally, Kurdish controlled areas are rather exaggerated. Perhaps, all these are conceptual designs to overload human perception.

As a result, Kurdish ambition to score larger areas from Daesh was hammered by Turkish cooperated FSA incursion. From now on, the plot for creating a Kurdish corridor from Iraq to Syria will have to be revised in accordance to Turkey's will.

CONCLUSION

The information and knowledge shared so far point only to ethnical, political, religious

“Hence, mending relations with Russia and Israel would be a win-win situation. Negotiations and agreements are realized with Russia and Israel. Indeed, Turkish military entered the Northern Syria, helped and guided FSA against Daesh, and Jarabulus was freed.”

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“Islamic world instinctively believes that the whole mess is about “Energy” as it was in the World War I and II, Cold War, Gulf incursions and Iraqi invasion. The future will reveal whether or not all related to energy once the unrest ends and sharing of the energy resources takes its place.”

“It is inhuman to strangle innocent people and ridicule them in some other countries as refuges. Creating a corridor by perversely dictating a state that nobody in the region really accepts is a very very bad idea as it will spread worldwide and became a burden on whomever has come up with the idea.”

and economic ambitions that drive the chaos in the Middle East. Therefore, there is no clue to relate the Middle East ridicule directly to energy even though the vast majority of world’s oil reserves are located in the region.

Nevertheless, Islamic world instinctively believes that the whole mess is about “Energy” as it was in the World War I and II, Cold War, Gulf incursions and Iraqi invasion. The future will reveal whether or not all related to energy once the unrest ends and sharing of the energy resources takes its place. Most probably, western companies will have the most profitable reserves and projects on blood covered soil. At this point, countries like Turkey with no effective oil company has to rethink about creating or designing a powerful energy company that will be able to harvest the Middle East’s fruits in Turkey’s favor.

Puppeteers seem to stage the game over ethnical concerns since each country in the region has a variety of ethnical minorities. And the fact that polarizing people over ethnical reasons is an easy task to disorganize a country that refuses to obey the puppeteers’ way of running business. Additionally, there is no harm to the puppeteers’ homeland and no threats to their citizens since they have no idea what their nations are doing in the Middle East.

However, it makes sense to focus on humanitarian issues that are brought upon by covert political and strategical activities. It is inhuman to strangle innocent people and ridicule them in some other countries as refuges. Creating a corridor by perversely dictating a state that nobody in the region really accepts is a very very bad idea as it will spread worldwide and became a burden on whomever has come up with the idea.

Debating behind closed doors about how to trade national weapons and arms that will be paid by blood and dirty oil by Middle Easterners is not the best way to set peace in the

world.

Let’s remember “God is watching us! He knows who is in GOOD or BAD faith.”.

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CHANGING BALANCES IN TURKISH ENERGY GAME BEFORE THE COUP

by *Oğuzhan Akyener*

“In the last two decades, Turkey steadily and successfully keeps leaping on economic – industry – technology and trade areas, which, indeed, grows the Turkish energy demand faster and faster.”

“The unrest at Gezi Park, 17th and 25th December operations and 15 July coup attempt: All of them aimed at weakening Turkey but none of these attempts were able to tackle the growing power of Turkish Moon & Star.”

INTRODUCTION

Turkey, with its growing economy, nearly 80 million population and increasing energy demand is one of the most important countries in energy politics of its region. Due to insufficient proven oil and gas reserves, and not having a suitable environment to efficiently develop her renewable energy resources, Turkey’s energy policies used to encapsulate only “sustainability on meeting the energy demand” item.

In the last two decades, Turkey steadily and successfully keeps leaping on economic – industry – technology and trade areas, which, indeed, grows the Turkish energy demand faster and faster. While the demand is growing and Turkish influence in the region is flourishing, Turkey has been trying to develop and execute new energy strategies, for example; “to become an energy transit hub in the region”, “to support the domestic renewable energy investments and technology productions”, “to take part in more international oil & gas projects”, “to construct nuclear power plants”, “to actively support domestic coal investments”.

Naturally within the concept of some of these strategies, successful steps have been taken that some of which have not yielded satisfactory results. However, in general, its visionaries in energy strategies and politics are in harmony with its economic growth.

With its increasing influence in the region, flourishing of the productivity and of its populace, growing economy and political and strategical foresight rise young Turkey’s consciousness to focus on a global visionary

(as it did throughout history). These rapid strides may not have been observed specifically in the energy area, however, Turkey’s expectations stands high in all involved areas.

Some international forces have been trying very hard in order to keep Turkey under control. At constant pace, steadily growing Turkey has been tussling with some political troubles since 2012. These troubles can be exemplified as: “the unrest at Gezi Park”, “17th and 25th December operations” and “15 July coup attempt”. All of them aimed at weakening Turkey but none of these attempts were able to tackle the growing power of Turkish Moon & Star. In contrast to their goals, Turks has eagerly got united at each planned attempt, however, each intervention disintegrated the country as it had to concentrate on defying each attack. Turkey had to defer some important items from its agenda such as energy in the midterm.

In this paper, to be able to investigate if the 15 July terrorist coup were related with the energy policies of Turkey, and if the key factors expressed so far affect the Turkish energy equation before the coup. Naturally, this will not mean that the main reason of the coup was energy, however, possible interrelations will be tried to be emerged from the outcomes.

Before starting to evaluate the key factors related to Turkish energy equation, some clues about the subcontractor terrorist group Fetullah Gulen Terrorist Group (FETO), which is the apparent mastermind of the coup, will be deciphered.

FETO & 15 JULY TERRORIST



COUP IN TURKEY

FETO is the terrorist group, which organized the coup in 15th of July 2016. Some evidences point that the group has connections with international organizations and has been supported by some of them. Perhaps, it has unofficial ties with some countries as well.

Off course, such an effective and well organized (intelligence service alike) group has many contacts and relations with the international key actors in the region. Without the permissions and unofficial support of those actors, it will not be easy for such a group to be able to establish a hidden, strong, effective, well organized global structure. In addition, a group in that measure cannot take the risk of being unsuccessful in such intervention without having some words and/or support of the big actors.

That's why, initially, main international key political actors in the region have to be identified to determine the most suitable actors and to examine their intimacy level with these infidels.

By the first look, as the international key political actors in the region (except Turkey) can be assumed as: USA, EU (assuming EU contains UK & Vatican), Russia, Israel and Iran.

Then, to determine the intimacy level, some public key clues will be overlooked as follows:

About USA:

- The leader of the FETO has been living in USA more than 10 years.
- The leader of FETO and the affiliated organizations usually make declarations parallel to global USA strategies.
- Organization has a great number of

members and a powerful structure in USA.

- USA tries hard not to return the mastermind to Turkey, expecting Turkey to prove his guilt while everything FETO did all sound and clear, placing legislations and diplomacy as a backdrop.
- An indirect connection that USA backs YPG, which has the same roots with PKK, against Turkey's will in Syria. FETO's militants infiltrated the key government institutions actively worked together with PKK and DAESH.

About Israel:

- Unlike the other Islamic groups or leaders, FETO's leader or members abstain from criticizing Israel's cruelties in Palestine.
- No problem is observed between FETO & Israel.

About EU (Including UK & Vatican):

- EU includes many countries in its structure. By assuming as the UK (as used to be) is also a member in the analysis;
- FETO has good relations with EU. Organization has many companies, schools and a great number of members inside the borders of EU.
- FETO also has close relations with the Vatican, which is a key actor in EU (also is not an official EU member).
- FETO is one of the subcontractors of Vatican's popular project: "Interreligious Dialogue" from the Islamic sight.

About Russia:

- Russia has closed the FETO schools inside its boundaries in 2006 by claiming they have relations with CIA.

"FETO is the terrorist group, which organized the coup in 15th of July 2016. Some evidences point that the group has connections with international organizations and has been supported by some of them. Perhaps, it has unofficial ties with some countries as well."

"By the first look, as the international key political actors in the region (except Turkey) can be assumed as: USA, EU (assuming EU contains UK & Vatican), Russia, Israel and Iran."



About Iran:

“FETO is obviously closer to or a part of Western Bloc (including the USA & EU). We may add Israel to the western bloc due to its regional policies are parallel with the Israel’s.”

- Due to temperate Islamic model of FETO, Iran always seems repulsive for the group members.
- There can be seen some declarations of the FETO group in favor of Israel, USA and some EU countries. But it is not easy to find such statements in favor of Iran and Russia.

By the way, with the light of very general public clues, it seems easy to determine the intimacy level of FETO with the due international key organizations in the region. As can be observed from the items above, FETO is obviously closer to or a part of Western Bloc (including the USA & EU). We may add Israel to the western bloc due to its regional policies are parallel with the Israel’s.

Important note: “This does not officially mean that: Turkish coup was organized by the western block. For such declaration more evidence is necessary. Here by taking into account, only some small public clues are used to make assumptions.”

In the next chapter, by assuming there is a possibility of the western bloc to be behind of the FETO and FETO’s last strike as the 15 July coup was organized to weaken Turkey’s power (while unsuccessful) or to subjugate the government and make it vulnerable to all the targets of the supporting actors (while successful). From this point of view, key factors expressed that affect Turkish energy equation will be evaluated in order to determine the possibility of having relations with the reasonings of the coup.

KEY FACTORS EXPRESSED AS EFFECTING TURKISH ENERGY EQUATION

Before the 15 July terrorist coup, some agreements and proceedings were on the talk be-

tween governments that would have changed the balances in Turkish energy equation. These can be expressed as the ongoing TANAP pipeline project, possible recuperations with Israel–Russia–Egypt–Syria relations, weakening EU, nuclear and domestic coal strategies.

These events are going to be analyzed inside the energy window, on a base of possible (also weak) reason for the 15 July Turkish coup to weaken Turkey.

TANAP – A CONCRETE STEP ON BEING A GAS TRANSIT HUB

TANAP is the ongoing pipeline project, which is going to transport Shah Deniz Stage 2 gas to Turkey (6 bcma) and Turkish western borders (10 bcma), then with TAP to Italy market. The project is to be completed at the beginning of 2019.

According to the capacity of the pipeline, although there are plans for extensions, 10 bcma is a very small volume for EU’s energy security issue, while considering, this is a project supported by EU & USA.

The importance of the pipeline project for Turkey is the pipeline to carry an additional 6 bcma for Turkey and to be the first international transit gas line through the boundaries. The second important point is that this pipeline will be the first concrete step of Turkey being a gas transit hub. Moreover, from the sight of EU, it is also the only and the first concrete step again in the concept of the “Southern Gas Corridor Project”.

From the sight of Russia, while some experts claim that Russian government is against the TANAP due to their strategic and commercial targets (and expressing that TANAP is the rival to Russian gas export routes), it is better to remind that Luk Oil (a Russian Company) is a partner of the Shah Den-

“The importance of the pipeline project for Turkey is the pipeline to carry an additional 6 bcma for Turkey and to be the first international transit gas line through the boundaries. The second important point is that this pipeline will be the first concrete step of Turkey being a gas transit hub.”



iz Project. TANAP is not a rival project for Russian strategies, hence:

- TANAP is going to transport Russian gas produced in Azerbaijan.
- TANAP has an insignificant capacity comparing the Russian gas export volumes to EU.
- Azeri gas transported to EU via TANAP will never be able to find a chance to compete with Russian gas price in EU markets.

Hence, none of Russia, EU, and USA is against TANAP. As a result, this project cannot be associated with the coup.

POLITICAL RECUPERATION WITH ISRAEL

As described above, Israel is assumed to be in the western block, which has more possibility of being behind the FETO group. By the way, before the coup Turkey and Israel relations has got in a recuperation period. As a result of this period, many experts claimed their expectations about Israeli gas transported to Turkey, and via TANAP to EU. In this concept, the conflicts for the Cyprus were anticipated to be solved.

Meanwhile, in order to claim Israeli gas being transported to Turkey and EU; initially, commercial estimation and export capacity has to be studied. The total export capacity of Israel after meeting her domestic demand and feeding the neighbors' demands (which will be more economic for the seller while considering the high transportation costs) have to be identified.

Currently, Israel has around 1 tcm proved and possible gas reserves. Current daily production is around the domestic consumption. In the midterm (in 2020), by developing the new fields (mainly Leviathan); and

considering the expected increasing domestic consumption, there will be around 5 bcma export capacity (for a 20 years sustainable supply capacity)¹. This volume is very small to alter the international strategies. However, as described in the same reference, although there are difficult political milestones to handle, Turkey is commercially the best option for Israel's oil fields to be developed and exported.

So, what do the mending relations with Israel bring to both sides from the sight of energy?

- From the sight of Turkey;
 - She will supply additional 5 (or 10) bcma gas to feed her domestic market.
 - And according to the unit costs, Israel gas may be cheaper than the Iran's, which means a positive affect for the domestic gas markets.
 - In addition to such project, the gate for the possibility of long term (by considering possible future discoveries) supplies of Israel and other Western Mediterranean resources to flow to Turkey will be opened. This may be a good step for Turkish energy strategy of being an energy transit hub.
- From the sight of Israel;
 - Besides the disputes in the political sight, Turkey root is the best selection for Israel's future exports. Hence other options are usually more complex or very huge investments are needed.
 - Turkey is the most stable, most trustable and the biggest market in the region.
 - Turkey is the only gate for Israel to economically reach her gas exports to EU markets.

While such a win-win situation exists between the two sides, what can be supposedly in for Israel in the 5 July coup attempt?



“But no one can say that if the coup was successful, the occupier terrorist government in Turkey would have bad relations with Israel. In addition, this situation makes some analysts think if Israel is not happy with some items in the concept of recuperation with Turkey.”

Initially, it is clear that Israel wishes such a recuperation with Turkey. And it is engrossing that Israel usually is on the side of western block and about the coup it was so silent.

But no one can say that if the coup was successful, the occupier terrorist government in Turkey would have bad relations with Israel. In addition, this situation makes some analysts think if Israel is not happy with some items in the concept of recuperation with Turkey.

However, hence there is no evidence about these claims, political recuperation with Israel cannot be directly related with the coup attempt in Turkey.

POLITICAL RECUPERATION WITH RUSSIA

Another important item these days that affects the Turkish energy equation is the results of the political recuperations with Russia.

As described above, Russia is one of the most important members of the eastern bloc. And far from the end of cold war, holding its position of being an unofficial enemy of the western bloc.

After a 7 months of straining period, as a result of some diplomatic attempts, Turkish relations with Russia has started to be normalized (before the coup). Due to normalization efforts, main items discussed by both sides have been the Syria policies, tourism, trade and energy.

Focus on energy item consists of two main sub items, which are the Turkish Stream Pipeline and Akkuyu Nuclear Power Plant.

TURKISH STREAM PIPELINE:

Russia is planning to have 2 gas supply hubs for the EU markets that bypass Ukraine.

They are located in the both North and South; one being in the northern German boundary and the other in the Northwest of the Turkish boundary. To the Northern hub, Russia is supplying gas via Nord Stream and is planning to supply additional volumes via Nord Stream2. To the southern part, Turkish Stream is going to transport the gas for the Southern Europe and the Balkan countries.

As can be understood from the explanation above, by considering the possible long term market struggles in EU, sustainability in gas supply security and importance of bypassing Ukraine, Turkish Stream is almost a vital project for Russian energy security.

By the way, aren't there any other options instead of Turkish Stream? Yes there are but Turkish Stream seems less complex, more stable and strategic.

If so, why US and some of the EU countries are against Turkish Stream?

Because:

- They do not want EU to be dependent on Russian gas supplies.
- EU in the mid and long term, is targeted to be the most important market for USA's gas supplies (Unconventional).
- However, USA's gas has no chance to win over a price struggle with Russian gas.² (While all EU gas markets are on the way of having hub price mechanisms.)
- If Turkish Stream (and Nord Stream 2) can be constructed, Russia will continue to be the leader supplier for all EU markets in the long term.
- Although Russian gas is the most economic option for EU markets, western political targets are more important.
- By Russia bypassing Ukraine (where Ukraine seems like the most strategic castle of the western bloc against Rus-

“As described above, Russia is one of the most important members of the eastern bloc. And far from the end of cold war, holding its position of being an unofficial enemy of the western bloc.”



sia), Ukraine will lose power & around annually 2 billion \$ transit fee, will need Russian gas in the midterm and these will make Western Bloc leave their castle in the hands of Russia.

In addition, similar to western bloc's anxieties on Turkish Stream, also in Nord Stream 2, although Germany seems the leader of EU and takes place on the western bloc's side, USA, UK and some EU members do not want Germany to be an energy hub and get stronger.

By the way both Germany and Turkey are the biggest customers for Russian gas.

So, Turkish Stream Project to turn back to life, which is a result of political recuperation with Russia, can be accepted to relate with the coup attempt in Turkey. Hence, the western bloc might favor a successful coup.

AKKUYU NUCLEAR POWER PLANT

First Turkish nuclear power plant, which will supply Turkey an additional electricity capacity equivalent to 4 bcma gas, was suspended due to corrupted relations with Russia.

This power plant has some strategic advantages for Turkey. Which are:

- Hence, being the first nuclear power plant, this will be an important step for Turkey on gaining knowledge and experience on nuclear technology and nuclear power plants.
- After that, new nuclear power plant projects are to be constructed.
- All nuclear power plants can be accepted as independency steps for Turkish energy demand.
- Turkey has qualified human resources capacities to develop nuclear technolo-

gies for the military issues, which can be accepted as a vital risk for western bloc.

As a result, only the realization possibility of the last item above, is enough for western bloc to assume having a chance to be related with the coup attempt.

POLITICAL RECUPERATION RUMOURS WITH SYRIA AND EGYPT

Before the coup, there were of rumors about Turkey to recuperate her relations with Syria and Egypt. However, after the coup it is understood that, those rumors means that:

- Turkey will have a more active role in the solution for the chaos in Syria. In the concept of this;
 - Continue to support unity of Syria.
 - Not let a terrorist Kurdish corridor or a dependent Kurdish government to be realized.
 - Support the composition of a democratic Syria government.
 - And after such a government achieved, again have close intercourses.
- From the sight of Egypt, with low level relations, Turkey wants to communicate with the current Egypt government.

So, how these steps can affect the Turkish energy equations?

Neither Syria nor Egypt is a key energy supplier in the region. And only Egypt has sort of important volumes of energy resources. On the contrary, due to its huge consumption, these resources do not seem strategic for the regional energy politics.

In addition, Neither Syria nor Egypt is geo-strategically important places from the sight

“Similar to western bloc's anxieties on Turkish Stream, also in Nord Stream 2, although Germany seems the leader of EU and takes place on the western bloc's side, USA, UK and some EU members do not want Germany to be an energy hub and get stronger.”

“Turkey will have a more active role in the solution for the chaos in Syria.”



“If unity of the Europe is disrupted, then history shows that, there is always a possibility to turn into a chaotic environment and a cold war (usually effecting the whole world).”

“While focusing on the results of Brexit on the Turkish energy issues, there seems no direct short or midterm affects. But Turkish Stream and southern gas corridor strategies can only be accepted as indirect effects.”

of energy politics of Turkey.

As a result, recuperation rumors of Turkey with Syria and Egypt, from the sight of energy cannot be referred to the coup attempt in Turkey.

A WEAKLING UNITY: EU AFTER BREXIT

If unity of the Europe is disrupted, then history shows that, there is always a possibility to turn into a chaotic environment and a cold war (usually effecting the whole world).

Initially, by checking the GDP change of EU after and before the Brexit (from CIA Factbook), EU used to have the second GDP in the world with 19,18 Trillion \$. And after the Brexit, the GDP rate is expected to be around 16,5 which makes EU to come after USA again in the GDP ranking (Remains unchanged but the figures have got smaller).

In addition to decrease in GDP, the possibility of some other countries to leave the EU is the most important risk for the unity. However, such a possibility is not likely to occur in the near term.

Before the Brexit, EU has already started the negotiations on the major climate and energy framework targets for 2030. In this concept, while shortly touching the results of the Brexit upon EU energy targets and policies;

- By considering the influence and self-success application potential of UK in the EU's energy targets, the power of the unity on achieving the agreed targets is weakened.
- Hence, UK's future position in the implementation of EU's existing energy targets and legislations is not clear, some delays are expected to happen in the agreed strategies. (For example: In emissions trading and effort sharing negotiations.)
- Midterm weakening in dealing ability

and short term fluctuations in energy prices.

- Weakened international energy diplomacy ability. Which will effect:
 - Southern gas corridor strategies.
 - Russian relations.
 - Energy import price negotiations.
 - World's carbon and climate issues.
- Unpredictable new milestones for the “single energy market” vision and the energy unity.

While focusing on the results of Brexit on the Turkish energy issues, there seems no direct short or midterm affects. But Turkish Stream and southern gas corridor strategies can only be accepted as indirect effects.

From the sight of Turkish Stream, as described in above due part, with a weakened EU diplomacy and with the absence of UK (which is strictly against to new Russian gas export strategies), the legislatives and agreement milestones of the project will be handled easier.

From the southern gas corridor's sight, the only concrete step TANAP and Shah Deniz 2 (also the operator of the project is a UK company: BP) does not seem to be effected. However, for the other possible resources such as the western Mediterranean, northern Iraq and etc. may not be able to find a chance to reach the European markets without a strong diplomatic and political support. So, a diplomatically weakling EU may affect the southern gas corridor strategies.

As a result, by considering the effect level and the importance of the results, Brexit and the weakening unity of EU may not be related to the coup attempt.

DOMESTIC COAL UTILIZATION STRATEGIES



Before the coup attempt, in order to reduce the imported natural gas dependency, Turkey has prepared legislations to encourage the investors for domestic coal burning power plants.

However, due to general technical handicaps of the Turkish coal reserves, with the common technologies and commercial conditions, by adding the possible sanctions of the Paris Climate Conference, these encouragements will not seem so effective in the mid-term.

Although there are some investments due to the governmental supports, however, this attempt does not seem to have a big effect in Turkish energy politics.

From another respect, domestic coal utilization strategy may result in a decrease in coal imports. Where Russia is again the biggest coal supplier for Turkey (as it is of natural gas). This issue can only find a chance to be related with the due key actors in the region. However, again the results of such strategy and the market volume shows that, this item also cannot refer the coup attempt.

RESULTS

As studied above, 15 July terrorist coup is attempted to be tied to the main energy issues in Turkey. By this way, most important events, which are assumed to affect the Turkish energy equation before the coup attempt are analyzed.

Before these analyses, main actors and groups, having influence in the region (except Turkey) are determined. And those actors' possible approaches and positions on the due energy issues are tried to be estimated.

According to the estimations and analyses, only Turkish recuperation with Russia and the natural results of this recuperation on en-

ergy, which are Turkish Stream and Akkuyu Nuclear Power Plant, might be accepted as the key energy items that can be referred as the indirect reasons of the coup. Because, the more intimate group for the terrorists of FETO: western bloc is strictly against these issues.

The other adverted issues cannot be referred with the coup. Moreover, may not have important effects on Turkish energy equation.

As a result, energy and Turkish steps on energy cannot be accepted as the main reasons for the 15 July terrorist coup. However, the results of the Russian recuperation gives some clues about how energy is important for the international policies.

WHAT ABOUT FOR TURKEY?

The analyses above show that; although energy issues cannot be directly accepted as the main reasons for the coup attempt, energy continues to be one of the most important items for the international policies.

Turkey with the due diplomatic, political, economic and technological leaps, continues to be more powerful and influential country in the region (as it was before). 15 July terrorist coup and the previous coups in Turkish history were organized by some key actors (?) in order to weaken the Turkish expansion in the region.

Due to those effects, Turkey had to delay some strategies and has become late for some important leaps on energy sector. Perhaps, with the correct attitude and feasible approaches in politics, economics, culture and religion, Turkey will reach out and grab its potential of being an energy giant that it has been longing for.

As it can be understood from the findings above, the main reason of the last coup was

“From another respect, domestic coal utilization strategy may result in a decrease in coal imports. Where Russia is again the biggest coal supplier for Turkey (as it is of natural gas).”

“As a result, energy and Turkish steps on energy cannot be accepted as the main reasons for the 15 July terrorist coup. However, the results of the Russian recuperation gives some clues about how energy is important for the international policies..”



“Perhaps, with the correct attitude and feasible approaches in politics, economics, culture and religion, Turkey will reach out and grab its potential of being an energy giant that it has been longing for.”

not the energy. However, to continue delaying the Turkish leaps in the energy game in the region can be accepted as one of the general important reasons for the coup attempt when the different energy policies are very active in the region.

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FUTURE OF ISRAEL GAS EXPORT UP TO 2050 & TURKEY

by Oğuzhan Akyener



INTRODUCTION

Despite its small population and territory, Israel is one of the most influential countries in the region. This is mostly due to global lobbying achievements, strong economy, high technology and military products, having support of ultra-rich Jewish people around the world and additionally being a natural strategic partner of USA.

Until the last decade, Israel's name could not be associated with energy resources although she has owned the same features above and the strong influence in the region. After some discoveries such as Tamar, Leviathan, Tanin and Karish inside its offshore boundaries, Israel has started to be introduced as the future's important gas exporter in the region.

From the sight of international affairs between Turkey (who is also another strategic partner of USA) and Israel; after the 2009 Davos statements of the Turkish President (as a result of Israel's cruelties in Palestine) and Mavi Marmara irruption of Israel, relations come to a rupture.

After the end of 2015, while Turkey's relations were strained with Russia and naturally, gas import security raised alerts. And by adding this situation some other political reasons, Turkey and Israel have taken steps forward to reestablish good relations (by the way, it has been claimed that Israel also needs Turkey for an economic gas export to the due markets).

Before the coup, Israel has agreed to pay compensations to the families of the Mavi Marmara victims. And after the coup, this

step and other due items have been negotiated and accepted by both governments.

With this alteration in the affairs between Israel and Turkey, energy, as it is stated, has become the most important issue that prepared both sides to have been eager to solve the problems in between. And now there are quite different scenarios, claimed by the experts, about the Israel's gas export route to Turkey and EU. In addition to these scenarios, unfortunately, the solution for the long-lasting Cyprus matter that stands against Turkish red lines, might find a ground to be asserted according to some Turkish experts.

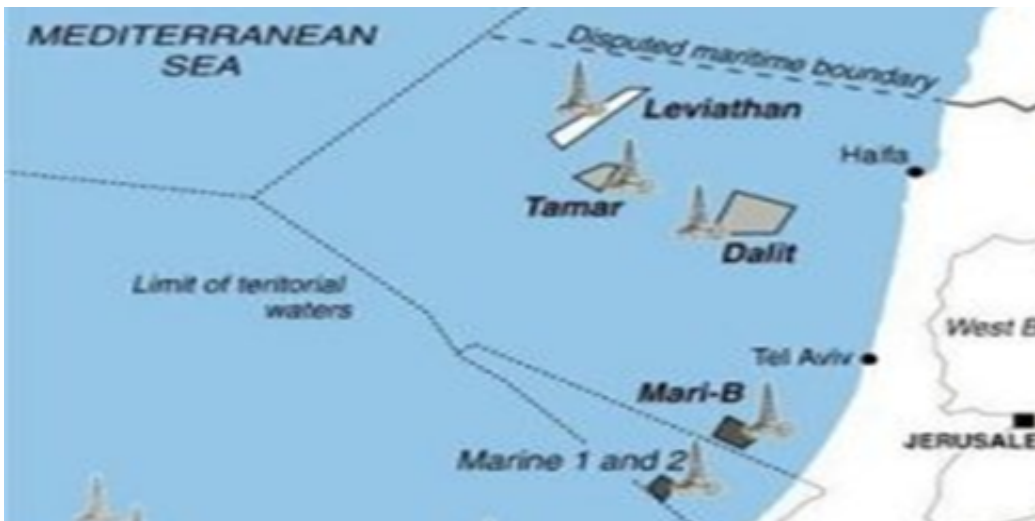
However, are these scenarios coherent from the point of reserves, export potentials, economics and other sights? What might happen in the future? For a possible gas transit or gas sales situation, may a country allow its red line policies to be relinquished?

In this study, after analyzing the reserves, export potential of Israel, and possible export options, Turkey's positioning, Cyprus matter and sales to EU conditions are tried to be detailed with the technical and economical sights in addition to politics.

RESERVE AND RESOURCE POTENTIAL?

Currently, there are 4 main producing gas fields in Israel, which are: Tamar, Mari, Noa and Zohar (onshore). Total current production is estimated to be around 10 bcma. It is estimated to have around 1 tcm (possible and probable) gas reserves, as seen in Table 1.

“Until the last decade, Israel's name could not be associated with energy resources although she has owned the same features above and the strong influence in the region. After some discoveries such as Tamar, Leviathan, Tanin and Karish inside its offshore boundaries, Israel has started to be introduced as the future's important gas exporter in the region.”



Map 1: Some gas fields in Israel offshore. (Source: <http://www.politicsforum.org>).

Type	Field Name	Reserves (bcm)
Producing	Tamar	283
Producing	Mari	12
Producing	Noa	20
Producing	Zohar	2,5
Development	Leviathan	623
Development	T a m a r Southwest	25
Development	Tanin	17
Development	Karish	36
Development	Dalit	14
Development	Hanna	No data available
TOTAL	A L L FIELDS	1032,5

Table 1: Main Fields & Reserves of Israel.

In addition to current producing fields, there are discovered new fields in the country.

Which are mainly: Leviathan, Tamar South-west, Tanin, Karish, Dalit and Hanna.

All the fields' reserves (proved and possible reserves) are calculating and given in Table 1.

As seen from Table 1, Leviathan and Tamar are the biggest reserve containing fields in Israel. And Israel seems to have around 1 tcm gas reserves.

While estimating the production profiles of these fields by benchmarking with the current producing fields and the due plans for each project below assumptions are made:

- For each field, production is assumed to be done technically in full capacity. No market, transportation limitations taken into consideration.
- Development plans and plateau rates are evaluated to reach the recovery rates between 70% and 85%. In addition, some public statements about the due projects are to be taken under consideration.
- Decline rates are assumed by benchmarking the current producing fields in the region. And for bigger structures (reserve volumes) decline rates are assumed to be lower.

“Currently, there are 4 main producing gas fields in Israel, which are: Tamar, Mari, Noa and Zohar (onshore). Total current production is estimated to be around 10 bcma. It is estimated to have around 1 tcm (possible and probable) gas reserves, as seen in Table 1.”

“There are discovered new fields in the country, which are mainly: Leviathan, Tamar Southwest, Tanin, Karish, Dalit and Hanna.”



“With the activation of Leviathan field, Israel will be able to have a gas export volume.”

“Only Tamar and Leviathan fields are strategically important.”

- For smaller fields (except Tamar, Leviathan) plateau periods are assumed to be lower, hence, less investment is expected to keep the plateau period longer.
- Commercial – political – security and international oil & gas price issues to be able to produce these fields are not taken into consideration.
- All fields are assumed to be produced up to the life of the field by not considering the economical limitations to abandon or license periods.
- Leviathan second phase is assumed to be in production with the beginning of 2030.
- Only Hanna license is not taken into consideration due to lack of information and a not approved discovery.

As a result of these general assumptions, with the limited data those can be reached from the internet and the suitable benchmarks, showing each important potential gas fields' production forecast, is shown in Graph 1.

As shown on the graph:

- With the activation of Leviathan field Israel will be able to have a gas export

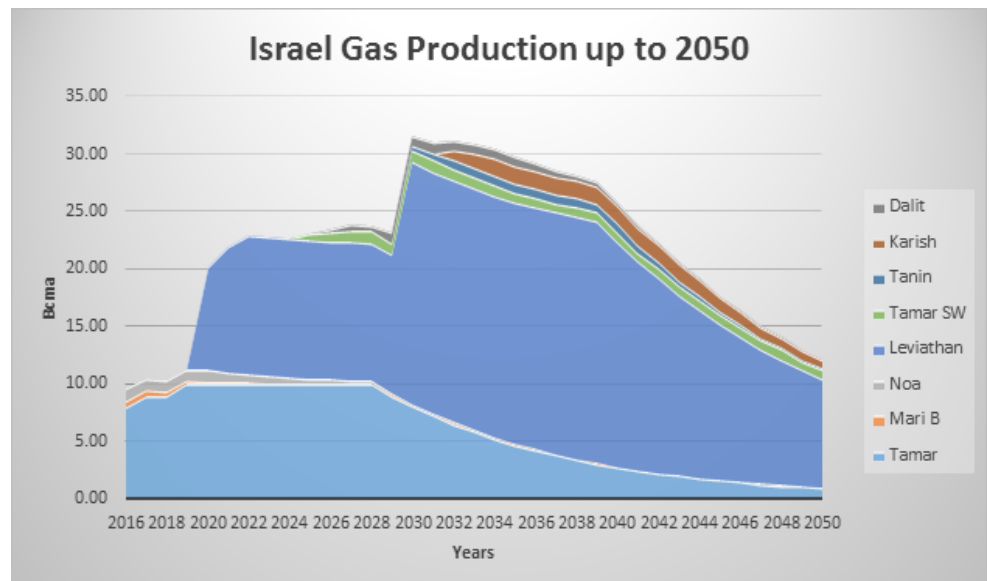
volume.

- Only Tamar and Leviathan fields are strategically important.
- While comparing the time gap between the discovery and first production date of the fields seems longer than the international standards. This is mostly due to the lack of infrastructures to reach the available markets and Israel's tiring legislations (including anti-trust commission) which means a worse investment environment. So, some precautions have to be applied in order to take the first production dates of the fields to an earlier stage.

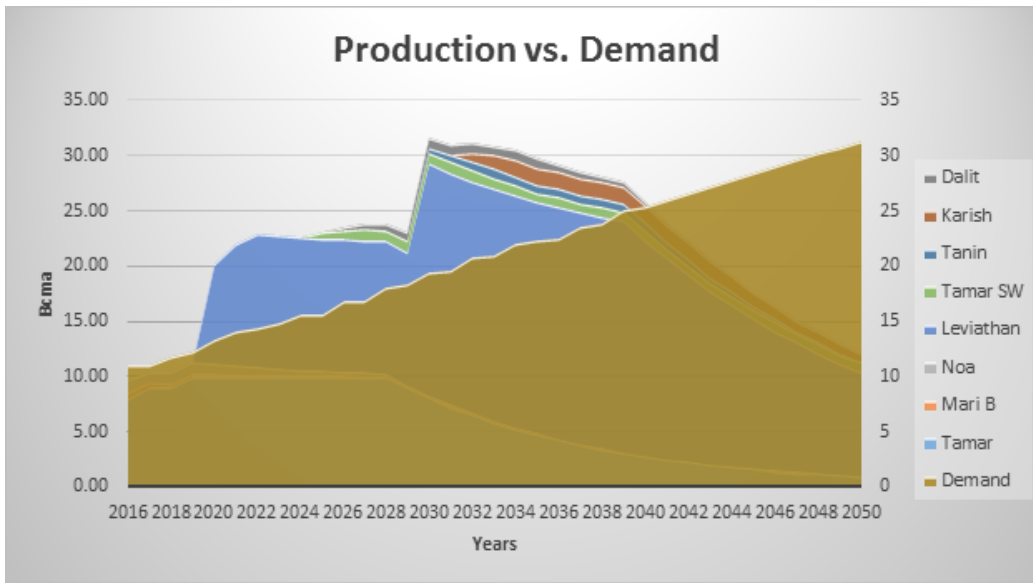
After evaluating the reserves potential and future production profiles of the important fields in Israel, by considering the demand profile, export potential have to be analyzed.

WHAT IS THE EXPORT POTENTIAL UP TO 2050?

To be able to evaluate the gas export potential of Israel, domestic gas demand scenario should be characterized. Generally, difference between the production capacity and the domestic demand will give the export



Graph 1: Israeli gas production forecast up to 2050.



Graph 2: Israel's production vs. demand profile.

potential (by not taking any possible imports into consideration).

For future demand profile, a study of Israel's Ministry of Energy and Water Resources, named "Israel's Natural Gas Demand Forecast 2011-2040" is used. Between the years 2041 to 2050, average incremental rate of the existing forecast (0,6 bcma) is added to the previous year's value.

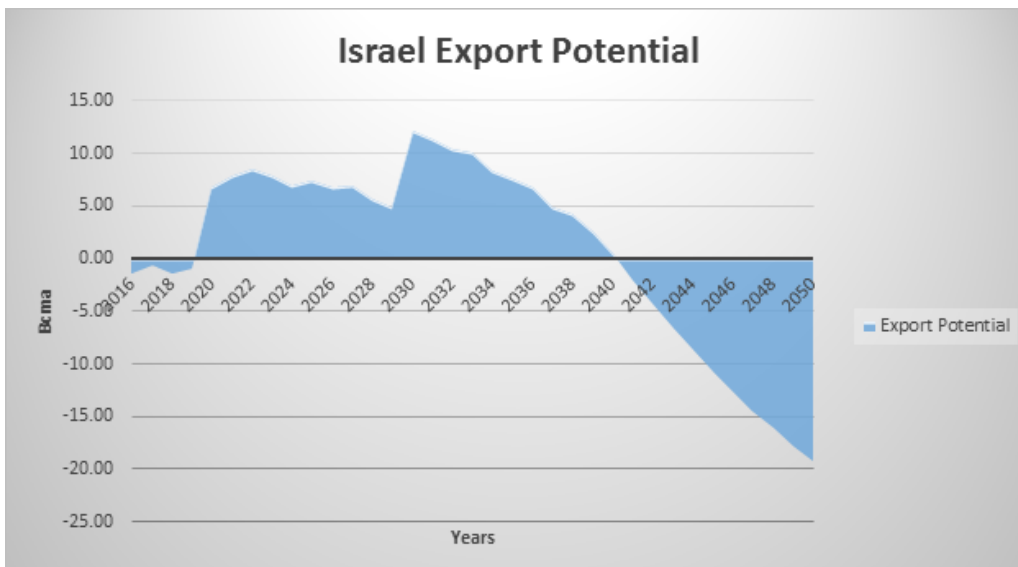
As a result, as shown in the Graph 2, production values in Graph 1 and the 2050 demand profiles are combined.

As seen from the Graph 2:

- Israel will have a gas supply capacity to the world markets only between 2020 and 2040.
- Only if some new giant discoveries can

"Israel will have a gas supply capacity to the world markets only between 2020 and 2040."

"Only if some new giant discoveries can change the scenarios."



Graph 3: Israeli export potential up to 2050.



change the scenarios.

By checking the possible export volumes in a clearer way, Israel's export potential can be calculated (See Graph 3).

According to the Graph 3:

- As mentioned above; Israel will only have a chance of 20 years to be a gas exporter in the region.
- Export volume potential, in comparison, is not as high and important as of the other gas exporters in the region.
- By putting a downside limit for long term gas sales agreements; as shown with the orange line in Graph 3, 5 bcma is available for Israel to make such contracts (from the sales of Leviathan). In the next sections, the possibility of constructing a pipeline with this volume of gas will be studied.
- The extra volume of gas, which can be accepted as the upside potential after extracting the 5 bcma long term volume, can be sold in spot markets or with short term agreements.
- Export potential graph proves that; Israel cannot be an important gas supplier for neither Turkey nor EU, by considering

the export potentials and demand volumes.

- There is no chance for Turkey to import gas from Israel before 2020.
- After 2040 Israel will have to check for solutions to fill the gap of its gas demand.

After defining the export potential of Israel up to 2050, in the next section possible export options will be evaluated.

EXPORT OPTIONS

After specifying the annual export volumes of Israel up to 2050, some export options in different phases can be evaluated as follows:

- Keeping the produced gas in existing phase.
- Exporting the gas after liquefying to LNG.
- After producing electricity in the power plants and making electricity export via cables.

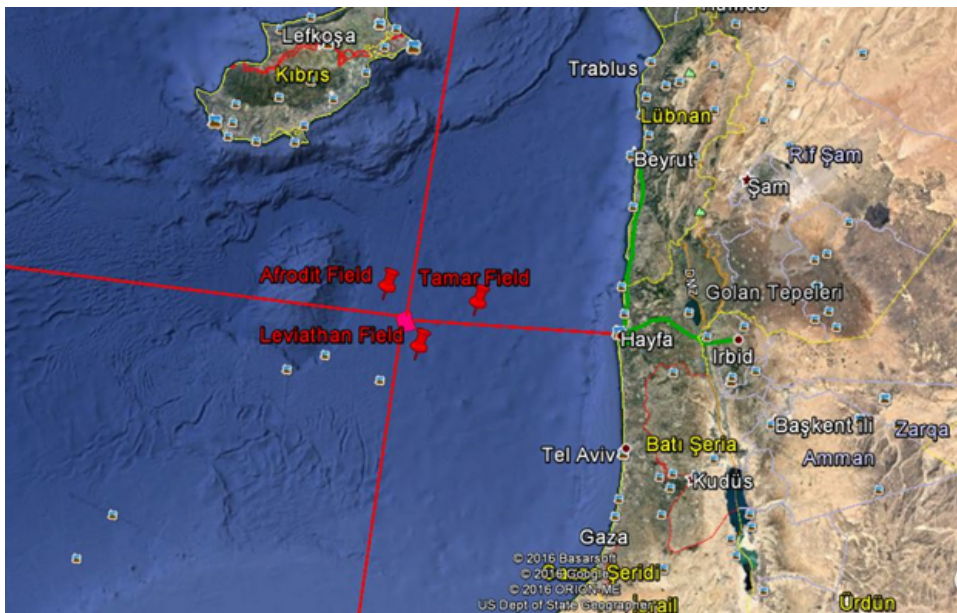
In the concept of each phase, export destination and the due markets will also be analyzed.

“Export potential graph proves that; Israel cannot be an important gas supplier for neither Turkey nor EU, by considering the export potentials and demand volumes.”

“There is no chance for Turkey to import gas from Israel before 2020.”



Map 2: Middle East (Source: Google maps).



Map 3: Possible offshore & onshore production plants and due export pipelines. (Note: Google Earth is used to prepare the map).

EXPORTING AS NATURAL GAS

Export as natural gas means; pipeline structures will be used for transportation but to which destinations?

Notes & Some Assumptions:

- For this scenario, hence, transportation is going to be done by the pipelines and such investments are more feasible with higher volumes and longer term contracts. That's why, in addition to Israel's 5 bcma downside gas potential after 2020, Aphrodite field's possible production is also assumed to fill the free volume of the pipeline. And the pipeline is assumed to have 10 bcma capacity. Although for some specific periods Israel fields and Aphrodite may have more production capacity but hence, those volumes will not be sustainable for minimum 20 years, for economic considerations 10 bcma capacity will be the best solution.
- In the below scenarios, possible risks as resource potential, market, infrastructures, commercial and political issues

will be evaluated.

- For the commercial evaluations, costs – tariffs – market prices are estimated as oil prices are assumed to be around 70 \$/bbl levels and according to this price level, (although will change according to the balances in the region) generally, gas prices are estimated to be 350 \$/1000 m³ and LNG prices to be 500 \$/1000 m³.
- Average unit production cost is assumed as 120 \$/bbl for Leviathan field in 2020 with the 70 \$/bbl oil prices (by considering the water depth), and the same with Leviathan for Aphrodite and other closer fields also.
- For cost estimations of the pipelines, due offshore pipeline cost with the due oil prices are benchmarked.
- For tariff calculations, pipeline project is assumed to have an IRR equal to 10.

FIRST SCENARIO:

By constructing an offshore floating production facility near the Leviathan Field, where Aphrodite, Tamar and other near fields will

“First scenario: By constructing an offshore floating production facility near the Leviathan Field, where Aphrodite, Tamar and other near fields will have chance to be linked, exporting the gas to Turkey, Egypt and Greece will be studied.”



have chance to be linked, exporting the gas to Turkey, Egypt and Greece will be studied.

EGYPT

Distance to Destination	250 km
Volume	10 bcma
Pipeline Diameter	28"
Estimated Cost	4,1 billion \$
Estimated Tariff	65 \$/1000 m ³
Resource Risks	To decrease the economic risks, capacity of the pipeline is selected as 10 bcma. However, without Aphrodite, Israel cannot fulfill such a pipeline capacity from 2020 to 2040. So, by considering the risk of Aphrodite not to be developed and taken into production in 2020's there seems a low risk in this scenario.
Market Risks	Hence, transporting the gas to Egypt LNG ports means there is going to be a chance to liquefy and then export the gas, there is no market risks.
Political Risks	Although there are some political disputes with Egypt, those may not affect the commercial projects with the current government.
Commercial Risks	Transportation of the gas up to the Egypt's ports does not have any commercial risks however, after adding the liquefaction and storage costs, the total LNG price of Israel gas in the Egypt's ports will naturally have the risk of price competition with other suppliers. By the way gas price @ Egypt LNG Facility = 120 + 65 = 185 \$/1000 m ³ . By adding an average 120 \$/1000 m ³ liquefaction and storage costs (by assuming to use existing facility's capacity) then the price will be 305 \$/1000 m ³ . For the estimated LNG prices in 2020, again the scenario can be commercially feasible.
Results	In addition to the small risks, this option has a chance to be successfully applied.

TURKEY

Distance to Destination	400 km
Volume	10 bcma
Pipeline Diameter	28"
Estimated Cost	6,5 billion \$
Estimated Tariff	95 \$/1000 m ³
Resource Risks	To decrease the economic risks, capacity of the pipeline is selected as 10 bcma. However, without Aphrodite, Israel cannot fulfill such a pipeline capacity from 2020 to 2040. So, by considering the risk of Aphrodite not to be developed and taken into production in 2020s, there seems to be a low risk in this scenario.
Market Risks	There is no market risks in Turkey. In 2020s, Turkish gas demand is expected to be around 60 bcma. In addition, if the commercial environment and the capacity of TANAP will be suitable there may be a chance to transport Israel gas to EU (Source: Turkiye Gas Denklemi 2050, O. Akyener, TESPAM).
Political Risks	The main obstacle in this scenario is the political issues. Hence, for such a pipeline to be constructed Lebanon, Syria, both governments of Cyprus and Turkey have to officially agree on. The dispute with Lebanon over maritime boundaries and the war in Syria are ongoing. From the sight of Turkey, although some conflicts have solved and the relations turn into a normal level with Israel, Cyprus will still hold its position on being another subject that seems not easy to solve because, Turkey cannot leave the Northern Cyprus Turkish Republic Government to the bloody hands of Southern Cyprus and Europe all alone. That's why, without the solution of Cyprus and Lebanon conflicts and having a stable Syria, politically, construction of such pipeline does not seem to be applicable. In addition no one will aim to solve these issues only for 10 bcma gas capacity. Some other reliable reasons have to encourage all the parties to work on the solutions.



Commercial Risks	From the commercial sight, by assuming gas price in Turkish market is around 350 \$/1000 m ³ and in such condition, net back unit price is 350 – 120 (unit production cost) – 95 = 135 \$/1000 m ³ ; project commercially is feasible.
Results	From the resource, technical, commercial and market sights, project has low or no risks. However, multinational political issues are mainly the obstacles. By the way, as being claimed in the international affairs terminology: There is always an open gate to solve the political disputes.

Directly transporting the gas to the onshore and by constructing an onshore facility in Hayfa, exporting gas to Jordan and Lebanon. However, in this scenario, the main obstacle is the market. Hence the estimated market capacity in Jordan is 1 bcma in 2020 and 0,7 bcma in Lebanon. So, there is no market to sale the gas with this option even if this scenario is studied to enrich the concept. In addition, for its own consumption and for the upside volumes, shown as the orange line in the Graph 3, gas sales to Jordan and Lebanon can be the most economic options for Israel.

“Second Scenario: Directly transporting the gas to the onshore and by constructing an onshore facility in Hayfa, exporting gas to Jordan and Lebanon.”

GREECE

Distance to Destination	1000 km
Volume	10 bcma
Pipeline Diameter	28”
Estimated Cost	16,5 billion \$
Estimated Tariff	210 \$/1000 m ³
Resource Risks	To decrease the economic risks, capacity of the pipeline is selected as 10 bcma. However, without Aphrodite, Israel cannot fulfill such a pipeline capacity from 2020 to 2040. So, by considering the risk of Aphrodite not to be developed and taken into production in 2020’s there seems a low risk in this scenario.
Market Risks	By only considering Greece, there are market risks while considering the gas demand volume.
Political Risks	There are no political risks if the route of the due pipeline does not go through the maritime boundaries of Turkey.
Commercial Risks	Total gas price @Greece = 120 + 210 = 330 \$/1000 m ³ . However, by considering the transportation cost inside the due EU markets, project will not be economically feasible.
Results	Due to economic obstacles, there is no chance this project to be realized.

As defined in this scenario, Israel is going to transport all its offshore gas production to the onshore facility in Haifa. No gas from Aphrodite is accepted into the system. After Haifa, gas can be sold to West Bank, Gaza, Jordan and Lebanon. However, all the demand volumes of these regions are estimated to be lower than 3 bcma. So, there is an important market obstacle. Then the remaining volume may be transported to Egypt’s LNG facilities for export, by using (after some maintenance works) the existing old pipeline network (El Arish to Ashkelon Pipeline and additional pipeline system in Egypt).

Distance to Destination	150 km to Haifa (offshore) + 35 km to Lebanon border (onshore) + 70 km to Jordan Border (onshore)
Volume	8 bcm up to Haifa + 1 bcma to Lebanon + 1 bcma to Jordan
Pipeline Diameter	22” to Haifa + 12” to Lebanon and Jordan
Estimated Cost	2,5 billion \$ to Haifa + 200 million \$ to Lebanon + 350 million \$ to Jordan
Estimated Tariff	35 \$/1000 m ³ to Haifa + 8 \$/1000 m ³ to Lebanon + 16 \$/1000 m ³ to Jordan
Resource Risks	No risks in resources. Hence, only Leviathan is going to be developed.

SECOND SCENARIO:



Market Risks	If there is no chance to transport the remaining volume of gas to Egypt's LNG facilities for LNG export, after the Jordan-Lebanon-West Bank sales, there is a high market risk in this option.
Political Risks	Hence, the sales are related with the countries which have political disputes with Israel, such project politically has medium level risks.
Commercial Risks	From the commercial sights, cumulative gas price @Haifa = 155 \$/1000 m ³ , @Jordan Border = 171 \$/1000 m ³ , @Lebanon Border = 163 \$/1000 m ³ , @ Egypt LNG Facilities (for 5 bcma volume, before liquefied and by using the existing pipeline structure with an average length of 400 km) = 195 \$/1000 m ³ . So, all cases are commercially feasible.
Results	This option is very complex and risky by considering the market and political issues.

RESULTS OF THE THREE GAS PHASE SCENARIOS

As a result, the main milestones are political issues, commerciality and the market demand. After eliminating the first scenario's Greece option, which has no chance to be applied,

- According to political issues: First Scenario, Egypt option is the best.
- According to commercial issues: Third Scenario and the First Scenario Turkey options are the best.
- According to overall results: First scenario, Turkey option seems as the best applicable and commercial selection. However, there are huge political obstacles and milestones on the way.

EXPORTING AS LNG

Export as LNG means; by constructing a floating LNG facility in the same location (linked with the offshore production facility) marked with pink color in map3 between the Leviathan – Aphrodite and Tamar Fields, and then exporting produced LNG to the world markets. In addition, with a smaller capacity floating LNG facility, Israel also has a chance to export its gas without bearing of the Aphrodite field. However, in this scenario, 10 bcma capacity is studied. Hence, while capacity doubles, the unit costs decrease.

Volume	10 bcma
Estimated Cost	11 billion \$
Estimated Unit Transportation Cost	This cost consists of liquefaction & storage (180 \$/1000 m ³) + transportation & insurance (60 \$/1000 m ³) + regasification (80 \$/1000 m ³) costs. And as total = 320 \$/1000 m ³ (for Turkey markets). For other markets transportation costs will differ.

THIRD SCENARIO (COMBINED SALES):

“Third Scenario (Combined Sales)

In this scenario, Turkey option of the first scenario and the second scenario will be combined.”

In this scenario, Turkey option of the first scenario and the second scenario will be combined. So, only downside level of the export potential of Israeli gas, which is 5 bcma under the orange line in Graph 3, and Aphrodite gas will be transported to Turkey between the years 2020 – 2040. And the remaining portion of Israeli gas is going to be exported to Jordan – Lebanon – West Bank and Gaza as described in Second Scenario.

By this scenario, although being more complex and politically difficult, better commercial savings and higher influence of Israel in the region is expected or gained.



Resource Risks	Low risks due to the wait for Aphrodite field development. However, by decreasing the capacity to the Leviathan limits, this risk can easily be handled.
Market Risks	No market capacity risks. All EU and Turkey are possible markets to reach.
Political Risks	No political risks.
Commercial Risks	<p>Huge investment needed. Furthermore, by considering the total gas cost for the nearest market Turkey; $120 + 320 = 440$ \$/1000 m³ is an acceptable LNG price by considering the assumed 2020 conditions.</p> <p>By comparing with the LNG sales in Egyptian port, LNG cost at such facility is $120 + 180 = 300$ \$/1000 m³, seems a little more economic option.</p> <p>Note that: Hence, it was assumed that in Egypt option, existing capacities of the due facilities are going to be used, liquefaction and storage costs of Egyptian port assumed lower than this scenario.</p> <p>From another point, hence, being floating and moveable, such facility can be sold to another producer and can be used for future projects.</p>
Results	Hence, has lower political and commercial risks, seems conceivable. However, while thinking the extra huge costs, seems unpreferable.

shore gas plants for electricity generation.

- After electricity is generated, by constructing electricity export lines to due customers and making sales.
- These customers may be its neighbors, other Middle East countries and Greece.

In this scenario:

- By giving a general approach “to generate 1 kwh in an average power plant, 0,01011 mcf gas is needed” (Source: <https://www.eia.gov/tools/faqs/faq.cfm?id=667&t=3>).
- While generating electricity from the stable downside potential of Israeli export volume, which is 5 bcma (not dealing with Aphrodite); then there is an average capacity of producing 17,5 billion kwh (after assuming the due demanded power plants are constructed).
- Then the targeted markets’ electricity imports are (Source: CIA Factbook):
 - West Bank = 4,9 billion kwh
 - Jordan = 381 million kwh
 - Lebanon = 323 million kwh
 - Syria = 1,2 billion kwh
 - Iraq = 8,2 billion kwh
 - Greece = 4,7 billion kwh
- However, these values belong to 2013 estimations. So, the situations, production capacities, and demand volumes may differ from current estimations. Nevertheless, by excluding the political issues, there may be nearly enough market capacity by considering 17,5 billion kwh export capacity and all above markets accept to make all their imports from Israel. However, this idea seems unrealistic.
- That’s why, supplying some of the generated electricity to West Bank and selling the other portion with an electrical line to EU markets may be a more suitable selection, by considering the market ob-

“Directly transporting the gas to due onshore gas plants for electricity generation by constructing electricity export lines to due customers and making sales.”

EXPORTING AS ELECTRICITY

Export as electricity means;

- Directly transporting the gas to due on-



“A huge investment is needed for gridding such an electricity line project. By considering the 2020 conditions, around 4,4 billion \$ cost is estimated to be paid only for the underwater cable project, which is around 1150 km.”

“There are some interesting theories regarding Israel becoming a gas and electricity supplier and an energy hub in the region, after achieving its plans on generating a Kurdish corridor starting from Western Iran, adding Northern Iraq and including Northern Syria.”

stacles in the neighboring areas.

- However, again a huge investment is needed for gridding such an electricity line project. By considering the 2020 conditions, around 4,4 billion \$ cost is estimated to be paid only for the underwater cable project, which is around 1150 km. This huge cost does not include the construction of due power plants needed to generate the electricity. After adding those items, the cost will be higher. Moreover, the increasing costs will augment the unit costs of the exported electricity prices. So, what this means for Israel as being an electricity supplier, with a higher unit cost she will have less advantage in price competition within the EU market.
- As a result, this scenario is also very complex and many related different items, such as the effect of gas power plant construction on the unit prices, unit tariffs of the underwater cable (by assuming such an investment to be unprofitable), other transportation – tax – extra costs in the EU markets and the unit sale prices in the targeted markets in EU have to be studied.

RESULTS FOR EXPORTS

As a result after eliminating the weak market demand or commercially impossible scenarios,

- From the economical sight: Exporting in gas phase and export to Turkey option is the best.
- From the political sight: LNG export is the best.
- From the complexity sight: LNG export is the best.

So, decision makers are going to follow the political tendencies. If the due disputes with Turkey can be solved, then gas export via pipeline to Turkey will be the best selection. If not, LNG seems easier and less complex

selection, although it is very expensive.

Electricity import, in addition to have lots of investment, is very complex to be able to manage.

SOME ANALYSIS

In this part, after defining the export potential of Israel and evaluating the possible export scenarios, some popular claims and questions related with these topics are tried to be analyzed.

KURDISH CORRIDOR AND ISRAEL AS A GAS & ELECTRICITY SUPPLIER?

There are some interesting theories regarding Israel becoming a gas and electricity supplier and an energy hub in the region, after achieving its plans on generating a Kurdish corridor starting from Western Iran, adding Northern Iraq and including Northern Syria.

Those theories might be used for psychological manipulations on illiterate societies. However, such claims are inconsistent and can only be considered as a conspiracy theory under current circumstances.

Hence;

- Israel does not have so much export potential and huge reserves, by comparing with the other suppliers' potentials.
- There is no so much demand in the due region.
- In the concept of such a Kurdish corridor, Israel's boundaries are not the best location for the oil and gas exports for Iraq and Iran resources.
- In addition, while there are existing and cheaper transportation systems, none of the operators would make extra investment to follow another political route.



- Neither Turkey nor Iran – Iraq and Syria will not allow generation of Kurdish corridor.
- Even though ethnicity in the region has been tried to be changed by use of terrorist forces as Daesh and KDP, such corridor is never possible.

As a result, Israel may supply gas and electricity within the region. However, this will not have a huge potential.

TURKEY'S POSITION IN EXPORT BALANCES

As can be understood from the sections above, Turkey has no vital but an important role for Israeli and possible Southern Cypriot gas exports. By considering:

- More profitable net back prices from the sight of seller.
- Huge Turkish gas demand market.
- Turkey being a good customer, a stable and an honest country.
- Except the political sight, this scenario to have less complexity and low investments.

Turkish option seems to be the best selection. In addition to these properties, via TANAP or extension of TANAP, there is always a chance to transport the Israeli gas to EU.

CYPRUS POLITICS

Although asserted that, solution of the disputes on Cyprus is necessarily an important milestone for the Turkish gas export scenario to be achieved, perhaps some back doors may be opened before trying to elaborate on difficult solutions.

For example:

- With the initial agreement of Turkey and

Israel, both Southern and Northern Cyprus Governments may not claim an approval of the pipeline laid through their officially disputed and proposed exclusive economic zones (EEZ).

- Hence, Turkey will not be positive about Aphrodite gas field being developed and produced gas being transported to Turkey, but Turkey can be inserted as a partner to the project. By this way, Turkey will be in a position for transporting and selling its own gas.

In addition to the sight of Turkey:

- It is clear that Israel's export potential is not too high and very important for Turkey.
- Turkey is aware of its advantage over Israel in any negotiations related with these topics.
- Opening a gate for Israel to export its gas means opening the gate also for Southern Cyprus.
- Cyprus for Turkey cannot be evaluated with any price and its rightful due disputes will not be relinquished for any project.
- From another point, Israel is not a stable country by evaluating its decisions, which provides investors with an unreliable environment. Israel, as easily changing items of the existing international exploration agreements signed with other countries, can be analyzed as an example of this situation. This fact also is the same for its international affairs. That's why both Turkey and other partners may act more gingerly about the joint projects with Israel.
- One another point: Israel is the only chance for Southern Cyprus to develop its discovered fields.

“Turkey has no vital but an important role for Israeli and possible Southern Cypriot gas exports.”

“Opening a gate for Israel to export its gas means opening the gate also for Southern Cyprus.”

POSSIBILITY OF EU SALES

The most important issue for Israeli gas to



“The most important issue for Israeli gas to be sold to EU via Turkey is economics.”

“As a result from the current view, it seems possible to export Israeli gas through Turkey to EU.”

be sold to EU via Turkey is economics. And economics can be checked with very small estimations.

- As identified above, the total cost of Israeli gas in the Turkish border is estimated as being 215 \$/1000 m³.
- After this point, by assuming that 5 bcma of 10 bcma Israel + Aphrodite gas is sold in Turkish domestic market, then the half portion of 5 bcma is assumed to be transported to the western Turkish border for sale to EU markets via:
 - Existing free capacity in TANAP: This option seems not possible due to Azerbaijan's national strategies and the current agreement items. Nonetheless, if assuming there is a free capacity due to unexpected situations and some amendments made to use that free capacity to transport 3rd party volumes in the existing agreement, then estimated transportation cost is estimated as (including the possible costs to reach the TANAP): 120 \$/1000 m³.
 - A new standalone pipeline is constructed to transport Israeli gas: After such an investment, with 32" diameter and 1000 km length with 5 bcma capacity, cost of such pipeline will be 6 billion \$ and the tariff is 65 \$/1000 m³.
 - Turkish gas distribution system is upgraded: In such a case, the tariff to pay the BOTAS is estimated as 30 \$/1000 m³ (without making investment in the upgrade operations).
 - So, third option is the best choice for such export volume according to economics.
- Then the total costs in Turkish western border with the 3rd option will be 245 \$/1000 m³. Gas from that point easily can be sold to Greece, Macedonia or Bulgaria. In addition, with other new projects can be transported to Baumgarten market with an additional cost of 60 \$/1000 m³. This means the total cost at

Baumgarten is 305 \$/1000 m³. Which is feasible in assumed conditions.

- Moreover, for such export projects, Russian gas supply politics, Turkish Stream, EU's gas pricing policies & pricing tendencies and the markets' demand expectations have to be studied.

As a result from the current view, it seems possible to export Israeli gas through Turkey to EU.

CONCLUSION

Israel is one of the most important and influential countries in the Middle East. In addition, after the offshore gas discoveries in its maritime boundaries, she has asserted to be the shining energy hub and important energy supplier in the region.

However, was this assertions really coherent? What was the export capacity of Israel? Yes, some mid-level huge gas fields have been discovered, however is there a suitable environment to develop those fields and export the gas? Initially, these questions have to be answered.

While reviewing the literatures, there are many studies related to the export options of Israeli gas. However, there is not enough studies on how much export potential Israel has.

That's why in this study, after evaluating the production and reserve properties of the Israel fields, its export potential up to 2050 is tried to be estimated.

According to this export potential, several export scenarios are studied. According to the results of the studies, Turkish route is selected as the best option.

However, hence this route to have may political disputes, some other items such as Cyprus were adverted.



In addition, the possibility of exporting Israel gas to EU is also studied.

As a result, export and reserves potential of Israel is not so high while compared with that of the other important suppliers' in the region. Additionally, for better commercial solutions in their projects, both Israel and Southern Cyprus need Turkey to succeed their goals.

That's why Turkey has to keep these facts in mind during any negotiations with Israel & Southern Cyprus.

“Export and reserves potential of Israel is not so high while compared with that of the other important suppliers' in the region. Additionally, for better commercial solutions in their projects, both Israel and Southern Cyprus need Turkey to succeed their goals.”



CONTRADICTIONAL POLITICS OF KRG & NEW ASSUMED ENERGY CORRIDOR THROUGH IRAN

by Oğuzhan Akyener

الله أكبر

“Turkey has tried to improve social, cultural and economic relations with the regional government of Northern Iraq (KRG), sometimes by having the risk of disrupting the relations with the Central Iraqi Government (CIG).”

“Turkey let KRG to export around 500 mb/d oil from Turkish Ceyhan port, which is the vital step for KRG’s presence.”

INTRODUCTION

In addition to its estimated 40 billion bbl oil and 8 tcm gas reserves (according to OPEC reports), Northern Iraq is one of the most strategic areas for Turkey by considering the historical, ethnical, commercial, security and other political issues. Due to this importance, in the last decade, Turkey has tried to improve social, cultural and economic relations with the regional government of Northern Iraq (KRG), sometimes by having the risk of disrupting the relations with the Central Iraqi Government (CIG). As a result of this strategy, Turkey let KRG to export around 500 mb/d oil from Turkish Ceyhan port, which is the vital step for KRG’s presence.

However, the region, being also strategic for other actors, increases the complexity of the relations. That’s why KRG’s ruling party KDP has been slogging on taking the steady and stable political steps and having contra-

dictory discourses and decisions between her relations with Turkey – Iran – Central Iraq Government (CIG) and USA.

In this article, after giving brief information about the geostrategic position of Northern Iraq (to be able understand why and for whom the region is important), key local and international actors having influence in the region will be tried to be identified. After having basically clarified the key actors’ main expectations in the region, some political contradictions of KRG in her relations with those key actors will be analyzed. Moreover, Northern Iraq to Iran oil pipeline (which is assumed as the new energy corridor through Iran) as one of the actual contradictions will be evaluated.

GEOSTRATEGIC POSITION OF NORTHERN IRAQ

To understand why Northern Iraq is impor-



Map 1: Kurdish areas of Northern Iraq. (Source: <http://www.lib.utexas.edu/maps/iraq.html>).



tant for her neighbors and other key actors in the region, geostrategic position will shortly have to be analyzed. In the concept of geostrategic position; geographical, ethnical, religion, energy and political sights with the following items will be analyzed over the maps given below.

FROM THE GEOGRAPHICAL SIGHT

- As can be observed from Map 1; Northern Iraq is located in the middle triangle of Turkey, Iran and Iraq.
- Iran does not need Northern Iraq as a link to the other neighbors, however from the sight of Turkey and Iraq, the bridge can only be connected through the boundaries of Northern Iraq.
- That's why, Northern Iraq is more important for Turkey, and Central Iraq's relationship by considering the Iran's.

FROM THE ETHNICAL SIGHT

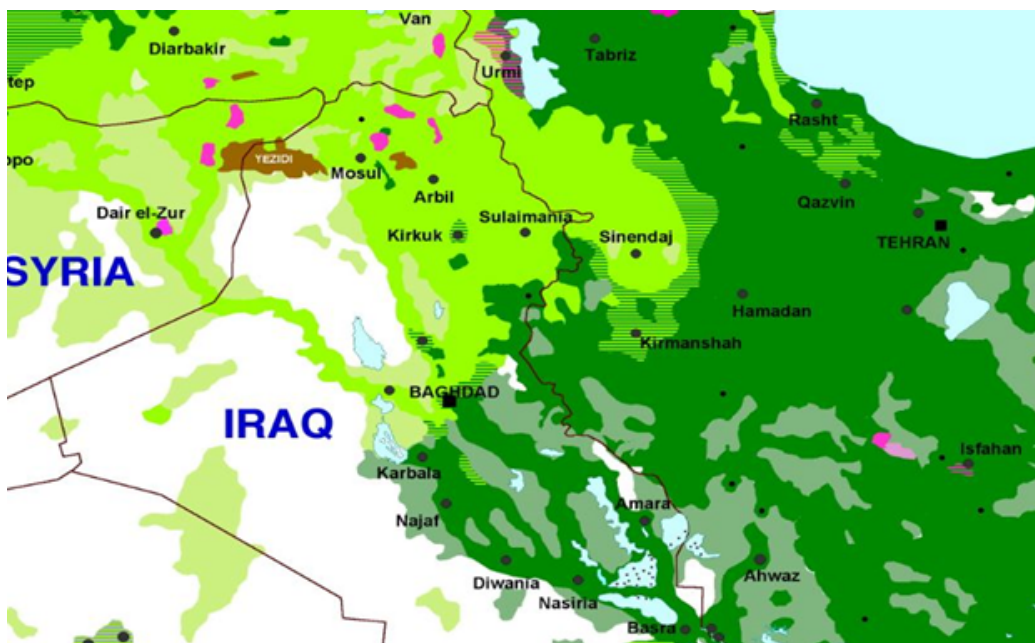
- Ethnicity is one of the most strategic

item for the region. Hence, as can be observed from the Map 3; both Turkey and Iran have Kurdish population linked to the Kurds in Northern Iraq.

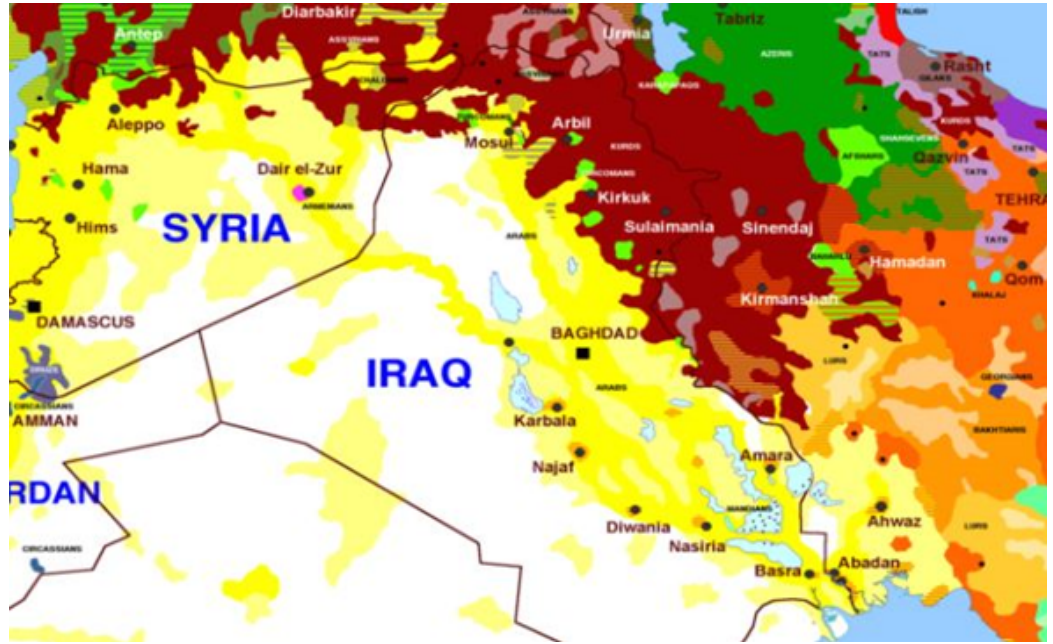
- This means that there is always a risk for Iran and Turkey to lose their populations as a result of Kurdish nationalism as if an independent Kurdish government founded in Northern Iraq. So, both Turkey and Iran (naturally Central Iraq Government) will never agree on allowing such attempts.
- There are also some Turkish (green color on the map) and Arabic (yellow color on the map) societies in the region. Those have lost their influences and populous after the USA's ethical engineering design studies in the region.
- In addition to above neighbors, there is also a Kurdish population in Northern Syria. The war continuing has changed all the balances in favor of the Kurdish society. Because, the USA's support for Kurds in the region against the Daesh attacks, make Kurds to extend their acting boundaries. Which can be an expressed

“Ethnicity is one of the most strategic item for the region. Hence, both Turkey and Iran have Kurdish population linked to the Kurds in Northern Iraq.”

“Kurdish nationalism as if an independent Kurdish government founded in Northern Iraq, both Turkey and Iran (naturally Central Iraq Government) will never agree on allowing such attempts.”



Map 2: Religion Distribution of the Region. Dark green refers to Shia, light green to Sunni and pink to Christian societies. (Source: <https://thegulfblog.com/tag/sunni-shia-middle-east-map/>).



Map 3: Ethnicity Map of Iraq. (Note: Yellow means Arabs, whereas dark red shows Kurds). (Source: <http://www.islamianaliz.com/ortadogu/>).

“Iran has a strong influence on the Shia societies and as a result on the CIG because it constitutes of Shia majority.”

“Energy is main answer to the question: “Why USA is in the region?” Hence the region has as estimated 40 billion bbl oil and 8 tcm gas reserves (according to OPEC reports).”

action taken in the content of the “Kurdish Corridor to the Mediterranean” idea (to which Turkey is strictly against).

FROM THE RELIGION SIGHT

- Religion is another key element having to be studied in the region. Hence, Iran has a strong influence on the Shia societies and as a result on the CIG because it constitutes of Shia majority.
- As it can be understood from the map, nearly all the Kurdish society in Northern Iraq, Turkey and Iran are Sunni. However, Turkey does not have such influence on the Sunni society in Northern Iraq, as Iran has on Shias in CIG.
- Conversely, Turkish population in Northern Iraq are Shias. However, they are affiliated more to Turkey despite the Shia Iran’s influencing attempts.
- As can be analyzed from the above explanations, ethnicity is more effective element in the region by comparing to that of the religion.

FROM THE ENERGY SIGHT

- Energy is main answer to the question: “Why USA is in the region?” Hence the region has as estimated 40 billion bbl oil and 8 tcm gas reserves (according to OPEC reports). And it has better potential to produce more in the future.
- In addition, the energy flow in the region has also direct effects on Turkey, CIG and Iran.
- Hence the USA’s gap in the region will naturally be filled with other players, which is why it is a necessity for USA to continue to push her limits to control Northern Iraq to be able to survive in the region.
- Oil exports from Ceyhan port of Turkey is the only revenue item for KRG to survive, which gives them a good opportunity to only deal with Turkey comparing to how many countries/actors it has to obey if it tried to use other export routes.
- Current daily production is around 570 mbbbl and this value is planned to be increased up to 1 mmbbl/d levels in 2020’s. However, with the current oil prices and the political and security risks in the region, this plan seems unachievable. For



gas, the expectations are to reach 15 bcma levels in 2020's, which also seems difficult to accomplish.

- Energy is the main economy driving item in KRG, current low oil prices caused the unrest in the country and directly affected the political balances.

FROM THE POLITICAL SIGHT

- In KRG, there are 3 main political parties, which are KDP, PUK and Gorran Movement (GM).
- KDP currently holds the management of KRG. KDP's main supporters are Turkey, USA and Israel.
- PUK and GM has assigned an agreement to make a collaboration in May 2016. And both parties are mainly supported by Iran.
- The influence of PUK and GM is increasing in KRG and this situates an unpredictable environment in the region.
- CIG has many uncompromised problems with KRG and tries to connect KRG to the CIG as oppose to becoming an independent country.
- Turkey and Iran are trying to follow careful steps in their political relations with KRG. Both do not want KRG to be independent (as CIG) and both are trying to be active in the region. On the other hand each of them are trying to prevent the other from getting the full control of KRG. Moreover, both are trying to balance their relations with CIG due to their policies on KRG.
- In addition, terrorist organizations such as PKK and PJAK have their main bases in the region. This issue alerts both Turkey and Iran to actively ensure their politics for security.

KEY ACTORS IN KRG

After giving brief information about the geostrategic properties of Northern Iraq, some

key items giving clues about the key actors in the region will be described below.

DOMESTIC ACTORS

Domestic actors in Northern Iraq can be accepted as the main political parties in KRG, which are Kurdistan Democratic Party (KDP), Patriotic Union of Kurdistan (PUK) and Gorran Movement (GM). In addition to these 3 parties, there are also 3 Islamic parties which are not effective due to being separated from each other. Moreover, the Turks in Northern Iraq is represented by 5, Christians by 5 and Armenians by 1 members in the Parliament. The key properties of 3 main parties will be tried to be described below.

KDP:

- The ruling party in KRG. (With president Barzani).
- Ascendant in the Erbil, Dohuk and Sulaymaniyah Cities of Northern Iraq.
- Has apparent support of Turkey and USA.
- Has good relations with the official Kurdish Political Party in Iran.

PUK:

- Second effective party in KRG. (With president Talabani).
- Ascendant in the Sulaymaniyah.
- Currently with some ministries, is a part of the cabinet.
- On May 2017 had a cooperation agreement with Gorran Movement against KDP and the presidency of Barzani.
- Has apparent support of Iran & UK.
- Has good relations with PKK.

GORRAN MOVEMENT:

"KDP currently holds the management of KRG. KDP's main supporters are Turkey, USA and Israel."

"PUK and GM has assigned an agreement to make a collaboration in May 2016. And both parties are mainly supported by Iran."

"KDP is the ruling party in KRG. (With president Barzani)."

"PUK is the second effective party in KRG. (With president Talabani)."



“TURKEY is against an independent Kurdistan, has good relationships with KRG and mostly with current ruling party KDP.”

“KRG’s oil to be exported via Ceyhan port has annual trade capacity of around 9 billion \$.”

“IRAN is strictly against an independent Kurdistan, has good relationships with PUK and Gorran Movement.”

“Iran has good relationships with and influence on the CIG, has annual trade capacity of around 6 billion \$ with CIG.”

- Founded by a group divorcing from PUK. (with president Novşirvan Mustafa)
- Initially claimed to be in the side of the civil populace and stop all the malpractices.
- Then made a cooperation with KDP and became a part of the cabinet.
- Due to conflicts with KDP and losing the voters support, left her floor to PUK.
- On May 2017 had a cooperation agreement with PUK against KDP and the presidency of Barzani.
- Has apparent support of Iran & UK.
- Has good relations with PKK.
- Permission for KRG’s oil to be exported via Ceyhan port, which means the permission for KRG to stand on her own legs. In addition, this means an open gate for the future possibilities of independent Kurdistan, and also a safe gate for possible clashes the central Iraqi government. However, Turkey seems to keep the upper hand as:
 - This oil trade continues pumping the heart of the KRG to the independency but the pump is in her hands.
 - If Turkey stops the trade, Iran is ready to fill the gap.
 - Officially, as a CIG dependent regional government, KRG has to be supported to survive since Turkey does not have direct influence in CIG.
 - In good relations with KRG, Turkey can make cooperation in:
 - Anti-terrorism activities (against PKK).
 - More trade and commercial activities (there are lots of Turkish service and construction companies working in Northern Iraq).
 - Increase effective boundaries in the region.
 - Find a better chance to support the Turkmen society in the region.

INTERNATIONAL ACTORS (LONG TERM PROJECTS)

After shortly describing the local actors in the game, in this part, main items for the international key actors and their national security policies regarding the region will be identified in general.

CENTRAL IRAQ:

- Strictly against an independent Kurdistan.
- Good relationships with Iran and high Shia influence in the government authorities.
- Existing conflicts with KRG about the share of oil revenues and KRG’s exports from Ceyhan.

TURKEY:

- Against an independent Kurdistan.
- Good relationships with KRG and mostly with current ruling party KDP.
- Annually has a trade capacity of around 9 billion \$.

IRAN:

- Strictly against an independent Kurdistan.
- Good relationships with PUK and Gorran Movement.
- Gives some declarations about warning KDP to support PJAK.
- Good relationships with and influence on the CIG.
- Annually has a trade capacity of around 6 billion \$ with.



- Unrest about the Turkish influence in the region.
- Trying to use Shia influence to be able to have more control in Iraq and the Middle East.
- Will be more effective in the region after the disposal of the sanctions.

ISRAEL:

- According to her national security policies; needs a divided, weak, conflicted and disordered Middle East (and naturally Iraq) in order to
 - Be able survive with her small population.
 - Be able to have to find higher market capacity for her arms production.
 - Not to be faced with an Arab or Muslim unity against Zionist policies.
- Encourages the ethnical, religion and political conflicts for her strategy in the region.

USA:

- Supports Israel's security policies.
- Officially supports the unity of Iraq but in reality, the perception of its politics is different. However, after the increasing Shia influence of Iran on CIG, it has changed to support the unity of Iraq not to let the whole Iraq to be under Shia management.
- After the Iraq invasion, left the CIG in the hands of (her enemy) Iran.
- Let Iran to extend her acting borders up to Syria – Iraq - Yemen – Bahrain and with a stronger Iran (Which also makes the experts think as US wants to encourage a Sunni – Shia war in the region).
- Seems supportive for both KDP and PUK.
- By supporting PYD in Syria and making

also KDP to support it, reveals the ongoing steps to set a Kurdish corridor in the Northern Syria.

POLITICAL CONTRADICTIONS & ANALYSIS

As can be understood from the chapters above, due to the strong key actors and policy makers, the balances are not easy to estimate in Northern Iraq. Her strong and influential neighbors: Turkey and Iran, her official authority: Central Iraq Government, Israel and USA's policies and the strengthening opponents of the ruling party puts KRG into a difficult and complex situation.

All political steps can easily be hindered by a key actor in the region. And this makes KDP to fall into unavoidable contradictions in her decisions and international relations.

In addition, with the new cooperation agreement between PUK and Gorran Movement, there is a higher risk for Barzani to secure his position and to keep his influence in the governmental structure. While adding the low oil prices, Daesh threat, increasing nationalism and the July 15 coup - terrorism in Turkey places KDP in a worsening situation.

This unpleasant worsening situation and increasing contradictions can easily be observed in the declarations of the KRG's officials. For example, 18 days after the terrorist coup in Turkey, Education Ministry of KRG stated that she will not close the FETO (Fetullahist Terrorist Group) schools. However, 5 days after that statement, again, declared that she will capture all FETO schools before the Turkey's official request. This sample case also gives lots of clues about the situation of KDP, KRG and the region.

In addition, Northern Iraq to Iran oil pipeline project, which is expressed as the "Eastern Kurdish Corridor" is another unsolved and contradictory issue that has to be exam-

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"USA reveals the ongoing steps to set a Kurdish corridor in the Northern Syria by supporting PYD in Syria and making also KDP to support it."

"All political steps can easily be hindered by a key actor in the region. And this makes KDP to fall into unavoidable contradictions in her decisions and international relations."



“Iran and KRG have agreed on basics to construct an oil export pipeline with a capacity of 250 mbld from Koysinjag to Kermanshah City of Iran; however, up to date, an agreement except the technical parameters of the pipeline could not be achieved.”

“IRAN is strictly against an independent Kurdistan, has good relationships with PUK and Gorran Movement.”

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ined. Hence, current situation shows that due to influence of Iran; PUK and Gorran Movement and naturally Iran directly supports the project. Due to her Turkish relations, KDP has a weaker support. CIG seems not being opposed to the project. USA and Israel's attitudes are not clear yet. So, being interested by nearly all the actors and potential to have long term effects on the regional policies, the project has to be technically and commercially analyzed as an addition to the politics.

NEW KURDISH ENERGY CORRIDOR: IRAN?

Assumed new Kurdish Energy Corridor through Iran, with another name Northern Iraq to Iran oil pipeline will be evaluated from the historical, technical, economical, market, resource and political sights below.

HISTORY

Iran and KRG have agreed on basics to construct an oil export pipeline with a capacity of 250 mbld from Koysinjag to Kermanshah City of Iran. The export volume will be transmitted through Iranian existing pipeline system or utilized in the northern refineries. The idea of such a project had been initiated in 2014, during the political crisis between KRG and CIG about the conflicts on utilization of the Ceyhan pipeline. In addition, there is also a continuing oil trade from KRG to Iranian refineries by trucks.

After 2014, some meetings are followed to agree on the political - technical and commercial aspects of the pipeline project; however, up to date, an agreement except the technical parameters of the pipeline could not be achieved. While checking the main reasons for constructing such a pipeline:

- From the sight of KRG:
 - PKK attacks to current Iraq – Ceyhan Pipeline and unpleasant loss in export

volumes (during these low oil prices).

- Disposal of the Iranian sanctions might relate to a more powerful Iran in the region. Politically and commercially this situation has to be rejoiced in.
- Importance of having an alternate root for sustainability of oil exports.
- Iranian influence and Iran's promises on:
 - The electricity supply to Sulaimania
 - More commercial activities
 - Financial support to KRG.
- PUK and Gorran Movement's affect.
- From the sight of Iran:
 - To increase her role on being a greater energy hub in the region.
 - To have more influence on the region.
 - To weaken the Turkish influence.

TECHNICALITIES

From the technical sight, most probable root (by considering the river crossings and the elevations) from Koysinjag to Kermanshah City of Iran is marked and shown on Map 4 below (by using google earth). As shown from the map and elevation graph, in Koysinjag and in around the 130th km of the pipeline (before the border) 2 pumping stations are demanded. For 250 mmbld capacity, 48” pipeline diameter is selected and around 10 river crossings are assumed to be encountered.

As shown from the elevation graph, after the 150th km of the pipeline, due to the mountains, construction problems are expected to be faced with. However, there is no technical limitation for such a project to be completed.



Map 4: Northern Iraq to Iran Pipeline.

ECONOMICS

According to the assumed technical properties above, such 292 km – 48” pipeline around 3,5 billion \$ capex is calculated after benchmarking the due projects in the region.

However, due to the current conditions, KRG does not have enough finance to construct such project. By generally assuming KRG is going to handle to costs up to the border, again minimum 1,7 billion \$ is a big investment for KRG (While she is suffering to pay her officers’ salaries).

Maybe Iran can handle all the costs and apply a tariff to KRG exports. However, this choice can also take some years to decide and prepare for Iran.

As a result, from the finance sight there seems a high risk for the pipeline project to be constructed.

RESOURCES

From the resources sight, currently Kirkuk to Ceyhan pipeline handles the export volumes of KRG. Only for unexpected situations such as the attacks and hot taps, the flow will be interrupted for some period and this will make KRG to need a spare transport capacity to reach a market. However, by calculating the economics of loosed sales volume capacity in those situations and comparing to the cost of a new pipeline to Iran, then being currently not having a necessity for such an investment will be observed.

However, in the midterm, if the investment environment will be better and oil prices go up to 80 \$/bbl levels again, export potential of KRG is expected to be around 1000 mbld and such an investment will be salvaged.

So, from the resource sight, current conditions marks such investment as unnecessary but it can be evaluated again in the future depending on the changes in economic conditions.

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POLITICS

“From the politics sight, Turkey’s position is unclear for such a pipeline project. Some agencies claim that CIG is not against, however, this does not mean she is supporting.”

From the politics sight, Turkey’s position is unclear for such a pipeline project. Some agencies claim that CIG is not against, however, this does not mean she is supporting.

Mainly Turkey’s and CIG’s positioning will determine the political risks of the project. Hence, from the sight of Iran, Islamic Republic does not want to make a conflict with CIG. And Turkey always has the power in her hands to cut the current oil export flow, which is the financing and survival issue for KRG.

That’s why, there is currently unsolved political risks for the future of the project.

MARKET

Hence the volume is not so high and it may be more economic for Iran to transport her existing production from the southern regions to the northern refineries, there will be no market obstacle.

RESULTS

As a result, by summarizing the analysis above;

- From the technical and market sights, there are no risks for the project. However, finance and politics will be the main milestones that cannot be achieved easily.
- Project will not be an easy going project. Steps taken seem to have more time to continue.
- PJAK and other terrorist activities in Iran will continue to break the ongoing relations with KDP and Iran and this will affect the project.
- Capacity of the pipeline seems as the spare route for KRG’s oil export. (Hence,

also current real capacity of the Kirkuk – Ceyhan Pipeline is around 600 mbbld, with the revising of the pump stations, this capacity can be increased up to 1200 mbbld). Not as the alternate to current export route, which may cause Turkey to take it as an attempt to find an alternative to Kirkuk - Ceyhan. But also there is no reason for Turkey to give a political permit for such project except getting some other gainings. Hence, Turkey already has shown his good face to KRG by shouldering all the risks even if it may disrupt her relations with CIG by allowing current export flow.

- CIG also seems as not negative to the project, would not politically support such project which will be another step for her dependent region to independency. However, by officially being a partner to the project, Iran’s insistence, having a free transportation capacity or other gainings may change her situation.
- In order to handle the economic risks and finance the project, Iran may wait for the nearest elections and take slow actions. With an ally of the ruling party in KRG, she may be able to make further effective plans and get more risks.

CONCLUSION

Northern Iraq is one of the most important regions for her neighbors and key players in the region. In addition to energy resources, ethnical and religious structures are also key elements for some security issues. That’s why, inside the region; the political parties and outside the region; key actors are willing to make all the efforts to struggle at each different and difficult situation.

Turkey, initially due to her historical background and her cognates in the region, ethnically has all the rights to influence in Northern Iraq than any other players. In addition, with her developing economy, geostrategic position and current balances show that as of

“In order to handle the economic risks and finance the project, Iran may wait for the nearest elections and take slow actions. With an ally of the ruling party in KRG, she may be able to make further effective plans and get more risks.”



today and also in the future, Turkey will be one of the rulers or main actors in the region.

From this sight of view, with the current risks on hand, Northern Iraq to Iran oil pipeline does not seem to be brought to life in the near term. However, if the variables such as the commercial and political obstacles, oil prices and investment environment change the equation, all might well be different.

As an additional item, as some experts suggest: "Construction of a gas pipeline from Northern Iraq to Iran" will not seem to be possible not only in the near term but also in the midterm. Hence, while there is a huge gas demand in Iraq and Northern Iraq markets, while there is an extreme lack of electricity generation in the region and the fastest solution is gas plants, while nearest market, Turkey may be a more economic option, none of the producers will be tending towards selling their gas to Iran.

As a result, it is neither easy to have politically stable actions in Northern Iraq nor to apply strategic projects (such as N. Iraq – Iran pipeline, which also cannot be accepted as a Kurdish energy corridor) with any assumptions that leaves Turkey to stay out of the equation.

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THE LEGAL STATUS OF THE CASPIAN SEA: IMPLICATIONS ON CASPIAN RESOURCES DEVELOPMENT AND TRANSPORT

by Sohbət Karbuz

“Caspian Sea’s location at the crossroads of Asia, Europe, and the Middle East has kept the region’s strategic importance to international geopolitics.”

“The legal headache of dividing up the sea continues to pose a serious obstacle to the development of several fields and blocked many projects including trans-Caspian oil and gas pipelines.”

INTRODUCTION

The Caspian Sea, the largest landlocked body of salty water in the world, is surrounded by five “Caspian States”: Russia in the north; Iran in the south; Azerbaijan in the west, and Kazakhstan and Turkmenistan in the east. Caspian Sea’s location at the crossroads of Asia, Europe, and the Middle East has kept the region’s strategic importance to international geopolitics.

Before the breakup of the Soviet Union in 1991, Soviet-Iran treaties governed the exploitation of the Caspian Sea, but since then a legislative black hole in governance and delimitation has been created. All littoral states agree that a multilateral treaty is the ideal way to resolve their dispute over the division of the sea bottom and the delimitation of surface waters.

For more than two decades, the Caspian littoral states have been working on resolving the Caspian problem in numerous meetings at various levels including the summit conferences of the heads of states and governments. However, despite over 40 ad hoc working group meetings at the level of deputy foreign ministers and four Summits¹ of Caspian Sea Heads of State, they have been unable to find a solution that would satisfy all.²

There are great difficulties in resolving this issue since even international laws fail to provide an adequate framework. All the treaties in the past relate to navigation and, to a lesser extent, fishing rights, but not to seabed

mining. Navigation and fishing rights should not be confused with the right of using the mineral resources. With mineral resources, the seabed is taken to consideration and not the water layer. Failed consensus due to diverse motives and interests paved the way for unilateral actions, bilateral and trilateral agreements,³ and consequent disputes.

The legal headache of dividing up the sea continues to pose a serious obstacle to the development of several fields and blocked many projects including trans-Caspian oil and gas pipelines. After all, how the Caspian seabed is divided among the littoral states will determine which hydrocarbon fields will fall into whose sector.

DIFFICULTIES INHERENT IN ESTABLISHING A LEGAL FRAMEWORK

Any investigation about the legal framework of the Caspian Sea should make distinction between legal status and legal regime. While the legal status, whether a particular body of water is a lake or a sea, relates to the sovereignty, the legal regime relates to using rights and obligations. In the absence of a definitive determination of such regime the Caspian Sea legal status will continue to be discussed with no end.

Can the disputes over the legal status and regime of the Caspian Sea be resolved by the international laws? Although the relevance of international maritime laws to the Caspian case is another disputed subject, the likeli-



hood is somewhere between very difficult and impossible. All littoral states have some legal grounds for their arguments, but taking the matter to the international legal tribunal would perhaps create more problems than solutions because:

- First, the real headache is the division of natural resources under the seabed and laying pipelines on it. But there has never been an agreement accepted by all the littoral states on these issues in the past.
- Second, which international law would be the reference? Since the name of the Caspian is still not legally set as sea or lake, no international law is applicable. Although, the weight of historical evidence indicates the Caspian rather as an international lake, it is neither a sea nor a lake. Therefore, neither the international law of the sea nor the law of inland lakes applies directly to it.
- Third, even if we set the name today, its legal regime needs to be solved according to the international law, which existed at the time of the problem.
- Forth, how can an unsolved problem in the past between two parties (Russia and Iran) be solved today with three additional parties?
- Fifth, there is the problem of the definition of these three new players. If we accept that 1921 and 1940 agreements are not anymore valid because a fundamental change in circumstances took place, then are Azerbaijan, Kazakhstan and Turkmenistan new successor states or newly independent states (*vis-à-vis* the 1978 Vienna Convention)? If the latter is accepted then how would it fit into the Minsk Agreement of the Commonwealth of Independent States as well as the 1991 Alma-Ata Declaration? If they are recognised as new independent states then how can they use arguments to fit into Customary International Law?⁴
- Sixth, the 1982 UN Convention on the Law of the Sea (UNCLOS) provisions regarding enclosed or semi-enclosed seas are not regarded as part of customary in-

ternational law.

- Seventh, the Caspian Sea does not fall clearly under the definition of enclosed, semi-enclosed, or open seas as set out in Articles 1, 2, and 122 of UNCLOS. By the way, except for Russia none of the Caspian littoral states ratified that Convention.
- Eight, application of UNCLOS to the Caspian Sea would also be complicated by the sea's dimensions.
- Ninth, the entire Iran-USSR land boundary on both sides of the Caspian Sea was delimited by the agreements concluded in the mid-1950s. The 1954 Iran-USSR Agreement defined an administrative borderline (the so-called Astara-Hasankuli line⁵) between the USSR and Iran on the Western and Eastern side of the Sea. However, no provisions were made to demarcate the Caspian Sea. Interestingly, the aviation agreement concluded in 1964 between the two countries upheld this imaginary line for determining the flight information region as the marine border.
- Tenth, in the early 1970s, the Soviet Ministry for Oil and Gas Industry divided the north of the Astara-Hasankuli line into four regional sectors by utilizing the modified median line principle: Russia, Azerbaijan, Kazakhstan and Turkmenistan. These Republics were also granted the right to develop the fields in their own sectors. However, this had a mere administrative value and could not be interpreted as awarding the republics any proprietary rights, since according to the Soviet constitutions exclusive ownership of all natural resources belonged to the Union.

In fact, it is because of many unique features that the Caspian Sea may need a special framework that would define its legal status and regime. This, however, would depend entirely on the unanimous agreement of all littoral states.

The littoral states have their own interpreta-

“Since the name of the Caspian is still not legally set as sea or lake, no international law is applicable.”



“The position of Azerbaijan, Kazakhstan and Turkmenistan has been driven first by commercial then political considerations.”

tions and views on the demarcation of the Caspian Sea. Kazakhstan and Azerbaijan were in favour of the complete division (seabed or subsoil, water layer and air space) by applying the UN Convention on the Law of the Sea of 1982 to the Caspian Sea. Russia and Iran wanted the Caspian Sea to remain a shared sea (except for 10-mile coastal zones), in which all littoral states would be equally entitled to make use of both its waters and its seabed. When its proposal for joint control over the entire Caspian by all littoral states was not accepted, Iran suggested dividing the Caspian Sea into five equal parts regardless of the length of the coastal line of each state. This means, Iran has always defended the legal status of a lake.

After offshore discoveries in its territorial waters Russia has changed or modified its opinion and has started to defend the idea of joint ownership in the undivided water layer and dividing the seabed (and the oil and gas resources underneath) into national sectors through a modified median line. This new proposal of Russia has been supported by Azerbaijan and Kazakhstan. Turkmenistan, meanwhile, has been holding a swinging and variable stance.

“All Caspian littoral states have been involved in ownership disputes over a small number of oil and gas fields. The most serious ones are between Azerbaijan and Turkmen and between Azerbaijan and Iran.”

In reality, the issue is not only the partition-

ing of the Sea itself but also partitioning the multiple interests involved. The position of Azerbaijan, Kazakhstan and Turkmenistan has been driven first by commercial then political considerations. The positions of Iran and Russia indeed involve greater political and security components than the commercial. This is because they have much larger reserves outside the Caspian Sea. Particularly for Iran, it is more of a national security issue.

In the absence of a stable legal framework, a military conflict over the disputed hydrocarbon fields and perhaps trans-Caspian pipelines cannot be downplayed. As new fields are discovered in the future, even the bilateral treaties can become a conflict issue. When the late Turkmen President Saparmurat Niyazov said in 2002 that “the Caspian smells blood” he was pointing out the possibility that territorial spats could one day get out of hand. Let us hope the future will prove him wrong.

DISPUTED FIELDS

All Caspian littoral states have been involved in ownership disputes over a small number of oil and gas fields. The most serious ones are between Azerbaijan and Turkmen and

Caspian State	Length of Coastline km	Bboe 'International Lake' Rules	Bboe 'Enclosed Sea' Rules
Russia	695	14.67	17.16
Azerbaijan	850	29.33	20.83
Kazakhstan	2,320	33.00	20.83
Turkmenistan	1,200	11.00	15.69
Iran	900	3.67	14.23

Table 1: Distribution of hydrocarbon reserves depending on legal status of the Caspian Sea. Source: Eugene Petrov and Nikolay Amelin (2015). Gaining a Regional Perspective Caspian. GEO ExPro. Vol. 10, No. 5.



between Azerbaijan and Iran. The Russia-Kazakhstan dispute has been managed diplomatically when Presidents of both countries signed a protocol in May 2002 to jointly develop the three fields located on the median line between the two countries.

The first dispute between Azerbaijan and Turkmenistan concerns three major offshore fields – Azeri, Chirag and Guneshli.⁶ On 20 September 1994, Azerbaijan and a consortium of foreign oil companies signed the so-called “Contract of the Century” to develop these fields. Turkmenistan, however, claimed that Azeri and (partly) Chirag fields are indeed in Turkmen territorial waters. Turkmenistan even suggested to agree on a long-term leasing arrangement since Azerbaijan has already started work on these fields.⁷ This

dispute still continues but the real dispute between Azerbaijan and Turkmenistan is indeed over another field - the Kapaz (known as Serdar in Turkmenistan) field.

When the State Oil Company of the Azerbaijan Republic signed an agreement in 1997 with Lukoil and Rosneft for joint exploration and development of the Kapaz oil field,⁸ Turkmenistan strongly reacted and declared that the field belongs to Turkmenistan. The same year, the late Azeri President Heydar Aliyev proposed to develop the field together with Turkmenistan but his offer was rejected. The relations between the two countries deteriorated so badly that the two presidents did not meet for over a decade. In 2007, the new Turkmen President Berdymukhamedov

“When the State Oil Company of the Azerbaijan Republic signed an agreement in 1997 with Lukoil and Rosneft for joint exploration and development of the Kapaz oil field, Turkmenistan strongly reacted and declared that the field belongs to Turkmenistan.”



Figure 1: The Uncertain Status of the Caspian Sea.



“The tone between the two states increased until an Iranian warship and two military aircraft threatened two Azeri vessels exploring the field on behalf of BP on 23 July 2001. As a result, BP suspended drilling in the area and the development of the field was frozen.”

“Interests and agendas of players inside and outside the region have particularly been reflected in a series of pipeline plans. Pipelines can, in a way, be a tool to build relationships between countries.”

invited Chevron executives to discuss developing the field. In 2009 Azerbaijan repeated its offer to Turkmenistan to develop the field together but received no reply. Instead, in 2009 Turkmen President announced that his government would be taking Azerbaijan to the International Court of Arbitration to resolve this dispute.

Another field, Alov (called Alborz in Iran)⁹ is a dispute subject between Azerbaijan and Iran. In July 1998, a Production Sharing Agreement signed with Azerbaijan and a consortium of oil companies gave permission to the consortium to conduct seismic operations on Alov.¹⁰ Iran strongly opposed the decision and asked Azerbaijan to stop activities until the establishment of a legal regime for the Caspian. When this call was ignored, National Iranian Oil Company formed the KEPCO (Khazar Exploration and Production Company) consortium with Shell, Lasmoplac and Weba to conduct similar studies in the same area. Azerbaijan protested that some of the studies were conducted within its territorial borders. The tone between the two states increased until an Iranian warship and two military aircraft threatened two Azeri vessels exploring the field on behalf of BP on 23 July 2001. As a result, BP suspended drilling in the area and the development of the field was frozen.

Meanwhile Iran has started its own exploration plans for Alborz. Reportedly, Iran has resumed in November 2015 talks with Brazil's Petrobras. In 2010 Khazar Exploration & Production Company had reached an agreement with Petrobras on developing two exploration blocks in deep-water Caspian, but international sanctions forced the Brazilian major to leave Iran.

On 23 February 2016, following the visit of Azerbaijan's president Ilham Aliyev to Tehran, it was announced that Iran and Azerbaijan have agreed in principle to develop jointly this disputed field without giving any details.¹¹

TRANS-CASPIAN ENERGY PIPELINES

There have been talks in Western political and economic circles about trans-Caspian energy pipelines since the mid 1990's - one transporting Kazakh/Turkmen gas and the other transporting Kazakh oil to Europe via the Caucasus and Turkey.

In August 2007 the US Agency for International Development awarded a \$1.7 million grant to the SOCAR to conduct a feasibility study on the construction of trans-Caspian oil and natural gas pipelines. Also, during a meeting between Presidents Clinton and Niyazov on 23 April 1998, the US Trade and Development Agency awarded a \$750,000 grant to conduct a feasibility study by Enron for a natural gas pipeline from Turkmenistan to Azerbaijan. But nothing concrete has happened, yet.

Interests and agendas of players inside and outside the region have particularly been reflected in a series of pipeline plans. Pipelines can, in a way, be a tool to build relationships between countries. As is case in the Caspian and Black Sea regions, however, pipelines can become to symbolise political dominance over the countries rather than being just commercial outlets for hydrocarbons. When seen from a geopolitics perspective, pipelines may have a stabilising effect and can prevent wars, but they can be the reason for instability, a conflict and even a war. To which category would a trans-Caspian pipeline fall in? This is hard to guess.

A stable and predictable legal environment that preserves corporate confidence in the legal validity of such projects is vital for the realisation of these pipeline projects. Moreover, several of the Caspian littoral states are opposed to trans-Caspian pipelines on environmental grounds, fearing that such pipelines could potentially cause an ecological disaster in the region.



TRANS-CASPIAN OIL PIPELINE

The idea of constructing a trans-Caspian oil pipeline goes back to the second half of the 1990s. Clinton administration's 1998 initiative for an East-West trans-Caspian energy transport corridor was foreseeing an Aktau-Baku-Tbilisi-Ceyhan oil export route stretching from Kazakhstan to the eastern Mediterranean.

On 16 June 2006 leaders of Azerbaijan and Turkmenistan signed a framework agreement to create a trans-Caspian project for sending Kazakh oil via the BTC. In April 2007 a memorandum was signed to carry oil extracted from Kashagan and Tengiz fields to Sengachal terminal near Baku through the 700 km undersea pipeline between Aktau and Baku. But after so much talk and ink the trans-Caspian oil pipeline project has not been realised due to several reasons, including political and commercial.

TRANS-CASPIAN GAS PIPELINE

So far three options have been considered to bring Turkmen gas to the Western markets; by pipeline, via LNG or via CNG. However, the strong Russian opposition to the concept of laying a physical pipe on the Caspian seabed based on environmental and legal grounds has made the pipeline option rather problematic. And the other two options are considered too costly when the transport volume and the distance travelled are considered.

In the early 1990s, Turkish and Turkmen leaders suggested the concept of a Trans-Caspian Gas Pipeline Project, which would transit Turkmen gas westward to Baku across the Caspian Sea for transshipment further west through Georgia and Turkey. Supported by the US, this pipeline would be linked with the Baku-Tbilisi-Erzurum pipeline and through it to the Nabucco Pipeline. Gas

from the Tengiz field in Kazakhstan would also link to the line at Aktau in Kazakhstan, as suggested by the US in 1997. USA and Turkmenistan signed a feasibility study agreement in 1998. Turkey and USA agreed to support the project.

In 1999, Turkey and Turkmenistan signed a 30-year agreement to export gas from Turkmenistan to Turkey. In addition, the same year Azerbaijan, Georgia, Turkey and Turkmenistan signed an Intergovernmental Declaration on laying the legal framework of the construction of the trans-Caspian pipeline.

Unfortunately, the parties failed to reach a common agreement and negotiations collapsed in 2000 – due to payment and price issues, the lack of a legal framework governing the use of the Caspian Sea, and capacity allocation among Turkmenistan and Azerbaijan. Oppositions from Russia and Iran to such a project had also impacted to the shelving of the project.

However, after the Russia-Ukraine gas disputes in January 2006 the project has started to reappear. Turkmenistan signed a memorandum of understanding in April 2008 with the EU to supply gas starting in 2009, presumably through a trans-Caspian pipeline. In December 2008, two Nabucco gas pipeline project partners, OMV and RWE established the Caspian Energy Company to assess options for the building of a trans-Caspian pipeline and to look for partners for a project which would build and operate such a pipeline.

When Turkmenistan stressed in a statement in April 2009 (following the Russia-Turkmenistan gas crisis) that it wishes to see “the shortest and most convenient routes” to market the developed gas, hopes were raised again for revitalizing the trans-Caspian gas pipeline.

In addition, several favourable developments helped building this feeling: Turkmen gas

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“The whole issue boils down to the question of how to demarcate or share the Sea among the littoral states by taking into account of the past treaties and current realities.”

“Western powers speak out in favour of non-Russian and non-Iranian export outlet for Caspian hydrocarbon resources.”

sales to Russia ceased, sales to Iran reduced, operator of Turkmenistan’s Block One fields, Petronas took a 15.5% stake in Shah Deniz, high level European Commission officials paid frequent visits to Turkmenistan, and Turkmenistan involved in TAPI pipeline. The latter is significant because it meant the end of Turkmenistan’s long supported policy of not being involved in pipeline projects.

Besides, Turkmenistan and Azerbaijan have demonstrated interests to deliver their gas to Southern Gas Corridor. In May 2015, the Ashgabat Declaration¹² brought Turkey, Turkmenistan, Azerbaijan and the EU together in a statement that recognised the importance of equally and mutually beneficial cooperation in ensuring reliable natural gas supplies from Turkmenistan to Europe but without any serious talks, let alone taking any tangible steps.

CONCLUDING REMARKS

The legal status and regime of the Caspian Sea was ruled by the Soviet-Iran Treaties of 1921 and 1940 until the breakup of the Soviet Union. Since then it has become a legal uncertainty and a headache, even if the past Treaties are still binding for all Caspian states (including the newly independent states).

As far as Caspian Sea’s legal status is concerned, the past Treaties do not provide any specific answer. They only mention that it is a Soviet-Iranian sea. Also, no marine boundaries or delimitation lines in the Caspian Sea between Soviet and Iranian parts are provided in any of the past Treaties.

As for its legal regime, the past treaties relate solely to regulation of navigation and fishing but do not address the issue of the seabed sovereignty or delimitation of seabed resources. The whole issue boils down to the question of how to demarcate or share the Sea among the littoral states by taking into account of the past treaties and current realities.

Although the littoral states have been dis-

cussing for two decades how the problems related to the demarcation (who gets what and how), the issue has not yet been settled. After 43 “going nowhere” sessions of the special working groups and a handful of summits, the positioning of the countries is very well-known. This situation has blocked many projects including trans-Caspian pipelines and many oil and gas fields situated in areas contested by neighbouring states.

When international oil companies entered the region in the early 1990s, their main worry was commercial as well as political risks and challenges they would be faced with. In less than a decade, managing these risks has turned out to be only a small part of a risk chain, which is tied to the uncertain legal framework of the Caspian Sea.

It is still not clear whether trans-Caspian pipelines will ever be built. If at least one of them is built, USA and the EU will be likely to support the construction as it will boost Western influence and hence may change the balance of power in the region. That is why the Western powers speak out in favour of non-Russian and non-Iranian export outlet for Caspian hydrocarbon resources.

While the big powers such as USA/EU, Russia and China will shape the region’s geopolitical future, the regional players including Turkey and Iran will try to advance their interests. Since the players in the region have conflicting interests and priorities, the trans-Caspian pipelines are likely to ignite conflicts of interests and a geopolitical competition between the different players.

Political disagreements among the players are inevitable in the region and will surface once their interests and priorities clash. Unless military security in the Caspian basin is ensured, Iran and Russia will delay by any means the process of the resolution of the legal framework. Iran, on the other hand, is likely to delay any agreement on the Caspian Sea legal framework until its relations with the US are put on track. With sanctions being



lifted on Iran, it is not yet clear what influence that might have on Tehran's position, though it is likely that Iran, which now has become a competitor, will continue to oppose the construction of any trans-Caspian pipeline.

Multidimensional aspects of a legal framework in terms of theoretical and practical basis require the political will of the key players for a consensus. As Vladimir Putin stated in 2002, the future of the Caspian – whether it is a sea of cooperation or a clash of interests – will depend on how the littoral states untangle the tight Caspian knot of problems. Although some argue that a five-way treaty currently seems highly unlikely, there is still hope.

The general consensus so far is that the seabed (and the oil and gas resources underneath) should be divided into national sectors and the sea's surface and water layer should be shared. But how this division may be accomplished still remains a challenge.

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¹ Up to now, the summits have been held in Ashgabat in 2002, Tehran in 2007, Baku in 2010 and Astrakhan in 2014. The next one is planned to be held this summer in Astana.

² Adopted agreements so far cover the conservation and sustainable use of marine biological resources of the Caspian Sea, cooperation in the field of prevention and liquidation of emergency situations in the Caspian Sea, and cooperation in the field of hydrometeorology of the Caspian Sea.

³ Following the bilateral treaties they concluded in the second half the 1990s, Russia, Kazakhstan and Azerbaijan signed in May 2003, a tripartite agreement dividing the northern 64% of the Caspian Sea seabed and subsoil into three unequal parts, and left the waters of the Caspian open to shared use for maritime commerce and fishing. Kazakhstan obtained 27%, Russia 19%, and Azerbaijan 18%. Iran rejects the suggested share of 14% but lays claim to 20%, transferring the boundary 80 km north of the line along which

the Iran-Soviet maritime boundary was drawn.

⁴ For instance, Azerbaijan mentions its oil exploitation in the Caspian Sea since 1956 as a customary practice. But how can a newly independent state perform customary practice and yet not be a successor state?

⁵ This imaginary line connects the Astara village (in Azerbaijan) on the western shore with the Hasankuli village (in Turkmenistan) on the eastern shore.

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"Political disagreements among the players are inevitable in the region and will surface once their interests and priorities clash. Unless military security in the Caspian basin is ensured, Iran and Russia will delay by any means the process of the resolution of the legal framework."



PROSPECTS FOR RENEWABLE ENERGY IN TURKEY AFTER PARIS COP21 SUMMIT

by Serhat S. Çubukçuoğlu

OVERVIEW OF COP21 SUMMIT'S IMPLICATIONS

“Ten years after its inauguration, Turkey ratified only the Annex-I of the UNFCCC in 2004 and is therefore exempted from the obligation to undertake GHG emissions reduction commitments.”

“Research reveals that 71% of CO2 emissions in Turkey are caused by the industry and coal-based power plants that contribute to 29% of electricity generation.”

Turkey is a developed OECD country in the league of G-20 with close to 4% projected GDP growth rate per annum in 2016-17.¹ Global warming due to greenhouse gas (GHG) emissions constitute a common problem of mankind and draws attention from countries at the top of the industrial league to emerging ones alike, and Turkey is no exception to this. Since 1994, UNFCCC² treaty obliges adopting parties to reduce the impact of global warming caused by human activities through “common but differentiated responsibilities.” Ten years after its inauguration, Turkey ratified only the Annex-I of the UNFCCC in 2004 and is therefore exempted from the obligation to undertake GHG emissions reduction commitments.³ Likewise, after tense negotiations and only then in 2009 following the third conference of the parties (COP3), Turkey became a signatory to Kyoto Protocol, but limited its responsibility to Annex I of the UNFCCC without introducing new commitments.

Research reveals that 71% of CO2 emissions in Turkey are caused by the industry and coal-based power plants⁴ that contribute to 29% of electricity generation. On the global scale, well-established scientific evidence shows that the world's human-induced GHG emissions, of which CO2 makes up 80%,⁵ that cause an enhanced greenhouse effect come from combustion of fossil fuels. These facts provide invaluable forecast about risks and courses of possible action to insure against them. By looking at current trends, it is not difficult to estimate that production of conventional oil & gas will peak and decline in the 21st century. Economic growth, pros-

perity, and better lives will be made possible with low carbon-footprint.

The UNFCCC COP21 summit in 2016, held in Paris, set a cornerstone in global energy revolution as for the first time, it brought 175 countries into a common cause to curb net CO2 emissions and limit global temperature rise to 2°C, however optimistic this target may still seem to be. Adoption of renewable and clean energy technologies plays a key role to implement this action plan. From that perspective, Turkey's active participation and contribution to gradually phase out coal and fuel power to replace them with solar, wind, geothermal, and hydro power will help preserve the environment for our future generations and for the world as a whole. As a growing economy, Turkey has demonstrated significant progress in its efforts to combat climate change through sustainable development principle, which is to “meet the needs of the present without compromising the ability of future generations to meet their own needs”.⁶ Turkey should continue to foster environmentally friendly, innovative policies to decarbonize energy through market liberalization, public-private partnerships, technology transfer, carbon taxation, and financial assistance for green investments. With Paris accord, Turkey has declared to commit up to 21% further reduction in carbon emissions rate from its current levels by 2030.⁷ It is crucial to emphasize that Paris COP21 is a non-binding treaty and intended national contributions are determined solely by each participating country on a voluntary basis. It is expected that the treaty will be ratified by signatories and enter into force within the next year.

RENEWABLE ENERGY POLI-



CY IN TURKEY

Turkey still has abundant potential to increase efficiency in energy production, distribution, and consumption.⁸ Therefore, it is imperative to adopt solutions that address energy supply and demand inefficiencies in order to reduce carbon emissions. From an economic perspective, the impact of further market liberalisation and higher efficiency would be to reduce import bills and wasteful fuel subsidies, thus contributing to GDP growth. The responsibility to adopt renewable energy also lays with the private sector, which has been encouraged and incentivised by the government to invest and participate in power generation. Yet, there is more work to be done to update the legislation, further develop the transmission infrastructure, and increase investor awareness to attract potential suppliers.⁹

There has been an unprecedented decline in global oil investments in two consecutive years, and lower oil prices will remain as a reality for years to come.¹⁰ The forecast for crude oil price this year is that it will hover around \$45-\$52 band.¹¹ However, this temporary situation should not preclude policy makers from adopting long-term measures to reduce reliance on fossil fuels. Turkey is a net importer of energy, with a gaping current account deficit at 4.5% of GDP in 2016,¹² part of which, despite substantial improvement since 2014, is due to price of fuel imports and has been exacerbated by the turmoil within Turkey's neighborhood. Access to cheaper, cleaner, and more sustainable energy supply would help Turkey to ease its current account deficit and help to realize its vision for the centennial anniversary in 2023. Turkey should maintain a disincentive through carbon taxation against consumption of oil by private entities. Taxation is a better, non-distorting, and transparent way to reduce emissions than policies such as subsidies or mandates for renewable energy.¹³ To the extent that renewable energy replaces carbon-intensive fuels, Turkey can further diversify its energy supplies and con-

tribute to the mitigation of urban pollution and CO₂ emissions.¹⁴

According to IEA,¹⁵ 46% of global CO₂ emissions resulted from coal as of 2013,¹⁶ and in order to meet COP21 criteria 80% of coal reserves must remain untouched. Although coal has been replaced by shale gas using fracking technologies in the US, for instance, 40% of electricity generation worldwide still comes from coal,¹⁷ the usage of which is high especially in emerging countries like India and China. In a similar fashion, Turkey planned to construct 86 new coal-fired power stations as of 2013¹⁸ that can increase coal-based GHG emissions by 60% until 2030, ranking Turkey as the fourth largest polluter in the G-20 league.¹⁹ According to sector players, the government reintroduced a number of incentives and exemptions from environmental regulations until 2020 for privatized coal-fired power plants.²⁰ These plants threaten the achievement of already inadequate targets and suggest that emissions from coal could more than double.²¹ Although the intention behind building coal-fired plants is to reduce import dependency, especially on natural gas, Turkey readily imports 32%²² of its total coal consumption and is dependent on hard-coal imports to meet 90% of this demand, which in fact presents a policy inconsistency.²³ Also, majority of lignite coal reserves in Turkey are of low quality and unsuitable for enrichment, which render these unfit for investment for electricity generation.²⁴

Turkey's EPDK²⁵ should no longer grant licenses to coal-fired plants; at least it should ban construction of inefficient plants. To incentivize coal power generation while the World Bank and EIDB²⁶ limit project finance is against the spirit of the COP21. Even Chinese investors, now that their own economy has slowed, do not pay great interest in such projects any more. Subsidized coal-power plants create overcapacity, inefficiency, and perpetuate imported energy. Turkish Ministry of Energy should engage well-financed private sector actors such as

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“Research reveals that each unit of electricity produced by solar power creates eight times higher employment than coal and natural gas, and seven times more than nuclear power, which are interesting facts to note especially in the wake of recent bilateral discussions between Turkey and Russia about reviving Turkish Stream and Akkuyu Nuclear Plant projects.”

TUSIAD²⁷ to develop sustainability practices and technologies that enable energy innovation to install larger, more efficient plants. Special attention should be devoted to SMEs that represent 46% of Turkish industry energy consumption and require mid-to-long term financing, such as European-funded Climate Turkey program or the World Bank’s Green Bond funding, to raise awareness, subsidize renewable energy projects²⁸ and address climate risk. With the 2023²⁹ vision, Turkey should aim to increase the rate of total electricity supply capacity from renewable energy sources to 30%.³⁰ Although Turkey ranks in the top three among South and Central Asian states for installed hydropower capacity,³¹ much of its potential capacity remains unutilized. By 2023, the government should provide technical advice and assistance needed by the private sector to respond to the priorities of reducing GHGs while polluting industries such as Cement Producers Association³² should incorporate carbon pollution costs into their long-term financial planning. This, in turn, requires assigning a quantitative value to carbon and transparency on its use.

RENEWABLE ENERGY TECHNOLOGIES IN TURKEY

Technology diffusion is apace at an unprecedented rate. Globalization helped to accelerate adoption of renewable energy technologies unlike before compared to just five years ago. The cost of solar power is now cheaper by 80%, and wind power by 30%.³³ IEA estimates that 60% of energy investments globally in the next 25 years will be on renewable energy sources. Even the oil-rich Emirate of Abu Dhabi in the UAE demonstrated at a recent climate change meeting that it is economically, environmentally and socially beneficial to invest in clean energy and other carbon mitigation strategies.³⁴ Decentralized power provision for areas without access to electricity grid and measures to prevent price hikes for consumer protection are sine qua non for a sustainable energy policy. G20 Energy Ministers recognized at a recent summit in 2016 the need to drive down technolo-

gy costs to support diffusion, enable policy frameworks and power system integration, and mobilize finance in order to triple the deployment level of renewable energy by 2030.³⁵

Research reveals that each unit of electricity produced by solar power creates eight times higher employment than coal and natural gas, and seven times more than nuclear power,³⁶ which are interesting facts to note especially in the wake of recent bilateral discussions between Turkey and Russia about reviving Turkish Stream and Akkuyu Nuclear Plant projects. On the other hand, Turkey’s largest solar power plant has opened in 2016 in the province of Konya to meet the electricity demand of more than 20,000 households and help prevent an average of 18,000 tons of CO₂ emissions every year.³⁷ The Mediterranean basin, including Turkey, is fortunate to receive significant amount of solar light convertible into electric power. Turkey has the second largest sunshine duration (7.5 hours per day) in Europe after Spain.³⁸ The main incentive for investors to solar energy in Turkey are feed-in tariffs, whereas other types of energy generation facilities such as wind, hydro, and biomass may be also subject to purchase guarantees, connection priorities, and license exemptions.³⁹ Despite high upfront costs, if by 2023 Turkey reaches 20,000 MW of installed wind power capacity by revising its investment and licensing model, this would reduce its natural gas bill by around US\$ 3 billion annually.⁴⁰ Moreover, Turkey is ranked 7th in the world in terms of geothermal energy potential⁴¹ and is a founding member of IRENA.⁴² Also, the energy stock exchange of Turkey, established in 2015,⁴³ is set to enhance market liberalization, increase the sector’s competitiveness, and facilitate emissions/carbon trade.

From a more conventional perspective, IAOGP⁴⁴ suggests that greater use of natural gas is essential in reducing GHG emissions and providing the backup power, on which wind turbines rely,⁴⁵ which should be preferable over coal power. Nevertheless, to improve coal combustion efficiency in min-



imizing GHG emissions, the World Coal Association also supports the G8 / G20 target of 20 industrial scale carbon capture and storage projects operating by 2020. Since this is a costly measure, financing for official development assistance and private sector investment in developing countries like Turkey that extensively burn coal is consistent with international climate protection goals and will require creating investment opportunities.⁴⁶

Despite improvements in sustainable development, it is important to highlight that Turkey is still not a forerunner in global efforts to tackle climate change, nor has it made any legally binding commitment to reduce GHG emissions from its current levels at COP21. Developed countries such as the EU and the US have maintained leadership in setting mitigation goals to reduce CO2 emissions by varying degrees up to 40% compared to 1990 levels by 2030.⁴⁷ Some developing countries like Mexico, Morocco, Kenya, and Ethiopia formulated metrics to describe a fair contribution, such as projected emissions per capita.⁴⁸

Part of the challenge is to find possible ways to de-couple economic growth from rising carbon emissions. Turkey, rightly to a certain extent, argues that addressing the environment reduces its development space, and that developed countries have less right to claim protected environmental space that might be needed for development.⁴⁹ Green goods trade facilitation, carbon storage, taxation, and trade are among mitigation options suggested by climate scientists, but even if Turkey meets its 21% reduction commitment by 2030, the per capita emission will still be higher than developing countries such as China, Mexico, South Africa, and South Korea. Moreover, higher carbon footprint might implicate indirect export barriers in the form of tariffs from lower footprint countries.⁵⁰ According to EBRD, Turkey must increase its non-hydro renewables output about sevenfold by 2023 in order to meet its objective of 30% renewable-generated power.⁵¹

CONCLUSION

In overall, if Turkey takes the right steps, it has a substantial potential to undertake renewable energy revolution, realize its vision to become an energy trade hub in an important geostrategic location, fuel its economic growth and enhance energy supply security. Turkey's gradual shift to renewables in its energy mix should be sustained through usage of domestic resources more likely utilizing wind and solar power instead of coal, incentives for the private sector, and better financing mechanisms to facilitate green investments.

Diversification of supply sources especially with a focus on local renewables would cement robust economic development while, at the same time, large scale projects would undoubtedly bring economies of scale in procurement, installation, hence driving down costs and increasing efficiency. In an era of low energy prices where pressures are high to undertake cost-cutting measures and scrap extravagant projects throughout the Middle East, it is crucial to take advantage of local resources, increase infrastructure capacity, and competitiveness. These coupled with Turkey's strategic location at the cross-roads between major producers of the Middle East and demand centers of Europe, make it an ideal target of energy import and export project proposals as well as a potential energy transit hub. With a more liberal market, renewables trade, and emission reductions efforts, Turkey has all the potential to put itself on the map as an ever more important player in energy geopolitics.

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ENERGY ISSUES IN THE USA & EU COMPETITION

by Serdar Gürüzümcü and Oğuzhan Akyener

INTRODUCTION

“The European Union (EU) and the United States of America (USA), as the most powerful economies in the world, have common history, ancestors, and many economical partnerships. However, there have always been competitive issues between two sides.”

“in 2013 when Germany complained bitterly as whistleblower, Edward Snowden revealed the extent of USA spying on Europe, which reportedly included monitoring Chancellor Angela Merkel’s cellphone.”

The European Union (EU) and the United States of America (USA), as the most powerful economies in the world, have common history, ancestors, and many economical partnerships. However, there have always been competitive issues between two sides. By analyzing this competition from the historical window, such as it happened in the Second World War, USA and some of EU members (which can be assumed as the leader of EU, Germany for example) had to fight against each other that has been affecting the current situations in the background.

On the contrary, during the Cold War they had accelerated economic relationships. Moreover, after the Cold War they had also maximized their economical partnership and decided to have a comprehensive trade agreement to increase this partnership to a higher level.

For accomplishing such target, Transatlantic Trade and Investment Partnerships (TTIP) was announced by USA President.¹ And the announcement was later endorsed by the European Commission President Barroso. The first round of TTIP negotiations took place in the week of July 8 in Washington, D.C., under the leadership of the Office of the U.S. Trade Representative², and such negotiations are still continuing.

During this period, the spy scandals occurred between EU and USA. Following that, the penalty for Volkswagen’s Emissions Scandal came out, then Brexit happened (while waiting for the negotiations). Currently European Union says Apple broke EU tax rules

in Ireland, and another USA company, McDonald’s, is also about to face tax penalty in Luxemburg, but contrarily the USA files for toxic mortgages between 2005 and 2007 on Deutsche Bank.

In the light of explicit competition being escalated through political and economic issues between two allies, this study will try to focus on how it may affect their energy policies.

POLITICAL AND ECONOMICAL ISSUES

There are some political and economic issues emerged from or led to such competition between the USA and EU. Such issues were confronted first in 2013 when Germany complained bitterly as whistleblower, Edward Snowden revealed the extent of USA spying on Europe, which reportedly included monitoring Chancellor Angela Merkel’s cellphone.³ Then, it was revealed that Bundesnachrichtendienst (BND) had spied on France and the European Commission on behalf of USA’s National Security Agency (NSA). But according to the new reports, BND has also spied on allies under its own initiative.⁴

There were also some opposite claims from Der Spiegel, which confirmed from some sources that the spying went further than previously reported. Since October’s revelations, it has emerged that the BND spied on the United States Department of the Interior and the interior ministries of EU member states including Poland, Austria, Denmark and Croatia. The search terms used by the BND in its espionage also included commu-



nication lines belonging to USA's diplomatic outposts in Brussels and the United Nations in New York. The list even included the US State Department's hotline for travel warnings.⁵

Those developments clearly indicate a trust issue confronted by German intelligence that has been steadily growing. It can be stated that the situation may be an initial reflection of the competition and it will have other following reflections as stated below:

- Volkswagen's Emissions Scandal: After the scandal was revealed at the end of 2015, according to US Environmental Protection Agency (EPA) in two related settlements, one with the United States and the State of California, and one with the U.S. Federal Trade Commission (FTC), German automaker Volkswagen AG and related entities have agreed to spend up to \$14.7 billion to settle allegations of cheating emissions' tests and deceiving customers.⁶
- Brexit: United Kingdom (UK) is the closest ally of the US in the EU- wanted to exit from the EU (mostly under the influence of France-Germany). According to the result of the referendum (non-binding) in June 2016, UK is waiting for the exit negotiations.
- Apple tax issue in Ireland: In August 2016, Apple has warned that future investment by multinationals in Europe could be hit after it was ordered to pay a record-breaking €13bn (£11bn) in back taxes to Ireland.⁷
- Mc Donald's tax issue: McDonald's could face an order to pay nearly \$500m in back taxes to Luxembourg according to a Financial Times analysis of an investigation by Brussels into state-supported tax avoidance.⁸
- Deutsche Bank penalty issue: The U.S. Justice Department wants the bank to pay \$14 billion over allegations for packaging toxic mortgages between 2005 and 2007.⁹

As it can be seen from the above information, economic and political issues are linked to each other in the scope of ongoing EU-USA competition. These open and easy to analyze issues are so clear to be defined as the competition items.

In addition, Syria and the other Middle East policies and also the immigrant issues can also be analyzed in the concept of this competition.

However, this study mainly wants to focus on the energy issues, which can be accepted as the competitive and disagreed items between US and EU politics. Those issues are going to be identified in the following section.

MAIN ENERGY ISSUES

On energy issues, main competition between USA and EU are related with the USA's future possible LNG supplies to EU and the position Ukraine in EU's supply chain. These issues are evaluated under the titles of Nord Stream 2, Ukraine bypass politics, Turkish Stream and Bulgaria transit option.

NORD STREAM 2

Nord Stream 2 is the pipeline project, which aims to double the current gas transportation volume of Nord Stream. In this concept, an additional 55 bcma Russian gas volume is planned to be transported to Germany and the other countries in Northern and Western Europe.

As the most influential country of the EU, Germany strictly supports the Nord Stream 2 project. On the contrary, USA, Britain (about to be non-member of EU) and additional some other weaker partners of EU are against of the project.

The "against" group claims that:

"Those developments clearly indicate a trust issue confronted by German intelligence that has been steadily growing."

"On energy issues, main competition between USA and EU are related with the USA's future possible LNG supplies to EU and the position Ukraine in EU's supply chain."



“EU’s gas demand is decreasing due to renewable energy and energy efficiency investments. Furthermore, alternative gas resources thanks to LNG are increasing. Therefore, EU does not need to increase trade volumes of Russian gas, which means a lower dependency on Russia.”

“Ukraine always uses its geostrategic position in the negotiations with Russia. By this way, Russia usually has to let Ukraine get cheap gas, not pay the bills for the purchase and follow after some political steps (with the support of USA and EU) against to Russian interests.”

EU’s gas demand is decreasing due to renewable energy and energy efficiency investments. Furthermore, alternative gas resources thanks to LNG are increasing. Therefore, EU does not need to increase trade volumes of Russian gas, which means a lower dependency on Russia.

Nord Stream 2 helps the Russian Ukraine bypass policies, which means EU and mostly USA politically loose Ukraine against Russia.

Project seems positive only for Germany. Hence, with Nord Stream 2 Germany will be the largest gas hub in EU.

However, in reality:

Although EU’s total gas demand may decrease, hence, the domestic supplies are decreasing, gas import volumes will continue to be as high as today’s.

Other possible supplies, as an alternative to Russian gas, will not be able to be as cheap as the Russian supplies, while considering the net back prices of each gases.

Although EU is expected to have the high-end on the table while Ukraine is a chess pawn on Russian politics, EU is not the gaining side while considering the gas cuts due to Ukraine’s domestic needs. This means the main ruler and the winner of such game would be USA.

So, while looking at Nord Stream 2 from the sight of USA;

As a potential LNG supplier in the medium term, USA targets the European coasts for its export. And Russian gas is/will be the unbeatable opponent in price and also volume competition. This means with such pipeline projects, Russia will continue to hold the European markets in its hands and will not let the USA supplies have a competition chance.

The USA attaches importance to Ukraine as a political borderline castle against Russia. From the political and security sights, the loss of Ukraine means that USA will lose an important foothold in the region. Such project will help Russia’s bypass politics that will weaken the hands of the key USA supporters in Ukraine, which means in the medium term, USA will completely leave Ukraine under the control of Russia.

As a result, while Nord Stream 2, helps EU to continue meeting its gas demand in the cheapest way in the long term, USA is against to this project by concentrating on the side effects of political issues.

On the contrary, the most influencing EU partners Germany and France seem supporters of the project.

UKRAINE BYPASS

As described above, as a result of Russian bypass politics, Ukraine will lose annually an average \$2 billion of transit fees. In addition to loss of those commercial gainings, hence, not having domestic resources, Ukraine will have to continue to import Russian gas to meet its own demands.

While currently being a transit country, Ukraine always uses its geostrategic position in the negotiations with Russia. By this way, Russia usually has to let Ukraine get cheap gas, not pay the bills for the purchase and follow after some political steps (with the support of USA and EU) against to Russian interests.

After Ukraine to lose its geostrategic position of being the main gas transit country for Russian sales, in addition to the economical and gas demand issues, Russian opposer domestic groups (which are supported by USA and some partners of EU) will lose their power. And this means USA loses its one of the eastern castles against its ex-enemy Russia.



TURKISH STREAM

Turkish Stream will be the second opening gate of Russian gas sales to EU. That's why the political situations are similar with the Nord Stream 2.

With Turkish Stream, Russia again is going to transport its gas up to Western Turkish border and then sell its gas to the Southern and Eastern Europe via other planned infrastructures. By extracting the 16 bcma Turkish volume, the long term capacity of the European portion via Turkish Stream is planned to be 48 bcma.

As a result of Turkish Stream, in addition to the Nord Stream 2, Russia will successfully complete its Ukraine bypass strategies and reach all the European markets via the newly constructed pipelines. This also means that, in addition to the Northern and Western markets, Russia will not let USA supplies compete with its sales in the Eastern and Southern markets of EU in the long term.

From the sight of EU, hence, not being against the third energy package and being the supplier of the cheapest possible resources without the Ukraine gas cut risks, Turkish Stream will be an important step for EU gas demand security.

By the way, hence, Turkish Stream being against to USA interests and being in favor of both Russia and Turkey, by some Turkish experts claiming that Russian plane being hit down by Turkish jets (which resulted in the suspension of Turkish Stream) and 15 July terrorist coup attempt (which was staged while the Russian relations were normalizing) were planned by USA.

BULGARIA GAS TRANSIT OPTION

A meeting about Varna, Bulgaria to be a gas transit hub for Russian gas, is planned to be

held between the EU Energy Commission, Bulgarian and Russian authorities before the December 2016.

As can be understood from the main topic of the meeting, the aim of EU Energy Commission to organize such a meeting is to change future Russian gas supply politics and to hinder Turkish Stream Pipeline Project.

Russian position and possible supporters from the side of EU are not clear at this point. However, this new concept, without facing with legislative problems, plans to make Bulgaria a new gas transit country for the Eastern Europe.

From the sight of politics and economics, such an option may be beneficial by considering less cost to reach the European borders and EU's general position on behalf of Turkey. However, from the market potential sight, this option means Russia does not target its second largest customer Turkey but target mostly future potential customer Italy (by considering gas to be easily transported via Turkish Stream to extended TAP to Italy market).

If the EU puts such step in the frontline that will successfully emerge Ukraine bypass, it means that EU is currently not strictly against on Russian gas export strategies and holds in a negotiable stand. This also implies the political separation of USA and EU against Russia.

In addition, Russia is sure about EU needing its supplies in the medium and long term.

By leaving aside the possibility of such an option to be selected and realized, in the concept of such an option there are 2 main items which are related with the USA's interests.

Which are:

- The USA is against both Turkish Stream

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and the Bulgarian alternative.

- However, in the worst case: The USA selects this option and wants Russian gas to be supplied into the Balkan markets and not to reach Italian markets.
- USA's future supplies will commercially find a chance to have an important share in Italian markets.
- Turkey's geostrategic importance will not be raised.

Both Russian and European sides have to consider these items before developing decisions on their ideas.

CONCLUSION

There is clearly a competition between USA and EU, and it has been escalated day by day as it can be understood in the political and economic issues.

From the sight of economics, main indicators are public and easy to be analyzed. However, from the sight of energy, the situation is somehow different. Hence, USA wants to be an important LNG supplier and EU is the biggest market in the world. At that point, Russia is the most effective rival for USA's gas suppliers (by considering the price, volume and political issues). In addition, again Russia can be the supplier of cheapest gas to EU. USA's future LNG can be helpful only for decreasing the hub prices and naturally making Russia to also decrease its prices.

In addition to USA's future LNG supply strategies, the position of Ukraine, which seems to be the western castle of USA politics against the sleeping giant enemy Russia, is another key point related to the energy sight of the competition.

As a result, there is a continuing competition over the hues on EU & USA matters. And the possible deepening of this competition

will change the main stones in the game of new world order. New Turkey has to deeply analyze and consider those issues for being one of the future leaders of the new world.

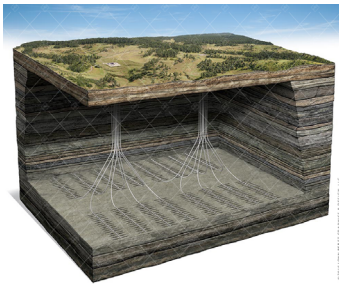
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A BRIEF LOOK ON THE ENVIRONMENTAL EFFECTS OF SHALE GAS EXTRACTION

by *Fatih Temiz*

ABSTRACT

Shale gas can still be considered as one of the hot topics today. Some people believe in the pros of the subject, whereas some others stand on the cons' side. Each party is firmly supporting their own side of the story. It is possible to express that there is more to the researches that are needed to determine the math about shale gas. The question of "Are we experiencing a shale gas revolution or is it another earth polluting source of energy?" is yet to be answered.

INTRODUCTION

Geology, current technology, accessibility, transportation alternatives, demands, and effective prices all affect the hydrocarbon market. Natural gas extraction takes its share from recent world events as well. It was 1821 when the first natural gas well was dug in the state of New York in the US (New York Department of Environmental Conservation, 2007). It was not until 1930s that horizontal drilling took place and the year was 1947 when the hydraulic fracturing started in the United States (Stevens, 2012). Shale gas is among the unconventional sources of energy (like coal-bed methane and tar sands) and extraction technologies had their development in progress in 1970s (Clark, 2012).

Next, it is possible to find in-depth reports about hydraulic fracturing and shale gas extraction. Starting with the report of Stockholm International Water Institute (SIWI), it summarizes the current situation about this hot issue. The report starts by saying it is not yet known if the world is experiencing a so-called shale gas revolution. The total

amount of shale gas reserves is difficult to assess and it is still discussed if shale gas can secure energy consumption of countries in the years to come. Like the oil boom in the past, countries such as the USA have started taking advantage of shale gas by taking advantage of this source of energy with the addition of clusters of work opportunities around. Whereas, dread of the possibility of environmental problems sets other countries back from fast exploitation of their shale gas reserves. Hydraulic fracturing is the technology associated with shale gas extraction; there are some findings that this technology brings environmental problems to areas where fracturing is done without regulations. Next, this process's effects are felt in water. Water usage in water-scarce areas of shale gas reserves puts further distress in the hydrology of the area. Additionally, when there is not enough water to run the shale gas production, then this water is needed to be carried from a distance (Hoffman et al., 2014).

The fluid used in hydraulic fracturing is mostly water and the proppant (sand or similar particulate material suspended in water) used – up to 99.5% – and between 5% and 2% is made up of the chemicals used (usually proprietary). The difference in the concentration is due to the differences in the local geology. Correspondingly, acid is an addition to "unclog" the gas reservoir and biocides are used to stop microorganisms from forming in the fractures. Then, more chemicals are added to stop corrosion and scale buildup; viscosity enhancers and chemicals reducing friction are also in the blend (Hoffman et al., 2014).

An environmental impact and a sustainability assessment are required for any place developing shale gas industries. According

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to European Union's (EU) environmental and public health assessment for the industry, vigorous regulations are needed since the risks are greater than those of conventional natural gas. EU endorses member states to prepare sustainability assessments before permitting shale gas production. Public health assessment, short and long term environmental impact analysis, effects to community and economy need to be considered (Dernbach and May, 2015).

There was mixed feelings from the environmentalist's point of view. Shale gas is supposedly a better alternative than coal. Howev-

the Southeast Anatolia Basin – as shown in Figure 1 below. These two basins are studied and undergone for exploring oil and natural gas by the state-owned Turkish Petroleum Corporation (TP) and other privately owned local and international companies. U.S. Energy Information Administration (EIA) provides the following map of shale gas reservoirs of Turkey.

TP is leading the hydrocarbon exploration activities in Turkey. The Salt Lake Basin and the Sivas Basin still need to be further explored. There have been limited studies on

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Figure 1. Shale Gas Assessment of Turkey. (Source: EIA, 2015).

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There are two major prospective basins of shale gas in Turkey – the Thrace Basin and

these two basins. As it can be seen in the map, some large metropolitan areas in Turkey are located in the locality of shale gas basins – Istanbul, Ankara, Edirne, Konya, Sivas, Gaziantep, Hatay, and Diyarbakir. Therefore, the obscurity of the safety or danger of shale gas is a matter of concern.



“In the USA, currently, shale gas production is rapidly increasing. It has come to a quarter of the nation’s total natural gas production. Yet, concerns are growing.”

“Harmful emissions also include VOCs such as BTEX (Benzene, Toluene, Ethylbenzene, and Xylene) that escape from the equipment used. Benzene is a compound that is known to cause cancer in humans. Natural gas production areas experience higher concentrations of benzene.”

In the USA, currently, shale gas production is rapidly increasing. It has come to a quarter of the nation’s total natural gas production. Yet, concerns are growing. In 2010, a movie showed tap water being set on fire and in 2012, a gossip claiming hydraulic fracturing could intoxicate drinking water of New York was caught up. However, due to unease from public, countries such as France and Bulgaria forbid hydraulic fracturing. Nevertheless, Australia gave the green light to hydraulic fracturing (Clark, 2012).

Breakthroughs in horizontal drilling techniques combined with developments in fracking technology gradually increased the economic feasibility of shale gas and American production started soaring around 2005. This – combined with rising energy prices and increasingly vast estimates of global reserves – led to growing an interest in the unconventional energy source around the world.

And about the public concerns; popularized method of unconventional gas production surely worries large numbers of the public. Possibility of spillages and leakages, increased wastewater production, water distress and water withdrawals, air pollution, plummeted water quality, impact to the surrounding ecosystems, increased traffic (especially heavy duty machinery and trucks), chemicals used, aesthetic worries, erosion, and earthquakes are some of the probable problems coming to one’s mind while thinking about hydraulic fracturing. This paper will try to bring pros and cons to the reader as it is mostly a literature and press review what opinions and facts are available regarding the subject.

AIR POLLUTION AND THE CLIMATE CHANGE

Air pollution is caused by leakages, maintenance exhausting (as in pneumatic valves, storage tanks, during dehydration etc.), routine processes and transferring the natural

gas. Greenhouse gases and the natural gas itself (the composition varies) go into the atmosphere (Alvarez and Paranhos, 2012) and methane (CH₄) makes up majority of the mixture of natural gas; also, methane is the main air pollutant resulting from the natural gas industry.

Succeeding, volatile organic compounds (VOC) and nitrogen oxides (NO_x) cause ozone pollution near the surface of earth. In areas extensively extracting natural gas the concentrations of VOC and NO_x may become significant – the biggest producers of ozone precursors in Colorado (according to Colorado Department of Public Health and Environment) and in Texas (Alvarez and Paranhos, 2012). Additionally, in the Haynesville Shale formation (stretching between Arkansas, Louisiana, and Texas) air pollution models propose rising of ozone pollution due to ozone conveyance near natural gas production fields (Kemball-Cook et al., 2010). Harmful emissions also include VOCs such as BTEX (Benzene, Toluene, Ethylbenzene, and Xylene) that escape from the equipment used. Benzene is a compound that is known to cause cancer in humans. Natural gas production areas experience higher concentrations of benzene. This was observed in Texas (Whitelet and Doty, 2009) and in Colorado (Coons and Walker, 2008).

Particle pollution also rises in the air because of these operations. With the handling of proppants, silica dust becomes an issue. Silica dust causes silicosis when it hits the lungs of people (Hoffman et al., 2014).

Some of the hazardous air pollutants found in the neighborhood of natural gas and oil wells are H₂S (hydrogen sulfide) and hydrocarbon compounds.

Compressor engines produce formaldehyde in their exhaust gases. Likewise, formaldehyde is a hazardous air pollutant and it was reported that a 37%-solution of 30 mL caused death in adult humans (Centers for Disease Control and Prevention, 2016).



Concerns were born as the unconventional natural gas production increased. The issue is on the table for only two decades, so, still, further research is needed. Air emission problems were analyzed and it was seen that people residing within 800 m (0.5 miles) from unconventional natural gas wells carry a bigger health risk than people living further than 800 m (0.5 miles) from these developments. The same study reported 67% more excess cancer risk for people living within the 800 m (0.5 miles) radius of natural gas wells than the people residing outside the circle – increasing from 10 per one million residents to 6 per one million residents (Mc Kenzie et al., 2012).

On the contrary, Sierra Research Inc.'s report on health risk assessment suggests that excess risk cancer risk and non-cancer health hazard indices did not show a significant difference according to their calculations when compared with Environmental Protection Agency's (EPA) data for given areas (Walther, January 2011).

There is a growing public opinion against fracturing and shale gas production. People living around natural gas development sites claim to be suffering from being nauseated, feeling lightheaded, and even claim their noses bleeding (Shogren, 2011). The reporter also adds that people cannot locate the exact source of the pollution although they are feeling the downsides.

Moreover, another news story includes people having muscle spasms because of the natural gas industry. The complaining parties also show their dead farm animals and claiming it is the natural gas industry's fault (Olsen, 2011). Olsen interviews the officials and they say the health issues are taken seriously. Dr. Adgate from Colorado School of Public Health co-authored a report on the air quality of the region and states that the air quality impacts are difficult to verify (Olsen, 2011).

As it is mentioned above, both story lines

hint there is "something" there but nobody can put a finger on it. There is still ambiguity in both public and scientific worlds.

Furthermore, there is still this debate – Is shale gas good or bad for global climate change? One side of the story sticks to their claims of shale gas emits less CO₂ than burning oil or coal. On the other hand, the environmentalists stand by their statement that this might not be so. The latter claim is based on studies suggesting vast methane gas leakages into the atmosphere. Additionally, the environmentalist side says this production does not guarantee to cut coal consumption. But then again, the pro-shale gas flank advocates for the idea that shale gas will lower greenhouse gas emissions and will slow down effects of global climate change till there is a full scale solution (Clark, 2012).

Like every industrial activity, any drilling activity pollutes the air. Exhaust gases from the heavy machinery and trucks with the addition of lifted dust are risks to human health. It is reported that ozone levels near some shale gas wells are competing with major cities with pollution problems. Methane pollution rises with back flows and well testing; also by flaring the excess amount of gas (Hoffman et al., 2014).

Advocates of shale gas are in favor since it produces half the CO₂ of what coal produces and 2/3 of CO₂ what oil burning does. In the total balance, when considering the methane leakages during production of shale gas, using shale gas as an energy source still has a large impact on the atmosphere. While we are cutting down our CO₂ emissions, this process emits a more powerful greenhouse gas i.e. methane. Although, a life cycle analysis is yet needed to assess the combined effect of shale gas to the atmosphere, a report written in 2013 states a promising improvement in 190 hydraulically fractured natural gas wells in USA have managed to lower their methane emissions by 99% (Hoffman et al., 2014).

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“Depletion of fresh water and contamination of these water resources cannot be sustained forever. A drastic finding by Prof. Ingraffea of Cornell University states that all natural gas wells leak sooner or later, some of this happens immediately and some in a few years.”

“A horizontal hydraulic fracturing well consumes great amounts of water – 15 to 30 thousand tons of water – which is mostly drawn from water bodies in the surrounding area within a short time frame of about a week.”

In the report titled “Can Shale Gas Help Accelerate the Transition to Sustainability?” it is inscribed that in ten years between 2005 and 2015, the greenhouse gas emissions dropped by 10%. Replacing highly polluting energy sources with natural gas contributed to this improvement. The same report also adds that by switching coal with natural gas the USA is showing promise of reaching its goal (lowering its greenhouse gas emissions by around 17%) of the 2009 Copenhagen Accord under the United Nations Framework Convention on Climate Change. This was possible by building new combined-cycle natural gas plants that emit only 1/3 of CO₂ gas produced by coal power plants. Up till now, methane leakage is a big step back in the positive contribution to lowering greenhouse emissions (Dernbach and May, 2015).

WATER POLLUTION AND HYDROLOGICAL PROBLEMS

While boring for shale gas, multi-layered steel casings are used to protect underground aquifers of water. This minimizes – if not eliminates – physical and chemical contact between shale gas and the chemicals used with the underground water bodies. Adding to the problem, there are tens of thousands of new shale gas wells are projected on the reserves. These new wells will be closely located and will withdraw massive amounts of water from the system. Depletion of fresh water and contamination of these water resources cannot be sustained forever. A drastic finding by Prof. Ingraffea of Cornell University states that all natural gas wells leak sooner or later, some of this happens immediately and some in a few years (The Water Footprint of Shale Gas Development, September 10, 2012).

Water quantity and water quality are likely to be altered in the surrounding area of shale gas extraction. Roads and well infrastructure cause disturbance to the surface structure. These disturbances alter hydrology and sediments and these may change sedimentations

and nutrient weathering in the water bodies. A horizontal hydraulic fracturing well consumes great amounts of water – 15 to 30 thousand tons of water – which is mostly drawn from water bodies in the surrounding area within a short time frame of about a week. This drastic interference changes the system especially during low water flow seasons. Next, this withdrawn water mostly stays inside the fractured well, yet, what is returned from the well must be treated off its added chemicals before being discharged into the water system. Moreover, nitrogen emissions tend to increase as the shale gas wells are developed which may cause deposition in the local area. Following, up to 1/5 of the fluids used during shale gas well development tend to reappear on the face of the earth. Next, this fluid contains up to 1/4 of a million total dissolved solids, toxic materials, and cancer causing chemicals (Gottschalk et al., 2012). Nonetheless, when fracturing finds an already existing fault, then chemicals used in the process would travel along these faults and contaminate freshwater aquifers.

Garfield County in Colorado is home to shale gas production. Studies were undertaken and possible contact with hazardous emissions is seen in these various studies. Still, this paper underlines that there are no planned observations of surface and sub-surface waters and the authors request a water monitoring scheme of whose results must be made available to public (Witter et al., 2008). On the other hand, it is stated that concentrations lower than regulatory standards in Garfield County in Colorado still cause health problems and if health risks are to be aimed to be lowered this issue should be taken seriously (Glass et al., 2005).

Without misgiving, moving immense amounts of water from the surrounding system will cause problems. This is because of the fact that this water is mostly not recycled back into the water system. Especially, in water-scarce regions the withdrawal of millions of gallons of water will bring distress into the hydrology of the area. Additionally, some

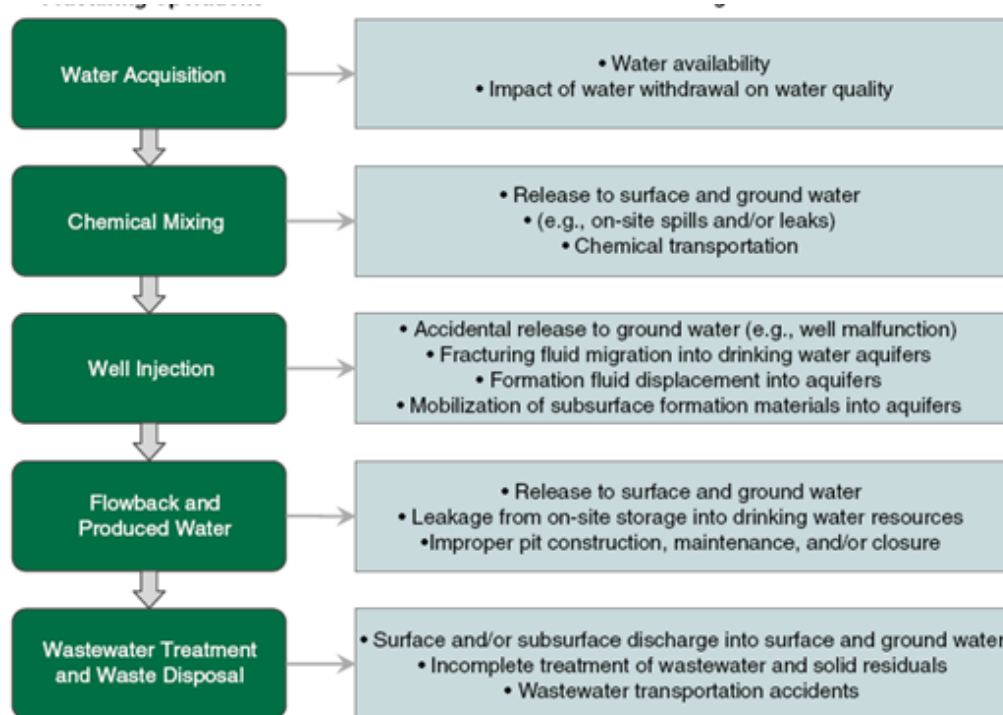


Figure 2. Water Use in Hydraulic Fracturing Operations. (Source: US EPA, 2011).

companies in the US have managed to treat the water they contaminated and reuse it in order to lower their hydrological impact (Energy and Climate Change Committee - Fifth Report, Shale Gas, 2011).

In the figure below, a diagram of possible water pollution issues are presented. It is a brief summary of ways of water contamination.

Once again, different reports come about the safety of hydraulic fracturing for shale gas. For instance, drinking water contamination with the chemicals used during processes or with methane gas is the strongest debate. EPA admitted there is an existing connection in the example of Wyoming community. Though, more recent articles from University of Texas determined that these issues can be lessened by improved drilling operations (Clark, 2012).

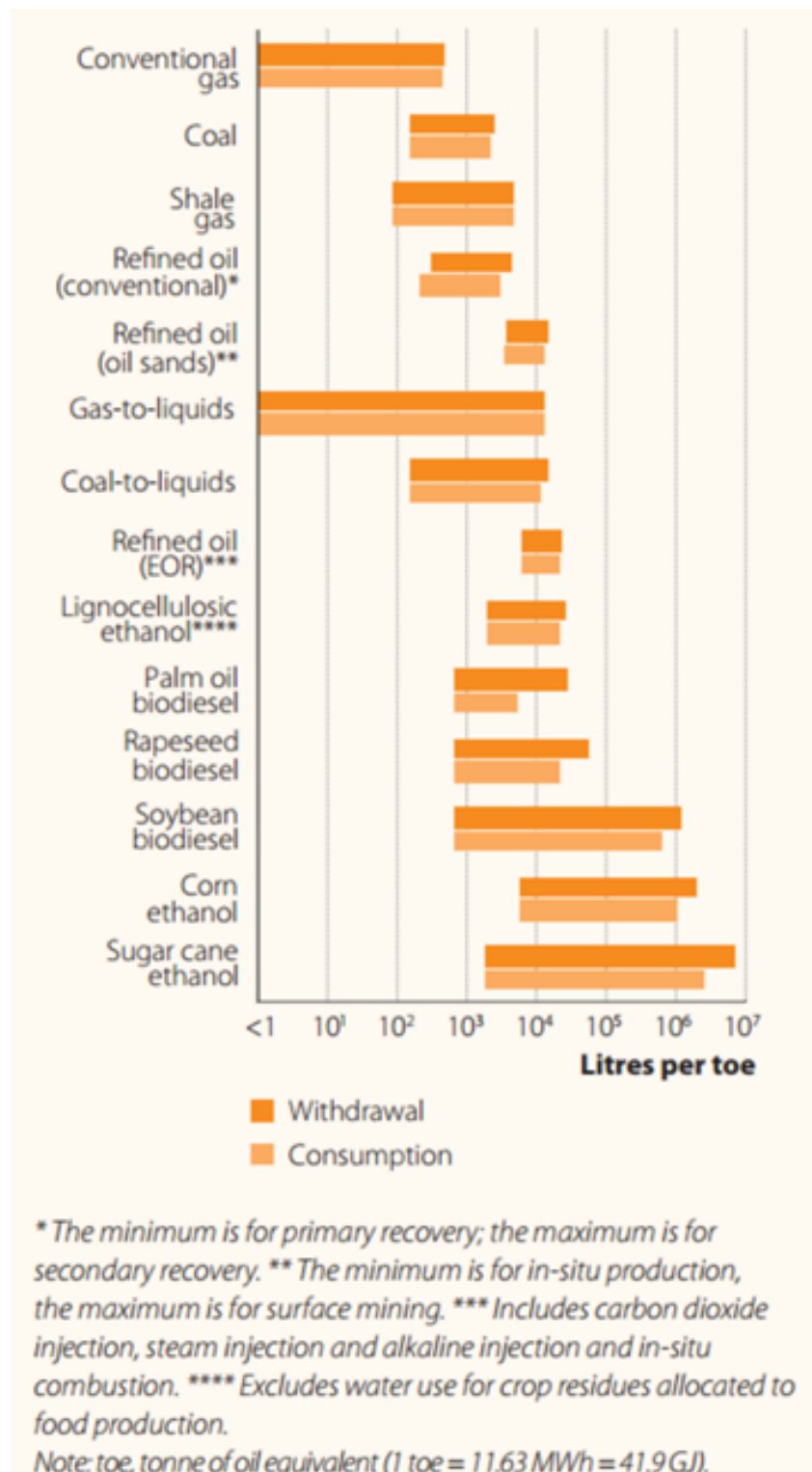
In the study “Water Pollution Risk Associated with Natural Gas Extraction from the Marcellus Shale”, the authors list trails of

water contamination - transportation spills, leaks from well casings, leaks through fractured rock, drilling site surface discharge, and wastewater disposal. These trails of contamination were studied statistically. The biggest cognitive ambiguity was for waste water disposal and the infrequent but severe effect-causing retention pit failures (Rozell and Reaven, 2011).

The same study above suggests probability of contamination by fracture migration is minor to the risk of contamination by wastewater disposal problems. Therefore, the authors call for further research in the area of water disposal pointing out that each well discharges around 200 tons of water that is chemically contaminated (Rozell and Reaven, 2011).

Once again, on the opposition side, The Geological Society states there is no proof of aquifers being polluted by hydraulic fracturing operations since shale gas formations are located hundreds of meters below aquifers (Energy and Climate Change Committee - Fifth

“The biggest cognitive ambiguity was for waste water disposal and the infrequent but severe effect-causing retention pit failures.”



“the journalist reports EPA’s findings of synthetic chemicals and oil (such as methane, ethane, propane, diesel oil, and phenol) remainders in the drinking water supply in a shale gas zone.”

Figure 3. Water Withdrawal and Consumption for Different Fuel Productions. (Source: The United Nations World Water Development Report, 2014).

Report, Shale Gas, 2011). However, even if fracturing fluids do not reach an aquifer, still their travel outside the aimed area is called “fluid leak off” and is a pollution source.

In addition, in Figure 3, the impact on water by different energy sources is given. The minimum amount of water needed for shale gas extraction is shown to be minimal according



to the graph.

Figure 3. Water Withdrawal and Consumption for Different Fuel Productions. (Source: The United Nations World Water Development Report, 2014).

In the Norwegian press (Stavanger Aftenblad, 28.09.2012) the journalist reports EPA's findings of synthetic chemicals and oil (such as methane, ethane, propane, diesel oil, and phenol) remainders in the drinking water supply in a shale gas zone.

Coming back to SIWI's report, it continues by stating that regulations and regulators have been lenient. Noting that, the shale gas industry is exempt from the Clean Water Act, the Safe Drinking Water Act and five more regulations in the USA. Once more, the companies can keep their fracturing fluid formulas secret. Then, there is the potential risk of methane contamination of drinking water. Methane catches more heat than carbon dioxide but it has a shorter half-life in the atmosphere. This leakage can occur if the well and the pipes are not properly built or maintained. Also, the amount of produced waste water that returns alternates between 15% and 300% according to the geological structure; this recovered water is transferred into tanks or pits to be later pumped into deep wells. The flowback water spillages affect well workers and the population in the surrounding area (Hoffman et al., 2014).

It is possible to say that there is a wide spectrum of chemicals used in fracturing fluids. The number can go as high as 750. Due to secrecy of the composition of these fluids it can be a challenge to identify all of them. In Commonwealth of Pennsylvania and State of West Virginia in the USA more than 300 of these chemicals that are used in the Marcellus Shale have been acknowledged. Carcinogenic properties of some of the chemicals are known, besides, these chemicals also affect the endocrine system, the nervous system, the respiratory system and harm the organs. Still, even if non-toxic chemicals were used,

the recovered water coming from the underground carries chemicals from the shale formation – sodium, chloride, bromide, arsenic, barium, and radioactive materials that are naturally found in the shale formations. One of the radioactive materials identified was Radium-226 with a half-life of 1,600 years which can cause lymph, blood, and bone cancer (The Water Footprint of Shale Gas Development, September 10, 2012).

SOIL POLLUTION, EARTHQUAKES AND SURFACE RUNOFF

Following, hydraulic fracturing is under operation in countries like Australia, Poland, the United Kingdom, and China. Nevertheless, the British felt many tiny earthquakes in 2011 which put the hydraulic fracturing operations on hold briefly – in April 2012 the UK government advisers admitted these tremors (tiny earthquakes) were associated with these operations, conversely, their report advised these processes could start again (Clark, 2012).

Worries about earthquakes brought new regulations in the USA declaring requirements for horizontal well drillings up to 5 km away from confirmed faults or other earthquake zones to first install seismic detectors before getting their permits. If there are earthquakes recorded greater than the Richter scale of 1.0 in the bed of the shale gas then the hydraulic fracturing will be halted for the foreseeable future. Due to an increase in the number of recorded earthquakes in Middle USA, the states of Oklahoma, Ohio, Texas, and Kansas are looking forward to having more strict legislations and standards for hydraulic fracturing operations (Hoffman et al., 2014).

According to The Wall Street Journal, more than 15 million people in the USA live within a radius of 1.6 km (1 mile) shale gas well drilled since the year 2000. This is more than the population of New York City. Anything

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“Storm water and surface runoff occur naturally. However, interruptions of fracturing practices upsurges volume and chemical composition of runoff. There is also contamination by contact with the equipment, and storage units”

“Then again, like every system and technology there are imperfections with fracturing.”

going wrong in this area almost immediately affects this population due to closeness of houses, schools, farms and other settlements (Dernbach and May, 2015).

Reports also suggest deforestation of shale gas sites is also a problem. This brings wishes for suspension of hydraulic fracturing by the environmental activists (Clark, 2012). When considering ten thousands of wells being drilled close to each other, then, this deforestation problem grows within a confined area and propagates outwards. Besides, approximately 30,000 m² of land is cleared for one shale gas well pad. There is also extra land usage for roads, storage units, retention pits, vehicle parking, and equipment usage and so on (Cooley and Donnelly, 2012).

The Pacific Institute’s report on fracturing underlines some issues about spillages, leakages, and surface water runoff. According to the report, spillages can happen at any phase of the process. Transportation of chemicals and on-site preparation of fluids are prone to spillages. Storage tanks and retention pits may also leak if not properly handled. Also to mention, human error and deliberate dumping of contaminated fluids may cause disasters in the surrounding. Industrial waste discharges, wastewater impoundment construction regulation violations, and defective pollution prevention applications are among violations of shale gas producers (Cooley and Donnelly, 2012).

Storm water and surface runoff occur naturally. However, interruptions of fracturing practices upsurges volume and chemical composition of runoff. There is also contamination by contact with the equipment, and storage units (Cooley and Donnelly, 2012). Storm water runoff ends up in water bodies in the surrounding, and when the runoff enters streams they can travel further.

CONCLUSION

Concluding the article, it is vital pointing

out that there are always positive and negative views on every aspect of hydraulic fracturing and shale gas extraction. Starting with well boring and well casing... A properly cased well is intact, therefore, if its integrity is sustained, it should possess little risk of contamination of water sources from the casing itself. Still, as mentioned before, all wells are prone to leaking and harming their surroundings.

SIWI’s detailed report makes a good summary. The authors express that there is a requirement for robust policies and an in-depth check list (complying with the most recent and scientific findings) of benefits and practices of the hydraulic fracturing process. Furthermore, there is no doubt that there is a hole on potential effects of hydraulic fracturing and this hole needs to be filled as soon as possible to make sound decisions possible. The effects include water problems, air quality damage, global climate change, increased earthquake occurrence, and negative effects on the human population and the ecosystem. Encouraging newer hydraulic fracturing technologies is necessary in order to improve production and to lessen its reverse effects. Companies should be willing to share the information of their water use and other natural impacts to be observed and measured (Hoffman et al., 2014).

Natural gas capturing technology should be applied to necessary production sites in order to reduce greenhouse gas emission and environmental impact. EPA’s Natural Gas STAR program lists recommended technologies and practices for methane emission lessening. These references list suggested compressors, engines, dehydrators, directed inspection and maintenance, pipelines, pneumatics, controls, tanks, valves, and wells for low-cost and effective methods and technologies in combatting reverse effects of natural gas production (epa.gov, 2015).

Then again, like every system and technology there are imperfections with fracturing. Dr. Jonathan Craig of the Geological Soci-



ety states that less than 1/3 of the fractures produced contribute to gas production; therefore, he is underlining the necessity of developing improved methods that would be more efficient, thus, using less water and less chemicals. Once more, cooperation of companies extracting shale gas would bring more applicable solutions to waste handling and co-owned wastewater disposal units would cut the distance travelled by the waste itself and energy costs (Energy and Climate Change Committee - Fifth Report, Shale Gas, 2011).

Moreover, the American and the European methods of approach to fracturing are different due to some nuances such as the density of population, strictness of environmental legislations, available land area etc. The European environmental legislations are stricter than their overseas counterparts. The European population density is greater than in remote areas of Texas or Colorado, for example. Hence, in Europe fewer wells are to be developed, improved technologies such as multiwell pad technology are to be used (Energy and Climate Change Committee - Fifth Report, Shale Gas, 2011). It would also be wise to use experience of older and current practices. There is no need to reinvent the wheel at this point; however, this approach may not be approved by companies that see their practices as their intellectual property.

Most importantly, there is deficiency of sound data which is a key obstacle in determining or assessing shale gas and hydraulic fracturing related risks. Business owners strongly prefer keeping their methods and operations secret in order to holding on to their own advantages. Furthermore, the other limitation to assessment of environmental risks is that there are inadequate quantity of peer reviewed articles or academic work. It is also observed that writings about environmental risks about the issue are one sided, written by industry-sided or environmentalist-sided authors. Also, the papers on this issue are not peer reviewed. Thus, it can be said that opinions are told by authors who

delay an all-inclusive investigation of environmental and health related risks. Thus, risk minimization is further postponed. As a final point, it is important to note that there are misperceptions in the definitions related to hydraulic fracturing and shale gas extraction. For instance, it is argued by the American Petroleum Institute's (API) constricted description of hydraulic fracturing that there is no connection between shale gas extraction and groundwater pollution. API and other industries deny witnessed proofs of groundwater contamination – as in Commonwealth of Pennsylvania and State of Wyoming (Cooley and Donnelly, 2012).

Overall, further studies in this specific area are necessary to clear out questions over the potential risks caused by hydraulic fracturing and the shale gas extraction. Only after shedding light on the potential risks, we can lower the impact of shale gas risks and proceed to mitigate environmental stress it has been causing.

ABBREVIATIONS

API: The American Petroleum Institute

BTEX: Benzene, Toluene, Ethylbenzene, and Xylene

EIA: U.S. Energy Information Administration

EPA: Environmental Protection Agency of United States

EU: European Union

NOx: Nitrogen oxides

SIWI: Stockholm International Water Institute

TP: Turkish Petroleum Corporation

VOC: Volatile organic compounds

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“Business owners strongly prefer keeping their methods and operations secret in order to holding on to their own advantages.”



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TURKEY'S NUCLEAR ISSUE - THE PAST AND FUTURE DYNAMICS

by Gizem Ebrar Özel

“Turkey has had plans to build a nuclear power plant since the 1970s. A nuclear power has been a strategic aim for Turkey since then.”

“Lignite, pit coal, asphaltite, oil shale, crude oil, natural gas, Uranium and Thorium are all present as fossil resources whereas hydraulic energy, geothermal energy, solar and wind power, and biomass energy all represent potential renewable energy resources.”

ABSTRACT

This article analyzes Turkey's whole nuclear issues in conjunction with nuclear history, nuclear future plans, possible risks, scenarios, and suggestions as nuclear energy is a subject, which is of strategic and comprehensive character. Turkey has had plans to build a nuclear power plant since the 1970s. A nuclear power has been a strategic aim for Turkey since then. All these years, restraints, economic deficiencies, diplomatic troubles, and technological deficiencies have delayed Turkey's nuclear targets and plans. Within the last decade, economic growth and stable development signified a new turn in terms of nuclear energy. The article aims to examine the utility of nuclear energy in Turkey and to present whether or not nuclear energy might offer an important solution for Turkey's energy future.

TURKEY'S ENERGY RESOURCES AND ELECTRICITY GENERATION - GENERAL OUTLOOK

Turkey's energy consumption and exports are rapidly increasing and this increase in demand on energy makes all the issues strategic in terms of energy politics. The development of economy and finances places energy as a premium in political spheres. Various factors affect both the demand and supply side of the global energy sector, where Turkey is one of the main actors on the consumer side. Consequently, economical developments in Turkey are expected to continue in the upcoming years and Turkey's energy needs as well. In order to understand Turkey's

energy future, the current state of energy resources and electricity generation should be overlooked and analyzed thoroughly so that substantive analyses, suggestions, and conclusions can be realized.

Lignite, pit coal, asphaltite, oil shale, crude oil, natural gas, Uranium and Thorium are all present as fossil resources whereas hydraulic energy, geothermal energy, solar and wind power, and biomass energy all represent potential renewable energy resources. Natural gas and lignite have a high rate in distribution of installed capacity of fossil fuel plants by resources as it can be seen from Figure 1. Imported coal, fuel oil, and pit coal exist subsequently. When the energy source potential of Turkey is examined, it can be seen that lignite has highest potential with 12.5 gigaton and pit coal follows it with 1.34 gigaton. Renewable energy potential takes its place as having a high rate in pie chart following these two fossil fuels. Wind power is gradually expanding in capacity, mainly in the Aegean and Marmara regions. Turkey has reached to 6.6 GW of installed capacity as of July 2016. Turkish government has a target to increase wind capacity tenfold by 2020. If the target reached, anticipated futurity energy leader becomes the wind power.

Renewable energy sources have a high share of energy supply in Turkey and especially hydroelectric power accounts for about 35% (as of July 2016) of the electricity demand. The percentage of solar energy power capacity is also continuously rising in that pie chart. Turkey is located at a sufficient zone that makes it a sun-soaked country. The total yearly insulation period is approximately 2,460 hours per year and 7.2 hours per day. These qualities functionalize Turkey to be a great solar power. High solar energy poten-

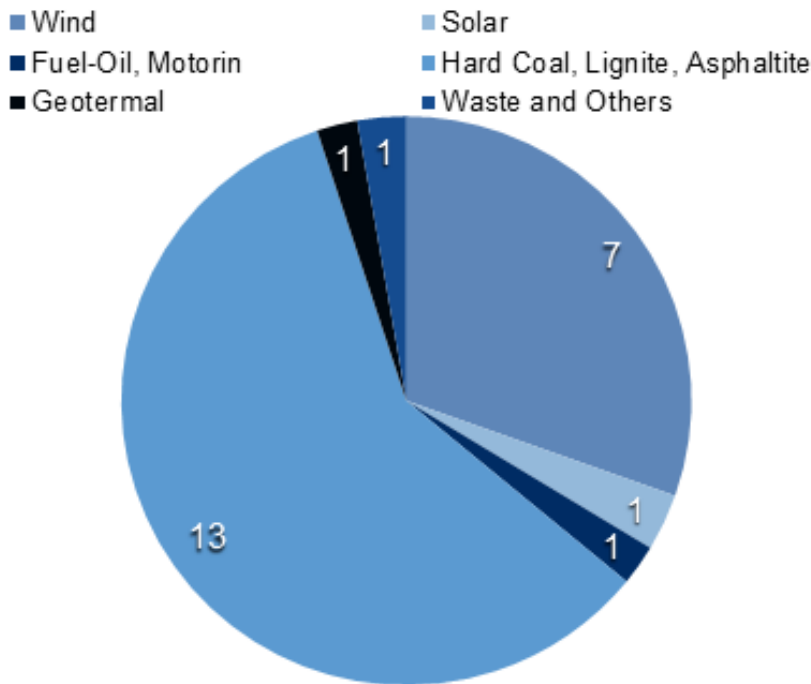


Figure 1: Installed capacity percentages for electricity generation by sources in Turkey as of July 2016. (Source: TEIAS).

tial and land availability give an opportunity for solar energy to be the most important clean energy resource for Turkey as it has a puissant demand in energy. The country also develops its hydropower potential, which is actually the only renewable source that is capable of providing huge amounts of renewable power. Hydropower holds an important advantage on lower operational costs, rather than its opponent thermal sources. It is perfectly superior to the rest of the sources in terms of fuel cost, which is zero in hydro plants. But, despite this advantage, and low construction and labor costs, investments in and operations of hydro plants in Turkey are lower compared to developed countries. Geothermal energy is set to grow rapidly against hydropower. Turkey is one of the hottest markets for geothermal plants with its theoretical geothermal potential of 31,500 MWt according to Turkey's Mineral Research and Exploration Agency (MTA). With this high resource potential, Turkey ranks 7th in the world and 1st in Europe.¹ Turkey has a potential for 1.000-2.000 MW but only 160 MW are currently installed and the government plans to have 600 MW more installed

by the end of 2023.²

If all energy resources and the markets are considered, it can be seen that nonrenewable resource reserves are utilized more comparing to the renewable energy sources. Natural gas has especially been the most used energy resource in the electricity market in Turkey. Statistics show that its demand is expected to increase by 2.9% annually until 2020.³ In spite of this rising demand, Turkey has a limited natural gas production capacity. Natural gas production is operated in accordance with the Petroleum Law. Pursuant to the statics of EMRA, the highest market share in natural gas production belongs to Turkish Petroleum Corporation (TPAO).⁴ Moreover, Turkey sustains average of 98% of its natural gas consumption from the imports. It can, thus, be said that Turkey is dependent too much on foreign natural gas. However, thanks to its geostrategic location, Turkey provides opportunities for investments in pipeline projects such as TANAP. The similar circumstances are true for the oil resources and markets as well. Turkey has a limited oil production capacity because of geographical

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“Turkey’s main energy suppliers are Russia, Iran, Azerbaijan, Algeria, Nigeria, Qatar, Saudi Arabia and Iraq with Russia and Iran being the biggest suppliers.”

“Despite the limited production from fossil fuel resources, Turkey’s demand is rapidly rising, causing increase in oil and gas imports. The solution lies in the diversification of energy sources.”

factors that are extremely affected by active fault systems. This situation makes the country poor of oil supplies and, for this reason, all market activities such as refining, storage, distribution, and transmission depend on imports (more than 90% of total liquid fuels being imported). Despite its terrestrial lack of fossil fuel reserves, Turkey is well placed to serve as a hub for oil and natural gas supply headed to Europe and other Atlantic markets from Russia, the Caspian region and the Middle East.⁵ The country is located in between energy consumers and producers. Turkey’s oil pipelines extend beyond 3,400 km and are part of an international and domestic web. Turkey’s oil pipelines are of the utmost significance for Azerbaijan and Iraq since Baku-Tbilisi-Ceyhan (BTC) and Kirkuk-Ceyhan are their main export outlets.⁶ The BTC, thus, allows Azerbaijan to become less dependent on Russia and Iran for its exports. Turkey’s geographical advantages might construct the regional energy web in and around the country.

ANALYSIS OF THE ENERGY PROBLEM IN TURKEY

Energy is an essential component of all economic activity and the provision of all services. Hence, preserving energy is one of the most vital actions for governments and energy security and thus it is linked with all political activity. If we examine Turkey’s actions to provide energy security for present and future, the major problems appear as to be fossil fuels as the country has limited reserves whereas infinite reserves are highly concentrated in certain regions in the World. Middle Eastern countries and the Russian Federation possess almost 70% of the world’s oil and gas reserves.⁷ Thus, each parameter of the energy security can be accepted as having a direct connection with geographical distribution of energy resources and reserves.

Turkey’s energy security challenges can be classified into two main categories. (1) The above-mentioned energy supply problem represents the first category here. Turkey’s

main energy suppliers are Russia, Iran, Azerbaijan, Algeria, Nigeria, Qatar, Saudi Arabia and Iraq with Russia and Iran being the biggest suppliers. Turkey’s energy security axis is, therefore, highly dependent on Russia and Iran. The reliability of these suppliers is a subject of argument in terms of energy diplomacy. Probable and mature disagreements with these suppliers put energy security at risk. The formula to keep energy under control is to highly diversify the suppliers. Turkey is trying to find new suppliers to diversify its gas and oil supplies and signing long-term contacts with many countries like Nigeria, Egypt, Azerbaijan, and Turkmenistan.⁸ These pursuits represent attempts to decrease dependency on the main suppliers and can be seen as the first step to achieving energy security.

The limited production from domestic sources have resulted in a high dependency on energy imports. Hence, (2) another important challenge for the country is high dependency on imported fossil fuels. While the first problem was about the reliability of suppliers, the second focuses on energy supply varieties. Turkey’s domestic oil and gas production is insufficient to meet the country’s energy need. Despite the limited production, the country’s demand is rapidly rising, causing increase in oil and gas imports. The solution lies in the diversification of energy sources. The rate of imported fossil fuels must be decreased by adding more sources to the energy supply equation. In this sense, it can be said that creating an energy source mix is vital to solve the problem because dependency on a single resource harbors both economic and political risks. At this point, Turkey should evaluate its renewable energy alternatives such as wind, solar, geothermal, and hydro and independent energy types like nuclear. Without this type of energy formula, Turkey will be under risk of energy supply distribution and be volatile to energy prices.

Other challenges in terms of energy for Turkey are energy saving and resources planning. Energy saving is completely involved with energy efficiency and storage capacity.



It is generally understood as less consuming, though actually evaluating energy wastes and preventing energy loss.⁹ According to statistical analyses, Turkey can save up to 25% of its energy consumption¹⁰ and this ratio can thus bring a remarkable acquisition for Turkey's economy. On top of that, the amount of loss and illegal electricity usage is higher than 20% and the average annual damage from these represents a big deficiency for the economy. Moreover, the economic measures suggest that storage is a big problem. Energy storage provides short-term security against unexpected disruptions, accidents, sabotages, and technical failures. For such reasons, Turkey generated its first underground storage facility in Silivri. Despite its functionality, capacity of the facility is not enough to meet the demand against mentioned risks. Accordingly, Turkey should enhance its storage capacity.

Finally, possible and more valuable energy resources should be discussed for Turkey's energy future. There are too many prominent energy types for the solution like bio-fuels, GTL (Gas to Liquids), CTL (Coal to Liquids), Hydrogen, fuel cells, and nuclear energy. All these types offer advantages for Turkey. Non-conventional energy types are mostly dependent on technical developments and economic structure comparing to those of conventional energy resources. With all these keys mentioned above, it can be understood that nuclear energy is one of the most common solutions for countries that aim to succeed energy security. Turkey has many reasons to go nuclear. It is an undeniable fact that nuclear power is the main source of energy in some of the major developing countries in the world.¹¹ In this regard, France will make of a good example thereby, generating %75 of its electricity from nuclear energy. France now claims a substantial level of energy independence and almost the lowest cost electricity in Europe.¹² Nuclear technology can have an important role to enable an increase in the share of renewable energy sources as well as fossil fuels to meet a more sustainable energy mix demand.¹³

Nuclear energy has the lowest impact on the

environment. A little amount of Uranium, a raw material of nuclear energy, produces a great amount of clean energy and a smaller use of fossil fuels means lowering greenhouse gas emissions (like carbon dioxide and methane) that are largely responsible for the greenhouse effect. The most promotive future for nuclear energy is actually reliability. Traditional sources of energy like solar and wind require sun or wind to produce energy. They need fertile dates. However, nuclear energy doesn't require a special time. Nuclear energy can be produced continuously from the plants even in case of rough weather conditions and the production can be provided 7/24. Aside from these main advantages, nuclear energy presents other benefits such as powerful and efficient output, cheap electricity, low fuel cost, economic advantages in setting up nuclear power plants, and easy transportation. Optimal and minimal utilization of energy resources in generation is preferred condition for any nation. The economic advantages in favor of the countries prompt to choose rational variants. From that point of view, Turkey will be able to significantly reduce energy bills due to the high rates of production. As economic advantage, the raw materials import for nonrenewable energy will be decreased accordingly. The amount of energy production depending on a variety of raw materials addresses that raw material of nuclear power generates more electricity than any other raw materials. TAEK provides figures on electricity generation by types of raw materials as follows: 1000 gram coal produces 3 kWh electricity, 1000 gram oil produces 4 kWh electricity, 1000 gram Uranium produces 50,000 kWh electricity. The figures prove that nuclear materials are a highly efficient source to produce energy at a very little cost. These figures are given on Figure 2.

Uranium, Thorium and specifically their certain isotopes are called radioactive raw materials that are used as resources in nuclear plants. Uranium is considered as the main raw material of nuclear fuel and today, it is commonly consumed as fuel in nuclear power plants. To use Uranium in electricity

"The amount of loss and illegal electricity usage is higher than 20% and the average annual damage from these represents a big deficiency for the economy."

"The most promotive future for nuclear energy is actually reliability. Traditional sources of energy like solar and wind require sun or wind to produce energy. They need fertile dates. However, nuclear energy doesn't require a special time and can be produced continuously."

“The cost of solar power is now cheaper by 80%, and wind power by 30%. IEA estimates that 60% of energy investments globally in the next 25 years will be on renewable energy sources.”

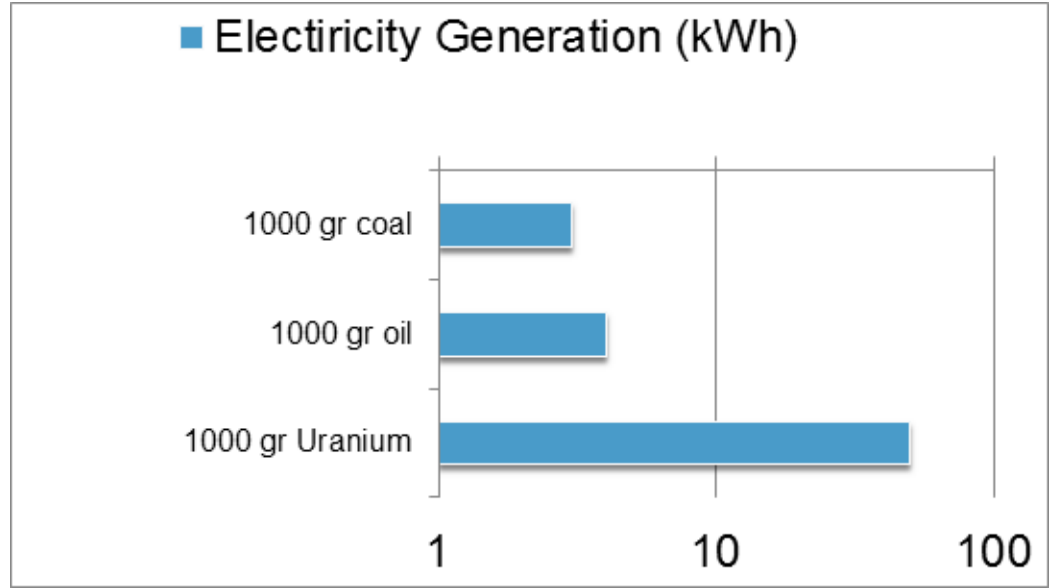


Figure 2: Comparison on electricity generation by types of raw materials. (Source TAEK).

“According to General Directorate of Mineral Research and Exploration’s (MTA) technological and scientific works and findings since 1958, there is quite important radioactive raw material reserves in Anatolia.”

generation, U235 isotope, which has ability of divisibility (fissile material) of Uranium, must be occurred with enrichment process. If Thorium is not a fissile material, it cannot be just used alone. It requires a neutron and a fissile material like U233 isotope to be able to use as nuclear fuel. According to General Directorate of Mineral Research and Exploration’s (MTA) technological and scientific works and findings since 1958, there is quite important radioactive raw material reserves in Anatolia. See Figure 3 for reverse distribution of nuclear materials. Turkey’s Uranium reserves has 0.07% rate that equals to 9,129 tons. The Thorium potential of the country

is 0.21% that totals to 380,000 tons.¹⁴ Most of the radioactive raw material reserves are situated in the western parts of Turkey. The largest known Uranium bed is located in Köprubasi area, Manisa. Thorium bed lays in Beylikahir, near Eskisehir-Sivrihisar region.

ORIGINS OF TURKEY’S NUCLEAR HISTORY

The world has stepped into nuclear age on December 20th, 1942 by realizing self-feeding chain reactions.¹⁵ This age was going to



Figure 3: Turkey’s Radioactive Raw Materials Map. (Source: TAEK).

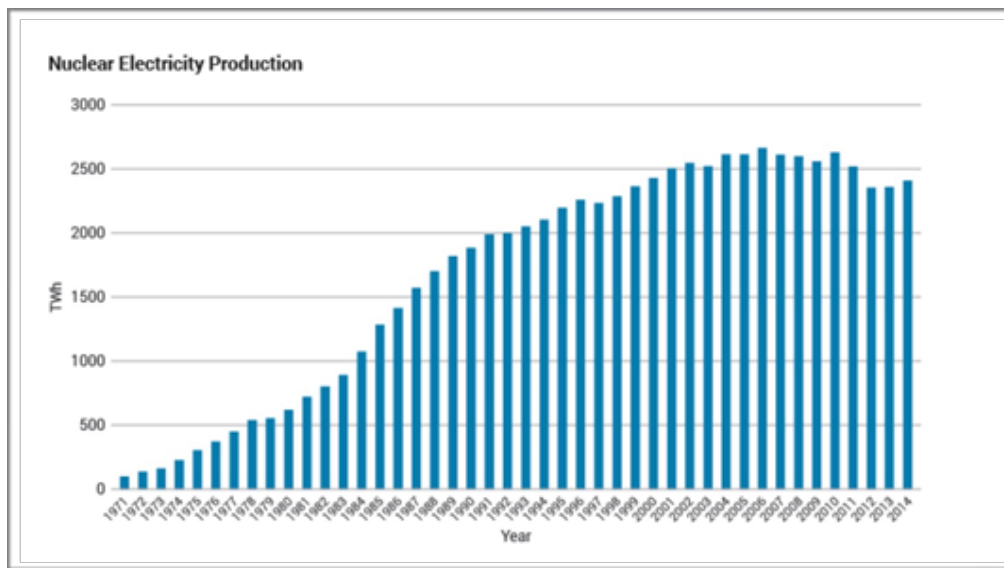


Figure 4: Nuclear electricity production in the World. (Source: World Nuclear Association).

bring too many alterations to Earth and this nuclear movement has affected a lot of countries. The movement changed the meaning of power and security, so that obtaining power meant obtaining nuclear for some countries and security meant national responsibilities and international obligations. If we want to look at nuclear history and the changes it has brought, we must also look at where we stand now. Today, the world meets 11% of its energy needs from nuclear energy and this number is 21% for OECD countries.¹⁶ A graphic chart showing the world's nuclear electricity production throughout years is given in Figure 4.

Like all affected countries, Turkey also wanted to come in contact with the nuclear age. Along with the constantly changing parameters, the country has been generating strategic plans to possess nuclear energy since the feasibility studies conducted in the 1970s. After the denomination of nuclear plans, Turkey decided to build its first nuclear reactor with a 80 MW capacity in 1973. The intended address was the city of Mersin, licensed for NPP (Nuclear Power Plant) in 1976. However, that plan failed because of lack of financial guarantees by the Turkish government. Turkey's nuclear history shows us that there were several attempts to build

power plants like the Mersin NPP. All these plans were delayed not any less than eightfold between June 1998 and April 2000.¹⁷ The abandonments of these plans were about economic conditions and unsteady politic circumstances. In 2006, the government announced that it had planned to have three nuclear power plants built. Sinop and Akkuyu in Mersin were chosen cities to host the nuclear power plants (See Figure 5). Turkey has thus concluded two of the three planned regions. Drafts passed the parliament in 2007 and subsequently, a civil nuclear cooperation agreement was signed with the USA in 2008. In the same year, TETAS (Turkey Electricity Trading and Contracting Co.) called for offers and TAEK (Turkish Atomic Energy Authority) issued specifications for the first NPP in Akkuyu. Only one bid was received from 14 interested parties and TAEK and ROSATOM (Russian Nuclear Energy Corporation) signed the agreement for the Aes-2006 NPP. In the following years, the other nuclear cooperation agreement was signed with South Korea in June 2010 and then two such agreements with China in April 2012. In May 2010, Russian and Turkish head of states signed a 20 billion USD intergovernmental agreement to build the Akkuyu NPP. The decision was for Rosatom to finance the project. Following all the agreements and intergovernmental contracts being signed, start

“Today, the world meets 11% of its energy needs from nuclear energy and this number is 21% for OECD countries.”

“Turkey's nuclear history shows us that there were several attempts to build power plants like the Mersin NPP. All these plans were delayed not any less than eightfold between June 1998 and April 2000. The abandonments of these plans were about economic conditions and unsteady politic circumstances.”



“From Turkey’s historical data, it is understood that the country’s motivation for nuclear power is triggered by the energy dependency mentioned in the 4th section and the changing dynamics of the world.”

“Turkey’s peaceful stance and aim clear doubts about any struggles caused by possible uses of nuclear power in military activities as noted by the nuclear authority.”



Figure 5: Nuclear power plants planned to be built in Turkey. (Source: Google).

of the Akkuyu’s construction is expected at the end of 2016, Sinop in 2017, and the last determined region for the third NPP is decided to be in İgneada, Kiklareli in 2019.

From Turkey’s historical data, it is understood that the country’s motivation for nuclear power is triggered by the energy dependency mentioned in the 4th section and the changing dynamics of the world. Turkey’s rapidly growing energy demand requires an immediate solution and Turkish policymakers are determined that solution can be nuclear energy. The nuclear security issue is considered by the Turkish government along with nuclear supply advantages that the country has. Ankara is one of the parties that signed the Treaty on the Non-Proliferation of Nuclear Weapons, the Comprehensive Test Ban Treaty, the Wassenaar Arrangement, the Missile Technology Control Regime, the Zangger Committee, the Nuclear Suppliers Group, and the Treaty banning nuclear tests in the Atmosphere and so on.¹⁸ This active diplomatic support for international nonproliferation accounts Turkey as a reliable country for the uses of nuclear power. Turkey’s peaceful stance and aim clear doubts about any struggles caused by possible uses of nuclear power in military activities as noted by the nuclear authority.

OVERVIEW OF NUCLEAR POWER POLICY IN TURKEY

Turkish energy policy can be summarized in six main topics that shapes the three objectives of the Ministry of Energy and Natural Resources (MENA).

1. Minimize the dependency on the supply of energy sources from foreign countries.
2. Diversify of energy sources and routes.
3. Increase the rate of domestic and renewable energy sources.
4. Generation, transmission, and consumption of energy efficiency.
5. Increase state’s and private industry’s capabilities under a liberalized energy markets framework.
6. Activate policies that enforce measures to provide Turkey’s energy demand in a safe manner.

The main aim of these strategies is meant to ensure the supply security, competitiveness, and sustainability. Under these circumstances, it’s very easy and strategic to reach nuclear energy as a reliable solution. The essential



disputes in Turkey's nuclear energy is completely about nuclear risks.

The nuclear industry is surrounded by a variety of risks related to safety, operation, finance, and strategy. All the risks that might threaten Turkey's nuclear program can be classified in five categories:

1. Political.
2. Regulatory.
3. Commercial and financial.
4. Safety.
5. Public risks.

The most significant of these risks is certainly the political one, since the loose international diplomacy can be altered at the least expected moment. For instance, the conflict between Turkey and Russia following the airspace incident changed the Akkuyu NPP's fate and we cannot talk about absolute progress for the future.

Another significant risk is regulatory, since national safety requirements, site permit requirements, reactor licensing requirements, safety requirements, discharge authorizations, waste management, storage transport, and disposal requirements all need to be clearly specified as part of the regulatory framework.¹⁹ In that sense, the most substantive fact is prudential, well-though regulatory works. Commercial and financial risks depend on the company that runs the project. If an example needs to be mentioned, we can look at Akkuyu's financier, Rosatom. The company's commitment and financial risks, thus, indirectly represents Russia's commitment and risks. This is why financial risks are involved with diplomatic risks. Safety risk is concerned with engineering process. The most dangerous disadvantage of nuclear energy is without a doubt the radioactivity issue. After the 1986 Chernobyl and 2011 Fukushima incidents, the nuclear reactor technology was immediately controlled.

Some countries changed their minds about nuclear, while some proceeded with their plans by making improvements. As for Turkey, the country has not changed its nuclear agenda.

In spite of all the potential risks, Turkey has rich Uranium and Thorium reserves as mentioned above. This big and vital advantage, along with other above-mentioned energy problems all are dragging Turkey to this compulsive nuclear power. However, nuclear is also related to authorities and other countries, as well as Turkey's domestic decisions. In that sense, conjunctures should be looked at to ensure the process. Iran was a key actor for countries newly stepping into nuclear. The nuclear deal between Iran and the West generated a new circle, thus the mainstream suspicions on Turkey was mostly eliminated. Therefore, the proliferation domino theory was under control. If we look at the IAEA (International Atomic Energy Agency)'s conclusion about Turkey, additional protocols can be seen. Turkey's nuclear activities have been subject to a comprehensive IAEA safeguards agreement since 1982. That long process is shaped by two causes.

- First, the bilateral nuclear cooperation between Turkey and Pakistan in the 1980s.²⁰ According to the USA, these were corrupt trade relationships between the two countries. The investigations went on until Turkey finally took measures for a crackdown.
- Second, the IAEA's drilling into front-end materials processing and experimenting. Despite all the suspicions and investigations, the IAEA found no evidence of any undeclared or clandestine nuclear activity.²¹ The IAEA asked questions about centrifuges to Turkish scientists and still did not find any nuclear latency.

The conclusion then ended with; "... no indications have been found by the IAEA that, in its judgement, would constitute a safeguard concern."

"The nuclear industry is surrounded by a variety of risks related to safety, operation, finance, and strategy."

"In spite of all the potential risks, Turkey has rich Uranium and Thorium reserves as mentioned above. This big and vital advantage, along with other above-mentioned energy problems all are dragging Turkey to this compulsive nuclear power."



“Suggestions for nuclear power are mostly related to perception management.

Adverse opinions must arise to clearly increase awareness about breaking the taboos on nuclear.”

“Turkey lacks domestic energy reserves and this fact causes a dependency on energy imports, accompanied by supply security risks. The national and local formula seems more likely to be nuclear power. In that sense, nuclear energy offers a powerful solution and has many benefits for Turkey.”

After all the historical arguments in Turkey, nuclear policies must include reliability and technical steps should take the safety of the world, thus, not be allowed the energy attitude that creates insecurity in the region. Possible scenarios and constructive critics on security issues as like “Long term reliability of the factors that kept Turkey from acquiring nuclear weapons” should be considered for stable and reliable energy policy.

POLICY SUGGESTIONS AND CONCLUSIONS

Turkey as a middle power in Eurasia has some aspiring purposes for the future. The Turkish government aims to become a regional power in the Middle East. That essential aim concerns the energy sector and policy. The objective of becoming a regional power then turns into becoming a transit country for energy policy issues. That strategic future goal requires some professional decision making to be achieved and nuclear power is, thus, a very important step towards the realization of the Turkish objective.

Suggestions can be gathered under the management process. Nuclear energy requires robust management and control systems. These are not completely about policy, thus the technical containment needs engineering suggestions. In that sense, the suggestions for nuclear power are mostly related to perception management. Adverse opinions must arise to clearly increase awareness about breaking the taboos on nuclear. Energy authors and the Ministry should labor on nuclear as a future energy source for Turkey. Arguments against nuclear power mostly include unsafety. This thesis must be changed into a perception of safe nuclear energy. This argument can be supported with the latest generation of nuclear reactor designs that are getting safer every day. Another argument against nuclear is about supporting renewable energy. Though renewable energy is indeed environmentalist, renewable energy supplies aren't able to take over nuclear pow-

er, yet. The country thus needs to use all energy sources. The hazardous energy sources are fossil fuels like coal and oil and the environmentalist argument must actually oppose fossil fuels since these are more polluting and damaging than nuclear energy. Thirdly, it is important to prove the good intention behind the use of nuclear. It must be asserted that nuclear would supply all energy needs and all investments are for technology to generate electricity. These arguments for and against nuclear power should be considered by the authorities because this perception management can bring the end of public risks. Nuclear fuel and waste management hold an important place in suggestions. Turkey has improved nuclear cooperation relations in terms of policy. Safety and security should also be processed in a synchronized way in order to ensure reliable nuclear energy areas.

As a result, Turkey's energy demand is rapidly rising and the energy security problem is surviving with all remarkable effects. Thus, solutions should be immediately rearranged for a reinforced energy future. Turkey lacks domestic energy reserves and this fact causes a dependency on energy imports, accompanied by supply security risks. The national and local formula seems more likely to be nuclear power. In that sense, nuclear energy offers a powerful solution and has many benefits for Turkey.

In this aspect, nuclear energy appears to be one of the most efficient and effective solutions. Turkey has rich Thorium reserves and this fortune must not be omitted as mentioned above.

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USING OIL SHALE AS AN ALTERNATIVE RAW MATERIAL FOR ENERGY PRODUCTION AND POTENTIALITY OF TURKEY

by *Abdurrahman Murat*

WHAT IS OIL SHALE

Oil shale is commonly defined as a fine-grained sedimentary rock containing organic matter (kerogen) that yields substantial amounts of oil and combustible gas upon destructive distillation (retorting). Most of the organic matter is insoluble in ordinary organic solvents; therefore, it is decomposed by heating to release such materials. What derives the importance of oil shale to produce energy including combustible gas and a number of procured products is how economic it can be recovered.

Deposits of oil shale having economic potential are generally those that are at or near enough to the surface to be developed by

open-pit, conventional underground mining or by in-situ methods. Oil shales have a wide range of organic content and oil yield. Commercial grades of oil shale, as determined by their shale oil yield, ranges from about 100 to 200 liters per metric ton (l/t) of rock. The U.S. Geological Survey has used a lower limit of about 42 lt/ton for classification of federal oil-shale lands.

USES, RESERVES AND STATUS OF OIL SHALE IN WORLD

Oil shale researches that fired up the energy sector during the crisis experienced all over the world draw a sinusoidal curve. First researchers of the oil shale started producing

“What derives the importance of oil shale to produce energy including combustible gas and a number of procured products is how economic it can be recovered.”



Figure 1: A display of oil shale rock samples.



shale oil and reached the maximum level in the 1800s, but the production declined in 1859 upon the discovery of raw oil.

Oil shale studies that gained importance again during World War I (1915) entered the recession period with the discovery of new oil fields in the coming years and shale oil produced from oil shales gathered all attentions on it once again during the World War II years (1940-1945), but production works of shale oil have been suspended with the start of the stabilization period on the oil prices after the war.

The crisis occurring in oil production in the 1970s and the price increases encountered after this crisis have been caused shale oil production to become the main topic of the agenda and these developments have given acceleration to the research activities.

USES OF OIL SHALE:

UTILIZATION OF THE SHALE OIL AND GAS PRODUCTION

Shale oil production from oil shales is carried out by means of making the pyrolysis in the places where oil shales are available (in-situ) or after oil shales are extracted from the place where they become available (ex-situ) subsequently during mining activities. Industry uses of oil shale is in Brazil, China, Estonia and to some extent in Germany, Israel, and Russia. Several additional countries started assessing their reserves or had built experimental production plants, while others had phased out their oil shale industry. Oil shale serves for oil production in Estonia, Brazil, and China; In 1920s, in Fushun, Liaoning Province, China, shale oil industry was set up. The Fushun-type retort, combined with pyrolysis and gasification sections was developed.

UTILIZATION AS SOLID FUEL IN

THERMAL POWER PLANTS

In Canada, fluidized-bed technology has been tested in the Lurgi's design. Coal with high sulfur content and oil shales with carbonate have been burned. In Israel, the energy has been produced in a power plant of 12 MW. In Jordan, the feasibility studies of oil shale-based power plant and also in Morocco, the laboratory and pilot power plant studies have been completed. Oil shale production in Estonia began in 1916 and the annual output reached 41 million tons in 1980. Oil shale with Kukersite type is used in Estonia in order to produce electricity, gas, liquefied hydrocarbon and other chemical products. Also residual shale is used as a raw material of high quality cement in Estonia, Germany, and China.

“Industry uses of oil shale is in Brazil, China, Estonia and to some extent in Germany, Israel, and Russia. Several additional countries started assessing their reserves or had built experimental production plants, while others had phased out their oil shale industry.”

COUNTRIES	RESERVES (Million tons)
USA	3,340,000
AUSTRALIA	32,400
BRASIL	9,646
ISRAEL	15,360
THE REP. OF SOUTH AFRICA	73
JORDAN	40,000
MOROCCO	12,200
THAILAND	18,668
TURKEY	1,641
ALBANIA	6
ESTONIA	1,500
UKRAINE	2,674

Figure 2: The distribution of oil shale reserves all over the world.

“In the system established in Dotternhausen in Germany and called as “Rohrbach Process”, electric energy is generated by burning the oil shale and residual shale is used as raw material of cement.”

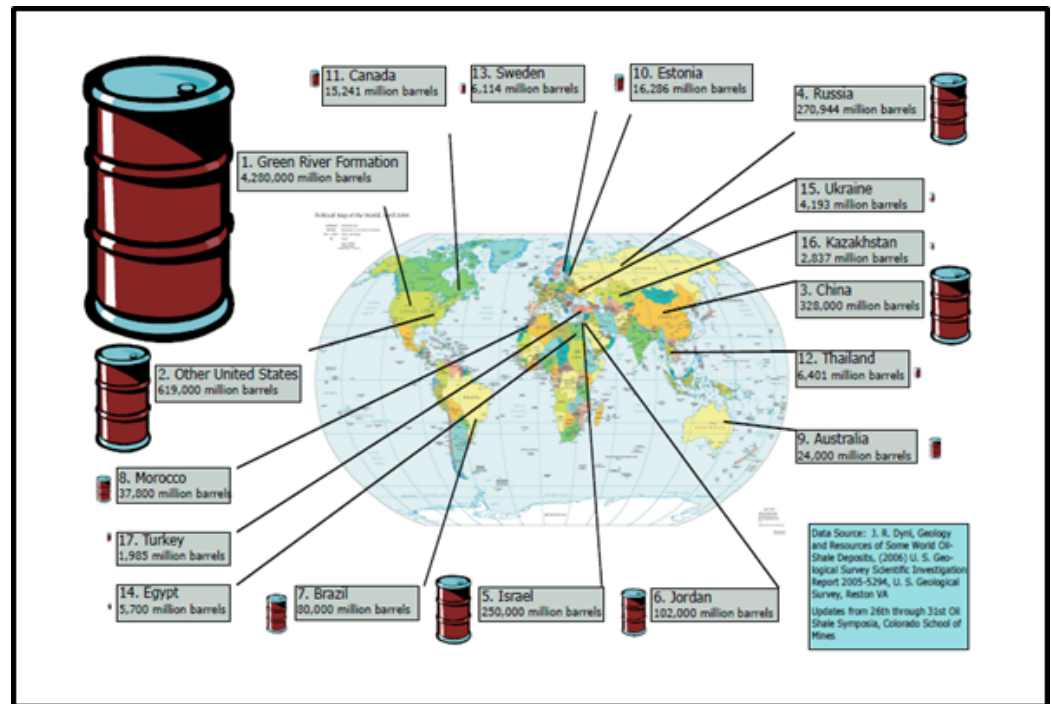


Figure 3: The distribution of oil equivalent reserves of oil shale all over the world.

Apart from these, oil shales are used with success as fertilizer and soil stabilizer after various operations are carried out and also they are used in the neutralization of acidic soils since 1964.

The residual oil shale is produced more than 11 million tons every year by means of burning Kukersite in the Baltic basin. A portion of produced residual oil shale is evaluated as raw material in the construction industry and its remainder is destroyed by methods that will not harm the environment.

In the system established in Dotternhausen in Germany and called as “Rohrbach Process”, electric energy is generated by burning the oil shale and residual shale is used as raw material of cement. In this way, the oil shale is both used as raw material of energy and cement is produced by using the residual shale.

Also, the precious metallic components (vanadium, uranium, etc.) are obtained from residual shales in the same complex. The distribution of oil shale reserves all over the world and oil equivalent reserves are shown

in Figure 2 and 3.

When resource reserve distribution of potential shale oil that can be produced from oil shale reserves in the world is examined, it is seen that United States is ranked as the first with total 4.9 trillion barrel reserves and Turkey is ranked as the last with 1.985 million barrel reserves. Commercial production of shale oil is occurring in Estonia, China and Brazil.

STATUS IN ESTONIA

70% of oil shale production in the world is carried out in Estonia. Estonia has approximately 100 years of business experience and 30 years of commercial experience. Oil shale is Estonia’s most important energy source and 93% (550 TWh / year) of the electric used in the country is produced from two thermal power plants that are fired with oil shale (2,800 MW).

Enefit Company, which is a government agency, has performed the oil shale mining



Figure 4: Model pictures belonging to Enefit280 shale oil production facilities.



Figure 5: A view of oil shale-fired power plants in Enefit-Narva.

activities and produced the shale oil through superficial retorting method by means of using vertical and horizontal integrated systems in Estonia and also it has carried out the electric production in significant quantities by burning the oil shale in the thermal power plants and has exported the electricity produced to the Baltic Region and Finland.

Enefit Company has produced approximately 1 billion ton oil shale together with 3300 workers employed in a field of 12,000 hectares in 2 open pits and 2 underground mines until today. Supplying almost all of electrical demand of Estonia, Enefit Company has carried out the shale oil production more than 200 million barrels as a result of retorting process ongoing during a time exceeding 30 years. The retorting plant called as Enefit140 is already an active plant even today. Also second plant Enefit280 has started the trial productions.

Estonia has carried out the shale oil production in Enefit140 facilities until today. A new and important project of Enefit Company is Enefit280 facility that will work with an operating life of 30 years.

Enefit280 facility has planned to produce 290,000 tons / year (1.8 mil. bbl / year) shale oil in a year by using 2.3 mil. tons oil shale. In addition, 280 GWh of electricity production will be carried out in the same facility. The total cost of the investment is approximately EUR 240 million. Also average cost of oil shale production is 14 EUR/ton. 1 MW of electricity generation costs 45 EUR.

Oil shale industry was established in Estonian in 1918. 2/3 of oil shale reserve with total 1.5 billion tons capacity of Narva open pit was used and it is estimated that approximately 500 million ton of reserves are still available.

“Enefit280 facility has planned to produce 290,000 tons / year (1.8 mil. bbl / year) shale oil in a year by using 2.3 mil. tons oil shale. In addition, 280 GWh of electricity production will be carried out in the same facility.”



“In China, The first commercial production of shale oil began at Fushun in 1930 with the construction of “Refinery No. 1, this was followed by Refinery No. 2,” which began production in 1954, and a third facility that began producing shale oil at Maoming in 1963.”

Overburden thickness in open pit mines is averagely 30 meters while average thickness of oil shale seam is 2.8 meters. There are oil shale seams in various thicknesses under this seam and their intercalations are generally composed of limestone. Production is carried out by dragline + trucks. The oil shale industry provides employment opportunities for 10,000 people in the country.

After Estonia has obtained the shale oil and electricity production from oil shale, it eliminates the ash by using it in different areas in order to reduce the environmental effects of remaining ash. The ash used in important cement factories can be used in the brick-making at the rate of 20-30% as well. Oil shale ash is used in the blocks drawing attention due to its light feature that is used in building construction through autoclave (pressure vessel) method by means of adding to cement and dry mixes.

STATUS IN CHINA

In China, oil shale deposits are widespread in many regions, the proved reserves amount to about 32 billion tons presenting a potential energy source. In China, The first commercial production of shale oil began at Fushun in 1930 with the construction of “Refinery No. 1, this was followed by Refinery No. 2,” which began production in 1954, and a third facility that began producing shale oil at Maoming in 1963. A new plant for retorting oil shale was constructed at Fushun, with production beginning in 1992. 90 Fushun type retorts, each having a capacity of 100 tons of oil shale per day, produce 90,000 tons of shale oil per year at Fushun (J. Qian and J. Wang, s., 2002).

The Fushun oil shale and coal deposit of Eocene age is located in Northeastern China just South of the town of Fushun in Liaoning Province. In this area, subbituminous to bituminous coal, carbonaceous mudstone and shale compose the Guchengzi Formation of Eocene age. In the West Open Pit coal mine near Fushun, 6 coal beds are present. Overly-

ing the Guchengzi Formation is the Eocene Jijuntun Formation that consists of oil shale of lacustrine origin.

The oil yield of the oil shale ranges from about 4.7 to 16 percent by weight of the rock, and the mined shale averages 7 to 8 percent (~78-89 lt/ton) oil. Coal mining at Fushun began in 1901. For the first 10 to 15 years of mining coal at Fushun, oil shale was discarded due to the overburden. Production of oil shale began in 1926 under the Japanese and peaked in the early 1970s with about 60 million tons of oil shale mined annually, then dropped to about 8 million tons in 1978. This reduction was partly due to increased discovery and production of cheaper crude oil within China.

In 2002, Fushun shale oil plant produced about 90,000 tons shale oil. In the case of Fushun type retort, for producing 1 ton shale oil, 33 tons oil shale are consumed (Fischer oil yield about 6 %). As the oil shale mining cost is no more than 10 yuan RMB per ton (as a by-product of coal mining), the oil shale feed cost for producing 1 ton shale oil accounts for about 330 yuan RMB. Addition of the production cost (manpower, electricity, steam, maintenance, etc.), 750 yuan RMB per ton shale oil, gives about 1000 yuan RMB for the total cost. Shale oil is sold as fuel oil at the cost 1500 yuan RMB/ton, and so the plant gains the benefit for 1 ton shale oil about 500 yuan RMB, that makes 45 million yuan RMB per year. Due to the good economic situation, Fushun shale oil plant is now planning to double its production capacity, and is seeking for advanced and elaborated technology with larger retorts. At present, besides the oil shale combustion plant, Huadian plans to build shale oil plant with the annual processing capacity of 1,500,000 tons oil shale (5,000 tons oil shale daily).

Harbin Gas and Chemical Company, in Heilongjiang Province, a company dealing with gasification of Yilan brown coal for producing town gas for Harbin City, is also



	OIL SHALE				
	FUSHUN	HUADIAN	LONGKOW	YILAN	SONG-YASAN
Province	Liaoning	Jilin	Shandong	Heilongjiang	
Age	Tertiary				
Burial	Coexists with coal	Oil shale	Coexists with coal		
Condition	Open pit mining	Underground mining	Underground mining	Open pit mining	
Recoverable reserves (million tons)	2,000	200	40	10	20

Table 1: Properties and Reserves of China oil shales.

INDICES	OIL SHALE			
	FUSHUN	HUADIAN	LONGKOW	YILAN
Fischer Assay, % (dry basis)				
Water	4.00	13.10	13.40	7.20
Shale oil	7.93	16.15	14.40	7.98
Char	84.80	64.30	66.70	80.39
Gas + losses	3.07	6.45	5.50	4.43
Proximate analysis, % (dry basis)				
Water	2.70	8.49	9.39	3.74
Ash	73.82	49.77	50.92	58.46
Volatile matter	20.13	37.37	39.00	23.32
Fixed carbon	3.35	4.37		14.48
Elemental analysis, % (dry basis)				
Oil shale kerogen composition:				
C	79.07	76.94	73.41	77.38
H	9.93	10.54	8.28	6.38
O	7.02	8.77	14.73	12.26
N	2.12	1.21	1.05	2.02
S	1.86	2.54	2.53	1.96
H/C mole ratio	1.51	1.64	1.35	0.99

Table 2: Chemical Properties of Chinese Oil Shale.

now intended to utilize their coal mining by-product oil shale for retorting to produce shale oil (1,000 tons oil shale daily). Song Ya San Coal Mining Company in Heilongjiang Province is a large coal mining company with yearly production of 10 million tons coal, also plans to develop the oil shale business (1,000 tons oil shale daily). Longkow Coal Mining Company in Shandong Province,

producing brown coal for more than twenty years already, also plans to mine its by-product - oil shale for producing shale oil (2,500 tons oil shale daily). At the end of 2008, the company operated the largest oil shale plant in the world consisting eleven retorting units with 20 retorts in each unit, total 220 sets of Fushun type retort. Annual oil shale processing capacity is designed to be 11 million tons

“Longkow Coal Mining Company in Shandong Province, producing brown coal for more than twenty years already, also plans to mine its by-product - oil shale for producing shale oil (2,500 tons oil shale daily).”



“In 2006, Jordan assigned fields for 4 different foreign companies (Shell, Enefit, Petrobras, Incosin) for the purpose of techno-economic report preparation in order to bring the oil shale resources in Attarat and El Lajun region into the economy.”

of oil shale, and annual shale oil yields to be 2,075,000 barrels.

Feasibility studies indicate that due to relatively low mining costs (as a by-product of coal mining) commercial production of Fushun and Yilan oil shales is profitable, in spite of low Fischer Assay oil yield (only about 7.9 %). As for Huadian and Longkow oil shales, in spite of much higher mining costs, their commercial production will also be profitable as their Fischer Assay oil yield is high. Certainly, it is important to utilize advanced and elaborated retorting technologies at these shale oil plants. The world's increasing need in the liquid fuel stimulate shale oil production in China. More oil shale retorting plants for producing shale oil will be built.

STATUS IN JORDAN

The Jordanian government still maintains its investment activities for the establishment of new production facilities to evaluate oil shale resources.

In 2006, Jordan assigned fields for 4 different foreign companies (Shell, Enefit, Petrobras, Incosin) for the purpose of techno-economic report preparation in order to bring the oil shale resources in Attarat and El Lajun region into the economy. Estonia-Enefit Company, one of the companies mentioned above, and Near East Investment Company established by the partnership of Malaysian government has started their works and they have planned to begin to the electricity generation through oil shale-fired thermal power plant with 2X230 MWe installed capacity in 2017.

RESERVES, USES AND STATUS OF OIL SHALE IN TURKEY

The oil and natural gas reserves in Turkey

are minor; solid fossil fuels are the primary potential energy resources. These resources include a wide variety of bituminous coal, lignite, oil shale, asphaltite, and peat deposits and vary in reserve quality and physical characteristics.

Oil shale comprises the second largest potential fossil fuel in Turkey after lignite. The main oil shale resources are located in the middle and western regions of Anatolia. The amount of proved explored reserves is around 1,641,381 tons (Table 1). Among the potential resources Beypazari, Seyitomer, Himmetoglu and Hatildag deposits are of major importance in terms of quality, amount and exploitability which constitute around 50% of the total oil shale potential of Turkey. Other potentially important resources are in Mengen (Bolu), Ulukisla (Nigde), Bahçecik (İzmit), Burhaniye (Balıkesir), Beydili (Ankara), Dodurga (Çorum) and Çeltek (Amasya).

Lacustrine oil-shale deposits of Paleocene to Eocene age and of late Miocene age are widely distributed in the middle and western Anatolia in western Turkey. The host rocks are marlstone and claystone in which the organic matter is finely dispersed. Data on the oil shale resources are sparse because only a few of the deposits have been investigated. The oil shale resources of Turkey might be larger, but further studies are required before reliable resource estimates can be made. On the basis of available data, total resources of in-situ oil shale for eight Turkish deposits are estimated at about 2.0 billion bbls (Dyini, 2005).

Oil shale studies in Turkey have begun with the establishment of the Institute of Mineral Research and Exploration (MTA) and the first studies in our country have been started in order to carry out the shale oil production along with the world's. Oil shale exploration activities intensified in the 1970s; geological map of 1/25,000 scale for 1,370 km² area and 1/10,000 scale for 561 km² area that will have potential power in the future has been prepared. 89 split type drillings and 42

“Lacustrine oil-shale deposits of Paleocene to Eocene age and of late Miocene age are widely distributed in the middle and western Anatolia in western Turkey.”



drilling activities with total depth of 4,870 m, have been performed throughout the researches as the prospecting works. Apart from these drillings; 204 drilling activities, total depth of which reaches up to 12,350 m, aiming to explore lignite have been evaluated in terms of oil shale. It can be said that with the new detailed oil shale exploration project in or near the coal production licence areas in Turkey, oil shale reserves can be powered up to 15 billion tons.

With regard to the evaluation of oil shale resources in Turkey, the studies were fulfilled by German experts in order to produce shale oil in Mengen (Bolu) district of our country during World War II. Due to the oil crisis encountered in the 1970s, oil shales have come to the fore again and scientific-technological projects have intensified in the same year. Because of burning technologies developing in the forthcoming years, the evaluation of oil shale in the thermal power plants with lignite has become the main topic of agenda.

The detailed organic geochemistry-petrography studies and burning tests were carried out in Beypazari, Seyitomer, Hatildag and Himmetoglu fields in the frame of "Turkish-German Technical Cooperation Agreement" between 1986-1988. Advanced burn-

ing technologies (fluidized bed, CFB) have demonstrated that oil shale located on lignite in Seyitomer field may be burned with lignite. In tests carried out in a pilot power plant with 2 MWe, it has been observed that the high calcium content of oil shale and lignite had a positive impact in reducing the polluting emissions generated during burning process. In the studies fulfilled, it has been determined that in case of mixing of 20% of Seyitomer oil shale and 40% of Himmetoglu oil shale with lignite, they can be used in a fluidized-bed thermal power plant.

Despite the fact that oil shale becomes one of the known alternative energy sources, it neither takes place among primary energy sources nor in the long-term energy demand projections and strategies in Turkey.

In this section, we have tried to present samples from resource assessment activities as well as bringing in the economy activities launched in many countries regarding oil shale and as a result of these activities it has been observed that a sufficient awareness could not be raised yet, in Turkey, while all studies have been implemented in a comprehensive way throughout worldwide. As a result, oil shale might be eliminated from

"With regard to the evaluation of oil shale resources in Turkey, the studies were fulfilled by German experts in order to produce shale oil in Mengen (Bolu) district of our country during World War II."

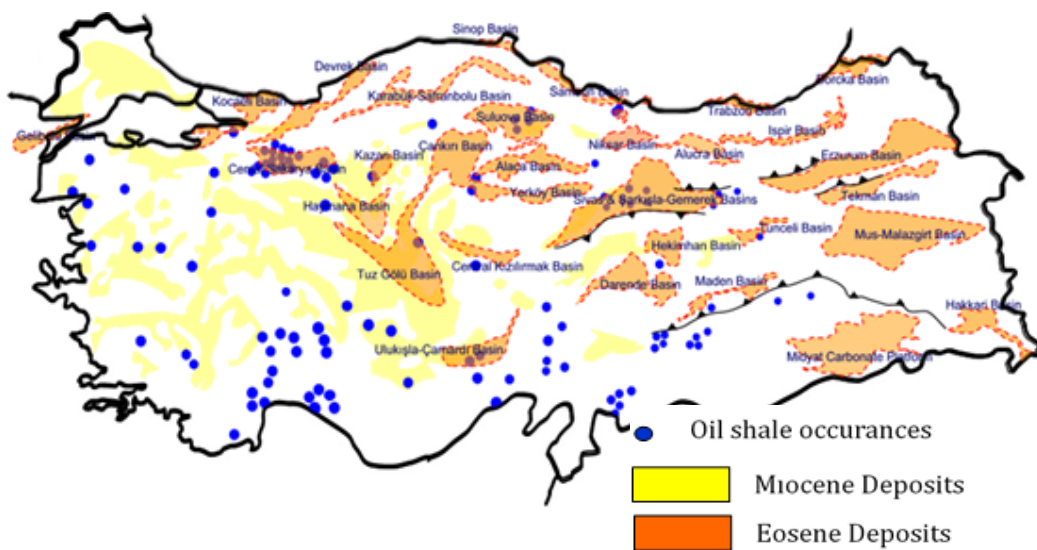


Table 2: Chemical Properties of Chinese Oil Shale.



assessment together due to its low calorific value.

kcal / kg), is discarded without consideration together with the overburden rocks.

“It has been believed that oil shale resources in Turkey can be evaluated at least by means of burning in oil shale fired thermal power plants and thus be brought in country’s economy and accordingly to contribute to the country’s energy raw material variety.”

OIL FIELD	RESERVE (1000 ton)	AVERAGE CALORIFIC VALUE (kcal/kg)
Beypazarı (Ankara)	327,684	966
Seyitömer (Kütahya)	122,170	860
Hatıldığ (Bolu)	359,959	774
Himmetoğlu (Bolu)	65,968	1,390
Ulukışla (Niğde)	130,000	851
Mengen (Bolu)	50,000	1,000
Bahçecik (İzmit)	42,000	1,060
Burhaniye (Balıkesir)	15,600	732
Beydili (Ankara)	300,000	800
Dodurga (Çorum)	138,000	365
Çeltek (Amasya)	90,000	541
TOTAL	1,641,381	

Table 3: Oil Shale reserves in Turkey.

Detailed studies have been maintained in order to evaluate and urgently bring in the economy the domestic coals in Turkey. However, although Turkey’s oil shale resources take place in the same environment with coal mine areas, mostly over and/or among coal seam levels, during the coal production, due to the low-calorific value (avg. 1000-2000

It has been believed that oil shale resources in Turkey can be evaluated at least by means of burning in oil shale fired thermal power plants and thus be brought in country’s economy and accordingly to contribute to the country’s energy raw material variety and available resource reserves as it becomes in Afsin-Elbistan lignites with average 1,100 kcal/kg used heavily in electricity generation purpose.

OIL SHALE PROJECTS IMPLEMENTED IN TURKEY

FIRST PROJECT

Turkish Coal Enterprises (TKI) and Turkish Petroleum Corporation (TPAO) jointly conduct a project having the topic of “Obtaining shale oil from oil shales through retorting process and/or energy production opportunities”. In this project; geological survey, mapping, well logging, exploration activities and sampling procedures have been completed. Analysis and testing process still continues.

The project has been carried out in oil shale licenses that belong to TKI. The total cost of the project has been determined in TL 6 million and TKI and TPAO has taken part as a strategic partner in this project. Service procurement from MTA has been carried out and implementation activities related to geological survey and drilling services in the licensed fields as well as preparation activities related to the operable reserve reports has been conducted. In the scope of this project, analyses shall be carried out to determine the hydrocarbon potential of oil shales and the production quantities of shale oil. In the event that technological tests result in the economic dimensions and also open pit reserve determines in a sufficient amount, the feasibility report for the investment shall be



prepared. After the nature and sizes of investment is determined in the oil shale fields, TKI and TPAO (in joint venture) shall ad-join domestic and foreign investors from private sector by declaring the project finance models and share rates. The project is the first project realized in our country, which aims to generate energy by using oil shale under partnership of public institutions and it is aimed to contribute to diversity of our domestic energy raw material chain.

SECOND PROJECT

36 month term R&D project on “Obtaining Liquid Fuel from Turkey’s Oil Shales with Solvent Extraction Method” is carried out between TKI and TUBITAK-MAM Chemistry Institute”. In the scope of this project, it is aimed to determine the effects of factors such as the most appropriate solvent type, extraction temperature, time and pressure, solvent-oil shale ratio, grain size and additional additive type through studies to be done on samples taken from oil shale fields in Turkey by using autoclave.

It is aimed at making the discrete pilot scale trial by means of performing pilot scaled reactor pressure works in the samples received from several oil shale fields determined positive as a result of extraction activities. In addition, studies on the recoverability of the valuable elements found in inorganic structure in the oil shales will be made. These studies shall be continued with additional samples to be obtained from oil shale fields in 2016.

THIRD PROJECT

Final Situation in the ‘Obtaining shale oil from oil shales through retorting process and/or energy production opportunities’ Project.

In Bolu-Göynük oil shale field, 20 exploration borehole drilling have been completed

in first phase until today and totally 4,146 m has been progressed. Among these borehole drilling logs, 3,964 samples have been compiled. Analysis and laboratory test works have been maintained in the laboratories of Turkish Petroleum Company (TPAO).

Also 6 exploration borehole drilling have been carried out in Ankara-Nallihan oil shale fields and totally 3,617 m has been progressed. The presence of live heavy oil filling the cracks in the range of 134-137 meters has been observed in drilling activity numbered TKIB-1, while weak natural gas (methane) output has been observed in drilling activity numbered TKIB-4.

Pyrolysis analysis of oil shale samples taken in the scope of the project is carried out in Research Center laboratories of TPAO. Fisher Assay analyses (oil yield %) are performed in the gasification lab. of MTA in the first phase, then Fisher assay analyzer is purchased by TPAO and delivered to support the project after its installation was completed. At the present time, 3,891 pyrolysis analyses and 385 Fisher Assay analyses have been completed. Evaluation and data processing activities in order to complete the analysis studies are maintained.

General Directorate of Mineral Research and Exploration (MTA) team continues the activities carried out in the field (geological survey, well logging and core sampling), accordingly reporting studies related to apparent + recoverable reserve account of oil shales and reporting studies related to the reserve of oil productive oil shale zones.

According to the first results obtained from the analysis of oil shales in the Bolu-Goynuk region; important data have been acquired to produce shale oil from oil shale rocks in this region. According to obtained data, it is understood that oil shales of Bolu-Goynuk field comply with the world standards in the context of shale oil production (SCO).

The short analysis needed in searching of

“General Directorate of Mineral Research and Exploration (MTA) team continues the activities carried out in the field (geological survey, well logging and core sampling), accordingly reporting studies related to apparent + recoverable reserve account of oil shales and reporting studies related to the reserve of oil productive oil shale zones.”



the opportunities to produce electricity by means of establishing the oil shale-fired thermal power plant (moisture, ash, volatile in the ash and total sulfur, fixed carbon, volatile matter, upper and lower calorific value) are carried out in TKI GLI-Tunçbilek laboratories. According to Fisher Assay analysis results, 48 samples are selected for ultimate and proximate analysis by means of putting aside the samples at the rate of 4% oil yield and above. Selected samples have been subjected to analysis for Thermal Power Plant in TKI/GLI Tunçbilek laboratories. According to the analysis results, lower calorific values of samples (AID) change between 500 and 2,114 kcal/kg values in the dry sample. Also, analysis studies are maintained.

In addition, interviews aiming to develop a joint project together with TUBITAK-MAM Material Institute are continued in order to minimize the impact caused by wastes to be obtained from facility to be established at the end of the project and to assess these wastes economically.

RESULTS

1. The lignite and hard coal that take place among fossil energy sources, the existence of which is known in Turkey, have been given necessary importance till the day. Although they have been brought in the country's economy for years, the same importance for oil shale as an energy raw material may not be the case.
2. In today's world where the procurement of oil and electricity gradually get difficult; the attractiveness of producing the shale oil and/or electric energy from oil shales has increased at the point of increasing the energy diversity of our country in terms of both economic and strategic.
3. Oil shales in Turkey form the energy raw material that has the second largest reserve after lignite and also it is, yet, an untouched domestic resource.
4. In the scope of oil shale project conducted jointly by TKI/TPAO; in case that the reserve determination studies and trial production test studies that are carried out in the oil shale fields in Bolu-Göynük and Ankara-Nallihan have been deemed suitable in terms of both economy and investment. It has been planned to establish a shale oil production facility and/or a thermal power plant in this region to produce the shale oil through retorting method on surface. It has been determined in shale oil yield (Fisher Assay) analysis of oil shales in these fields that oil yield changes in the medium and high economic level and between 750-2,250 kcal/kg calories. Analysis and performing tests still continue.
5. In the scope of the TKI/TPAO joint project, the interviews in various levels have been scheduled with the countries having shale oil production technology and accordingly studies in order to determine the domestic/foreign investors as well as environment friendly technology and production type are maintained in accordance with time schedule of the project. Works required to bring these facilities in our country's economy are continued.
6. In case of using of oil shales as domestic raw material, it has been believed that increasing in the energy raw material diversity and energy supply security will be able to play an important role to reduce the current deficit arising from energy import by means of obtaining liquid fuel and generating energy from oil shales.
7. TKI/TPAO and MTA provide the necessary support for the joint projects and it is aimed to conclude the investments to be carried out in order to produce shale oil and/or to install oil shale-fired thermal power plants by means of benefiting from our oil shale resources until the year of 2023.



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TURKEY'S 2016 NATIONAL COAL POLICY

by Haluk Direskeneli

“It is foreseen that coal will come to increase its share in global markets in the future thanks to new “Clean Coal Technologies”.”

“The Turkish Hard Coal Institute operates five underground mines in Turkey, and is the only hard coal production entity in the country.”

FOREWORD

Whereas coal constitutes a 25% share of the global energy supply market, second only to petroleum, which is the first in the global electricity generation market, with a share of 40%, locally, coal ranks first with a 40% share in the primary energy generation market, but fourth in the electricity generation market, with a 16% share. It is foreseen that coal will come to increase its share in global markets in the future thanks to new “Clean Coal Technologies”. As a matter of fact, coal is the most important indigenous fossil fuel in Turkey, therefore, with the best applicable use of advanced technologies, it should be utilized countrywide for greater electricity generation at a cheaper rate.

In this article, we will strive to evaluate the new lignite, hard coal and/or imported-coal firing thermal power plants in our local market, explain operational problems, and recommend that new coal firing technologies be implemented for the best use and most efficient application of local coal in the new thermal power plant investments from 2016 onward.

RESERVES AND MINING

Turkey has both hard coal and lignite deposits. The hard coal reserves are mostly located in the western part of the country, in the Zonguldak Basin, which has more than 1.6 billion metric tons of workable reserves, 512 million tons of which are proven and about 80% of which can be coked. Lignite deposits are widespread and plentiful throughout the country: reserves are estimated at more than 14 billion metric tons, 7th largest in the world, most of which are economically mineable, though only about 7% thereof have a

heat content of more than 3,000 kilocalories per kilogram (LHV). In 2012, around 68 million of metric tons of lignite were produced annually. About 40% of the Turkey's lignite is found in the Elbistan Basin.

PRODUCTION AND CONSUMPTION

The Turkish Hard Coal Institute operates five underground mines in Turkey, and is the only hard coal production entity in the country. The two most important lignite fields in Turkey -the Afsin-Elbistan and Sivas-Kangal coal fields- are owned by EÜAŞ and operated by private companies under contract.

Even though there is significant production of lignite and some production of hard coal in Turkey, not enough coal is mined to meet domestic demand.

As a result, Turkey imports more than 25 million tons (2013) of hard coal each year, mostly from Russia (33%), Columbia (24%), the USA (14%), South Africa (11%), and Australia (5%) as of 2012. Imported hard coal is used mainly for electric power steelmaking, and cement production. About 75% of the Turkey's lignite is used as a fuel source for electricity generation.

COAL TECHNOLOGY AND COAL MARKETS

Seeing that there is relatively little investment in coal fired power plants in the global liberalized markets, or at least investment priority is given to natural gas fired combined cycle power plants due to their relatively cheap installation-costs and faster construction periods, foreign dependency increases in coun-



tries which depend on imported fuel. For that reason, demand for more natural gas has also triggered the demand for more coal.

This urge for greater utilization of coal has also necessitated the application of new coal technologies. We are now witnessing an obvious evolution in clean coal technologies. When we look at the available technology and new trends in market demand, the most important sector in the field of energy revolves around the development of new technologies. It has now become a new tendency for such leading technologies to be developed and applied not only in the advanced countries, but also in the developing countries, which are consuming more and more energy.

The energy technologies of Western European as well as North American companies are becoming too expensive to export; soon these countries will not be able to sell their products on the global market. Even in their home markets, protective measures such as high import taxes and strict labor codes will need to be implemented in order to avoid an influx of cheap labor from abroad. In recent years, China, India, South Korea, and many other Asian countries have increasingly come to compete in the global energy markets.

The companies in these countries already assert dominance in their home markets with their self-made fabrications supported by advanced technology and fabrication licenses. Although their products are cheap, they have serious difficulties in fabricating the latest and the most efficient designs in compliance with environmental standards that are largely adopted across the globe. However, we can predict that these companies will completely reach these targets soon with the price advantage that they already possess in the first place.

We need to reposition our local energy market in Turkey, keeping these new developments in mind. We have the engineering and intellectual capacities as well as the market

potential for local fabrication and site construction. We must design, fabricate, construct, install, and operate our own thermal power plants that fire our own indigenous fuel.

In the past, we have prioritized attracting foreign investors that had the financial capability to cover power plant investment projects although their products were not the best of their kind, not the most efficient, and not designed to incorporate the latest technologies that would utilize our local coal. These plants have not been suitable when it comes to using our local fuel, whether lignite or hard coal, and hence they have aged quickly, very quickly, faster than the acceptable market norms.

Reputable western energy companies do not exist anymore, as they are either in bankruptcy, or unable to compete with the market players beyond their national borders. In recent years, Asian companies have presented increasingly cheap offers in thermal power plant tenders. If such an eastern company is prequalified in the pre tender procedure, western companies certainly hesitate to participate in the process as, in the end, it would be a waste of time and resources to go head on against such competitive players.

In this way, it is increasingly difficult to attract western technologies although they may certainly be desired. Price is of little importance to the new players; they are often unaware of the prevailing market figures, and hence, they quote extravagantly low prices. Their labor costs for design and fabrication is extremely low. They seriously have effective market policies that allow them to infiltrate the global energy market.

It is often forgotten, or ignored, that the best design which allows for the use of local fuel is accomplished by tapping into one's own local engineering capital, namely, local engineering and local construction companies. Foreign contractors design the facility, com-

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“It is often forgotten, or ignored, that the best design which allows for the use of local fuel is accomplished by tapping into one's own local engineering capital, namely, local engineering and local construction companies.”



“Local market forces should facilitate that these activities can be handled independently, in harmony with local investors, financial institutions and academicians, engineers, engineering unions, and contracting service providers.”

“Currently, more than 50% of the electricity generated in the local market is dependent on imported natural gas. Due to the delays in hydro- and coal-based power plant investments, those imported-natural gas firing thermal power plants are operating at base load.”

mence construction, engage in site installation, and then wait for the guarantee period of 2-3 years to come to an end. Having fulfilled their obligations, they then leave the site.

On the other hand, the local operator remains in site, running the plant alone for the long term. It is very difficult to pursue long term rehabilitation and programmed repair works without the design/fabrication support of the original equipment supplier. Therefore, local design and fabrication are indispensable when it comes to long term operations.

UPCOMING ENERGY CRISIS

We all know that we are in the midst of an energy crisis; we lack a sufficient energy supply. Our resources are unable to generate the necessary amounts of energy. In other words, such a huge energy demand is not able to be met by our limited energy supply.

Here, the growing demand for renewable technologies, such as wind/solar, cannot be fulfilled quickly. These technologies will only enter the local energy market with time. Fast/easy/cheap solutions are not available, nor are they practical or feasible.

We must design our own thermal power plants, through the efforts of our own design teams, to operate using our own fuels that are available locally, whether they be lignite or hard coal. We must fabricate the necessary equipment by ourselves in our own fabrication shops. We must take on site installation, and ultimately, operate the facilities by ourselves. Our local engineers are capable of handling the formulation and implementation of such plant designs.

We need to create a positive investment climate in the local market in order for this to be achieved. Local market forces should facilitate that these activities can be handled

independently, in harmony with local investors, financial institutions and academicians, engineers, engineering unions, and contracting service providers. We need to take the initiative, not to leave it to the foreigners. We should not employ foreign contractors just because their labor is cheap. Our energy markets and our energy potential should be protected against foreign domination and incursions.

HOW TO COVER PROJECT FINANCING

Financially, we have serious reasons to support such an end-goal. We have genuine expectations that Turkey will have an electricity market based on real costs. Seeing that crude oil prices are immediately reflected in local petroleum byproducts, and that the consumers accept this burden in their cost calculations, the same will similarly be applied in all phases of the price structure for electricity generation.

When we evaluate the projections for the supply and demand of electricity for the next 10-15 years in Turkey, there is no new potential primary energy resource that could reduce the ever increasing prices. Hence, the short term electricity prices are expected to hover in the range of US\$ 0.04 - US\$ 0.08 per kWh in our local electricity market.

Considering their rehabilitation and renewal costs, the newly privatized thermal power plants will not help to reduce overall electricity prices in the short and medium terms.

Currently, more than 50% of the electricity generated in the local market is dependent on imported natural gas. Due to the delays in hydro- and coal-based power plant investments, those imported-natural gas firing thermal power plants are operating at base load. Unfortunately, this will increase the demand for more combined cycle power plant investments.



PREVAILING COAL PRICES ON THE GLOBAL MARKET

Thanks to the latest developments in technology, coal fired thermal power plants based on PC (Pulverized Coal) and CFB (Circulating Fluidized Bed) designs have reached 46% efficiency and beyond, with the application of supercritical pressures and temperatures.

Imported coal at the prevailing market price of US\$ 40-55 per ton, or spot price of US\$ 2-3 per MMBtu, are now comparable with the prices of natural gas, at US\$ 7-8 per MMBtu, that is used in combined cycle power plants generating electricity with 60% efficiencies. However, imported coal is indexed to oil prices and there is no reason to expect any drastic change in these price ranges in the medium and long terms. Therefore, we should not expect any decrease in coal prices any time soon.

In any case, one should keep in mind that the raw coal price of our local Afşin-Elbistan coal is less than US\$ 1.80 per MMBtu as of 2014. Nonetheless, firing this coal in our thermal power plants located nearby is not so easy; this is supplemented by the fact that these plants are not so efficient. Specially tailored academic and commercial methods need to be explored and enforced to amend these deficiencies.

NEW TECHNOLOGIES FOR FIRING DIFFICULT COAL

IGCC (Integrated Gasification Combined Cycle), CFB, Oxy-fuel firing, and underground gasification methods could be applied to our local coals with low calorific values. CFB, for example, has proven to allow up to an output of 165 MWe per unit.

Energy security is a major parameter that qualifies a country as independent. Energy security can only be achieved by a prudent

combination and management of local natural and socio-economic resources in parallel with the implementation of the latest technology.

It is difficult to think that a country can protect its borders if its energy investment policy is fully import-oriented. Turkey has many energy resources but they are not easy to exploit. For example, hydro power in Turkey, while exhibiting great potential, requires careful and intelligent policies taken into account for the impact of such projects on the environment and on local rural and urban areas.

Our local coal mines have varying specifications, even if they are in the same basin. Therefore, for better and more efficient firing of the available coal in these thermal power plants, we need to apply more expensive and selective mining techniques rather than our traditional, cheap mining methods. This is an expensive investment that is only observable in a few private operations in Turkey.

The traditional mining method involves the extraction of coal complete with a host of undesirable and non-burnable materials such as sand, ash, moisture, etc. All new imported-coal fired power plant investors are major players in other sectors which are in need of cheap electricity. Therefore, they consume almost 60-70% of electricity generated within their own plants. The remainder is then sold on the national market; and this is not a problem seeing that there is always a need for more energy in our ever shrinking energy environment. Generally, local investments are realized by methods of "corporate finance". Between 1993 and 2005, power plant projects exhibiting an overall installed capacity of more than 4000 MW have been realized. These natural gas firing, cogeneration plants pay for themselves quickly, thus freeing up more money for the use in further investments in new plants.

CONCLUSIONS AND RECOM-

"Energy security is a major parameter that qualifies a country as independent. Energy security can only be achieved by a prudent combination and management of local natural and socio-economic resources in parallel with the implementation of the latest technology.."



MENDATIONS

The energy policies of today's administration prioritize the securement of the best quality, most reliable electricity for the local market at the cheapest rate. Considering this, the effective and rational use of local fuel resources is of vital importance as domestic energy planning is synonymous with planning for the future of the country, allowing us to avoid any foreseen economic crises.

“We do not have the luxury to make mistakes in our energy policies, as any misstep will have severe repercussions down the road. While securing a steady supply of energy is the first priority, it is our sincere and humble opinion that new investments based on imported-coal are too risky.”

We do not have the luxury to make mistakes in our energy policies, as any misstep will have severe repercussions down the road. While securing a steady supply of energy is the first priority, it is our sincere and humble opinion that new investments based on imported-coal are too risky. The construction of such facilities on the coasts of the Black Sea adds more up to this risk due to increased coal prices on the world markets and the limited routes through which coal can travel in the ever-congested Turkish Channels. Russian coal is not cheap and it never has been. Moreover, we have bitter relations with Russians due to downing of SU-24 jet fighter.

We must be very careful in issuing Environmental Impact Report certifications as well as regulatory licenses. Plants should never be placed on forested lands. Any new and significant increases in a plant's capacity and any fuel changes from local coal to imported coal should be carefully evaluated. Seaports where the unloading of cargo occurs should be carefully selected. The deep sea discharge of thermal plant bottom ash should also be avoided.

The best price is not the best choice for the long term, consistent, and cheap generation of electricity.





TURKEY'S ENERGY STRATEGIES AND POLITICS RESEARCH CENTER (TESPAM)

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TO THE IDEAL OF MAKING TURKEY AN AGENDA-SETTER COUNTRY

TESPAM is Turkey's first and only civil organization that is focused on energy policies.

The idea was brought to the public's attention in 2005 as a civil platform founded by a few students that pursued the goal of contributing to determination of Turkey's energy politics and strategies and being responsive to the need for training specialists in energy politics that Turkey has been longing for.

In 2015, TESPAM's main identity was brought alive among energy specialists, who are currently working in governmentally and privately owned energy industry, and academicians from several universities. TESPAM values and brings together a group of young, dynamic and solution-based professionals with the capability of both being self-driven and working in multi-dimensional environments and disciplines.

TESPAM is highly motivated to fill the gap for setting "Turkey's Energy Agenda".

TESPAM governs the mission of being an organization that:

- plays an effective role in development of energy policies and strategies,*
- executes independent –scientific-realistic studies, conducts useful analyses,*
- conducts useful analyses,*
- produces projects for Turkey,*
- enables training of energy specialists that Turkey needs.*
- being a referred organization in determination of energy policies with its analyses and comments,*
- being an organization that steers the energy policies.*



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We are on the web.

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FROM THE FIRST AND ONLY CIVIL ORGANIZATION
FOCUSED ON ENERGY POLICIES:

TESPAM

“from a country as being a follower of the international energy policies agenda
to the ideal of making Turkey an agenda-setter country”



Energy Policy Turkey

NEW TURKEY:
ONE-STEP FORWARD TO INTERNATIONAL POLICY MAKING

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