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Revisiting Schumpeter in Europe: Place-based innovation and transformative industrial policy

Luc Soete and Johan Stierna

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Maastricht Economic and social Research institute on Innovation and Technology (UNU-MERIT)
email: info@merit.unu.edu | website: http://www.merit.unu.edu

Boschstraat 24, 6211 AX Maastricht, The Netherlands
Tel: (31) (43) 388 44 00

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Revisiting Schumpeter in Europe: Place-based innovation and transformative industrial policy

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Abstract

This paper offers a Schumpeterian perspective on the policy responses to the current polycrisis environment, the European Union (EU) finds itself confronted with. Joseph Schumpeter developed most of his insights into long-term economic and political development while being confronted himself with major transformative, societal changes: political, economic and technological ones. From this perspective, the current turbulent times of rising geo-political tensions, unsustainable development resulting in out-of-control climate change and declining biodiversity, and widespread application of Artificial Intelligence (AI), have a lot in common with the period in which Schumpeter developed his thoughts and hence might benefit from a closer look at those Schumpeterian insights. Times of turbulence require transformative policies integrating various policy areas. However, while 'transformation' will often be perceived as essential at a global level: "transform or be transformed", it will also be understood by citizens living in concrete places as a threat or a sudden unexpected confrontation with new uncertainties. In this context, 'places' need to become increasingly recognized as important for industrial policy, just as they are for climate, energy, agriculture, and innovation policy. The analysis presented here highlights following Schumpeter's insights, the need for an open industrial transformation approach less based on old, national industrial policy notions but adopting a new vision on the role of place-based industrial innovation in strengthening Europe's long-term resilience to political, economic and technological change.

JEL Codes: F63; L52; N74; O25; P18; Q48

Keywords: Industrial policy, Schumpeterian dynamics, green energy transformation

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Emails: Luc Soete: l.soete@maastrichtuniversity.nl and/or luc.soete@vub.be and Johan Stierna: johan.stierna@ec.europa.eu. This paper is a further elaboration of the Schumpeter "Innovation in Enterprise" lecture given by Luc Soete on November 28th, 2022 in Prague, Czech Republic (see https://www.youtube.com/watch?v=xPuY8NKflvU). Luc Soete is Emeritus Professor, Maastricht University, The Netherlands and Dean, Brussels School of Governance, Free University of Brussels (VUB), Belgium Johan Stierna is Lead scientist, Joint Research Centre, Sevilla, Spain.

1. Introduction: a Schumpeterian time of turbulence?

There are good reasons in the current turbulent times to return to Joseph Schumpeter, who passed away nearly 75 years ago, for a policy reflection on the role of place-based innovation in transformative industrial policy. Schumpeter lived both from a historical perspective as well as at a more personal level, in particularly turbulent times. Revolutionary periods: politically, economically and technologically with the devastating effects of the first and second World War leading particularly in Europe to the falling apart of empires and nations' identities[1], an economic great depression and an "industrial" revolution with amongst others the emergence of new modes of transport with the cracking of crude oil and the gradual dominance of the combustion engine, the emergence of new scientific fields such as chemical and mechanical engineering and dramatic organisational changes in industry with the widespread use of unit electric drive and the resulting possibilities for mass production, etc. In short, the period in which Schumpeter lived[2], was a period of dramatic change where the long lasting political, economic and social effects of the industrial revolution became visible, often in revolutionary and short-term destructive ways but ultimately resulting in a long-term transformation of industrial and societal systems.[3]

Of course, the global ecological and demographic background behind the current polycrisis[4] environment is rather different from the period in which Schumpeter lived – a world population of a mere 2 billion and politically a divided Europe prone to nationalism – but the occurrence of "cascading crises" often transgressing both territories and areas, has been a recurrent phenomenon affecting in particular Europe in a disproportionate fashion. Over the last decades, the EU has been confronted more than other, high income regions in the world with the local consequences of global crises: starting with the financial crisis of 2008-9 (a financial crisis outbreak in the US nearly leading to the collapse of the EU's common currency and pushing the EU into a "great recession"); the COVID-19 pandemic (a global health crisis outbreak in China bringing to the fore Europe's dependency on foreign medical and other essential materials' supplies); and last but not least the Russian invasion of Ukraine in 2022 (a military security crisis highlighting on the one hand Europe's military dependency on the US and on the other hand Europe's energy dependency on Russian fossil fuels). Each time the external dependency of particular European Member States, whether in terms of capital imbalances, global value chains or fossil fuel supplies, translated itself into an overall EU vulnerability.

Not surprisingly, the need for a radically different approach in Europe's external dependencies on various goods and services including fossil fuels, rare earth materials, some essential medical goods and equipment, electronic chips and other technologically advanced equipment, became quite suddenly

[1] Schumpeter's own birth city Triesch (or Třešť) in Moravia changed several times over his life in national identity.

[2] Turbulent times have been an inspiration for many intellectuals long before Schumpeter, as in the case of Karl Marx, Max Weber, Georg Simmel and Friedrich Nietzsche, among others. Most of these intellectuals lived one or two generations before Schumpeter, witnessing the first signs of the turbulent times associated with various phases of the Industrial Revolution.

[3] For instance, Schumpeter illustrated his argument with the revolution of mobility in the early 1900, when the automotive industry emerged and established itself in the US. Its early history saw many new entrepreneurs and smaller firms. "The bonanza time was over by about 1916. A host of firms nevertheless crowded into the industry afterwards, most of which were eliminated by 1925. From a fierce life and death struggle three concerns emerged." (Ibid: p.55 footnote) .

[4] For the Cascade institute "A global 'polycrisis' occurs when crises in multiple global systems become causally entangled in ways that significantly degrade humanity's prospects. These interacting crises produce harms greater than the sum of those the crises would produce in isolation, were their host systems not so deeply interconnected." (*What is a polycrisis and how is it different from a systemic risk? Discussion Paper, Cascade Institute 10/*2022) https://cascadeinstitute.org/technical-paper/a-call-for-an-international-research-program-on-the-risk-of-a-global-polycrisis/.

recognized in most European policy circles and translated into a new call for a European industrial policy under the heading of "open strategic autonomy"[5]. As if the case for the old, industrial policies of the 70's and 80's came suddenly back to life, now under the umbrella of sustainable, green industrial policies.[6]

2. Schumpeterian Industrial Policy in Europe: open towards creative reallocation?

Following Schumpeter, we would claim though that the new European industrial policy will have to be rather different from the old industrial policies of the previous Century.

First of all, there is the need to bring about a fundamental transformative shift in the aim and purpose of industrial production. The expansionary and rather linear growth and development framework assumed to govern business and industrial growth is today being questioned in more or less similar ways as it was in the Schumpeterian period of the late 19th Century. This has been well encapsulated in Schumpeter's famous quote: "add as many mail-coaches as you please, you will never get a railroad by doing so"[7]. Over the last 75 years or so, Europe became internationally specialized in energy intensive industrial production processes from the production of iron and steel to the manufacture of motor cars and machine equipment. The enlargement of the EU in the 90's further "widened" these European industrial value chains across the EU towards both the Southern and Eastern parts of Europe and was extended sector-wise from the agro-industrial sector to chemicals, mechanical and electrical engineering.

As a result, the current industrial transformation towards green energy-based sectors raises particularly in Europe, major structural change challenges. This involves not just systemic transformations of industrial production and supply chains with heavy investments in new, green energy production sites and new, renewable energy grids but also a possible relocation of industries near more easily accessible renewable green energy sources. At the same time, the (re-)use of existing materials might also become reflected in more revolutionary, than incremental applications of circular economy principles with as a result more radical shifts in the reliance on local suppliers as opposed to the well-established global value chains. A similar transformation is likely to take place in the agricultural sector.

In short, Europe is likely to be confronted with an industrial structural transformation process with major relocations implications across Europe. A transformation process which the European Commission (EC) will be trying to orchestrate from a European perspective, but which the European individual Member States will be implementing with primarily their own national industrial policy

[5] For an overview of the challenges this represents for European research and innovation policy in particular the EU's championing of "open science", see Soete and Burgelman (2023).

[6] As in the case of the recent Green Deal Industrial Plan, and the Net-zero Industry Act, European Commission, March 2023. For us, this is actually not surprising. Back in 2007, one of us wrote about the fact that European industry, if it wanted to keep its, at that time relative front runner position in both environmental-friendly technologies and in well-regulated and controlled social conditions would be in need of some form of industrial policy. To quote: "Turning to the future, it seems that one of the central policy questions…, is to what extent industry can continue to play its role as frontrunner in such areas as the environment and social conditions within an increasingly competitive environment without a strong domestic industrial policy….With increased globalisation, one can only hope that [European] industry will be an engine for the spreading of social progress, environmentally friendly technologies and eco-innovations world-wide. Industrial policy in different forms and sorts is back, high on the agenda." (Soete, L. (2007), "From Industrial to Innovation Policy", *Journal of industry, Competition and Trade*, **7**, pages 273–284, https://link.springer.com/article/10.1007/s10842-007-0019-5#citeas)

[7] Schumpeter, J. A. (1935), "The Analysis of Economic Change," Review of Economic Statistics, vol. 17, May, p. 4.

interests in mind. As Ricardo Hausmann (2021) recently highlighted, energy based on fossil fuels such as coal and oil had "*a unique feature… they are amazingly energetic per unit of volume and weight. This fact, combined with advances in transportation technologies in the twentieth century, meant that the world became "flat" from an energy point of view… the absence of local energy sources was not an obstacle… Yet, as the world weans itself off coal and oil, energy flatness will become a thing of the past. With the exception of nuclear power, all green sources of energy – sun, wind, hydro, and geothermal – are unevenly distributed and costly to transport. Even if firms insist on using fossil fuels together with carbon capture and storage, they will benefit from proximity to geological formations that can store carbon dioxide – and these are not ubiquitous. In a decarbonizing world, therefore, energy-intensive activities will again have to take place near specific locations, just as in the days of waterwheels*."[8] Applied to the EU, it means that many of the most energy-intensive industries will under the umbrella of "strategic autonomy" start to focus on the differences in renewable energy costs within Europe.[9] These differences are, as Hausmann pointed out, significant also within Europe.

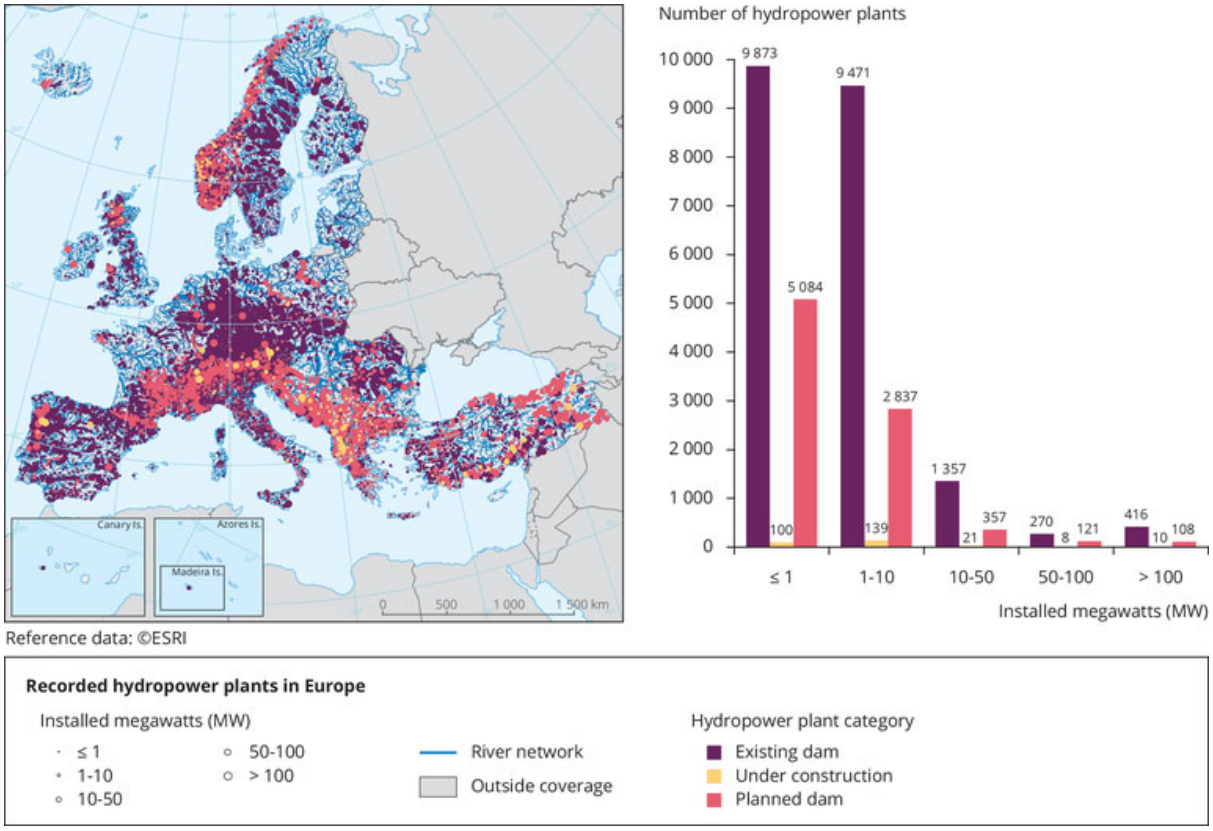
Second, and as a result, any industrial policy addressing Europe's green energy transformation will have to take into account more fully the relocation implications of such transformation. It will have to be a Schumpeterian place-based approach to industrial policy involving now also the "creative destruction" opportunities *and* threats across different territories in Europe. There are indeed huge differences in the locational advantages and disadvantages of renewable energy production across Europe. A brief elaboration.

Hydropower, one of the oldest sources of renewable energy, deriving power from the flowing of water which covers today some 17% of the EU's electricity (and one third of the EU's total renewable electricity production), is strongly subject to decreasing returns in location and limited to places located primarily in mountainous countries with low population densities such as Norway and Sweden and European regions surrounding the Alpes and the Balkan peninsula. As illustrated in Figure 1, the differences in the location of dams and hydropower stations across Europe is significant. The Netherlands, Denmark, Finland, the Baltic countries as well as the largest parts of Belgium, Western and Northern Germany, Poland and Western and Northern France provide only limited opportunities for hydropower production.

[8] See https://www.project-syndicate.org/commentary/green-growth-and-end-of-flat-energy-world-by-ricardo-hausmann-2021-12

[9] We consider from this perspective the threat of European firms and the European industry representatives to move to the US because of cheaper energy costs, as not very realistic. By contrast, we consider the threat of European firms to move to the US because of "made in America" measures taken under the new Inflation Reduction Act, a more serious threat.

<u>Figure 1</u>: Recorded hydropower plants in Europe[10]



<u>Source</u>: European Environment Agency[11]

In a similar way, there are huge locational differences across Europe in wind velocity and sun hours, the two other major sources of renewable energy production in Europe.[12]

As illustrated in Figure 2 within Europe, wind velocity is highest in offshore windfarms on the North and Baltic Sea and onshore windfarms along coastal areas[13].

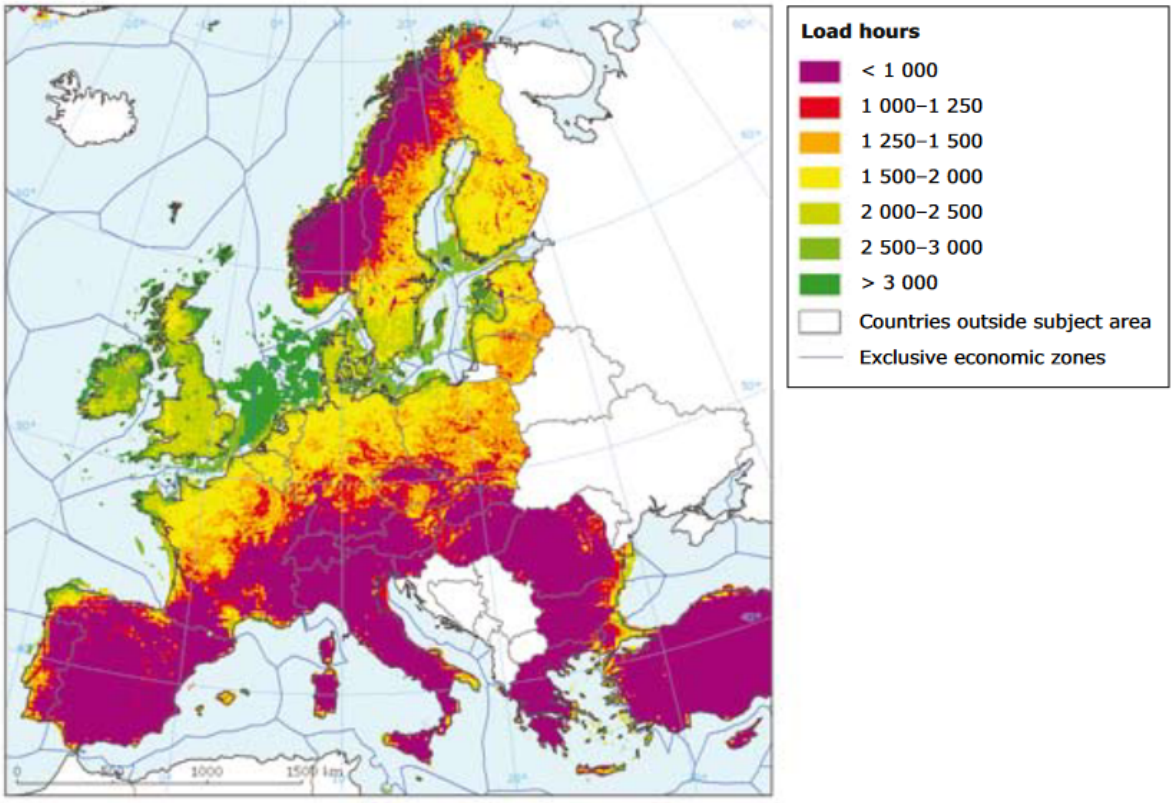
[10] The figure shows the number of existing, under construction and planned hydropower plants by size categories (installed megaWatts) in Europe.

[11] <u>https://www.eea.europa.eu/data-and-maps/figures/recorded-hydropower-plants-in-europe</u>

[12] The use of deep geothermal energy for electricity generation and industrial production in Europe has a similar place-based characteristics. Natural settings are found in very few places (e.g. Iceland, Italy, Canary Islands). Advanced technological investments are being made in Germany, France and the Netherlands) <u>Deep Geothermal Energy in the European Union (europa.eu)</u>; <u>Case studies of GEO-ENERGY EUROPE members (geoenergyeurope.com)</u>

[13] European Environment Agency (2009), Technical report no 6, Europe's onshore and offshore wind energy potential An assessment of environmental and economic constraints.

Figure 2: Distribution of wind velocity in Europe: full load hours (80 m hub height onshore, 120 m hub height offshore)



Source: EEA, 2008.

Of course, the investment costs for building offshore windfarms are much higher than for onshore windfarms. However, once the higher wind velocity on open seas is taken into account, the generation cost for wind energy, particularly in the low depth (less than 50 meters) areas of both the North Sea and the Baltic Sea is more or less equal to coastal area onshore windfarms.

In the case of solar renewable energy, places matter again with of course much more radiation and number of hours of sun in southern Europe than in the middle and northern parts of Europe as illustrated in Figure 3[14]. In the most southern parts, the red areas in Figure 3, with an average of 4000 hours of sun a year, there are opportunities for "concentrated solar power" production allowing now also for thermal and hydrogen storage, providing cheap power up to 24 hours a day.

Up to recently, the physical presence of sun, wind, water and geothermal energy was not threatening the dominant fossil-based energy system. However, renewable energy technology inventions have now evolved into market-based innovation. Today, all major renewable energy sources benefit from lower marginal lifetime costs than fossil-based energy.[15]

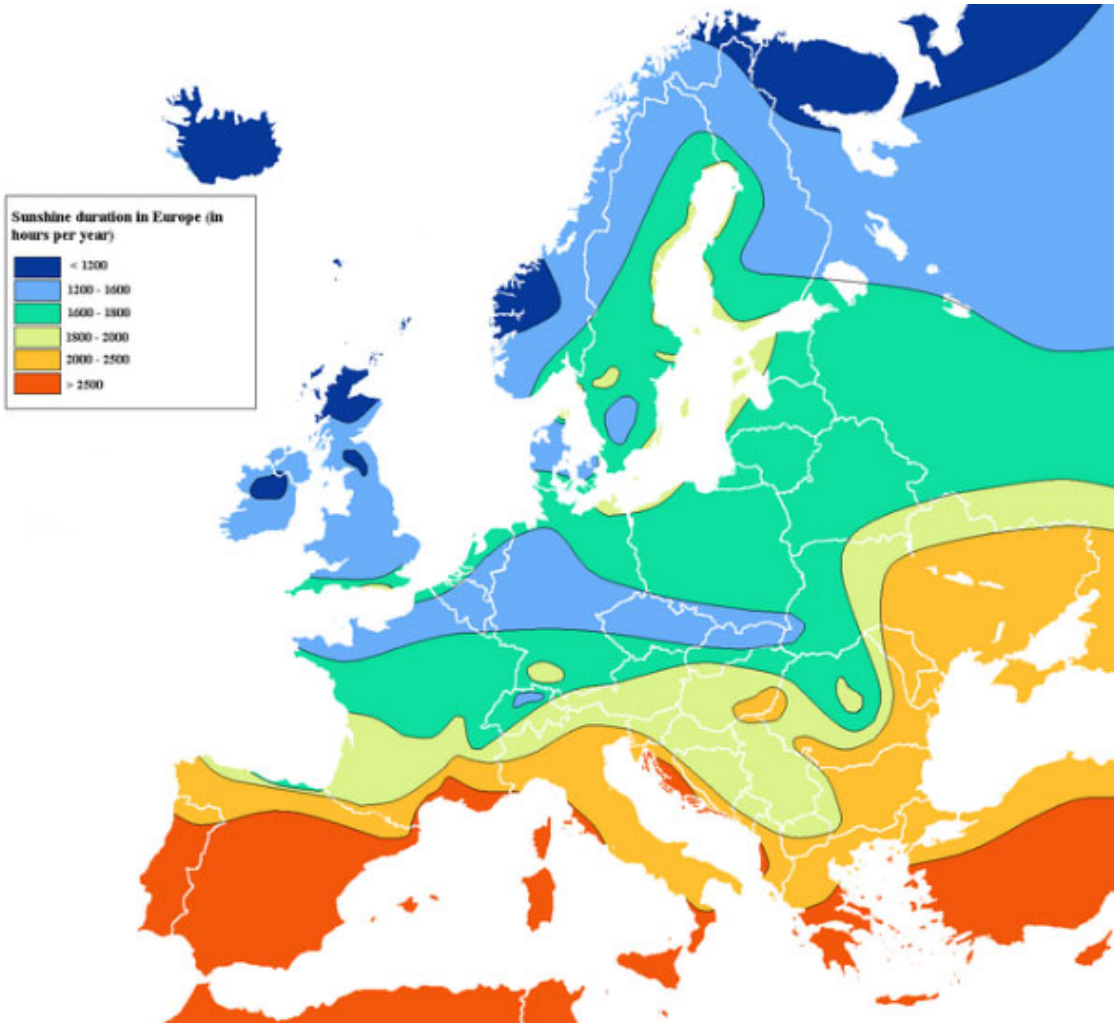
[15] Irena, 2021. Renewable Power Generation Costs in 2021 (irena.org)

In short, Europe's future green energy system will be a much more place-based one with substantial differences in the costs of renewable energy production. Places along the North and Baltic Seas near offshore windfarms with possibilities for close-by hydrogen energy production[16], or alternatively Southern European places in Spain, Italy or the Balkan with up to four times more hours of sun will now become more interesting locations for energy-intensive industries.

In a certain way this is also indicative of the more decentralized nature of the emerging green energy system. In the previous "flat energy" system, the place-based nature of coal mining or oil and gas winning was accompanied both by heavy local and infrastructural grid investments, providing more or less equal access to cheap fossil-fuel based energy. In the new, green energy system, there will be new place-based opportunities emerging related to relatively easily accessible renewable energy, primarily solar power, benefitting local creative entrepreneurs and overall more competitive and differentiated markets.

Figure 3: Simplified map of sunshine duration in Europe according to national data

[16] Such as such as Rotterdam or Delfzijl in The Netherlands or Antwerp and Zeebrugge in Belgium



From this perspective, the transformation of some of Europe's most energy-intensive industries towards the use of renewable energy sources is likely to also involve the relocation of industries to places with lower renewable energy costs.[17]

3. Industrial transformation: how place and people matter

The green transformation relocation patterns across Europe do, however, not necessarily fit current industrial locations in European countries and regions such as landlocked areas with limited wind velocity and sun hours. Many of those regions[18] became over the earlier part of the previous Century, industrial concentration areas because of the place-based, cheap local accessibility of coal, replaced later on by the easiness of pipeline energy transportation along the lines of Hausmann's "flat energy

[17] In this context, it is relevant to learn from the strategy developed in Iceland. Capitalizing on the cheap and limitless flow of local geothermal energy, the authorities created the framework conditions for replacing oil with geothermal energy for heating and for new energy-intensive process industries, including international investment nearby the energy sources, opening-up for an export of higher value-added products. In addition, Icelandic firms export their knowhow at the global market (e.g. in China)..(Logadóttir, 2015, Iceland's Sustainable Energy Story: A Model for the World? | United Nations

[18] such as the German Ruhr industrial region or the Dutch Southern Limburg area…

world". The same pattern could be observed with respect to hydropower often located in mountainous areas which required both huge local investments and infrastructural grid investments.

Viewed through the glasses of these old, centralized energy systems, there will be a national policy tendency to prioritize infrastructural grid investments linking the new, national locations of green energy production to the old industrial concentration areas. In short, trying to get back to the old "flat energy world" with European countries investing each in primarily the domestic, new renewable energy grid infrastructure to enable the smooth energy transformation of their own landlocked industrial zones. However, from an overall European perspective, such national investments aimed at transforming existing industry's competitiveness into a sustainable one will be particularly costly. It will as Hausmann suggests, undermine Europe's overall "sustainable competitiveness" in some of the heavy, energy-intensive industrial sectors, while at the same time miss new, Schumpeterian place-based opportunities associated with the relocation of energy-intensive industries. It is in this sense, that Europe's green energy transformation requires a different, what we called, Schumpeterian approach to industrial policy, including across Europe different territorial "creative destruction" processes.

An additional feature of industrial transformation also connected to Schumpeterian insights relates to the way industrial and more broadly economic transformation involves the emergence of new firms, the development of new markets, even the emergence of new industries. Economic turbulence in the sudden confrontation with regulatory and unexpected institutional changes challenging existing firms and industries in their traditional profit-making activities. New players will emerge alongside existing firms fighting for their survival and having to transform themselves from beginning till the end. It was Schumpeter who brought to the fore how it would be ultimately the creative entrepreneur – the "***Schöpferischer Zerstörer***": a dynamic individual who would through perseverance and conviction overcome all resistance, driven by: "the dream and the will to found a private kingdom, the will to conquer and the joy of creation" – would bring about the radical structural change in society. This radical, now ecological entrepreneur will though have to find as her natural companion, the creative, ecological consumer[19].

From this perspective, the biggest transformation needed today, accompanying a more sustainable development path, might well be on the consumption side. How to reverse the old, post-war consumerism trend to spend any increased income on new varieties of goods subject to quick replacement rates not based on any physical obsolescence or wearing out? How to transform the high mobility patterns which were themselves primarily the result of improved transport infrastructure and facilities which consumers translated in greater home-work distances and long-distance holiday patterns? In this sense the COVID-19 crisis with the rediscovery of the importance of proximity might have been a tipping moment for reducing the negative environmental impact of consumerism, leading amongst others to the development and growth of second-hand markets, the upgrading and re-use of old electronic equipment, the shift towards online communication in work, even the "shaming" of

[19] Again there is relatively little new in this. Back in 2007, it was already noted: "*There is already today a large gap between the environmental awareness, introduction of environmental-friendly technologies (end-of pipeline and clean technologies) in industry and the same awareness and diffusion of such goods with final consumers… At the moment, it could even be argued that when the consumer enters the factory as worker/employee he enters an environmentally more sophisticated and fine-tuned world than when he gets back at home. The consumer's lagging awareness of environmental issues has as a consequence created a gap with the demand for environmental friendly products. The question can be raised how long European industry will be able to maintain such a front running position in a less environmentally friendly regulated world market with too few domestic consumers ready to contribute in their consumption behaviour to the additional costs*." Soete, L. (2007), op.cit.

private travelling. It may even be that places with a higher density of 'sustainability-demanding' consumers and public procurers would benefit from global competitive advantages in lead markets[20], creating new firms and experimenting locally in sustainable products and services of potentially high value-added in global markets. Again, the industrial policy challenge for European citizens both as employers and as consumers has today a much more specific institutional and place-based angle to it.

4. Conclusions: a European integration process connecting reinvented industrial places

The EU has had an institutional history of integrating individual European nations through the application of economic "single market" principles to a continuous expanding space: from goods to services, from employers to employees, from students to knowledge. In the current polycrisis environment a core fundamental question is whether this tying of individual European countries together through the exchange of goods, persons or knowledge is still the appropriate framework for addressing the rising uncertainties associated with unsustainable development.

With respect to good and services, the question needs to be raised whether the emphasis in individual European countries on strengthening their "national" competitiveness or in European regions on creating "smart" specialization patterns still represent the appropriate overall policy framework for the EU. Do such principles still fit the 'swarming'-effect of a more decentralised energy system, the current paradigm-shift in digitalisation and the need for more radical transformations within citizens consumer paths as described above? Has the time not come to rethink which 'places', borders and governance[21] fit best a European integration in the current polycrisis environment: a process which should now be capable of ensuring also citizens' aspirations towards security, welfare and wellbeing?

As Ulrich Beck and Elisabeth Beck-Gernsheim pointed out some twenty years ago: "conventional social and political science remains caught up in a national-territorial concept of society. Critics of 'methodological nationalism' have attacked its explicit or implicit premise that the national state is the 'container' of social processes and that the national framework is… the one best suited to measure and analyse major social, economic and political changes." (Beck and Beck-Gernsheim, 2002). It is in this direction that the debate on the optimal governance structure for implementing the required transformative changes will have to go. For the EU, the current challenge will be how to bring about the industrial and consumer transformations as described above, no longer with the national-territorial obsession glasses of social scientists and policy makers, but from a cross-border European perspective.

The starting point should be the assumption that these transformations will hit places differently. The energy transition from fossil to renewable energy, the systemic transformation of key industry sectors in the EU including industrial agriculture and in particular live-stock farming, the circular economy principles and the subsequent shifting demands for land use, housing, mobility, public transport, will of course create plenty of new sustainable development opportunities. However, they will most likely also create pressures to reallocate industries and value chains, putting other territories under stress with

[20] Edler, J., Georghiou, L, et al. 2009

[21] The focus on place-based innovation does not forcefully mean that the local or regional administrations hold the unique or optimal level of competences. Local policy actors may not have the full information or long-term incentives when dealing with industries of strategic interest for the green and digital transitions. Moreover, the transformation often require large-scale investment for both public infrastructures and the renewal of private capital stock. In strategic industries with high entry barriers, such as the mining industry, there may be business cases for an EU or intergovernmental initiative as was the case when Airbus was created in the airplane industry.

populations ageing or emigrating, forced as it were to adjust to a rapidly changing external environment in which one has little say. The territorial effects of the accelerating climate change and declining biodiversity will trigger an additional stress with several territories already now suffering from water scarcity, wildfires, loss of biodiversity or flooding.

As Europe expands its financial tools and means (The European Green Deal, NextGenerationEU, the Just Transition Fund, the Green Industrial Plan, etc.) to assist territories: regions and places to transform, it will increasingly have to admit that it is first and foremost a union of places rather than of nations. Creative solutions cannot be restricted by borders, as illustrated in the case of the transformation of national electricity or renewable energy grids, or in public transport. The role and importance of proximity in new circular economy principles highlight the role of local suppliers, of neighborhood: in short, the central role of territories. The required changes imply in other words many more structural transformations: sectoral ones and geographical ones.

From this perspective, the current European regional development and cohesion 'business as usual' approaches such as regional Smart Specialisation Strategies (S3), will not suffice.[22] They will tend to focus primarily on "incremental" improvements and innovations with as a result a tendency to shy away from new, more disruptive structural changes giving more emphasis to the established incumbents in the region. The latter carry with them the nostalgia of the past, having often been responsible for the region's S3; by contrast the Schumpeterian entrepreneurs of the creative destruction type, are not. Yet, it is precisely in this local arena that room should be given for Schumpeterian entrepreneurs of the "creative destruction" type, for local partnerships mobilizing stakeholders and citizens, for designing even new funding instruments.[23] As we argued elsewhere with colleagues[24], such bottom-up experiments will have to build on place-based innovation experiments in furthering a local sustainable transformation. Local public policy must now have the freedom to experiment, e.g. through regulator sandboxes.

From this perspective, the new industrial policy in the EU will have to become a must open-up for place-based dynamics, where the potential of the decentralised energy, digital and consumption systems is fully exploited by local entrepreneurs[25] benefitting at the same time from the cultural diversity in Europe. It will give room for experimentation, a pragmatic reindustrialisation and bottom-up structural transformations essential for achieving the European Green Deal and Sustainable Development Goals.

[22] Each policy concept is the child of particular historical circumstances. Smart specialisation, focusing on growth, rationalisation and innovation building on existing industrial strengths, was conceived in a context of economic expansion and technological deployment.

[23] One illustration of this is the increasing use of crowdfunding where citizens co-fund place-based renewable energy.(see the EU financed CrowdThermal project, 2023), Crowdthermal - CROWDTHERMAL (crowdthermalproject.eu)

[24] See Schwaag Serger, S., Soete, L. Stierna J., 2023.

[25] See e.g. the case made by Mark Sanders (2022) on the need for "entrepreneurship for a Resilient and Sustainable Economy" in his inaugural lecture "Enter the Prince of Denmark".

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