Financing RES with Crowdfunding: Local Scale as a Key Factor?

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Abstract

Energy transition is not only a government concern. Citizens are also getting increasingly involved and aware of the importance of this topic. In this paper, we look at crowdfunding as an innovative financing instrument for renewable energy sources and understand its full potential. We explore the ecosystem already put in place in France and empirically investigate crowdfunding platforms and related projects, thanks to a database we created and online documentation. Our results show that the scale of crowdfunding is still insufficient to achieve national targets for 2030. We have found little evidence of learning across the RES platforms and limited support, mainly governmental or community based. The heterogeneity of the motivations is, on the other side, encouraging and could be leveraged by renewable energy sources platforms with an investment based business model. The expansion and success of crowdfunding in France is mainly driven by government mechanism and regulation frameworks. Such financing technique holds high potential but needs more apprehension.

Keywords: crowdfunding, renewable energy, innovative financing

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1. Introduction and background[3]

Since the early 2000s, the climate issues mentioned during the regular conferences of the parties (COP) have pushed the governments to accelerate the energy transition, notably by strongly promoting the renewable energies. Thus, the European Union set strategic objectives, called the Energy 2020 goals, transcribed in each country in National Action Plans and reinforced by the 2030 Energy Strategy, which include a target of 27% for the share of renewable energy sources (RES) in final energy consumption (European Commission, 2014). European legislation has been strengthened to support the development of RES, in particular by acting on the market, for instance, by giving priority to green electricity on the market (Andriosopoulos and Silvestre, 2017). Thus, France adopted the Energy Transition Law in July 2015 and eased its legislative framework to boost RES projects. This regulatory context has facilitated the rapid deployment of RES power generation equipment, on an industrial scale, but also for individual users. At the same time, crowdfunding has become increasingly popular among the general public, particularly in the United Kingdom, France, Germany and the Netherlands: in 2014, Europe concentrated 300 platforms, or 60% of the platforms identified in the world (Iizuka, 2014). This alternative financing tool has significantly evolved and covers diverse forms of financing (donation and reward, lending -or debt- and equity), very useful for individuals and SMEs (OECD, 2015). In France, a new set of rules has been endorsed since October 2014 and AMF regulations changed. New statuses have been created: companies registered at approved organizations can benefit from the "Financement Participatif" label and act legally. Thus, the number of platforms has increased from five in 2009 to more than seventy in 2015, such as the investments: € 78 M were raised in 2013, € 152 M in 2014, € 297 M in 2015 and € 629 M in 2016 (FPF and KPMG, 2017). As a result, this method of financing provided an opportunity for financing local and private RES equipment projects. Its attractiveness has been strengthened by the willingness of many

[3] We would like to warmly thank Mélodie Caumes and Vanessa Ortun, from Paris School of Business.

citizens to get involved in the development of RES, but also the decentralized power generation. Therefore, several crowdfunding platforms have launched sections dedicated to the RES, such as Wiseed (2008), then platforms dedicated exclusively to this topic have emerged. In France, there are five pure player platforms in 2018: Energie Partagée (since 2011), Lumo (2014), Lendopolis (2014)[4], Enerfip (2015) and Lendosphère (2015), while one of them, Green Channel, shut down in 2017, one year after its launch. Thus, the question is: to what extent can crowdfunding platforms contribute to the growth and success of renewable RES equipment projects in France? The literature on this topic has mainly explored the importance of community on project development (Belleflamme *et al.*, 2014) or the impact of crowdfunding on the penetration of solar energy (Zheng *et al.*, 2015). Recently, Vasileiadou *et al.* (2016) evidenced that crowdfunding for renewable energy could only develop in a favorable regulatory context. However, no author has studied this question in the specific context of France. In order to answer this question, we provide an overview of related literature in section 2, then we describe our methodological approach and the data collection in section 3. Section 4 presents our results and interpretations and section 5 depicts the conclusions drawn.

2. Literature Review

The renewable energy production sector benefits from a wide variety of financing sources: conventional bank loans, conventional corporate bonds, green bonds, public subsidies and grants (national or European), equity in the secondary financial markets and now the crowdfunding (debt or equity). For SMEs more specifically, these different modes of financing can be classified according to their nature and their level of risk (OECD, 2015). As shown in Table 1, the crowdfunding in debt is categorized in low risk, while the crowdfunding in equity is high risk.

[4] Lendopolis is not only dedicated to the RES projects because the platform also carries real estate projects, but they are very few. As a result we consider Lendopolis as a pure player.

Table 1: Alternative external financing techniques for SMEs and entrepreneurs

Low Risk/Return	Low Risk/Return	Medium Risk/Return	High Risk/Return
Asset-Based Finance	Alternative Debt	"Hybrid" Instruments	Equity Instruments
- Asset-based lending - Factoring - Purchase Order Finance - Warehouse Receipts - Leasing	- Corporate Bonds - Securitized Debt - Covered Bonds - Private Placements - Crowdfunding (debt)	- Subordinated Loans/Bonds - Silent Participations - Participating Loans - Profit Participation Rights - Convertible Bonds - Bonds with Warrants - Mezzanine Finance	- Private Equity - Venture Capital - Business Angels - Specialized Platforms for Public Listing of SMEs - Crowdfunding (equity)

Source: OECD (2015)

To encourage power generation from RES, France has favored the use of regulated feed-in tariffs (FIT) rather than the Tradable Green Certificate (TGC). This scheme is funded since 2004 by a contribution levied on electricity bills, the CSPE, which is refunded to the operator retrospectively by the government. However, the rapid expansion of wind and solar led to an imbalance between EDF expenditure and its revenue from the CSPE. This led the government to significantly reduce the FIT in 2008, which caused a slowdown in the market. In 2018, the share of the CSPE dedicated to the repayment of the FIT will be € 5.5 billion[5]. Ritzenhofen and Spinler (2016) show that uncertainty regarding FIT regulatory delays or reduces investment activity in RES. As for green bonds, France is the most dynamic European country, with € 17 billion issued in 2017, representing 13% of the global total. EDF alone has issued € 4.5 billion worth of green bonds between 2013 and 2017, mainly for the construction of new wind capacities and the modernization of its hydropower facilities. Green bonds remain a preferred way to direct financial flows to RES power generation equipment (Blyth *et al.*, 2015). Nonetheless, the FIT mechanism does not solve the initial investment barrier, which is often too high for individuals, artisans, farmers or SMEs. Unlike large companies or local authorities, this category of investors does not have access to the issue of shares or bonds and crowdfunding offers an attractive option for raising small capital. Zheng *et al.* (2015) have developed a model to simulate the interactions between crowdfunders, solar

[5] Deliberation of the CRE, July 13, 2017.

plant owners and power companies. According to this model, the presence of crowdfunding favors investments in RES electricity, as well as the penetration rate of green electricity in consumption, in particular by lowering its cost.

As shown by Howe (2006), some companies such as Ebay or MySpace have built their business model thanks to the full power of the online network. This outsourcing to the crowd of specific tasks is called the crowdsourcing. Crowdfunding has grown rapidly since the mid-2000s and can be viewed as combining concepts of crowdsourcing and microfinance (Mitra, 2012). According to Mollick (2014), "crowdfunding allows founders of for-profit, artistic, and cultural ventures to fund their efforts by drawing on relatively small contributions from a relatively large number of individuals using the internet, without standard financial intermediaries". By eliminating the financial intermediary, it can be seen as an innovative tool (Strausz, 2017). Moreover, crowdfunding can be seen as innovative too because this alternative financing opportunity appears to be a "sustainable business model […] with a dominant organizational social innovation change component" (Bocken *et al*., 2014). As a result, crowdfunding is the new way to make people feel they have the power on their money and not the institutions: investors will only provide, the amount they want (low or high) in the projects they really feel closed to or want to have a real impact on. This model enables small investors to diversify their capital and get shares in bigger start-ups. But it is more than just a financing mean. It also covers the ethical and values part of an investor. As noted by Collins and Pierrakis (2012), "in many cases investment will also be motivated by non–financial aims, such as becoming part of an entrepreneurial venture or supporting a particular individual or business".

Then crowdfunding covers many relevant points for the platforms, the entrepreneurs, the investors and the communities. First of all, the major benefit of crowdfunding is for the entrepreneurs. As written at the beginning of this paper, crowdfunding allows small entrepreneurs to raise capital without asking loans or credits to the banks, at the early stage of

their businesses (Mitra, 2012). When starting a business, it is usually difficult to get a loan from the bank without any profits. Through the investment from the population or companies, the entrepreneur can only believe on its future investors, make his project relevant and possible to attract the maximum number of interested investors. By creating opportunities for liquidity and new capital, crowdfunding allows the project or a business to grow at each stage of its life. For the entrepreneurs, the model is also a way to make your project validated from the communities. Belleflamme *et al.* (2014) highlight the importance of community-based experience for crowdfunding to be a viable alternative to traditional funding. Before starting a project or a product, an entrepreneur can assess the consistency and feasibility of their idea through the feedback gotten from the audience. The community who invests in the project can feel itself closer to it and more involved on its evolution; sensitivity and attachment will be generated. The more people invest in your project, the more they believe in it and see it as an opportunity to raise their personal capital. It is a rapid way to get the validation of the project instead of all the long processes as before the creation of crowdfunding. By crowdfunding the project, entrepreneurs' measure if for example the price is suitable for the community, how much they will be ready to pay for it, or also they can get advice from the population on how they can improve the product or the project. It can also lead to more advertising via word of mouth. Moreover, with this new financing method, there are fewer risks involved. Entrepreneurs decrease the cost of starting a new business such as search costs or transaction costs (Coase, 1937).

In another hand, crowdfunding also benefits to the platforms. This new financing approach creates new marketplaces and never stops to increase its number of users. It provides a place where entrepreneurs can meet their future investors. More projects can be easily invested. This has an impact on the economy because the more projects grow and succeed the better will be the economy of a country. Increase and better regulate the crowdfunding platform will lead to the creation of new projects.

Then, investors (communities) will get advantages from this financing method also. For example, with the reward based method, they will get their product in exchange of their investment (no financial return) and benefit from it. In the equity based model, investors will get dividends, equity or shares in the company, and by this way, be part of the project. They are free to choose the project where they will put their money. Investors can diversify their expenses in several companies or projects that they trust and take part into their growth. The investment amount can be low or high. This explains why crowdfunding targets a large group of people in order to make it available to everyone. The lender on these platforms will less rely on the banks and the credits because with crowdfunding, there is no need of tax credit.

Crowdfunding allows investors to directly invest as they see fit with less barriers while diversifying their risk through small investments over a variety of projects. In contrast, for example, while a crowdfunding investor can diversify the risk in the stock market by investing in multiple different companies, an investor must purchase his or her stock through a broker at a premium market value and at a certain volume. As said before, with crowdfunding, there are no intermediaries between the entrepreneurs and the investors. They can easily exchange and lend. The only intermediary is the online platform where the entrepreneur shares everything about their project and where the investor can be informed of each detail, reducing the information asymmetry.

Therefore, crowdfunding connects people who desire to invest (for financial or other reasons) on one hand with a person or a company who wants to raise capital on the other hand. Since the 2009 financial crisis and the growing gap between supply and demand of financial resources, crowdfunding may be considered as a new opportunity for financing projects, especially RES projects (Vasileiadou *et al*., 2016). It operates through three main categories: donation and reward, equity and debt or lending based crowdfunding (Mitra, 2012). Generally the equity based method is riskier than the two others and implies more regulations on it, especially concerning the three main actors (investor, platform, and the campaigner). Each of the

crowdfunding categories has its own regulations. In France, regulation aims to protect investors when investing through crowdfunding platforms. In order to guarantee the security of this new growing financing method, and make the actors feel safe and confident concerning the financing of a project, regulations exist. One of these regulations concerns the fact that a company which is presenting its project on the platform cannot borrow more than € 2.5 million for RES projects, against € 1 million for the rest of the sector. Since October 2014, platforms must detail more information to investors (Aschenbeck-Florange *et al.*, 2015). Given this new and alternative way of raising capital, we study the potential of crowdfunding for the RES projects in France through an empirical analysis on the four pure player French platforms.

3. Methodology and Data

Since crowdfunding is based on the interaction between project issuers and funders, its success is based on largely qualitative factors. Therefore, we investigate both individual experiences and opinions, and related specific indicators, which allow to understand not only the financial potentiality but also the social, economic and political stakes of crowdfunding in this sector.

3.1. Methodology

The empirical analysis is based on databases we built via online documentation studying the main French crowdfunding platforms. We elaborated a method that helped us assess and conclude over the financing potentiality of crowdfunding, leveraging a set of proxies such as: scale, learning, support and heterogeneity of crowdfunders' motivations, according to Geels and Schot (2007), Dóci *et al.* (2015) and Vasileiadou *et al*. (2016). Donation funding is the most dominant form of crowdfunding worldwide, representing 50 to 60% of all campaigns. Very few platforms using donation-based or reward-based models have specialized in RES projects though. Thus, we will primarily focus on lending and equity- based crowdfunding

and projects, which are more significant from a financial and quantitative point of view (amount of capital and projects realized).

To identify the degree of support, we sought online documentation and organization reports with the objective to uncover links and collaboration between RES crowdfunding platforms and powerful regime actors. The procedure was to look into financial contribution or other type of support, such as information, tax deduction, regional lobbying, special regulation, governmental help, etc. from different actors in the energy, bank, industrial, institutional and non-profit sectors.

3.2. Data collection

We examine and audit proxies and indicators, outlined in Table 2.

Table 2: Proxies and indicators used

Proxies	Indicators
Scale and reach of platform	Fund raised
	Number of projects
	Average investments
	Number of projects exclusively for local residents
Learning process and generic rules	Shared understanding of the social practices
	Communication around the platforms goals, projects and lessons
	Networking events, associations, websites on renewables
Support of regime actors	Regional and national regime contribution
	Strength and breadth of link
	Government and legislation support
Heterogeneity of platform users	Heterogeneity of participants' motivations

We collected online data from all crowdfunding platforms specialized in RES projects in France: Enerfip, Energie Partagée, Lendopolis, Lendosphère and Lumo. We draw an overview of all available information related to "on-going", "to follow" and successful "finalized" projects on renewable electricity production such as in photovoltaic, wind, biomass and hydraulic. We benefited from online documentation and crowdfunding platforms to identify the total amount collected, the number of crowdfunders, the average transaction per backers and the number of profitable and finalized projects over time. The crowdfunding websites sample will operate within the same "keep-it-all" business model. It means regardless of whether or not the fundraising goal is reached, the project owner will use the

entire amount raised. For RES projects, funds collected through crowdfunding platforms generally represent less than 20 % of the total capital needed. Therefore, even if the targeted amount is not gathered, the scalable project will still take place.

To identify crowdfunders' motivations, we collected online all posts contributors wrote as a testimony, after backing a RES project. From these statements, we conducted qualitative thematic analysis and, based on the goal-frame theory studied in previous paper (Lindenberg and Steg, 2007; Dóci *et al.*, 2016; Vasileiadou *et al.*, 2016), we studied environmental behaviors and categorized them into three groups. We can distinguish these three groups by arguing that people wish to achieve a goal that respond to inner aspirations. These individual desires and needs are fulfilled depending on the perception and point of view they had while achieving this goal. We can summarize them as followed: the hedonic goal "to feel better, feel comfortable", the gain goal "to keep and improve one's resources" and the normative goal "to act appropriately". Crowdfunders either want to improve the way they feel at the moment, raise their pleasure and satisfaction in the short-term, called the hedonic goal-frame; or they want to increase and protect their resources in the middle or long-term horizon, called the gain goal-frame; or they want to be in line with their values or norms the communities set, to behave ethically and morally, called the normative goal-frame.

4. Results and Discussion

4.1. The business models

Table 3 presents of the platforms, their birthdates, the business model they are using and some additional information concerning their financing methods. We can see none of the studied platforms are using donation or reward-based model. Also, they are all quite new and born within the past five to two years. They all offer to invest from, as little as, € 10 with an average return on investment of 4.86% for an investment term between two to fifteen years, paid either monthly, semi-annually or annually.

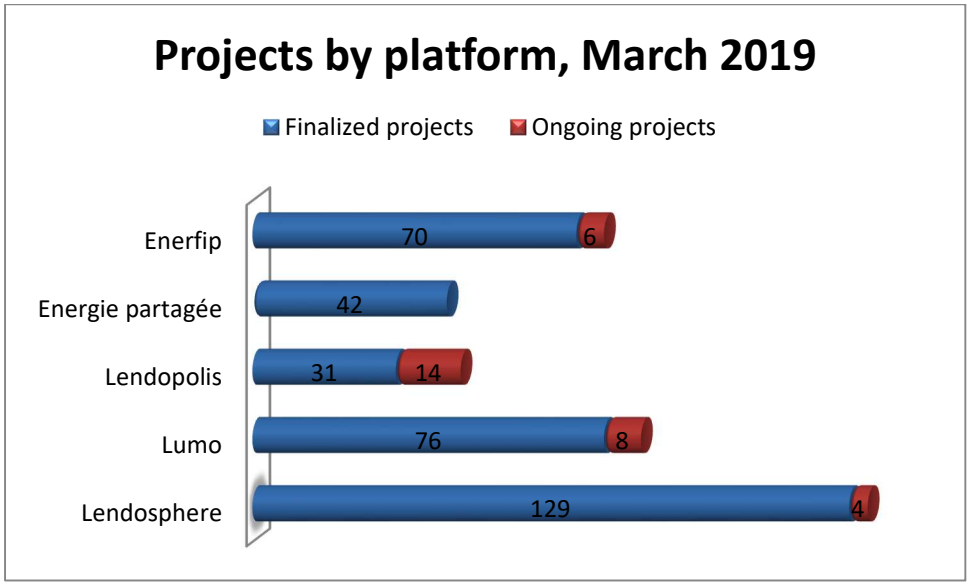
Table 3: Platforms, date of creation and business model

Platform	Creation	Business Model	Extra information
Enerfip	September 2014	Equity based	Securities issuance
Energie Partagée	September 2010	Equity based	"Citizen" Fund
Lumo	March 2012	Equity based	Securities issuance
Lendopolis	November 2014	Lending and equity based	Short term bond
Lendosphere	December 2014	Lending or peer to peer	Short term bond

From September 2010 to the end of April 2017, they have posted a total of 138 projects submitted by 86 contractors. This adds up 112 finalized projects, 26 ongoing projects and 19 projects to follow up. 47% were focused on solar projects, 46% on wind turbines, 6% for biomass plants and the rest for hydroelectric systems. On May 1st, 2017, 72% of the projects were successfully completed, 19% were still in the collecting phase and 9% were unsuccessfully completed. Success being defined as reaching the amount targeted. All projects were concluded despite not having collected the funding pot set by crowdfunding platforms.

Figure 1 shows the number of posted projects per platform. Each platform has its own strategy, while Energie Partagée forecasts both 15 ongoing and follow-up projects, others put online fewer current and coming projects and Lendosphere never display its pending file.

Figure 1: Number of posted projects per platform



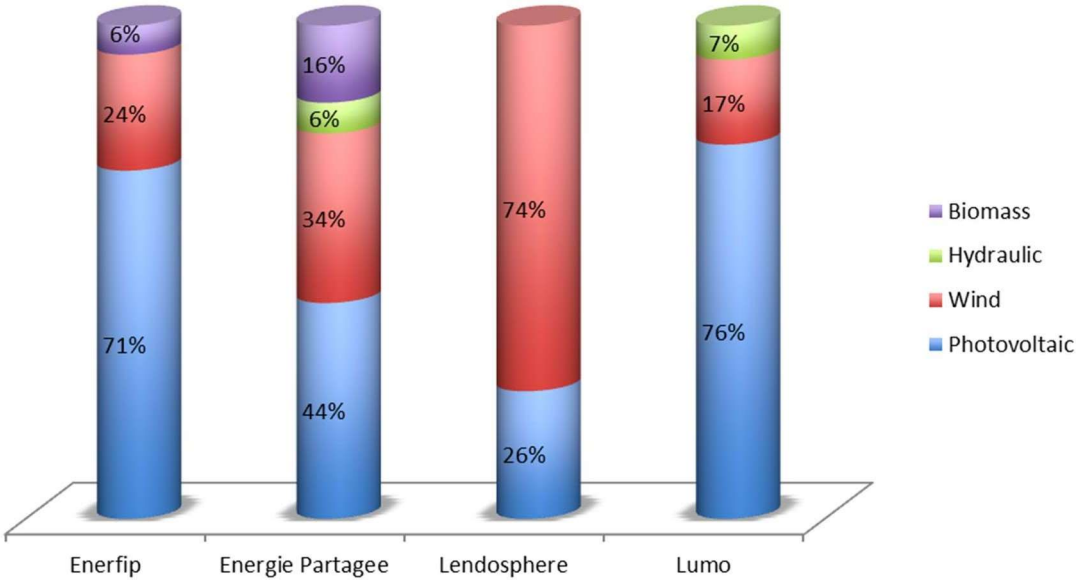
Platform	Number of finalized projects	Number of ongoing projects	Funds raised (€)	% of projects exclusively reserved to local residents	% of projects located in the Mediterranean Basin
Enerfip	70	6	20,000 to 800,000	15,7%	N/C
Lumo	76	8	N/C	N/C	5%
Lendosphère	129	4	40,000 to 1,100,000	20.2%	6%
Energie partagée	42	-	600 to 1,485,055	N/C	11.9%
Lendopolis	31	14	22,000 to 1,360,000	62.2%	22.2%

All these projects piled up to more than € 25 M and have been collected from around 16,350 investors; this means the average amount invested is about € 1,500 although it highly depends on platforms and projects. Thanks to these programs, we estimated the total installed capacity to 2,450 MW, which represents the consumption of 844,600 French households[6]. According to websites, Lendosphere raised the largest amount (€ 15.2 M), Energie Partagée comes second (€ 4.2 M), Lumo (€ 3.1 M) and Enerfip (€ 2.7 M) follows.

While the first French RES crowdfunding platform emerged in 2012, the government started to regulate and set a legislative framework only late October 2014. It means, it has barely been three years platforms operate fully. This suggest limited amount of time to mature the learning curve and insufficient meetings, seminars, conferences, etc. to share key lessons. In addition to time, we noticed each platform had their own ways of working, some paid particular attention to create strong network around each project and local communities (Energie Partagée), while others only wish to simplify the financing of RES (Lendosphere) and fund project overseas (Morocco, Namibia, Benin…). As shown by Figure 2, Enerfip and Lumo are mostly specialized in solar projects (respectively 71% and 76%) while Lendosphere focuses only on wind (74%) and photovoltaic (26%) plans. Energie Partagée, on the other hand, is the only platform that has a diverse portfolio, raising capital for photovoltaic (44%), wind (34%) but also hydraulic (6%) and biomass (16%) activities. This makes it difficult to share best practices in all areas of expertise.

[6] Excluding heating and hot water, a household of 2 adult and 2 children consume in average 2,800 kWh per year - sources ADEME, CRE, INSEE, CEREN and MEDDE.

Figure 2: Type of RES per platform



4.2. Support and communication events to promote RES

We should firstly consider the French Crowdfunding Association (Financement Participatif France), which is established since August 13, 2012 and gathers 140 members, from whose 73 are crowdfunding platforms. Its main missions are to plea and put pressure on the government for favorable regulatory measures, to promote and encourage crowdfunding through various events and publications, but also to work on ethical practices to preserve players trust and prevent abuses. Other associations and forums have emerged in the past few years to represent, promote and federate crowdfunding actors. The AFIP (Association Française de l'Investissement Participatif) speaks for platforms, which use the equity model to raise capital, while the Crowdlending.fr blog give guidance to entrepreneurs who wish to find investment on lending-based platforms. However, none of these focuses on RES projects. To find a RES crowdfunding association, we need to look out of our border, in Europe. The Renewable Energy Crowdfunding Association, Solarplaza or Citizenergy, organize yearly conferences, regular events and wish to empower professionals in RES business by building a network. Regarding the AMF (Autorité des Marchés Financiers) role, we mentioned earlier the several decrees that gradually legislated the crowdfunding framework. It acts as a trust mechanism for all players and guarantees some sort of liability for platforms. Other

decentralized government services are worth being mentioned when it comes to finance RES projects. The ADEME (Agence de l'Environnement et de la Maîtrise de l'Énergie) shares its expertise and services to guide in the investment process, they also publish a monthly journal with different environmental thematic. The DRIEE (Direction Régional et Interdépartemental de l'environnement et de l'Énergie) helps companies put in touch with the appropriate investment entity (Crédit Bail SOFERGIE, Caisse des Dépôts, EUROFIDEME 2). Regional funds also exist, such as OSER (Auvergne-Rhône-Alpes) or EILAN (Brittany). We also detected a few investment groups, who provide financial support for companies working on sustainable energies. To name only a few, Eiffel Energy Transition, supported by the European Investment Bank (BEI), is one of them, but also OMNES Capital, which has already € 1 billion capital under management (representing more than 1.5 GWh/year).

Enerfip initiated its first project beginning 2015. Since then, it has become a member of the association FPF, the law office Solferino Associates helped them to compile key legal documents, it has been supported by REALIS, social economic startup incubator in Languedoc-Roussillon and by ALE Montpellier (Local Energy Agency). In 2016, Enerfip raised € 600,000, in two stages, alongside their partner Crédit Agricole (and more specifically their regional banking networks, Group Sofilaro Capital Investment). On a lighter note, Enerfip increased their awareness thanks to the Mondial du Vent in Leucate (April 2017) beside their official partner Quadran and EolMed. Enerfip is also one of the first companies to test and validate a proof-of-concept with Blockchains, as a complementary financing tool for its platform. This additional bond issuance can become a crucial leverage for crowdfunding. Enerfip has made available online a White Paper and secured a partnership with BNP Paribas Securities Services to reinforce this innovative financing alternative in RES.

Energie Partagée is the synergy of Energie Partagée Association and Energie Partagée Investment. While the Association makes available technical, legal and economic competences for project leader and offers them collective training, customized support, etc. the Investment

entity is acting like a crowdfunding platform, a financing tool which complete the capital needed to kick off a project. Energie Partagée Investment main support are its founding member Nef and Credit Cooperatif (both cooperative banks), its promoting cooperative Enercoop, La Fonciere Terre de liens (agricultural investment fund), the CLER (network for the energetic transition), the association negaWatt, AMORCE network, the European cooperative Rescoop, Biocoop retail stores and the RTES (Réseau des collectivités territoriales pour une économie solidaire). In addition, all projects introduced by the platform take full advantage of the Finansol label, which guarantees investment transparency and certificates as "carrying company".

Lendosphere is the most established crowdfunding platform of all. It has developed a strategic partnership with Allianz France, which, for a selection of project, doubled citizen investments through the Eiffel Investment Group (cap to € 2,000 per lender). The innovation Seinergy Lab and the state operator ADEME have also partnered with this project. It also signed an agreement in 2016 with the union Jeunes Agriculteurs, associated with the financing collectivity AFL (Agence France Locale), is referenced on Bpifrance Financial Portal and, last but not least, is part of the association FPF.

Lumo is one of the most connected platforms in France. It is a founding member of the FPF and the ECN (European Crowdfunding Network) and is also a member of ENERPLAN (association of solar energy), FEE (association of wind energy), CLER, TEPOS, Citizenergy and CrowdFundRES. These partnerships give easy access to a network of professional all invested in RES in France and in Europe. Before Lumo was officially launched, the founders created a company specialized in solar project (BlueGreen Energy) then SUN Impact Investing in 2010, which studied for the first-time microfinance tool for RES local projects. This pre-launching phase allowed Lumo to gain footholds in the RES industry in France and understand financial entities and regional institutions influence. Before it materialized, Latham & Watkins law office offered a pro bono legal assistance to build the platform and its

business model. After its official launch in 2012, Lumo is labeled by Finance Innovation, a cluster gathering 340 members stem from bank, insurance, technologic and social economy company. It also benefited from the start-up incubation of Bpifrance early 2014 and is now referenced on its Financial Portal. Since less than three years, it joined forces with SAEML SERGIES on photovoltaic projects in Poitou Charentes, reached a non-exclusive partnership with Crédit Coopératif, joined the European incubator ClimateKIC and is the first French start-up to be labeled by « B-Corporation ».

All these different links with regime actors provide a framework, certifications, national and provincial measures to support the establishment, the operations and the expansion of such platforms.

4.3. Investors' motivations

In order to identify investors' motivations, we based our empirical analysis on the reactions that some participants posted online (204 different answers), following their investment on each platform. In addition of the four studied RES crowdfunding platforms, we assessed the comments posted on another portal that have opened a dedicated section to RES and, unlike other, allowed crowdfunders to share their opinion after backing up one wind and two photovoltaic projects (Wiseed). Contributors from these five platforms are expected to be a heterogeneous set of people with different motivations behind their investment decision. These aspirations are mostly driven by normative, then gain and, to an extent, hedonic considerations. Indeed, the analysis of the answers gives the following distribution of the motivations: normative (44 %), gain and normative (21 %), normative and hedonic (15 %), gain (11 %), hedonic (8 %), gain and hedonic (1 %).

In the posts we have encountered, a normative motivation could be expressed by anyone who wants to behave ethically or morally: *"I want to support RES development and growth"* was the most cited normative motivation. It was often backed up by different reasons such as *"It's the future!" or "To tackle global warming"*. This goal-frame mostly addresses climate-

change and the protection of our environment. The gain motivation was conveyed by people who wanted to increase their resources in the middle- or long-term: *"I want to diversify my investments"* was the most mentioned gain motivation. Another important gain aspiration was the fact that the added economic value would stay within the collectivities around the project: *"If it generates cash flows, it stays in the region"*, *"Exploit resources locally for the benefit of local communities"*, *"It is good to have projects, which involve local population"*.

This goal-frame discusses only the potential to gain money thanks to the RES sector. As the crowdfunding platforms either use the equity or lending business model, the hedonic motivation is less prominent. However, when we confronted such ambitions they often referred to the project proximity: *"I want to support local project near me"*, *"This project takes place in my department"*. The investment transparency was cited few times as well: *"It is the chance to directly finance well identified projects"*, *"While eco-investing, I know what I'm supporting and why"*, *"We can choose in full transparency how our saving is used"*.

This goal-frame is all about raising their or the collectivity satisfaction. Sometimes, the categorization of motivation in hedonic, normative or gain goal-frame is not obvious, as some citations contain different elements. We very often came across *"I want to participate in the energy transition while enjoying a financial gain"*, a mix of gain and normative goal. Regarding the mix of normative and hedonic goal, it usually links individual experiences with ethical practices: *"I'm environmental activist investing in green energy, primarily to reduce hydrocarbon and nuclear production, but it is also my way to take action to build a better legacy for future generation"*, *"We need to replace fossil energies as quickly as possible and if public authorities don't step in, we, as citizens, need to lead the way"*.

Most of respondents' inspirations were heterogeneous across platforms and mostly driven by normative goal-frame or a mix of gain and normative or hedonic and normative. External studies found on Enerfip and Energie Partagée websites confirm these results. In accordance with the literature review, the financial incentive is part of the overall motivation but it is not the main one, taking ownership of their saving is most important for Enerfip and Lumo contributors, and honoring their ecological and ethical convictions comes first for Energie Partagée stakeholders.

4.4. The potential of crowdfunding

Since the French government Act of August 17, 2015 on energy transition, the French

government estimates the investment needed to finance this shift to around € 10 to € 30 billion per year. This is of course far from the total amount collected through these crowdfunding platforms over the last four year, € 25 M. However, we should take into consideration that the crowdfunding platforms and the legislation framework are still recent. Enerfip and Lendosphere operate since 2014 and raised respectively € 2.7 M and € 15.2 M, while Energie Partagée raised € 4.2 M and Lumo € 3.1 M. The € 10 M difference between the first and the second can be interpreted by the number of projects completed, which doubles up for Lendosphere, and the slightly greater number of contributors. Even if Energie Partagée is the oldest platform, they did rather serve the communities around each project and make sure they get all the support they need before closing crowdfunding investment. It is the only platform which does not indicate a specific deadline for contribution. It also often calls on Energie Partagée Association and its stakeholders to finance directly their projects. We assume from Lendosphere fierce breakthrough that growing the crowdfunding RES business is possible and hold high potential with the right economic and legislative environment. However, there is currently still no competitive or profit-oriented spirit in this sector, established platforms focus on the communities benefit before the "greater good", such as population awareness, economic interest or energy and finance system decentralization.

The € 25.3 million raised through these four platforms represent 15 % of the total crowdfunding capital raised through lending and equity in 2016 (€ 135 M, +40% from 2015[7]). This ranks France second in Europe, behind UK and in before Germany, but still lower than Sweden, the Netherlands and Estonia, if considered in euro per capita.

To build and expand crowdfunding, we believe this should be combined with third party, existing RES financing business models. Knowing the amount collected through this alternative financing tool are minimal, compared to the investment needed, this should only stay a tool to empower communities, offer citizens economic spin-off, allow savings to be managed individually while acting for a better future. Through the quantitative and qualitative

[7] http://financeparticipative.org/wp-content/uploads/2017/02/Barometre-CrowdFunding-2016.pdf

research, we saw that there were only few organizations which offer help and services to crowdfunding platforms in France (FPF, AFIP, Crowdlending.fr). These associations and blogs are often as recent as the platforms themselves, October 2012 for the FPF, 2013 for the AFIP and November 2014 for crowdlending. This let hardly enough time to shape mutual exchanges and learning practices. The understanding of social practices within the RES sector and the communication around platforms dedicated to this industry are minor in France. Only in Europe, we saw networking events appearing, particularly in London, with the Renewable Energy Crowdfunding Conference first edition in 2014 and second in November 2015. Speakers such as platforms founders (Abundance UK, Lendosphere FR, LeihDeinerStadtGeld DE, etc.), crowdfunding associations (UK, DE, EU), law firms (Ramparts SP, EVERSHEDS UK), investment companies (Ecoligo DE, Temporis Capital UK), banks (Triodos NE) and even the AMF and Greenpeace were presents. Such events have not been organized in France yet but as global warming is a global concern, financing renewable energies should be as well. Citizenergy is the only European initiative that gathers a few platforms from different countries (Sharenergy UK, Abundance UK, Investor FI, Bettervest DE, Croenergy HR, Coopernico PT, ECrowd! ES and Lumo FR), leverage investments across borders and answer this environmental crisis. This transnational and aggregator portal already promoted 43 projects and offers contributors from all over Europe to invest in RES.

Although some networks are flourishing around the usage of crowdfunding to finance RES projects, there is not much evidence of learning process across platforms in France. Therefore the phenomenon is actively spreading overseas though and best practices should soon be shared not only nationally but with France's neighbor too. The challenges of harmonizing regulations across European countries are colossal but necessary to overcome if we want to enable investments beyond our borders, increase the number of contributions overall and therefore growth faster the business.

Taking into consideration that most platforms have been operating for the past three years

only, we believe more networks of finance, associations, communities, NGOs, etc. will come into sight and get involved through blogs, newsletters, conferences, seminars, workshops, press releases, etc. The implementation of one specific entity gathering all actors will allow to put in common knowledge and goals, create behavioral patterns, facilitate new practices and advance their shared mission. We interpreted from previous results that each platform has been supported one way or another since they have been implemented. Different links have been established with regime actors and we identified three specific types of relationship that will be detailed below: policy, financial and socio-cultural. The most important tie for crowdfunding platforms is from actors who create policies to support them. We have seen the laborious and successful work of FPF and the government to soften the regulation around crowdfunding investments in October 2014. Government operators, such as ADEME and Bpifrance, are also highly involved, mainly to provide financing and professional assistance during the investment process of RES projects. Even on a local and regional level, we often see the government, territorial agencies and municipalities' contribution to RES projects. The two main actions orchestrated by these entities are the creation of the legal form SCIC (Société Coopérative d'Intérêts Collectifs) and the tax credit associated for investors. The SCIC status is aggregated to any corporation, which social goal is to serve the collective interests. Producing electricity through photovoltaic projects is part of it and anybody (volunteers, employees, individuals, association, etc.) can hold cooperative partnership shares. Cooperative shareholders can also profit from a 25% tax credit from the amount invested or 75% tax credit for those paying the ISF tax (Impôt de Solidarité sur la Fortune). Energie Partagée association is a SCIC and benefit from these characteristics. For the other crowdfunding platforms using securities or bonds issuance, the 199 terdecies-0 A article outlawed any tax deduction possibility. Furthermore, revenue earned from dividend or loan interest is always subject to income tax.

Financial actors can also support in many ways crowdfunding platforms and RES projects. The

potentiality has already attracted cooperative banks, investment funds, insurance companies and law firms, which assisted with bureaucracy during their creation and operation process. These institutions helped them raise capital, provided loans, build network, reach and increase awareness, extend regional influence, etc. The most important financial support is coordinated by EDF and, since beginning 2017, by Enercoop. For any RES project development, lead either by private individual or company, feed-in-tariffs will be guaranteed for the first twenty functioning years. This reassures RES producers and protects them from any electricity price volatility or inflation effect. Credit Agricole also created a € 150 M fund[8] thanks to the EIB (European Investment Bank) to support collectivities and RES projects. This allowed them to buy into Enerfip capital in 2016.

Regarding socio-cultural regime, several NGOs have understood RES and crowdfunding potential together and support them through different actions. WWF already invested through Lumo platform and is partner with Boralex, RES producer, since 2011. NGO consortium regrouping WWF, Réseau Action Climat, Fondation Nicolas Hulot and even Energie Partagée, is pressuring government to fix a 15% target for citizens and collectivities to invest in RES by 2030. Beyond RES development helping reduce global greenhouse gas emissions, NGOs wish to boost local economies, keep energy resources in the region and generate additional employment.

Overall, the government role and national policy instruments are the most prominent. Even if financial institutions support starts to raise, they stay relatively low and irregular from one platform to another. In our view, these backing are still insufficient but still hold high potential while increasing the number of project leaders and raising motivation across contributors.

Finally, even if the gain consideration is indisputable while using equity -or lending- based crowdfunding platform, it is not the leading motivation for RES. The normative gain is central and represents 80% of the crowdfunders' motivation when paired with hedonic and gain

[8] https://www.credit-agricole.fr/collectivite-locale/solutions/financement/enveloppes-bei/enveloppe-france- energies-renouvelables.html.

aspiration. Hedonic on the other hand stays a secondary ambition and is not enough influential to be leveraged to attract more contributors. From more than 200 backer's quotes, we estimated the successful factors that need to be adopted while opening RES project capital to crowdfunders. The list includes a loan repayment term around five years (not exceeding ten years) *"after 5 years I will earn € 150, which is not negligible"*, an expected interest rate around 5% *"which is pretty rare"* and *"very attractive"*, clear benefits for the community *"made in France"*, *"profit the local collectivities"* and *"create local jobs"*, and clear communication around the project *"it is the headway of the construction that gave me confidence for investing"*.

In addition, we have realized that platforms implementing a semi-annually annuity and returning pre-amortization the same year of investment had more chance to attract investors. They also outperformed the amount targeted way much more often (46/56 projects for Lendosphere and 14/16 projects for Enerfip) than the other platforms (4/17 for Energie Partagée and 1/23 for Lumo). Also, the correlation of a third entity implication was highly appreciated and persuasive among backers: *"It seems like a secured investment thanks to EDF tariffs level guarantee"* or *"Bpifrance is financing part of the project, which is reassuring"*. Third investors such as government bodies or financing institutions are very important in the decision-making of crowdfunders and can be decisive while assessing a project viability and reliability. It can highly influence the number of contributors and the amount invested.

Project leaders should be able to apply the recommendation above fairly easily, but crowdfunding platforms should also be aware of the three types of goal-frame that drive their contributors' aspirations. Hedonic goal-frame people are more likely to invest in RES projects if it contributes to their happiness and comfort. If backing up a project becomes rather complex (uploading too many documents, disclosing private financial details, lack of refund information), it will dissuade them from acting. Gain goal-frame people are highly motivated by return on investment so enforcing a semi-annually annuity and other incentives seen

previously, might be useful to attract such users. Regarding normative goal-frame people, the action of investing within a RES crowdfunding platform is already fulfilling their aspirations. However, if the evaluated cost increase or the activity becomes time-consuming, then another goal-frame might take over.

Finally, if the financial side of a project is a very important matter to investors, it is not the only focus in RES investment. The benefit to the community component plays a key role, as the industry values are mainly social, ecological and solidarity based.

5. Conclusions

Since the early 2000s, the new energy regulations resulting from international climate agreements have facilitated the massive deployment of Renewable Energy Sources (RES) equipment. This take-off of investments has led to a growing need for financing. With a growing number of platforms and level of raised capital for the last decade in France, crowdfunding has been clearly a new complementary financing tool for RES projects. In this context, crowdfunding has an attractive potential for both investors and entrepreneurs. The business models of the five studied platforms are mainly based on lending or equity. Donation and reward crowdfunding are marginal in this sector, which emphasizes the fact that investors expect a specific return on investment.

France has showed a strong willingness to invest in RES in order to keep up with the European trend (led by Germany). Thus, the development of crowdfunding, jointly with other funding means for RES, is more than likely to grow. Moreover, as citizens become growingly sensitive to the eco-responsibility of projects, they will inject additional financial resources in RES, leaded by hedonic motivations (Dóci and Vasileiadou, 2016; Lindenberg and Steg, 2007). For crowdfunding to develop further, two conditions are required: first, the need of a strong institutional support, especially in the RES projects (Rogers *et al.*, 2008). There is still little and very novel governance around this financial instrument. This does not facilitate

renewable energy platforms' proliferation and operational activities. A spectrum of a more flexible set of rules and revisiting a higher ceiling on investment will give crowdfunding more momentum and help to reduce the intermediaries in the usual renewable energy financing process. Existing regulatory authorities, such as AMF, should act as national regulators to, on one hand, ease and speed up crowdfunding expansion and, on the other hand, implement a more secured legal framework for project initiators and investors.

Second, the need of specific incentives. As explained by Dóci and Vasileiadou (2016): "our results suggest that incentives addressing mainly the gain and normative motivations could be the most effective triggers, if we want to support the spread of renewable energy communities".

Finally, the renewable energy production sector benefits from a wide existing variety of financing sources. Due to the predominance of hedonic and normative motivations of crowdfunders, the development potential for crowdfunding in RES projects is mainly on local projects. Indeed, it seems to have a very strong local anchorage, some fund-raisings being exclusively reserved for local residents. Further research must now focus on the economic impact of crowdfunding on local projects.

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