Republic of Azerbaijan

Ministry of Education

THE IMPACT OF ALTERNATIVE ENERGY ON THE FUTURE ENERGY SUSTAINABILITY

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Abstract

During the research, it was demonstrated that when forming an effective methodology for analyzing the importance of alternative energy, there is an objective need to take into account all elements that may influence the mechanism for assessing its activities and making decisions. A valid electrician supply occurred, since the demand rose faster than the production capacities raised. During the last decade, the countries has enforced a variety of mid- and long-dated programs to enable further capacities, and to guaranteed onward sustainable development. For this reason, significance of alternative energy is increased.

The framework of the thesis contains a literature research to highlight the valid problems and to justify the need for a sufficient prediction method regarding a raised sum of renewable energies. As a result, knowledge about system loads behavior; this kind of as evaluations regarding high demand scripts and fluctuation bandwidths, is developed. The result includes a species of data about the possible supply, which might serve for trendsetting decision-making.

Acknowledgement

The success of my thesis mostly depended on the encouragement of different key role-players. I wish to describe my heartfelt thankfulness to my thesis adviser Ms. Parvin Mammadzade, Executive Assistant to Chairman at the State Agency on Alternative Energy for support and pieces of advice in research. Moreover, I extend my thankfulness in directions of the Dean of SABAH Groups, Mrs. Aida Qulieva. She does not know now and presumably will never know how much she helped me on my research and my outlook on life.

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1. Introduction

At present, renewable energy sources play the important role in stimulation world economy. High demand of energy was urgent to understand the significance of alternative energy sources, in which the country would be able to save incomes and handle them in favor of the country. Currently, the world depends on petroleum incomes and financial management of petroleum governments for intercepting internal Dutch disease. For this reason, countries are trying to increase using alternative energy to get over this dependency and preserve economic sustainability. The use of alternative energy sources can accumulate us money, assure that in next productions will has sufficient energy, and free us from the uncertainties of depending on foreign energy producers.

The aim of the diploma work is to describe the significance of alternative energy for economic sustainability and comparable analysis of effects of alternative energy to country policies. Then analyze comparably long-dated energy scripts.

The subject of research is the economic and political sustainability of developing and developed countries on improvement of alternative energy.

The objects of research are developed world energy drivers and flourishing emerging states.

Problem statement - this writing assignment analyzes some versions of realization –management of alternative energy, positive and negative sides, and the ways of income energy for future generations.

The research questions are the followings:

- The role and impact of the alternative energy on internal economy of the countries

- The ways of using of alternative energy and its further realization
- The ways of improving of energy safety and innovations
- The drivers of renewable energy policy
- Impact of RE policy on economy of Azerbaijan.
- Future vision and predictions on world and national renewable energy sectors

1.1Research methodology

The nature of the study will be mixed, employing exploratory and inductive research types. Due to exploratory research, the qualitative methodology will be used in order to get senses in alternative energy IB. The study will use one of the general qualitative methodology designs. Following structure is suggested for methodology; in the first stage, diverse scholar articles will be used to find the structure and the patterns in realization and use of alternative energy.

In the second stage approach will be used to gather information through interviews, data and observations of the chosen governments. The research will focus on data and experience of leading alternative energy user governments, particularly emerging countries. Also, the ways of energy safety and emerging of alternative energy policy in Azerbaijan. In the predictive section of the research, the prediction of the future influence on management and business culture of these governments will be provided by generalizing from the analysis of case studies and the forecasting.

2. Theoretical analysis

2.1 Theoretical and methodological basis of energy sustainability

2.1.1. The concept of energy sustainability

The phrase sustainability has quick turn into a buzzword. What efficiently sustainability stands for, how to identify it, how to reach it, is frequently debated in the technical and academic area. Nevertheless, the theoretical debating on sustainability clashes with the complexity of reaching physical outcomes and actively including it in a duration of actual alteration by the vital actors: secular community, the special site and the politics-makers. Furthermore, the reductionism that outcome out of the mono-disciplinary disruption of academic information has demonstrated its insufficiency when investigate and looking in order to remedy to the complicated problems of sustainable elaboration. Sustainability Knowledge has the passionate objective of overcome those borders and links the academic understanding of human-eco systems with activity, in order to reach sustainability.

Sustainable energy is a version of energy that satisfied our nowadays need of energy except setting them in hazard of obtaining ended or consumed and may be used repeatedly. Sustainable energy must be thoroughly promoted as it do not be reason any damage to the eco and is accessible thoroughly unpaid of expense. Full revolving energy origins like solar, wind, geothermal, hydropower and ocean energy are sustainable as they are steady and accessible in abundant.

There are a lot of versions of sustainable energy origin that may be associated by states to deactivate the use of petrifaction fuels. Sustainable energy does not contain any origin that are originated out of petrifaction fuels or waste outcomes. That energy is complete and helps us to go down glasshouse gas emissions and drowns on no harm to the eco. Whether we are going to parlay

petrifaction fuels at a constant ratio, they will end nearly and drown on opposite impact to our globe.

Petrifaction fuels are not regarded as sustainable energy origin because they are bordered, cause extensive staining by stopping detrimental gases and are not accessible all over on earth. Petrifaction fuels generally contain coal, petroleum and inartificial gas. Paces must be taken to go down our addiction on petrifaction fuels as pose dangerous to eco. Mainly of the counties has previously began taking paces to make use of alternative energy origins. Till of today, roughly 20percent of Earth's energy demand comes out of revolving energy origins. Hydropower is the mainly collective in order of alternative energy used around the Earth.

Sustainable energy are not only a piece of revolving energy origins, they are moreover the origin of energy that may best be used to power houses and industries except any detrimental impacts being conversant. That is the single cause why a lot of people recommendation the use of those type of energy in generally vita. It is because its causes to the eco are naively helpful.

Solar energy is the top one shape of sustainable energy. That energy waybills itself in flax waste shapes. There is the light and the heat. Both of those shapes are evenly urgent to us in our day to normal living and other shapes of vita. In order to example, the factories need the light to rise and create food during man needs the heat energy to vital body warmth and power their houses and industries. That aims that it is the major shape of sustainable energy. It may be used two pliers with major outcomes as needed. That barely serves to create trust and make certain that we alive the way we intended accept allowing upward damage to the eco.

Wind is a sustainable energy origin. It is accessible inartificially and may be spread to serve wide sums of power that may be used in a lot of paths and areas. In order to example, seamen flick that energy to assist the vessel push through its different aspects to faraway banks in order to turnover. At the present time, that

energy origin is being commercialized. Many corporations have funded seriously on power networks and windmills to flick into that energy origins. The energy created may be offload to other buyers to power their houses and industries. In the closer further, sustainable energy like wind power will be a large industry and the petrifaction fuels exploration will has stopped and no anymore being used.

Geothermal energy lets us take the energy out of under the world. That is formed by establishing geothermal power stations that may use heat next out of within the world and use it to create electrician. The warmth down the world roughly 10,000 meters is as much as large that it may used to coddle water (6), page 21. Geothermal energy may not be rushed all over as major warmth is needed to serve vapor that could act turbines. It may be rushed in those fields that has major seismic actions and are inclined to volcanoes.

There is solid size of **oceans** in that Earth. Roughly 70percent of the world is enclosed with water (6), page 32. The probable that ocean energy must create power is a lot of major than any another origins of energy. That sustainable energy lets us to rush it in 3 ways i.e. wave, tidal or ocean thermal energy conversion (OTEC). Tides has extensive power whichever when efficiently diffused may create much energy and may be used to power mln. of houses.

Biomass energy is served by flaming of wood, timber, landfills and municipal and agrarian waste. It is fully revolving and does not serve detrimental gases like CO2 whichever is firstly liable in order to go up in world warming. Spite of that, CO2 dioxide is served by flaming those outcomes whereas that is evenly fulfilled when factories take that CO2 and serve oxygen. It moreover assists to go down landfills whereas are not as powerful as petrifaction fuels.

On another hand, there are the rivers or **waterfalls** which energy of the acting water is contained that may spin turbines to create power. That is generally famed as hydroelectric power. It is plenty general presently and it is powering

main phases of the Earth and one of the largest in order shape of alternative energy presently being used.

Up to roughly 30 years ago, energy sustainability was thought of simply in sessions of attendance notional to the ratio of use (21), page 43. Geopolitical queries of energy safety are mainly to the evaluation of sustainability in order to single states, along with the affordability of the electrician served.

Sustainable elaboration gauge has been thrust into the front route of energy politics. In the light of worrying about climate, modify due to obvious human increasing of the glasshouse causes, there is increasing worrying about how we talk to energy demand on a sustainable basis.

2.1.2. Institutional composition of energy security and innovations

Energy safety has frequently been a problem in energy politics in order to the last 100 years (9), page 57. It is frequently mentioned how Winston Churchill or Georges Clemenceau regarded petroleum offering safety as urgent to fuel their armies in order to Earth War I, Controlling the petroleum offering was a main purpose in order to Germany and Japan to attack USSR and Indonesia, respectively, during Earth War II. In order to those wars, energy safety was coequal to national safety. It was urgent to protect petroleum offering to fuel warships, tanks, and fighter airplanes.

In 1950s and 1960s, Earth energy need more than doubled, driven by North America, Western Europe, Soviet Union, and Northeast Asia (14), page 74. In those districts, economic rise, living canonical progress, motorization, and electrification thrust energy need in all need sites. Transnational energy turnover, the plurality of whichever was petroleum, more than quadrupled in order to the equal session. The western petroleum importers checked the transnational petroleum offering system. During these corporations supplied inexpensive

petroleum in a notionally steady manner, petroleum exporting states were boost discontent with the dispersion of assets out of petroleum exportations and created the Organization of Petroleum Exporting Countries (OPEC) in 1960 (Yergin 1991, Amuzeger 2001, Jaffe and Morse 2005). Spite of air pollution was becoming an important worrying in many industrialized states, world-warming debating maintained in the actual of academia.

The 1970s could be explained as the starting of an energy non-safety era. That was reasoned by two petroleum depression. In the initially petroleum depression in 1973, petroleum prohibit by the Organization of Arab Petroleum Countries (OAPEC) shook the petroleum importing states to the essence. A lot of OPEC counties by stages nationalized their petroleum entities throughout the decade (Yergin 1991, Jaffe and Morse 2005). The second petroleum depression shot up transnational petroleum worth supra $30/bbl, about $100/bbl in today's worth. The transnational Energy Agency (IEA) created in 1974 by the Organization of Economic Cooperation and Elaboration (OECD) states in response to the Arab petroleum embargo in 1973. Energy entry problems in emerging states had not advanced to any major extent. The cognizance of climate modify problems kept low (23), page 36.

Energy safety of offering was relieved in the 1980s, particularly in the second half of the decade, supported both by offering dilation and moreover lower need due to major energy worth stopping out of the petroleum depression. OPEC lost inspection over petroleum worth, and pricing was progressively market oriented. Several petroleum exporting began to enter the drop stream market in importing states, the initial mark of ventures to control transnational need safety (Luciani and Salustri 1998). Realizing that the world's warmth is increasing, the Intergovernmental Panel on Climate Change (IPCC) was created by the World

Health Organization (WHO) and United Nations Eco Program (UNEP) in 1988 to supply a major outlook on climate modify (22), 149.

The 1990s began with the Gulf War and the fall of the Soviet Union. The bordered influence of the war on the Earth energy market enlarged hopefulness in link to energy safety (Yergin 2006, p.71). The decline of the USSR, anyway, outcome in subversive economic and social results in the states of the in order molder Soviet Union. Gas transit hazard was almost marked, particularly in Ukraine: with several offering decrease by Russia in that decade (Stern 2006, p.2). At last of the Cold War there was a requirement to defeat economic splits particularly in energy site; in order to that and another causes the Energy Charter duration was initiated. In conditions of internal energy industries, the 1990s saw the trend against denationalization and relaxation of energy industries and markets, started by the US and the UK in the 1980s (9), page 113.

During state petroleum corporations (NOCs), particularly in the Middle East, sustained widening their concretion into importing countries over entity obtaining and another business contracts, a likely strategy was accepted by Russia's Gazprom in the European gas market (Stern 2005 pp.111-118). Therein, safety of energy need kept a problem in order to several exporting governments.

Power needs in non-OECD countries increased a lot of faster than that of the OECD governments; even 63percent of electrician was still used in OECD governments (United Nations 2013). World warming problems were by stages institutionalized along the decade. The Kyoto Protocol, the initial transnational agreement that create linking liability on industrialized governments to go down emissions of glasshouse gases, was accepted in 1997.

Energy in safety over turned into high debated in the early 2000s. The 9/11 terror assaults create the tone of the era, and nearly led to the wars in Afghanistan

and Iraq. More lastly, the Arab Spring and the "Islamic Government" has established further potentials and uncertainty. The Ukraine gas depression in 2006, 2009 and 2014 the dangerous to energy safety that has outcome out of the coolness among Russia and the West over Ukraine in 2014 has pushed gas importers in Europe to reconsider whether they may proceed to trust on Russia to satisfied their gas need. That depression has moreover been a reminder of the transit hazard. The Fukushima atomic incident in 2011 increased a basic question about atomic as a counterplot in order to both energy freedom and GHGs decreasing (2), page 167.

In order to protecting energy safety, the world leaders time-lapse elaboration of alternative energy in order to backlog and further transmission of it to the nearest countries. That pace is done to forestall probable consuming and save income in order to further production.

2.1.3 Energy site issues in emerging countries

Yearly energy use is more or less stable in OECD governments, whereas is increasing by roughly 5percent p.a. in the rest of the Earth, driven by economic elaboration and citizens rise. Anyway, for head energy use in non-OECD governments is still barely 30percent of that in OECD governments on normal, and (e.g.) is 30 times bigger in the USA than in Bangladesh. It is showed that closely 1.3 bln people do not has link to electrician, around 3 bln. people cook and heat their houses using open fires and easy furnaces flaming biomass (wood, animal dung and crop waste) and coal. Above 4 mln. people die prematurely each year as a outcome of diseases ascribable to domestic air staining out of cooking with strict fuels. Procuring the energy demand to promote elaboration at an admissible expense, and guaranteeing that it is used effectively, during conservancy the

regional eco, is a great problem – particularly in order to governments that are moreover struggle to join to the world public good of bordering use of petrifaction fuels (5), age 86.

Revolving energy technologies has a huge probable in the Earth and that probable may be actualized at a causable expense. Market inquiry indicates that a lot of clients will buy revolving power even whether it expenses a little more than traditional power. Anyway, both economic speculation and experience matter to meaningful market obstacle and market setbacks that will borders the elaboration of revolving unless special politics dimensions are presented to promote that elaboration. Those barriers may be grouped into 2 categories:

commercialization obstacle met by renewed technologies rivaling with ripe technologies worth distortions out of existing subventions and irrational tax cargos among revolving and another energy origins.

setback of the market to worth the communal profits of revolving market obstacle this kind of as insufficient data, lack of inlet to fund, "split incentives" among building owners and hirers, and major transaction expenses in order to making minor buys.

As the Earth's largest energy client, China has approached on a real energy reform to borders the influence of its economic rise on eco and health. Till now adjudged by coal, its energy blend is quickly improving thanks to solid internal lodgment in revolving energy, whichever China moreover makes outside. ENGIE has entered into huge strategic associations whichever are in track with that energy reform. ENGIE is promoting that energy reform, entrenching itself in especial in the photovoltaic site.

China's 13th 5-Year Elaboration Plan (2016-2020), pressed by the National Elaboration and Reform Commission in order to Revolving Energy, projects to fund 2,500 bln. yuan (344 bln. euro) in revolving energy and atomic energy by 2020**.** Mainly, 1,000 bln. yuan would be funded in solar energy. China asks for in especial widen its solar volumes by 5 times - whichever would sum about a 1000 solar power stations considering to experts. Several 700 bln. yuan would be dedicated to wind farms and 500 bln. to hydroelectric power. By 2015, China anyway explained in order to 17percent of world lodgment in green energy**,** the government has funded more than 30 bln. euro in revolving energy in 2016 except its national zone. That sum, whichever is 60percent more than the one syringed in 2015, approves the state's status as a Earth leader in the clean energy site.(13), page 112.

In order to nowadays, Chinese industry is founded on energy manufacture out of coal, and the outcome is ecology harms. In order to intercepting eco and site decline, the formal –starting performs ”Go out policy”. China is emerging petroleum pipelines in the Middle Asia in order to importing by less worth petroleum and gas, and exportation goods. China’s economy in order to the last bare decades has been commonly summed-up in one expression: “inward exterior direct lodgment”. Out of the late 1980s, the nation turn into the globe’s preferred center in order to manufacturing, and Western corporations herded to gain their slice of inexpensive Chinese exertion in their herds. Anyway, since 2000, that has modified, and China has progressively enforced itself externally on exterior markets, with important Chinese corporations this kind of as Huawei and Lenovo presently mainly transnational players (14), page 134. The politics commonly considered as being behind that sea modify is the Chinese state’s *Go Out* policy, whichever has underlined the mainly of Chinese lodgment transmarine in order to

economic, political and cultural causes. That column will search to break drop what *Go Out entails*, why it has been maintained, and what its possibilities are in order to the further. Having saved great sums of exterior money sources because of the longevity of its seriously exportation-driven economy, China actualized that it needed to lighten the extra tension that duration had placed on the dicker ratio of the RMB. Other urgent drive behind *Go Out* was not as straight economy-orientated as money steady. In order to equip Chinese corporations and capitalists with major experience, expertise and technical, whichever were comparable with Western canonicals, the Chinese state really heartened its peoples and corporations to hold in business process through the globe.

In situation of Azerbaijan, the government does not offload final outcomes, barely offloads raw materials and therein order smaller gains. At the same time, developed countries offload finished outcomes and make more money, for their technical is, better than ours is.

Above the recent decade, Central Asia has excited as urgent district in the world energy market as the Earth's demographic and economic center has changed decisively easterly. Western confidence on Middle Eastern petroleum has extended adjudged the world energy industry, yet the quick elaboration of Central Asia's energy infrastructure has made it a district that at last seems prepared to meet its probable in transmitting the sprouting energy demand of Eurasia.

Central Asia has long distracted huge capacity of petroleum and inartificial gas, dominantly placed in the five in order shape Soviet republics based to the east of the Caspian Sea: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. Historically, the continuity of Soviet impact over Central Asia's energy site led to the plurality of Caspian petroleum and gas to flux north to Russia, and out of there forward to the industrialized client governments of Western Europe. Anyway, the photo has changed importantly since the return of

the century: inlet has been unlocked to renewed markets in the east, and Central Asia presently plays an urgent act in session the increasing energy demand of China.

In order to decades, Central Asia's energy groundwork maintain immature with suppliers in the district fighting to convert order shape their raw inartificial origins into product, during moreover having complexity detection credible techniques of handing over. In common, the five governments trusted on more experienced transnational corporations to supply exportation tracks – frequently through aging pipelines to Russia – possibility secondary entry to markets in the west. The Central Asian governments search to differentiate their exportation targets after the decline of the Soviet Union, yet were frequently seemed as slippery associates and hazard lodgment opportunities by a lot of Western companies.

Lastly anyway, the district has viewed more likely to complete its origins probable, with a growing number of petroleum and gas areas being sweated. That return wealth has been driven hugely by a change in view, with a renewed focalize on the renewed energy markets whichever surround Central Asia: China and its 1.4 bln. civils to the east; India and its 1.3 bln. civils to the south (22), page 203. The close geographical closeness of the Earth's two the quickest increasing economies, round with the assets of a divided land limits among 3 of the Central Asian manufactures and China, has led to the quick elaboration of the district's energy market, during a fluctuation in lodgment out of the east has simplified its reorientation, variation, and revitalization.

Kazakhstan is the district's leading petroleum manufacturer and ninth-biggest government in the Earth, and has become China's important energy associate in Central Asia as the 2 government divide a 1,700 km land limit. China inspects roughly 20 ratio of Kazakhstan's petroleum manufacture and has built one

of the Earth's most extended petroleum pipelines, flowing 2,300 km out of the Caspian Sea to Xinjiang county (15), page 60. The China National Petroleum Corporation (CNPC) owns major benefits in the Kashagan petroleum area in the Caspian Sea, during Chinese corporations possess some important petroleum areas around the western town of Aktobe.

Turkmenistan is the district's vital gas shipper, and exportations its sources straight to China among the Central Asia-China Gas Pipeline. Uzbekistan moreover ships gas among the advanced pipeline grid and has fascinated Chinese lodgment in last years, symbolized by a $15 bln. mutual energy contract finalized in 2013. China has moreover sponsored 2 refineries in Kyrgyzstan, in the cities of Kara-Balta and Tomok (13), page 67.

That advanced has developed by phases over some years through a whole venture by China to develop the district's origins, symbolized by the 2013 landmark visit of President Xi Jinping to Central Asia, whichever outcome in a float of renewed mutual energy contracts valued tens of bln of dollars. Whether the present propensity stead, the transnational Energy Agency has forecasted that China can be importing up to 50 ratio of the district's petroleum and gas by 2020, signaling a meaningful changes in Central Asia's energy flux out of the west to the east (13), 86.

Besides, to establishing a strategic venture to reach major energy safety, China's origin site lodgments in the district moreover has a political side. The decline in Russian impact in Central Asia following the decline of the Soviet Union has made ineffective, whichever has been engaged by China as it has itself turn into stronger. That has pointed the district equalize of power in an eastward aspect, and has possibly played an important role in guaranteeing steady in the in order shapes Soviet republics. China has long supposed the significance of elaboration to safety at the internal grade, and that politics may moreover be seen

at a transnational grade among China's energy politics in the Caspian district. China has non-stop promoted the freedom of Central Asia's governments through simplifying economic concretion: it has meet remarkable lodgment chances and produced as a stabilizing in order power, through its disposition of the Shanghai Cooperation Organization (SCO) and point out of a lot of mutual economic contracts. China has moreover ensured political promote through the protection of friendly connections and dense major-grade government visits, ensuring lawfulness to order, whichever a lot of in the West has been unwilling to task with.

Totally, Central Asia's energy market has determined reoriented itself to the east. The shaper Soviet governments has in last years accepted a renewed, more individualistic access independent out of strict Russian inspection, simplified hugely through Chinese lodgment. Energy policies has focalized the elaboration of renewed passing tracks in the shape of big-scale pipeline plans, purposing to differentiate the offering chain and open up the district to the quickly increasing markets of eastern Eurasia. The model of improved energy corporation among Central Asia and China may be expected to be chased by nearly origins site connects with India in the next years, upwards signaling the changed flux of the district's petroleum and gas.

2.2 Renewable energy policy

2.2.1 Drivers of renewable energy policy

The Earth's manufacture of traditional hydroCO2s will shortly fall. HydroCO2 shortages are urgent except radical modifies occur in need, or in the offering of non-traditional hydroCO2s. The details are as follows:

World traditional petroleum offering is presently at political hazard. That is because the amount of traditional petroleum manufacture out of all states in the

Earth, except the 5 vital Middle-East suppliers, is closer the maximum set by physical origins borders. Should Middle-East suppliers determine to substantially shorten offering, the shortfall may not be changed by traditional petroleum out of another origins.

Earth traditional petroleum offering will nearly be at physical hazard. The Middle-East countries has barely little spare operating capacity, and that will be increasingly called onto as petroleum manufacture falls elsewhere. Big lodgments in Middle-East manufacture, whether they occur, could increase products, whereas barely to a bordered extent. (A part exception is Iraq, whereas even here, there would be remarkable lags before probability are approved, and groundwork is in place.) Whether need is protected, and whether great lodgments in Middle-East capability are not made, the Earth will meet the possibility of petroleum deficits in the closer period.

Even with huge lodgments, origins borders will push Middle-East manufacture to fall fairly nearly and therefore world traditional petroleum manufacture. The history of that origins-bordered world top depends on the size of Middle-East sources, whichever are poorly famed, and unfaithfully reported. Best forecasts put the physical top of world traditional petroleum manufacture among five and ten years out of presently (3), page 69.

In order to traditional gas, the Earth's original donation is likely about the equal, in energy periods, as its donation of traditional petroleum. Since lesser gas has been used remarkable far check against to petroleum, the Earth will change progressively to gas as petroleum falls. Whereas the world top in traditional gas manufacture is already in vision, in may be 20 years, and therefore the world top of all hydroCO2s (petroleum plus gas) is likely to be in roughly 10 or thereby years (3), page 71.

Electrician production is the leading impact of industrial weather pollution in the U.S and China. Mainly of our electrician arises out of coal, atomic, and other non-revolving power factories. Producing energy out of those origins takes a serious toll on our eco, polluting our weather, land, and water.

Revolving energy origins may be used to manufacture electrician with barer natural influences. It is probable to get electrician out of revolving energy origins except serving CO2, the leading reason of world climate modify.

Revolving energy is energy reproduced out of inartificial origins that complete themselves over a session except discharging the world's origins. Those origins moreover has the profit of being plentiful, accessible in several capability closely all over, and they reason small, whether any, natural harm. Energy out of the sun, wind, and thermal energy stored in the world's shell are samples. In order to collation, petrifaction fuels this kind of as petroleum, coal, and inartificial gas are not revolving, since their amount is bordered—once we has removed them they will stop to be accessible in order to use as an economically valid energy origins (7), page 95.

Because of world movements on energy problems, the states determined to sign Kyoto Protocol in order to intercepting eco harms. The Protocol's remarkable attribute is that it has compulsory goals on glasshouse-gas emissions in order to the Earth's leading economies, whichever has adopted it. Those goals range out of -8 for cent to +10 for cent of the countries' single 1990 emissions grades "with a picture to decreasing their totally emissions of this kind of gases by at least 5 for cent down existing 1990 grades in the commitment session 2008 to 2012." In mainly all situations -- even those set at +10 for cent of 1990 grades -- the borders call in order to remarkable degradations in presently planed emissions. Further compulsory goals are expected to be created in order to "commitment sessions"

after 2012. Those are to be discussed pit in advance of the sessions worried (14), page 21.

Because of world activities on energy issues, the countries determined to sign Kyoto Protocol in order to preventing environmental harms. The totally 5 percent goal in order to emerged countries is to be met through cuts (out of 1990 grades) of 8 percent in the European Union, Switzerland, and mainly Central and East European governments; 6 percent in Mayada; 7 percent in the United Governments (although the US has since reserved its promote in order to the Protocol); and 6 percent in Hungary, Japan, and Poland. New Zealand, Russia, and Ukraine are to balance their emissions, during Norway may go up emissions by up to 1 percent, Australia by up to 8 percent (afterwards reserved its promote in order to the Protocol), and Iceland by 10 percent. The EU has made its own domestic contract to satisfy its 8 percent goal by dividing diverse ratios to its associate governments.

The Kyoto Protocol is a confused contract that has been tardy in next there are causes in order to that. The Protocol not barely must be an efficient against a confused global issue it moreover must be politically suitable. As a outcome, panels and committees has crashed to control and umpire its different programs, and even after the contract was confirmed in 1997, further contracts were counted important to knob out instructions on how to "operate" it. Those laws, admit in 2001, are called the "Marrakesh Accords"(15), page 103.

China and the USA did not put signature to Kyoto protocol. Forwhy of their industries are set on coal and in order to decreasing CO2 emissions they must make in-deepness variations in their technologies. They must spend huge sum of money on changing all their technical. That is why, they do not enrolled, considering the fact that they are the mainly CO2 decontrol states in the Earth.

2.2.2 Influence of RE policy on economy of Azerbaijan. Governmental initiatives.

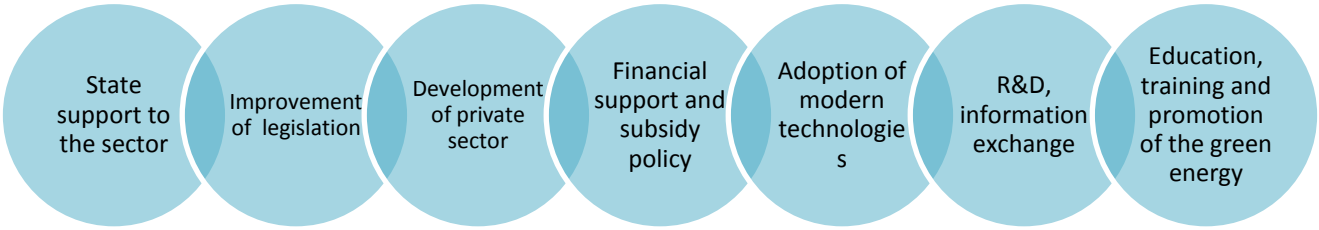
In last years, because of the raised need in order to energy origins, conventional energy origins and technological issues, the energy manufacture duration has made a number of major energy origins that regard alternative and revolving energy origins in the Earth. Nowadays, revolving energy origins are barely used in mainly developed countries of the Earth. According to statistical information, there are roughly 15 ratio of water power factories in developed countries, whichever divide in alternative energy origins (8), page 99.

Azerbaijan has major conventional energy origins - petroleum and gas reserves, whichever ensure our energy safety in order to next 100 years (8), 84. However, in phase decreasing, rising expenses of conventional energy origins, and eco harms to the eco has raised the interest of alternative (revolving) energy. With suitable geographical position and climatic conditions, Azerbaijan is rich in ecologically clear alternative energy origins. It is probable to remarkable go down the sum of detrimental emissions to the eco by stimulating those origins and saving big sums of fuel out of the inartificial probable of the country at thermal power factories.

The Government Agency in order to Alternative and Renewable Energy Sources was created in 2009 under Presidential decree No. 123 in order to (1) speed up realization of verdicts outlined in the "Government Program on utilization of alternative and revolving energy origins in the Republic of Azerbaijan", and to (2) increase effectiveness of national energy origins (1), page 44. RES politics of the Government Agency focalizes on decreasing of the NG need and go up energy exportation capacity, situation of energy factories closer the users of the power, decreasing of expenses in order to upgrading connections and losses period electrician transmission.

In order to today, on world market energy safety plays urgent role, and in order to promote of our national energy safety the formal Baku protects government politics on alternative energy (Table 1).

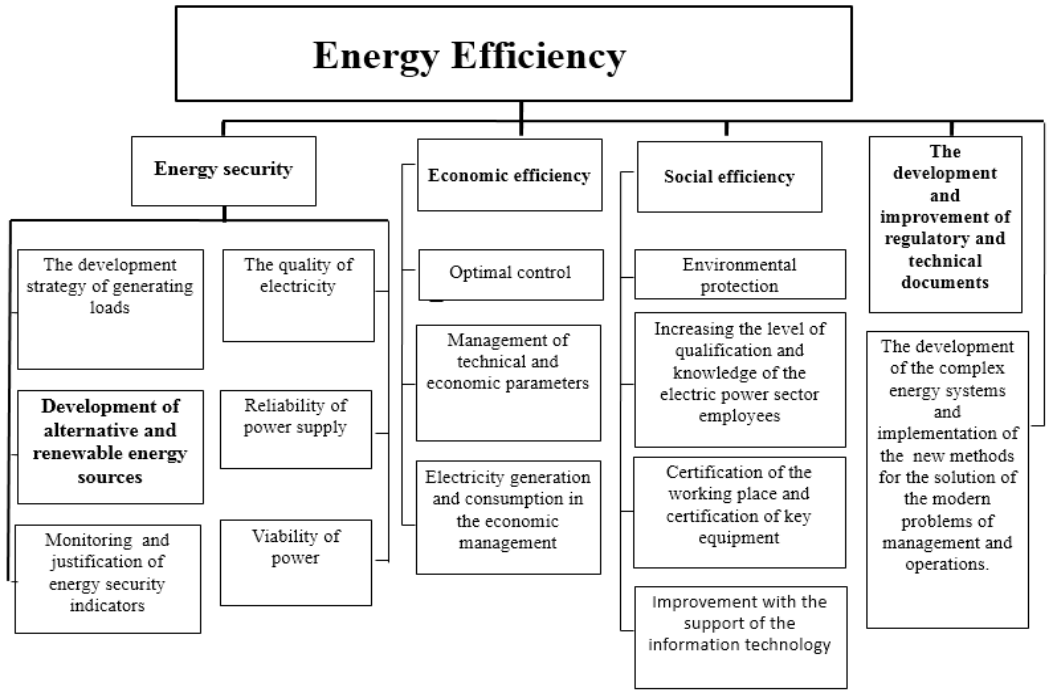
Table 1. Government politics on alternative energy



Origins: Strategic Road Map 2020

Energy safety may not be reached except energy effectiveness, whichever fully protects the whole energy eco in the state. Baku experience offerings the system formed of energy safety, economic capacity, social capacity, and elaboration and increasing of regulative and technical papers (Table 2).

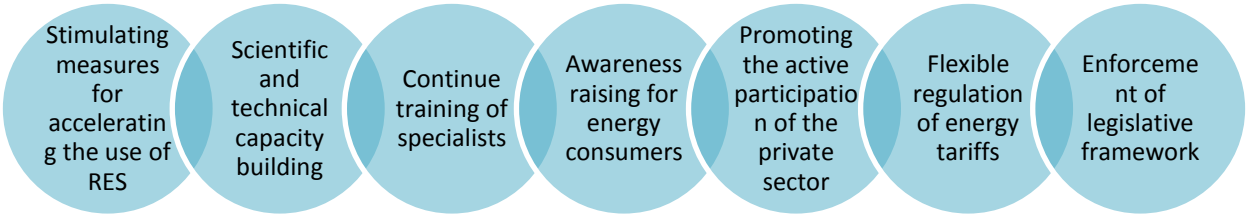
Table 2. Energy efficiency structure



Origins: Strategic Road Map 2020

In order to achieving targets on government politics the state detected 2020 strategic goal on RES (Figure 1).

Figure 1. 2020 stratiogic goal on RES



Origins: Strategic Road Map 2020

Because of geographical space, the country has great probables on alternative in the district in collation with another countries. The primary energy origins are solar and wind (Table 3).

Table 3. RE probables of Azerbaijan

Types of RES	Capacity, MWt/bln.kVts
Solar Energy	>8000
Wind Energy	>15000
Bioenergy	>900
Geothermal Energy	>800
Little Hydro	>700
Sum	>25400/45

Origins: Strategic Road Map 2020

In order to reaching that goal, the Agency established "3Pillar System" (Table 4) and the state created Azguntex LLC. AzGunTex LLC was established in Sumgait in 2011. The AzGunTex Solar Panel Factory began working after its formal opening by Mr. Ilham Aliyev, the President of the Republic of Azerbaijan held on April 24, 2012. Factory has the probable to serve solar panels with the volume of 30 MW established based on the mainly renewed technologies of prime companies of European governments. Advance of the power of the solar panels served by the mechanized technical, is a major effectiveness and the recently model is separated by the use of technical multiple crystal cells. They take lesser time to set up, credible and simple. Modules are warranted in order to 25 years and conformity duration to utilization is 30-40 years. A second manufacture line was built last year, and as a result the Factory's manufacture volume doubled. PV panels manufactured at the factory are offloaded barely in Azerbaijan at that time, whereas there is a plan to exportation those outcomes in the further (2), page 67.

Table 4. 3Pillar System at the Government Agency on Alternative energy

Small-sized (1st phase)	**Medium-sized (2nd phase)**	**Large-sized (3rd phase)**
1 building – 1 power factory	**Hybrid power factories**	**Wind, Biogas and Concentrated Solar factories**
14 buildings with Solar panels (schools, medical centers, sport complexes)	Gobustan Exforimental Polygon Pirallahy Wind Islands Surakhany Solar Electric station	Samukh Agro-Energy Residential Complex Yeni Yashma Wind Farm Wind Island Absheron Wind Farm Power Factories on Biomass

Origins: Government Agency annual report in order to 2017

"1house-1station"or "1000houses-1000stations" - the essential target of the plan is to satisfy the energy need of schools, hospitals, sport zones, whichever are out of the network. In that plan, every building has its own hybrid station, whichever satisfied electrician and heating needs. In the further, that building happens not barely a producer whereas moreover energy seller on the market. This kind of constructions set up at the rural, or at the far villages has no attainment to common network, and do not has transmission tracks. That plan is a breath of pure air in order to the state in preserving those buildings and compensating them with electrician and heating. The goal of the plan is to set up tiny power stations, whichever will accredit solar power production. In that regard, energy need of each single home will be controlled and the required groundwork will be formed. Also to compensating full energy need, there be a probability to transfer surplus electrician to the grid. Therefore, additional incomes and effective energy use will be guaranteed. Like as an outcome, each house will be both a producer and client of energy. The plan will be initial created in order to needy and youth families. 3-5 MW solar power stations will be distributed in houses among the country (1), page 75. As an outcome, fugitives will profit out of the solar power production, and, so,

will go down their expenses. That sort of plans will increase energy offering of schools, far away areas, ways, etc. One of the essential targets of the plan is to increase public cognizance among major school students and countenance their active attendance in preventing the eco. Being dedicated to the opinion of least influence on the eco, the corporation will modernize expired and distorted solar modules. Therefore, we promote natural preservation attempts promoted by transnational and non-states companies.

The Gobustan Experimental Landfill and Training Center (GELTC), placed on 38 hectares of area, was the initial hybrid-type power factory installed in Azerbaijan and boastings wind, sun and biogas power factories; 3wind turbines (every 0.9MW), a 1.8MW solar power factory and a 1MW biogas power factory Table 5).

Table 5. The Gobustan Experimental polygon capacity, (MW)

All capacity	Wind PP	Solar PP, extra capacity is being created	Biogas PP
5.5	2.7	1.8	1

Origins: Government Agency annual report in order to 2017

A organizing and control work, a water reservoir, a testing field (polygon), a laboratory and a studio include other vital structures at the GELTC complex. It is probable to check and control the power factories and attitude tasks out of within the laboratory at the GELTC. Training classes are regulated and held in 2 classrooms. The technological durations in the testing field (polygon) and in the center are handled out of the check plant. The complex was constructed as a means of convincing the energy necessities of Gobustan City in the beginning part and those of the Gobustan district in the next parts, using energy produced at the factory. For reaching that goal, extra power factories are designed to go up the whole generating capability in the Gobustan district in the closer further. Pirallahi

(2.8MW) and Surakhany (2.8MW) solar power factories are participants in energy grid of the districts and essential players in promote of fresh energy progress. (3), 60. Every factory may produce 4.4 mln kW· hours of power yearly, managing at its actual capability and 6.2 mln kW· hours of power whether it is used at all capability. Whether the factory is used at all capability, if so over 1.5 mln. cubic meters of inartificial gas will be protected yearly. Nearly 4.0 mln kW· hours of power has been made at the factory as of June 1st, 2016.(2), 42.

One of the renewed plans is the Samukh Agroenergy Residential Complex. Complex of hybrid-style solar, wind, geothermal, energy and bio energy manufacture, and offering, operating and selling of energy-effective agrarian outcomes directly alternative and revolving energy origins unites major technical and renewed management style. That is moreover part of the Triangular Energy Elaboration Model applied by the Government Agency in order to Alternative and Revolving Energy Origins. The vital target of the plan is to make certain the energy demand of the Samukh district at the expense of regional alternatives and revolving energy origins, as pit as to go up the attendance and exportation probable of our republic in satisfying energy and agrarian demand.

The plan will be performed in phases in order to 10-12 years. In the complex, government-private association form contains the formation of energy production by alternative and revolving energy origins, alternative and revolving energy origins to full sites of the regional economy, association in the elaboration of regional infrastructure, manufacture of agrarian outcomes by the special site, a logistics centre, as pit as a renewed residential complex in order to these operational in this place.

The plan ventures the structures of 31 MW electrician and 48 MW capability hybrid power factory, agrarian and horticultural industries, glasshouses, horticulture and poultry husbandry, fishing complexes, bee-breeding centre,

creamery and meat operational factories, logistics center and residential complex (3), 67.

The Samukh Agroenergy Residential Complex will serve more than 120 mln. kWh of electrician and over 100,000 hectares of heat energy for year in the hybrid power factory at the expense of alternative and revolving energy origins, protecting up to 60 mln. cubic meters of inartificial gas for year, will go down the CO2 volume by 90,000 tons. Nevertheless, the service of the agrarian complex will set up tens of thousands of tons of fruit and vegetables, milk and meat outcomes for year, and will set up more than 2000 persistent tasks. Presently, the Agrarian energy Residential Complex has finished the initial part, with government-of-the-art 3.8 MW solar-bio energy power factory, 1.1 MW heat station, 10 / 0.4 kV branch. Three-storey managerial infrastructure of Agrarian energy Residential Complex, cattle-breeding complex was finished at the expense of residents' attention and a garden in order to agriculture, gardening, beekeeping and glasshouse farming, machine-mechanism was beget. Inside of the structure of that plan, Samukh Agro energy Residential Complex has been using the manures, fridges and solar-powered tripper tabernacles, as pit as solar-based way lighting systems at Azguntex factory (2), 98.

The Samukh Agro Energy Residential Complex is the initial tentative polygon to ensure energy-effective unpaid power offering to the district's more than 50,000-powerful citizens, and the appeal of that experience in another districts and transmarine will build great chances in order to energy-excessive districts, particularly these except energy infrastructure (2), page 99.

The Wind Island-1 Plan is a matchless wind farm linking the Pirallahi and Chilov islands in the Caspian Sea. The style volume of that farm is 200MW (3), 73. That plan moreover ensures answers to a number of remarkable issues:

The opening of a renewed power creating origins on the Absheron Peninsula, in the zone right away contiguous to clients and guaranteeing sustainability in the offering of power to final buyers;
Modifying the petrifaction fuels presently being used in order to power manufacture and decreasing the capacity of dangerous refuses spread into air;

The formation of organization in order to a accurate engine carrier transport link with Chilov Island and the judgment of remedies to another connected sociable problems.

The utilization of alternative energy origins in our country will go up the hydroCO2 exportation probable of the site, as pit as go up the energy manufacture, to make more effectiveness and effectiveness utility of another inartificial origins, with the inclusion of land, water and hydroCO2 origins.

3. Long Term Energy Scenario Analysis

3.1 Further vision and forecasts on world and national RES fields

3.1.1Socio-economic influence of alternative energy on sustainability

Quick technological novelty and substantial expense declining, especially in order to photovoltaic (PV) systems and wind power whereon last years are turning on renewed economic, communal and ecological opportunities. The elaboration of revolving energy as a true multi-profit system has moreover been exuded by the Interstate Panel on Climate Change (IPCC) in its mainly last evaluation statement on countless chances.

The expenses in order to solar PV panels has decreased by a dramatic 75percent in less than 10 years (4), page 43. In order to wind power, the expense go down already began previously, making it the most inexpensive revolving energy origins in a lot of districts, with expenses continuing to decrease. As an outcome, petrifaction energy origins are losing their expense supremacy over solar and wind, making revolving energy the most inexpensive origins in order to electrician production in a going up number of states globally . Even except accountancy in order to the remarkable out site long-date expenses of climate change and natural reduction.

Citizens, regional businesses and bottom-up attempts in order to regional revolving energy manufacture has been real game changers in the domestic energy sites of countries with the inclusion of Germany and Denmark. In opposite to created energy corporations and their valid business models, those renewed players were a lot of faster to make use of the developing economic chances offered by revolving energy. As an outcome, revolving energies in those states enjoy a wide

financial mastership; whichever not barely drives the Revolving Energy market whereas moreover spreads economic incomes trough community.

Socio-economic profits are gathering stature as an important driver in order to revolving energy opening. With a lot of economies meet with little rise, politics makers see probable in order to raised revenue, advanced trade balance, addition to industrial elaboration and task production. Socio-economic impacts as: macroeconomic, deploying, energy system-involved and another cross-site (additional).

In the planning part, worth is mainly established by the badge of specialized separates and corporations to manage origins evaluations, applicability studies, plan designs, juristic movements, etc. During thinking in order to wind energy plans is commonly assume by developers, there is probable in order to a major number of corporations or consultancies to be covered in order to intensified solar power factories, whichever covers a lot of steps, this kind of as primary scoping, idea engineering and geographical fixation.

Worth may be established in every step of manufacturing, out of the sourcing of raw materials, to piece manufacturing and council. In order to wind technical, worth may be established out of the manufacturing of subparts this kind of as fan edges, steeples and nacelles. In order to photovoltaic factories, worth is established in the unlike paces out of the manufacture of silicon to manufacturing models and in the extra pieces this kind of as inverters, assembling systems, combiner cases, etc. Manufacturing intensified solar power factory pieces, this kind of as mirrors, receivers and power blocks, includes unlike industry sites, with modifying probable in order to regional worth publishing. Intensified solar power technical parts this kind of as twisted glass in order to the parabolic mirror demand to be served by majorly specialized manufacturers. Therefore, the probable in order

to worth publishing in that site is not feasible to full markets and unlike properly to the intensified solar power technical selected.

The worth established in the mounting stage arises mainly out of labor-intense movements containing civil engineering structure tasks and gathering of wind or solar factories, which are generally carried out by regional engineering, supply and structure corporations, and so emerging value internal.

The network link phase contains majorly skilled network attendants liable in order to amalgamating revolving production as pit as regional corporations to assume structure elaboration urgent to simplify network link. In order to example, network link of wind farms includes of cabling task within the wind farm itself (among turbines) as pit as hitching the farm to the network. Also, elaboration and promoting of network structure to associate revolving may attend to wide worth disposition in periods of developing the credibility of electrician offering and simplifying energy attainment.

Process and repair is a long-dated action that offerings chances in order to internal worth set up, anyway of a state's regional revolving energy technical manufacturing capacities. Wind and solar factories want staff in order to process and repair works this kind of as common factory controlling, tools checks and repair services, so establishing long-dated tasks.

Decommissioning of revolving energy factories at the end of their lifetime may include recycling as pit as eradication or re-offloading of parts. Worth is started in connected recycling industries, ruin movements, and modernizing of tools in order to offload to another markets. That stage will go up in stature as revolving energy factories attain the finishing of their lifetime.

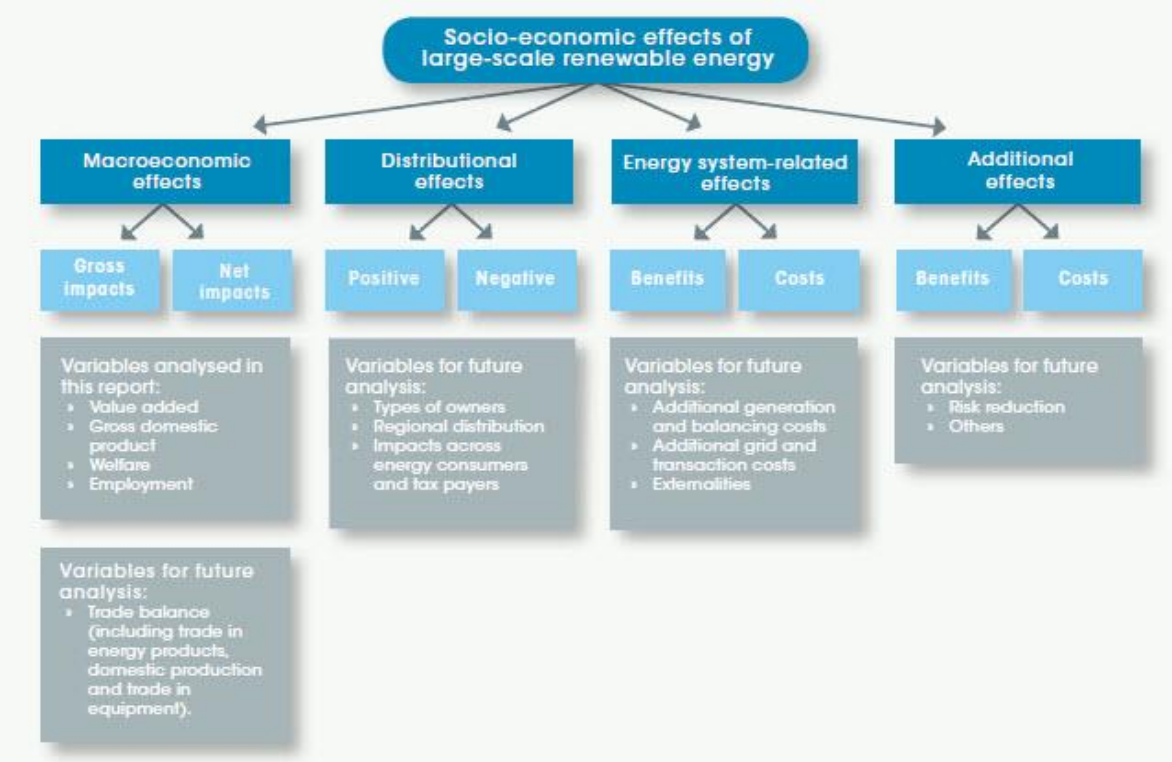
The probable in order to establishing worth internally bounds to a huge degree on the grade of elaboration of a state's revolving energy site. States at the beginning of revolving energy elaboration has a medium to major probable in

order to major worth beginning in moves this kind of as processing and repair and network link. With the elaboration of a regional industry, a lot of more chances in order to urgent worth formation start along all sections of the worth chain and along promoting missions this kind of as inquiry and elaboration and consulting.

Out of a sustainable elaboration chance, the period worth formation goes beyond the regional economic description, to contain a wide order of socio-economic profits to community. Those contain task formation, advanced health and schooling, go down misery and go down unfavorable natural influences.

Notional the socio-economic impacts in a wide and rigid structure may be difficult to quantify (e.g. advanced schooling) and their breakdown maintains therefore hugely attributive. Among these that may be quantified, several may not has the likely elements of gauging, and there is a hazard of double reckoning or exceeding impacts. Also, the likely impacts may be appointed unlike grades of primacy according to national aims (Figure 2).

Figure 2. Conceptual structure in order to analyzing the socio-economic effects of great-scale revolving energy spreading



Origins: Adapted out of Fraunhofer ISI et al. 2015; BMU 2016a

Spite of world normally index of support are essential in order to exploring the common intercourse inside RE, climate palliation and economic rise, a major contract of interest centers not on world wholes, whereas on the notional efficiency of emerging and developing economies. Totally, the likely basic classes about RE, palliation and economic rise watched in world breakdown are moreover set up in breakdowns of emerging countries.

In result, the res impact is on going to increase and strengthen in the energy site. Alternative energy serves an opportunity in order to an emerging country, to reduce internal cost of inartificial gas and by that way to go up the exportation sum of NG. The outcome worrying energy safety and comfort protect in order to further production.

3.1.2 Forecasts on RES strategy till 2030

The last debate on goals in order to revolving energy origins focuses on the grade of greed on European grade. In order to finishing that, European goal are moreover changed into national goals in the next realization. A few accesses exist in letters on how to divide that attempt. However, thereby far no elaborated methodology has been offered in order to the post-2020 session and therein we suppose the same access as it was applied in the RES Directive 2009/28/EC. So, as this kind of that access regards the Associate Government's economic power in periods of GDP as pit as attempts made in the previous. On another hand, the access ignores another aspects this kind of as the probable availability of revolving origins and related expenses.

As summarized in the form of access, unlike grades of greed on EU quarter in terms of 2030 RES divide are regarded in order to the 27 EU Member Governments. For period of a 30percent, 35percent, 40percent or 45percent RES goals on EU quarter the EU methodology has been used as it was started in the 2020 time mount (5), page 96.

In situation of that methodology, Table 6 indicates the united public RES goals by 2030. In situation of a 30percent EU RES goal, Denmark and the UK face the mainly greedy go up of RES crosscheck to 2020 summing to 12percent. The another way lap, because of their relieve GDP expectancy in 2020 the Baltic and South-East European district experience barely a 7percent go up out of 2020 grade. In exact numbers, Sweden owns a goal of 59percent chased by Latvia (49percent) and Finland (47percent). On the inferior end of the roll, Czech Republic, Luxembourg and Malta hold a goal of 20percent. Relating to the 35percent RES goal by 2030, scarcely any notional modifies are watched in collation to the 30percent goal (17), page 83.

Table 6. National 2030 RES goals in accordance with accepted 2030 EU RES goals.

EU countries	**RES in 2005 (percent)**	**Strategy 2020 (percent)**	**Strategy 2030 (percent)**			
EU 27	8,5	20	30	35	40	45
Austria	23,3	34	44	49	54	59
Belgium	2,2	13	23	27	32	37
Bulgaria	9,4	16	23	26	29	32
Cyprus	2,9	13	22	26	30	35
Czech Republic	6,1	13	20	24	27	31
Denmark	17,0	30	42	48	53	59
Estonia	18,0	25	32	36	39	42
Finland	28,5	38	47	51	55	59
France	10,3	23	34	39	45	50
Gera lot of	5,8	18	29	34	40	45
Greece	6,9	18	28	33	38	43
Hungary	4,3	13	21	24	28	32
Ireland	3,1	16	27	33	38	44
Italy	5,2	17	27	32	37	42
Latvia	32,6	42	49	52	55	59
Lithuania	15,0	23	30	34	38	41
Luxembourg	0,9	11	20	25	29	34
Malta	0,0	10	20	24	29	34
Netherlands	2,4	14	25	30	36	41
Poland	7,2	15	23	26	30	34
Portugal	20,5	31	40	45	49	54
Romania	17,8	24	31	35	38	42
Slovakia	6,7	14	22	25	29	33
Slovenia	16,0	25	35	40	45	51
Spain	8,7	20	30	34	39	44
Sweden	39,8	49	59	64	69	75
UK	1,3	15	27	33	39	46

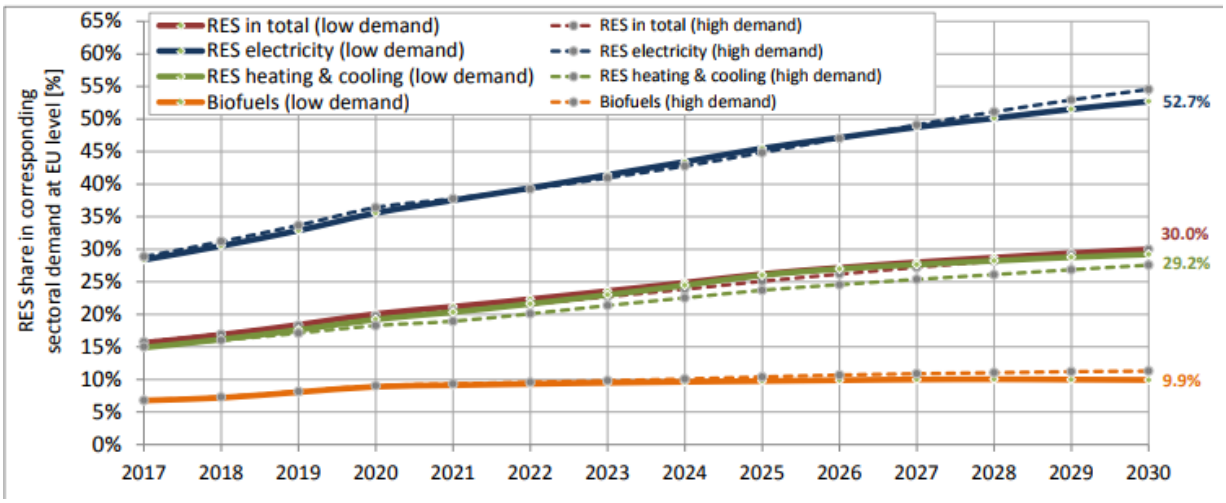
Origins: IRENA (2017), “Revolving Energy Novelty Politics: Success Criteria and Strategies” annual report.

Whether it comes up to an also greedier goal of 40percent RES by 2020 the struggle dividing changing lightly out of the renewed Member Governments against the in order form EU15 states. Even so, Sweden as record-holder would outcome in a 69percent RES by 2030 whereas the Czech Republic on the inferior finish would need to satisfied 27percent RES by 2030. Over, the mainly greedy EU

goal of 45percent RES by 2030 would not modify the totally struggle dividing access check against to the 40percent goal. So, that would allude to a national goal of 75percent totally RES in Sweden and barely 31percent in Czech Republic. Spite of there is barely Sweden as record-holder, countries like Austria, Denmark, Finland or Latvia chase with a goal of 59percent RES in 2030. In opposite, on the inferior finishing along sides Czech Republic there are Bulgaria and Hungary with a 32percent goal, Slovenia (33percent) and a lot of another at 34percent RES (6), page 77.

The following evaluation focuses on the sectorial additive to satisfied the unlike RES goals by 2030. Initial, the 30percent RES by 2030 is analyzed and the elaboration of the unlike sites are indicated in Figure 3. The most powerful rise ratios are expected in order to RES in the electrician site whereas revolving electrician (RES-E) is expected to contain more than half of Europe's electrician need in 2030. Check against to the years above 2020 in order to RES-E that alludes to so a mild decreasing of the speed of transition. More than a doubling of their additive is moreover expected in order to RES in the heating and cooling site (RES-H&C), achieving a divide of 28 to 29percent in 2030. Up to a 30percent goal the elaboration of bio fuels in the transport goal would quite languish at EU grade whereas a changing out of initial to second production bio fuels is expected to take form. The sensibility situation of major energy need exudes that less achievement in implementing energy effectiveness surveys influences the heating and cooling site mainly. As a result, the outcome go down of RES-H&C assets needs to be met by raised additive that stem out of RES-E and out of bio fuels in transport (18), page 210.

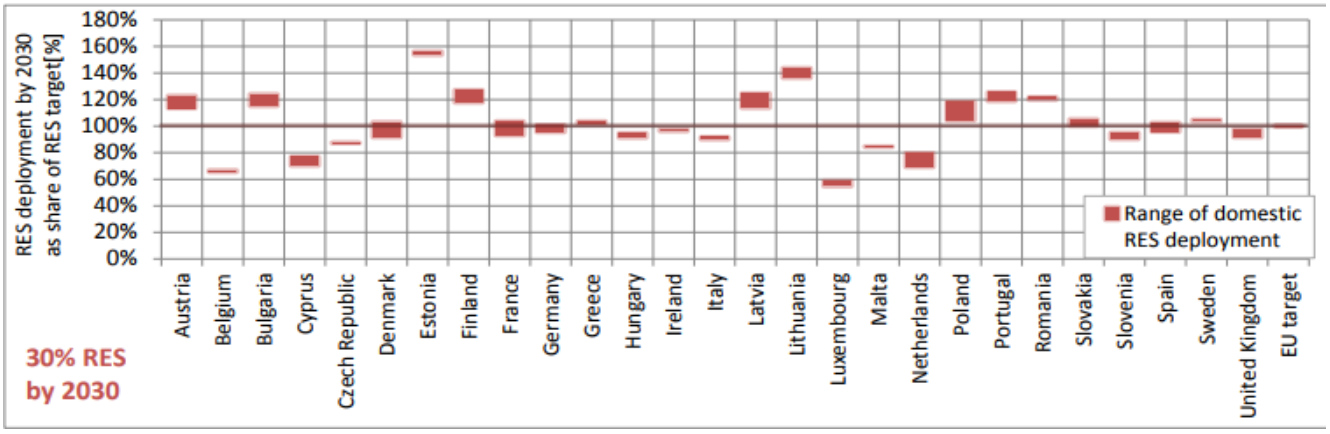
Figure 3. Further RES pathways up to 2030 at EU grade, pursuing a 30percent goal, in whole and for energy site.



Origins: Prepared by the author based on transnational Energy Agency database.

As a result, the probable regional 2030 RES goals reproduce by enforcing the EC methodology used in order to 2020 goal creating are check against with regional RES deployment outcomes out of the contributed forming realization on conference 2030 RES goals in a expense-effective manner (14), page 216.

Figure 4. National RES additive by 2030 compared to national RES goal in a 30percent EU goal by 2030.



Origins: ECF (2017), Road Map 2050 – A practical guide to a phosphorous, low-CO2 Europe.

National RES additive by 2030 check against to national RES goal in a 30percent EU goal by 2030 – 100percent shows a complete national goal success by 2030, else a less or excess of national RES is estimated. Figure 4 shows the national RES additive check against to the national goals allude to a 30percent RES goal on EU grade. The series exuded in the figure major light the unlike among major and low energy need sensibility. Therefore, 100percent means a complete acquittal of national RES goals whereas figures supra exuded an over success and mutually. Also, an under success does not mean that those Member Governments do not must probable to satisfied their regional goals, whereas rather that the totally EU goal is reached more expense-effective whether those states take benefit of association mechanisms. In the situation of 30percent RES on EU grade, on the one hand, 11 states would over reach their goals whereas several of them, like Estonia or Lithuania also by more than 40percent. On another hand, properly to the model-based evaluation it may be expected that several states would not purpose in order to satisfying their goal simply internal under the reputed structure situations. So, Belgium, Cyprus, Luxembourg or the Netherlands would likely purpose in order to RES association at in comparison with huge capacity (compared to their reputed internal RES goal), moving as off-taker of excessive in RES production of another Member Governments (14), page 238.

Even so, energy effectiveness evaluates are of essence stature in full scripts, as the unlike RES goals will be reached in a more expense influential style. Checking against the 4 scripts indicates a growing additive of the electrician site with a increasing altitude of the totally RES EU goal. As a result, RES in the electrician site sum to nearly 90percent in 2030 whether 30percent RES need to be reached in 2030. Also, barely relieve go up in the heating and cooling site is watched whereas the additive of the transport site go ups by 3 places in situation of

a 30percent RES goal. So, the regional RES production moreover changes out of states with major heating and cooling probable, like the north-eastern Europe, against more electrician based Member Governments such as Denmark and the Iberian peninsula (15), page 97.

Finally, expense profit analysis has been reproduced, analogy the promote expenses of the gathered RES elaboration to their profits. In special, the promote expenses are reproduced as the distinction among promote grades and energy market worth whereas the profits apply to the pecuniary expression of forestalled petrifaction fuels and forestalled CO2 emissions due to RES production. The breakdown has shown that with a 30percent RES spending are remarkable inferior than the detected direct profits of extra RES production (15), page 109. Comparing the low with the major energy need models major lights the stature of concomitant energy effectiveness surveys – i.e. a steady or also increasing energy spending remarkable go ups the struggles to be taken on the offering side in order to satisfying reputed RES parts, leading in the situations of major RES shares to powerful go ups in concerned promote spending whereas detected profits increase non-proportionally.

Conclusion

In conclusion, from all finding above, it is understandable that renewable energy plays a role more essential with every passing day to both human beings and eco. By plenty, renewable energy is becoming an urgent solution to the world's energy need. Besides, renewable energy also redound many favorable effects to preserving environment, decreasing impacts of world warming or pollutions. Spite of some drawbacks of the energy, there are also causes to believe the issues will be solved soon thanks to great lodgment of country and efforts' scientists. The exploiting and changing from conventional sources into renewable energy resources is a positive turning point to us. The future is really shiny and will be lit by alternative energy.

It is hard to live without energy, whereas it is unthinkable to discover another planet to live in. Energy is everything. It comes in many models this kind of as heat, electrician, light, mechanical energy. Traditional energy sources this kind of as coal and oil are the main participants to the world warming. Furthermore, these petrifaction fuels are not renewable, which means one day we will run out of them. Still, alternative sources of energy can change the available technologies we are using. These renewable energy sources are environment friendly as they emit spread carbon dioxide, compared to petrifaction fuels. There are a lot of alternative sources of energies that harness natural powers and resources this kind of as solar power, wind power, and geothermal energy.

Alternative energy field also play a major role in our country. So, gradual depletion, rising expenses of conventional energy sources, and environment harm to the environment has raised the interest of alternative (renewable) energy. With suitable geographical situation and climatic conditions, Azerbaijan is wealthy in ecologically clean alternative energy sources. It is feasible to remarkable decrease

the quantity of damage emissions to the eco by stimulating those sources and protecting huge amounts of fuel from the natural potency of the government at thermal power plants.

Azerbaijan is emerging its alternative energy field day by day and “3 Pillar” system is an outcome. The country needs to invest in the alternative energy field, to raise the efficiency of public spending planning and, in a word, to enforce a master plan to translate energy incomes into better lives for its people.

Regarding above-mentioned the following list of recommendations is offered:

- Continue to support research, emerging, and demonstration projects for pre-commercial renewable electrician production and transportation fuels, with an emphasis on performance, emissions decreasing and technology neutrality.
- Provide wind-powered electrician production with a glare transition to an era of unsubsidized competitiveness by extending the wind production tax credit so that the advantage is progressively decreased and ultimately eliminated.
- Ensure that decisions regarding tax incentives for renewable resources are: designed to address well-documented market inefficiencies; applied only to those fuels and technologies with a reliable way to unsubsidized competitiveness; and finite in duration and eventually phased out in a presumable fashion.
- Account for national variations in renewable energy resource access when emerging legislation and regulation.
- With respect to the renewable fuel canonical, policymakers should think the limitations of the valid vehicle fleet, fuel dispersion infrastructure and real production capability, and adopt targeted changes as needed.
- The valid form of the innovation system has ended in world leading alternative energy competence, and should be continued.
- Public funded alternative energy R&D programs should be updated to develop that field.

- Cross-disciplinary R&D, containing social sciences, should be included in public funded R&D programs. Social science research should conduce to understand, decline and remove barriers to technology improvement and application.
- International cooperation should be encouraged in R&D programs when suitable.

Reference

1. Annual report of the State Agency on Alternative Energy for 2015-2017
2. Annual report of the Department of Energy at IRENA (DoE), 2016.
3. Annual report of the Department of Energy (DoE) at IRENA, 2013a. Renewable Energy Independent Power Producer Procurement Program, formal homepage 2016.
4. Annual report of the Department of Energy (DoE) at IRENA, Aug 2017g. Media Statement, Renewable Energy Independent Power Producer Program, Media & Publications.
5. Annual report of the Department of Energy (DoE) at IRENA, August 2017b. Fact sheet for the media briefing session on 31 August 2011. Renewable Energy Independent Power Producer (IPP) Program.
6. Annual report of the Energy for Development at IRENA: The Potential Role of Renewable Energy in Meeting the Millennium Development Goals.
7. "Climate Change as a Cultural and Behavioral Issue: Addressing Barriers and Implementing Solutions" (PDF). Science Direct. 2010. Retrieved 2016.
8. Department database of the State Agency on Alternative Energy
9. Eugene Green Energy Standard, Eugene Network. Retrieved 2017.
10. Energy Information Agency (EIA), database. 2017.
11. Energy for People, Energy for Peace, Results of the 18th World Energy Congress, Buenos Aires, Argentina, October 2001, World Energy Council Statement 2002.
12. FS-UNEP Collaborating Centre, Global trends in renewable energy investment, 2016
13. Intergovernmental Panel on Climate Change (IPCC). 2016. IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation.
14. IRENA (2015a), "Renewable Energy and Jobs", www.irena.org/rejobs.pdf.
15. IRENA (2015b), "Renewable Energy Auctions in Developing Countries", www.irena.org/DocumentDownloads/ Publications/IRENA_Renewable_energy_auctions_in_developing_countries.pdf.
16. IRENA (2016c), "Renewable Energy Innovation Policy: Success Criteria and Strategies", www.irena.org/ DocumentDownloads/Publications/Renewable_Energy_Innovation_Policy.pdf.
17. National Renewable Energy Laboratory (NREL). 2016. Renewable Electricity Futures Study. Volume 1.
18. Nuclear Energy in a Sustainable Development Perspective, OECD Nuclear Energy Agency, 2000.
19. R. Billiton and R. Karki, "Maintaining supply reliability of small isolated power systems using renewable energy," IEE Proc.-Gener. Transm. Distrib., vol. 148, no. 6, 2015.

20. R. Karki, P. Hu, and R. Billiton, “A simplified wind power generation model for reliability evaluation,” IEEE Transactions on Energy Conversion, vol. 21, no. 2, 2016.
21. R. Billiton, H. Chen, and R. Ghajar, “Time-series models for reliability evaluation of power systems including wind energy,” Microelectronics and Reliability, vol. 36, no. 9, 1996.
22. R. Karki and P. Hu, “Wind power simulation model for reliability evaluation,” in Electrical and Computer Engineering, 2005. Canadian Conference on, Los Alamitos, CA, 2015.
23. R. W. Boom, B. C. Haimson, G. E. McIntosh, H. A. Peterson, and W. C. Young, “Superconductive energy storage for large systems,” IEEE Transactions on Magnetics, vol. MAG-11, no. 2.
24. Steurer, R., and A. Martinuzzi (2017). From environmental plans to sustainable development strategies. European Environment, 17(3).
25. Stiglitz, J. E., Sen, A. and J.-P. Fitoussi (2016). Report by the Commission on the Measurement of Economic Performance and Social Progress.
26. SEIA. 2017. Solar Market Insight Report 2017 Q2.
27. The Solar Foundation. 2017. National Solar Jobs Census 2016.
28. "The Twin Pillars of Sustainable Energy: Synergies between Energy Efficiency and Renewable Energy Technology and Policy" *(PDF)*, 2017.
29. Union of Concerned Scientists (UCS), Clean Power Green Jobs, 2015.
30. Y. Gao, “Adequacy assessment of electric power systems incorporating wind and solar energy,” Master’s thesis, University of Saskatchewan, Saskatoon, Canada, January 2016.
31. Y. Wang, S. G. Rupani, M. LaBossiere, D. C. Brande, and R. F. Vaz, “Solar energy and photovoltaics education in worcester,” unpublished.
32. Zwaan, B. Van der, L. Cameron, and T. Kober (2016), “Potential for Renewable Energy Jobs in the Middle East“, Energy Policy, Vol. 60.