TRNC

NEAR EAST UNIVERSITY

INSTITUTE OF EDUCATIONAL SCIENCES

ENVIRONMENTAL EDUCATION AND MANAGEMENT

EXAMINING THE OPINIONS OF ENGINEERS ABOUT RENEWABLE ENERGY SOURCES

MASTER THESIS

Yousef MOHAMED AKASH

Nicosia

May, 2019

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The Directorate Institute of Educational Sciences,

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I hereby declare that all the information in this document has been obtained and presented in accordance with the academic rules and ethical guidelines of the Graduate School of Educational Sciences. I have fully cited and referenced all materials and results that are not original to this study.

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ABSTRACT

EXAMINING THE OPINIONS OF ENGINEERS ABOUT RENEWABLE ENERGY SOURCES

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The importance of energy is significantly increasing in the world. The consumed amount of energy indicates the development level of countries today. Oil and coal stocks are decreasing fastly, and lack of natural gas sources results in an increasing demand on renewable energy sources. The negative effects of the renewable energy sources is less than conventional energy sources on the environment. The cost of renewable energy sources is less than fossil fuels, and is not used up, and in contrast to conventional fuels they are not an important threat to human health and the environment.

The aim of this study is to determine the opinions of Libyan engineers working in Libya, the UK and the United State, about renewable energy sources.

For data collection, the survey technique, the most commonly used data collection tool, eas conducted. In this study, 318 Libyan engineers working in Libya, UK and the USA were surveyed.

The participants answered the questionnaires between 15-20 minutes. For data analysis, the SPSS 20 program was used.

The results show that, the participants know about renewable energy sources, but this is not sufficient. Their attitudes and thoughts are high, but there are deficiencies in converting this into behavior. The reason for these shortcomings is that renewable energy sources are expensive and there is lack of education. In order to increase the use of renewable energy sources, sponsors will be found, reducing the prices and dissemination of information and training on this issue will increase the transformation into awareness as well as awareness.

Keywords*:* environment, energy, renewable energy, climate change, sustainable energy resources, solar energy, wind energy, attitude.

ÖZET

MÜHENDİSLERİN YENİLENEBİLİR ENERJİ KAYNAKLARI KONUSUNDA GÖRÜŞLERİNİN İNCELENMESİ

Yousef MOHAMED AKASH

Yüksek Lisans, Çevre Eğitimi ve Yönetimi Anabililm Dalı

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Dünyada enerjinin önemi her geçen gün artmaktadır. Tüketilen enerji miktarı, günümüzde ülkelerin gelişmişlik seviyesini gösterir. Petrol ve kömür rezervlerinin giderek azalması, doğalgazın da kısıtlı olması nedeniyle yenilenebilir enerji kaynaklarına olan talep giderek artmaktadır. Yenilenebilir enerji kaynaklarının çevreye olumsuz etkileri, konvansiyonel enerji kaynaklarına göre daha azdır. Yenilenebilir enerji kaynaklarının maliyetleri fosil kökenli yakıtlara göre daha azdır, yenilenebilir enerji, fosil yakıtların aksine çevre ve insan sağlığı için önemli bir tehdit oluşturmazlar.

Bu çalışmanın amacı, Libya, İngiltere ve ABD'de çalışan Libya'lı mühendislerin yenilenebilir enerji kaynakları hakkındaki görüşlerini belirlemektir.

Araştırmada veri toplama aracı olarak anket kullanılmıştır. Çalışma, Libya, İngiltere ve ABD'de çalışan toplam 318 Libya'lı mühendisin görüşlerine yönelik incelenmiştir.

Yapılan gözlemler sonucunda katılımcılar 15-20 dakika içerisinde anket sorularını cevaplamışlardır. Verilerin analizinde SPSS-20 programı kullanılmıştır.

Sonuç olarak bu araştırmada katılımcıların Yenilenebilir Enerji kaynakları konusunda bilgi sahibi oldukları fakat bu bilginin yeterli düzeyde olmadığı, tutum ve düşüncelerinin yüksek olmasına rağmen bunun davranışa dönüştürülmesi konusunda eksiklikler yaşandığı görülmektedir. Bu eksikliklerin sebebi yenilenebilir enerji kaynaklarının kurulumunun pahalı olması ve eğitim eksikliği olduğu düşünülmektedir. Yenilenebilir Enerji kaynaklarının kullanımının arttırılması yönünde sponsorlar bulunarak fiyatların düşürülmesi, bu konuda bilgilendirme ve

eğitimlerin yaygınlaştırılması, farkındalığın yanında davranışa dönüştürlmesini arttıracaktır.

***Anahtar Kelimeler**:* çevre, enerji, yenilenebilir enerji, iklim değişikliği, sürdürülebilir enerji kaynakları, güneş enerjisi, rüzgar enerjisi, tutum.

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Nicosia

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ABBREVIATIONS

RES	Renewable energy sources
GHG	Greenhouse Gases
UK	United Kingdom
USA	United State of America
CO_2	Carbon Dioxide
H_2O	Water Vapour
LNG	Liquid natural gas
UNECA	United Nations Economic Commission for Africa
WWEA	World Wind Energy Association
CSERS	Solar Energy Research and Studies
REAoL	Renewable Energy Authority of Libya
CSP	Concentrated Solar Power
OECD	Organization for Economic Cooperation and Development
WECR	World Energy Council Report,
WTI	West Texas Intermediate
IEA	International Energy Agency
WCEP	Watt Committee on Energy Publications
EU	European Union
SPSS	Statistical Package for Social Science
%	Percentage

CHAPTER I
INTRODUCTION

Energy is one of the basic necessities to sustain life. In heating, lighting, power tools, transport, industry etc. energy is used in many areas. However, the consumption of energy resources brings environmental problems together. The renewable energy sources that have gained importance in the face of the current energy problem, biogas seems to be capable of responding to local factors in favorable conditions.

Geothermal energy is a clean and environmental friendly energy source. In particular, it contributes to the protection of air quality. Solar energy is a renewable energy source. It prevents unnecessary and excessive commercial energy consumption of buildings by using natural heating and cooling systems and protects the environmental balance. Wind energy is a stable, reliable, continuous source and not externally dependent.

After the industrial revolution in 1800s, energy has become a primary requirement for growth and development of the world and the key problem was to supply this energy demand, which increased during the years. Although coal was the primary energy source during 1800s and especially after the Second World War, a large amount of other fossil fuels such as oil and natural gas was put in use after the industrial revolution (Kostic, 2004).

People ignored the usage of fossil fuels and their effects on environment until Svante Arrhenius claimed that fossil fuel consumptions and their emitted greenhouse gases (GHG) emissions such as carbon dioxide, methane, nitrous oxide and fluorinated gases, might have an effect on the global warming by 1896 (Crawford, 2009). After his claims, many studies and technological developments on understanding greenhouse gas effects and their calculation methods were created to produce concentration curves by 1958 at Mauna Loa, in Hawaii (Malamud, 2005).

1.1. Research Problem

1.1.1. Sub-Problems

"What is the opinion of Libyan engineers working in Libya, UK and USA about the use of renewable energy sources?" Based on this problem sentence, the following sub-problems were created:

- What is the opinion of the Libyan engineers working in Libya, UK and USA about use of energy sources?

- What is the opinion of Libyan engineers working in Libya, UK, and USA about perspectives on renewable energy?

- What is the opinion of Libyan engineers working in Libya, UK and USA about perspectives on the environment in terms of renewable energy?

- What is the opinion of Libyan engineers working in Libya, UK and USA about attitudes and environmental issues?

1.2. Aim of the Study

Nowdays renewable energy sources have increased rapidly due to the high damage of the fossil fuels used today and due to the high probability of exhaustion in the near future. Increasing population, developing technology and diminishing fossil fuels mean that more work is needed on renewable energies. Therefore, the aim of this study was to determine the opinions of Libyan engineers working in Libya, the UK and the United States about renewable energy sources.

1.3. The Importance of the Study

Today, more fossil fuels are being used to meet the increasing need for energy in parallel with the rapid population growth and developing technology in the world. This means that in the near future, fossil fuels will be exhausted, and the over consumption of fossil fuels in the years to come and the failure to replace them will necessiate new and

alternative energy sources. The high potential of renewable energy sources in our country requires more work in this area. Many studies on renewable energy sources are carried out. In this study, the presence of Libyan engineers working in Libya, England and America is an important difference.

1.4. Assumptions

1. The students participating in the study will be deemed to have responded to the tests to be applied sincerely.

2. It is assumed that the chosen subject and the research method are appropriate for the purpose of the study.

1.5. Limitations

1 The research was conducted with Libyan engineers working in Libya, the UK and the USA;

2. It is limited by the measuring capacity of the data collection tools used.

1.6. Definitions

- **Environmental Science:** It is a branch of science that examines how human and other living things are in relation with one another and their lifeless environment, and the problems and solutions that arise with the breakdown of these relations (İnceoğlu, 2010).

- **Environmental Problems**: It is defined as issues with the planet's systems (air, water, soil, etc.) emerged from of human interference or mistreatment of the planet (Santamouris, 2013).

- **Climate Change:** Is a long-term shift in the statistics of the weather (including its averages). For example, it could show up as a change in climate (expected average values for temperature and precipitation) for a given place and time of year, from one decade to the next. We know that the global climate is currently changing (Brown, 2002).

Renewable Resources: The energy which is generated from natural resources such as sunlight, wind, rain, tides and also the geothermal heat, which is renewable (that which gets replenished naturally) (Acikgoz, 2011).

CHAPTER II
LITERATURE REVIEW

In this chapter, we will discuss the theories and information obtained from the scientific studies that will shed light on the research.

2.1. Environment

The environment can be defined as a medium in which living things live in, connected with vital bonds, affect and influence in various ways. In general, environment, natural environment and artificial environment can be examined in two groups:

 Natural environment; Natural assets and natural processes (natural life support systems - mountains, plains, seas, lakes, energy etc.).

 Artificial environment; From the existence to the present day and in the process, it is all values and beings created by people by utilizing the natural environment (roads, bridges, dams, cultures etc.) (Yildiz et.al.2008).

2.2. Environmental Problems

An environment problem arises wherever there is a change in the quality or quantity of any environmental factor which directly or indirectly affects the health and well-being of man in an adverse manner. Environmental problems can be studied from two different viewpoints. One is simple to look for adverse effects without considering their origin in order to detect trends that call further investigation; the other is to try to understand the cause and effect relationships, which make better prediction and proper management possible. Some of the environmental problems which are critical at the present time are fairly widely known because of the growing awareness of all levels of society, including government, general public and scientific community. However, our present information on the structure and function of the biosphere is not sufficient to all an accurate evolution of the total situation; except to indicate some broad problem areas (Santamouris, 2013).

The major critical problem may be summarized as, “the adverse effects of the changed environment on human health and well-being”; the possibility that a changing environment may lead to increase mortality, increased frequency of diseases, lowered nutritional status via decreased agricultural productivity, and lowered psychological value of the environment. Concern has been widely expressed that these possible effects on man may be caused by direct input of toxic substances into the environment or improper land use. Climatic changes as a result of human activities may also adversely affect the standard of living through, for example reduced crop productivity, and increased energy consumption. Those problems are considered as the most relevant for early implementation by a global environmental monitoring system (Gurevitz, 2002).

- ✓ Climate change resulting from human activities. Large-scale climate changes could be caused by alteration in the earth-atmosphere system through changes in the atmospheric content of carbon dioxide, atmospheric turbidity (aerosol content), mean global cloudiness, the earth’s surface, the composition of the stratosphere, and the amount of heat generated by man’s activities. Example of human activities include; deforestation, erosion, extension of arid or desert land, irrigation, urbanization, and the creation of artificial lakes.
- ✓ Change in biota and man from contamination by toxic substances including radionuclide
- ✓ Change in biological productivity caused by improper land use (reduced solid fertility, soil erosion, extension of arid zones etc.).
- ✓ Change in growth, structure and distribution of the human population.
- ✓ Changes in the subjective human perception of the environment
- ✓ Eutrophication of waters
- ✓ Decrease of fresh water resources
- ✓ Natural disasters.

2.3. Energy

2.3.1. Renewable Energy

Renewable energy denotes the energy which is generated from the natural resources; sunlight, wind, rain, tides and also the geothermal heat which is renewable (that which gets replenished naturally). These are the energy technologies that range from solar power, wind power, solar photovoltaic, hydro power, bio mass and the bio fuels that are used for transportation. This is the energy that is expected to have lesser environmental impact. These are the energy resources which never gets depleted at the same time and they produce only fewer pollutants (Acikgoz, 2011). This is making the renewable energy different from that fossil fuels and they are promoted by many countries inclusive Turkey so that the country could avail the benefits by using the incentive and also the subsidy schemes (Arikan, 2017).

The past decade witnessed huge fluctuations for cost of natural gas, oil and also the electricity in the world economy, of world, the deregulation and also the political events that is seen in certain parts of the world. The significance of energy in the development of economy has been recognised in a universal manner (Ata, 2015). Environmental repercussions as the result of the global warming and also the green house gas emissions is increasing the concerns on consuming fossil fuels, thus the renewable energy sources areemerging as the vital component of the world energy consumption (Aydın, 2011). The significant features in the renewable energy sources are in reduction of the carbon dioxide emissions and also assisting in the protection of the environment.

Electricity energy is a very important factor for the development of each country. The more developed a country is, the more energy it needs. As Harris, Aiden M. wrote in thebook “Energy has always been the driving force behind economic and social developments in the history of humanity. With the advent of the industrial revolution and technological progress, energy demand has increased in an exponential way throughout the world. With the improvement of the standard of living, consumption has exceeded the stage of fundamental needs (Nilssen, 2003). Now, energy occupies a significant position in all

human activities. It has become so much significant to the degree that the development of a country is measured by its level of energy consumption (Howel, et. al. 2012).

2.4. Climate Change

Climate change is a long-term shift in the statistics of the weather (including its averages). For example, it could show up as a change in climate (expected average values for temperature and precipitation) for a given place and time of year, from one decade to the next. We know that the global climate is currently changing. The last decade of the 20th Century and the beginning of the 21st have been the warmest period in the entire global instrumental temperature record, starting in the mid-19th century (Brown, 2002).

Natural variability climate change is a normal part of the Earth's natural variability, which is related to interactions among the atmosphere, ocean, and land, as well as changes in the amount of solar radiation reaching the earth. The geologic record includes significant evidence for large-scale climate changes in Earth's past. An example to this variability is shown in the plot below of temperature data for the last 420,000 years, derived from an Antarctic ice core (Joel, 2003).

Causes of Climate Change: Human-induced change, Greenhouse Gases, certain naturally occurring gases, such as carbon dioxide (CO_2) and water vapour (H_2O), trap heat in the atmosphere cause a greenhouse effect. Burning of fossil fuels, like oil, coal, and natural gas send carbon dioxide to the atmosphere. The current level is the highest in the past 650,000 years. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change concludes that "most of the observed increases in the globally averaged temperature since the mid-20th century has been very likely due to the observed increase in anthropogenic greenhouse gas concentrations" (Thomas, 2005).

What can be done? The greenhouse gases that are already in the atmosphere because of human activity will continue to warm the planet for several centuries. In other words, some levels of continued climate change is inevitable, meaning that

humanity is going to have to take action to adapt to a warming world. However, scientists say it is still possible and necessary to reduce the magnitude of climate change by "stabilizing" atmospheric concentrations of greenhouse gases. This means stopping these concentrations from rising further, chiefly by achieving substantial reductions in emissions of carbon dioxide and other greenhouse gases from human sources.

The consensus among climate scientists is that worldwide emissions of greenhouse gases need to start a long-term decline within the next decade or two. According to the Intergovernmental Panel on Climate Change, the world needs to reduce total emissions by about 50 to 80 per cent (compared to a business-as-usual scenario) in order to stabilize atmospheric greenhouse gas concentrations and avoid dangerous climatic change. The science makes it abundantly clear; "the time to act is now". The world is already facing severe consequences. We must respond to the overwhelming scientific evidence and take strong actions to reduce the greenhouse gas emissions that cause climate change (Anthony, 2013).

2.5. Sustainable Energy Resources

Sustainable energy is a form of energy that meets our today's demand of energy without putting them in danger of getting expired or depleted and can be used over and over again. Sustainable energy should be widely encouraged as it does not cause any harm to the environment and is available widely free of cost. All renewable energy sources like solar, wind, geothermal, hydropower and ocean energy are sustainable as they are stable and available in plenty. The sun will continue to provide sunlight as long as we all exist here on earth. Heat caused by sun will continue to produce winds, earth will continue to produce heat from inside and will not cool down anytime soon. Movement of the earth, sun and moon will not stop and this will keep on producing tides and the process of evaporation will cause water to evaporate that will fall down in the form of rain or ice which will go through rivers or streams and merge in the oceans and that can be used to produce energy through hydropower. This clearly states that all these

renewable energy sources are sustainable and will continue to provide energy for the coming generations (Ibrahim, 2012).

There are many forms of sustainable energy sources that can be incorporated by countries to stop the use of fossil fuels. Sustainable energy does not include any sources that are derived from fossil fuels or waste products. This energy is renewable and it helps us to reduce greenhouse gas emissions and causes no damage to the environment. If we use fossil fuels at a steady rate, they will expire soon and cause adverse effect to our planet (Paul, 2006).

In ancient times, wood, timber and waste products were the only major energy sources. In a short expression, biomass was the only way to get energy. The time when more technology was developed, fossil fuels like coal, oil and natural gas were discovered. Fossil fuels proved boom to the mankind as they were widely available and could be harnessed easily. When these fossil fuels started to be used extensively by all countries throughout the world, they led to degradation of the environment. Coal and oil are two of the major sources that produce large amount of carbon dioxide in the air to increaseing in global warming (Karl, 2012).

Also, few countries have hold on these valuable products which led to the rise in prices of these fuels. Now, with rising prices, increasing air pollution and risk of getting expired soon forced scientists to look for some alternative or renewable energy sources. The need for this is to look for resources that are available widely, causing no pollution and are renewable. When Sustainable Energy came into the picture meet our today's increasing demand of energy it also provides us with an option to make use of it in future (Karl, 2012).

2.5.1. Types of Sustainable Energy

Sustainable energy is not just a part of renewable energy sources; it is also the source of energy that can best be used to power homes and industries without any harmful effects being experienced. This is the sole reason why many people advice the

use of these forms of energy in everyday life. It is because its effects to the environment are purely beneficial (Winebrake, 2004).

- Solar Energy
- Wind Energy

2.5.1.1. Solar Energy

This is the best form of sustainable energy. This energy manifests itself in two forms. There is the light and the heat. Both of these forms are equally important to us in our daily living and other forms of life. For instance, the plants need the light to grow and generate food while men need the heat energy to maintain body temperature and power their homes and industries. This means that it is the greatest form of sustainable energy. It can be used in two folds with greater results as needed. This only serves to generate confidence and ensure that we live the way we intended without causing further harm to the environment (Winebrake, 2004).

According to activists, it is the future of energy. Evidence of intensive use of this alternative energy source can be seen everywhere. There are many companies that are making solar panels to tap this energy for use at home or in the industries. Consequently, the energy is also being tapped for commercial purposes in many fields like powering of homes in power grids. All that one needs to do is to get hold of the solar panel and install it in the homes or commercial property. During the summer periods, you can cut down on your energy costs (Winebrake, 2004).

2.5.1.2. Wind Energy

Wind is a sustainable energy source. It is available naturally and can be tapped to produce vast amounts of power that can be used in many ways and places. For instance, sailors tap this energy to help the ship propel through its various directions to distant shores for trading. Nowadays, this energy source is being commercialized. There are many companies that have invested heavily on power grids and windmills to tap into this energy source. The energy generated can be sold to other people to power their homes

and industries. In the near future, sustainable energy like wind power will be a big industry and the fossil fuels exploration will have been halted and will no longer be used (Winebrake, 2004).

2.6. Non-Renewable Energy Resources

Non-renewable energy resources are natural resources from the earth that exist in limited supply and cannot be replaced if it is used up. Also, any natural resource that cannot be replenished by natural means at the same rates that it is consumed. Non-renewable energy comes from sources that will run out or will not be replenished in our lifetime-or even in so many lifetimes (Tiwari, 2012).

2.7. Types of Non-Renewable Energy Resources

2.7.1. Coal

Coal is a black or brownish rock. We burn coal to create energy. Coal is ranked depending on how much "carbonization" it has gone through. Carbonization is the process that ancient organisms undergo to become coal. About 3 meters (10 feet) of solid vegetation crushed together into 3 meters (1 foot) of coal peat is the lowest rank of coal, gone through the least amount of carbonization. It is an important fuel in many areas of the world including Scotland, Ireland, and Finland. Anthracite is the highest rank of coal. Anthracite forms in regions of the world where there have been giant movements of the earth, such as the formation of mountain ranges. The Appalachian Mountains, in the eastern part of the United States, are rich in anthracite (Ghosh, 2011).

There are two ways of mining coal: underground mining and surface mining:

- Underground mining is used when the coal is below the surface of the Earth, sometimes 300 meters (1,000 feet) deep, that's deeper than most of the Great Lakes. Miners take an elevator down a mineshaft. They operate heavy machinery that cuts the coal out of the Earth and brings it above the ground. This can be dangerous work because cutting coal can release dangerous gases, which can cause explosions or make it hard for miners to breathe.

- Surface mining is used when the coal is very near the surface of the earth. To get to the coal, companies must first clear the area. They take away the trees and soil. The coal can then be cut out of the ground more easily. Entire habitats around are destroyed during this process (Twidell, 2015).

About half of the electricity in the United States comes from coal. It gives power to our lights, refrigerators, dishwashers, and most other things we plug in. When coal is burned, it leaves "by-products" that are also valuable. We use the by-products to make cement, plastic, roads, and many other things (Ghosh, 2011).

Advantages and Disadvantages: Coal is a reliable source of energy. We can rely on it day and night, summer and winter, sunshine or rain, to provide fuel and electricity. Using coal is also harmful. Mining is one of the most dangerous jobs in the world. Coal miners are exposed to toxic dust and face the dangers of cave-ins and explosions at work. When coal is burned, it releases many toxic gases and pollutants into the atmosphere. Mining for coal can also cause the ground to cave in and create underground fires that burn for decades at a time (Twidell, 2015).

2.7.2. Petroleum

Petroleum is a liquid fossil fuel. It is also called oil or crude oil. Petroleum is trapped by underground rock formations. In some places, oil bubbles right out of the ground. At the La Brea Tar Pits, in Los Angeles, California, big pools of thick oil bubble up through the ground. Remains of animals that got trapped there thousands of years ago are still preserved in the tar! Most of the world's oil is still deep under the ground. We drill through the earth to reach the oil. Some deposits are on land, and others are under the ocean floor (Taverne, 2008).

Once oil companies begin drilling with a "drill rig" they can extract petroleum 24 hours a day, seven days a week and 365 days a year. Many successful oil sites produce oil for about 30 years. Sometimes they can produce oil for much longer. When oil is under the ocean floor, companies drill offshore. They must build an oil platform. Oil

platforms are some of the biggest manmade structures in the world. Once the oil has been drilled, it must be refined. Oil contains many chemicals besides carbon, and refining the oil takes some of these chemicals out. We use oil for many things. About half of the world's petroleum is converted into gasoline. The rest can be processed and used in liquid products such as nail polish and rubbing alcohol, or solid products such as water pipes, shoes, crayons, roofing, vitamin capsules, and thousands of other items (Taverne, 2008).

However, burning gasoline is harmful to the environment. It releases hazardous gases and fumes into the air that we breathe. There is also the possibility of an oil spill. If there is a problem with the drilling machinery, the oil can explode out of the well and spill into the ocean or surrounding land. Oil spills are environmental disasters, especially offshore spills. Oil floats on water, so it may look like food to fish and ruin birds' feathers (Hyne, 2012).

2.7.3. Natural Gas

Natural gas is another fossil fuel that is trapped underground in reservoirs. It is mostly made up of methane. The decomposing material in landfills also releases methane, which smells like rotten egg. There is so much natural gas underground that it is measured in million, billion, or trillion cubic meters (Kelkar, 2008).

Natural gas is found in deposits a few hundred meters underground. In order to get natural gas out of the ground, companies drill straight down. However, it does not form in big open pockets. It is trapped in rock formations that can stretch for kilometres.

To reach natural gas, some companies use a process called "hydraulic fracturing". Hydraulic means water, and fracturing means to "split apart." The process uses high-pressure water to split apart the rocks underground. This releases the natural gas that is trapped in rock formations. If the rock is too hard, they can send acid down the well to dissolve the rock. They can also use tiny grains of glass or sand to prop open the rock and let the gas escape (Mokhatab, 2012).

We use natural gas for heating and cooking. It can also be burned to generate electricity. We rely on it to give power to lights, televisions, air conditioners, and kitchen appliances in our homes. Natural gas can also be turned into a liquid form, called liquid natural gas (LNG). LNG is much purer than any other fossil fuels.

Liquid natural gas takes up much less space than the gaseous form. The amount of natural gas that would fit into a big beach ball would fit into a ping-pong ball as a liquid! LNG can be easily stored and used for different purposes. It can even be a replacement for gasoline (Mokhatab, 2012).

Advantages and Disadvantages: Natural gas is relatively inexpensive to extract, and is a "cleaner" fossil fuel than oil or coal. When natural gas is burned, it only releases carbon dioxide and water vapour (exact by the same gases that we breathe out when we exhale). This is healthier than burning coal (Etiope, 2015).

However, extracting natural gas can cause environmental problems. Fracturing rocks can cause mini-earthquakes. The high-pressure water and chemicals that are forced underground can also lead to other sources of water. The water sources, used for drinking or bathing, can become contaminated and become unsafe (Chandra, 2006).

2.8. Libyan Energy Policy

Libya is Africa's largest oil producing and exporting country, located in the heart of North Africa. The country hosts 6 million inhabitants distributed over an area of 1,750,000 Km2. Crude oil is an integral part of Libyan economy and forms the basis on which Libyan energy policy is formed, however, with increasing global drive towards more sustainable and renewable energy sources, climate change, and global warming, there have been renewed and concerted efforts shown by nations around the world to adopt more sustainable energy sources. This has been highlighted in varied global convections and treaties amongst which are, the 1997 Kyoto Protocol, the 2009 Copenhagen summit to mention, but a few of them (USA International Business Publications, 2009).

Due to the climate change and high exploitation of nature resources, the country is aiming at using renewable energy to produce at least 30% of its total energy demands by 2030, In order to achieve this, Libya set itself intermediary objectives which aim at 20% of total electricity production from renewable in 2020 and 25% in 2025 (UNECA, 2012). Wind energy has been utilized for water pumping in many cases since 1940. The use of wind energy has not been developed extensively since the exploration of the oil and later on the natural gas the country concentrated on developing these resources. The wind potential is huge and it must be exploited.

According to World Wind Energy Association (WWEA), wind capacity worldwide has reached more than 282 GW by the end of 2012, out of which more than 44.5 GW was added during the same year. The amount of energy generated by wind turbines by the end of 2012 is around 580 terawatt hours per year. This represents about 3% of the global electric energy demand. WWEA expects that the global wind capacity will exceed 500 GW by 2016 and 1,000 GW by 2020 (WWEA, 2012). The Centre for Solar Energy Research and Studies (CSERS) started its wind energy programme to assess wind potential since the development of wind energy department in June 1988. Wind data from meteorological authority was analysed for a period of ten years for 16 meteorological stations (El Ghawi, 2015). The renewable energy authority of Libya (REAoL) started a measurement campaign in 2004 by installing ten wind data measuring stations over the Libyan coast. In addition to several stations around the country, the analysis of the wind data showed that the average wind speed at 40 m above ground level (a.g.l.) is between 6 to 7.7 m/s, (MENA, 2009).

A wind farm of 60 MW is under development et al-Fataih, close to Dernah on north east coast. This is the first notable renewable energy project in Libya that should open the door for many similar projects. The total cost of this project is estimated to be at around $180 million (103 million Euros) WAoL (2008). REAoL's plan comprises several wind farms with total a capacity of a little less than 1,000 MW (El Ghawi, 2015), such as; Dernah wind farm (120 MW in two stages); the load factor of this plant is estimated at 40% Al Maqrun wind farm (240 MW in two stages), western region farms

at Meslata, Tarhunah and Asabap (250 MW), south eastern region wind farms at Jallo, Almasarra, Alkofra, Tazrbo (120 MW), south western region wind farms at Sabha, Gatt, Ashwairef (120 MW).

Libya also plans to develop solar energy power plants and it is already working to expand photo voltaic (PV) technology to remote areas. Small solar energy stations with different capacities were installed in many locations at oil fields. The total installed capacity of PV systems by GECoL is about 240 kWp. The solar regime in Libya is excellent. The daily solar radiation on the horizontal plane goes up to 7.5 kWh/m2 with 3,000–3,500 hours of sunshine a year. The technical potential of concentrated solar power (CSP) in Libya is huge. It has been estimated at 140,000 TWh/year, equivalent to 27,000 GW of capacity at 60% load factor, (MENA, 2009).

The proposed solar energy projects including PV (centralized and decentralized power plants) and solar thermal technology are as follows (UNECA, 2012): three large-scale PV plants connected to the grid et aljofra, Green Mountain, Sabha, (5–10 MW each) extending the use of PV technologies in remote areas (2 MW), 1,000 PV roof top systems for residential areas (3 MW), feasibility study for CSP plant in unspecified locations (100 MW) (Abdiwe, 2009).

2.9. World Energy Production and Consumption

2.9.1. World Energy Production

The global market for energy consumption is forecasted to grow almost 55% by 2035, according to the US Energy Information Administration's International Energy 2011. The faster rate of growth in energy consumption is represented by nations outside of the Organization for Economic Cooperation and Development (OECD) indicating of economic growth: within the OCED, growth is expected to remain inferior to 20% and outside the OCED it is forecasted to rise by 85% (World Energy Council Report, 2002).

Factors impacting the global energy industry and its rate of growth include different rates of recovery from the worldwide 2008 recession sets back due to natural

disasters and rising oil prices. Japan's earthquake and tsunami crises in March 2011 have had a knock-on effect on the use of nuclear power both in Japan and around the globe. Security and political tension combined to drive oil prices higher in 2010, which have not hit $112 per barrel early in April 2011 making a $40 per barrel rise in less than five months (Crabtree, 2010).

Oil prices continue to climb. Thanks to the slow growth in supply and rapid growth in emerging-market demand. With oil prices around $100 bbl mark, strained energy budgets and governments different political issues that will potentially impact prices further, this segment of the global energy market remain especially volatile. In September 2011, West Texas Intermediate (WTI) and Brent saw an increasing gap between the former at $86/bbl and latter at $111/bbl, reports the International Energy Agency (IEA). Oil supply in countries outside the Organization of the Petroleum Exporting Country (OPEC) was revised to 52.8 mb/d in 2011, increasing to 53.8 mb/d in 20112. Oil stock with the OECD rose to almost 2688 mb in July 2011, but fell under the five-year average for the first time in over three years. Worldwide Gross Domestic Product growth is currently estimated less than 4% in 2011 and 4.2% in 2012, with oil demand estimated close to 89.5 mb/d in 201 and almost 91mb/d in 2012. Global refinery crude oil runs are believed to rise almost 2 mb/d in the third quarter of 2011 on the preceding quarter over 75.5mb/d and are expected to fall only slightly in the fourth quarter (Crabtree, 2010).

Gas energy constitutes around 20% of the world electricity generated, according to the IEA. Global gas market share has seen demand rebound to higher levels than before the global recession in most area. USA gas prices are around half of those of Asia and the EU. The IEA reports demand for gas dropped 3% in 2009, representing the largest drop in three decades. There is a huge demand disparity between different regions, with OECD country demand for gas falling almost 3.5% in 2009 to 1,495 billion cubic meters (bcm) whereas demand in China and India grew between 10% and 20% (Brown, 2002).

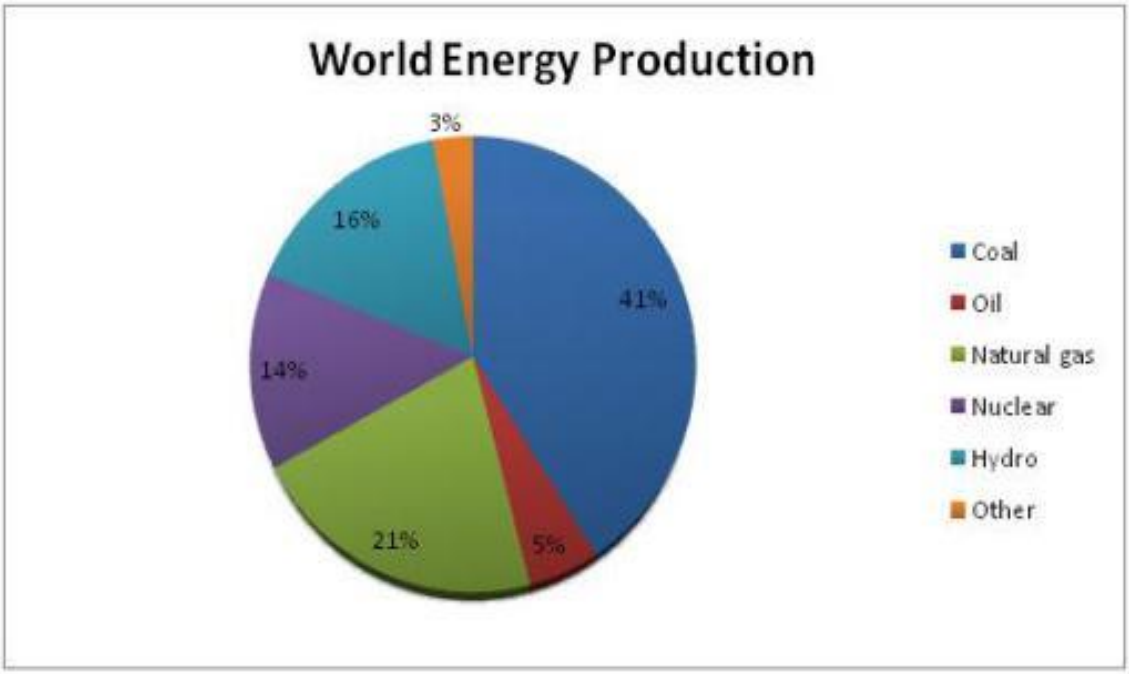
The nuclear energy market forecasts to grow at a compound annual growth rate of more than 4.5% in the five-year period from 2010 to exceed $272 billion at the close to 2015, according to Market Line. In September 2011, there were almost 435 nuclear reactors for the generation of electricity in operation throughout 30 countries worldwide, with 65 new plants being built across less than 15 countries, reports the Nuclear Energy Institute. More than 13% of global electricity produced in 2010 came from nuclear power plants, with 15 countries meeting over 25% of their electricity demand with nuclear energy. France generated close to three quarters of its electricity from nuclear energy followed by Slovakia and Belgium at almost 52% and just over 51%, respectively. Ukraine generated close to half of its electricity from nuclear energy at 48%, and Hungary relied on nuclear for 42% of its electricity needs. Japan came in at less than 30% of its electricity, and around 27% for both Finland and Germany. The US was the world's top nuclear generating country in 2010, producing close to 810 billion kilowatt hours (kWh), followed by France with almost 408 billion kWh. In third place was Japan at close to 280 billion kWh, followed by Russia, Korea and Germany (International Energy Agency, 2005).

Renewable Energy: Renewable energy encompasses different markets including geothermal, wind, hydro, solar, and combustion of wood and waste. In 2010, revenue from the global renewable energy market was in excess of $322 billion, reports Market Line, showing a compound annual growth rate of almost 6.5% in the four-year period to 2010. In the following five years, Market Line forecasted higher growth of close to 8.5%, hitting almost $480 billion at the close of 2015 (International Energy Agency, 2005).

Coal Energy: The IEA estimates that the world's coal reserves are adequate to last more than 120 years at today's rate of production. Coal accounts for 40% of the world's electricity and use is forecasted to rise more than 60% by 2030 from 2006 figures. Developing countries are the heaviest consumers, believed to use 97% of the projected total. The main drawback of coal energy is its negative impact on the environment: coal accounts for 40% of CO2 released from energy generation and consumption. Carbon

Capture Storage is being looked to in the global move to combat climate change (Brown, 2002).

Figure 1. World Energy Production



Sources: https://momentusstrategy.wordpress.com/tag/solar/

2.9.2. World Energy Consumption

World energy consumption refers to the total energy used by all human civilization. Typically, measured per year, it involves all energy harnessed from every energy source applied toward humanity's endeavours across every single industrial and technological sector, across every country. Being the power source metric of civilization, world energy consumption has deep implications for humanity's social-economic-political sphere (World Energy Council Report, 2002).

Global energy consumption has doubled in the last three decades of the past century. In 2004, about 77.8% of the primary energy consumption is from fossil fuels (32.8% oil, 21.1% natural gas, 24.1% coal), 5.4% from nuclear fuels, 16.5% from renewable resources of which the main one is hydroelectric, 5.5% whereas the

remaining 11% consists of non-commercial biomasses, such as wood, hay, and other types of fodder, that in rural-economies still constitute the main resources.

These “rural” biomasses (mainly fodder) are usually ignored by statistical reviews of energy consumption proposed by oil companies, but for a correct global perspective they ought to be considered, because at least two thirds of human kind still live in rural and artisanship economies not different from the European Middle Age. For example, in the USA in 1850 two thirds of the mechanical energy was obtained from horses, and in 1925 horses were still 30 million (Fettweis, 2008).

To fix ideas, the amount of energy currently consumed everyday by human kind corresponds to the heating value of large oil tankers. Not according the 1.2. Gtoe/year of “rural biomass”, the fraction of energy demand covered by fossil fuels in 2004 appears to 87.7%, a percentage often cited by various sources. Direct solar energy usage is about 11 million tons less than 0.1% of the global consumption (Fettweis, 2008).

2.9.3. Distribution of Source and Country of World Energy Consumption

Although there are many types of energy available in earth system, they are not all accessible to us under current economic and technological conditions. Consequently, fossil fuels, particularly oil and gas, have been the dominant energy sources used to power modern economies. The geological and geographic distribution of the fossil fuels is highly uneven. Geologically, most oils and gases are found and produced in sedimentary basins that reservoir rocks are typically less than 500 million years old and that most oils and gases are found in less than 100 million years old younger rocks. Approximately, 85% of oil and gas exited in less than 5% of large production field, and most of the oil and gas fields are located near plate boundaries. Geographically, it is estimated that the Middle East has more than 60% of the world oil reserves and 40% of the gas reserves. It is based on the world-wide oil and gas reserve data from the BP statistical Review, the geographical distribution of oil and gas by regions in 2005 (Watt Committee on Energy Publications, 2004)

CHAPTER III
RESEARCH METHODS

This section of the study explains the model, data gathering tool, applying the data gathering tool and data analysis of the study which has been conducted to determine, “Examınıng The Opinions of Engineers About Renewable Energy Sources ”.

3.1. Research Model

The survey model was used as a research model. The screening model is a widely used type of non-experimental research. This model is a method that we can choose when we want to determine the thoughts, opinions, attitudes and beliefs of individuals. In the screening model, the data is collected by the survey technique (Aypay, 2015).

The method applied in this study to make it more reliable is quantitative method by use of research questionnaire adopted from Amber et al., (2017) and from sources like articles, textbooks, and studies on the subject and internet source. In this study, it has been preferred to determine the opinions of teachers and teacher candidates about renewable energies and to examine these views by comparing them with different variables.

3.2. Data Gathering Tools

In the data collection process, the survey technique, which is the most used data collection tool in the survey model, was used. The questionnaire is a data collection tool designed to reveal the information, opinions and attitudes of the people who form the group in order to determine the situation in any subject (Demir,2006). In the process of collecting data, similar studies were examined and in the “Survey on Renewable Energy Resources Use” developed by the researcher was used. The questionnaire (Omer,2008) consists of two parts; demographic information and renewable energies opinion questionnaire.

3.3. Participants and Sample

In this study, 318 Libyan engineers working in Libya, UK and USA were surveyed. As a result of the observations, it was observed that the participants answered the questionnaire between 15-20 minutes.

3.4. Data Analysis

In this research SPSS 20 (Statistical Package for the Social Sciences) program was used to evaluate the opinions of Libyan engineers working in Libya, UK and USA in Energy Renewable Energy Resources Opinion Survey which is used for data collection purposes. Descriptive analysis was performed for each item in the Renewable Energy Resources Opinion Survey; percentage and frequency values were found and also shown as tables. In analysing the data and investigating the statistics Frequency test techniques were used.

3.5. Research Ethics

For the research to be reliable, validity and scientific process research ethics were considered. The participants were give direct questions. The researcher actually demonstrated an objective attitude during the research by demonstrating a good work in order not to influence the study.

CHAPTER IV
RESULTS AND DISCUSSION

This section consists of the results where research findings are assessed and suggestions about similar researches that could be carried out in this field.

4.1. Analyses of Demographic Information

The findings and comments with regard to the questions about demographic features are given as follows:

Table 1.
Distribution of Sample by Gender

	Frequency	**Percentage**
Male	196	61,6
Female	122	38,4
Total	**318**	**100,0**

As seen in Table 1, 318 people participated in the research, 61,6% female and 38,4% male. In terms of the distribution of sample by gender, we can see that males are more than females.

Table 2.
Distribution of Sample by Ethnic Groups

	Frequency	**Percentage**
Libyan Engineers working in Libya	118	37,2%
Libyan Engineers working in UK	100	31,4%
Libyan Engineers working in USA	100	31,4%
Total	**318**	**100,0**

As in Table 2, 37,2% of the participant Libyan Engineers working in Libya, 31,4% of the participant Libyan Engineers working in UK, 31,4% of the participant Libyan Engineers working in USA.

Table 3.
Please tick the box which corresponds to the highest level of education you have completed.

	Frequency	**Percentage**
Post Graduate (Master or PhD)	158	49,7
University degree or equivalent	96	30,2
A Levels or equivalent	27	8,5
No formal qualifications	24	7,5
GCSE/O Levels or equivalent	13	4,1
Total	**318**	**100,0**

In Table 3, 49, 7% of the participants are "Post Graduate" (Master or PhD), 30, 2% with "University degree or equivalent", 8,5% with "A Levels or equivalent", 7,5% with "No formal Qualifications", 4, 1% with "GCSE / 0 Levels or equivalent". Most of the participants (49,7%) are from the above table.

Table 4.
Please tick the household income bracket that corresponds to your total household income in 2002.

	Frequency	**Percentage**
Under 10.000	99	31,1
10.000 – 20.000	66	20,6
21.000 – 30.000	47	14,6
31.000 – 40.000	32	10,0
Over 50.000	30	10,0
41.000 – 50.000	25	7,8
51.000 – 60.000	19	5,9
Total	**318**	**100,0**

As seen in Table 4, 31,1% of the participant's monthly incomeis under 10.000 (20,6%), between 10.000-20.000 (20,6%), 21.000-30.000, (14,6%), 31.000-40.000 (10,0%), over 50.000, (10,0%), 41.000-50.000, (7,8%), 51.000-60.000 (10,0%). In the

distribution of the sample, the monthly income of the families is seen to be at least 10.000 (31, 1%) and between 51.000-60.000 dollars (5, 9%) at maximum.

Table 5.

What type of property do you live in?

	Frequency	**Percentage**
Ground floor flat	108	33,9
Detached	80	25,1
Semi-detached	53	16,7
Middle floor flat	39	12,3
Mid terrace	18	5,7
End terrace	11	3,5
Mid terrace with passage	9	2,8
Total	**318**	**100,0**

As seen Table 5, 33.9% of the participants were on the “Ground floor”, 25%, “Detached”, 16.7% “Semi-detached”, 12.3% on Middle floor flat, 5.7% mid terrace, 3.5% is on “End terrace”, while 2,8% on “Mid terrace with a passage”. Most of the participants (33.9%) live on the ground floor, while a small part (2.8%) has a mid terrace with a passage.

Table 6.
In which year was your house built?

Years	Frequency	Percentage
After 1990	130	40,8
Don't know	77	24,2
1980s	31	9,7
1970s	25	7,9
Before 1900	13	4,1
1950s	10	3,1
1960s	8	2,5
1900s	7	2,2
1920s	6	1,9
1940s	5	1,6
1910s	4	1,3
1930s	2	0,6
Total	**318**	**100,0**

Table 6 shows the participants' answers to the question "when was your house built" was 40.8% in 1990, 24.2% of them had no knowledge of this subject, in 9.7% of 1980, 7.9% 'in 1970, 4.1% of before 1990, at 3.1% of 1950, 2.5% of 1960, at 2.2% in 1900, 1.9% in 1920, 1,6% in 1940, 1,3% in 1910, 0.6% in 1930. Most of the participants (40%) lived in the building built in 1990, the minority of participants (0.6%) live in houses built after 1930.

Table 7.
Do you have access to the Internet?

	Frequency	Percentage
Yes	292	91,8
No	15	4,7
Total	**307**	**96,5**

In the Table 7, "Do you have access to the Internet?" 91.8% of the participants answered "Yes" and 4.7% answered "No".

Table 8.
Where do you live?

	Frequency	**Percentage**
England	113	35,5
Libya	104	32,7
United states	100	31,4
Total	**317**	**99,7**

As seen in Table 8, 35.5% of the participants live in the UK, 32.7% live in Libya and 31.4% live in the USA.

4.2. Findings Related to the First Sub-Problem

The first sub-problem of the research was formed by the participants' opinions about the "Evaluation of The Use of Energy Sources" and the findings obtained are presented in the table below.

Table 9.
Which of the following terms are you aware of?

	Frequency	**Percentage**
Global warming	123	38,7
The greenhouse effect	96	30,2
Renewable energy	34	10,7
Energy efficiency	19	6,0
The greenhouse effect	18	5,7
None of above	11	3,5
Biodiversity	10	3,1
Sustainable development	7	2,2
Total	**318**	**100,0**

As seen in Table 9, the majority of participants answers to the question "Which of the following terms are you aware of?" were 38.7% "Global warming" and 30.2% "The greenhouse effect".

Table 10.
Generally where did you hear of following?

	Frequency	**Percentage**
Internet	114	35,8
TV	113	35,5
Other, please specify	51	16,2
Word of mouth	17	5,3
Energy Advice Centres	12	3,8
Newspapers	8	2,5
Radio	3	0,9
Total	**318**	**100,0**

As stated in Table 10, the majority of the participants 35.8% responded as “Internet” and 35.5% as “TV”.

Table 11.
How concerned are you that the earth’s climate and long-term weather patterns are changing?

	Frequency	**Percentage**
Fairly concerned	118	37,1
Very concerned	109	34,3
Indifferent	33	10,4
Not very concerned	29	9,1
Not at all concerned	15	4,7
Don’t know	13	4,1
Total	**318**	**100,0**

The most intensive answers to the question above were "Fairly concerned" 37.1% and "Very concerned" 34.3%.

Table12.

In your view which of the following generate electricity in wave which significantly increase the risk of climate change?

	Frequency	**Percent**
Coal (or coal fired)	116	36,5
Oil (or oil-fired)	59	18,6
Gas/natural gas (or gas-fired)	51	16,0
Incineration (waste burning)	50	15,7
Biomass (burns wood, straw etc)	18	5,7
Nuclear	14	4,4
Wind	4	1,3
Solar	3	,9
Hydro-electric	3	,9
Total	**318**	**100,0**

As in the Table 12, the majority of the participant's 36.5% responded as "Coal", 18.6% "Oil, 16.0% "Gas", 15.7% "Incineration".

Table 13.

Which of the following do you feel may be the consequences of climate change?

	Frequency	**Percentage**
Change in weather conditions	123	38,7
Rise in temperatures	116	36,5
Loss of habitat	22	6,9
Increased risk of flooding	19	6,0
Drought and water shortage	15	4,7
Increased risk of disease	15	4,7
None	8	2,5
Total	**318**	**100,0**

As in the Table 13, 38.7% responded "Change in weather conditions" and 36.5% "Rise in temperatures".

Table 14.
How much trust do you place in the following groups to make the right decisions about the enviroment? 1-Scientists, 2-Businesses and industry, 3-Environmental groups, 4-The government, 5-Ordinary people.

	Frequency	**Percentage**
Some	153	48,1
None	89	28,0
A lot	76	23,9
Total	**318**	**100,0**

As in the Table 14, 48.1% responded "Some", 28.0% "None" and 23.9% "A lot".

The participants' views about "Evaluation of The Use of Energy Sources" were examined and was found out that the participants from three countries gave similar and close answers. Six questions were asked and the answers were found to be similar. Most answers to the question "Which of the following terms are you aware of?" were "Global warming" (Americans 40%, British %45, Libyans 30%), and "The greenhouse effect" (Americans 7%, British 4,5%, Libyans 5,8%). Considering these percentages, there is no significant difference in the responses of the Libyan engineers living in all three countries (America, England and Libya).

4.3. Findings Related to the Second Sub-Problem

The second sub-problem of the research was formed by the participants' opinions about the "Perspectives on Renewable Energy" and the findings obtained are presented in the table below.

Table 15.
Do you agree that energy generated from the following resources can replace the use of fossil fuels (oil/gas/coal etc.)? 1-Wind energy, 2-Solar energy, 3-Wood fuel.

	Frequency	**Percentage**
Agree	239	75,2
Don't know	42	13,2
Disagree	37	11,6
Total	**318**	**100,0**

As it can be seen in Table 15, 75,2% of the participants “Agreed”, 13,2% "Don't know" and 11.6% "Agree to disagreed".

Table 16.
Do you feel that you need more information about renewable energy?

	Frequency	**Percent**
Yes	227	71,4
No	91	28,6
Total	**318**	**100,0**

As in Table 16, the majority of participants 71,4% said “Yes”.

Table 17.
Where is the most useful place for such information to be made available?

	Frequency	**Percent**
TV	103	32,4
A website	104	32,7
Newspapers	19	6,0
Radio	11	3,5
Total	**318**	**100,0**

As it can be answered in Table 17, 32,4% of participants’ responded as “TV” and 32,7% as “A Website”.

Table 18.
Do you think that we should increase the use of renewable energy?

	Frequency	**Percentage**
Yes	267	84,0
No	26	8,1
Don't know	25	7,9
Total	**318**	**100,0**

Table 18 shows that 84,0% of the participants' responded to the question as "Yes".

Table 19.
Who do you think should take the major responsibility for increasing our use of renewable energy?

	Frequency	**Percentage**
National Government	229	72,0
People like you	37	11,6
Government Office of the South East	20	6,3
Private businesses	19	5,9
Reading Borough Council	13	4,2
Total	**318**	**100,0**

Table 19, reveal that 72,0% of the participants' put the responsibility on "National Government".

Table 20.
Have you heard of a 'renewable' or 'green' tariff from your electricity supplier?

	Frequency	**Percentage**
Yes	98	30,8
No	211	66,4
Total	**309**	**97,2**

As in Table 20, 66,4% of the participants' responded as "No".

Table 21.
Is your household on such a tariff?

	Frequency	Percentage
Yes	131	41,2
No	187	58,8
Total	**318**	**100,0**

As in Table 21, 58,8% of the participants' admitted that they did not have such a tariff.

Table 22.
Under what circumstances would you be interested in having such an energy tariff?

	Frequency	Percentage
Interested if it was the same cost as my current tariff	94	29,6
Interested if it was cheaper than my current tariff	74	23,3
Interested regardless of cost	58	18,2
Not interested	49	15,4
Interested at above the cost of my current tariff	34	10,7
Other	9	2,8
Total	**318**	**100,0**

As it can be observed in Table 22, 29,6% said "Interested if it was the same cost as my current tariff", 23,3% "Interested if it was cheaper than my current tariff", 18,2% "Interested regardless of cost" and 15,4% "Not interested".

Table 23.
Do you have any of the following in your house?

	Frequency	Percentage
None of above	209	65,7
Solar hot water heating	43	13,5
Solar panels/PV	30	9,4
Other	19	6,1
A wood burning Stove/fire place	17	5,3
Total	**318**	**100,0**

Table 23, indicates that 65,7% of the participants had "None of above".

Table 24.

Are you aware that government grants to help you to invest in renewable energy such as solar panels, small wind turbines, and wood fired boiler systems?

	Frequency	**Percentage**
Yes	127	39,9
No	191	60,1
Total	**318**	**100,0**

The majority of participants, 60,1% disagreed and answered as "No".

Table 25.

Would you like to install the following technologies into your home? Tick as many as apply,1- Solar electric PV panels, 2-Solar water heating, 3-Small wind turbine, 4-Small hydro, 5-Ground source heat pumps, 6-Wood fired boiler system, 7-Wood pellet stoves, 8-No.

	Frequency	**Percentage**
Yes	150	47,2
No	91	28,6
Don't Know	77	24,2
Total	**318**	**100,0**

As in Table 25, the answers "Yes" come from 47.2% of the participants'.

Table 26.

If you do not plan to install renewable energy technology at your home, which of the following reasons apply?

	Frequency	**Percentage**
I think that installations would be too expensive	68	21,4
Other	26	8,2
They are unattractive	23	7,2
I don't understand how they work	22	6,9
They would not produce enough electricity for my home	17	5,3
My current supply of energy is adequate	12	3,8
They are noisy	12	3,8
Total	**318**	**100,0**

As revealed in the Table 26, reasoned as “Too expensive”, 7,2% “Unattractive”, 6,9% as “They don’tknow how they work” and 8,2% “Other reason”.

Table 27.
Do you know of anyone personally (i.e. friends, relatives or colleagues) who have used renewable energy?

	Frequency	**Percentage**
Yes	171	53,8
No	147	46,2
Total	**318**	**100,0**

As respond to the question above, 53,8% said “Yes” and 46,2% said “No”.

Table 28.
If you were looking to buy a home would you be more likely to buy one with renewable energy installations?

	Frequency	**Percentage**
Yes	215	67,6
No	51	16,0
Don’t Know	52	16,4
Total	**318**	**100,0**

The majority of participants’ responded in favour of the question saying 67,6% “Yes”.

Participants from three countries gave similar and close answers to “Perspectives on Renewable Energy”. A total of thirteen questions in “Perspectives on Renewable Energy” were asked and the answers were found to be similar. Most answers about the question “Where is the most useful place for such information to be made available?” were as “TV” (Americans 48%, British 42%, Libyans 51%), and “Website” (Americans 27%, British 26%, Libyans 32%). Considering these percentages, there is no significant difference in the responses of the Libyan engineers living in all three countries (America, England and Libya).

4.3. Findings Related to the Third Sub-Problem

The third sub-problem of the research was formed by the participants' opinions about the "Perspectives on The Environment in Terms of Renewable Energy? And the findings obtained are presented in the table below.

Table 29.
What type of fuel do you use in your home?

	Frequency	**Percentage**
Oil	191	60,1
Gas	92	28,9
Coal	18	5,6
Electricity	7	2,2
Wood	4	1,3
Don't know	4	1,3
Other	2	0,6
Total	**318**	**100,0**

As in Table 29, 60,1% of participants' said they used "Oil" and 28,9% used "Gas" in their house.

Table 30.
What is your estimated annual fuel bill with your home currency?

	Frequency	**Percentage**
Electricity bill	194	61,0
Gas bill	67	21,1
Oil bill	31	9,7
Wood bill	18	5,7
Coal bill	8	2,5
Total	**318**	**100,0**

The answer as "Electricity bill" come from 61,0% of the participants' and 21,1% as "Gas bill".

Table 31.
Do you try to conserve energy in your home by the following?

	Frequency	**Percent**
Turning off electric appliances when not in use	184	57,9
Use energy saving light bulbs	31	9,7
Wash full loads when using dishwasher/washing machine	29	9,1
Showers instead of baths	25	7,9
Keep temperatures at home between 18C – 21C	17	5,3
Buy eco-friendly appliances	13	4,1
Other, please specify	11	3,4
None of above	8	2,6
Total	**318**	**100,0**

As it can be seen in Table 31, 57,9% of participants' turned off electric appliances when not in use to save energy in their houses.

Table 32.
If your local authority were to provide you with containers and a collection service for green (organic) waste, how likely would you be to participate?

	Frequency	**Percentage**
Very likely	116	36,5
Fairly likely	76	23,9
Don't know	41	12,9
Indifferent	31	9,7
Not at all likely	29	9,1
Fairly unlikely	25	7,9
Total	**318**	**100,0**

As it can be observed in Table 32, the "Very likely" answer come from 35,5% of the participants' and "Fairly likely" come from 23,9%.

Table 33.
Do you have a recycling box provided by Reading Borough Council?

	Frequency	**Percentage**
Yes	164	51,6
No	154	48,4
Total	**318**	**100,0**

Table 33, reserved 51,6% of the participants' have a recycling box, whereas 48,4% do not.

Table 34.
Do you have any of the following in your home? Please tick as many as apply. 1-Double-glazing, 2-Loft insulation, 3-Cavity wall insulation, 4-Energy saver light bulb/s, 5-Other (energy saving device).

	Frequency	**Percentage**
Yes	126	39,6
No	112	35,2
Don't know	80	25,1
Total	**318**	**100,0**

As Table 34, reveals, 39,6% of the participants responded as "Yes", 35,2% as "No" and 25,1% as "Don't know" to the question above.

When the participants' views about "Perspectives on the Environment in Terms of Renewable Energy" are examined, it is seen that the participants from three countries have similar and close answers. A total of seven questions were asked for views about the subject question and the answers were found to be similar. The most answers to the question, "What type of fuel do you use in your house?" were "Gas" (Americans 48%, British 42%, Libyans 51%), and "Oil" (Americans 28%, British 29%, Libyans 32%). Considering these percentages, there is no significant difference in the responses of the Libyan engineers living in all three countries (America, England and Libya).

4.4. Findings Related to the Fourth Sub-Problem

The fourth sub-problem of the research was formed by the participants' opinions about the "Attitudes and Opinions about Environmental Issues" and the findings obtained are presented in the table below.

Table 35.
Would you be prepared to make a financial contribution to local environmental projects?

	Frequency	**Percentage**
Yes	135	42,5
No	73	22,9
Don't know	110	34,6
Total	**318**	**100,0**

As stated in Table 35, 42,5% said they would be prepared to contribute, 22,9% said wouldn't, and %34,6 said they didn't know.

Table 36.
Would you be prepared to make a voluntary contribution (give your time) to local environmental projects?

	Frequency	**Percentage**
Yes	147	46,2
No	98	30,8
Don't know	73	23,0
Total	**318**	**100,0**

Table 36, shows that 46,2% of the participants contributed to environmental projects, 30,8% didn't contribute and 23,0% didn't know about two subject question.

Table 37.

Has anyone in your household…1-Signed a petition about an environmental issue?, 2-Given money to an environmental group?, 3-Taken part in a protest or demonstration about an environmental issue?

	Frequency	**Percentage**
Yes	79	24,8
No	167	52,6
Don't know	72	22,6
Total	**318**	**100,0**

The "No" answer come from 52,6% of the participants' to the question in Table 37.

Table 38.

Do you agree with the following statements?, 1-I give first priority to the quality of the environment, even if it cost me more money, 2-Renewable technologies can help to improve the local environment, 3-Renewable energy is too expensive for me to consider.

	Frequency	**Percent**
Agree	185	58,2
Indifferent	84	26,4
Disagree	29	9,1
Don't know	20	6,3
Total	**318**	**100,0**

The majority of participants', %58,2 agreed with the subject question in Table 38.

Table 39.
Which main mode of transport do you use to travel to work/study?

	Frequency	**Percentage**
Car	228	71,7
Walk	32	10,1
Bus	28	8,8
Car share	12	3,8
Train	10	3,1
Bicycle	8	2,5
Total	**318**	**100,0**

A big majority, %71,7 of the participants' as shown in table 39, used their cars to work / study.

Table 40.
Do you agree that many of the journeys that you take using a car can be avoided?

	Frequency	**Percentage**
Yes	148	46,5
No	118	37,1
Don't know	52	16,4
Total	**318**	**100,0**

46,5% of the participants' admitted that they can avoid using cars when they travel.

Table 41.
How concerned are you about the following issues?, 1-The need to save energy, 2-The need to recycle, 3-The development of renewable energy, 4-Household waste disposal, 5-Traffic congestion, 6-Traffic fumes emissions, 7-Pollution of waterways.

	Frequency	**Percentage**
Very concerned	162	50,9
Fairly concerned	131	41,2
Not concerned	25	7,9
Total	**318**	**100,0**

As it is revealed in Table 41, 50,9% of the participants' are very concerned and 41,2% are fairly concerned about the subject question.

Table 42.
What is your opinion on the following forms of energy sources?, 1-Wind energy, 2-Solar panels, 3-Hydro, 4-Nuclear power, 5-Biomass plants, 6-Waste incineration,7-Fossil fuel

	Frequency	**Percentage**
No real opinion	127	39,9
Oppose	114	35,8
Support	77	24,3
Total	**318**	**100,0**

While 35,8% of the participants' opposed to the subject question in Table 42, 39,9% had no real opinion.

When the views of the participants about "Attitudes and Opinions about Environmental Issues" are examined, it is seen that the participants from three countries have similar and close answers. A total of nine question were asked and the answers were found to be similar. The most answers to "Would you be prepared to make a financial contribution to local environmental projects?" were "Yes" (Americans 50%, British 50%, Libyans 52%), and "No" (Americans 40%, British 36%, Libyans 32%). Considering these percentages, there is no significant difference in the responses of the Libyan engineers living in all three countries (America, England and Libya).

CHAPTER V
CONCLUSION, DISCUSSION AND RECOMMENDATION

The results obtained in this section and the suggestions developed from these results.

5.1. Conclusion and Discussion

318 people, 61,6% female and 38,4%male, participated in this study. In terms of the distribution of the sample by gender, there are more meals than females, 31,4% living in the U.K, 37,2% in Libya, and 31,4% in the U.S.A. As it is started in Table 4, 28,0% of the participants' havd a monthly income under 10.000, 19,5% between 10.000-20.000, 14,2% between 21.000-30.000, 10,1% between 31.000-40.000, 6.3% between 41.000-50.000, 10,1% over 50.000 and 4,1% between 51.000-60.000. As for the family monthly income, the least is 10.000 (28.10%). Maximum family income of some participants' (4.1%) is between 51.000-60.000 dollars.

Table 3 reveals the participants' education levels as 49,7% with Higher Degrees (M.A or Ph.D), 30,2% with University Degrees, 8,5% with "A" Levels, 7,5% without formal qualification, and 4,1% with GCSE/O levels. The distribution of the Ethnics groups is described in Table 3. The majority (75,2%) from Libya, smallest goup (0,6%) from Nigeria, and 0,3% from different ethnics groups.

5.1.1. The Results from the First Sub-Problem

In the first sub-problem of the study, it was aimed to determine the opinions of the participants about the use of energy resources. Looking at the results obtained in this context, global warming, greenhouse effect, renewable energy, energy efficiency, greenhouse effect, biodiversity, and sustainable development are the top issues. This information was obtained from internet and television programs. The processing of these issues on television and the Internet may have an impact on this outcome. In addition, the majority of the participants stated that they were very concerned about climate changes. This concern is also a sign that the participants are aware of environmental

problems. The main factors affecting climate changes are Coal (or coal-fired), Oil (or oil-fired), Gas/natural gas (or gas-fueled), and incineration (incineration). These effects mostly cause changes in air conditions and temperature rise. The participants often rely on institutions (scientists, business owners, government, etc.) that make decisions for the solution of the problems. The reason for this trust is always the fact that the environmental problems continue and the solution cannot be produced. When the results obtained from the first sub-problems are examined in general, it is concluded that the participants are concerned about the use of energy resources and their negative effects on the environment, and they are also concerned about the negative picture. Toolin and Watson (2010), Saraç and Bedir (2014), Aslanova, Gökçekuş & Alhadl (2019) concluded in their study that individuals are aware of renewable energy sources and that they have knowledge about it. This study supports the results of the research.

5.1.2. The Results from the Second Sub-Problem

The second sub-problem of the study dealt with the participant's views about their perspectives on renewable energy.

When the findings relted to renewable energy are overviewed, it can be noted that the participants' mostly agreed on the use of wind energy, solar energy, and wood fuel instead of oil and derivatives. They streeswd that such alternatives to oil and derivatives are increased. Meanwhile, they pointed to the role of TV and the internet in raising awareness and providing more information about the subject matter. The statements by the participants revealed that they did not have renewable or green programs on their electricity tariffs which are an indication of lack of information. Among the results of the first sub-problem of the study, it was observed that the participants' reached most of the information about the environment through TV and web-pages. These two parallels show that TV and the internet are important sources of information. They also emphasized that Governments had the most responsibility for widespreading the use of renewable energy. The participants' extressed that they can not install renewable energy in their houses because of high costs. Considering the

environmental problems, the use of renewable energy to disseminate the current problems and prenent the loss of the existing ones, the cost of this path seemscheaper. Results in Liarakou's study (2009) have similar indications with the ones in this research.

5.1.3. The Results from the Third Sub-Problem

The third sub-problem of the study dealth with the participant's opinions about their perspectives on the environment in terms of renewable energy.

Most of the participants stated that renewable energy sources were less harmful to the environment, they are a kind of nature friendly energy that does not harm the environment and human health, and that renewable energy sources do not harm the environment like fossil fuels. But the most used fuel in their homes is oil and gas. This result shows that the participants have a positive perspective on renewable energy but do not turn into behavior. This deficiency is thought to be caused by financial insufficiency and lack of information.

The question asked about the annual invoices of the money spent on the fuel of the participants (61,0%) and the question about energy saving were closed when we were not at home (57,9%). most of the participants stated "Yes" (51,6%). Çolak, Kaymakçı and Akpınar (2015)., Bozdoğan and Yiğit (2014)., Saraç and Bedir (2014)., Çelikler and Kara (2011), Aslanova and Gökçekuş & Alhadl (2019), the results of their studies on renewable energy sources coincide with this result.

5.1.4. Results for the Forth Sub-Problem

The forth sub-problem of the study dealt with the participant's views about attitudes and opinions towards about environmental issues.

The findings in this dimension reflected the participants' (42,5%) interest in the subject question and their desire to participate in projects related to environmental issues both voluntarily and financially. Though the high costs, the majority (58,2%) wanted to

participate in environmental quality issues (Table 38). Even more, they suggested that the use of cars could be restricted to an extent.

When the attitudes and opinions of the participants' are considered, it can be noted that they are positive about renewable energy in general, but not an effective factor itself to adapt new behaviors. In a similar study by Karatepe et al., (2012) with engineering students, it was found out that female students knowledge and awareness of renewable energy was higher than of male students. Kaldellis, Kapsali &Katsanou (2012) argued in their study that the more positive attitudes people exhibit, the more they become aware of renewable energy.

In conclusion, the findings in this research indicated that the participants are well aware of renewable energy resources, they have positive thoughts and attitudes, but due to some defficiences, they can not adapt new behaviors.

In order to benefit more from renewable energy sources, sponsors should be involved in the process, costs should be reduced and dissemination of information and training in the subject matter should address to masses of people to raise awareness.

5.6. Recommendation

In the light of the finding and the results obtained the following are recommended:

- Non-governmental organizations related to the environmental matters should involve every people around.

- The volunteer environmental organizations should check out their own activities, and take measures to provide more efficient activities. Also, these organizations should involve everyone and organize environmental activities.

- In order to increase environmental knowledge and develop people's their environmental attitudes, formal and informal programs should be checked out, and be arranged in a more effective way.

- In-service trainings should be given importance in order to raise awareness of renewable energy.

- When individuals produce their own electricity using solar panels in their rooms, regulations should be prepared and resources should be provided.

- Lack of knowledge regarding renewable energy sources leads to unconscious use of these resources. Formal education is the most effective way of achieving desired behavior changes.

- In order to expand the use of renewable energy sources, the initial installation costs should be reduced and their efficiency should be increased. It is suggested that research and development activities are increased, the first installation costs are reduced and the use of renewable resources based tools and equipment are increased among the public. The effect of different teaching strategies, methods and techniques in the

learning process is known. It is suggested that project-based learning should be highlighted in order to increase the level of knowledge and awareness of the participants on renewable energy sources.

- Considering the effective use of the Internet and the written and verbal media, it is recommended that the information on renewable energy sources should be included in such media tools in such a way that it will not mislead people.

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Appendix1: Questionnaire for Reading Area Study

Section 1 –Evaluation of the Use of Energy Sources

(Environmental Issues)

1 Which of the following terms are you aware of? Tick one.

Global warming	□
The greenhouse effect	□
Climate change	□
Sustainable development	□
Energy efficiency	□
Biodiversity	□
Renewable energy	□
None of above	□

If none of above go to Q2

1.2 Generally where did you hear of them? Tick one..

TV	□
Newspapers	□
Radio	□
Energy Advice Centres	□
Internet	□
Word of mouth	□
Other, please specify	□

2. How concerned are you that the earth's climate and long-term weather patterns are changing?

Not at all concerned	□
Not very concerned	□
Indifferent	□
Fairly concerned	□
Very concerned	□
Don't know	□

3.1 In your view, which of the following generate electricity in ways which significantly increase the risk of climate change? Tick one.

Coal (or coal fired)	□
Oil (or oil-fired)	□
Incineration (waste burning)	□
Gas/natural gas (or gas-fired)	□
Nuclear	□
Biomass (burns wood, straw etc)	□
Solar	□
Wind	□
Hydro-electric	□
None of above	□

3.2 Which of the following do you feel may be the consequences of climate change? Tick one.

Rise in temperatures	□
Increased risk of flooding	□
Change in weather patterns	□
Drought and water shortage	□
Increased risk of disease	□
Loss of habitat	□
None of above	□

4. How much trust do you place in the following groups to make the right decisions about the environment?

	None	Some	A lot
Scientists	□	□	□
Businesses and industry	□	□	□
Environmental groups	□	□	□
The government	□	□	□
Ordinary people	□	□	□

Appendix 2 – Perspectives on Renewable Energy

5. Do you agree that energy generated from the following resources can replace the use of fossil fuels (oil/gas/coal etc.)?

	Agree	Disagree	Don't know
Wind energy			
Solar energy			
Wood fuel			

6.1 Do you feel that you need more information about renewable energy?

Yes □ No □

If yes, go to Q 6.2, if no go to Q 7.1

6.2 If yes, where is the most useful place for such information to be made available? Please tick one.

Newspapers	□
TV	□
Radio	□
A website	□
Public buildings/libraries	□

Do you think that we should increase the use of renewable energy?

Yes □ No □ don't know □

7.2 Who do you think should take the major responsibility for increasing our use of renewable energy? Please tick one

National Government □
Government Office of the South East □
Reading Borough Council □
Private businesses □
People like you □

8.1 Have you heard of a 'renewable' or 'green' tariff from your electricity supplier?

Yes □ No □

If yes go to Q8.2, if no, go to Q9

8.2 Is your household on such a tariff?

Yes □ No □

If yes go to Q9, if no go to Q8.3

8.3 Under what circumstances would you be interested in having such an energy tariff? Tick one.

Interested regardless of cost □
Interested at above the cost of my current tariff □
Interested if it was the same cost as my current Tariff □
Interested if it was cheaper than my current tariff □
Not interested □
Other

9. Do you have any of the following for your home? Tick one.

Solar panels/PV□
Solar hot water heating□
A wood burning stove/fire place □
None of above □
Other □

10. Are you aware that government grants to help you to invest in renewable energy such as solar panels, small wind turbines, and wood fired boiler systems?

Yes □ No □

11.1 Would you like to install the following technologies into your home? Tick as many as apply.

	Yes	No	Don't Know
Solar electric PV panels	□	□	□
Solar water heating	□	□	□
Small wind turbine	□	□	□
Small hydro	□	□	□
Ground source heat pumps	□	□	□
Wood fired boiler system	□	□	□
Wood pellet stoves	□	□	□
None of the above	□	□	□

If no to any of above, go to Q11.2, if yes to any of above, go to Q12

11.2 If you do not plan to install renewable energy technology at your home, which of the following reasons apply? Tick one.

They are unattractive	□
I think that installations would be too expensive	□
They are noisy	□
They would not produce enough electricity for my home	□
My current supply of energy is adequate	□
I don't understand how they work	□
Other	□

12. Do you know of anyone personally (i.e. friends, relatives or colleagues) who have used renewable energy?

Yes □ No □

13.1 If you were looking to buy a home would you be more likely to buy one with renewable energy installations?

Yes	□
No	□
Don't know	□

Appendix 3 –Perspectives On The Environment In Terms Of Renewable Energy (Attitudes And Opinions About Environmental Issues)

14.1 What type of fuel do you use in your home? Tick one.

Gas	□	Oil	□
Electricity	□	Coal	□
Wood	□	Don't know	□
Other	□		

14.2. What is your estimated annual fuel bill (this can be calculated from bills)?

Gas	$…….	Oil	$…….
Electricity	$…….	Coal	$…….
Wood	$…….	Don't know	$…….

15. Do you try to conserve energy in your home by the following? Tick one.

Turning off electric appliances when not in use	□
Wash full loads when using dishwasher/washing Machine	□
Showers instead of baths	□
Use energy saving light bulbs	□
Keep temperatures at home between 18C – 21C	□
Buy eco-friendly appliances	□
Other, please specify	□
None of above	□

16.1. If your local authority were to provide you with containers and a collection service for green (organic) waste, how likely would you be to participate?

Not at all likely	□
Fairly unlikely	□
Indifferent	□
Fairly likely	□
Very likely	□
Don't know	□

16.2. Do you have a recycling box provided by Reading Borough Council?

Yes □ No □

17. Do you have any of the following in your home? Please tick as many as apply.

	Yes	No	Don't know
Double-glazing			
Loft insulation			
Cavity wall insulation	□	□	□
Energy saver light bulb/s	□	□	□
Other (energy saving device)	□	□	□
	□	□	□

18. How many cars are there in your household?

……

Appendix 4 – Attitudes And Opinions About Environmental Issues

19.1 Would you be prepared to make a financial contribution to local environmental projects?

Yes □ No □ Don't know □

19.2 Would you be prepared to make a voluntary contribution (give your time) to local environmental projects?

Yes □ No □ Don't know □

20. Has anyone in your household…

	Yes	No	Don't know
• Signed a petition about an environmental issue?	□	□	□
• Given money to an environmental group?	□	□	□
• Taken part in a protest or demonstration about an environmental issue?	□	□	□

21. Do you agree with the following statements?

	Agree	Indifferent	Disagree	Don't know
I give first priority to the quality of the environment, even if it cost me more money				
Renewable technologies can help to improve the local environment				
Renewable energy is too expensive for me to consider for my home				

22.1. Which main mode of transport do you use to travel to work/study? Please tick one.

Car □
Car share □
Train □
Bus □
Taxi □
Bicycle □
Walk □

If main mode of transport is by car, go to Q22.2, if other, go to Q23

22.2. Do you agree that many of the journeys that you take using a car can be avoided?

Yes □ No □ Don't know □

23. What would you estimate your household monthly petrol bill to be?

…..……

24. How concerned are you about the following issues?

	Very concerned	Fairly concerned	Not concerned
The need to save energy			
The need to recycle			
The development of renewable energy			
Household waste disposal			
Traffic congestion			
Traffic fumes emissions			
Pollution of waterways			

25. What is your opinion on the following forms of energy sources?

	Support	No real opinion	Oppose
Wind energy			
Solar panels			
Hydro			
Nuclear power			
Biomass plants			
Waste incineration			
Fossil fuel p			

Appendix 5 – About You and Your Household

26. Gender

Male □ Female □

27. Age

……

28. Ethnic background

Bangladeshi □
Libyan □
Egyptian □
Nigerian □
Indian □
Syrian □
Pakistani □
Other □

29. Please tick the box which corresponds to the highest level of education you have completed.

No formal qualifications □
GCSE/O Levels or equivalent □
A Levels or equivalent □
University degree or equivalent □
Higher degree □

30. Please tick the household income bracket that corresponds to your total household income in 2002.

Under $10,000 □ $10,000-$20,000 □
$21,000-$30,000 □ $31,000-$40,000 □
$41,000-$50,000 □ $51,000-$60,000 □
Over $60,000 □

31.1. What type of property do you live in?

Detached □
Semi-detached □
End terrace □
Mid terrace with passage □
Mid terrace □
Ground floor flat □
Middle floor flat □
Top floor flat

31.2. In what year was the house you occupy built?

Before 1900 □
1900s □
1910s □
1920s □
1930s □
1940s □
1950s □
1960s □
1970s □
1980s □
After 1990 □
Don't know □

31.3 How many bedroom & reception rooms are there in this property (not including kitchen/bathroom/utility)?

……

32.1. Do you have children under 18 years?

Yes □ No □

32.2. If yes, how many?

Child one ……. Child two …….
Child three …… Child four …….
Others …….

33. Do you have access to the Internet?

Yes □ No □

CURRUCULUM VITAE

I'm, Yousef Mohamed AKASH was born on 1/10/1975 in Libya. I started my studies from 1982 - 1988 and obtained my first school certificate. On 1992 – 1996 I attended high school and obtained my Secondary School Certificate. I graduated from Almergab University, and obtained a B.Sc. degree on 2000. On 2017-2018 academic year I attended Near East University, Northern Cyprus to obtain a Master's degree in Environmental Education and Management.

YAKIN DOĞU ÜNİVERSİTESİ

BİLİMSEL ARAŞTIRMALAR ETİK KURULU

01.04.2019

Dear Yousef Mohamed Akash

Your application titled "**Environment Protection through Renewable Energy Sources**" with the application number YDÜ/EB/2019/322 has been evaluated by the Scientific Research Ethics Committee and granted approval. You can start your research on the condition that you will abide by the information provided in your application form.

Assoc. Prof. Dr. Direnç Kanol

Rapporteur of the Scientific Research Ethics Committee

Direnc Kanol

Note: If you need to provide an official letter to an institution with the signature of the Head of NEU Scientific Research Ethics Committee, please apply to the secretariat of the ethics committee by showing this document.

Tez

ORIJINALLIK RAPORU

%8	%6	%3	%
BENZERLIK ENDEKSI	İNTERNET KAYNAKLARI	YAYINLAR	ÖĞRENCI ÖDEVLERI

BIRINCIL KAYNAKLAR

1	Serkan İlseven, Fidan Aslanova, Ismail Albakoush. "Raising Farmers Environmental Awareness in the Use of Pesticides and Agriculture Machinery", Eurasian Journal of Analytical Chemistry, 2018 Yayın	%1
2	www.thermaloilheater.com İnternet Kaynağı	<%1
3	www.flashcardmachine.com İnternet Kaynağı	<%1
4	energypedia.info İnternet Kaynağı	<%1
5	www.moelagos.org İnternet Kaynağı	<%1
6	www.iiste.org İnternet Kaynağı	<%1
7	oppapers.com İnternet Kaynağı	<%1