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RENEWABLE ENERGY SOURCES: EUROPEVS BRICS

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Abstract: *The term entrepreneurial environment includes all institutional, legal, financial and public policy aspects that can support any type of business activity. These different layers can affect the growth or the decline of a business sector by the creation of incentives or barriers in the entrepreneur's actions.*

This paper examines the Renewable Energy Sources (RES) business sector in Europe as well as in BRICS in order to compare and contrast the entrepreneurial environment of these countries. We investigate the progress of these RES markets the last decade and analyze the administrative, financial, political and technological framework that covers this sector's operation.

The paper presents the progress of the installed capacity in the most common renewable technologies of wind and photovoltaic-solar energy. All the available financial support mechanisms that have been used in the promotion of relevant technology and the differences in the implementation among all the above mentioned countries are also presented. Moreover, the different political and economical situations that the countries have faced during the financial crisis, the last five years, created emergency political decisions and affected the public policy in the sector of RES.

The legal framework, the licensing process, the taxation and the role of the banking system are also analyzed in order to fully describe the RES environment. The different weather situations, such as the wind potential and the sunshine, have also a crucial effet in the renewable development. Additionally, in some countries, an important parallel manufacturing industry for several components necessary for the renewable projects have been developed. All these aspects create a very different dynamic in the entrepreneurial environment of each country.

The empirical results of the survey describe the strengths and the weaknesses of the sector and the perspectives for the future growth of renewable in each country.

Keywords:Entrepreneurial Environment, Renewable Energy, Europe, BRICS.

1. INTRODUCTION

This research tries to describe the development of a sector in several countries over the world. The sample of our research includes firstly the leader European countries in the renewable industry such as Denmark, Germany and Spain which also host the most important module manufacturers in the sector. Some other countries with important entrepreneurial activity such as Austria, Italy and France

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are also invetigated. Three more countries with specific characteristics, Romania, Turkey and USA are also included in our research. Finally, we analyze the different characteristics of the sector in Brazil, Russia, India, China and Saudi Arabia. The significance of this paper is based on the comparison of very different group of countries and the situation that the enterprises face there.

The growth of renewable industry is connected with the United Nations agreement concerning the climate change in December 1997 known as the "Kyoto Protocol". After this agreement many international and European policies were established in order to create a framework for the operation of this industry. In this direction the European Union published the Directive 2001/77/EC in 2001 on the promotion of electricity production from renewable sources that contained individual targets for each EU Member State.

In the literature, many studies have been carried out concerning the sources of funding. Evans & Jovanovich (1989), highlight the importance of the entrepreneurs' ability to reach the necessary start-up capital for their business and Fonseca *et al.* (2007) notes "the interaction between the start-up costs and liquidity constraints affect the decision to become a businessman". The internal sources include personal funds of the entrepreneur or those he can draw from his environment, as Deakins & Freel (2007) note. The external sources may include short-term bank loans, venture capitals, formal or informal investors, leasing or even subsidies and grants. The bank lending is the most common and by far the most important form of external financing for Enterprises (ESRC, 2002). On the other hand, there is a mismatch in the demand for funds from businesses and the availability of respective funds in the financial institutions. These gaps, recognized by Macmillan (2002) and identified as "financial gap".

Many researchers have also analyzed the role of the public policy in the development of an entrepreneurial spirit. Characteristically, Lundstrom and Stevenson (2001) note that these policies aim at the invigoration of the entrepreneurial activity in a country, supporting the creation of new startups.

Regulations, such as the cost of entry, have also a significant effect on the level of entrepreneurial activity. Fonseca (2007) shows that indeed, in OECD countries, fewer individuals become entrepreneurs where start-up costs are higher. Êlapper (2004) finds that bureaucratic regulations inhibit entry in a sample of European countries.

On the other hand, the taxes can work as an obstacle in the entrepreneurship. A large number of studies have proved that taxes have a negative effect on the starting up, growth, survival, and generally speaking in the viability of an enterprise (Klapper, 2004), (Poutziouris, 2000).

Moreover, a very important field in the literature also refers to the obstacles that any investor can face in his entrepreneurial activity. There are many studies

concerning the administrative burdens, the governmental restrictions and the regulations. Characteristically, Krauss and Stahlecker (2001) demonstrated that the bureaucratic regulations and the administrative burdens have a significant effect on the level of entrepreneurial activity.

The rest of the paper is structured as below. The next section refers to the description of the data from the renewable sector in Europe and BRICS. Section III presents the public sector support mechanisms in these countries. Section IV outlines the institutional and financial framework in these countries. Finally, paper concludes by Section V which refers to study's implications.

2. THE GROWTH OF THE RES INDUSTRY

Denmark has the highest percentage of wind energy in the world; with production in 2013 in 33% of total energy consumption. Solar energy in Denmark contributes to a goal for the use of 100% renewable energy sources by 2050. The target for PV installed capacity is 3.400 MW by 2030. The Danish state will increase the country's offshore wind capacity with an additional 6 nearshore wind farms with a total capacity of 450 MW, along with 50 MW pilot offshore wind farms no later than 2020. Apart from offshore projects an additional 500 MW net additional onshore wind farms will be built in the same period. Denmark has relatively low average wind speed in the range of 4.9-5.6 m/s measured at a height of 10 m. The country has very large offshore wind potential, and large areas of sea territory with a shallow water depth of 5-15 m, where siting is most feasible. These sites offer higher wind speeds in the range of about 8,5-9,0 m/s at 50 m height. The Danish wind turbine industry is the largest in the world. About 90% of national production is exported, and Danish companies represented the 38% of the global turbine market, when the industry employed approximately 20,000 people and had a turnover of around 3 billion euros. The largest wind turbine manufacturers with production facilities in Denmark are Vestas and Siemens Wind Power.

Germany became a world leader in the installation of photovoltaic systems. The wind and photovoltaic projects in Germany, was first recorded in 2012 production of more than 30,000 megawatts (MW). Germany is one of the leading countries in the offshore wind energy, holding the title of the most innovative country. The production of photovoltaic electricity in Germany has overcome the wind. At this time there is no other country on earth that can produce electricity from photovoltaic installations with a capacity of 20.000 MW.

The *Spanish* government's national renewable energy plan sets the objective of expanding wind energy onshore to 35.000 MW and offshore to 750 MW. Spain is the fourth largest wind market worldwide right behind the USA, China and Germany. Wind energy already covers 16 percent of the Spanish power mix. The Spanish Gamesa, one of the world's largest wind energy companies, has announced

that it has installed a total of 30 GW worth of wind power. The Spanish manufacturer doubled its net profit to €64 million in the first nine months of 2014 due to an increase in revenue and margin.

France has the third largest wind resources in Europe after Germany and the United Kingdom. Solar power in France had been growing rapidly. By the end of 2013, the cumulative photovoltaic capacity reached almost 4.7 GW. This makes France the seventh biggest producer of PV electricity in the world, behind Germany, China, Italy, Japan, the United Statesand Spain.

The *Italian* national target for the share of renewable sources in gross final consumption of energy in 2020 is 17%. The amount of energy from renewable sources in target year 2020 should be 22,617 ktoe. Italy sets a target of the share of renewable energies to be 26,39% in the electricity sector, 17,09% in the heating/cooling sector and 10,14% in the transport sector by 2020.

Austrian wind power has developed in different periods. The first diffusion period led to 1 GW installed wind power. After some years with too low feed-in tariff, new capacities installed starting 2011 and led to a total capacity of 1684 MW by the end of 2013. The total installed capacity had a production capacity of 3.6 TWh which counts for 5.8% of national electricity consumption. The total amount of installed PV capacity in Austria was 626 MW at the end of 2013. The Austrian photovoltaic industry is highly diversified covering production of PV modules and converters as well as other PV components and devices. Furthermore there is a high density of planning and installation companies for PV systems as well as specialized institutions and universities, which play an important role in international photovoltaic research & development (R&D).

Romania has been a leader among emerging markets of Europe in terms of new installed wind power capacity positioning at number five in Europe. Romania has the highest wind potential in South Eastern Europe and the second best place in Europe (after Scotland) to construct wind farms due to its large wind potential. The wind farms could contribute with 13 GW to the national power generation capacity by 2020. The global financial crisis has contributed to the decreasing of economical potential, and, therefore, investments of international companies have been severely restricted or even delayed. However, despite the fall in gross domestic product of most countries, investments in the renewable energy sector have not diminished. The long-term need for energy of Romanian economy makes the energy industry, including renewable energy, to be an extremely exciting area for global equity involvement. Romania met all the criteria for a strong PV market. But similar to other markets, a rapid phase-out of incentives caused a significant drop in installations. Although this story of incentive-driven growth has been common in market development to date, the improving economics of solar will drive more interest in sustainable markets where incentives may be

minimal but steady. While the stability of a government- or utility-backed revenue stream is highly desirable, retroactive feed-in tariff cuts in European markets show that it also comes with policy and regulatory risk.

Turkey aims to make more use of renewable energy resources by 2023. Turkey aims to use 36,000 MW hydroelectric, 20,000 MW wind, 3,000 MW solar, 600 MW geothermal and 2,000MW biomass energy by 2023.

Renewable energy in the *United States* accounted for 12.9 percent of the domestically produced electricity, and 11.2 percent of total energy generation. The 80% renewables future is feasible with currently available technologies by 2050, including wind turbines, solar photovoltaics, concentrating solar power, bio power, geothermal, and hydropower. In this case the carbon emissions from the power sector would be reduced by 80 percent, and water use would be reduced by 50 percent. This goal is technically feasible and affordable, but can only be achieved with the right policies and measures in place.

Brazil has the largest electricity market in South Amerika. The installed capacity is comparable to that of Italy and United Kingdom. Wind energy in Brazil has an installed capacity of 5 GW in the middle of 2014. The wind potential in Brazil is more intense from June to December, coinciding with the months of lower intensity of rainfall. The total installed solar power in Brazil is estimated to be 17 MW at the end of 2012, and generates less than 0.01% of the country's electricity demand. Brazil has one of the highest solar potential in the world, ranging from 4.25 to 6.5 hours at the sun/day.

In *Russia*, renewable energymainly consists of hydroelectric energy. The country is the fifth largest producer of renewable energy in the world, although it is 56th when hydroelectric energy is not taken into account. The 16% of Russia's electricity is generated from hydropower(44 GW), and less than 1% is generated from all other renewable energy sources combined. While most of the large hydropower plants in Russia date from the Soviet era, the abundance of fossil fuels in the Soviet Union and the Russian Federation has resulted in little need for the development of other renewable energy sources. There are currently plans to develop all types of renewable energy, which is strongly encouraged by the Russian government. Solar energy is virtually nonexistent in Russia, despite its large potential in the country. The first Russian solar plant was opened in November 2010. Russia plans to set up an overall solar capacity of 150 MW by 2020. Russia has a long history of small-scale wind energy use but has never developed large-scale commercial wind energy production. Most of its current wind production is located in agricultural areas with low population densities where connection to the main energy grid is difficult.

In *India*, the growth of Renewable Energy is enormous and wind energy proves to be the most effective solution to the problem of depleting fossil fuels, importing

of coal, greenhouse gas emission, environmental pollution etc. With an installed capacity of 21.136 MW (March 2014) of wind energy, RES currently accounts for 13,86% of India's overall installed power capacity. Wind Energy holds the major portion of 66,7% of total RE capacity and continued as the largest supplier of clean energy. The Indian Government has set a target of adding 18.5 GW of renewable energy sources to the generation mix out of which 11 GW is the wind and the rest from renewable sources like solar 4 GW and others 3.5 GW in the plan period of 2012-2017.

China led the world in renewable energy production, in 2013, with a total capacity of 378 GW, mainly from hydroelectric and wind power. As of 2014, China leads the world in the production and use of wind power, solar photovoltaic power and smart grid technologies, generating almost as much water, wind and solar energy as all of France and Germany's power plants combined. Since 2005, production of solar cells in China has expanded 100-fold. As Chinese renewable manufacturing has grown, the costs of renewable energy technologies have dropped dramatically. Innovation has helped, but the main driver of reduced costs has been market expansion. China has the largest wind resources in the world and three-quarters of its wind farms are offshore. In 2008 China was the fourth largest producer of wind power after the United States, Germany, and Spain. China identified wind power as a key growth component of the country's economy. So, in 2010 China became the world's largest maker of wind turbines, surpassing Denmark, Germany, Spain, and the United States. Leading wind power companies were Goldwind, Dongfang, and Sinovel. China produces 63% of the world's solar photovoltaics. It has emerged as the world's largest manufacturer of solar panels in the last two years. China has become a world leader in the manufacture of solar photovoltaic technology, with its six biggest solar companies having a combined value of over $15 billion.

South Africa was the 4th largest investor in renewable power in the world after Uruguay, Mauritius and Costa Rica,in terms of share of GDP in 2012. South Africa's per capita greenhouse gas emissions are the highest in Africa. South Africa's commitment to renewable energy lags behind that of China, India, Brazil, and Russia. South Africa receives more than twice as much sunshine than Germany. Although still heavily dependent on fossil fuels, South Africa has been quietly creating one of the world's most progressive alternative energy plans. Solar, biomass and wind energy systems are popping up all over the country and feeding clean energy into the strained electrical grid. The country has added a total of 4,322MW of renewable energy capacity in less than four years and the Renewable Energy has the 10.9% of the total primary energy supply in 2012.

Table 1 and 2 presents the progress of the total installed capacity in wind and photovoltaic energy in several European countries, as well as in BRICS, the last 10 years.

Table 1
Total Installed CapacityWind Energy (MW)

Year	*France*	*Spain*	*Denmark*	*Austria*	*Italy*	*Romania*	*Turkey*	*Usa*	*Brazil*	*Russia*	*India*	*China*	*South Africa*
2005	757	9991	3127	819	1639	0	21	17811	29	—	—	1260	3,2
2006	1567	11569	3135	966	1908	0	65	26589	237	15	—	2599	3,2
2007	2455	15071	3154	983	2714	0	207	34450	247	—	—	5912	3,2
2008	3404	16682	3163	996	3538	3	433	55363	339	—	—	12200	8,4
2009	4492	19137	3482	996	4898	14	801	73886	606	—	—	26000	21,6
2010	5970	20624	3752	1012	5814	462	1329	94652	931	—	—	31100	64,8
2011	6640	21674	3927	1084	6936	982	1799	120177	1429	—	—	62700	64,8
2012	7564	22785	4162	1378	8144	1905	2312	140822	2508	—	—	75000	64,8
2013	8254	— —-	4792	1684	8552	2599	2959	167665	3399	—	—	91424	64,8
2014	—-	—-	4855	2064	—-	—-	—-	—-	—-	1700	22465	114763	368,4

Table 2
Total Installed Capacity Photovoltaic Energy (MW)

Year	*France*	*Spain*	*Denmark*	*Austria*	*Italy*	*Romania*	*Turkey*	*Usa*	*Brazil*	*Russia*	*India*	*China*	*South Africa*
2005	—	—	1.2	24	37.5	0	2.3	16	—-	—	—	70	0
2006	—	100	1.4	25.6	50	0	2.8	15	—-	—	—	80	0
2007	—	800	1.6	27.7	120.2	0	3.3	16	—-	—	—	100	0
2008	104	3100	1.8	32.4	458.3	0.45	4	76	—-	—	—	140	0
2009	289	3150	3.1	52.6	1181.3	0.64	5	157	—-	—	—	300	0
2010	1197	3950	5.6	95.5	3470	1.94	6	423	—-	—	—	800	0
2011	2949	4200	15	188	12783	4	7	1012	5000	—	—	3300	1
2012	4060	5100	331	363	16479	51	12	3451	17000	—	—	8300	41
2013	4673	5150	547	626	17928	1151	18	8327	—-	—	—	18300	122
2014	—-	—-	—-	— —	—-	—-	—-	—-	—-	—	3063	—	922

3. PUBLIC SECTOR SUPPORT MECHANISMS

The most commonly used Public Support Mechanisms in the renewable energy industry include:

- The mechanism of *Feed in Tariff* (FIT) that is an energy supply policy focused on supporting the development of new renewable energy projects by offering long-term purchase agreements for the sale of RE electricity. These purchase agreements are typically offered within contracts ranging from 10-25 years and are extended for every kilowatt-hour of electricity produced. The payment levels offered for each kilowatt-hour can be differentiated by technology type, project size, resource quality, and project location to better reflect actual project costs. Policy designers can also adjust the payment levels to decline for installations in subsequent years, which will both track and encourage technological change.
- The mechanism of *Quota Systems* or Quota obligations which is based on Tradable Green Certificates (TGCs) are generation-based, quantity-driven instruments. The government defines targets for RES-E deployment and obliges a particular party of the electricity supply-chain (e. g. generator, wholesaler or consumer) with their fulfilment.
- The *Tax mechanisms* that are generally favorable for electricity produced from RES.
- The *Tendering* systems that use government-supervised competitive processes to meet planned targets by making long-term power purchase agreements with renewable energy generators. Tendering policies are similar in some respects to feed-in laws and renewable portfolio standards; in that both the price and targets are set, but here the price and the RE projects eligible for government support at the specified price are chosen through a competitive bidding process, in which bidders submit project proposals with the price they are able to offer (Wiser, 2002).
- *Net metering* programs serve as an important incentive for consumer investment in on-site renewable energy generation. Net metering enables customers to use their own generation from on-site renewable energy systems to offset their consumption over a billing period by allowing their electric meters to turn backwards when they generate electricity in excess of their demand, enabling customers to receive retail prices for the excess electricity they generate. Without net metering, a second meter is usually installed to measure the electricity that flows back to the provider, with the provider purchasing the power at a rate much lower than the retail rate (Carley, 2009).
- *Self-Consumption.* The possibility for any kind of electricity consumer to connect a photovoltaic system, with a capacity corresponding to his/her

> consumption, to his/her own system or to the grid, for his/her own or for on-site consumption, while receiving value for the non-consumed electricity which is fed into to the grid (EPIA, 2012).

In the most *European* countries, electricity from renewable sources is promoted through a *feed-in tariff* and *tax benefits*. Tariffs for photovoltaics are differentiated by size, location (residential, other/commercial buildings, educational/health buildings; ground-mounted), and the compliance to certain quality criteria. On January 2010, the rate of 58 c€ / kWh in *France*, considered as "the highest in the world" was established to apply for "building integrated" systems.

Romania has established a Green certificate scheme. The *Tradable Green Certificates (TGC or GC)* system has been in place in Romania since 2004, coupled with a supplier *quota obligation system*. Under this framework, energy producers are entitled to receive a set amount of GCs according to the amount of electricity generated and delivered by them from renewable sources. The revenue from GC sales represents additional revenue for eligible renewable producers on top f electricity sales on the market. The Romanian State supports the production of solar / PV energy by offering six (6) green certificates for each MWh produced and injected into the grid. The Romanian territory genuinely provides resources for implementing a large variety of renewable energy projects, offering fertile ground for capitalizing the green potential in wind, solar, biomass and geothermal department.

USA has a long history of supporting energy infrastructure through the U.S. tax code. The market certainty provided by a long-term *Investment Tax Credit (ITC)* for solar energy has supported private investment in manufacturing and project construction, a vital part in meeting the nation's energy policy goals, driving cost-cutting innovation and job growth. The ITC reduces tax liability for individuals or businesses that purchase qualifying solar energy technologies, encouraging investment and spurring growth in solar energy. The *Production Tax Credit (PTC)* is a federal incentive that provides financial support for the development of renewable energy facilities.Companies that generates electricity from wind, geothermal, and "closed-loop" bioenergy are eligible for a federal PTC. Combined with state renewable electricity standards, the PTC has been a major driver of wind power development in the United States.

The global financial crisis affects many countries, especially these in the south Europe. This reason had a big effect in the feed in tariffs and many countries made important discounts in these tariffs. *Spain*implemented, on September 2008, a 30% FiT cut for new PV installations, an additional sudden and severe FiT cut of 25% for rooftop PV systems and 45% for groundmounted PV systems took place in November 2010. It inevitably led to massive losses in revenue for PV system owners and damaged heavily investors' confidence. These decisions have led to major job

losses in the sector. At the same time, the tax is being considered over the sector's turnover, in many cases. A big tax canalso reduce the profitability of wind farms as well as the projects may not meet the terms of the payment of their debts. Wind energy is already bearing a higher tax burden since on top of taxes common to other technologies Spain is among the European countries where wind power carries a heavier tax burden.Many companies have had to refinance loans taken out to develop power plants because the revenue they get for selling electricity no longer covers the cost of servicing their loans.It is estimated that the Spanish banks have given €25 billion ($33.2 billion) in loans to finance national PV installations, which are still on their balance sheets. There are rumors that a "photovoltaic bad bank" may be created to administer all of the loans that borrowers would not be able to pay back if the FITs were cut again.

In *India*, the Ministry of New Renewable Energy has launched a new scheme for installation of solar power plants and this generation-based subsidy is available for 10 years. The MNRE in order to make solar PV systems financially feasible for consumers provides a capital subsidy of up to 30%. This capital subsidy for solar PV systems is provided for system sizes up to 100kW but in the second phase the limit has been increased to system sizes as large as 500 kW.India reinstated the wind farm subsidy after its expiry last year led to a 42% plunge in turbine installations. The MNRE approved the proposal to revive the generation-based subsidy for wind farms and also agreed to raise the cap on the total subsidy a wind farm can claim over 10 years by 61%. The generation-based incentive is over and above any feed-in tariff specified by any of the state energy regulatory commissions.

Table 3presents the support mechanisms that have been implemented in several European countries, as well as in BRICS.

4. THE INSTITUTIONAL AND FINANCIAL FRAMEWORK

In *Denmark*, the required licenses may be required bydifferentrecipientsin local, federal, national level. Denmarkhailedinternationally asa worldleader by offering in its investors one-stop shop services for the renewableenergy projects.

The *French* national regulatory authority (CRE) is the independent administrative authority that regulates the energy sector in France and is responsible for the authorization procedures. Their competence is always direct in the permit process for the following technologies and installation dimensions: solar energy (for power plants above 250 kW), solar thermal, bioenergy, biofuels, geothermal, hydropower. For wind systems, municipalities have direct competence in the permitting process for wind turbines taller than 12 m, Departmental Prefectures are responsible for issuing the building permit and Regional Prefectures are competent on the exercise permit. Local authorities can develop an energy plan required by law.

Similarly, *Spain* land use legislation and energy planning are the responsibility of the Spanish Regional Governments called "Autonomous Communities" (AC). Within each AC, urban planning is developed at a local level by the Town Councils. The General Urban Distribution Plan is the main tool for urban planning in Spain. Once developed and approved by the Town Council, the proposal must receive the final approval by the Government of the AC, in order to come into effect. There are more than 30 municipal bylaws concerning solar technologies, most of them only dealing with Solar thermal. The region of Catalonia is by far the most active in this field, followed by Madrid and Valencia.

In *Italy* the operators of renewable energy plants are entitled to be connected to the national electricity grid upon request. To this aim, the grid operator and a given plant operator conclude a contract. The procedure for connection consists of several steps. The response to applications range from 20 working days for capacities of up to 100 kW up to 90 working days for capacities of more than 10,000 kW. The distribution grid operator must connect a plant within 30 working days for basic works. Grid operators are obliged to give priority access to renewable energy plants. They are also obliged to give priority dispatch to electricity from renewable sources. Plant operators can request the grid operator to expand the grid if the connection of a plant requires this expansion.

In *Turkey,* there is not any license obligation - procedure for projects that either is off-grid or is up to 1 MW. In Turkey, the connection to the grid occurs through a bidding procedure. The vailable connection regions and points are published by the Turkish Transmission System Operator on every March of the year. A plant operator who wants to be connected to the grid needs a production license, clarify the connection details and arrange an agreement of the connection with the TEIAS.

The *Romanian* regulatory framework and the incentive system played a crucial role in the rapid process of development of this specific field. The next step consists of obtaining an operation license. Prior to the commencement of the commercial operations an operation license must be obtained and the applicant must submit certain forms. The application should contain details regarding the electricity production capacity, the organizational chart of the company and also a certificate attesting personnel qualification. The operation license is usually issued in 30 days and it is valid for 25 years.

The states of the *U.S.A.* have their own policies, rules, and regulations concerning exploitation, development, and use of energy resources within the boundaries of their jurisdiction. The body regulating various sources of energy and the state regulatory requirements vary from state to state. Each state has its own department/divisions/agencies to provide safe, sustainable, reliable, and reasonably priced energy to its citizens.

South Africa's National Energy Regulator (NERSA) introduce in 2009 a system of feed-in tariffs designed to produce 10 TWh of electricity per year by 2013. The feed-in tariffs differentiated by technology, will be paid for a period of 20 years(IEA, 2010). NERSA said in its release that the tariffs were based, as in most European countries, on the cost of generation plus a reasonable profit. The tariffs for wind energy and concentrating solar power are among the most attractive worldwide. South Africa is the first African country to introduce a feed-in tariff for wind energy.However, the feed-in tariff was abandoned before being promulgated in favor of a competitive bidding process launched on 3 August 2011. Under this bidding process, the South African government plans to procure 3,750MW of renewable energy: 1,850MW of onshore wind, 1,450MW of solar PV, 200MW of CSP, 75MW of small hydro, 25MW of landfill gas, 12.5MW of biogas, 12.5MW of biomass, and 100MW of small projects.

Concerning the financial framework, the availability of financing for renewable energy projects is a critical issue for the industry, in every country. Central Banks supports renewable energy projects. The *European Investment Bank* (EIB) has announced a financial commitment of €750m to be invested in renewable energy projects, only in France. Same programs run in many other countries in Europe. So, projects in renewable energy will be considered for financing, including wind energy, solar, hydro and geothermal. Similarly, Inter-American Development Bank, since 2000 has financed more than US$2.1 billion in renewable energy projects, including hydropower, wind power, and geothermal, in addition to improved energy efficiency in power transmission. Financing has been extended to both the public and private sectors.

In most of countries, the funding will be implemented in collaboration with national Comercial Banks. Concerning the Banking Loans most of the comercial banks in the world provide people with them in favor of Renewable Energy Sources. These specialize in tailored financing products and services for renewable energy projects and equipment, include equity investments and secured loans.

Moreover, *Independent State Authorities* also fund renewable projects in many countries. In the *USA*, the Department of Energy Loan Guarantee Program (LGP) supports financing of renewable projects and manufacturing facilities, helping to deploy clean energy technologies across the U.S. Third-party solar financing allows residential and commercial solar customers to purchase solar through leases, power purchase agreements, and other alternative ownership models. *Saudi* Industrial Development Fund grants loans for the industrial institutions reaching up to 50% of the total of the project costs. They are to be paid back within five or ten years, after a year and a half grace of the production date. And the Fund does not receive any profits for these loans except the administrative fees which amount to 2, 5% of each loan. As for Saudi Arabia, local banks are familiar and comfortable with financing the energy sector. Saudi Arabia's 13 banks are extremely conservative,

but they have experience in IPPs and massive liquidity is available. While local banks will play a key role in project financing, it is unlikely there will be sufficient money available to cover the sheer number of projects that are due to be tendered, meaning there will certainly be a role for international banks and investors.

5. CONCLUSIONS

The entrepreneurial environment in RES is developed as a sequence of national objectives, political decisions, financial tools, weather conditions, local technological situations and international factors. All these variables create a multilevel problem that may be exploited by the entrepreneur.

The *weather conditions* are the first very crucial factor for the growth of this technological sector. The wind potential and the wind speed in onshore and offshore plants and in different heights is a first important factor. Romania has the highest wind potential in South Eastern Europe and the second best place in Europe (after Scotland) to construct wind farms due to its large wind potential. Additionally in some countries the best plants are already occupied and free space where companies can build, it is now minimal. The next phase of development for countries such as Germany and the Netherlands are in coastal areas, where the potential is better.

The global financial crisis affects many countries, especially these in the south Europe. This reason had a big effect in the feed in tariffs and many countries made important discounts in these tariffs. It inevitably led to massive losses in revenue for PV system owners and damaged heavily investors' confidence. These decisions have also led to major job losses in the sector. Moreover, the maturing photovoltaic markets in Germany, Spain, France, Italy and the above mentioned *cuts of in feed-in tariffs* in Czech Republic, Greece and Bulgaria allowed investors to look for new opportunities in South-East European (SEE) nations. Romania is presenting one very interesting investment alternative. Romania was one of the most promising emerging markets for photovoltaic energy investments in 2013 amongst SEE countries.

Some countries host a heavy *industry of wind turbines as well as PV modules*. These countries play a very important role as the major manufacturers of necessary components for the renewable sector. The Danish wind turbine industry is the largest in the world. About 90% of national production is exported, and Danish companies represented the 38% of the global turbine market. The Spanish Gamesa is also one of the world's largest wind energy companies. The Austrian photovoltaic industry is highly diversified covering production of PV modules and converters as well as other PV components and devices. China also has emerged as the world's largest manufacturer of solar panels in the last two years. China has become a world leader in the manufacture of solar photovoltaic technology. In 2010 China

Table 3
Public Policy in Europe and BRICS

Countries	Support Mechanisms	Taxation
FRANCE	Cnshore Wind power plants: 0.082€/ kWh for 10 years 0.028€/kWh - 0.082 €/kWh for the next 5 years Offshore Wind power plants: 0.13€/kWh for 10 years 0.03€/kWh - 0.13€/kWh for the next 10 years Ground-based PV power plants: 0.18€/kWh Building-integrated generating PV facilities: 0.2794 €/kWh,	Photovoltaic installations 10%
SPAIN	Wind : -A fixed tariff of 79.084€/MWh -A variable premium 76.975€/MWh - 91.737 €/MWh. PV: 2.5 Ct/kWh (decrease of 29 EUR/MWh-70 % of FiT from 2010)	PV: 7% tax on income from electricity production Wind: tax of 11%
DENMARK	Feed-in tariffs PV: 0.60 DKK / kWh (for 20 years) On Shore Wind: 0.25 DKK / kWh (for the first 22.000 hours) Off Shore Wind: 0.518DKK / kWh – 0.629 DKK / kWh (for the first 22.000 hours)	----------
AUSTRIA	Feed-in tariff: (Duration 13 years) Wind energy: 9.45 cents (ct) /kWh PV:On buildings: 5 kWp to 500 kWp: 18.12 ct /kWh In open space: 5 kWp to 500 kWp: 16.59 ct /kWh Reduction on tarrifs from January 2015, 8% up to 200 Kw.	----------
ITALY	Feed-in tariff for PV: 0.251€ / kWh - 0.402€/kWh (20 years after the plant operation)	Reduced VAT of 10 % (instead of 20 %)
ROMANIA	Romanian Programme for renewable energy: Financing is granted for up to 50% of the total eligible costs Tradable Green Certificates (TGC or GC) • 0.5 GC/MWh for wind power, up to 31/12/ 2017 and • 0.25 GC/MWh starting with 1/1/2018. (GC = 0.27-0.59€) The support scheme is granted for a period of 3 to 15 years	Tax rate on taxable profits is 16%, with several exceptions: certain state-owned enterprises are tax-exempt, and the tax rate applicable to the revenue of micro-businesses is 2-3%.

TURKEY	Feed-in tariff (10 years from project operation) • Wind: ct7.3/kWh • Solar: ct13.3/kWh • 85% discount on transmission costs for 10 years • bonus payments for hardware components made in Turkey to support and boost the national manufacturing sector	VAT exemption on purchase (or import) of investment equipment
USA	Production Tax Credit (PTC): 2.3 cents/kWh Incentive for the first ten years. Feed-in tariffs – Wind & Hydropower On-Shore Wind < 20 kW 16.1 cents/kWh On-Shore Wind 20-100/500 kW 13.8 cents/kWh Feed-in tariffs - Photovoltaics (PV) PV < 20 kW 21.8 - 27.4 cents/kWh PV 20-100/500 kW 18.9 - 23.8 cents/kWh	35% state tax credit 24.5% refundable tax credit
BRAZIL	----------	----------
RUSSIA	----------	----------
INDIA	PV: Generation-based subsidy 12 Rs./kWh (0.21 /kWh) Feed in-tariff: 17.90 Rs./kWh - 15.40 Rs./kWh. (25 yrs) PV: Capital Subsidy of up to 30% Wind farm subsidy 42% - 61%	Direct Taxes ○ Exemption on Income Tax on earnings from the Green Energy Projects for 10 years. Indirect Taxes ○ For Wind Power Generators, Custom Duty is 7.5% ○ For Wind Power Generators, Excise Duty is 10.0%
CHINA	----------	----------
SOUTH AFRICA	Feed-in Tariffs Wind energy: 1.25 ZAR/kWh (0.104/kWh) Solar: 2.10 ZAR/kWh Bid Prices Concentrating solar power (CSP): R1,64 per kWh - R2,69 per kWh Solar photo-voltaic (PV): R0,99 per kWh - R2,76 per kWh Wind: R0,90 per kWh - R1,14 per kWh	----------

became the world's largest maker of wind turbines, surpassing Denmark, Germany, Spain, and the United States. Furthermore there are countries with a high density of specialized institutions and universities, which play an important role in international photovoltaic research & development (R&D).

The *operation license* and the connection with the distribution grid is another serious aspect for the sector. There are big differences among the countries in the duration for these processes as well as in the number and the level of the responsible administrative authorities.

Concerning the *projects funding*, Central Banks supports renewable energy projects, both in Europe and America. Moreover, in most of countries, the funding will be implemented in collaboration with national Comercial Banks as well as Independant State Organisations, with several programs and enormous capitals. One parameter for banks is the challenge to finance these projects with unattractive returns, especially when you consider the high borrowing costs, such as India, combined with the fact that foreign banks may consider the market too immature and risky for such low returns. On the other hand, there are many cases where borrowers are not being able to pay back the loans due to the FITs cut. Finally, in many countries there are also public subsidies for the projects' capital that range from 30& to 60%.

At the same time, the *taxation* is being considered over the sector's turnover, in many cases. A big tax can also reduce the profitability of projects and they may not meet the terms of the payment of their debts.

It is also very important the *enviromental aspect* in our analysis. The growth of renewables in the future is feasible with currently available technologies, including wind turbines, solar photovoltaics, concentrating solar power, bio power, geothermal, and hydropower. In this case the carbon emissions from the power sector would be reduced and water use would be also reduced. This goal is technically feasible and affordable, but can only be achieved with the right policies and measures in place.

Finally, as an *overview of BRICS* we can conclude different potentials, opportunitiesand goals. Brazil has the largest electricity market in South Amerika.The total installed solar power in Brazil generates less than 0.01% of the country's electricity demand. Brazil has one of the highest solar potential in the world, ranging the fifth largest producer of renewable energy in the world, although it is 56th when hydroelectric energy is not taken into account.

The 16% of Russia's electricity is generated from hydropower, and less than 1% is generated from all other renewable energy sources combined. The Russian Federation has resulted in little need for the development of other renewable energy sources. Solar energy is virtually nonexistent in Russia, despite its large potential in the country.

In *India*, the growth of Renewable Energy is enormous. RES currently accounts for 13,86% of India's overall installed power capacity. Wind Energy holds the major portion of the total RE capacity and continued as the largest supplier of clean energy.

China led the world in renewable energy production mainly from hydroelectric and wind power. China generating almost as much water, wind and solar energy as all of France and Germany's power plants combined. China has the largest wind resources in the world and three-quarters of its wind farms are offshore.

The *South African* renewable energy market has seen exponential growth in recent years driven in the most part from 2011 when the South African government announced a Renewable Energy Procurement Programme.

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