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Political FITs: Regulating the emergence of photovoltaic in France¹

Paper for the 8th IPA Conference, Vienna, 3rd-6th July 2013.

In less than a decade, photovoltaic (PV) has undergone dramatic evolutions. Considered extremely promising but also extremely expensive and still far from economic maturity a few years ago, it has turned into an increasingly widespread and affordable electricity generating technology. PV prices have indeed decreased sharply since 2008, and installed capacity has expanded at an unprecedented scale, especially in Europe (Bazilian et al. 2012; JRC 2012, 2013). This surge in PV development and the radical transformation that it triggered were driven by policy support: in the context of EU renewable energy objectives for 2020, many European countries have adopted incentives for grid-connected PV, finally taking the technology out of the labs and niches. In the wake of Germany, most of these countries opted for feed-in-tariffs (FITs) instead of quantity-based instruments (JRC 2012, 2013).

France was no exception, and opted for feed-in-tariffs to spur the early development of electricity from renewable energy sources in 2000. However, effective support for photovoltaic really started in 2006, when FITs were raised to a level that allowed for the economic viability of PV projects. Political commitment in favour of photovoltaic development was maintained and to an extent reinforced from 2007 to 2010. Photovoltaic was then seen as a high-tech research-intensive sector that held great promises and potentials and was bound to develop globally, but in a distant future. The explicit objective of support for PV was thus to spur innovation through the creation of a national market to ensure that France stayed in the race (MEEDDAT 2008).

The FIT system, to which other incentives such as fiscal credits were later added, far exceeded expectations, and the French PV market boomed between 2006 and 2010. As the extra-costs induced by FITs are compensated by electricity consumers, this became a political issue in late 2010, when the government abruptly decided to halt FIT for three months and launched a consultation with stakeholders to redesign incentives and “define a new balance” able to redirect investment towards projects that would bring economic and industrial value.²

This paper focuses on two distinct forms of mobilisations that were triggered by French FITs: first, the mobilisation of economic actors by very generous FITs. This led to the uncoordinated development of a heterogeneous PV sector, as well as the proliferation of PV installations of various types. Second, following this uncontrolled development, the mobilisation of the PV sector by and against the State that was summoned by the moratorium of December 2010. Though it took place in a delimited time and space, this mobilisation was no less disorderly and passionate.

What links these two mobilisations is the fact that the rapid development of PV proved overwhelming. Most actors, and especially established institutions and representatives, were not equipped yet to deal with the rapid transformation of the sector. They were thus challenged in their legitimacy, while the diffuse proliferation of PV actors and project made it difficult to track the market. The consultation that followed the moratorium took place in a context of deep uncertainty, because expertise on the PV market was not stabilised,

¹ This paper is the summary of a longer working paper written in February-March 2013.

² Service de Presse du Premier Ministre, Communiqué de Presse, 2 décembre 2010, Paris.

information devices were heterogeneous and disputed, and no legitimate arbiter stood out of the mass of stakeholders involved in PV.

As a moment of destabilisation and renegotiations of both the economies and the policies of PV, the consultation channelled and redistributed the uncertainty regarding the present and the future of photovoltaic in France. As the paper will show, by gathering them as a collective, the consultation forced PV actors to talk and debate, launching a process of public formation and “focusing disagreement” (Marres 2005). Because it was attempt at clarifying the situation, it also provided a forum for the emergence of shared expertise on PV. However, its conflictual and passionate character clashed with governmental expectations and intentions. I will show that this resulted in the development of an alternative form of tracking PV development that was incorporated into mathematical and legal devices, though it did not succeed in closing the controversies either. Paying specific attention to the way uncertainties, unexpected turns of events and disorder were dealt with, I analyse this episode as a crucial moment in the articulation of policy- and market-making around an emerging technology. I thus seek to explore the politics of a market instrument that does not function as expected.

1. Markets and policies in-the-making

This study relies on a set of interviews conducted between March 2011 and September 2012 with various actors in the photovoltaic community (civil servants, industry representatives, NGOs, researchers, members of Parliament, renewable energy companies, local government officials, grid operators...) as well as on the analysis of both documents produced during the consultation, and documents relating to photovoltaic policy before and after the consultation (Parliamentary reports, legislative and regulatory texts, policy-relevant documents...). The objective of this investigation was to understand what led to the moratorium, what had happened during the consultation, and how this had changed the PV sector in France.

From this material, it clearly appeared that actors and positions related to photovoltaic in France were very diverse and heterogeneous. As an emerging market and political issue, photovoltaic appears to be an object not yet stabilised, whose characteristics, assets and prospects in France remain contested and debated. Taking an ANT approach, French photovoltaic³ can thus be addressed as a matter of concern, that is as an instance of these “real, objectives, atypical, discussed, still uncertain forms of existence” that “need to be seized less as objects than as *gatherings*” (Latour 2007, 163).⁴

In the case of the 2010-2011 PV crisis the consultation convoked and then articulated the constituents of French photovoltaic as a gathering. This gathering is specific insofar as it was concerned with an emerging policy-dependent market: in this instance, we are facing both policies *and* markets in-the-making.

Debourdeau (2011a, 2011b) has studied the economisation of PV through the importation of German FITs and their impact on the marketisation of photovoltaic; the episode of the

³ I chose not to specify what constitutes “French photovoltaic” in more details at this point, since one of the main problems that this article attempts to address is the unstable, undisciplined, uncertain, contested and passionate process of negotiating and (re)assembling a legitimate “French photovoltaic”.

⁴ « Ces formes d’existence réelles, objectives, atypiques, discutées, encore incertaines, doivent être saisies moins comme des objets que comme des *rassemblements*. »

moratorium that happened later makes it possible to move further in the analysis of “the ongoing process of co-construction of the economy and politics” (Callon 2007). Indeed, Callon (2007) argues that market framings and overflows trigger matters of concerns that are characterised by deep uncertainties and to which markets “are not always able to provide satisfactory answers”, so that they “evolve into many (potentially) political issues whose solutions may, in turn, impact on the organisation of economic activities” (p. 139).

Those issues are brought up by unexpected groups, that Callon calls emergent concerned groups. This notion echoes work by Latour and Marres that draw on pragmatists theories to renew STS approaches to policy-making (de Vries 2007; Latour 2007b; Marres 2005, 2007). In a 2007 trying to map out different meanings of the words “political”, Latour defines “Political n°2” as the type of situations in which we face “consequences that entangle many unanticipated actors without [...] any [developed] instruments to represent, follow, take care of, or anticipate those unexpected entanglements” (Latour 2007b, p. 816), and relates it to the situations that call for the constitution of “publics” in pragmatist approaches (Dewey 2010).

In a similar perspective, Marres draws on Dewey’s and Lippman’s work to build the case for an object-oriented perspective on policy-making; she particularly stresses the difficult, risky process of public formation that occurs through the articulation of issues (Marres, 2005, 2007). In the face of unintended consequences and unexpected entanglements, collectives that she calls “communities of strange things” emerge out of concern for a similar issue⁵; these heterogeneous collectives, often composed of actors with different, sometimes diverging, interests, *can* emerge as a public (in deweysonian terms) if the “specific irreconcilability” between members of the collective “comes to be articulated” and if divergences are translated into “focused disagreement” (Marres 2005, p. 61)

In the case of photovoltaic, the policy-driven market triggered unexpected consequences and entanglements in that FITs led to a proliferation of actors and projects that overwhelmed instituted actors, as the next section of this paper will show. The community of people and organisations with interests and stakes in photovoltaic was not enacted as a delimited group until the moratorium and the consultation convoked them together around a single aim (that of redesigning PV incentives).

Yet, one can argue that the late 2010 crisis constituted them as an “emergent concerned group”, albeit one that was unsettled and disorganised (but definitely concerned). Marres notion of public formation and issue articulation as a tentative process can then be used to study how this emergent and concerned group started to take shape as a public. Indeed, this paper shows how, during the consultation on PV, discussions attempting at defining photovoltaic as an issue allowed a public-in-the-making to emerge from a messy and passionate assembly, highlighting the role of economic instruments and their management in this process. At the end of the consultation, disagreement persisted but key issues to be addressed and areas of divergence and convergence had been mapped out to an extent. However, the study of this peculiar moment also shows how tentative the process was, and how difficult it was to translate the articulation of the issue outside the consultation itself, and to use it to redesign incentives.

⁵ Marres defines a community of strange things as « a relation, or rather a tangle of relations, among entities that do not belong to the same social world but are connected through an affair that affects them jointly. » (Marres 2005, p. 58)

Barry (2001) defines “politics” as a way of codifying particular forms of contestation which role “is not generally to produce dissensus and controversy, but to contain and channel it in particular directions” (p. 208). He opposes it to “the political” defined as an index of the space of contestation: an action is political, he argues, “to the degree to which it opens up new sites and objects of contestation” (p. 194). In this sense, FITs are indeed political: they triggered overflows that culminated in a crisis, turning PV into an object of contestation and a matter of concern gathering people and organisations that previously rarely interacted. The consultation can be read as an attempt by the government to steer contestation towards a codified, familiar space of politics. Yet, at the same time, it provided a setting for the expression of contestation and its channelling in a potentially original form. The redesign of incentives that followed, however, was a clear move back to the familiar tools of “politics” aimed at closing down the space of contestation that had just opened.

In the next sections, I will first retrace the series of events through which the unintended consequences of FITs led to the call into being of an “emergent concerned group”. I will then focus on the consultation itself, highlighting the dynamics of issue articulation and re-gauging of information and expertise that occurred then. Finally, I analyse the outcome of the process as an alternative articulation of the issue and a temporary shift in the balance of uncertainty.

2. French FITs in crisis

2.1. The 2006 FIT

Incentives for the development of photovoltaic (or, in legal term “electricity produced using the sun’s radiative energy”) in France are framed by the 10th February 2000 Bill on the modernisation and development of the electricity public service, which defines the overarching objectives, the mode of financing and the economic instruments available for the development of renewable energy technologies. This bill created an obligation to purchase electricity generated from renewable energy sources, opening the door to FITs, as well as the possibility to suspend the aforementioned obligation by decree in the event that “it no longer corresponded to the objectives of the multi-year planning of investments”.⁶

Within this frame, a feed-in-tariff for photovoltaic was set at a level of 15,25 c/kWh in March 2002 (MEFI 2002). However, it was not until the doubling and the level of FITs and the creation of a premium for building-integrated photovoltaic (BIPV) in July 2006 that the conditions for the emergence of a grid-connected PV market in France were met (MEFI 2006a).

Inspired from the German precedent, the French 2006 FIT is a price-based incentive that provides potential investors with guarantees that the electricity produced will be bought at a fixed price for 20 years. For the mechanism to function, the FIT level needs to be high enough to ensure the profitability of projects – which is why the 2002 FIT did not lead to any significant increase in PV projects. Conversely, if it is too high, it can lead to windfall profits. In line with economic theory, the 2006 FIT provides no certainty on the volume of projects that will be carried out: the only way to control this volume is to re-adjust the level of the tariff as it goes.

⁶ Loi n°2000-108 du 10 février 2000 relative à la modernisation et au développement du service public de l’électricité, article 10.

As opposed to the 2002 FIT that was set to decrease by 5% every year, no adjustment-mechanism is embedded in the tariff: the FIT is indexed to inflation, but does not take into account the cost decreases expected from technology deployment. This resulted in a slight increase between 2006 and 2010. The 2006 scheme also introduces a fixed premium for BIPV to take into account the extra-costs induced by such systems. Last, the level of the FIT from which a specific project will benefit is set at the date of the request of the purchase agreement, which leaves even less visibility over the volume of projects that will be carried out and when – and hence, over the total cost of the incentives.

Several features of the FIT were criticised by the Commission de Régulation de l'Énergie⁷ (CRE), which emitted a negative opinion on the FIT design. The CRE considered it too high compared to avoided costs, environmental externalities and other positive effects; in the light of the pace of innovation in PV technologies, it underlined the risk that it lead to massive installation of expansive, soon-to-be obsolete PV systems; it also deemed the BIPV premium too high and not necessarily relevant (CRE 2006). The FIT design was, however, maintained as it was. This probably owes to the fact that the government did not expect the development of PV to have any significant impact in the short to medium term. Scenarios used at the time assumed that PV development would mostly occur in overseas territories and zones not connected to the central grid and would not lead to more than 500 MW of installed capacity in 2015 (MEFI 2006b). The support of PV development was considered a marginal policy.

2.2. Market changes

Things shifted between 2007 and 2009 as political focus on environmental and climate-related issue increased both at the national and at the European level. The negotiation of the European Energy-Climate Package, as well as the creation of a Ministry in charge of both Energy and Ecology, and the Grenelle de l'Environnement process all contributed to spur the development of renewable energy policy in France.

Meanwhile, the development of PV was catching up quickly with the 2006 objectives.⁸ It was now considered as a still expensive and marginal but very promising energy technology that was gaining research and industrial importance. Along this line of reasoning, FITs provided a way to develop a market that would allow for the emergence of an industry, provide an outlet for R&D, and thus ensure that France stayed in the race. As a research intensive, promising technology, photovoltaic could serve as a figurehead for renewable energy development, all the more because the fulfilment of its great potential still seemed relatively remote.

At the time, the PV market underwent radical changes. The price of PV modules had remained stable between 2004 and mid-2008 because the shortage of polysilicon constrained production, while German and Spanish incentives made it possible to buy the technology at that price. Driven by the expansion of polysilicon production and downstream manufacturers, it fell from \$4.00/W in 2008 to \$2.00/W in 2009 (Bazilian et al. 2012). PV

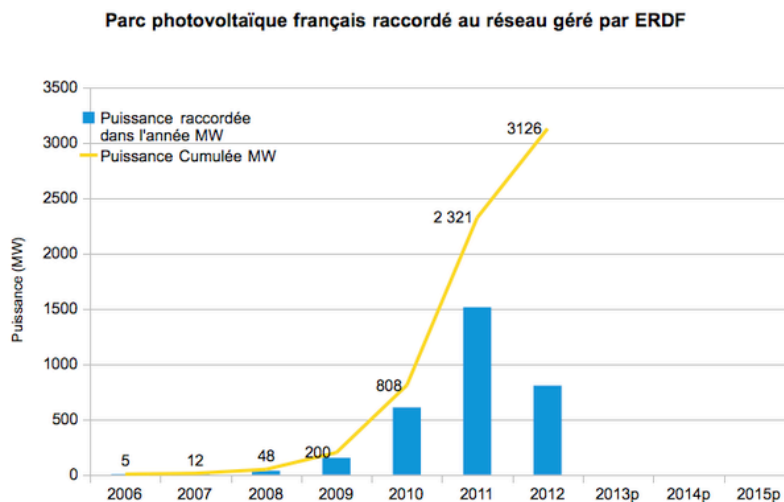
⁷ Energy Regulation Commission, the body in charge of regulating energy markets, which emits a consultative opinion on administrative decisions pertaining to energy regulation.

⁸ The dynamism of the sector was highlighted in several reports, e.g. Grenelle de l'Environnement 2007 ; MEEDDAT 2008 ; MEEDDAT 2009 ; MEEDDM 2009.

modules prices have remained on a sharp decreasing trend since then and were falling by around 20% a year between 2009 and 2011.⁹

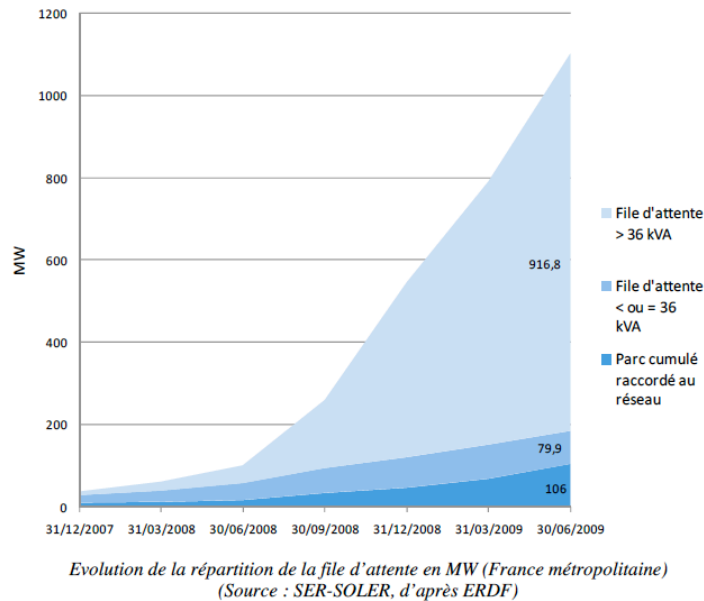
Because incentives remained high, return rates for photovoltaic projects in French went flying through the roof. In December 2008, a 50% fiscal credit for photovoltaic projects on individual houses was adopted. Combined with the FIT, which now amounted to over 60 c€/kWh for BIPV, this set French incentives for PV among the most attractive in Europe. Lifted by a growing and diverse community of subvention-fuelled project developers, the market swelled out of proportions. The generosity of the incentive scheme allowed new actors to enter the market and a wide variety of business models to develop: large-scale ground-mounted solar plants, rental of the roofs of farm buildings to install photovoltaic panels on them, BIPV on large public buildings, installations on individual houses, etc... Photovoltaic had largely turned into a financial product, an extremely profitable and secure investment with Internal Rates of Returns as high as 25% in certain case. The supply and demand generated by subventions were increasingly articulated in terms of financial and economic profitability (Debourdeau 2011a).

Indeed, though the increase in newly connected installations remained reasonable in 2008 and 2009, the number of purchase agreement requests rose exponentially: high FITs were secured with no guarantee on whether and when projects would be carried out, at a time when installations costs were decreasing extremely fast, feeding a bubble.



PV capacity connected to the ERDF grid in France (photovoltaique.info)

⁹ PVX spot market price index solar PV modules, Solar Server, last accessed 04/09/2013 : <http://www.solarserver.com/service/pvx-spot-market-price-index-solar-pv-modules.html>



Evolution of the waiting list in metropolitan France (SER 2009)

2.3. MisFITs

The first concerns on the mismatch of incentives arose in 2009. The brutal collapse of the Spanish photovoltaic market, triggered by the suppression of incentives in 2008, served as a first warning sign (Poignant, 2009). In late 2009, EDF, forwarding information from the grid operators, warned public authorities about the increasing monthly flows that it could hardly manage; the administration sent notes to the Minister of the Ecology's staff, while local governments (especially in the south of France) were overflowed with paperwork.¹⁰

2010 was thus a year of in-the-field experiments in reframing incentives to realign their effects with their initial objectives. Regulatory proliferation added to PV projects proliferation, each reinforcing the other. The fiscal credit for individual households was decreased in January, and two targeted FITs decreases affecting specific categories of projects came into effect in January, then in August. Yet, as they were announced several months ahead, they only incited developers to rush for the high FITs while they were still available. On top of that, the government released a large number of circulars and notes aiming at clarifying the increasingly refined – and so increasingly confusing – picture of PV incentives, which mostly resulted in making things even more tangled, adding layer upon layer of regulatory bodies, texts, categories and guidelines that never quite managed to thwart the multiplication of projects.

Concerns at the political level thus kept rising over the year and the issue was moving up on the agenda by the last trimester of 2010, with the Ministry of Finance and the Economy starting to push for a moratorium in the face of rising costs. Yet, Jean-Louis Borloo, the Minister for Ecology, Energy, Sustainable Development and the Sea, dismissed alarms and kept its political stance in favour of renewable energy development.¹¹

¹⁰ Interviews with EDF, EDF AOA, civil servants at the DGEC and Ministry of Finance, Regional civil servant in Midi-Pyrénées.

¹¹ "The troubles encountered are at the margins. [...] Developing the photovoltaic sector by 500% was the only way to meet our objectives. The fact that we reduced by 12% part of the tariffs does not mean that we are not controlling growth" (Assemblée Nationale 2010a)

The financial dimension of photovoltaic support was eventually gained importance when Jean-Louis Borloo left the government in November 2010. As an electoral period drew near, the main concern was now the impact of FITs on the electricity bill – a particularly sensitive issue in France, where cheap electricity is considered a key asset.¹² The issue moved to the Prime Ministerial level, where drastic action was taken. On December 2nd, a press release announced an imminent transitory suspension of new projects registration, as well as the organisation of a consultation with stakeholders to find a new balance that would respect “the objective of 500 MW of new photovoltaic each year, and protect consumers by allowing for the control of the evolution of the price of electricity”.¹³

By suspending the attribution of FITs and defining which projects would be affected by this suspension, the government opted for the solution that entailed least uncertainty and momentarily took back control over the volume of projected installations. It affirmed its will to bridle volumes and not just meddle with prices hoping it would steer development in the intended direction.

The moratorium was a shock for the photovoltaic sector and violently disrupted it. It constituted a threat on the very existence of many actors of the emerging photovoltaic industry, and reactions to it outline the tragic dimension of this episode. The government’s panic had transferred to the sector, and anxiety was at its peak.¹⁴

Yet, despite the tension that it triggered, the moratorium was also a way to buy time from the relentless dynamic of PV deployment, and to cut short to the proliferation of projects, stakeholders and regulations that were making PV un-manageable. As a recognition that the framework called for at least partial redesign, the decision thus opened a window to renegotiate regulatory disposition that the pace of market development would not let be renegotiated.

3. A specific assembly for a specific assemblage

Chaired by two high officials in close interaction with ministers and their staff, the consultation consisted of six thematic plenary meetings scheduled over three months, as well as a large number of bilateral consultations. It was a peculiar moment in that it gathered a large, diverse and passionate assembly in a disorderly manner and in a tense climate. It so made explicit the multiplicity of those affected by the consequences of public support for PV and by the suspension thereof, enacting the chaotic situation and proliferation progressively engendered by FITs for PV and thus providing the space for the tentative emergence of a public. Both the height of a political and sectorial crisis and a unique opportunity for dialogue and negotiation, the moratorium is characterised by a tension between mutual defiance and the need to establish the grounds for trust and compromise.

3.1. Mass and Mess

One of the most striking specificities of the consultation was that it gathered many people who represented a large diversity of organisations and interests. Because of the number of

¹² Interview with EDF, 2012 ; intervention by Daniel Paul, Member of Parliament (Assemblée nationale 2010b).

¹³ Service de Presse du Premier Ministre, Communiqué de Presse, 2 décembre 2010, Paris.

¹⁴ Assemblée Nationale 2010c, interviews with SER, EDF, Hespul, EDF-EN, Enerplan.

participants, as well as of the short amount of time available and the overall tense climate, it was a relatively messy process.

Seventy-four people or organisations were invited to plenary meetings, which took place in one large meeting room in the Ministry of Finance, and fifty-five bilateral meetings were held. Not only the number, but also the diversity of those willing to be heeded or take part in the process were striking. Both were a manifestation of the impact of FITs. FITs had radically transformed the photovoltaic sector, and their generosity allowed a great variety of business models and activities related to PV to thrive and proliferate. The diversity of stakeholders reflected the great heterogeneity of the PV sector.

Because the PV value chain is very segmented, the “industry” was composed of firms operating in very different realms: panels manufacture, system components manufacture, projects development, building... PV electricity producers were equally diverse, since PV installations can take many forms, and the tariff did not exclude any. The community of PV producers thus was not simply constituted of promoters and manufacturers, but also comprised local governments, social-housing promoters, individual households, craftsmen and farmers. Banks and insurance also had an important part to play in the emergence of this market and were thus represented, as were environmental NGOs.¹⁵

As FITs left room for virtually everybody on the market, they had allowed these stakeholders to cohabit in all their diversity without really needing to organise as a constituency. But, apart from their dependence on PV policies, these actors had little in common. They were not used to working together, and had very different, sometimes irreconcilable interests and objectives. This unanticipated myriad of actors thus came in dispersed order. Some of the participants were not accustomed to this type of negotiations and, as the future of their enterprises was often under threat, could take rather radical stances.

All of these factors made the consultation difficult to conduct in a smooth way, and the whole process is often described as a messy, cacophonous undertaking that occurred in a climate too tense to lead to productive discussions.¹⁶

3.2. Established institutions challenged

The defiance and tension that dominated the consultation, at last in its early days, were exacerbated by the uncertainties about the exact status of PV markets, that made it difficult to adjust incentives (evolution of the prices of PV systems, part of the PV chain with the highest added value, number of “real” as opposed to “speculative” projects, number of firms and jobs threatened by the moratorium...). The unanticipated pace and scale of PV development made it difficult to address these uncertainties for two main reasons: the quick and disorganised proliferation of projects and stakeholders, and the failure of established institutions, representatives and expertises to channel it.

First, the rapid proliferation of actors dealing in PV had blurred the picture, especially when it came to analysing the actual status of PV deployment and projects in France. To assess the cost of support, it was necessary to know which share of the projects registered in waiting lists would actually be carried out. This uncertainty is illustrated by the reference often made to “speculative projects”, supposedly encompassing a large share of the waiting list, but whose origin was undefined. This uncertainty over who had “speculated” and was

¹⁵ A list of participants is available as an annex to Charpin et al. 2011.

¹⁶ Interviews.

responsible for the bubble sparked suspicion and accusations. Besides, the diversity and disorganisation of participants and of their positions made it hard to distinguish between legitimate and illegitimate representatives of the sector and to identify reliable messages from mere lobbying.

This was reinforced by the fact that established institutions had trouble keeping up with the fast development of the PV sector. State officials, electricity retailers and grid operators and traditional representative of the renewable energy sector had not had time to readjust their expertise, tools and discourses yet.

The whole EDF group (EDF, EDF-EN, EDF-AOA, RTE and ERDF) was in a difficult and ambiguous position since it included entities with different and potentially conflicting mandates and interests. Added to the historical proximity of EDF with the government, this triggered suspicions of collusion of interests.¹⁷

The government and the administration, on their part, did not seem to have anticipated the impact of FITs, and lacked human resources to tackle it. The government was also largely blamed for its erratic management of incentives during the previous years. The brutality of the moratorium definitely undermined trust in its ability and/or will to steer the PV industry towards prosperity.¹⁸

Last, the main representative of Renewable Energy professions, the Syndicat de Energies Renouvelables (SER), was challenged in its representation and mediation role. The recent evolutions of the PV sector had transformed its membership basis, now dominated by project developers and promoters whose best interest was that tariffs remain as high as possible. This undermined the trust that the government and the administration had in the SER, who appeared to them as protecting the interests of those who had reaped most benefits from the misalignment of FITs. On the other hand, as a well-established syndicate, it had a large and diverse membership, including large energy firms (EDF, GDF...) and a history of working closely with ministries. It was thus perceived as a moderate actor, and many of the new, more radical players felt it failed to represent their interests faithfully, hence the proliferation of associations that further undermined the SER's legitimacy as *the* representative of the PV sector.¹⁹

As a result, no competent authority stood out as a potential legitimate arbiter, and the debate was levelled as boundaries between legitimate and illegitimate representatives and expertises were shifting.

3.3. Focusing disagreement over a shared matter of concern

The consultation thus started on shifting grounds, but allowed for the emergence of a shared expertise that ultimately manage to stabilise controversies and focus disagreement. In this sense, it can be analysed as the emergence of a public in-the-making (Marres 2005). Since a clear analysis of the situation had not been established yet and given the diversity and unruliness of the participants, virtually everything was contested or contestable and there was no predefined hierarchy of matters under discussion. What was at stake was the (re-)alignment of objectives, instruments and policy design and actual PV development. The debates and hesitations that occurred show how the details of market design, the

¹⁷ Interviews with SER, Enerplan and EDF 2012.

¹⁸ Interviews with SER and Enerplan, 2012.

¹⁹ Interviews with SER, Touche pas à mon Panneau Solaire, EDF and DGEC, 2012.

establishment of some actors and their claims as legitimate, and the elaboration of policy objectives structured each other.

There is no space here to give a precise account of all the issues raised during the consultation, which are detailed in the report that concluded the process (Charpin et al. 2011). Yet, in spite of the tension and disorder of the consultation, the assembly managed to articulate a range of key concerns and uncertainties regarding the emerging PV economy along three main axes: the qualification and quantification of the photovoltaic market, the stabilisation of the sector and the market and the re-establishment of trust, and the determination of where value lies and how to capture and distribute it in a way that justify public support.

Table 1 Key issues and uncertainties discussed during the consultation

	Evaluation	Organisation	Distribution
Waiting list	Share of projects that will be carried out Length of grid-connection delays (i.e. when will FITs need to be paid)?	Improving transparency Delays and rules to ensure the seriousness of Projects and secure registered projects	Who should be impacted by the moratorium? How to make the difference between “good” and “bad” projects?
Structure of the industry	Obtaining reliable data on costs and prices Status of the French PV industry and impact of the incentives on it. Share of importations Added value of the different segment	Certification and labels Instituting reliable representatives and spokespersons	Choosing which segments to develop (R&D, panel production, project development, installation...)
Development targets and categories of installations	Level of targets Quantifying the current state of PV development Prices of different categories of PV systems	Nature of the targets Categories of installations in relation to targets and incentives	Objectives of PV development targets Splitting targets among categories How much more can we afford?
BIPV	Cost of BIPV Impact of BIPV on domestic PV industry	Setting clear rules and procedures to evaluate BIPV Standards, labels and certification	Should BIPV be supported or not? Does it help developing a domestic industry or does it just make PV more expensive?
CSPE	Calculation of the actual costs of PV (avoided costs, grid connexion and management costs...)	Link between the CSPE and the PV development targets	“How expensive is too expensive?”
Structure of incentives	Adjusting the level of FITs to the price of PV Parameters for the calibration of incentives	Ensuring visibility on the evolution of incentives Adjustment mechanisms or procedures	Types of incentives Criteria to benefit from incentives

Such negotiations implied the re-articulation of the collective at work. On most of these issues, no consensus was reached, but concerned actors and what they stood for were identified, and areas of convergence and divergence were specified. In short, the consultation forced the diversity of actors concerned by PV into talking. The shock of the moratorium generated a form of solidarity, and the work of articulating discussions along a

few key issues and axes allowed for the elaboration of a common language and, in some instances, of a common ground. Groups and federations such the Association des Industriels du Photovoltaïque Français (AIPF) or the Etats Généraux du Solaire Photovoltaïque (EGSPV) emerged during the consultation or in its aftermath to channel and strengthen positions. In spite of its difficult start, the moratorium thus made it possible for a public to start emerging and focusing disagreement.

4. A paradoxical outcome

4.1. The new FIT

Yet, most participants agree in their analysis of the consultation and of its outcome as a disappointment, or even a deception: no one was listened to and everything had been decided ahead, they say.²⁰ This reaction can be at least partially accounted for by the outcome of the moratorium that ended with the publication of an administrative order defining a new design for FITs.

The new scheme is designed to support the installation of 500 MW of new capacity each year - and no more.²¹ PV installations are divided into a dozen of distinct categories, each submitted to a different regime. FITs are restricted to small-scale BIPV and are set to automatically decrease every three months, on the basis of cumulated purchase agreement requests for a specific categories of projects: the more projects in the waiting list, the sharper the decrease. This mechanism is supposed to provide for the necessity to adjust FITs without recourse to political management (MEEDDTL 2011). For larger installations, two types of calls for bids are created: an automatic call for bids for medium-capacity installations (100 to 250 kWc), for which the only criteria is the price and a classic calls for bids divided into seven distinct lots for installations over 250 kWc (MEEDTL et MEFI 2011).

Because of its complexity and mathematical sophistication, this new scheme - and especially the new FIT - was not only analysed as a serious restriction on PV development, but also as an achievement in technocratic, engineer-led policy-making.

Type d'installation (Critères techniques)		Tarif en €/MWh		
Installations sur bâtiments		Bâtiments à usage d'habitation	Bâtiments à usage d'enseignement et de santé	Autres bâtiments
Intégration complète	$P \leq 3 \text{ kWc}$	460	406	352
	$3 \text{ kWc} < P \leq 9 \text{ kWc}$	460	406	352
	$9 \text{ kWc} < P \leq 36 \text{ kWc}$	403	406	120
	$36 \text{ kWc} < P$	120		
Intégration simplifiée	$P \leq 36 \text{ kWc}$	303,5		
	$36 \text{ kWc} < P \leq 100 \text{ kWc}$	288,3		
	$100 \text{ kWc} < P$	120		
Surimposition		120		
Installations au sol		120		

FITs by catégories of installations (CRE 2011, p.2)

²⁰ Interviews with FNE, EDF-EN, SER, Hespul, Enerplan, 2011-2012.

²¹ « To put it clearly, the Prime Minister agrees to pay for as much as 500 MW to see what it results in, but no more », Pierre-Marie Abadie, DGEC (Poniatowski 2011).

4.2. Complicated assembly v. complicated formulas

The logic of the new PV support scheme reflected the government's will to master full control of the development of French photovoltaic and its costs. As before the moratorium, it wanted to take a little risk as possible.

The choice to incorporate adjustment mechanisms within the design of economic instruments resulted from the intention to take responsibility for dealing with the uncertainties on the evolution of the PV market away from a concerned collective that seemed too diverse and untamed to reach a reasonable agreement. Though the assembly gathered during the consultation managed to articulate the issue and agree on a common understanding of the state of the French PV market, this articulation failed to survive outside of the microcosm of the consultation. The government decided not to trust this emerging expertise; but neither did it want to take the responsibility of adjusting FITs and steering the market upon itself. It thus delegated this responsibility into a set of mathematical and legal devices apparently considered as the fittest way to keep track of the dynamic of the PV market. Provided that they were well calibrated from the start, such stand-alone mechanisms are not supposed to require any further intervention.

Yet, this initial calibration requires a form of negotiation and expertise, if only to distinguish between the specificities of different categories of projects. The sophistication and refinement of the scheme may not have been possible without the consultation. Besides, the success of the calibration can only be assessed through experience, and, in that, the emergence of a structuring, potentially contesting during the consultation may play an important role.

4.3. Balancing uncertainty

The moratorium and consultation were characterised by an oscillation between two opposite but to an extent complementary ways of addressing the uncertainties related to the emergence of the hardly-predictable policy-driven PV market.

The consultation focused disagreement and allowed for the start of an organisation and stabilisation of the actors concerned by PV through the process of public constitution and issue articulation (Marres 2005, 2007). The government's way of circumventing asymmetries of information through the use of mathematical formulas and legal devices was an attempt at containing and channelling contestations and market uncertainties through the use of familiar policy-engineering techniques, that is what Barry calls "politics" (Barry 2001). Both grapple with the same need to ensure enough stability and flexibility so as to steer the development of a market and an industry in a highly uncertain context. The fact that none perfectly manages it gives an idea of all the work and hesitations of market-making: stabilising a market while guaranteeing a fair allocations of costs and benefits appears as a complicated, risky and highly conflictual endeavour.

In fact, the issue was not so much to reduce uncertainty as to identify its sources and, most importantly, to allocate the burden of uncertainty. The March 2011 administrative order marks a shift from a situation in which virtually all the consequences of uncertainties were on the government's side to one in which the government took all the guarantees. The de-publicizing character of the new support scheme reinforced this imbalance. Incorporating the task of tracking market evolutions and adjusting incentives to them into mathematical

and legal techniques was a way to stabilise things and to circumvent the need to constantly review and update support. However, it also made it more difficult for alternative proposals to be taken into account and for potential flaws to be corrected quickly, thus introducing a new source of inertia. As a result, it is uncertain whether it is a more sustainable way of supporting PV. The critics voiced against it and the recent punctual modifications made to FITs design suggest that it may not be.

5. Conclusion

Relying on theoretical developments in ANT that can help articulate the links between market emergence, technologies and politics, this paper traced back the emergence of French photovoltaic since the setting of the 2006 FIT. Through the study of the constitution and evolution of this policy-driven market, it explored the interdependent dynamics of policy- and market-making.

The combination of a rather generous incentives scheme and of sharp cost decreases on the global photovoltaic market allowed the French photovoltaic market to take off in between 2008 and 2010. The paper showed how this led to a deep destabilisation of the policies supposed to steer the market that in turn led to a moratorium that violently disrupted the French photovoltaic economy, underlining the “political” character of FITs. It then focused on the consultation that was organised during the moratorium as a manifestation of the chaotic state in which the PV sector found itself, but also as the arena for articulating the issue of PV development in France and the heterogeneous collective of actors concerned by it.

Indeed, the generosity of FITs had spurred the proliferation of projects and stakeholders without inciting them to organise, since it left room for everyone. The consultation made it possible to take the measure of this diversity and of the difficulties it posed. Started in a tense climate in which established authorities and representatives were challenged by a disparate assembly of newcomers, the consultation still managed to focus disagreement within an assembly of actors that had little in common, apart from their dependence on FITs. FITs and the crisis they triggered provided the (intensely political) space for the emergence and tentative articulation of a concerned collective around the issue of PV development.

However, as the paper show, the outcome of the moratorium was a new FIT designed precisely so as not to require any further intervention, and left most (if not all) participants with a taste of disappointment. The moratorium, the consultation and the administrative order that concluded them can be analysed as attempts to address the unexpected entanglements and uncertainties related to French PV. Looking at them as tentative articulations of the issue of photovoltaic, the paper highlights the difficulties in establishing and regulating a sustainable, reliable market and policy setting around a relatively new technology.

Rather than resulting in the constitution of an organised public for photovoltaic (though it contributed to it), the 2010-2011 crisis allowed for the enactment, then clarification, of the chaotic situation in which French photovoltaic had found itself. However, the outcome of the moratorium, a very strict incentive schemes through which the government hoped to retain maximum control over the development of the technology, suggests that the negotiations did not aim at reducing uncertainties so much as to allocate the risks resulting

from them. Facing a diverse assembly that had been able to focus disagreement but not to reach a consensus, the government thus chose to maximise guarantees on its side. In this sense, the case of French PV provides an interesting oscillation between “politics” and “the political” as defined by Barry, that is between the closing and opening of spaces of contestation. This oscillation could be further studied by looking at the undergoing evolutions of French PV policy, which I have not addressed in this paper.

Annex : Evolution of the regulation of PV support in France, 2002-2010

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010						
Texts	13 March 2002 <i>Arrêté</i>				10 July 2006 <i>Arrêté</i>		30 December 2008 Act: Fiscal credit for individual households PV projects								
									12 January 2010 <i>Arrêté</i> , 16 March 2010 <i>Arrêtés</i>	31 August 2010 <i>Arrêté</i>					
FIT levels in continental France (c€/kWh)	< 5kWc (individual households) < 1000 kWc (collective or professional buildings) < 150 kWc (others)			15.25	Standard	30	30.520	31.193	31.502	BIPV ≤ 250 kWc	Residential	58	< 3kWc	58	
	Other			4.42	BIPV premium (25c€/kWh)	55	55.964	57.187	60.176		Other	Educational and Medical	58	>3 kWc	51
												Other buildings	50		44
												Simplified	42		37
												≤ 250 kWc	31.4	27.6	
												≥ 250 kWc	31.4 x C	27.6 x C	
FIT levels in overseas territories	< 5kWc (individual households) < 1000 kWc (collective or professional buildings) < 150 kWc (others)			30.50	Standard	40 (initial value)				40		35.2			
	Other			5.34	BIPV premium (15c€/kWh)	55 (initial value)									
Cumulative installed capacity (MWc)		1.5	2.7	8.2	13.0	24.5	69.0	269.0	1054						

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