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Assetization

Turning Things into Assets in Technoscientific Capitalism

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6 Turning Sunlit Rooftops and Windy Sites into Energy Assets

Alain Nadaï and Béatrice Cointe

Introduction

In their introduction to this book, Birch and Muniesa define assets as things that "can be owned, traded, and capitalized as a revenue stream, often involving the valuation of discounted future earnings in the present." They insist that assets "are made" and are not "the consequence of some inherent or embodied quality." In charting dimensions of the asset form to be explored, they emphasize the legal, economic, and financial dimensions.

This chapter aims at advancing our understanding of the ways in and through which assets are made and what it means precisely to say that they are "made." In order to explore these questions, we start from two case studies of politically engaged renewable energy (ReN) development projects in France: a mutualized photovoltaic (PV) project—the Fermes de Figeac—carried out by farmers in the Lot department (Cointe 2016, 2018), and a wind farm "repowering" in a European migratory corridor involving bird watchers and a wind power developer in Narbonnaise, Languedoc-Roussillon department (Nadaï and Labussière 2010).

The current framing of renewable energy development by policies such as feed-in tariffs (FITs)—investment subsidies in the form of a guaranteed fixed tariff for a kWh of electricity generated from renewable sources—makes the financial dimension a central part of current ReN development. Policies such as FITs are designed to attract investment in the sector by guaranteeing a stable revenue stream in the mid-term future (e.g., twenty years or so).

Based on these two case studies, we empirically analyze the process of constituting qualities that allow parts of the environment—wind, sun, a roof, a site—to become owned, capitalized as a revenue stream, and possibly

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traded. In particular, we explore the territorial, spatial, and political dimensions of this making and their articulations in forms of calculation, aspects that have not been much covered by the literature interested in assets and assetization processes (see Buier, this volume).

At the core of ReN development is the work of turning things such as sunlit roofs or windy sites into productive entities—solar roofs or wind farms producing ReN kilowatt hours—through the siting of material devices (PV panels, wind turbines) (Nadaï et al. 2018). The resulting entities convert an untamed flow (sun, wind) into electricity dubbed "renewable" and, in the current French policy context, eligible for stable remuneration (feed-in tariff). They produce value in the form of marketable electricity. They are thus valued in different ways. For instance, investors may regard solar roofs or wind farms as potentially profitable opportunities to invest in. In certain cases, they may gauge the financial viability of a ReN developer by considering its ongoing (productive) solar/wind farms portfolio. Sometimes solar or wind farms can even be traded over the counter by ReN developers in order to fine-tune their project portfolio and improve their worth for potential investors. Like assets, they thus articulate different types of revenues—that is, profits and rents (Birch and Tyfield 2013).

The work of assembling productive-enough ReN entities commonly falls under the heading of project development. The project has a multiple existence as a social, technical, territorial, financial, legal, and regulatory entity. A successful ReN project incorporates and articulates all these dimensions together. For example, the siting of wind turbines must be rendered compatible with ongoing uses of land, landscape, and air and with administrative requirements. The scaling of the project must allow for sufficient return on investment in order to attract investors and to permit the financing of the project. In certain cases, project design must allow for sharing the value derived from ReN production.

Hence, developing a project requires engaging things—roofs, sites, turbines, PV panels, but also wildlife, landscape, and so on—in hybrid "agencements" by requalifying their preexisting usages and/or users. Callon (2008) defines an agencement as a hybrid ensemble; it foregrounds both materiality and the fact that agency is distributed and derives from the relations among hybrid entities. In what follows, we do not approach assetization from the exclusive perspective of financial calculation, which is only a part of the work of financialization (Chiapello 2017). Drawing on Leyshon and

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Thrift (2007), we are interested in the articulation between the agencing of productive activities and the work of financialization (see also Gilbert, this volume). We thus look at ReN projects development and consider the extent to which the requalifications at work in these developments bear the imprint of financialization and capitalization, conceiving the latter as a multidimensional, cultural process (Muniesa et al. 2017).

Our case studies allow us to describe the socio-technical and economic reconfigurations through which sunlit rooftops and a windy site are turned into ReN projects and made to generate revenue streams for the developers of these projects and/or for the owners of the roofs/plots of lands. This allows us to discuss three aspects of assetization and the asset form: (1) the relational work through which assetization articulates different entities and types of values, financial, territorial, and political, leading to the suggestion of talking of *assets-as-agencements*; (2) the specific role of the state (through feed-in tariffs) in setting the conditions for entities such as wind turbines /sun roofs and sites to be engaged in assetization processes; and (3) the uneven extent to which the work of financialization underpins that of assetization.

The chapter is structured as follows: the first part sets the analytical frame, the second and third parts present our case studies, and the fourth part draws on these presentations in order to discuss the three insights this chapter brings to the discussion about assets forms—assets as agencements, the role of the state in triggering assetization processes, and the articulation between financialization and assetization.

Assets as State-Triggered Agencements

As developed in the introduction to this book, several dimensions of assets have been outlined in the literature. Within the wider literature, three sources of inspiration are important for this chapter.

The first is the work of Leyshon and Thrift (2007) proposing to address the way in which financialization may steer and reframe mundane economic practices and also the spatial, global, geographical dimension of assetization. The authors study the search for new, sometimes unexpected, spaces that can yield dividends and be constructed as assets, a proposal which resonates with the search for windy or sunny areas in our case studies. The authors emphasize securitization—the pooling of ordinary sources of income along dimensions of risk and rewards—as the way capitalists have

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to construct predictable income streams and construct ordinary activities as collateral in their search for capital. Entities that were there as mere sources of revenues, not worth capitalization, become assets through their requalification (assessment/sorting), pooling, and articulation within the financial system. Financialization can end up imposing conditions and requirements on the way in which these sources of economic revenues are managed.

The work of Leyshon and Thrift is inspiring because of its emphasis on the geographical dimension of assetization (the search for new spaces for development). Yet our analysis does not focus on the global geography of financialization. We target instead a local, spatial dimension of assetization, which has not been addressed in the literature. Similarly, rather than securitization, our case studies involve only some type of pooling. The construction of predictable income streams mainly operates through feed-in-tariffs, which trigger investment in the development of concrete economic activities (ReN projects) with simultaneous productive, territorial, and political dimensions. Hence, central to our exploration are the relations between these different dimensions and the multiple values associated with them, and the relations between these values, the financial dimension, and the role of state public policy (see Milyaeva and Neyland, this volume; Williams, this volume).

Chiapello (2015, 2017) has described the work of financialization, including that of public policy. She shows how the financialization of public policy may change the definition of domains of activities, objects and professional practices: what she calls "colonization"—that is, when the values and practices of financialization penetrate deep into the core of practices, values and meaning. In so doing, she points to the upstream expert work of explicitation (Muniesa 2014; Muniesa and Linhardt 2011), which interprets these domains of activities, objects, or professional practices in terms of risks to be quantified and monetized so as to translate them in terms of investment choices and profitability. Here again, Chiapello mainly insists on the relation between financialization and the language and categories of accounting, while our case studies foreground territorial and environmental dimensions. They thus invite us to explore the way in which explicitation and/or colonization amounts to a work of hybridization between heterogeneous values and entities. This connects our analysis with an argument in STS about marketization processes involving multiple values and valuations (e.g., Callon 2008; Callon et al. 2013; Geiger et al. 2015), and shows how assetization may gain in being approached as a relational work of agencement.

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Last but not least, as feed-in-tariffs foreground the central role of the state in channeling money flows toward certain things (renewable energy production), our case studies offer an occasion to reflect on the role of the state in setting up the actual flows of money necessary to make financialization happen. Boltanski's and Esquerre's (2016) work about the "economy of enrichment"—an economy of constructing value from and around already existing objects—offers a good perspective for reflecting on these matters. The authors characterize assetization as a process of constructing new value out of already existing objects by engaging them in a future-oriented narrative. The economy of enrichment then plays with difference (between these objects and others) and time (horizons, future revenues) to enrich these objects. Interestingly, analyzing the setting up of feed-in tariffs along these lines allows us to specify the role of the state in differentiating ReN from other resources and in channeling money flows to ReN projects to make their future value predictable. This has two advantages. It allows us to link the limited need for financial calculation in our case studies (e.g., no genuine securitization) to the state-backed promise of value. It is also an invitation to understand better the politics allowing for such a promise of value and for its implementation in actual money flows.

Mutualizing Sunshine

Our first case study is a photovoltaic (PV) project initiated in 2008 by an agricultural cooperative in southwest France, the Fermes de Figeac. It was made possible by feed-in tariffs for PV-generated electricity, which were very high in France in 2008 and thus promised high rates of return. At the same time, the project took part in the cooperative's broader strategy of territorial innovation and development. Feed-in tariffs were particularly high for building-integrated photovoltaics: large sunlit rooftops thus became a potentially profitable resource. The cooperative's idea was to pool rooftops owned by farmers in the area and to install photovoltaic systems on them to constitute a scattered photovoltaic park that would be managed in a mutualized way. The objective was to yield income—for farmers, for the cooperative, and for reinvestment in other territorial projects—from a resource that feed-in tariffs suddenly made financially interesting, but in a way that reassured the cooperative in its commitment to mutualization and helped revive the territory. As long as the resource was there and gained the

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attention of various project developers, the cooperative (and many farmers) thought it better to exploit it in a way that kept profits local.

A company was created specifically for the project. Its capital was constituted by shares held by participants in the project (each participant brought in 20 percent of the amount needed to equip their rooftops with photovoltaics) and by funds borrowed in the form of a syndicated loan. The company signed leases to rent the rooftops and paid for the installation of photovoltaic systems. It also took care of all the administrative and technical procedures (building permits, purchase agreements for the sale of electricity at the feed-in tariff, grid connection). The electricity generated is injected into the grid and sold to EDF (Électricité de France, the dominant French electricity utility company) at the feed-in rate that was in place in 2008 (60 €c/kWh). Income is redistributed to shareholders via rents paid for their rooftops and dividends, with each square meter of photovoltaic panel considered as yielding the same amount. On the balance sheet, roof surfaces were converted into shares (i.e., in investments).

A computation of the average solar radiation in the area and of the feed-in tariff rate projected provisional income, expecting profits after eight years in operation (so from 2017 on). The company is set to be discontinued after twenty years, at the end of the purchase agreements, and the revenue stream was projected until this date. Once the park was installed, the cooperative organized a system for maintenance, hiring an engineer and a technician, and devising software and a communication system to monitor the functioning of the park as a whole. This system of proximity maintenance is a way to maximize profits by ensuring that the park works as well as possible all the time. With this project, the cooperative combined a logic of borrowing and investment—projecting income, assessing risks, aggregating rooftops, negotiating with bankers (who had their own procedure for risk assessment)—with a territorial approach to turn rooftops into a source of monetary value and a source of new dynamism for the territory. The commitment to local development was explicit in the design of the project, since the company's status prevents shares being transferred to "outsiders" (i.e., to anyone without direct links to the rooftops that are part of the project).

Sharing the Wind

Our second case study is a wind power repowering project located in La Narbonnaise Parc Naturel Régional (PNR: "regional nature park"), at the border

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between France and Spain on the east side of the Pyrenean mountains. As one of the windiest places in France, Narbonnaise attracted early interest for wind power development. It was the place where the first, very early industrial wind power project was built in France in 1990, with EU Thermie funding (before any feed-in tariffs were in place). In 2010, a new project proposed the first repowering project in the country (i.e., dismantling the wind farm in order to set up a new one). Neighboring communities shared an interest in repowering the wind farm located on common land, which allowed them a part of the revenues from the farm (taxes, land rents).

As a windy place, the small littoral plain of Narbonnaise is also one of two migratory routes for birds on their way from Africa to Eastern Europe and back. Narbonnaise has a strong political history of bird watching. It was one of the most important places in France where bird watchers met and set up "migration camps" in the 1970s, to attract Europe's and the French state's attention to the traditional hunting of birds of prey, endangered species, and the need for regulatory protection. Migration camps notably politicized birds by counting the population of birds passing through.

The wind power site of this second case study is thus located within a major migration corridor, which made birds an important project adjuster. The project has a somewhat standard financial approach, through the setting up of a private project company by the developer, but is original in two ways. First, its design and siting proposal involved a collaboration between the wind power developer and the local branch of the French bird protection organization (Ligue pour la Protection des Oiseaux, or LPO). Second, part of its benefits were to be shared with local actors—the LPO, a local hunters NGO, a local shepherd—in order to allow for environmental compensation and for the monitoring of the impact of the future wind farm on migrating birds.

As a collaboration between developer and bird watchers, the project design triggered an experiment. The LPO developed a new method for observing birds and connected it with its national strategy in the area of wind power planning and its European network of bird protection NGOs. "Micro-siting," as this method is called, focuses on the way in which birds use a site, including the wind and the (eventual) presence of wind turbines. Unlike usual bird watching methods in the Narbonnaise area, micro-siting is not a census nor is it primarily about counting the size of the migrating species populations. It is about following individual birds so as to understand the way in which they develop strategies in relation to the presence of wind turbines. It is about individual stories, individual or small group

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successes, difficulties or failures in passing through, beside, or over a wind farm. It is about birds' strategies in finding thermals and updrafts, about soaring and gliding. By focusing on individual stories so as to capture birds' intelligence, micro-siting multiplies observations and expands statistical reach, which allows it to translate birds' strategies into indices that are congruent with planning and siting practices. It thus endows birds with new capacities and ventures in evolving the politics of bird protection in the same area where migration camps had politicized it in the 1970s.

With this project and experiment, the developer and the LPO opened access to spaces that were deemed protected because of bird migratory movements in order to turn them into energy productive spaces.

Assetization and the Asset Form

Both case studies foreground the work of assembling productive agencements, which is at the core of project development, and the values that are associated with this work. This allows us to make three main contributions to the discussion about asset forms and the making of assets.

Assets-as-Agencements: A Relational Work

Both case studies show that multiple values are associated with project development. Hence assetization is not restricted to the economic, financial, or legal domains, which is the main focus of the literature (see Birch and Muniesa, this volume). On the one hand, the feed-in tariff model can be regarded as a penetration of market and finance in the sense of a stable remuneration (tariff for twenty years) attached to a stable electricity commodity (a standard kWh injected into the grid, a tradable certificate of "renewable origin") with the objective to trigger investment in and capitalization on ReN projects. Feed-in tariffs offer an opportunity for profit, provided that sun or wind can be turned into standard electrical kWh thanks to electricity producing devices (PV panel, wind turbine). Roofs and sites that were not regarded as value-generating places suddenly become potential sources of income. On the other hand, value making is politically driven. First, because of the various administrative procedures, which make a certain environment or landscape (environmental assessment, visual assessment, physical resource assessment) matter in the process of project development. Second, because of values—such as mutualization in the case

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of Figeac, environment or bird protection in the case of Narbonnaise—which are shared by the actors engaged in these specific processes. Both processes go beyond what is usual or usually required by administrative procedures for the development of renewable energy projects. They can thus be said to be political in the sense that they overcome usual policy frameworks, point to specific issues and invent their way of dealing with project development (Barry 1999).

Nonetheless, in both case studies, the attention and work devoted to project development in the collective or environmental dimension make explicit the *ontological dimension* of this development. What we mean here by ontological stems from a relational approach that sees entities as the product of relations and practical activities (Simondon 1989; Woolgar and Lezaun 2013) and enables research to shed light on ways through which things can be requalified in order to seem the same (Mol 2002; Law and Lien 2013), and to be invested with political or normative capacities (Marres 2012). The productive entities that emerge through these processes do not just connect preexisting entities. They amount to a new relational realm, weaving together what is there (roof, sites), with new value making and sharing devices which include the feed-in tariff, know-how (bird watching techniques, bird classification, affects, mapping, aeolic grid, knowledge of local variations in sunshine) and material devices (PV panels, meters, ICTs, PV panel-cleaning robot, on-site wind turbines, bird watching devices, etc.). By bringing what is there into a new net of relations and qualifications, the new agencement allows entities to become active in a different way, as energy-producing entities.

In Figeac, a first step consists in actively recruiting farmers potentially interested in taking part in a PV project and in assembling a pool of roofs and a collective that can be equipped to perform as a single mutualized project. Material devices such as meters and ICT connection with the PV-farm technicians allow a dedicated team within the cooperative to follow production in real time and to engage farmers in the collective monitoring and performance of the photovoltaic park (they are asked to intervene or check in case of problems). Farmers thus become energy producers. This organization is a crucial part of guaranteeing the stability of the income generated by the rooftops. It also translates into balance sheets: actual production is recorded for each installation and compared against theoretical production. Anomalies in electricity production for individual roofs are

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made visible as differences from the prevision, so that it takes only a few steps to translate them into financial gain or loss (compared with expectations). Roof leasing contracts and share-holding in the PV project (a simplified joint-stock company) turns not only previously unproductive private roofs into shared sunlit productive units but also turns farmers into investors, shareholders, and renters. Share-ownership, however, is bound to the buildings equipped with photovoltaics: only people related to these buildings are entitled to hold shares, and shares cannot be sold without the PV company administrative council's agreement.

In Narbonnaise, the major challenge for gaining a renewed access to the wind is to gain access to the site as a migratory corridor. Reactivating the site as an energy productive entity requires an exploration of the potential for compatibilities between migrating birds and new wind turbines on a finer spatial grain, a novelty at that time. Existing wind turbines are turned into a type of lab-scape for the experiment. Bird watchers hide behind the turbines, observe and follow individual birds in their crossing through the existing wind farm, gauging their individual cognitive/strategic ability to pass through, over, under, or beside the working turbines. The reshuffling of bird classifications (according to crossing ability rather than to statutory protection) and the drawing of ensuing individual bird trajectories both allow for the mapping of migratory micro-corridors, which paves the way for wind farm siting proposals judged compatible with bird migration.

While this opens a new potential for sharing the wind, it raises accountability issues on the part of bird watchers (it requires a follow-up) for birds not to be unduly put at risk. On the part of the wind power developer, this implies a limitation in the size and power of the new wind turbines in order to allow for birds migrating conditions. In this process, entities are not only requalified but also perform differently. Birds overall become more skilled (wind farm compatible). The wind farm overall becomes more compatible with migrating birds. The siting of the turbines compromises between profit maximization and the safety of migrating birds. Its revenue is also partly recycled into onsite bird watching in order to endorse accountability, and partly directed in support of herd grazing in order to improve the habitat for small game, which are prey for raptors and for local hunters whose associations are engaged in a joint EU Life Project. Changes are therefore of two kinds. Some of them are scripted in the very materiality of the project and cannot be changed were the project to be sold to another developer

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in the future. Others are contractual agreements that can potentially be revised in such a prospect.

In both case studies, processes lead to hybrid collectives (farmers/cooperative/energy producers; bird watchers/hunters/wind power developers), hybrid roofs (private homes/energy production homes/revenue earning devices) and hybrid sites (wildlife habitat/agricultural commons/energy production). *Hybridization here is thus a way of accessing spaces* in order to access resources (sun, wind). Spaces that were not producing energy are turned into energy productive spatial agencements (PV roofs, wind farm). Our analysis thus contains a genuinely *spatial dimension* that we have not seen in other analyses of assetization.

Here "accessing" has a double meaning. It means colonizing spaces in the sense of expanding into or occupying spaces, but also colonizing in the sense of changing ways of perceiving, representing, practicing, and performing (Chiapello 2015). These are inseparable, since ontological requalification allows for hybridization, which in turn allows for the spaces to become shared and productive spaces. Roofs (for the collective of farmers in Figeac) and sites (for the neighboring communities in La Narbonnaise) become sources of a stream of future revenue because the set of relations in which they are engaged is changed. The relation of the farmers to their roofs is changed (from property to roof property + PV-roof rental contract + part-ownership of the PV renting entity). The relation of the birds to the site is changed (from protected species/protected site to skilled species/spatially differentiated micro-corridors).

While such requalifications open a spatial access to the resource (sun or wind), they do not imply access to the (future) value set by the feed-in tariffs. The articulation between access to the resource and access to the value set by the tariffs in terms of monetary flows is taken charge of by an organizational and financial agencement: the project company. Neither the roofs nor the site are capitalized as such; neither can be traded as energy producing entities, neither receives flows of money coming from the French state. What receives money in exchange for kWh injected into the grid, what is capitalized, what is potentially traded (but *not actually traded in our case studies*) are the projects—that is, the project companies: the legal entities associated with this materiality and spatial access.

A project company can endorse a variety of forms and status that we cannot detail here (see Poize 2015; Médiation & Environnement 2016;

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Poize and Rüdinger 2014). The simplified joint-stock company adopted in Figeac is only one among many possibilities. Forms and status allow for very different articulations between the collective of actors financially participating into the project, as money lender, shareholder, beneficiaries, and the material, spatial, territorial anchorage of the project. Financial engagement can be tightly tied to material, spatial, territorial participation, as in Figeac, where only roof holders are entitled to hold shares and shares cannot be sold without the PV company administrative council's agreement. In other renewable energy projects, however, financial engagement is kept completely separate from the other dimensions of the project, the developer being the sole project manager.

While project companies can endorse many statuses, they always allow for various types of revenues. One is the discounted income flow as payment for upcoming electrical production. This income can be redistributed among the (varying) parties in the form of environmental compensations (financial support to herd grazing, birds follow-up in the case of Narbonnaise), rents (rooftops, communal lands), per production payment (to the developer or mutualized as in Figeac) through fixed tariffs covering development and exploitation costs, and the remuneration of developers (IRR) and shareholders (IRR shareholders). As emphasized by Birch (2017) and Muniesa (2012), capitalization and assetization are undertaken through such organizational settings and management practices.

Hence assetization is the outcome of relations that can be arranged in different manners. In our case studies, things that become productive are engaged into *agencements-as-assets*. In the examples developed by Leyshon and Thrift (2007), it is the creation of secondary markets and the securitization of assets that turn the original market (real economy) into an asset that can be used as collateral for financial operations (capitalization). In our case studies, roofs or sites are not productive in themselves: they become productive by being woven into a network that connects them to a project company, the electricity grid, the feed-in tariff, and so on. It is thus the project company that makes the site or the roof active and worth capitalization. The extent to which financialization impacts the way in which the roof or the site is rendered productive depends on the type of interweaving that the project company settles upon.

Considering assetization as the outcome of relations that can be arranged in different manners through agencement thus seems important if we want

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to make sense of the significant differences in the relations between projects and finance.

Enriching, the Decisive Role of the State

In many respects, FITs can be considered as capitalization devices in that they are devices which potentially turn a "variety of things… into [assets] that have the power to generate streams of future revenues" (Doganova and Muniesa 2015). Yet they do so in a peculiar way compared with all the examples of sophisticated valuation processes that have been described, such as business models and IPRs, or discounted cash flows calculation in genetic engineering, or pharmaceutical R&D (Doganova 2012), or securitization (Leyshon and Thrift 2007).

With FITs, defined as political and economic arrangements (Cointe, 2014), governments decide and set the value of the future flow of revenue per ReN kWh sold, leaving uncertainties only about the scaling of individual ReN projects and whether or not these will be able to access the spaces (and wind or sun resource) that will make them profitable. Hence, for entrepreneurs, FITs simplify the valuation process to a great extent. Further, with renewable energy sources, especially unavoidable energy sources such as sunshine or wind, the amount of electricity generated can be projected with relatively low uncertainty. For instance, the business plan of the Fermes de Figeac's project relied on two simulations taking into account only two sets of assumptions: average sun exposure and interest rates. The need to undertake complex calculations, to perform a scale or role model, is greatly simplified because the main issue becomes demonstrating that the project will be able to access the space that makes it profitable—that is, both convincing the necessary actors on the local level and gaining the administrative and technical authorizations required. Differently stated, because the value is constructed politically, calculations translating entities in terms of risks and rewards to demonstrate the stability and value of a future income flow are not what requires the most attention. What is crucial is the construction and demonstration of access, chiefly through the very practical arrangement of material and administrative entities. As we have indicated, this work is akin to that of explicitation which implies ontological requalifications while not directly implementing them along (explicit) financial calculations.

On a broader level, FIT can be regarded as underpinning assetization by enriching renewable energies through a play with difference and time

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(Boltanski and Esquerre 2016). The very existence of FITs bears witness to a state's work of (1) setting a difference between renewable energies and other energies, (2) setting the value of renewable energies and stabilizing it over time, and (3) channeling actual money flows to ReN kWh as a delimited object (commodity). As Boltanski and Esquerre point out, making money converge in an object (ReN kWh) makes this object (ReN kWh) generate money (money-commodity-money), turning it into an asset.

Existing analyses of the career of feed-in tariff in France and the European Union (Cointe 2014, 2015; Cointe and Nadaï 2018) testify to the upstream political work that has been required of member states in order to set the tariff in motion. Member states had to legitimate feed-in tariffs as a renewable energy policy instrument before the European Commission, which was desiring to develop the EU as a market economy. This first supposed a differentiation of fossil and nonfossil energies with respect to their environmental and social benefits. It also required making the tariff congruent with the integrated electricity market vision by playing with both tariff design (making it more market-like—that is, responsive to demand and calculation based on externality assessments) and the very definition of what ought to be considered as the (market) value of renewable energies (playing with ideas of costs, such as avoided cost of production, avoided externality, production cost). This process attests to the mutual entanglement of the political and economic orders behind the attribution of a predictable value to ReN production. In addition, member states had to legitimate the necessary money transfer underpinning the implementation of any feed-in tariff on a national level, ranging from electricity consumers, tax payers, or fossil energy producers to ReN developers. In France, this transfer was implemented by raising a tax already borne by electricity consumers. Finally, the tariff was implemented through state enforcement of a mix of property and contract law. While the resource (sun, wind) remained *res communis*, the ownership of its energy ended up being governed by that of the technical device harnessing it (PV panel, wind turbine). Only the owner of this device can contract for the tariff, provided they succeed in getting a construction permit (access to the resource) (Nadaï and Labussière 2017; Nadaï et al. 2018).

As a consequence, the construction of a predictable income associated with renewable energy results from a construction that operates on multiple levels. The very existence of a tariff results from meta-calculation and political and institutional negotiation. It legitimizes a founding difference between

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renewable energies and other energies, and the possibility of stabilizing a value for the former in the future. These are preconditions for assetization to emerge, as suggested by Boltanski and Esquerre (2016). Still, they are not sufficient. The evolving value of a given feed-in tariff (always contracted at a-point-in-time-value for an entire period—e.g., 20 years) mirrors a state's specific objectives for the development of new energies. Important variations may be apt to unsettle the predictability of ReN value. At the beginning of the 2000s (Haas et al. 2004) or more recently for the French PV tariff (Cointe 2015), the instability of renewable energy policies was pointed out as one reason for their slow development. Hence, the impression given by our case studies that there is no need for such complex proof of value or calculation as there is in classical examples of financing innovation (Doganova 2015) is a result of the calculations being the clear product of a multilayered political construction. This construction sometimes succeeds in establishing stable enough time-difference configurations to enrich renewable energies and allow for the relational process leading to their assetization.

Assetization and Financialization

With respect to the financial dimension, our case studies are also specific in two ways. First, because of FITs, there is no (or little) uncertainty as to the future revenue stream that can be derived from these projects once their initial development phase has begun and they have received the various administrative authorizations. So again, as opposed to studies of innovation-based start-ups (Doganova 2012, 2015), what entrepreneurs need to prove to investors is not that there is potential future value, but that they are able to access it—to get the construction permit and grid-connection authorization, to fund the installation of ReN production devices, and to site their project materially. The fact that the future value is defined by public policy to a certain extent alleviates the pressure of financial considerations on project development. Investors can still attempt to play with cost reduction or the scaling of the project in order to increase the project rate of return on investment (RRI), but there is no room or need for a race to the bottom on unit kWh remuneration, which limits the pressure on development costs.

Second, these case studies can be regarded as innovative ReN projects for France (Nadaï et al. 2014) in that they are based on the participation of politically engaged actors—the Figeac agricultural cooperative (mutualization, territorialization), the LPO (bird protection, environmental protection). In

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France, most wind power or PV solar projects are developed by private ReN developers. While developers need to take into account local configurations in order to get access to sun (roofs) or wind (site), profit-making and financial values tend to be more prevalent in project development processes than described here, with less attention and work devoted to the collective or environmental dimension of the projects (see Debourdeau 2011).

Hence, in both cases financialization is limited as a consequence (intended or unintended) of the design of the project. Entities—birds, roofs—are assessed, sorted, and aggregated, but only to a certain extent. While bird protection is reprocessed as to its risks, the gains that ensue from protecting (or not protecting) bird lives is not translated into financial terms nor even into monetary terms. Of course, there is a gain expected by the developer in collaborating in the processing of birds in relation to their risk—the gain in accessing the tariff by getting a construction permit for the wind farm. Yet the gains in protecting birds are not processed through financial calculation in terms of their amount: bird protection is not reprocessed as to its rewards.[1]

In Figeac, there is a pooling of roofs according both to the technical and geographical suitability of roofs as sites for photovoltaic electricity generation and to the contribution of individual farmers to the capital of the project. Holding shares and investing in the project was a requirement for participation, but while there was financial consideration of these investments and their expected yield, the pooling of the farmers' collective and the roofs did not occur according to a computation of financial risk and reward (but rather according to the viability of the project), and the project sought to work with a relatively homogeneous set of roofs in terms of PV potential, contribution to capital, administrative requirements, grid connection cost, and feed-in rate. In a later step, the bank undertook the usual due diligence, disaggregating (roof by roof) and reaggregating (for the whole project) risk assessment, but this had no consequences as to the perimeter of the project. In fact, the main financial risk was that access to the resource (both feed-in tariffs and sunshine) would not be secured, so that little uncertainty remained once the installation was completed.

In neither case, therefore, was pooling run along a genuine reward dimension as described by Leyshon and Thrift (2007) or Eve Chiapello (2017) in their descriptions of the work of financialization. In these cases, we do not see any genuine financial calculation carried out in order to requalify or aggregate entities. Further, while the projects involve financial

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calculations—in Figeac, profits depend on sunshine, and electricity production is recorded as part of the accounting—this does not colonize all the material practices considered: bird life is not monetized, and access to shares is not solely based on financial contribution but rather grounded in local land ownership.

Assetization of renewable energy sources takes place through the setting up of project-specific companies that assemble the roofs or the site and carry out the work of turning them into productive entities. This, and the fact that the income stream yielded by projects is guaranteed by public policies (FITs), echoes Leyshon's and Thrift's examples of the Private Finance Initiatives (Leyshon and Thrift 2007, 105–106). In our cases, however, no secondary markets are constituted on the basis of the stream of income generated by the projects. Assetization is not carried all the way through, since assets are not traded, bundled-up, and incorporated in the international financial system. This owes to the specificities of our case studies but not to the specificities of renewable energy projects per se. It thus raises questions about the extent to which renewable energy projects are actually traded, incorporated in portfolios, or used to back further financial activities or speculation. This would call for a complementary analysis of renewable energy projects carried out by more "standard" developers. Moreover, it goes to show that the asset form is not an absolute and inherent quality (see Braun, this volume). It is rather a state that depends on the net of relations through which assetization is achieved. It can thus be restricted to a specific spatial and political site, as in our two cases, or carried forward by making assets transportable and widely tradable, depending on how assetization is performed.

Conclusion

This chapter has explored the territorial/spatial dimension of assetization processes, a point that has not been covered in the literature about assets. Our analysis shows that assetization cannot be reduced to a process of turning a well-delimited object or entity into a financial product. Instead, it is a process that associates a future value and revenue stream with an object or entity by including it in an agencement. Such relational work has an ontological dimension: it recomposes heterogeneous entities and values together so that they advance and contribute to a shared end. To that extent, things are engaged in assets-as-agencements.

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The chapter describes case studies in which the state has a decisive role in setting a future value and in channeling money flows toward assetized entities. Building on Boltanski's and Esquerre's (2016) analytical proposal for an economy of enrichment, and based on the example of the feed-in-tariff for ReN in France and the EU, the discussion has emphasized the political work required from the state to stabilize a prospect for value and a predictable revenue stream, and attach it to given entities. We emphasized the specific tension raised in doing this within a purported market economy of which assets and assetization are supposed to be part. The tension runs between the work of differentiation allowing for money flows to be targeted at certain things (and not others) and the funding pledge for undifferentiation that underlies the political ideal of free and open competition.

This construction sometimes succeeds in establishing a stable enough time-difference configuration to enrich certain entities and allow for the relational process leading to their assetization to occur. We have shown that this construction then operates on multiple levels, suggesting that assetization processes are multilayered processes. The founding time-difference configuration associated with the adoption of a feed-in-tariff in a country is only a precondition for assetization: it provides only a breeding ground but no guarantee that the relational process engaging things in assets-as-agencement will actually take place.

When this is so, our case studies have shown that the need to prove the future profitability of assets and the work of financialization might be significantly alleviated. While financialization is still at work (for instance, through inscription in the balance book, since the founding difference and the future value have been set at a political/policy level), actors have to prove only that they can access the resource, which significantly reduces the work of calculation. This suggests that asset forms and their construction might be very diverse, and that more analyses of asset forming processes are needed.

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Note

1. This would anyway make little sense as the value of the tariff itself results from a meta-calculation that does not really take the externality of renewable energies into account. The idea behind its value is rather to allow investment to happen, and so to match a sufficient return on investment.

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