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Regulatory cuts and economic and financial performance of Spanish solar power companies: An empirical review



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ABSTRACT

Spain exemplifies the development of renewable energy in general and photovoltaic solar energy in particular, influenced to a major extent by public regulation. Without suitable caution regarding the approaching world crisis, the regulatory framework gave rise to the fact that Spain would rank second worldwide in 2008 in terms of installed photovoltaic (PV) solar energy. Yet a serious financial and economic crisis still in its infancy started to lead to readjustments, while the new regulatory framework put a stop to the construction of new PV plants. Many companies and investors either went bankrupt or saw their performance levels dwindle. Although the academic literature has analyzed some general aspects related to this boom-and-bust of the Spanish photovoltaic solar sector, no studies have been carried out on a company level. In order to fill this void, this paper analyses the economic and financial performance of Spanish companies involved in photovoltaic solar energy production over the period 2006–2015. The results, based on a longitudinal population sample of around 5469 companies from the sector, show the economic hardships they have experienced, especially smaller enterprises. An improvement in the most recent situation is also noted. The international implications of the Spanish case for scholars, policy makers, investors and other stakeholders worldwide, as well as avenues for further research, are discussed.

1. Introduction

Owing to its location and climate, Spain is one of the countries in Europe with the most abundant solar resources [1]. The country also has the advantage that this resources is distributed relatively evenly throughout the territory, to the extent that variations in solar irradiation seldom occur [14,26]. However, it is not these natural conditions that have fostered the growth of photovoltaic energy in Spain. Rather, development of the renewable energy sector in general, and of photovoltaic solar energy in particular, has been greatly influenced by the regulatory framework and public aid.

In Spain renewable energies started to be promoted with the coming into force of the Plan for the Promotion of Renewable Energies (REs) in 2004, which included a programme for the extensive establishment of photovoltaic solar energy. Subsequently, the regulatory framework in the form of Royal Decree (RD) 661/2007 [39] promoted the development of photovoltaic solar plants connected to the national distribution network with guarantees for the entire lifespan of the PV plant and substantial premiums. Other favourable factors coincided within this, including stagnation in the housing market, easy access to credit

supported to a certain extent by the RD and relatively low interest rates [13]. These extraordinary conditions attracted a large amount of capital, including investments from many small investors who, relying on government guarantees, did not hesitate to use their family savings and/or become indebted by mortgaging their family assets [2].

In 2008, Spain ranked second in the world in terms of installed photovoltaic solar energy [10]. In the resulting situation, the Spanish authorities felt compelled to take steps toward the end of that year, and subsequent readjustments have followed the same restrictive lines [40]. Moreover, with the passing of Royal Decree-Law (RDL) 1/2012 [22], new PV plants were no longer rewarded [12], while RDL 9/2013 [20] removed the premiums, RD 413/2014 [35] formulated a very complex new framework for determining reasonable remuneration and RD 900/2015 [35] penalised PV plants designed for self-consumption by levying taxes (*the sun tax*) while also increasing the bureaucratic and administrative red tape required to establish them – making Spain one of the most restrictive regulatory systems of any EU member state [30]. With the cuts set in motion by public policies, PV plants set up to produce photovoltaic solar energy in Spain faced a major down-turn, and the construction of new plants was held back as a result of the reduction in

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Table 1
Tariffs and premiums for plants within the Spanish PV regulatory framework.
Source: the authors

Subgroup b.1.1.	Power	Period	RD 661/2007	RD 222/2008	RD 1565/2010	RDL 14/ 2010	Ley 2/ 2011	RDL 9/2013
			Regulated tariff c€/kWh	Regulated tariff c€/kWh	Regulated tariff c€/kWh	Period	Period	Regulated tariff c€/kWh
PV plants that only use solar radiation as a primary energy source via photovoltaic energy	P ≤ 100 kW	First 25 years	44.0381	45.5134	44.0381	First 28 years	First 30 years	x
		Afterwards	35.2305	36.4107	x	x	x	x
	100 kW < P ≤ 10 MW	First 25 years	41.7500	43.1486	41.7500	First 28 years	First 30 years	x
		Afterwards	33.4000	34.5189	x	x	x	x
	10 < P ≤ 50 MW	First 25 years	22.9764	23.7461	22.9764	First 25 years	First 30 years	x
		Afterwards	18.3811	18.9969	x	x	x	x

premiums and the limitation of the number of years guaranteed [11].

Table 1 shows how Spain dropped from second position among the EU28 in 2008, with 32.5% of production, to fifth in 2015, with 5.1% of production. Following the investment made during the years 2007 and 2008, the rise until 2015 is very gradual, almost flat – in contrast with the general evolution of production capacity in the other leading countries belonging to the EU28.

The initial boom in the photovoltaic energy sector generated academic interest in the subject and there have been numerous studies that focus on the Spanish photovoltaic sector [9,10,13,14,16,25,26,31,40,42,44]. However, despite the extraordinary theoretical importance of their performance levels [7,15,41,43], the studies carried out have not analyzed the dynamic development of companies in the sector. Neither has the effect of regulatory cuts on the financial and economic performance of Spanish solar power companies been analyzed. In order to fill this gap, this article analyses the economic and financial performance of Spanish companies over the period 2006–2015.

The article contributes to the international scholarly literature about the supporting frameworks to foster REs. The work sheds light on the effects of specific regulatory cuts on the financial and economic performance of companies. It also discusses the international implications of the Spanish case for scholars, policy makers, investors and other stakeholders worldwide.

2. Dynamics of the regulatory framework: from extraordinary support to drastic regulatory cuts

In Spain, the Government passed the Plan for the Promotion of Renewable Energies in 1999, which kick-started the photovoltaic solar energy sector with a view to meeting a 12% target for GDP in terms of EU energy by 2010. This plan established a series of promotion mechanisms such as the setting of tariffs regulated by the feed-in tariff (FIT) mechanism with premiums. The following plan, in 2005, set a target of 371 MW installed capacity by the year 2010. A third plan, to cover the period 2011–2020 [28], like the previous ones, has been questioned from different standpoints [42] and especially in view of the evidence obtained from the results [4,10,25,43].

RD 2818/1998 [33] established that the promotion of photovoltaic solar energy in Spain would be mainly undertaken via FIT premium mechanisms. Adjustments made in 2004 – in accordance with RD 436/2004 [32] and 2007 (RD 661/2007 [39]) – significantly increased photovoltaic solar energy deployment, offering advantageous incentives to PV plant developers, and creating a photovoltaic power boom [11,16]. To be more specific, the domestic energy system prioritised the granting of direct aid for the production of renewable energy and this jump-started the sector spectacularly [42]. Instead of a well-controlled evolution of installed capacity, Spain shows the problem of rapid development, which not only leads to higher prices due to

sudden high demand but could also lead to later cuts which might have a major impact on local employment [4].

The support system provided by RD 436/2004 was based on the possibility that the producer might choose whether to sell the electricity produced at a fixed tariff or whether to sell it on the free market by taking advantage of a premium on the sales price. Producers that chose to sell on the free market benefited from a further incentive, which differs according to the various RE technologies, and is expressed as a percentage of the reference average tariff (RAT). Therefore, the FIT is not constant over time but varies according to the average price of electric energy [5]. RD 661/2007 [39] updated this special system which allows producers to sell surplus electricity to distributors in return for considerable compensation in the form of a regulated tariff defined as a percentage of TMR, or to sell their surplus directly through the daily market or bilateral contracts. In the case of bilateral contracts, producers received the negotiated price plus a premium [6]. Under these conditions, photovoltaic energy production capacity exceeded all expectations – according to information published by the National Energy Commission (CNE), 85% of the 371 MW target of installed capacity for 2010 was exceeded by August 2007 and 1000 MW was reached by May 2008. Photovoltaic solar energy legislation started to be reviewed in that same year based on the 30/2008 report issued by the CNE [8]. This report considered the *feed-in tariff* or regulated tariff system to be more efficient than other systems like the green certificates issued in the United Kingdom. However, attention was drawn to the fact that any over-encouraging might end up having negative effects on the sector and on the electricity system in general. Thus, in terms of the promotion of increasingly competitive photovoltaic solar energy, excessive rewards were deemed potentially harmful to competition and cost reduction, thus discouraging technological research into this type of energy [8].

RD 661/2007 [39], which regulated existing PV plants, was reviewed, and a new RD 1578/2008 [37] was drafted for new PV plants. The measures that affected tariffs and premiums for PV plants pursuant to section 36 of RD 661/2007 [39] were modified up to 4 times before being derogated by RDL 9/2013 [20]:

1. The first modification was prior to the 30/2008 report issued by the CNE and still retained its encouraging nature. It dealt with annual updates of tariffs and upper and lower limits of the special system, annex V of RD 222/2008 [38].
2. Subsequently, considerations gathered in the 30/2008 report were applied, and regulated tariff values for b.1.1. type PV plants over 26 years of age were removed, in accordance with RD 1565/2010 [36].
3. RDL 14/2010 retroactively limited the maximum number of hours of PV plants entitled to receive regulated tariffs. References were modified by way of compensation within the time period specified for b.1.1. type PV plants, by the 1st final provision of RDL 14/2010 [24].

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