Journal of Fundamentals of Renewable Energy and Applications

OPEN ACCESS Freely available online

Research Article

Renewable Energy Communities in the Law of EU, GCC Countries and Iran

Hassan Yahyazadeh[1]*

[1] *Faculty of Oil and Gas Law, University of Tehran, Iran*

ABSTRACT

The Gulf Cooperation Council and Iran are the largest oil and gas producing countries. Also, these countries have many renewable resources that benefit from a strong sunshine for the development of large solar power plants. The area also has significant wind, geothermal and biomass resources from urban waste. The research shows that although these countries have a perspective for using renewable energy in the future, but lack of personnel, engineers, technicians, designers, national and local laws to stimulate development, the technology and renewable energy market, and finally, cheap fossil fuels, are serious challenges to the transition from fossil to renewable energy. On the other hand, the policies and regulations promoting the development of renewable energies in GCC countries are limited to large-scale generation and GCC countries have not been as successful as European countries to boost local energy transition initiatives allowing communities and individuals to generate, store, consume and sell their own energy.

Key words: Renewable energy; Cooperation; Directives; Climate change; Energy community.

INTRODUCTION

The trend towards renewable energies has created a basis for promoting the global clean energy economy that fossil fuel-producing countries such as the GCC members and Iran are not exempt from these effects. The Convention on Climate Change in December (2015) has set the stage for the countries to make decisions on using renewable energy as one of the first changes to be made. This can lead to their self-sufficiency and prosperity of the local economies and the entry into a new market for these countries.

GCC members and Iran are in a good position to develop renewable energy sources because they are in a no-rainfall region that extends from North Africa to Central Asia and has 80% of the sky throughout the year and lower costs of solar energy technologies make the Persian Gulf region very attractive for investment in renewable energy sector, especially solar energy. However, the actions taken by these countries have not been as serious as in Europe because European Union has been trying to pass different directives to stimulate member states to develop the use of the energy resources.

The main purpose of this article is to bring together the measures taken on renewable energy in the GCC Countries, Iran, and the European Union, referring to the EU law providing an appropriate framework for Promoting community energy, which can be traced back by GCC member and Iran.

The topic is discussed in the framework of the history of renewable energy in the region. The paper then addresses current status, challenges and legal actions taken in the GCC Countries, Iran and European Union in relation to the renewable energy to determine if these countries could succeed in promotion renewable energy sources.

Brief History of Usage of Renewable Energy in the Middle East

Humans have been in contact with the nature and energy from the beginning of mankind, starting from as simple types of energy as mechanical – muscle power. But since this type of energy is very limited and weak, human has always been searching for an inexhaustible power in his imagination that is always available at any time and place [1]. Solar energy was one of the first sources that humans used to supply heat. The application of solar energy dates back to the seventh century BC. Humans used solar energy for heating, cooking, lighting and lighting the fire. In the Pottery era, the clergy of the temples used large golden cups and sun rays to light the fire. Also, one of the Egyptian pharaohs built a temple that was opened at the dawn of the sun and closed at the sunset.

Regarding wind energy, humans were aware of the power of the wind long time ago using it for ages to move ships and windmills. Historical sources show that the windmills in ancient Iran, Iraq, Egypt, and China were used, and in these civilizations, windmills were used to crush grains and pump water [2]. The machines that were made at that time are similar to those that are being used today in the Khaf area of Iran. In the 17th century BC, the king of Babylon Hamurabi presented a plan to irrigate the Mesopotamian Fertile plains with energy from the wind [3]. The first windmills

***Correspondence to:** Hassan Yahyazadeh, Faculty of Oil and Gas Law, University of Tehran, Iran, Tel: 09116311161; E- mail: hassan_yahyazadeh@yahoo.com

Received: August 29, 2020; **Accepted:** October14, 2020; **Published:** October 21, 2020

Citation: Yahyazadeh H (2020) Unification, Renewable Energy Communities in the Law of EU, GCC Countries and Iran. J Fundam Renewable Energy Appl 10:6. doi: 10.4172/2090-4541.1000279

were used for grain crushing and water pumping, and the oldest model designed for this type of vertical axis was developed in Iran during the years of 500-900 AD. The first documentation related to the design of these windmill is also related to ancient Persians which the blades of this mill were made of wood or straw, which were attached to the vertical axis [4].

Also among other provinces with a history of wind energy, in Kerman, Isfahan, and Yazd in Iran, the wind was used special ventilation channels – wind catchers to cool the houses. It is not clear exactly which of the first wind catchers was built in Iran, but the medieval travel writers mentioned the wind catcher in desert towns like Yazd, Gonabad and Tabas, Kerman, Bam and Zahedan in Iran which draw cool air into the house, and with the water leak inside them, it cools and lights the air and leads it to the house [2].

In the past, Arabs were also familiar with wind catchers, and wind catchers are seen in the construction of Middle East regions like Iraq and Egypt during the period of the Pharaohs and Babylon. Moreover, there are good examples of wind catchers in Egypt which in all three Egyptian pyramids, holes are installed as air exhausters that are connected to the grave room.

The oldestcase of gas leakage andincomplete ignitiondue to landfilling in the basement has been reported by the Russian Pili Ni. He saw the exhaustion of gas and incomplete fires coming from the ground. But in the 1630s, this was Van Helmont who officially announced thegas ignition. In 1667, a scholar named Shirley discovered the methane biogas, but scientifically and practically, methane gas was identified as the main combination of biogas from fermented materials by Volta in 1776. In Iran biomass energy has a long history. Mohammad bin Hussein Amali, known as the Sheikh Baha'i (1031-935 AH), was one of the first to use biogas from biomass (bath waste) and use it as a fuel of a bath inIsfahan [2].

Renewable Energy Developments in GCC Countries and Iran

Gulf Cooperation Council (GCC) was signed in 1981 with the aim of establishing coordination, cooperation and integration among member states in all fields. The GCC Supreme Council emphasized the importance of "joint environmental action to align policies, unify environmental laws and legislations, increase national and regional capacity, educate the workforce, increase environmental awareness among citizens and protect natural resources". At the Gulf Cooperation Council meeting in April 2009, one of the main debates had been on the feasibility of implementing a green tax that is based on systems currently in use in Europe. Council members also participate in other regional bodies such as the Council of Arab Ministers Responsible for the Environment, the Joint Committee on Environment and Development in the Arab Region and the Center of Environment and Development for Arab Region and Europe.

Due to the very good potential of the region, a favorable political environment and the competitive and downward costs of solar panels technology, GCC countries are one of the world's most attractive areas for developing solar and wind power projects on a large scale [5]. Nearly 60% of the areas in these countries are very suitable for the establishment of the photovoltaic system. Extending this system is enough to produce 470 gigawatts of electricity in only 1% of these areas. Based on a new report by IRENA, attaining 2030 targets will bring fundamental benefits to the region which include the development of more than 220,000 jobs whereas GCC countries could save over 354 million barrels of oil in the region. These goals could reduce the amount of carbon dioxide emissions by 136 million tons (22% reduction), while reducing water consumption in the electricity sector to 11.5 trillion litres (17% decrease) in 2020.

Under current plans, the region will install a total of almost 7 gigawatts (GW) new power generation capacity from renewable sources by the early 2020s [6]. By 2004, there has not been enough effort to use renewable energy in the Middle East. Most of these countries have used oil and gas to generate electricity. There are several countries like Iran, Israel, Syria, Lebanon and Jordan who are able to use dams to access electricity. Israel is the only country that has used coal and other energy sources. Since there is a cheap resource for energy such as oil and gas, the Middle East is not ready to use renewable energy sources. However, in recent years, many Middle Eastern countries have been focusing on renewable energy targets.

While Bahrain, Kuwait, Oman, and Qatar have moderate opportunities for wind electricity generation (5-7m/s), Saudi Arabia and the UAE have finite potential for this opportunity (2.5-4.5m/s). Under a long-term prospect, Saudi Arabia the world's largest oil exporter intends to prevent its dependence on crude oil exports by 2030. Riyad plans to invest 10% of its electricity from renewable energy sources by 2023, with investments of $ 30-50 billion.

The United Arab Emirates has decided to provide 44% of its energy by 2050, at a cost of $ 160 billion in the energy sector. While gas, coal, and nuclear energy will form the rest of this basket. In March, Dubai opened the second phase of the world's largest solar park project, which is scheduled to be completed in three phases by 2030. The French Power Company and Abu Dhabi have offered joint supply of a 300-megawatt photovoltaic power plant at 1.79 cents per kilowatt-hour. If the offer is accepted, the previous cheap record of 2.42 cents per kilowatt-hour in March in Abu Dhabi will be broken [7].

The Kuwaiti Ministry of Electricity and Water predicted a threefold increase in domestic demand for energy by 2030, targeting 15 percent of its electricity from wind and solar energy by then. Kuwait, meanwhile, is trying to convert 50 percent of its municipal waste into electricity, in an effort to realize clean energy projects.

Also, Qatar, the world's largest exporter of liquid natural gas, plans to supply 1.8 gigawatts or 16% of its production by 2020 through the solar energy. This capacity will increase to 10 gigawatts by 2030. Qatar's Science and Technology Park (QSTP), an experiment for various types of solar technology is developing to test the suitability of technology in local conditions (because of dust and wind) [8].

Saudi Arabia and Qatar have plans to create global production facilities. For example, the center is expected to produce 10,000 tons of poly-silicon annually in the industrial city of Yanbu (Saudi Arabia) and create 1,000 new local jobs [9].

Oman has several solar projects, including a plan to encourage the use of roof solar panels. American Glass Point Solar Builds a gigabit heat-solar installment to convert water to steam in order to inject it to oilfields to increase oil recovery.

The smallest member of the GCC should increase its production capacity by 6 percent per year to meet growing demand and Bahrain will target a five percent share of renewable energy in its country's electricity production by 2020. However, there is no supporting framework for RES policies aimed at achieving the goal of generating 5 to 7 percent of energy from renewable energysources

by 2030 [10]. Some of these countries such as the UAE, Oman, and Kuwait have taken seriously energy conversion projects. Oman is currently investing $ 600 million to $ 700 million in a seawater desalination program with a capacity of 1,000,000 tons a year with the energy generated from the conversion of large quantities of municipal waste.

In Iran, the main source of energy has been oil since 1971, after a sharp decline in 1978 it reached to its lowest level in 1980. Natural gas consumption is also rising rapidly, and the government is spending billions of dollars to build a new gas pipeline for many outlying towns and villages to reduce oil dependence [11]. Nevertheless, use of other energy type's especially renewable energy has received great attention from the government in recent years. According to the Sixth Socio- Economic Development Plan in Iran (2017-2021) the Ministry of energy is required to increase the share of renewable and clean power plants to at least five percent (5%) with the priority of Public non-governmental sectors investment (domestic or foreign). Also, according to Article 48 of the Sixth Socio-Economic and Cultural Development Plan, the Ministry of Energy is required to increase the power generation capacity to 25,000 MW through the investment of Public non- governmental, co-operative and private institutions (domestic or foreign) or, in the form of conventional investment methods such as build, operation and owned (BOO) and build, operation and transfer (BOT). Guaranteed purchases of electricity will be based on the rates set by the Economic Council.

Furthermore, the two articles of paragraph B of the general policies of the Islamic Republic of Iran approved by the S u p r e m e Leader on 2001 include:

A) Diversification of energy resources and their use withrespect to the environmental issues and efforts to increase the share of renewable energies with the priority of hydropower.

B) Struggling to acquire new energy technology and build power plants such as wind, solar, fuel cells and geothermal.

LEGAL STRUCTURES FOR ENERGY COMMUNITIES IN GCC COUNTRIES AND IRAN

In the late 1990s in the Gulf Countries the government established a business model that was very successful model that was very successful in developing larg-scale centralised energy infrastracture. It was first used for thermal power generation and then extended to the renewable source, too. In this regard, through independent water and power projects (IPP and IWPPs respectively) the private ownership of the investments on power sectors was encouraged. Oman was the first GCC country to employ the privisitation of its utility sector in the mid-1990s, and then most of GCC countries adopted the model.

State authorities in Gulf Cooperation Countries decided to develop their energy infrastructure like power generation portable water production through desalination by implementing IPP scheme by international expertise firms. These schemes also had a lot of benefits for local citizens in UAE, Saudi, Qatar, Oman, Kuwait or Bahrain, because through these schemes the firms running the IPP or WIPP schemes brought their expertise and knowledge in power generation units to the Gulf countries and this in place led to strong economic growth in the countries having high thermic pressure (by expanding the access level to energy in the fields like industry, services, residential housing, digital expansion), and also in projects like Qatar financial Center Authority, these schemed reduced and produced enormous energy intensity for cooling and humidity relieving purpose [12].

The state authorities tried to decrease the risks involved in IPP project schemes by considering adequate risk allocation between developers, EPC construction firms, banks by providing long-term Power Purchase Agreement including supporting pricing conditions and strong economic fundamentals. By improving financial issues, and tendering state shares through Initial Public Offering (IPO) in some countries like Kuwait or Oman, power plant companies and therefore listed on local financial markets, and this in turn enabled them to have access to capital ownership of local strategic energy infrastructure.

The GCC IPP also encourages the transfer of knowledge to the local industry and people through its local content clauses. These traditional clauses which were firstly developed for the thermal power assets now are implemented in the RES including and are popularly adopted in the GCC region. The IPP schemes were successful in attracting massive developers and banks to the region because of the law tariffs set in PPAs and also because of the suitable climate conditions like high insulation, large empty flat landscape, and high wind factor.

When the Gulf countries reaches some benefits of renewable energies, they tried to promote the usage of this kind of energy by citizens in local states and business models, and now they are focusing on decentralized generation like solar panel on residential homes, rooftop PV and also electric transportation to decrease the amount of gasoline use and save the oil for export purposes. There are two successful aspects for GCC IPP business models. First, acceleration energy access to the benefit of economic development and thus population wealth growth, and second democratizing renewable energy sources utilization by encouraging citizens to use this kind of energy [13].

There are some remarkable projects in Gulf Cooperation Council countries. Abu Dhabi's Masdar City is one of the world's most sustainable urban communities. The construction began in 2006 and the completion of this city was scheduled for 2016. The city's goal is to become home to a population of 90,000 people from 40,000 residents and 50,000 daily travellers.

Another example of renewable energy projects is Desert Rose city along the Dubai Al-Ain road which is in a shape of a desert rose flower and generates electricity from renewable sources. It also has a water recycling facility [14]. The residential units of Desert Rose city are allocated to Emirates for 20,000 units and 10,000 units are allocated to expatriate residents. 23 Furthermore, Silicon Park (SP) project articulates Dubai's Plan 2021 to transform the emirate into a smart city. As of January 2016, Dubai Silicon Oasis (DSO) had succeeded in reducing cumulative energy consumption by 31 percent exceeding the target set by Dubai Integrated Energy Strategy 2030 of 30 percent.

Qatar Science and Technology Park (QSTP) are under construction with the aim of attracting multinational oil and gas companies to be the next major energy hub and to develop hydro carbons. 25This project is also testing different solar sources to measure the suitability of the technology in regard to regional restrictions made by dust and the wind. Among the other projects in Saudi Arabia and Qatar, is the project of the industrial city of Yanbu that plans to produce 10,000 tons of poly- silion annually and create 1,000 new local jobs.

Bahrain's financial district in Manama has installed wind turbines in the Bahrain World Trade Center. Also, King Abdullah University of Science and Technology creates a sustainable campus [15].

The Supreme leader of Iran in June 2005 revised Article 44 of the constitution of Iran. Initially, it defined the economic system on the basis of public, private and cooperative sector and it is emphasized that the governmental sector is the main basis for the country's economy and private sector activities are accepted as complementary. But this revision authorized the activities of the private sector in the upstream sector of economy. Therefore, the government accepts the electricity production from renewable sources by the private sector and the private sector can be responsible for the energy production up to 80 percent except for the main power transmission. After this revision, investment, ownership and management in order to supply power both for domestic uses and export purposes are allowed by public non-governmental, cooperative and private sector.

CHALLENGES TO RENEWABLE ENERGY COMMUNITY IN GCC COUNTRIES

Technological knowledge, policy development, and inadequate use of RE technology in buildings are some challenges and barriers in GCC and Iran. The ways to improve these include promotion of research and development, public / private initiatives, legal and regulatory frameworks, and technical solutions, knowledge sharing and scientific advice.

Six Gulf Co-operation Council countries pay high subsidies on energy carriers to their citizens; United Arab Emirates provide 85% of the cost of electricity and water for Emirate citizens and 50% for foreign citizens. The price of oil in Oman is low enough that trucks often enter the border of neighbouring countries and fill their fuel tank and return to their country. But it seems impossible to continue this situation in the long run. According to the Chatham Independent Policy Institute, energy consumption in the Gulf States is more than the total consumption of Africa. Household consumption in Saudi Arabia is expected to increase by 7% annually (according to the Wall Street Journal). The cost of subsidizing this growing demand will be borne by thegovernment.

Nevertheless, increasing the Gulf energy demand is expected to put pressure on government budgets and reduce the potential for hydrocarbon exports, resulting in a loss of foreign exchange earnings.

According to the International Monetary Fund (IMF) in 2011, the share of energy subsidies in the Gulf States is estimated to range from 9% to 28% of the state budget of the region. Currently, many of these countries are aware of the dangers of paying high subsidies on energy carriers and are trying to reduce them. Kuwait, for example, is planning to cut subsidies for water, electricity and fuel in this country. Bahrain proposes to raise oil and gas prices, and the United Arab Emirates is considering a renewal of the energy subsidy program in that country. Although, the overall cutbacks in subsidies are not right. The sudden cutback in energy subsidies in these countries could undermine the competitiveness of the economy and its recession and, at the same time; a sharp rise in prices of goods and materials and this action will lead to a higher inflation. So, fluctuations in the lives of citizens will be politically very risky. Nevertheless, reducing energy subsidies will liberate some of the oil revenues in these countries and provide the basis for investment to create a viable economy. GCC countries and Iran are distributive, not extractive, which means they do nothave administrative devices to regulate the market, because regulations require information and in many cases financial instruments.

Despite the abundance of oil, there is no need for such efforts, because energy can be achieved at relatively low costs. If the fossil resources are unavailable and their revenues are reduced, the Gulf Cooperation Council may be under increased pressure to tax their population. This is an opportunity for environmental change, such as carbon tax which can help maintain the climate [11].

The current level of development in the Gulf region does not exploit the potential of the region. Most RE projects are small in scale, and there is a lack of coordination between the various institutions and research centers responsible for developing the program. The technical cooperation between GCC institutions for the development of the solar energy and international partners is a challenge that should be addressed in all Gulf Cooperation Council countries. Also, there is a lack of local content in solar energy that is a challenge for all Gulf Cooperation Council nations. Another major challenge is that there are no solar panel manufacturing plants in the Gulf Cooperation Council countries. Apparently, there are no public and private initiatives for solar energy development. There is also no cooperative approach between the Gulf Cooperation Council and government organizations for RE development. Furthermore, there is no federation for the exchange of scientific advice at GCC meetings through regular seminars or workshops [11]. Nevertheless, a number of Gulf Cooperation Council countries (UAE, Qatar) have good bond markets that could potentially be used to promote the development of clean energy projects, the most common was public Competitive Bidding for fixed quantities of RE and public financing policies, including grants and subsidies [16].

RENEWABLE ENERGY DEVELOPMENTS IN EUROPE

According to White Paper, the European Union set targets for using renewable energy sources to meet 12% of energy consumption and 22.1% of electricity consumption needs by 2010. This led to goals being set for union members in Directive 2001/77/EC aimed to ensure better utilization of the potential of renewable energy sources within the domestic electricity market [17]. The issue of administrative burdens in the renewable sector was raised by Directive (2001/77 / EC) which introduced well-known legal entities such as support schemes or guarantees of origin. The issue of energy cooperation is not regulated by the Directive. The Directive 2001 / 77EC (recital 19) recognized the category of "small and medium sized renewable tasks in a general way.

Establishing a mandatory 20% share of EU energy consumption from RES by 2020 was adopted on 23 April 2009 and repealed Directive 2001/77/EC. Also, obtaining 10% of transport fuel from RES by 2020 is needed by all member states. Different mechanisms were planned by the 2009/28/EC which contains as follows: support schemes, guarantees of origin, joint projects, cooperation between Member States and third countries, which could be applied by Member States. Making easy the small decentralised renewable installations is called by the Directive. The utilisation of local energy sources, increased local security of energy supply, shorter transport distances, reduced energy transmission losses, foster community development and cohesion by providing income sources and creating jobs [18].

The national targets for renewable energy in the Directive 2009/28/EC were set with the starting point and overall renewable potential of each country varying from at least 10% in Malta to 49% in

Sweden. EU countries have planned the ways to achieve these goals and a key roadmap for their renewable energy policies in their national renewable energy action plans. Measures are taken every two years when EU countries publish national renewable energy progress reports.

In addition to the Renewable Directives, the renewable dispersed energy sources have been influenced by Electricity Directives which provide regulatory framework in the case. However, treatment of small energy systems has been possible by Second and Third Electricity Directive, but easy access to the energy market and the grid was considered in Third Electricity Directive [19]. Nevertheless, the issue of energy cooperation in civic structure is addressed in an indirect way by the Electricity Directives [18].

A further Directive was provided in November 2013 in case of support schemes and the use of cooperation mechanisms to achieve renewable energy goals at a lower cost. A full overhaul of subsidies is announced to allow member states toprovide renewable energy sector, preferring tendering, feed-in premiums and quota obligations to commonly used feed-in tariffs.

A legislative package named 'Clean energy for all Europeans' was published by commission in 30 November 2016 [19] in order to expand the Energy Union strategy [20]. The goals of this Directive were: energy efficiency, achieving global leadership in renewable energy and providing fair trade to consumers. This action is estimated to create 900,000 jobs and increase to 1% in production GDP in the future [21]. New opportunity for energy communities has been created by this method, however, local renewable energy sources is deeply resulted from internal energy market in Europe. The Commission's proposal contains different areas as follow: deployment of more renewable energy in the electricity sector, mainstreaming renewables in heating and cooling part; diversification of the transport part to decarbonize in order to achieve at least 14% of energy consumption in transport by 2030; empowering and informing customers; achieving on time and in a cost effective way in order to gain the goal in EUlevel.

There are two separate laws of Clean Energy Package that defined Energy Communities that give the citizens the right to engage directly in energy sectors. The first one is revised Renewable Energy Directive (EU) 2018/2001 that covers the principles for renewable energy communities. The second directive that covers roles and responsibilities for "citizen energy community" is Internal Electricity Market Directive (EU) 2019/944. According to this directive the provisions on citizen energy communities do not preclude the existence of other citizen initiatives such as those stemming from private law agreements. Thus in both directives, the legal engaging of energy communities like cooperation, associations, and others are allowed [13].

Energy communities are defined as a non-commercial type of market members that combine non- commercial economic aims with environmental and social community objective [22]. The citizen energy communities have specifically defined features in relation to their size and ownership structure as specified in the revised Renewable Energy Directive. These specified criteria and characteristics are defined to eliminate discrimination for these communities when operating in the market. But this should be done without distorting competition and without setting obligations for other market parties. There are two features that define the conceptual elements of both directives [23].

"Openand voluntary" participation of citizens is encouraged in both directives. The revised Renewable Energy Directive promotes all potential local members to participate in renewable energy projects based on non-discriminatory criteria. It is allowed in the revised Electricity Market Directive that household customers voluntarily take part in community energy initiatives. In directives citizens, local authorities and smaller businesses whose primary economic activity is not the energy sector are encouraged to participate and have effective control in renewable energy projects [24].

It should be noted that in both directives the emphasis is on the social and environmental benefits rather the financial ones. As was mentioned, the directives consider the energy community as non- commercial actors who use their revenues from economic activities to provide service for members of local community. According to the revised Electricity Market Directive, both citizen energy communities and renewable energy communities can have similar activities like generation, distribution, supply, aggregation, consumption, sharing, storage of energy, and provision of energy related services [24]. They are treated the same as the other market participants in relation with the obligations and restrictions according to their performed activity, so that the competition is non- discriminatory and proportional [13].

The main purpose of new EU renewable energy legislation is to encourage communities and individuals to generate, store, consume and sell their own energy by local energy transition initiatives according to the national law of that country. It is forecasted that by 2050, half of EU citizens including local communities, school and hospitals could be generating their own renewable electricity that is equal to the 45 percent of their energy demand according to the findings of a community energy coalition study. It should be noted that the most common form of citizen-led initiatives is cooperatives. Cooperatives are common in countries with strong community traditions like Germany or Sweden. In this type of economic enterprise, citizens are allowed to own and manage renewable energy projects collectively. Then can invest in these projects through buying shares to finance a project.

In the UK, renewable cooperatives are in the form of Industrial and Provident Societies (IPS). Usually, the statutes of the cooperatives decide on the distributions of profits. Sometimes surpluses are reinvested to support the members and/or the community. Also, they may provide energy benefits in the form of lower energy prices. The governance in cooperatives is democratizes that means decision are made on a "one member-one vote" basis. These cooperatives that are led by the citizens can be put together in larger networks that integrate them at national and EU levels.

Still, in larger projects with high investment volume like citizen-owned wind parks in Germany, another legal model is popular that includes limited participation with a limited liability company as a general partner. Here, voting rights are not democratic like cooperatives, but they are proportional to the capital invested. The Model used in Scotland is "development trust" in which the community group responsible for the energy project is the full owner of the renewable installation, and raises funds through grants and loans and distributes income from renewables to community projects. In the Netherlands, no specific legal model is available for collective customer ownership.

The public model to invest in renewables in the foundation or public ownership of energy utilities. "Energy Cluster" is a terms used in Renewable Energy Sources Act in Poland which refers to the civil-law agreements that includes different groups of

parties like natural persons, legal bodies, scientific units, research institutes and local-government units. The aim of the agreement is to balance the amount of demand and generation and distribution network with voltage below 110 KV. The cluster looks for the local values, sustainability of the region and promoting local residents and monetary institutes to take part in the projects, so it is a civil law agreement with a form of micro- network and will not run as a business activity.

Another model for energy management is housing associations that are applied in the United Kingdom, Denmark or Sweden. In Denmark, tenants of the social housing states are responsible for managing the estate. In Sweden, there is a housing association called Bostadsrättsföreningen Lyckansberg's solar cell plant that generates electricity needed for the common facilities of 85 tenant- owned apartments. In Denmark not-for-profit ownership model returns the profit to the members in the form of low energy prices [13].

COOPERATION BETWEEN GCC COUNTRIES AND EUROPE

To encourage business and economic cooperation in energy, the Gulf Cooperation Council has been in close contact with the European Union from 1981. The Council of Ministers of the European Economic Community (EEC), on July 22, 1985, expressed its interest in developing economic and political relations with the Gulf Cooperation Council. The cooperation agreement was signed in 1988, which encouraged business and economic cooperation in energy, industry, trade, investment, agriculture, science, technology and the environment.

On the occasion of the 20th Joint Council meeting in Luxembourg on June 14, 2010, EU and GCC officials approved a Joint EU-GCC Program for the period 2010-2013. In terms of energy, cooperation in the field of clean-up and RETs has been envisaged in the field of energy efficiency policy and measures, solar energy technology and policy frameworks [25]. This cooperation also provides technical cooperation and technology transfer in all phases of electricity and water production (transportation, distribution of energy and service providers) [26] using the European Union's experience in power interconnection, the legal framework and the creation and development of regional markets for trade in and electricity exchange, development and technology on integrated management and sustainable consumption of water for achieving water security in GCC countries.

At a meeting of the 22nd session of the Joint Council and Ministerial meeting in Luxembourg on June 25, 2012, delegates agreed to prepare a joint work plan for the next 2013-2016, identifying priorities and goals [27].

It should be mentioned that the United Nations Framework Convention on Climate Change was approved by all GCC member states. Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates and Bahrain adopted the Kyoto Protocol. GCC member states are Non-Annex I parties, which means they have no commitment to reduce greenhouse gases. Nonetheless, GCC member states have been a powerful force in blocking climate negotiations that are based on unanimous consensus. A member state can only derail, weaken or delay the progress of the decision [28].

CONCLUSION

Although the new legislative packages in Europe places active energy consumers in the centre of the future energy market in order to push European members towards the energy communities, the process is still in its early stages in the GCC countries and Iran. In order to stimulate development of RE in GCC member states and Iran, these items are needed: local content in solar energy, solar panel manufacturing plants and technologies, public and private initiatives for solar energy development, cooperative approach between the GCC and government organizations and local laws. Since there is a cheap resource for energy such as oil and gas, the Middle East is not ready to use renewable energy sources. In recent years, GCC members and Iran have been focusing on renewable energy targets but there is no supporting framework for RES policies aimed at achieving energy from renewable energy sources. Nevertheless, these countries can benefit fromexchanging experiences and acquiring policies based on European Union efforts and activities. Like the measures that European Union has taken to promote renewable community energy in small and micro case, the GCC countries and Iran can promote energy transition initiatives that enable the local and legal individuals and communities to generate, store, consume and sell the energy produced by their own. This strategy could make citizens independent from government and consequently these countries could reduce energy subsidies and liberate some of the oil revenues in these countries and provide the basis for investment to create a viable economy.

REFERENCES

1. Samad S, Mohammad S. F. Important Developments in Nature and Its Role in the Formation of Architectural Space, Fine Arts. Summer. 2015; 42:39-43.
2. Ameri, Siahhoii, Hamidreza et al. An overview of the history of human use of renewable energy in nature. A First National Conference on Architecture, Civil and Urban Environment. 2014.
3. Mohammadi and Farhad. A Look at Wind Energy in the World and Iran at the Beginning of the Third Millennium. Journal of Economics and Energy. 2000; 13.
4. Rad R, Majid. An Attitude towards Solar Energy Use Systems. 2007.
5. IRENA. Renewable Energy Market Analysis: The GCC Region'. IRENA, 2016.
6. IRENA. Renewable Energy Market Analysis: GCC 2019'. IRENA, 2019.
7. Sarihi A. A. Renewable Energy in the Gulf Arab States. Center for Contemporary Arab Studies. 2019.
8. Ferroukhi R, Doukas H, Androulaki S. EU-GCC Renewable Energy Policy Cooperation: Exploring Opportunities. Gulf Research Center. 2013.
9. Ferroukhi R, Aswad G. N, Androulaki S. Renewable energy in the GCC: status and challenges. International Journal of Energy Sector Management. 2013;7:84-112. https://doi.org/10.1108/17506221311316498
10. MacDonald F. Kuwait Invites Bids for Clean-Energy Park to Save Oil for Export. 2013. https://www.bloomberg.com/news/articles/2013-06-12/kuwait-invites-bids-for-clean-energy-park-to-save-oil-for-export
11. Reiche D. Energy Policies of Gulf Cooperation Council (GCC) countries—possibilities and limitations of ecological modernization in rentier states. Energy Policy. 2010; 38:2395–2403.
12. Qatar Financial Centre Authority. Public Private Partnerships: A Vehicle of Excellence for the Next Wave of Infrastructure Development in the GCC. 2012. http://online.wsj.com/adimg/assetmanagement-related_ppp.pdf
13. Verma P, Fuselli L, Brkic I. Localising the Grand Transition: Enabling

Citizen Participation and Encompassing Local Government. Future Energy Leader Position Paper. 2019.

14. Ruwiyah A. The City Centre at 'Desert Rose' Smart Sustainable City. 2016.
15. Kablam Z, Gastli. Solar water heating initiative in Oman energy saving and carbon credits. Article in Renewable and Sustainable Energy Reviews. 2011;15:4:1851-1856.
16. Bielenberg A. Financing the Clean Energy Sector in the GCC with Green Bonds and Green Sukuks: Is a Market Being Born?. 2011.
17. Sokolowski M. M. European Law on the Energy Communities: a long way to a Direct Legal Framework. European Energy and Environmental Law Review. 2018.
18. Sokolowski M. M. Renewable Energy Communities Renewable Energy Communities in the Law of the EU, Australia, and New Zealand. European Energy and Environmental Law Review. 2019;2834-46.
19. Directorate-General for Communications Networks, Content and Technology (European Commission), and European Commission. Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions a European strategy for data.2020.
20. Brussels. Communication from the commission to the European parliament, the council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank, Clean Energy For All Europeans. European Commission. 2016.
21. Directorate-General for Energy. Clean energy for all Europeans. Publications Office of the EU. 2019.
22. Caramizaru A, Uihlein A. Energy communities: an overview of energy and social innovation. Publications Office of the European Union. 2020.
23. Lowitzsch J, Hoicka C.H, Tulder F. J. V.Renewable energy communities under the 2019 European Clean Energy Package – Governance model for the energy clusters of the future?. Renewable and Sustainable Energy Reviews. 2020; 122.
24. Sokolowski M. M. Renewable Energy Communities in the Law of the EU, Australia, and New Zealand. European Energy and Environmental Law Review. 2019; 2: 2:34-46.
25. Papadopoulou A, Doukas H and I. Makarouni R et al.,. Tools and mechanisms fostering EU GCC cooperation on Energy Efficiency. World renewable energy congress. 2011.
26. Ferroukhi R, Doukas H, Menichetti S. A. E. EU-GCC Renewable Energy Policy Cooperation: Exploring Opportunities. EU GCC Renewable Energy Policy Experts Workshop. 2013.
27. Al-Shalabi A, Cottret N, Menichetti E. EU-GCC Cooperation on Energy-Technical Report," Deliverable of WP5 (EU-GCC Cooperation on Energy, Environment and Climate Change), EU- funded project Sharaka "Enhancing Understanding and Cooperation in EU-GCC Relations. 2013.
28. Reiche D. Energy Policies of Gulf Cooperation Council (GCC) countries Possibilities and limitations of ecological modernization in rentier states. In: Energy Policy. 2010; 38: 2395-2403.