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Beyond clusters, the rise of territorial valuation policies?

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BEYOND CLUSTERS, THE RISE OF TERRITORIAL VALUATION POLICIES?

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Abstract. This article pursues to investigate the hypothesis that we are currently facing a change of innovation policy paradigm in a context of post-crisis and ecological transition. Drawing upon the case of *pilot and demonstration* (P&D) projects funded in the framework of the Swiss federal policy for clean technologies, the *Masterplan Cleantech*, traditional innovation policies are reconsidered and broadened. In contrast to conventional R&D innovation policies promoting economic change through knowledge transfers between science and industry, P&D innovation policies contribute to societal change through the co-development and legitimation of new socio-economic values. P&D project translate political discourses into concrete actions. They can be interpreted as 'hybrid forums' creating and enhancing new shared values through controversial discussions and negotiations taking place in concrete contexts of implementation. We finally discuss the theoretical implications underpinned by environmental preoccupations' integration in innovation and competitiveness policies. The term of *valuation policy* is proposed as new pertinent concept to address the future of innovation policy.

Keywords: competitiveness, science-based innovation, transition, value, hybrid forums

1. Introduction

Clean energy is the new 'space race'. In his 2011's State of the Union, Barack Obama recalled American success in after-war's race for supremacy in space exploration to justify an ambitious recovery plan in response to the threatening recession caused by the economic crisis of 2008-2009. In alluding to the strategic public funding provided to research and development – when 'science wasn't even there yet' – that laid the seeds of 'new industries and millions of new jobs', President Obama added belief and credibility to a foreseen yet abstract future.

This historical metaphor is not anecdotic. It actualises a policy interpretation of the new challenges that regions and nations face today for their future economic development. Not only does it motivate a 'green new deal' meant to stimulate employment and economic growth through consequential programs of public spending in the domain of eco-energies. It also views economic success in a new global race for scientific discovery and cutting-edge

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technologies. The 'cleantech' is the purpose and the engine of this new race. Its matter of supremacy is innovation and competitiveness.

These justifications echo over twenty years of public dedication to the support to technological development and territorial competitiveness, which took shape with the advent of the so-called 'knowledge economy'. They recall the fundamental features of what have generically been termed as 'clusters' since Porter's emblematic contributions. Moreover, modelled on the basis of successful industrial productive stories, the cluster approach may be regarded today as a paradigm as it has proved its abiding attractiveness to both scientists and policy makers.

Yet, in a postmodern era in which commodities are more and more chosen for what they represent rather than for their functional properties (Harvey, 1990), the foundational assumptions epitomized by Sillicon Valley's industrial success stories are called into question. Today, we are facing a system change fundamentally characterized by 'user practices and, policy and cultural meanings' and 'consumer moral values' (Aspers and Beckert, 2011; Geels, 2010). Moreover the shift towards more sustainable modes of production and consumption implies complex and multidimensional issues related to socio-technical and institutional dimensions of change (Coenen et al., 2012).

No longer to be found in the post war opposition of two political blocks, the contemporary race for clean energy is a democratized race for a transition to a new social, economic and technological regime involving countries and regions at large. Not confined to various competing territories of technological innovation, it implies a translation, within particular territories of implementation, of broader societal and environmental preoccupations into new socio-economic values. How to revisit territorial competitiveness today and for the future in this broader context? How to reconsider the archetypal technology and cluster innovation policies in regard to contemporary socio-economic challenges and new public initiatives?

This article pursues to investigate the hypothesis that we are currently facing a change of paradigm. We are no longer in a paradigm primarily guided by techno-productive logics of competitive growth characterized both by actors upstream to market and by uncertainties primarily related to economic change. Rather, we are currently going through a phase of transition characterized by post-modern growth agendas combining economic development and well-being objectives aiming to solve long term challenges linked to societal and environmental challenges. Characterized by the involvement of a variety of actors sharing/negotiating a common agenda, transition is primarily concerned with societal change and its related uncertainties. In such a context, meaning and culture constitute primary drivers of transition through the involvement of consumers/users' values and behaviours. As a result, economic value creation derives from complex business models articulated around shared social values entailing indirect monetary revenues while growingly involving territories linked to the consumption sphere.

Drawing upon the case of pilot and demonstration (P&D) projects funded in the framework of the Swiss federal policy for clean technologies (the Masterplan Cleantech) traditional innovation policies are reconsidered and broadened. In contrast to conventional R&D innovation policies promoting economic change through knowledge transfers between science and industry, P&D innovation policies contribute to societal change through the co-development and legitimation of new socio-economic values. P&D project translate political discourses into concrete actions. They can be interpreted as 'hybrid forums' (Callon et al., 2001) creating and enhancing new shared values through controversial discussions and negotiations taking place in concrete contexts of implementation. We finally discuss the

theoretical implications underpinned by environmental preoccupations' integration in innovation and competitiveness policies. The term of valuation policy is proposed as new pertinent concept to address the future of innovation policy.

2. From innovation to transition policies

2.1. Innovation and competitiveness: a hegemonic model of development

Since markets opening over twenty years ago, 'competitiveness', both as a concept and as a policy creed, has growingly polarized scientists, economists and policy experts' attention on localization's importance (Lazzeretti et al., 2014; Kitson et al., 2004). This interest in geography's impact on economy is not surprising. It comes in at a time of fundamental structural changes implying the interconnectedness of economies and internationalization of exchanges perceived by some as the territorial homogenization of economic activities (Martin and Sunley, 2003). Globalization hence exacerbated positions on the relevance of territories' economic distinctiveness and revived interest in geographically localized 'clustered' firms (ibid.). In 2000, the Lisbon 'growth strategy' moreover marks policy's attention on this issues' significance with its view to make Europe become the world's most competitive and dynamic knowledge-based economy in the world (EU, 2000: 2).

Thus, while competitiveness has constituted an inexhaustible resource for policy makers for over a decade, as a concept it nonetheless has served as a fertile ground for numerous debates (Martin and Sunley, 2003). These debates in turn intrinsically reflect the kaleidoscopic dimension of theoretical approaches on territorial factors of economic performance (Moulaert and Sekia, 2003). Indeed, as Martin and Sunley (2003) eloquently put it in their discussion on Michael Porter's approach to competitiveness: economic competition and its determinants relate in a 'tautological' way. Thus and since Marshall's (1890) seminal works on industrial organizations and their related external economies, a wide range of representative scholars (Porter, 1998; Saxenian, 1994; Cooke and Martin, 2006; Becattini, 1990; Aydalot, 1986; Camagni, 1995) epitomizing various schools of thought (Clusters, Learning regions, Industrial districts, Milieux innovateurs) merged under so-called Territorial Innovation Models (TIMs) (Moulaert and Sekia, 2003), re-opened the way for analysis of productive systems' organization. Even though these schools have given varied guises to territorial models of economic development, they all attach to supply-side and technological development a primary significance in economic value creation.

These approaches are guided by visions essentially concerned with the enhancement of techno-productive capacities in which augmenting export capacities constitutes the main underlying locus of foci. Inherited from Ricardo's concept of comparative advantage, nations and regions are thus viewed to compete through their capacity to increase their export-base market share (Kitson et al., 2004). Yet, contrary to this approach based on static factors of production, today, competitiveness is rather perceived 'as a function of dynamic progressiveness, innovation, and an ability to change and improve' as the main advocate of this idea, Porter has stated (Kitson et al., 2004: 993).

It is thus through processes of cumulative scientific knowledge that innovations constantly upgrade and that productivity, thus export capacities, is increased. Technological innovations in these models thus emerge as a result of close links tied through 'regional solidarities' between research institutes, firms and public actors also conceptualized as 'triple helix relations' (Etzkowitz and Leydesdorff, 2000). Besides, these models view innovations in a functional perspective: needs are given and innovative goods and products constitute a means of answering consumers' 'insatiability' (Jackson et al., 2004). In line with this view,

users/consumers select between ‘good’ and ‘bad’ innovations and thus occupy a merely passive role in value creation (Jeannerat, 2012). From a territorial standpoint, innovation is viewed as developed locally through the exploitation of resources and to be sold elsewhere – globally. Markets are thus exogenous to the analyzed productive dynamics. Hence, as Kebir and Jeannerat (2013) argue, in archetypical ‘cluster’ approaches of industrial organization, competitiveness remains essentially ‘observed’ while its ‘quality is hardly being de-constructed.

2.2. The post-crisis grammar, the ‘green new deal’ and the transition approach

Today’s discourse on environment is mobilized as a key response to the global financial crisis and presented as the ‘green new deal’ (Lipietz, 2012; OECD, 2009a; Jackson, 2009). On the one hand, the financial crisis has polarized public’s attention on the systemic character of the world we are dealing with (Orléan, 2009). On the other, economies are under the pressure of global trends linked to climate change, finiteness of natural resources and worldwide demographic evolution (OECD, 2012). Thus, most discourses linked to the implementation of recent structural policies share ‘crisis’ as a common inspiration. Displayed at various levels of governance, this notion is recurrent in strategic documents on a worldwide scale such as the UNEP’s report on ‘Green Economy’, G20 communiques, EC communications on 2020 Europe. Likewise, NGOs such as the World Wildlife Fund (WWF) see in radical technological innovations a response to global environmental challenges and a trigger of growth allowing overcoming the economic hangover of 2009-2008.

While sustainability had already taken shape in political discourses in 1992 with the Rio Declaration and had gained importance on the political agendas in the 1990s and early 2000s (Geels, 2010), the financial and economic crisis acted as a catalyst for concrete action plans. Presented in policy documents as a ‘new economic paradigm’ or a ‘post-crisis paradigm’ (OECD, 2011c; UNEP, 2011), recent structural public policies linked to climate change and environment, increasingly tend to mirror the ‘messy and complex, multi-level multi-actor (…)’ developments of socio-economic dynamics (Flanagan et al., 2011: 702). Indeed, with the aim to re-dynamize the economy after the crisis, support to the development of technological innovations has been introduced within macro recovery plans thus calling on both Keynes and Schumpeter (Zerka, 2010). With the former, the economic system is to be pulled out of the crisis thanks to macro measures oriented towards sustainability thus ‘saving capitalism’. With the latter, technological innovation is assumed to serve environment. Whilst this revisited combination of policies illustrates ‘green economy’ action plans’ innovative rationales, they inherently bring to the fore the underlying complexity of current socio-economic developments. These challenges in turn reflect in economic geographers and policy analysts’ growing interest for transition dynamics.

This post-crisis grammar associated to the rise of new ecological priorities in policy discourses, which calls for a turn in our technological and value regimes, has given birth to a new field of research around the concept of transition. Recent literature has notably contributed to the understanding of the current interlinked challenges related to the ‘post-crisis world’ (OECD, 2012). While accounting for technological innovations and their corresponding changes in market, these studies also integrate issues linked to, ‘user practices, policy and cultural discourses [and] governing institutions’ (Coenen et al., 2012: 968).

Partly sharing common conceptual building blocks, transition literature has rapidly grown in recent years and emphasized in various ways how a new turn may be reached and operated through new forms of production, consumption, work and living. Our aim is here not to provide an exhaustive account of this literature that has, for some parts, already been

reviewed elsewhere (see for instance (Cooke, 2011; Coenen and Truffer, 2012). Not opposing the various approaches to transition mechanisms at stake in today's economy and society, two complementary veins of analysis can be highlighted in regard to transition issues.

A first line of analysis emphasizes transition as an evolutionary shift to a new socio-economic or socio-technical paradigm of development. This approach is for instance illustrated by a technological innovation system (TIS) approach or by the multilevel perspective (MLP). The former sees in socio-technical breakthroughs a means of 'greening' markets through 'crowding out established technologies' (Coenen et al., 2012: 969). This is for instance the case of new configurations of joint actors belonging to traditionally unconnected sectors (e.g. agriculture's economic diversification through solar energy production). The latter addresses socio-technical transformations within a wider scope of description. Basing its analysis on the social embeddedness of socio-technical 'disruptions', it views to give a holistic account of the development, diffusion and adoption of new institutional configurations through up-scaled micro changes or niche actions and through down-scaled socio-technological regimes and landscapes (Geels and Schot, 2007).

A parallel line of analysis gives more prominence to the socio-economic context of action in which transition occurs in a different way of traditional innovation. Transition is not only described as the incumbent phase of a new socio-technical regime. It is viewed as a democratized process transcending the traditional innovation boundaries of research and development involving societal change at large. In an actor-network perspective, Callon goes beyond a techno-scientific oriented approach of economic change essentially concerned with actors up-stream to markets to address challenges such as ecological issues within a technical evolutions engaging the collective. In addressing the dynamics linked to the diffusion 'in the wild' of debates linked to socio-technical uncertainties – traditionally viewed as confined within circles of experts – his approach throws light on the dynamics underlined by a democratization of science (Callon et al., 2001). Socio-economic change does only occur through changes in production, on the one hand, and consumption, on the other. It emerges from social 'hybrids forums' promoting collective debates, controversy and shared values in action. In a more systemic and operational approach, the issue of transition is challenging the traditional 'triple helix' model based on science, industry and public authorities. It implies considering civil society as part of collective learning process constitutive of a socio-economic and environmental change at large.

Taking stock of the aforementioned discussion, two related yet contrasted approaches to territorial economic policies may be derived. Both relate to distinct times of socio-economic change thus reflecting 'evolving paradigms' (OECD, 2011c). On the one hand, the 'innovation approach', which has inspired most European economic development policies for over a decade and on the other, what we regard as the emergent 'transition approach'. This approach carries out and emphasizes new conceptual principles and socio-economic concerns not only extending but also revisiting the commonly granted innovation approach. Contrasting them with this innovation approach can highlight some specific scopes and reach of this emerging transition approach.

2.3. Contrasting innovation and transition approaches

A first contrasting issue relates to the nature of economic growth carried by recent policy and theoretical discourses on transition. In the innovation approach, growth is regarded through the lens of a competitive growth involving different production activities and spaces competing on the basis of exogenous market rationales. Innovation is granted as a fundamental driver of distinction among production firms and territories. Competitive growth

is measured through the capacity to take market shares in a global economic trade of goods. Indicators of exports sales, national trade balances and growth domestic product is a main indicator of this competitive growth.

In the transition approach, growth is not reduced to production firms and territories competing for global market shares. Innovation is not restrained to a driver of new productivity, new technology or new traded goods and services on the global market. It is perceived as a lever for 'inclusive growth'. Inclusive growth comes in reaction to the global crisis thus challenging 'the idea of a growth model with a single general equilibrium' (OECD, 2012:2). At the same time, this crisis crystallizes major global social pressures. New reflections has emerged drawing on the interlinked structural, environmental, institutional and societal factors of progress. Thus, no longer solely focusing on economic development, policies view to integrate life-satisfaction and well-being in a growing manner (OECD, 2011b). Approached in different terms, innovation is regarded not merely as a potential for a renewed trade growth across competing productive regions and nations. It is also viewed as a democratized opportunity to enhance quality of living and to reduce social disparities through alternative forms of production and consumption.

Table 1: Contrasting innovation and transition approaches

	'INNOVATION' APPROACH	**'TRANSITION' APPROACH**
Vision of development	Competitive growth	Inclusive growth (OECD 2012)
Innovation	Technological and science-based	Environmental (OECD 2011a)
Uncertainty	About economic change	About societal change
Actors	Upstream actors to markets (e.g. producers, suppliers, research and education bodies)	Variety of actors sharing/negociating a common agenda (e.g. firms, civil society, policy/politics markers, consumers, ….)
Measures	Pre-competitive intervention	Demand-side innovation instrument (EU 2009)
Policies	STI, 'triple helix'	Broad-based (OECD 2009; EU 2009)

Source: own elaboration

In a similar vein of argumentation, the scope of the transition approach reaches beyond the technological and economic boundaries of innovation. It is perceived in its environmental dimension at large. Environmental policies, dealing with negative environmental externalities, and innovation policies, dealing with positive knowledge externalities, are considered complementary and 'mutually consubstantial' (Hamdouch and Depret, 2010: 477; Van den Bergh et al., 2011). Combining stick and carrot measures, which traditionally belonged to separate sectorial policies, highlights the challenge policies are faced with when dealing with sustainability transition (Flanagan et al., 2011; Hamdouch et al., 2010; van den Bergh et al., 2011; OECD, 2011a). On the one hand, conventional economic development policies alone fail to achieve the 'goal diversity' inherent to the qualitative turn impelled by social pressures. On the other, the levers of environmental policies do not suffice to stimulate environmental innovations.

In other terms, innovation policies may influence technological change but they do not automatically limit technological lock-in (from a theoretical viewpoint, they may fail to answer negative environmental externalities). At the same time, energy policy measures may hamper producers through high-priced energy (in theoretical terms inhibiting knowledge externalities) (van den Bergh et al., 2011). Moreover, from a firm's point of view, investing in efficiency – thus internalizing costs linked to environmental negative externalities – is often perceived as an additional cost4. Today process-oriented quality linked to energy efficiency remains a socially unrecognized attribute of products. As a consequence, final offerings cannot singularize and be given higher prices, thus hampering clean innovations' implementation (ibid.).

Consequently, transition policies are not only to deal with the uncertainty of an economic change related for instance to the sunk costs implied by cutting edge research and development or to the adoption of new radical technologies in markets. They face a radical uncertainty regarding a societal change generalized to an established perception of how to produce, consume, work and live. With the rise of socio-environmental preoccupations, challenges no longer primarily rest on technologies – competencies exist in R&D and there already are numerous technologies available on the market. Although consistence has been given to issues linked to future environment and social problems by politics through their 'green agendas', challenges lie in the public's adhesion to these new technologies – they rest on 'use values' (Aspers and Beckert, 2011). Indeed, although regulations might come as an answer to this issue, OECD's report (2009b:11) argues: 'Future regulation must provide space for both companies and policymakers to create common solutions, but how can these solutions be found when future innovations might be unknown?'

Moreover, in a context where prices do not represent a prime reference and thus constitute insufficient and in-exhaustive criteria, the issue lies in addressing how clean technologies make sense for individuals in general and who in particular wants to believe in them and support their implementation. For now, there is indeed no established norm inherent to the adoption and implementation of clean technologies. As a consequence, the future 'states of the world' will depend on multiple combinations relying on behaviors and on the interactions between the entities (actors, objects, situations), which compose these combinations (freely translated from Callon et al., 2001).

As a result, policy reports note that, on the one hand, governments are induced to search and implement new ways to deal with innovation creation and more generally with contextual change. On the other, policy implications of so-called 'broad-based policies' require a more thorough examination (EU, 2009; OECD, 2009b). Designed, for instance, by the new metaphors of 'quadruple' and 'quintuple helix' of innovation (Carayannis et al., 2012), the civil society not only in its consumption but also cultural and communicational dimension are to be integrated to the new policy paradigm of transition.

2.4. Which policy innovation for which innovation policy?

In line with Morlacchi and Martin's (2009), Flanagan and al. (2011: 702) assume that *'innovation policy studies are at something of a crossroads*'. The qualitative shift implied by the transition approach as described above is, for sure, affecting traditional policies of science, technology and innovation (STI). However, if new research and policy agendas have been

[4] Van den Bergh et al (2011) distinguish between 'factor saving' and 'quality-improving' in order to describe the difference between environmental innovations and any other type of innovations.

drafted in academic literature and policy reports, providing a pragmatic and integrative conceptual framework to the future of innovation policy is not unproblematic.

If the concept of 'policy mix' is, for instance, increasingly used to promote a closer interaction between traditionally unconnected policy instruments (EU, 2009), the benefits of the quest of synergies are implicit. Yet, policy complexity does not remain unchallenged (Flanagan et al., 2011). Both 'the composition of the mix' and the innate policy dynamic remain under-conceptualized (Flanagan et al., 2011; Hamdouch et al., 2010). Further in-depth empirical investigations are needed to unveil policy-learning processes at stake, on the one hand, and to break with the rationalistic ethos surrounding policy mixes' implementation, on the other (Flanagan et al., 2011).

Another well-advocated issue relates to role customers/users involvement in innovation in the new nature of innovation. While long considered as the primary trigger of innovation, technology is increasingly presented as becoming 'an enabler of innovation' (OECD, 2009b: 9). New policy tools have thus been developed linked to demand and which are targeted towards areas said '*to be critical to future needs, but [are] unmet by current offerings*' (i.e. eHealth, sustainable construction, protective textiles, bio-based products, recycling and renewable energies) (Zerka, 2010: 16). It is for instance the case of innovation pilot projects, which are said to '*bring down barriers in getting innovation products to the markets'* (EU, 2009: 40). However, the general question of how such kind of policy is a constitutive element of transition, rather than an external force on transition, mainly remains unexplored (Smith et al., 2010; Voß et al., 2009).

More generally, policy innovation has rarely been investigated as an element of innovation policy. In past decades, academic research has usually informed innovation policy in light of the innovation processes studied in research, markets and enterprises (Smith et al., 2010; Voß et al., 2009). Innovation policy is there designed according to field observation. In this paper, we adopt a reverse perspective. Which new concrete and specific policy innovation do general discourses on transition imply for innovation policies? How do these policy innovations contribute to perform transition? Which territorialities do they give shape to?

Through the examination of the recent Swiss cleantech innovation policy and the specific case of 'pilot and demonstration' (P&D) projects, the next section builds upon these research questions to propose an analysis and a possible conceptual interpretation of future innovation policy challenges.

3. Inside the Swiss cleantech innovation policy

Switzerland represents an interesting case as it shares similar broad ethical referential as those permeating global policy agendas since 2008-2009's financial crisis. In Switzerland, public support to developing a green economy took definite shape in 2011, just after Fukushima's nuclear accident. This was done through the implementation of a strategy focusing on so-called 'cleantech'. Seen as 'tomorrow's economic driving force', 'cleantech' has been identified as an emerging cross-sectional field[5] with global growth potential meant to maintain and create competitive job (Bundesrat, 2011).

This section examines how general discourses on policy orientation about environmental transition are put into practice in a multilevel perspective and with a particular attention to the involvement of customers/citizens. Our study investigates the cleantech transition policy launched, at national level, by the *Masterplan Cleantech* and then examines,

[5] This policy involves the Federal Department of Economy, Education and Research (OFFT, SECO) and the Federal Department of the Environment, Transports, Energy and Communication (DETEC).

in more details, three P&D projects implemented at a local level in the framework of this masterplan.

3.1. Methodology

To gain insights on Switzerland's case, we carried out a qualitative research based on multiple sources of embedded units of analysis (Yin, 2009). Our study was built on oral and written data and analyzed following our theoretical propositions' components. Two policy instruments currently receiving particular attention from the State were distinguished.

First, the *Masterplan Cleantech* coinciding with a 'meso' level of analysis frames all the existing accompanying measures (public and semi-private) linked to cleantech at the three federal institutional administrative levels (State, canton, commune). Its related data was drawn from governmental documents and websites (*Masterplan Cleantech*, pronouncements, lobbies' positions during policy's consultation).

Second, *P&D projects* at the 'micro' level of analysis, which have been granted increased financial support since 2009 (OFEN, 2011), with the *Masterplan*'s implementation and view to accelerate technological innovations' adoption. Two corresponding documents consisting of directives defining *P&D project*'s utility, aims and conditions of funding eligibility were examined. In addition we analyzed nine interviews carried out with actors directly concerned by the *Masterplan* and *P&D projects*' application. Several specialized conferences and forums animated by public and private actors were also attended (Cleantech Forum Geneva, Energie-Cluster Bern conferences, I-net innovation seminar and networking event in the Jura). Finally and in line with the open dimension of projects and the debated character of the topics they relate to, online and paper press articles related to the implementation of renewables and energy efficiency were mobilized to complement in our analysis.

Viewing to inform change through the analysis of the incorporation of the 'inclusive growth world views' in novel institutional settings, we both focused on the rules governing interactions and on actors' narratives. On the one hand governmental literature research aimed to throw light on the institutional formalization of transition in Switzerland. On the other hand, semi-structured interviews intended to grasp how this policy is put to practice and which representations its appropriation gives rise to. While enlarged exposure to the cleantech field both through conferences and press reviews (specialized governmental journals, energy association reports and regional press) strengthened the research's general lines of expectations, it also contributed, through data triangulation, to validating and enriching the multiple-cases' study (Yin, 2009). As we further highlight, studying the cleantech policy requires a comprehensive understanding of broader energy issues in Switzerland.

Our empirical results were obtained, analyzed and interpreted following our preliminary hypothesis' outlines. Correspondingly, our theoretical propositions were based on the assumption that recent changes in socio-economic developments have been assimilated in innovation and competitiveness policies, thus reflecting in a new ontology of economic development – that of transition. Following this line of thought, particular attention was paid to the form taken by innovation, the role played by users/consumers in innovations and to the way general ethical engagement reflects in a national public policy and its related applications.

Following Yin's (2009) contribution to qualitative methods, this analysis will be presented according to the dual level inquiry of meso (national) and micro (projects) scales, hence crossing data resulting from grey literature and interviews. Indeed, we are dealing with embedded scales of analysis in which the data of the larger unit (national level) serves as the

main case in addition to cross-case data from the multiple micro case studies (P&D projects). As both levels feed each other and embed new institutional structures, we will conclude with a discussion based on a synthesis.

The three P&D projects field studies examined were supported by the Swiss cleantech policy spanning along the period starting at the end of 2011 and finishing in 2013. Since 2012 strong encouragement from the Federal Council has been given to Pilot and Demonstration projects and was further associated with a new 'Flagship program' in 2013 (BFE, 2013). The three build on the same legal rules and have common purposes: While P&D projects primarily aim at proving the feasibility of energy technologies in scientific and commercial terms, they nonetheless share a 'showcase' dimension with Flagship projects.

Two aspects determined our selection: a focus on territorially anchored projects; projects both covering illustrations of renewables and efficiency's implementation. While the employed technologies differ, they nonetheless epitomize P&D projects' general underlying mechanisms hence illustrating how transition unfolds concretely. Thus contrary to a comparative analysis, these will be reported through a cross-case analysis picturing in a comprehensive way the issues related to a localized implementation of green deal's rationales.

Two of our case studies deal with projects of CO2 emissions reduction through the implementation of solar thermal heating systems. The firms who instigated this new productive process represent the two largest milk manufactures companies in Switzerland: The Emmi Group's plant in the Swiss Jura who produces 'Tête de Moine' cheese and Cremo SA on the Swiss midlands, whose dairy production comprises, inter alia, that of coffee cream. Both require hot water in their milk processing, which is obtained via the implementation of parabolic trough collectors on their plants' roof. This technology was commissioned to the company Nep solar whose initial developments ware based in the South pacific and further expanded to Americas and Europe. Pivoting following the sun's trajectory, its technological installations allow generating solar heated water to 150-160 degrees Celsius.

A third case concerns a 'smart grid' demonstration project involving a consortium uniting the electricity utility provider of the Canton of Bern BKW, IBM's research laboratory in Zürich, Migros, Switzerland's largest retailer and supermarket chain and the national grid operator, Swissgrid. The project views to illustrate how industrial energy consumers can help balance fluctuations of the availability of renewable energy on the energy grid, thus producing so-called 'secondary energy'. Through the aggregation of information on Migros' biggest cold storage warehouses (roughly the size of 30 football fields) and on that of energy data from BKW and Swissgrid, IBM views to optimize the balance between production and consumption. When buffering energy is required in the grid, Migros' cooling units are temporarily run at lower level or even shut down. In the opposite case, the conditioning units run full blast (IBM, 2012).

3.2. 'Hybrid forums' as analytical and comprehension tool

With the aim to deconstruct P&D projects, we will make a free use of Callon and al.'s (2001) 'hybrid forums' analytical concept. Basing their contribution on the study of socio-technical uncertainties often related to domains such as health and environment, these authors capture the processes at play in the dynamics implied by the creation of shared views of the world, stem of ulterior collective coordinate actions. These procedures in turn involve the creation of what they refer to as 'the collective' emphasizing the significance of involving the community in controversies directly or indirectly linked to innovation.

Hybrid forums schematically characterize threefold: First, they constitute spaces of creation of meaning. Crystallized around concrete experiments 'in the wild', they reveal

controversies (not viewed as a social dysfunction, but rather as an essential stage in the construction of a public issue) (Lascoumes and Le Galès, 2007), thus allowing the identification of unforeseen social, technical and institutional 'overflows'. Second, they engage a range of heterogeneous stakeholders such as scientists, managers, politicians, media and civil society. Third, the problems brought to light within hybrid forums display from ethics to economy.

Although these three thematic dimensions are used in an un-literal way in our study, they nevertheless epitomize the afore-identified key dimensions of transition. Therefore, we consider Callon et al.'s hybrid forums an appropriate tool, which serves revealing new analytical categories derived from our empirical research. In addition, as we will further examine, P&D projects inherently carry a dialogic intention also mirrored in hybrid forums' function. Linked to the modalities of knowledge creation and to its diffusion in a context primarily characterized by social uncertainties, they hence allow addressing dynamic exploratory and collective learning processes. Indeed, as controversies enrich the initial situations through an inventory of the problems; the solutions and the actors involved as well as their mutual relations, they trigger renewed projects and the reformulation of initial problems.

3.3. The Swiss cleantech innovation policy and the Masterplan Cleantech

In Switzerland, there is currently a convergence between, on the one hand, cleantech (energy efficiency, the way out of nuclear energy, renewables) and competitiveness and, on the other hand, domestic energy issues (energy supply's security, the grid's renewal and energy pricing) and foreign issues (the country's insertion in the UE, market's evolution towards liberalization). This convergence illustrates along four policy issues: 1) the Green economy 2) the Energetic strategy 2050 3) the Electricity Supply Act 4) the grid' renewal.

The Swiss Federal Council's decision to implement a cleantech strategy in 2010 constitutes a turning point of broader political orientations in the country's energy and economy fields. It was firstly followed in 2011 by a mandate to the administration to build a green economy to improve the conditions for managing natural resources in the interest of the environment and the economy (Office fédéral de l'environnement [OFEV], 2014). Secondly just after Fukushima's nuclear accident, a principled decision towards a progressive way out of nuclear power was taken in May 2011. This decision was actuated through the Energetic Strategy 2050 prioritizing energy efficiency's reinforcement. Thirdly and in the background of these agendas, the progressive liberalization of the energy sector decided in 2007 was put into action in 2011 for final consumers whose consumption exceeds 100 000 kWh (Office fédéral de l'énergie [OFEN], 2014b). In view of the sector's generalized opening and because it is closely linked with the 2050 Strategy's associated tasks, the Electricity Supply Act is currently under revision. In addition, as discussions about this market's liberalization also depend on Swiss-UE bilateral arrangements, the term of the Act's legal bases finalization is yet unclear. Fourth, closely associated to arrangements with neighboring countries, the necessary grid's restoration (by 2020 the grid should be developed and renewed on about 1000 km corresponding to an investment amounting to minimum 3, 2 billion Swiss francs) also implies issues linked to the future compensation of nuclear sources of energy. Indeed, this compensation will either be assured on basis of trans-border flows or through domestic production. Thus, while analysts have forecasted plenty of scenarios, the system's future remains uncertain. It depends on the conjunction of multiple factors and varied policy agenda timings: Not only is it contingent to policy measures' orientations and effectiveness, but also

to pricing models, technological developments and more generally to demand's evolution (Paul Scherrer Institut, 2013).

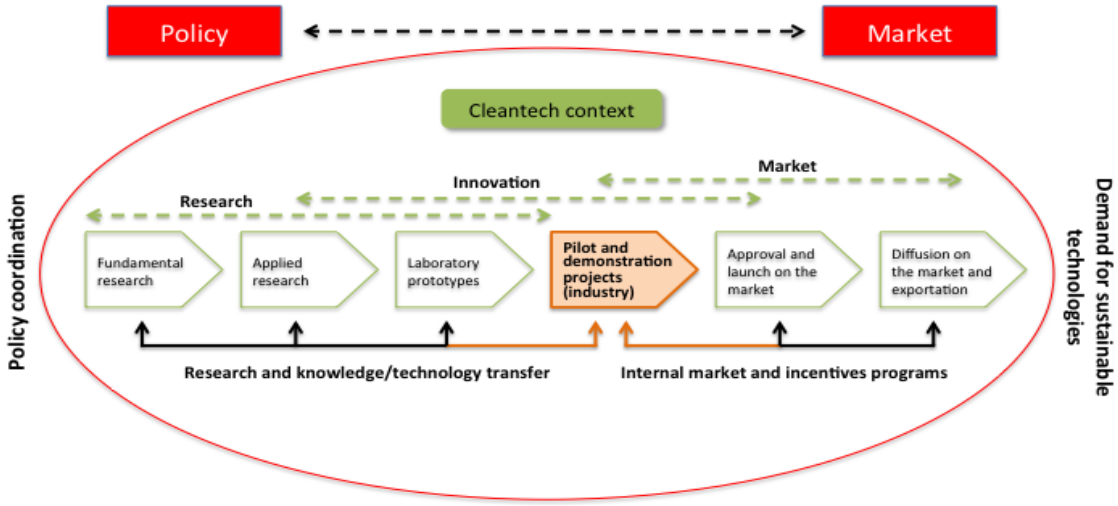
Whilst reviewing energy efficiency and renewables' strengths and weaknesses in Switzerland, the 'Cleantech Masterplan' offers a reference framework to all actors concerned by the State's objectives in cleantech (Cleantech, 2014). It reflects the Federal Council's vision that by 2020 the country becomes a leader in cleantech research and production. In 2009 the sector was employing an average 160,000 people. With an annual gross added value of about CHF 18-20 billion, cleantech accounted for roughly 3% to 3.5% of Switzerland's gross domestic product (Basler & Partner, 2009). A study by Roland Berger Strategy Consultants (2007) forecasted that by 2020 the sector's share (considering some segments will better perform than others) in GDP would double to roughly 6%.

This plan mirrors the field's heterogeneity *('all technologies, fabrication processes and services, which contribute to protect and preserve resources and natural systems'* admin.ch) as it involves the Federal Department of Economy, Education and Research (OFFT, SECO) and the Federal Department of the Environment, Transports, Energy and Communication (DETEC). Although comprising conventional measures of support to economic framework conditions, the *Masterplan Cleantech* is not a subsidizing instrument nor does it correspond to a top-down industrial policy per se. Political debates have indeed highlighted that a cluster policy may induce discrimination within economic and innovation policies and risks duplicating already set up instruments. Well-established Federal sectorial policies exist, which have proved successful considering both Switzerland's economic position and innovation capabilities (SECO, 2010).

Besides, the *Masterplan Cleantech* discloses instruments reflecting the political coupling between production and market on a linear model of technological development: 'Pilot, demonstration and flagship projects' (Bundesrat, 2011). Generally referred to in policy documents as the *'valley of death'*, P&D projects are implemented at what is seen as a critical stage. Policy reports describe it as the value chain creation sequence in which the availability of private financial funds often fails for first production series (Zerka, 2010). Hence public financial support reduces the associated financial risk and stimulates the private sector's investment.

Following a 'transition perspective'; this plan's main characteristics condensate in the following synthetic analysis. Going beyond the scope of action of innovation policies, the cleantech policy aims to stimulate economic actors as well as the whole of society towards new ways of consuming and producing in view of a foreseen wealthy future. Rather than products or technologies, cleantech is thus often seen as projects bringing together numerous actors enlarged to market (users/consumers, civil society, media and politics) who are steered by convergent aspirations of sustainability. Cleantech consequently corresponds less to an identifiable content than to a driving process. Relying on similar dynamics as those present in the fashion branch, cleantech not only implies producers, but also the users/consumers involved and the context of use/implementation.

As a coordination instrument, the *Masterplan Cleantech* is a typical policy-mix, translating in ambiguous rationales, which schematically differentiate under what may be characterized as technologies versus applications. Though the *Masterplan Cleantech*'s design was motivated on the basis of traditional criteria such as yields and patents reflecting conventional techno-economic indicators; public actors primarily present cleantech as a solution to be integrated or even as a trend.



Source: Masterplan Cleantech 2011

Figure 1: The conception of the Masterplan Cleantech

3.4. Three analytical and interpretative categories

While labeled as pre-competitive measures, P&D projects' factsheet displays causal links and includes actors so far unmet in conventional innovation policies: Said to 'give sight and make the energy strategy 2050 tangible' and to 'support the energy dialogue and sensitize professional (expert) circles as well as the population' at the same time, 'they [view to] increase the market acceptation of new concepts and technologies' (own translation BFE, 2013). This broadening of innovation policy to what characterize as social processes involving public, discursive and cognitive dimensions entails the use of new analytical lenses. Thus, with aim to account for concrete projects' underlying mechanisms, we derive three analytical and interpretative categories from the triangulation between Callon's 'hybrid forums' analytical components and the data obtained from the examination of four P&D projects' case-studies: 1) Creating new meaning through controversy in action 2) The project as flagship and toolkit rather than an end product 3) Use value through valuation in commitment.

3.5. Creating new meaning through controversy in action

As a criterion determining public support to P&D projects, 'social adhesion' (OFEN, 2014a), counter to viewing consensus as an end point, not only acknowledges the controversial nature of technologies and procedures, but it also makes use of these debates to facilitate the adoption of new ways of consuming and producing. It echoes a general observation in Switzerland: renewables and energy efficiency projects virtually automatically embed within debates on their potential foreseen outcomes. These in turn often retard or even block the implementation of renewables and the adoption of new ways of doing business (OFEN, 2013). Thus, P&D projects aim at going beyond anticipated fear on foreseen projects. Moreover, as our field-cases further suggest, whilst triggering the materialization of change and thus experimenting the controversial corollaries of clean technologies' application, P&D allow the identification of unforeseen problems and solutions.

The OFEN (2013) reports that although representing the most marginal types of projects arousing debates, the implementation of solar panels polarizes residents' and less often authorities' positions. The invoked arguments range from esthetic values (harmony and integration within traditional style constructions) to landscape protection and land use. Our

case studies of high solar temperature production relate more particularly to the latter as they highlight the significance, in the context of Swiss 'land rarity' (ARE, 2014), of industrial rooftops optimization. This is expressed by Cremo's executive whose remark illustrates he has internalized the debates linked to land use in Switzerland: 'Each square meter of an industrial roof represents a rare element' (Magazine de la Banque Cantonale de Fribourg, 2011). In Emmi's case, Saignelégier's chief of dairy production had long been wishing to get solar panels installed on a piece of land behind his plant. Yet it was only when an added flat-roofed cave's construction had been planned that the person in charge of the energy for the company took decision to implement solar energy. In both cases, the validation of solar troughs' implementation was thus narrowly related to coinciding motivations linked to land preservation and energy efficiency thus bringing to light the value bestowed to the living environment and quality of life.

While these cases demonstrate new openings for renewables' implementation in a context where oppositions often delay adoption, the grid project throws light on the exploration of new interests and identities in a context of market change.

Smart grid projects relate to the whole energy system's reorganization and consequently involve numerous long-standing anchored institutions. So far, the system has been vertically organized implying clearly defined actors and roles, clear repartition of electricity costs and benefits, as well as easily adjusted electricity production to consumption. Tomorrow, the electricity system will be horizontally organized requiring adjustments between production and demand and mainly based on volatile sources of energy requiring the management of flexibility. These will entail at least three main changes: First, the energy value chain will growingly integrate consumers as new providing actors. Second, more and more appliances of our everyday life will be aggregated in the system in view of balancing the electric power grid. Third, disintermediation may come as a consequence of decentralized electricity production. Energy suppliers might lose their monopoly as intermediaries between producers and consumers and have to look for alternative sources of revenue such as providing new services linked to energy efficiency.

Currently only a minority of energy supply companies considers energy efficiency as a trade. Rather, most see it as a branding strategy or as part of a clients' loyalty building program, as recently brought to the fore by a survey carried out by the Swiss Association of Electric Enterprises. To describe energy efficiency activities a Power Supply company's remarked that 'it is as asking a butcher for more vegetarian dishes' (The Boston Consulting Group, 2013). The Flexlast project relates to this context as it contributed to uncover major 'spillovers' linked to stakeholders' position/role in the system.

For both the food supplier and the energy supplier the challenge may be characterized as that of 'role-hybridation'. The Migros broadens its activities through the integration of its appliances in the energy value chain. BKW, at the intersection between demand and supply, experiments the pooling of electrical capacity.

While investigating how to energetically optimize its cooling warehouses, thus taking an active part in the system as an 'auxiliary energy supplier', the Migros learns about the energy costs induced when alternately switching on and off at short intervals its cooling units. To produce 'secondary energy' indeed implies the use of more energy than usual thus engendering supplementary costs. However, these costs are pondered by the profits drawn from its sale[6]. Thus, while representing a potentially future lucrative market (Energies

[6] Swissgrid representative (19.12.2013) highlighted it is paid 20 percent higher than other types of energies.

Renouvelables, 2013); producing secondary energy entails the experimentation of a new active role in the energy system and taking new associated industrial and commercial risks.

In BKW's case, while offering a virtual power station on the balancing energy market, the key challenge is to get into a network coordinator's role and to learn how to deal with future new solutions packages. Thus, changes in energy suppliers' function within the energetic system involve broader issues linked to the distributed benefits of energy regulation. These firstly concern viewing new business models as innovations. Secondly they relate to yet un-existing legal contracts regulating each of the pool's interface and its related risks.

More generally, the analysis of these three cases highlights that issues dealt with by P&D projects go beyond the strict scope of technology. As they concretize, environmental innovations challenge uncertainties linked to their social acceptation. Besides, while addressing actors' relations to technologies, P&D projects reveal controversies linked to land protection and role-hybridation, hence throwing light on the new meanings associated to 'greener' ways of producing and of new ways of doing business.

3.6. The project as flagship and toolkit rather than an end product

To focus more particularly on how innovations develop through P&D projects, attention is here paid to two other dimensions, which OFEN's (2014a) directives labelled as the 'application potential' and 'public interest'. Correspondingly, these criteria entail first that projects' expected results are adopted in future applications, thus underlining users' role and the experimental and dialogic dimensions of P&D projects. Second, the projects' topics must prove of public pertinence, thus emphasizing future developments potentials not only concern specialist but also profane.

Contrary to a conventional manufacturer-centric approach in which consumer's role is to have needs to which manufacturers answer by producing new products; P&D's implemented and tested technologies are renewed as projects multiply and individual users can get what they want by designing it for themselves (von Hippel, 2005). The cutting-edge technological and organizational innovations evolve as the technologies are appropriated and implemented. 'User-innovators' (ibid.) – in our cases dairy producers and food supplier – engage in modifying and adapting the 'toolkits' (ibid.) to their specific use.

Solar high heat production in the milk processing was first experienced in the Grisons (South east of Switzerland) at 1700 meters where temperatures may reach -30C in winter, before it was implemented in the Jura and on the plateau. The toolkit was successively adapted to the roofs' size and inclination and to the local climatic conditions. Also, the type of solar collector field was expressly renewed in order to comply with the specific applications (quantity and temperature of heated water required). This was illustrated by Cremo's manager who stressed the significance of producing equivalent renewable energy than that required for coffee creams' sterilization enabling in turn energy's embodiment in a specific product: 'The fact it is a concrete application, which corresponds to something real, that is the most important' (Interview with Manager of Cremo: 28.11.2013).

User's behavior in energy efficiency innovation is of primary importance. Migros' energy consumption (equivalent to 4,100 households' annual electricity consumption) and the quantity of stocked products and deliveries frequencies are foundational factors in secondary energy production. IBM's software had to be adapted to Migros particular behavior highlighting technology's evolution through use. Indeed, the Flexlast project follows former experiments on the buffer potential of electric vehicles and household devices and is viewed to be further experimented in an enlarged pooling of numerous and diversified consuming industries (Aluminium industry; Steel industry; Timber industry; Chemical industry etc.).

Moreover, smart grid developments are emblematic of user-innovator dynamics, as it is through the aggregation of multiple electrical devices not operated under constant loads that adjustment between consumption and demand may potentially be achieved in the future.

Staged exemplarity is closely associated to the user-developed character of P&D projects as the new ways of producing and consuming are open to the public and socially acknowledged through the intervention of experts and journalists (Jeannerat and Crevoisier, 2011).

Our interlocutors emphasized that the implemented solar systems perform as glass cases: 'It has an advertising and educative impact. One sees that the sun could provide what we need but that it requires work to be able to get it.' (Interview with Manager of Cremo: 28.11.2013). Yet, creative practices are not only broadcasted via concrete space. The symbolic sphere is also engaged through prizes mediatized in press releases (online and paper). In our cases, two main prizes were identified: First, the 'Swiss Solar price' (Swiss Solar Agency, 2014), which rewards the exploitation of solar technologies and views to encourage renewed applications on a national scale in order to reduce Switzerland's energetic reliance on foreign supply[7]. Second, the 'World Retail Award 2013' with international reputation judges a retailer along categories such as 'Customer Experience' 'Advertising Campaign', 'Store Design' and 'CSR Initiatives'. In both projects, it is the user-innovators' practice, which is primarily qualified rather than the intrinsic functional quality of technologies implemented: The 'Tête de Moine' cheese manufacture was awarded in 2013 for the new perspectives it opens in industrial applications of thermic energy consumption (ibid.). Migros was prized in 2009 as 'the worlds' most responsible retailer' for implementing initiatives aiming at 'living its values' (World Retail Awards, 2014).

In addition, cases show that contrary to conventional techno-industrial innovations generally associated to productive capacities, we are facing situations in which technologies spur innovations, thus no longer constituting intrinsic elements of value creation. Technological innovations hence play a functional role in the value chain creation. It is the socio-technical processes at stake when toolkits are implemented – shedding light on the relation between producer and consumer – which constitute the linchpin of economic and cultural value creation (Kebir et al., 2012).

In addition, the resulting innovations are not to be directly exported, contrary to traditional techno-productive innovations. Correspondingly, in the case of solar heating system it is the symbolic incorporation of the values attached to these new ways of producing and consuming in the products, which will eventually be economically valued and monetized in the future: 'What we earn is not to use fossil energy. (…) We are in a totally different world, that's why we want to stick a little sunshine on coffee cream lids' (Interview with Manager of Cremo: 28.11.2013). In the smart grid case, secondary energy's trade is limited to domestic market for technical reasons. Thus, what will eventually become tradable in the future consists of solution packages implying complex business models and indirect revenues involving heterogeneous actors around shared socio-economic values (Chesbrough, 2013; Ng, 2010; Osterwalder et al., 2005; Teece, 2010).

3.7. Use value through valuation in commitment

Furthermore, our interviews spotlighted that social justifications are primary to economic calculations. It is the commitment and the meaning attached to these new ways of producing/consuming, which is valued by the firms and recognized by market influencers.

[7] Federal Office in Statistics OFS (2014) says about 70% of Switzerland's needs in energy are covered by imports.

Thus, our study revealed that in a context in which environment's preservation and the way out of nuclear energy is considered as a cost, given their symbolic authority, public actors legitimate these new use values through their support to cleantech projects.

'It is not a ways of making money; it is above all the search to use renewable energies.' (Interview with Tête de Moine's chief operations officer: 03.11.2013); 'We will have another 20 to 30 years with petrol, it will not be profitable before long' (Interview with Manager of Cremo: 28.11.2013). As these quotes suggest, economic rationales do not constitute a primary justificatory motive in energy efficiency projects' implementation. Twenty years will be necessary to pay off the invested amount of money in the solar installations, which roughly corresponds to the foreseen technology's life span. Also, the proportion of spared heating oil compared to the amount required is like a drop in the ocean. Figures in Cremo's case are telling: One oil tank is saved per year, while three to four tanks a day are necessary to turn all the manufacture's installations. Thus, neither the monetary saving argument nor, that of major CO2 reductions comes in as realistic explanations.

Rather, use value through valuation in commitment, occupies a central position for qualifying cleantech demonstration projects. Projects' importance lies in the pioneering engagement for the future thus reflecting a moral position, which has been politically recognized: 'If we are not capable of changing, then who else?' (Interview with Tête de Moine chief operations officer: 03:11:2013); 'The bigger the firm, the bigger is its responsibility' (Interview with Migros: 11.06.2013). Acting over declarations of intention also came out as a determinant dimension: 'We must act in accordance with our concrete promises' (Interview with Migros: 11.06.2013). Our case-studies thus emphasize the relational and emotional dynamics involved finding resonance in Dewey's (1939) words on valuation processes: 'The measure of the value a person attaches to a given end is not what he says about its preciousness but the care he devotes to obtaining and using the means without which it cannot be attained'.

While support through subsidies came out as non-negligible, it is public actors' symbolic support, which came out as the prime driver of projects in our interviews. In a context where socio-technical experiments are only nascent, contextual, open-ended with evolutionary contents; functionality and price indeed only partially constitute references to evaluate them (Kebir et al., 2012). Thus, through the deployment of strategic policy aims and of specific policy measures linked to energy efficiency, public actors signify the importance of firms' activities linked to natural resources preservation. They legitimate the new socio-cultural values related to 'responsible' (Interview with Migros: 11.06.2013) actions, subsequently taking part in the co-development of the new social values linked to environment preservation and the way out of nuclear energy. Thus, public actors not only justify investing in new ways of producing/consuming but also contribute to the final symbolic reach of products, which represents a significant part of post-modern economic values.

As they view to support 'dialogue' and 'social adhesion' through flagship measures, public actors engage in the publicly debatable dimension of the new social values. The foreseen marketization of products not only rests on the mere presentation of technological products in the open – on objectivation. Also, it is contingent upon collective mobilization hence both emphasizing society's relation to products and concepts and the meaning society attaches to them. Correspondingly, on the one hand, it is through the staging of successive trials that the firms will internalize these new environmental values, which in are in turn diffused through the mediatico-symbolic sphere (Kebir et al., 2012). On the other hand, given the uncertainties characterizing the energetic field in Switzerland, public actors take part to the

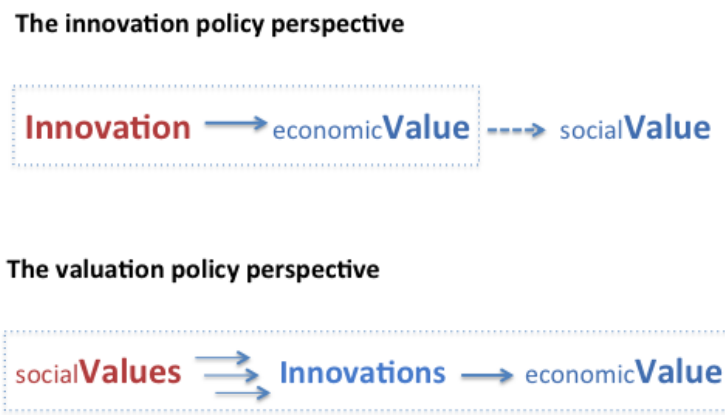
co-development of future social and political agendas through reflexive dynamics of learning embracing a wide array of actors (firms, civil society, politicians). Accordingly, echoing OECD's (2009b) report on the 'New Nature of Innovation', our cases illustrate that the partnering between public entities with the private sector procures added legitimacy both-ways: On the one hand the intervention of high reputational firms allows legitimating long term policy goals in a context of systemic uncertainties. On the other, public sector's intervention stands as necessary to legitimate private engagement in new value-laden activities.

Opening conclusion: Transiting from innovation to valuation policies?

The empirical analysis and interpretation of the Swiss Masterplan Cleantech and its associated P&D projects proposed in this paper have not the ambition to provide a definitive answer and general understanding of the new 'space race' for clean energy advocated by President Obama. Nevertheless, this particular case study can shed light on new issues for current and future innovation policies.

While the traditional 'space race' metaphor tend to grant an innovation approach driven by science and technology progress, the case of the Swiss cleantech policy seems to show that the new race for clean energy reaches far beyond such a restrictive lens. The new race is there not only about supporting innovation through research, education and industrial policies acting as catalysts of economic change. What are primarily at stake are the co-development, legitimation, adoption and implementation of social values shared among social, economic and political players involved in a broader societal change. In such a context public policy is not reduced to an exogenous catalyst of innovation but rather understood as the endogenous component of a socio-economic transition to clean energies.

In this view, the P&D projects launched in the framework of the Swiss Masterplan Cleantech can be seen as a policy innovation illustrative of a new conception of innovation policy. In contrast to the R&D projects traditionally promoted by regional innovation policies, the rationales behind a public support to P&D projects may open a new conception of innovation policy and future research agendas. A provocative but constructive proposition could be to operate a conceptual shift from an innovation policy perspective to what we would call a valuation policy perspective (Figure 2).



Source: own elaboration

Figure 2: The innovation and valuation policy perspectives

In the conventional innovation policy perspective, innovation is regarded as the primary driver of competitiveness. Analytical and conceptual focuses mainly pose the question of how innovation can arise and create economic value through its implementation into new competitive market goods and services. Economic value created from innovation is then implicitly conceived as a generator of social value to be found in an increased (material) quality of life and in well-being. This perspective is well illustrated by the canonical models of STI or 'triple helix' innovation policies that concentrate policy intervention on the science-industry nexus.

A valuation policy perspective can propose a different interpretation by posing the question of social value at the front. Illustrated by the example of P&D projects, the question of how to create, negotiate and define the new social values of a transition to clean energy comes to the fore and primary to technological innovation. A first general policy issue thus relates to which social values are worth promoting and co-developing with enterprises, consumers and civil society in regard to future societal challenges. In such promotion and co-development, public intervention should be conceived not merely as an exogenous regulation framework – as acknowledged, for instance in Porter's hypothesis (Porter and Linde, 1995) – but rather as an endogenous force to social change (Weber and Rohracher, 2012).

Such policy perspective does however not end up with this single issue and not forget about innovation. A second fundamental question is how to translate these social values into various innovations. These innovations would not primarily find their coherence in a Schumpeterian bunch of activities developed along particular industrial or technological trajectory. This coherence would rather be in the capacity of different innovations to engage, in various and complementary ways, with shared social values in which producers, consumers and other social actors are committed.

A third crucial question to be addressed in this valuation perspective relates to ways these various innovations are turned into economic value. In the innovation perspective, the economic value of innovation is usually resumed in the capacity to produce and sell new competitive goods or services on an external market. As described in our case study, the economic benefit derived from a P&D project is not necessary bound to the marketization or commodification of new goods or services. In this sense developing a valuation policy perspective is also about understanding of innovation integrate in evermore complex business models today (Teece, 2010; Osterwalder et al., 2005; Chesbrough, 2013).

How finally could we (re) interpret territorial innovation and development in such a perspective? As exposed, P&D projects' prime locus of complex economic value creation potential lies in the consumption sphere, as innovations result from the interaction created through consumers' commitment to use far-fetched technological devices. Thus, contrasting with conventional territorial dynamics centering on a productive approach of territorial innovation systems, it is the socio-cultural aspects related to contextual contingencies and personal engagement, which constitute determinant drivers of territorial innovation dynamics (Kebir et al., 2012).

More generally, it is territories' ability to capture and thus to embed the socio-cultural meaning derived from the "greener" ways of producing/consuming, which determines economic value's creation potentialities in the first place. In the long run and through ongoing trials, projects' economic value will eventually concretely realize through the embodiment of the new socially recognized environmental values in the 'user-developed products' (von Hippel, 2005). Subsequently, we are facing situations in which, economic value may only be derived on the condition that social value is primarily created and widely acknowledged. Thus, we are far from traditional cluster approaches, which posit territorial competitiveness as

a result of 'goods manufactured here to be sold on an export market'. Rather, wealth is created through the local anchoring of symbolic transactions, which in turn are monetized through complex business models.

In this context, public action hence contributes to co-create territorial identity built around the living environment and quality of life. This identity being itself part of the creation of environmental innovations, it redefines in a reflexive loop the boundaries between economic and extra-economic activities.

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