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Promoting Renewable Energy in Jordan by Employing Economic Incentives

Fawwaz Z El-Karmi[1*] and Nazih M Abu-Shikhah[2]

[1]*Al-ahilya Amman University, Post Office:1932, Amman, Jordan*
[2]*Electrical Regulatory Commission, Amman, Jordan*

Abstract

Renewable energy is the way forward in the medium to long-term future in Jordan. Renewable energy (RE) in Jordan has a very modest share not exceeding 0.5% of total installed capacity. This paper compares between the economics of conventional power and that of renewable power. The renewable power considered includes photovoltaic (PV), wind, and concentrated solar power (CSP). Results showed that the levelized cost is 11, 14, 20, and 21 ¢/kWh for wind, CCGT, CSP, and PV, respectively. The Internal Rate of Return values (IRR), were 16.35%, 11.17%, 8.85%, and 6.28% for CCGT, wind, CSP and PV, respectively. The major outcome showed Wind power is faring well in the economic comparison with conventional power while CSP and PV are still not economically justified. Testing of the potential of two economic incentives for renewable energy was performed. The first incentive being a price premium for power purchase, illustrated a decisive change of feasibility but still the same ranking. Introducing a price premium of 15% alone led to the ranking of CCGT, Wind, CSP, and PV in priority order with both Wind and CSP feasible while PV not yet feasible. The second incentive pertaining to adding an increase of 5% to CCGT cost to cover for pollution control results in the same ranking order as before but with only Wind feasible. Finally combining both incentives results in a different ranking with Wind power coming before CCGT, then followed by CSP and PV. Moreover, in this case all RE power sources become feasible.

Keywords: Renewable power; Conventional power; Economic incentives; Pollution control

Introduction

All global efforts are directed to harnessing renewable energy sources. At the present time conventional power possess several advantages over renewable power including production economics, economy of scale and mature technologies. However, this situation cannot continue forever, since fossil fuels are being depleted and nuclear power is not really safe. Moreover, renewable power usually uses local natural resources and encourages local manufacturing capabilities. It is well realized that energy is consumed in everyday use for various applications with electricity being the most efficient forms of energy; hence, electricity generation from renewable energy is getting more and more attention at the global level.

This is due to two facts: 1) the need for sustainable resources, and 2) requirements for less pollution. Therefore, the quest for renewable energy does not include sources of new but not renewable sources such as nuclear power. Although nuclear power can be considered renewable in nature, if one takes the point of view of breeder reactors, however, it is not considered so because of its hazardous and harmful environmental impacts, e.g. the 2011 Fukushima accident.

Most promising renewable sources for electricity generation are wind and solar. The technological development of both has improved steadily throughout the last two decades or so. Moreover, costs have gone down appreciably as well. It must be admitted that there are still major problems facing the wide spread of renewable energy technologies or green power as it is called. These include [1]: a) institutional deficiencies, b) economy of scale, c) pricing distortions, and d) limited information on resource base.

The problem facing the global energy scene today is that time is pressing and we do not have the luxury of dragging our feet for one or two decades. This is especially true after the setback resulting from the nuclear accident at Fukushima in Japan. Therefore, it is vital that some strategies be developed and implemented to alleviate the obstacles facing the utilization of renewable energy. The ideas related to such measures include: a) implementing long-term renewable energy policy programs, b) developing and applying carefully selected strategies, c) starting long-term capacity building programs and awareness campaigns, d) devising flexible financing mechanisms, and *e)* applying wider innovative spreading strategies.

The most promising spot in the future of renewable energy is that their costs are getting down much faster or even contrary to those of conventional power. In other words, if the cost of pollution was included on top of the already increasing conventional production costs then will surely be in favor of promoting renewable energy. The rationale being that renewable energy has essentially a zero operating cost relative to conventional sources. Moreover, the phenomenal development in renewable energy technologies compared to the slowing down in development for conventional sources adds up to the comparison. Finally, the impact of the global efforts being addressed by all countries; developed and developing is apparent. A good example is the Kyoto protocol which encourages the cooperation between developed and developing countries under the umbrella of carbon credit trading schemes.

Practically speaking, renewable energy is priced according to one of the following general types: a) fixed energy quantity block, whereby the price is often expressed as a price premium on top of the price of conventional power, b) percentage of monthly use, whereby customers may choose to be supplied by renewable energy to cover a

***Corresponding author:** El-Karmi FZ, Al-ahliya Amman University, Post Office 19328, Amman, Jordan, Tel: (+96279) 5506 535; E-mail: fkarmi@ammanu.edu.jo

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fixed percentage of their monthly consumption, and c) long-term fixed price contracts, whereby the project developer will be enabled to secure financing from users and in return will provide them with a stable electricity supply [2].

Many countries have devised incentives to promote the use of renewable energy. This seems to be a global trend and the way forward to enhance the utilization of renewable power. In Senegal, for instance, an optimization technique is combined with a cash flow analysis to investigate investment decisions in renewable energy sector. Findings indicate that this support mechanism could strengthen the sustainable deployment of renewable energy in remote areas of Senegal [3].

Germany, Romania, Slovak Republic, Denmark, Sweden and Poland have included an exemption on the payments of excise duties for electricity when the electricity is generated from renewable energy sources (RES). This tax incentive is the most widely used. Limited tax incentives in personal income tax are available in Belgium, France, Czech Republic and Luxembourg. In corporate tax, tax incentives consist mainly of a deduction in the taxable profit in Belgium, Greece, Czech Republic and Spain. Lower tax rates in value added tax (VAT) are applied in France, Italy and Portugal. Only Spain and Italy use effective tax incentives in property tax. As a great diversity of tax incentives has been used to promote green electricity, this adds another difficulty to the EU objective of providing a renewable energy policy framework, but also it offers a useful set of case studies which can be used to inform EU policy development [4].

Langniss et al. suggested three different options to improve the penetration of renewable energy in Germany by providing suitable and flexible incentives to the promotion mechanism and the quantitative compensation scheme without endangering the deployment of renewable energy technologies [5]. A "Retailer Model" encourages end-use retailers to adapt renewable power to the actual demand of their respective customers. The "Market Mediator Model" creates an independent market mediator responsible to market the output of renewable plants. This model is the primary choice when new market entrants are regarded as crucial for the better integration of renewable energy and enhanced competition. Finally, the "Optional Bonus Model" is directing towards functioning markets; whereby, plant operators can alternatively choose to market the generated electricity themselves with a premium on top of the market price instead of a fixed price [5].

Renewable energy certificates (RECs) represent tradable instruments that can be used to meet voluntary renewable energy targets as well as compliance requirements for renewable policies [6]. RECs come in different forms including: a) bundled, i.e. paired by the electric service provider with grid electricity delivered to the buyer, b) unbundled from electricity as a standalone product and paired by the buyer with its grid electricity purchase, and c) subscription or future certificates involving an up-front purchase of certificates to be generated in the future by a new or soon-to-be-built renewable electricity facility.

Renewable energy can be promoted through adopting regulations and policies that will serve in the reduction of the costs associated with this energy. These cost minimizing features are usually developed by independent power producers (IPP) rather than traditional electric utility companies [1]. This is good in a sense of increasing the competition with conventional sources. One or more of the following measures and actions can be adopted to reduce the costs of renewable energy production. These include: increasing manufacturing output and hence efficiency, development of industrial infrastructure by supporting businesses and venders of various materials/renewable technology components thereby reducing actual project costs, creation of multiple project development opportunities, providing proper incentive mechanisms, and using fair comparison with conventional sources by including cost externalities such as the cost of polluting the environment.

It should be emphasized that several criteria will affect the success of any renewable energy policy. These factors include: minimizing cost of generation, maximizing competition, meeting and maintaining firm development targets, maintaining and creation of sustainable purchase market, encouraging diversity, enhancing political support, and developing local industrial infrastructure. Among potentially effective factors are: compatibility of electricity sector standards, regulatory structure, stability of the renewable policies over time, and competitive parity that allows fair spreading of costs over stakeholders, reduction of industrial barriers that will enable the integration of renewable energy with other electricity sectors, and finally the simplicity of the design and administration of the energy policy [1].

Within Jordan, conventional power is dominant and it is basically made up of a generation mix of gas-fired combined cycle and gas/heavy fuel-fired simple cycle power plants. On the other hand, renewable energy has a very modest share not exceeding 0.5% of total installed capacity. This paper discusses two economic incentive schemes to be included in renewable energy strategy as applied to the case of Jordan. The first incentive involves a purchase price adder that is already suggested in the new Jordanian renewable energy Law being discussed and will soon be approved by Parliament [7]. This involves an added 15% over purchase price from any renewable source if it includes local manufacturing of parts and/or systems. The second involves the inclusion of environmental pollution as an added cost to the cost of production from conventional sources. This cost item is calculated as the cost of removing one unit of CO_2. A cost of 5% is added to the cost of conventional power to cover the cost of pollution control equipment. Both incentives are included in the comparison between renewable power and conventional power according to the Jordanian situation. This will hopefully improve the competitive advantage of renewable power.

This paper is organized as follows: in section 2 the methodology implemented is described; section 3 describes the developed economical model, while section 4 presents tests used in the current investigation and section 5 presents the results obtained and their analysis. Finally, section 6 discusses the conclusions and recommendations.

Methodology

Rationale

Competition for electric power from various power generating technologies has been the subject of recent interest of public as well as investor sides. Competition based solely on market forces could favor certain technologies over others. This is a good objective in itself; however, with the increased distortions and externalities to costs and prices some intervention is needed. Governments may be in a position to affect certain incentives to tilt this situation in order to bring some equity to the comparison. For example, construction costs, fuel costs, environmental regulations and financing costs can be largely affected by government policies [8].

Pure competition among power generating technologies will select the most feasible option without due attention to important issues which are essential at the present time but will be more so in the future. If environmental pollution is not taken into consideration now when levels of pollution are low it will be inevitable to do so when they become alarmingly high. Moreover, if power plant owners can manage to finance their projects rather easily and cheaply now it does not mean that they will continue to do so in the future when capital becomes scarcer. More importantly, if governments do not lend a helping hand to promising technologies by various means and policy instruments who else will?

In this paper two such economic incentives are studied to measure their effect on the economic comparison of conventional versus renewable power sources as applicable to the situation in Jordan. Although the assessment is carried out for the Jordanian case, which means that most data are obtained form the real data of power plants in Jordan, however, most of the data is represent international practices as well actual operating plant data.

The economic incentives tested in this paper are as follows:

Providing a price premium to renewable power as an encouragement token for various reasons. The reasons include, inter alia, encouraging green power, utilizing local resources, and encouraging local manufacturing.

Adding environmental pollution abatement costs to conventional power cost data.

The cost comparison at first is made among the alternatives according to the base case, which does not include any such incentives. This presents the true current situation with expected advantage of conventional power over renewable power. Adding the incentives one at a time and combined will provide a testimony to the viability of such incentives to the government or the regulatory commission to adopt such economic incentives. Therefore, the objective of the paper is to test these incentives in order to give reason for their adoption in the future.

Input data

Jordan power system is comprised of existing power plants all owned by the private sector. Some of the power plants were built through independent power producer (IPP) scheme. Total installed capacity is currently about 3500 MW. About 58% of the installed capacity comes from combined cycle gas turbine plants (*CCGT*). Some 33% comes from simple cycle power plants and about 9% from gas turbines. Only about 0.5% comes from renewable energy. Fuels used are natural gas imported from Egypt, heavy fuel oil, and diesel. Renewable energy comprises several wind and *PV* plants. It is assumed that the thermal efficiency of *CCGT* is 55%, and this measure is not applicable to Renewable Energy technologies (Table 1).

Basis of calculations

The cash flow components comprising the proposed model are:

Capital cost represented by present worth payment.

Annual Costs:

a. Installation cost (annualized capital cost)

b. Operation cost

c. Maintenance cost

d. Other costs: including interest, taxes, administrative, general, and miscellaneous.

Annual Income:

Sales of electricity based on preset price.

The interest (discount) rate used throughout the analysis is 10%. This is more representative of the economic situation of Jordan. It also represents to a good estimate the opportunity cost of capital.

Calculations are carried out using an *Excel*™ spreadsheet. Each alternative has its input data as well as its control parameters included. The following economic metrics/indicators, which underpin the feasibility of the alternatives, were used in the analysis:

1. Internal Rate of Return (IRR) of the cost as well as revenue cash flows for the life of the alternatives.

2. Benefit/cost ratio.

3. Payback period.

4. Net Present Value (NPV).

The model

The proposed model although being simple it caters for many factors that affect the economies covered by any project in the power sector. It can be used to compare among many power alternatives involving many control variables. The model was designed and split into three main Excel sheets; namely:

1. The input sheet

2. The calculation sheet

3. The output sheet

Model details are discussed in the following.

Model input and calculations

Table 2 shows the model input parameters and the operations performed on these parameters, such that the cash flow items are assessed in order to compute him abovementioned metrics. The first column gives names to different model parameters, and the calculations done. The second column describes the variables used in the model. Columns 3 and 4 illustrate how this model is applied to the Wind renewable technology for the base case and the 15% premium incentive (Table 2).

Model Output metrics

The metrics are computed based on the cash flows obtained as a result of processing the input parameters. Wind technology is used to demonstrate the output metrics as shown in Table 3.

Testing and investigation

Four cases of analysis were carried out. These are:

1. Base case representing the introduction of no economic incentives.
2. Base case CCGT and renewable alternatives with price premium.
3. CCGT with CO_2 control adder and base case renewable power.
4. CCGT with CO_2 control adder and renewable alternatives with price premium.

For each of the cases the output metrics are calculated. The objective of this analysis is to show the economics of each power option with no economic incentives. This reflects the status quo in Jordan based on actual cost figures along with international standards were appropriate. Moreover, the incentives are also assessed separately and together in

Alternative	Technology	Capital Cost (CC) $/kWh	O&M (% of CC)	Other costs (% of CC)	Capacity Factor (CF)%	Fuel consumption Kg/kWh	Average Life (Yr)
CCGT	Combined cycle	2300	4	4	85	160	30
PV	Modules	2293	2	2	20	0	20
Wind	Onshore	1968	2	4	35	0	20
CSP	Parabolic trough	2882	2	4.5	30	0	20

Table 1*:* lists the relevant input data for the four power alternatives.

Variable	Item	Base case	15% Premium
A	Installation Cost ($ /Watt)	2	2
B	Installed capacity (MW)	100	100
C	Total Installation Cost (M$)	200	200
Control Parameters			
D	Discount rate (%)	10	10
E	Capacity factor (%)	30	30
F	Life span (Yr)	20	20
G	Operation Cost (%)	1	1
H	Maintenance cost (%)	1	1
I	Other costs (%)	4	4
General			
J	Total hours per year	8760	8760
K	Annuity Factor	8.514	8.514
Computed costs			
L=C × G	Annual Operation cost (M $)	2	2
M=C × H	Annual Maintenance cost (M $)	2	2
N=C × I	Other Annual costs (M $)	8	8
O=L+M+N	Total running costs (M $)	12	12
P=C / K	Annual installation cost (M $)	23.492	23.492
Q= O + P	Total Annual Cost (M $)	35.492	35.492
Energy Generated			
R	Annual Production(GWh)	262.8	262.8
Average Costs			
S=O / R	Average Running Cost (Cents/kWh)	4.566	4.566
T=Q / R	Levelized Cost (Cents/kWh)	13.505	13.505
U	Selling price (Cents/kWh)	12	13.8
Sales and Income			
V=U × R	Total sales (M $)	31.536	36.266
W=V - O	Total Income (M $)	19.536	24.266

Table 2: Model input parameters and calculations performed on them.

order to gauge their effectiveness in encouraging the investment in renewable power.

Moreover, two sensitivity analyses were conducted. The first analysis aims to demonstrate the effect of variation of the power purchase price premium incentive between 10% - 20% for the renewable options. The second analysis investigates the role of variations of CO_2 control costs between 2% - 7% on CCGT power.

Analysis of Results

Base case

Table 4 illustrates the main results for the base case (i.e. with no economic incentives) for all alternatives.

Table 4 clearly shows that CCGT power is the best alternative according to all indicators. Wind comes second and it is feasible even in the base case; i.e. the IRR (11.71%) is higher than the discount rate (10%). CSP is not feasible and PV is the least feasible.

Base case for CCGT with price premium for renewable power

Table 5 lists the results of the base case for CCGT and price premium for the renewable alternatives for several service lives.

It evident that the economic incentive of adding 15%, as stipulated by the Electricity Regulatory Commission in the recently published directive will improve the attractiveness of renewable power [3]. Even PV becomes marginally feasible under this condition.

CCGT with CO_2 cost adder and base case renewable power

Table 6 contains results of the case involving CCGT with CO_2 cost adder and base case renewable power. It is worth noting that the CO_2 equipment control cost is added to the other costs in the calculations.

It can be seen from the results, when CO_2 cost adder is applied with no economic incentive for renewable power, the CCGT alternative is still feasible and ranks as number one alternative. Wind power is marginally feasible, while both CSP and PV are not feasible. Therefore, this economic incentive although penalizes conventional power it does not improve the competitive advantage of renewable power.

(a) Base case – 0% bonus

	Lifespan (Yr)		
	15	**20**	**25**
IRR (%)	9.4	11.17	11.94
NPV (M$)	35.272	-6.704	30.050
PB-period (Yr)		7.87	
BCR	0.966	1.08	1.15

(b) 15% bonus (price premium)

	Lifespan (Yr)		
	15	**20**	**25**
IRR (%)	13.04	14.46	15.04
NPV (M$)	35.272	62.955	80.144
PB-period (Yr)		6.5	
BCR	1.179	1.32	1.41

Table 3: Model output metrics.

Item	CCGT	PV	Wind	CSP
IRR (%)	16.35	6.28	11.17	8.85
PB period (Yr)	6.05	11.21	7.87	9.22
B/C ratio	1.56	0.76	1.08	0.92
NPV (M$)	91.16	-39.18	15.971	-15.78

Table 4: Base case results.

Both economic incentives

Table 7 lists the results of both economic incentives included. This case clearly shows that renewable energy in all its forms, including PV, becomes feasible or economically justified. Moreover, both wind and CSP surpass conventional power, while PV still comes after conventional power.

Sensitivity analysis

Two sensitivity analyses were carried out: 1) varying the price premium from 10% to 20% at 2.5% steps, 2) varying the cost of CO_2 cost control equipment from 2% to 7% at 1% steps.

Case (1): Table 8 lists the results of varying the price premium for renewable power from 10 to 20% for the average life of 20 years.

This sensitivity test proves that PV starts to become feasible at a price premium of 15%, while both wind and CSP are already feasible even at a premium of 10% only. Figure 1 presents the effect of premium percentage variations on the IRR and NPV for the renewable energy technologies under investigation. The metrics of the conventional power will not be affected by the imposed variations and they will be 16.35% and 91.16 Million $ (Figure 1).

Case (2): Table 9 presents the results of varying the CO_2 control equipment cost adder on the results of CCGT power using an average plant life of 30 years.

It is evident from Table 9 that CCGT remains marginally feasible up to a CO_2 control equipment cost adder of 6%, and it becomes unfeasible at 7%. Figure 2 shows results regarding IRR and NPV metrics in graphical form (Figure 2).

Conclusions and Recommendations

From the analysis of the results it is evident that renewable power has very good potential in competing with conventional power. At least for wind energy it is competitive and this is why the electricity regulatory commission in Jordan set the purchasing price from wind power plants the least among all purchased power. The selling price for wind is set at 0.12 $/kWh compared with 0.15 $/kWh for CCGT, 0.17 $/kWh, and 0.19 $/kWh for CSP (ERC, 2012). This reflects the status of development of each technology globally. At the same time it reflects the future potential of wind versus other technologies.

Results further prove that the economic incentives are justified. The carbon cost adder is actually a reflection of cost recovery for a cleaner environment. It can be recovered through global carbon trade mechanisms. Jordan has already benefited from such schemes. Therefore, it is a reality rather than a fantasy.

On the other hand the renewable price premium is also justified as it represents additional incentive for investors wanting to invest in these technologies. The least that can be said about such an incentive

Item	CCGT			PV			Wind			CSP		
Life span (Yr)	25	30	35	15	20	25	15	20	25	15	20	25
IRR (%)	16.14	16.35	16.45	8.24	10.14	10.98	13.04	14.46	15.04	10.39	12.06	12.78
PB period (Yr)		6.05			8.43			6.45			7.44	
B/C ratio	1.5	1.56	1.59	0.90	1.01	1.08	1.18	1.32	1.41	1.02	1.14	1.22
NPV (M$)	81.72	91.16	97.02	-15.99	1.52	12.39	35.27	62.96	80.15	4.57	29.53	45.02

Table 5: Base case CCGT plus premium for RE.

Item	CCGT			PV			Wind			CSP		
Life span (Yr)	25	30	35	15	20	25	15	20	25	15	20	25
IRR (%)	11.44	11.83	12.03	3.88	6.28	7.43	9.4	11.17	11.94	6.8	8.85	9.79
PB period (Yr)	8.16			11.21			7.87			9.22		
B/C ratio	1.11	1.16	1.18	0.68	0.76	0.81	0.97	1.08	1.15	0.82	0.92	0.98
NPV (M$)	18.43	25.43	29.78	-52.36	-39.18	-31.01	-6.70	15.97	30.05	-35.91	-15.78	-3.28

Table 6: 5% CO_2 tax on CCGT plus base case RE.

Item	CCGT			PV			Wind			CSP		
Life span (Yr)	25	30	35	15	20	25	15	20	25	15	20	25
IRR (%)	11.44	11.83	12.03	8.24	10.14	10.98	13.04	14.46	15.04	10.39	12.06	12.78
PB period (Yr)	8.16			8.43			6.45			7.44		
B/C ratio	1.11	1.16	1.18	0.90	1.01	1.08	1.18	1.32	1.41	1.02	1.14	1.22
NPV (M$)	18.43	25.43	29.78	-15.99	1.52	12.39	35.27	62.96	80.15	4.57	29.53	45.02

Table 7: 5% CO_2 tax on CCGT plus premium for RE.

Variation (%)	PV				Wind				CSP			
	IRR (%)	PB (Yr)	B/C	NPV (M$)	IRR (%)	PB (Yr)	B/C	NPV (M$)	IRR (%)	PB (Yr)	B/C	NPV (M$)
10	9.33	8.92	0.95	-7.43	13.39	6.86	1.24	47.29	11.02	7.95	1.07	14.43
12.5	9.73	8.86	0.98	-2.95	13.93	8.65	1.28	55.12	11.54	7.69	1.11	21.98
15	10.14	8.43	1.01	1.52	14.46	6.45	1.32	62.96	12.06	7.44	1.14	29.53
17.5	10.54	8.21	1.04	5.99	15.00	6.26	1.36	70.79	12.58	7.21	1.18	37.08
20	10.93	8.00	1.06	10.47	15.52	6.08	1.40	78.62	13.09	6.99	1.22	44.63

Table 8: Varying RE price premium.

Variation (%)	CCGT			
	IRR (%)	PB (Yr)	B/C	NPV (M$)
2	15.03	6.55	1.44	71.61
3	13.98	7.01	1.34	56.22
4	12.91	7.54	1.25	40.83
5	11.83	8.16	1.16	25.43
6	10.73	8.88	1.06	10.04
7	9.61	9.75	0.97	-5.35

Table 9: Varying CO_2control equipment cost.

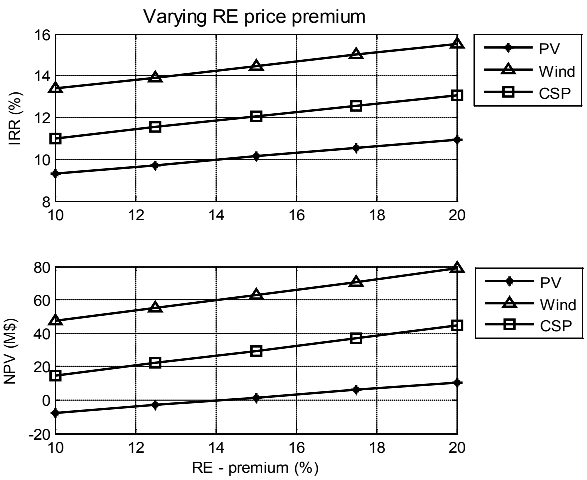

Figure 1: Role of Premium % variations on IRR and NPV of renewable energy technologies.

is that it brings renewable at par with the conventional power thus affecting equity in the comparison.

Combining both economic incentives is really a win-win situation, as it enforces environmental pollution control, and provides justified economic signals to investors to invest in renewable power. With the application of both investigated incentives, even the least economic renewable power, which is PV becomes attractive and more feasible than conventional power.

In reality, applying economic incentives is not an act of distortion on the market forces but rather a means to bring equity to the comparison between conventional and renewable power. Throughout the previous years this comparison was tilted towards conventional power. As such, conventional power enjoyed long period of technological maturity and thus underwent stages of efficiency and cost improvements. Moreover, they possess the economy of scale whereby single units reach the order of 1000 MW in capacity. On the other hand renewable power was handicapped by slow technological development as market opportunities offered to them were very limited, in addition to the low prices of fossil fuel at the time. Furthermore, the cost of renewable technologies could not be reduced quickly as both technological breakthroughs and market openings were not forthcoming.

The way that renewable technology is seen nowadays relies on the fact that such technologies bring environmental benefits and prepare for the inevitable case of oil depletion or the hazards of nuclear power. In addition, such technologies represent investment opportunities for local and foreign investors, and initiate local manufacturing opportunities as well as business support.

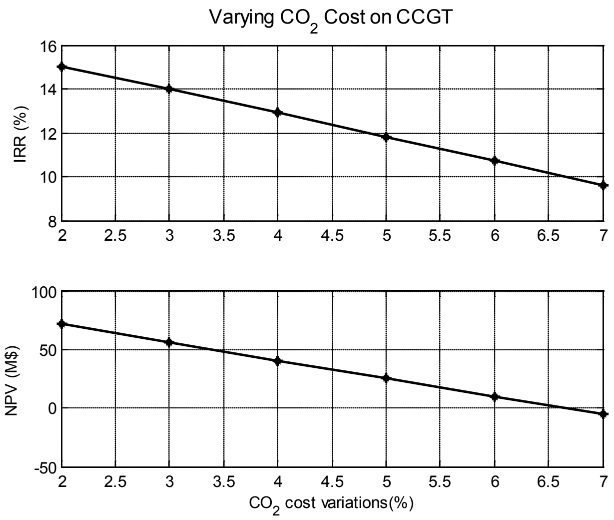

Figure 2: Role of CO_2 Cost variations on conventional CCGT related IRR and NPV metrics.

As most countries have opted to apply economic incentives to achieve improved the energy mix. This, in return, has resulted in both cost and technological improvements to renewable power. Consequently, it can be stated that the implementation of economic incentives should be looked at as a tool that will serve in the improvement of the national economic interests.

The sensitivity tests prove that the choices made for the renewable power premium and the CO_2 control cost; i.e. 15% and 5% are reasonable and justified. For a price premium less than 15% for renewable power makes PV unfeasible, which is a setback for PV. On the other hand a CO_2 control cost of more than 5% of capital cost is not needed as with it CCGT becomes unfeasible. The motive for selecting the economic incentives is to encourage renewable power but at the same time not to discourage conventional power.

It is recommended that the studied incentives in this paper, aiming to promote renewable energy technology, be used to setup an economical based promotion strategy, and put it in action as soon as possible. This strategy, once implemented, shall contribute positively to the national economy in both medium and long term time frames. Tangible results are expected to be seen and measured in terms of reducing the fuel bill, increasing the energy security, and leading to better local and global environment.

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