Study regarding the obtaining of an european financing by a company

Coordinator: PhD. Brasoveanu Iulian Viorel
Student: Iancu Robert George

Abstract

Accession to the European Union opened a long way to our country's economic convergence towards Western states. Union rules require strict steps aimed at balancing all European economies and uniformity in legislative terms so that countries do form a body not a suite of individuality. European states do not have the strength to compete individually, with the two largest world economies, USA and China, therefore the only solution is the unity of the group. There are, however, numerous problems regarding the cohesion of the member states and the contribution of each economy to the general economy of the EU. In order to eliminate these disparities, the European Union member countries have at their disposal financial instruments, known as "Structural and Cohesion Funds' (European Funds).

Introduction

European funds are for non-refundable and are accessible to any public or private companies, but their access, at least in our country, has proven difficult. Statistics published by the European Commission show that Romania ranks last regarding the absorption level of European funds during 2007-2013. The failure of this period can be attributed to several reasons, but the most important thing this period demonstrates is the potential of companies in Romania. To access untapped resources.

The current economic context, the economies' dynamics and global trends suggest a more pronounced shift towards giving up conventional, polluting energy sources and adopting projects that generate renewable, non-polluting energy. Governments in most countries propose schemes for companies that invest in renewable energy sources in order to boost this sector. The effects of these measures can be seen in the last decade, when the production of energy from alternative sources had a global explosion. Statistics published by Bloomberg at the beginning of 2015 show that 2014 was one in which investment in green energy at global level grew by 17%, to 270 billion dollars. A key feature of 2014 was the result of the rapid expansion of renewable energies in emerging countries. Investments in developing countries (worth $ 131.3 billion), up 36% over the previous year.

It should be bearded in mind that, in the present, the EU tries to find an optimal mix between energy sources and encourage investment in renewable energy projects to reduce both production costs and environmental impact. Studies show that for 2020, the European Union will fail to reach its target in terms of reducing greenhouse gas emissions. To this end, for 2030, is projected spending of money higher than those established to stimulate investment in renewable energy projects. These costs have also higher risks, but the European Union is willing to take the risks necessary to change the scale of the energy mix used today.

Considering all the above, this paper aims to present the perspective of a company, attracting European funding in order to invest this sum in developing a photovoltaic park.

EU Funds

The economic cohesion policy was considered by the European Community half a century now. Until now it demonstrated the importance of these funds and are still an EU priority. Article 3 of the Treaty on European Union (the Maastricht Treaty) states that the Union "shall work for sustainable development of Europe based on balanced economic growth and (...) should promote economic, social and territorial cohesion and solidarity among Member States". It also recognizes the importance of this economic growth for all Member States, in order to tend towards a convergence of living standards in different regions. EU aims to achieve this goal through its policy of regional development, in particular the Structural and Cohesion Funds..[1]

Determinants of European Funds absorption[2]:

High degrees of absorption depends largely on institutional factors, both at EU level (eg consistency and increase coordination in the allocation) and national (eg the federal political system). Absorption capacity is usually positively correlated with the ability of the central and regional authorities to prepare coherent multi-annual plans to cope with the level of administrative work, and, finally, to finance and oversee implementation, avoid fraud and corruption.

Another factor in the absorption of European funds is political stability, which can cause administrative performance. The lack of such stability could undermine the continuity, consistency and coherence to the successful implementation of the programs.

The European Commission has identified a number of additional factors that influenced the absorption of funds in 2007-2013. These include programs starting late because of the previous term extension, a lack (or even decline) administrative capacity challenges that may arise in the preparation of major infrastructure projects and approval by the Commission, the changes in EU legislation, political changes (changes in national and regional governments, changes in institutions) and the impact of national reforms.

Solar Energy

The article "Environmental and economic analysis of building integrated photovoltaic systems in Italian regions"[3] (Cucchiella, F., 2015) analyzes the factors that may influence the efficiency of a photovoltaic park: electricity consumption, installed capacity of solar cells, the average annual solar radiation , the surface area available for the placement of such a park. In the same article, it is evaluated investment in a photovoltaic park located in Italy, by calculating the NPV indicators, IRR, payback period real. It was calculated the same time a reduction coefficient of carbon dioxide emissions. The study concluded that such investment has positive effects both locally and regionally, helping the country to reach the target required by EU renewable energy in total energy.

---

[1] I. Brasoveanu, “Structural and cohesionfunds: theoreticaland statistical aspects in Romania and EU”,2011

[2]The (low) absorption of EU Structural Funds, Library of the European Parliament, 1/10/2013

[3] F.Cucchiella, Environmental and economic analysis of building integrated photovoltaic systems in Italian regions”, 2015,“

In "Experimental and numerical assessment of performance photovoltaic collectors dependence on frame size and installation technique"[4] (Arpino, F., 2015) states that PV power is inversely proportional to the temperature at which the installation reaches during operation. It has been shown, so as to increase the efficiency of producing electricity, the site of the solar panels is very important. At the same time, they should be positioned at a distance from the support, to allow the air and go and thus to increase the energy efficiency.

Another paper which discusses issues in solar panels is "Quantitative study on global solar photovoltaic market long term" [5] (Gan, P., Li, Z., 2015). It analyzes, in this case, developing the demand for photovoltaics and prices. The authors predict that by 2035 demand will grow steadily, reaching a total installed capacity of 659 GW. With this development, expect a price drop to half the 2010 level, largely due to unbalanced supply and demand and low prices charged for panels produced in China.

In the study "Renewable energy sources project appraisal under uncertainty" [6] (Venetsanos, K., 2002) it is analyzed the assessment of investment projects in renewable energy sources, under conditions of uncertainty. In this study are used both the classic indicator NPV as well as non-financial methods for evaluation of investment projects in renewable energy. Such analysis are introduced in four non-financial indicators such as: climate change (with positive impact on growth feasibility of renewable energy projects), expected growth in European Union member countries (with direct effect on energy production from renewable sources), change consumption patterns and technological advance that allows increased efficiency in renewable energy, thus having a positive impact on investment projects.

In the study "Costing electricity supply scenarios: A case study of Promoting Renewable Energy technologies on Rodriguez, Mauritius"[7] (Weisser, D., 2003), a parallel is made between different investment projects that are based on different renewable energy sources (wind , biomass, photovoltaic, wind and conventional energy). The starting point in this analysis was the indicator NPV and the average cost of producing a unit of electricity (measured in MWh). The study results confirm that although initial costs are higher in investment projects in renewable energy overall impact economy is positive.

Another paper discusses the idea that renewable energy is "The European low-carbon mix for 2030: The role of Renewable Energy sources in environmentally and socially efficient approach year"[8] (Fernando LP, S. Calvo, S. Iglesias, IS Soares, 2014) . The article presents the European Union's efforts to support energy production from renewable and clean sources. It also shows that these efforts have resulted in better security of energy supply countries, increased competitiveness which led to lower prices, but also a healthy and sustainable environment. In addition, this study tries to find an optimal mix between energy sources and presents attractive investment projects in renewable energy sources both in terms

---

[4] F. Arpino, "Experimental and numerical assessment of photovoltaic collectors performance dependence on frame size and installation technique",2015

[5] Gan, P., Li, Z., "Quantitative study on long term global solar photovoltaic market", 2015

[6] K.Venetsanos, "Renewable energy sources project appraisal under uncertainty: the case of wind energy exploitation within a changing energy market environment" , 2002

[7] D. Weisser,"Costing electricity supply scenarios: A case study of promoting renewable energy technologies on Rodriguez, Mauritius", 2003

[8] Renewable and Sustainable Energy Reviews, Volume 48page 49-61

of cost but also in terms of risk and environmental impact. The purpose of this mix of sources of energy production is to reduce as far as possible direct and indirect costs and the risks that companies must incur to produce energy. The study shows that for 2020, the European Union will fail to reach its target in terms of reducing greenhouse gas emissions. To this end, for 2030, is projected spending of money greater than those provided to stimulate investment in renewable energy projects. These costs are too similar and greater risks, because, as the study shows, will be accepted for funding and more risky projects in order to achieve the desired threshold. It concludes that the EU is prepared to take the risks necessary to change the scale of the energy mix used today.

According to the report Global Trends in Renewable Energy Investment[9] , issued by Bloomberg, 2014 brought a recovery in investment in green energy worldwide, with solid growth of 17% to 270 billion dollars. A key feature of the result of 2014 was the rapid expansion of renewable energies in emerging markets. Investments in developing countries (worth $ 131.3 billion), up 36% over the previous year. Thus they almost caught up with developed economies, whose investments totaled $ 138.9 billion, with an annual increase of only 3%. Besides China and Brazil ($ 7.6 billion), India (7.4 billion) and South Africa (5.5 billion dollars) entered the top 10 countries with investments in renewable energy. Noteworthy is the fact that Indonesia, Chile, Mexico, Kenya and Turkey have also deposit $ 1 billion threshold.

Photovoltaic energy Investment

The photovoltaic plant has an installed capacity of 39.63 MWp and consists of 333 monocrystalline solar panels of 120 Wp each. The panels are grouped in rows of three rows of panels cate15 each connected in series. Each array is connected to a DC / AC inverter 11 kW capacity SMA Sunny Mini Central. The inverters 88 are connected to a transformer designed to raise the voltage at 20 kV.

The size of a panel is 1660x991x50mm. Photovoltaic panels are mounted on a galvanized steel profile and are inclined at 32 ° to the ground, facing south. The supporting structure of a PV array (PV 45) is anchored in the ground by 18 blocks. The central foundation is connected to the public supply network 20 kV.

The life of the investment is 15 years, after which period the efficiency of solar panels drops below breakeven, and they become ineffective. Also, 15 is the period for which green certificates are granted.

In addition to the investment costs of operating the solar park, annual expenditure are needed proper functioning of the business.

Operating and maintenance expenses: according to the details provided by the manufacturer of photovoltaic panels, for every MW / h installed power, maintenance and operating costs amounted to EUR 23.5 million. Costs of providing photovoltaic panels is directly contracted from the manufacturer and is calculated as 0.5% per annum of the value of solar panels. Thus, for each megawatt / hour product assurance about EUR 1.7 million will be paid to the manufacturer. To protect the park the cost is about 6500 euros per month, thus

[9]Bloomberg, “Global Trends în Renewable Energy Investment”, 2015

totaling a cost of about 80 thousand per year. With the commissioning function to use electricity grid and power distribution products, ANRE charge a fee of 0.08% of revenues.

Non-cash expense, related to the impairment of fixed assets acquired during the analysis is constant, whereas I opted for the straight technique, for 15 years. The annual depreciation value is approximately EUR 2.8 million.

According to the assistance scheme proposed by the Government, a significant proportion of revenues generated by photovoltaic park come from green certificates sold (approximately 73% of revenues). Under this scheme, for a period of 15 years investment will benefit from green certificates for each mega-watt product and actually placed in the system. 27% of revenues are generated by selling electricity either on Day Ahead Market or on the basis of bilateral agreements to be signed.

According to general economic theory, the price of a good is determined by the intersection of supply and demand. Starting from this premise, we decided to build an econometric model, the dependent variable and the explanatory variable price of electricity consumption and production of energy from different sources.

With this structure, we obtained in the first phase, the database provided by OPCOM, the hourly electricity prices for perioada01.01.2012 - 31.12.2014. I then transformed data series, hourly frequency of one in one daily frequency, calculating the average price for each day.

Explanatory variables in the analysis were chosen: electricity consumption nationally and energy production from three sources: hydropower, the burning of hydrocarbons and green energy (biomass, wind and solar). Information was obtained from the database of Transelectrica. Daily frequency data obtained for the period 01.01.2012 - 31.12.2014 and did not require adjustments. Thus the number of observations for this period is 1018.

Subsequently to the database construction using econometric software Eviews, we estimated the following regression equation:

$Pret = C + \beta_1 * Consum + \beta_2 * PH + \beta_3 * PC + \beta_4 * Pgreen + \varepsilon$, where:

Pret = price of electric energy;

Consumn = national electricity consumption;

PH = hydroelectric production;

PC = production resulting from the combustion of hydrocarbons;

PGreen = production from renewable energy sources.

Variable	**Consumption**	**PH**	**PC**	**Pgreen**
Coefficient	0,004924*	0,002392*	0,059199**	0,049523**
R^2	60,4%			
R^2 - adjusted	60,2%			
F - statistic	91,92			
Prob (F - statistic)	0,017140**			

From this econometric model I used the "Forecast" Eviews available. This functionality takes the model results and uses them to generate a new series, adjusted attributable dependent variable. In this case, automatically generated series called "PretF".

Taking on the NBR website the EUR / RON for the period under review, we transformed prices in euro. Doing average of those prices, we obtained a value of 37.16 EUR / MW. This price was the reference point in determining the cash-flows generated by investment analyzed. This amount was indexed, as the price of green certificates, inflation for the EU 28, as per EIU for the period.

Cost of capital was estimated using the C.A.P.M model, as detailed below:

Cost of capital			**Cost of debt**	
Risk free rate		2.51%	Interest rate	*4.31%*
Unlevered beta		*0.44*	Tax	*16.00%*
Relevered beta		0.73	Cost of debt	*3.62%*
Market risk premium		*6.00%*		
Sector risk premium		*1.00%*		
Size risk premium		3.85%		
Cost of capital		*11.59%*		
WACC				
Debt	Share	50%	Cost of debt	3.62%	*1.60%*
Capital	Share	50%	Cost of capital	11.59%	*5.90%*
WACC					*7.50%*

Considering all the above assumptions, we calculated the net present value of the investment, using the calculation formula: VAN = -I_0+ $\sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} + \frac{VR}{(1+k)^n}$.

Thus, taking into consideration that the residual value at the end of the period is 0, since the equipment was fully depreciated and photovoltaic panels will be obsolete, and their potential resale value will always be 0, we obtained a NPV of -6.75 mil. EUR. The negative value of the indicator suggests that investment is not economically feasible in this form.

For the period 2014-2020, the European Commission approved the continuation of the Sectorial Operational Programme "Increase of Economic Competitiveness", started in 2007-2013. According to data provided by the Ministry of European Funds overall objective of this program is to "increase productivity of Romanian companies in accordance with the principles of sustainable development and reducing productivity gaps compared to the EU".

As per applicant's guide, the amount of expenses that can be covered by structural funds is of 84% of total spending. However, according to the Applicant's Guide, for large enterprises, which are high Bucharest municipality than the maximum amount that can be financed is 50%.

In these circumstances, we decided contracting legal maximum permissible amount. Therefore, the EU funds attracted value will amount to 21.25 mil. EUR. The project will be analyzed, therefore, under these assumptions, equivalent practical in terms of cost of funding with a bank loan contracted at an interest rate equal to 0.

From the revenue perspective, from baseline, investment financing through a bank loan, nothing will change. The difference occurs at the expense because the loan expenses will disappear, whereas European funds are for non-refundable. Decreased spending will generate an increase in cash flow generated by investment sites, something that will translate directly into size VAN indicator that will become higher than originally Also unlike the

original situation, where it took the average cost calculation weighted capital to be able to update cash-flows investment, according to the Applicant's Guide, the discount rate to be used in projects to apply for European funding grants, is 5.5%.

Unlike the original cash-flows when the impact of the funding could be spotted, particularly when full payment of the loan, in the context of financing structural funds, cash-flows presents only changes due to indexation of income.

Taking into consideration all the changes in the investment project, like changing the discount rate and replacing the bank financing with European funds we obtained a positive effect on the net present value of the cash-flows. Thus, following these changes, new NPV indicator value is 12.3 million. EUR.

After the calculations, we obtained a value of 9.79% IRR, higher than the discount rate used (5.5%). The result is as expected, given the fact that the NPV was positive.

In our investment analysis, MIRR value was calculated using the MIRR function in Excel, assuming reinvestment of cash-flows at the weighted average cost of capital. We thus obtained a RIRM = 7.9%, which indicates that the IRR value was slightly unrealistic. However, we note that the value is higher discount rate used in the project (5.5%), which leads to the idea of feasibility, in terms of economic investment.

Within this investment project, we have achieved a nominal payback period of 8 years and 71 days, and a real recovery period of 11 years and 11 days.

The sensitivity analysis had 3 directions: initial investment modifications, operating expenses changes and revenues changes. As expected, considering the fact that 73% of the income is generated by the trade of green certificates, the NPV is most sensitive when it comes to changes in the price of the green certificates.

Thus, all the NPV’s obtained from the sensitivity analysis are positive, and higher than 5 mil. Euro.

Monte-Carlo Technical analysis is a statistical method that attempts to determine a variation interval of selected variables. This technique involves initial establishment of ranges to certain factors, then make numerous reiterations of calculating the final amount of the analyzed indicator. The number simulations is recommended to be as high, so the distribution of the results are as close to a normal distribution as possible. From this analysis we conclude lows and highs of variation of various indicators and the likelihood that they take values below a limit set. If this investment project, Monte Carlo simulation was performed by 10,000 iterations and the results are as follows, cash-flows with a deviation of +/- 15%:

The probability that the NPV is positive is 97.52%, and most focus values between 5 mil. EUR and 18 mil.EUR. VAN's high probability of being positive is explained by lower discount rate adopted by European standards.

Conclusions and future developments

Global solar market will continue to evolve over the coming decades and the global trend is to grant more importance to clean energy sources. Thus, in previous years, the number of renewable energy projects both globally and in the case of Romania increased considerably.

A very great importance in implementing projects of this type, renewable energy, is the Operational Programmes, namely Priority 4. As the costs for an investment of this scale are very high, without European funding difficulties in find investors should appear. First it would be difficult for an investor to find sources of funding, namely lenders willing to provide considerable sums. Secondly, even if someone finds investors interested in the project, interest costs would be too high to be able to talk about an profitable investment. In an unfavorable environment the electricity costs will grow considerably, with no alternative use of alternative energy sources.

Renewable energy is continuously growing. Given the targets set by the European Union and undertaken by each Member State investmenting in this area incrisingly in the future. But to achieve these targets, the companies that want to build such projects meed funding. In their wine come the European funds. For this reason, the achievement of renewable energy production and the provision of European funds are interconnected. In order to achieve a cleaner environment and replacing polluting energy sources with green sources, the main help comes and will come in the future from the European Union.

In light of these considerations, the investment analysis in a photovoltaic park assumed reinvestment of company profits to which was added to complement capital requirements, a bank loan contracted for a period of 10 years at an interest rate lower (due to a low interest monetary policy used by central bank to boost lending) of 4.31%.

In determinations income from investment econometric model was used based on the relationship between the price of electricity consumption and production of energy from different sources. There was a high validity of the model, which allowed an average price forecast, which was used in the investment model.

The generated cash-flows analysis of investment that have been updated with a discount factor represents the weighted average cost of capital, has shown that the investment is economically unfeasible.

We introduced thus analysis, the possibility of contracting European funds, which led to changes in assumptions and results.

Accordingly, European financing investment generates a positive NPV, so an added value, making it economically feasible. It demonstrates thus the importance of European funds in these projects.

It must consider, however, that there is a problem in Romania in terms of accessing European funds available to our country. Paradoxically, although primarily intended for countries with economic problems to economic convergence by Western countries, it was noted that funds are accessed by economies that appear to have the greatest need of funding, but also by countries with a well developed system .

This should be viewed from two perspectives: in a negative way, as a lack of organization led to the loss of large sums of money, and a positive outlook. It could be that,

for the moment, Romania still has available funds that can be raised, so potentially exists there, it just needs to be exploited.

In future research we refer to the conference held last year by Oxford Photovoltaics CEO Kevin Arthur, who presented to Bloomberg a new type of solar cell, transparent, which can be used by applying it to the windows of office space. The photovoltaic cell invented by those in Photovoltaics Oxfort only allows light in the visible spectrum, retaining ultraviolet and infrared. Thus, on the one hand, harmful component of light is blocked, providing superior working conditions, and on the other hand, these are not scattered or reflected radiation outward, but are converted into electrical energy, which can be used for operation buildings.

The system is not yet produced on a large scale, but company representatives believe that they could move to industrialized production and sale of these cells until 2017.

So, I think that along with the benefits of renewable energy sources already known, new technological developments can increase the efficiency of energy generation.

Bibliography

1. Brealey, R., Myers S. (2003). „Principles of Corporate Finance". Editura McGraw-Hill, Ediţia a VII-a.
2. Brealey R., Myers S., Marcus A. (2001) "Fundamentals of corporate finance" (Ediţia a III-a). Editura McGraw-Hill.
3. Brezeanu P. (2005). "Management financiar. Managementul deciziilor de investiţii". Editura Universităţii Româno-Britanice, Bucureşti.
4. DeFusco, R., McLeavey, D., Pinto, J., Runkle, D. (2007). "Quantitative Investment Analysis (Ediţia a II-a).Editura John Wiley & Sons, New Jersey.
5. Dragotă, V., Ciobanu, A., Obreja, L., Dragotă, M. (2003). "Management financiar" (Vol. II). Editura Economică.
6. Negrea, E., Ţâţu, L., Braşoveanu, I. (2003). "Finanţe generale şi de întreprindere". Ed. ASE.
7. Pike, R., Neale, B. (2006)."Corporate Finance and investment" (Ediţia a V-a,). Editura Prentice Hall,Londra.
8. Ross, S.A., Westerfield, R., Jaffe J. (2002). "Corporate Finance" (Ediţia a VI-a). Editura McGraw-Hill.
9. Stancu, I. (2007). "Finanţe" (Ediția a IV-a). București. Ed. Economică.
10. Stancu, I., Stancu, D. (2012). "Finanţe corporative cu excel". Editura Economică.
11. Stroe, R. (2004). "Finanțe" (Editia a II-a). București. Editura ASE
12. Vasile., I. (2010). "Gestiunea financiarăa întreprinderii". EdituraMeteor Press.
13. Vintilă, G. (1997). „Gestiunea financiară a întreprinderii". Editura Didactică şi Pedagocică, Bucureşti.
14. Vintilă, N. **(**2009). "Evaluarea şi finanţarea investiţiilor directe". Editura ASE, Bucureşti.
15. Arpino, F. (2014), "Experimental and numerical assessment of photovoltaic collectors performance dependence on frame size and installation technique", *Solar Energy***,** Volume 118, August 2014, Pag 7–19

16. Annin, M., Falaschetti, D. (1998). ”Equity risk premiums still produce debate”. *Valuation strategies.* Ibbotson Associates.
17. Barad, M., McDowell, T. (2002). ”Capturing industry risk in a Build up Model”. Ibbotson Associates, Illinois.
18. Black, F. (1972). ”Capital market equilibrium with restricted borrowing”. *Journal of business*, Vol. 45, Nr. 3, 444-455.
19. Cheremushkin, S. V. (2011). ”Cum să asiguri coerenţa între rata de actualizare şi fluxul de numerar?”.*Revista de evaluarea Asociaţiei Naţionale a evaluatorilor din România* - ANEVAR, Vol. 6, Nr. 2, 4- 45
20. Ciobanu, A., Aldea, A., Lipară, C., Băncescu, M. (2009). “The utility of multicriterial methods in valuation of investments in exploitation of renewable energy”. ISSN 1582- 2559
21. Cucchiella, F. (2014), “Environmental and economic analysis of building integrated photovoltaic systems in Italian regions”, *Journal of Cleaner Production,* Volume 98, 1 July 2014, Pag 241‑252
22. Dragotă, V. (2007). „Calculul indicatorului: termen de recuperare a unei investiţii”.*Tribuna Economică*, Nr. 49.
23. Dragotă, V., Dragotă, M. (2009). “Models and indicators for risk valuation of direct investments”. *Economic computation and economic cybernetics studies and research*, Vol. 43, Nr. 3.
24. Dragotă, V., Dragotă, M. (2000). ”Gestionarea portofoliului de valori mobiliare cu ajutorul modelului de arbitraj al lui Stephen Ross”. *Finanţe, credit, contabilitate.*
25. Dragotă, V., Vintilă, N., Ţâţu, L., Pele, D., Semenescu, A. (2010). “Capital Budgeting: The Romanian University Professors’ points of view”. *The Review of Finance and Banking* (Vol. II).
26. Dragotă, V., Semenescu, A., Pele, D. T. (2007). ”Some consideration on investment projects valuation”.*Is agency theory relevant in capital structure decisions? Modelling and dependence between financial structure and performances of the companies*, Nr. 86.
27. Gan, P., Li, Z., (2015), “Quantitative study on long term global solar photovoltaic market”, *Renewable and Sustainable Energy Reviews,*Volume 46, March 2015, Pag 88–99
28. Marcu, A., Rotaru S., Obreja, L. (2012). ”Studiu privind ratele de actualizare financiară şi socială”.*Dezvoltarea capacităţii pentru analiza cost-beneficiu,* finanţat de FEDR prin POAT.
29. Pohekar, S., Ramachandran, M., (2003). “Application of multi-criteria decision making to sustainable energy planning – A review”. *Renewable and Sustainable Energy Reviews*, vol. 8, nr. 4, 365-381.
30. Ross, S. (1976). ”The arbitrage theory of capital asset pricing”. *Journal of economic theory*, Vol. 13, Nr. 3, 341-360.
31. Sharpe, W. (1964). ”Capital asset prices: a theory of market equilibrium under conditions of risk”. *Journal of finance*, Vol. 11, Nr. 3.

32. Venetsanos, K. (2002), "Renewable energy sources project appraisal under uncertainty: the case of wind energy exploitation within a changing energy market environment" , *Energy Policy*, Volume 30, Pag 293-307
33. Wang, G. Y. (2012),"Evaluating an investment project in an incomplete market".*The review of finance and banking*, Vol. 4, Nr. 1.
34. Weisser, D. (2003),"Costing electricity supply scenarios: A case study of promoting renewable energy technologies on Rodriguez, Mauritius", *Renewable and Sustainable Energy Reviews*, Volume 48, Pag 49-61
35. ANRE, Raport privind activitatea Direcției Autorizare și Cooperare în Domeniul Eficienței Energetice (2014)
36. ANRE, Raport privind rezultatele monitorizării pieței de energie electrică în luna decembrie 2014".
37. Bloomberg, 2015, "Global Trends în Renewable Energy Investment"
38. Ministerul Economiei (2010). "Planul Național de Acțiune în Domeniul Energiei din Surse Regenerabile" (PNAER). București.
39. Strategia Energetică 2011-2035, Direcții și obiective strategice în sectorul energiei electrice, Ministerul Economiei, Comerțului și Turismului (2010)
40. Raport Redpoint (2013). "Romanian power and renewables market report".
41. BNR, Buletin Lunar 12/2014.
42. REN21 (2014), "Renewables 2014. Global status report".
43. Ibbotson, Size Premium Report 2014

***Ministerul Fondurilor Europene, Ghidul Solicitantului
***Legea 220/2008
***Ordonanța de Urgență a Guvernului 88/2011
***www.capitaliq.com
***www.morningstar.com
***http://pages.stern.nyu.edu/~adamodar/
***www.opcom.ro
***www.anre.ro
***www.transelectrica.ro

Appendices

Appendix 1.DCF

	2015	2016	2017	2018	2019	2020	2021	2022
Venituri	-	7,874	8,047	8,214	8,378	8,541	8,710	8,884
Cheltuieli	-	(1,612)	(1,732)	(1,769)	(1,804)	(1,839)	(1,854)	(1,891)
EBITDA	-	6,262	6,315	6,445	6,574	6,702	6,856	6,992
Depreciere	2,597	2,833	2,833	2,833	2,833	2,833	2,833	2,833
EBIT	(2,597)	3,429	3,481	3,612	3,740	3,868	4,022	4,159
EBIT(1-τ)	(2,182)	2,880	2,924	3,034	3,142	3,249	3,379	3,494
Dob	(913)	(692)	(614)	(537)	(460)	(385)	(307)	(230)
CF	(42,501)	3,075	3,627	3,732	3,840	3,949	4,073	4,191
	2023	2024	2025	2026	2027	2028	2029	2030

Venituri	9,063	9,243	9,424	9,608	9,796	9,986	10,179	2,580
Cheltuieli	(1,930)	(1,968)	(2,007)	(2,023)	(2,062)	(2,103)	(2,143)	(2,185)
EBITDA	7,133	7,274	7,417	7,586	7,733	7,884	8,036	395
Depreciere	2,833	2,833	2,833	2,833	2,833	2,833	2,833	236
EBIT	4,300	4,441	4,584	4,752	4,900	5,050	5,202	159
EBIT(1-τ)	3,612	3,730	3,851	3,992	4,116	4,242	4,370	133
Dob	(153)	(77)						
CF	4,309	4,429	6,671	6,812	6,937	7,065	7,189	997
VAN	**(6,750)**							

Appendix 2. DCF (mii euro):

	2015	2016	2017	2018	2019	2020	2021	2022
Venituri	-	7,874	8,047	8,214	8,378	8,541	8,710	8,884
Cheltuieli	-	(1,612)	(1,732)	(1,769)	(1,804)	(1,839)	(1,854)	(1,891)
EBITDA	-	6,262	6,315	6,445	6,574	6,702	6,856	6,992
Depreciere	(2,597)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)
EBIT	(2,597)	3,429	3,481	3,612	3,740	3,868	4,022	4,159
EBIT(1-τ)	(2,182)	2,880	2,924	3,034	3,142	3,249	3,379	3,494
Dob								
CF	(42,501)	5,200	5,752	5,857	5,965	6,074	6,198	6,316
	2023	2024	2025	2026	2027	2028	2029	2030
Venituri	9,063	9,243	9,424	9,608	9,796	9,986	10,179	2,580
Cheltuieli	(1,930)	(1,968)	(2,007)	(2,023)	(2,062)	(2,103)	(2,143)	(2,185)
EBITDA	7,133	7,274	7,417	7,586	7,733	7,884	8,036	395
Depreciere	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(236)
EBIT	4,300	4,441	4,584	4,752	4,900	5,050	5,202	159
EBIT(1-τ)	3,612	3,730	3,851	3,992	4,116	4,242	4,370	133
Dob								
CF	6,434	6,554	6,671	6,812	6,937	7,065	7,189	997
VAN	12,300							

Appendix 3. Reimbursment

An	2015	2016	2017	2018	2019
Rata de principal	(213)	(213)	(213)	(213)	(213)
Dobândă	(913)	(762)	(752)	(744)	(737)
Principal rămas	1,912	1,700	1,487	1,275	1,062

An	2020	2021	2022	2,023	2,024
Rata de principal	(213)	(213)	(213)	(213)	(213)
Dobândă	(731)	(721)	(713)	(706)	(700)
Principal rămas	850	637	425	212	(0)

Appendix 4. World energy

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Europe	1,306	2,291	3,289	5,312	11,020	16,854	30,505	52,764	70,513	81,488
Asia - Pacific	1,198	1,502	1,827	2,098	2,628	3,373	4,951	7,513	12,159	21,992
China	62	70	80	100	140	300	4800	43,300	46,800	418,600
Americas	163	246	355	522	828	1,328	2,410	4,590	8,365	13,727
Restul Lumii	993	1,003	1,108	1,150	1,226	1,306	1,590	2,098	2,098	2,098
Orientul Mijl.	1	1	1	2	2	25	205	205	570	953
Total	3,723	5,112	6,660	9,183	15,844	23,185	40,336	70,469	100,504	138,856

Source: European Photovoltaic Industry Association

Appendix5. EU Funds absorption

Lituania	60.5%	Grecia	45.3%
Portugalia	58.4%	Luxemburg	44.9%
Irlanda	55.6%	Olanda	44.0%
Estonia	53.9%	Ungaria	43.0%
Suedia	53.3%	Cipru	42.6%
Finlanda	52.7%	Danemarca	42.5%
Germania	52.3%	Franta	41.6%
Polonia	51.3%	Slovacia	38.9%
Marea Britanie	50.3%	Cehia	37.0%
Austria	49.3%	Malta	33.2%
Letonia	48.5%	Bulgaria	28.5%
Spania	48.4%	Italia	28.0%
Slovenia	47.6%	Romania	20.7%
Belgia	46.8%		

Source: Comisia Europeana

Appendix 6. Inflation

	2,016	**2,017**	**2,018**	**2,019**	**2,020**	**2,021**	**2,022**	**2,023**
Inflatie	1.997%	2.200%	2.072%	1.997%	1.951%	1.977%	1.995%	2.018%
	2,024	**2,025**	**2,026**	**2,027**	**2,028**	**2,029**	**2,030**	
Inflatie	1.980%	1.968%	1.952%	1.949%	1.946%	1.930%	1.941%	

Source: European Intelligence Unit

Appendix 7. Comparables

Companie	**Beta L**	**Beta UL**
Greentech Energy Systems A/S (Polonia)	0.71	0.50
Tema Energy (Cehia)	1.09	1.03
Infigen Energy(Ungaria)	0.91	0.27
Boralex(Şerbia)	0.63	0.38
Renovesis(Serbia)	0.84	0.44
PNE Wind (Polonia)	1.30	0.37

Source: Capital IQ

Appendix 8 Econometric Model

Dependent Variable: PRET
Method: Least Squares
Date: 05/11/15 Time: 23:12
Sample: 1/01/2012 10/15/2014
Included observations: 1018

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	38.75242	12.56793	3.083438	0.0021
CONSUM	-0.004924	0.002779	1.771638	0.0768
PC	0.059199	0.003856	15.35118	0.0417
PGREEN	0.049523	0.003503	-14.13651	0.0462
PH	0.002392	0.002337	-1.023847	0.0091

R-squared	0.604059	Mean dependent var	175.2194
Adjusted R-squared	0.602496	S.D. dependent var	60.59361
S.E. of regression	38.20303	Akaike info criterion	10.12861
Sum squared resid	1478444.	Schwarz criterion	10.15280
Log likelihood	-5150.460	Hannan-Quinn criter.	10.13779
F-statistic	93.92424	Durbin-Watson stat	0.953436
Prob(F-statistic)	0.017140		

Source: Own calculus