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**INTERNATIONAL ECONOMIC COOPERATION FOR DEVELOPMENT
OF GLOBAL ALTERNATIVE ENERGY SECTOR**

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ABSTRACT

Throughout the research, it was established that when assessing the international economic cooperation for development of international renewable energy sector, there are many factors like governmental policy, environmental issues and etc. that play a crucial role in this process. Today, demand for energy growth faster than supply, and that's why discovery new and more environmental-friendly energy source, implementing more effective energy strategies are real almost all around the world. And for that moment renewable energy play a crucial role in nation energy policies.

The outline of the work includes a literature research to highlight the current state of international cooperation on renewable energy and to sign an importance of predictions regarding policies of renewable energies. As a conclusion, knowledge about state energy demand and supply and its instabilities is developed. The outcome covers a variation of information about the long-term vision scenarios and prognoses on worldwide alternative energy fields that is so essential for future improving.

ACKNOWLEDGEMENT

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INTRODUCTION

Today, renewable energy sources play the influential role in prosperous global world economy. Increasing demand for energy was needed to understand the significance of alternative energy strategies, in which the governments recognize need for economic cooperation with others in this field. Today, most economies in the world depends on petroleum sector profits and countries trying to cut the effects of Dutch disease. The usage of alternative energy can protect them from immoral effects of this reliance and lead to economic development and sustainability.

The purpose of the diploma work is to explain the importance of international economic cooperation for development of global alternative energy, importance of alternative energy for economic sustainability and comparable investigation of effects of alternative energy to state policies. Then examine comparably long-term energy circumstances.

The subject of research is the evaluating international economic cooperation for development of worldwide alternative energy sector.

The objects of research are developed global renewable energy sources and developed countries that produce it.

Problem statement - this writing assignment analyzes cooperation between countries in field of alternative energy – energy sector problems, drivers of international alternative energy policy, and forecasts on development of global alternative energy sector.

The research questions are the followings:

- Institutional composition of energy security and innovations
- Energy sector problems in developed and developing countries
- Alternative energy policy in the world
- Drivers of international alternative energy policy

- Influence of international RES corporations on global economy
- Future vision and forecasts on global and national alternative energy fields

1.1 RESEARCH METHODOLOGY

The nature of the study will be varied, employing empirical and inductive investigation types. Due to exploratory research, the qualitative methodology will be used in order to achieve insights in renewable energy IB. The study will use one of the spread qualitative methodology designs. Subsequent structure is suggested for methodology; in the initial phase, various scholar articles will be used to catch the structure and the arrangements in implementation and use of alternative energy.

In the second phase, methodology will be used to gather data by interviews, documents and observations of the selected states. The research will focus on information and experience of leading renewable energy user countries, especially developing countries. Moreover, the ways of energy security and improvement of renewable energy policy in Azerbaijan. In the extrapolative part of the study, the prognosis of the future impact on management and business culture of these states will be provided by generalizing from the analysis of case studies and the predictions.

CHAPTER 2. THEORETICAL ANALYSIS

2.1 THEORETICAL AND METHODOLOGICAL BASIS OF INTERNATIONAL ECONOMIC COOPERATION ON ALTERNATIVE ENERGY

2.1.1. THE CONCEPT OF INTERNATIONAL ECONOMIC COOPERATION

International economic cooperation is a system of collaboration with foreign partners targeted to ensuring joint economic development and attaining economic benefits. It is about corporation of great number of nations in field of economic matters such as investment and resources cooperation, collaboration on trade actions etc. Economic collaboration plays a vast role in progression of developing countries as it supports countries in rushing economic growth, dropping inflation, increasing employment, etc.

International economic cooperation is the foundation of international interchange, the base of the international division of labor, the basis of international trade, as well as the economic coordination of individual states. At the center of international collaboration lie the presence of definite traditions, trust, natural and climatic resources, administrative structure, as well as the level of ability and way of the population in the manufacturing of something.

The increased awareness in international economic cooperation also reproduces the more essential fluctuations in the global economy that have been progressing over a extensive period of time. The global economy has come to be interdependent: international trade has enlarged relative to manufacturing for local markets and international assets markets have become greater and more dynamic. In addition, the United States has lost the leading economic position that it adored in the initial postwar years. The European Economic Community (EEC) and Japan have become main financial powers that compete efficiently in trade and business¹.

¹ Annual report of the Department of Energy at IRENA (DoE), 2016.

Nowadays, the sophisticated complexes of finance, trade, confidence channels and society that connect us all have made a world where a state's economic conditions and strategies don't only impress itself. It's not crucial to mention cases in provision of this as the years from the time when the beginning of the worldwide financial crisis have taken this bluntly into straight insight, if it wasn't there earlier.

In a world like this , international collaboration is crucial. It's essential that states distinguish unity of interests, doing action to moderate damaging spill-overs and recognising the possible welfares of cooperative action to offer international communal goods.

Nevertheless, whereas the significance of international cooperation continues undisputed, the varying backdrop is donating issues to the international design. The international design was set up beneath a Trans-Atlantic hegemony. By way of the hegemonic position has altered, the system has come to be strained, and the incompetence to regulate is causing in increasing breaking ups. The wide use of the expression "design"—suggesting a comparatively stable, well-designed, and equally established set of international associations and agreements -is questionably, progressively misleading.

The development of numerous centres with solider and more deviating speeches is both a reason of, and a reply to, this hesitating development. Mutual commendation can no longer be attained only through common welfares and morals of a slight quantity of states. Developing powers are gradually more unwilling to take effects from procedures in which they have not been expressive contributors, and they do not essentially share the primary principles and interests of the central players².

The motives for the appearance and improvement of international economic cooperation are: - Rough distribution of natural, human, scientific resources between

² Annual report of the Department of Energy (DoE) at IRENA, August 2017b. Fact sheet for the media briefing session on 31 August 2011.

states; Differences in the level of professional training of workers; Features of specialization of nations; Development of the scale of investment projects and the risk of their application; The emergence of worldwide difficulties of our time; The necessity to harmonize national economic strategies in the framework of strengthening the joint effects of states on each other's economic development.

Examples for international economic cooperation are³:

International trade (foreign trade) contains the export and import or only exportation, or only the importation of goods and services among states. This is the key form of foreign economic relations; System of international commodity-money relations, consisting of the export and import of goods and services. Foreign trade is carried out mainly through commercial transactions, formalized by foreign trade contracts; Scientific and technical collaboration is a matched activity of matters of foreign economic relations of dissimilar countries, designed to hurrying systematic and technological development.

One of the operative methods of construction multilateral economic cooperation is the formation of worldwide economic establishments planned to promote the adoption of multidimensional agreements, to form international mechanisms for monitoring and monitoring their application, to progress and launch norms marked at the legal rules of international economic relationship.

The initial international economic organizations (commissions, mergers, committees, associations) appear in the XIX century. Thus, commissions have been set up on the abuse of the worldwide waterways of the Rhine (1814) and the Danube (1856), the Universal Postal Union (1875), the International Association of Railway Congresses (1885), etc.

The progression of creation of international organizations afterward the Second World War was dynamic. On October 24, 1945, an international diplomatic

³ Annual report of the Department of Energy at IRENA (DoE), 2016.

organization was founded, the United Nations (UN), intended to sustain international harmony and safety, to improve sociable relations of the states of the world established on respect for the belief of equal civil rights and self-determination of people, and to succeed in international partnership in resolving international difficulties of economic, societal, ethnic and humanitarian character.

The history of the improvement of integration procedures goes back to the twentieth century. First (from the 1950s), international economic incorporation was established in Europe, and then (from the 1960s) extended to other regions. Requisites for intercontinental economic integration of nations are - Immediacy of levels of financial development and extend of market development; Geographic proximity, the presence of a mutual border and historically recognized economic links; The unity of economic and other issues.

Demonstration effect. In states that have launched incorporation associations, there are regularly optimistic economic variations (hurrying economic development, dropping inflation, growing employment, etc.), which has a particular psychological influence on other states.

"Domino effect". After most states in a region have become participant of an integration friendship, the remaining countries that keep on outside it unavoidably experiences some problems related with the reorientation of the economic connections of the republics fitting to the group to each other. This frequently leads smooth to a falling in the trade of states that have originated themselves outside of integration⁴.

The economic system of each republic is special and unrepeatable, since, as distinguished by E. Avdokushin , A. Kholopov , etc., national economies have their personal features and individual features connected to the socio-economic level of improvement, geographical position, microclimate, reserve potential, the uniqueness of the domestic market, legitimate norms, employment traditions, social and historic

⁴ Annual report of the Department of Energy at IRENA (DoE), 2016.

phenomena. All together, the improvement of the domestic markets of the republics of the up-to-date world takes place below the impact of globalization procedures, environmental world economic links. As a result, no country can presently conduct a locked economic strategy at the existing stage. It is likely to assign diverse degrees of directness of different state economies, the level of involvement of countries in the global separation of labor and manufacturing specialization. We will magnet attention to the procedures that led to the building of a scheme of intercontinental economic relations: international trade in products and services in domestic markets, as well as in third-country marketplaces; international immigration of capital; international interchange in the field of science, technology, innovative technologies; international manufacture collaboration; global labor relocation; global economic and credit relations.

Economic ties amongst countries, as we know, have a lengthy history. Over the epochs, they were primarily as foreign trade relations, resolving the difficulties of providing the people with products that the domestic economy manufactured inefficiently, in scarce quantities or not at all. In the course of progress, external economic relations expanded foreign trade and curved into a compound set of global economic relations, which donated to the transformation of the world marketplace into a global economy and into the world economy, support the interrelations and interdependencies of all countries of the world⁵.

"Recent development of the world," notes the Russian economist V.K.Lomakin, "is categorized by a additional growth in the balance of economic activity, extension of links between different states, and expanding of the inter-state dissection of labor. There are no states that do not cooperate economically with each other, would not be involved in the system of construction relations and interdependencies. At the moment, the whole world is an field of interrelationships among people's economic actions ".

⁵ Annual report of the Department of Energy (DoE) at IRENA, August 2017b. Fact sheet for the media briefing session on 31 August 2011.

The likelihood and objective necessity for interaction and interconnection, the working of national economic schemes lead to the progression and formation of mutual economic features of diverse countries.

Thus, the characteristics of economies, on the one side, and the accessibility of joint features on the other, in many respects define the details of the improvement of international economic collaboration at diverse levels: global, continental, regional, mutual⁶.

Particular consideration in this object is funded to consensual regional economic cooperation. It looks that it is bilateral collaboration that permits us to localize a range of shaped aspects influencing its expansion, to procedure them as much as possible to increase the effectiveness of regional economic communication.

In this linking, it is needed to simplify the sense of the notions "international economic collaboration", "interstate economic collaboration". In the methodical literature there is no combined definition of the notion of "international economic collaboration". The aim of the article is to explain bilateral economic international collaboration, to reflect its heart in the background of the improvement of domestic economies of the states of the current world.

In the economic fiction, this notion is well-defined as follows: as an objective procedures of the improvement of varied economic and scientific and technical links among states of the world, groups of republics, socio-economic and political structures of the two states on the values of freedom, fairness and joint benefit of the parties.

In the legal literature, international economic collaboration is observed as a international multi-level arrangement of international economic communication of all performers designed to guaranteeing sustainable joint economic development and finding economic welfares. On the one side, international economic collaboration is

⁶ Annual report of the Department of Energy at IRENA (DoE), 2016.

a system of matched activities of countries and global organizations intended for strengthening the constancy of the IEA, guaranteeing national benefits and improving the instruments for conjointly advantageous cooperation.

On the other side, it is a compound of dynamic administrative, political and economic (industrial, commercial, scientific and technical) relationships with the involvement of countries, their crowds and international organizations, as well as separate economic bodies.

Subjects of international economic collaboration are Countries, administrative-territorial units of countries, legitimate entities and individuals.

In this respect, according to the experts, global economic cooperation is escorted by the creation of a multi-level system of relationships, between which are - Interstate economic relations rising from the application of external economic dealings; Interstate economic relations of states with foreign companions; Foreign economic relations of subjects of states and administrative-territorial units (cross-border collaboration of subjects of nearby countries); Foreign economic movements of economic objects of foreign countries, arbitrating business actions.

Ensuing from this attitude to the explanation of the notion of "international economic cooperation" it looks like legitimate to consider interstate economic cooperation as a subsystem of interstate economic cooperation and suggest the following definition of this notion⁷.

Interstate economic cooperation is a relationship that arises between countries in the procedures of the global division of labor (international specialization), the coordination of trade turnover, international production collaboration, scientific and technical interchange, the improvement of credit and business ties, movement of funds and labor assets in order to guarantee the complementarity of domestic

⁷ Annual report of the Department of Energy (DoE) at IRENA, Aug 2017g. Media Statement, Renewable Energy Independent Power Producer Programme, Media & Publications.

markets, strategic configuration of domestic economies, entrance into global economic relationships.

Interstate economic cooperation proceeds such forms as foreign trade, interstate production collaboration, and collaboration in the fields of investment movement and improvement of natural assets, scientific and technical collaboration (trade in certificates, machineries, mutual scientific improvements, technical developments, training, etc.), and reward transactions.

The improvement of international financial cooperation determined the need aimed at its regulation. This initiate look in the construction of legal and formal structures inside the global economy, regions, and states.

In the framework of globalization, interstate regulation began to develop most dynamically, which was embodied in the foundation of international financial organizations and associations whose actions are synchronized by the United Nations. This directed to the liberalization of various ranges of international collaboration.

Economic collaboration is also carried out built on bilateral contracts among countries. Global experience demonstrates us that in last decades the significance of bilateral economic links became bigger. Therefore, the 2010 World Trade Report notes, first, that over the last five years, the quantity of superior trade contracts (in the WTO-regional reports) has significantly enlarged, including bilateral, regional and contracts that go outside of the same region and deliver privileged treatment in different features of trade and business relations. This approves that the real sector perceives them as the most effective means of opening the market. Second, current regionalism is considered by the conclusion of a huge number of bilateral contracts, and not by the foundation of unions⁸.

⁸ Intergovernmental Panel on Climate Change (IPCC). 2016. IPCC Special Report on Alternative Energy Sources and Climate Change Mitigation.

Now, preferential treaties denote more than half of global trade, ever since for the private sector, in both developing and developed states, preferential treaties are more favorable than multilateral trade liberalization. For example, developing states are seeing favored treaties with developed countries as a way to attract external direct investment and develop their access to foreign trade markets, as tariffs are reduced; tariffs spread on are reduced, rights are approved to firms to defend investments, control the environment, labor standards and governmental supplies. For example, a typical privileged North-South trade arrangement includes full tariff liberalization of trade in produced goods (zero tariffs), liberalization of the main service sectors (containing financial services), providing of special guidelines in areas that are not controlled by WTO arrangements (investment, environment and labor standards) or are outside of what was achieved by multifaceted contracts (for example, intellectual property safeguarding, public attaining).

2.1.2. INSTITUTIONAL COMPOSITION OF ENERGY SECURITY AND INNOVATIONS

Energy systems are strictly complicated with national and social security. Worries over the reliability of critical energy services have made public thoughts and political programs, eventually touching wider security concerns ranging from risks of armed conflicts, to feasibility of domestic economies, and to reliability and steadiness of political systems. Policies established in the search for energy security have been – and are likely to keep on – crucial driving force in the transformations of energy structure⁹.

Current analysis of energy security in the world is built on a powerful tradition of talking this topic in political, proficient, and academic groups. Traditionally, the concept of energy security arose in the first half of the 20th century as an anxiety over the protect supply of fuels (coal and oil) for naval armadas and armies. Political and military leaders wanted to warrant security of fuel provisions over differentiating suppliers, substituting foreign imports with domestic manufacturing

⁹ Nuclear Energy in a Sustainable Development Perspective, OECD Nuclear Energy Agency, 2000.

(e.g., artificial aviation petroleum in Germany), limiting non-vital uses of fuels (e.g., restricting of gasoline in the United States) and, lastly, looking for military control above energy reserves and infrastructure (military movements in Indonesia, Caucasus, and further theaters throughout World War II).

In the another half of the 20th century, oil began to be progressively crucial not only for the military, but also for retaining such vital functions industrialized fields like transport, mechanical agriculture, electricity generation and heating of constructions. Simultaneously, global trade in oil has risen suddenly, as big economies such as the United States become reliant on imports, not home resources. The oil restraints in the 1970s guaranteed energy security at the front political attention in good industrialized countries. Energy Security Strategies affected by those embargoes, involved the formation of alternative and cooperative response instruments in the Organization for International Economic Cooperation and Development (OECD), substituting oil by means of other sources of energy (natural gas, nuclear power, coal, etc.) in heating system and generation of energy, investing in petroleum reserves outside the Organization of oil-exporting countries (OPEC) - for instance, in Alaska and the North Sea - and encourage energy effectiveness to decrease oil products concentration of the economy¹⁰.

By the end of the 20th century, many of these tactics bore fruit so that the horror of global petroleum supply interruptions subsided. At that time, other alarms at the edge of energy constructions and national security emerged. One was the protection of electricity transmission and generation systems. Vulnerability of nuclear-powered plants was revealed by the Three Mile Island, Chernobyl, and Fukushima accidents, by Chernobyl virtually ham-fisted the building of innovative nuclear devices in the worldwide for two decades. Large-scale closures due to catastrophes of generation and transmission showing the weakness of modern societies to even short-term disruptions of energy supply. Totally, with the failure of

¹⁰ R. Billinton and R. Karki, "Maintaining supply reliability of small isolated power systems using renewable energy," IEE Proc.-Gener. Transm. Distrib., vol. 148, no. 6, 2015.

the Soviet Union, it turned into pure fact that the economies of majority of oil-exporting states are not practicable without steady energy export profits. This stimulated a shift in deliberation to “demand security,” a dissimilar part of energy security.

Energy security is a compound idea linked to a number of points:

- political energy security;
- technogenic energy security.
- economic energy security;

Energy security proposes such conditions, in which the consumer has consistent entree to the energy he demands, and the supplier - to its customers. That is, it is not only about constant flows, but also about stable and balanced prices.

In order to achieve energy security, a definite domestic policy and special movements are required. Also, marketplaces can contribute to energy security, but they can not be the only ones who do this. Attainment energy security needs the joint usage of all managerial mechanisms.

Energy importers and exporters realize energy security in different means. The provider is interested in high, and the consumer - in small prices for the product, and both - in the consistency of supply. Republics that export energy resources perform the main prominence on keeping the "steadiness of demand", which, in the end, affords the major part of their government incomes. Developing states are worried about how the variation in energy prices shakes their stability of expenses¹¹.

It is essential to distinguish that the majority of experts recent energy condition in the world is considered as comparatively harmless: the availability of big fossil fuel resources, progress in maintenance and balanced use of energy, development of energy technologies, more effective use of market controllers, etc.

¹¹ Energy for People, Energy for Peace, Results of the 18th World Energy Congress, Buenos Aires, Argentina, October 2001, World Energy Council Statement 2002.

The last situation, in turn, is one of the key reasons for the increased attention of countries to the issues of safeguarding their energy security.

By this approach, where the community's focus on energy security is founded on unbiased processes and phenomena, mainly in the local fuel and energy industry, as well as in the international economy and the system of global economic relationships. Therefore, to date, the methodical analysis of current tendencies and main problems in safeguarding energy security of the world is of certain importance.

As is known, in some case, energy supply is one of the most significant, cause steady and efficient improvement of the domestic economy is impossible. Consequently, in the economic practice of industrialized countries, in circumstances of an accurately standing limited funds of resources.

It should also be renowned that, although the close consideration of many experts in the field of energy supply to the national economy, unluckily many theoretic aspects of the energy security issue of the government are still either outdoor the scope of technical analysis or do not permit to efficiently use previously regional practices of functioning in this area¹².

At the same time, various views of experts on the core of the notion of "economic security" demonstrate first of all, that the issues of economic security itself is "dissolving" in overall characteristics of the state's economic improvement: the condition of the economy and establishments of control, which warrants guaranteed security of domestic benefits, social policy positioning, appropriate security potential, even under disapproving circumstances for the improvement of external and internal procedures; the situation of the country's economy, which, primarily, in terms of size and organizational parameters, is adequate to safeguard the current status of the government, its sovereign political and socio-economic development and liberated of external burden, and, furthermore, it can sustain the

¹² Energy Information Agency (EIA), database. 2017.

level of legal revenue, which guarantees the complete majority of the population benefit, which matches to the principles of civilized republics.

So, today the notion "security" is used in relation to a variety of phenomena and processes, both natural and social. Moreover, in modern society it reflects not only specific signs of the phenomenon of "human life safety", but also includes the general, typical, sustainable, which is typical for all areas of human and society functioning (in other words, security as a goal, condition and strategy of protection from danger is ultimately aimed at the survival of the entire socio-economic system.

There is no doubt that the benefits, fears (threats) and guards are the core components of security. Actually, the interests of separate citizens, from which the interests of community and the government stem (the last, in this case, is deliberated as an tool providing the best circumstances for the improvement of man and society) establish its prime foundation. The risk to safety is a mixture of circumstances and reasons that build a risk to the vital welfares of the individual, people and the government. Consequently, the main term for "safety" is the notion "security" (from threats), through the frame of which numerous specialists express¹³.

The technological innovation process is compound and nonlinear, compound as it includes a range of players and aspects and nonlinear cause technological innovation occurs over multiple dynamic responses among the phases of the process. Moreover, the technological innovation system is made up of a lot of institutions, containing colleges, large companies, start-ups, the central government, countries, and other global and extra-national institutions, and the relations (or linkages) among them. The difficulty of the innovation process is specially excessive for energy technologies for a several number of motives (Table 1.).

¹³ Intergovernmental Panel on Climate Change (IPCC). 2016. IPCC Special Report on Alternative Energy Sources and Climate Change Mitigation.

Table 1. Stimulators of green energy.

Limited and undefined market indications for energy investigation, improvement; the externalities of greenhouse gas emissions and energy safety.	The huge scale of various energy technologies such as clean-coal developments and nuclear-powered and the long timeframes above which their expansion takes place more hinder the involvement of the private sector in the increase of such technologies
Energy technologies are very varied within each phase—investigation, improvement, demonstration, quick deployment, and widespread dispersion—offering various challenges, with quick deployment and following development issues being mostly important.	Energy technologies eventually have to contest in the market with influential compulsory technologies and integrate into a bigger technological system, where network and structure effects may cause technology “lock-in.”

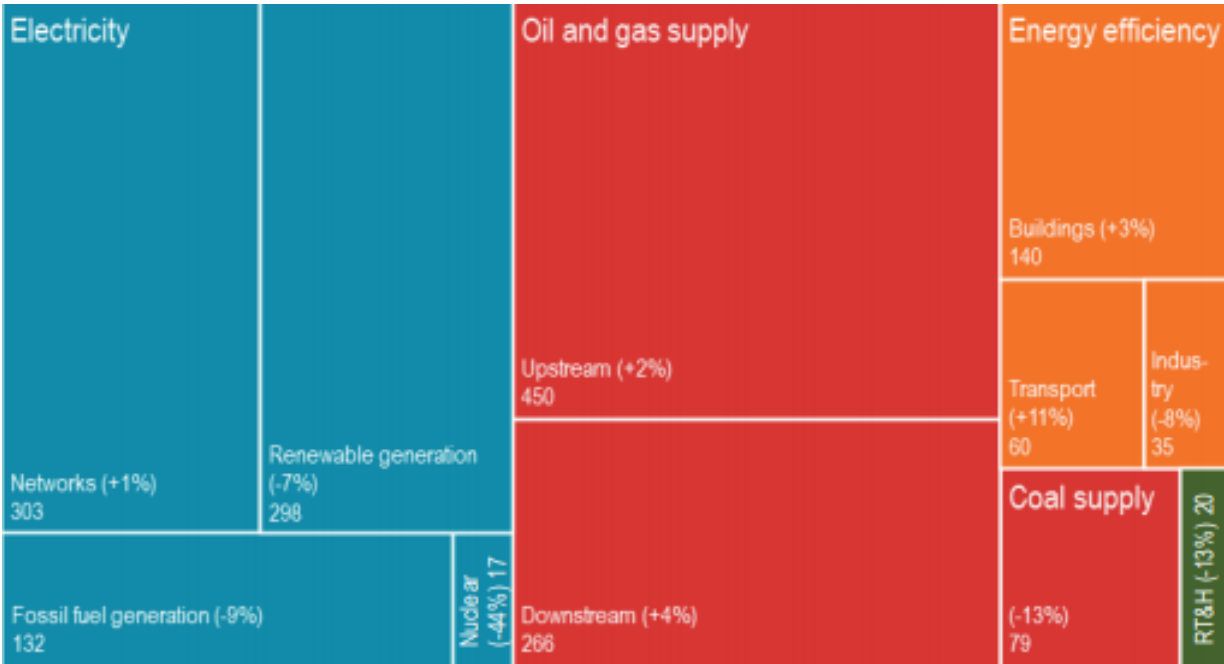
Source: International Energy Agency outlook, 2017

The public-goods characteristics of energy technologies thus demands a different role for the state: safeguarding the accessibility of future technology options, reducing risk, increasing more suitable marketplace indicators, and frequently even assisting in creating markets. As a consequence, the federal administration is not only a key funder and player of energy R&D but also a main performer in simplifying the overview of technologies into the market. Given the principally large scales and scope of the energy space, the strategy and organization of energy innovation associations and their connections with the rest of the energy scheme is extremely complex¹⁴.

¹⁴ IRENA (2016c), “Renewable Energy Innovation Policy: Success Criteria and Strategies”

Overall energy investment global, containing capital expenses on energy stream and developments in end-use energy effectiveness, in 2017 is assessed to have amounted to 1.8 trillion USD,¹ accounting for 1.9 percent of total GDP, a inferior piece related with the prior double years (Figure 1). Investment in all sections of the economy as a part of GDP has been steady, signifying that accessibility of wealth usually has not been a restricted. The power generation industry accounted for peak of the decline, due to less accompaniments of coal, nuclear and hydro power capability, which more than balance enlarged investments in solar PV.

Figure 1. Global energy investment in 2017 and percent change from 2016

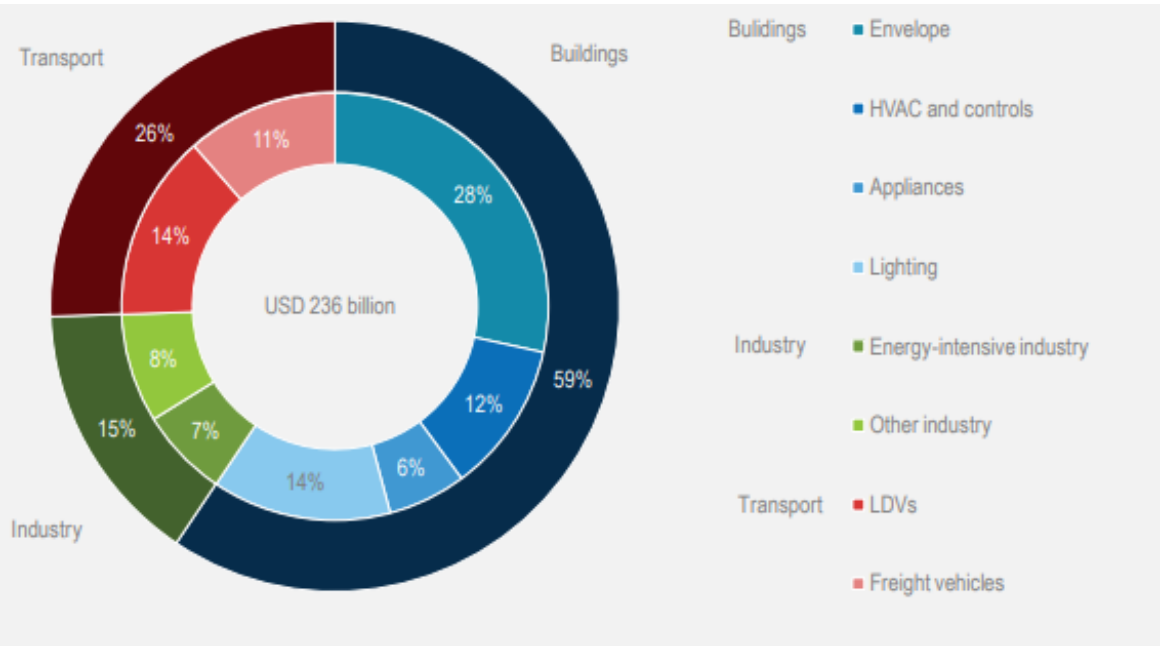


Source: Annual report of the Energy for Development at IRENA: The Potential Role of Renewable Energy in Meeting the Millennium Development Goals, 2018

Spending connected to energy effectiveness enhancements, which has grownup powerfully in latest years, endured comparatively protected from the complete descending tendency in energy investment global in 2017. A overall of USD 236 billion capitalized in energy effectiveness through the constructions, transportation and industry segments – an growth of USD 8 billion, or 3 percent. The growth was mainly due to funds in heating, lighting and cooling, while expenses

on manufacturing energy effectiveness dropped slightly. The maximum portion of investment was in buildings (Figure 2).

Figure 2. Global energy efficiency investment , 2017



Source: Annual report of the Energy for Development at IRENA: The Potential Role of Renewable Energy in Meeting the Millennium Development Goals, 2018

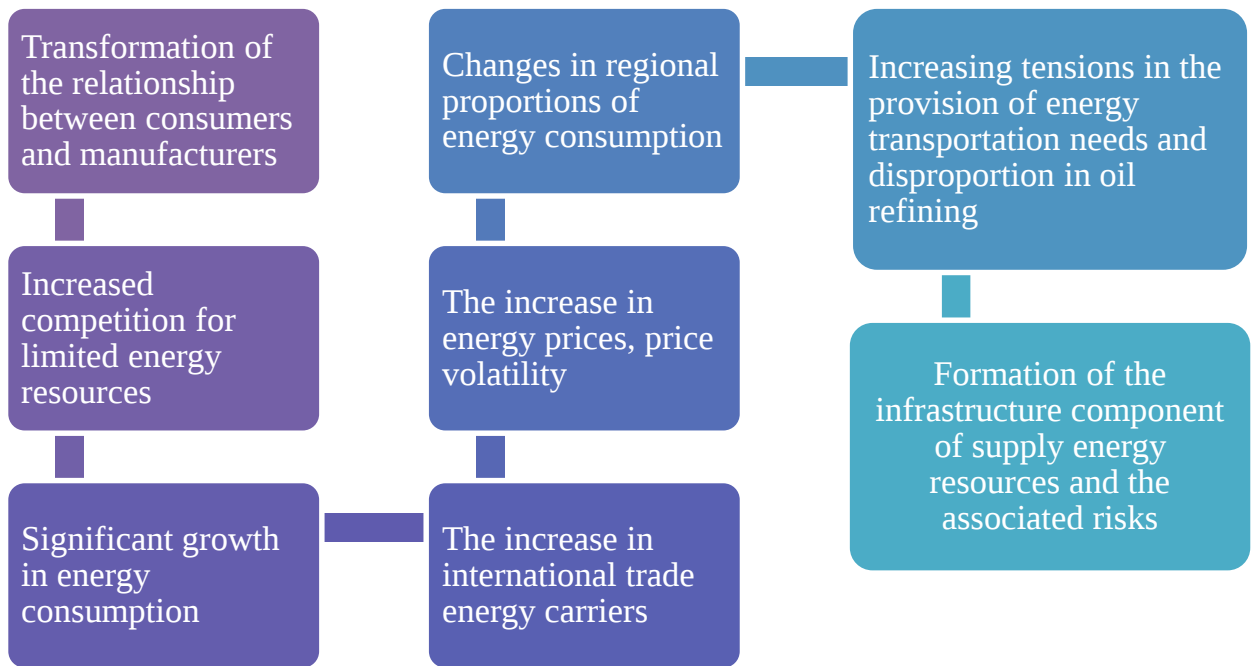
Working out the unique specifics for each of the energy innovation actions will necessitate more effort but the literature on the design and administration of innovation institutions and individual experiences of superiors does offer some important interconnected principles for the achievement of the innovative and redesigning of old-community organizations and initiatives for improving U.S. energy technological innovation¹⁵.

2.1.3 ENERGY SECTOR PROBLEMS IN DEVELOPED AND DEVELOPING COUNTRIES

¹⁵ IRENA (2015b), “Renewable Energy Auctions in Developing Countries”, www.irena.org/DocumentDownloads/Publications/IRENA_Renewable_energy_auctions_in_developing_countries.pdf.

In last years, in the expansion of world energy performed tendencies that, with their unrestrained flow can cause to violation of steadiness in this area (Table 2).

Table 2. A map of stability tendency



Source: Prepared by the author based on REN21 annual outlook, 2018

The rapid progression of electricity depletion in developing states can help as a crucial catalyst for further increasing world energy market place. For the improvement of the global economy in over the next decades, it will be essential to rise energy effectiveness and influence all available economical and environmentally clean energy sources.

Important changes are estimated over the following decades. The increase in energy consumption connected generally with the growth of the economy and

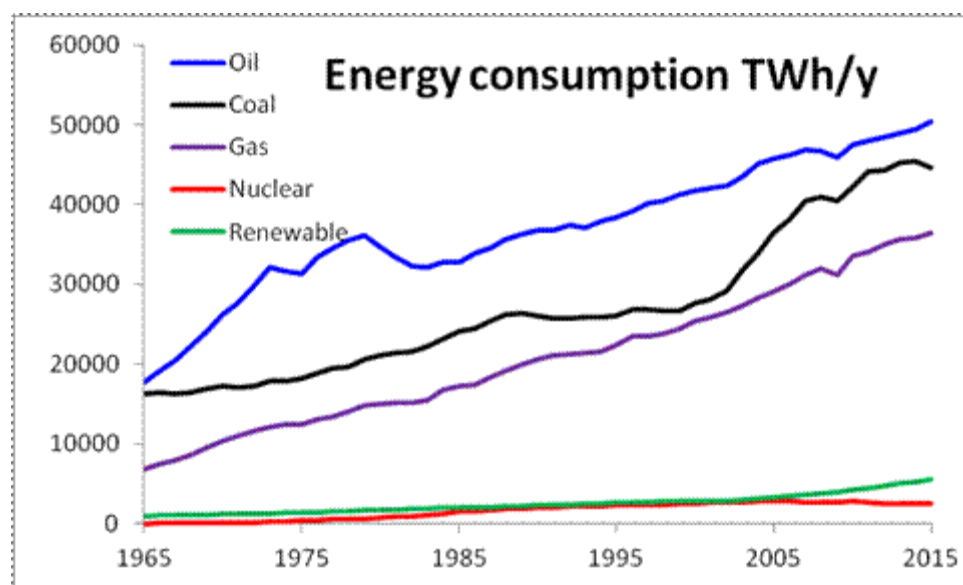
population growth. This will cause burden on the influence supply system and will lead to increased attention to energy effectiveness¹⁶.

In 2030, total energy demand will grow by 35 percent in contrast with 2005; increasing demand in developing republics will be about 70 percent. The rate of rise in energy effectiveness in the period from 2009 to 2030 will exceed the historical tendency. The occurrence of innovative methods of rational and effective use of energy in various sectors of the world economy will deliver a chance to reduce the expansion of energy consumption by 2030 by 60 percent.

The rate of rise in energy efficacy from 2009 to 2030 will surpass the historical tendency. The appearance of innovative methods of rational and effective usage of energy in different sectors of the worldwide economy will make it probable to decrease the growth of energy consumption by 2030 by 60 percent.

According to the “Energy Information Administration” prognoses (“EIA”), energy consumption in developing states will grow quickly whereas natural gas and oil production in the United States and Europe will decrease (Diagram 1).

Diagram 1. Energy consumption boom, tWh/y

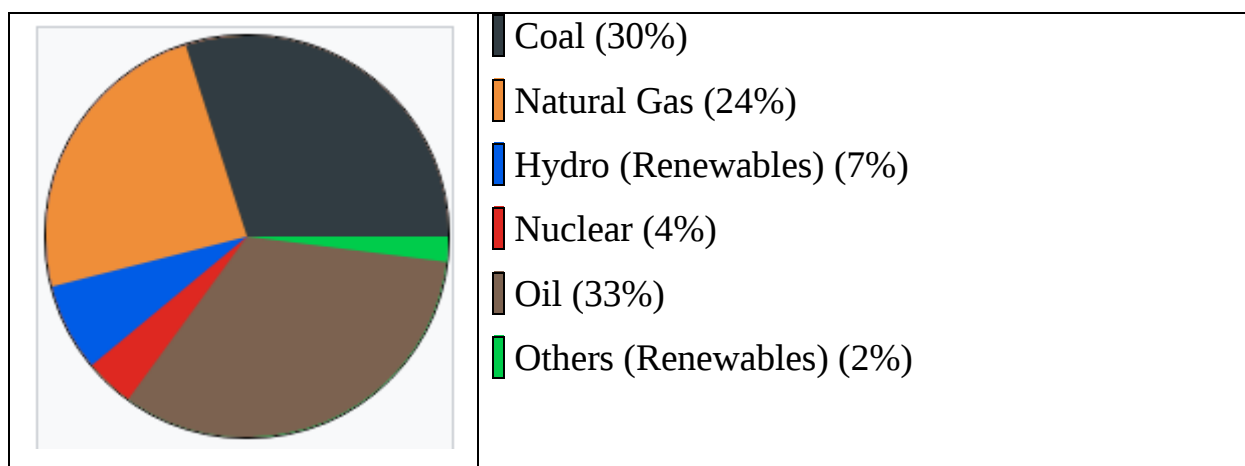


¹⁶ Intergovernmental Panel on Climate Change (IPCC). 2016. IPCC Special Report on Alternative Energy Sources and Climate Change Mitigation.

Source: International Energy Agency outlook, 2017

The dynamics of worldwide natural gas manufacture indicates to its constant progressive growth: in the another half of the XX century. It enlarged nearly 12 times. By 2010, production increased to an expected 4 trillion cubic meters, and by the mid of the century will growth to 7 trillion cubic meters (Chart 1).

Chart 1. World total primary energy consumption by fuel in 2015



Source: International Energy Agency outlook, 2017

In the baseline version of the EIA Energy News Agency prediction, it is well-known that in order to meet the increasing demand for usage of natural gas from global producers, it will be essential to growth its supply by nearly 50 trillion cubic meters between 2007 and 2035. The major increase in supply will be providing by OECD republics (Organization for Economic Cooperation and Development), their portion in this process will be 89 percent of the overall increase in global natural gas production from 2007 to 2035. Natural gas production by non-OECD providers will grow by an average of 1.8 percent per year from 67 trillion cubic meters in 2007 to

111 trillion cubic meters in 2035, while in OECD states production will raise by only 0.4 percent per year¹⁷.

The prediction of world energy demonstrates that in the period from 2005 to 2030, the global demand for primary energy resources will rise by 55.1 percent and will amount to 17.721 million tons of oil equivalent (million tons of oil equivalent). In 2007, the percentage of coal in global world energy consumption will grow from 25.6 percent in 2004 to 28.4 percent in 2030. According to EIA forecasts, by 2015 the growth in coal consumption will be 2.6 percent (2.2 percent in the case of slow growth and 2.9 percent in the case of rapid growth). These figures are lower than earlier estimated by the Energy Information Administration in 2006, and well beneath the prediction controlled in the World Energy Outlook 2007 report for coal, according to which yearly growth will be 3.3 percent.

The global fuel and energy industry occupies particularly significant place in the international economy. It is value noting that the net overall percentage of energy production in the structure of world GDP is presently assessed at 10-12 percent on average, which means almost \$ 1.8 thousand annually per capita of the world's population. All together, the growth speed of energy consumption virtually entirely agrees with similar indicators of increase in global GDP. In this respect, the obtainability of energy is the strategic source of the national safety of any state.

Now, continuous multi-year increase in global main energy demand is estimated, especially in developing states.

The major energy resources of the world, providing overall of more than two-thirds of global production, are the China, Russia, states of the Near and Middle East, partly South Africa (for coal) and Australia. At the same time, the states of the Asia-Pacific Region (APR), which are the main customers of raw materials, are least of all provided with energy resources. Economically developed states, provided with

¹⁷ Annual Report of the Ministry of Energy (DoE) to IRENA, August 2017 Media Statement, Independent Renewable Energy, Media and Publication Program.

the lowest amount of raw materials, consume almost 80 percent of the energy resources extracted and manufactured in the world. The growth in energy usage on the background of a plentiful slower.

The growth of supply has been manifested for several years now in the increase in prices for all types of fuel and energy resources. Such a process poses a serious threat to the economy of the world and certain countries. If we talk about Europe, then, given the promising growth in demand for primary fuel and energy resources in this region, the interest of European countries in Russia, as in one of the major suppliers of these resources, until 2030¹⁸.

The issue of population growth and collapse of resources is very serious, and it is just essential to announce any methods to control the consumption of global natural resources, otherwise society will suffer an uninviting fate. The expansion of global energy trade needs adequate structural development. Nevertheless, in latest years it has related with a number of problems as first-hand mining areas are removed from traditional market places, the creation of more and more extensive and costly pipelines is necessary; due to the growth in the number of transit republics ever since the beginning of the 1990 years and the progress in the number of transit conflicts, the ruling of relationships among suppliers and transit states is becoming more serious; some transport roads (e.g., straits) already reach the maximum of their carrying capability; the building of infrastructure in developed states, especially oil processing plants and terminals for the regasification of liquid natural gas (LNG), effects a negative response from the domestic population; a marked growth in the prices of steel, energy and labor causes to an upturn in the capital concentration of all structure projects and makes problems in inviting funding.

The increase in the capacity of cross- state energy trade leads to enlarged threats connected with the likelihood of power outages due to reasons such as

¹⁸ Annual Report of the Ministry of Energy (DoE) to IRENA, August 2017 Media Statement, Independent Renewable Energy, Media and Publication Program.

political conflicts, man-made tragedies and system calamities, natural phenomena and action of terrorism¹⁹.

The energy problem continues to be one of the most critical. This is due, primarily, to the increasing gap among the high rates of expansion of energy-intensive industries in developed (and in the near future and emerging) states and the reserves of inimitable energy resources (oil, gas, coal); furthermore, the negative environmental concerns of energy development while continuing the traditional construction of the fuel and energy stability (TEB), with a sharp prevalence of poisoning fuels (about 85 percent of TEB). Both of these sides are closely interconnected, since the consumption of alternative energy sources could significantly relieve both resource and environmental rigidities in the world.

Manhood has already arrived a transition period - from energy based on clean natural resources, which are limited, to energy on a nearly unlimited basis (solar radiation, nuclear energy, heat of the Earth, etc.). This period is categorized by the progression of less energy consuming technologies and all-round energy savings.

The United States was the second major energy consumer in 2017 bearing in mind total use. The core energy problems in USA are followings: nuclear energy, wind power stations, coal industry. Alike any other source of energy, nuclear plants defend NIMBY's concerns, however the apocalyptic hazard of a nuclear tragedy, for example, affects the life of a natural landscape that can move a civilization to avoid the wind farms. America's young offshore wind industry celebrated the achievement of the opening offshore wind farm in the U.S. But struggle is that this industry is completely reliant on the central government facilitating its development by method of the national offshore wind leasing program.

Presently, China is reliant on foreign imports of less than 50 percent of oil consumption. The dense contamination circumstances and environmental harms,

¹⁹ R. Billinton and R. Karki, "Maintaining supply reliability of small isolated power systems using renewable energy," IEE Proc.-Gener. Transm. Distrib., vol. 148, no. 6, 2015.

dramatic variations in global energy and domestic energy prices increased, severe scarcities of water and electricity. An instinctual global financial decline has become greater than Chinese foreign direct investment demand and imports of energy. During the financial crisis, the IEA, hurrying the speeding up of China's oil and other energy deliveries to the global market, forecasts that China's dependency on foreign energy will raise 60-70 percent of overall consumption. Such prognostications generate economic, political and social permanent questions, and China's energy demand will overwhelm the energy demands of other states and cause to global energy resources utilization²⁰.

Russia has the biggest known natural gas reserves of any state in the world, together with the eighth largest oil reserves and the second largest coal reserves. The difficulties of the improvement of the energy sector are inseparable from the difficulties of the complete Russian economy, which is so energy-independent and energy-inefficient compared to the developed states of the world. And impartial aspects cannot be ignored either: environmental conditions, the state's geographical situation, the existence of an essential amount of established reserves of energy resources, which in common does not encourage energy proficiency and the increase of green energy. Therefore, the core problems of Russian Federation in energy sector are as follows: insufficient level of investment in the industry; dependency of the energy industry on natural gas, the portion of consumption of which is a substantial amount and etc.

2.2 ALTERNATIVE ENERGY POLICY IN THE WORLD

2.2.1 DRIVERS OF INTERNATIONAL ALTERNATIVE ENERGY POLICY

There are many reasons to support renewable energy. Drivers who dynamically support alternative energy sources variation according to the state and change over period. In the 1970s, a comprehensive crisis led to the political

²⁰ Annual Report of the Ministry of Energy (DoE) to IRENA, August 2017 Media Statement, Independent Renewable Energy, Media and Publication Program.

significance of renewable energy sources for energy safety. More lately, worries about environmental developments and the perseverance of traditional energy consumption have been important factors in encouraging the use of alternative energy. At present, the incentive to stimulate alternative energy is principally associated to climate change ecological priorities and, moreover, energy supply²¹.

It is obvious that there are numerous different factors contributing to alternative energy, which include not only environmental and economic influences, but also social objects. These prospective positive influences of alternative energy have a mutual value on any scale: global, regional, national or local. However, it is obvious that drivers of support from local or national administrations will tail priorities at these stages. There are the drivers for renewable energy summarized in 3 groups: economic, social and environmental factors²².

Economic factors

Economic optimization: economic optimization of energy supply is the core reasoning for the usage of choices for the use of alternative energy sources. Mainly for power supply in hard-to-reach zones or for insignificant power supply outer the network, alternative energy sources are often low-costly than joining the power network. Moreover, various forms of alternative energy can be used for distributed energy supply, which can decrease the necessity for intensifying system bandwidth and therefore save capital.

Security of supply: owed to the large energy consumption of fossil fuel possessions situated in the European states, European external dependency on imports of fossil fuels is large enough. The consumption of alternative energy sources accessible in Europe decreases this reliance on imports and thus upturns the safety of energy supply. As a consequence, the European civilization will become less susceptible to variations in the price of fossil fuels, thus developing its socio-

²¹ Annual Report of the Ministry of Energy (DoE) at IRENA, August 2017b. Media briefing newsletter on August 31, 2011. The Independent Renewable Energy Producer (IPP) program.

²² FS-UNEP Collaborating Centre, Global trends in renewable energy investment, 2016

economic steadiness. In latest years, the substantial cost of supply safety has enlarged, as sales have increased, that reliance on fuel supplies from governmentally unsteady areas detrimental.

Leading European Industry: By way of an inspiring policy, European enterprises can rise their market share and will be able to take a considerable share of future international business prospects in the alternative energy sector, in that way encouraging the European economy.

Environmental drivers

Emission reduction: in the case of alternative energy (with the exemption of biomass), there are no straight releases from energy transformation. As a regulation, energy is produced from a solar energy, wind or wave and causes no emissions. In the example of biomass or waste, emissions occur, but they are limited by regulation analogous to fossil fuel burning or waste burning.

Environment change mitigation: releases from biomass and waste are measured to alleviate environmental density due to a closed tiny carbon cycle. Toxic emissions seem in the same quantity or even in large amounts matched to fossil fuels, but at minimum no additional CO₂ is releases to the atmosphere. CO₂ has been taken before, will also be released through renewable routes, such as organic biodegradation or dumping.

Social drivers

Employment: both direct and indirect employment will arise when the share of alternative energy is growing. This relates not only with the production of a factory or installation, as well as its remaining and fuel supply (the last only in the situation of biomass). Possibly increasing the use of alternative energy will upturn alternative energy industry. But simultaneously, net incomes from employment can be obliterated by dropping traditional energy. It is much difficult to evaluate the effect of alternative energy policies and employment, but it is expected that the total

influence on the European labor market place will be optimistic with consequent penetration of alternative energy sources.

Public support: the subject of alternative energy in Europe. Substantial numbers of individuals pay further attention to the improvement of alternative energy sources alike part of a supportable lifestyle.

Social-economic consistency: the alternative energy sector can function in geographical zones in which other industries cannot. With the improvement of economic action, incited alternative energy industries such as growing energy crops in distant zones or the capture of solar energy in southern states, growth may rise in areas that earlier were economically less attractive. Such economic changes donate to the formation of innovative European unity.

The environmental welfares of alternative energy are presently one of the vital elements supporting this industry. Since the “environment” is often understood as a “climate” from a strategy point of view, the driver’s environmental welfares are no longer effective, because alternative energy technologies should compete with energy effectiveness measures. In order to securely continue supporting alternative energy sources, alternative energy objectives should be separated from CO₂ reduction goals.

From a domestic perspective, local improvement through the establishment of work places has become a driving power. This is particularly obvious in the example of Spain, where more than 70% (estimate) of state funding for alternative energy is providing by the regional development plans of the European Commission. This driver is also probable to decline. First, the source of support for alternative energy sources is likely to decrease with the entrance of new states into the EU. Secondly, if a global system of tradable green documentations is constructed to guarantee cost-effective spreading of technology, domestic benefits can no longer be straight encouraged. Then national governments can search for other industries than alternative energy sources with which to attain local improvement.

Alternative energy is progressively regarded as a remote policy field. Joining alternative energy sources into all connected policy zones, such as the environmental, four-dimensional planning, employment, economic issues will extend the substance for long-standing sustainability of supporting the consumption of alternative energy²³.

2.2.2 INFLUENCE OF INTERNATIONAL RES CORPORATIONS ON GLOBAL ECONOMY

The global economy can be given a narrow and broad definition. By broad definition, the global economy is the summation of all national economies of the world. If it is measured by yearly volumes of their GDP, at that point in 2010 this amount estimated to 63 trillion US dollars.

By narrow definition (and in this narrow sense, it is so-called the global economy), it is the entirety of only those portions of domestic economies that supply the outside world and accept welfares and resources from it. This external world for domestic economies is named the world market place of economic goods and resources, and it, in turn, contains individual world marketplaces for goods, services and resources.

Therefore, the scope of the world economy is uncertain, because it covers not only realistically, but also theoretically tradable and internationally transportable goods and properties. But if you attempt to measure the world economy (the global economy by narrow definition), at minimum in core, the welfares and resources taking part in the global market, then its scope will be several times smaller than the global economy by a broad definition. This is because the primary economies of the global (for instance, the 20 largest states in terms of GDP, which produce about 90 percent of global GDP), remain to emphasis on the demand and supply of products

²³ Intergovernmental Panel on Climate Change (IPCC). 2016. IPCC Special Report on Alternative Energy Sources and Climate Change Mitigation.

and resources, primarily at the expenditure of national and not a common global market²⁴.

The ten producers in wind power production mentioned beneath were accountable for over 43GW of new wind volume in 2016, representing 76 percent of the world market, and amounting to approximately 20,000 turbines. Between them Vestas is the world's top wind-turbine supplier (Chart 2).

Chart 2: Top manufacturers in wind power production.



Source: International Energy Agency outlook, 2017

The US is basically accountable for the lion's portion of the order volume, although the high and medium wind V100 and V110 2.0MW models. The Europe-based 3MW stage was advanced to a label plate of 4.2MW with a propeller diameter of 136, 150 and 117 meters. MHI Vestas offshore mutual venture was born in Dong

²⁴ Intergovernmental Panel on Climate Change (IPCC). 2016. IPCC Special Report on Alternative Energy Sources and Climate Change Mitigation.

Energy in 2017 with the extension of 258MW Burbo Bank from the north-west shore of England.

International companies are driving the occurrence of new marketplaces, technologies, industries and business models as well as exceptional cross-border business streams and extended international value chains. Some are also assisting advanced market-driven methodologies and public-private conglomerates with the probable to address problems that have traditionally been the purview of the public sector—most particularly in the zones of economic exclusion, poverty reduction, humanitarian relief, environmental sustainability, health and human rights. Simultaneously, transnational organizations and their leaders are facing discriminating community expectations and criticism in terms of their destructive impact in these spaces, accountability for non-financial performance and corporate governance scandals—all in the look of unrelenting competitive burdens and investor requirements. However innovative market-driven methods and public-private organizations offer prospective to mobilize unexploited private sector resources, problem-solving skills and networks, they also generate new risks as well as governance and accountability issues for both corporate and government leaders. This is specifically the situation when organizations are functioning under circumstances of bad governance, weak public administration, conflict, insufficient structure or other governance holes and market failures. The problems of corporate accountability and moral public governance are practically always entwined, but they are principally interrelated under such conditions.

Innovative business models, marketplace instruments, and governance frameworks are required to more efficiently harness the prospects and address the dangers of increasing company investment in developing states and engagement in global challenges. Innovative approaches, run by business or where enterprises partner with others, can play a central role in three ranges²⁵:

²⁵ IRENA (2016c), “Renewable Energy Innovation Policy: Success Criteria and Strategies”, www.irena.org/

To mobilize, remunerate and scale up the optimistic contributions that companies can make, specifically via modernizations in their main business processes and investments, and through activating corporate capabilities, such as the abilities of workforces as part of volunteering inventiveness and public investment.

To identify, moderate and monitor any destructive influence and externalities ascending from business actions, through initiatives like industry-wide standards and rules, honesty agreements and multi-stakeholder observing and disagreement resolution mechanisms.

To allow the private sector to perform a reasonable role in improving the wider permitting environment at a state or regional level, in specific through struggles to support municipal governance and public institutes, not only in the monetary sphere but also in zones such as anticorruption and strengthening civic health systems.

Planning and realizing these innovative approaches to involve companies in an operative and responsible manner is a task for corporate and government leaders similar, as well as bests of labor and civil society. This is a leadership task that goes far outside business compliance and compassion, even though both have a significant role. It necessitates the arrangement of corporations and their leaders at the maximum strategic level to connect their essential capabilities and resources alongside the company value chain, and to assemble business leadership at both the operative and policy levels. It necessitates systematic communication and discussion with crucial business shareholders, extending from personnel, customers, shareholders and business partners to controllers, NGOs, practicalities and resident public leaders. It involves individual organizations to ascertain and manage the main development assistances and dangers ascending from their own procedures, while at the same time functioning with their industry peers and bests in other segments to

challenge more obstinate improvement experiments that need concentrated cooperative action²⁶.

Encouraging samples in these spaces already exist and numerous extra are developing. There are more and more innovative separable business models and goods, industry-wide efforts, and worldwide multisector associations and financing instruments—to generate greater economic chance, distribute services to low-income societies, reaction to multifaceted emergencies, support human rights, throw international health tasks, accomplish the risk of contagions, address environmental changes and water shortage, maintenance education reorganization and overcome fraudulence. These samples are in the initial days, and considerably desires to be learned about these inventions in terms of their motorists, their scalability and their influence, both on the corporations themselves and on the growth challenges they purpose to address. Yet they offer prospective for assisting to transform the progress landscape, specifically if they can accomplish better scale and integrate more of the world's most important organizations. Three recommendations for moving in this way are as follows:

Upturn collective efforts.

Though it is important that main organizations get their individual processes in order and emphasis on what they are best prepared to distribute, there is prospective to increase influence and address more complete challenges through mutual initiatives with other corporations, governments and improvement partners. These inventiveness can be dedicated on a certain state or region, a particular development experiment or policy, or a specific industry sector. Samples include: Philippines Business for Social Progress South Africa's National Business Initiative; the Global Business Coalition Against HIV/AIDs; Business Action for Africa, the Global Alliance for Improved Nutrition TB and Malaria; the Marine and Forest

²⁶ R. Billinton and R. Karki, "Maintaining supply reliability of small isolated power systems using renewable energy," IEE Proc.-Gener. Transm. Distrib., vol. 148, no. 6, 2015.

Stewardship Councils the Extractive Industries Transparency Initiative; the Brookings Initiative on International Volunteering and Service; the Equator Principles.

Study initiatives that have reached scale.

A certain amount of individual organizations and mutual initiatives can claim to have completed scale in attempting a definite improvement challenge or set of tasks at either a national or international level, in some conditions accomplishment millions of individuals. These necessitate bigger investigation in terms of what has functioned and what has not, and whether they can either be imitated elsewhere or scaled-up more.

Dynamically engage emergent market multinationals.

There is a critical necessity to better recognize and partner with the developing international organizations and state-owned organization from China, India, elsewhere in Asia, Mexico, Brazil, the Middle East and Africa, particularly those that are capitalizing seriously in other developing states. The increasing reach, impression and influence of international organizations, both individually and cooperatively, are doubtful to diminish. The leadership task is to grow innovative business models, market instruments and governance frameworks that assist in the community interest while creating sound business sense and that organize conglomerates without interchanging or decline the role of governments or terminating the capability of the private sector to generate long-term value.

CHAPTER 3. LONG TERM VISION SCENARIO

3.1 FUTURE VISION AND FORECASTS ON GLOBAL AND NATIONAL ALTERNATIVE ENERGY FIELDS

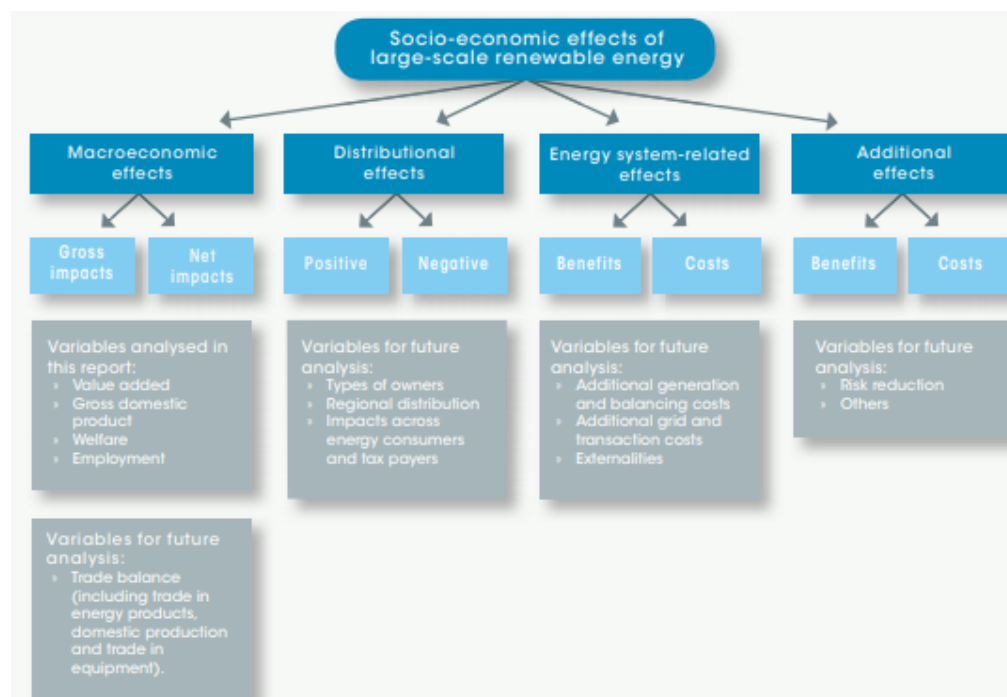
3.1.1. SOCIO-ECONOMIC IMPACT OF INTERNATIONAL ENERGY CORPORATIONS ON SUSTAINABILITY

Alternative energy equipment has practiced fast distribution over the previous few years, primarily motivated by the ambition to increase energy safety, increase energy entrance and alleviate climate change. Various states are nowadays exploring methods to encourage social and economic progression through the improvement of the alternative energy sector. Investment in alternative energy able to create different sources of development, growth income, increase trade balances, donate to industrial development and build jobs. Whereas such socio-economic assistances are progressively gaining reputation in the international alternative energy debate, particular analytical work and experimental evidence on this significant subject continue comparatively limited.

There are every time sustainable energy resolutions, including alternative energy criticized of the statement that he came with a large amount of commercials on the base of common socio-economic growth. Certainly, governments in different parts of the world are trying to set the environment of Paris in 2015 in the implementation of the agreement, the stability of energy need to be balanced a lots of people go over their judgments prosperity. Happily, alternative energy offers solutions to the environment. It also maintains extensive socio-economic benefits, containing net business formation, health and more public coverage.

The socio-economic impact of alternative energy deployment contingently are allocated into four core categories: macroeconomic effects, energy system-related effects, distributional effects and additional effects, as illustrated in Figure 3.

Figure 3. Socio-economic effects of large-scale RES.



Source: International Energy Agency outlook, 2017

Macroeconomic effects denote the components usually studied inside of the framework of macroeconomics. These effects can be evaluated either within the alternative energy and associated sectors (overall impacts) or inside of the economy as an entire (net effects). The macroeconomic impacts include the four main variables studied in this report: value added, GDP, employment and welfare. Furthermore, macroeconomic variables that will be concealed in future investigations are those related with trade balance. In the situation of alternative energy, it's associated to concerns such products like the trade of energy, trade of RETS implements, internal production and further associated products and services.

Value added mentions the cost of products and services produced, minus the value of utilization of intermediate inputs. At this point, the price of products and services is assumed to be defined at market price amounts. Value added from the alternative energy sector is measured at the macro or micro level.

GDP, which calculate the whole performance of alternative variable economy and is the greatest broadly used indicator of national economic action. GDP and GDP growth are the foundation for national policy debates and international assessments. The investigation demonstrates that although the boundaries of current approaches to assess the effect of alternative energy distribution on GDP, as presented in the samples of Japan and Mexico, it is commonly positive.

Indicators such as GDP only do not capture the complete spectrum of social benefit gains. A fuller assessing of welfares contains dimensions such as employment, education, health, changes in material consumption and reduced greenhouse gas emissions. Since employment is important for income generation and therefore for the welfare of people and their families, the formation and retaining of jobs is of critical significance in any extent of socio-economic growth. Wage and salary revenue – specifically from well-paying works – allows individuals to make the consumptions that convert into steady demand for products and services, contributing to strong local and national economies. The extent of employment

accordingly goes far away from direct works in the alternative energy sector and indirect works in the supply chain, also surrounding so-called encouraged jobs in the wider economy.

The 2017 edition determines that direct and indirect alternative energy employment has extended to 8.3 million individuals globally. Furthermore, there are an expected 1.5 million jobs in big hydropower (direct only), for a mutual total of 9.8 million jobs. Huge hydropower jobs have seen a drop in latest years, reflecting a slower speed of new fittings and a rise in labor efficiency²⁷.

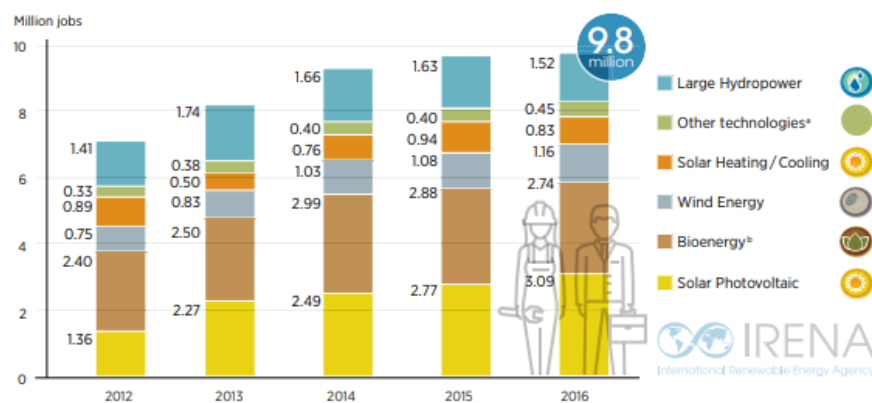
Brazil, China and the US are most important employers in the alternative energy sector. Recent years have seen a significant shift towards Asian states, whose percentage of global alternative energy employment rose from 50 percent in 2013 to 62 percent in 2016. This shift is the outcome of two reasons. Strong deployment strategies have run to the occurrence of dynamic local markets, and industrial strategies have supported the development of internationally competitive industrialized facilities, particularly in the solar photovoltaics (PV) industry. China remains the single major employer with 3.6 million alternative energy jobs. Solar photovoltaic (PV) panel and module engineering is also enchanting in South East Asian states, such as Malaysia. In India, record utilization of solar and wind capabilities has been motivated by both domestic- and state level strategy mechanisms. Others in the region, mostly Thailand, the Philippines and Indonesia, have been totaling jobs in the biofuels industry.

Startup solar PV, which engage 3.1 million workplaces in 2016, has improved by 12 percent and has enlarged more than threefold ever since 2011. The industry is followed by the biofuels industry and 1.2 million jobs, with a 7 % growth in the wind industry. Daily PV plans usually need around 230,000 individuals through the value chain. Operation and keep accounted for 56 %, 22 % manufacture, 17 % building

²⁷ Annual Report of the Ministry of Energy (DoE) to IRENA, August 2017 Media Statement, Independent Renewable Energy, Media and Publication Program.

and fitting. Building workforces and factory employees and specialists are between the most protruding works. Furthermost locally engaged occupations - particularly building - do not necessitate extraordinary skills with great renewal competence and this is a worthy place to hire (Figure 3).

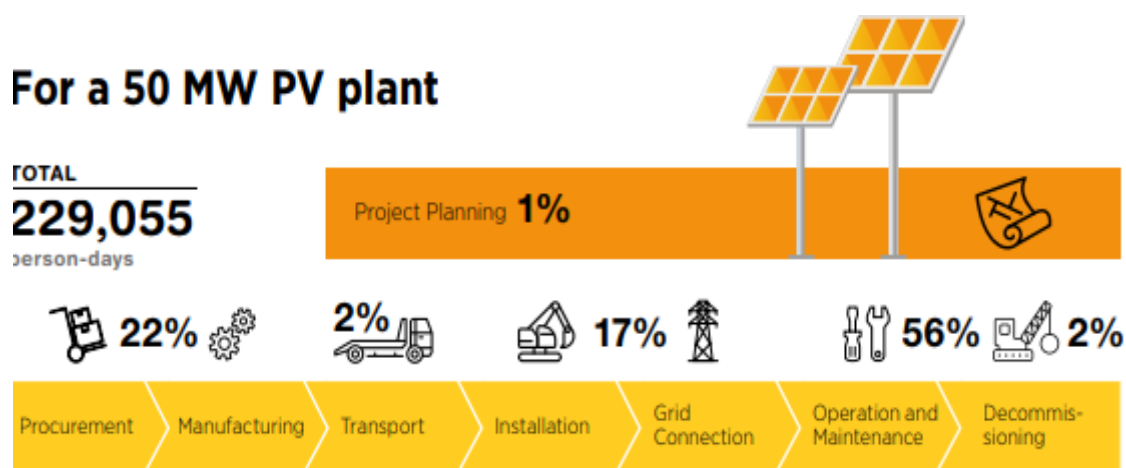
Figure 3. Progress in global alternative employment by technology, 2012-2016



Source: IRENA annual report, 2017b

IRENA's Leveraging Local Volume for Solar PV (IRENA, 2017d) analysed the industrial configurations and skills necessities of a representative 50 MW solar PV project. Totally, some 230 thousand person days are required alongside the value chain (Figure 4). Processing and maintenance estimated for 56 percent, manufacturing for 22 percent, and building and installation for 17 percent. Building and construction workforces (35 500 person days) and plant workers and technicians (32 thousand person days) are between the greatest protruding jobs. Majority of the jobs that can be occupied locally – specially in building – do not need greatly renewables-specific abilities and therefore offer appropriate entry workplaces for occupation.

Figure 4. Employment influences in the solar PV value chain



Source: IRENA annual report, 2017b

Distributional impacts imply the distribution of impacts to various shareholders inside the energy industry. They can be financial but can also communicate to other parts as the type of ownership arrangement (even if financial mechanisms usually have been used with distributional resolutions). Distributional impacts can arise: between stakeholders within the alternative energy industry itself (e.g., among categories of owners of alternative energy facilities); within the energy industry as a complete (e.g., distributional impacts among alternative and conservative energy sources and between various types of energy customers); through the economy at a public, sub-national, national, regional or even international level; among various sets of representatives (e.g., families of different revenue levels, companies, governments); or more commonly amongst different generations (i.e., connected to the intergenerational impartiality discussion in the structure of sustainable growth).

Energy impacts of renewable energy utilization in contrast with the non-alternative energy structure. This group contains supplementary alternative energy outlays (e.g., more commonly used), further balancing expenses (such as inventory volume), containing the profits and expenses of alternative energy distribution (direct and indirect), further network expenses (other energy expenses (e.g. wind prediction expenses), the profits of reduced energy injuries (which might have some

effects) have been categorized within trade deficit problems) and negative assistances.

Further effects cover all outstanding welfares and costs may be connected to RET utilization. These impacts are not more significant than eternally before because it can be categorized in more than one class, they have converted to separate group for them identical double computations. One of the key trappings the influences of large-scale alternative energy using is risk declining. It encompasses to decrease the possible coincidences with conservative energy sources (e.g., nuclear calamities, oil falls, etc.); small technical risks related with more dispersed energy scheme; and geopolitical and fiscal decline risks related with energy dependency states. The latter are titled in risks literature as "safety of supply" or "energy security" contains "trade balance" influence, containing these they can get them under "macroeconomic" impacts²⁸.

3.1.2 FORECASTS ON DEVELOPMENT OF GLOBAL ALTERNATIVE ENERGY SECTOR TILL 2030

Meeting the aim of replication, the share of alternative energy till 2030 requires accomplishment by community and private sectors. Several obstacles exist nowadays, and action is desirable to overwhelm them. The Remap investigation has determined priority spaces for accomplishment. Greatest action will be nationwide, but in various regions additional global cooperation can assist in accelerating an energy alteration. Activities and strategies will necessity to be tailored to justification for the particular requirements of regions, segments and technologies and include multiple interested parties (World Bank et al., 2013b). The priority parts for accomplishment are the subsequent:

²⁸ Annual Report of the Ministry of Energy (DoE) to IRENA, August 2017 Media Statement, Independent Renewable Energy, Media and Publication Program.

1. Planning faithful but motivated transition pathways

Evaluate the base-year condition and Reference Situation tendencies for alternative energy till 2030. Improve a national roadmap to satisfy objectives. Monitor improvement and re-evaluate objectives and outline efficiency and effectiveness frequently. Rationalize planning procedures and guarantee their steadiness and completeness on altered levels, containing public, domestic and regional planning. Warranty human and formal volume to mature and sustain the changeover.

2. Creating an enabling business environment

Create a set of reliable and predictable strategy structures for the authority subdivision and the three end-use segments (constructions, industry and transport) that can be sustained over lengthier periods. Decrease risk for shareholders in order to decrease the cost of investment. Guarantee an equal playing field for profitmaking renewables and additional energy possibilities where cost and profits are valued properly. Encourage global technology marketplaces, e.g., through certification and standards.

3. Supervising knowledge of technology alternatives and their positioning

Construct a strong, publicly available information base on alternative energy tools costs and possibilities and alternatives. Create and make stronger programs to raise consciousness and strengthen the volume of manufacturers, installers and consumers.

4. Ensuring fluent integration into the present infrastructure

Construct permitting arrangement such as transmission networks and interconnectors. Simplify sustainable biomass resource to allow bioenergy progress. Consider join matters in the improvement of alternative energy policies, especially renewables-efficiency-entrance, energy-land-water usage, as well as energy and industrialized development.

5. Unleashing improvement

Confirm suitable support instruments for developing renewables dependent on their progress status and perspective. Analysis on high energy-using submissions and cultivate programmes to plug the technology hole.

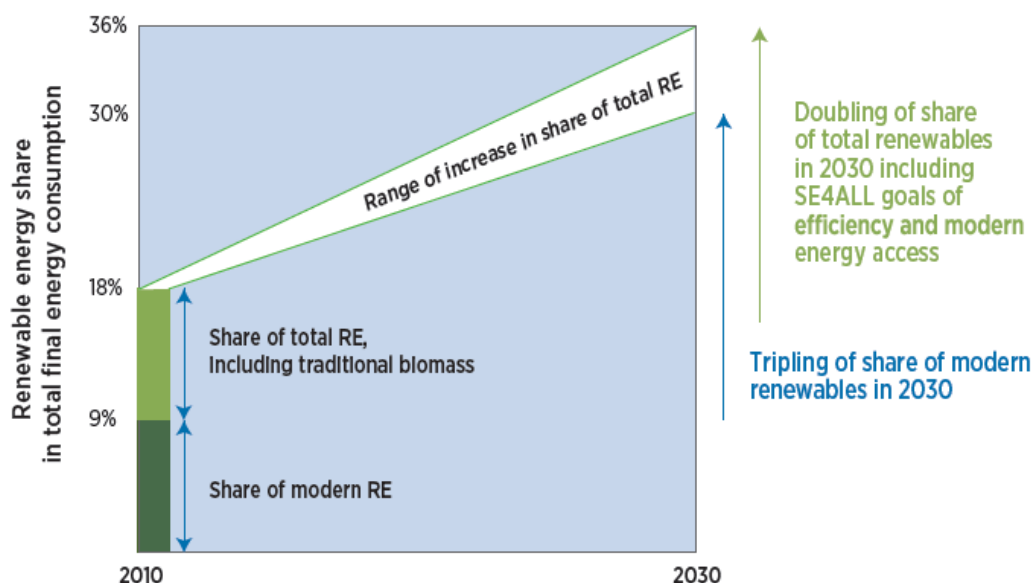
The UN GA (United Nations General Assembly) in 2012 declared that 2014 to 2024 to be the Decade of Sustainable Energy for All, underscoring the significance of energy matters for sustainable improvement and for the elaboration of the post-2015 growth agenda (UN GA, 2012).

IRENA was proven in April 2011 as the international organization for the arrangement of alternative energy. As of the finish of 2013, the Agency had 122 Memberships and more than 45 republics in the procedure of agreement. The Members examined the Agency to search how an ambitious target of replication the global alternative energy portion could be placed into practice (IRENA, 2012a). IRENA established REmap 2030 to discover the possibility of the third goal – containing the interconnectivity among alternative energy and energy effectiveness policies – in more detail²⁹.

IRENA published the workpaper Doubling up the Global Share of Alternative Energy: A Roadmap to 2030 (IRENA, 2013a). This paper founded on an investigation of international energy states for 2030, presented that a replication of alternative energy is realizable and necessitates accomplishment in all counties. It moreover exposed a substantial crack among the international alternative energy share in 2030 based on current domestic alternative energy strategies and the doubling up purposes of the SE4ALL inventiveness. Joining this gap will need foremost growth in improving energy effectiveness and attaining worldwide energy entree.

²⁹ IRENA (2015a), “Renewable Energy and Jobs”, www.irena.org/rejobs.pdf.

Figure 5. Doubling the share of alternative energy suggests a tripling of the piece of modern renewables.



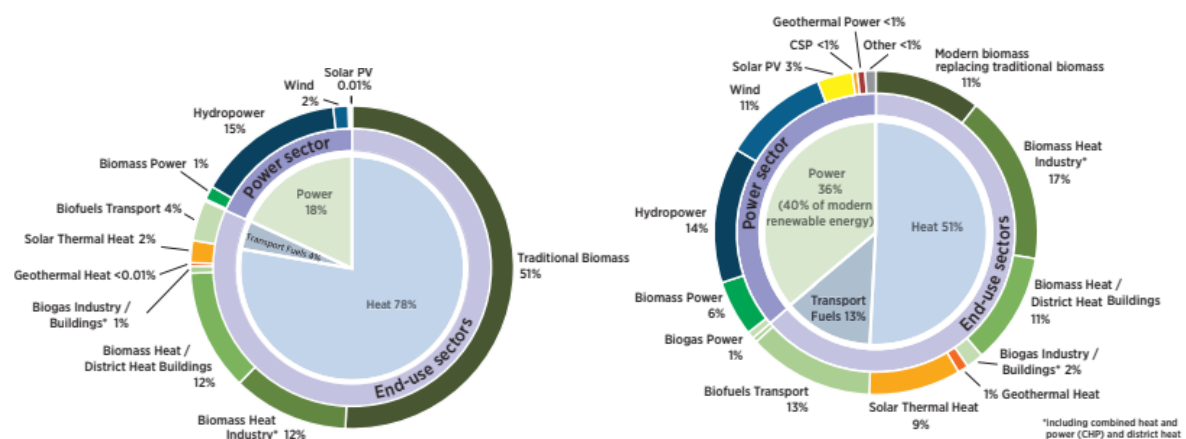
Source: IRENA, 2012a

Figure demonstrates the part of alternative energy in 2010 as a part of TFEC. 9 % of TFEC is modern alternative energy, and up to other 9 percent is usual biomass, consequential in a total alternative energy portion of 18 percent in 2010. The International Energy Agency expresses traditional biomass as: “...the consumption of forest, charcoal, farming residues and animal dung for cooking and warming in the housing sector. It inclines to have very small transformation effectiveness (10 percent to 20 percent) and often depend on unjustifiable biomass supply” (IEA, 2012a). The estimation of customary biomass consumptions in 2010 follows the IEA explanation, which undertakes that entirely biomass use in the construction segments outside states of the OECD is customary, except a REmap state provided a further comprehensive analysis which permitted for more inclusive reporting.

On the route to a replication of alternative energy, current renewables require to switch traditional biomass almost entirely. As a consequence, the share of nowadays renewables more than trebles from 9 percent in 2010 to 30 percent by 2030.

Figure 6 demonstrates the share of various alternative energy sources in overall last energy consumption internationally for 2010, as well as for 2030 with the supplementary development from the REmap Options involved. The biggest source of alternative energy visibly will remain to be bioenergy, that can be used not only to produce energy, but besides to afford motor and heat fuels. The different forms of gaseous, solid and liquid biomass make up 61 percent of alternative energy use in REmap 2030. But, as stated previously, the significant shift in biomass will be start from traditional to new technologies and fuels.

Figure 6. Breakdown of global energy use in 2010 and REmap 2030, by technology and sector



Source: IRENA annual report, 2017b

International new investment in alternative energy was USD 285.9 billion in 2017, as assessed by Bloomberg New Energy Finance (BNEF, 2018). This denotes a 5 percent progress matched to the earlier year and surpasses the earlier record of USD 278.5 billion achieved in 2013 (REN21, 2016).

In doing so, it is expected, we can develop the use of renewable energy and contained by over 160 joining countries to encourage the extensive and bigger acceptance and maintainable use of all practices of alternative energy to guarantee a sustainable energy for future generations.

CONCLUSION

In conclusion, from all finding above, it is clear that alternative energy plays a role more important with every passing day to both state economy and environment. Renewable energy is the most sustainable way to generate power, and we must continue to develop the various technologies in order to replace fossil fuels. There are three key reasons for this: environmental impact, human health and energy security as well. There are also reasons to believe that problems with alternative energy generation will be solved soon thanks to cooperation and investment of government in different projects in this field. The exploiting and converting from traditional sources into alternative energy resources are ones of the most suitable policy for countries.

It is hard for some countries to reach their targets and implement appropriate renewable energy policies as well without international cooperation. Some countries buy energy from petroleum countries and mostly uses these energy sources that are not renewable. That's why some countries require more concentration and investment in order develop their alternative energy sector. And it's clear that international economic cooperation for development of global alternative energy sector is important for reaching these goals of states.

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

- Countries endorsed to continue to support research, development, and involvement in international projects for development of renewable electricity generation and transportation fuels, with aspects of environment, such as reduction of carbon emissions at international level.
- Establish a set of credible and predictable policy frameworks for the power sector and the three end-use sectors (buildings, transport and industry) that can be maintained over longer periods.

- Develop a national roadmap to meet objectives that directed to improve alternative energy sector. Monitor progress and re-evaluate targets and framework effectiveness and efficiency regularly.
- Build enabling infrastructure such as transmission grids and interconnectors. Facilitate sustainable biomass supply to enable bioenergy growth. Consider nexus issues in the development of renewable energy strategies, notably renewables-efficiency-access, energy-water-land use, as well as energy and industrial development.
- Ensure appropriate support mechanisms for emerging renewables depending on their development status and perspective. Review high energy-using applications and develop programmes to fill the technology gap
- The current scheme of the collaboration system that resulted in world leading alternative energy competence should be continued and improved more with every passing day.
- International collaboration in R&D programs related with alternative energy sources should be encouraged and implemented.

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