Environmental Protection by Oil Companies: The Case of Turkey

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Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Arts
in
Marketing Management

Eastern Mediterranean University
June 2018
Gazimağusa, North Cyprus

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ABSTRACT

Oil is one the most widely used energies all over the world and it has positively affected the economics of countries. Therefore, there has been a rapid growth in oil industries in last decades. In Turkey oil production is relatively growing and many national and international oil companies are active in this country. However, activities of these companies have some impacts on environment. This study is an attempt to investigate the environmental protection of oil companies in Turkey. Using interviews with experts in the field including oil companies` managers and university teachers as well as investigating regulations and laws relating to environmental protection, this study examined the extent of implementing environmental protection regulations by oil companies in Turkey. Turkey has already started using renewable energy sources such as wind power, Hydroelectric power, natural gas and solar power and they are going to future potential alternatives of fossil sources including oil. The results of the study showed that although there are comprehensive regulations regarding environmental protections, there are some limitation in implementing them which causes pollutions with different qualities and quantities. Finally, this study makes some recommendations to reduce the pollution of oil companies.

Keywords: Environmental Protection, Oil Companies, Turkey.

ÖZ

Petrol, dünyanın her yerinde en yaygın kullanılan enerjilerden biridir ve ülkelerin ekonomisini olumlu yönde etkilemiştir. Bu yüzden, son yıllarda petrol endüstrilerinde hızlı bir büyüme yaşanmıştır. Türkiye'de petrol üretimi kısmen büyüyor, ve birçok ulusal ile uluslararsı petrol şirketi faaliyet gösteriyor ; ancak, bu şirketlerin faaliyetleri, çevre üzerinde birtakım etkileri vardır. Bu çalışma, Türkiye'deki petrol şirketlerinin çevre korumasını araştırmaya yönelik bir girişimdir. Bu çalışma, Petrol şirketleri yöneticileri ve üniversite öğretmenleri de dahil olmak üzere alandaki uzmanlarla yapılan görüşmeler ve çevre koruma ile ilgili düzenlemeleri ve yasaları kullanarak ,Türkiye'deki petrol şirketleri tarafından çevre koruma düzenlemelerinin uygulanması kapsamını incelemiştir. Türkiye rüzgar enerjisi, hidroelektrik gücü, doğal gaz ve güneş enerjisi gibi yenilenebilir enerji kaynaklarını kullanmaya başladı ve petrol dahil fosil kaynaklarının gelecekteki potansiyel alternatifleri olacaktır. Çalışmanın sonuçları, çevre korumaları ile ilgili kapsamlı düzenlemeler olmasına rağmen, bunların farklı nitelik ve niceliklerle kirliliğe neden olan uygulamalarında bazı sınırlamaların olduğunu göstermiştir. Son olarak, bu çalışma petrol şirketlerinin kirliliğini azaltmak için bazı tavsiyelerde bulunur.

Anahtar Kelimeler: Çevre Koruma, Petrol Şirketleri, Türkiye.

DEDICATION

To the ones I love

My beloved husband, Ebrahim, for his inexhaustible patience, understanding, and ability in a dignified way to overcome the difficulties connected with my thesis work.

My dear mother, father, sisters and brother for their wholehearted support and unshakeable faith in me.

ACKNOWLEDGMENT

I would like to express my deepest gratitude to my dear supervisor, Assoc. Prof. Dr. Deniz İşçioğlu, for her genuine guidance, unstinted support, useful suggestions, and constructive criticism throughout my thesis work. Without her this thesis would have never been completed.

I am truly grateful to all the participants, i.e. managers and university teachers, for their invaluable contribution to this study in terms of time, efforts, and responses.

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INTRODUCTION

1.1 Background of the Study

The roll of oil in politics and economies has been significant in the world in the previous decades. Hence, petroleum industry had great improvement in these decades. This in turn, lead to drilling more for exploring oil. All processes of exploring, producing and transporting oil contain some environmental issues and it faced the petroleum industry at the international level some pressures by governments and NGOs to protect the environment as much as possible (Vinogradov, 2005). The Organization of the Petroleum Exporting Countries (OPEC) as a coordinator between its oil producer members has been responsible for environmental protection. All 14 Member Countries of OPEC have signed the United Nations Framework Convention on Climate Change (UNFCCC) to consider the protection of environment (OPEC, 2017).

Based on Alipoor (2014) release of oil and its productions in the environment endanger life of most of the creatures that live in water or on the earth. Therefore, by polluting groundwater, human health faces irrecoverable dangers. The most significant pollution in the ocean is made by oil. One type of oil pollution is dissemination due to marine accidents and release of oil to the ocean due to human's fault.

Nowadays, oil has a vast and important role as it is organized. Oil is not only viewed as main source of energy that is used by human, but its products can be seen in various goods around us. Oil industry has a significant possibility of danger for environment and it has various impact levels: water, air and soil, that is, everything on the earth. Oil-related activities have the risk of polluting our environment. In processes of drilling, production, refining and transportation various areoles, solid waste, greenhouse gases and waste waters are generated. (Marino & La Rovere, 2017).

Oil is a growing industry in the world and specifically in Turkey. Oil has created the impressive resources for consumption and investment of different companies in Turkey.

1.2 Limitations and Delimitations

In the process of conducting this study the researcher faced some issues and limitations. Since the first group of participants of the study were in different areas and cities of Turkey, it was difficult to have face-to-face interview with them; therefore, phone and email are used to conduct interviews. Another limitation of the study was that some of the participants could not speak English fluently, then questions of interview had translated into Turkish. Finding the second group of participants who were residences of cities and areas around the oil companies, was difficult; as a result, they were all chosen from the students who study in North Cyprus and are originally from those areas. The last limitation was that most of the potential participants were not eager to participate in this study, so the researcher had to search and find more other participants.

1.3 Statement of the Problem

One of the main sources of energy in Turkey is oil (IEA, 2016). Limitations in plans and regulations of oil companies in Turkey or in implementation of this regulations can cause irrecoverable harms in environment and this area of research has been lees investigated in Turkey. Moreover, although renewable energies are going to future partial alternatives of fossil energies such as oil, there are still big companies across the world including Turkey that are expanding their oil production plans.

1.4 Purpose of the Study

This study is intended to investigate the environmental protection plans and extend of their implementation by oil companies in Turkey by interviewing managers of oil companies and expert university teachers and people in cities around the oil companies. Furthermore, it suggests some recommendations for more protection of Turkey`s environment.

1.5 Significance of the Study

Business activities have many advantages for their owners and engaged people. However, these activities should not endanger environment and the place that we live in. Investigating the environmental protection of oil company in Turkey and the extent of its implementation will help to find out the potential limitations, obstacles and inefficient works in this regard. This can help to improve or revise some plans and remove at least some of the limitations for better protecting of environment.

1.6 Research Questions

1) What are environmental issues caused by oil companies in Turkey? Are all these issues inevitable?

2) What are environmental protection plans of oil companies in Turkey?

3) To what extend the environmental protection plans of oil companies in Turkey have been implemented?

4) If these plans have not been implemented completely, what are reasons and how should be overcome?

Chapter 2

LITERATURE REVIEW

2.1 Introduction

In this section importance of oil production and various environmental effects and pollutions of oil companies on marine, land, air and human in different phases such as drilling and refinery are considered. Next, the environmental protection conventions across the globe are studied. Later, environmental pollution and regulations of oil companies in Turkey including Turkish petroleum, Perenco and MEKE companies are investigated. Finally, some previous studies in this regard are considered.

2.2 Importance of Oil Production

Sometimes Oil is called crude oil or petroleum. As a cleaner substance in comparing with traditional fuels such as coal, oil can be found not only as liquid but also as gas and a dense material. However, it has some environmental issues.

Usually resources of crude oil or petroleum are under layers of rock deep underground on the land or under seafloor. After exploration, drilling and extraction, crude oil should be refined to be used for other purposes such as gasoline for transportation and petrochemicals for producing cleaning materials, plastic, and pharmaceutic purposes (Fagan, 1991).

Distribution of oil resources like other resources is not equal across the globe. The world top 10 reserves holders of oil according Eni (2016) are Saudi Arabia, Iraq, Iran, Kuwait, UAE, Russia, Libya and United States, Canada, Venezuela.

The Organization of the Petroleum Exporting Countries (OPEC) predicts although demand for oil may decrease in future, it remains as the most significant energy recourse across the globe.

2.3 Impacts of Oil on Environment

The major factor of destroying environment is individual convenience and normally citizens face the main harms of these exploitations; this causes some environmental issues including various deceases, climatic change and consequently disasters, depleting resources, annihilating biological diversity in environment and harm to ozone layer (Abu-Bakr, 2014). In such a situation, pollution is the most serious problem of oil industry. Based on Mariano and La Rovere (2017) all stages of oil exploration, drilling, production, refining and transportation, includes some degree of pollution. Among these stages, refining of crude oil is the most pollutant stage, because of using huge quantities of water and energy, big amount of wastewaters, producing dangerous gases and making solid waste, and these are not easy to dispose and treat.

Based on BOEM (2016) major factors of oil spill are human mistakes, failure of equipment, natural reasons such as weather, and some other external and unknown factors. Spills of oil are categorized into minor medium, major spills and disaster spill and this classification is according to the amount of oil spill on water and land (Tewari & Sirvaiya, 2015).

Mariano and La Rovere (2017) summarized the general negative impacts of oil companies on environment:

- Pollution of water because of outgoing water that is used for washing and cooling, and passes from storehouse and tanks of waste;
- Pollution of water because of spread of outgoing water which is full of inorganic salts that is usually known as saline pollution;
- Thermal contamination because of outgoing release of water with high temperatures;
- Water pollution because of spills of oil;
- Spread of particulate into air that is produced during the activities of refining and production sections;
- Spread of compound gases during the activities of refining and production sections such as fluorine, acid mist, ammonia, nitrogen oxides and Sulfur;
- Potential spread of dangerous and harmful substances such as alkaline substances and solvents;
- Pollution of underground water, surface water and soil because of unsuitable disposing various wastes of chemical activities of oil companies such as spread of sludge and particulate of operations;
- Causing more traffic in local places due to transportation of oil that usually includes hazardous burden;
- Noise pollution due to the activities and working instruments during the all stages of exploration, drilling, production, refining and transportation;
- Unpredicted events including huge spills of oil, leakages, explosions and fires that each has its own negative impact on environment.

Boesch and Rabalais (1987) considered the environmental impacts of oil-related operations based on their priority:

Negative effects with high priority: according to Boesch and Rabalais, these effects are continuous and long term impacts due to existence of heterocyclics and hydrocarbons with different molecular weights (high and medium) and their gradual outcomes in materials that sinks to the bottom and in cold places; hazards and harms of spills of oil to various creatures and biogenic collections including plants, reefs and seashore wetlands; and impacts of digging channels for pipes crossing from seashore wetlands.

Other effects with intermediate and low priority: these effects are included engaging in residuum of oil-related operations of animals such as turtles, mammals and birds, especially when are gathered in group in special times; impacts on marine creature of drilling discharge that collects during this activity; impacts of created water evacuation that is made in marine but evacuated in seashore places; negative impacts of disturbances such as noise on group of turtles, mammals and birds; impacts of oil spills on decrease of fishery because of extinct of eggs; and impacts of man-made causeways and routes on marine creatures.

Moreover, sources and negative effects of oil companies on environment could be categorized based on different stages from oil exploration and production to its transportation. This categorization includes impacts of exploration and production activities, setting up and maintenance of equipment in coastal and occasional leakages and spills of oil (Qurban, Joydas, Manikandan, Krishnakumar & Wafar, 2012).

Furthermore, Qurban et al (2012) classify the source of pollution in each stage as follow:

- Pollution in exploration and production stage

generated water containing oil, chemicals that are used for drilling, cuttings and mucks of drilling, spills of oil within extraction activities, oil that used for fuel of ships and other apparatuses, flaming of related natural gases such as hydrocarbons and methane.

- Pollution in constructions in seacoast and inshore

Creating platforms in inshore, installation of pipelines for submarine, installation of cables for submarine, dredging, diking and trenching, landfilling.

- Pollutions of unintentional incidents of leakages and spills

Oil spills from pipelines, oil spills from channels, releases from washing of cargo, spills from equipment of seashore, release of gas from leakages and spills.

2.3.1 Oil Spill

Although most of the oil spills in history are unintentional, there are some intentional accidents. The biggest accidental disaster spill oil in world occurred in 2010 in Gulf of Mexico, in which more than 200 million gallons of oil spilled into marine and caused a big explosion (Tewari & Sirvaiya, 2015). However, the biggest oil spill according to Rowe (2005) is related to an event, in which Iraqi army intentionally released more than 8 million barrels in the Persian Gulf in order to prevent from the attack of the USA. This amount of oil covered more than 4,000 square miles with thickness of more than 4 inch. Based on Lindén, Jernelöv and Egerup (2004) this oil spill had multi-dimensional impacts on environment that are not easy to specify clearly. However, these impacts are investigated from different perspective:

Air pollution: due to fired oil wells a huge amount of smoke and gas generated and created a plume at the top of wells that later with winds came back to ground. This generated smoke consisted of dangerous toxic gases that were breathed in by people and animals and took over plants and houses. The wells that were burning caused to exit large portion of oil without burning within the flames that later produced rain of oil and came to the ground. This oil rain forms lakes of oil that in turn are sources of spread in air. Moreover, this fire smokes had important impacts of the climate of local.

Terrestrial environment pollution: the most significant impact was on the terrestrial environment of this disaster. The ruined wells discharged big amount of oil to around lands, creating many lakes of oil. Although, most of these lakes have been filled by government or rainfall, oil still was existed and penetrating in surface layers and was a big threat for underground water (Omar et al., 2000). Smoke of fire covered all vegetation of area such as plants, trees and shrubs that later became a cover of oil and tar-like (Hobbs and Radke, 1992). There are still many parts that have not been recovered or it is recovering in a slow rate. Furthermore, smoke of fire heavily affected animals' body parts such as their immune and respiratory systems and blood. Many of the animals were contaminated and this impact was more visible among sheep, since many of sheep of died.

Marine pollution: this disaster, as mentioned above, was the biggest environment pollution accident in the world and affected coastlines of Saudi Arabia and Kuwait. Its impact was almost on all aquatics. Effects on prawns, cormorants were significant. Furthermore, negative impacts on seabirds` populations were observed.

2.3.2 Environmental Pollution of Drilling for Oil

Oil is pumped by special tools from oil wells from underground resources of oil. Tools and equipment of drilling that are used for drilling of seafloor resources in marine on platforms are very complicated. When resources of oil in a place was finished the tools of drilling should be moved (Demirhan, 2016). Drilling for oil based on Rose (2009) has aspects including locating, drilling, pumping and transporting. Each of these steps can have different effects on environment:

Discovering or locating: this stage contains generating seismic waves for locating undersea oil reserves. Research showed that seismic waves affect the life of all creatures of the sea. One of these creatures who are very sensitive to these waves, are whales. Sound of waves can make them lost or confused, and causes problems in their patterns of migration. Moreover, it can affect the fishes` health, especially their hearing.

Impacts on marine floor: process of drilling for oil exploitation usually includes some issues for benthos. Marine channels and pipelines, traces of rigs, trashes of cutting and other waste materials are some factors that have long time effects on the seafloor. This point becomes more significant when we know that the most important resources of oil in marines at the same time are from the most significant places for benthos and seafloor habitants. Most of this oil is transported by ships through the Gulf. There is a potential risk for oil pollution that is about 28 times higher than the other areas in relation to the oil transportation and production (Poonian, 2003). For example, Persian Gulf, the Arctic and Mexico Gulf are important reserves of oil with various ecosystems including different fishes and benthic communities.

Pollution of water: Soleymani and Azadi (2013) mentioned two major factors of water pollution by drilling, which are fluid from drilling and leaks and spills of oil. Fluid of drilling is considered as toxic for habitants of sea. In drilling process, fluid has role of regulating, cooling and lubricating while drilling. Fluid is made from some metals and products of petroleum. Based on diversity of these metals and products and ways of using it, fluid can have different effects. Observed effects are negative impact on general health, especially breeding of sea life, declining the number of benthos and increasing toxic elements in the marine foods. Another factor of water pollution as mentioned is leaks, spills and unpredicted events in drilling. Some believe that only one rig that is used in drilling could pure thousands of ton waste materials and fluid into the sea while working. Although, it has been claimed that in some countries such as the United States the amount of water pollution by oil drilling is less than pollution by industry, sea transportation system and other sources, drilling pollution still has negative effects on life and ecosystems of marine in different aspects.

Pollution of air: working of equipment and rigs of drilling and their burning gases are main elements of air pollution. Drilling platforms in addition to refining and producing stages are important sources of polluting local air in specific and global warming and climate change in general. Pollution of each drilling rig in its lifetime working equals with pollution of 7000 cars that are used 1500 miles a month. Each oil well normally generates around 214,000 pounds of different chemical gases (Soleymani & Azadi, 2013).

2.3.3 Effects of Oil Refineries on Environment

After oil production next stage is its refining. Building refineries of oil includes systems of transportation, building basic equipment and structures, providing

employment positions, and refinery meets the needs of a defense of a country. By refining crude oil different products are generated including fuel oils, diesel oils, jet fuels, gasoline, liquefied petroleum gas and many other products.

Using huge quantities of water and energy, refineries of oil have significant role in polluting the environment and generate large volumes of toxic gases, waste waters and materials. Like oil drilling, extraction and transportation, oil refining, has dangerous impacts on soil, water, air and therefore on all the globe (Siddqui, 2015).

2.4 Environmental Protection Conventions across the Globe

Based on the report of Brundtland Commission, three main factors of sustainable development are development of economic, social improvement and protection of environment. These factors are intertwined in real world and manufacturing firms must consider environmental protection factors in order to reach sustainable development and manufacturing (United Nations, as cited in Nörmann & Maier-Speredelozzi, 2016).

According to Mariano and La Rovere (2017), while oil production creates some issues and has negative impacts on our environment, it is considered as a positive factor in society because it provides job opportunities and is an important source of income for countries. Then, it can be considered as beneficial factor for oil companies. However, there are some oil industries that do not fully consider or implement the environmental protection regulations and laws. These industries have orientation toward accepting these regulations that shows their reactive view toward protection of environment. Considering environmental factors by oil companies is viewed as a crucial challenge for them. Responsibility for protection of environment is significant factor for development and even survival of companies, because many customers may have

negative attitude toward companies that do not consider environmental protection regulations.

2.5 Marketing Management and Environmental Protection by Companies

Environmental protection is an inseparable activity of each company and like other activities of companies paying attention to social responsibility projects and emphasizing their own operations contributing to social welfare of people, will make environmentally sensitive individual more calm in consumption of oil and petrochemical products. However, environmental pollution by companies can cause irrecoverable and permanent harms on environment, then foster use of technologies that will minimize both waste and pollution, is a must.

Kotler and Keller (2012) state that Marketing management is “the art and science of choosing target markets and getting, keeping, and growing customers through creating, delivering, and communicating superior customer value” (p.5). They added that marketing itself is a social activity in which people achieve what they require by producing, offering and freely exchanging products and services of value with others.

One important element of holistic marketing, based on Kotler and Keller (2012), is performance marketing. According to performance marketing, good marketers not only consider the revenue of sale but also loss or satisfaction of customers and in this regard considering environmental, social and ethical factors in their activities are crucial.

The green marketing revolution and green buying are other related concepts in marketing management. Nowadays, consumers are more concerned about environmental protection by oil companies. Many research in this regard have been conducted in recent years. For instance, in one of these studies concerns of the participants from the USA about global warming has increased from 25 percent in 1998 to 40 percent in 2008. In another study, impacts of companies` activities on local environment such as rivers and lakes around them were reported as their main concerns. Most of the time costumers` behavioral change is followed by their attitudinal change. As a result, consumers` environmental concerns would impact the activities of companies. For example, Walt Disney Corp, has committed that by 2013, will decrease its solid waste and save millions of gallons of water and will invest in renewable energy. Whole Foods, is another example which pledged that with a partnership will decrease the grocery refrigerators` emission and apply the renewable energy to generate electricity. Therefore, companies are required to be aware of the society`s concerns of environmental protection of their activities and they should apply green marketing programs (Kotler & Keller, 2012; Mainieri, Barnett, Valdero, Unipan & Oskamp, 1997).

2.6 Environmental Protection of Oil Companies in Turkey

2.6.1 History of Oil in Turkey

In the 18th century for the first time Evliya Çelebi, a Turkish historian, introduced the possibility of oil existence in Turkey; however, oil exploration did not start until 19th century. From the second half of this century both national and international companies started oil exploration. European Petroleum Company explored the first oil well in Thrace (Hora Deresi area). With World War I, the Ottoman Empire collapsed

and consequently, for a period of time oil activities had stopped (Özceylan, Paksoy, Del Rosario, Kropat, & Weber, 2010).

In 1923 after proclaim of republic and emergence of new Turkish state, oil exploration has restarted. Mineral Exploration and Research Institute (MTA) was actively exploring in the southeast areas, specifically in the Raman area. The first oil well of Raman area was drilled in 1940. Approximately 10 years later, Garzan oil region was explored with cooperation of MTA. In the 1950s, New legislations and changes in petroleum policy of government were occurred and the national oil company of Turkish Petroleum Corporation was established. Later Turkish Petroleum (TP) became the first company in oil exploration and exploitation (TPC, 2018).

Interest for oil production had increased in Mediterranean area in recent years; this leaded to increase of terminals of oil, pipelines and shipping in the area. Therefore, there has been many efforts for identifying the potential sources of oil spill and for fastest ways to control it. Each year, in different places of the world million tons of disposals of oil are discharged in the marines (Kostianoy & Lavrova, 2014).

According to Jakarta and Sunar, (2008), Ships with more than 40%, are the major source of this waste and Nearly 30% of the world`s petroleum transportation is done through Mediterranean Sea. On the other hand, the project of transfer of oil from Azerbaijan to Ceyhan, Turkey, is more than 1000 km pipeline, crossing many fault areas, rivers and mountainous places from east to west (Kerem, Kirbas & Saygın, 2016). Therefore, in addition to its environmental issues of oil production, considering the situation of Turkey in Mediterranean area, it is surrounded by heavy traffic of oil

ships; consequently, its environment is under danger and risk of pollution from land and water. Based on Kasap (2002, as cited in Jakarta & Sunar, 2008) Turkey is among ten countries with most oil tanker accidents. The main accidents of oil tankers were Independenta accident and Nassia accident, respectively in 1979 and 1994, in which oil spill was more than 100,000 tons (Otay & Yenigün, 2000).

2.6.2 Major Oil Spills in Turkey

Turkey, according to Turan (2009), is located at the middle of Caspian regions, North Africa and Middle East, which they have more nearly 70 percent of world`s oil reserves. Therefore, in 2010 around 155 million metric tons is transported through the traits of this transit country.

Turkey has different traits including Istanbul, Canakkale and Marmara Sea traits and each year more than 50.000 vessels cross these straits. Istanbul strait is the major strait in Turkey and most of the transportations relates to this trait. As a result, oil spill in Istanbul trait is increasing (Basar, Kose & Guneroglu, 2006). Turan (2009) illustrated the major oil spills in Turkey.

Table 1: Important oil spills in Turkish straits (Turan, 2009)

Date	Vessel Name and Flag Accident	Accident Area	Accident Type and Oil Spilt
1960	World Harmony (Greek) v. Peter Zoranic (Yugoslavia)	Kanlica	Collison and fire: 18.000 tons oil spilled
1964	Norborn (Norvegian) v. wreck of Peter Zoranic	Kanlica	Contact: fire and oil spilled
1966	Lutsk (Russia) v. Kransky Oktiabr (Russia)	Kizkulesi	Collison and fire: 1.850 tons oil spilled
1979	Independentia (Romania) v. Evriali (Greek)	-	Collison and fire: 20.000 tons of oil spilled and 50.000 tons of oil burned
1980	Nordic Faith (British) v. Stavanda (Greek)	-	Collison and fire
1982	Bluestar (Malta) v. Gaziantep (Turkish)	Ahirkapi	Contact: 1.000 tons ammonia spill
1988	Jambur (Iraqi) v. Da Tung Shan (Chinese)	Sariyer	Collison: 2.600 tons oil spilled
1990	Nassia (Philippines) v. Shipbroker	Bebek	Collison and stranding: 22 tons oil spilled
1994	Unirea		66.400 tons oil spilled
1999	Semele v. Sipka	Yenikapi	Collision: 10 tons oil spilled
1999	Volganef 248	Florya	1.500 tons oil spilled
2002	M.V. Gotia	Emirgan Dock	Stranding: 20 tons oil spilled
2003	Svyatoy Panteleymon (Georgia)	Anadolu Feneri	Grounding: 230 tons oil spilled

Another example is an oil spill in 2013 in Kalecik Village in North Cyprus and south of Turkey in which oil was discharged from the burst pipe for approximately 10 minutes, releasing 50-100 tons of fuel oil (LGC News, 2013).

2.6.3 Renewable Energy and Sustainable Development

Steeves and Ouriques (2016) notes that in the last two centuries, the crisis of source of energy was decreased by shifting attentions from charcoal to coal in the 19th century and in 20th century by becoming oil the dominant source of energy. For example, during 19th century, in Great Britain there was a transition from coal to oil. Nowadays,

crisis of oil will partially lead to a change toward other sources such as renewable energy (Podobnik, 2006).

On the one hand, economic growth and cheapness of oil for consuming and importing countries and on the other hand, increasing profit of the oil sail for oil companies and countries which possess oil has led to more and more consumption of oil from the last decade (Moore 2013). Since the world`s largest economic powers such as the USA and China don`t have sufficient resources of oil, they have been importing energy. However, strategy of importing oil would not be effective for their future energy demands and renewable energy seems to be a possible alternative. Recently, countries have sought to find alternative sources of clean energy such as natural gas and renewable energy for their energy demands (Steeves & Ouriques, 2016). For instance, around 1% of Gross Domestic Production (GDP) of European Union includes renewable energy and this proportion seems increasing in next years. It is predicted that by 2020, China which is a rapidly developing country, each year will invest about 50 billion USD and European Union`s leading position in this regard will be replaced by China (Csomós, 2014).

The USA is leading country in the energy research and has had significant developments in energy technologies. This country with Canada has a project of investment in renewable energy for 2020, in which they will invest 50 billion USD. Other developed countries such as Japan, South Korea, Germany and other countries in European Union have started to increase their investments in this field. In addition, developing countries including Turkey, Indonesia, India, Brazil and Australia have

good opportunities to develop renewable energies to meet the needs of their growing economics (Csomós, 2014).

According to Csomós (2014) China and its state oil companies such as PetroChina and Sinopec, have many projects to reduce environmental pollution and develop renewable energies and in this regard, they have a plan of investing 670 billion USD during 2015-2020. However, there are many companies who do not care about renewable energy in practice. ExxonMobil, a giant American company, although believes in the growth of renewable energy in near future, still has many investment plans in oil and gas fields, because it claims that oil remains as dominant fuel of world for next decades. The reason could be more profitability and cheapness of fossil energy including oil and gaining less from investment in renewable energy. ExxonMobil adds that there is not any urgent to stop using oil and we need it to save people from poverty.

Therefore, there is controversial debate over investment in renewable energy and this significant question arises that how the goals of renewable energy could be achieved while companies keep their interest in oil exploitation.

Energy is considered as a significant element to achieve sustainable development. Growing economics and industries of Turkey in last decades demands more energy for various section (Kar & Bahadir, 2016; Yuksel, Arman & Demirel, 2017), therefore, it has opened the market for national and international companies.

However, Turkey has imported more than half of its required energy. Although, Turkey has some reserves of lignite and oil, the increasing total amount of energy

consumption as a result of economic growth and individual use, has made this country an energy importing country. Increase in the amount of consumption of fossil energies such as oil and lignite, as noted above, has caused some issues for environment. Because of this and in line with developed and developing countries, renewable energies in last decades has appeared to be an important commentary and in some parts alternative of fossil energies for sustainable energy development and more environmental protection of Turkey (Kaygusuz, 2001; Ozturk & Yuksel, 2016).

Geographical location of Turkey has made it feasible to use a wide range of renewable energy sources. Turkey is currently using non fossil energies as biomass, wind power, Hydroelectric power, natural gas and solar power (EIA, 2000; Kaygusuz, 2001).

Kar and Bahadir (2016) in their study tabulated the Turkey`s total energy demand, total energy production and supply by the renewable energies from 2000 to 2015 based on tons of oil equivalent (TOE/year).

Table 2: Clean energy resources in Turkey (1000 toe/year), (Kar and Bahadir, 2016)

	2000	**2005**	**2010**	**2015**
Total energy demand	77624	85340	101510	131214
Total energy production	26808	23626	27279	34650
Supply by renewables	10149	10131	9604	10426
Biomass and waste	6546	5332	5023	4864
Wood/wood waste	6541	5325	4994	4322
Biogas	5	7	15	28
Municipal solid waste	-	-	-	6
Biofuels	0	0	14	20
Wind energy	3	5	31	46
Solar energy	262	385	420	964
Hydropower	2655	3402	3083	4864
Geothermal energy	684	1007	1048	1214
Share (%)	13.07	11.87	9.46	10.2
Biomass and waste	8.43	6.25	4.95	5.10
Wood/wood waste	8.43	6.24	4.92	4.96
Biogas	0.01	0.01	0.01	0.02
Municipal solid waste	-	-	-	-
Biofuels	0.00	0.00	0.01	0.01
Wind energy	0.00	0.01	0.03	0.06
Solar energy	0.34	0.45	0.41	0.52
Hydropower	3.42	3.99	3.04	3.46
Geothermal energy	0.00	1.18	1.03	124

The use of biomass has decreased from 1990 to 2008 because of environmental issues such as residential heating, air pollution and deforestation and wind power on the other hand has increasingly generated. Moreover, potentials for investment for clean energies in Turkey are for hydroelectric, wind power, solar thermal, and biogas respectively (Kar & Bahadir, 2016).

However, there is still more potential and need for growth in this fields. Considering renewable energies in Turkey`s short-term and long-term policies helps both sustainable energy development and protection of its environment (Kaygusuz, 2001; Kar & Bahadir, 2016).

2.6.4 Oil Companies in Turkey

Oil production in Turkey although reached its peak in 1991 at 85 thousand barrels a day (bbl/d), in 2006 reached its bottom at 44 thousand bbl/d, then after a small increase reached approximately 53 thousand bbl/d in 2009. This amount is only about 10% of demand and remaining 90% is imported mainly from Russia and Iran (EIA, 2011).

More than 50 national and international oil companies are actively engaged in Turkey`s petroleum in various field including exploration & production, drilling & well services, transportation, engineering, manufacturers & suppliers, consultancy, environmental & safety and other services (Rigzone, 2018). Some leader national and international oil companies in Turkey are Shell, ExxonMobil, Chevron. TPAO, BP, Petrobras and Toreador.

In this section three sample international and national companies, namely Turkish Petroleum Corporation, Perenco company and MEKE is considered, which are respectively national company, the biggest international oil company and leading company in environmental protection field in Turkey. Later Turkey`s environmental protection Laws are studied.

2.6.4.1 Turkish Petroleum (TPAO or TP)

As the only national petroleum company, TP according to TPAO (2018) was established in the fields of exploration, drilling, production, refinery and marketing in

1954. During its activities, TP has had prominent works in all fields of petroleum and had significant and successful investments based on its legal rights. TP was integrated cooperation until 1983 and involved in all branches of oil industry. TP, today, as national oil corporation engaged in exploration, drilling and production fields.

Major plans of TP related to protection of environment have been scheduled to keep water, atmosphere and environment as a clean heritage for the future generations (www.tpao.gov.tr).

There have been positive activities in regional managements to remove or reduce pollution of land. As claimed by TPAO (2018), in 2010, there was prominent achievements in comparing with 2009. Success of plans, for example, in Batman region is 96% and in Adiyaman is 81%. In order to boost the effectiveness of system of environmental management, plans for protection of environment were prepared. Based on environmental laws, treatment of pollutants or waste and preventing from harmful activities in oil industry were performed in order to stop environmental pollution in oil industry.

TP implemented the following plans and projects throughout 2010: project of emergency intervention, project of managing waste water, project of managing waste water of drilling, project of applying products of bioremediation, mixing waste oil into crude oil, managing dispose of waste water, applying consumable equipment of environment, project of offshore of black sea, project of offshore drilling of deep water and finally, management researches about waste water as result of production of offshore gas (TPAO, 2018).

2.6.4.2 Perenco

Perenco is an oil company based in Singapore which is active in 13 countries, in Asia, Europe, America and Africa. Perenco`s oil activities are both offshore and onshore. Perenco with production of 450000 barrels of oil equivalent per day (BOE/D), is currently leading independent firm in Europe. Perenco, as it has been claimed is proud of its highest standards regarding environmental protection (Perenco, 2018).

Based on Perenco (2018), this company is active in various branches of oil industry in Turkey, specifically in Diyarbakir region. It is the biggest private producer in Turkey and in 2016 its approximate daily production was 9,000 BOE/D. Perenco is currently cooperating with TP in exploration field.

Perenco, as is claimed, is committed to improvement and use of the highest environmental protection plans. In this regard its goals and plans are as follow:

- To reduce the traces of their activities.
- To develop best environmental management.
- Accountability and responsibility of managers for environmental issues.
- All employees are responsible for impact of their works on environment.
- Have a system of environmental management in accordance with related legislations and with standards of E & P industry.
- Assurance of understanding and applying system of environmental management within all levels of the firm.
- Assurance of exact implementation of environmental regulation by personnel and employees.
- Considering environmental issues both on work and out of work.

- Evaluating the environmental impacts of company`s activities and appointing suitable limiting measures.
- Caution about physical appearance of equipment, in order to reduce the potential of accidental discharge of pollutant materials.
- Applying the most suitable and highest technologies to decrease the negative effects and improve its efficiency.
- Having performance goals and supportive plans annually.
- Carry on current projects of emergency response for environmental issues.
- Implementing emergency drills and practices to assess effectiveness, in order to response quickly in environmental issues.
- Study and survey all events, applying suitable measures to stop recurrence of these incidents.
- Frequent investigation of all company`s activities and implementing the findings to improve the performance (perenco, 2018).

2.6.4.3 MEKE

According to its official website (www.sesmeke.com), MEKE Marine Environmental Protection Services Ltd as Turkey`s leading environmental firm is engaged in response of both land and water pollution. MEKE`s services to its clients, municipality of Istanbul and ministry of Turkish Marine, include: production of equipment and materials for emergency response in oil spill such as, oil skimmers, Oil spill response vessel (OSRV) and high quality sorbent and oil booms, cleaning of sea waste and response to oil spill both offshore and onshore. Sesmeke as subsidiary of MEKE and Seacor, a spill response firm of the USA, is responsible for emergency response of 4 section in Turkish part of BTC (Baku-Tbilisi-Ceyhan) pipeline. MEKE is working as Turkey`s sole corporation active in international organizations of spill response,

OSRAM and MOIG. With its 11 OSRV, MEKE had successful experiences in oil spill response in Mediterranean, Black Sea, Marmara Sea and Bosphorus, in last 29 years (Rigzone, 2018).

MEKE`s accountability based on MEKE (2008) is included considering environment, safety and health by all staff of the company and their agreement to produce the safety culture, reduce the dangers by specifying the risks, participating all group members in testing potential accidents situations, economical and effective use of natural resorts, stopping or decreasing various types of pollutants from its sources, producing products and providing services in a way that protects environment, training all staff and other interested persons, raise their awareness toward accountability and capability and participate them in the projects, providing high quality products and services, conform with all conventions, regulations and laws in all fields in both national and international levels, meet the needs of and demands of costumers, regular control and improve the management system, consequently, applying a maintainable system with goals, to interact with authorities, suppliers, customers and other related people to realize the main values and activities of MEKE.

With its proficient and experienced staff, a huge fleet and equipment, MEKE has various operations in marinas, refineries and shipyards and ports. The provided services of company in the field are: response to offshore and onshore oil spills, response to pipeline spills, collecting and managing the hazardous waste materials at marine and land, producing equipment and vessels for emergency response to chemical and oil spills, services in open marines, providing emergency projects and risk assessment for facilities of shoreline providing exact zone maps, providing projects of

geographical response, teaching managers and others in response groups, specialized consultation, and emergency management (Meke, 2008).

International Maritime Organization (IMO), by its experienced members, for 30 years has been active in trainings of response to oil spill and prepared guidelines for preparation of oil spill. These trainings are included:

- Training of members of support and operation.
- Training of coordinator and supervisors of incidents.
- Training of major coordinators.
- Training of supervisors of cleaning of shorelines.
- Training about offshore oil spills.
- Training of response operations in oil spills.
- Training of management of response operations in oil spills.
- Training of response refresher in oil spills.
- Training of management system of incidents.
- Training of response to dangerous materials.
- Training of entry to restricted spaces.
- Officers and staff categorization in tankers training.
- Training of disaster management (Meke, 2008).

Moreover, MEKE provided services of involvement in emergency response in projects of research on offshore oil to big companies in the oil fields: in 2015 shell, from 2008-2014 TPAO, 2010-2011 ExxonMobil, 2011 Chevron, 2009 Petrobras and 2009 Toreador (Meke, 2008).

2.7 Previous Studies

Many studies investigated activities related to the environmental impact of oil companies such as oil spill (Jakarta, & Sunar, 2008; Alves, Kokkinos, Horiatis, Lardner, Panagiotis, & Radhakrishnan, 2015; Boudaghpour, 2011; Otay, & Yenigün, 2000; Sunar, Jakarta, Göral, & Uça Avcı, 2007; Toz, 2017; Turin, 2009), oil transportation (ORS, 2004), marine pollution (Neville, 2001; Usluer, 2016; Yang, & Khan, 2012), regulation of environmental protection (Luoma, 2009; Ugbaja, 2016).

For instance, Boudaghpour (2011) in his environmental study of different refineries in Iran found that process of oil refinery produces different pollutants, toxic materials and gases that some parts of them have long-term effects on environment including water, land and air, and all human beings. He added that there will be a terrible disaster if these companies do not obey the environmental regulations.

In their study, Yang and Khan (2012) mentioned that there are two obstacles in implementation of regulations of environmental protection; the first one is absence of new technologies to prevent pollution and second factor is lack of training and development. Moreover, in order to make sure about the effective implementation of regulations they suggested environmental management system.

Toz (2017) investigated the potential oil spills in Samsun of Turkey. Using different models, the results showed that even in the case of an average accident (oil spill) Samsun city will be under the risk pollution; however, the density of pollution completely depends on the kind of oil spill and its quantity.

As mentioned above, oil for many years remains as the dominant source of energy in the world and some companies instead of more attention to renewable energies, still have future investment plans in oil production. In addition, renewable energies cannot be fully replaced the oil, because oil is used for constitutive material of hundreds of products.

However, few studies, if any, investigated the environmental protection of oil companies. Therefore, the current study attempts to examine the implementation of the environmental protection regulations and laws by national and international oil companies in Turkey.

Chapter 3

METHODOLOGY

3.1 Participants

The first group of participants of this study was least 16 managers and employees of oil companies and expert university teachers on environmental protection in different areas of Turkey. Managers and employees were from different national and international companies including TPAO, MEKE, Perenco, Shell and SOS. University teachers were from Boğaziçi University, İstanbul University and Dokuz Eylül University.

Table 3: Demographic of first group participants

Participants	Number	Position	Years of Experience
Managers and employees	11	4 Managers 5 Engineers 2 Personnel	3-17
University teachers	5	2 assistant professors 2 associate professors 1 full professor	5-23

The purposeful sampling was used to find expert persons in both fields of environmental protection and oil activities by searching on the internet and finding their background and also by asking from other experts. Although the researcher contacted with more than 90 managers and university teachers in different companies and universities, only 16 of them fully responded the interview questions. Conduction

of interviews were though telephone and email. All of the participants were informed about the nature of the study and assured about the confidentiality of their names and responses. After informing and getting the consent of the participants, telephone interviews were audio-recorded (each about 15 minutes).

Second group of participants were 23 people who lived in cities (such as Istanbul, Diyarbakir, Batman, Iskenderun, …) and areas around the oil companies. Availability sampling was used for selecting the participants from the students who were studying at Eastern Mediterranean University in North Cyprus and were originally from those areas. According to Farhady (2008), in availability sampling, participants are selected based on their availability and willing to participate in the research. The number of these participants were 23, they were studying in different departments and levels (3 PhD, 5 MA and 15 BA). Data was collected from these participant using face-to-face interview. Interviews were in Turkish and they were conducted by a Turkish person. With permission of participants interviews were audio-recorded and each interview lasted about 15 minutes.

Table 4: Demographic of second group of participants

Participants	Number	gender	age	city
Students	23	13 Males 10 Females	19- 27	Istanbul, Diyarbakir, Batman, Iskenderun, Mardin and Adiyaman

3.2 Data Collection

This study has applied a qualitative method of data collection by using semi-structured interview and document analysis tools. Semi-structure interviews often provide detailed and in deep information from participants (Harrell & Bradley, 2009). Conduction of interviews were though telephone and email. In addition, considering available documents related to environmental protection by oil companies and comparing them with results of interviews gives the opportunity to realize the extent of their implementation and possible lacks in these regulations.

3.2.1 Interviews

Interviews has been conducted with managers and employees of oil companies, university teachers and residences of the areas around the oil companies in Turkey. As it was noted above, since some of the participants could not speak English, the interview questions were translated into Turkish by a Turkish native speaker. Moreover, Turkish responses (both face-to face and telephone) were transcribed by the same person. Later, both transcribed data and Turkish responses (through emails) were translated into English. The translated data was checked by an expert translator to enhance its reliability.

3.2.2 Document Analysis

According to Bowen (2009) document analysis is a systematic procedure for reviewing or evaluating documents and it is often used in combination with other qualitative research. Documents are viable sources that often state the related missions of the organizations.

The researcher investigated and carefully studied the existing documents and regulation of oil companies in order to understand what are the environmental

protection plans and requirements of oil companies in Turkey. Moreover, by comparing them with results of the interviews, possible lacks in these documents can be revealed.

Chapter 4

RESULTS

4.1 Introduction

As mentioned above, data was collected from different interviews as well as analyzing available documents and regulations regarding the environmental protection by oil companies in Turkey. Later, their results have been compared to evaluate the extent of implementation of the laws and regulations.

4.2 Interviews

Thematic analysis is used for analyzing the responses and based on the interview questions. The researcher included some extracts of participants` responses. Pseudonyms are used to consider the confidentiality of the participants` information.

4.2.1 First Group Interviews

The first group of participants of this study was least 16 managers and employees of oil companies as well as university teachers in different areas of Turkey. Second group was 23 people from residences of areas that there are oil companies.

The first interview question was:

1) What are environmental issues caused by oil companies in Turkey? Are all these issues inevitable?

In answering this question almost all participants had similar answers, although some answers were very short and others were more comprehensive. They all mentioned

some negative impacts of oil companies in different stages in land, water, air and all human being. One of the participants, for example answered as follow:

“In all phases of exploration, drilling, production, refinery and transportation, oil companies have impacts on environment. These activities affect the soil, air, water (including surface water and underground water), plants, trees, and generally all humans.” (Participants 12)

Other important themes that are emerged based on responses were as follow:

- Some of impacts are unavoidable, and some are avoided
- some of them have short-term effects and some have long-term effects
- some impacts are in the small areas and some affecting large areas

“Although some of the negative effects could be prevented but some of them such as spread of some gases into air in the process of refinery is inevitable. Moreover, these effects can be large or small scale.” (Participant 7)

“Refineries produce pollutants such as organic volatile organic compounds (VOCs, SO2, NOx, H2S), and particles of micelles and aerosols and other toxic compounds, some of which are very dangerous. These are the largest producers of greenhouse gases.” (Participant 8)

> … for example, in the process of exploration of hydrocarbon sources in land due to the need for exploratory boreholes and the creation of seismic waves on the surface by explosives, the greatest impact of these operations on the soil and the earth is in the surface layers, which may be a short and insignificant effect on the environment of the area and lead to the mixing and physical collapse of the soil. But if exploration leads to the exploration of new resources in that area, subsequent development and drilling operations to achieve carbon-rich resources can have significant environmental impacts on the land, water and weather conditions of that area in the long run. (Participant 3)

The second interview question was:

2) What are environmental protection plans of oil companies in Turkey?

The following themes have emerged based on participants` responses:

- Environmental impact assessment report
- Preparing manual guide for monitoring air pollutants
- Implementing quality improvement projects
- Refinery of drilling wastewater
- Recycling and purifying oil sludge
- The use of environmental friendly technologies
- Improvements in oil recovery plant
- Prevention of wasting and releasing oil in the environment by using a mobile recovery plant
- Improvements in the wastewater reservoirs
- Improvements in the installations and the equipment
- Increasing green spaces in oily cities and around the oil companies
- separating some gases of oil in the process of oil production

“We have different plants to protects environment such as regular control and improving our equipment and using new technologies that have less negative impacts on environment.” (Participant 9)

“Pollution of environment is reduced by for example prevention of wasting and releasing oil in the environment by using a mobile recovery plant, Recycling and purifying sludge of oil in different processes such as production and refinery.” (Participant 15)

“…Collecting some gases of oil in the process of oil production, in order to prevent from their spread into air and as a result air pollution.” (Participant 1)

The third question and emerged themes are as follow:

3) To what extend the environmental protection plans of oil companies in Turkey have been implemented?

Most of the Participants believed that environmental protection plans have fully implemented in recent years:

"Many oil companies have contingency response plans for oil spills (in the sea or on land). I am not sure about the details but you can visit the web sites of the major oil companies that operate in Turkey." (Participant 6)

"One important indication of our environmental protection implementation is preparing and submitting the report of environment impact assessment to related authorities." (Participant 10)

> Oil spill management plans are implemented fully since compensating environmental damage due to oil spills may be very costly to the oil company involved. Apart from all these, some oil companies run social responsibility projects many of which have environmental implications. (Participant 2)

However, some of them claimed that there are some limitations:

"Because of the strict regulations and laws of Turkey regarding the protection of environment, most of the oil companies consider and implement the plans, however there are still some limitations in implementing plans." (Participant 13)

Fourth question of the interview was:

4) If these plans have not been implemented completely, what are reasons and how should be overcome?

The reasons of defects in implementation were:

- Some external factors
- Unpredicted events (fire)

- Lack of knowledge of some personnel
- Carelessness on some personnel
- Absence of alternative option: no other places to release the waste
- Expense of other options (ease of releasing)

"Many factors may cause problems in process of implementing plans such as staff`s unawareness about regulations or paying less attention to regulations." (Participant 9)

"There are unpredicted events, for example fire in different places, that make problems. Also, it is sometime costly for companies to implement all environmental regulations, then they choose the easiest way." (Participant 13)

The participants made the following suggestions to overcome these issues:

- Awareness and more education of all staff
- Minimizing the risk of oil spill and leaking by prediction of incidental events
- Regular control of equipment
- More restricted control

"…regular control of all installations an equipment in drilling, production and transportation phases, as well as pipelines." (Participant 6)

"Government and other environmental protection organizations such as NGOs should control oil companies more strictly and put more pressure on them to apply all regulation regarding the protection of environment." (Participant 13)

"Turkey is a developed country and also in the field of oil it uses new technologies and considers environmental protection as an important issue." (Participant 3)

"The government should be more careful about the oil companies, especially foreign companies, in order to protect the country`s environment from the negative influences of activities of these companies." (Participant 16)

4.2.2 Second Group Interviews

Second group of the participants was 23 people from residences of areas and cities that there are oil companies. They have been asked the same questions as the first group of participants. Although they were all university students, they did not have enough information about some of the questions, especially question 2 (What are environmental protection plans of oil companies in Turkey?) and question 3 (To what extend the environmental protection plans of oil companies in Turkey have been implemented?).

About the first questions almost all students agreed with the responses of the first group of participants in that activities of oil companies influences land, water, air and all human beings, although their answers were simpler than first group.

However, most of these participants claimed that activities of oil companies the different phases had negative impact of their environment:

"we live in a place that there is a refinery company of oil it has very bad smell and we heard from many people that it has bad effects on our health and on air pollution." (Participant F)

"I don`t know the exact regulations that oil companies should consider, but I know that in my city there is an oil company that destroyed our environment by drilling and pollution and constructing roads." (Participant K)

> I think oil is important, but not as environment, we can use new and other cleaner energies such as solar energy, but we have only one environment then we have to protect it and government and oil companies should be more careful about environment; because I heard that these companies have negative effects on environment and our lives. (Participant D)

4.3 Document Analysis

In Turkey Legislations on protection of environment is basically consisted of national decisions, regulations and laws. Turkey has also signed various international conventions such as: Stockholm Convention on Organic Pollutants, Convention on Long-range Trans-Boundary Air Pollution (CRLTAP), Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal, Kyoto Protocol regarding to the United Nations Framework Convention on Climate Change, Montreal Protocol on Substances that Deplete the Ozone Layer, Barcelona Convention for the Protection of Marine Environment and the Coastal Region of the Mediterranean, Vienna Convention for the Protection of the Ozone Layer (Mavioglu, Seymen & Tamtürk, 2017).

According to Mavioglu et al (2017) the Ministry of Environment and Urbanisation is the major organization for setting regulations and it has responsibility about protection of environmental, pollution prevention, controlling plants and facilities, issuing permissions, global warming and sustainable development. However, Municipalities, Ministry of Agriculture and Rural Affairs, and the Ministry of Culture and Tourism are also environmental-related ministries and authorities.

Based on Tunc, Altunyuva, and Kepkep, (2017) and Mavioglu et al (2017), some of the important regulations regarding environmental consideration by oil companies are as follow:

Environmental protection plans regulations and standards has been provided by Ministry of Environment and Urban Planning (MEUP) which is concerned with issues

such as waste collection and recycling and some other activities of oil companies. MEUP has the responsibility of implementation of standards.

There are some activities and facilities that need environmental auditing or report. MEUP has provided the list of these activities and facilities that may cause pollution. Companies are required to show that in their facilities precautions are considered and make sure about its legitimacy through annual auditing. Moreover, for activities such as construction of oil pipelines and oil transportation, companies are required to meet the standards and acquire necessary licences and certificates.

Companies which produce waste should consider precautions to prevent any harm to the environment and minimize the production of waste. Furthermore, the amount of produced waste should be annually reported to MEUP.

According to Article 20 of Environment Law, in the case of any accident, companies must immediately inform the MEUP.

Moreover, Article 5 of Ministry of Environment and Forestry in the Official Gazette No. 25752 (as cited in Turin, 2009) stated that responsible organizations and persons including equipment and ships which are subject to this regulation should be accountable for all of their activities as it is mentioned in the international regulations and in the laws relating to the safety assurance of environment, assets and life such as preparing for maintenance and protection measurement. Moreover, they should attempt to prevent accidents and in the case of an accident they should try to remove or at least reduce the damage.

Comparing the responses of first group of participants (managers of oil companies and university teachers) and second group (residences of the areas around the oil companies) showed that there was not more agreement in their responses. Overall, second group had negative attitude toward oil companies impact on environment and their lives, while the first group mostly agreed that oil companies considered and implemented the environmental protection standards and plans.

Considering environmental protection regulations and documents and the results of first group of participants, implementation of the regulations is relatively satisfactory. However, it can be implied from the results of the second group of participants that there are some limitations in implementation of environmental protection regulations and plans.

These limitations and lacks could be removed or reduced by different programs of companies including applying new research findings, technologies and equipment, more training of personnel and regular control of installations, pipelines and vessels as well as stricter inspection of oil companies` activities by government and related authorities.

Chapter 5

CONCLUSION

5.1 Summary of the Study

The main aim of this study was investigating environmental protection plans and extent of their implementation by oil companies in Turkey. Results of the study which are compatible answer to the research questions show that although there are comprehensible regulations and plans for environmental protection in Turkey, covering almost all activities of oil companies, there are still some issues regarding the environmental pollution. These issues may have various reasons including lack of training of staff of oil companies, lack of new technologies, unpredicted events and external factors. Some of the pollutions by oil companies have short term effects, whereas others have long term impacts. In addition, some impacts may cover small areas, while others affect big areas. However, it should be noted that some parts of pollution in different processes of oil production are inevitable and there is no solution for them around the world.

The results of this study is compatible with findings of Turan`s (2009) study. For better protection of Turkey`s environment, he recommended that there should be more control and inspection, personnel should be qualified and there should be training programs.

As mentioned above, some pollutions by activities of oil companies such as activities in drilling and refinery phases are inevitable and cannot be prevented. However, more research in these fields and using new technologies can mitigate these pollutions.

One of the important issue relating to environmental pollution is preparedness of staff for prevention and control of oil spill, discharge and leakage and its potential consequences in water and land. Providing more opportunities for staff to attend related workshops and training programs could be useful in this regard.

There are some pollutions that caused by problems in the equipment. For example, some oil spill may happen because of corrosion and oldness of oil pipelines and vessels. Corrosion in pipelines and vessels can lead to problems such as oil leakages, this in turn leads to disasters such as fires and explosions.

5.2 Recommendations for Environmental Protection of Turkey

According to the results, the current study makes some recommendations for more protection of environment in Turkey. These recommendations include improvement in oil companies` installations and equipment, using new technologies in all phases of exploration, drilling, refinery and transportation, more training of oil companies` staff, regular control of all equipment including all related machines and pipelines, more focus on waste reducing and recycling, and related authorities` stricter investigation of implementing environmental protection regulations by oil companies.

Furthermore, opportunities should be provided for managers and other related authorities to be familiar with new technologies in the field and new method of

preparing for events such as oil spill, and to provide them with new research findings in the field through workshops, conferences and publications.

Finally, it should be mentioned that Turkey is already using non fossil energies such as wind power, Hydroelectric power, natural gas and solar power. However, there is still more potential and need for growth in this fields. Moreover, more research on renewable energies and its production should be encouraged and oil consuming industries should be leaded and even enforced to use more renewable energies.

Since Turkey has attempted to meet all criteria of membership in European Union, this country should promote the efficiency of its energy. Environmental protection of Turkey has a significant role in sustainable development of the country. The extent to which Turkey uses the clean and renewable energies as alternative for fossil energies, it will mitigate the pollution. The pollution could be significantly reduced by providing stricter regulation and setting taxes to encourage using clean and renewable energies.

The extent of use of renewable energy is determined by the interaction of two opposing parties, the government and society that are seeking to use renewable energy as much as possible, on the other hand, oil companies which prefer their profits more than environmental issues.

Then, government and related authorities should invest more in renewable energies and encourage national and international companies to assist and invest in this field to meet the required demand of energy for the sake of sustainable growth.

However, oil can be used for various reasons for many following years. Therefore, along with developments in researches and technologies related to renewable energy, the main focus should be on reducing environmental pollution by oil companies.

5.3 Implications of the Study

This study signals that, although our living standards highly depend on oil production and petrochemical products, later in the future, demand for such energy sources may reduce. Therefore, oil production companies should be aware of this and start concern about alterations to their company operations that will keep sustainable economic gain without pollution.

Since people become more concern about environment today and having enough knowledge about other alternative energy sources, it is suggested that consumption and product use behaviors of individual may foster marketing strategies of companies to be reconsidered in respect to protecting environment and minimizing pollution.

Additionally, this study may have implication for both related authorities and oil companies to consider more implementation of environmental protection regulations and plans and possible lacks in these plans or obstacles in implementing them.

5.4 Suggestions for Further Studies

Further studies about the impacts of oil companies` activities on Turkey`s environment, especially their long-term and large scale impacts is recommended, although short-term and small scale impacts should not be ignored. Moreover, more research on the reasons of environmental pollution of oil companies is necessary to find out whether they are because of limitations in regulations and laws or as a result of imperfection implementation of these regulations. Studies on comparing

environmental pollution by oil companies in Turkey and successful countries in protecting environment in this regard would be helpful. Finally, research about role of renewable energy sources in reducing air pollution and reduce of oil need is suggested for strengthening necessary sanctions on oil companies for taking necessary steps to reengineer their operations for protecting environment and pollution in the future.

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