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Kyoto Protocol and Iran's Energy Policy adaptation assessment

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Abstract— *Kyoto Protocol has been extended until 2020 at Doha climate change conference. It is possible that some developing countries assumed GHGs emission binding commitments in this period. Iran, as a developing country, emits large amount of GHGs and is ranked in ninth place. Energy sector has greatest share of GHGs emissions in Iran. Hence, it is important to adapt energy sector with Kyoto Protocol goals. In this paper, a composite index is presented based on several indicators such as energy intensity, energy consumption growth rate, energy consumption per capita, amount of CO2 emissions and the share of renewable energies in total primary energy supply to assess Iran energy policies These indicators has been selected by data which is gathered from item-selection questionnaires and interviews form Iranian experts in the related fields (expert judgment). Based on the proposed index, the adaptation degree of Iran in comparison to seventeen selected countries is discussed. The results show that Iran has placed at the end of the list of countries in energy intensity and CO2 emission indicators as well as in the composite adaptation index. So, in spite of Kyoto protocol have considered within Iran's energy policy making, there has not been much successes in implementation.*

Keywords— *UNFCCC; Kyoto Protocol; Energy Policy; Adaptation*

1. INTRODUCTION

The UNFCCC issued to deal with the rising problem regarding climate change in 1992. This is considered to be the first international climate treaty. UNFCCC became legally effective in 1994. Three years later in 1997, the Kyoto Protocol (KP) was adopted on December 11, 1997 in Kyoto, Japan, and entered into force on February 16, 2005 (Hu & Rodriguez Monroy, 2012).

1-1 CONCEPT OF ADAPTATION

The adaptation with climate change and abatement of GHGs emissions (mitigation) are both set out in the United Nations Framework Convention on Climate Change (UNFCCC) as responses to anthropogenic climate change (UNFCCC,1992). Adaptation is considered crucial and realistic response options such as energy policies along with mitigation. The relationship between adaptation and mitigation is such that, in theory, the more mitigation that takes place, the less adaptation will be needed, and vice versa. Adaptation represents policy-driven adjustments such as energy policies to changes in climate, particularly in developing countries, and is promoted as a standard element in development agencies work programs (Schipper & Lisa, 2006).

Economic growth and development, patterns and levels of energy consumption beside energy policies are drivers of climate change, not simply emissions. Population growth, per capita energy consumption, the "energy mix" in future supplies are assumptions have been taken into account to creation emission scenarios (Ian Burton et al, 2002).

The issue of adaptation with climate change has become a priority topic on energy policy agenda worldwide especially after the UNFCCC and Kyoto protocol since 1997. Under the Kyoto Protocol, countries were divided into two categories: industrialized countries (Annex I countries) and developing countries (Non-Annex I countries). The Annex I countries agreed and committed to reduce the collective GHGs emissions by 5.2% from the 1990 level. The first period of the Kyoto Protocol was from 2008 to 2012, and the corresponding GHG emission reduction commitments by the Annex I countries expired at the end of 2012. Because of this reason, it becomes urgent to discuss and set a new global regulation about reduction of GHG emission between different parties in a second period of the Kyoto Protocol.

1-2 IRAN'S REGARDING STATUS KP

Iran is the second largest economy in the Middle East and North Africa in terms of GDP—US$400 billion in 2011 (after Saudi Arabia) and in terms of population—78 million people (after Egypt) (World Bank, 2013).

Iran is one of the Non-Annex I countries that has ratified UNFCCC and KP. So, under the common but differentiated responsibilities has to adapt itself with climate change. Also, Iran is one of the biggest GHGs emitters in the world with 521 million tons of CO2 emission in 2011. Iran is the fourth largest GHGs emitter between the developing countries (after china) and ninth emitter in the world in 2011 (IEA Statistics, 2013).

While the first period of commitments of Kyoto Protocol ended in 2012 and it has been extended until 2020 at Doha climate change conference, it is possible that some developing countries which have outstanding emissions such as china, India and even Iran assumed binding commitments to reduce greenhouse gas emissions. It is not a possibility raise only from the pressure of international negotiations but also from Iran's own sustainable development. So, a realistic scenario could be that Iran commits to mitigate its GHGs emission in the near future, and join a new legally binding global GHGs reduction scheme between 2018 and 2020. Hence, it is necessary to

make right policies for mitigation GHGs and adaptation with climate change.

Based on UNFCCC's information's among the many human activities that produce greenhouse gases, the use of energy represents by far the largest source of emissions. Smaller shares correspond to agriculture, producing mainly CH4 and N2O from domestic livestock and rice cultivation, and to industrial processes not related to energy, producing mainly fluorinated gases and N2O. Hence, we try to assess Iranian energy policies in order to adaptation to climate change by doing commitments regarding UNFCCC and KP and assess how it can implement these policies.

Fig 1. Shares of anthropogenic GHG emissions in Annex I countries, 2011 (IEA Statistics, 2013).

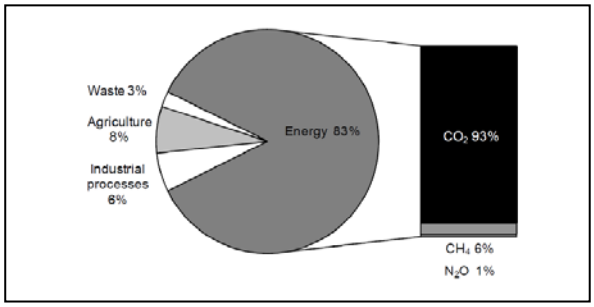

Fig. 1. Shares of anteropogenic GHG emissions in Annex 1 counteries

The paper has been organized as follows: In section 2, we summarize some relative works in this regard. Section 3 describes the Iran's energy policies regarding adaptation with climate change convention and kyoto protocol and presents Iran's energy policy model as well as how to implement environmental conventions into the model. Section 4 investigates the Iran's adaptation status by selected indicatores as well as adaptation composite index. Section 5 gives a summary about the paper results. Conclution and suggestions for the future associated with paper results and findings are highlighted in section 6.

2. Related works

Assessment of the UNFCCC and KP emission limitations impacts on countries' economies has most to been addressed. In some studies (F.Rutherford & Felder, 1993; Babiker, M.Reilly, & D.Jacoby, 2000; Babiker & D.Jacoby, 1999) both the annex I and non-annex I countries have been taken into account. Some others investigate the KP impacts on special group of countries such as OPEC countries (Dessai, 2001) or emerging economies such as China and India (M.Ingold, 2010). Implementation of the KP is another challenging issue that (Barnett, Dessai, & Webber, 2004) address it. Energy sector which is responsible for the greatest share of the emissions has been studied in the energy intensity point of view (Radpour, 2012), or energy consumption mitigation point of view. In addition, (Eshraghi, 2012) has surveyed the impacts of climate change mitigation policies on energy security (Eshraghi, 2012).

Although a lot of studies have been accomplished in order to assessing UNFCCC and KP impacts on countries' economies and energy security, but convergence of the countries' energy policies with UNFCCC and KP goals has not been mentioned, in prior works. We aim to address this issue for the first time in this paper.

3. The energy sector and energy policy regarding to climate change in Iran: Review on Upstream documents

Due to intensive GHG emission and other global environmental challenges, United Nations Development Programme (UNDP)'s Country Programme Action Plan Results and Resource Framework is explicit in highlighting energy and environment as two pillars for sustainable development frameworks and strategies. Under the Unted Nations Development Assistance Framework (UNDAF) outcome, the two relevant expected outcomes are as follows:

- Mitigateing and adapting to climate change and providing energy for sustainable development; and
- Global environmental commitments integrated into development planning and implementation capacity developed (Iran's second National Communication to the UNFCCC, 2010).

The two goals which are mentioned above are considered in Iran's energy policies. A clear increasing level of attention has been recently found in Iranian governments energy policy related to climate change. More concern has been shown in the area of energy efficiency, pollution reduction, renewable energy, and GHG emission (Iran's initial National Communication to UNFCCC, 2003). However, Iran doesn't have a comprehensive energy policy. There is not a single responsible organization for Energy policy making in Iran. There are several organizations responsible to these policies under government administration such as ministry of energy, ministry of oil, Iran Energy Efficiency Organization (saba), Iran Renewable Energies Organization (sana) (Allahdadi, 2012). In Iran, energy policies is considered as energy laws under five years Governmental development programs (Amir moeini, 2009). So, we have a comprehensive analysis about energy policies in five-years Governmental development programs. Capturing associated gas addressed in the first Five-Year Development Plan (FYDP) for the first time (First Five-year Socio Economic Development Plan of Iran). Energy saving law, reduction in energy intensity, decline in the energy growth rate and financing to new technologies in the energy sector are discussed in the second FYDP (Amirmoeini, 2010). Iran has high potential for alleviating the amount of GHGs emission. In the energy sector, the principal policies pursued clean and efficient power generation, environmentally friendly refineries and improved public transport and energy efficiency (Amiri & Eslamian, 2010). These policies have been legislated mainly in FYDP3. Also, subsides' allocation to regulate energy market and increase the share of renewable energies in the total primary energy supply has been addressed seriously (Fadaei,

2010). In the forth FYDP, an special energy management act has been developed, energy subsidies targeting program and fuel switching program from gasoline in light vehicles to CNG has been started (Rostami, 2011). Finally, article 138 of fifth FYPD addressed to take into account and develop clean development mechanism (CDM) projects. Based on this law, all organizations and companies are allowed to sell their emission certificates (Fifth national socio-economic development plan of Iran).

Results show that Iran is making an effort to mitigate climate change by establishing and reforming its energy and climate policies in order to achieve a low-carbon development. But, in these documents, Iran has not stated a clear and quantitative goal about GHGs reduction. In fig.2 we try to visualize energy policy process in Iran. There is no policy in the regional level. Also, there is not special planning at the local planning level. As well as KP considered in FYDPs. Annual Budget Laws Transportation Laws Energy Laws Kyoto Protocol FYDP Air Pollution Laws International Level National Legislation Level National Strategic Planning Level Regional Level (Middle East) Local Planning Level ,Source: Author's investigations

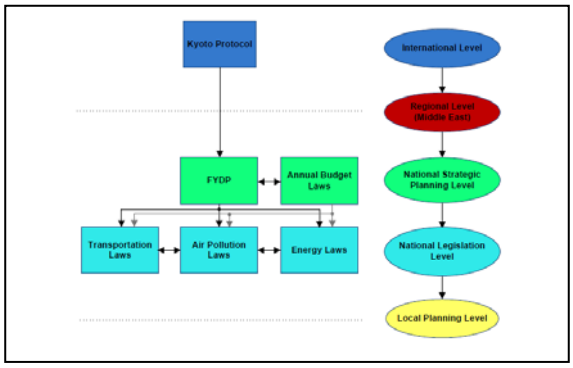

Fig. 2. Energy Policy Model in Iran

4. METHOD

In this paper the following method is proposed: (1) the composite index was defined as the Euclidian distance (ED) to the worst adaptation case represented by the zero point; (2) when the relative indicators are significantly correlated, the ED is estimated in the orthogonal system defined by the principal components; and (3) the ED is standardised in order to get a value between 0 and 1.

4.1. Selection of relevant indicators for modeling energy policy adaptation index regarding UNFCCC and KP.

We construct a comparative index to assess energy policies adaptation regarding UNFCCC and KP. In this case, the adaptation index of a country is the degree to which that country is able to cope with its responsibilities regarding UNFCCC and KP. The proposed index is based on several indicators selected by expert judgment. The selection process consists of following four steps:

Step1) Identifying sources of indicators

After comprehensive interviews with energy and environmental experts from gas treating plants, RIPI and private sector we identified 6 groups of indicators:

1. World Energy Council (WEC) Energy sustainability indices

The Energy Sustainability Index ranks WEC member countries in terms of their likely ability to provide a stable, affordable, and environmentally-sensitive energy system. The rankings are based on a range of country level data and databases that capture both energy performance and the environmental impact of the country's energy use (Energy Sustainability Index, 2012).

2. Environmental performance Index (EPI)

The Environmental performance Index (EPI) ranks countries on performance indicators tracked across policy categories that cover both environmental public health and ecosystem vitality (Srebotnjak & C.Esty, 2010).

3. Commission on Sustainable Development (CSD) indicators

CSD approved its Work program on Indicators of Sustainable Development in 1995. The first two sets of CSD Indicators of Sustainable Development (henceforth CSD indicators) were developed between 1994 and 2001. They have been extensively tested, applied and used in many countries as the basis for the development of national indicators of sustainable development. We used environment and energy related indicators of third edition of these indicators.

3. Sustainable energy indicators of Helio

Helio International is a non-governmental organization based in Paris. Its secretariat coordinates the development and execution of projects, liaises with energy experts and ensures regional representation on issues concerning energy sustainability. HELIO International has undertaken a research project to assess and monitor the contribution of energy systems to an improved quality of life and to check the implementation of environmental conventions and principles. Energy experts evaluate their country's energy policy according to eight indicators that cover all aspects of national energy systems (social and technological, as well as environmental). These reports can then be used by governments and other stakeholders to better promote eco-development via comprehensive energy policies (HEILO, Sustainable Energy Watch, 2006).

4. IEA indicators.

The international energy agency (IEA) agenda has been defined on three main policies: energy security, economic development and save the environment. But paid more attention to climate change then. We can find sustainable energy policies that activate economic growth and environment protection in IEA reports. GHGs mitigation is one of the five

main goals of IEA. We used ten indicators IEA uses in its annual reports (World Energy Outlook, 2013).

5. Iran's sustainable development committee indicators.

Iran's sustainable development committee has developed a set of environmental sustainability indicators for Iran in 2012. These indicators categorized in five issue and 13 sub-issue. We just detect one related issued two sub-issue within. We select two indicator from this group (Javaherian, 2013).

We chose energy policy related indicators from these groups of indices and listed below.

Table.1. Collection of indicators gathering from 6 different sustainable energy indicator groups.

Indicator \ Group Indicators	WEC(I1)	EPI(I2)	CSD(I3)	HELIO(I4)	EIA(I5)	SDCI(I6)
Consumption of ozone-depleting substances	*					
Air polution	*					
Annual energy consumption	*					
GHGs emissions	*					
Share of renewable energy in total energy supply	*					
SO_2 emissions		*				
No_2 emissions		*				
CFCs emissions		*				
Out of rate ozone formation		*				
GHGs emissions per capita		*				
Carbone per capita in power generating units		*				
Industrial Carbone per capita		*				
Power generating variety			*			
Energy export variety and dependence			*			
Energy consumption per capita			*			
Climate impact			*			
Power generation efficiency			*			
Gasoline affordability			*			
Family electricity affordability			*			
Access to electricity				*		
Investment in clean energies				*		
Vulnerability				*		
Quality of information				*		
Common property				*		
Economic growth rate					*	
Energy consumption rate	*				*	
Population growth					*	
Innovation and technology progress					*	
Oil price					*	
Energy intensity	*			*	*	*
Energy consumption per capita	*					
Co2 emissions	*	*		*	*	*
Energy efficiency		*		*		
Private sector investment				*		

I1: World energy council energy sustainability indicators, I2:Environmental performance framework indicator, I3: Sustainable development indicators, I4: Helio sustainable energy indicators, I5: International energy agency

After suitable indicators were identified, we asked our experts to prioritize these indicators by grading them from 1 to 10.
We created a questionnaire with 34 questions and sent to 27 top experts in the energy and environment fields and delivered 20 of them. We calculated mean values for all of the indicators and selected indicators which have mean value that is higher than 7. So, 5 of them were selected.

Table. 2. : For a given country indicators of the adaptation index defined as:

Indicator	Formula
Energy intensity of GDP (X_1)	$X_1 = \frac{TPES}{GDP}$ (Where TPES is the total primary energy supply and GDP is the gross domestic product)
The ratio of energy consumption growth (X_2)	5 year average of energy consumption growth
Energy consumption per capita	$X_3 = \frac{FEC}{Population}$ (Where FEC is the final energy consumption)
Green house gas emissions	Total GHGs emissions from fuel combustion (CO_2 equivalent)
share of the renewable energies in the total primary energy supply	$X_5 = \frac{TPES_{Renewable}}{TPES_{Total}}$

Step 3) The context of non-annex I countries those are at the same stage of development with Iran.

Since our composite index of adaptation is a comparative index, we have to compare Iran with countries which have two essential characteristics. First, they must be one of the non-annex I countries. Based on common but differentiated responsibilities principle of the KP, these countries don't have any commitment to GHGs mitigation, but they must formulate where relevant, possible and cost effective national programs to improve the quality of local emission factors. We try to evaluate these activities in energy sector in this study. Second, they must be in the same situation with Iran, based on stage of development.

Annual global Competitiveness report is one of the comprehensive series of reports that is published by World Economic Forum. On issue which was published in 2012-13 Iran is ranked with 17 countries in the Transition from stage 1 to stage 2 (The Global Competitiveness Report, 2012-2013).

Step 4) Construction of the composite index of adaptation

We defined the composite index of adaptation as the mean of the five selected indices. Since selected indices had different units, we had to standardize them.

5. Results

The proposed adaptation index (I) was estimated for year 2010 (as the base year after the Kyoto's approval) as well as for year 1996 (as the base year before the Kyoto's approval) for selected countries.

Notwithstanding the ED was estimated in both systems, i.e. the (I1, I2, …, I5) system and the principal components (P1, P2, …, X5) system, the results were exactly the same.

Table. 3. : Values of the adaptation relative indicators for selective counteries

Indicator	X_1		X_2		X_3		X_4		X_5	
Year / Country	1996	2010	1996	2010	1996	2010	1996	2010	1996	2010
Algeria	13095	15834	-0.73	5.56	32.54	53.8	56.02	112.2	0.376	0.16
Azerbaijan	92065	25308	-6.78	1.77	59.92	82.6	28.93	34.6	2.019	2.28
Bolivia	22619	22120	3.61	6.24	21.43	26.0	6.71	13.6	30.845	5.1
Botswana	9921	5802	3.81	-0.61	35.32	29.9	3.04	3.8	4.393	6.3
Brunei	10714	12897	9.84	6.59	302.39	324.4	4.71	7.2	0.000	0
Egypt	24207	28385	-0.45	5.96	23.41	42.9	87.55	189.5	9.868	3.7
Gabon	6746	5811	3.32	5.20	50.00	29.9	1.42	4.6	71.365	14
Honduras	16270	12108	2.39	4.13	19.84	17.4	3.48	8.1	63.805	12.5
Iran	30159	43010	5.69	5.35	63.89	118.7	258.61	548.9	1.056	0.17
Kuwait	11508	13422	46.09	1.85	356.75	462.3	35.21	83.7	0.000	0
Libya	17064	14990	6.88	0.19	121.43	123.4	36.98	55.0	1.555	0.83
Mongolia	54763	31399	-9.91	7.06	38.89	30.9	8.50	8.0	2.826	2.3
Philippines	18651	10271	4.85	-0.20	19.44	12.2	61.80	72.9	34.891	10.6
Qatar	19445	11620	3.60	4.98	670.25	1229.6	19.72	63.6	0.000	0
Saudi Arabia	15476	22513	5.14	4.94	196.43	309.3	216.7/4	438.2	0.304	0
Sri Lanka	16270	7143	4.30	0.06	14.68	10.3	8.09	12.7	0.757	14
Venezuela	17857	18182	4.01	2.53	103.97	118.7	125.14	159.0	0.000	12
Min	6746	5802	-9.91	-0.61	14.68	10.3	1.42	3.8	0.000	0
Max	92065	43010	46.09	7.06	670.25	1229.6	258.61	548.9	71.365	14

5.1. Iran's status

5.1.1. Energy intensity

As fig. 1 shows, Gabon and Azerbaijan were found as the highest and the lowest adaptive in 1996 as the base year before KP. As fig.3 shows, Botswana and Iran were found as the highest and the lowest adaptive in 2010 as the base year after KP, respectively.

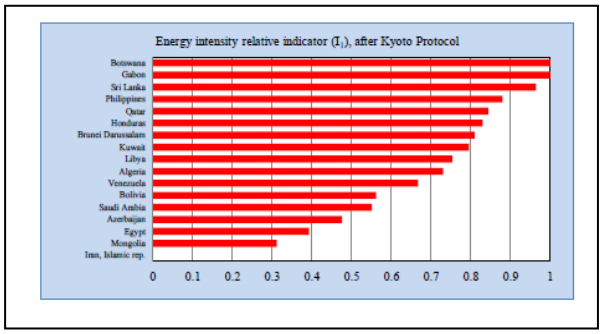

Fig. 3. Values of the adaptation relative indicators for selective counteries after Kyoto Protocol

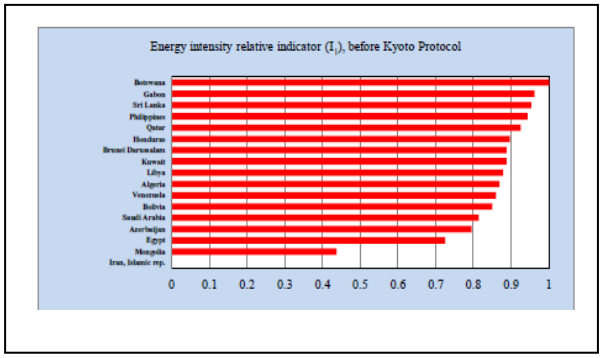

Fig. 4. Values of the adaptation relative indicators for selective counteries after Kyoto Protocol

Some points are noteworthy in relation to the energy intensity in Iran: First, the oil share in primary energy supply in the country has been stabilized, which is due to increased gas production and its replacement by oil. However, the energy intensity in Iran is extremely ascending and because of low fuel prices, the resulted exhaustion and also lack of equipment efficiency, the energy intensity is much higher than other countries. Second, as fig.3 indicates, energy intensity is higher in energy producer countries than others such as Botswana, Gabon, Sri Lanka and Philippines which are not energy producer or exporter. So, they use energy more efficiently. There is an exception about Qatar which is an energy producer but doesn't consume so much energy because of its small population size. Low energy prices in energy producer countries, is the main difference between energy producer countries and energy importer countries which makes the former consume energy with low efficiency.

5.1.2. Energy consumption growth rate

Iran has a higher energy consumption growth rate in respect of other energy producers. Other energy producer countries were able to control their energy consumption growth rate. Maybe it has happened due to low economic growth of these countries. But, unfavorable status in energy intensity indicator, indicates that Iran's energy consumption growth rate did not lead into economic growth.

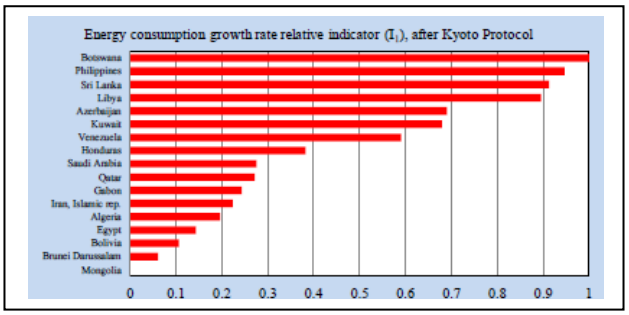

Fig. 5. Values of the energy consumption growth rate relative indicator for selective countries after Kyoto Protocol

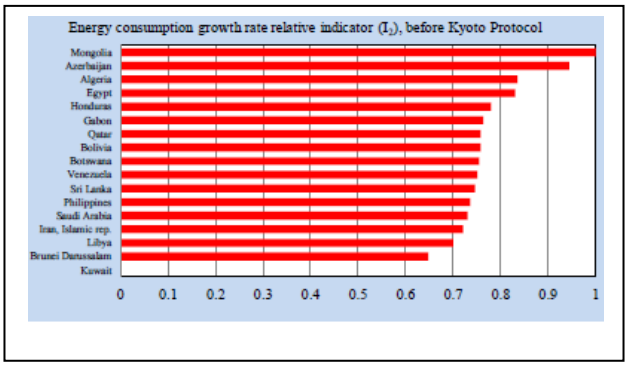

Fig. 6. Values of the energy consumption growth rate relative indicator for selective countries before Kyoto Protocol

5.1.3. Per capita energy consumption

Qatar has the worst status in per capita energy consumption relative indicator. It makes marks of other countries in this indicator stand above 0.6. Nine of ten countries that have the largest per capita energy consumption are the main energy producers. Iran's per capita energy consumption isn't high but it is not much suitable between selected countries.

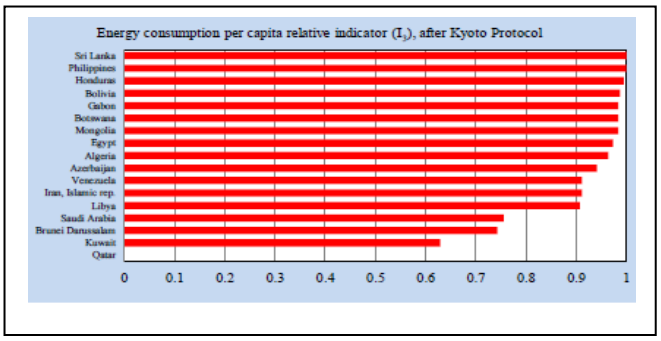

Fig. 7. Values of energy consumption per capita relative indicator for selective countries after Kyoto Protocol

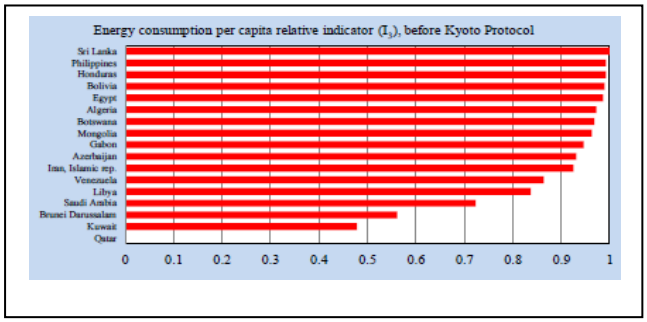

Fig. 8. Values of energy consumption per capita relative indicator for selective countries after Kyoto Protocol

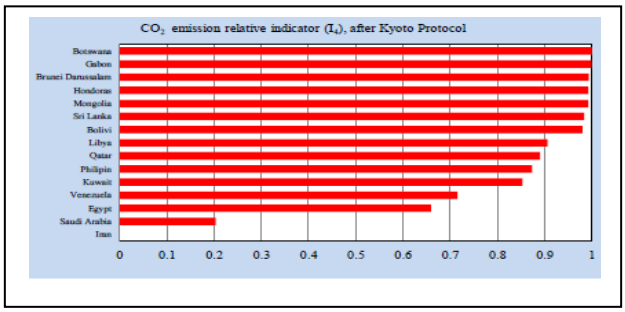

Fig. 9. Values of the CO_2 emission relative indicator for selected counteries after Kyoto Protocol

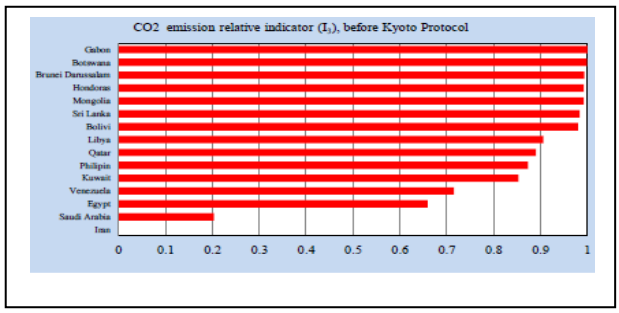

Fig. 10. Values of the CO_2 emission relative indicator for selected counteries before Kyoto Protocol

5.1.4. CO_2 emission rate

Iran has the lowest grade in CO_2 emission relative indicator both before and after the KP. Saudi Arabia has second place. Energy intensive industries such as cement, steel and glass in Iran and desalination and petrochemical industries in Saudi Arabia cause most CO_2 emissions in these two largest emitter countries.

5.1.5. Share of renewable energies in TPES

As fig.11 and fig.12 show Iran has better position between selected countries in this index respect to other indices. However it has placed in the second half of the list yet.

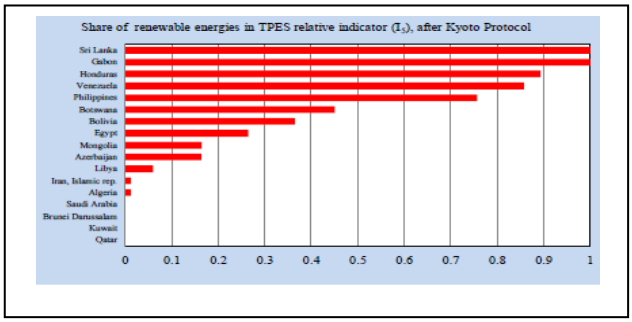

Fig. 11. Values of the share of renewable energies in TPES relative indicator for selected counteries after Kyoto Protocol

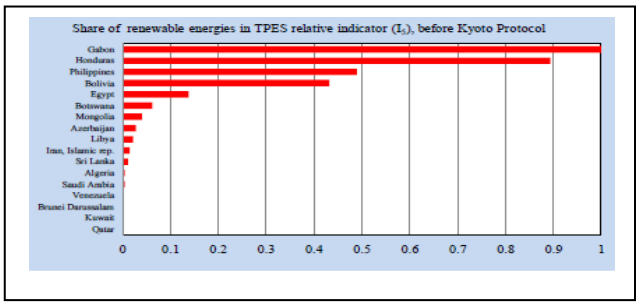

Fig. 12. Values of the share of renewable energies in TPES relative indicator for selected counteries before Kyoto Protocol

Saudi Arabia, Qatar and Kuwait have managed to increase share of renewable energies in their TPES. They are placed in top 40 countries based on Ernst & Young institute's Renewable Energy Country Attractiveness Index (RECAI). However, they have not a desirable status in the this indicator because of their enormous share of fossil fuels in TPES.

Finally, we have created an adaptation profile of six selected countries. Fig. 13 shows this profile which contains six countries identified as rivals of Iran in the Iran's 20-year perspective document.

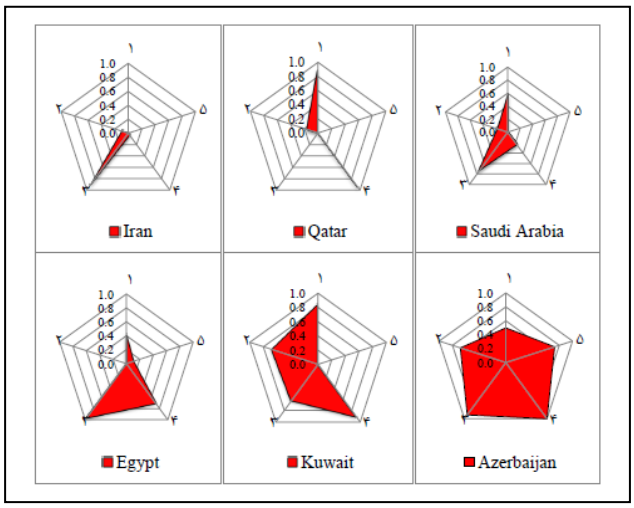

Fig. 13. Adaptation profile of selected countries

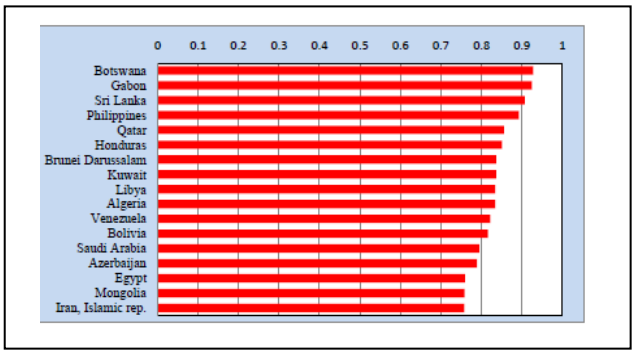

Fig. 14. Values of the composite index of adaption in selected countries after Kyoto Protocol

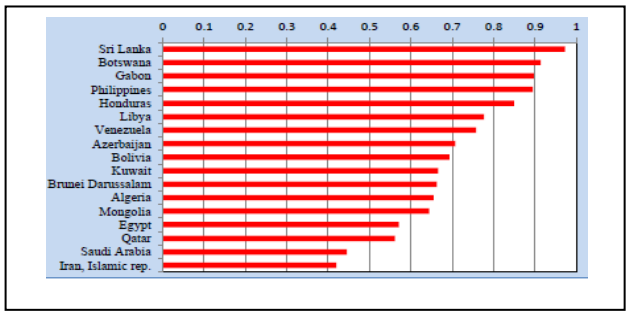

Fig. 15. Values of the composite index of adaption in selected countries before Kyoto Protocol

5.1.6. Composite adaptation index

As fig. 14 and fig.15 show, Iran has the lowest adaptation between selected countries and this status hasn't differed in comparison of before KP. The mean value and standard deviation of composite index of adaptation were respectively 0.74 and 0.098. Sri Lanka has the highest adaptation value in 2010 and Iran has the lowest value.

Because of increasing importance of the environmental protection, many countries such as Iran have accepted environmental commitments and try to adapt their policies, specialy energy policies with these commitments. One of the most important environmental commitments is the UNFCCC and the KP. UNFCCC and KP related energy policies have been defined in the natinal five year development plans in Iran. In this study, first, we investigated these plans. Second, we defined a composite adaptation index by literature review and expert judgment and assessed the adaptation of energy policies with UNFCCC and KP goals.

Assessing a composite adaptation index is not straightforward since energy policy adaptation with KP goals is a multi-dimensional and somewhat qualitative concept. The various dimensions are often correlated. For example, improvement of the CO2 emission relative indicator could be achieved by improvement in energy intensity relative indicator. Also reduction in energy intensity make energy consumption per capita and energy consumption growth rate indicators to be improved. Then a composite adaptation index can be computed as the distance to the best case. In this paper, an Euclidian Distance is used allowing a limited compensation between the scores on the various dimensions. The concept was illustrated by comparing 17 countries with similar economic status with Iran.

Calculation results indicate that nevertheless Iran has took into consideration its commitments to UNFCCC and KP in its energy policies, it doesn't have any success to implement these policies. Based on the proposed index, the adaptation degree of Iran in comparison to seventeen selected countries is discussed. The results show that Iran has placed at the end of the list of countries in energy intensity and CO2 emission indicators as well as in the composite adaptation index. So, in spite of Kyoto protocol have considered within Iran's energy policy making, there has not been much successes in implementation.

Results show that Iran is making a great effort to mitigate climate change by establishing and reforming its energy and climate policies in order to achieve a low-carbon development, but has not stated a clear and quantitative goal about GHGs reduction. These results show that in Iran there is a continuous energy policy concern about climate change but there is not a special organization with legislative power to implement and pursue these policies. Hence, Iran has not roughly achieved its goal in the past 14 years and there are reasons to claim that Iran is not on the right way to make defined achievements on GHG emission control.

6.2. Suggestions

We have some suggestions to improve the adaptation status.

While the low status of Iran in the adaptation index is mainly related to energy intensity and CO_2 emission and since decrease in energy intensity for consistent gross national product, causes CO_2 emission reduction, as well as, status of energy consumption per capita and energy consumption growth rate indicators have been improved due to energy intensity reduction it has the most priority to improve adaptation index.

According to the current situation of the energy sector in Iran, different obstacles can be found that prevent it from reducing its GHG emission and surpassing the emission caps. The key obstacles which affect the Iranian GHG emission policies include:

- Lack of comprehensive "energy policy agenda" such as "strategic national energy plan" in Iran. It cause a lot of implementing obstacles as well as monitoring difficulties due to distributing energy-environmental policies between diverse sectors without sufficient coordination.
- Lack of attention to UNFCCC's flexible mechanisms exacerbate this issue. CDM is one of the flexible mechanism that were defined in KP framework to help countries especially developing ones to adapt themselves with climate change. In this regard, we proposed a modified energy policy model in which strategic cooperation such as CDM is considered.

Strategic energy plan has proposed at the national strategic planning level. FYDP and annual budget laws interaction with this plan must be considered. Finally climate change laws in coordination with energy, air pollution and transportation laws

must be considered. These laws form the planning for adaptation with climate change at the local planning level.

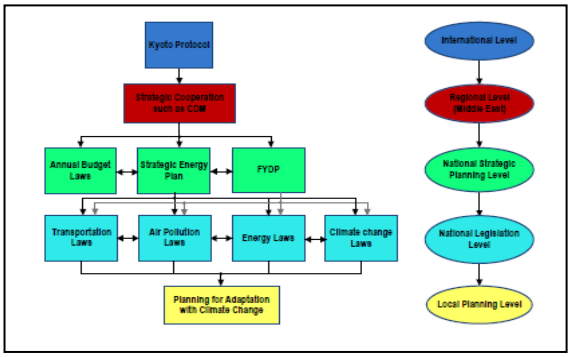

Fig. 16. Proposed Energy Policy Model in Iran

As we have shown in Fig.16, we can use CDM in the regional level and emission trading mechanism in the local level. As we said, CDM is used in Iran but the number of registered projects in comparison of its potential is negligible. So it is a necessity to remove its obstacles and invest in facilitating process of define and implementation of CDM projects.

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BIOGRAPHY

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