

THE MANAGEMENT OF GREEN CERTIFICATES IN ROMANIA

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Abstract: *Green certificates remain a sensitive issue both for Romanian authorities, but especially among producers of renewable energy that thought they would benefit from the authorities' support for a long time. Thanks to a particularly generous support scheme (the most generous in Europe), there is a danger of producing a phenomenon similar to that produced in the real estate sector in 2006-2008 by creating an investment bubble in the field of unconventional energies. The renewable investment bubble would be choppy following the reduction in the number of green certificates, a government measure. Since the legislative measures to be taken on green certificates are not yet clear, there is a possibility that their number may fall or their volume drops from 55 euros. At present, the producers of renewable energy pay the profit tax only when the CV is traded, which will lead to the decrease of the cases of insolvency and bankruptcy among the renewable energy producers.*

Keywords: *renewable energy, green certificates, reducing emission, renewable investment bubble, efficiency.*

JEL Classification: Q42, Q43, Q48.

1. Introduction

In Romania, there are two markets for energy transactions, the regulated market and the competitive market, which are also divided into the wholesale market, the retail market and the green certificates market.

The Green Certificates Market is a market distinct from the electricity market operating on the basis of competitive, demanding and green certificate offerings. At EU Member State level, the energy system is applied through two price-based systems, a fixed price for renewable energy and quantity is set, and governments impose an obligation on suppliers or consumers to produce part of their electricity from renewable sources.

Green certificates are titles that show the production of a quantity of electricity from renewable sources.

Their purpose is to gradually allow the development of new technologies for the production of electricity from renewable sources without public aid. If the price-based system does not have a limit on the amount of energy produced, it allows for a forecast of outputs, receipts, and also a long-term business plan, the green certificates market is traded with certificates attesting to 1MWh of electricity produced from renewable energy sources. These certificates are issued in order to promote E-SER through a system of competitive market mechanisms, that of binding quotas combined with green certificates trading (CVs), as energy suppliers have to buy a share of E-SER and resell it to final consumers.

These certificates can be traded separately from the associated electricity, on a bilateral contract market or on the centralized green certificates market and have unlimited validity. Their price is set by the government and ranges from a minimum price calculated to protect E-SER producers, and a maximum price cut to protect consumers.

Until 2012, there has been an increase in investments in this area of green certificates, together with the number of legal entities that benefited from the Romanian state support scheme.

The value of green certificates was calculated at a value of 55 euro / piece, the average value between the values of the reference years analyzed. The value of green certificates increased by 765.5% in 2012 compared to 2005, with the indication that the maximum was reached in 2012. Also, the number of energy producers increased by 48% in 2012 compared to base year 2005, which means a development of this sector.

2. Evolution of value of green certificates in Romania

This rhythm of growth is in line with the projections of the National Energy Strategy, with the Romanian state providing subsidies and aid to producers in order to increase investments in the renewable energy sector. The annual evolution of the CV number issued since the implementation of the E-RES promotion system to date is shown in Table no. 1.

Table no. 1. Evolution of the green certificates number since the implementation of the E-RES promotion system

| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------------------------------------|--------|---------|---------|---------|---------|---------|---------|----------|
| Hidro/SER technologies | 272412 | 186913 | 747026 | 1233874 | 1699219 | 1523843 | 1854457 | 1974883 |
| New winds | 292072 | 1334282 | 4429299 | 6390576 | 4249381 | 521862 | 6010239 | 10888083 |
| Biomass | 112115 | 209260 | 212692 | 561999 | 113062 | 120283 | 864917 | 783722 |
| Photo-voltaic | 7 | 1815 | 45269 | 1809603 | 4942852 | 6217502 | 6177080 | 6530926 |
| High efficiency cogeneration | 0 | 20524 | 66710 | 136988 | 0 | 0 | 0 | 0 |

Source: Data processed by the author based on statistics ANRE (2017).

The decision to suspend (temporarily) green certificates trading will probably reduce the number of green energy market participants, especially the producers in this sector. At the same time, it is important for the market to remain dynamic and not to block itself on the basis of those public decisions, in order to avoid possible adverse effects.

Perhaps a large number of producers will disappear from the market as a result of the decision to suspend green certificates trading, the large proportion will be among those producing small amounts of renewable energy. In support of them, the Romanian government promises to grant subsidies in order not to block their activity until 2017.

Renewable energy producers who own plants / parks with a capacity of up to 1 MW will benefit from regulated tariffs ranging from 69.4 Euro / MWh to 167 Euro / MWh. These tariffs will be granted according to the technology used by the producers.

The number of CV required to meet the quota in 2015 was 12,193,817 CV, and the share of CVs received by E-RES producers who benefited from them in 2015 were: Enel Green Power Romania with a 10 %, CEZ Romania with a 5% share, EDP Romania with a 5% share, Verbund Renewable Power with a 4% share and a 1.44% Hidroelectrica S.A are shown in Figure no. 1.

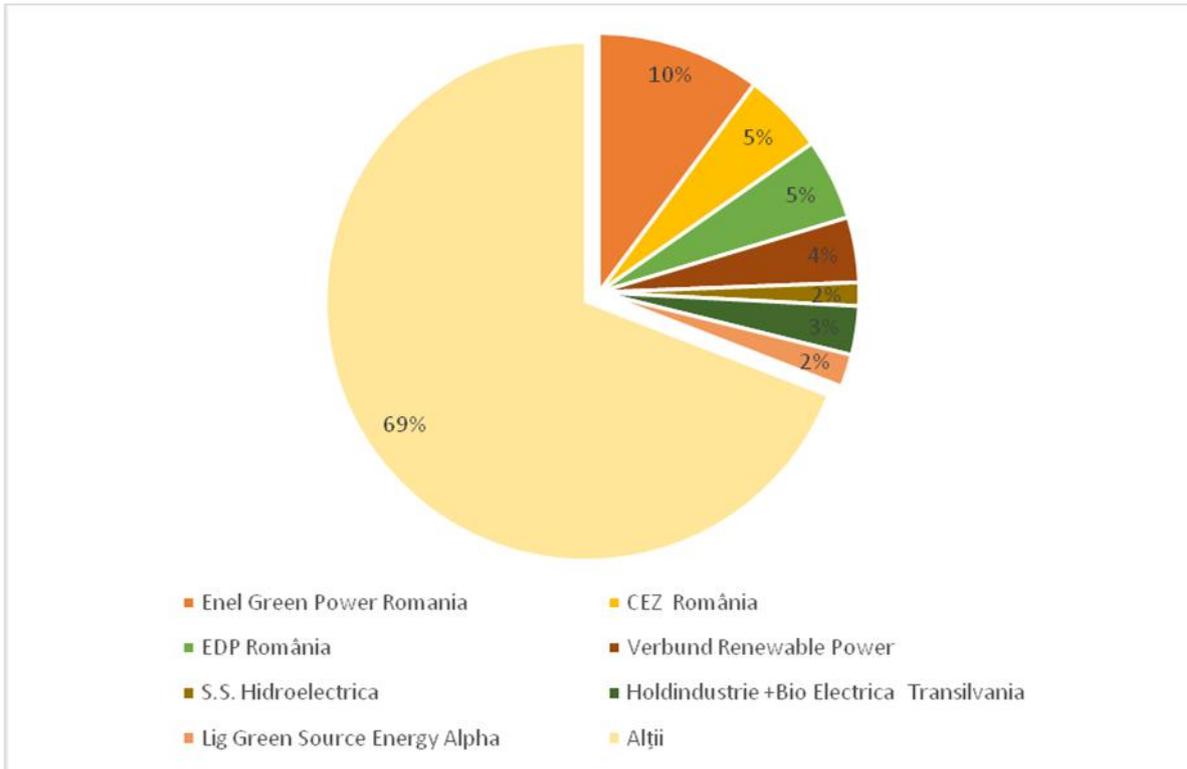


Figure no. 1. Share of green certificates system received by manufacturers in 2015

Source: data processed by the author on the basis of ANRE statistics (2015)

If at the beginning of 2009 the renewable energy field was underdeveloped, it is currently experiencing a considerable increase in both the number of market players, installed capacity, investments in the field and the results obtained from using this type of energy (Figure no. 2).

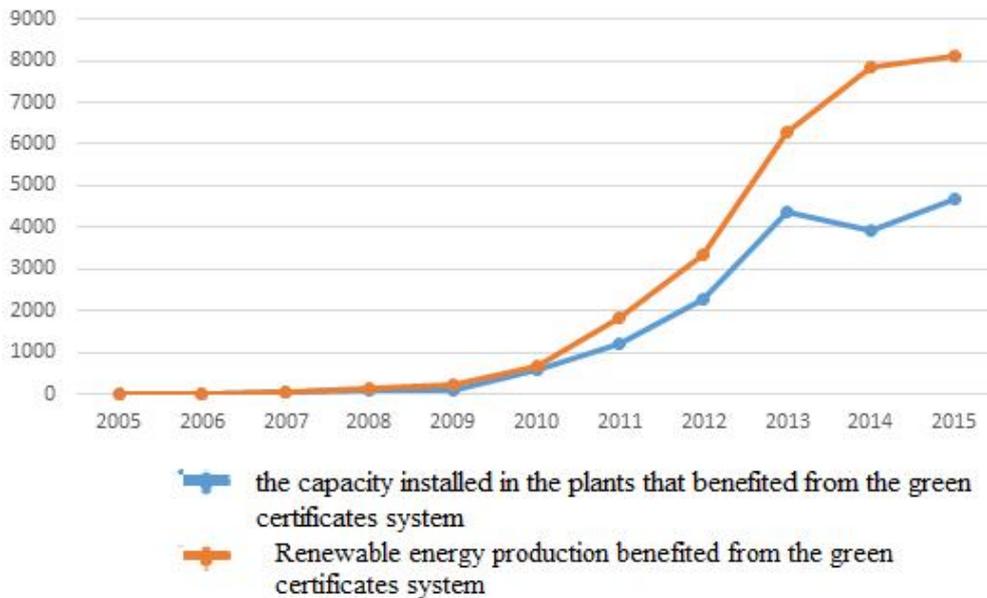


Figure no. 2. The evolution of the renewable energy production quantity of producers who benefited from the green certificates system

Source: data processed by the author on the basis of ANRE statistics (2005-2015)

Analyzing Figure 2 we can see that the year with the highest renewable energy produced in Romania is 2015, when the total energy consumption is covered by 15% of wind and solar, while the investments in the field tend to zero.

In Romania, out of the 25 wind farms, 8 of them are central probes with a total installed capacity of 1887.5 MW at the end of 2013, and with a total investment value of 2973, 8 million euro, 6 are managed by companies with Romanian capital, and the remaining 19 are owned by foreign companies.

The largest parks are owned by EDP Renewables (Portugal), with six parks, by Enel Green Power in Italy with five own parks and one jointly followed by CEZ with two parks.

However, the biggest capacity is the wind farm owned by CEZ, this company occupying the first place on the wind power market with the highest installed capacity and the highest value of the investment. The total value of investments in Romania, in production capacities, by type of technology, in the period 2011-2014 is 5.529 million euro (Table no. 2).

Table no. 2. Value of investments in production capacities, by types of technologies, in 2011-2014

| SER technologies | Investment 2011 | Investment 2012 | Investment 2013 | Investment 2014 | Total |
|--------------------------|-----------------|-----------------|-----------------|-----------------|--------------|
| New winds | 1.243 | 1.272 | 1.015 | 143 | 3.673 |
| Hydro (new, refurbished) | 61 | 67 | 240 | 36 | 403 |
| Biomass | - | 30 | 860 | 0.384 | |
| Photovoltaic | 3 | 62 | 1.228 | 43 | 1.336 |
| Total | 1.307 | 1.431 | 2.568 | 223 | 5.529 |

Source: Data processed by the author based on statistics ANRE (2016)

The two wind farms built in Constanta (Fântânele and Cogeleac) have the supremacy in Europe with an installed capacity of 600 MW.

Regarding the solar parks, in 2012, there were 1082,103 MW installed in photovoltaic parks in Romania with a total investment value of 2 billion euros. Despite these investments, in Romania at the end of 2012 only three solar parks with a total of 2 MW operated.

The decline in renewable energy investments in mid-2013 can be explained by the fact that the Romanian state has changed its support scheme for this area and decided that part of the support for already operational projects be postponed for the period 2017-2020. Thus, support for energy producers has been diminished as follows: wind energy is to receive 1 green certificate compared to 2 certificates granted by 2017, hydro power will receive 1 green certificate versus 3 and solar energy will receive 2 green certificates against the 6 green certificates granted until 2017.

In 2017, what will remain as certificates will be preserved by ANRE (National Regulatory Authority for Energy), which will estimate and calculate the number of green certificates corresponding to each investor. Their value can be used only in 2017, until it remains stuck.

Also, the fact that the payment of green certificates was postponed has produced negative effects, the EUR 4 million that had to be collected for the production of green energy from wind sources in July 2013 to be recovered after January 2017.

Starting with 1 April 2017, Government Emergency Ordinance no. 24/2017 regarding the amendment and completion of the Law no. 220/2008 to establish a system for the promotion of renewable energy production to ensure a balance between producers of electricity from renewable sources and final consumers with the objective of maintaining the national target of 24% of the total energy produced.

In the period 2011-2017 the evolution of the annual mandatory quotas of CVs and of the quotas made by the acquisition of CV by economic operators obliged to purchase green certificates is presented in Table no. 3.

Table no. 3. Evolution of annual mandatory CV shares and quotas achieved by the acquisition of CV by economic operators

| Years / CVs | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Annual CV rates | 0,037 | 0,119 | 0,224 | 0,218 | 0,278 | 0,306 | 0,357 |
| Annual quotas made by CV | 0,118 | 0,223 | 0,218 | 0,278 | 0,278 | 0,306 | 0,357 |

Source: data processed by the author based on statistics ANRE (2017).

In 2017, the estimated mandatory green certificate acquisition quota was set at 0.320 CV/MWh, corresponding to a final electricity consumption excluding green certificates of 6,700 GWh.

The mandatory green certificate purchase quota for 2018 was set at 0.346 CV / MWh, corresponding to a final electricity consumption excluding green certificates of 7.040 GWh.

3. Distortions on the Renewable Energy Market in Romania - Comparative analyzes

Regarding the distortions of the energy market obtained from renewable sources in Romania, we will aim at highlighting the malfunctions regarding the financing of this sector, the subsidies granted by the state to the investors whose projects have no financing to be completed, the defective management, the energy prices which evolves inversely in proportion to consumer incomes.

E-SER producers are the beneficiaries of CV subsidies, this cost being borne by industrial and household consumers through the monthly electricity bill. Although in the E-SER field, production capacity increased from 21 MW in 2005 to 4552 MW in 2015 and ANRE predicts continued growth, energy efficiency remains a problem for Romania because the economy and the national energy sector are not sustainable, the main causes being the poor organization and losses in this sector.

Distortions of the green certificates market are the result of subsidizing this sector, an intervention that changes the price of energy affecting producers, suppliers and final consumers of energy.

Renewable energy producers are beneficiaries of CV subsidies, their cost is borne by industrial and household consumers through the monthly electricity bill.

The number of traded green certificates increased 13 times, from 48 economic operators in 2010, to 622 economic operators in 2014, while the weighted average price, both in lei and in euro, was changing (Table no. 3).

Table no. 3. Evolution of green certificates number traded on the renewable energy market in 2010-2014

| Green certificates | 2010 | 2011 | 2012 | 2013 | 2014 |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|
| New winds | 26 | 42 | 56 | 73 | 23 |
| Hydro (new, refurbished) | 18 | 32 | 47 | 77 | 81 |
| Biomass | 3 | 4 | 7 | 14 | 19 |
| Photovoltaic | 1 | 4 | 41 | 395 | 456 |
| Total | 48 | 82 | 151 | 559 | 622 |

Source: Data statistics ANRE (2016).

Financing the energy sector is a public decision, borne by all consumers, which affects the attraction of private funding and hinders real investment in this area. The lack of adequate legislation in the energy sector and a stable political climate have had adverse effects on attracting investment in the E-SER sector. While the liberalization of the E-SER market is desirable, it can't be sustained by the state at all times, the lack of investments in the field being a real problem.

Also, E-RES grants are only used through mandatory green certificate quotas. In this way, many investors have been able to benefit from the recovery of investments made by issuing and selling green certificates, not wanting to continue their activity on the energy market as operators.

Under these conditions, investors who have produced green energy and have managed to recover their investments are no longer loyal players on the market, abandoning their activity and withdrawing money from the Romanian market. In fact, they get a double win: once they sell the business at the market price, recovering their money and once they have benefited from the subsidies granted by the Romanian state. This raises the question of those investors receiving subsidies of any kind and the fact that their grant should be conditional on a long-term commitment to the Romanian energy market.

The renewable energy market can't be truly developed in Romania due to the functioning of the electricity market. Thus, although we witness the liberalization of the electricity market in Romania in 100% since 2007, this is not really the case due to long-term bilateral contracts negotiated outside the stock market at prices below the market (centralized market of bilateral contracts), which represent approximately 16TWh, about one third of total consumption, we can't talk about a total liberalization of the electricity market in Romania. These contracts represent 80% of long-term contracts, indicating that the electricity market is about 20-25%.

The development of EE's production capacities in the SER is only apparent, since the approvals of documentation for the construction of a wind or photovoltaic park remain mostly in the feasibility study, with potential investors not finding sources of financing for investment projects.

Electricity in Romania has a distorted price, has not declined at all in recent years, contrary to the expectations of the Romanian authorities that have supported the development of green energy and the fact that the country has one of the largest national renewable potential. In 2012, the average price per MWh is 21% higher than in 2011, so for a company the average cost of electricity is \$ 80 / MWh, compared to the U.E. of \$ 65 / MWh. This can be explained by the fact that in Romania about 35% of the electricity price is composed of subsidies, eco-taxes, infrastructure and transport tariffs.

Electricity prices in Romania are considered small compared to the European average, but monthly consumer bills reflect fairly high values, largely due to the fact that markets are not properly regulated and liberalized. Also, prices rise very quickly and significantly in relation to the incomes of the population, which prevents their support in the medium and long term.

If the system of the electricity market in general and of the energy in the RES were based on perfect competition, the price of the product would be the result of the efficient use of energy resources, the ideal situation within the economic theory. The market mechanism can be radically influenced if the price of a good does not include the socio-economic costs resulting from its production.

Excessive volatility of energy prices and trading-related risk occurs when participants can not estimate the quantities produced and consumed, the manufacturer can't predict when its production capacity will be exceeded, and the energy seller can't estimate the demand. Thus, the price tends to have strong oscillations, mean values and variable dispersions, presents seasonality, the so-called calendar effect, characterized by increased volatility and unpredictable developments.

In the electricity market, although prices are largely regulated, they do not include the real socio-economic costs of the products traded. In the energy market the most common environmental externalities are difficult to quantify and often not included in the price of products and services.

Market prices do not reflect some of the costs or benefits associated with production or consumption, lack of socioeconomic cost assessment creates distortions, preventing price formation according to the supply-demand ratio.

Within the energy market of the RES, there are some major imbalances between the prices paid by households vs. on the one hand, and the prices of cogeneration power plants, individual consumer prices, on the other hand. These disturbances seriously affect the heating economy, a sub-sector, which is completely disconnected from European practices. Renewable energy support schemes have further contributed to disrupting the proper functioning of the energy system.

In this situation, minimizing the impact of energy market transformation shocks, environmental externalities, and the risks associated with company penetration raise the issue of studying an optimal structure of the market for the existence of an optimum.

Although the costs of negative externalities are fairly high, they are borne by all consumers and produce inefficiencies in resource allocation, they are preferred to the detriment of alternative energy generating alternatives.

The different costs of the externalities resulting from the application of the technologies for energy production in the RES are relatively low. However, these technologies remain a rarity in the energy market due to very high operating costs. In these situations, in order to eliminate the distortions of the energy market in the RES, it is necessary to internalize the environmental externalities resulting from the exploitation of these resources

Distortions of the market are manifested in various ways: energy price changes, fragmented information of market players, inadequate subsidies, uncontrolled and insufficient investment, corruption, bureaucracy, negative externalities, improper management and losses in the electricity distribution network. Energy losses account for almost a third of consumption, largely due to old technologies, old buildings and inefficient transport systems.

Other constraints that may arise from climate change restrictions, reluctance to use nuclear power and the difficulty of further promoting renewable energy, due to higher costs.

The lack of informing the market players, the lack of information of the suppliers regarding the changes in electricity taxes, bureaucratic barriers and corruption, are other causes of the occurrence of distortions from the EER market of the EES.

In many cases the projects have documentation, have connections to the National Energy System but are not completed due to corruption). These distortions on the SER energy market can be corrected by monitoring investments for a period of 3 years.

In order to correct the distortions of EER market E, the subsidies for these energies and the indirect effects they produce should be considered: the real impact on prices, the production market, the pressure on transport networks.

Those who invest in green electricity production should benefit from a stable, fair and predictable regulatory framework that would provide them with conditions for meeting a calendar to maximize the economic performance of the plant.

4. Conclusions

In many cases, despite the fact that subsidy E of the RES is borne by all consumers due to the increase in production, it was exported to the exclusive benefit of traders.

It is often ignored that the price of electricity to the producer has decreased in Romania as a result of the market entry of renewable energy, which put pressure on all the producers to make the activity more efficient.

In order to correct the market failures of renewable energy, the following measures are needed:

- Renewable energy subsidies should be granted to those who make a commitment to long-term participation in the Romanian energy market. Subsidization introduces changes in energy prices - manufacturers, suppliers and end-users are affected. Many investors benefited from investment recovery by issuing and selling green certificates but did not want to continue their activity on the energy market as operators (they sell their investments at market price). Renewable energy producers receive free green certificates, which they sell on a specialized market for extra gains from energy. These green certificates are paid by all consumers in Romania, including by the population, in the final electricity bill.

- setting the correct energy price - about 35% of the electricity price consists of subsidies, eco-taxes, infrastructure and transport tariffs.

- internalizing externalities - market prices do not reflect some of the costs or benefits associated with production or consumption.

- the existence of bilateral long-term negotiated contracts at below-market levels (the centralized bilateral contracts market). This represents about 80% of long-term contracts. (OPCOM - Operator of the Romanian Electricity and Natural Gas Market).

- Monitoring investments over a period of 3 years (have documentation, have connections to the National Energy System, but projects are not completed due to corruption);

- Trending from the payment of the CV when they were registered in the profit tax account only at the moment of their trading, which will lead to the decrease of the cases of insolvency and bankruptcy;

- investing in modern technologies and eliminating energy losses.

The measures needed to achieve the priority objectives are: regulations, energy audit, voluntary agreements and cooperation instruments, financial instruments, energy performance contracts involving the private sector (energy saving services), tax reductions, subsidies to private companies involved, advantageous loans granted by banks to private producers of renewable energy

References

1. Barbier, E.B., 2010. *A global green new deal: rethinking the economic recovery*. Cambridge University Press.
2. Brunnschweiler, C.N., 2010. Finance for renewable energy: an empirical analysis of developing and transition economies. *Environment and Development Economics*, 15(3), pp.241-274.
3. Deichmann, U., Meisner, C., Murray, S. and Wheeler, D., 2011. The economics of renewable energy expansion in rural Sub-Saharan Africa. *Energy Policy*, 39(1), pp.215-227.
4. European Commission, 2016. *Renewable Energy*. [online] Available at: <https://ec.europa.eu/energy/en/topics/renewable-energy/progress-reports> [Accessed 05 November 2016].
5. European Commission, 2016. *Energy*. [online] Available at: <http://ec.europa.eu/eurostat/web/energy/data/shares> [Accessed 27 February 2016].
6. Firbank, L.G., 2008. Assessing the ecological impacts of bioenergy projects. *BioEnergy Research*, 1(1), pp.12-19.
7. Gross, R., Heptonstall, P., Leach, M., Anderson, D., Green, T. and Skea, J., 2007. Renewables and the grid: understanding intermittency. *Proceedings of the Institution of Civil Engineers-Energy*, 160(1), pp.31-41.
8. Langhamer, O., Haikonen, K. and Sundberg, J., 2010. Wave power—sustainable energy or environmentally costly? A review with special emphasis on linear wave energy converters. *Renewable and Sustainable Energy Reviews*, 14(4), pp.1329-1335.
9. Lund, H., Ostergaard, P.A. and Stadler, I., 2011. *Towards 100% renewable energy systems*.
10. McCrone, A., Usher, E., Sonntag-O'Brien, V., Moslener, U. and Grüning, C., 2012. Global trends in renewable energy investment 2012. *Frankfurt School UNEP Collaborating Centre for Climate and Sustainable Energy Finance*.
11. Romanian Energy Regulatory Authority, 2017. *Public Interest Information*. [online] Available at: <http://www.anre.ro/> [Accessed 12 July 2017].
12. Thiam, D.R., 2010. Renewable decentralized in developing countries: Appraisal from microgrids project in Senegal. *Renewable Energy*, 35(8), pp.1615-1623.
13. Thompson, S., and B. Duggirala, 2009. The feasibility of renewable energies at an off-grid community in Canada. *Renewable and Sustainable Energy Reviews*, 13(9), pp.2740-2745.