Smart specialisation strategies and energy transition: An exploratory analysis of the case of the Basque Country[*]

Energy transition is a core element of the sustainability transition around which the European Union's post-COVID recovery strategies are built. While these strategies are being designed primarily by EU Member States, the regional level will be critical for their success. Firstly, because regions are key 'implementers on-the ground' of European and national policies. Secondly, because the place-specificities of regions make them ideal 'laboratories' for experimenting with the innovations needed for sustainability transitions. This opens an important research question around how regional innovation policy, and more precisely how the regional smart specialisation strategies (S3) that have been developed over recent years, could provide a 'ready-made' framework for discovery and experimentation oriented explicitly to energy transitions. This paper explores this question by combining discussion of the concepts of S3 and energy transitions with an exploratory analysis of the S3 experience in the specific case of the Basque region. The paper highlights that moving from a S3 to a Sustainable S3 (or S4) will require enhancing the connectedness of different parts of existing strategies so that energy transition goals are approached in a holistic manner.

La transición energética es un elemento clave en la transición a la sostenibilidad en torno a la cual se están creando las estrategias de recuperación pos-COVID en la Unión Europea. Aunque dichas estrategias son diseñadas fundamentalmente por los estados miembros de la UE, el ámbito regional puede ser crítico para el éxito de las mismas. En primer lugar, porque las regiones son «actores clave sobre el terreno» de las políticas nacionales y europeas. Segundo, porque las características de cada región las convierten en 'laboratorios' ideales para experimentar con las innovaciones necesarias para la transición hacia la sostenibilidad. Esto plantea una importante cuestión de investigación sobre cómo las políticas regionales de innovación y, más concretamente, cómo las estrategias regionales de especialización inteligente (S3) que han sido desarrolladas en los últimos años, podrían aportar un marco 'ready-made' para la experimentación y el descubrimiento orientados explícitamente a transiciones energéticas. Este artículo analiza esta cuestión combinando el debate sobre los conceptos de S3 y transiciones energéticas, con un análisis exploratorio de la experiencia S3 en el caso específico de la región vasca. El artículo pone de manifiesto que pasar de un S3 a un S3 sostenible (o S4) exigirá la mejora de la conexión entre diferentes partes de las estrategias existentes para que las metas de la transición energética se aborden de manera holística.

Trantsizio energetikoa funtsezko elementua da Europar Batasunean COVID osteko berreskuratze-estrategiak sortzen ari diren iraunkortasunerako trantsizioan. Estrategia horiek, funtsean, EBko estatu kideek diseinatzen dituzte, baina eskualde-eremua erabakigarria izan daiteke estrategia horiek arrakasta izan dezaten. Lehenik eta behin, eskualdeak politika nazionalen eta europarren «eragile giltzarriak» direlako. Bigarrenik, eskualde bakoitzaren ezaugarriek jasangarritasunerako trantsizioa egiteko beharrezkoak diren berrikuntzekin esperimentatzeko 'laborategi' idealak bihurtzen dituztelako. Horrek ikerketa-gai garrantzitsu bat planteatzen du: berrikuntzako eskualde-politikek eta, zehazkiago, azken urteotan garatu diren espezializazio adimenduneko eskualde-estrategiek (S3) esperimentaziorako eta aurkikuntzarako 'ready-made' esparru bat ekar lezaketela, esplizituki trantsizio energetikoetara bideratuta. Artikulu honek gai hori aztertzen du S3 eta trantsizio energetikoen kontzeptuei buruzko eztabaida eta S3 esperientziaren analisi arakatzailea konbinatuz EAEren kasu espezifikoan. Artikuluak agerian uzten du S3 batetik S3 jasangarri (edo S4) batera pasatzeak dauden estrategien zatien arteko lotura hobetzea eskatuko duela, trantsizio energetikoaren xedeak modu holistikoan landu daitezen.

[*] Spanish version available at https:/euskadi.eus/ekonomiaz.

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Table of contents

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1. INTRODUCTION

Transition towards more sustainable economies and societies is a challenge that is common to all countries and regions, and today forms the lynchpin of the recovery and growth strategies that are being developed for a post-COVID world. Indeed, a central element of the European Commission's Next Generation EU recovery programme is to convert the *European Green Deal* that was published in 2019 into an EU growth strategy that will both 'repair' and 'prepare' for the next generation (European Commission, 2020a). We can therefore expect a large injection of funds and a range of radical measures oriented to promoting a sustainable transition over the coming years. Energy transitions are a pivotal ingredient in sustainability transitions due to both the impact of energy generation and use on CO_2 emissions and the fact that energy usage permeates all parts of the economy. From a policy perspective, therefore, there are important questions around how best to foster transitions in the energy systems that underlie our socioeconomic activity. Moreover, there is an emerging focus on the spatial dimension of energy transitions (and sustainability transitions more broadly) (Coenen *et al.*, 2015; Hansen and Coenen, 2015; Chlebna

and Mattes, 2020), suggesting that regions have a particularly important role to play in policy implementation.

This opens an interesting research agenda with regards to how the regional role in energy transitions can be effectively articulated. Given that innovation and experimentation are at the heart of energy transitions there is a natural link with regional innovation policy, which in recent years has been heavily influenced in Europe through the design and implementation of smart specialisation policies (S3) (Foray, 2015; Foray *et al.*, 2009; Hassink and Gong, 2019). How then can these S3, which have now been evolving for several years in regions across Europe, be leveraged to support energy transition at the regional level?

The aim of this paper is to explore that question by combining discussion of the concepts of S3 and energy transitions with insights on the S3 experience in a specific case. The Basque Country region, in the north of Spain, is an industrial region with an important energy sector. Moreover, it has explicitly developed an S3 since 2014, and has included energy as one of the core prioritised activities. Reflecting on how the S3 has been articulated, particularly with respect to the energy priority, aims to shed light on some of the benefits and stumbling blocks involved in leveraging existing S3 processes as a basis from which to accelerate regional energy transitions, and indeed sustainability transitions more generally. The case study has been built from analysis of a range of policy documents and semi-structured interviews with representatives of organisations involved in the Basque S3 from 2016 onwards.

The paper is structured as follows. Section 2 discusses the concepts of smart specialisation strategies and energy transition. Section 3 then zooms in on the concept of energy transition in its international, Spanish and Basque context. Section 4 explores the case of the Basque Country S3 and its relation to energy transition, and Section 5 draws conclusions.

2. SMART SPECIALISATION FOR SUSTAINABILITY TRANSITIONS

2.1. Smart specialisation strategies (S3)

The emergence and development of smart specialisation strategies (S3) in Europe is part of a progressive booming of interest in territorial strategy-making over the last two decades that brings together several streams of academic and policy analysis (Valdaliso and Wilson, 2015). Firstly, there has been a well-acknowledged geographical turn in the analysis of economic development in general, which has been rooted especially in an increasingly nuanced understanding of the importance of place as a context for innovation, and for innovation policies (Asheim and Gertler, 2005; Barca *et al.*, 2012; Cooke and Morgan, 1998; Shearmur *et al.*, 2016). This focus on the geography of innovation has intersected with analysis of the structural transformation of economies over time – via emerging economic complexity (Hidalgo and Hausmann, 2009) or related and unrelated variety (Boschma and

Frenken, 2011; Frenken *et al.*, 2007) – and with proposals for new forms of industrial policy to provide a strategic impetus to economic development (Rodrik, 2004; Bailey *et al.*, 2015). Finally, concern with a strategic approach to territorial development is also reflected in burgeoning recent analysis of the need for innovation to respond to societal challenges, including that of ensuring environmental sustainability (Breznitz *et al.*, 2018; Kuhlman and Rip, 2018; Mazzucato, 2017).

In the context of these various debates, the concept of S3 has emerged and evolved in the European context as a practical approach to providing strategic direction to regional innovation policies. Initially prompted by the work of the European Commission's *Knowledge for Growth Expert Group* (Foray *et al.*, 2009), the idea that every region in Europe should develop an S3 was subsequently promoted through an *ex-ante* conditionality for access to innovation funding under the European Regional Development Fund (ERDF) during the period 2014-2020. This led to regions across Europe embarking on a journey of experimentation with designing and implementing S3.

S3 require regions to prioritise their research and innovation investments to facilitate the structural transformation of their economies. In this sense, Foray (2015, p. 25) notes that smart specialisation «is a new word to describe an old phenomenon: the capacity of an economic system (a region for example) to generate new specialties through the discovery of new domains of opportunity and the local concentration and agglomeration of resources and competences in these domains». Rather than being determined 'top-down' by government, this process of structural transformation should emerge through a 'bottom-up' discovery process that draws on the collective intelligence of businesses, universities, government bodies and other key territorial actors.

S3 therefore require a significant paradigm shift in innovation policy, most notably from a planning logic to a process logic, which in turn requires new forms of governance and distributed leadership among a wide cast of actors (Aranguren *et al.*, 2017). Indeed, in this sense Morgan (2017, p. 569) has described the S3 experiment as «the most ambitious regional innovation programme ever to be launched in the European Union». The scale of ambition is reflected in emerging literature analyzing the early experiences of regions with regards such a challenging process (for example, Aranguren *et al.,* 2019a; Capello and Kroll, 2016; Cvijanovic *et al.*, 2020; Trippl *et al.*, 2019). It is also reflected in the recent debate sparked by Hassink and Gong's (2019) framing of 'six critical questions' identified in academic analysis of the S3 experience (Benner, 2020; Foray, 2019, 2020; Hassink and Gong, 2019).

The Covid-19 pandemic that began in 2020, together with the advent of a new European funding programming period in 2021, mark an inflection point for S3, particularly given the firming of consensus around the need to embark on more radical transition towards sustainable forms of economic development. While regions across Europe will continue to develop and evolve their S3, supported by on-

going commitment to this framework from the European Commission, the scenario in which they do so is changing.

In particular, the crisis (and post-crisis) scenario raises new challenges in terms of positioning regional strategies alongside the strategies being developed at other administrative levels. On the one hand, the large 'missions' associated with resisting the health crisis and with the transitions required for long-term recovery from associated socio-economic crises require certain scale, at national and European levels. On the other hand, they also require on-the-ground implementation. Thus, while the leadership of the *Next Generation EU* recovery strategies rests largely with EU Member States and the European Commission, the effectiveness of these strategies will rely on implementation at the regional, city and local levels, and in turn on their fit with strategic thinking at these levels. This implies a pivotal role for regional S3 as bridging these dynamics, in which they will need to ensure a delicate balance in acting strategically in a regional context while also engaging in national & EU strategic initiatives that need to be implemented locally.

More generally, S3 will also need to evolve to reflect the societal challenges associated with the need for accelerating ongoing green, digital and social transitions that have wide and deep implications for European industry. These transitions predate the COVID-19 pandemic and are well-reflected for example in the *European Green Deal* (European Commission, 2019), the *New Industrial Strategy for Europe* (European Commission, 2020b) and the *2030 Agenda for Sustainable Development* (United Nations, 2015), among others. Most recently, the European Commission's first *Strategic Foresight Report* (European Commission, 2020c) sets out four dimensions of resilience – socioeconomic, green, digital and geopolitical – as the new compass for policies to guide Europe's recovery. At the heart of these four inter-related dimensions is the capacity of European industry to adapt and transform itself.

While one of the weaknesses of the S3 process to date has been the lack of real integration of societal challenges and/or civil society actors, these transformations will require cooperation across a wide range of actors in precisely the way that S3 were envisaged to foster. In particular, it is widely acknowledged that the transition towards a more environmentally sustainable economy and society will need to permeate regional S3 to leverage cooperation between business, education-research, government and civil society explicitly towards required technological, organisational and societal solutions.

2.2. **Sustainability transitions and the European Green Deal**

The *European Green Deal*, launched at the end of 2019, was expected from its inception to become a key pillar of future economic development strategies and policies, together with the *New Industrial Strategy for Europe* that was published a few months later. The green deal has as a main objective to «transform the EU into a fair

and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use» (European Commission, 2019, p.2). This is a highly ambitious goal as many interconnected socioeconomic systems within the European economy are currently heavily resource-dependent and carry a large environmental footprint. Thus, a transition capable of delivering that objective requires several complex system transitions that need to be accomplished simultaneously; what have been analysed in the literature as sustainability transitions.

While this strategy was launched before the COVID-19 pandemic fundamentally altered the socioeconomic landscape in Europe, sustainability transitions have since become even more relevant in academic and public debates amidst a sense that the pandemic offers opportunities for 're-setting' certain economic and social trajectories. Indeed, the European Commission has positioned green and digital transitions at the forefront of the *Next Generation EU* recovery strategy. This implies that an enormous amount of European funds projected for the period 2021-2024 will be directed towards these path shifts.

The *European Green Deal* considers several elements and areas for action, most notably sustainable energy, circular economy, clean transport, biodiversity, food and agriculture, and green finance and industry. Acknowledging the relevance of all of these interconnected areas, we can highlight three principal transitions that offer the most potential for large scale savings in CO_2 emissions: mobility transition, energy transition and agro-food transition (EEA, 2019). Moreover, digital transition could also be considered as enabling transition that is intimately related with each of these.

Sustainability transitions literature has focused during the last decades on conceptualising and analysing the transformation processes of industries, systems and societies towards more sustainable modes of production and consumption. Indeed, sustainability transition scholars argue that changes in socio-technical systems in both the production and consumption systems are needed at the same time in order to break existing pathways (Geels, 2002). These transformative changes are not only technological in nature but also behavioural and social (Schot and Steinmuller, 2018). Therefore, innovation policy under this paradigm should not seek only for more technological innovation *per se* but a combination of technological and social innovation that has a clear directionality in terms of moving towards more sustainable ways of doing things.

This directionality reveals itself in several characteristics that can be seen to define sustainability transitions (Köhler et al., 2017). Firstly, transitions are long-term processes, not only because radical innovations need time to be developed but also because they need time to be diffused and accompanied by other less radical and/or social innovations so they can substitute previous established paradigms. One example of this could be the electric vehicle as opposed to those powered by an internal combustion engine. Related to this time dimension, a second key element is the

multi-dimensionality of sustainable transitions, because socio-technological systems are composed of multiple and diverse elements that inter-connect with one another: technologies, markets, industries, infrastructures, policy, user practices, etc. Moreover, this inherent multi-dimensionality implies that multiple types of actors are both protagonists and affected by transitions. This leads to a third key characteristic, the contested nature of sustainability transitions given that not all actors have the same position towards change. Indeed, following Wanzenböck *et al.* (2019) such contestation is characteristic of complex and uncertain problems where the solution is in multiple hands. It implies that multi-scalar frameworks, where different actors are involved in both problem definition and solution, are useful approaches to conceptualise sustainability transitions such as energy transition.

In this context of long-term, multi-dimensional and contested processes, it is important to acknowledge the relevance of experimentation within transitions (Schot and Geels, 2008), which forms the basis for new innovations to arise from specific niches, some of which can subsequently be scaled-up. These experimentation processes are more likely to arise in local environments where small initiatives comprising a full range of different actors can not only emerge but can also be applied and tested. However, the literature on sustainability transitions has been rather silent about the specific role of regions and the importance of regional context for innovation (Coenen *et al.*, 2015).

Hansen and Coenen (2015) bring together insights on the importance of place for sustainability transitions, highlighting the relevance of localised policies, institutions, resource endowments, technological and industrial specialisations, and market dynamics. In this regard, there are now more voices that plead for a place-based approach for implementing the European Green Deal (McCann and Soete, 2020; Larosse *et al.*, 2020) or a particular role for regions in the pandemic recovery (CoR, 2020). Indeed, two sets of reasons stand out for considering regions as relevant administrative units for fostering the transformations required to move towards the Green Deal objectives. Firstly, every region faces a different context, in terms of its natural resources, industrial structure, consumption patterns and environmental problems. For that reason, they are natural spaces for experimenting with transitions. Secondly, regions control many of the assets, capabilities and policy levers that the Green Deal requires for its effective implementation.

In summary, the *European Green Deal* can be considered as a 'mission' in terms of its scale, but one that encapsulates significant territorial diversity in both problems and solutions. It can only be achieved, therefore, by articulating a 'bottom up' regional implementation (McCann and Soete, 2020). As discussed above, smart specialisation strategies (S3) incorporate some of the needed ingredients for such a regional articulation of the Green Deal as a transition. In particular, S3 share a transformative aim and rely on a governance model (or entrepreneurial discovery process) that it is multi-actor and that favours experimentation. In addition, multi-

regional collaboration in the S3 sphere has been strengthened in recent years through the European Commission's *Smart Specialisation Thematic Platforms*.

These key characteristics of S3 suggest that they are a valuable vehicle for the regional articulation of sustainability transitions, implying that they could make an explicit leap from S3 to S4 (Sustainable Smart Specialisation Strategies).[1] In the remainder of the article we seek to explore this possibility through the analysis of one of the principle sustainability transitions – the energy transition – in the specific context of the Basque Country.

3. ENERGY TRANSITION IN THE CONTEXT OF THE BASQUE COUNTRY

3.1. Energy transition: Concept and principles

Energy transition as a core sustainability transition refers to the shift towards zero net emissions. In a broad sense, energy transition can be defined as the period and process needed to transition from one energy model to another, characterized by: (1) a drastic reduction in greenhouse gas emissions; (2) a greater penetration of renewable energy sources, in both the fields of primary energy and final energy, and especially in the generation of electric energy; and (3) a strong reduction in energy consumption by reducing energy intensity and improving energy efficiency in all processes of energy use and in all its forms (Club Español de la Energía, 2020).

Due to the omnipresence of energy in all economies, this process of changing the energy model requires profound changes across all economic sectors. Moreover, it requires changes on both the production and the consumption sides, as well as in the development of new technologies and in the promotion of organisational changes, for example towards a circular economy. Energy transitions are highly complex, therefore, and so difficult to characterize and to predict their evolution. Nevertheless, Blazquez *et. al* (2020) have developed a framework, based on four key propositions, that is oriented to provide some general guidelines on energy transitions for policymakers, companies and investors.

A first principle of Blazquez *et al.*'s (2020) framework is that current energy transition is driven by policies and not only by technology improvements, which differs from previous energy transitions. As the policies implemented vary between countries, two identical countries can achieve the same level of decarbonization with a different energy mix, a different level of energy supplied, and a different level of prices. A second principle is that energy transition disrupts liberalized electricity markets and undermines their economic foundation. Liberalized electricity markets are being disrupted by renewable technologies that changes their rules, so markets need to be redesigned to efficiently integrate these renewable technologies, which

[1] The suggestion of a transition from S3 to S4 was made by Mikel Landabaso in February 2020 in an opinion article for the European Commission's Joint Research Centre in Seville.

have lower marginal costs but are less predictable and not dispatchable on demand. A third principle is that given current technologies and technological perspectives, the transition to renewable sources is going to be incomplete. However, an incomplete transition to renewables does not necessarily imply a high level of carbon emissions as technologies to capture and store CO_2 can eliminate most of the negative externalities from fossil fuels. Finally, a fourth principle refers to the fact that there is a change in consumer preferences for cleaner energy, which generates demand for business models that move from 'energy only' (based on lowest price) towards 'energy services' (integrating other facets).

Building on the earlier discussion of the place specificities of sustainability transitions, there are also important principles of energy transitions related to their place-based economic, social and institutional dynamics. Indeed, Chlebna and Mattes (2020) explore the fragility of regional energy transitions, which they argue are «determined by the interaction and interdependency between actors, institutions and technologies» (p. 76). While the inherent fragility of regional energy transitions stems from complex endogenous dynamics that vary in different phases of the transition, their analysis highlights that «it is the region's embeddedness in development dynamics on multiple scales, which makes it particularly susceptible to fragility» (p. 76). With this in mind, we now turn to situate the Basque energy transition context within the broader Spanish, European and international contexts.

3.2. **Targets of energy transitions in European, Spanish and Basque contexts**

In the international arena multilateral agreements are key elements to alleviate climate change because, while being a global problem that affects all countries on the planet, its solution is channelled through the actions of individual countries. In 2015 the United Nations approved 17 Sustainable Development Goals under its Agenda 2030 (United Nations, 201). No other branch of activity is as present as energy in this strategy to overcome the great challenges that the planet faces to ensure its sustainability. Goal 7 is focused specifically on affordable and clean energy, and energy is also instrumental in several other goals, most notably goals 9 (industry, innovation and infrastructure), 11 (sustainable cities and communities), 12 (responsible consumption and production) and 13 (climate action). Also in 2015, at the United Nations 21st Conference of the Parties (COP) in Paris, 195 countries reached a long-term multilateral commitment to limit the increase in the planet's temperature by below 2ºC, and preferably by 1.5ºC, compared to pre-industrial levels. That same meeting underlined the importance of the involvement of civil society and companies, alongside governments, in the pursuit of the required reductions in greenhouse gas emissions. Finally, at the 2019 climate summit in New York 77 countries pledged to reduce their CO_2 emissions to zero by 2050.

The European Union has long been a pioneering world region with regards to the energy transition that is pivotal for meeting these international climate agree-

ments. Indeed, following the signing of the Kyoto Protocol in 1997, the Green Package for Integrated Energy and Climate Policies (2007), Winter Package for 2030 (2016), and 2050 long-term strategy to be climate-neutral (2018) have marked commitment and global leadership in the energy transition. The 2020 European Green Deal goes further still, and clearly positions environmental sustainability as a strategy for economic growth and increased competitiveness. Specific objectives that have been set along the way include:

- 40% reduction in CO_2 emissions from 1990 to 2030 (2014 European Council), increased to 50-55% in the European Green Deal;
- 30% renewable energy in final energy by 2030 (2018 European Council and Parliament);
- 32.5% improvement in energy efficiency by 2030 (compared to 1990) (2018 European Council and Parliament);
- Other measures of electricity market design, self-consumption, security of electricity supply, governance and actions to help coal-intensive regions (2018 European Council and Parliament);
- Achieving net-zero emissions by 2050 (2018 EU long-term strategy); and
- Conversion of the European Investment Bank into a Climate Bank and creation of a Just Transition Fund to help the groups or sectors most negatively affected by the transition (2020 European Investment Bank, Climate Bank Roadmap).

Moreover, under the European Green Deal, a new European Climate Law is in process of being developed to enshrine the 2050 climate-neutrality objective into EU law.

The Spanish energy transition is evolving under this global and European context. By early 2019 the 28 EU member states had sent the European Commission first drafts of their 'Integrated National Energy and Climate Plans'. The Spanish plan (Ministerio para la Transición Energética y Reto Demográfico, 2020) places its objectives among the most ambitious in terms of renewables and energy efficiency. Among these national objectives are:

- Reduce greenhouse gas emissions by 23% by 2030 and to zero by 2050;
- Double the share of renewables in the final energy mix to 42% by 2030, and achieve a 100% renewable electricity system by 2050;
- 39.5% improvement in energy efficiency by 2030; and
- Penetration of 5 million electric vehicles and that by 2040 passenger cars and commercial vehicles will be zero emissions.

Beyond the objectives set in government-led policies and strategies, the actions and strategies of business, research, education, civil society and a range of other actors all become highly relevant for implementation of energy transitions. Moreover, as argued in the previous section the required innovation and experimentation processes are situated above all in the regional, urban and local spheres.

Turning to the Basque Country, therefore, the long term vision of the current Basque Energy Strategy 2030 (EVE, 2017) is the «progressive evolution of the Basque socioeconomic model, especially in relation to industry, buildings and transport, towards a new model of lower energy consumption, with progressive incorporation of renewable energy, and with electrical energy as the main energy vector». The long-term objectives for the period 2016-2030 are specifically:

- Zero oil consumption for energy uses in 2050, which requires a structural change in the transport system;
- Reduction of greenhouse gas emissions in the Basque Country by at least 40% by 2030 and by at least 80% by 2050, with respect to 2005; and
- 40% renewable energy in consumption by 2050.

In the context of the more demanding conditions that will characterise the new European Climate Law, however, this vision is considered outdated and the Basque Government is currently working on a new Law on Energy Transition and Climate Change for 2022.

4. BASQUE S3 AND ENERGY TRANSITION

In the context of the principles and strategies set out in the previous section, it is widely acknowledged within the Basque Country that the great challenge related to the energy transition over the next 10 years is to achieve a significant reduction in emissions in sectors in which little progress has thus far been made, such as transport and industry. Due to the weight and importance of industry in the region, which accounts for around 20% of GDP, industrial transformation will require significant innovation (in fuels, processes, technologies, use of equipment, data, etc.). In this section we explore the mechanics and evolution of the Basque Country's smart specialisation strategy (S3) as a lever for fostering this energy transition in the industrial sphere. The analysis has been informed by a range of policy documents and semi-structured interviews with representatives of organisations involved in the Basque RIS3 from 2016 onwards (see Aranguren *et al*., 2016 and 2019b for more details).

4.1. Basque Smart Specialisation Strategy (S3)

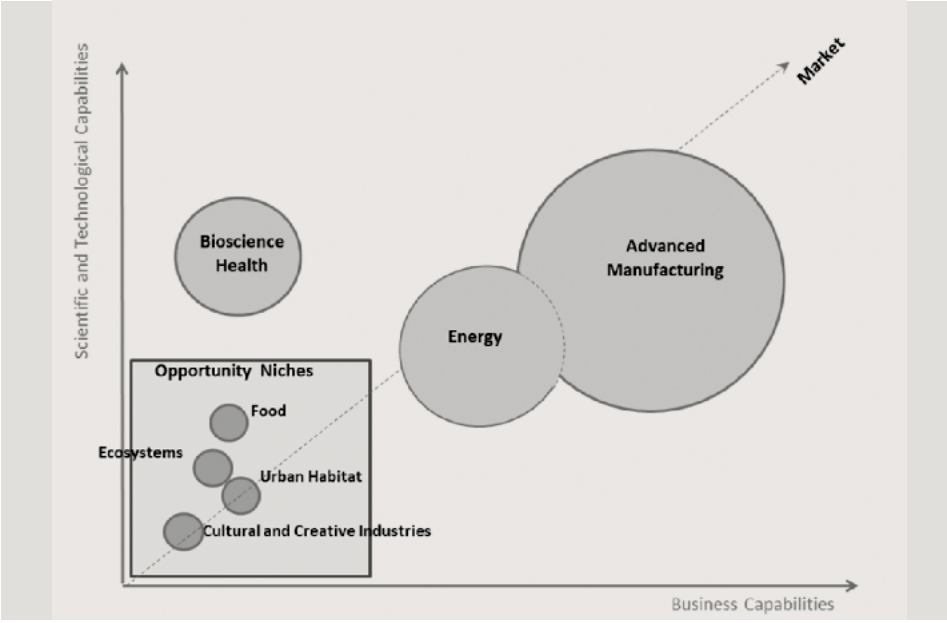
The Basque S3 to date has been formally embodied in the *2020 Science Technology and Innovation Plan (STIP)*, which was published in 2014 (Basque Government, 2014)[2]. Informally, however the S3 has antecedents that significantly pre-date this plan, and it is important to conceive of the strategy within this bigger picture. In this regard, Valdaliso (2015) provides a detailed analysis of the evolution of Basque competitiveness strategy over the last four decades, in which three distinct phases

[2] In February 2021 the new Basque Science, Technology and Innovation Plan (PCTI2030) was officially launched as an evolution of the S3 strategy implemented between 2014 and 2020.

can be highlighted. Following the statute of autonomy in 1979, the 1980s was defined by the creation of a new regional government and administration, alongside the need to promote substantial industrial restructuring of the economy in response to deep economic crisis. This process evolved in the 1990s into a strategy explicitly built around clusters that was geared towards improving the efficiency of Basque firms, fostering non-R&D-based diversification, and promoting internationalisation. In turn, this evolved in the 2000s into a sustained focus on innovation and science-driven industrial diversification, laying the immediate foundations for the Basque S3.

Thus, the foundations of the current S3 are deep, and the 2020 STIP can be seen as an evolution of both the previous STIP and of other plans and initiatives (Aranguren *et al.,* 2016), including existing strategies for advanced manufacturing, biosciences and energy, and the activities of cluster organisations supported under the long-running cluster policy (Konstantynova, 2017; Aranguren and Wilson, 2013). The 2020 STIP itself was elaborated from 2013, building in the first instance on a diagnostic analysis to define priorities based on industrial capabilities, scientific capabilities and market opportunities. Advanced manufacturing, energy and biosciences-health were identified as three *strategic priority areas*, and the four *opportunity niches* of food, ecosystems, urban habitat and creative and cultural industries also emerged as secondary focal points (see Figure 1).

Figure 1. **BASQUE RIS3 PRIORITIES**



Source: Aranguren *et al.* (2016).

Following the publication of the 2020 STIP in 2014, the S3 has been progressively implemented through the establishment of several new governance mechanisms. Most notably, these have included steering groups designed to foster processes of entrepreneurial discovery in each of the three priority areas and four opportunity niches. These have since evolved flexibly, at different speeds and in different directions, based on a set of ground rules that established the principles of involving actors from across the triple helix of government, business and research and focussing collective entrepreneurial discovery activities on the identification of more granular technologies, market opportunities and projects to prioritise (Aranguren et al., 2016, 2019b).

More than the other priority areas and opportunity niches, the activities of the energy priority have built explicitly on pre-existing dynamics, most notably those related to the EnergiBasque strategy (led by the Basque Energy Agency, EVE) and to the Energy Cluster Association (ECA). One of the main objectives of the energy priority that guides its activities is to consolidate leading Basque firms as global technological leaders so they can drive the value chain focused on products and services with high added value. The ECA was established in 1997 and groups together several value chains that include producers and distributors of different forms of energy, manufacturers of capital goods and components, engineering firms and other companies offering specialised services for the energy industry. It has around 200 members, and made up of a small core of very large firms – some of them global leaders in their respective industries – and a larger number of small and medium-sized enterprises, most of which have a high degree of internationalisation (Valdaliso et al., 2015). When the steering group for the energy priority was set up in November 2015, it was decided that the ECA should take leadership to ensure a business-oriented focus (Aranguren *et al.*, 2016). Moreover, the activities of the steering group initially maintained continuity with the nine working groups already in place for the strategic areas defined in the EnergiBasque strategy, from which a series of strategic initiatives were identified (*Ibid*, 2016).

As the steering group activity has progressed over time, SMEs from other related sectors have become involved, universities have begun to play a greater role, and the strategy itself has evolved (Aranguren *et al.*, 2019b). In particular, the strategic focus has taken on three new value chains – offshore energy, smart grids and resource efficient manufacturing – which have significant crossover with other clusters and sectors. Moreover, there is a clear awareness of «a specific challenge related to energy transitions, and more generally to the integration of market and social issues into the currently predominant technological focus of the activities» (*Ibid.*, 2019, p. 18).

4.2. **Basque S3 as a lever for energy transition**

As one of the three priority areas identified within the Basque S3, the energy sector has been a key focal point for Basque industrial and innovation policies since

2014 and has built on a much longer trajectory in energy policy over the previous decades. This has centred on a set of strong industrial and research actors in the energy field, such as large multinational companies in the oil and gas sector and internationally regarded technology centres. In addition, the ECA has played a key intermediary role in bringing together these different actors and fostering collaborative dynamics oriented towards articulating common strategic actions. Indeed, that the ECA includes members from across all key value chains and across the triple helix has put it in a prime position to be able to define the innovation strategy associated with the energy area of the S3 from the 'bottom-up'.

As mentioned above, the ECA had already been involved in defining a collaborative innovation and technology strategy – EnergiBasque – prior to the advent of the S3. This defined strategic areas mainly focused on electricity as an energy vector and its connection through smart grids, and with energy storage included as an enabling technology. However, this strategy changed from 2015 onwards, with the configuration and work of the actors included in the energy priority steering group of the Basque S3. The result was a shift to seven strategic areas and two enabling technologies. These strategic areas are related with energy generation (oil and gas), with a strong emphasis on renewable generation (wave power, wind power and solar-thermoelectric power), smart grids (electricity grids) and efficient consumption (energy efficiency and electric mobility).

During the implementation of the S3 the work being carried out by the different working groups defined for the energy priority has recognised the existence of significant synergies beyond traditional industrial value chains and technology areas. This has led to a reconfiguration around three new, cross-cutting value chains, which have important connections with activities in other areas of the S3 strategy: offshore energy, smart grids and resource efficient manufacturing. These value chains were selected for further exploration and development according to three criterium:

- New business opportunities in high growth markets.
- Strong capacities present in the Basque Country.
- Existing challenges that can be tackled by common technological solutions.

The evolution of the strategic focus towards these 'non-traditional' value chains is thus based on Basque industrial and technological capabilities and considering the market potential of each of the strategic areas. While they are in themselves strongly related to the specific challenges of energy transition in the Basque Country and are expected to contribute to the reduction of emissions, to energy efficiency and to renewable generation, they remain strongly oriented towards the supply side of energy value chains. Indeed, a clear weakness exists in terms of the integration of the demand side, through close involvement of consumers (i.e. high energy intensive industries) and civil society actors. This can be seen by the fact that most of the actors that have been involved in the steering group activities belong to the energy field.

Nevertheless, there has been an evolution in terms of the broadening of actors and focus over recent years, with the progressive integration of SMEs specialised in other sectors – particularly the ICT sector, related to digitalisation challenges – in the different working groups within the energy priority of the S3 (Aranguren *et al.*, 2019b). Moreover, there has been increasing attention afforded to connections between the energy priority area and other Basque RIS3 priority areas, most notably:

- Connections with the advanced manufacturing *steering group*, in order to work on the area of energy efficiency for industry, advanced manufacturing for power generation in hostile environments (i.e. wind offshore), and advanced manufacturing for the electric vehicle;
- Connections with the *ecosystems* and *urban habitat steering groups* in areas such as energy efficiency in buildings and infrastructures for electric vehicle (re-charging infrastructures).

While these are steps in the right direction, the transversal nature of energy transition challenges across all economic activities suggests that energy transition should be incorporated more horizontally throughout the whole of the S3 strategy. This will respond to the need to interconnect the transitions of different systems for sustainability, something that has been highlighted by the EEA (2019). For example, the *food* opportunity niche must respond to challenges related to emissions throughout its value chains, an element that could also be addressed as business opportunities for companies in both the energy and food sectors. In addition, the opportunity niche related to *ecosystems* could be conceived more transversally through the Basque S3 by incorporating green challenges to all priority areas. This would mean sharing green and energy transition goals as territorial goals and not only dependent on the current actors involved in the energy priority. Planning for the next strategy period, which is reflected in a new 2030 Basque Science, Technology and Innovation Plan 2030, does appear to be moving in this direction. While the 7 areas (priorities and opportunity niches) will be maintained, three *transversal lead initiatives* are foreseen, two of them related to green and energy transition goals (electric mobility and circular economy). The way in which these initiatives are reflected in practice is likely to be critical for positioning energy transition challenges within the evolution of the Basque S3.

In particular, the broadening of green transition goals to the whole S3 strategy, essentially moving from an S3 towards an S4 (Sustainable Smart Specialisation Strategy), will require further evolution of governance mechanisms. According to McCann & Soete (2020), implementing an S4 involves reinforcing a mission-oriented policy with non-neutrality, direction, and a system approach. We have already reflected the key intermediary role of the ECA during the first stage of the Basque S3, but the role of the Basque regional government and its Energy Agency (EVE) also stands out since the 1980s. In particular, these two institutions have provided strategic coordination mechanisms and have fostered shared vision around energy-

relevant industrial and technological fields, especially during the initial phases of S3 design and early implementation. In the more recent implementation of the S3 they have taken a step back to enable a greater role for large and globally-leading energy companies, who are now coordinating projects in which a range of other actors are involved (including SMEs). However, as analysed by Aranguren *et al.* (2019b), one of the biggest remaining challenges is to continue widening participation in strategic processes. Indeed, although the leading role of key companies is seen as positive in terms of innovation and technology development, a lack of engagement of other actors and/or intermediaries could bias the process towards specific interests.

Given the transversal nature of energy transitions, such widening in the governance of S3 will be critical if S3 are to provide an effective lever for the energy transition challenges of Basque industry across the board. Moreover, the need to address inter-regional and multi-level governance of the Basque S3 more effectively has also been identified (Aranguren *et al.*, 2016, 2019b). In terms of energy transition specifically, this chimes with Chebna and Mattes (2020) observations on the fragility of regional energy transitions being influenced by their multi-level context and to their call for further research on inter-regional dynamics. In the Basque case, the energy strategy is already connected to European Union networks, initiatives and projects, such as the Smart Specialisation Platform on Energy (S3P-Energy), and it will be important to build on these dynamics to ensure the regional specificities of energy transitions within the S3 are able to identify synergies and scaling possibilities with other regions.

5. CONCLUSIONS

Energy transition is a pivotal element of the green transition around which the European Union's post-COVID recovery strategies are built. Yet while these strategies are being designed primarily by EU Member States, the regional (and sub-regional) administrative levels will be critical for their success. Firstly, because regions are key 'implementers on-the ground' of European and national policies. Secondly, because the place-specificities of regions make them ideal 'laboratories' for experimenting with the innovations needed for sustainability transitions. In this respect, the paper has explored how the regional smart specialisation strategies that have been developed over recent years could provide a 'ready-made' framework for discovery and experimentation oriented explicitly to energy transitions. They are an ideal starting point because S3 themselves are designed to be built from existing regional assets and capabilities, and to engage a wide range of stakeholders from across the quadruple helix (government, knowledge organisations, firms and civil society). This also implies, however, that regions with a longer trajectory in industrial development and innovation related to energy transition will be better positioned for leveraging their S3 towards energy transition challenges. This is the case of the Basque Country region, which has developed a long-term energy strategy over several decades, together with a strong trajectory in industrial and innovation policy.

Through an exploratory analysis of the Basque Country S3, the paper has provided insights about how the processes and mechanisms put in place for an S3 could work in leveraging energy transition. In this case the potential is clear, given the central role of energy as one of three strategic priorities within the S3. However, the analysis points to the need to ensure the involvement of a wide range of actors from across the different parts of the quadruple helix. In particular, we have highlighted how in the Basque case the demand side – in terms of consumers, users, and/or representatives from civil society more broadly – is not yet well represented in the discovery dynamics that could support energy transition. This missing element in the social dynamics surrounding energy transition, which by nature is a socio-technical transition, could be seen as a source of «fragility» in the transition process (Chlebna and Matte, 2020).

Other potential sources of fragility highlighted by this case include the potential for vested interests to emerge when experimentation projects imply certain technological paths, for example in working groups that become very narrowly focused and/or isolated from other dynamics. This implies that incorporating different configurations of actors and projects within inter-connected working groups will be important to ensure broad-based experimentation, as will fostering connections between the working groups within the energy priority and those being developed in other priority areas of the S3, and indeed international connections capable of developing synergies beyond the region. More generally, experimentation with and monitoring of new and inclusive governance mechanisms is likely to be a key success factor in ensuring that S3 dynamics are capable of effectively galvanising energy transition across the whole economy.

There are indeed some lessons on governance from the Basque case, most notably relating to the importance of intermediaries in terms of bridging different interests and fostering sustained strategic vision and actions. Indeed, at a time when regions across Europe were first designing their S3, Aranguren and Wilson (2013) highlighted the conceptual similarities between cluster policies and S3, using Basque cluster policy to illustrate how policy-makers could leverage cluster organisations to foster entrepreneurial discovery dynamics. The role of the Energy Cluster Association (ECA) in the Basque S3 process to date, as analysed here, has borne out many of the arguments made then. In particular, the case shows the importance of this intermediary role in the initial stages of the strategy, whereby the pre-existing cluster dynamics gave the energy priority steering group a 'head start'. As implementation of the strategy took pace, the integral involvement of a well-established intermediary also enabled the relatively fast transition of leadership of working groups and projects to the private sector.

A final key message from the analysis of the Basque case to date refers to the scale of ambition of energy transition goals and their relevance for the green transition across the entire economy. While S3 contain many of the ingredients for sup-

porting ambitious energy transitions, their design in sometimes isolated priority areas can provide a barrier to wholesale transformation that permeates across the regional economy. The increasingly cited need to move from S3 to S4 (sustainable smart specialisation strategies) will require enhancing the connectedness of different parts of existing strategies so that energy transition goals are approached in a holistic manner.

This paper has focused on exploring the link between a new generation of regional innovation policies and the need for energy transitions, illustrated through an analysis of key elements in this link as revealed in the context of the Basque Country case. However, there remains an important research agenda ahead, to deepen such conceptual, exploratory analysis with detailed study of concrete practices, projects and activities that arise from the S3 dynamics and that could constitute mechanisms for change that drive energy transitions.

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