Master´s thesis

Title of Master´s thesis:
“Influence of regulatory risks on private investments in wind energy — a financial investor’s perspective”

Author: Aleksandra Łukasik
Enrolment No.: h1054258
Major: Socio-Ecological Economics and Policy
Examiner: Prof. Dr. Gunther Maier

I hereby declare that:

I have written this Master’s thesis myself, independently and without the aid of unfair or unauthorized resources. Whenever content has been taken directly or indirectly from other sources, this has been indicated and the source referenced.

This Master’s thesis has not been previously presented as an examination paper in this or any other form in Austria or abroad.

This Master’s thesis is identical with the thesis assessed by the examiner.

06.09.2014

Date
Signature
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Acknowledgements

Hereby I would like to express my very great appreciation to all the people who supported me while writing this thesis.

I would like to offer my special thanks to my supervisor at the Vienna University of Economics and Business, Prof. Dr Gunther Maier, who encouraged me to take the great opportunity and apply for the NEURUS scholarship that turned out to be a great chance to investigate developments in wind energy in the USA and broadening my European perspective, by inclusion of the American insights collected on the ground. His patient guidance and feedback have been a great help for me. Many thanks to professors at my hosting university, Prof. Andrew Greenlee and Prof. Brian Deal from the University of Illinois, Urbana-Champaign who beside their great assistance during my research exchange, made my stay in the USA also an unforgettable personal experience. Last but not least, it was a pleasure for me to study with such wise colleagues in Socio- Ecological Economics and Policy and with my NEURUS scholarship peers who gave me a lot of motivation, valuable feedback and made me think through my subject even more critical.

I would also like to thank the Prof. Wüstenhagen who evoked my interest in this subject and whose constructive suggestions have been very helpful for me. I would like to extend my acknowledgments to my interview partners who despite their busy schedules took their time to discuss this interesting subject with me and did so very openly. I am particularly grateful for the help given by my first interviewee [A] whose great advice, provided at the most initial stage of my work, helped me understand the research problem from a practitioner's perspective. In addition, opening me the doors to so many exciting and knowledgeable interview partners, he helped me a lot with collection of the empirical data.

Finally, I would like to thank my parents, siblings and friends for their support and encouragement throughout my study.

It was all of them who made writing this thesis an exciting, memorable learning experience for me.
Abstract

The proposed master’s thesis explores factors which drive long-term private investments in wind energy. It analyzes factors influencing regulatory risk assessment for investments in wind energy from a financial investor’s perspective, by conducting a qualitative research on influence of governmental policies, and other regulatory risk factors, and its perception in investment decisions in wind energy, based on a literature review and 10 expert interviews.

The key goal of this master’s thesis is to find sound alternatives for financial support mechanism schemes, by researching political and regulatory factors and their influence on risks assessment processes. Based on the assumption that policy-makers have within their reach a set of non-financial incentives which could minimize not only the real risks, but also their perception by investors, the paper aims to look into the factors that could help in attraction of more long-term private investments in wind energy.

This research deals with the problem of international pressure towards energy transformation and renewable energy policies (REP) which have been on top of EU and US governments’ agenda in the last decade. Financial policies such as feed-in tariffs are most wanted by one of the key drivers of renewable investments, namely private investors. However, in many cases they have proved to be unsustainable and hardly available for a longer time in the crisis-affected, constrained public budgets. This paper looks at the insights gained from private European and American investors who decide upon financing of projects in wind power energy plants on a regular basis and in various political and regulatory environments, by challenging their openly expressed policy preferences.

While most of the related research stems from neoclassical economics and behavioral finance, this paper goes further in its investigation. It starts by a discussion of the widely acknowledged factors and tries to find out if different institutional environments of both investors and investment projects influence investment project’s risk regulatory perception.

Institutional pressure related to private investments, investigated in this paper may have two different aspects: on the project itself, as different levels of transparency, longevity, and certainty of government programs and policies may affect risk assessment, and on the investor himself, given the institutional influence of his peers and industry consultants.
Using the available policy papers, academic journals and industry publications and having conducted an initial in-depth interview, the most crucial factors have been selected. In a later stage of the research, a further qualitative data analysis method has been employed – semi-structured in-depth expert interviews were conducted with mid-management of European and US financial investors in wind power energy. The key industry representatives interviewed come from wind energy companies, banks, funds and insurance companies. The interviews were transcribed and analyzed using the framework analysis method.

1 Introduction to the research problem

1.1 Relevance of the project and problem statement – private investments and regulatory risks as a measurement of policy efficiency

In the last decade energy system transformation has been on top of more and more governmental and corporate agendas in some developed European countries and North-American states. Some very clear top-down political actions such as the climate and energy package “20-20-20”, obliging Europe to become a highly energy-efficient, low carbon economy, or Renewable Portfolio Standards (RPS) in selected U.S. states create a better political environment towards this transition. For example, one of the “20-20-20” goals is to raise the share of EU energy consumption produced from renewable resources to 20% by 2020. This increase in the demand for renewable energies (RE) on the energy market gives at least a bit of hope towards the energy transition. Although many Western European economies have already achieved a significant progress in recent years, it will still take some time until the change will be done jointly on a global level. Currently in the USA, there is still no RPS program at the national level in place that would require or encourage electricity producers within all jurisdictions to supply a certain minimum share of their electricity from designated RE sources. As of the end of 2012, according to the U.S. Energy Information Administration, 30 States and the District of Columbia had enforceable RPS or other mandated renewable capacity policies, whereas seven states introduced voluntary goals for RE generation. These programs vary widely in terms of program structure, enforcement mechanisms, size, and application.

The realization of the targets on a country or on a state level and the real commitment are more difficult that one could think, as the intermediate results suggest. The still very powerful lobbyists of fossil fuel energies focus its criticism on the lack of competitiveness of RE technologies, when comparing to gas
or petroleum, and focus on the high costs of RE electricity production that, as for now, must be co-financed by tax money. According to the newest World Energy Outlook (OECD/IEA, 2013), subsidies for RE reached $101 billion in 2012, up 11% from 2011, peaking in electricity generation ($82 billion), followed by subsidies to biofuels for transport ($19 billion). Almost 60% of these were paid in the European Union ($57 billion), the United States ($21 billion) and China ($7 billion) followed. The report forecasts that global subsidies to RE will increase to over $220 billion by 2035 so criticism over RE being expensive for tax-payers might not wane.

Especially in the time of harsh economic and political environment, the critical voices becomes more and more apparent, and the arguments such as higher importance of job or energy security at the cost of environment get a lot of attention from the public.

So that we can stop the climate change, a common effort across state and country borders has to start as the climate neither follow any jurisdictions or acts within any borders. Persuaded must be still a great part of the developing countries such as Brazil, India, but also the more developed, but very coal dependent economies such as China, Republic of South Africa, Poland or, finally, the USA to focus on more future-oriented solutions and to actively engage in transformation of their energy systems. Apart from a global consensus, followed by a certain consequence, a number of additional special policy measures need to be applied, as scientists agree (World Energy Outlook, 2013, WGBU Policy paper No.7, 2013, Florini A., Sovacool B.K., 2009). But is there any way of driving the energy change at a limited cost of tax payers in a long-term?

In order to make any initial conclusions on how more investments in RE could be driven in an effective way, it is crucial to understand the current situation of global renewable energy market and where the investments have been coming from so far. Also, for the purpose of this master’s thesis, we will narrow down our investigations to just one renewable energy source, namely wind, to make different regulatory environments comparable, given different levels of development of RE technologies and different weather conditions across the globe.

The most recent global figures, published by Bloomberg New Energy Finance (2013) for the year 2012 suggest, at the first glance, some positive developments in wind industry. There is an advantageous for investors cost effect because of the 2-3% drop in average prices paid for onshore turbines, compared to 2011. Moreover, the wind capacity installed in 2012 hit a record of 48.4GW, up from 42.1GW in the previous year. However, a great part of capacity installed in 2012 was financed in 2011, so some timing effect needs to be taken into account. Therefore, as some economists suggest (WGBU, 2013), if we want to effectively forecast the wind energy development, we should rather look at the current investments which will bear fruits in the future. Usher (2008) compares this phenomena of looking at
present investment rather than installed capacity to a time machine, or a crystal ball, also Wüstenhagen and Menichetti (2010) recommend that “by measuring today’s investment in project finance, researchers can gain insights into tomorrow’s installed capacities” (Strategic Choices for Renewable Energy Investment: Conceptual Framework and Opportunities for Further Research, 2010, p. 3). If we look at the most recent figures on investments into global wind energy markets, the situation does not look as promising as the previous numbers. The first time in several years, 2012 saw a decline of 12% from 2011’s record of $279 billion to $244 billion in investments in RE, excluding large hydro power station. As we see on the Graph 1, the most significant decline has been experienced in asset finance investments of utility-scale renewable energy projects, dropping to $149 billion. Although short-term oriented, it still stands for the largest investment class. They are followed by $80 billion of small distributed capacity, primarily rooftop solar, financings. Apart from them, the rest of assets such as publicly listed companies, venture capital, private equity, and both corporate and government R&D expenditures stand for a small fraction of total investments.

Graph 1 Global new investment in RE by asset class, 2004-2012, $bn.

Source: BNEF, 2013
Although wind energy was not as much hit as biomass, biofuel or geothermal energy, in 2012 investments in new wind mills have declined by 10%, when comparing to the previous year (Graph 2). Overall, wind energy placed second with $80 billion investment in 2012, while the leader, solar energy generation attracted $140 billion of capital. As we read in the BNEF report, the dynamics of the investments worldwide were facing a downdraft mainly from uncertainty over support policies in Europe and the US (BNEF, 2013) which again, draw our attention to the problem which is the subject of this master’s thesis.

Graph 2 Global new investment in RE by sector, 2012, and growth, $bn

<table>
<thead>
<tr>
<th>Sector</th>
<th>Investment</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>140</td>
<td>-11%</td>
</tr>
<tr>
<td>Wind</td>
<td>80</td>
<td>-10%</td>
</tr>
<tr>
<td>Biomass &amp; Waste</td>
<td>9</td>
<td>-34%</td>
</tr>
<tr>
<td>Small hydro</td>
<td>8</td>
<td>20%</td>
</tr>
<tr>
<td>Biofuels</td>
<td>5</td>
<td>-40%</td>
</tr>
<tr>
<td>Geothermal</td>
<td>2</td>
<td>-44%</td>
</tr>
<tr>
<td>Marine</td>
<td>0.3</td>
<td>13%</td>
</tr>
</tbody>
</table>

Source: BNEF, 2013

If we compare the $101 billion of global subsidies for RE paid out in 2012 to the $244 billion of investments in the same year, we will be struck how high the part of public financing in the overall investments is. Nearly 42% of all the global investments in RE in 2012 came from state budgets in form of subsidies. This suggests that the public investments have been playing a very important role in development of RE and there is still much room for improvement if we want the RE sector to become independent from such a significant state financing.

The World Energy Outlook (OECD/IAE, 2013) released new projections on how much investments will need to be done so that policy commitments and plans already announced by countries are met. This New Policy Scenario includes national promises to reduce greenhouse-gas emissions and plans to
phase out fossil-energy subsidies, also if the implementation means have not been identified yet. In this scenario the IEA projected (OECD/IAE, 2013) that the world needs a cumulative investment of $6.5 trillion in RE between 2013 and 2035, which is $280 billion per year on average. The investments shall increase year by year and in 2035 they should each almost $370 billion. Wind energy is projected to account for one-third of the total investment in RE capacity, followed by hydropower (27%) and solar PV (23%), which would suggest an important role of investments in wind power sector in the context of development of the entire RE sector.

As already suggested, this significant number of the total investments should be faced with its unsustainable structure, too. So far they have been financed by state budgets to a very large extent, thus, we need to realize that we are not facing a promising financing mix that would provide the RE sector with any long-term oriented and secure financing in the future. Komendantova et al. (2012) point out the example of solar power in North Africa: “State financing has contributed the major share of investment in renewable energy projects in North Africa so far, but continued reliance on state investment may prove to be both unsustainable and unattractive. Reasons for this include the unprecedented level of investment that planned investments will require, the potential drain on public budgets of these projects, and the likely gains in efficiency that the involvement of private markets typically creates.” (Perception of risks in renewable energy projects: The case of concentrated solar power in North Africa, Komendantova et al, 2012, p.2). Also Mathews et al. (2010) argue that more involvement from the private sector is needed: „(…) while the transition towards a low-carbon economy requires important investments, private finance has so far played a relatively marginal role in this industry (…)” (Mobilizing private finance to drive an energy industrial revolution, Mathews et al, 2010, p.2).

Figure 1 Proportion of global subsidies for RE to global investments in 2012 and the projected investments for 2035 according to the New Policies Scenario.

Source: Own, based on data provided by World Energy Outlook, IEA, 2013
As Figure 1 suggests, if the financing structure does not change and we do not see any increased involvement of the private sector, the subsidies will become extremely costly by 2035. If we assume that we keep the same proportion of state and private financing as we had in 2012, by 2035 our global

Graph 3 Renewables-based generation subsidies by source and selected region in the New Policies Scenario

yearly subsidies in 2035 will need to reach over $153 billion. However, keeping the same proportion of subsidies and yet not speaking about any increase of the private involvement seems to be a quite optimistic scenario. A survey done by IEA (Word Energy Outlook, 2013) revealed that 2012 saw an increase by 11% in subsidies, when compared to those in 2011. A quick comparison of this data with the data provided by Graph 1 shows that this increase in subsidies did not result in any increase of global investments in 2012. It is quite the contrary; we saw a decline of 12% investments in 2012 which again, should alarm us about the current situation of the energy sector.

More interestingly for our study, Graph 4 shows a comparison of historical and projected subsidies by source in the New Policies Scenario between the US, the EU and China. In 2012, the highest amount of subsidies ($50 billion) was to be observed in the EU, followed by the US ($13 billion) and China ($7 billion). Although now the US have been providing the RE sector with more subsidies than China, China is expected to catch up already by 2015, mainly because of subsidies in wind, solar PV and bioenergy. The subsidies in the EU will be rising till about 2018, then stay almost at the same level 2025 when they will start to decline. Subsidies both in the States and in China are expected to be continuously on rise the till 2030.

The discussed data and researcher’s opinions seem to prove that more engagement of private financing is needed to make the structure of RE financing more attractive and less costly for tax payers. Thus, the key question emerging here is how to encourage the financial community and make the RE market attractive for investments? How to create a financing mix that would be both accepted by the public and effective in a long-term development of RE power plants in a sustainable way? This is a complex issue and the relevance of a cautious design of subsidy schemes is drawn to our attention also by the IEA. We read in the latest World Energy Outlook (2013):

“In addition to playing a crucial role in driving down the costs of renewable energy technologies, subsidies to renewables can have important co-benefits. But support schemes for renewables need to be carefully designed to ensure their efficiency and effectiveness. They should be predictable and transparent and, where possible, provide for competition between technologies best suited to meet short- and long-term objectives. They need to be accompanied by ambitious, yet credible, targets and offer support differentiated according to the maturity of each technology. As cost reductions are achieved, the level of support provided for new installations needs to decline to avoid unnecessary increases in the cost of energy services.” (IEA, 2013)

Besides the financial subsidies aiming at cost reductions of RE technologies, the report underlines the
importance of other, non-financial measures that can support RE development: transparency, predictability and credibility of the policies, as we read in the recommendation. But what does it mean specifically, how can we understand it? This is one of the questions that will be answered in this paper by asking investors for their subjective opinions to find out the way they form their own views on that.

This paper will investigate the real influence of policy-makers on investments and the policy efficiency from a risk perspective. In this way we will try to provide some insights on how regulators influence the risks that have to be accepted by investors, when committing to a wind energy project. An analysis by Altran Arthur D. Little (Risk Quantification and Risk Management in Renewable Energy Projects, 2011) sheds more light on risk assessment processes in RE projects in particular. Financial institutions usually conduct risk assessments, when considering different investment options, and the regulatory risk, as a part of political risks\(^1\) is a component of the entire risk assessment processes that is applied. The analysis divides the risks faced by financial investors into four groups: political, economic, technical and social risks. Each and every type of risk is important for the whole assessment process; however, depending on the type of RE, the importance of selective risks changes. For example, when assessing risks associated with off-shore wind projects the relevance of political, social risk on the impact on return on equity and/or debt leverage capability stands out in particular. Risks such as changes in policy, planning and permitting issues (by both environmental interest groups and also by government) and resistance by interest groups turn out to have the highest importance on debt leverage capability when looking for external sources of financing. Also Al Khattab et al. (2008) prove that relevance of political, regulatory risks in risks assessments. According to their study, political risks, including regulations and political stability, were identified by investors from developed countries into developing countries as their significant concern (76% of all respondents) than financial (63%), cultural (40%) and natural (16%) risks.

Also Bloomberg New Energy Finance (Global Trends in Renewable Energy Investment, 2013) stresses the significant impact of regulatory risks on financial investors. According to the recent BNEF report, the main issue holding back investments in 2012 was instability of the policy regime for RE in important developed-economy markets.

Another aspects related to the regulatory risk, is its perception. The problem of perception of risks related to RE investments has been underlined by a few scholars in the field of RE, many times by Wüstenhagen (2007, 2011, 2012). Wüstenhagen stresses (2011) the strong influence of policy makers\(^1\)

\(^1\) However, both in the academic and industry community, the precise understandings of political and regulatory risks and their division vary, as elaborated later, in the literature review.
on the risk weighted out by investors and indicates the need for going beyond traditional economic models, when explaining strategic decision making processes.

Moreover, the problem has been identified not only by academics, but is also widely acknowledged by industry. The unclear picture and the lack of confidence in how to deal with it has been confirmed in an in-depth interview at the initial stage of this research with an asset manager in RE of one of the largest reassurance firm in Europe: “How to rationalize it, this regulatory risk, how to quantify it and what risk premiums should one attach for these risks, I find it really, really interesting. At our firm, this is all about a kind of … a gut feeling. (...) There isn’t any actual model for that.”

Figure 2 Stakeholders and risks of a RE project

![Stakeholders and risks of a RE project](image)

Source: Adapted from Risk Quantification and Risk Management in Renewable Energy Projects, Altran Arthur D. Little, 2011

The situation gets even more complex if one takes the above graph into consideration. Figure 2 pictures various perspectives of actors involved in a risk assessment process. It suggests that some risks will be perceived differently, depending on the person who makes the judgment, even though they form one whole. For example, even though it is the regulators who have the largest control over the political risks, their assessment and assumption of political risks attached to certain policies or actions might significantly differ from the assessment of a banker who later makes decisions, basing on their own assessment of selected regulatory risks. The colored actors, bankers and projects sponsors, as well as political risks are in the focus of this work – the political risks, and their subjective perception by
1.2 Objectives of this master’s thesis

In an attempt to fill this gap and provide for a more complete view on the influence of regulatory risks on the financial investments in wind energy, this master’s thesis analyzes this topic from the perspective of the financial community, experienced in supporting RE in Europe and Northern America. The author of this thesis recognizes the lack of academic studies on the perception of regulatory risks from the perspective of long-term oriented investors, who commit to investments for over 10 years, usually in form of project finance, and therefore, provide sustainable financing.

With regards to the above, this thesis aims to address the following research questions:
- What are the real and perceived regulatory risks in wind energy investments?
- What are the factors influencing a decision-making process when deciding upon different energy investments?
- How can the perceived regulatory risks be minimized so that the financing costs of wind energy projects are decreased?

This thesis attempts at contributing to the academic research by opening a new perspective for further studies in this field, especially by inclusion of institutional factors onto the decision processes. The investigated institutional pressure related to private investments focuses on two different aspects of a wind energy investment: this pressure can be executed both on a project and on an investor. These different formal and informal institutional frameworks may have different effects on regulatory risks perception, as the initial research and an in-depth interview proved.

1.3 Structure of the thesis and approach

The thesis is structured as follows. In the beginning of Chapter 2, the studies on regulatory risks in RE and wind power markets are investigated. In another section of Chapter 2, all the relevant theories stemming from the neoclassical economics, behavioral finance and socioeconomic are reviewed in order to get a better understanding of different concepts explaining investment decision making processes. Chapter 3 presents the methodology applied in this study. In the following Chapter 4, the findings are presented and interpreted. The last chapter summarizes the main findings, provides
implications for policy-makers and governments and opens doors for further research in the field of investments in RE.

2 State of the Art

2.1 Regulatory risks as an assessment tool of attraction of various regulatory environments

The greatest and most recent contribution to conceptualizing the influence of risks in the measurement of energy policy effectiveness has been provided by Wüstenhagen and his team. Wüstenhagen points out the phenomena that similar policy frameworks have been leading to significantly different results in terms of investments in different markets. He draws upon the most recent pieces of research, which underline the importance of policy risk instead of the high support levels and stability of policy frameworks. Lüthi and Wüstenhagen (2012) suggest that there seems to be an emerging common understanding that an important characteristic of effective policies is that they succeed in reducing risk for investors. According to this work, however, empirical proofs that might help identify the most important risk factors are still scarce, especially since there has so far been a limited amount of RE capacity installed. Given the short history of the industry, it is difficult to draw any sound conclusions regarding the relationship between specific features of policy risk and the investment outcomes in which they resulted. The most interesting insight emerging from their paper, which seeks to identify the most efficient and most effective energy policy in supporting investments, may actually be that it depends, as they frame it, meaning that the answer is far more complex. There is a great number of publications evaluating different energy policy measures, but only a fraction of them takes the risk perspective. The few articles with which we are familiar with either deal with the risk in wind energy specifically or take the perspective of other players besides investors involved in wind energy project development.

The most comprehensive list of risks related with RE projects has been developed by Altran Arthur D. Little (Risk Quantification and Risk Management in Renewable Energy Projects, 2011). As the author of this master’s thesis finds this conceptualization unique and advanced, Little’s definition and framework will be followed for the rest of this study. Little’s study detected a number of challenges, specific to RE, which have to be considered in order to understand barriers to ensuring financial closure of a given project.
Besides the key problem of insufficient capital resources available for the RE ventures, the consultants of Altran Arthur D. Little (2011) point out the dependency on support mechanisms and public policy risks as being a critical aspect in the development of RE projects. One of the inherent barriers of with RE projects is the high or unclear risk which makes it impossible to guarantee any cash-flows. In addition, there are no enforceable securities. Given investors’ relatively short experience dealing with REs, their skills, for example their ability to secure any long-term agreements in selling the energy, need to be further developed. This is a barrier that needs to be overcome by the private energy sector alone. The success of investments in RE projects is constrained by the lacking knowledge, both on the micro level of a single project sponsor, as well as on the macro level of the entire sector. There is also still little knowledge about RE among financiers – not understanding the new sector does not encourage them to commit to investments in this field. The paper opens up the problem of the assumptions that underlie classical finance theory, which claim that all the actors involved are well-informed and have sufficient resources and also willingness to accurately investigate the projects. To explain investors' motives and how their real behaviors may differ from those modeled by neoclassical
economics, we will later discuss some of the theories developed in behavioral finance.

All the mentioned barriers can only be mitigated by policy makers to a very limited level. The key change needs to be done by project developers and investors. However, there are other challenges of RE which are out of their reach and are mainly influenced by policy makers. In the external environment of a RE project, politics plays a key role in its success. Since different policies could either foster or significantly hamper the development of RE, instability or lack of clarity in the further development of regulations as well as support schemes for fossil fuel energies cause fundamental difficulties and rise insecurity among the investors. So there are insufficient institutional frameworks, mainly formal, especially in the context of energy markets. Nonetheless, the listed barriers include also the lack of development of some informal institutional barriers, such as public acceptance for planned projects or projects under development which will be further elaborated in this paper.

In the next stage of the research (Risk Quantification and Risk Management in Renewable Energy Projects, 2011), the authors translate all the barriers into risks related with RE projects. They break them down into four categories, following the PEST analysis, and divide the risks into the categories: Political, Economic, Social and Technical (Figure 4). The universal division of the risks is supposed to enable identification of project risks related to any RE sources. Figure 3 depicts all the risks so that the reader can easily see the political risks in a broader context.

This depiction also provides a subdivision of the broader concept of political risks into subcategories of its own, namely: country, fiscal, legal, and regulatory risks. The proposed risk breakdown is supposed to reflects the perspectives of all stakeholders, engaged in each stage of the RE project (conception, procurement, construction, operation or abandonment phases of the project). On the country level, regime stability is understood in the context of a potential expropriation, nationalization or any potential insurrection. There are also risks stemming from any changes in energy and climate policies, such as changes in the already established feed-in-tariffs, quotas, or any other market mechanisms, or public decisions made in elections and referenda. Countries are, however, usually subjects also to some international policies, such as the Kyoto Protocol or targets of the EU.
The assessment of political risks is significantly influenced by all the fiscal aspects of an investment. Tax credits, allowances in form of amortization, depreciation, national or regional investment subsidies and grants, but also good infrastructure investments in roads or grids may have a positive influence on projects. As a part of political risks, investors also consider the condition of the legal framework in which they must act. In most of the developed countries, the legal stability is usually taken for granted, yet its importance can often be seen in less developed countries with less stable legal systems. Independent justice and the enforcement of court awards, such as damages, are the most important requirements that have to be in place for the political risks of projects to be accepted by potential project sponsors.

Finally, regulatory risks form an important category of political risks. These include actions by various authorities involved in the process of environmental permitting, health and safety protection, energy regulators specifically and many other permitting authorities whose actions indirectly influence the perception of regulatory risks. Noise, water and wildlife protection, various health reports and hence-resulting directives come into play here. The energy regulators have one of the most direct effects on the political risks, as their decisions on grid connections, volume requirements or pricing might make some investments more or less profitable than the others.

The risk division related with RE projects made by Altran/ADL research (2011) is only one of the suggested classifications in the industry. There is also an alternative nomenclature. While this study
discusses the problem of a “regulatory risk”, other researchers such as Lüthi and Wüstenhagen (2012) view it as a “policy risk”. The author of this master’s thesis believes that the observed subjective perception of the concepts among investors in the interviews as well as their very first associations with the problem of “regulatory” or “political risks” might be a good indicator of the most important aspects (for them) when assessing risks related with a RE project. Therefore, the understanding of the risk by each and every interviewee is also investigated in the empirical stage of this work.

Depending on the specific RE source and technology, the respective risks discussed above have different impact on a project's success. Figure 5 presents wind energy impact and visibility mapping for both on-shore and off-shore wind energy. All the PEST risks are positioned above or below the X and Y axes, depending on the risk's impact on return on equity (ROE) and debt leverage capability, and grouped into two different types: risks exogenous to the project, above the X axis, and endogenous risks, below the X axis.

Figure 5 Wind energy impact and visibility mapping

Source: Risk quantification and assessment in renewable energies, Altran Arthur D. Little, 2011
Off-shore wind:
Operation and Maintenance:
1 high operation and maintenance costs
2 failure of grid connection
3 limited knowledge on maintenance issues
4 difficult maintenance in windy offshore areas
5 downtime due to delayed repair/maintenance
6 corrosion issues
7 transport and logistics complexity of blades

Project:
8 changes in policy
9 planning and permitting issues
(environmental interest groups, also government)
10 exceeding construction costs due to delay
11 non-cooperation between offshore and non offshore
Partners in the supply chain
12 transport and logistics complexity of blades

On-shore wind:
Operation and maintenance
13 transport and logistics complexity of blades

Project
14 permitting issues
15 resistance by interest groups
16 transport and logistics complexity of blades

For our consideration, we will be interested in the exogenous risks, impacting both the ROE (in the case of self-financed projects) and the debt leverage capability of a project (in the case of wind power plants financed by money borrowed from financial investors). As we can see on the graph, the political risks (marked blue 8, 9 and 14), such as planning and permitting issues for off-shore wind (environmental interest groups, also government), permitting issues for on-shore wind, but above all changes in policy have the greatest impact on debt leverage capability. This suggests that the investment community gives a lot of attention to the problem of changes in policies and confirms the relevance of the risk further investigated in this master’s thesis.

2.2 Decisions of financial actors in energy investment

In the past, many countries have financed investments in renewable energies through public budgets but, as previously mentioned, this financing structure has been criticized for providing too little incentives for market integration of REs. In order to be able to understand how private investors could be mobilized and motivated for RE investments, it is crucial, I believe, to know the decision making process of their investments. This section deals, therefore, with the key question how financial
investors decide upon different investments, for example, when choosing between an investment in wind power and or a coal-fired plant. The discussion is opened by theories acknowledged by the mainstream economics, and the finance theory in particular. Later on, the investment-decision making process will be expanded by inclusion of more novel theories such as behavioral finance or new institutionalism.

2.2.1 Neoclassical finance theory: risk-return evaluation and portfolio theory

In the basic finance theory, given the assumption stemming from the neoclassical economics, every investor had a profound knowledge with regards his investment decisions, was well informed and able to rationally choose the best investment option, only by weighing different levels of risk and returns. He would select this investment that has a higher return, given the level of risk that he is willing to accept, disregarding additional factors. In other words, this theory says that his decision is only based on two factors: risks and return, and as Wüstenhagen (2012) sums up, investments in RE would be a simple function of risk and return. And so the way that policy makers can influence these decisions is only to make the relationship between these factors more encouraging for the investors, either reducing the risks with given profits, or increase profits given some level of risks. The clear policy recommendation following this kind of reasoning and also accepting the assumptions behind this model, would be a conclusion that only factors such feed-in-tariffs, renewable energy certificates, tax credits or government loan guarantees would drive more investments.

Some key insights for the question that this paper is aiming to answer are to be found in a study conducted by Bürer and Wüstenhagen (2009). A survey among investors from European and North American venture capital and private equity funds, who were asked to assess the effectiveness of various policies (in terms of increasing their interest to invest in innovative clean energy technologies) made the researchers conclude that the investors, especially those in Europe, perceived feed-in-tariffs as the best incentives. Nevertheless, this conclusion is based on a number of assumptions, with the most crucial one saying that investors participating in the quantitative study would be perfectly rational and be able to conclude what policy instruments motivate them most since the survey and interviewed investors are asked about their preferences in a direct way. It surely provides great insights on what the openly stated preferences of investors are and what the investors want to be heard by the readers. The stated-preference method seems to be truly a better approach than a price-based revealed preference model, however, it is still a utility-based model resulting in a hidden assumption that the key factor influencing the decisions of interviewed and surveyed investors is utility maximization. Although it
seems to be a fair starting point, we would also try to look for other factors discussed in the academic community.

Moreover, the study mentioned above sheds light on the behavior of venture capitalists and private equity funds, however, since their returns are mainly exit-driven, the investments of venture capitalist and private equity funds are not usually long-term-oriented. By inclusion of corporate and project finance, this paper would focus more on drivers of the more long-term investors which is the primary goal of this research.

Another theory stemming from the neoclassical economics, in line with the basic finance theory, which contributes to understanding of investment decision choices is portfolio's theory. Coined by Markowitz in early the 1950s, it assumes well-informed, rational investors and efficient markets. According to this concept, financial investors aim to maximize a portfolio expected return for a level of portfolio risk that he is going to accept, by choosing the proportions of various assets. However, there might be a diversification effect if he agrees to invest in few different assets. In this theory’s world, investors can model asset returns as a normally distributed function, the risk is defined as the standard deviation of return, and so a portfolio is modeled as a weighted combination of assets. Therefore, the return of a portfolio is the weighted combination of the assets' returns (Markowitz, 1952). By combining different assets whose returns are not perfectly positively correlated, the investor’s action is aimed at reduction of the total variance of the portfolio return – the risk is lowered on a collective level, when looking at the total risk of all the invested assets, and not at the individual level. In this neoclassical view, portfolio theory would be another argument in favor for investing in RE because investments in renewable energy can positively contribute to the expected returns of an investment portfolio in energy assets. The portfolio theory in the context of REs has been discussed, for instance, by Awerbuch (2006). He points out the role of renewable energies in the mitigation of fossil price volatility with regards to the energy security and argues that investor’s portfolio of electricity-generating asset can benefit from the additional shares in RE, including wind. His key argument is that inclusion of even more costly REs in a portfolio can actually reduce portfolio-generating costs since in dynamic and uncertain environments since the relative value of generating technologies needs to be determined not by evaluating alternative resources, but by evaluating alternative resource portfolios. Wüstenhagen (2012) underlines the importance of this argument of portfolio diversification especially for financial investors deciding upon investments in various energy sources. The effect shall come in play, firstly, when an investor chooses between investment in fossil fuel energies and RE, and secondly, when he chooses between different RE technologies such as solar or wind power.

The portfolio theory and its assumptions in particular have been criticized by other economic sciences
such as behavioral economics. Therefore, when including the portfolio theory into our discussion, it seems to be crucial to take into consideration all the hidden assumptions. The critique of more heterodox economic schools would draw attention to the fact that in the real world not all investors are well-informed or have enough sources to acquire this knowledge that would let them structure a fully diversified portfolio. Therefore, the market risk and betas are said to be not the one and only crucial factor in estimating required return from investors’ investments. In addition, these theories assume market efficiency, which poses another point of critique on the neoclassical economists. Nonetheless, it needs to be pointed out that since the earliest version of the portfolio theory, back in 1952, the modern portfolio theory evolved over the time. Elton et al. (2010) point out the changes that have been done, and discuss the problems related to its real application by financial institutions or the methods that are used for evaluation of the efficiency of the portfolio allocation. There might be also a problem of a proper valuation of portfolio effects by investors, pointed out, for example, by Wüstenhagen (2012), who reminds that investors might vary in terms of their experience in portfolio evaluation skills. In our specific case of RE investments financial investors would be usually more experienced than incumbent utilities producing electricity, therefore, they might tend to be more willing to invest in RE, including wind power.

Last but not least, one of the core arguments against the portfolio theory is the distinction of different risks that an investor is exposed to. That would mean that an investment decision in wind power would be not only a simple function between different levels of returns and risks, but also between different types of risks that an investor wants to be exposed to.

2.2.2 Behavioral finance: the role of bounded rationality, risk perceptions, prospect theory, status quo bias, investor heterogeneity, path dependence

Investments in RE have a relatively short history and most of the research focusing on the risk aspects of RE investments build upon the basic finance theory. However, more and more researchers stemming from different disciplines such as behavioral finance or psychology, point out other aspects that should be taken into account when studying decision making processes. Some recent papers prove that the empirical evidence on perception of policies, and related regulatory risk in particular, by investors has been limited so far (Bürer et al, 2009, Wüstenhagen et al, 2011). The role of cognition, risk perceptions and bounded rationality, which are not taken into account in the above discussed models, is underlined also by Wüstenhagen and Menichetti (2012). A similar approach to this problem is shared by Masini et al. (2012) who investigated non-financial drivers of investors’ decision. In view of the authors, there is increasing evidence stemming from sociology and psychological science proving that a purely rational
economic evaluation of the investment alternatives is not sufficient for investors’ decision making process of their capital allocation in RE. The argument of bounded rationality must be, therefore, taken into consideration, since it is challenging the validity of the rational-actor models of classical economics, including the finance theory and the risk/return evaluation by investors. True understanding of the risk and return perception, is crucial for energy economists and policy making aimed at the RE financing support. However, to my knowledge, so far it has not been applied to study behavior of long-term investors (such as project finance or corporate finance) in the wind power industry in particular and therefore, it seems to be interesting research problem to examine if these agents from Europe and North America have, indeed, very different attitudes towards wind power investments.

The research proving that the perception of risks and cognitive biases might pose an actual problem and change investors’ behavior expected from the basic finance theories has a longer history. Starting with Simon (1955), finishing with through well-known names such as Tversky and Kahneman (1970) and many others, a great number of theories show how the real behavior differs from the one modeled in neoclassical economics. For example, frame dependence, which is one component of psychologist Daniel Kahneman's Nobel Prize-winning prospect theory, is regarded as a major contribution to behavioral economics. In the frame dependence concept, the humans tend to view options and scenarios differently, depending on the way they are presented. The psychology of choices was also further researched by Kahneman’s co-researcher, Tversky and within the prospect theory there are also three other factors on the actual human behavior pointed out, which we may want to look at when investigating financial investors’ in wind power: loss aversion, perception of relative, rather than absolute changes in investors’ utilities and the problem of anchoring, meaning a bias leading to a too heavy reliance on the first piece of information offered to an investor. In addition, in 1988 Samuelson argued in his paper published by Journal of Risk and Uncertainty that most real decisions show that individuals disproportionally stick with their status quo alternatives in their decision-making processes, and so it may also apply to our investors in wind power – their status quo and the alternatives they might have had at the time of their decisions. The status quo of financial investors might be of a particular importance when discussing investments done by an asset manager of a large utility or a financial institution with a more conservative approach. Due to the relatively new nature of RE he might be far better experienced in investments in fossil fuels rather than in RE and therefore, more willing to stick to his year-long decisions, rather than disinvesting and looking for all the available alternatives.

Researchers on behavioral finance, such as Hampl et al. (2012), suggest also that especially cost estimation and forecasting are likely to be exposed to psychological biases and politics, especially in
the context of investment decision-making under uncertainty. The limited research provides more insights on preferences of investors’ in RE in particular. Wüstenhagen (2012, 2009) points out another aspect of the risk perception analysis done by financial investors. Investors may decide to finance different types of technologies because they either tend to invest in more risky “early-stage technology firms” or they might want to invest in project finance, which usually is seen in the area of mature, often better proved, and therefore, less risky technologies. And this investors’ heterogeneity does influence policy recommendations – different policies might be needed in order to drive different types of RE, but also to drive different types of investors. The differences among investors are also to be noticed in their own personal histories, backgrounds or professional experiences, as other scholars suggest. In addition, Wüstenhagen believes that also path dependence has an impact on the decision-making process in RE - current technologies and systems depend on historical circumstances and might not necessarily be the result of an efficient resource allocation. Therefore, also investments in wind power may be affected. In case of an investment decision-making process, path dependence could be understood as a factor having impact both on an investor’s decision (as a single economic actor), but also in a broader context - of the entire financial institution and its previous investments.

Another bias was described just recently by Lüdeke-Freund et al. (2011). He explored biases in project finance in photovoltaic energy in Germany and found out that debt investors prefer projects with premium brand technology (of modules or inverters, for example) to low-cost technology; he calls the phenomena a “debt for brands bias”. The initial assumption that lenders would prefer projects with the highest Debt Service Cover Ratio (DSCR) did not hold – investors tended to choose projects with a lower DSCR, as long as those projects included premium brand technology. This is a crucial finding of a non-rational behavior in risk evaluation in RE since lenders chose to give the same financial support to projects with a higher risk, despite options with less risk available. Although this research taps a different type of RE investments, it might be a good start of further research in other technologies and for investigation this debt for brand bias holds also for wind power.

2.2.3 New institutional economics: institutional theory, institutional pressure

Having discussed the theories arising in neoclassical economics and behavioral finance, this paper takes into account also the most relevant findings from socioeconomics. Starting with the concept of new institutional economics and institutional theory, the institutional environment of the investment decision making in RE will be considered.

The concept of new institutionalism was defined for the first time John Meyer and his colleagues such
as Brian Rowan, Richard Scott in the late 1970s and early 1980s, as claimed by Powell (2007). This theory investigates institutions from a different perspective than neoclassical economics does, proposing that organizations are shaped not only by demand and available resources, but also by some institutional forces, such as rational myths, knowledge authorized by public opinion, the law and formal educational system, including professors and experts. Since new institutionalism is a very broad concept, this paper will narrow it down mainly to its economic aspect and challenge the concepts of new institutional economics (NIE). Although scientists have not agreed upon one definition of NIE, its basic postulate is that institutions matter for an economic activity. It is crucial to distinguish old and new institutional economics because NIE, as opposed to the old institutional economics, operates within the framework developed by neoclassical economics, but does not strictly sticks to its assumptions, such as the rationality assumption and the rational choices models (it assumes a bounded rationality). In the view of NIE, economic activities are embedded in a framework of institutions, both formal and informal ones. Applying this theory to our research problem, we would like to look at the embedding of private investors, who invest in wind power, in an institutional environment, and their responses to the surrounding rules, believes and conventions.

The emerging “umbrella” concepts such as the global governance in energy security have been already widely discussed in the academic community, mainly with regards to their responses to the energy policies in general. The policy recommendations stemming from this field underline the importance of “(global energy) governance” and institutions being put in place to set and execute rules and norms governing global energy problems. For instance, Florini and Sovacool (2009) analyze the weaknesses and strengths of design options of institution, such as inter-governmental organizations, summit processes, multi-lateral development banks, global action networks. In this way, they focus more on the formal aspect of institutional shaping behavior of actors involved in the global energy security. The Policy Paper No. 7 “Financing the Global Energy-System Transformation” seems to give more insights on the institutional aspects of RE financing in particular. The German Advisory Council on Global Change (WBGU) proposes a tailored institutional environment of private financing sources for the electricity generation. It argues that a specific regulatory policy should be introduced to create more investment incentives for the private sector to commit itself to more RE investments. Overall, the WBGU is a clear advocate of a proactive state that “integrates energy, environmental and climate policy” and it believes that existing investment risk could be decreased by development of “a stable, long-term transformative regulatory framework”. The council based its policy recommendation on the case of Germany, claiming that as a current leader in the energy transformation it can be, both in terms
of technological innovations and also in the creation of a suitable policy framework, a good example for other governments. Despite the fact that the German council seems to take the example of Germany not very critically, there are a few good arguments pointed out with regards to a development of a suitable institutional environment desired by investors. It recalls a study published by the financial industry itself (Deutsche Bank Change Advisors, 2009), saying that investors expect not only attractive risk-adjusted returns, but they also need a transparent and legal planning security, which it sums up with the abbreviation TLC - transparency, longevity, certainty. This certainty should be ensured by a country’s strategic, long-term and, what is even more important, legally binding climate- and energy-policy targets which would, for example, make any retroactive cuts impossible. The WGBU points out also the technological aspect of the necessary institutional framework, such as infrastructures, grid development and storage systems in order to drive a large-scale electricity generation. This becomes even more important in case of wind and solar power since due to their nature of time-related and geographical fluctuations which need to be balanced out. All the conditions just mentioned, especially the TLC, would lead to reduction of transaction costs, widely analyzed in new institutional economics, of an investment in wind power. A clear, secure and long-term oriented framework would not only decrease the search and information costs for an investor, but also ensure him that the other parties, such as governments, utilities, grid operators engaged in the support schemes or other arrangements, act in line with the previous contract, and so his policing and enforcement costs are also reduced. It would decrease the uncertainty he has to deal with anyways and strengthen the enforcement of policies and the law. This is important not only at the time of making the first investment, but also throughout the whole project since high costs of monitoring could possibly lead to a decision of a disinvestment at the more mature stages of the project.

However, as previously discussed, new institutional economics stress the significance of not only formal institutions, but also the informal ones, such as social norms or types of governance which private investments in wind power project are unavoidably embedded in. Believing that formal institutions and policies, developed by politicians and policy makers will be on their political agenda as long as there is enough public support, we should have a look at the indirect influence of social acceptance and governance on the investors’ regulatory risk assessment. Taking a closer look at the newest publications on informal institutional environment of investments in wind power, we can notice that also the WGBU council recommended in its earlier policy paper in 2011 that the policy-makers need to create more opportunities for citizen participation. It could improve, the paper writes, social acceptance of the RE projects, fostering planning and approval processes for infrastructure projects, and encourage participation. The WGBU recommends a transformative regulatory policy, which would
open some space for addressing of public concerns. Breukers and Wolsink (2007) are among the researchers who stress the importance of a proper institutional framework, not only with regards to the infrastructure provided by governments, such as access for new plants to the electricity grid, but also the social acceptance barriers from local communities. A case study by Breukers et al. (2007) compares different implementations of wind power projects in different institutional setups: in the Netherlands, England, and the German state of North Rhine Westphalia, and in different levels of embedding of wind power projects in societies. It takes into account various aspects such as changing political, economic, environmental and planning conditions, but one of the key reasons, as the authors conclude, why the projects have different results are the local acceptance problems. The authors claim that policy-makers and wind project developers are not able to realize or underestimate the tensions happening at the local level. Their answer to the acceptance problem is enabling some local ownership in the projects and institutionalizing participation in project planning that would end up in a better recognition of risk of the project by other relevant interest groups, needed at the local level of the implementation. As we believe, the risk aspect could be considered here, however, at a higher level as well – insights on risk perceptions of other parties engaged in the entire project already at the earlier stages of the process would give an investor more knowledge on the risks related to the success of the project in general and so it could help to manage his own risk expectations.

Wolsink (2007) underlines the significance of a deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation in planning of RE also in another paper published in 2007. Especially in case of wind power projects, he argues, the community acceptance of the impact of wind power on landscape, such as noise or disputable visual aspect of wind turbines, seems to be the most crucial factor in explanation of opposition or support. Some institutional changes that create involvement and trust of actors at the actual implementation level are again, another important success aspects stemming from a project's institutional environment, defined as a social capital by new institutional economists. Interestingly enough, in earlier papers Wolsink (1999) represents, at the first look, a different stance toward importance of public support. He discusses, as he phrases it, the “Not-In-My-Backyard -myth”, and argues institutional factors have a far greater impact on wind power projects, rather than the public acceptance. He explains it, however, further – even if strong public support is not a sufficient factor for development of wind power, it has certainly a positive impact on policy sitting. He makes his point underlining the importance of institutional capital, seen, in his view, in knowledge resources, relational resources, and the capacity for mobilization, energized by a collaborative bottom-up approach to planning. A valid point of his criticism towards the NIMBY myth seems to be the fact that supporters of the NIMBY theory do not
distinguish between the interests and drivers of opponents of different projects such as nuclear-waste plant, wind power plant or a mental health facilities. Moreover, they usually do not take the opponents' perceptions of risk into account, which can be changed through their involvement in planning processes. Even if sometimes wrongly simplified, the NIMBY concept is still, however, widely acknowledged, both by the academic and professional communities related to wind power investments. In the special issue on social acceptance on RE innovation, Wüstenhagen (2007), et al. (including Wolsink as its co-author) claim that factors influencing socio-political and community acceptance are increasingly getting more and more recognition as important explanations for differences in the general public support for RE innovation and the differing progresses in realization of projects. Also the WGBU paper underlines the social acceptance barrier as an important risk factor in investments in RE, especially since local resistance increases management costs of an investment and, thus, threatens its funding. This is supposed to be of key importance mainly in the energy infrastructure sector where “delay cascades” of subsequent parts of projects are to be faced, often putting realization of the whole infrastructure into a great danger.

Besides institutional forces on RE projects coming from the government, policy-makers, and the public, many more other tensions can be distinguished. Loock, also the co-author of the mentioned “debt for brands bias” study, claims in one of his most recent studies (2012) that there are also other factors affecting investors while deciding upon an investment. He calls it an evidence of a “customer intimacy”, meaning that a business model of RE projects that proposes the best services is much more preferred by RE investor managers, rather than a business model that propose the lowest price or best technology. This study points out a novel policy implication - according to Loock’s study, policy support for service-driven business models for RE, focused on the customers’ needs, is of a crucial importance, and not less significant than technology or price involved. Therefore, Loock calls for more of a bottom-up approach, basing on customers’ needs, rather than on technology or production only. Energy policy should be, as he suggests, based on three pillars. Firstly, it should promote service-oriented business models through lowering transaction costs for RE, for example, through incentives. Secondly, energy policies could advance executive education for RE, mainly in the area of marketing and sales, so that managers become more aware of the importance of this service aspect, and not only focusing on the technological aspect of a project. Last but not least, energy policy shall found research and support more of knowledge-spillover for RE services and best practices in this area.

That all being said, in the literature there are quite a few visible arguments favoring development of a specific institutional framework around potential wind power project plans, which, altogether, would
be similar to those stemming from a number of factors being investigated by the new institutional economics. With national energy strategies with measurable targets, political consensus and commitment to RE at all governmental levels, strengthening the public promotion of investment, provision of legal certainty and a proper design of power markets the formal structures of institutions are hoped to be shaped in a desired way – through lowering regulatory risks they could, indirectly, support private investments in wind power. An increase in public awareness and social acceptance for the infrastructure projects, citizen engagement and pressure from the society could, on the other hand, create and improve informal institutions – and so either, in the view of NIE, decrease transaction costs, or help to reduce (at least reasonably assess) other risks related to a regulatory environment of a wind power project.

Nonetheless, it shall be noted that these points being just discussed are only one layer of institutional aspects of financial investments in wind power – observed on the project level. Another interesting perspective on the institutional theory with regards to RE was contributed by Masini (2012) et al.. Searching for the non-financial drivers of investment decisions, she recognizes the importance of institutional pressure on the investor level. The action of his competitors, opinions of industry consultants, academics and the way an investor responds to them – all that also matters when discussing an investment decision making-process.

Trying to sum up all the diverse concepts and views, if we aim at creation of an investor-friendly environment, a solid institutional framework that would decrease regulatory risks should be developed. This is a way of addressing the non-economic barriers, which, obviously, need to be discussed together with the economic barriers, faced by financial community in wind power. As the available literature suggests, both economic and non-economic barriers may, indeed, affect risk assessment of projects considered by financial investors.

2.3 Pre-assumptions developed for the empirical part of the master´s thesis

The observation categories for interpretation of the empirical part of master´s thesis (interviews) are closely related to the pre-assumptions developed basing on the discussed theoretical framework. Three pre-assumptions (and so categories) will be investigated in the later stage of this research:

1. Financial incentives or policies lowering the actual risk can drive long-term private investment in wind power (built up upon the neoclassical economics):
Active governmental policies to lower actual risk or increasing actual return: tax policies, subsidies, abolition of the price distortion of fossil and nuclear energies caused by subsidies, etc. lead to an increase in expected return, whereas support such as government guarantees lowers the actual risks; risk-return analysis as a decisive factor for private investment decisions

2. Inclusion of more non-financial incentives can greatly support the private investments in wind power (built upon the behavioral finance)

Expectations management by policy makers: risk-return perceptions can, for example, be negatively influenced by frequent policy changes or unclear targets; there are also behavioral aspects of the decision-making process

3. Investors respond to an institutional pressure and act accordingly during the investment decision process (Socioeconomics, NIE)

Development of a specific institutional framework: national energy strategies with measurable targets, provision of legal certainty, a proper design of power markets, increase of public awareness and social acceptance for the infrastructure projects, citizen engagement and pressure from the society; development of a proper institutional environment will decrease regulatory risks related to the wind power investments

3 Empirical design / Methods applied

The study follows an exploratory market research approach, using qualitative research methods. Exploratory expert interviews and in-depth literature studies will help to conceptualize a set of factors that let us understand not only the real regulatory risks, but also capture the problem of their perception, drawing upon behavioral finance and socioeconomics.

In the initial stadium of the research, policy papers, academic journals, industry publications and media reports publicly available have been analyzed. Industry-specific publications, e.g., guidelines, textbooks and journals, dealing with renewable energy project financing elaborate the practical approach on risk assessment, and the political and regulatory risks in particular. In turn, the academic literature captures the nature and short-comings of similar risk assessment processes. Nonetheless, to my knowledge, there has been no study dealing with financial investors and wind energy investments in particular, thus, this study is investigating a still unexplored field. Available studies deal with either decisions made by other actors participating in the wind power investments, different kinds of investors or with other types of RE. Following a detailed investigation of the state of the art, which was discussed in the previous section, this paper will continue with the interpretation of interviews
conducted with industry experts in the second part of this qualitative research.

Since the question that this paper is aiming to ask specifically, to knowledge of the author, has not been answered yet, there is no research that could serve as a clear base for this paper. In-depth interviews will serve as a mean of conceptualizing the idea how the problem is perceived by the investors alone. The investment behavior will be analyzed indirectly, basing on investor’s reflection on it, and by exploring what the key factors influencing investors' opinion on regulatory risks are. Interviews provide us means to look at this matter through the eyes of financial investors, however, this perception, investors’ claims and statements will be challenged in order to try to look for the underlying drivers, embedded deeper, somewhere in their believes. The goal of this study is to go beyond the stated-preference approach of a related study done among venture capital funds by Bürer et al. (2009), in which clean tech investors were asked directly for their preferences with regards to RE policies. The outspoken beliefs might not necessarily go in hand with the real assessment of investments in wind power and the attached regulatory risks. Although it is planned to approach the problem of regulatory and political risks with the investors directly, too, this paper wants to study the way different regulatory frameworks (and the attached risks) are perceived, basing mainly on investors' experience with successful or failed investment opportunities. We will look for drivers that might have encouraged them to commit to those investments, assuming that the underlying reasons might be a good lesson for understanding how more investors can be attracted to the wind energy market.

A great part of the research in the field of risk assessment methods is done either in focus groups, or in a qualitative way, through questionnaires. However, since this study is focused on the individual reflections, an in-depth interview seems to be the best choice for the research at this stage. The interviews will provide a door for a detailed investigation of each investor’s personal perspective. Drawing on what Richie at all (2012) point out in their guide on qualitative interviews for social science students and researchers, they will provide an in-depth understanding of the personal context embedded in the regulatory risks which they act in.

In addition, our research problem has not been researched in the specific sample of financial investors we have selected yet. Hence, our in-depth interviews will help us understand their complex motivations and the decision-making processes of their investments.

Within the scope of this research, the problem pointed out by Masini et al. (2012) will be further investigated, however, with a lager focus on the institutional pressure, and with a prior discussion of the basics stemming from neoclassical finance theory and behavioral finance. In addition, the sample of expert interviewees will be expanded from the sample of only European investors, by inclusion of
American investors into the empirical part of the research.

The target and frame population for the interviews consists of the most common private finance actors. The data published by OECD (Bloomberg New Energy Finance data from the report of UNEP and BNEF, 2010) indicates that the most of all the private investment in RE are financed by:

- Asset finance - representing more than 70% of private sector’s finance for the clean energy industry, including electricity generation by renewable sources, energy efficiency and bio-fuels
- Public equity markets – 14%
- Venture capital and private equity - 7% in the period 2004-2009

As a first step of the data collection process and recruitment of interview participants, a database of target respondents was developed. Contact details of companies and their senior representatives were collected from multiple sources, including the websites of industry organizations, key international conferences on sustainable energy finance, such as the Renewable Energy Finance Forum, and the New Energy Finance Summit, but also through professional networks of the researchers and their colleagues.

One of the goals of this study was a methodological contribution with regards to the investigated sample and analysis of a broader group of agents, when comparing to who is usually considered in similar studies. As the research aims at investigation of drivers of long-term investments, the frame population consists of investors in project or corporate finance investments, who stay invested in wind energy projects for at least 10 years. The recruited sample of interviewees works as a regular employee or a consultant for following companies:

- Energy companies
- Banks
- Insurance companies
- Funds: pension, insurance, infrastructure
- Free-lance consultants experienced in project finance.

The first in-depth interview was done in early 2014, after the preliminary research, in order to get a practitioners’ view of which aspects of the political risks might be interesting to dive into more and how the research focus could be narrowed down. The [A] interviewee, heading a RE department of an internal asset management company at a large financial institution, has been working for the RE business for over 5.5 year, being in charge of running strategic business plans for RE projects, deciding how much to invest in which asset classes, investigating the challenges and the risk capital that have to be provided for these kinds of risks. The interview was done via teleconference, on Skype, and lasted about 40 minutes. The interviewee has experience in investments in four different countries within
Europe, two other market opportunities that he was looking into were not finalized due to better competitors’ bids. About 90% of all his investment have been done as project finance investment, his firm usually stays invested in the whole cycle of the investment, for about 20-25 years.

Throughout the entire research process, interviews were conducted with ten male investors/consultants. Their investment experience has been pictured in Figure 6, followed by brief descriptions of their profiles.

Figure 6 Sample of the empirical research conducted for the purposes of this master’s thesis is constituted of 10 investors, experienced with wind energy investments in Europe, US and Canada.

Source: Own

Short profiles of the research sample/investors:

Investor [A]

[A] has been working for four years as head of a RE department at a group internal asset management company of a large insurance group. His company invests in green infrastructure assets: wind farms, solar parks, geothermal assets, sometimes clean tech companies. He has been in the RE business for 5.5 years, running the strategic business plans for RE projects for the group. Besides his investments in wind energy, he has been investing in solar power plants in Spain.
Invested in: Germany, UK, Sweden, France
Looked/looking at investment opportunities in: US, Poland, Gulf region

Investor [B]
[B] works at an energy and infrastructure fund at a leading global investment firm. He is experienced in private equity investments and has been in the RE business since 2009. In addition to his investments in wind energy, he has invested in solar power plants in Italy and Spain.
Invested in: France, Italy, Spain
Looked/looking at investment opportunities in: UK, Germany, Poland

Investor [C]
[C] works for a consulting firm in the RE business with an engineering and wind energy focus. He has been in the RE business since about 1995, dealing mainly with feasibility studies, due diligence, research projects, and pre-work procedures related with wind farms.
Consulted/consulting markets: Austria, Serbia, Bosnia, Croatia, Bulgaria, Romania, and other parts of the Balkan region

Investor [D]
[D] works for a large life insurance company. He has been active in the wind power sector for 1.5 years and has looked at a number of investment opportunities in the last 12 months, though only one of them resulted in a transaction. RE investments are only a part of his company’s investment programs, combined with other types of infrastructure investments at the firm.
Invested in markets: Canada
Looked/looking at investment opportunities in: USA, Germany, France, Italy, UK

Investor [E]
[E] works at a company which plans and operates RE power stations with a strong expertise in wind energy. He has been working in the RE sector for about 10 years and in wind energy for 3 years.
Invested in markets: Germany, Austria, France, Italy, Czech Republic, Canada
Looked/looking at investment opportunities in: Scandinavia, Romania

Investor [F]
[F] began an investment career in the USA, working on a development strategy for a global US energy
corporation as a developer and operator of power plants. Later on, this investor and a few other colleagues started their own company, developing wind power plants in the UK. They shut down their business in 2013. Now self-employed, he is consulting wind and solar energy projects for other investors.

Invested in wind energy in: UK
Looked/looking at investment opportunities in: UK

Investor [G]

[G] has been investing in the wind power sector for nearly 10 years and has invested over 1 billion Euros into 45 wind farms with a total capacity of 60 MW. He works at an investment firm and manages seven employees as head of the department. Apart from investments in wind energy, [G] has invested in PV in a few European markets.

Invested in wind energy in: Germany and France
Looked/looking at investment opportunities in: US, Spain, Italy, Netherlands

Investor [H]

[H] started out in the US, carrying out projects in power plants in Asia and South America until 1997. After that, he started to work for a large European company, carrying out energy projects across the world and working, among others, on large coal-fired projects in Morocco, Ivory Coast, and Australia. [H]’s first investment in wind energy was executed in 2003.

Invested in wind energy in: Sweden, Greece, Baltics, France, Ukraine
Looked/looking at investment opportunities in: Germany, Italy, Romania, Poland

Investor [I]

[I] has been working for a year as a technical consultant for a regional grid operator and transmission organization in the USA. Before, he worked for an American utility and was involved in the first wind investments in the USA, driven by the Renewable Energy Portfolio, which required the utilities to supply some of their energy from RE sources.

Consulted/consulting wind energy investments in: USA (Minnesota, Illinois, Michigan)

Investor [J]

[J] is a Professor of Economics, expert in regulatory policies and Head of the State Center for Renewable Energy in Illinois. He has renowned expertise in the evaluation of policy effectiveness in
the wind and solar markets.
Consulted/consulting wind energy investments in: USA (Illinois)

For the purpose of this master thesis, the interviewees have been treated anonymously. In the next chapters, when interpreting their statements, they will be related to as [A], [B], [C], etc.
The interviews were conducted in a semi-structured way, focused on the key topic of regulatory risks and its perception. In the first part of an interview, the interviewee would go through his experience and reasons that made him (want to) enter a specific country and the market of wind energy in general. Depending on his experience, follow-up questions on specific investment cases would follow. In another stage of the interview, he would be asked questions on a general role of government or policy makers in driving wind energy investments in order to grasp his view on the relationship between politics and wind power market. Last but not least, questions touching upon the problem of regulatory risks in a direct way followed. The interviewees were also asked about their opinion on perception of the risks and the way their companies deal with their assessment.
A detailed interview guideline has been attached as an appendix to this master´s thesis.

4 Empirical analysis
A great part of the interviewees touched upon the problem of risk-return analysis, when making an investment decision, by themselves, being only led by general questions, not any specific ones. The question that turned to be very insightful in this respect asked investors about their opinion on the general role of government or policy-makers on the investments in wind power. It provided a grounded starting point for understanding the decisions being made in an investment process.

4.1 Neoclassical economics
A thorough analysis of the interviews in the eyes of neoclassical economics draws our attention to the following aspects:

4.1.1 Competitiveness of wind energy among other energy sources
A 5-year experienced RE asset manager [A] gave a number of arguments when underlining “the utmost importance” of governmental support, pointing out few aspects controlling the return site of the
analysis, especially the levelized cost of energy (LCOE). LCOE, as defined by the National Renewable Energy Laboratory, is the price at which electricity needs to be generated from a specific energy source to break even over the lifetime of the project. In an economic assessment of all the costs over the project's lifetime are taken into account: initial investment, operations and maintenance, cost of fuel, cost of capital, and therefore, it is commonly used among practitioners seen to calculate the costs of generation from different sources. Our interviewee recognized correctly, as the newest reports confirm, the decreasing LCOE in the European RE sector:

“The LCOE has come down significantly, especially in the solar segment. And wind, if you have good locations, let's say somewhere on the shore, in northern part of Germany or on the frontal shore in the UK, where they have a lot of wind there, you are completely competitive to gas power plants or coal power plant. But in many European markets the wind conditions are not that favorable and that is why you need some subsidies.”

As Frauenhofer Institut for Solar Energy Systems ISE (Levelized cost of electricity renewable energy technologies, 2013) reported, in Q3 2013 wind power at very good onshore wind locations in Germany already had lower costs than new hard coal or combined cycle gas turbines power plants. Today, the LCOE for onshore wind power is between 0.045 and 0.107 Euro/kWh, whereas offshore wind power, despite the higher annual average full load hour, with 0.119 to 0.194 Euro/kWh (World Energy Outlook, 2013) has, unfortunately, significantly higher LCOE than onshore wind power, mainly due to the unstable and newer technology. As the report explains, the underlying reason lies in the expensive installation as well as higher operating of the available technology and, what is more important for our study, higher financing costs for offshore power plants than for the onshore plants. Cheaper financing could lower the LCOE, and increase the competitiveness of RE among other energy sources. Not only the available data, but also the interviewee [A] makes a distinction between onshore and offshore investments with regards to the risk-return relationship on the German wind energy market, stressing the fact that, despite significant incentives schemes, he would rather not recommend them to his clients (investors) because of low returns, given the risks that they would need to accept. Since, according to the basic finance theory, the higher the expected risks are, the higher the premium for the additional risks between onshore and offshore wind power should be, which consequently, leads to a more expensive financing for offshore wind. If policy makers want to attract investors, not increasing their return, they need to act on the other side of the equation and lower the risks.
Figure 7 Renewable electricity production costs relative to the wholesale prices for onshore wind and regions in the New Policies Scenario

![Graph showing renewable electricity production costs relative to wholesale prices for onshore wind and regions in the New Policies Scenario.](image)


In order to draw any conclusions on attraction of RE as an investment option for global investment players, we should also look into the development of the relation of LCOE and wholesale prices in countries other than Germany. An overview over the global situation of electricity produced to sell on wholesale markets has been provided in the World Energy Outlook, 2013. As Figure 7 shows, globally, the LCOE for wind-generated electricity are far higher than in Germany, even higher than the critical offshore wind. On average, neither the EU, nor the US or China have reached the breakeven for wind power electricity, meaning that the LCOE of wind power still does exceed the average wholesale electricity price received for generation over its lifetime, making RE production investments very unattractive. The provided examples prove that a breakeven of wind power electricity generation is possible, however, still far away from happening in certain regions. [A] opts for financial subsidizing of the technology in some markets:

“Unfortunately, for the time being, yeah... the government support, subsidies, feed-in-tariffs or green certificates are, or however you call it, in the markets is of utmost importance.”

A similar opinion on financial subsidies has the interviewee [F]:

“I think government and policy makers are at the heart of whether it is attractive business. The present technologies require subsidy. Having started subsidizing this market, they have to carry on. The rest of the market is irretrievably terrible and they [UK government] realized that they have to subsidize everything, not only RE but also conventional generation. So it is not really much of a market. If we could have atom again, we would need to have a tight carbon system, a cap on carbon, a tight one so
that not much of emissions can be emitted. The price of carbon would go up and it would force people to move to the most cost-effective solutions. And the rest of the regulations is unnecessary. (…) when you start to subsidize a market, the whole market is screwed.”

The less developed wind power technologies cannot compete with the developed over dozens of years fossil fuels technologies yet, and therefore, require state subsidies which would decrease their costs, one could say, following the logic of [A]’s arguments. However, reducing the LCOE by streaming financial subsidies to the RE sector is only one way of making the equation more attractive for investors. The other way, as [F] indirectly suggests, is an increase in the wholesale prices. There are, for example in the UK, price distortions in the entire energy industry, such as financial subsidies for other sources of energy, also conventional ones, so it becomes even more challenging for RE to compete with them. Although similarly, he underlines the high impact that governments have on investments, he believes that actually the market itself could solve the problem, if there was no government stepping in and distorting any energy prices. His conclusion makes us want to recall the results in the differences between investors' geographical focuses on investments turning out be of relevance in a study conducted by Bürer and Wüstenhagen (2009). In their comparative study between European and North American venture capitalists into clean tech, they found that only 18 of the 47 sampled funds which regarded FIT effective were based in the US. They rather opted for reduction of subsidies of the conventional energies or technologies performance standard instead of FIT. [F] began his investment career in the USA, in an American energy corporation and later continued his investments in the country of his origin, in England, where at that time (2011) there was a simple FIT, steadily decreasing, but ensuring stable cash-flows over the investment period. He is familiar with both of the investment environments, at that time he even based his own business on the English FIT, however, he still regards the FIT as ineffective policy measures, indicating elimination of price distortions and introduction of carbon cap as a more effective solution. Similarly to the great part of Northern American sample of investors studied by Bürer, he believes in the “invisible hand” of the market. Once the government started its subsidies, it destroyed the British energy market, he would say. And since it is not a market in the strict sense anymore, it needs a constant support to make demand and supply meet in the equilibrium. The interviewee might have developed this view in a conservative financial corporation that he started his career at, whose investments were done in fossil fuel and nuclear energies. Political views of the investors, obtained in the answers on the government's role on the investments seem to be very closely linked with their preferences between a general governmental intervention into the market or rather a belief in the market forces.
[I], one of the interviewed American investors, underlines many times the lacking competitiveness of the US wind energy sector. As a result, he believes that the Renewable Portfolio Standard (RPS) was the key, if not the only, driver of his previous investments in wind energy.

When asked about the obstacle for the investors who would like to develop more wind farms, he points out two aspects:

“First, a preferred provider agreement, which is an agreement with an utility to pay him their energy, and second, subsidy: production tax credit and investment tax credit. They get their investment back in few years. That is a subsidized industry right now, and if it will end, then the development will quit. The production tax credit makes it just lower costs, it does not really go into economic choices. It is still high for that, even with the production tax credit. Gas has to be above $8 for wind to break in, fixing dollar rate. Gas has just hit $6 yesterday, or the day before. It is still $2 to beat it. The price of gas it what wind is competing with right now.”

The low natural gas price in the US is pointed out also by the Bloomberg New Energy Finance report (Global Trends in Renewable Energy Investment, BNEF, 2013) as a key reason for the investment drop in wind power since the low gas price reduced the value of power purchasing agreements available to all generators, including wind developers.

Besides the agreements between wind investors and utilities, which is more of a market risk in this respect, [I] mentions subsidies in form of the production tax credits (PTC) and investment tax credit (ITC). PTC reduces the federal income taxes of qualified tax-paying owners of RE projects based on the electrical output (measured in kWh) of grid-connected RE facilities, while ITC reduces federal income taxes for qualified tax-paying owners based on capital investment in RE projects (measured in dollars) and is earned when the equipment is placed into service. [I] seems to be very critical about the RPS, he believes that it does not actually change the problematic lack of competitiveness of wind energy technologies, it will only have a positive influence as long as the subsidies are kept in place. As soon as the tax credits are abolished, the investments will decline since according to the rationale of economic choices – wind energy will provide fewer returns than fossil fuels, given the accepted risk profile.

The withdrawal of financial incentives in some Western European countries, such as in Italy or Spain, have caused a significant decline in private investments RE in 2013, as we read in the BNEF report.

In late 2010, Spain retroactively cut FIT for existing PV projects, and 2012 further negative for investors developments followed – a moratorium over FIT support for all new projects, and a tax on the
revenues of clean power plants. The investments dropped also in Italy where a tight cap on capacity eligible for FIT was introduced.

4.1.2 A temporary, phase-out support of underdeveloped wind energy technologies

A closer look at interviewee's [A] previous argument of the required governmental support in markets where the wind conditions are not favorable might raise questions about validity of wind mill placements in some areas. Will the technology improve in the next years well enough so that the weather conditions stay sufficient for a competitive electricity generation without any governmental support in the future? Or might financial incentives be actually misused and taken advantage of in the earliest years when the support is the highest one? Being a great burden for the public budget, will they in the end turn out to be just short-term investments, dropped as soon as the FIT expires? The answer might be both, depending on the case and market, of course. Riskier investors such as venture capitalists have a great impact on development of new technologies, contributing in this way to new innovations on the market (Bürer, Wüsthenagen, 2009). And as interviewees [A] and [F] suggest, the present underdeveloped technologies need such a temporary financial support now because the riskier, in terms of technology and regulations, investment opportunities are, the higher risk premium will be expected by investors, when comparing to the safer investments. And if they need to be rewarded with higher returns, it will, indeed, pose a greater cost to a wind power plant developer whose financing will be more expensive than financing of a technologically further developed coal-fired plant.

Another, even more experienced interviewee [G], who has been investing in wind power for the last 10 years, aiming at almost only long-term project finance, points out the same problem of high LCOE in many markets.

“There is still no grid parity\(^2\) reached, so green power needs some subsidy, whether it is tax-paid subsidy or FIT subsidy. It is all, kind of, the same, we need the political support to invest into wind power.”

Buying relatively young wind farms, his company usually holds the farms until the end of the feed-in-tariff period, or “any other economically useful life period”, as he mentions. The investor [B] also pointed out the problem of high LCOE of certain RE technologies in general, and gives the example of solar PV electricity generation which few years ago did not make any return. The risks related to some

\(^2\) A situation when RE source can generate electricity at a LCOE which is less than or equal to the price of purchasing power from the electricity grid.
of the technologies, such as offshore wind, were considered by him as too high and would stop them from any investment in them (or, alternatively, the risk premiums attached were considered to be too low to make the investment attractive). Mainly those investors who are willing to accept more risk, who we could call risk-loving investors, would support the developing technologies in their early development phases, and they will be rewarded with higher risk premiums. Therefore, he does acknowledge the need of financial support for early-stage wind energy technologies if a government wants to attract also more conservative investors, not looking for higher premiums, but rather for lower risks. However, [B] makes his point when he says:

“And key conclusion is that when any support system, from the regulatory and political perspective, for a RE technology is given on this way that eventually, the technology needs to stand on its own feet, and not requiring external support and funding to function. So it becomes just a normal player in the market. In 10 years, 20 years, whatever time, but at some point they have to reach their goal when the technology will not be support any longer. (...), the support will be provided if the regulator sees that at some point this plant can stand on its own feet.”

In his view, the yet underdeveloped wind, especially offshore, technologies should get financial support only if after their early development phase they are expected to become competitive. Later, they should become as competitive as other energy sources. Since he implicitly does not see wind power as a “normal player” yet, he expects the government to step in and make up for its loss of competitiveness. The crucial insight is here that the subsidies are expected to be only temporary ones.

4.1.3 Knowing who you want to attract – differences in risk attitudes among the investors

Interviewee's [G] conservative, risk-averse attitude contrasts with another interviewee [H], who despite his early career as a “prudent and conservative“ investor ended up as a consultant being on a far riskier wind-power venture now.

“In Sweden, they had a lot of discussion about supporting REs through green certificates that are now in place. And, company X [a leading supplier of products and systems for power transmission in Europe] has always seen the green certificates...it is more attractive, in one way, because you can get a higher return on that, or, at least, the perceived higher return. On the other hand, you have a much higher risk. And compared, if you had a fixed feed-in-tariff like in Germany. And always, we were
sitting in a situation where there was no really a decision about this but everybody was talking about it. And I think, I am not sure about it, but I think it got clarified in 2003. So I guess you can say that it was almost a venture capital type of an investment in getting into this kind of project. But if you have enough cash, and risk appetite and you can stand in on those conditions, then obviously, if it turns out that you were not able to pick up from the project almost nothing, and withdraw then maybe this is not a good business.”

The attractiveness of a project might be, in his eyes, measured by the expected return. He knows that the higher the returns, the higher the related risk that he needs to accept. As he quickly corrects himself, there are rather “perceived” returns. Nothing is sure here and he sees those returns in relative terms, not in absolute ones, which is another interesting aspect of the discussion on returns of a project (the problem of perception in risk-return analyses will be elaborated in more details in further sections of this paper).

The interviewee [H] has a different regulatory risk appetite as compared to [G] and [A], and therefore, a different attitude towards investments in riskier regulatory environments. Some money might be invested into a “venture”, as [H] positively describes his additional, spare capital, while conservative [A] describes it derogatively as “stupid money”:

“And when you have a lot of capital, so called stupid money out there, when they do not really know where to put the money, and they are not able to make a good diligence, and they throw away money into wind power, it might come to an overheating.”

This would confirm the previous conclusion that not the entire capital invested in the RE market is not planning on staying for the whole life-cycle of the project, and therefore, might not be a sound base for a long-term, sustainable financing. Therefore, I believe that it is crucial that policy makers are aware of the fact that different policies attract different sorts of investment. Not only his expression of the “stupid money” or “overheating”, but also the tone of his voice, indicated interviewee's irritation. When asked, however, if there is any kind of “wind power bubble” approaching, he denied quickly. He restated that the industry he works in is, overall, sound, and there is nothing like the 2000s “IT bubble” to be expected. He might have felt insecure that I was trying to undermine the perceived condition of his business – especially since he also is advising some other clients to invest in RE, or maybe, indeed, this quick and risky capital is only incidental and not popular among long-term oriented investors.

The key lesson to be taken from this section is the fact that there are investors with different risk-
attitudes, willing, therefore, to support projects with different levels of regulatory risks. The insights from our interviews let us conclude that investors think that there is a correlation between the level of risk that they are willing to accept and time perspective that they want to stay invested in the project. If a market's regulators aim at a successful attraction of long-term investors, they should rather focus on decreasing regulatory risks in the first place. High subsidies alone will not build up a wind energy market in a sustainable fashion, it might potentially attract a great number of investors, but rather short-term oriented who hope at making quick profits as long as the subsidies are kept at a high level. The rationale resembles the concept of the “price of policy risk”, a concept developed by Lüthi and Wüstenhagen (2012) in a study on the influence of different PV policies on project developers’ behavior. These developers turned out to have a different level of willingness to accept some policy risks and they tend to attach “price tags” on different regulatory risks, such as the duration of administrative processes or uncertainty induced by an approaching capacity cap. If aware of the phenomena, policy-makers can make a more mindful trade-off between the level of offered FIT or a decrease in other relevant policy risks, leading, according to the authors, to a more efficient policy framework. Following this logic, we could relate this to investors' behavior shaped by different wind energy policies – the higher are regulatory risks, the higher “price cap” will investors attach to the accepted risks in form of higher expected returns, counting on, for example, higher FIT. Therefore, a market attractive in terms of a high FIT level might still be unattractive from a regulatory risk perspective in case other components of regulatory risks are too high. Since a regulator has to make up for the risks attached, it becomes very costly for him to attract an investor.

4.1.4 Portfolio aspects

The positive aspects of wind energy investments on the investors' portfolio risk have been mentioned only by investor [A]. The role of RE in portfolio diversification seems to be important from a strategic point of view, when allocating capital among different energy assets, as claimed by Wüstenhagen (2012). [A] is analyzing:

“I mean it is a little bit related to the risk from a portfolio point of view. So a good thing about this kind of investments is that their correlation to the market risks, to the equity, to credit risk, bonds, is pretty limited. So if you have a FIT in Germany, no matter what how the equity market or the credit market is doing, if you have a good wind location, and you have a good wind form, technique works out, then you get nice cash-flows from the project, no matter how the equity or the credit market are actually doing.
So the low correlation and the diversification effect from a portfolio point of view, is very important. Not so much for me, because I am a transaction manager with my team. But from a strategic asset allocation point of view, this is really important for illiquid assets, infrastructure assets so… project financing in RE. There is a clear trend, at least in our company, but I think we are not the only one, it also applies for other institutions and investors. There is a clear trend: away from security, towards illiquid assets. And there are two reasons. First, the low-yield environment we are in. So the government bond yields are on a real basis negative in Germany. And so the yields are very low, there is a need to look for other investments, where the yields are higher. And also there is this diversification effect. So that the portfolio comprising of equity, bonds, of real estate, illiquid assets mostly, then the illiquid assets have a negative correlation with the rest of the portfolio.”

The portfolio theory, discussed in previous chapter, may play a certain role, especially in financial institutions allocating their capital in different energy industries due to RE’s low correlation with other risks, such as market, equity or credit risks. The reason why it was not captured by more interviewees might be the fact that a great part of them work now in firms/companies investing in wind energy specifically. They have rather an executive role, deciding on specific markets, and not a strategic one, leading to more ground-breaking changes in the portfolio, such as entering a new sector. And so [A] believes that the trend for investments in wind power might have been driven to a great extent by the portfolio diversification effect. The other reason why it was not mentioned is that the portfolio effect is related rather with financial risks, not with the regulatory ones, which happened to be important for [A], but to the core problem of this study they relate indirectly. Nonetheless, it is interesting how [A] compares the security and returns of certain wind investments to the German government bonds. In a way, the very low yield bond environment forces the capital to move to other assets. This new available capital, seeking low risk and long-term investments opportunities, needs to be allocated so it will go for those assets which are seen as stable and low-risk ones, mainly due to the portfolio effect. This opens up another target group for governments which seek a long-term capital in wind farm investments. However, we need to stress here that this capital looks only for stable, low-risk profiles of investments, so a governmental action is needed on the risk side of the risk-return equation, rather than the return one. Instead of any premiums for higher regulatory risks in monetary terms, reduction of regulatory risks is desired by this particular group of financial investors.

The initial insights emerging from the interviews seem to be in line to some extent with the basic finance theory. For all the experienced, well-informed investors who have time and money resources to
conduct a proper due diligence process, it is as simple as that - the higher the regulatory risk, the higher return is expected by them to make them invest. These investors behave rationally, demanding a risk premium for the additional risk that was taken on by them. The argument of competitiveness of wind energy, when comparing to other energy investments, seems to be the loudest voice here. However, at the same time we have proven that not all the investors in wind power seem to follow this rationale. Besides investors’ skills and willingness to perform a thorough due diligence process and a risk-return analysis, there is still the problem of scarce available information about the markets, which is crucial to have a clear overview of all the investment opportunities and make a sound judgment. Last but not least, the problem of risk perception was identified and will be discussed in the following chapter of the paper.

4.2 Behavioral finance

4.2.1 The role of cognition and bounded rationality in the risk perceptions

The problem of the difference between the real regulatory risks and the perceived regulatory risks has been identified not only by academics, as discussed in the theoretical part, but also acknowledged by the industry. All interviewees confirmed the unclear picture and the lack of confidence how to deal with it. There is no real measurement, there is no quantitative method, only qualitative methods based on different, subjective aspects can be applied, there is no arbitrary solution to that issue in the industry. The investor [A] says:

“How to rationalize it, this regulatory risk, how to quantify it and what risk premiums should one attach for these risks, I find it really, really interesting. At our firm, this is all about a kind of … a gut feeling. (…) There isn’t any actual model for that.”

His firm, a large reinsurance corporation experienced in dealing with risks, is seen as one of the industry leaders. If not one of the European finance leaders with an outstanding record in this respect, who else can capture it better? This proves the complexity of the problem which has not been solved yet. When asked if there is a problem with a good perception of the regulatory risk in the entire industry, he confirmed, saying:

“If people get a lot of money, people are getting very crazy. The perception is not always there. I would say that particularly this is a problem for private equity infrastructure funds that are exit-driven.”
Again, he criticizes the short-term approach of some industry players. His statement suggests that high amounts of financial incentives, subsidies can make people less rational, alluring, again, to private equity infrastructure funds. Due to their short-term investment horizons, they take advantage of steady cash-flows, supported by schemes like FITs in particular, provided in the early stages of projects. [A] believes that some of their asset managers (and so is the great part of the investment community) are not able to truthfully recognize regulatory risks. Later, he mentions also their incapability of conducting a proper due diligence process, which would tell us that their investments are not results of a clear “risk-return” analysis. This paragraph makes, however, another crucial point – it draws our attention to the lacking rationality among some investors from the sector. Without a careful diligence process, no rational and sound decision can be made. When shaping energy markets through policy measures, it needs to be kept in mind that not all of the investors behave rationally and some decisions are not based entirely on a risk-return analysis. As discussed in the theoretical part, these insights suggest that, indeed, there are other factors such as behavioral aspects or institutional environment that come into play. The impossibility of a proper assignment of regulatory risks among some investors opens up another section of this work. We observe that there are various behavioral elements that shape investors’ perception of the regulatory risk and make financiers invest in or rather drop selected projects.

4.2.2 Investors' heterogeneity in terms of cognition, personal histories, backgrounds or professional experiences

The further study of the interview lets us distinguish different types of investors, with distinctive attitudes and goals. Although the following example of the current situation of the British solar energy market cannot be directly applied for the wind energy sector, it shows contrasting investment approaches in the RE market, especially with regards to various goals expected to be achieved, when investing within different time horizons:

“The UK is subsidizing solar pretty heavily at the moment and they can make a very good return. So a lot of capital is being thrown into solar in the UK, and a lot of money is coming from investors that do not stay invested over the whole life-cycle of the asset. So my understanding is that some of them think, okay, let’s stay on the wave and before it is becoming really critical, we are trying to sell it. So if it is becoming critical, there is no market, they cannot sell. So they are a little bit blind, they say, okay, we can make money, we get management fees, we can get fair interests, we can then present our fund investments are a very nice story so they are, not all of them, but some, they are not really aware of the
During the interview [A] seemed to be even a bit annoyed by his peers’ investment approaches. As a conservative investor who provides capital for the entire economic cycles of wind power projects, he wants to distance himself from investors rushing into short-termed, not well-studied investments. He tries to separate himself from “them”, investors who are not aware of the related risks, while he is at least aware of the existing problem. Pointing out the inability of a proper risk assessment among some investment funds and their exit-driven profits (these investors will exit the market as soon as they reach some desired return on it), [A] wants to convince us that this is not a sustainable approach towards financing wind power development. Extraordinary high yields might attract some quick capital, but no sound, longstanding one. We can read between the lines that such capital would not stay invested for the whole life-cycle of the project; it may be taken away once its owner reaches the expected return. Moreover, such a brisk flow of capital can lead to an overheating on the market, as he mentions later. Subsequently, such an oversupply would still be supported by the governmental subsidies, financed by tax payers' money and burden the public budget.

4.2.3 Historical record of country's attitude towards wind power and investors - stories and emotions preferred to an analysis

Investor [B] draws a comparison between investment decisions to a shopping experience, he compares the choice of investment locations to a process of buying a jacket.

“There is no measurement, there is just a question of what happened. You can talk to people and take a view, right? It is a little like... if you buy a jacket in the shop, how would you know if this is a bad or a good quality? I could find out by researching on what happened to five previous customers that obtained the jacket, get their reviews, and then, you know, you kind of try it out and get a sense of that. It is impossible to MEASURE in a quantitative basis, you can only measure it anecdotally, looking at historical evidence, how the regulator behaved and then you talk to them and see what kind of comfort you get, so this is not a quantitative measure. It is more empirical and anecdotal, I would say.”

The opinion on country's regulation and assessment of the related risk is made in an “anecdotal” way, as [B] investor underlines it. He associates the assessment process with emotions, rather than with any rational calculation. Feelings, a “sense”, “comfort” are, in his view, the key factors on somebody's risk perception, similarly to the “gut feeling”, mentioned by [A] three times in the same context. There
is no great rationale behind it, only historical evidence and your own brief impression from meetings with regulators, government and ministries can help you make you an opinion about them. Investor [B] even polarizes this judgment, there might be either good or bad regulatory environments. However, instead of objective terms, he uses subjective ones, which are strengthened by the way he talks, also in the later paragraphs: “I would say”, “I think”, trying to distance himself from any generalizations. Every investor takes “a view” on different regulatory environments, it is all about forming an opinion, not measuring it in an absolute way. “Talking” to the influencers in the wind power industry of a certain country is supposed to help an investor make up his mind, by finding out their approach and attitude towards him. Judgments of his peers and other investors seem to be for [B] almost equally important. They might be experienced with the governments of respective countries, maybe they know them personally, have talked to them already or even invested some capital and therefore, they can share their view of the government's influence on their investment performances. [B] talks about a “review” of a selected government and its officials, as it was a “jacket”. An investment is seen here as a purchasing process, and all the other shops are various investment opportunities competing for investors. This reveals [B]'s view on power relations in these transactions. It is the investor who is a customer here, and it is the government who is trying to sell him this jacket, meaning that governments serve him and try to get his attention. It reminds us of Loock’s (2012) results where he coined the term of “customer intimacy” with regards to RE investors. He concluded that the financiers prefer a business model of RE projects that proposes the best services rather than a model that offers the lowest price or best technology. Drawing upon his concept, it seems like, from [B]'s perspective, the customer intimacy might also apply to the relation between investors and regulators/governments. Since it cannot be fully formalized and followed by measured standards, the quality of the service, advice and commitments that a government delivers might greatly influence investment decisions. Interestingly, [B] also talks about some comfort that must be related to his decisions. When asked if only Canada turned out to have the best risk-return relation out of all the other investigated markets, he goes away from the rational risk-return analysis by himself:

“Well, at least, yea, again, I don’t think we have the best market overview, so it could be a coincidence that the one investment they felt comfortable with was in Canada. It is certainly not a coincidence that we did not invest in Germany. Germany as a market offers very low returns, we are still looking at the US market, and the UK, Italy where, I think, you can find a good risk return profile. It is just that the project that we have been looking at did not quite meet our criteria. But I don’t want to say that we cannot find the right opportunities.”
 Whereas [A] was focusing mainly on the lacking rationality of his peers and diligence deficit when investing, [B] goes even a step further and points out the bounded rationality related to his own firm’s decisions; he is critical about himself and his rationality. He is aware of the fact that in the past, when he was making decisions, he and his firm lacked resources to have a good market overview so they went for an investment they just felt comfortable with. The risk-return profiles of investment opportunities play certainly some role, but a limited one. Some analyses have made him stay away from the German market due to its low (perceived) returns, but then, it was not a risk assessment process which made him invest in Canada after a prior selection of opportunities that met his “criteria”. It proves that behavioral aspects might even have a critical effect and be decisive during an investment.

4.2.4 Peers influence: herding

One of key insights for discussion of behavioral aspects of the decision-making processes is the fact pointed by [A] who draws upon his over 5-year experience in wind power investments - some market actors do not behave rationally at all. They do not follow any logics of neoclassical economics since they are not aware of the regulatory risks that they should know about. They are “blind”, either not wanting to see these risks or simply being incapable of understanding them due to lack of their experience, knowledge or time. By saying “on the wave”, [A] refers to some herd behavior that he observes in the industry. In his view, the key motivation of certain investment funds might be high expected management fees or some good records later used for marketing communications with their stakeholders, rather than a mindful decision of accepting certain level of risk at a given price. He suggests that this does not resemble any cost-benefit analysis either, rather some moral hazards as if they were betting on the regulatory environment by accepting these risks. Besides “on the wave” investment actions, the herd behavior can be found also in other fields. It goes further if we take into consideration the way [D] sources the information about market conditions – he keeps on asking his peers for their reviews. Comparing to the rest of interviewees, [D] is relatively new to the RE. The RE market is a quite new experience to him and his firm, although his energy investment experience is outstanding. He has been in wind power for only 1.5 year, looked at a number of investment opportunities in the last 12 months, but only one of them ended up as a closed transaction. [D] is saying:

“I think the most important is to look at the life-opportunities, and then sound out the market, so… Speak to investment bank, to other investors, also to energy traders, or integrated utilities. Also then, you have to involve the specialists, consultants, on the power market, for example, like Redpoint, you
speak to technical consultants, and to the developers, as well, obviously. So this is how we try to gain the information. There are some news services as well.”

Similarly to investor [B], he also values opinions of other industry representatives and his peers, when investigating various markets and their regulatory frameworks. Whereas [B] was focusing mainly on the active way of gathering information, talking to the decision-makers by himself, and taking peers' review as something additional, [D] seems to rely on the secondary information to a greater extent. Even though he represents the largest insurance group in one of the Western European country, he takes advantage of the energy market and industry representatives to shape his own view. He does sound out the market, tries to find out what the market thinks. Instead of an objective diligence process, he knows that it is crucial to understand what various market players think. It gives him some idea of future development of the entire industry. This finding is relevant for our study as it proves, again, that not all of the investors act in a fully rational way. In addition, the information sourcing from the market reminds us being “on a wave”, the herd behavior in investment decisions. A herd behavior in the context of investments was coined by Scharfstein and Stein (1990) who examined forces that can make investors mimic the investment decisions of other managers, ignoring the power of substantive private information. As classical economic theory suggests, investment decisions reflect investors' rationally formed expectations, while their decisions are made using all the available information in an efficient manner. The scholars (Scharfstein et al, 1990) recall Keynes, who already in 1936 was critical about the ability and willingness of “long-term investors” to oppose market trends and ensure efficient investments. He suggested that investors might not necessarily act according to their own information and beliefs; they would rather follow the herd if they do care how others will evaluate their ability to make sound judgments. From what [D] said, it might be the case that as one of the long-term investors he mimics his peers by investing on markets which are proved by them. As Keynes' theory would suggest, he will not behave unconventionally and “eccentric” with regards to his choice of a market. He will rather enter that market whose regulatory environment is regarded as favorable to wind investors and popular among them. This factor might have an even greater influence than we expect since it is such a difficult factor to be measured, therefore, opinions and views might count more. It is safer for the reputation of a long-term investor to “fail conventionally” rather than “succeed unconventionally”, as Keynes explains. It might apply also to [G], the institutional investor whose firm has an investment committee and risk department that together decide upon any acquisition. In addition, there is an advisory board which needs to approve any potential investment presented by their investors. Therefore, the herd behavior might be observed not only as an industry trend, but also as an internal tendency,
present within the organizational structures of financial institutions. Employees, asset managers would tend to be in favor of investing in the more popular markets – popular among their work colleagues – rather than being more inventive and look at less popular ones. And it would not surprise us if the left out markets could have actually turned out to be a better option if they ever underwent a thorough risk-return analysis. [G] is exposed to both a great internal peer pressure, having so many different bodies within his own firm, and to the external one, as a whole firm being exposed to his competitors in the entire industry. If we recognize effects of a herd behavior, it might not come to a surprise that [G] has invested in wind farms only in Germany and France so far, not having even looked at any other opportunities in Eastern European countries, or other, less popular markets.

4.3 New institutional economics: institutional theory, institutional pressure

The conducted interviews revealed that both formal and informal institutional frameworks play a key role in investment decision processes. Investors go far beyond risk-return analyses and take into account many aspects of RE markets that they consider to invest in:

4.3.1 Clear targets and obligations

All of the interviewees experienced in dealing with wind energy in the American Mid-West, point out the Renewable Portfolio Standard (RPS) mechanism as the most important driver of increased investments in certain states. As a state law, the RPS requires electricity companies to produce a specific fraction of their electricity from RE sources. [I] says that:

“wind power is driven only by RPS because the prices of our grid operator were too low to support wind even with the production tax credit. You could not make enough money to pay the investment capital ROE. In the operation unit it costs for our grid operator' averaged on revenues. Our prices were too low.”

The utility that he used to work for would need to purchase the RE outlet from a wind energy developer or they develop the energy themselves. In the previous section, we discussed the lack of competitiveness of wind energy vis-à-vis conventional sources of energy, such as gas or coal, which, in [I]'s opinion, underlies the problem of RE investments. He discusses high production costs of wind
energy, when comparing to its wholesale prices. The production of RE at his utility was not able to generate such revenues that would exceed their costs, even governmentally subsidized in form of production taxes. So again, either the wholesale prices could have been decreased or the LCOE lowered. The introduction of RPS started in early 2000s in California, but the discussion on this subject, considering such an obligation, continues until now. While some of the states decided to introduce voluntary RPS targets, the largest part of the participating states have ordered obligatory RPS, imposing penalties for non-compliance. In this way, the obligatory state energy policies started to require electric supply companies to produce some part of their electricity from RE sources. Since every such supplier had to comply with the new market mandate, the wholesale prices increased in the entire state. Supporters of RPS claim that this obligation allows more competition than FIT, and therefore, can lead to efficiency and innovation, helping RE be produced at the lowest possible cost. The common understanding of RPS and their personal experience with this mechanism on the home markets might have made all the Northern American interviewees believe that RPS positively contributed to the change.

As [I] goes on with his first investment that he was involved in, he seems to be truly convinced that it was launched only because of the RPS. The interviewee believes that the RPS targets have had a very significant impact on driving private investments in some US states in the past, slowly starting the RE transformation. If there were no RPS goals to be met, the uncompetitive wind energy would not attract as many investments as fossil fuel power plants.

The initial investigation of the role of clear targets and obligations suggests that my assumption about the positive influence of a proper institutional framework might be worth a further discussion. In the following sections of the paper, my interviews will be studied in the context of theories pointed out in the theoretical part.

- **T for Transparency**

When asked about the relevance of administrative functions of a market, [A] gives a good example of the UK government whose approach is perceived by [A] as a very transparent, open and welcoming one.

“Yea, it is, I would say, more or less, same importance as the regulatory stability or longevity of the rules, yeah? If you do not understand all the rules, all the relevance of the legislation or of laws, then you are in a bad position. The more transparent, the better the regulator explain the relevant rules, the
better. For example, the UK is a very good example. They have an agency, an authority, which is in charge of communication to investors and so if the government decides or put a new law in place, then the agency launches investment guidelines in which it explains really all the relevant political position of law, so they have better information, and the website is also very good. So if you have no clue about this kind of investments, if you go to the website, and you spend some time, then you have a very good change to understand it because the all what is important is there, on the website. And it is an easy language, the description of the material is really good, you call the agency once you have questions. So it is very, very important.”

[A] sees the importance of a right approach by regulators towards the investment community and the transparency in policy making. These results are in line with the findings of a study on transparency and international investor behavior by Gelos and Wei (2002). They proved that international funds prefer to hold bigger assets in more transparent markets. The key message that [A] is trying to convey is nothing else but the TLC concept. The idea was established by Deutsche Bank Change Advisors and it says that transparency, longevity, certainty altogether create the most desired investment environment. And indeed, as discussed in the theoretical part, the TLC of energy policies seems to help investors reduce their transaction costs, especially the search and information costs.

Since interviewee [A] seems to be an investor who searches for all the relevant information by himself, he wants to talk to the regulators. He is very active and independent in looking for the information he needs. So if regulators aim at a longstanding attraction of investors like him, they should open a communication channel between them. Even just the availability of the information and publication of planned and introduced policies, for example online, seem to have a positive effect on the risk perception. [A] underlines the importance of understanding of all the policies and laws introduced, and therefore, he appreciates the agency's role in their proper explanation. The agency, designated for communications only with investors, communicates in a simple and approachable way, and all what he needs most is there, online, in one place, explained and well-described. There is even a possibility of calling the agency if one has more questions. This diligent service reminds us an attempt of shaping the “customer intimacy” that Loock (2012) was talking about. It seems that there is the discussed “customer-seller” relationship between the investors and the British government – the agency is designed for the “comfort” creation for the buyer, represented by an investor in our case.

Figure 8 is a screenshot of a website of British Office of Gas and Electricity Markets (Ofgem), a non-ministerial government department and an independent National Regulatory Authority, governed by the Gas and Electricity Markets Authority (GEMA). Its transparent website, praised by [A], provides clear
and relevant information on all the environmental programs available in the UK which are administered by Ofgem on behalf of the government. In an easy and quick way every interested person can find out in which programs she might be able to participate in.

- L for longevity - the problem of changes related to changes in ruling parties, governments

Besides governmental programs in the RE sector being transparent, investors want them to be longstanding, too. [E] recalls the temporary nature of any government which leads to some level of intrinsic instability of any projects planned for about 15-20 years. In a way, the project's success depends then on a government's performance:

“There is another problem, the elections and the politics are usually done every four/five years so there is no long-term insurance or safety that they will stick to the rule. You can just basically assess the country before you go. You can assess the political stability of the situation in general, and just don’t go to countries where you don’t think it is stable.”

It means that due to a political cycle and new elections, there is no regulatory stability for any longer period of time. Therefore, every projection for a long-term project may be based only on a rough, general assessment and no sure, specific judgments can be actually made. The relative perception of the regulatory stability is stressed by him another time, saying: “where you don't think it is stable”. Thus, a legal stability helps to decrease the perceived regulatory risk, as some investors suggested. Few recent examples of changes in the framework by new political parties or governments have made a legally binding regulations even more needed. Since investor’s trust has been shaken in the recent months, now they expect at least some kind of guarantee of the regulatory promises. Besides the above discussed problem of the stability and certainty being parts of the Deutsche Bank's TLC concept, the longevity aspect of regulations has also been proved to be important to our interviewees. [A] provides a good argumentation why the longevity is as important as “T” and “C” components if regulators and governments aim at attraction of long-term investors:
Figure 8 The comprehensive website of Ofgem with information on governmental support programs, published in English, is appreciated by foreign investors who seek reliable and transparent sources.

Sources: https://www.ofgem.gov.uk/environmental-programmes/renewables-obligation-ro

“Because of the long time frame of the investment, we are, as an insurance company, we are investing long-term, we are matching long-term insurance cash-flow with the cash-flow from the project, so we need to have very clear and reliable rules. For example, if you have a feed-in-tariff, and after 5 years a new government is in charge and they change the feed-in-tariff, say, they cut it, then they destroy completely your investment case. So if you attract capital, especially financial investors, the longevity of the regulation is key. So it is the most important thing for this kind of investments. (...) That it is what we are looking at in the diligence, situations like in Spain, is there a debt, if the subsidies are transferred to the end consumer or if they are a ticking bomb, so to speak, that you are facing the risk
that the government change the subsidies scheme and what we are looking also is if the feed-in-tariff is extremely high. Is it much, much higher than the stock market price for electricity, like in Japan, for example. (...) the subsidy [in Japan] is very, very high. And if you assume that a lot of energy power plant will be built in the next few years, then it is becoming extremely expensive for Japan.”

Both [A] and [E] talk about few rules that a government should stick to. It reminds us of a game – investors want the game to have clear rules that will not be changed throughout the entire time of playing. Only then they can decide if they want to play it further or not.

The regulation's longevity is supposed to be the most relevant factor, says [A], a conservative asset manager of an insurance firm. Without it, even a high FIT does not make up for the instability involved. A market with higher returns, but perceived as instable, might turn out to be unattractive to the long-term investors. Only short-term investors will come and simply take advantage of those subsidies and leave the market as soon as the FIT start to decrease. Japan exemplifies such a case, its government seems to try to convince investors that it will deliver the promised subsidies, even if unrealistic in amounts. Following [A]'s logic, if he was planning to finance a wind power project in Japan, he would demand higher risk premiums. But because of the very negative perception of the Japanese regulatory framework in general, he probably would never finance it at all. The outstandingly high subsidies not only do not make up for the higher regulatory risks in Japan, but also make investor suspicious of their true longevity as well as government's credibility. It might be the case that there are some limits in the prices of policy risks (the theory developed by Lüthi, Wüstenhagen, 2012), especially when discussing decisions made by long-term investors. Japan is a simple case where some policy risks are just too high to be accepted, even if the price is invitingly promising. Some conservative investors will never enter those markets, fearing that the “price tag”, attached to some riskier regulatory environments, might be taken away any time. [A], full of emotions, speaks about “destroying” his investment plans in case of a change in regulations. The tone of his voice, the true anxiety and anger can also tell us how important those aspects actually are to him.

The longevity problem can be solved, as WBGU (2013) recommends, by a “gradual reduction” of the level of subsidies over all the investment years. Their phase-out, once a predetermined amount of installed capacity has been reached, should also be announced well in advance, as the policy paper reads. Having talked to the investors, I can conclude that, indeed, this is greatly in line with their own wishes. It is all about some advanced planning of their investment projects, knowing what they can count on as investors and managing their expectations throughout the entire process.

We are gaining more insights on the most critical examples of instability of regulatory frameworks,
when taking a closer look at what happened to investor [E].

[E] So I would call it relatively safe in older Western European countries. There is, of course, (...) there is former Eastern European countries. In Romania, for example, there were changes on how the grid access was handled, so that things can happen. And another tremendous change that happened, it was in Ontario. There was a feed-in-tariff system that existed until last November and in the end of the last year the government canceled the program. And now they want to start a completely new program. So this is something that is probably the most critical thing that can happen to a project developer or to an investor. And it is very unpredictable.”

When asked about the way he is dealing with such cases, he answers: “(...) You spread your risk, or have a portfolio in different countries, like we do, that you don’t focus only on one country but you focus on different countries, and you want to spread your projects also in different jurisdictions. Because, of course, it can always happen. For example, in Austria, in the province of Lower Austria, also the regulations were changed. There was a hold open process approached for nearly a year because they rearranged the planning process. It is another thing that you just cannot know. But in fact, in Austria and in Ontario, it is the same in a way.”

The Romanian case seems to be for [E] a similar problem to what [A] is predicting with regards to the regulations in Japan. Some publicly available comments of “schoennherr”, one of the strongest legal firms in the Central and Eastern Europe, deal with the problem of governmental promises of a generous FIT. In Romania the tariffs might, indeed, have proved to be effective in attraction of a great amount of capital into Romanian wind power market. However, it came mainly from the international financiers. In the meantime, it has also turned out to be very costly for the Romanian public. This quick attraction of the capital resulted in a rise of strong lobbyists “concerned” about the great costs generated by the tariffs, creating another burden on the public finance. A simple cut in FIT was an “effective” solution – it made the Romanian market quickly far less attractive and stopped so the influx of the international capital. At the same time, though, it has surely undermined the perception for any future incentive program that the Romanian government will be planning to introduce in the future as its credibility significantly dropped in the eyes of the international community. The key merit, namely the longevity of their support programs, so much valued by a number of investors, has disappeared. [E] uses very strong words when describing the regulatory changes in Romania, Ontario and in Austria: “a tremendous change”, “completely new”, “probably the most critical”, “very unpredictable”, which depicture all his negative experiences in an extreme way. Those developments seem to have shaped his
view on regulatory risks in selected countries in a very strong way and all of them will throw some negative light on any other future consideration. However, he seems to have accepted the fact that there is no ultimate stability in none of the markets. He acknowledges this fact and therefore, he tries to spread his regulatory risks, investing in different markets with different incentives schemes and regulated by various governments. In his view, all of the changes, even if they happened on two different continents under various jurisdictions, they all seem to be quite similar. It is just about the longevity of the planned regulatory regime or its lack, regardless of its actual design.

Also [C] discusses an example of legislative changes from his personal experience. He recalls Croatia where he had to face them due to the Croatia’s inclusion into the EU. At that time Croatia was required to adapt its legislation, including energy policies, to the European standards. His frustration, also expressed in his voice, confirms the importance of already discussed TLC of regulatory environments. He gives even more examples of difficulties that he had to face:

“Bulgaria and Romania joined the EU so they also stipulated the FIT. Investors expected good conditions in those countries, but in the end, it turned out to be, yeah, very difficult for different reasons. For example, not enough grid capacity for Bulgaria, for example; changing the legislation when it comes to the FITs, green certificates in case of Romania, alignment of the legislative requirements according to new development to requirement to the EU.”

[C] created a list of obstacles which he has encountered so far. Its greatest part relates to the changes that appeared during the investment development where investors’ initial expectations have not been met despite the regulators’ promises. This is another example that proves the importance of expectation management by a government.

A good conclusion of this section seems to be a statement made by [E]. When asked about the government and its role in driving private investments, he said that he wishes himself a government that follows its own strategy and sticks to its previously stated plans. The officials should have realistic, as he stresses, “realistic” goals and follow them with a firm consequence. Giving an example of the European 20-20-20 targets, his simple wish is that the regulators just follow their initial targets until 2020 and do not change them prematurely, before 2020.

- **C for Certainty**

Another important factor that seems to influence the perception of the regulatory risk is certainty of the
regulatory framework. A stable regulatory regime in conjunction with “a relatively high” yield was the key driver for the investor [G] to invest in the German wind power sector. When asked about a “perfect, but real investment environment”, he says, again, how much he appreciates its stability:

“It is a kind of Germany in the past where we have a clear statement from the policy makers not to change the provided feed-in-tariff for the next 20 years. This is perfect, we can rely within a fixed time frame on a given regulatory regime. This is all we need.”

The word “stability” or “stable”, either in the context of a regulatory regime or projected cash-flows was mentioned in every single conducted interview, by investors themselves, not being guided into this problem. It proves its true importance to all of the interviewed investors. When asked about his own definition of regulatory risks, [J], experienced with the US regulatory environment in RE, answers:

“What is the regulatory risk? I think it is the question how much RE will going to be required. The mechanism by which those RE are going to be procured creates, I think, a great regulatory risk for the developer and investor. Because it could, depending on how the rules are being written, the supply could come from the municipal contracts, the supply could come directly from the Illinois Power Agency. You know, it creates this area of uncertainty that adds to the regulatory risks on the part of wind developers and investors.“

[J] defines the regulatory risk as any uncertainty related to the structure of a RPS and any other regulation that requires some RE supply. This uncertainty is at the core of the problem for him – how much RE generation will be needed and who will be required to provide it? He stresses the fact that this poses a great risk for both developers and investors, and the inability to predict the future worries him most. Many of the interviewees appreciated the stability of the German regulatory regime in particular, for example, [D] says:

“Even if the consumer is founding the incentive gap, we would still look at the health of the project sector, health of the project finances. And I think this is one of the great things about Canada where you have strong public finances. Clearly, this is a strong point in Germany, but then, again, the pricing has probably gone a bit too far. And it is a concern in places like Spain, Italy, Portugal, to some extent

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3 It might be sold by a wind power operator directly to municipalities or through the Illinois Power Agency.
maybe in France. There we definitely put a premium on, in terms of returns that compensate for the less stable, or PERCEIVED less stable regulatory framework. And potentially also tax regulatory because it is not only FIT, which is regulatory aspect, taxes are also an important aspect of the incentives that you get.”

However, [D] suggests that the declining return in Germany has decreased the attractiveness of the market in the meantime. It used to be very attractive, hence the expression “in the past”, but the stability of the German market is still seen as its great advantage. [D] says “probably” and “the pricing”, [G] mentions “relatively high yield”, so it becomes obvious that the risk and return aspects do matter to a certain extent, while interviewees do not know exactly what kind of effect the return factors have had. The investors point out that there are other factors that influence their decision, and the stability is one of the most crucial ones. They usually see stability as not changing the once set regulations for an initially predefined time frame. It is all based rather on trust and the overall belief in stability of the rules. Especially since some legal enforcement measures have already been circumvented in the past, there is no real guarantee. Also [G] recalls the political stability as the most relevant factor when deciding upon a market:

“(…) political stability, which is more of a country issue. But you have seen some retroactive changes in the RE sector in the past, we go, therefore, to countries which we consider stable… and … stable, which don’t bear the risk of retroactive change”.

The relative perception of stability is strengthened here by his statement “which we consider”, and stressed “PERCEIVED less stable regulatory framework” which reminds us about the previous statements on “probably” and “relatively high” returns. This is a subjective view, an opinion, which can be shaped by various factors, e.g. the level of trust built upon the historical records, investors’ personal contacts with regulators or designated bodies, or by a third party's opinion.

Similar claim is shared by the recent BNEF report (Global Trends in Renewable Energy Investment, 2013). It forecasts that “future investment is likely to coalesce in countries that can offer policies that command investor confidence, plus the need for extra generating capacity and strong renewable power resources”. As BNEF suggests, it is all about a relative persuasion of investors that one market is more stable than the other one, and shaping investors' perception in a specific way. Surprisingly, the investments were down in many developed economies exactly due to the policy uncertainty. Equity providers, lenders and developers were unsure about whether commitments to subsidies RE
deployment would continue beyond scheduled expiry dates in countries like the US, the UK and Germany, as we read in the report. For example, policy uncertainty has taken a heavy toll of investment in the US, as BNEF reports, down 34% at $36 billion.

Another way to assess the stability of the regulatory framework, popular among the interviewed investors, is to check the general political stability, seen as the condition of the public finance or country's credit risk.

4.3.2 Country's credit risk

It seems impossible to disconnect those two when discussing the regulatory risks. Even if the practical assessment guidelines tend to separate those two risks, the quantitative assessment of countries' risks has a great impact on the practical assessment of the regulatory risk – being of a purely qualitative nature and yet so difficult to capture in the eyes of the investment industry.

[D] quickly points out countries with, in his view, less stable regulatory frameworks, and indicates exactly those countries which struggle in terms of their great public debts: Spain, Italy, Portugal, and possibly also France. The unclear nature of regulatory risks seems to force investors to look for other quantitative measurements and indices which are believed to help in the evaluation. The higher is the part of financial incentives born by public budgets, and not by the electricity consumers, the higher the impact of country's credit risks on the assessment, as [D] claims.

Beside the credit risk, [A] mentions the public discussion of planned laws and other indices, such as the performance of country's bonds:

“We have this practical approach, we just look how the state bonds perform, we look at a country's risks, look for law amendments that are currently discussed and considered in a country. We look if there is an energy deficit in a country but in the end it is just a gut feeling, we say, okay, it this case we need one hundred or two hundreds base points for the credit risk premium. There isn't any actual model for that.”

It is the state who is obliged (or rather expected) to pay the subsidies so investors want to check the credibility of the “seller” in this transaction (keeping in mind the logic of the customer intimacy), not only in terms of its trustworthiness and transparency, but also its financial credibility.

[D]'s thesis that the design of FIT matters, especially with regards its actual payer, has been confirmed by [A]. If it is the government who is paying, a quick check on its credit risk is here one of his first moves. He needs to see if the country can actually afford these sorts of incentives for the planned
period of time. Also [B] uses credit risks in his regulatory risk assessments. When asked directly what he perceives as regulatory risks, he explains thoroughly:

“Two aspects: operating portfolios, whichever technology it is, and the regulators, changing the regime retroactively. For example, said that you will have some regime for 20 years, and after first five years you are changing your mind what will happen in next 15 years. You can also do it legally, you are not allowed to do it, but you can go around it, how it happened in Spain for all RE, and that is a big risk, obviously. Because you expect something, and you expecting it once the regime is put in place. For existing assets you want to have a contract that you are not going to change, you know, going back. And this is happening, and it is, I think, a big risk. Another aspect is more about development plans, if you buy a portfolio, you might have projects developed at different levels. If you have a mill that is already built up, you are selling it on agreed terms. And then you have new plants when you have a license to build them. So the time when the regulations can be chance is even longer here. The change may happen between the time you invest and by the time you are building it, the structure can change a bit. It is legally allowed and can happen, so therefore, we are trying to omit these things. Finally, it is the credit risks. So in the end of the day it needs to be a counterpart who pays the money, and if they don’t pay you, they make a delayed payment. In Europe it is not such a problem, but you have this problem in emerging markets where you have local electricity boards and they pay you, but like 18 months later. But this is mainly emerging markets, and less, less in Europe.”

The credit risk is elaborated in the end of the paragraph, he mentions the possibility of a delayed payment that can occur in the emerging markets. He perceives Europe as generally less risky markets, but he recognizes the danger that his investments might be exposed to. Therefore, a check on credibility of his counterparts is so vital. The more difficult, the more expensive (time- and money-wise) the check is, the higher the transaction costs.

4.3.3 Country’s regulatory framework “brand” and mistrust in the industry due to retroactively changed regulations

In the section drawing upon behavioral finance it was concluded that investors exchange their experiences in investments in different markets. This fact should be kept in mind by all policy makers and governments. Markets have either a good or bad quality “brand” among (wind power) investors, shaped by both peer influence and the historical records. Governments and policy-makers can, therefore, proactively shape their image among the financial community by their behavior and
engagement with them. The power of experience and emotions in this respect might remind us the power of word of mouth marketing among investors. The relationship between governments and investors, similar to the seller-buyer relationship, seems to be possible to be influenced not only by hard factors such as prices (i.e. the risk-return profiles of markets), by also by a number of soft factors, such as creation of a proper attitude towards investors, its service and intimacy.

In the paragraph above, [B] contributes to the problem of the regulatory risk perception, by pointing out examples of incidents that might influence it. Investors are exposed to the risk that regulators change the regime during their investment time, before it is completed. In addition, some regulatory changes can have even a retroactive power, affecting the past investment years. [B] underlines that despite their actual illegality, some ways to overcome the legal aspects can always be found by other measures. He seems to have no trust in any legal enforcement of this kind of promises any more. And indeed, retroactive changes turned out to be a significant concern among the interviewees in the last months, with the most outstanding example of the Spanish regulators who have shocked the industry and affected its trust towards any other regulator. Also [G] touched upon the problem of retroactive changes, when talking about the political stability. The cuts happened over a year ago but they are still a vividly debated subject in the investment community. The greatest focus was laid on the fact that their business plans can be so quickly destroyed. If the wind power investment does not work on the terms agreed before, it will generate different cash-flows, so their expectations and promises will never be fulfilled.

Drawing on my analysis, it seems that the government and the regulators in Spain were not able to meet the challenge of their role of managing investors’ expectations. Different regulatory regimes are not the only problem, but it is also its unstable, relative, difficult to predict and therefore, difficult to hedge against nature. The government is not expected to promise unrealistic subsidies, it is just supposed to deliver their realistic, once promised support, as we read between the lines. The expectation’s management can be one done basing on the trust built between the government and investors by the general actions of the government, but also in personal relationships.

4.3.4 Public acceptance increasing resistance against changes in governments

[B]’s story on what was the most decisive factor to commit to his very first investment in wind energy gives us new perspectives. In 2005-2006, he started to investigate the RE market and some investment opportunities but it took him other three years to finalize an offshore investment in France:

“I planned across, but step by step you got there: he [his work colleague] had a team who believed that RE where there to stay, in terms of that there was public support for that, which translated to political
support and a stable regulatory regime. It changed within time, at that time it seemed to be stable. So these are the three factors, and usually one is driven by the other, you know, the public acceptance will drive the politicians, the public may give the politicians focus what they should do. And given that, Europe is the most mature RE market in the world in term of public support, and public and regulatory stability.”

(...)My view is, when you look across the world, how mature the market is against the other, the starting point is always the public support. So the first item is the consumer saying, or a politician, or whoever saying: “we need to supply more green”. And then enough people agree with him. If this does not happen, I think, it is not going to happen. Western Europe is the most mature RE market in the world, more than Northern American or Southern Asia because of the awareness that came here first. People like Germany or Spain, that’s where it started off. I mean, this is the starting point. If this does not happen, there is no reason to support that. If it is there, they will let investors come and make the money and doing it because the consumer agrees on having a slightly higher electricity bill for the benefits they receive for a green energy generation.”

[B] presents here creation of a stable, favoring wind energy regulatory regime as a chain reaction. The very first critical component is the public support, meaning that a significant group of people living in a specific regime should be in favor of wind energy. Only that can bring this theme onto the politicians' agenda and drive the way politicians view things, as [D] sees it. If there is such a lobby group of wind energy, political parties will start to have interests in pushing the RE strategy. Politicians must listen to their voters' opinions and act (or at least promise to do so), reflecting expectations of parts of the voting population. The decisive factor is here an answer to the question who wins in the lobby activities: supporters of conventional, but cheaper energies or those in favor of RE, most probably more expensive, especially in the transition time?

Public acceptance of RE in an environmentally concerned society seems to be to [B] a kind of assurance (or even, in a way, insurance) that the once put in place regime will not be easily changed. In his eyes, the change of a regulatory regime appears to be easier rather than a change of the public opinion. As he admits, the example of France has proven that such a regime may never be stable and taken for granted. However, he values the public support and so consequently chooses markets where the public welcomes wind energy, rather than opposes it and forms other barriers. [D] and [A] go even more into details and they look at the level of consumers’ power prices, investigating if there is any chance that the subsidies or other financial incentives can be co-financed by consumers. In either of the cases: both when the government provides with FITs or tax credits, and when end consumers pay
higher prices for the consumed energy, in the end, it is always the broadly seen public who must make up for the lack of competitiveness of RE. The public can be forced to make up for it indirectly, as taxpayers providing funds to the public budget, or directly, as consumers of electricity supply companies. Therefore, their acceptance and willingness to do so is vital if we want to pass longstanding, secure and transparent regulations that will not be fought back by the public. And last but not least, they vote for governments (and so the regulators) who constitute the law and design energy policies what makes their support for RE even more necessary. The public should understand the need of an energy transition from cheaper fossil fuels to more expensive RE (at least on this stage of development) and be willing to pay more for the energy they consume, either directly or indirectly. [D] stresses the role of a consumer in the creation of a regulatory framework, he sees him as a motor of “changing things”, and a power pushing the politics, similarly to what [B] is saying.

4.3.5 Involvement of local communities as a hedging against the NIMBY

In previous section of this work we have already described [E]'s negative experience from his investment in Ontario where the government drastically changed the laws. It made [E] conclude that some precautionary steps, such as keeping a certain buffer to some of the regulations in project developments, spreading regulatory risks into various jurisdictions, but also, surprisingly, an intensified community involvement are needed and can help foster investments:

“(…) Or bigger community involvement, something like that, so it is always good to have the community participate and involve and inform right away from the beginning. Because then you’re all quite safe if there is a change in the regulations. (…) The community engagement is important that you, first of all, inform the community, don’t try to hide anything from the because these engines ARE going to be big so there is no sense to hide it from them. Tell them right away how it is gonna look like, and another thing – it is always a good thing if the community gets the chance to buy the ownership. So give the people the possibility to invest in the project directly. So make them also participate in the profit late on. (…) Beside Austria we have also a direct participation of community owners in Nova Scotia and that gives us big support.”

When interrupted with another question during the interview, [E] asked if he may continue with the previous topic. He was willing to give some additional background information on the community engagement in the projects he has invested in. That move might be either a way of positioning his firm among other peers or the community engagement plays, indeed, such a key role in a project's success.
[E] distinguishes two issues that have to be considered when talking about the community involvement. First of all, clear communications about the wind power project to the community and its transparency is of a key importance to [E]. He stresses the need of a proper and true information, being honest and open from the very beginning because coloring any aspect of the project might potentially (and probably will) surface in the future and become a critical problem. He does not focus on the advantages for the community, he clearly does see profits to investors in particular, saying “it is good to have the community participate”. He focuses on the investors' benefits, it makes him feel safer in case of a change in regulations and enables him to indirectly hedge against any regulatory changes. The hedging seems to be even more effective if the community is given a chance to participate with its own capital what leads to an even higher level of community involvement. Such a move ties up the community to the wind power projects in a financial way and makes the community have personal interest in such a venture. In that case the community has not only sunk cost in it, but it can also financially benefit from it in the future – clearly, these benefits are expected to help increase the social acceptance of a project. [E] is discussing the community involvement, basing on his own experience with projects in Austria and in Canada. The Canadian project with a community engagement in Nova Scotia turned out to be far more successful than the other one, in Ontario, where the government changed the regulations during his investment. [B] points out the significant impact of social acceptance on project's development, he fears a loop problem when one unexpected problem can raise another one, leading to an accumulation of issues that need to be dealt with. For example, as he goes on, the wind mills can be killing a significant number of birds or there might be some noise caused by a wind power plant. When all those unpredictable problems accumulate, they can make residents of the neighborhood complain about them, affecting the project's success. Therefore, this concern for unpredictability of these sorts of issues makes investors want to engage the community in their projects, even before the project starts in order to avoid “the mistakes that have been done in the past”, as [B] continues. Since investors acknowledge the positive role of public acceptance in making politicians want to support the RE, they can also see the negative one when the public support is not there, making political parties withdraw they support. My desktop research, analysis of publicly available online information, documents, media, blogs proved that before any discussion on wind energy in Ontario started among politicians, there had been a strong resistance against wind power, especially in the local communities. Protests, media battles on both sides have successfully drown their attention to the dispute and made the government withdraw its initial support as soon as the public was very much against it. Of course, there is a great number of other aspects that should be taken into account when discussing factors of [E]'s success in Nova Scotia and his failure in Ontario, however, the contrasting
level of community involvement in an interesting aspect indirectly pointed out by the interviewed investor alone.

[J] elaborates on the engagement of local communities in the planning processes in the US:

“Yes, there is a long regulatory process. So the first step to get a permit is a zoning board of appeals. They usually have hearings letting people testify. I’ve been to ones of those zoning boards of appeals last night, two hours. There some boards of appeal that last 3 weeks, almost every night, letting everybody, residents, and experts. The local residents say what they think, and it goes on for a long, long time, hours and hours of testimony. Then, once the local board of appeals rules to recommend the turbine, it is of relevance as an opinion poll. Then it becomes a legal matter to say if the developers followed the ordinance that we through out as a requirements or not. No matter what they say, “we don’t want these wind farms here” or anything. From a legal matter, it comes down to the point if they followed everything that we set out in our energy ordinance. So they make recommendation to the county board, and the county board can also come to the hearings, if they want to, or they can just act on their own, based on the recommendation of the board of appeal. And it is their decision that really matters, the other was just a recommendation for the county of board.”

Figure 9 Protest in Ontario against wind energy projects

Source: http://ontario-wind-resistance.org/

[J] gives another example of involvement of local communities. They can express their opinions, and even though their views do not have any legal effect, they may consult the county board. It can possibly give the community some feeling that they have been listed to and that their complaints have been collected. However, the hearings do not have any legal power. As found out in the interview with [J], he distinguishes county boards which are generally in favor of wind energy, against it or ambivalent, depending on the economic situation of a county. From what he is saying, we can read between the
lines that in case of an undecided county, hearings might possibly have some influence, but other than that, on a local level it is a political decision that will be done probably irrespective of any result of the hearing. Overall, it seems to be difficult to tell if this has any influence on regulatory risks, however, some relations can be observed. On the one hand, supportive attitudes from both the public and the county side might give investors certain assurance of the stability of regulatory frameworks. On the other hand, if local communities had been against the windmills, but the county acted in favor of them, the investor can still expect some protests and movements against their investments. Therefore, the regulatory risk (or its perception) will stay rather on a higher level.

Apart from [F], [C] also lists some other countries where wind power investment faced resistance from local communities, such as Austria or Germany, especially in the more densely populated areas. The NIMBY effect might actually have a greater power than one could think, and be less of a myth that Wolsink (1999) suggests. He argues that institutional factors have a far greater impact on wind power projects than the public acceptance. However, the so far collected insights from our interviews suggest that the public acceptance has a greater driving force and indeed, it does shape politicians' behavior. My results make me believe that public acceptance of a project has a truly positive, decreasing impact on regulatory risks for the financial community. It might not directly translate into passing laws that are expected by the public, but investors can accept it as some kind of assurance or a form of hedging against the often changing legislations and unstable governments. Our investors indicate that the regulators eventually have to address the public needs so through an engagement of local communities, they hope to find some support among policy makers. In addition, if the communities are driven by other, own interests in a project, they might be willing to get heard even lauder. The public shapes the debate more or less intensive, depending on how much it matters to them on a personal level. Some good strategic moves towards an increase in the public acceptance can be done especially in the early stages of wind power developments when the greatest acceptance barriers appear in communities with no or a very low experience with wind energy:

“And it is always different when you somewhere where you are doing a first wind farm or somewhere like Burgenland where people are really aware, where people know what it means when you want to install a wind farm. And the funny thing is that the more wind farms are installed, the easier it is to persuade the population to have further wind farm projects. If you are the first one, then people tend to be more careful and feel insecure.”

The more unfamiliar people are with this issue, the more insecurity and care can drive them against it,
as [C] sees it. It comes hand in hand with what [E] was trying to convey before: the transparency, proper information and communications seem to be good ways of making people knowledgeable about the potential investments. They can help them make a sound opinion about any prospective wind investments in their neighborhood before any investment actually starts. Therefore, through an active search for information investors can possibly examine the stability of the regulatory framework and depending on the level of public acceptance, they are able to predict its longevity.

4.3.6 Governance: authorities experience, norms such as Responsible Financing Initiative

When discussing risks related to different regulatory frameworks, one should not forget about the regulators themselves, their knowledge, experience, attitude their present in any contact with investors. Some of our interviewees admitted that when assessing different investment opportunities they usually reach out to regulators, decision-makers not only to discuss the legislation, incentives they might get, but also to get to know them and make their own opinion about them. Since we have already discussed an example of a transparent and welcoming attitude in the UK, it might be interesting to look at a contrasting example, introduced by the investor [C]. When asked about any external reasons that he believes might have made the investors decide not to invest in selected countries, [C] recalls, among others, Bosnia:

“(…) lack of experience of the authorities, unclear legislative requirement, changing requirements, difficulties in restitution in those countries. (…) Yeah, there are no wind farms installed in Bosnia, no wind turbines installed in Serbia. So if you go there and want to develop a project, you have to do a kind of pioneering work.”

With a follow-up question on the government's influence on investments in wind power, [C] admits:

“Yes, it is there. And one of the important issues is the lack of experience of the authorities. So when you are going through an approval procedure for a wind farm, it is simply not the same as you do it for a hydro power plant. So the authorities have to learn... they have to learn what to require from the project developers, which kind of expertise, document do they want.”

A clear barrier faced by both the developers and the financial investors is the lack of experience in the field of wind energy among the governments and delegated authorities. [C] gives here the example of Southeast Europe and mentions countries such as Bosnia, Serbia to illustrate the problem. On top of that, the unclear, changing regulatory environment and the problem of restitution of property rights do not make any project easier. There are no knowledgeable institutions supporting the wind energy
investments and the institutional environment is very unfavorable – there is no favorable governance in this respect. [C] claims that it is crucial that the authorities know how to deal with investors like him, what to require from him, what kind of permits, documentations demand to. Moreover, there is another, even more problematic issue that comes into play – a proper evaluation of the submitted documentation. He is talking about a “pioneering”, a kind of experimental work that needs to be done when entering markets and regulatory environments like that. Instead of any kind of support, he faces just obstacles and an unfriendly environment.

On the other hand, [A] gives a positive example of good governance driving him towards investments in wind energy. When asked about factors that might have driven him into wind energy investments, he talks about his firm’s corporate governance rules:

“For us, it is also responsible investing. So you probably heard about the Principles of Responsible Investment (PRI), our firm was one of the first companies in Germany to underwrite these principles almost 10 years ago, so investing in appropriate, socially ethical is very important to us. And this investment in responsible power generation, solar farm, fulfills these criteria. (…) So we have the goal to be CO2 neutral, as a group, and the investments, they help us to become CO2 neutral by 2015.”

The informal governance, such as norms and believes positively contributed to the development of responsible financing which aims at a behavioral change in investment decision. As we read on the homepage of the United Nations-supported PRI Initiative, it is an international network of investors working together to put the six Principles for Responsible Investment into practice. Its goal is to understand the implications of sustainability for investors and support signatories to incorporate these issues into their investment decision making and ownership practices. Interestingly enough, the PRI sees its mission in influencing the “investment decision making” through creation of a set of voluntary rules and a network of learning among peers how to incorporate sustainable practices. One of the way to do so, chosen by [A]’s firm, is incorporation of the rules through investments into selected asset classes – assets such as RE, or wind power in particular. It is interesting to observe some positive aspects of peer and industry pressure in the investment community. The pressure might come, however, also from [A]’s clients who expect him to commit to the PRI initiative. There is a growing group of clients who do care about the type of investments they put their capital for because they see it as an important way of acting environmentally responsible.
5 Conclusions

Building upon three different sciences: neoclassical economics, behavioral finance and socioeconomics, our research has proved that there is a mix of factors that influence perception of regulatory risks among investors in wind energy.

The initial pre-assumption on lack of competitiveness of wind energy among other energy sources has been confirmed in a great part of our interviews. The industry still sees the need for a temporary, phase-out support of the underdeveloped wind energy technologies which has become one of the key conditions for a market attractive for RE, and wind energy in particular. When designing such a financial support scheme, policy makers shall be aware of different risk attitudes observed in the financial industry. If we want to create a sound base of a long-term sustainable financing that will stay invested throughout the whole life cycle of an investment, regulators should aim at a reduction of regulatory risks in a first place, rather then making up for riskier profits with higher expected returns in the form of higher monetary support. And despite the fact that some conservative investors commit to wind energy projects anyways, due to their positive portfolio aspects, still a great amount of capital is needed by the RE industry. Regulators can, however, act on the other side of the risk/return equation, and effectively attract investors by decreasing regulatory risks and their perception. Behavioral finance has provided us with arguments of bounded rationality in the risk assessments conducted by investors and tries to explain how to manage investors’ expectations. We found that investors' heterogeneity in terms of their cognition, personal histories, backgrounds or professional experiences is of a great relevance to our research problem. Historical record of countries’ stance towards wind power and investors, shared by the industry in form of stories and emotions, is quite often much more preferred than a formal risk-return analysis or, at least, completes it to a great extent.

The observed phenomena of peer influence, investors herding to some markets and client-seller relations between investors and regulators suggest that countries might develop something like a “brand” of their own regulatory framework. Creation of national energy strategies with measurable targets, together with application of the TLC concept in their institutional frameworks (T for Transparency, L for longevity, C for Certainty) are one of the most desired support measures by the financial community.

Retroactively changed regulations that happened few months ago, e.g. in Spain, were unexpected by the entire industry and raised a lot of mistrust and fear in the RE sector. My research provides results that the possible way of protection against such events in the future goes far beyond
a thorough check on country’s credit risk. In my opinion, policy makers underestimate the role of public acceptance in increasing investors’ resistance against any changes in regulations, or even in governments. Moreover, I conclude that some investors appreciate involvement of local communities in planning processes, with or without their financial participation in the project, as a good hedge against the NIMBY syndrome and regulatory risks. Last but not least, further development of proper governance and informal institutional frameworks such as responsible investing principles or strengthening energy consumer awareness are key recommendations following our research.

Acknowledging theories coined in behavioral finance and socioeconomics, the conducted work proves that in addition to a rational evaluation of the economics of investment opportunities, there are various non-financial factors affecting an investment decision in wind energy. Policy-makers have within their reach a set of non-financial incentives which can minimize regulatory risks but does not burden the public finance. Governments and regulators should take an action and start to attract investors looking for low-risk investments on the capital markets as their alternative to today’s unattractive governmental bonds.

6 Research limitations

One of the study’s limitations is the limited number of interview partners. It captured perceptions and opinions of 10 financial investors. Moreover, we expect that during the interviews our interviewees might represent not only their own, but also their firms’ opinions or goals and communicate in a way that it is compliant with their corporate policies. Therefore, it is more than of a key importance to look behind these statements and interpret their stated preferences in a broader socioeconomic context.

A further limitation of the following research is its restriction to only one kind of renewable energy source, namely wind energy. Depending on the type of REs, technologies and financing opportunities might differ significantly. Therefore, we found such a constraint necessary. Although the wind power industry has been developing both in some European countries and US states in recent years, it is of a key importance to bear in mind that wind power is strongly dependent on the climate conditions. Its real development varies between specific geographic regions with different wind conditions, however, for the purpose of this research – as it is a common assumption in the available literature - we assume that the climate conditions are fairly similar.
7 References


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Appendix

Interview guideline

Incentives for private investments in wind power

The goal of this study is to investigate the impact that different policy settings and regulations have on a decision-making process of private investors. It is aimed at finding out what can be done by policy-makers in order to increase attractiveness of policy support systems for investments in wind energy.

- What is your position and how long have you been working at your company?
- How long are you have you been working on renewable energies and wind power in particular?
- In which countries have you been investing so far inside and outside Europe? If also in non-European markets, how do you perceive this experience?
- Do you remember your first investment in wind power? What was the most decisive factor at that time?
- Which factors, you think, influence your decision in renewable energy and wind power now? Has it changed somehow since your first decision?
- Looking back at the most significant projects/investments you decided not to invest in, what was the key reason of dropping it?
- Your greatest success, what was the most decisive factor?
- What do you think about government and policy-makers and their influence on investments in wind power?
- What do you perceive as an attractive market for wind power?
- What do you think, what are the most important factors for you while doing some strategic investment decisions in renewable energies?
- What do you perceive as a regulatory risk? And what as a political risk?
- How do you assess it and deal with in risk assessment processes?
- Besides risks and return factors, are there any important factors, which you consider while making your investment decision?
- On a scale 1-10, where one is the most risk-averse, and the 10 is the most risk-loving, how would you describe your investment decisions?
• What kind of investments types do you mainly deal with:
  business angels, venture capital, private equity, project finance? Or else?

Thank you very much for taking your time to answer my questions. Your answers will be treated in an anonymous way and analyzed only in a broader context. If interested, I would be happy to provide you with my final results.