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Full Length Research Paper

The Impact of Government Policies in the Renewable Energy Investment: Developing a Conceptual Framework and Qualitative Analysis

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Investments in renewable energy sources are regarded with increasing interest as an effective means toward energy independence and stimulate economic growth. Numerous policies, therefore, are implemented to promote renewable sources. To shed light on this association, this paper discusses the relationship between renewable energy policies and renewable investment using a case study approach. In this paper I examine the decision-making policy process underlying RE investments. The aim of this paper is to emphasise the selections for renewable energy investment, to shed new light on RE investment decisions, and how they are influenced by renewable energy policies. This paper proposes a conceptual framework and qualitative analysis to understand the structural factors affecting the investors' decisions as well as the linkage between renewable energy policies and investment in the case study countries of United Kingdom, Turkey and Nigeria. The results suggest that renewable policies increases growth in the RE investment in the sector.

Keywords: Renewable energy, Investment, Renewable energy policy

INTRODUCTION

Governments face a number of energy security challenges due to depletion of fossil fuel sources, climate change, and pollution. Renewable energy (RE) development is a key way to address these challenges because it can help meet future energy demand while minimizing the risks of traditional energy supplies. Many governments have enacted ambitious RE policy goals with differing strategies (e.g., quotas, feed-in tariffs). Unfortunately, large investments for electricity from RE sources are required to meet targets in countries renewables directives (Bergek et al., 2013). Because the RE sector requires enormous infrastructure costs that cannot be borne by government alone, successful RE development requires investment from both public and private sectors. More effective policies for RE investment are therefore needed to support the deployment of

renewable sources (Bergman et al., 2006; Reuter et al., 2012; Wüstenhagen and Menichetti, 2012).

RE investment is supported by various policy frameworks that have taken divergent pathways based on a country's differences in economic factors, geographical locations, and experiences with previous RE investment. Renewable policies have not only produced opportunities, but also exposed risks for RE investors (Barradale, 2010; Lipp, 2007), who are often uncertain of the investment implications of a given policy. To examine these divergent pathways, an analysis based on conceptual framework and qualitative excerpt will be conducted on the cases of United Kingdom (UK), Turkey, and Nigeria. This case study approach will assess how distinctive circumstances, with multiple variables of interest (e.g., different political and geographical contexts), influence RE policy decision-making for investors. More specifically, this analysis will focus on government's policies with high rates of capacity for RE investment and emphasise the impact of policies for RE investment and identify obstacles (e.g. cost, lack of knowledge, bureaucratic issues) and opportunities (e.g. security of energy, use of new technology) associated with the growth of RE deployment.

United Kingdom, Turkey, and Nigeria were selected based on the type of policy framework each has implemented (see Table A1). All three countries are at a different industrialised level, from different regions in the world with many different contextual factors such as industrial institutions, RE energy consumption trends, and environmental and social standards. They also differ in other significant ways, particularly their energy policy history, political, and institutional arrangements. This paper provides important insights regarding the development of successful RE strategies with a particular focus on the RE investment in the case study countries. *This research will shed light on how the RE investments are affected by RE policies in those case study countries. And what policymakers can learn from insights about investor decision-making for more accurate policies.*

An emerging body of literature has investigated how policies should be designed to mobilize investments in the RE sector. Yet despite more than three decades of effort, understanding of RE investment and the variables associated with renewable policies remains limited. Several studies have provided a measure for policy effectiveness with only limited insights into the investors' perspectives (Lipp, 2007; Masini and Menichetti, 2012; Musango and Brent, 2011; Wüstenhagen and Menichetti, 2012). To achieve development of RE investment goals through policies, we need better knowledge of how people make decisions related to investment in RE. There is a lack of a comprehensive theoretical and empirical framework for understanding the linkage between RE investment and renewable policies. This paper intends to discuss this niche by shedding new light on the process through how investors make investment decisions for RE sources and how RE policies affect renewable investment. To fill in this gap, I develop a conceptual model and a qualitative test that investigates the impact of renewable policies on the overall share of RE investment. The model is qualitatively tested using primary data collected from the policy makers and expert renewable companies in the case study countries. This paper builds upon current knowledge of RE investment and develops a new conceptual framework to guide analyses of renewable policies. It focuses on the RE investment process. Past and current trends in the field of RE investment are investigated by using the literature on RE investment linkage with policies, which identifies patterns and similarities and the qualitative analysis with policy makers focusing on policies for RE investment.

The present study aims to contribute to the existing research in several ways. First, this paper will help policy makers design more effective policy instruments to support the market deployment of RE sources in the case study countries. Second, this study will contribute a better understanding of how renewable policies promote RE investment based on opportunities and overcoming challenges. Finally, this study will contribute to extend the validity of previous findings to a broader and more general context. The paper reviews current knowledge on RE investment and identifies factors affecting the renewable investment requirements of the case study countries. Therefore, this paper will elaborate on RE investment focusing renewable policies and other factors (e.g. technology, economy) as part of theoretical framework, and to address the possible interactions or relationships among them.

The rest of the paper is organised as follows: Section 2 will discuss a brief overview of the literature on RE investment and a review of related studies used to understand RE investment. In section 3, a new conceptual framework is presented. It will describe a conceptual model linking investors' and investment decisions in this paper. Then, qualitative analysis result is presented. Section 4 will provide the conclusions and discuss further research areas as well as the limitations of the paper.

Theoretical Background and Literature

Current Status of Re Investment

Over the last decade, RE investment has gradually increased in both developed and developing countries with policies that have consistently delivered new RE supply more effectively, and at lower cost for the rapid development of RE sources. To further increase investment in renewables worldwide-improved policy frameworks for RE are required. Policy makers should, therefore, include incentives that encourage investment. The main barrier to investment in renewable technologies

is not only the lack of capital, but also the lack of appropriate policy to stimulate investment (Usher, 2008). RE investment had been increasing steadily until 2011, but has recently declined since then. See Figure 1 for details.

Investment growth prior to 2011 is likely the result of effective RE policies and technology improvements which has made RE cheaper to deploy and therefore a more attractive investment. In addition, RE policies have successfully created new market opportunities as technology development has led to increased reliability and decreasing costs of exploiting RE sources (Wüstenhagen and Menichetti, 2012). The reduced volume of RE investment after 2011 may reflect the addition of renewable policies that fail to fully account for investment incentives. For example, in Germany, has cut their FIT from 30 cents/kwh to 17-20 cents/kwh. Such policy changes by governments and states create more investment uncertainty that discourages further investment.

A lack of attention to RE policy details that may negatively affect incentives to invest may be a worldwide phenomenon as major players in the RE sector like China, US, and Europe have reduced RE investment since 2011. The US and China's RE investment is down 8.4% to 3.8% respectively, while Europe's RE investment has contracted by 41%. In the UK, the largest European market, RE investment declined modestly from $14.3 billion in 2012 to $13.1 billion in 2013 (Bloomberg New Energy Finance, 2014) jeopardizing their stated goal of getting 15% of electricity from renewable sources by 2020 (Masden et al., 2009). Smaller players in the RE sector face significant challenges in strengthening their RE investment and development. Turkey is highly dependent on imported energy sources (70%) so energy security issues have made RE a driving concern. The total investment required to meet the energy demand in Turkey by 2023 is estimated at nearly $120 billion. For this target, Turkey is reforming its legal framework regarding European Union (EU) renewable policies (Kolcuoglu, 2010; Sirin and Ege, 2012). Nigeria's RE resource development remains in a nascent stage because of low investment levels due to poor policy implementation by policy makers and regulators. Progress will continue to be slow until more effective RE policies are implemented that encourages investment from energy companies and communities. In addition, the Nigerian government also needs to improve other RE inducements such as tax reductions, low or interest free loans, and free land provide to support for RE investment as well as RE investors (Ajayi and Ajayi, 2013).

RE Investments

Previous research has drawn on many perspectives in examining RE investment. Some studies argue renewable investments are best viewed from economic perspectives. In the energy economics literature, RE investors are identified as a homogeneous set of players who are utility type actors investing with respect to profit maximization (Bergek et al., 2013; Kangas et al., 2011) and RE investors typically make investment decisions based on comparisons between different electricity generation systems (Bergek et al., 2013; Gross et al., 2010; Koo et al., 2011). In contrast, some studies define RE investors as a heterogeneous group of players that are small private investors, unaffiliated power producers and cooperatives (Agterbosch et al., 2004). Investment in RE sources are generally more attractive than fossil based sources because of the risks related to fossil fuels, such as fossil price volatility, import availability, and the price of domestic economic exposure. RE sources are essentially domestic supplies of energy that are not subject to import availability and pricing based on world markets. However, uncertainties in policies, prices and regulations for RE sources can create levels of investment uncertainty and risk to the point when renewable investments are less attractive than uncertain fossil based sources (Finon and Perez, 2007; Popp et al., 2011).

Other studies focus on rational, behavioural, and portfolio aspects. For instance, Loock (2012) reports on the results of explorative research approach with a set of RE investors. He examines the relative importance of traditional financial metrics (e.g. price and earnings ratio) and qualitative factors in clarifying decisions to invest in RE firms. Pinkse and van den Buuse (2012) investigate the different strategies and behaviours for the solar industry. They suggested that policy makers create incentives in line with the RE source being developed. For instance, incentives for wind may require a 10 cent/kwh FIT, whereas incentives for solar may require a 20 cent/kwh FIT. In addition, both solar and wind development may require targeted tax breaks. Masini and Menichetti (2012) investigated the decision-making process underlying investments in RE sources. They used a conceptual model and empirical analysis to examine behavioural factors affecting RE investment decisions and the relationship between RE investments and portfolio performance. They point out that more policies should be selected to encourage the investment of renewable sources because decisions to invest are heavily influenced by policy instruments, particularly those relevant to investment decisions. The results also showed that some investors take radically different investment approaches. One type of investor prefers short-term incentives and is more motivated to invest based on short-term policy incentives with more immediate profit potential. Other investors have a more long-term view. They prefer policy incentives that produce a more modest return on investment over a longer period of time, as long as the policy guarantees the required long-term support.

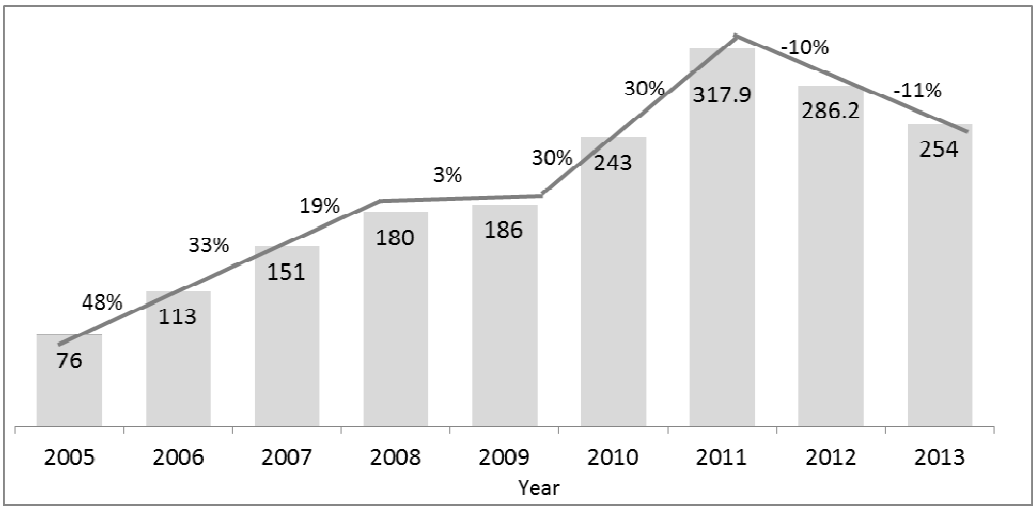

Figure 1. Worldwide RE investment from 2005 to 2013 ($ billion)
Source: Bloomberg New Energy Finance, (2014).

Fuss et al. (2012) and Bhattacharya and Kojima (2012) apply the portfolio analysis for RE investment. Fuss et al. (2012) analysed the influence of technological (e.g. accessibility of renewable technology), policy (e.g. stability of energy prices and liability of specific target), socio-economic (e.g. enlargement of different macroeconomic factors) and market (e.g. price volatility) uncertainty on RE investment decision by using portfolio selection approaches. Their results indicate that uncertainty appears to have less impact on the overall portfolio than the possibility of stringent targets. Bhattacharya and Kojima (2012) show the importance of expressing the financial risk and the decision making process in RE investment by using the portfolio optimization model. Results of the modelling showed that the risk can be alleviated by including RE in the portfolio and to show the importance of two main policy decision in the area of RE sector investment.

In another empirical approach to assess RE investment, Sadorsky (2012) used a beta model to investigate the determinants of RE company risk in a sample of 52 RE companies. The results show that risk for RE firms is definitely high, and there are two important determinants, which are sales growth and price changes. Donovan and Nuñez (2012) analysed the risk faced by RE investors in the large emerging markets of Brazil, China, and India with 60 companies employing the conceptual framework. This framework explains either graphically in narrative form and the main things to be studied like key factors, concept and variables. Their results suggest that RE investments in these countries have average or below risk to investors because of Clean Development Mechanism (CDM) which is one of the flexibility mechanisms defined in the Kyoto Protocol that aims to reduce greenhouse gas emissions in developing countries and at the same time to assist these countries in sustainable development (Rogger et al., 2011). This mechanism allows the countries that have accepted emissions reduction targets to develop CDM projects would create new credits in countries and would transfer of those credits to countries with commitments.

Aspects of RE investment risk in developing or emerging economies are represented by examining the role of the CDM for RE investment (Hultman et al., 2012; Komendantova et al., 2012; Wong, 2012; Zavodov, 2012). Zavodov (2012) suggests that CDM plays a secondary role in long-term RE investment plan, if fiscal regulation is available as an alternative policy tool. Hultman et al. (2012) investigated CDM markets employing a comparative case study approach for Brazil and India. Their results suggest that there was no standard practice, that is, assessing potential financial benefits were diverse and frequently did not adhere to textbook corporate finance approaches commonly deployed in international business circles, which explain the financial benefits of CDM investments. Although CDM played a central role in most policy maker's decisions to pursue RE investment, Wong (2012) explored, with an in-depth analysis, the effectiveness of the World Bank's investment strategies in RE projects in two case developing countries, Bangladesh and India, Wong (2012) looked at three key obstacles for solar lighting projects: lack of financial support, weak governance, and inactive non-governmental/voluntary organization and customer participation. His study suggested that a deep understanding of context is a prior condition for effective RE investment strategies and technological efficiency in developing countries. Komendantova et al. (2012) examined, in the literature, risks as barriers to RE investment, in the particular

Table 1. Summary of factors affecting RE investment

Categories	Factors
Endogenous Factors (RE Investment Characteristics)	
Economic characteristics	Income
Non-economic characteristics	Lack of information and knowledge
Exogenous Factors (External Conditions)	
RE policies	Subsidies, price and quantity based policies
Physical atmosphere	Geographic location, grid line
Energy supply factors	Affordability and reliability of energy supplies
Technology	Lack of R&D activities and cost

context of RE development for the North African area. They found that there are three types of risks for RE investors: regulatory risk (e.g. corruption and complex bureaucratic procedures), political risk (e.g. general political instability) and force risks (e.g. terrorism). Their results suggest that while technical, construction, operation, financial and environmental risks were seen as relatively less important; regulatory, political and force risks are crucial barriers to invest RE sources. However, all RE investors are not the same and similar investment opportunities that are also differentiated by RE sources. Summary of factors affecting renewable investment is shown in below Table 1.

Table 1 shows that in the existing literature there are a number of factors that affect RE investment and they are thoroughly interrelated with each other. In endogenous factors, income is major driver of RE investment and there are strong correlations between an increase in income and RE investment (Kowsari and Zerriffi, 2011; Peng et al., 2010). Furthermore, the external conditions that influence RE investment are policies, technology, physical atmosphere, and energy supply factors. Government policies are major determinants of investor's decisions that directly affect RE investment (Victor, 2009). Affordability and reliability of the energy supply are main factors affecting the RE investment.

That is, it is important to understand how different factors affect RE investment decisions not only policies, but also technology, personal experience, cultural and economic factors, and knowledge of the RE operations.

Linking RE Investment, Policies, and the Roles of Government

The RE policy literature has rarely incorporated the investors' viewpoint. The policy literature has usually focused on the economics of energy technologies, and market efficiency. The economic evaluation for investment choices does not entirely explain how investors arrange capital or how they choose the competing RE technologies. The literature suggests that RE investors must be using social and psychological perspective in the analysis of investment choices (Masini and Menichetti, 2013).

Furthermore, the installed RE capacity instead of RE investment has used as a dependent variable to look at the effectiveness of RE policies. For example, a large number of country/state level case studies have been carried out across different geographies, RE policy instruments and RE sources (Aguirre and Ibikunle, 2014; Breukers and Wolsink, 2007; Carley, 2009; Lipp, 2007; Song, 2011; Zhao et al., 2013). Much of this literature suggests that renewable policy instruments are effective drivers to invest RE sources. On the other hand, diversity in RE policy outcomes are strongly affected by variations in the level of risk those different policies involve for renewable investors (Wüstenhagen and Menichetti, 2012).

RE policy instruments that effectively reduce the risk for investors are more likely to encourage investment in large-scale investment/deployment of RE (Luthi and Wüstenhagen, 2011; Masini and Menichetti, 2012). The importance of policy instruments is significant for developing renewable sectors. For example, Miranda (2010) argues the importance of RE policies and many projects require access to credit because they have large capital investments. Policies should be flexible enough to adapt to new technologies and changing markets.

RE policies can help lower investment risks, to create greater investment security, and increase the number of investors willing to invest in RE projects. Carley (2009), Kaldellis et al. (2012), Masini and Menichetti (2013), Norberg-Bohm (2000), Yin and Powers (2010) argue that investments in RE sources could be encouraged only within dedicated policies which are direct subsidies, energy taxes, and FITs. Most RE instruments stimulate renewable investment but they have shown mixed results, because renewable instruments have been unfeasible to leverage all the drivers of the investment decision procedure.

Additionally, RE sources receive a lot of governmental support in financial, institutional and educational aid. Governments provide financial support by grants, subsidies, tax incentives, FITs, quota and tender systems

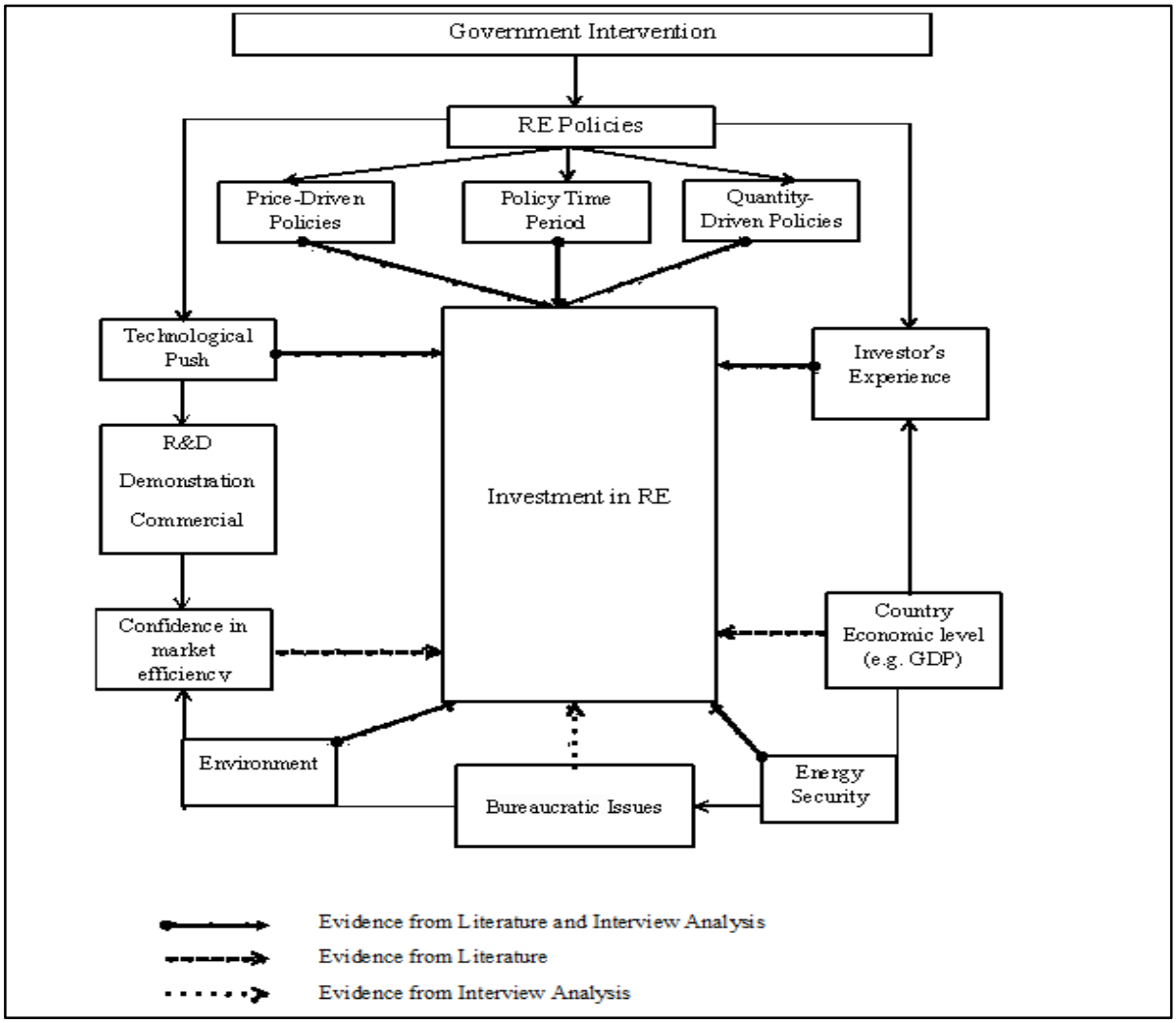

Figure 2. A Conceptual model of RE policy and investment

(Peidong et al., 2009; Fouquet and Johansson, 2008; Alvarez et al., 2009). These policy instruments are typically targeted at promoting RE investment (White et al., 2013). Other important papers were written by Taylor and Van Doren (2002); Zhao (2012); Gallagher (2013) and Yi et al. (2013). All of these papers attempt to describe the role played by the government in RE investment. With respect to RE policies, arguments are made for policy reliability. However, the recent slow down in RE investment suggests it is time to pay more attention to how governments can support changes that will increase RE investment.

Moreover, the potential role of the government in the RE economy is to provide social welfare including energy security, energy supply, energy affordability, sustainability, creating job opportunities, adapting and mitigating climate change (White et al. 2013). A more common role for governments in the RE investment is in the development of policies that affect the companies and firms. Governments assume the role of shaping the economy according to their strategy for development. A challenge for governments is the being of diverse goals for the different levels of government. Local governances interest is in the local control of the RE supply and in creating more local jobs for renewable projects. That is, goals for each different RE projects require different policy instruments (Tinbergen, 1952).

To sum up the literature, financial risk takers, in general, evaluate investment potential in much the same way, but the RE investor has additional considerations to factor in, like understanding complex RE policies, bureaucratic uncertainty, large swings in market energy

prices, among others.

Models and Analysis

Conceptual Model

A conceptual analysis was proposed to trace the major concepts of RE investment, which together build the theoretical framework of renewable investment as part of policies. The conceptual methodology process involves making inductions, identifying themes from the data, and making deductions that suggest the relationships between concepts. A review of the literature and a series of interviews with policy makers and industry experts have provided the groundwork for the development of the conceptual model presented in Figure 2. To understand what designates current levels of RE investment, Figure 2 represents investments as a function of renewable policies, government interventions, and technology push. The effect of RE policies on investment is crucial, for instance, by reducing risk with loan guaranteed or by increasing the returns for RE investment.

Figure 2 is, compared to previous conceptual models, more sophisticated for examining strategic choices for RE investment which helps both as a framework for understanding this paper, but also as a starting point to identify promising approaches for further research. It also provides a schematic representation of the proposed conceptual framework for relationships between renewable policies and investment in RE. The aim of the framework is to demonstrate the linkages between the key elements that are proposed as important for improved RE investment: investment in RE, renewable policies, technology development, and economic approach. Pairing these elements facilitates the understanding of investment in the RE sector.

What are the implications for RE investment and policy? Renewable policies affect the perceived level of risk and expected returns on investment. That is, RE investors have broad considerations to determine their potential risk and profit based on a given policy. They evaluate the level of financial support offered, the availability of technical resources required, and the expectation that profit will not accrue for as long as 7-10 years.

Policy makers should be attuned to and manage these expectations. Similarly, voluntary RE strategies may have positive effects on private sector investment and can help by decreasing perceived risk and RE sources reliability (Wüstenhagen and Menichetti, 2012). Government intervention, technological push, and helping instil confidence in market efficiency of renewables are all important. But, equally important is being aware of investors' attitudes and experience as they relate to the perceived risks of a particular RE investment.

Technology has effects on RE investment in a number of ways. Musango and Brent (2011) considered the technological change as endogenous to the economy as a result of newly perceived opportunities, incentives, deliberate research, and development. According to Kowsari and Zerriffi (2011), technological dimensions are an important aspect of RE renewable investment. Technology adoption theory attempts to explain why RE players adopt or do not adopt new and more efficient renewable sources. People do not simply change behaviour or adopt new technology based on awareness and attitudes. For this, energy models that intend to include behavioural dimensions should consider the social context of individual actions. This theory assumes a linear progression of knowledge, awareness, and objectives in the adoption of RE sources. Therefore, the technology adoption must address cognitive, emotional, and contextual concerns.

Investors' experience, such as cultural factors, educational backgrounds, and previous experience with RE investments, influences investment decisions. In the current conceptual model, I also consider two different types of beliefs-- technological feasibility and economic viability. Lack of understanding technology in RE projects is the most important barrier to adoption of renewable sources. Technical adequacy of the RE sources is a foundation of investing, but it is often expensive and not all countries are producing these technologies (Barradale, 2010; Loock, 2012; Masini and Menichetti, 2013).

In brief, there are key determiners for renewable investment: policies that are guaranteed and enforceable, innovation and technology considerations, investor's experience, energy security, along with environmental and bureaucratic climate. These are supported by literature review and qualitative analysis. While economic issues and confidence of market efficiency are derived from literature, bureaucratic issues are revealed in qualitative analysis. Policies, innovation, and investors' experience are emphasized in both literature and qualitative analysis.

This paper proposes the following:

Proposition 1: The effectiveness of renewable policies is associated with a higher share of renewable investment and a higher profitability of energy investment portfolio.

Proposition 2: Tendency for technological innovation is associated with a higher share of renewable investment.

Proposition 3: Quality of the country's institution to deliver policy goals has a significant effect on the share of renewable investment.

Proposition 4: Investors' experience (knowledge of the RE context) is associated with a higher share of renewable investment.

Qualitative Analysis

I started the analytical process by conducting a pilot

study, with leaders in the private RE sector using an abbreviated version of the full interview protocol. This was to determine whether the importance of government's role for investors was appropriate and understandable as stated by policy makers. Pilot interviews with four people from private RE companies (two from UK and two from Turkey) were conducted to help validate the full protocol. These interviews took place between March 2014 and May 2014. I attempted to identify whether the primary premise of the interviews was feasible and whether there were any particular issues or identified challenges to subsequently focus on in more depth. Evaluation of these initial interviews strengthened the questions used for the main study. For instance, I found out that some questions were not important for this study and a number of questions were not clear to the interviewees. Therefore, some interview questions later evolved in the light of the findings from the pilot study.

As a first step for the main data collection process, a database of potential interviewees was developed. To guide selection of policy makers and RE company leaders, a systematic approach was developed. I contacted 40 people from LinkedIn, United Kingdom Energy Research Centre (UKERC), The Ministry of Energy and Natural Resources and RE companies. This yielded 13 volunteers agreeing to be interviewed. They consisted of policy makers and private sector individuals working in the Ministry of Energy, leaders in the sector, and RE investors in case study countries. Five were from UK and eight from Turkey.

Case study data was collected using primary data from face-to-face interviews that took place in June 2014 (in UK) and October 2014 (in Turkey). Interview questions were divided into 4 sections (detailed in Appendix A2) and each interview lasted for approximately an hour. Interviews were recorded and transcribed from nine participants. Because of confidentially concerns four participants wouldn't allow audio recording, but allowed the interviewer to take notes. Notes and transcriptions were converted into a case study for each participant within 24 hours of the interview. The interviewer had no previous relationship with the interviewees.

I conducted a content analysis of the interview content and discovered the following general themes: policies, technology, government support, investor experience, RE targets, and quality of RE institutions. Furthermore, the choice of policy makers and leaders of RE companies for investigation was validated in the content because they were key players with a desire to establish new RE markets and were determined to make an impact on renewable investment.

Motivation for supporting RE, according to the interviewees, are policies, fostering technology, government support, investor experience, RE targets, quality of RE institutions, energy security, protecting the environment, and economic improvement. Between the two case countries, Turkey is the most dependent on imported energy sources although it has largely self-sufficient RE potential for electricity generation. Both countries are motivated to reduce their dependence on fossil based sources due to energy security and desire to be an energy independent country. For energy security, Turkey is located in a region that has chronic political instability affecting the price, supply, and safety of fossil resources. A British participant suggests that the UK recently imported 40% of its natural gas for only the electricity sector and 40% of electricity supply is generated from natural gas.

While the RE sector in the UK has seen substantial growth since 1990 (Lipp, 2007) with most activity in the wind, biomass, and solar in south UK, the renewable sector in Turkey has also increased RE with wind, solar, and geothermal after the year 2000. Both case study countries that can foster technology and commercial development in this sector are expected to find increasing markets to serve due to job creation and enhanced competitiveness. Although both case study countries mention technology in the context of RE policy, different emphasis has clearly been given to achieve this objective as detailed below.

RESULTS FROM THE CASE OF UNITED KINGDOM

UK has previously relied on quota (Renewable Obligation Certificate-ROC) for renewables, and is now adding FIT, which is the cheapest way to encourage RE investment, largely because the policy instruments were well designed. That is, FIT delivered on its promises in terms of benefits. The quota started at 3% electricity from renewable sources in 2002/2003, and this ratio has increased almost 1% each year, with a RE electricity target set to 2020 at 15% (Lipp, 2007). The UK has not been as successful as other European countries in promoting renewable deployment because of their poor choice of polices. For instance, one interviewee specified that "*UK have effective RE policy to meet its short and long term targets but the current government has done much to undermine effective policy. It has made cuts, some of which were justified, to the FIT, but most of which were not well communicated and which risked undermining the sector. It has made significant changes to the RO and particularly it is replacing it with an unnecessarily complex mechanism when it could have gone for a relatively simple alternative and again it is creating uncertainty."* Therefore, the UK government is creating uncertainty and risk in this sector.

For some technologies in UK, the case study recommends that the government support is enough, but some technologies, such as wave and PV (Photovoltaic), need financial support. Furthermore, a British participant suggested that **"***regulation to try to remove barriers to investment or to engender a return can also have an*

impact. Government does need to encourage investment in particular directions since some outcomes will better serve the needs of the public and the market is not effective at delivering these." Pioneering and large companies are active because RE is now a multi-billion dollar industry, but it does not follow that all the investment comes from big companies. There are a number of small companies involved in developing, constructing, and operating RE technology in the UK. However, some private RE company owners suggest that long payback might is a barrier to renewable investment. Uptake rate of renewable technology is still relatively modest, partly due to initial installation costs. Investments for RE development are currently ongoing in the UK, and it is expected that RE sources will be affordable. Even so, without incentives from government, the uptake rate of renewable energy technologies will be low. Only few individuals invest for energy generation purposes because of the relatively high initial installation costs.

Furthermore, big energy companies such as EDF, Shell, and EON have a tendency to invest in renewable energy sources because they are under pressure to develop low carbon energy sources due to factors including competition, volatility of fuel price, regulation and legislation, cost and waste savings and so on. However, such pressure does not exist within local companies as compared to bigger companies. To encourage local companies, policy instruments shouldn't be so complex that local companies are forced to hire consultants to understand them. Because the overall benefit of investing in RE is in the long term, efforts (e.g., quota and FIT) should also include short-term returns on investment for small companies.

UK's target is to have 20% of its energy needs generated from RE sources, with 15% of electrical generation from RE. In some participants' opinion, these target goals will be difficult to achieve. One interviewee emphasised that *"I am not convinced that the UK will achieve the 20% figure, the current government certainly lack the will for it, since it will require onshore wind, biomass and offshore wind, with onshore being the cheapest but facing increasing social barriers, such as the recent government commitment to stop building onshore wind."* Another participant from UK suggested that "*the UK is not among the top five countries (US, Germany, Spain, China, and Brazil) leading the world in renewable energy supplies at the moment. To realise the 15% targets, considerable effort is required on the part of government both in terms of policy development and uptake rates."* However, these targets are possible and realistic with more renewable projects and incentives. If the government desires to encourage the use of renewables, according to economic theory perspective, the best alternative would be to impose a tax on fossil fuels so politicians prefer to subsidise RE sources. In general, the participants' idea about future of UK renewable is positive: "*It will keep growing."*

RESULTS FROM THE CASE OF TURKEY

Turkey uses FITs, the most effective incentive for the investors that make financial commitments more predictable and encourage RE investment, The FITs rates were generous, according to participants and included 73 USD/MWh for wind, 133USD/MWh for solar, and 105 USD/MWh for geothermal (EIE, 2014). The Turkish case suggests that the time of FIT (10 years in Turkey) is not sufficient to encourage investors. According to recent technology and market conditions, this time should be increased to 15 years. The government should increase the incentives much more in RE sector; otherwise, renewable plants cannot compete against fossil plants that are also encouraged by the government recently by giving Build-Operate Transfer (BOT) rights. When I asked the interviewees that what else government should do for companies, Turkish interviewee suggested that "*there should be discounts or exemptions from social security for a certain period. The government should set out individual and illumination incentives and planning of existing construction and public improvements should change*."

Indirectly, the uncertainties with respect to future policies have played a major role in relinquishment of larger RE investment in Turkey. At the same time, a main problem for the industry is bureaucratic drawbacks; for example, one interviewee remarked that *"RE companies have to get permission from 13 government institution for licenced projects and renewable investor has to wait approximately 3-4 years for licenced wind projects and they have to wait at least 9 months for unlicensed 1 MW projects."* This is relatively long, compared to 2 years, to acquire licenses in other countries.

Adopters of new RE technology generally appreciated the renewable policies, for instance, unfortunately, in Turkey, there is very onerous regulatory process and investors thought that *"the government would like to fix it."* And also, a policy maker indicated that "*a total of 9.000 MW solar project applications were received for 600 MW licenced projects."* The private sector still continues to invest in RE because they believe that sustainable energy, security of supply, and environmental concerns are only solved by renewable sources.

In regards to future RE prospects, uncertainty continues in Turkey. Predictions and energy strategies that are prepared by the government can be seen as meaningful, but recent market conditions are not efficient for the improvement of RE market because of the lack of transparency and knowledge. Lack of transparency in cross border capacities and statistical information, therefore, some of Turkish investors cannot predict anything about RE market come 10 -20 years in the future.

The Turkish 2023 target is 30% electricity from renewables, and there are various comments on this

target. For example, a participant stated that "*in last 10 years, solar plant cost decreased 70%. 10 years ago, you could not make an investment in solar but today why not?"* According to most of participants, Turkey will reach this target with the increase of solar and wind energy potential but participants also mentioned that the government should fix bureaucratic drawbacks such as long period licenced process. However, this target remains unrealistic for other participants due to growth of electricity demand, long licencing period, population growth, and lack of feasibility planning and especially dysfunctional bureaucratic structure.

Furthermore, experience plays very important role to increase share of renewable investment for Turkey. One participant specified that "*a Chinese renewable company came to Turkey to invest this sector and they prepared all investment plans and they waited almost two years for licence RE investment. Then, they got fed up with the bureaucratic process of the Turkey and they headed back to China."* Unfortunately, this type of experience negatively affects investors' desire to commit to of renewable investment.

Viewed at a glance, the Turkish case suggests that there are significant RE problems in Turkey that need to be overcome. The success of renewable policies that carried the country forward to its present position should be further pursued. Furthermore, the most interesting point is long-term bureaucratic renewable process for Turkish investors. The Turkish government, therefore, needs to reform its permitting and regulatory process if it is to reasonably expect to meet its RE targets. The bureaucratic process of liberalization should be immediately revised and improved and it should be expanded in co-operation with European member countries in all RE areas.

CONCLUSIONS AND FURTHER RESEARCH

This paper developed a conceptual framework for RE investment assessment with renewable policies, technology, and economic approach. The aim of this paper was to examine the experience of case study countries' RE investment situation with government/RE policies during start up stage and later in the form of difficulties for growth. A subsequent objective was to search out the interaction of between RE policies and RE investment in the sector. Using a conceptual framework and qualitative analysis, this study sought to shed light on an under-researched aspect of how RE investment is affected by renewable policies. The conceptual framework analysis also allowed me to draw a clearer picture of the relationship between investment and policies.

A comparison of the support schemes for the market based deployment of RE in the UK and Turkey demonstrate that RE policy instruments reduce the risks for investors and result in larger deployment mechanisms. Therefore, policy instruments have been effective in stimulating renewable investments. However, the effectiveness of renewable policy instruments depends on its impact on perception, understanding policy implications, regulatory burdens, investors' experience, and so on. Policy makers need a better understanding how RE investors make their decisions when considering RE investment. Furthermore, by taking a holistic perspective into understanding the obstacles that hindered successful policy interventions, this research was intended to come up with practical solutions that could maximise the potential of renewable investment. In the energy literature, there is lack of empirical studies about renewable investment from the investor perspective. This paper discusses this important consideration with both conceptual and qualitative analysis.

Both qualitative and conceptual analyses show that many factors including policies, technology, economic viability, and investor' behaviours play an important role in stimulating renewable investment. The qualitative analysis results for two cases demonstrate the notion that policy inconsistencies cause problems for the industry in both the short and long term. The evidence from both countries suggests that, given appropriate design features, the FIT is more cost effective at easing RE development. Quota, as shown the UK case, does not provide the same level of certainty for investment. In addition, investments in the future development of the industry can also be hampered by bureaucratic inefficiency. Furthermore, the case study countries appear to have a cost problem, specifically infrastructure/preliminary cost for investment. A key demand of those who want to invest in RE sources is the implementation of long-term stable policies that minimise uncertainty. Therefore, it is expected that policymakers should fix their policies, which should be synchronized with evolving RE markets. For instance, Turkey should fix the impetus in political commitment in shaping Turkey's renewable energy policies and regulations with EU cooperation. For the United Kingdom, policy choice and design should be considered key factors in the slower pace of RE development in the UK. Furthermore, interviewees reconfirm my choice of requirements regarding government interventions (such as policies, technological push, investor's experience, environment, energy security, and so on) in case countries.

In this paper, I presented evidence from two case study countries on the renewable policy effects on RE investment with both conceptual and qualitative analysis perspectives. Indeed, this research provides valuable further insights in how to reach the significant RE investment levels. First, the implications for policy makers are clear and indicate how to design more effective renewable policies to encourage RE investment. Second, this study supports these implications with qualitative

data provided by the investors themselves. Finally, this paper improves the emerging the field of renewable investment and extends the validity of previous findings.

The conclusions that can be drawn from this study are limited because of its preliminary nature. The first limitation is that it was the intention of this study to include Nigerian variables in the empirical analysis. However, this study included only Turkish and British respondents because it was very difficult to reach Nigerian respondents. I did not have any opportunities to go to Nigeria due to security reasons but this paper has a strong and in-depth study for two countries within the qualitative analysis section. A second limitation is that this study was constrained to specific empirical and geographical context for the case countries. The findings, therefore, may not be meaningful to generalize. For instance, UK consumers are traditionally more sensitive to environmental concerns than Turkish citizens, which creates a more encouraging renewable investment in the UK. Also, the renewable energy market in Europe has been conventionally supported by stronger incentives than, say, United States, Turkey, African countries and others (Masini and Menichetti, 2013).

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8. Appendix A

Appendix A1: Summary of the Case Study Countries (2012)

	UK	Turkey	Nigeria
Outline			
Population	63, 612,729	73,997,128	168,833,776
GDP (current US$)	2,475,781,990,521	789,257,487,307	459.615,931,973
Fossil fuel energy consumption (% of total)	85.1	89.5	17.4
Total Electricity Net Generation (Billion Kilowatt-hours)	338.877	228.080	26.695
Total Electricity Net Imports (Billion Kilowatt-hours)	12.045	2.874	0
Renewable electricity			
Wind	19.584	6.699	0
Geothermal	2.565	0	0
Tidal/Viva	4	0	0
Solar	1.188	0	0
Biomass	15,198	2.665	0
Hydro	5.284	55.000	6.240
Total Renewable Electricity Net Generation (Billion Kilowatt-hours)	43.823	64.372	6.240
RE target (% of electricity supply)	20% by 2020	30% by 2023	7% by 2025
Renewable Energy Policies			
Principal policy *(last decade)*	Quota	Feed-in tariffs	Tax Incentives
Other	Feed-in tariff, tax reduction	Tax reduction, Quota, Land appropriation	Investment incentives such as tax reduction, capital allowances

Sources: *World Bank Database, US Energy Information Administration, GOV.UK, Turkish Statistical Institute*

Appendix A2: Interview Questions

Part 1: *Introductory Questions*

1. Could you please start by telling about your background, your role and your work?
2. How are you involved in the renewable energy sector?

Part 2: *Renewable Energy Situation*

1. UK/Turkey/Nigeria target is 20% (30%, 10%) of electricity from renewable energy sources by 2020. What do you think about this target? And, do you think this is realistic for UK/Turkey/Nigeria? Why or why not? Why does UK/Turkey/Nigeria use much more energy than……?
2. Which type of renewable energy source is the most realistic and efficient for UK/Turkey/Nigeria?
3. The RE market is competitive in the UK. What strategies does your company use to survive in the renewable energy market in UK? Are they effective? Are there other strategies that could be effective?
4. What is your market share in this renewable energy sector? Why are you still involved in this sector? What can be done to increase your market share?
5. Do you think new renewable technologies are promoted by this renewable energy sector? Is there new investment for new technologies? Can you give me detail about this?
6. Big energy companies such as EDF, Shell, and EON have a tendency to invest in renewable energy sources. What can be done to encourage RE commitment within the local companies?
7. Considering the high cost of renewable energy technologies, how long does an investment take to show profitability in UK/Turkey/Nigeria?

Part 3: *Renewable Energy Policies*

1. The four main renewable policy instruments are feed-in tariffs, quotas, tender, and tax credits. Which of these four do you think are effective for UK/Turkey/Nigeria? Why?
2. While FIT and quota are generation-based policy instruments, tender and tax are investment-based policy instruments. What are the main differences you see between generation and investment-based policies? Do you think one is better than the other?
3. Feed in tariff is used commonly in Europe and it is very popular. What do you think about feed-in tariff? Does UK/Turkey/Nigeria government provide this policy instrument for renewable energy sources?
4. Do you think implementations of renewable energy policies encourage or discourage the use of renewable energy technologies? Could you give me an example in your company? In general, what would you say is the opinion within your company about government renewable energy policies?
5. What do you think about the government incentives: Are they enough? What else can government do? Should government do anything at all?
6. How does the UK/Turkey/Nigeria government encourage investors to invest in the renewable energy sector? Are these efforts effective, in your opinion? Is the government right to try to influence what investors do with their money?

7. Energy security, economy, and climate change are the main challenges. Do you think these are serious challenges? How do you think how these challenges influence development of renewable energy? Are there other ways to help meet these challenges, outside of renewable energy development?
8. How do you see renewable energy market in following ten years and twenty years?

Part 4: *Closing Questions*

1. Is there anything else you think I should know about your experiences in the renewable energy sector?
2. As I talk to other interviewees, I may realize that there is something important I neglected to ask you. Can I contact you again if I want your opinion on something else? What is the best way to get in touch with you again phone, email, letter, or appointment?