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# **Crowdfunding niches? Exploring the potential of crowdfunding for financing renewable energy niches in the Netherlands**

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## **Abstract:**

There is a huge gap between demand and supply of finance for energy transitions, and the financial and economic crisis have had a negative impact in the already meagre funds for transforming the energy system towards renewable resources. In this paper we explore whether crowdfunding can provide an adequate business model for the creation, nurturing and upscaling of renewable energy niches. We empirically investigate crowdfunding initiatives and platforms linked to renewable electricity projects in the Netherlands. The main conclusion is that the volume of crowdfunding today is low, but the dynamic of these projects holds potential. There is limited indication of learning processes until now, as well as limited support from regime actors, pointing at a low level of niche stabilization and break-through potential, which may however be related to the early stage of development of crowdfunding in the Netherlands. On the other hand, the heterogeneity of crowdfunders is very promising. Platforms dedicated to renewable electricity exclusively, and with an investment based business model seem to be the most successful. We show how governmental market regulation and support mechanisms are shaping crowdfunding as a business model, and discuss the implications for other countries.

## **Highlights:**

- The volume of crowdfunding for renewable energy projects today is low, but the dynamic holds potential.
- There is limited indication of stabilisation of learning processes or support from powerful actors.

- Crowdfunders exhibit a variety of normative, gain and hedonic motivations.
- Governmental market support and regulations are shaping crowdfunding as a business model.
- We can expect crowdfunding to be prominent in countries without much structural support for renewables, or formal business models.

Keywords: renewable energy, crowdfunding, sustainability transitions, business models, up-scaling

## 1. Introduction

Sustainability transitions, large scale changes in socio-technical systems for the provision of needs such as energy, food and healthcare, have been advocated the last decades as solutions to environmental and socio-political challenges: energy security, resource scarcity, and climate change (Geels & Schot, 2010). The nature of these transitions is such that large investments would be necessary, even if the level of this transition is confined within one nation state (Jacobsson & Jacobsson, 2012). Since the financial crisis of 2009, both governmental funding as well as bank investments decreased, with a resulting gap between supply and demand of financial resources for renewable energy projects (Geels, 2013). At the same time, especially in the energy market, new business models have emerged to fill in this gap, even though at smaller scales. Business models can be defined as ‘the content, structure, and governance of transactions designed so as to create value through the exploitation of (Christoph Zott & Amit, 2010) (p. 219), and they are a means to market new technologies like renewables (Chesbrough, 2002; C. Zott, Amit, & Massa, 2011)

Many of these models are based on the direct participation of the energy user in energy production: for instance citizens owning shares in solar PV installations (Huijben & Verbong, 2013). More recently, some of these models are based on crowdfunding, defined as “the collective effort by people who network and pool their money together, usually via the internet, in order to invest in and support efforts initiated by other people or organizations” (Ordanini, Miceli, Pizzetti, & Parasuraman, 2011). Crowdfunding is not new – it builds upon previous models, such as cooperatives, or microfinancing; but the recent use of social media has given a tremendous boost to crowdfunding and enabled new models (Harrison, 2013). Different forms of crowdfunding exist, including donation, lending and reward systems where investors are rewarded with a token.

Our starting point in this paper is that crowdfunding as a business model for renewable energy projects might not only financially shape energy transitions, by, for instance, tapping into financial resources of users, at a time of scarce bank loans after the global financial crisis (Tomczak & Brem, 2013), but can also increase societal support for renewable energy as users and citizens become more actively engaged in energy systems. This can potentially translate in political support. As such, crowdfunding can shape positive feedback loops between technological, market, social and political dimensions of energy system transformation.

Indeed, the growth rates of crowdfunding have been impressive (Tomczak & Brem, 2013). Even though systematic figures are scarce, there is an estimated \$2,7 billion raised worldwide, in different types of platforms, with \$1,6 billion in North America, \$945 million in Europe, and 110 million in the rest of the world<sup>1</sup>. Kickstarter alone, arguably the largest crowdfunding platform in the world, has raised in total more than \$1,3 billion since 2009<sup>2</sup>. There is a growing interest on crowdfunding in all countries, and especially a focus on developing economies, where crowdfunding is expected to fill in the financing gap<sup>3</sup>.

The Netherlands offers an interesting case of crowdfunding in many respects. The Netherlands ranks 4<sup>th</sup> in the world in number of CF platforms (2012 data)<sup>4</sup>. Structural conditions are very favourable: internet access is among the highest in the world, and there is a very successful online payment system called iDEAL<sup>5</sup>. Indicatively, 32 million euros were contributed via crowdfunding in the Netherlands in 2013 alone<sup>6</sup>, while in the first half of 2014 €23 million was crowdfunded in a total of 900 successful individual and company projects<sup>7</sup>.

The Netherlands is also an interesting case from the point of view of sustainable energy transition. While it has been among the pioneer countries in the discourse around sustainability transitions (Markard, Raven, & Truffer, 2012), the actual practice in terms of

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<sup>1</sup> infoDev (2013), *Crowdfunding's potential for the Developing World*. Finance and Private Sector Development Department. Washington DC: World bank, p. 19. Available at: [http://www.infodev.org/infodev-files/wb\\_crowdfundingreport-v12.pdf](http://www.infodev.org/infodev-files/wb_crowdfundingreport-v12.pdf)

<sup>2</sup> Figures until end September 2014.

<sup>3</sup> Ibid. infoDev (2013)

<sup>4</sup> Some statistics suggest it is the third <http://www.statista.com/statistics/251573/number-of-crowdfunding-platforms-worldwide-by-country/> while the World bank report suggests it is fourth [http://www.infodev.org/infodev-files/wb\\_crowdfundingreport-v12.pdf](http://www.infodev.org/infodev-files/wb_crowdfundingreport-v12.pdf)

<sup>5</sup> It is not a coincidence that the largest worldwide platform, Kickstarter opened in the Netherlands, in the spring 2014, in its first outside-the-USA attempt.

<sup>6</sup> <http://www.douwenkoren.nl/crowdfunding-in-nederland-2013-de-cijfers/> The global numbers are for the last four years, while the numbers for the Netherlands are only per year.

<sup>7</sup> <http://www.douwenkoren.nl/crowdfunding-op-weg-naar-mainstream/>

renewable energy is lagging behind other countries, as a result of low levels of governmental support and turbulent public policies (Huijben & Verbong, 2013; Verbong, Geels, & Raven, 2008). In 2013, the share of renewables to the total use of electricity was 10%, including hydro, wind, solar, biomass and biogas<sup>8</sup>. Recently, the number of projects where citizens joined forces and together enabled PV and wind implementation has seen substantial growth rates (Docì, Vasileiadou, & Petersen, 2014; Huijben & Verbong, 2013). Collective buying and community shares projects have boomed since 2011. This suggests that in the Netherlands there is great need for new business models for renewable energy such as crowdfunding, and the country has favourable facilitating conditions in place.

Our paper explores crowdfunding for renewable energy projects in the Netherlands, with the aim to evaluate its potential as a business model for growing renewable energy markets. Our research question is:

RQ: To what extent can crowdfunding provide an adequate business model for the creation, nurturing and up-scaling of renewable energy niches?

## **2. Literature review**

### ***2.1 Financing energy niches***

We position our paper in the sustainability transitions literature, and in particular in relation to one of the field's key frameworks – the Multi-Level Perspective (MLP). The multi-level perspective explains long-term transformations as interactions between socio-technical regimes, broader landscape developments and innovative niches (Geels, 2002). Socio-technical regimes are the incumbent path-dependent structures such as institutions, networks and infrastructures that stabilise the provision of human needs. A radical transformation of these regimes is needed for achieving sustainable development. Such a sustainability transition comes about as the result of broader 'landscape' trends and events that provide a dynamic context for regimes, and experimentation by heterogeneous actor networks developing socio-technical alternatives in protective spaces called niches (Schot & Geels, 2008).

Recently, the literature has turned attention to the ways in which protective measures are created, maintained and eventually removed or institutionalised. Successful niches need

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<sup>8</sup> According to official statistics, at <http://statline.cbs.nl/StatWeb/publication/?DM=SELEN&PA=70789ENG>

to *shield* experimentation with path-breaking innovations from regime selection pressures; *nurture* innovations through shaping new actor networks, facilitate social learning processes and allow the development of shared expectations; and eventually *empower* innovations as niche actors increasingly engage in outward-oriented socio-political work so as to reform regime structures beneficial to the path breaking innovation (Smith & Raven, 2012). Their success rests in their ability to link niche performance to wider socio-political narratives around job creation, economic growth, innovation, industrial export opportunities and international climate commitments.

One of the major bottlenecks in developing niche innovations, is related to access to financial resources. As already mentioned in the introduction, there is a huge gap between demand and supply of finance for energy transitions, and the financial and economic crisis have had a negative impact in the already meagre funds for transforming the energy system towards renewable resources. This financing gap is beginning to get filled with numerous alternative business models. There is also indication that new business models are being developed in niches (Boons, Montalvo, Quist, & Wagner, 2013). In a study on PV market developments in the Netherlands three main types of business models were identified: *customer owned*, *third party* and *community shares* (Huijben & Verbong, 2013). A lot of *customer owned* PV systems were bought in local or national collective buying initiatives where households or farmers joined forces in buying PV systems for individual use. The advantage of *third party* business models is the removal of the initial investment barrier thereby attracting new customer segments (Drury et al., 2012). Huijben and Verbong (2013) found different investors in the Netherlands including banks, companies, housing corporations, governmental agencies and, interestingly, also traditional energy suppliers. Finally, *community shares* business models in which investors buy shares in communal local projects and which is the closest to crowdfunding, are interesting for those without suitable conditions (e.g. rental house for solar PV placement) or with less money available for investment (Asmus, 2008), but such projects tend to have a highly local character.

These business models co-evolve with the broader socio-economic and regulatory environment. For instance the government may introduce regulations that affect profit opportunities for entrepreneurs, who in turn may follow new strategies (Provance, Donnelly, & Carayannis, 2011). At the same time, success of a business model and lobbying of its proponents may actively shape regulation (Docì et al., 2014).

## ***2.2 Crowdfunding as business model***

Building on the upscaling potential of some of its predecessors, crowdfunding similarly can lower the barriers of initial investment. In crowdfunding, the expectation is that a large dispersed audience (the crowd) provide small amounts of money, which accumulates in an investment large enough to finance a specific project (Lehner, 2013). Moreover, it provides a relatively simple investment procedure and enables those previously excluded to be involved in PV and wind projects. Crowdfunding is not new, but the advent and use of social media have given a tremendous boost to crowdfunding (Harrison, 2013).

In addition, crowdfunding has been given a boost by several governments around the world as a response to the financial and credit crisis starting 2009. For instance, in the USA, the government passed the Jumpstart Our Business Start-ups (JOBS) act, which legalises certain forms of equity crowdfunding (Parrino & Romeo, 2013). This boost does not come without risks: the combination of investors who don't know much about the new business models with ventures and projects that are inherently risky suggest that crowdfunding needs to be approached with caution (Stemler, 2013).

Crowdfunding offers several opportunities for renewable energy projects. Aside from tapping into financial resources of users, and transforming the energy consumer into energy financier and producer, crowdfunding may bring in new types of customers, for instance individuals interested in experimenting with novel online tools. In addition, crowdfunding may facilitate societal support for renewable energy, which can translate in **political support**. Similar arguments are made for crowdfunding of scientific projects: that it can encourage public involvement in the earlier stages of research and thus create long-lasting ties (Wheat, Wang, Byrnes, & Ranganathan, 2013). Related to this, crowdfunding may provide additional **legitimacy** to the renewable energy projects, since, as noted by Lehner (2013), “the selection process by the crowd is perceived as per se democratic” (p. 294).

Thus, crowdfunding renewable energy projects does not only have the direct impact of financing a project, but could also have a more indirect impact: creating a positive feedback loop of support for a renewable energy transition. This, however, has not been empirically investigated so far.

There are different crowdfunding models. Harrison (2013) mentions five distinct models:

- (i) Donation: contributors gain nothing, mainly focusing on charitable projects;
- (ii) Reward model: contributors are rewarded with a token in return for their funding, but no interest in the earnings, or shares.

(iii) The pre-purchase model: similar to the reward model, but provides the contributor with the product that the financed project is developing, instead of any other token.

(iv) The lending or peer-to-peer model: contributors expect return of their capital, (the principal being often interest bearing, or alternatively not).

(v) The equity model, buying shares: contributors are offered a share in the business or a share in the profit stream.

In practice there are many variations to these basic models, as we will also show in the empirical section.

Lehner (2013) discusses crowdfunding of social entrepreneurship ventures<sup>9</sup> and suggests that crowdfunding is especially important in such ventures in the start-up phase. In addition, he claims that crowdfunding may even have an additional positive impact, which is creating a “buzz in the social media” (ibid. p. 297), drawing even more potential investors to the project. Nevertheless, active participation of the crowdfunders in the project cannot be taken for granted in all projects, nor is it stable over time in the stages of a crowdfunded project.

The heterogeneity in crowdfunding models is related to, and partly defines, motivations of contributors to crowdfunding projects. Individual motivations are important to assess the potential of such models, because they can indicate how to attract more crowdfunders, but also the limits of such models. We can expect crowdfunders in donation or reward platforms to participate because of altruistic or normative reasons, with an emphasis on the outcome of the project (Aitamurto, 2011; Mollick, 2014) or the feeling of belonging to a community (Gerber, Hui, & Kuo, 2009). In contrast, we expect crowdfunders in peer-to-peer or equity models to be mainly driven by financial considerations, investing their money with the expectation of gaining more in the future.

### ***2.3 Assessing the potential of crowdfunding***

Geels and Schot have introduced the following four proxies or criteria to assess whether a niche has stabilised and is ready to break through more widely:

“(a) learning processes have stabilised in a dominant design, (b) powerful actors have joined the support network, (c) price/performance improvements have improved and there are strong expectations of further improvement (e.g. learning curves) and (d) the innovation is used in

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<sup>9</sup> Social entrepreneurship ventures have a social or environmental mission as their primary goal, but aim to be financially and legally independent.

market niches, which cumulatively amount to more than 5% market share” (Geels & Schot, 2007)(p. 405). The last two proxies relate more to technological innovation niches, rather than new practices, such as business models. In addition, Doci et al. studying renewable energy communities as social innovations, introduce heterogeneity of the niches as an additional proxy (Doci et al., 2014). They refer to *heterogeneity in terms of variety of actors involved, technological innovations they use, as well as broader conditions they operate*. This is related to the fact that the breadth of the niche actor network is important for learning to occur: networks dominated by regime insiders hinder second-order learning and niche development (Hoogma, Kemp, Schot, & Tru, 2002). The important role of diversity of actors and local sites has also been indicated in Danish wind energy niche building (Raven, 2012).

We here look into heterogeneity in terms of the motivations of crowdfunders, employing the theoretical framework developed by Lindenberg and Steg (2007), who studied environmental behavior and coupled motivations behind such individual behavior with goal-frames, arguing that in every situation people want to achieve a goal that combines certain types of motivations (Lindenberg & Steg, 2007). The framework distinguishes among *hedonic goal frames*, when individuals want to improve the way they feel at the moment, *gain goal frames*, when individuals aim at increasing or protecting their resources, and *normative goal-frames*, when individuals behave in moral or ethical way, meeting norms expected by themselves or their community (ibid.). In communities that invested collectively in renewable energy, individuals were drawing from all three goal-frames at the same time, although one goal-framing tended to be prevalent (Doci & Vasileiadou, 2014). Heterogeneity of motivations is important, because, as indicated elsewhere, grassroots movements, with only ideological aims in mind (normative goal-frames) have a limited capacity to grow, as they have difficulties linking to regime actors and scaling up (G Seyfang & Smith, 2007). Therefore, one of the elements we investigate in the empirical part are the motivations of individual crowdfunders, and especially the extent to which normative considerations are accompanied by gain and hedonic considerations.

Summing up, we look into crowdfunding as a novel business model, drawing from pre-existing business models in the energy market. There is some indication that crowdfunding can create a positive feedback loop of support, as the projects gain not only the needed financial resources, especially important in the start-up phase, but also broader social and political support, “word of mouth” buzz, and perceived legitimacy. There is considerable variety in the specific design of crowdfunding platforms, in terms of coordination of funding,

the role of the funder and whether the funder can expect anything back for his/her contribution. These differences also relate to differences in the motivations of the participants in crowdfunding, whereby heterogeneity of motivations is important for scaling-up and attracting a larger pool of participants. This heterogeneity of motivations, alongside support from powerful actors and broader learning processes which contribute to stabilisation, can indicate the potential of crowdfunding to contribute to a broader energy transition.

### 3. Methodology

Drawing from previous studies (Doci et al., 2014; Geels & Schot, 2007) we study the proxies indicated in Table 1, below.

Our empirical material is based on an overview of all online crowdfunding platforms in the Netherlands: we read all publicly available information on the successfully finalised projects on these platforms (see Appendix for list of all crowdfunding platforms we examined). First, we identified those projects that were related to renewable electricity production. Only seven platforms had relevant projects. For these selected projects, we used online documentation to identify the amount of money invested, the amount of crowdfunders, and the number of successful projects over time (proxy 1, Table 1)<sup>10</sup>.

<b>Proxies</b>	<b>Indicators used</b>
Scale	Amount of money Number of projects
Learning	Communication events around the platforms Networking events on renewables
Support	(Energy) regime companies in business model Governmental support at different levels
Heterogeneity	Heterogeneity of participants' motivations

*Table 1: Proxies and indicators used in the analysis*

Further, we read all publicly available material for the organisation of crowdfunding platforms and developments aimed to connect the different initiatives, such as associations, national conferences etc. to identify learning across platforms and degree of stabilisation (proxy 2). This was supplemented by 4 face-to-face open-ended interviews with experts in the field in spring 2014, where general developments on crowdfunding in the Netherlands

<sup>10</sup> We collected all projects that were successfully finished until April 2014, and used the publicly available websites to collect this information.

were discussed<sup>11</sup>. Finally, the descriptions of the crowdfunding platforms, and sections of the paper were sent back to the experts for validation and additional information.

Regarding support and heterogeneity, we analyse four platforms in greater detail, indicating the diversity of models (proxies 3,4): *Windcentrale*, *Oneplanetcrowd*, *Greencrowd*, and *Imiljoenwatt*.

*Windcentrale* is the largest crowdfunding initiative in the Netherlands with more than €14 million collected. It is a limited liability company established in 2010, and operating outside of AFM control. *Windcentrale* splits existing wind turbines in *wind-shares* of 500 KWh expected capacity each, and the individuals can, with a mouse click, buy a number of these wind-shares (with a maximum of 85% of their demand needs in KWh), for the price of €200-€500 per wind-share, and additional maintenance costs of the windmill (€15-€30 per wind-share per year). The electricity actually produced by the wind-shares is deducted from the electricity tariff in the annual electricity bill. *Windcentrale* in essence creates a wind energy cooperative of crowdfunders for each windmill, but also runs the cooperative and the windmills for the life duration of the windmill. Until now (April, 2014) it has successfully sold wind-shares for 8 existing windmills, with 14,623 clients, and a total of 27,656,000 KWh production capacity (company data).

*Oneplanetcrowd* is the only reward-based platform related to broadly-defined sustainability projects. It is a “for profit” crowdfunding platform for environmentally or socially sustainable projects<sup>12</sup>. It operates under AFM control, even though it is exempted from licence obligation, according to Dutch law. The platform assesses each potential project on the basis of, among other things, financial history and a business plan. The platform earns €200 per advertised project, and 7% over the final amount of money. The model is reward-based: the participants give money to the projects and, in exchange, receive a reward “in kind”.

*Greencrowd* is a platform combining both donation as well as investment crowdfunding for solar PV. It is a non-for-profit foundation with an online crowdfunding platform for PV projects that started in October 2012. It analyses the projects and assigns them with a risk profile, setting standards for participation in the platform, and minimizing the risk for individual crowdfunders. The platform has received an exemption for AFM

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<sup>11</sup> Interviews were conducted with initiators of the crowdfunding platforms *Windcentrale*, *Crowdaboutnow*, *Greencrowd*, and the crowdfunding consultancy *Douw&Koren*.

<sup>12</sup> <http://www.oneplanetcrowd.nl/over>

license, but it still operates under AFM control<sup>13</sup>. Investors can decide on how long to finance and which amount they like to invest (i.e. for different interest rates), starting from €10. Participants can also indicate who receives the interest and initial deposit. Money can also be donated.

*Imiljoenwatt* is a foundation which started to crowd fund from June 2013 for placing of PV panels on a local football sports stadium in the city of Groningen. In November 2014, 531 panels were sold (292k€) and the first PV panels could be installed on the roof<sup>14</sup>. In this project, people can buy ‘solar obligations’ of €550 which corresponds to one individual solar panel including maintenance. Every year people receive money from the electricity that their panels produced and which is sold to the football club. After 23 years they also get back their initial investment. The project received a subsidy from the national government to make it profitable. Additionally, the project, like all the other cases, could exploit a tax deduction scheme for investments in renewable energy. People can register online and have to pay 10% of the total investment in advance. In this way, the foundation aims to support and include people without large budgets or suitable roofs in buying PV systems. Finally, the Dutch law for financial enterprises allows *Imiljoenwatt* to operate without AFM supervision.

## 4. Results

### 4.1 Scale

From Table 2 we can see that the total amount of money invested or donated to renewable energy projects through crowdfunding over the last 4 years<sup>15</sup> is about €15.6 million, which is only a small fraction of the needed investments for the Dutch electricity system to switch to renewable sources. Nevertheless we need to take into account that the platforms are quite new, for instance for *Oneplanetcrowd* the €375 K euros reflect about one and half year of operation.

*Windcentrale* plays a unique role as it represents 92% of the amount of money on renewable energy projects the last years. The resources raised through crowdfunding, without this “outlier” in the dataset, are limited (€1,262,211).

Further, we can see from the second column, Table 2, that the crowdfunding model most prominent is the investment model totalling €15,153,089. Reward-based funding

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<sup>13</sup> Crowd funders cannot donate or invest more than 40k€ (maximum 100 loans) and in case of investment over 5k€ Greencrowd has to provide extra information on the risks of investing in their projects.

<sup>14</sup> This was followed by a second round, not included in our dataset.

<sup>15</sup> The oldest initiative, Windcentrale exists since 2010, Geldvoorelkaar since January 2011, Oneplanetcrowd since October 2012, Greencrowd since October 2012, Doneerdezon since June 2013.

accounts for €375,650, and donation accounts for €76,351 (exclusively on solar panels). The predominance of the investment model also suggests that the main motivations of crowdfunders would be related to financial gains. We explore this further in the four case studies below.

<b>Platform</b>	<b>Type of funding</b>	<b>Amount of money</b>	<b>Average contribution</b>	<b>St. deviation</b>
<i>Windcentrale</i>	Investment	14,342,789	-	-
<i>Geldvoorelkaar</i>	Investment	536,200	529	210
<i>Oneplanetcrowd</i>	Reward	375,560	881	287
<i>1miljoenwatt</i>	Investment	292,050	1513	-
<i>Greencrowd</i>	Investment	224,100	1389	1254
	Donation	58,440		
<i>Symbid</i>	Investment	50,000	327	-
<i>Doneerdezoon</i>	Donation	17,911	206	220
<b>Total</b>		<b>15,605,000</b>		

Table 2: Overview of platforms with successful renewable energy projects. Hyphens indicate that no data is available

In the last two columns in Table 2 we indicate the average contribution per participant in each platform. The standard deviation suggests that for some of the platforms the average contribution varies greatly, with *Greencrowd* being a platform where contributions ranged from 10 euros to €6,950. In some, the financial barrier for crowdfunding through these platforms (excluding *Windcentrale*) is very low, which is key for the success of crowdfunding.

In order to put these amounts in context, the volume of crowdfunding for renewable electricity production represents 21.8% of the total volume of crowdfunding since 2011 (€71.5 million), which is a substantial contribution<sup>16</sup>.

#### 4.2 Learning

Online crowdfunding platforms have started only recently in the Netherlands. The oldest, *Windcentrale*, operates since 2010, while most operate after 2012. This suggests a limited opportunities until now for meetings, conferences, and exchange of best practice.

<sup>16</sup> Data is available by Douw en Koren at <http://www.douwenkoren.nl/crowdfunding-op-weg-naar-mainstream/>

In February 2014, the platforms, together with consultancies in the market, established the Crowdfunding Association of the Netherlands (*Branchevereniging Nederland Crowdfunding*), with an aim to “strengthen and make the development of crowdfunding for business financing in the Netherlands more sustainable”<sup>17</sup>. This association represents more than 95% of the market of crowdfunding platforms for company financing<sup>18</sup>. The Ministry of Economic Affairs played a key role in facilitating its establishment as the government increasingly views crowdfunding as an additional source of financing for small and medium-sized enterprises, at a time when financing opportunities are limited.

Another recently established learning network relevant for crowdfunding is coordinated by the Netherlands Enterprise Agency. This is a network of financiers, such as banks, insurance companies, business angels and pension funds, including crowdfunding platforms that aims to provide advice and support for start-up companies on sustainable energy.

In addition, other governmental institutions are attempting to create favourable conditions for crowdfunding. In 2011, the Netherlands Authority for Financial Markets (AFM) and the Dutch Central Bank clarified in a communication how the Law for Financial Regulation applies to the different types of crowdfunding. This communication identified the risks and financial obligations of crowdfunding platforms. Depending on the type of crowdfunding, a licence of operations needs to be obtained, or an exemption is allowed. This regulation, and the subsequent supervision of AFM acts as a trust mechanism for the participants and guarantees some liability for the platforms<sup>19</sup>.

Part of the learning across some of these platforms takes place in a broader network of renewable energy initiatives in the Netherlands through workshops, seminars, newsletters and other events (see also Doci et al., 2014 and Huijben and Verbong, 2013). This is especially the case for platforms such as *Greencrowd* and *Imiljoenwatt*, which focus exclusively on renewable energy projects.

In sum, there is not much evidence of learning across the platforms yet, although several networks have been established or orienting themselves towards crowdfunding. When taking into account that most platforms operate since the last 2 years only, we expect this to change over time in particular when the Crowdfunding Association starts to shape mutual exchange and learning.

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<sup>17</sup> <http://www.nederlandcrowdfunding.nl/>

<sup>18</sup> <http://www.crowdfunding.nl/branchevereniging-crowdfunding/>

<sup>19</sup> <http://www.afm.nl/nl/professionals/diensten/starters/wet-regelgeving/crowdfunding.aspx>

### 4.3 Support

In its starting phase, Windcentrale has been financially supported by both *Stichting Doen*, a major NGO in the Netherlands, as well as *Rabobank*, one of the largest banks in the Netherlands. In addition, it has had support from the Association of House Owners. *Greenchoice*, the largest green energy provider in the Netherlands, arranges the billing of the process. Thus there is support from financial, and housing regime actors, and one niche actor in the electricity sector.

*Oneplanetcrowd* started in 2012, as a partnership of several organisations: investment companies, investment consultancies, and a law firm, some of which are targeting specifically sustainability companies. Even though the partner organisations are numerous (nine in total), they are not very influential as regime actors in the energy (or financial) regime. There is no evidence of major support from powerful actors from the energy or financing regime.

The foundation *Greencrowd* is supported by their partner organization *Greenspread*, a commercial enterprise that provides knowledge (e.g. information memoranda to investors), back office services and money that enables *Greencrowd* to operate. There is no evidence of major support from powerful actors from the energy or financing regime.

*Imiljoenwatt* has received support from several actors, including the municipality of Groningen, as well as *Essent*, an incumbent energy supplier which interestingly also became a member of the alliance operating the business model. Thus there is some support from the electricity regime.

The role of the government in these initiatives is multiple. First, as discussed already, the government has supported the establishment of the main learning platform, the Association, and set a clear regulatory framework, through the supervising body AFM. These are facilitating conditions for crowdfunding to develop. In addition, some of these initiatives, namely *Greenspread* and *Imiljoenwatt*, take advantage of existing subsidy schemes for renewable energy, namely net metering support<sup>20</sup>.

In conclusion, evidence suggests support by regime actors exists in some cases (*Windcentrale*, *Imiljoenwatt*), but not in others (*Oneplanetcrowd*, *Greencrowd*). General governmental support exists, and some of the platforms also take advantage of advantageous financial regulations related to renewable energy.

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<sup>20</sup> Net metering is the financial off-setting of Electricity taken from and provided to the grid on the energy bill.

#### 4.4 Heterogeneity

To identify the crowdfunders' motivations, we looked into the reactions that some participants posted online for each project. For *Windcentrale*, since there is no forum or blog dedicated to the crowdfunders' posts, we use the arguments promoted in the Windcentrale website, to deduce the types of motivations of the crowdfunders<sup>21</sup>. The main advertising points are [italics added]:

“ You can meet your own electricity demands in a *fun* and *simple* way; You use at home your own 100% *green* electricity from your own windmill; You don't suffer any more from rising electricity *prices* and you almost always *save money*”<sup>22</sup>

Therefore the crowdfunders in *Windcentrale* are expected to be a heterogeneous set of people, with different motivations, most prominently *normative*, *gain* and to an extent, *hedonic* considerations behind their investment decision.

In *Oneplanetcrowd* we identified *normative* and, in fewer cases, *hedonic* motivations, but an absence of *gain* motivations, since the platform is reward-based. In one of the projects, developing a new design prototype for a small scale wind turbine, the reactions can be grouped in three broad categories: contributing to the future and the environment (i.e. “For my children”, “good for the environment”); being enthusiastic about a new wind technology (“As an ex-glider I find this an exciting innovation”, “Promising sustainable technology”), and being part of something bigger (“Great to be part of a brighter future”).

In *Greencrowd*, the crowdfunders' motivations were in line with the *gain* and *normative* goal-frames discussed in the literature review. A number of participants relate to the profitability of the investment, sometimes also by comparison to low interest rates provided by the bank (“The interest rate at the bank is low and I like solar energy”). Several individuals indicated they could not make an investment on their own house and therefore decided to join one of the projects (“I wanted to invest in solar PV for months, but I rent a house where this is impossible”). The *normative* considerations relate to contributing to sustainability and the local economy, and being independent from traditional energy suppliers. Finally, the educational component and raising awareness is considered very

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<sup>21</sup> In the following cases we also noticed a close reflection between the stated purpose of the platform, and the motivations contributed by the crowdfunders themselves, which suggests that these stated purposes are adequate indicators of crowdfunders' motivations.

<sup>22</sup> <https://www.windcentrale.nl/>

important by a number of participants ('School sets a good example for students and their parents').

In *Imiljoenwatt* quotes from individuals were again in line with the *gain* and *normative* goal-frames, while motivations supporting the *hedonic* goal-frame were not identified. Again here, often the motivations are mixed ('It is always good to do something for the environment, a nice bonus is the good profit' or 'Nicer than my bank account and doing good as well!'). Motivations in line with the *normative* goal frame related to sustainability ('Acting sustainable and contributing to the new world'), as well as doing something for the next generations ('We like to invest in a good environment for the future of our children'). Independence from fossil fuel incumbents and freedom by self-production are also mentioned as drivers for investment ('My freedom, finally independent from fossil'), again suggesting a mix of normative and gain goal-frame.

Such reactions in some cases can also act as part of a marketing strategy, or corporate social responsibility when organisations and companies (and not individuals) fund the project. For instance, in Greencrowd, where a company invested money with the rationale '[it] fits to our company's mission'. The large majority of crowdfunders, however, in all platforms are individuals.

In conclusion, in some platforms, more than others, crowdfunders exhibit large heterogeneity of motivations, related to *gain*, *normative* and to a less extent, *hedonic* motivations.

The summary of the analysis can be found in Table 3, in the following, concluding chapter.

## **5. Conclusions and discussion**

This paper has reviewed crowdfunding initiatives in the Netherlands as an alternative source of finance in energy transitions. Our research question was: "To what extent can crowdfunding provide an adequate business model for the creation, nurturing and upscaling of renewable energy niches?". We can now draw the following conclusions (summarised in Table 3).

<b>Proxy</b>	<b>Results</b>
<i>Scale</i>	Limited, but growing over time.
<i>Learning</i>	Limited indications for learning until now. Future potential on the basis of association establishment.
<i>Support</i>	Limited support from incumbent electricity regime companies. Some governmental support (depending on the platform)
<i>Heterogeneity</i>	Large heterogeneity of crowdfunders, on the basis of their motivations (depending on the platform)

Table 3: Summary of analysis

First, our analysis suggests that crowdfunding can be an adequate business model in energy transitions, but that this model is far from routine practice. We have found substantial evidence of crowdfunding as a mechanism for developing renewable electricity niches, but the **scale** of crowdfunding remains very low compared with the funding needs for the transition of the electricity system. We also found limited indication of stabilization of **learning processes** until now. Evidence for **support** from regime actors is at this stage ambiguous, because we only found regime support in half of the case studies (*Windcentrale* and *Imiljoenwatt*). Finally, with respect to **heterogeneity**, motivations, normative and gain considerations prevail, while hedonic ones come less often, which echoes results from previous work on renewable energy communities (Docì & Vasileiadou, 2014). Moreover, reward or donation models seem to attract a primarily green crowd. All types of crowdfunding models were found, but the investment model was dominant.

Second, we show how crowdfunding draws some elements from preexisting business models, but brings novel elements to the fore. Similar to collective buying and community shares business models, crowdfunding is about uniting citizens in renewable energy projects, thereby reducing perceived risk by the end user, since an external party is organizing the project and the AFM authority is, in most cases, overseeing the platform. Crowdfunding platforms are also reducing overhead costs for the users, by providing easy access to

information on the projects and investment opportunities and a very simple subscription process, also for investors that are not geographically close to the project. Finally, similar to the community shares business model crowdfunding is enabling those without suitable roofs or high investment capital to join in renewable energy projects.

Our research suggests two important venues for future research. First, a lot of rhetoric currently around crowdfunding has the implicit assumption of “small government” and “big society”, which suggest a contraction of government’s roles. In all our cases, though, the success of crowdfunding depended on governmental support. In some cases (e.g. *Imiljoenwatt*) this support takes the form of removing the initial investment barrier, by creating favourable economic conditions, since many such initiatives depend on expectations of stable income, or at least no financial net loss (Doci & Vasileiadou, 2014). In other cases, there is more general support, as the government facilitated the establishment of the crowdfunding association, and regulates crowdfunding activities in order to protect potential investors. As a result, crowdfunding platforms have to make adaptations to their business model in order to comply with these regulations. These results are in line with previous work showing that governmental market regulation and support mechanisms are continuously shaping renewable energy business models in the market (Huijben & Verbong, 2013). Future research could explore in more detail to what extent crowdfunding reduces, maintains or increases public policy influence in energy markets.

Second, future research could explore developments, differences and similarities in different spatial contexts in relation to broader socio-economic and political conditions. In the UK, for example, collective buying and community shares projects are growing quickly, because of favourable governmental policies. The UK’s Government has enabled community energy projects to fix a tariff and defined eligibility criteria under the 2012 Feed-in-Tariff program review. Nevertheless, support for renewable energy community projects is lagging behind, and most projects are under-resourced (Gill Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014). In this context, *Abundance*, a UK investment crowdfunding platform linking individuals and communities with renewable energy projects has raised \$10 million. In the USA, on the other hand, renewable energy policy is shaped by Renewable Portfolio Standards (RPS) and tax incentives, which mostly ignore collective buying or community shares initiatives<sup>23</sup>. Nevertheless, *Mosaic*, the leading solar crowdfunding

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<sup>23</sup> Farrell, J., 2013. *Barriers and Solutions for Community Renewable Energy*, <http://www.renewableenergyworld.com/rea/blog/post/2013/09/5-barriers-to-and-solutions-for-community-renewable-energy> (Accessed 17.10.2013)

platform in the USA, has raised \$8 million. The situation in Germany is different again. There are plenty of market opportunities for financing renewable energy projects in the German market, with favourable regulations, and social support for renewable energy as indicated by hundreds of collective buying and community shares projects (not using crowdfunding) is generally large<sup>24</sup>. The German Feed in Tariff is designed in a way that most organizational forms, irrespective if they are private, community-owned or public, are able to benefit. Therefore, there may not be so much need for additional business models, such as crowdfunding.

As renewable energy niches have grown and consolidated in several countries in the last decade, the field of sustainability transitions can benefit from theoretically and empirically understanding how niches enter the market. Development of new financing strategies and related business models is key in this process.

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<sup>24</sup> Arbeitsgruppe Erneuerbare Energien-Statistik (AGEE Stat), 2012. *Zeitreihen zur Entwicklung der erneuerbaren Energien in Deutschland*. [http://www.erneuerbare-energien.de/fileadmin/Daten\\_EE/Bilder\\_Startseite/Bilder\\_Datenservice/PDFs\\_XLS/ee-energie-daten\\_ohne\\_formeln\\_2012.pdf](http://www.erneuerbare-energien.de/fileadmin/Daten_EE/Bilder_Startseite/Bilder_Datenservice/PDFs_XLS/ee-energie-daten_ohne_formeln_2012.pdf)

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## Appendix

In the table below are the crowdfunding platforms whose project we searched, to find renewable electricity projects.

<i>Windcentrale</i>	<i>Crowdaboutnow</i>	<i>Kapitaal op maat</i>
<i>Geldvoorelkaar</i>	<i>Share2start</i>	<i>Fundyd</i>
<i>Oneplanetcrowd</i>	<i>Seeds</i>	<i>The Dutch Deal</i>
<i>Greencrowd</i>	<i>Voorjebuurt</i>	<i>Duurzaam Investeren</i>
<i>Symbid</i>	<i>Wekomenerwel</i>	<i>Doneer de zon</i>
<i>Doneerdezon</i>	<i>Leapfunder</i>	<i>Sunny schools</i>