Energy Policy 56 (2013) 362–370

Contents lists available at SciVerse ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

Breakthrough without subsidies? PV business model experiments in the Netherlands

J.C.C.M. Huijben*, G.P.J. Verbong

Eindhoven university of technology, School of Innovation Sciences, IPO building, P.O. Box 513, 5600 MB Eindhoven, The Netherlands

HIGHLIGHTS

- From 2008 increased business opportunities for PV in the Netherlands.
- Business models: Customer Owned, Community Shares, Third Party.
- Focal point: net metering regulations.
- Maturing of PV niche: networking, knowledge sharing and lobbying.

ARTICLE INFO

Article history:
Received 8 October 2012
Accepted 26 December 2012
Available online 26 January 2013

Keywords:
Dutch PV market
Business model experiments
Up scaling

ABSTRACT

Despite a lack of steady governmental support for PV in the Netherlands over the last decade, from 2008 onwards an increased number of initiatives started experimenting with new business models for PV. Though absolute numbers of installed capacity are still low, this is a promising sign. In this article we aim to contribute to the understanding of these developments by using insights from both business model and transition studies literature (i.e. Strategic Niche Management). By performing a literature study and a series of interviews we found three main types of business models: Customer-Owned, Community Shares and Third Party. Financial viability of these was found to be heavily dependent on net metering regulations which are surrounded by uncertainty and struggle about its meaning and application. Also, the overall PV niche is maturing. We found several local and national organizations lobbying for expansion of the space for PV business model experiments and enabling knowledge sharing and networking between initiatives. Furthermore, a number of regime players is getting involved in the PV niche. Considering the current economic turndown and related subsidy cuts in many other countries we believe the Netherlands, with its relatively poor and unstable support system, could serve as an example.

1. Introduction

Over the last decades it has become increasingly clear that our fossil fuel based energy system is unsustainable. Depletion and uneven distribution of resources as well as air pollution by combustion of fossil fuels and climate change have fostered the search for a transition to a more sustainable system. Solar energy or PhotoVoltaics (PV) is a very promising option. It has by far the largest potential and, after a few decades of development, it has become a proven technology that can contribute to energy security in all countries; it also does not produce any harmful emissions in the operational phase (EPIA and Greenpeace, 2011). The main barrier to a large scale application of PV has been the high costs of the electricity produced. However, in recent years, there has been a dramatic change. Continuous growth has resulted in a total installed capacity of 40 GW in 2010 globally (EPIA, 2011) corresponding to a seven time increase compared to 2005 (REN21, 2011). About 30 GW could be contributed to the European Union (EPIA, 2011). In 2011 this number increased to an installed capacity of 69 GW of which Europe retained the major share of 51 GW (EPIA, 2012). However, the European market is very unbalanced with only a handful of countries like Germany and Italy dominating the market in 2011 (EPIA, 2012). This can be explained by the favorable Feed-In-Tariff (FIT) policies that these countries have in place (Schleicher-Tappeser, 2012; Timilsina et al., 2012). These policies have created a large market for PV and production capacity has increased dramatically, in particular in China. As a result, prices of PV modules have come down substantially from more than $4 per Wp in 2008 to less than $1 per Wp by January 2012 (Aanesen et al., 2012). However, not every PV module producer could keep up with the reduction of costs, leading to pressure on profit margins and a major shakeup of the industry. Additionally, because of the economic crisis subsidies are cut in many countries leading

* Corresponding author. Tel.: +31 402475579.
E-mail addresses: b.huijben@tue.nl, boukjehuijben@hotmail.com (J.C.C.M. Huijben).

0301-4215/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.enpol.2012.12.073

to a decreased demand as well. As a result many solar energy manufacturing companies have gone bankrupt in the last years (Aanesen et al., 2012).

Compared to Germany or Italy, the Netherlands has only a minor share with a total installed capacity of just 130 MW in 2011, corresponding to only 0.3% of the total renewable energy, which is less than 0.02% of total energy demand (CBS, 2012a). The Dutch PV sector puts the blame on government policy. From 2003 until 2008 there has been no governmental support for PV; as a result only a minor growth was observed (KEMA et al., 2010). In 2008 the 'Stimulering Duurzame Energie' (SDE; Stimulation of Renewable Energy) subsidy scheme was put in place by the national government and an increase in installed PV systems could be observed. However, there have been several problems with this SDE subsidy scheme. There was considerable interest but only a limited amount of money was available. There were also many complaints about the difficult and rather bureaucratic nature of the whole procedure. From the 69 MW of total accorded applications in 2010 only 18 MW had been installed in March 2011 (AgentschapNL, 2011). Moreover, it has been argued that the SDE subsidy scheme actually limited market growth because of a loss of motivation for investing in PV by parties that were excluded from the subsidy scheme.[1] In July 2011 a new subsidy scheme was introduced (SDE+) but now the government focused on the cheapest renewable energy technologies available (Verhagen, 2010). Also, only PV systems larger than 15 kWp were included (AgentschapNL, 2012). Although a total of €1.5 billion was reserved, just €35 million has been granted to solar PV projects. For 2012, regulations for PV even became stricter as no subsidies are granted to small scale users (maximum 3*80 A connection; households and SMEs) since these are already profiting from net metering regulations (Verhagen, 2011). Net metering is the financial balancing of electricity taken from and provided to the grid on the energy bill (Würtenberger et al., 2011). A combination of increasing electricity and decreasing PV system prices has made net metering a central issue in recent years. In April 2012, the Dutch national cabinet fell. After this, several political parties gathered together to form a temporary coalition with the Spring Agreement as an outcome. In this agreement a new subsidy scheme for PV was included. From July 2012, households could apply for a 15% reduction in the costs of a PV system with a maximum of €650. For 2012 a total of €22 million has been reserved (Verhagen, 2012). The weak support and frequent changes in policy have been singled out as the main reason why the contribution of renewables, including PV, to the Dutch electricity production is one of the lowest in Europe (CBS, 2012a; Verbong et al., 2008).

Despite this, from 2008 onwards an increased number of initiatives has started experimenting with new ways to create viable business models for PV in the Netherlands in order to increase the PV market share in the Dutch energy supply system. For 2012, these initiatives are expected to create an extra installed PV capacity of 42 MW (Segaar, 2012). Although the total amount of installed capacity is still low, this is a promising sign. So how can we understand these new market developments? Is this the way forward in a time where subsidy cuts have led to crumbling PV markets in many other European countries?

Also, from 2009 onwards venture capital firms started to focus their investments in downstream PV business models rather than in low profit manufacturing companies (Aanesen et al., 2012). However, the development of such innovative business models is not straightforward. Because of rapidly changing contextual conditions, business models cannot be fully anticipated in advance and therefore learning and experimenting are essential (McGrath, 2010; Mullins and Komisar, 2009). Such business model experiments can take place both within and between firms. By performing business model experiments new business opportunities can be found or even created (Chesbrough, 2010; Osterwalder and Pigneur, 2010). However, despite the growing body of research in this field, empirical data for support of the above findings are still limited.

Business model experiments have been a new topic of research in the field of sustainability transition studies as well. This field of research studies socio-technical transitions, structural changes in the way societal functions like mobility or energy supply are being performed (Geels and Schot, 2010). Radically new, sustainable technologies like PV emerge in protected spaces called niches. Strategic Niche Management (SNM) focuses on the analysis of niche developments. Niches provide promising technologies with the opportunity to develop, but to become mainstream the experiments need to be up scaled. In this context, SNM scholars recently started exploring the role of business model experiments in sustainability transition pathways as well (Cheschin, 2012; Geels, 2011; Jolly et al., 2012; Raven et al., 2008).

With this paper we aim to contribute to the further understanding of the role of business model experiments in up scaling processes and socio-technical change. We will analyze a set of business model experiments for PV in the Netherlands using insights from both business model and Strategic Niche Management. In the following section relevant insights from both business model and strategic niche management literature will be further discussed. Next, we will discuss the method that has been used for data collection, and present the main results. The paper will end with a discussion and conclusion section.

2. Theory

2.1. Business models

Business model research started gathering momentum in the mid 1990s (Zott et al., 2011). Since then, the concept increasingly gained attention from both practitioners and academics. However, the concept is still under development and there is no clear uniform definition of the concept yet (Burkhart et al., 2011; Klang et al., 2010; Zott et al., 2011). While in the beginning mainly textual definitions were used, more recently business models started to be considered as being built up of several interdependent components (Burkhart et al., 2011). A large number of business model components has been defined but there is no consensus on which set to use and research on business model component interdependencies is lacking (Burkhart et al., 2011; Klang et al., 2010). However, despite the lack of consensus on its definition, business models are considered to be a source of innovation and competitive advantage for a company (Zott et al., 2011). Additionally, most scholars agree that business models cross individual focal firm boundaries and that value is created in a network of partners rather than by an individual firm alone (Burkhart et al., 2011; Klang et al., 2010; Zott et al., 2011).

2.1.1. Business model experimentation

Business models are considered to be vehicles for bringing new technologies like renewables to the market as well (Würtenberger et al., 2011; Wüstenhagen and Boehnke, 2008; Zott et al., 2011). However, finding and implementing such new, innovative business models is by no means an easy task. As profit margins for new technologies are usually much lower, resources are allocated to the more profitable, ongoing business activities (Chesbrough, 2010). Furthermore, managers tend to use only information that fits within their current business logic. Additionally, business models are

[1] Data acquired from Lemmens, J.H.J., Ende van den, C.H.C., Verbong, G.P.J. and Huijben, J.C.C.M., 2011. Status report PV 2010 for the Dutch ministry of economic affairs, agriculture and innovation. Confidential.