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Making the Great Turnaround work

Economic policy for a green and just transition

Edited by the Heinrich Böll Foundation, ZOE – Institute for Future-Fit Economies, and Finanzwende Recherche

institute for future-fit economies

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PREFACE

When this series was conceived in autumn 2021, the economic policy environment was quite different. Policy-makers focussed on the challenges of implementing the Paris Agreement while overcoming the scars left by the Covid-19 pandemic. COP26 in Glasgow was a global event that attracted many heads of state and government.

It was in this context that we started a series of three roundtables among economists and political scientists from both sides of the North Atlantic on how to transform our economies to meet the Paris Agreement's climate goals while addressing inequality and stabilising the financial system. We called this the «Great Turnaround» of our economies, which currently are moving at high speed towards a crash with planetary boundaries.

As a background to the roundtables, we asked some participants to contribute short papers on certain aspects of the multifaceted challenges implied in the «Great Turnaround». In the process, drafts of the papers received comments from other participants.

This publication aims at contributing to the emergence of a transformative economic thinking, integrating environmental, social, and economic dimensions, after the wreckage of neoliberal economic thought that clearly has reached its date of expiry.

It is the product of a collaboration of the Heinrich Böll Foundation, the ZOE Institute for Future-Fit Economies, and Finanzwende Recherche. Jonathan Barth took the lead in conceptualising the contributions.

We owe a big debt of gratitude to Adam Tooze, who kindly chaired the roundtable series and helped to convene a really fascinating set of innovative authors and thinkers. Our thanks go furthermore to all the authors who penned a series of truly insightful articles. Sarah Ribbert (Heinrich Böll Foundation) and Jan Siebert (ZOE) managed the whole process with admirable diligence, while Robert Furlong provided valuable support as the copy editor.

Berlin, May 2022

Jörg Haas
Head of Division International Politics
Heinrich Böll Foundation

ABBREVIATIONS

CERF	carbon emissions reduction facility
ECB	European Central Bank
EGD	European Green Deal
ESG	environmental, social and governance
ETS	Emissions Trading Scheme
EU	European Union
GDP	gross domestic product
GFC	Great Financial Crisis
GHG	greenhouse gas
GND	Green New Deal
IEA	International Energy Agency
NHS	National Health Service
OECD	Organisation for Economic Co-operation and Development
SEIP	Sustainable Europe Investment Plan
SG	Social Guarantee
SGP	Stability and Growth Pact
UK	United Kingdom
US	United States

JONATHAN BARTH, JAKOB HAFELE, AND ADAM TOOZE

Winning the Marathon and the Sprint

Achieving long-term economic policy objectives in an era of short-term responses

The back-to-back impact of corona, the escalation of tensions between the West and China, and the war in Ukraine mark a new era. So far, it has been interpreted primarily in terms of foreign policy and geopolitics. However, the war also marks a qualitative break that has been in the making for a long time: The economies of the Global North are being shaken out of a long era of stability. Our customary practices are increasingly under attack. The financial crisis of 2007–2008, the euro crisis of 2010–2013, the corona crisis of 2020, and now the war in Ukraine. Welcome to the era of crises, in which the exception becomes the norm.

This new quality has immediate consequences. Governments increasingly have to react quickly and effectively to crises. Their actions resemble a series of sprints: back-to-back all-night meetings in which hordes of officials and politicians forge rescue measures for Greece, draft recovery packages for the corona pandemic, or find answers for exploding gas prices. Time is always short. It is not the policy cycle that determines priorities, but the crisis of the moment.

How to win the marathon?

The crucial question in this era is how to lose not sight of long-term goals and the marathon ahead. The long-term challenges have lost none of their significance – be it climate breakdown, species extinction, the increase in inequality, or demographic change. On the contrary, they harbour enormous crisis potential in themselves. In January 2022, the World Economic Forum identified planetary warming, extreme droughts, and the biodiversity crisis as the three most important risks for the next decade in its Global Risk Report.[1] Even the Pentagon classifies climate change as a national security risk.[2]

1 World Economic Forum (2022), *The Global Risks Report 2022 17th Edition*, https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf.

2 Department of Defense, Office of the Undersecretary for Policy (Strategy, Plans, and Capabilities) (2021), *Department of Defense Climate Risk Analysis*, https://media.defense.gov/2021/Oct/21/2002877353/-1/-1/0/DOD-CLIMATE-RISK-ANALYSIS-FINAL.PDF.

Tackling these challenges requires stamina. The political response is not a sprint but a marathon. Year after year, the world needs to find somewhere in the order of €3–4 trillion in new investment to address climate change. Over decades, the one-way fossil-fuelled production structure will have to give way to a circular economy based on renewable energies. Whole sectors and regions will have to reinvent themselves. Conflicts will increase, and with them the need for political mediation.

The role of economic policy in achieving long-term goals

It is important that governments look for the right immediate responses to the Ukraine war. Still, policy needs to prepare for the fact that this crisis will not be the last. So far, there has been a lack of an economic policy approach that is able to integrate the ability to sprint with the stamina to run a marathon.

For a long time, economic policy assumed that markets are capable of meeting complex challenges. The ability of markets to distribute scarce resources efficiently in the sense of increasing material wealth seemed superior to everything else. But today it is becoming apparent that the globalised and deregulated capitalism built on this assumption is increasingly reaching its limits.

Not only did deregulated financial markets trigger crises, be it the financial crisis or the resulting euro crisis. In general, without appropriate regulation, globalised capitalism still remains incapable of pursuing long-term goals beyond the increase of financial wealth. There may be few successes, such as the Emissions Trading Scheme in the European Union (EU) or promising attempts to deprive fossil industries of investment. On a broad scale, the internalisation of external climate costs still fails, mainly due to politico-economic hurdles.[3] The market is not neutral – its operating conditions are shaped by incumbent interest groups. And this is said without the internalisation of ecological costs beyond climate change even being on the agenda.

Long-term projects such as the energy transition are not driven by markets but by active industrial policy. It was the interplay of regulated feed-in tariffs, research funding, subsidies, and planning security that initially pushed down the costs of renewable energies in Germany, until others such as China jumped on board.[4]

In addition, the corona crisis has revealed how surprisingly vulnerable the coordination capacity of globalised markets has become. A local corona outbreak in China is now leading to production losses in Germany via just-in-time production and overextended global supply chains. Resilience as a long-term goal does not feature in the optimisation function of markets. An appalling lack of resilience is also the key element of the energy crisis in Europe. triggered by the dependence of some European countries on Russian energy imports.

Last but not least, the corona crisis and the current energy crisis have brought the perverse structural features of markets ever more clearly to light: Markets distribute

3 D. Cullenward and D.G. Victor (2020), *Making Climate Policy Work*, Hoboken, NJ: John Wiley & Sons.

4 M. Mazzucato, K. Rainer, and J. Ryan-Collins (2020), «Challenge-driven Innovation Policy: Towards a New Policy Toolkit», *Journal of Industry, Competition and Trade* 20(2): 421–437.

goods primarily to those who can pay, not to those who need them most. This mechanism may make sense for many goods and services. But with basic goods such as energy, food, or mobility, the interplay of supply and demand quickly reaches its limits. Speculation generates wealth at the expense of the essential needs of ordinary people. This is the reason why governments are now massively intervening in markets in the wake of the energy crisis, be it through price restrictions, energy subsidies, or reduced prices for public transport. In the crisis, it is thanks to government interventions that political meltdowns do not happen. The state steps in when the markets fail.

A new relationship between market and state

At a time when the public debate is focussed on the immediate next sprint, let us ask what an alternative might look like, one in which markets serve the long-term goals and profits of the marathon.

For this, we do not need to throw the baby out with the bathwater. Just because markets have clear weaknesses does not mean they are not part of the solution. Markets are good at efficiently allocating resources to the most productive suppliers of goods and services, thereby spurring productivity increases. That way businesses can produce the things that they know best. Car manufacturers produce cars, and supermarkets sell groceries. However, when we talk about the long term, we are not talking about supermarket shopping. We are talking about the biggest investment projects the world has ever seen. What markets need in order to unfold their potential on these scales is planning security. Much capital investment is long-term; its course is the marathon, not the sprint. But it is difficult to raise funding if the future is too uncertain, and thus the risk too great. This was already a problem before Covid-19 and the Ukraine war. Entering the age of crises exacerbates the situation.

It is precisely this uncertainty that requires the state and an active economic policy that counters uncertainty with certainty and clarity.

On the one side, politics has the ability to formulate a vision that sets the course. By setting the socio-political goals to which the market economy should contribute, politics creates clarity about where to make worthwhile investments. Markets can develop through investment if security is created and if the state channels expectations, thereby creating confidence that there will also be successful business models in a future economy.

Those who think in the long term win the marathon. Those who object and say that this means investing in inefficient ideas and technologies forget that efficiency is not an exogenously given quantity. Efficiency is created precisely when massive investments are made in new technologies and the state removes the obstacles to this. For example, only forward-looking education and labour-market policies create the qualifications that are needed in the long term for people to invest in new technologies: from specialists for heat pumps to experts for recycling lithium batteries to installers of solar systems. The framework provided by clear government commitments unleashes the power of market-driven problem-solving.

On the other side, politics must create a basis for political stability. For this to happen, it is above all lower-income groups and regions that have been left behind that should benefit from the visions formulated. They need the new jobs just as much as those who lose their jobs in the course of the transition processes. For this, the state must create incentives and regulate. Politics must not hide the costs and burdens under the cover of a narrative in which everyone becomes an apparent winner. It must name the burdens clearly and courageously. The challenge is to build coalitions that ensure that the costs are borne above all by strong shoulders and are thus sustainable. Solidarity is a close cousin of sustainability.

An understanding of the state as a guarantor of planning security – for people as well as for markets – is by no means to be understood as a regression to a planned economy. Rather, it means a purposeful orientation of the economy towards long-term goals: resilience, social security, and ecological sustainability. It redefines the relationship between the market and the state so that competing in successive sprints does not deflect us from the challenge of the marathon.

Policy approaches for a new era

The very first thing that is needed is a restructuring of the state itself. The state of the neoliberal era was self-limiting and modest in its capacities. In contrast, we need a state that is capable of acting and sees itself as a driver of transformation.

In recent months, we have developed a series of analyses and proposals on how to achieve this, based on regular digital exchanges with experts on both sides of the Atlantic. They explain what a long-term policy approach would mean for the interplay of fiscal, monetary, industrial, labour market, and social policies.

Jonathan Barth and Michael Jacobs begin with a brief overview of the various debates on what the economy of the future might look like – from green and inclusive growth to post-growth and degrowth. In order to alleviate the growth debate, they propose a synthesis in which they combine the core elements of the different approaches in a policy programme. Economic policy in this sense should focus directly on ensuring a decent standard of living for all, with an emphasis on reducing inequalities and improving individual and social well-being.

This raises the question of how economic policy in general can be directed towards these long-term goals and how it is possible to mobilise investments for this purpose. Frank van Lerven addresses the issue from the perspective of fiscal policy. He explains the importance of European debt rules in mobilising investment for climate policy and preventing a new wave of austerity in Europe.

In addition, Daniela Gabor looks at the monetary policy side and the role of central banks. Her focus is not only on the possibilities but also the limitations of central banks in achieving long-term policy goals such as greening the economy.

Carolyn Sissoko provides the framework for these two contributions, arguing that it is precisely the interplay of fiscal and monetary policy that is needed to make a green transformation a success.

This is followed by the question of what investments can be used for and what accompanying policies are needed to make the marathon a success.

Peter Victor offers an important distinction at the interface of economic and environmental policy. He distinguishes between additional/non-additional and productivity-enhancing/non-productivity-enhancing investments in the course of the green transformation. He thus offers a blueprint for the fiscal policy effects of climate policy.

Antonio Andreoni goes into more detail on the importance of industrial policy. In his view, the key to orienting economic activity towards long-term goals lies in the interplay between the instruments of public financing, public procurement, and standard-setting.

Jochen Markard frames the debate from the perspective of the sustainability transition studies. Policy should be guided by six overarching criteria to make decarbonisation a success: i) target system transformations and radical innovation rather than incremental change, ii) prioritise effectiveness, that is, address the largest emissions first, iii)develop context-sensitive policy mixes tailored to specific sectors and places, iv)adapt policies to different transition phases, v)react to unforeseen developments (policy learning), and vi) account for resistance and political feasibility. As background, J.W. Mason critically questions some of the basic assumptions of economic policy, especially with regard to solving long-term problems such as climate change, and explains how an investment-centred analysis of the economy comes to different conclusions than a price-centred analysis.

However, the call for certainty of direction for investment and economic development, which shines through in all the contributions, is not devoid of the need for political stability. Here, combating inequalities and ensuring adequate living standards are essential.

Daniel Driscoll and Mark Blyth shed light on the distribution of the benefits and burdens between the shoulders of low-income individuals and powerful financial players. Briefly, how can policy encourage private-sector investment without capital once again getting everything it wants at the expense of everyone else?

Jakob Hafele and Claudius Gräbner-Radkowitsch look at another important distributional conflict – that between European peripheries and centres, outlying regions, and economically strong regions. They identify a possible fault line across the EU that may determine whether Europe achieves its goal of becoming the first climate-neutral continent.

Anna Coote then provides the socio-political flanking for the series. With the «social guarantee», she formulates a proposal of what progressive politics can look like, one that puts interpersonal relationships and the way we care for each other at the centre. When policy-makers think about investment, it is not just about climate. It is also about strengthening the social infrastructure on which the rest of the economy depends.

Both the sprint and the marathon start with a first step

With this series, we want to provide food for thought on what a long-term economic policy could look like. We need to build on both the promises and disappointments experienced with projects such as the *Energiewende* in Germany, the Green New Deal, and the environmental programme of the Biden administration. The course on which we have embarked involves continuous struggle in the face of adversity. The challenge is to craft a strategic approach that can set the course for long-term success – with regard to the climate crisis, increasing inequality, the loss of biodiversity, and creating financial stability. In every response to crises, politics has the opportunity to redefine the relationship between the market and the state – in a form that is sustainable in the long term or in one that aims at short-term damage mitigation. Our task is to pick the former rather than the latter.

I. FINDING COMMON GROUND: A SHARED AGENDA FOR THE FUTURE OF ECONOMIC POLICY

JONATHAN BARTH AND MICHAEL JACOBS

Sustainable Prosperity in an Uncertain Future

A shared agenda between green growth and degrowth

It is an amazing coincidence: This year marks the 50th anniversary of the Club of Rome's report on the «Limits to Growth». For half a century, economists and environmentalists have argued about the pros and cons of economic growth: its sustainability, desirability, measurability, and future trajectory. But for most of this period, the debate has remained on the fringes of academic economics and mainstream politics.

But these days, the debate is becoming very topical: Germany's new Minister of Economics and Climate, Robert Habeck, has given his annual economic report a completely new coat of paint – with a chapter that's unprecedented in the report's more than 50-year history. In it, Habeck's ministry lists 31 alternative indicators for measuring prosperity, reaching from women in leadership positions to groundwater pollution.

For Habeck, prosperity is no longer simply economic growth. The indicators are intended to assess the success of what he calls the «social-ecological market economy». However, Habeck is not propagating a fundamental departure from economic growth either. The same holds for others, such as Ursula von der Leyen's European Green Deal or Joe Biden's infrastructure package. Rather, what all of them are concerned with is green growth. «To say we are giving up the idea of growth would mean we are giving up the idea of progress», Habeck said.

One reason for the hesitancy to move beyond the idea of green growth may be that a productive synthesis of the two poles of pro-environmental narratives has not yet been developed – despite the effots of actors such as the Organisation for Economic Co-operation and Development (OECD), the European Environment Agency, or the German Environment Agency pushing in this direction. Still, economists and activists interested in these issues can be organised along two extreme poles, with some taking more extreme and others more moderate positions:

1. **Inclusive green growth:** Habeck is well-aware that economic growth (growth of gross domestic product, GDP) is deeply embedded in society's understanding of what constitutes a prosperous economy. That it is so closely related to rising household incomes, employment levels, government tax revenues, pension systems, and business interests means that it is politically suicidal to argue against it.

Instead, policy should aim at making growth more inclusive (egalitarian) and green.

2. **Degrowth:** For advocates of degrowth, the pursue of continuous GDP growth per se is the problem. It is the source of Western society's environmental and social ills, not just as an economic phenomenon but as paradigm of thought. Sustaining GDP growth while reducing energy and material throughput to ecologically and socially healthy levels is impossible. Therefore, the GDP in advanced nations must decline. In addition, the growth-generating mechanisms of a capitalist economy – capital accumulation and wage labour – will always continue to generate inequalities.

In this paper, we attempt to overcome this polarisation. We suggest that the idea of «post-growth» can serve as a unifying concept and define the pillars of a progressive economic policy agenda that can help Germany, the European Union (EU), and the United States (US) achieve their net-zero ambitions while ensuring prosperity and reducing inequality.

The differences between green growth and degrowth can be best understood by looking at the theory first, and then comparing the theory to real world data.[1]

Theory: Are there limits to technological progress?

Starting with the theory, green growth advocates often point out that GDP is only a measure of the value of traded goods and services; it does not measure their environmental impact. Some economic activities have much higher energy and resource content and waste impact per dollar than others. Consequently, if the structure of the economy were gradually to shift to less environmentally harmful activities (e.g.by using renewable energy, organic materials, increasing energy efficiency, a shift in consumption from material to digital products, etc.), GDP growth would be decoupled from environmental damage and greenhouse gas emissions. Technological innovation, along with social organisation and a change in consumption patterns and tastes, can make such a shift possible.

The belief in technological innovation is the foundation of the «green growth» argument. By means of innovation, certain finite resources (phosphorous, rare earths, etc.) are no problem for the economy, even if they «run out». There will always be sufficient innovation that will free the economy from the need to use them, as it has in the past. For example, we do not need chlorofluorocarbons anymore to run our refrigerators. The same is assumed for impacts of economic production: Pollution and CO_2 emissions will continue to decrease with economic progress.

In contrast, ecological economists argue precisely that this technological progress has its limits. First, workers and machines will always require resources and

1 We present the arguments here in abbreviated form and refer to the literature, e.g. M. Jakob et al. (2020), «Understanding Different Perspectives on Economic Growth and Climate Policy», *Wiley Interdisciplinary Reviews: Climate Change* 11(6): e677.

energy to work, despite the level of innovation. In consequence, the level of production (global GDP) is limited by the resources, land, and energy needed. Since all of these are limited, GDP is limited.

Second – and this is the weightier argument – technological progress is unable to sufficiently mitigate the impacts from economic production on the Earth's critical ecosystems that regulate our climate, pollinate our plants, and clean our water. As Partha Dasgupta elaborated for the British Treasury,[2] the question is not simply whether GDP growth can be achieved with greater «environmental efficiency» by using fewer and fewer resources per unit of output (say, producing a car) over time and having fewer and fewer impacts on the environment (e.g. waste). It is also about the point at which the absolute level of resource use, waste, and pollution crosses ecological tipping points, whereby climate change, biodiversity loss, and damage to other planetary life support functions become irreversible.

This has important practical implications. For the proponents of green growth like Habeck, investments such as the ones put forward by Germany, but also the EU and the US, have the potential to accelerate the use of green technologies, thereby addressing ecological scarcities while generating more wealth. Against this, proponents of degrowth argue that increasing investment will *absolutely* lead to higher energy and resource consumption and land conversion. If investments increase economic production, this cancels out any *relative* per unit reduction in environmental efficiency, and in doing so threatens ecological tipping points. Growth-based programmes for environmental improvement will simply be self-defeating.

A fight for data

It might be thought that this dispute could easily be settled with data. But the two sides utilise different evidence. On the one hand, as green growth advocates point out, there is no doubt that over the last decade and a half the shift to cheaper renewable energies and greater energy efficiency have brought about a global trend towards «greener growth».[3] Structural shifts have also occurred in advanced economies, away from the manufacturing of material outputs towards both digital production and consumption and services. These shifts are making value creation in these economies less dependent on fossil fuels, thereby decoupling GDP growth from greenhouse gas emissions.

On the other hand, an ecological economist might argue that these facts do not prove that GDP growth is or can be environmentally sustainable. A reduction in carbon emissions is not enough – it matters how fast carbon emissions are reduced. At current levels of emissions, we have seven (!) years left until the 1.5 degrees Celsius budget is depleted. It matters whether reductions can be sustained over decades and whether this can be achieved globally, not just in a few economies.

2 P. Dasgupta (2021), «The Economics of Biodiversity», *The Dasgupta Review*, www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review.

3 IRENA (2021), *Renewable Power Generation Costs in 2020*, www.irena.org/publications/2021/Jun/Renewable-Power-Costs-in-2020.

To date, according to the European Environment Agency, even reductions in CO_2 emissions in Europe (which has seen the largest decoupling) have been occurring at a rate only one-third of that required to limit global heating to 1.5 degrees Celsius above pre-industrial levels. Meanwhile, globally, emissions are still rising.

This is critical because (as degrowth advocates note) one of the reasons advanced economies have seen declining emissions – though you cannot observe them on a global level – is that they have relocated much of their carbon-intensive production to China and other developing and emerging countries.[4] At the same time, the energy consumption levels and environmental impact of digital industries and service sectors are much larger than widely anticipated.[5] Lastly, the «rebound effect», through which efficiency cost savings lead to higher demand, has wiped out reductions in the levels of environmental impact.[6]

It is also important that the idea of green growth should not be reduced to a reduction in greenhouse gas emissions and climate change. For growth to be considered green, the global economy needs to be maintained within *all* the Earth's «planetary boundaries», including phosphorous use, land conversion, and biodiversity loss.[7] With technologies ready to deploy, climate change may prove to be one of the easier challenges among these.

The socio-political significance of economic growth

However, the ecological question is only one side of the coin. A key reason why proponents of green growth cling so strongly to the idea of economic growth are the positive distributional effects from tighter labour markets when the economy is «run hot». The flow of tax revenue that arises from it, in turn, enables improvement in public services and the financing of pensions and welfare systems. At the same time, economic growth makes the reduction in inequalities politically much more palatable. A growing economy makes it easier to finance fiscal redistribution through public and social services, and for workers and trade unions to bargain for higher earnings and better working conditions.

Critics of growth counter that the growth-generating mechanisms of a capitalist economy – capital accumulation, technological innovation, and wage labour – are also those that tend to generate inequalities, rather than contribute to social equality or a wider improvement in individual and social well-being.[8]

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4 J. Hickel and G. Kallis, «Is Green Growth Possible?», *New Political Economy* 25(4): 469–486.

5 J. Rosenblum , C. Hendrickson, and A. Horvath (2000), *Environmental Implications of Service Industries*, www.semanticscholar.org/paper/Environmental-Implications-of-Service-Industries-Rosenblum-Horvath/1cb8584c2802ad33d1b48c74e6746216fc7b0ef2.

6 S. Lange et al. (2021), «The Jevons Paradox Unravelled: A Multi-level Typology of Rebound Effects and Mechanisms», *Energy Research & Social Science* 74: 101982.

7 W. Steffen et al. (2015), «Planetary Boundaries: Guiding Human Development on a Changing Planet», *Science* 347(6223): 1259855.

8 See, among others, G. Kallis et al. (2018), «Research on Degrowth», *Annual Review of Environment and Resources* 43(1): 291–316, https://doi.org/10.1146/annurev-environ-102017-025941.

This argument is difficult to resolve in theory. In practice, the history of capitalist welfare states, such as those in western Europe, have demonstrated that economic growth *can* be combined with fewer societal inequalities. But even in these countries – and more so elsewhere – the impact of labour-saving technological changes and rising returns on capital are entrenching inequalities in the growth model, not only within states but between advanced economies and the least-developed countries of the Global South.

Uncertainty about the future as a point of convergence

These arguments are not resolvable at the theoretical level. In the absence of real-world attempts to achieve either fully sustainable green growth or degrowth, we do not have the empirical evidence either. An alternative to picking one side or the other is to accept that capitalist economies are complex systems operating in conditions of great uncertainty: We do not know with certainty whether there are feasible public policies that can sufficiently influence technological progress, environmental degradation, as well as the restoration and distribution of income and wealth to the extent – and at the speed – required to achieve environmental sustainability and social inclusion. We also do not know how legally binding environmental limits are going to affect economic growth in the long term. In the face of environmental and social crises, it seems more productive to be open to different futures – be it a green inclusive growth one or a degrowth one, and maybe others – and to encourage scholars and activists to work out a joint political economic programme that includes insights from all sides. This would be neither a green growth nor a degrowth agenda, but a post-growth one.

Post-growth as a shared agenda

What is meant by «post-growth»? Four core principles underpin the idea:

1. An acknowledgement that the model of advanced capitalist economies that is driven by increasing material consumption and resource and energy extraction is not working in terms of environmental sustainability, inequality, and social well-being, and therefore needs to be changed.
2. A conscious agreement that no rate of growth, whether positive, zero, or negative, will automatically generate solutions to the world's or advanced societies' environmental and social problems.
3. An insistence that economic policy should therefore focus not on achieving growth, but onmeeting society's primary goals. On the one hand, this implies that economic policy needs to directly constrain economies to operate within sustainable environmental limits and planetary boundaries. On the other, it should focus directly on providing a decent living standard for everyone, emphasising a reduction in inequalities and an improvement in individual and social

well-being. Economic progress, in turn, needs to be measured and assessed by the achievement of these goals.

4. A desire that economic growth and its accompanying pathologies should cease to be the dominant forces in our economic, social, and cultural lives, and that they should be replaced instead by a focus on qualitative improvement and development.

These principles, we believe, can be accepted by advocates of both green and inclusive growth and of degrowth. As guiding principles for economic policy, they offer the basis of a shared «post-growth» policy programme.

Being a synthesis, such an agenda has no genuine policy proposals of its own. Rather, it incorporates elements from both the green growth and degrowth agendas and builds on what others have elaborated under terms such as becoming «agnostic about economic growth» (Kate Raworth), seeking «a-growth» (van den Bergh), espousing a «post-growth» position (Tim Jackson), or a «beyond growth» approach (OECD).

The green investment programme

To achieve net-zero emissions – now the official goal on both sides of the Atlantic – and greater environmental sustainability, the next two decades will need to see large-scale investments in green technologies, infrastructure, and living patterns, reaching from renewable heat to urban design and comprehensive material recycling. Such a programme of investments is unsurprisingly advocated by proponents of green growth, who note that, as well as cutting emissions (and improving other aspects of the environment such as air quality), it will also drive job creation, higher living standards, and tax revenues, which can support better public services and welfare systems. But a programme of this sort is also effectively required by advocates of degrowth. They wish to see fossil fuel use drastically and rapidly cut. However, this will require alternative energy sources to be put in place and inevitably generate growth, even as the output from old fossil fuel capital (oil, gas, and coal) declines. Indeed, decommissioning old capital will also have a positive effect on GDP.

A common demand of both green growth and degrowth advocates is a major programme of investment over the next two decades to create a net zero and circular economy.[9] It is beyond the scope of this paper to describe the mixture of policies that would be needed to generate such a green investment programme. But it will clearly require both public investment (financed largely by borrowing, but also potentially through a higher level of taxation as a proportion of GDP) and measures to guide or direct private finance into green assets and projects rather than alternatives.[10]

More importantly, we need to ask what makes these investments a «post-growth» programme. In terms of discourse, the green investment programme would be aimed not at generating economic growth per se, but at decarbonising and dematerializing

9 For a classification of these investments, see P. A. Victor in this publication.

10 See J. W. Mason and F. van Lerven in this publication.

the economy, helping to reduce inequalities, and improving the quality of life (and also increasing the economy's resilience). Just as Habeck has understood, indicators and numbers can be a start to promote a transformation of political and economic discourse away from the traditional growth paradigm towards a discourse concerned with sustainable and inclusive prosperity on a surviving planet. Environmental and social indicators can form the basis for a systemic and regular assessment of the social and environmental impacts of policies. However, in practice, a «post-growth» programme will depend on the other policies accompanying the investment programme.

Supporting green investment

For degrowth advocates to be able to support it, a «post-growth» investment programme would require that it be buttressed by three ancillary policy frameworks to ensure that it leads to genuinely sustainable environmental impact reduction.

First, the whole economy needs to be covered by statutory or otherwise paramount provisions that **require environmental impacts to be held within sustainable environmental limits.**[11] Climate change is increasingly governed in this way. Gradually declining «carbon emission budgets», as formulated under the United Kingdom's 2008 Climate Change Act and the new European Union Emissions Trading Scheme (ETS), have so far been at the centre of this approach. But for true sustainability, as degrowth advocates argue, targets for greenhouse gas emissions not only have to cover all sector – as the reform of the ETS aims to achieve. Beyond this, a comparable set of limits are required for key biodiversity, resource use, and pollution indicators. Adopting a statutory framework of this kind can both drive innovation and prevent rebound effects: Oftentimes, savings from efficiency gains lead to increased demand, and in consequence drive emissions, pollution, and biodiversity loss. Legally imposed limits will apply pressure. In practice, this means that the environmental-economic policies, which are designed to reduce such impacts (such as energy-efficiency standards and carbon pricing), will need to be progressively tightened to ensure that economic growth does not overwhelm them.

Second, an **active industrial policy** can then guide and direct investment to stimulate technological innovation, bring cost reductions, and coordinate the ecosystem of market and state actors to achieve the environmental-economic policy goals.[12] A rapid industrial transformation of the kind required to achieve net zero and broader sustainability goals is extremely unlikely to be possible if left to the private sector alone. There are simply too many other investment opportunities available (many of them no doubt more initially profitable) and too many technological lock-ins and systemic barriers to be overcome. Only active state-led coordination can achieve systemic goals of this kind. Necessary instruments are likely to include state

11 M. Jacobs (2018), «Only Revolutionary New Laws Can Stop Brexit Harming the Environment», *The Guardian*, April 3.

12 See A. Andreoni in this publication.

investment banks, central bank credit guidance[13], and active regional and sectoral policies involving business associations, trade unions, and democratic representatives. What makes this industrial policy approach a post-growth one is that it is constrained by a set of pre-defined environmental limits.

Third, changing people's consumption patterns requires not just technological change, but **demand-side measures** that promote changes in culture, consumer tastes, and lifestyles. As degrowth and post-growth proponents argue, to escape the fossil economy, businesses need to provide sustainable product alternatives. Governments and civil society actors will need to create the broader context of consumption behaviour – in terms of values, attitudes, accessibility, and affordability – that will make such a programme politically and socially acceptable, and even attractive. This is what is implied by a systemic perspective to transformation.[14]

Guiding social investments

In addition to its environmental ambitions, a post-growth approach requires policy to give equal importance towards improvements in people's lives, in particular to low-income and vulnerable groups. Although there is not space to outline this in full here, we can identify three essential strategies that can provide the foundation for a resilient social security net on which progressive economists might be able to agree.

First, investment in **public services:** a strong health care system; an inclusive education system; places and personnel for elderly care and child care; social housing; the promotion of civic associations, including spaces and programmes for building and strengthening communities. Together, such policies can provide a «social guarantee»[15] embodying the contract between state and citizen, and ensure that everyone in society has a degree of security and care. Investments in these areas generate two kinds of benefits: It can create jobs with low environmental impact, and at the same time improve individual and social well-being.

Second, social investments are needed to **cushion the transition to a green economy,** especially in hard-hit regions and sectors and for low-skilled jobs. Social investments include easily accessible reskilling programmes, compensation payments for job losses, facilitated access to unemployment benefits, and the strengthening of part-time and job-sharing programmes to avoid the drastic impacts of redundancy. It will be particularly important that industrial policy is aligned with this. New emerging industries should not only replace the fossil industry base but also provide opportunities in those regions that count already today as «left behind».[16]

Third, all of these measures must be supported by a **progressive tax system and other redistributive institutions** that address power imbalances, redistribute wealth, and provide fair and reasonably equal economic conditions for all people. Given the central role of the concentration of capital ownership and its increasing

13 See D. Gabor as well as C. Sissoko in this publication.
14 See J. Markard in this publication.
15 See A. Coote as well as D. Driscoll and M. Blyth in this publication.
16 See C. Gräbner-Radkowitsch and J. Hafele in this publication.

returns in driving both inequality and investment patterns, a focus on wealth distribution and capital asset ownership distribution is critical to this agenda.

From numbers to measures

Habeck may have initiated a new phase of economic policy with the new version of the Annual Economic Report. But figures are only the first step. What must follow are goals and measures. The building blocks of the agenda presented here provide a blueprint against which to compare the prospects for success of Habeck's agenda of a social-ecological market economy, the European Green Deal, and Biden's infrastructure package. What counts are the measures, regardless of their title or framing.

II. MAKING FINANCE, CENTRAL BANKS AND FISCAL POLICY SERVE LONG-TERM GOALS

FRANK VAN LERVEN

Changing Europe's Fiscal Rules: Unleashing Public Investment for a Socially Just Green Deal

Introduction

The economy of the next decade and beyond is being created now, out of the Covid emergency and ensuing energy and cost of living crises. Europe's lack of social and economic resilience in the wake of these crises is a clear indictment of collective fiscal policy failings and the missed opportunity to recover better from the 2008 Great Financial Crisis (GFC). Instead of scaling-up transformative environmental investment that would have simultaneously catalysed a strong recovery, reduced energy precarity, and boosted living standards, a policy of «austerity» (in the form of spending cuts) won the day. A return to business as usual – prioritising debt and deficit reduction over vital environmental, social, and economic goals – is simply not an option.

This paper critically examines whether the European fiscal framework will be sufficient to stabilise the macro economy in the aftermath of the abovementioned crises, let alone achieve the goals of a green transition that leads to full capacity utilisation of the economy (i.e. full-employment with well-paid jobs).[1] After reviewing the considerable size of the green investment gap, the reader will come to understand that private finance alone is neither sufficient nor desirable to achieve the goals of a socially just green transition. Fiscal policy must play a leading role, but for a variety of reasons the rules governing public finance are broken. Europe's fiscal framework requires a bold overhaul to support immediate economic recovery efforts following Covid-19, whilst also tackling the pressing challenges of environmental breakdown, the future impacts of which could far exceed those from the pandemic.

1 P. Sigl-Glöckner, M. Krahé, P. Schneemelcher, F. Schuster, V. Hilbert, and H. Meyer (2021), *A New Fiscal Policy for Germany* (Forum New Economy Working Papers No. 2a), https://dezernatzukunft.org/a-new-fiscal-policy-for-germany.

The green investment gap

The European Commission's most recent estimate of the «green investment gap» – the additional investments necessary to achieve the climate and environmental goals of the European Green Deal (EGD) – is €520 billion per year.[2] Yet, there is good cause to believe the Commission is vastly underestimating both the scale and timeliness of investments needed. The Commission's own research suggests that making building energy efficient by 2050 could require €490 billion annually.[3] Accordingly, other estimates suggest annual investments of up to €855 billion (excluding transport) in the EU27 could be required to tackle climate change alone (thus precluding investments needed to thwart wider environmental breakdown).[4]

As of January 2020, the Sustainable Europe Investment Plan (SEIP), also called the European Green Deal Investment Plan, aims at mobilising €1 trillion of sustainable investments from both the private and public sectors over 10 years (up to 2030) to finance the EGD.[5] In addition, of the €723.8 billion Recovery and Resilience Facility, member states are estimated to have allocated 40 % of their spending in their recovery plans to climate measures.[6] Even so, by its own estimates of the green investment gap, the European Commission is optimistically only set to mobilise about a third of the public and private investment needed to realise its own EGD objectives.

The role of private finance

Robust reforms to monetary policy and financial regulation will be needed to stimulate green financial flows and harness the untapped potential of private finance.[7] On the other hand, subsidies, public guarantees, public-private partnerships, and so-called blended finance – as set out in the EU Sustainable Finance Agenda –

2 European Commission (2021), *The EU Economy after COVID-19: Implications for Economic Governance*, https://ec.europa.eu/info/sites/default/files/economy-finance/economic_governance_review-communication.pdf.

3 A. Hermelink, S. Schimschar, M. Offermann, A. John, M. Reiser, A. Pohl, and J. Grözinger (2019), *Comprehensive Study of Building Energy Renovation Activities and the Uptake of Nearly Zero-energy Buildings in the EU*, Cologne: European Commission, https://op.europa.eu/en/publication-detail/-/publication/97d6a4ca-5847-11ea-8b81-01aa75ed71a1/language-en/format-PDF/source-119528141.

4 R. Wildauer, S. Leitch, and J. Kapeller (2020), *How to Boost the European Green Deal's Scale and Ambition* (ICAE Working Paper Series No. 111), www.econstor.eu/handle/10419/223126.

5 European Commission (2020), «Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions», https://ec.europa.eu/commission/presscorner/api/files/attachment/860462/Commission%20Communication%20on%20the%20European%20Green%20Deal%20Investment%20Plan_EN.pdf.pdf.

6 European Commission (2021), *Recovery Plan for Europe*, https://ec.europa.eu/info/strategy/recovery-plan-europe_en.

7 New Economics Foundation, Positive Money and 350.Org (2020), *The ECB and Climate Change: Outlining a Vision for Success*, https://neweconomics.org/uploads/files/ecb-climate-change1a.pdf.

will also play an important role in leveraging finance to green the economy. Vital though these measures are, an overreliance on re-orienting towards and mobilising to private finance will not be sufficient or desirable to meet the goals of the European Green Deal.

Firstly, there is a historical track record showing that private finance has often been ineffective in financing public goods and infrastructure.[8] It is often neglected that industrial transformations have always been state-led.[9]

Secondly, given the urgency and scale of the challenge at hand, private finance (alongside the SEIP and NextGeneration EU) will still not be sufficient on its own.[10]

Thirdly, scant attention is being given to the balance sheet position of much of the private sector. Many businesses have been forced to take out debt to deal with the economic consequences of the Covid pandemic and are still recovering from a debt overhang from the 2008 GFC. While there have been questions about what governments can afford, there is a strong case to be asking what a heterogeneous private sector can afford?

Fourthly, investment will be needed not just in the places where markets can make use of the profit motives of firms alone. Funds will also need to flow into projects and investments that yield the highest social returns for people and communities, and sometimes in the absence of direct commercial interests. This not only means investing in assets deemed to be «public goods» but supporting jobs, economic security, and social well-being among places and industries that are already being neglected by the EU's current economic model.[11]

Fifthly, there are vital political economy questions surrounding whether firms should profit from owning strategically important public goods – effectively extracting rents from the rest of society and whether governments should de-risk such private-sector investments, guaranteeing profits for the investors.[12]

Sixthly, if the private sector is left to finance the majority of the transition, the drive to retain certain profit margins will have important distributional effects (e.g. through higher everyday energy bills) but can also lead to significant macroeconomic instability in the long run. This is because – absent public finance and adequate social security – maintaining expected profits margins on private-sector

8 D. Gabor (2021), «The Wall Street Consensus», *Development and Change*, https://doi.org/10.1111/dech.12645.

9 R. Wildauer, S. Leitch, and J. Kapeller (2021), *Is a €10 trillion European Climate Investment Initiative Fiscally Sustainable?*, www.feps-europe.eu/attachments/publications/211022%2010%20trillion%20european%20climate%20final.pdf.

10 Counter Balance (2021), *EU Green Deal: Reclaiming Public Investments for Socio-ecological Transformation*, https://corporateeurope.org/en/2021/10/eu-green-deal-reclaiming-public-investments-socio-ecological-transformation.

11 A. Stirling, D. Powell, & F. van Lerven (2019), *Changing the Fiscal Rules Unlocking Public Investment*, https://neweconomics.org/uploads/files/changing-fiscal-rules.pdf.

12 See e.g. Gabor (2021), «The Wall Street Consensus» (see note 8); see also N. Tankus, A. Bernal, and R. Carrillo (2019), «The Green New Deal Will Be Tremendously Expensive: Every Penny Should Go on the Government's Tab», *Business Insider*, www.businessinsider.com/green-new-deal-climate-change-government-spending-no-private-money-2019-9?r=US&IR=T.

investment may drive up energy prices, and thus the general rate of price inflation, which can possibly lead to recession and/or below-trend output growth.[13] Finally, there is a good case that leaving the majority of financing to the private sector perversely shifts the emphasis of climate goals towards profitability and financial returns. The underlying profit motive would increase pressure «to compete precisely when we must cooperate».[14]

The Stability and Growth Pact

Despite their crucial roles, the EU budget and private finance are limited in scope and not equipped to foster the investments needed to fill the green finance gap. In fact, more fiscal support will be needed to «crowd» private finance in.[15] Accordingly, if the European Commission intends to genuinely foster investment to accelerate the transition, it must work with national governments to boost green public investment. The primary means of doing this is through Europe's main fiscal framework – the Stability and Growth Pact (SGP). Problematically, the rules governing public finance within the SGP framework are broken and actively stand in the way of successfully achieving a just low-carbon transition.

In a nutshell, the SGP failed on its own terms.[16] Based on a set of macroeconomic axioms that imply economies have an innate tendency to self-regulate, in the aftermath of a downturn the economic output gap is assumed to close over the medium to long run. Output «naturally» bounces back to its underlying potential trend that is supply-determined and does not respond to changes in demand (i.e. fiscal policy). That is, even without fiscal policy interventions, the economy is assumed to eventually recover over the medium to long term. Unfortunately, despite the flawed means of measuring output gaps (whereby unemployment rates of 20 % are considered normal),[17] the European economy did not return to its pre-crisis trend – a permanent loss in income followed, instead of «just a delayed recovery».

The design of fiscal rules therefore neglects that fiscal policy can play an important role in stimulating a recovery and bringing an economy back to full capacity. After the 2008 GFC, the endeavour to prematurely and excessively consolidate public finances – before full-capacity utilisation of the economy had been reached, as dictated by the fiscal rules – led to a fall in aggregate demand, a decline in economic

13 For a more detailed explanation, see A. Jackson and T. Jackson (2021), «Modelling Energy Transition Risk: The Impact of Declining Energy Return on Investment (EROI)», *Ecological Economics* 185: 107023.

14 Tankus, Bernal, and Carrillo (2019), «The Green New Deal» (see note 12).

15 C. Hepburn, B. O'Callaghan, N. Stern, J. Stiglitz, and D. Zenghelis (2020), «Will Covid-19 Fiscal Recovery Packages Accelerate or Retard Progress on Climate Change?», *Oxford Review of Economic Policy* 36 (Supplement_1): S359–S381.

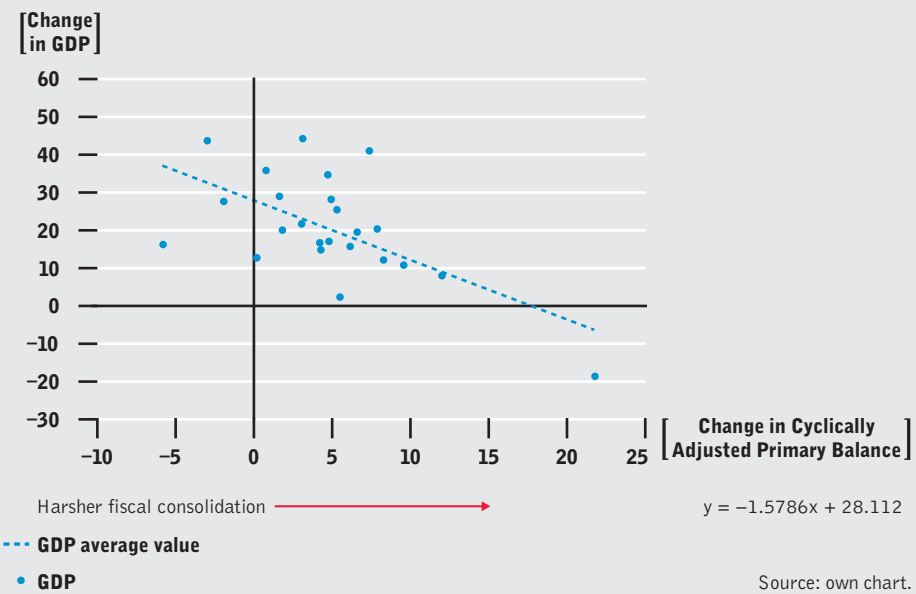
16 O. Costantini (2020), «The Eurozone As a Trap and a Hostage: Obstacles and Prospects of the Debate on European Fiscal Rules», *Intereconomics* 55(5): 284–291.

17 P. Heimberger and J. Kapeller (2017), «The Performativity of Potential Output: Pro-cyclicality and Path Dependency in Coordinating European Fiscal Policies», *Review of International Political Economy* 24(5): 904–928.

output, and permanent economic scarring (see left panel of Figure 1 below). In an effort to repair their own balance sheets, European governments may have inadvertently weakened the financial position of the private sector, making it more vulnerable to shocks as a result. In short, European governments could have issued debt to stimulate their economies and potentially had the effect of crowding private finance in.

The depressed economic activity resulting from the fiscal rules led to a reduction in the tax take and an increase in the deficit, while a reduction in GDP reduced the denominator, and thus led to a higher debt-to-GDP ratio overall. Contrary to recent IMF analyses,[18] instead of reversing debt levels after the 2008 GFC, fiscal rules actually led to higher levels of debt overall (the right panel of Figure 1 below shows that harsher fiscal spending cuts are clearly correlated with higher debt levels in Europe).

Fig. 1a: The correlation of fiscal consolidation with GDP and debt change, 2009–2019
Fiscal consolidation suppressed groth in European economies
Change in cyclically adjusted primary balance and change in GDP for European economies

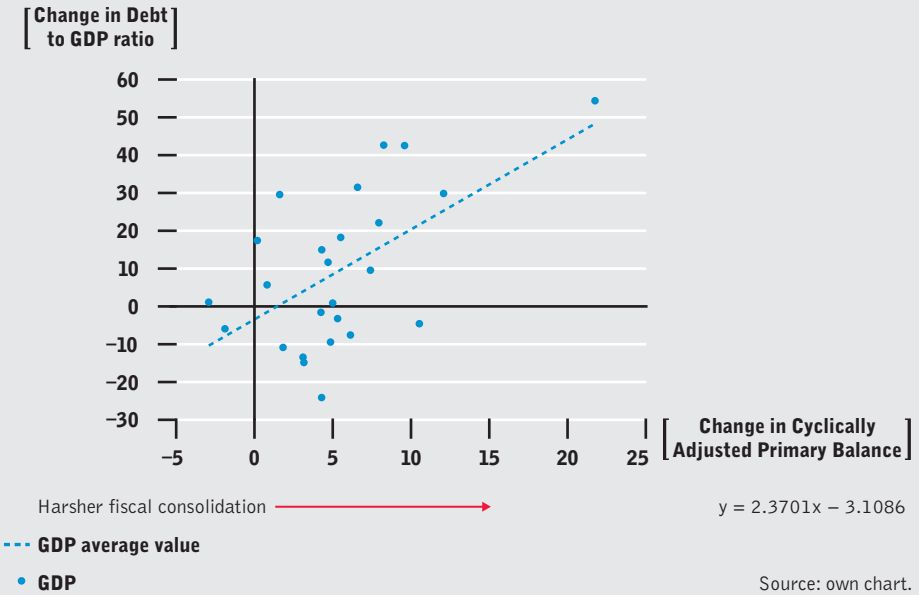


Source: own chart.

While the European Central Bank (ECB) attempted to do its job of boosting aggregate demand through a raft of unconventional monetary policies, fiscal authorities were consolidating their spending in line with fiscal rules, which had the opposite

18 International Monetary Fund (2021, October), *Strengthening the Credibility of Public Finances*, www.imf.org/en/Publications/FM/Issues/2021/10/13/fiscal-monitor-october-2021.

Fig. 1b: The correlation of fiscal consolidation with GDP and debt change, 2009–2019
Fiscal consolidation correlated with higher levels of debt in European economies
Change in cyclically adjusted primary balance and change in gross debt-to-GDP ratios for European economies



Source: own chart.

contractionary effect.[19] The great irony is that, through its monetary policy stimulus – aimed at reducing both short- and long-term interest rates – the ECB ended up creating significant «fiscal space» for European fiscal authorities. Indeed, interest rates and government borrowing costs have been consistently declining for almost three decades.[20] Still, fiscal rules and a built-in adherence to deficit fetishism (the opposite of deficit bias) has prevented member states from taking advantage of historically low rates to lock in debt for transformational investment. As recently noted by former World Bank, IMF, Danish Central Bank, and Goldman Sachs economist Erik Nielsen, «mindbogglingly, borrowing at zero or negative rates to save the planet continues to be a no-go for parts of the European political leadership».[21]

19 F. van Lerven (2018), *Ending the Fiscal-monetary Tug-o-war*, New Economics Foundation, https://neweconomics.org/2018/08/ending-the-fiscal-monetary-tug-o-war.

20 O. Blanchard, A. Leandro, and J. Zettelmeyer (2020), *Revisiting the EU Fiscal Framework in an Era of Low Interest Rates*, www.ecb.europa.eu/pub/conferences/shared/pdf/20191219_4th_fiscalpolicyconference/OlivierBlanchard_keynotespeech.pdf.

21 E. Nielsen (2021), «Sunday Wrap: Chief Economist's Comment», Unicredit Macro Research, www.research.unicredit.eu/DocsKey/economics_docs_2021_181603.ashx?EXT=pdf&KEY=C814QI31EjqIm_1zIJDBJGpOO6_2VW3LDBiB9rN5nOE=&T=1.

This clearly illustrates another important problem. Fiscal rules are built around considerably weak indicators of fiscal space that disregard important macroeconomic conditions (i.e. the state of low interest rates) and the role of central banks.[22]

In terms of fiscal space and important macroeconomic conditions – the current state of fiscal rules further ignores that the fiscal costs of inaction in boosting green investments will prove far more costly in the long run. Fiscal rules are built around the notion that a government should balance its books and reduce public debt levels in an economic upswing to supposedly create more space to borrow in the event of a crisis. However, given the environmental crisis is a structural issue with permanent effects, rather than a temporary one with side effects that can be remedied, cumulative pre-emptive spending and investment will be necessary over the short, medium, and long term. The alternative of waiting until the planet has overheated and biodiversity has been devastated is simply not an option – not only will fiscal costs be far more expensive, but it would come with certain permanent social, environmental, and economic losses that cannot be priced.

Of course, there is also an important flip side that warrants consideration. By boosting the supply potential and underlying productive capacity of the economy, the benefits of green public investment may end up paying for themselves and/or reduce debt-to-GDP ratios.[23] The fact that this can all be undertaken by issuing debt at historically low interest rates should make the decision an obvious one.

There are a number of observable issues with the current fiscal rules – not least in relation to climate change and the green investment gap. For example, a 60 % debt to GDP ratio is often argued to be «arbitrary», not least because average debt levels in high income countries has doubled from 60 % to 120 % of GDP since the 1990s, while average borrowing costs have fallen from 9.4 % to 0.5 % (see Figure 2 below).[24] Despite facing a huge green investment gap, Italy and Portugal would have to run primary budget surpluses of 4–5 % of GDP over the next decade and more.[25] Nevertheless, the thrust of the arguments made here is that European fiscal rules were designed irrespective of the current economic and environmental crisis – with long-term and large-scale public borrowing for transformational investment currently precluded by the SGP. Together these issues beg the question of whether fiscal rules and the SGP in its current guise represent the very definition of fiscal irresponsibility.

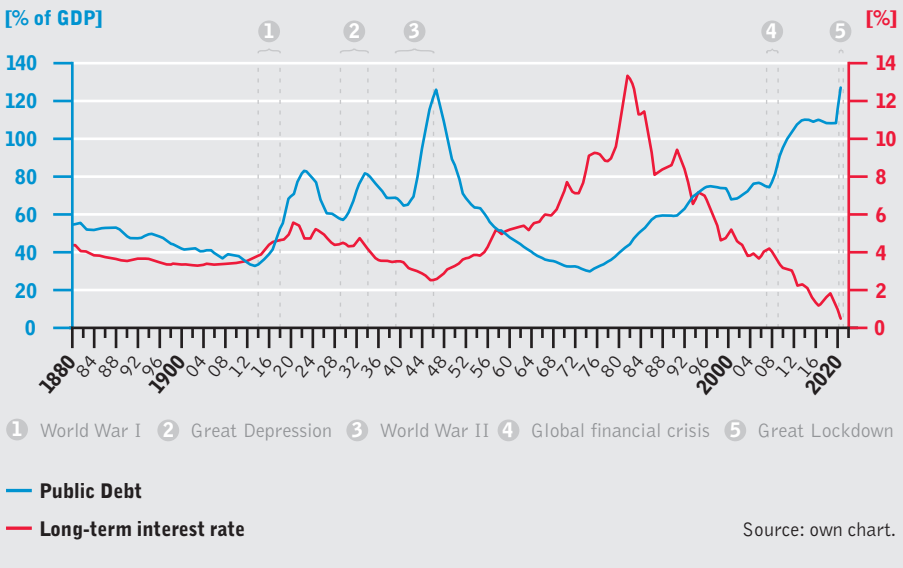
22 F. van Lerven, A. Stirling, and L. Prieg (2021), *Calling Time: Replacing the Fiscal Rules with Fiscal Referees*, New Economics Foundation, https://neweconomics.org/2021/10/calling-time.

23 A. Pettifor (2020), *The Case for the Green New Deal*, New York, NY: Verso.

24 L. L. Pasinetti (1998), «The Myth (or Folly) of the 3 % Deficit/GDP Maastricht ‹Parameter›», *Cambridge Journal of Economics* 22(1): 103–116.

25 Costantini (2020), «The Eurozone As a Trap» (see note 16); see also F. van Lerven (2021), *Pick a Number, Any Number: Setting Arbitrary Targets for Fiscal Policy Risks Locking-in Fresh Rounds of Austerity*, New Economics Foundation, https://neweconomics.org/2021/03/pick-a-number-any-number.

Fig. 2: Public Debt and Bond Yields in Advances Economies, 1880–2020
Debt levels have doubled since 1990s but borrowing costs have fallen to nearly zero



Source: own chart.

Fiscal rules – a fit-for-purpose approach

Various welcome proposals are being considered to help achieve the goals of a green transition and fill the green investment gap – not least in the form of taxation, monetary policy, and wider regulatory reforms. Naturally, the new EU economic governance framework must encourage and support member states to ensure their tax policies and national budgets serve a socially just green transformation and the reduction of inequality. Likewise, the EU's Recovery and Resilience Facility must be considerably scaled-up and made permanent. Institutional mechanisms through the European Semester will also need to be established for effective policy coordination, public accountability, and transparency to prevent the misuse of funding and corruption. A fuller discussion of these important reforms is beyond the scope of this brief paper, but the reader is reminded that nothing on the scale and speed of required investment for the EGD has ever been achieved before without significant national-level public-sector borrowing. Thus, the fiscal rules themselves require reform.

Most recently, some momentum has been given to circumvent fiscal rules by establishing an off-balance sheet fund that is excluded from the deficit.[26] Such proposals are highly problematic, not least because of their complexity, and they must be independent of state control. And in so much as these would represent loans

26 M. Arnold (2021), «What Germany's Election Means for the Country's Debt Debate», *The Financial Times*, September 21, www.ft.com/content/23e906e7-f399-4774-a3c8-2adbbba7b4b3.

rather than tendering grants to the private sector, public goods would still rest in private hands – and all the problems that come with it. From a balance sheet position, governments would be missing the chance to inject a debt-free source of income into the private sector. Finally, the irony of this proposal is that, rather than actually change the SGP, the Commission would put significant effort into creating backdoor policies simply to get round existing ones.

A more credible and desirable proposal is a «golden rule» for public investment, which would exempt green capital investment (like green infrastructure projects) from narrow deficit targets.[27] However, the borrowing under such a rule would still be constrained by an overlap with a fiscal rule on current expenditure (i.e. everyday spending) and/or overall debt issuance. The negative financial returns (and cost of depreciation) would have to be covered by the current account, and therefore investment with low financial returns (i.e. many public goods) would not be covered. Importantly, policy-makers should be aware that this may risk leaving vital public goods in private-sector hands, or worse, such vital investments may be found wanting all together. Furthermore, depending on how it is formulated, vital investment and spending in social infrastructure, skills training, and adequate safety nets related to the Just Transition may be precluded by such a rule.

In an unequivocally overhauled fiscal and monetary framework, a better solution would be to institute green capital investment and social infrastructure budgets tied to full-capacity utilisation and filling the green investment budget.[28] This would in effect mean that the capital budget could remain in deficit until the economy reaches the limits of its full capacity alongside other environmental objectives and/or constraints. The primary indicators for assessing fiscal space would be better connected to the productive capacity of the economy and the availability of real resources (i.e. levels of employment, wages, inflation, the current account balance, and environmental as well as biosphere constraints). When signs of the economy indicate that it is at, or approaching, its productive capacity limits, a smaller deficit or a surplus would be warranted.

Such a fiscal policy rule would work best in coordination with the ECB, but it is nevertheless generally consistent with central bank independence and a non-explosive path for the debt-to-GDP ratio at any reasonable rate of interest.[29] The rule implies that, as full-capacity utilisation and environmental targets are hit, debt levels would naturally begin to stabilise/converge. Any increased debt servicing (because of higher interest rates or further issuance of debt) would innately require

27 C. Cottarelli (2020), *The Role of Fiscal Rules in Relation with the Green Economy*, European Parliament, requested by the ECON committee, www.europarl.europa.eu/RegData/etudes/STUD/2020/614524/IPOL_STU(2020)614524_EN.pdf.

28 The following is adapted and builds upon the idea of Costantini (2020), «The Eurozone As a Trap» (see note 16).

29 W. Godley and M. Lavoie (2012), «Fiscal Policy in a Stock-flow Consistent (SFC) Model», in *The Stock-Flow Consistent Approach*, ed. M. Lavoie and G. Zezza (London: Palgrave Macmillan), 194–215; S. T. Fullwiler (2016), «The Debt Ratio and Sustainable Macroeconomic Policy», *World Economic Review* 2016(7): 12–42.

a larger deficit. The additional deficit would raise spending and demand, putting the economy above its productive potential (and threatening the inflation constraint). Accordingly, in these circumstances, the rule would require non-interest expenditure (i.e. borrowing for the primary balance) to be cut or taxes raised in order to reduce the primary balance so that output would not exceed the productive potential or the inflation target, thereby stabilising the debt-to-GDP ratio.

DANIELA GABOR

Green Central Banking

The green turn in central banking has generated considerable controversy. At one end of the spectrum, the «central banks are doing too much» voices have questioned central banks' growing engagement with climate issues, arguing that unaccountable technocrats do not have the tools or the political legitimacy to intervene in (or possibly highjack) the low-carbon transition. Instead, this process should be guided by political commitments to higher carbon taxes, the fiscal de-risking of green private investment, and where fiscal space permits it, green public investment. At the other end, the «central banks are doing too little» camp questions the continued emphasis on voluntary decarbonisation, even among green champions in the central bank community (Bank of England, the European Central Bank, ECB). It points to the systemic greenwashing that characterises private credit creation to argue that central banks need to urgently create frameworks for the *rapid and mandatory* decarbonisation of private finance.

This paper intervenes in and nuances the «too little vs too much» debate. It first unpacks the climate question(s) for central banks, to then argue that the pace and nature of decarbonisation – the build-up of green productive capacities and green infrastructure – is ultimately a question of the broader institutional context that configures the relationship between central banks, private finance, and fiscal/industrial authorities.[1] Put differently, the status-quo monetary dominance arrangement that characterises financial capitalism – where inflation-targeting policies play the decisive role – cannot generate the institutional basis for a green «nationalisation of credit»[2] that systematically directs credit towards green productive capacities. Instead, this central bank-dominated arrangement delegates the specific pace and nature of the structural transformation to private finance – with the attendant risks of greenwashing – and is vulnerable to a «price stability first» central bank mandate.

1 As elaborated in Carolyn Sissoko's contribution in this series. Braun and Gabor theorise these as macrofinancial regimes, understood as institutional modes of creation and access to financial assets, including money; see B. Braun and D. Gabor (2022), *In Search of a Green Macrofinancial Regime*, mimeo.

2 See E. Monnet (2018), *Controlling Credit: Central Banking and the Planned Economy in Postwar France, 1948–1973* (Cambridge: Cambridge University Press).

The climate policy question: (Mandatory) decarbonisation for financial/monetary stability vs green structural transformation

For most central banks, the climate question is how to decarbonise the financial system for financial or monetary stability purposes. Central banks can interpret this policy question in two ways, either as a) how to reduce climate risks, including transition risks from carbon tax policies, to private finance's balance sheets (single materiality, a la ECB), or b) how to reduce both climate risks and the climate footprint of private finance (double materiality, a la Bank of England).

The Network for Greening the Financial System, a worldwide network of central banks, is guided by the financial/monetary stability framing precisely because this organises, and legitimises, monetary decarbonisation efforts within the institutional set-up of monetary dominance, defined by central banks[3] as operational independence to pursue inflation targets with no formal requirement to stabilise the costs of government borrowing (known as fiscal dominance) or to intervene directly in the private allocation of credit. To preserve their claims to independence and defend their hegemonic position in the macrofinancial status quo, inflation-targeting central banks argue that they have a legitimate stake in fighting the climate crisis by construing it as a direct threat to price or financial stability.

In contrast, a handful of central banks, mostly in middle- or low-income countries, have promoted or announced initiatives to encourage (small-scale) green private lending to green sectors, with the aim of accelerating the low-carbon structural transformation. When green monetary policy explicitly targets structural transformation, it is often designed in coordination with green industrial policies.[4]

Mandatory decarbonisation under monetary dominance: Soft credit guidance

Some central banks are accelerating the move to mandatory decarbonisation, understood as adjustments to monetary and regulatory frameworks that are designed to green monetary/regulatory policies, including collateral policies and unconventional bond purchases.

The first step, typically taken in context of unconventional corporate bond purchases, was for central banks to accept that the principle of market neutrality hardwires a carbon bias[5] in monetary policy operations. Market neutrality allows central banks to eschew accusations of intervening in the private allocation of credit – it instructs central banks to organise unconventional purchases of corporate bonds

3 See, for instance, I. Schnable (2020), *The Shadow of Fiscal Dominance: Misconceptions, Perceptions and Perspectives*, European Central Bank, www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200911~ea32bd8bb3.en.html.

4 For an elaboration, see B. Allan, J. I. Lewis, and T. Oatley (2021), «Green Industrial Policy and the Global Transformation of Climate Politics», *Global Environmental Politics* 21(4): 1–19.

5 See L. Boneva, G. Ferrucci, and F. P. Mongelli (2021), *To Be or Not to Be «Green»: How Can Monetary Policy React to Climate Change?* www.ecb.europa.eu/pub/pdf/scpops/ecb.op285~be7d631055.en.pdf?ddcbc43ab00d4c7a96e9d27aaa972748.

according to the bond market share of the corporate issuer. In so doing, central banks implicitly disregard the fact that carbon-intensive issuers are overrepresented in the bond markets because markets misprice climate risks.[6] But we should not overestimate the importance of this shift in the world of central banks. The acknowledgment of carbon bias does not imply, or indeed require, a fundamental shift away from the current regime of monetary dominance. Nor does it require a fundamental structural transformation of financial capitalism, understood as entrenched infra/structural power[7] of private finance, as it can be deployed to secure state protection (or de-risking) for systemic liabilities and new asset classes such as green/infrastructure/nature assets.[8]

When the topic of carbon bias is considered, the principle of market neutrality is a fiction, albeit a politically powerful one. It is a fiction in the sense that «following the market» in practice means that central banks subsidise carbon issuers (say Shell) when purchasing corporate bonds, since the market fails to price climate risks. The Trojan horse of market neutrality hides carbon subsidies.

Yet paradoxically, central banks have been reluctant to abandon market neutrality altogether, a political decision to preserve the appearance of independence against (conservative) charges that greening monetary/regulatory policies means green interventionist credit policies. Take the Bank of England, the first with an explicit environmental mandate among high-income countries, and thus an interesting case study in the new political economy of mandatory decarbonisation. It first announced plans to green the corporate bond purchase programme by tilting reinvestments *within* but not *across* sectors in November 2021. This would have retained market neutrality and, in practice, could have perversely led the Bank to offer better treatment to carbon-intensive companies than to green companies.[9] It then abandoned its greening plans altogether in February 2022, announcing that it would liquidate its portfolio of corporate bonds by the end of 2023 – a decision motivated by the imperative of shrinking its balance sheet (or quantitative tightening) to contain widespread inflationary pressures. Put differently, the Bank subordinated its environmental mandate to its (interpretation of) of the price stability mandate, and sacrificed its experiments with decarbonising unconventional monetary policy

6 See Y. Dafermos, D. Gabor, M. Nikolaidi, A. Pawloff, and F. van Lerven (2021), *Greening the Eurosystem Collateral Framework: How to Decarbonise the ECB's Monetary Policy*, https://eprints.soas.ac.uk/35503/1/Dafermos%20et%20al%20%282021%29%20Greening%20the%20Eurosystem%20collateral.pdf.

7 See B. Braun (2020), «Central Banking and the Infrastructural Power of Finance: The Case of ECB Support for Repo and Securitization Markets», *Socio-Economic Review* 18(2): 395–418; see also B. Braun (2021), From Exit to Control: The Structural Power of Finance under Asset Manager Capitalism, https://uni-frankfurt.zoom.us/j/94043210548?pwd=cmRzODBVRGhwMHlhUmlwT1BLZUpNdz09.

8 See D. Gabor (2020), «Critical Macro-finance: A Theoretical Lens», Finance and Society 6(1): 45–55.

9 See Y. Dafermos, D. Gabor, M. Nikolaidi, and F. van Lerven (2021), *An Environmental Mandate, Now What? Options for Greening the Bank of England's Corporate Bond Purchase Scheme* (SOAS Working Paper no 22), London: SOAS University of London.

tools on the altar of price stability. It need not have done so, since the Bank can tighten monetary conditions without having to liquidate its corporate bond holding.

The Bank of England's example suggests that even at its most ambitious, mandatory decarbonisation under monetary dominance amounts to *soft credit guidance*[10]: It aims to increase the relative price of dirty credit created on bank balance sheets or in bond markets via signalling effects and demand effects. When central banks signal to private markets their views about green vs dirty assets, the effect is potentially more influential than changes in central bank demand for green/dirty bonds, since their corporate bond portfolios and collateral portfolios are relatively small (see Table 1). But central banks do not set new green/dirty asset prices (via haircuts on collateral or directly) based on a strategy of promoting certain green activities or industries. Signalling (central bank views of dirty vs green asset prices) and demand (changes in demand for assets from tilting or central bank divestment) effects do not per se guarantee that private finance redirects credit flows into green productive activities, as opposed to asset bubbles in property or other new asset classes.

Table 1: Credit policies for the low-carbon transition

	Price tools	Quantity tools	Decarbonisation path	Macrofinancial regime
Soft credit guidance	relative price of dirty/green credit (Bank of England)	market neutrality	delegated to market	monetary dominance
Credit allocation	de-risking green credit assets (PBOC)	– green/dirty credit ceilings/quotas; and – dirty credit rationing	state-led green nationalisation of credit	green coordination w/fiscal and green industrial policies

Source: own compilation.

Under monetary dominance, central banks do not target a sector-specific price of credit or quantity of credit, and their climate frameworks aim at the general greening of both monetary/regulatory policies and the financial system without seeking to promote any distinctive low-carbonisation pathway.

The Bank of England's commitment to market neutrality discussed above illustrates well the vulnerabilities of a strategy that outsources the greening pathway to markets. Where monetary decarbonisation and price stability appear to be at odds with each other, inflation-targeting central banks will inevitably prioritise the latter. Furthermore, the climate costs of this strategy can be significant, considering the systemic greenwashing that prevails in private finance.

In the absence of specific mechanisms of coordination with green industrial policies, mandatory decarbonisation through green central banking delegates the specific pace and nature of structural transformation to private finance.

10 For an elaboration, see J. Ryan-Collins, D. Gabor, and K. Kedward (2022), *Green Credit for the Low-carbon Transition*, mimeo.

Monetary policy aimed at the structural transformation of economic activities: Credit allocation

Credit allocation policies go further than credit guidance in that these are set within an overall explicit strategy – coordinated with fiscal and industrial policies – to closely steer the structural transformation of the economy. Monetary dominance is replaced with a macrofinancial regime of closer green coordination between credit, industrial, and fiscal policies, and with policies aimed specifically at rationing the access to credit for high-carbon activities.

Such structural monetary policies have historically relied on *quantitative tools* – credit ceilings and quotas targeting level/growth rate of credit in certain sectors, or «window guidance» allocation to banks and industrial sectors in line with nominal GDP growth targets or strategic aims.[11] This green nationalisation of credit would have to go hand in hand with dirty credit rationing to reduce access to new credit for dirty activities.

However, so far even the more ambitious central banks have preferred price-based green credit allocation. The People's Bank Of China, the central bank of China, introduced a new «carbon emissions reduction facility» (CERF) in 2021, through which it encourages banks to lend to a set of priority green sectors that specialise in developing and adopting clean energies, improving energy efficiency, and adopting decarbonisation technologies.[12]

But the design of the CERF tool is more market-based than traditional quantitative tools: The PBOC would provide banks with reserves on preferential terms (60 % of qualifying loans at an interest rate of 1.75 % with a one-year maturity, to be rolled at most twice), expecting that banks would in turn create green loans at rates close to the one year PBOC rate. Similarly, the Bank of Japan announced in December 2021 an $18 billion green financing scheme through which it provides zero interest rate loans to banks for a two year period that can be extended to 2030. Compare this with the Term Funding Scheme of the Bank of England, which had the specific aim of passing the low policy rates onto households and businesses.[13] The Bank of England only agreed to lower funding costs for UK banks if these passed those onto households and businesses, imposing a tighter conditionality on banks than either the Chinese or the Japanese central banks.

11 See D. Bezemer, J. Ryan-Collins, F. van Lerven, and L. Zhang (2021), «Credit Policy and the ‹Debt Shift› in Advanced Economies», *Socio-Economic Review*, https://doi.org/10.1093/ser/mwab041.

12 See «PBOC Officials Answer Press Questions on the Launch of Carbon Emission Reduction Facility», www.pbc.gov.cn/en/3688110/3688172/4157443/4385447/index.html.

13 See Bank of England (2018), *The Term Funding Scheme: Design, Operation and Impact*, www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2018/term-funding-scheme-web-version.pdf.

These price-based green refinancing tools fall under the broader umbrella of green TLTROs[14] recently proposed for the ECB. Central banks offer banks long-term refinancing operations against green (loans/bonds) collateral, thus effectively encouraging the banking system to finance their green credit assets with cheaper green public funding.

The logic of lending against green collateral is inherently one of credit allocation, as the central bank identifies a set of sectors for which it supports private green credit creation. The sectoral criteria can be guided by an industrial policy strategy (as appears to be the case of the PBOC) or by green taxonomies, such as the European Commission's Sustainable Finance taxonomy. It can involve judgments about the greenness of the underlying assets if the taxonomy applied has been designed by other private or public actors, since these can be subject to greenwashing (as is arguably the case for the European Sustainable Finance taxonomy).

Perhaps more important, in the absence of specific sectoral-level quantity targets, the green refinancing logic remains one of *de-risking* private green credit creation also built within the soft credit guidance discussed above. The purpose is to change the risk/return profile of private green credit assets in the expectation that such price incentives would generate supply responses from the banking or shadow banking systems[15] and higher demand for credit from green sectors. It is indeed stronger than the soft credit guidance discussed above, but its effectiveness in generating a rapid structural transformation of the economy is again contingent on private shadow/banking decisions.

Questions to resolve for the credit allocation pathway

Whatever the combination of quantitative and price tools, the credit allocation pathway requires (scholars of) central banks to address several broader political economy questions about green transformations under financial capitalism:

- Does the green transformation of productive structures require the transformation and/or shrinking of private finance in its market-based stage, given its demonstrated propensity to greenwashing and its resistance to the necessary stranding of fossil fuel assets? Can this be achieved via dirty credit rationing alone, or does it require green financial repression?

14 Targeted longer-term refinancing operations; see J. van 't Klooster and R. van Tillburg (2020), *Targeting a Sustainable Recovery with Green TLTROs*, www.positivemoney.eu/wp-content/uploads/2020/09/Green-TLTROs.pdf.

15 For an elaboration of the growing importance of state de-risking as a new instrument of statecraft in financial capitalism, see D. Gabor (2021), «The Wall Street Consensus», *Development and Change* 52(3): 429–459, https://onlinelibrary.wiley.com/doi/full/10.1111/dech.12645.

- Since decarbonisation requires the destruction of financial wealth generated by fossil fuel assets (such as oil and gas), what should be the role of central banks in the institutional set-up that will organise the management of stranded assets?
- Since carbon assets are largely issued and managed on globalised balance sheets (of institutional capital, including asset managers and private equity, and global banks), what would a global framework for both penalising new dirty credit and for preventing «brown-spinning» – that is, the transfer of carbon assets to private equity funds that have little regulatory scrutiny – look like?

CAROLYN SISSOKO

The Role of Financial Markets in a Green Transformation

What is the role of financial markets in a green transformation? There are two key aspects to this question. First, what should be the balance between private and public funding of the transformation? Second, what are the dangers that our modern financial market structure poses to a successful green transformation?

With respect to the balance between private and public funding, on the one hand many – such as John Kerry at COP26[1] – argue that we need private financing to fund a green transformation, and that the role of the state is to support financiers in doing so by providing guarantees to green projects or by «de-risking». Financiers such as Larry Fink of Blackrock concur.[2] On the other hand, Adam Tooze has argued that the financing needs for a climate transformation are really not so large – nothing like the scale of financing needed for the Second World War – and there is no reason that the transformation should be viewed as lying beyond the capacity of developed countries to issue debt.[3] Tooze finds that the problem is fundamentally one of politics, not financial constraints.[4]

The fact that private financing proposals are treated as – quite obviously – only being possible with state support, which is designed to bear a significant portion of the risks of the projects being financed, is a red flag for critical finance scholars

1 See Gabor's Cop26 analysis: D. Gabor (2021), «The Wall Street Consensus at COP26», *Phenomenal World*, November 18, www.phenomenalworld.org/analysis/cop26; see also Tooze's COP26 analysis: A. Tooze, «The Cop26 Message? We Are Trusting Big Business, Not States, to Fix the Climate Crisis», *The Guardian*, November 16, www.theguardian.com/commentisfree/2021/nov/16/cop-26-big-business-climate-crisis-neoliberal.

2 See D. Driscoll and M. Blyth in this publication for a more detailed discussion.

3 A. Tooze (2021), «Chartbook #48: The First Climate Kalecki Moment – the Politics of Energy Crisis Talk», https://adamtooze.com/2021/10/31/chartbook-48-the-first-climate-kalecki-moment-the-politics-of-energy-crisis-talk.

4 Note that some of the contrary arguments are not serious efforts to measure the costs of the transition, e.g. McKinsey's recently published «The Net-zero Transition: What It Would Cost, What It Could Bring», www.mckinsey.com/~/media/mckinsey/business%20functions/sustainability/our%20insights/the%20net%20zero%20transition%20what%20it%20would%20cost%20what%20it%20could%20bring/the%20net-zero%20transition-report-jan-2022-es-final.pdf; see K. Burkart (n.d.), «No McKinsey, It Will Not Cost $9 Trillion Per Year to Solve Climate Change», *oneearth*, https://medium.com/oneearth/no-mckinsey-it-will-not-cost-9-trillion-per-year-to-solve-climate-change-3d0e20af52a.

such as Daniela Gabor.[5] De-risking proposals often draw from the structure of the 2008 financial crisis bailouts: When the Federal Reserve took over the management of bad assets in its Maiden Lane conduits, for example, the losses were divided into a first loss «equity» tranche (which was retained by the private sector) and a much larger, but less risky, second loss tranche, or «senior loan» (which was provided by the Fed). Now proposals such as Blackrock's would have public entities such as the International Monetary Fund and the World Bank bear the equity risk of projects to «green» the developing world.[6] In fact, we should question whether private financing that is made possible because public bodies agree to bear the «equity» risk of the project should really be considered private financing at all. Indeed, the very concept of bearing first loss «equity» risk would normally indicate ownership of the project, as on the stock market. In short, proposals such as Blackrock's would have financial markets fund the green transformation in name only.

As we learnt in 2008, public guarantees are rarely as limited as the legislatures that enacted them intended them to be. Instead, private finance excels at exploiting such guarantees in ways that come as a shock to the public servants who must honour them. Examples in 2008 abound, including: the expansion of deposit insurance in the United States (US), Ireland, the United Kingdom (UK), Germany, etc.; the temporary guarantee of money market funds in the US; and the conversion on a shotgun basis of US investment banks Goldman Sachs and Morgan Stanley into bank holding companies – with direct access to Federal Reserve support. There is no reason to believe that these dynamics – whereby large private-sector financial firms are able to socialise their losses by expanding narrow guarantees beyond what legislators intended – will be any different when it comes to the guarantees that support a green transformation. In short, when private funding is supported by public «de-risking», the effect is almost certainly a form of off-balance-sheet rather than on-balance-sheet public funding of the activity. Needless to say, this off-balance-sheet public funding is likely to be much more expensive than direct public funding of the same activity, which would be supervised by the standard rules of public procurement. Indeed, public de-risking can be viewed as a form of regulatory arbitrage designed to circumvent public procurement regulations.

Overall, current proposals for so-called private funding of the green transformation should be met with robust scepticism as long as they depend on de-risking by public entities. That said, there is surely a role for private finance in the form of purchases of publicly issued debt dedicated to the finance of the green transformation, as well as in the finance of projects that meet state-designated standards and may be granted certain benefits, such as tax preferences or lower fees for the use of public property and services.

5 In this series and also D. Gabor (2021), «Wall Street Consensus», *Development and Change* 0(0): 1–31, http://dx.doi.org/10.1111/dech.12645.

6 See Driscoll and Blyth 2022 in this series. Note that the Maiden Lane conduits themselves draw from structured finance and the collateralized debt obligation model of concentrating risk in «equity» and «mezzanine» tranches.

This then leads to the second issue: What are the dangers that our modern financial market structure poses to a successful green transformation? In particular, the coronavirus crisis has revealed that fundamental instability lies at the heart of our public debt markets, so that the markets that have for most of the past century been described as «the most liquid in the world» are now subject to dramatic liquidity crises.[7] These liquid public debt markets are a cornerstone of modern finance, as banks, pension funds, as well as financial and non-financial businesses all rely on them as a means of transferring funds with a measure of safety from today into the future. Financial markets are not equipped to deal with the possibility that these assets which sit at the heart of the financial system can be «illiquid», and markets are at risk of collapse when forced to adapt to unstable, illiquid values in these assets.

This growth of fundamental instability in the core of modern financial markets has already altered the traditional relationship between monetary and fiscal authorities, as central banks have had to step in to support the value of government debt on a scale and at a speed that is unprecedented. Monetary policy-makers are now regularly taking actions that have clear fiscal implications, and the issue of public debt by fiscal authorities can interfere with the traditional channels of monetary policy transmission in novel ways.[8] Indeed, Gabor argues that financial markets are now so completely dominated by central bank policy that we need to protect against the likelihood that central banks could derail a green transformation.[9] She argues that a commitment to green coordination between the central bank and fiscal authorities is essential. This is certainly true, and the long-standing tradition of coordination between monetary and fiscal authorities in countries such as the US and the UK means that it should not be difficult for them. While the European Central Bank faces a more complicated situation, recent history indicates that, when necessary, it can demonstrate creativity in «muddling through» to reach an effective solution, such as Mario Draghi's «whatever it takes» approach to the 2012 debt crisis.

Another pressing issue that is raised by the ever-increasing frequency in advanced economies of episodes of financial instability is what can be done to ensure that a green transformation is not derailed either by instability originating in financial markets, or by the political repercussions deriving from increasing inequality that is both created and perpetuated by solutions to instability.

Our current financial markets are characterised not just by unreliable liquidity in sovereign debt markets, but also by a zeitgeist that favours what is best described as crony capitalism in advanced economies, when structural financial instability

7 C. Sissoko (2020), *The Collateral Supply Effect on Central Bank Policy*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3545546.

8 Ibid.

9 D. Gabor (2021), «Revolution without Revolutionaries: Interrogating the Return of Monetary Financing», https://transformative-responses.org/wp-content/uploads/2021/01/TR_Report_Gabor_FINAL.pdf.

is transformed into a reason to socialise losses and bail out unsuccessful companies.[10] The discussion of the «de-risking state» above is part of this phenomenon, and we have seen this in the responses to financial crises in 2007–2009 and in 2020, when the central banks stepped in to provide price support for private contracts. There is a pretense of public purpose for bailouts that support the wealthy far more than they support the real economy and the general public. Reform must address not just the liquidity problem, but also the policy bias towards bailouts for the wealthy.

On the one hand, there is a consensus among progressives that instability is associated with private-sector money creation. However, there is little consensus on what to do about it. As in the past, proposals range from regulatory reform of banking to calls to get the private sector out of banking entirely. A taxonomy of the range of proposals to address the problem of financial stability includes:

1. Ring-fencing. This involves housing the different banking activities in different financial holding company subsidiaries. An example is the Vickers Commission, whose policy recommendations were in fact adopted in the UK. This policy proposal is closely targeted to averting bank solvency issues and does not do much to address the problem of market instability.
2. An updated Glass-Steagall Act. These policy proposals are related to ring-fencing, but they involve a more dramatic separation between the different financing activities. In particular, commercial or retail banks are prohibited from engaging in market trading activities or being affiliated with companies that do so. Thus, a single corporate entity – measured at the holding company level – cannot engage in both activities. An example of this is the 21st century Glass-Steagall Act, which was a bill proposed (but not adopted) in the US in 2017.
3. An asset-based approach. This focusses on putting in place regulation that will forestall bank finance of long-term assets such as real estate, public debt, and corporate bonds or securitisations. This approach can also be viewed as one of structural separation, similar to that which characterised the US and the UK prior to the 1980s. Under this approach, mortgages would be mostly financed by dedicated financial institutions that are not directly tied into the monetary system.[11]

10 For more on this, see K. Kettering (2008), «Securitization and Its Discontents: The Dynamics of Financial Product Development», *Cardozo Law Review* 29: 1553–1728; N. Shaxson (2019), «The Finance Curse», www.academia.edu/42822101/Shaxson_Nicholas_2019_The_Financial_Curse_How_Global_Finance_is_Making_us_all_Poorer_New_York_Grove_Press_pp_376; and M. Senn and M. Peters (2021), «Shrink Finance, for Prosperity. Why to much finance harms the European economy and society», https://transformative-responses.org/wp-content/uploads/2021/12/2021214_Shrink-Finance_komplett.pdf.

11 C. Sissoko (2016), «How to Stabilize the Banking System: Lessons from the pre-1914 London Money Market», *Financial History Review* 23(1): 1–20; C. Sissoko (2020), «The Collateral Supply» (see note 7); C. Goodhart and E. Perotti (2015, March), *Maturity Mismatch Stretching: Banking Has Taken a Wrong Turn* (CEPR Policy Insight No. 81), London: Centre for Economic Policy Research.

4. The market maker of last resort. This is a central bank purchase facility for public debt that can have the effect of targeting yields on long-term public debt. Gabor builds on the importance of this central bank function to the operation of modern markets to conclude that we need to focus attention on central banks when discussing implementation of a green transformation.[12] The market maker of last resort is related to proposals for the central clearing of sovereign debt.[13]
5. The expansion of central bank services to the public as a substitute for private bank services. Proposals include central bank deposit accounts,[14] central bank digital currencies,[15] and narrow banking proposals that seek to get banks out of money creation entirely.[16]
6. Government direction of credit and/or credit guidance.[17]

Key areas of contention include clearly defining (or redefining) the parameters of banking – and of private-sector money creation (items 1–3) – as well as the role of both central banks and government more generally in supporting or displacing such private money creation (items 4–6).

Ring-fencing and Glass-Steagall take an entity-based approach to redefining banking, whereas Sissoko has argued that it is important to take an asset-based approach and to restrict the flow of bank money into specific categories of assets (as in fact the original Glass-Steagall Act did[18]). The aforementioned liquidity problems in sovereign debt markets during the coronavirus crisis stand as an example of why such regulation is necessary.

Others argue that perhaps central banks acting as market makers of last resort can successfully target the yields of long-term sovereign debt, not just over the short

12 D. Gabor (2021), Revolution (see note 9).

13 D. Duffie (2020). *Still the Worlds' Safe Haven?* (Hutchins Center Working Paper #62), Washington, DC: Brookings.

14 S. Omarova (2021), «The People's Ledger: How to Democratize Money and Finance in the Economy», *Vanderbilt Law Review* 74: 1231–1300; J. Crawford, L. Menand, and M. Ricks (2021), «Fed Accounts: Digital Dollars», *George Washington Law Review* 89: 113–172.

15 Bank of England (2020), *Central Bank Digital Currency* (discussion paper), London: Bank of England; Bank of International Settlements (2021), «Central Bank Digital Currencies: Executive Summary», Basel: Bank of International Settlements.

16 A. Levitin (2016), «Safe Banking: Finance and Democracy», *University of Chicago Law Review* 83(1): 357–455; M. Wolf (2014), *The Shifts and the Shocks: What We've Learned – and Have Still to Learn – from the Financial Crisis*, London: Penguin Books.

17 D. Bezemer, J. Ryan-Collins, F. van Lerven, and L. Zhang (2021), «Credit Policy and the ‹Debt Shift› in Advanced Economies», *Socio-Economic Review*, https://doi.org/10.1093/ser/mwab041; S. Omarova (2020), *Why We Need a National Investment Authority*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3566462.

18 C. Sissoko (2017), «The Plight of Modern Markets: How Universal Banking Undermines Capital Markets», *Economic Notes* 46(1): 53–104.

term, but over a long-term horizon.[19] If so, then government-bond financed investment in, for example, a green transformation is a free lunch, as government debt can be issued without any risk that interest rates will rise over the long run and ultimately make the policy expensive. Two problems arise with this approach. First, financial markets have developed in an environment where there is a market price for sovereign debt, so the shift to a central bank-supported price creates windfall gains for the current owners of sovereign debt – and to the degree that these owners are the wealthy, this exacerbates inequality. Second, the market-based approach to pricing sovereign debt has the advantage that the market indicates quickly when there are concerns about the sovereign repayment (though it may be manipulated and do so too quickly). Eliminate this and sovereign debt problems may grow unnoticed until they are irrecoverable. In short, the policy creates a danger of cliff risk.

Perhaps, then, financial stability is best supported by a strategy of structural reform of sovereign debt markets that relies on regulation to limit the practice of borrowing against longer-term government debt in order to obtain leverage in financial markets, as this practice creates liquidity crises. Such limitations would mitigate the need for central bank intervention. After all, this central bank intervention is necessarily most immediately beneficial to the – wealthy – owners of the debt and may undermine support for all policies associated with it, including a green transformation. Ensuring a robust market structure will arguably provide a better foundation for the debt issuance that is needed to fund a green transformation than one that is founded on periodic or persistent central bank support for bond prices.

In this environment, there is still a need for a reform of the banking system to ensure that everyone can benefit from it. These reforms include (i) the provision of some kind of very low-fee public bank account – provided by, for example, the post office, the central bank, or even a central bank digital currency – to ensure that even the least-advantaged have access to the payments system, and (ii) credit guidance and/or regulation that ensures that bank-created money flows into real activity and not into financial engineering or asset price bubbles that exacerbate inequality.

To summarise, the question «What is the role of financial markets in a green transformation?» needs to be restated: What is the role of the state in making sure that our financial markets can support a green transformation? Proposals for the state to play a «de-risking» role are ill-advised, because they are designed to bail out wealthy investors. However, there is an important role for the state in financial markets. First, the state should issue public debt to fund its own green agenda, and thus supply financial markets with tradable assets. Second, the state should reform

19 For example N. Tankus (2022), «The New Monetary Policy – Reimagining Demand Management and Price Stability in the 21st Century» (https://files.modernmoney.network/M3F000001.pdf) argues that nominal yields on long-term sovereign debt should be fixed by the central bank at zero. It is important to acknowledge that those who advocate this approach are well-aware of the danger of inflation and would both limit the issue of government debt to productive purposes such as the Green New Deal, as well as use regulation and credit controls to constrain private finance.

sovereign debt markets to limit the practice of borrowing against longer-term debt in order to avoid the impetus for central bank bailouts of the private sector. Making financial markets more robust in this way will support the long-term liquidity of sovereign debt and not harm it, as is often claimed. Third, the state should set green and «dirty» or equivalent standards with the explicit expectation that the central bank will be governed by these standards and not invest in «dirty» assets or support them in other ways. Fourth, the state should certify projects that are designed to explore and develop future green technologies and consider providing preferential treatment for such projects, such as advantageous tax rates. Two additional policies that are not specific to the green transformation but are necessary to address growing problems of finance-driven inequality are publicly provided, low-fee universal access to the payments system, and credit policies that direct financing into real activities.

Financial markets have an important supporting role to play in a green transformation, and we can only expect them to be successful in playing this role if the state carefully designs the rules of engagement for financial market players with the green transformation. In this situation, we can expect the central bank to play an important role in following the rules for a green transformation laid out by the state.[20]

20 For more on central banks and the green transformation, see D. Gabor in this publication.

III. BEYOND FINANCE: THE ROLE OF THE STATE, INVESTMENTS AND INDUSTRIAL POLICY

PETER A. VICTOR

The Macroeconomics of a Green Transformation: The Role of Green Investment

Background and objectives

The «Green New Deals» that are underway and being contemplated on both sides of the Atlantic entail major investments intended to reduce the environmental impacts of economic activity. McKinsey & Co. has estimated that reaching net-zero greenhouse gas (GHG) emissions by 2050 will require about $275 trillion of cumulative spending on physical assets over the next three decades.[1] No equivalent estimate of costs is available for addressing other globally significant environmental problems, but we can be confident that they would be very substantial. Successful mitigation of and adaptation to the climate crisis, biodiversity loss, shortages of fresh water, and more will be determined by the kind of investments made today and their relation to macroeconomic objectives.[2] Some of these objectives have recently received increasing attention, such as inflation and public debt, both in the European Union (EU) and the United States, and others such as full employment, income inequality, and private-sector debt remain matters of concern.

A green transformation of the economy will require a major commitment to green investment to reduce and respond to environmental degradation. The main objective of this paper is to explore the macroeconomic implications of green investment in the transformation to a green economy.

What is meant by green investment? Starting from the taxonomy of green investment put forward by the EU to facilitate sustainable investment,[3] we propose a further classification of green investments based on their different macroeconomic

1 McKinsey & Company (2022), *The Net-Zero Transition, What it Would Cost and What it Would Bring?*, www.mckinsey.com/~/media/mckinsey/business%20functions/sustainability/our%20insights/the%20net%20zero%20transition%20what%20it%20would%20cost%20what%20it%20could%20bring/the%20net-zero%20transition-report-jan-2022-es-final.pdf.

2 W. Steffen et al. (2015), «Planetary Boundaries: Guiding Human Development on a Changing Planet», *Science* 347 (6223): 1259855.

3 European Parliament and European Council (2020), Regulation (EU) 2020/852 of the European Parliament and of the Council, 18 June.

implications rather than on different technologies and environmental objectives as is more common. Then we present three scenarios simulated using the LowGrow SFC macroeconomic model – a base case, a modest green transformation scenario, and an ambitious green transformation scenario – to help illuminate trade-offs among environmental and economic objectives. LowGrow SFC is specially designed for exploring long-term transformational macroeconomic scenarios in which the rate of economic growth is determined rather than assumed, GHG emissions and other environmental pressures are responsive to various interventions, and financial flows in the economy are tracked along with sector balance sheets.[4] The paper concludes with some observations about why we should not allow the pursuit of economic growth to be an obstacle to a green transformation and the respective roles of the public and private sectors in financing green investment.

A taxonomy of green investment

Investment is the economic bridge to the future. The scale and composition of investments made today will determine the capital stock that will be available in years to come. This stock of real, physical capital includes built infrastructure such as roads, railways, harbours, and airports; water and sewage systems; power plants, refineries, pipelines; and buildings and equipment. Real physical capital should not be confused with financial capital, though the two are related. Investment in the physical capital stock must be financed, but it is the real capital – designed and operated by people and powered by energy – that provides the goods and services produced and consumed in the economy.

Green investment is investment in real capital with the primary objective of reducing the environmental impacts of economic activities. This includes investment in equipment that reduces emissions of GHGs, such as more efficient heating and lighting, and in solar arrays and wind turbines to replace fossil fuels. It also includes investments that reduce the risk of adverse impacts of climate heating, such as barriers to protect coastal settlements from rising sea levels. The primacy of such environmental objectives distinguishes green investment from other investments whose main purpose is to add to real capital stocks and increase economic output. In the private sector, investment is primarily about generating profits. In the public sector, it is to achieve economic growth and other policy objectives.

The EU's «Green Taxonomy» on Sustainable Finance (Regulation 2020/852) is very useful for clarifying the scope and meaning of green investment. According to this taxonomy «environmentally sustainable investment» (understood here as green investment) 1) must make a substantial contribution to one of six environmental objectives (climate change mitigation; climate change adaptation; sustainable use and protection of water and marine resources; transition to a circular economy; pollution prevention and control; and protection and restoration of biodiversity

4 LowGrow SFC can be accessed online at https://exchange.iseesystems.com/public/petervictor/lowgrow-sfc/index.html#page1.

and ecosystems), 2) does no significant harm to the other five, and 3) must meet minimum safeguards such as the UN guiding principles on business and human rights. The EU regulation includes 35 economic activities that contribute to the six environmental objectives such as improving investment in energy efficiency, switching to the use of sustainably sourced materials, and nature and biodiversity conservation.[5]

The EU Taxonomy defines what is meant by green investment. However, to explore the short- and long-term macroeconomic effects of green investment and of a green transformation, another cross-cutting classification of green investment is required, one that distinguishes between whether the green investments are «productive» or «non-productive», and whether they are «additional» and «non-additional». Productive investment increases the capacity of the economy to produce goods and services that are bought and sold. These goods and services are included in the gross domestic product (GDP), which measures the market value of final purchases on goods and services (but excludes many considerations that contribute to well-being such as unpaid work, inequality, and environmental damage). Some green investments such as solar and wind energy technologies are productive in this sense. Others, such as barriers to prevent flooding to protect productive capital, are themselves not productive because they do not produce marketable goods and services. Their purpose is to help protect other productive capital, not to add to it. Expenditure on non-productive green investments is included in GDP and can help maintain production in the face of climate change, but it does not add to the productive capacity of the economy. In contrast, expenditure on productive green investments is included in GDP, and these investments also increase the capacity of the economy to produce goods and services, which is key to economic growth over the long term.

The second criterion of additionality and non-additionality refers to whether expenditures on green investment add to the total investment expenditures in the economy or simply displace other investments. This has much to do with how the green investment is financed. Additional expenditure on green investment adds to aggregate demand (i.e. the total expenditures in the economy that constitute GDP). Non-additional expenditure on green investment does not add to GDP because other investment is reduced and the net effect on aggregate demand is zero.

These two criteria can be combined to give four categories of green investment, with different implications for the productive capital stock and aggregate demand, and therefore different effects on the macro economy and a green transformation. Simply put, short-term macroeconomic effects depend on the extent to which green investment is additional, and long-term effects depend on the extent to which it

5 Subsequently, the European Commission made the controversial decision to add «specific nuclear and gas energy activities in the list of economic activities covered by the EU taxonomy», European Commission (2022), *EU taxonomy: Commission Presents Complementary Climate Delegated Act to Accelerate Decarbonization*, https://ec.europa.eu/info/publications/220202-sustainable-finance-taxonomy-complementary-climate-delegated-act_en.

is productive. If these distinctions are overlooked and the implicit assumption that all green investment is productive and additional, the macroeconomic implications of a green transition can be seriously misconstrued.

Table 1: Four categories of green investment

	Productive investment	Non-productive investment
Additional green investment	– Increases productive capital stock – Adds to aggregate demand	– No effect on productive capital stock – Adds to aggregate demand
Non-additional green investment	– No effect on productive capital stock – No effect on aggregate demand	– Reduces productive capital stock – No effect on aggregate demand

Source: Victor (2019, p. 275, see note 6).

Based on the available information, it is not possible to estimate what proportion of the 35 economic activities listed in the EU Taxonomy regulation that meet at least one of the six environmental objectives should be categorised as productive or non-productive, or a combination of both. A casual assessment based on whether the activities are likely to produce marketable goods and services that can be sold at a profit suggests that 3 of the 35 are, or will soon be, productive (e.g. clean or climate-neutral mobility), 8 are a mix of productive and non-productive (e.g. increasing the recyclability of products), and 24 are non-productive (e.g. protecting the environment from the adverse effects of urban and industrial wastewater discharges). The predominance of non-productive green investments is not surprising since most, if not all, of the benefits generated are not captured in market transactions.

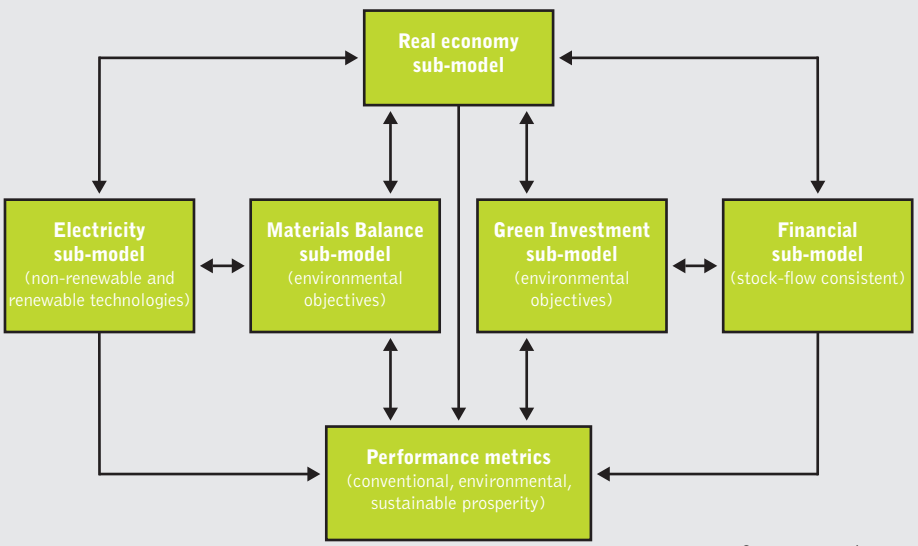
Simulating a green transformation

It is difficult to understand the macroeconomic implications of these different kinds of investments, but some useful insights can be gained with the use of the LowGrow SFC simulation model of a national economy.[6] LowGrow SFC is a systems dynamics model of the type used to analyse natural, social, and economic systems in which positive and negative feedbacks play an important role in determining system behaviour. The model estimates change in a wide range of indicators – including GDP, unemployment, public- and private-sector debt, income inequality, GHG emissions, and material flows – through the interplay of standard economic factors such as investment in capital, household and government spending, and finance. As well as these demand-side factors, the dynamics of the model are determined by the relationship between the capital stock and labour productivity. The model is calibrated for Canada, and a United Kingdom version is in preparation.

6 P. A. Victor (2019), *Managing without Growth: Slower by Design, Not Disaster*, 2nd edition, Cheltenham: Edward Elgar Publishing; T. Jackson and P. A. Victor (2020), «The Transition to a Sustainable Prosperity – A Stock-Flow-Consistent Ecological Macroeconomic Model for Canada», *Ecological Economics*, 177: 106787.

As shown in Figure 1, LowGrow SFC consists of five interconnected sub-models. The Real economy sub-model is of the production of goods and services using labour, capital (buildings, equipment, and infrastructure), materials, and energy. In the Financial sub-model, financial flows among the sectors of the economy are tracked, as are their financial assets and financial liabilities. The Electricity sub-model captures the shift from fossil fuels to electricity generated from renewable sources to reduce emissions of GHGs. Other sources of GHG emissions are also included in the Green Investment sub-model, which is structured around the distinctions between productive and non-productive and additional and non-additional investments described above. Finally, the flow of materials through the economy – from extraction to wastes of all kinds – is simulated in the Materials Balance sub-model.

Fig. 1: LowGrow SFC: An ecological macroeconomic simulation model



Source: own chart.

Two green transformation scenarios – «modest» and «ambitious» – have been simulated for this paper. They differ in the scope and extent of the various initiatives introduced, as can be seen from the input values used in the simulations in Table 2. The scenarios run from 2022 to 2072 and are compared with a base-case scenario with no new initiatives. The green transformation initiatives start in 2023 and are phased in over 10 years, except for the material flows initiatives, which are phased in over 50 years.

Table 2: Input values for the scenarios

Scenarios	Timing		Green Investment					GHG Emissions		Social	
	Year Initiatives Start	Number of Years to Phase in the Changes	Productive Proportion of Green Investment	Non-Additional Non GHG Investment Included	Non-Green Depreciation Diverted to Green Investment %	Non-Electric Green Investment	Rate of Road & Rail Conversion Proportion per Year	Carbon Price on Emissions From Electricity Sector $/tonne	Net -Zero Target Year	Population Groth	Income Supplement $b per Year
1. Base Case	No Initiatives	No Initiatives	0	No	0	No	0	0	None	Medium	0
Green Transformation											
2. Modest	2023	10	0.4	Yes	25	Yes	0.05	150	None	Medium	0
3. Ambitious	2023	10	0.2	Yes	59	Yes	0.1	300	2050	Low	50

Source: own compilation.

In the modest green transformation scenario, 25 % of capital depreciation is diverted to green investment, and 40 % of this green investment is assumed productive. A carbon price reaching $150 per tonne is imposed on GHG emissions from the electric power sector, and green investment in the non-electric power sector is undertaken, also reducing GHG emissions and other impacts. Five per cent per year of road and rail transport is electrified. In the ambitious green transformation, 50 % of capital depreciation is diverted to green investment, the carbon price rises to $300 per tonne of GHG emissions from the electric power sector, 10 % per year of road and rail transport is electrified, and green investment is increased so that net-zero emissions are reached by 2050. The ambitious green transformation scenario also includes an additional $50 billion per year allocated to households specifically to reduce income inequality. Material flows in both green transformation scenarios are affected by increases in the rates of recycling, backfilling, incineration, and in product durability, sharing, production efficiency, and material accumulation. These increases are greater in the ambitious green transformation scenario than in the modest one. Some of the key results from the simulations are shown in Figure 2.

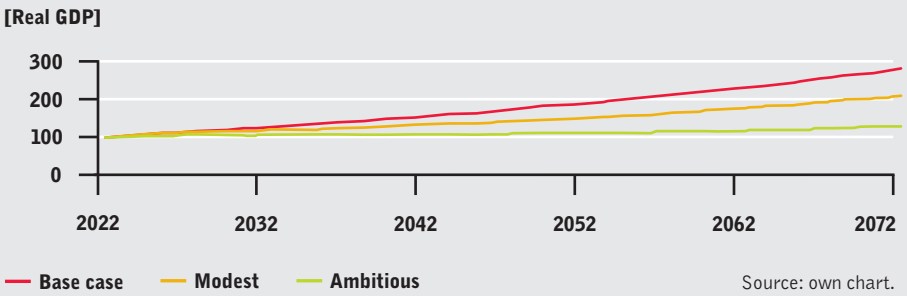
Several macroeconomic results are displayed in Figure 2. Panel a shows the path of real GDP indexed to 100 in 2022 in the three scenarios. It increases at an annual average rate of 2.1 % per year in the base case, slowing to 1.5 % in the modest green

	Material Flows							
Number of Years to Phase in Material Flow Changes	Recycling Change %	Backfilling Change %	Incineration Change %	Ratio of Material Use to Processed Material Change %	Durability Change %	Sharing Change %	Production Efficiency Change %	Material Accumulation Change %
No Initiatives	0	0	0	0	0	0	0	0
Green Transformation								
50	30	20	−20	−2	20	20	20	10
50	60	40	−40	−4	40	40	40	20

transformation scenario due to the diversion of some investment to non-productive capital, and further still to 0.5 % in the ambitious green transformation scenario as the diversion of investment to non-productive capital is further increased. The unemployment rate hovers around 6 % in all three scenarios (panel b). The ratio of government debt to GDP is very similar in the base case and the modest green transformation scenario, but it is noticeably higher, yet stable, in the ambitious green transformation scenario. This is largely due to lower tax revenues and the increased income support to reduce income inequality (panel e). Household indebtedness increases in the base case, is stable in the modest green transformation scenario, and declines in the ambitious green transformation scenario because less consumer borrowing is required to finance the lower level of consumption in this scenario (panel d).

Turning to the green dimensions of the scenarios, in all three there is an increase in the percentage of electricity from renewable sources, which become more cost-competitive over time. It reaches 100 % in the ambitious green transformation scenario in response to the carbon price, which is higher than in the modest green transformation scenario (panel f). GHG emissions almost double in the base case, decline by 85 % in the modest green transformation scenario, and fall to zero in the ambitious green transformation scenario with its greater commitment of green investment and slower economic growth.

Fig. 2a: Summary of the simulation results
Real GDP Index (2022 = 100)



Source: own chart.

Fig. 2b: Summary of the simulation results
Unemployment rate %

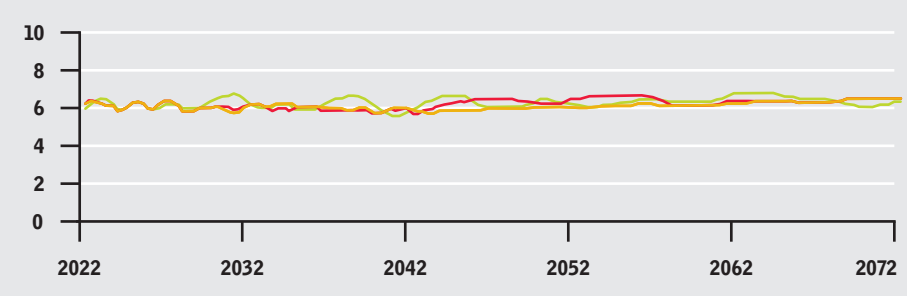


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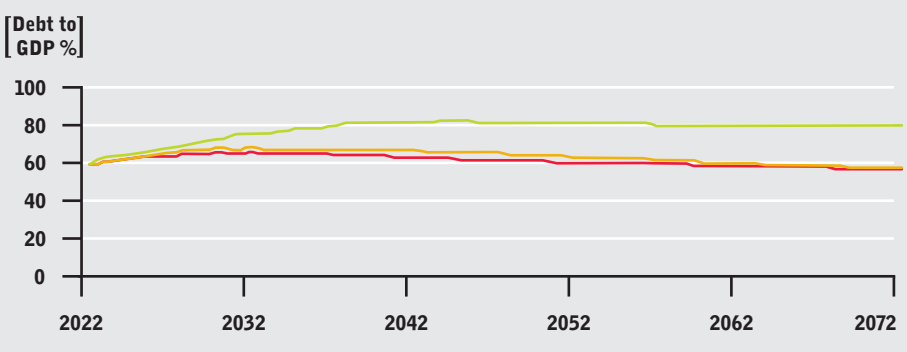
Fig. 2c: Summary of the simulation results
Government debt to GDP %



Source: own chart.

Fig. 2d: Summary of the simulation results
Household dept to net worth %

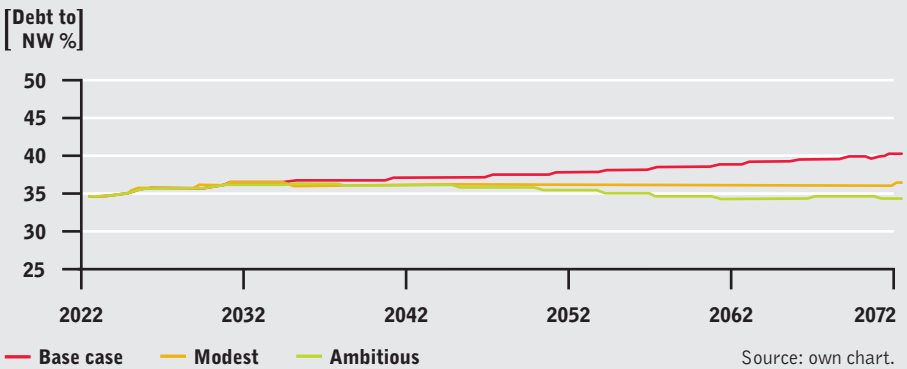


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Fig. 2e: Summary of the simulation results
Gini coefficient of pre-tax incomes

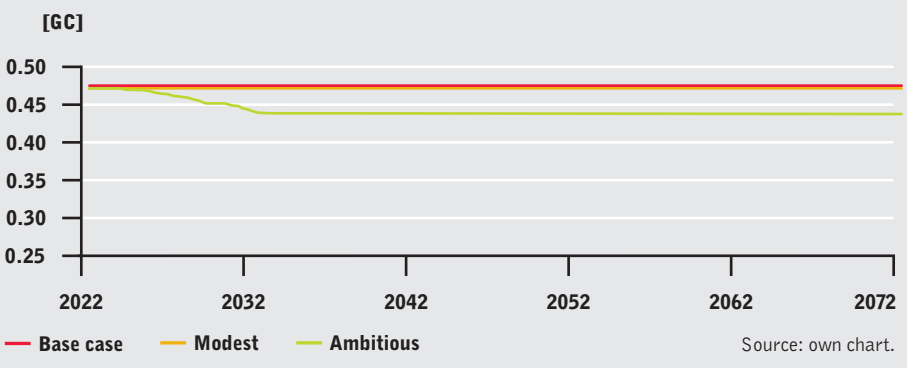

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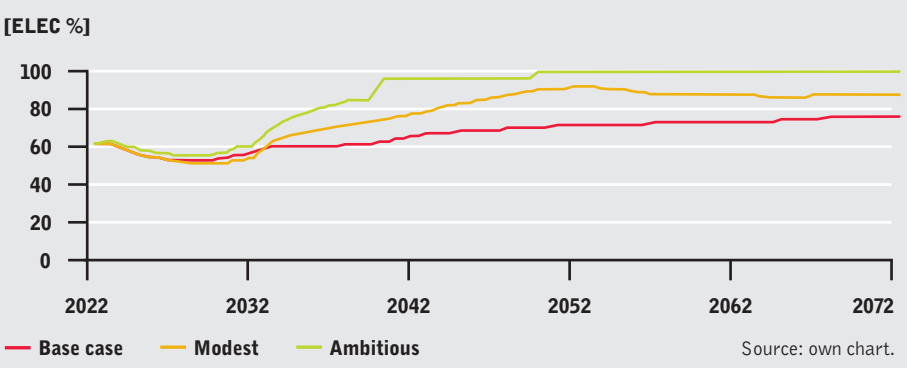
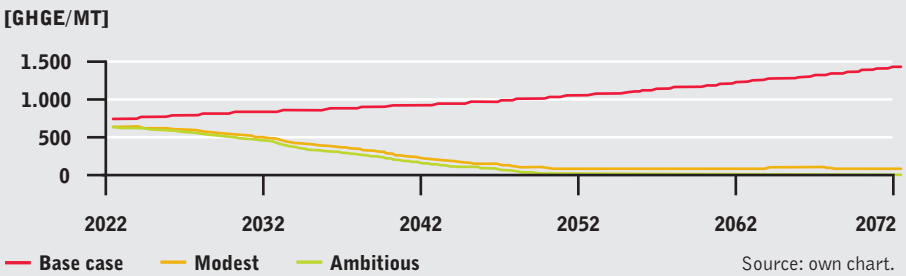
Fig. 2f: Summary of the simulation results
Electricity from renewable %



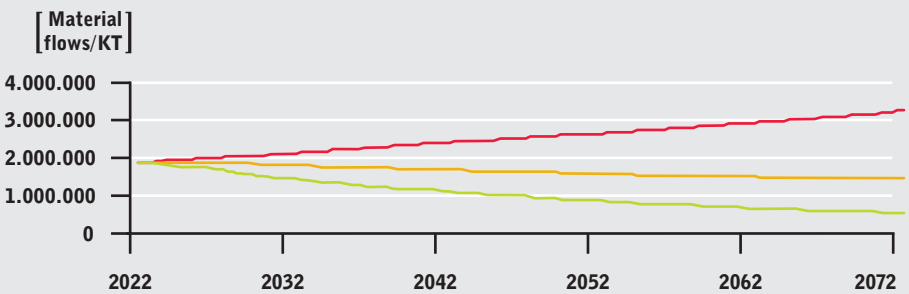
Source: own chart.

Fig. 2g: Summary of the simulation results
Greenhouse gas emmissions (MT)



Source: own chart.

Fig. 2h: Summary of the simulation results
Total Material flows (KT)



Source: own chart.

Many environmental impacts can be traced back to the massive quantities of raw materials used in large and growing national economies. These will only become more severe in the base case, where total material flows increase by 72 %. There is a modest reduction of 22 % in material flows in the modest green transformation scenario, and a 70 % reduction in the ambitious green transformation scenario.

These scenarios are not predictions. They are intended to provide an initial, indicative, and quantitative estimate of what a green transformation in Canada and similar developed economies might look like at an aggregated, macroeconomic level. By comparing them, we can see that the faster economic growth in the base case comes at the cost of unrelenting and unacceptable increases in GHG emissions and materials. These increases are reversed in the modest green transformation scenario with substantial green investment and slower economic growth, but not sufficiently to reach net-zero GHG emissions by 2050. Net zero by 2050 is achieved in the ambitious green transformation scenario, materials are much reduced, as is income inequality, while the rate of economic growth slows further.

Conclusions

The scenarios suggest that, taking Canada as an example, a substantial increase in green investment in developed economies can help bring about a green transformation that will achieve a range of environmental, social, and economic objectives while economic growth slows, possibly ceasing completely. Indeed, if priority is given to the pursuit of economic growth, it will be an obstacle to a green transformation, since productive investments in the private and public sectors will take priority over essential non-productive green investments. All investment adds to GDP, but if green investment simply displaces other investments, the net effect on aggregate demand will be zero. This holds whether the green investments are productive or not. However, over the longer term, if a substantial proportion of green investments are non-productive, in the sense that they do not add to the economy's capacity to produce marketed goods and services, the rate of economic growth in a green transformation will be sharply reduced. This is to be expected, since much of the investment required for a green transformation for mitigation and adaptation is likely to be non-productive.[7] However, growth in GDP should not be a goal. GDP is an inadequate indicator of well-being, not least because it ignores environmental damage and other costs. As the simulations illustrate, the ambitious green scenario is the one in which GDP increases barely at all, performs the best environmentally and socially (through reduced income inequality and reduced working time), and lowers household indebtedness.

At COP26 in 2021, considerable attention was given to the new-found enthusiasm of the private sector to invest in the drive to net-zero emissions. If left to the private sector, such green investments are bound to favour those that are expected to yield a profit. The real challenge of financing a green transformation will be paying for green investment that generates environmental and social benefits not captured in market prices, and which offer little or no financial return to the private sector. This means that government incentives and direct government investment on a very large scale will be required to achieve the level of green investment necessary for a successful green transformation.[8]

7 See J. W. Mason in this publication for a different perspective on the macroeconomic implications of green investment (climate-related only) but which crucially does not distinguish between productive, non-productive, additional, and non-additional green investment.

8 See F. van Lerven in this publication for a useful discussion of green transition financing.

JOCHEN MARKARD

Beyond Carbon Pricing: Six Sustainability Transition Policy Principles for Net Zero

Introduction

The new net-zero emission targets are a game changer. They require a swift, economy-wide, and radical transformation of business and consumption practices, supported by a new suite of policies. Conventional climate policy approaches such as carbon pricing have remained very limited in their effects and political feasibility, and they are insufficient to support the fundamental changes needed.[1] Research suggests that this relates to a mismatch between the nature of the climate problem and proposed solutions.[2]

Conventional climate policy approaches are often based on neoclassical economic theorising. Climate change is regarded as a market failure related to a negative externality in the form of greenhouse gas (GHG) emissions. In this view, the core thrust of climate policy is about fixing markets, through adjustments in relative prices.[3]

1 J. F. Green (2021), «Does Carbon Pricing Reduce Emissions? A Review of Ex-post Analyses», *Environmental Research Letters*, https://iopscience.iop.org/article/10.1088/1748-9326/abdae9/meta; J. Lilliestam, A. Patt, and G. Bersalli (2021), «The Effect of Carbon Pricing on Technological Change for Full Energy Decarbonization: A Review of Empirical Ex-Post Evidence», *Wiley Interdisciplinary Reviews: Climate Change* 12: e681; E. Tvinnereim and M. Mehling (2018), «Carbon Pricing and Deep Decarbonisation», *Energy Policy* 121: 185–189.

2 K. Levin, B. Cashore, S. Bernstein, and G. Auld (2012), «Overcoming the Tragedy of Super Wicked Problems: Constraining Our Future Selves to Ameliorate Global Climate Change», Policy Sciences 45: 123–152; D. Rosenbloom, J. Markard, F. W. Geels, and L. Fuenfschilling (2020), «Why Carbon Pricing Is Not Sufficient to Mitigate Climate Change — and How ‹Sustainability Transition Policy› Can Help», *Proceedings of the National Academy of Sciences* 117: 8664–8668.

3 A. Baranzini, J. van den Bergh, S. Carattini, R. B. Howarth, E. Padilla, and J. Roca (2017), «Carbon Pricing in Climate Policy: Seven Reasons, Complementary Instruments, and Political Economy Considerations», *Wiley Interdisciplinary Reviews: Climate Change* 8, e462; J. E. Stiglitz, N. Stern, M. Duan, O. Edenhofer, G. Giraud, G. M. Heal, M. Pangestu (2017), Report of the High-level Commission on Carbon Prices. Washington, DC: World Bank.

This framing, however, misses the core of the problem: Current energy systems and economic sectors have coevolved over decades with fossil fuel use and high levels of (energy) consumption. To tackle climate change, we must fundamentally transform established sectors and systems, not just market prices. Public policies are crucial for this transformation. This paper builds on sustainability transition perspectives that are receiving increasing international attention in policy practice.[4] It presents six principles to inform net-zero transition policies[5]: i) Target system transformation and radical innovation, ii) prioritise effectiveness over efficiency, iii) tailor policies to specific sectors and places, iv) align policies with transition phases, v) adapt policies as a reaction to unintended developments, and vi) build strong coalitions to support the transformation.

Sustainability challenges such as climate change, loss of biodiversity, or depletion of natural resources are wicked problems in the sense that they are very difficult to address.[6] They are complex and systemic, wide in scope, and highly political. There is also a high degree of uncertainty, for example with regard to unwanted consequences of potential solutions.[7]

To effectively address climate change, we need a swift and rapid reduction of all GHG emissions in all sectors to net-zero levels, at the latest by mid-century. This process of «deep decarbonisation»[8] will include sectors such as energy, road transport, and buildings, for which low-carbon electricity is an option, but also «difficult-to-decarbonise» industries around chemicals, steel, cement, aviation, shipping, and agri-food, for which other solution strategies need to be developed.[9]

4 European Environment Agency (2019), *Sustainability Transitions: Policy and Practice*, Copenhagen: EEA; F. W. Geels, B. K. Sovacool, T. Schwanen, and S. Sorrell (2017), «Sociotechnical Transitions for Deep Decarbonization», *Science* 357: 1242–1244; D. G. Victor, F. W. Geels, and S. Sharpe (2019), *Accelerating the Low-carbon Transition: The Case for Stronger, More Targeted and Coordinated International Action*, Washington, DC: Brookings.

5 J. Köhler, F. W. Geels, F. Kern, J. Markard, A. Wieczorek, F. Alkemade, …P. Wells (2019), «An Agenda for Sustainability Transitions Research: State of the Art and Future Directions», *Environmental Innovation and Societal Transitions* 31: 1–32; Rosenbloom et al. (2020), «Why Carbon Pricing» (see note 2).

6 F. Ferraro, D. Etzion, and J. Gehman (2015), «Tackling Grand Challenges Pragmatically: Robust Action Revisited», *Organization Studies* 36: 363–390; Levin et al. (2012), «Overcoming the Tragedy» (see note 2).

7 J. van den Bergh, C. Folke, S. Polasky, M. Scheffer, and W. Steffen (2015), «What If Solar Energy Becomes Really Cheap? A Thought Experiment on Environmental Problem Shifting», *Current Opinion in Environmental Sustainability* 14: 170–179; B. K. Sovacool, S. H. Ali, M. Bazilian, B. Radley, B. Nemery, J. Okatz, and D. Mulvaney (2020), «Sustainable Minerals and Metals for a Low-carbon Future», *Science* 367: 30–33.

8 Geels et al. (2017), «Sociotechnical Transitions» (see note 5).

9 C. Cunliff (2019), «An Innovation Agenda for Hard-to-Decarbonize Energy Sectors», *Issues in Science and Technology* 16; S. J. Davis, N. S. Lewis, M. Shaner, S. Aggarwal, D. Arent, I. L. Azevedo …K. Caldeira (2018), «Net-zero Emissions Energy Systems», *Science* 360: 1419; International Energy Agency (2021), *Net Zero by 2050: A Roadmap for the Global Energy Sector*, Paris: IEA, 224.

Table 1 looks into problem characteristics, solution characteristics, and governance issues around climate change and what implications they have for research and policy. Climate change is a highly complex problem whose dynamics and interactions (e.g. between natural and socio-economic systems) are still not fully understood. In technical, social, and economic terms, we are confronted with massive lock-ins around fossil fuel infrastructures and energy-intensive practices.[10] Time is running out: At the global scale, we only have a very limited carbon emission budget left, and that of the United States was already exhausted in 2021.[11]

To adequately address these characteristics, we must develop new theoretical frameworks. One approach is the sustainability transition perspective (Section 3). It suggests conceptualising deep decarbonisation as a large-scale transformation that involves multiple transitions in multiple sectors.[12] The problem characteristics also have policy implications (Section 4): For example, policies should be tailored to the particularities of different sectors and places. To break up lock-ins, dedicated decline policies such as bans or phase-outs can be implemented. Given the urgency, it is important to first target big emission reductions such as coal-fired power generation.[13]

For decarbonisation, there is a broad array of technical and non-technical solution strategies (e.g. around hydrogen or radical changes in lifestyles) with a high level of uncertainty regarding future performance. It is often not possible to predict their development and impact due to multi-causality, interdependence, time lags, or incomplete knowledge. For example, biofuels were once hailed as a great option, but later, several unwanted effects (e.g. monocultures, competition with food, additional carbon emissions from soil) became visible.[14]

This has several implications. For research, it is important to study how different solutions influence each other and to also include a broader range of sustainability issues (e.g. land or resource use, justice) in our assessments.[15] For policy, it is vital to support a variety of innovations, especially radical ones, and to build flexible systems to avoid new lock-ins.

10 G. C. Unruh (2000), «Understanding Carbon Lock-in», *Energy Policy* 28: 817–830; G. C. Unruh (2002), «Escaping Carbon Lock-in», *Energy Policy* 30: 317–325.

11 IPCC (2021), «Summary for Policymakers», in *Climate Change 2021: The Physical Science Basis Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. V. Masson-Delmotte, P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, …B. Zhou (Cambridge: Cambridge University Press).

12 J. Markard and D. Rosenbloom (forthcoming), «Phases of the Net-zero Energy Transition and Strategies to Achieve It», in *Handbook of Energy Transitions*, ed. K. Araujo (New York, NY: Routledge).

13 V. Vinichenko, A. Cherp, and J. Jewell (2021), «Historical Precedents and Feasibility of Rapid Coal and Gas Decline Required for the 1.5°C Target», *One Earth* 4: 1477–1490.

14 J. Markard, S. Wirth, and B. Truffer (2016), «Institutional Dynamics and Technology Legitimacy: A Framework and a Case Study on Biogas Technology», *Research Policy* 45: 330–344.

15 Van den Bergh et al. (2015), «What If Solar Energy» (see note 7).

Table 1: Particularities of climate change and decarbonisation and implications for theory and policy

	Climate change and deep decarbonisation	Theory	Policy
		Problem characteristics	
General	Complex, incomplete understanding (e.g. tipping points), interdependent systems, moving targets	Develop new scientific approaches; work across disciplines	Flexible and adaptive policies (with reliable long-term targets)
Scope	Economy-wide (multi-sectoral); global (multiple jurisdictions); supply and demand	Conceptualise decarbonisation as a multi-system, multi-transition phenomenon	Context-sensitive approaches, policy coordination across sectors and places (e.g. countries)
Lock-in	Long-lasting assets and infrastructures (e.g. gas/oil pipelines), energy-intensive practices and lifestyles	Integrate lifetime and capital intensity of assets	Decline policies to destabilise existing systems (e.g. phase-out, carbon pricing)
Urgency	Time is running out		Target big chunks first, prioritise effectiveness over efficiency
		Solution characteristics	
General	Broad array of potential solutions; solutions may be partial and temporary	Study technical and non-technical innovations; interaction of multiple innovations	Support radical innovation and stimulate diffusion
Uncertainty	Unwanted «side-effects», unclear performance and progress (e.g. negative emission technologies), changing societal values	Widen focus to other sustainability dimensions (e.g. resources, justice)	Adaptive policy-making, build flexible systems to avoid dead-end pathways and new lock-ins (e.g. bio-fuels, natural gas)
		Governance	
Agency	No central authority, broad range of distributed actors		Start with pioneers and first movers
Politics	Conflicting interests, problem views, and solution preferences	Integration of policy process theories	Participation; policy sequencing; coalition-building

Source: own compilation.

In terms of governance, there is no central authority. At the same time, in each sector and country, a broad range of actors are involved in climate-relevant decision-making, including public and private, individual and collective. These actors may have diverging interests and conflicting views on problems, priorities, and potential solutions.

To improve our theorising of politics, one approach is to work with policy process theories.[16] For policy-making, it is important to garner broad support for the transformation.[17] A specific strategy can be to start with pioneers and, over time, forge coalitions of «winning actors».[18] A complementary approach is participatory decision-making.

A brief guide to sustainability transitions

The field of sustainability transition studies offers novel perspectives to address grand sustainability challenges.[19] It argues that fundamental changes in existing systems, so-called *transitions*, are needed, and it provides lessons for initiating and accelerating such transformation processes.[20]

Socio-technical systems are the primary unit that changes during a transition.[21] Mature socio-technical systems are highly resistant to radical change because their elements have coevolved over time, and eventually they become locked-in.[22] In energy, we have seen how difficult it is to break up the lock-in around fossil fuels.[23] Nonetheless, socio-technical systems can and do change. The ongoing low-carbon energy transitions in electricity supply and in road transport are prominent examples.[24]

Transitions entail two key processes, which both require policy support: the emergence and diffusion of innovations and the destabilisation and decline of existing

16 F. Kern and K. S. Rogge (2018), «Harnessing Theories of the Policy Process for Analysing the Politics of Sustainability Transitions: A Critical Survey», *Environmental Innovation and Societal Transitions* 27: 102–117; J. Markard, M. Suter, and K. Ingold (2016), «Socio-Technical Transitions and Policy Change – Advocacy Coalitions in Swiss Energy Policy», *Environmental Innovation and Societal Transitions* 18: 215–237.

17 See A. Coote as well as D. Driscoll and M. Blyth in this publication.

18 J. Meckling, N. Kelsey, E. Biber, and J. Zysman (2015), «Winning Coalitions for Climate Policy», *Science* 349: 1170–1171; M. Pahle, D. Burtraw, C. Flachsland, N. Kelsey, E. Biber, J. Meckling, …J. Zysman (2018), «Sequencing to Ratchet Up Climate Policy Stringency», *Nature Climate Change* 8: 861–867.

19 Köhler et al. (2019), «An Agenda for Sustainability» (see note 5).

20 J. Markard, F. W. Geels, and R. P. J. M. Raven (2020), «Challenges in the Acceleration of Sustainability Transitions», *Environmental Research Letters* 15: 081001.

21 A. Rip and R. Kemp (1998), «Technological Change», in *Human Choice and Climate Change – Resources and Technology*, ed. S. Rayner and E. L. Malone (Columbus, OH: Battelle Press), 327–399.

22 F. Berkhout (2002), «Technological Regimes, Path Dependency and the Environment», *Global Environmental Change* 12: 1–4; Unruh (2000), «Understanding Carbon» (see note 10).

23 G. Trencher, A. Rinscheid, M. Duygan, N. Truong, and J. Asuka (2020), «Revisiting Carbon Lock-in in Energy Systems: Explaining the Perpetuation of Coal Power in Japan», *Energy Research & Social Science* 69: 101770; G. C. Unruh and J. Carrillo-Hermosilla (2006), «Globalizing Carbon Lock-in», *Energy Policy* 34: 1185–1197.

24 J. Markard (2018), «The Next Phase of the Energy Transition and Its Implications for Research and Policy», *Nature Energy* 3: 628–633.

system structures.[25] Innovations include new technologies but also non-technical novelties (e.g. changes in policies, business models, practices, or lifestyles). Decline can include established technologies such as internal combustion vehicles but also prevailing practices such as commuting to work by car.

Policies often play a key role in initiating, guiding, and accelerating transitions.[26] They are used to formulate long-term sustainability goals, they can target (radical) innovation, they can change price signals, or they can phase-out specific practices.[27]

Box 1: Key concepts in the field of transition studies

Socio-technical system: Assemblage of actors (e.g. firms, associations, non-governmental organisations, policy-makers), institutions (e.g. policies, societal norms), technologies and infrastructures that, together, provide societal services such as energy or water supply, transport, or food provision.

Transition: Major transformation of a socio-technical system. Transitions occur if an established socio-technical system faces substantial pressure (e.g. due to climate change or oil price shocks) and if, at the same time, alternative system configurations (e.g. wind and solar, together with the firms, institutions, and regulations that support them) have matured sufficiently.

Lock-in: Complex interplay of material and non-material structures (technologies, infrastructures, established business models, consumption practices) that hinders major transformation.

Transition policy: New approach of long-term and transformation-oriented policy-making involving a wide range of instruments, targeting both innovation and decline.

25 J. Markard and D. Rosenbloom (2020), «A Tale of Two Crises: Covid-19 and Climate», *Sustainability: Science, Practice and Policy* 16: 53–60.

26 J.-P. Voß, D. Bauknecht, and R. Kemp (2006), *Reflexive Governance for Sustainable Development* (Cheltenham: Edward Elgar); P. Kivimaa and F. Kern (2016), «Creative Destruction or Mere Niche Support? Innovation Policy Mixes for Sustainability Transitions», *Research Policy* 45: 205–17.

27 R. Kemp, J. Schot, and R. Hoogma (1998), «Regime Shifts to Sustainability through Processes of Niche Formation: The Approach of Strategic Niche Management», T*echnology Analysis and Strategic Management* 10: 175–195; D. Rosenbloom and A. Rinscheid (2020), «Deliberate Decline: An Emerging Frontier for the Study and Practice of Decarbonization», *Wiley Interdisciplinary Reviews: Climate Change* 11: e669; J. Schot and W. E. Steinmueller (2018), «Three Frames for Innovation Policy: R&D, Systems of Innovation and Transformative Change», *Research Policy* 47: 1554–1567.

Transitions unfold in a non-linear way over different phases.[28] This is often depicted in the form of an S-curve. At an early stage, progress is slow and confined to small market niches. Later, one or more innovations start to diffuse. Over time, changes accumulate, resulting in a major transformation of the socio-technical system.[29] Towards the end, dynamics slow down again as a new system forms and stabilises.[30] As a transition unfolds, new lock-ins can occur, resulting in «dead-end pathways»: investments into short-term improvements (e.g. switching from coal to natural gas) with limited potential for deep decarbonisation.[31] Especially investments into long-lasting infrastructures such as gas pipelines have to be carefully monitored in this regard (see below).

The transition to net zero includes multiple transitions unfolding in parallel in different sectors such as electricity, transport, buildings, and industry (Figure 1). Like individual transitions, the overarching transition to net zero is characterised by different phases. After a first phase, in which low-carbon innovations such as renewable power-generation technologies emerged, we currently observe an acceleration of the transition in the electricity sector (second phase).[32] We also see that low-carbon electricity has become a key element for decarbonising other sectors such as transport and buildings, which means that the overall transition expands in scope.[33] This new phase of development marks a shift from the transition of a single socio-technical system to one that involves multiple sectors (third phase). In future years, the scope has to widen even further to also include a broader range of solution strategies for decarbonisation (fourth phase).[34]

28 J. Rotmans, R. Kemp, and M. van Asselt (2001), «More Evolution Than Revolution: Transition Management in Public Policy», *Foresight* 3: 15–31.

29 A. Mcmeekin, F. W. Geels, and M. Hodson (2019), «Mapping the Winds of Whole System Reconfiguration: Analysing Low-Carbon Transformations Across Production, Distribution and Consumption in the UK Electricity System (1990–2016)», *Research Policy* 48: 1216–1231.

30 F. W. Geels (2002), «Technological Transitions As Evolutionary Reconfiguration Processes: A Multi-Level Perspective and a Case Study», *Research Policy* 31: 1257–1274.

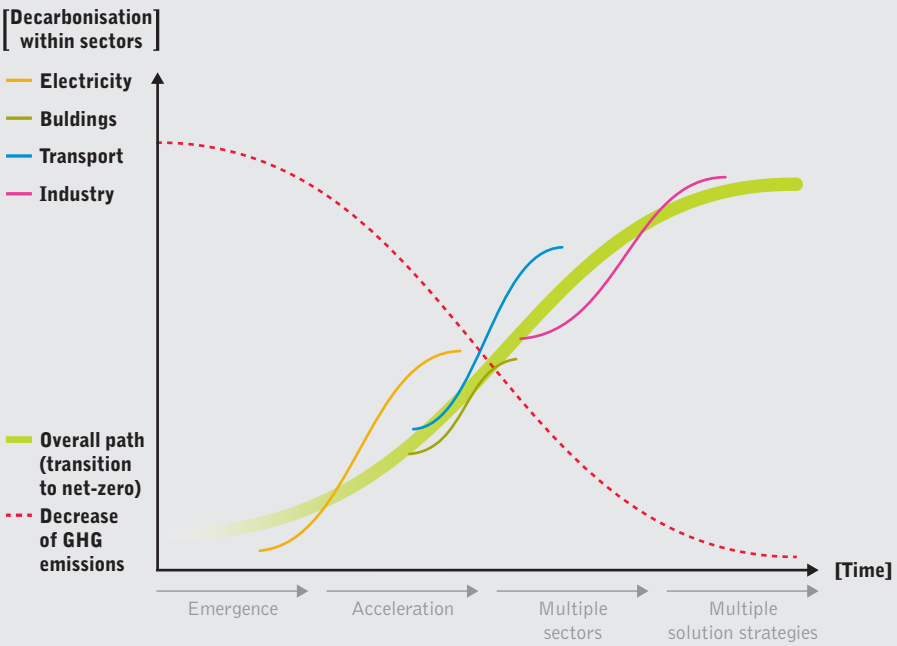
31 D. Rosenbloom (2020), *Breaking Carbon Lock-In through Innovation and Decline*, Washington, DC: World Resources Institute.

32 Markard (2018), «The Next Phase» (see note 24).

33 Markard et al. (2020), «Challenges in the Acceleration» (see note 20).

34 Markard and Rosenbloom (forthcoming), «Phases of the Net-zero Energy Transition» (see note 12).

Fig. 1: Multiple transitions in different sectors accumulate in the pursuit of net-zero targets
Accumulative decarbonisation of different sectors within time



Source: own chart.

Key principles for net-zero transition policies

Below we offer six key principles to guide policy-making for deep decarbonisation.[35] They reflect the policy implications in the last column of Table 1.

System transformation

To embark on a net-zero emission pathway, incremental changes will not suffice. Instead, radical innovations and fundamental transformations of established socio-technical systems are necessary. This includes, for example, changes in urban planning to reduce the demand for transport, creating multimodal and widely accessible mobility systems instead of just pushing electric vehicles, or new bio-based building materials to complement low-carbon steel and cement.

To achieve such fundamental system transformations, it is vital to support both (radical) innovation and decline.[36] First, policy-makers need to develop

35 Rosenbloom et al. (2020), «Why Carbon Pricing Is Not Sufficient» (see note 2).
36 Markard and Rosenbloom (2020), «A Tale of Two Crises» (see note 25).

transformative, mission-oriented innovation policies.[37] These policies support the development of key innovations (e.g. hydrogen airplanes or ammonia for shipping) as well as market formation, competence-building, standard development, and infrastructure investments, that is, the many complementary elements required to build alternative systems. Second, policy makers need to implement decline policies targeting incumbent system structures. They have to break up lock-ins (e.g. by signalling that specific business models will not be viable in the future) and accelerate the phase-out of carbon-intensive technologies, businesses, and practices. Examples of decline policies include removing fossil fuel subsidies, technology bans (e.g. fossil fuel heating), phase-out policies (e.g. coal), divestment campaigns, and carbon pricing.[38] The European Green Deal is an example of a package of transformative, mission-oriented policies. It includes measures that support low-carbon innovations such as hydrogen-based fuels as well as decline policies such as the phase-out of coal.

Effectiveness

A key challenge of climate change is that there is only a limited GHG budget left to stabilise global warming at or around 1.5°C.[39] Decarbonisation policies should therefore prioritise effectiveness, that is, focus on measures that rapidly reduce large amounts of emissions (e.g. coal phase-out, renewable energy deployment). This also implies that we move beyond lowest-cost solutions: Effectiveness should be favoured over efficiency. As interest rates are at historically low levels (e.g. due to Covid-19 recovery programmes), there is a window of opportunity for large-scale investments into low-carbon technologies and infrastructures.[40]

Sensitivity to context

Policy mixes for deep decarbonisation have to be tailored to the broad variety of context conditions. Due to the scope of climate change, policies need to cover all parts of the economy and the globe, eventually.

However, there are vast differences, both across sectors and places (or jurisdictions). Countries and regions vary substantially in terms of political systems, institutional stability, administrative capabilities, societal values, practices around food, farming and housing, and mobility patterns. Also, difficult-to-decarbonise sectors such as aviation, shipping, agri-food, and heavy industry require specific solutions.[41] These do not just include low-carbon production technologies but also major demand-side changes (flying less), a substitution of products (plant-based proteins,

37 M. P. Hekkert, M. J. Janssen, J. H. Wesseling, and S. O. Negro (2020), «Mission-oriented Innovation Systems», *Environmental Innovation and Societal Transitions* 34: 76–79; M. Mazzucato (2021), «Financing the Green New Deal», *Nature Sustainability* 5: 93–94; Schot and Steinmueller (2018), «Three Frames» (see note 27).

38 Rosenbloom and Rinscheid (2020), «Deliberate Decline» (see note 27).

39 IPCC (2021), «Summary for Policymakers» (see note 11).

40 D. Rosenbloom and J. Markard (2020), «A Covid-19 Recovery for Climate», *Science* 368: 477.

41 Davis et al. (2018), «Net-zero Emissions» (see note 9).

bio-based construction), and new business practices (reuse and repair rather than planned obsolescence).[42]

Net-zero policies have to take these context specificities into account. «One-size-fits-all» approaches are not likely to be politically feasible or effective. For example, carbon pricing has been met with fierce resistance in France and in Ontario, it does not seem to be politically feasible in the United States, and it has taken decades to become a relevant element in EU climate policy.

Adapting policies to transition phases

The progress and also the pace of the transition to net zero are likely to differ for each place and sector. Policies have to be adapted accordingly. Policy-making becomes more challenging over time as the complexity of the transition increases, for example due to the expansion in scope.

Transformative innovation policies are a key element in the transition policy mix for all phases.[43] In early stages, they are the primary focus of policy-making. From the acceleration phase onwards, they have to be complemented with policies targeting decline (see above)[44]. In the third phase, cross-sectoral policy coordination comes on top of the existing policy challenges. For example, it is important to avoid bottlenecks in the expansion of renewable power generation, which will be needed in many different sectors. In the fourth phase, finally, policies have to support the development of entirely new decarbonisation strategies, for example massive reductions in demand through changes in behaviour and lifestyles, or radically new technologies around hydrogen.

Policy evaluation and learning

A fifth element in transition policy approaches is about learning and reflexivity. Policy outcomes have to be monitored closely to avoid unwanted effects such as environmental problem-shifting or new lock-ins into dead-end pathways. Problem-shifting occurs when solutions create new problems or aggravate already existing sustainability issues, either in different places or sectors.[45] Examples include land use for biofuels (and competition with food production) and the increasing use of minerals for batteries.[46] Against this background, policies have to be evaluated regularly, and the scope of policy evaluation has to be broader than usual.[47]

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42 C. G. F. Bataille (2020), «Physical and Policy Pathways to Net-Zero Emissions Industry», *Wiley Interdisciplinary Reviews: Climate Change* 11: e633.

43 Schot and Steinmueller (2018), «Three Frames» (see note 27).

44 J. Markard, A. Rinscheid, and L.Widdel (2021), «Analyzing Transitions through the Lens of Discourse Networks: Coal Phase-out in Germany», *Environmental Innovation and Societal Transitions* 40: 315–31.

45 Van den Bergh et al. (2015), «What If Solar Energy» (see note 7).

46 Sovacool et al. (2020), «Sustainable Minerals» (see note 7).

47 S. Hampton, T. Fawcett, J. Rosenow, C. Michaelis, and R. Mayne (2021), «Evaluation in an Emergency: Assessing Transformative Energy Policy amidst the Climate Crisis», *Joule* 5: 285–289.

Politics

Transitions create winners (e.g. firms that develop low-carbon technologies) and losers (e.g. people in coal-mining regions). As a consequence, transitions are highly contested, and transition policies have to deal proactively with politics. Actors will struggle over policies, technologies, ideas, and values.[48] Effective transition policies cannot be enacted without the support of key stakeholders. Therefore, it is essential for policy-making to build strong coalitions of actors (innovators, advocacy groups, new businesses, re-orienting incumbents) who will support the transition as it advances.[49] As a consequence of the already ongoing transition towards low-carbon electricity and also as a result of the Covid-19 pandemic, many incumbent actors that typically have strong influence on policy-making are weakened.[50] This represents a unique window of opportunity to strengthen the constellation of actors supportive of the net-zero energy transition and to help incumbent firms in their re-orientation towards low-carbon business models.

Conclusion

Sustainability transition perspectives are receiving increasing attention in policy and practice.[51] This paper discussed how they can be used to address the net-zero energy transition, which is an extraordinary challenge given its complexity and urgency. It highlighted six key principles to guide «transitions based» decarbonisation policies. For credible policy responses, it is also important to balance changes on the supply side (e.g. net-zero electricity generation) and on the demand side (e.g. lifestyle changes). The latter will be more difficult to address, but it is essential for deep decarbonisation.

48 J. Meadowcroft (2011), «Engaging with the Politics of Sustainability Transitions», *Environmental Innovation and Societal Transitions* 1: 70–75; Meckling et al. (2015), «Winning Coalitions» (see note 18); C. Roberts, F. W. Geels, M. Lockwood, P. Newell, H. Schmitz, B. Turnheim, and A. Jordan (2018), «The Politics of Accelerating Low-Carbon Transitions: Towards a New Research Agenda», *Energy Research and Social Science* 44: 304–311.

49 Meckling et al. (2015), «Winning Coalitions» (see note 18).

50 Markard and Rosenbloom (2020), «A Tale of Two Crises» (see note 25).

51 European Environment Agency (2019), *Sustainability Transitions* (see note 4); Victor et al. (2019), *Accelerating the Low-carbon Transition* (see note 4).

ANTONIO ANDREONI

Industrial Policy Reloaded

Shaping industrial ecosystems towards sustainable prosperity

Climate change is the most pressing grand challenge of the 21st century – perhaps the greatest, truly global challenge humankind has ever faced. In international fora, such as the latest United Nations Climate Change Conference (COP26), it has been often emphasised that «we are all in this together». In reality, climate change impacts countries, social groups, industries, and places in very different and asymmetric ways. Climate change risks will increase inequalities *within* countries – where workers are expected to pay the highest cost for the green transition and industrial restructuring; and *between* countries – with developing countries already bearing the costs of a climate change crisis not of their making, in a context of limited financial and technological support and looming debt spirals.[1] Shifting away from an unsustainable economic model centred around fossil fuels is key to overcome climate change and mitigate its disproportional impact on societies and countries.

In its most recent roadmap towards «Net Zero by 2050», the International Energy Agency (IEA) highlighted the need for a dramatic acceleration in clean energy investments, rapid deployment and diffusion of available technologies, and implementation of climate policies across more than 400 sectoral and technology milestones.[2] The IEA also denounced how countries' commitments have often felt short in implementation. Specifically, the rate of energy-efficiency improvements must increase three times more than the average rate achieved over the last two decades. A 4 % per year average increase to 2030 is necessary for economic growth to be decoupled from energy consumption. On the technological end, this requires a five-fold increase in energy capacity from solar and wind technologies, as well as the exploitation of numerous opportunities arising from advanced battery technologies, hydrogen electrolysers, and direct air capture and storage. Supporting this energy transition calls for an estimated $90 billion of public investments to be mobilised globally, new measures redirecting finance away from new coal plants, and crowding-in further clean energy investments on the order of more than $4 trillion.

1 U. Volz, S. Akhtar, K. P. Gallagher, S. Griffith-Jones, J. Haas, and M. Kraemer (2021), *Debt Relief for a Green and Inclusive Recovery: Securing Private-sector Participation and Creating Policy Space for Sustainable Development*, Berlin, London, and Boston, MA: Heinrich-Böll-Stiftung; SOAS, University of London; and Boston University.

2 IEA (2021), *Net Zero by 2050: A Roadmap for the Global Energy Sector*, www.iea.org/events/net-zero-by-2050-a-roadmap-for-the-global-energy-system.

Against this global scenario, countries face both the challenge of mobilising large technical *and* financial resources and the challenge of directing them towards sustainable structural transformation. In this paper, we start from questioning the extent to which standard market-fixing and macroeconomic expansionary measures will be able to direct and shape new industrial ecosystems in economies across the Atlantic. Second, we advance a strategic industrial policy approach for deep industrial restructuring. This is followed by a discussion on specific industrial policy instruments – including public finance, procurement, and various types of technology services – and how conditionalities and policy alignments are central to balancing risks and rewards in the process of green transition. We conclude with some reflections on the need to rebuild state capacity for the successful implementation of this strategic industrial policy approach.

The challenge of deep industrial restructuring: Why we need to go beyond market-fixing and macroeconomic policy

The IEA's Net Zero Agenda has stressed just how significant the magnitude of financial resources and investments required to address the climate change crisis is. However, the largest and most advanced economies astride the Atlantic – the United States (US) and the European Union (EU) – are not short on financial resources. Instead, they are facing a more fundamental political economy challenge, namely the restructuring of their industrial sectors – especially the most energy-intensive – towards new models of sustainable prosperity, including new patterns of sustainable production and consumption. If we focus on the supply side, this means opening feasible pathways for incumbents – firms and workers – towards new production, technological, and organisational models. These pathways need to favour and direct new «green entrants» while at the same time manage the exit of «brown firms» from specific industries or technology paradigms. In most cases, turning the existing «brown firms» into «green firms» will call for «deep» industrial ecosystem restructuring. It is deep as it entails coordinated changes within firms and across value chains.

Addressing the political economy challenge of deep industrial restructuring cannot be achieved with «horizontal» measures, that is, policies relying mainly on market-pricing coordination. It needs a «strategic» policy approach that, first, goes beyond a market failure-fixing framework and, second, that is not limited to expansionary macroeconomic measures, which are often not sufficiently selective in driving and coordinating deep industrial restructuring. Let us turn to these two policy approaches – often underpinning the EU and US New Green Deals – and see why they might not be enough.

Carbon pricing is a good example of market-fixing policies.[3] Although these measures might have some role to play,[4] there has been an increasing recognition of

3 D. Rosenbloom, J. Markard, F. W. Geels, and L. Fuenfschilling (2020), «Why Carbon Pricing Is Not Sufficient to Mitigate Climate Change — and How ‹Sustainability Transition Policy› Can Help», *Proceedings of the National Academy of Sciences* 117(16): 8664–8668.

4 D. Rodrik (2014), «Green Industrial Policy», *Oxford Review of Economic Policy* 30(3): 469–491.

the fact that markets have failed to internalise environmental costs at the scale and speed required. Markets alone have also proven incapable of promoting the development and widespread diffusion of green technologies and steer economies towards a much-needed energy and industrial transition. The reason is that the market performs poorly in allocating and committing resources under conditions of uncertainty, especially when productive and technology assets are highly specialised, and when specific markets do not exist yet.[5]

Similarly, expansionary macroeconomic measures can play an important role, but they are likely to be insufficient. They can be used to create demand for green products and jobs, as well as for overheating the overall economy and, in doing so, stimulating private-sector investments in new technologies and industries. However, expansionary macroeconomic policy – the favoured approach of Democrats in the US – also tends to over-rely on markets and uncoordinated demand expansion, while underestimating the level of industrial coordination and deep restructuring that is needed. Moreover, even if expanded demand can be sufficiently channelled in the direction needed for a green transition, macroeconomic measures tend to assume that productive, technological, and organisational capabilities will adjust and develop accordingly. This is a very problematic assumption, given the de-industrialisation and industrial concentration experienced in many states and regions in the US and EU, hence the lack of productive, technological, and organisational capabilities.

In sum, market-fixing measures, such as carbon pricing and macroeconomic measures of the type promoted in the EU and US Green New Deals, can play a role, but they will not be sufficient. Although stemming from different economic paradigms, these two policy approaches share too much faith in the market as an incentive and coordinating mechanism for deep industrial restructuring. They are also not sufficiently strategic, and they often overlook differences across productive sectors, technologies, and places. In what follows, we advance a more strategic policy approach for deep industrial restructuring.

Towards industrial policies for deep ecosystems restructuring

The strategic industrial policy approach to the climate change crisis that we advance here starts with the recognition of three sets of political economy challenges. These are about (1) understanding, leveraging, and managing differences across sectors and places, (2) accelerating the speed of energy transition and industrial restructuring, and (3) directing innovation and its diffusion towards sustainable prosperity.

Understanding, leveraging, and managing differences across sectors and places

The first political economy challenge is about understanding, leveraging, and managing differences across sectors and places, hence their different needs, capabilities, as well as opportunities for deep industrial restructuring. Understanding these

5 H.-J. Chang and A. Andreoni (2020), «Industrial Policy for the 21st Century», *Development and Change* 51(2): 324–351.

differences is a first key step towards *targeting and coordinating policies for the restructuring* of highly heterogeneous and place-specific industrial sectors of the economy. Globally, the energy sector generates around three-quarters of greenhouse gas emissions,[6] and it is therefore central to this industrial restructuring. However, decarbonisation cannot be limited to the energy sector. All industrial sectors – from agro-food and garments to chemicals and steel, aerospace, and automotive industries – contribute to climate change differently in direct, but also indirect and mediated ways. Therefore, each industrial sector requires different restructuring approaches and targeted strategies.

Each industry (and firms within them) are also part of complex industrial ecosystems involving interdependent production, consumption, and technological activities spanning along and across regional and global value chains. Although decisions about these activities and their impact on climate change are interdependent, achieving coordinated decisions across actors and places towards a more sustainable economy model is difficult, given the dispersed and disaligned interests, power, and ownership. In the US, for example, the fossil fuel industry in West Virginia, represented by Senator Joe Manchin, has been a major obstacle to the Biden climate programme.[7] Similarly, sectoral incumbents and interests remain disaligned across European nations,[8] where industrial capacity has increasingly concentrated around the manufacturing core of Germany, and the development of the energy sector (and energy security policy) has followed different pathways, from nuclear to gas and renewables.

Across developing and middle-income countries, needs, capabilities, as well as opportunities for deep industrial restructuring are also highly heterogeneous. These countries, however, share a fundamental problem, that is, the lack of domestically owned productive, technological, and organisational capabilities, including the lack of state capacity in implementing and enforcing green industrial policy.[9] Although these countries need financial resources for both climate change mitigation and adaptation, without developing their own productive and state capabilities, they will remain dependent on advanced countries. Indeed, under these circumstances, green finance and debt relief from advanced countries will *flow into* developing countries and immediately *flow back* to advanced countries to get access to green technologies.

6 IEA (2021), *Net Zero* (see note 2).

7 A. Tooze (2021), «Chartbook #46: West Virginia – the Historic Roadblock to US Climate Policy», https://adamtooze.substack.com/p/chartbook-46-west-virginia-the-historic.

8 See C. Gräbner and J. Hafele in this publication.

9 For some examples across middle-income and developing countries, see A. Andreoni, K. Creamer, M. Mazzucato, and G. Steyn (2022), «How Can South Africa Advance a New Energy Paradigm? A Mission-oriented Approach to Megaprojects», *Oxford Review of Economic Policy*, forthcoming; A. Andreoni, L. Tasciotti, and E. Tayari (2022), *Feasible Pathways for Energy Transition in Tanzania: Shifting Unproductive Subsidies towards Targeted Green Rents* (ACE Working paper No. 39/2021), London: SOAS, University of London.

Accelerating the speed of energy transition and industrial restructuring

In the last two centuries, major energy transitions – for example the shift from wood to coal, or coal to oil – unfolded over several decades and were delayed by technology lock-ins and resistance to change. However, evidence at varying scales and sectors suggests opportunities for a relatively faster transition.[10] Sovacool provides compelling evidence of energy transitions from the adoption of cookstoves, air conditioners, and flex-fuel vehicles that, in aggregate, affected almost one billion people and needed only one to sixteen years to unfold.[11] This points to the fact that targeted interventions at the sectoral and sub-sectoral levels can have better chances to accelerate energy transition, especially if these measures are not simply «encouraging entry» of new technology or actors, but if there are also policies «facilitating the exit» and restructuring of incumbents.[12] In fact, facilitating an exit via industrial restructuring is as important as promoting the diffusion of new technologies via subsidies such as feed-in tariffs schemes, which have been widely adopted by Germany and other EU countries.

Directing innovation and its diffusion towards sustainable prosperity

The third major challenge is to promote the widespread diffusion and continuous innovation of renewables and other low-carbon technologies and, in doing that, seize the related employment opportunities arising from a green transition. Since 2009, the dramatic decline in the cost of electricity from renewables – solar photovoltaics and wind, on-shore in particular – has offered a viable pathway for accelerating energy transition.[13] Non-renewable energy technologies rely on limited, geographically concentrated, and non-reproducible resources – that is, fossil fuels. On the contrary, renewable energy technologies are manufactured under a regime of increasing returns, whereby costs decline along steep learning curves and with increased installed capacity.[14] Continuous innovation is needed however because even manufactured technologies can hit non-reproducible resource boundaries – for example, batteries for electric mobility rely on lithium.[15] Continuous innovation

10 V. Vinichenko, A. Cherp, and J. Jewell (2021), «Historical Precedents and Feasibility of Rapid Coal and Gas Decline Required for the 1.5°C Target», *One Earth* 4(10): 1477–1490; J. Markard, F. W. Geels, and R. P. J. M. Raven (2020), «Challenges in the Acceleration of Sustainability Transitions», *Environmental Research Letters* 15(8): 081001; C. Roberts, F. W. Geels, M. Lockwood, P. Newell, H. Schmitz, B. Turnheim, and A. Jordan (2018), «The Politics of Accelerating Low-Carbon Transitions: Towards a New Research Agenda», *Energy Research and Social Science* 44: 304–311.

11 B. Sovacool (2016), «How Long Will It Take? Conceptualizing the Temporal Dynamics of Energy Transitions», *Energy Research & Social Science* 13: 202–215.

12 Chang and Andreoni (2020), «Industrial Policy» (see note 5).

13 IRENA (2021), *Renewable Power Generation Costs in 2020*, www.irena.org/publications/2021/Jun/Renewable-Power-Costs-in-2020.

14 J. A. Mathews and E. Reinert (2014), «Renewables, Manufacturing and Green Growth: Energy Strategies Based on Capturing Increasing Returns», *Futures* 61: 13–22.

15 See J. Barth and M. Jacobs in this publication; see also B. Sovacool, H. A. Saleem, M. Bazilian, B. Radley, B. Nemery, J. Okatz, and D. Mulvaney (2020), «Sustainable Minerals and Metals for a Low-carbon Future», *Science* 367(6473): 30–33.

in manufacturing processes and product technologies for energy generation can shift non-reproducibility boundaries and reduce reliance on non-reproducible resources. Furthermore, renewable technologies need innovation and investment in transmission and storage infrastructures to support an industrial economy.

Green technology innovation and diffusion, as well as complementary investments in enabling infrastructures, should not be seen from a supply-side perspective only. They are, in fact, major sources of new intermediate and final demand of green products and services, which can generate investments and job creation while opening pathways for incumbents to restructure their industries. Creating and exploiting these new sources of demand to generate broader support for energy transition is as important as promoting supply-side innovation and industrial restructuring.

Reloading industrial policies: Instruments, risks, and rewards

Historically, the state has played a key role in addressing structural transformation challenges through a variety of industrial policies.[16] The state at different levels of governance can play a key inter-temporal and spatial coordinating function beyond fixing markets.[17] The state can reshape industries, align incentives among institutions and organisations, build coalitions of interest, and provide technological and organisational innovation with directionality. This does not necessarily mean preselecting technological pathways to the exclusion of others or limiting private-sector initiatives. On the contrary, the state can steer the search for both sector-specific and cross-sectoral solutions; de-risk experimentation and innovation efforts; crowd-in private investments by committing infrastructural investments or by creating demand; promote competition among alternative solutions; and enable the absorption and diffusion of different technological innovations.

These goals can be achieved with different industrial policy instruments and packages – including public finance and public procurement – and also by setting standards and providing technology services along the entire innovation/production chain, from basic research to the full deployment and diffusion of new technologies. These are explained in some detail below.

Public finance: *Directing finance matters more than increasing the amount of finance available, as directionality is what makes finance transformative and capable to crowd-in resources.*

From an innovation directionality perspective, more finance is not always the solution. It is the specific type of finance (public vs private; conditional vs unconditional; concessional loans vs grants) and how it is directed towards addressing sustainability challenges and industrial restructuring that matter most. Public

16 A. Andreoni (2016), «Varieties of Industrial Policy: Models, Packages and Transformation Cycles», in *Efficiency, Finance and Varieties of Industrial Policy*, ed. A. Noman and J. Stiglitz (pp. 245–305). New York, NY: Columbia University Press; see also Chang and Andreoni (2020), «Industrial Policy» (see note 5).

17 See J. Markard in this publication.

financing is not simply important in terms of delivering a portfolio of viable innovative solutions and crowding-in private investors. It is also critical in addressing problems associated with effective scaling-up and the deployment and diffusion of new technologies, especially in those areas of the innovation chain where finance is more limited («valley of death» in EU policy). Green finance products and services must be designed while taking into account what is needed from a «production-innovation» perspective, and how green finance can be aligned with other industrial policy instruments, such as public procurement.

Public procurement: *Public procurement can be used to discover and experiment with functional solutions to challenges posed by the climate crisis.*

Demand-side measures – especially procurement policies – can play a central role in energy transition, especially given the important role that the public sector plays in energy infrastructure management. Public procurement can be used to create (or increase) the demand for products – goods and services – as well as emerging technologies. Public procurement can also be designed around problems and solutions – that is, *functional procurement* – something that is often contemplated but little used, for example in the EU.[18] Procurement and hybrid forms of finance that combine grants, concessional finance, and procurement contracts are already being used among US federal agencies (e.g. ARPA-E), including at the state level (e.g. NYSERDA).

Standards and technology services: *The adoption of new technologies needs system-level coordination and services to increase diffusion in the industrial ecosystem.*

The state can also set the standards and regulatory requirements (e.g. emissions, performance targets, energy intensity) under which new goods and technologies are both produced and deployed. Standards-setting is of central importance: It can be used to shape the emerging markets and industry, but also to provide coordination across innovation and technology investments, shifting competition away from areas where industry coordination delivers better payoffs. Technology services and access to infra-technologies (such as data, prototyping, and metrology systems) via institutions such as the Fraunhofer in Germany or the laboratories of the National Institute of Standards and Technologies also matter greatly in the scaling-up of a decentralised and more resilient energy system. Manufacturing extension services can also help small and medium-sized firms with the adoption of sustainable manufacturing processes and technologies along sectoral value chains.

Balancing risks and rewards via conditionalities and policy alignment

In the design of each of these industrial policy instruments, various types of conditionalities can be introduced to reflect risk-reward arrangements functional to

18 C. Edquist and J. M. Zabala-Iturriagagoitia (2020), «Functional Procurement for Innovation, Welfare, and the Environment», *Science and Public Policy* 47(5): 595–603.

sustainable prosperity. These conditionalities can operate ex ante by setting different types of requirements about the types of firms that can access incentives or by selecting the types of activities supported. They can also operate ex post by setting specific requirements concerning firms' future performances or corporate governance decisions (e.g. limiting stock buy-backs or dividend distribution). Attaching conditionalities to policies such as financing and procurement, but also company bailouts, investment-attraction schemes, business restructurings, etc., is no longer a taboo; international experiences from Austria and France during the Covid-19 pandemic are testaments of these public-private conditionalities. Conditionalities are a way to steer financial resources strategically and ensure that they are retained and reinvested within productive business organisations to improve their social, economic, and environmental outcomes.

Furthermore, the effectiveness of these industrial policy instruments is likely to increase if they are efficiently aligned.[19] For example, aligning industrial and competition policies to support sustainable transitions along sectoral value chains is becoming increasingly critical in governing global value chains and digital platforms.[20] A rapid green transition and deep industrial restructuring are better achieved using a diversity of approaches and business models to ensure an optimal degree of dynamic and healthy competition among firms. Concentration in certain markets and industrial value chains can limit the emergence of new, innovative entrants. It can also result in a situation in which powerful firms controlling regional, national, and global value chains shift the costs of industrial restructuring down the chain, where less-powerful firms are fiercely competing with one another. In Europe, for example, the proposed supply chain law in Germany will potentially turbo-charge accountability for social and environmental impacts. It is supported by major businesses as well as across the political spectrum in Germany. A similar measure may instead be adopted at the EU level, taking into full account how this law will impact EU-level value chains, competition at each stage of the chain, and how different firms will bear the costs of deep industrial restructuring, which is indeed about firms as well as market-competitive structures.

Rewiring the state for public purpose

The industrial policy approach envisioned here relies on a wide range of targeted instruments and coordinated interventions across sectors with a common mission,[21]

19 A. Andreoni and H. J. Chang (2019), «The Political Economy of Industrial Policy: Structural Interdependencies, Policy Alignment and Conflict Management», *Structural Change and Economic Dynamics* 48: 136–150.

20 A. Andreoni and S. Roberts (2020), *Governing Data and Digital Platforms: Regulations, Competition and Industrial Policies, with Sectoral Case Studies from South Africa* (Digital Pathways at Oxford Paper Series no. 5), https://pathwayscommission.bsg.ox.ac.uk/Governing-data-and-digital-platforms-in-middle-income-countries.

21 M. Mazzucato (2021), *Mission Economy: A Moonshot Guide to Changing Capitalism*, Penguin; see also M. P. Hekkert, M. J. Janssen, J. H. Wesseling, and S. O. Negro (2020), «Mission-oriented Innovation Systems», *Environmental Innovation and Societal Transitions* 34: 76–79.

that is, shaping industrial ecosystems towards sustainable prosperity. This approach could be described as a new form of economic planning being directed towards achieving systemic change and providing a rapid response to the climate change crisis. This form of strategic industrial policy goes far beyond hands-off innovation policies, which have been dominant over the last two decades in the US and Europe, at least until the Covid-19 pandemic. The pandemic has represented an important stress test of the resilience of these advanced economies and their governmental capacity to coordinate a response to major systemic shocks. One of the main lessons learnt is that the type of targeted and coordinated interventions that extreme events such as a pandemic or climate change require cannot be implemented by a government with limited capacities.[22] Governments across Europe and the US itself no longer have the state capacity that characterised the post-Second World War reconstruction phase, when indicative planning and strategic industrial policy were widely used. Hence, an industrial policy for a green transition, as the one envisioned here, can only be framed as part of a broader reconsideration of the role of the state in the economy and a significant rewiring of state capacity at different governance levels.

22 R. Kattel and M. Mazzucato (2018), «Mission-oriented Innovation Policy and Dynamic Capabilities in the Public Sector», *Industrial and Corporate Change* 27(5): 787–801.

J. W. MASON

Climate Policy from a Keynesian Point of View

Climate change is perhaps the greatest challenge of our times. Few today disagree on the need for immediate action to reduce carbon emissions. But there are deep divides over what kind of action is called for.

To an economist, one division stands out, between what we might call a price-centred versus an investment-centred approach to climate policy. The first sees the fundamental problem as a market externality. Because the cost of carbon emissions is not incorporated into prices, we spend too much on carbon-intensive goods and services and too little on alternatives. The goal of regulation should be to correct this mispricing; once this is done, private businesses and consumers can find the lowest cost path to decarbonising the economy in a decentralised way. From this point of view, the fundamental choice is how high the carbon price should be. This in turn reflects the trade-off between reducing carbon emissions and maintaining current living standards. The faster we want to move towards our long-term climate goals, the more consumption we will have to give up in the present.

Until recently, the dominant perspective on the economics of climate policy was a tradeoff between current consumption and climate spending, where the key question is how to set the right price for climate externalities.[1]

More recently, though, a different approach to climate policy has been gaining ground and emphasises more direct measures to boost climate investment rather than taxes or other forms of carbon pricing. This vision of climate policy, sometimes referred to as the Green New Deal in the United States or the Green Deal in Europe, sees decarbonisation as a project of actively building up a low-carbon economy, with the state playing a leading role, both through public investment and measures to direct private spending. This second vision rejects the trade-off between climate goals and current living standards.

People may arrive in one or the other of these camps for many reasons. Advocates of the investment-centred approach tend to link climate policy to broader concerns over economic justice. Developments like the *Gilets Jaunes* protests in France, and more recent responses to rising energy prices in the wake of the war in Ukraine, have raised doubts about the viability of aggressive carbon pricing, making

1 W. Nordhaus (2019), «Climate Change: The Ultimate Challenge For Economics», *American Economic Review* 109(6): 1991–2014.

an investment-centred approach more attractive. More subtle, but equally important, are the different underlying economic visions behind the two approaches to climate policy. In this paper, I bring these submerged differences to the surface. In particular, I sketch out the radical Keynesian vision of the economy that underlies strong forms of the investment-centred response to climate. I hope this elucidate how disagreements over climate policy arise, not just from different political judgements or preferences, but from alternative models of how the economy works.

Alternative visions of the economy

The fundamental macroeconomic model in modern macroeconomics is of a single, infinitely lived, infinitely foresighted «representative household» choosing how to best divide their time between labour and leisure. This single household performs all the labour in the economy and also owns all the capital goods; they have a given technology for turning labour into products and services, and for investing today to produce more in the future. They know the true probabilities of all possible future events that might change these trade-offs. Based on this, they can pick the future path that gives them the best trade-off between labour and consumption.

Of course, there are many variations on this basic model, but they share the essential features that resources and technology are given, known, and fully utilised; the only question is what way of using them will deliver the most well-being or utility.

It is this conception of economics that the Keynesian revolution challenged, though it did not ultimately overturn it. The heart of the Keynesian vision is the idea that the central economic problem is not scarcity, but *coordination*. Production does not just require the use of labour and other resources, it also poses immense organisational problems. Industrial production requires the cooperation of enormous numbers of people. Modern corporations, financial institutions, and governments have allowed us to cooperate on a larger scale than in earlier times, but there is an almost endless scope for further improvement. So while limits to physical resources certainly exist – this is why we are talking about climate policy in the first place – it is wrong to imagine them as adding up to an overall limit on potential output. A country may possess a certain number of acres of arable land or a certain annual flow of potable water, but to turn these into an economic constraint, we must assume they are already being put to their most valuable use. This would be plausible in a world where a single agent made all decisions about production, using a fully-specified technology. In the real world, it is less so.

As development economist Ha-Joon Chang likes to point out, real processes of economic development look nothing like the smooth trade-offs between present and future goods described by economic theory. His native South Korea is a case in point. In 1960, it was one of the poorest countries in the world – one of its main exports was human hair for wigs. Its ascent to one of the world's leading exporters did not come from new endowments of resources falling from the sky, nor did it involve any sacrifice of current consumption in return for faster growth – Korean living standards rose rapidly during industrialisation. Rather, it came from new coordination mechanisms

that greatly expanded society's productive capabilities. Through a variety of mechanisms, the state actively channelled investment to new higher-productivity industries.[2] The orthodox economics that says we cannot have rapid decarbonisation without giving up current consumption would have ruled out this sort of industrialisation, too.

A Keynesian vision of climate economics

What does all this mean for climate policy? In the first place, it means that decarbonisation will be experienced as an economic boom. If we imagine the economy in terms of a fixed pot of resources to be allocated, then devoting more to climate goals must mean less for other purposes. If we think of the economy as an open-ended process of cooperation, then there is every reason to think that a big influx of new spending will mean more production of all kinds, especially if it is accompanied by new forms of coordination.

Renovating buildings, investing in new structures and equipment, building infrastructure and so on all add to demand. The decommissioning of the existing means of production does not, however, subtract from demand. Global investment in renewable energy and transmission, to take one important example, is already several times greater than investment in fossil fuel-generation capacity.[3] The former could easily rise to many multiples of its current level, while the latter cannot fall below zero. So a more rapid energy transition will certainly see higher investment in the aggregate. The same goes for other areas. A shift towards higher-density settlement patterns – an important part of a lower-carbon world – will involve a period of higher housing investment, even if the total amount of housing does not change.

It is important to distinguish here between the transition and hypothetical endpoint. The world of 50 or 100 years from now may well involve less market activity, less time spent in paid employment, and lower or even negative growth in wages and gross domestic product as we currently measure it. A world with more opportunities for creative expression, participation in public life, and time with family and friends could be experienced as one of material abundance, even with far less of the carbon-intensive activities we currently measure as «the economy». But however we imagine life in the distant future, any path to a different world will require large outlays of money the faster we traverse it. In our world of chronic demand constraints, that implies faster-measured growth and higher incomes during the transition.

The second major implication of the Keynesian view of the economy is that there is no trade-off between decarbonisation and current living standards. The idea that there is a hard trade-off between current consumption and decarbonisation rests on the assumption that there is no meaningful slack in today's economy, and that

2 H.-J. Chang (2010), *Bad Samaritans: The Myth of Free Trade and the Secret History of Capitalism*, New York, NY: Bloomsbury Publishing.

3 International Energy Agency (2021), *World Energy Investment*, www.iea.org/reports/world-energy-investment-2021/executive-summary.

workers are already engaged in the highest level of productivity activity they are capable of. There is no reason to think this is true. The workers engaged in, say, expanding renewable energy capacity are not being taken away from equal-value activity in some other sector. They are, in the aggregate, un- or underemployed workers whose capacities would otherwise be wasted – and the incomes they receive in their new activity will generate more output in demand-constrained consumption goods sectors.

Another reason why decarbonisation need not come at the expense of current living standards is the prevalence of increasing returns. Conventional economic models assume that production normally takes place under conditions of rising marginal costs – each unit of output costs more than the last one. But in real industries, per-unit costs fall as output rises because learning-by-doing seems to be almost universal in industry – the production process itself is the best source of knowledge about potential improvements.

Increasing returns fundamentally change the economics of decarbonisation. In a conventional model, substituting sustainable production for carbon energy production, for example, means replacing a lower-cost technology with a higher-cost one, and the cost disadvantage of the sustainable technology will only get worse as its share of production rises. This implies that decarbonising energy production will require devoting more resources to energy production than we otherwise would. In a world of increasing returns, by contrast, a new technology may initially face a cost disadvantage but that will narrow or disappear as it is more widely adopted. It is no secret that costs for many forms of renewable energy have fallen steeply as their scale has grown. In the United States, for example, the cost of solar power construction fell by half between 2013 and 2019, while the pace of capacity addition doubled.[4] In a conventional model, lower-carbon technologies must be more expensive than existing ones, since otherwise they would already have been adopted.

A third major implication follows from the first two: There is no international coordination problem in climate policy, because the countries that move fastest on climate will reap direct benefits.

The mainstream view is that international «free riding […] lies at the heart of the failure to deal with climate change». Individual countries bear the full cost of decarbonisation measures, in this view, but only get a fraction of the global benefits, so countries that do not engage in decarbonisation can free-ride on the efforts of those that do.[5] It follows that binding international agreements are an essential precondition for effective climate action. This makes sense if you think that the benefits of climate change mitigation are global but require a costly diversion of real resources, and especially if you think of it mainly in terms of carbon taxes. From a Keynesian perspective, however, while coordination problems are ubiquitous, this particular

4 US Energy Information Administration (2020), «Average U.S. Construction Costs for Solar and Wind Generation Continue to Fall», www.eia.gov/todayinenergy/detail.php?id=45136.

5 W. Nordhaus (1993), «Reflections on the Economics of Climate Change», *Journal of Economic Perspectives* 7(4): 11–25.

one should not be a concern. It is true that countries that take an early lead in decarbonisation will contribute to a global public good. But investment-centred action on climate will not impose costs on their domestic economies. In the first place, aggressive decarbonisation will boost domestic demand, leading to faster growth. Second, many decarbonisation policies are likely to have co-benefits (to public health, for example) that outweigh their costs and will be realised at a national level. In these cases, rather than facing an international coordination problem, action on climate change can be seen as helping overcome political obstacles to policies that are already in the nation's self interest. Third, early investment in decarbonisation will generate a persistent advantage in strategic industries.

While these claims run against the textbook economics of climate change, they are consistent with the way these questions are discussed in policy settings. The central macroeconomic problem facing China, in the eyes of many observers, is how to sustain rapid growth while shifting away from exports towards domestic demand. Although this is often framed in terms of raising consumption by Chinese households, decarbonisation spending would serve the same goal. Meanwhile, few – if any – observers in the rest of the world see state support for China's wind, solar, and battery industries as public-spirited shouldering of the costs of the climate crisis. Rather, it is seen as a strategic challenge that other countries, in their own national interests, must seek to match.

None of this is to suggest that international agreements on climate policy are not desirable. The point is that it is wrong and counterproductive to suggest that the case for decarbonisation efforts at a national level is contingent on first reaching such agreements. The failure of the Paris Agreements has not stopped countries such as Germany from aggressively moving forward with decarbonisation efforts, nor should it be an excuse elsewhere.

Turning from the what and why to the how, a major implication of a Keynesian perspective for climate policy is that price-based measures cannot be the primary tool for decarbonisation. One major reason for this is the increasing-returns problem discussed above. Private decisions are made at the margin, but in a world of increasing returns, the trade-offs at the margin may not be a good guide to the full range of possibilities. Think again of fossil fuels and wind power. Not so many years ago, wind power costs were much higher than the costs of new fossil fuel power capacity. Even a very high carbon tax might not have been enough to close this gap, while imposing unacceptable hardship on consumers. Targeted subsidies for wind generation, on the other hand, were able to raise the scale of wind investment until eventually its costs fell below those of fossil fuel generation.

The same logic applies to consumption. When a society's transport system is organised around private car ownership, for example, opting for more sustainable modes may entail considerable sacrifice and, hence, would require a very large price difference. This does not mean that a society-wide shift towards mass transit and more walkable settlement patterns would leave people worse off – but it does mean

that a carbon price is unlikely to bring it about. What is needed is not incentives for people to make what is currently a very costly private choice, but rather public investment that over time will make that choice less costly.

Another fundamental obstacle to a price-based approach is coordination. Market signals work on the premise that each actor can take everyone else's choices as given. But decarbonisation, like other major economic transitions, requires coordinated changes by many different actors. To take a familiar chicken-and-egg problem, one of the major obstacles to the widespread adoption of electric cars is the lack of charging stations. But it makes no sense for private businesses to invest in charging stations when the share of electric cars is still very low. What is needed in cases like this is a single decision-maker to ensure that all sides move forward together. The fundamental constraint on decarbonisation, then, should not be seen as the productive capacity of the economy, but rather the planning capacity for large-scale non-market coordination.

A corollary of this is that central banks' contribution must take the form of active credit policy. Today, most proposals for climate action by central banks involve treating «green» assets more favourably than «dirty» ones.[6] This might take the form of differential rate-lending facilities, purchasing assets, or accepting them as collateral at prices adjusted for carbon-intensity, or requiring climate-risk disclosure from banks and other financial institutions. Such measures are often framed as a natural extension of normal central bank policies towards financial risk, since the «dirty» assets impose greater risks – to their holders and to the financial system. Treating assets differently based on climate criteria would then contribute to the central bank's financial stability mandate as well as the protection of its own balance sheet.

A fundamental problem with this approach is that there is no reason, in general, to think that the businesses that are at greatest risk from climate change are the same as the ones that are contributing to it. Borrowers whose repayment capacity is at risk from climate change need not be major carbon emitters. Buildings on the coast, for example, are at greater risk from sea-level rise but emit no more carbon than structures anywhere else. Conversely, there is no reason to expect the profitability of emitters to be reduced, except insofar as some other policy brings this about. The conflation of carbon intensity with financial risk from climate change in effect assumes that the policies to bring about decarbonisation are already in place – that the only risks the central bank needs to worry about are «transition risks» to firms negatively impacted by climate policy.

From a Keynesian standpoint, central banks should worry less about these transition risks and more about channelling credit directly to activities that contribute to the climate transition but are likely to face credit constraints. Most business investment is not especially responsive to interest rates. For larger firms, the hurdle rate for new investment appears to be high and basically invariant to market

6 For a typical example, see Network for Greening the Financial System (2021), «Adapting Central Bank Operations to a Hotter World: Reviewing Some Options», www.ngfs.net/sites/default/files/media/2021/06/17/ngfs_monetary_policy_operations_final.pdf.

interest rates.[7] For smaller borrowers, constraints on how much (or whether) they can borrow are often more important than the interest rate. For example, there are many improvements to buildings that can reduce energy use and pay for themselves in a short period, but homeowners and small property owners will be unable to carry out these improvements because of the upfront costs. Credit facilities that specifically encourage this type of investment will have a much bigger impact than across-the-board measures that, at best, will have some small effect on bond prices.

Concluding thoughts

The differences between the older climate economics – with its emphasis on trade-offs and price mechanisms – and the investment-centred approach not only reflect different views about what kinds of climate policies will be effective and achievable. They also reflect different, though not always articulated, visions of how the economy operates.

I have argued so far that some widely accepted economic constraints on climate policy are, in fact, not very important. I will conclude by suggesting two economic challenges for climate change that are, in my opinion, underemphasised.

First, if we face a political conflict involving climate and growth, it is not because decarbonisation requires accepting a lower level of growth, but because it entails *faster* economic growth than existing institutions can handle. Sustained strong demand and rapid growth may be limited not by any technical constraints on production, but by the distributional conflicts that arise, as low unemployment allows workers to demand a greater share of income and increased rights in the workplace. The assumption that faster growth is possible only if workers remain docile is shared by many mainstream policy-makers. Former Federal Reserve chair Alan Greenspan observed in the 1990s that low unemployment was sustainable only because workers had been «traumatised» by the deep recession and attacks on trade unions in the previous decade.[8] More recently, the European Central Bank has demanded measures to weaken labour rights as a condition of accepting pro-growth fiscal measures in a number of European countries.[9] Today, business leaders on both sides of the Atlantic increasingly complain of «labour shortages». In principle, centralised bargaining could give workers a stronger voice in the workplace and a gradually rising share of national income without undermining the conditions for private investment. But under the neoliberal macroeconomic model, wage bargaining is decentralised, and limiting economic growth is the main tool for managing distributional conflicts. If decarbonisation leads to stronger demand and more rapid growth, this will

7 S. A. Sharpe and G. A. Suarez (2021), «Why Isn't Business Investment More Sensitive to Interest Rates? Evidence from Surveys», *Management Science* 67(2): 720–741.

8 D. J. B. Mitchell and C. L. Erickson (2005), «Not Yet Dead at the Fed: Unions, Worker Bargaining, and Economy-wide Wage Determination», *Industrial Relations: A Journal of Economy and Society* 44(4): 565–606.

9 For example, see www.corriere.it/economia/11_settembre_29/trichet_draghi_inglese_304a5f1e-ea59-11e0-ae06-4da866778017.shtml (in Italian).

empower workers to demand higher wages and more control over the workplace. In the absence of new institutions for collective bargaining, these demands will be a source of ongoing frictions and social conflict. The great political challenge of the climate transition may turn out to be not that ordinary people have to accept getting less, but that business owners have to accept ordinary people getting more.

Second, rapid decarbonisation will require considerably more centralised coordination than is usual in today's advanced economies. If there is a fundamental conflict between capitalism and sustainability, I would suggest, it is not because the pursuit of profit implies or requires an endless increase in material throughputs. Rather, it is because capitalism treats the collective processes of social production as the private property of individuals. The rapid redirection of production – whether during industrialisation or in wartime – has always required a degree of central planning. Decarbonisation (and adaptation to the climate change already underway) will require collective decisions about many aspects of production and consumption that are today regarded as private choices. It will also turn many decisions that are already made collectively – but in ways that are regarded as natural or neutral – into visible political questions. To take one important example, a central bank setting an interest rate is already engaged in a form of planning, but this can be presented as a purely technical matter. If the climate transition requires central banks to channel credit towards specific sectors or businesses, the fiction of central bank «independence» will no longer be tenable, and their actions will be subject to the same kind of scrutiny and contestation as those of other branches of government. The planning required by the climate transition will run against decades of ideological opposition to central planning and to an expanded role for the public sector. But beyond these ideological obstacles, it will also face the more straightforward problem that many of the required institutions do not currently exist, at least not on the scale required. The tools of economic planning used so extensively (and, arguably, successfully) by notionally «capitalist» countries such as Japan and France in the post-war decades have long since been abandoned; rebuilding them is not an easy task. The investment-centred approach to decarbonisation calls for some institution that can identify a coherent set of priorities for climate investment and that has the authority – and political legitimacy – to direct spending towards them. The lack of such an institution, and not any material scarcity, may be the most urgent and immediate challenge for the transition to a sustainable economy.

IV. THE SOCIAL FOUNDATION AND IT'S IMPLICATIONS FOR THE POLITICAL ECONOMY

DANIEL DRISCOLL AND MARK BLYTH

Just Who Gets Paid-Off in a «Just» Transition?

Some difficult lessons from BlackRock and French populists

Introduction

This paper links two things that are often dealt with separately when discussing what we mean by the word «just» in the notion of a «just transition». On the one hand, activists and reformers – especially those promoting the United States (US) version of the Green New Deal (GND) – see this as an opportunity to empower marginalised populations and redistribute wealth-generating assets using the state in the form of green industrial policy. On the other hand lies private finance, especially in the form of asset managers, who own huge swathes of global companies. Their investment decisions are critical to the transition, but they have no intention of allowing such a redistribution of assets and power. Indeed, they see the function of the state as using its balance sheet to insure private investors against losses. We use these competing notions of «just» as a way to discuss how we can have a transition that leverages the investments of the private sector without once again simply giving capital everything it wants at the expense of everyone else.

Just a «just transition»?

Discussions of decarbonisation, especially in the US and the United Kingdom (UK), often invoke the image of a «just» transition – that is, some version of the future when those most affected by the crisis emerge, if not better off, then at least no worse off than when they started. This imaginary is ingrained into most versions of a GND whereby a diverse coalition of urban dwellers and unionised workers are enabled by an activist state to construct a green future.[1] In such a vision, transition compensation bails out workers and transforms employment, housing, and transport. In doing so, the carbon-saturated neoliberal world of inequality, racism, and hierarchy is swept away with the construction of a new green (and just) economy. «Just» in this instance, means redistributive justice for the majority of citizens.

1 US Congress (2021–2022), H.Res.332 – Recognizing the duty of the Federal Government to create a Green New Deal, www.congress.gov/bill/117th-congress/house-resolution/332?r=50.

Although it is seldom said out loud, this version of the transition is not only a revolution in the production of energy, but also a revolution in the distribution of assets, wealth, and power. Carbon assets may only constitute around 0.2 % of the total financial assets of the planet, but their destruction promises to impact certain geographies much more than others.[2] The core states of the US Republican Party's coalition and other oil and gas producers such as Saudi Arabia, Russia, and Australia will need to find a whole new business model post-transition.[3] This creates a rather acute distributional problem, and one aspect of this is distribution across places.

Although in theory a GND can provide the funding to transition carbon-heavy areas to new growth models *within states*, doing so *between states* is another matter entirely. West Palm Beach may be willing to bail out West Virginia, but there is no way that the UK will offer to bail out Saudi Arabia. As such, we can expect carbon producers at all levels to treat GND ideas as an existential threat and resist. Moreover, GND-thinking tends to elide other important sources of resistance, even within states – specifically from asset holders.[4] Recent pronouncements by the CEO of the global asset manager BlackRock put these sources of resistance into bright relief.

Throughout 2020 and 2021, BlackRock made the positive case for the CEOs of the companies in which they invest to ready themselves for the green transition.[5] As the world's largest asset manager, this matters. By embracing the Task Force on Climate-Related Financial Disclosures[6] and Sustainable Accounting Standards Board[7] disclosure standards; providing ESG (environmental, social, and governance)-linked exchange-traded and index funds; and by pushing firms to commit to such standards, BlackRock is – along with other parts of finance – putting carbon assets on notice, to the point that legal authorities and regulators in carbon-heavy states are pushing back against such pressures.[8]

But there is also something else going on at BlackRock. As was widely reported, BlackRock's CEO, Larry Fink, has recently embraced a particular version of the green

2 T. Whipple (2020), «The $900bn Cost of ‹Stranded Energy Assets›», *Financial Times*, February 4, www.ft.com/content/95efca74-4299-11ea-a43a-c4b328d9061c. A report by Credit Suisse estimates the global wealth stock at $418 trillion by the end of 2020, by which calculus the *Financial Times* estimates that stranded assets account for 0.2 % of global wealth stock. See A. Shorrocks et al. (2021, June), *Global Wealth Report*, Zürich: Credit Suisse.

3 T. Oatley and M. Blyth (2021) «The Death of the Carbon Coalition», *Foreign Policy*, February 12, https://foreignpolicy.com/2021/02/12/carbon-coalition-median-voter-us-politics.

4 B. Braun (2021), «Asset Manager Capitalism As a Corporate Governance Regime», in *The American Political Economy: Politics, Markets, and Power*, ed. J. S. Hacker, A. Hertel-Fernandez, P. Pierson, and K. Thelen (Cambridge: Cambridge University Press), 270–294. And: D. Gabor (2020), «Critical Macro-Finance: A Theoretical Lens», *Finance and Society* 6(1): 45–55, http://dx.doi.org/10.2218/finsoc.v6i1.4408.

5 L. Fink (2022), «The Power of Capitalism», Letters to CEOs, www.blackrock.com/corporate/investor-relations/larry-fink-ceo-letter.

6 See website at www.fsb-tcfd.org.

7 See website at www.sasb.org.

8 See E. Bolstad (2021), *Oil-Friendly States Fight Back Against Sustainable Investment Trend*, PEW Charitable Trusts, www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2021/03/16/oil-friendly-states-fight-back-against-sustainable-investment-trend.

transition, whereby the state's balance sheet needs to be activated to the fullest extent. Firms can do a lot on their own, so the argument goes, but collectively their actions are insufficient. Only the balance sheet of the state is large enough to make the transition possible.[9]

So is BlackRock embracing a vision where the state builds post-carbon assets, as the GND crowd imagines? Not at all. What BlackRock imagines the state doing instead is to act as the «insurer of first resort» so that current asset holders can take the upside of the investment risk of the transition while the state acts as insurance against losses on current assets and future bets.[10] As the world's largest asset manager and actual owner of companies, this matters.[11]

BlackRock calls this «de-risking» the transition, and it is. But the risk being insured here is quite different from that in the original GND model. Rather than the income and employment of workers being insured, here we have existing asset holders being insured so that they do not book any losses during the transition and get the upside of new investments on the way there. Here the question of justice is subtly reframed, from one where the vision shifts from «redistribution by transition» to one of a «short squeeze» by asset holders on everyone else.

Short squeezes

A short squeeze in finance comes in two forms. The first was seen in 2020 with the US retailer GameStop. A large hedge fund had taken a short position in the stock, basically, borrowing shares in the company in the hope that they could buy them back cheaper and pocket the difference. Small investors united via a Reddit board called «Wall Street Bets» to buy the stock and push up the price, making the short position of the hedge fund so expensive that they had to abandon it.[12] The second type of short squeeze is more generic and occurs when a fund needs a particular stock in its portfolio (Apple or Tesla for growth or for an ESG rating) but the fund can only buy them from a seller who has taken a large position in the available stock. You can get the stock, but at a price you really do not want to pay. You get squeezed.

9 E. Schatzker (2021), «BlackRock's Fink Urges World Bank, IMF Overhaul for Green Era», *Bloomberg*, July 11, www.bloomberg.com/news/articles/2021-07-11/blackrock-s-fink-urges-world-bank-imf-overhaul-for-green-era.

10 D. Gabor (2021), «The Wall Street Consensus», *Development and Change*, https://doi.org/10.1111/dech.12645.

11 Three asset manager firms – Vanguard, BlackRock, and State Street – own 20 % of every S & P company and 80 % of the ETF market. For more on the power of these firms, see A. Tooze (2021), «Chartbook #82: The rise of asset manager capitalism and the financial crisis of 2008», https://adamtooze.substack.com/p/chartbook-82-the-rise-of-asset-manager.

12 E. Lopatto (2021), «How r/WallStreetBets Gamed the Stock of GameStop», *The Verge*, January 27, www.theverge.com/22251427/reddit-gamestop-stock-short-wallstreetbets-robinhood-wall-street. Note that Robinhood (the main outlet for small traders at the time) shut down all trading of GameStop in the end, aligning with mainstream asset managers, see V. Tenev (2021), «Robinhood Chief Apologises over GameStop Affair», *Financial Times*, February 18, www.ft.com/content/69c0b5b0-9d49-4d0e-8f32-fe9428bff5b1.

BlackRock exemplifies both strategies. The one type of squeeze is its explicit marketing of its own ESG-friendly products while placing pressure on other asset managers to buy them. The second type of squeeze is telling states everywhere that BlackRock – the world's largest owner of capital – is willing to play ball on the transition, so long as the balance sheet of the state is used to absorb its losses, and still get the investment upside.

In short, if you pardon the pun, BlackRock is saying: «You can't transition without our investment, and we are not going to invest unless you (the state, and ultimately the taxpayer) take the losses». In other words, current asset holders are short-squeezing the entire global economy, effectively saying, «You can have a transition, but not a ‹just› one» – unless justice is defined as existing asset holders suffering no losses while getting all the gains.[13] You can see how this leads to two quite irreconcilable views of what the transition is and how to get there.

In the middle of these two positions lie governments, who seem to be mainly concerned with another form of justice, that is, avoiding moral hazard in order to safeguard their balance sheets, thereby demonstrating their fiscal probity to their taxpaying populations. States in this world, particularly in Europe, have only been partially freed from the fiscal binds of perma-austerity by the pandemic. As the new German government exemplifies, such states want to use their balance sheets to effect the transition but are terrified of piling «debt» onto the balance sheet to do so – even if those debts have a zero-interest rate and are used to build new assets. As such, a variety of off-balance-sheet vehicles are being used to disguise the nature of investment, while states fret quite obsessively and publicly about the moral hazard problems of the transition to justify this move, that is, worrying about such things as hedge funds buying coal mines to fuel power stations to mine bitcoins.[14]

Although laudable, the actual macroeconomic effects of such diversions are minimal and constitute a diversion from the main task of the transition – weaning the economy off carbon while building substitute infrastructure. As a conception of justice, this also misses the mark. The French experience with decarbonisation is particularly salient when thinking through possible pathways to a post-carbon future, and it exemplifies the trade-offs involved in maximising any criterion of justice. According to the World Bank, France collects more carbon tax revenue than any country on Earth, serving as an experiment for comparatively aggressive carbon pricing.[15]

13 If you don't like the short squeeze analogy, a Kaleckian Capital Strike is the other obvious model, see M. Kalecki (1943), «Political Problems of Full Employment», *The Political Quarterly*.

14 That actually happened, see T. D. Chant (2021), «Private-equity Firm Revives Zombie Fossil-fuel Power Plant to Mine Bitcoin», *Ars Technica*, May 10, https://arstechnica.com/tech-policy/2021/05/private-equity-firm-revives-zombie-fossil-fuel-power-plant-to-mine-bitcoin.

15 D. Driscoll (2021), «Drivers of Carbon Price Adoption in Wealthy Democracies: International or Domestic Forces?», Sage Journals, https://doi.org/10.1177/2378023121992252.

French carbon taxation and Les Gilets Jaunes

In order to enact their carbon tax – after over a decade of failed attempts at more equitable designs – the French state resigned itself to a policy that provided abundant exemptions for industry (including those regulated under the European Union's Emissions Trading Scheme) with much of the revenue earmarked for a corporate tax credit.[16] Five years later, when the carbon tax rate took a scheduled increase, the Yellow Vest movement exploded onto the streets of France. Initially, the movement was labelled as anti-climate and anti-carbon tax. However, new research reveals that while the Yellow Vests uniformly support climate action, they simply disagree with a carbon tax that burdens households at the expense of businesses. Not unreasonably, being the folks paying the tax, they want participation in the climate policy-making process.[17]

In terms of the vision of justice being promoted in the French case, we see a short squeeze in action. Repeated attempts by the state to tax business failed. The French state needs the assets of business to make the transition happen, and business was not willing to pay the price that the state was offering for joining in – the carbon tax. As a result, the state effectively did what BlackRock wanted before they even asked. They put the cost of the transition onto consumers and workers, even pouring the revenue earned into a subsidy for business. The French carbon tax advantaged «business elites» and asset holders, which, although instrumental for the policy's implementation, strongly violated equity concerns, eventually triggering a revolt as the tax rate increased. The result was a backlash that is both predictable and yet entirely missing from the transition vision of BlackRock.

What makes the French example particularly instructive is that the French economy is comparatively less carbon-intensive than many other states facing the same problems.[18] Less than 10 % of French electricity is sourced from fossil fuels, whereas more than 80 % of global energy is sourced from fossil fuels . Given this, to paraphrase Sinatra: *if you can't make it* [carbon taxes] *there, you can't make it anywhere*. Meanwhile, a new European study has found that individuals living in rural, fossil-fuel dependent, and poor communities are more likely to deny the reality of climate change.[19] This suggests that, like states with heavily carbon-dependent growth models, there may be many «pro-carbon» versions of the Yellow Vests who will

16 A. Rocamora (2017), *The Rise of Carbon Taxation in France: From Environmental Protection to Low-Carbon Transition*, Arlington, VA: Institute for Global Environmental Strategies. And: P. A. Durand (2018), «Comprendre la taxe carbone en huit questions», *Le Monde*, December 7, www.lemonde.fr/les-decodeurs/article/2018/12/07/comprendre-la-taxe-carbone-en-huit-questions_5394292_4355770.html.

17 D. Driscoll (2021), «Populism and Carbon Tax Justice: The Yellow Vest Movement in France», *Social Problems*, https://doi.org/10.1093/socpro/spab036.

18 See website at https://ccpi.org.

19 C. Lübke (2021), «Socioeconomic Roots of Climate Change Denial and Uncertainty among the European Population», *European Sociological Review*, https://doi.org/10.1093/esr/jcab035.

vehemently oppose aggressive decarbonisation in countries (and sub-national areas) with higher carbon dependencies.

Interventions

To counter this, a pragmatic, and difficult, strategy involves bribing both workers and business elites. The problem we face is that we cannot seem to be able to bribe one without shorting the other. If we double down on the BlackRock strategy, we risk a generalised Yellow Vest response. If we double down on workers, asset holders can effectively go on an investment strike, derailing an already late transition. If states sit in the middle and fret about moral hazard, nothing actually happens. So how do we get out of this impasse?

Carbon taxes are naturally regressive. Therefore, if a carbon tax is utilised, a carbon tax-and-dividend method that rebates the income to workers seeks to offset this regressivity. Furthermore, carbon tax revenue can be graduated across income groups so that lower-income households receive more support. Canada and Switzerland utilise versions of the tax-and-dividend strategy – political opposition to their carbon taxes remains unclear and the policies themselves are often misunderstood by the public.[20] Still, those national policies were successfully enacted, which is a difficult achievement for any country.

As Matto Mildenberger recently argued, however, tax-and-dividend schemes risk creating a kind of «pass the buck» logic that keeps carbon polluters in place.[21] Given this, conditionality offers much more leverage on the problem. Conditionality can be applied to a variety of policies to decarbonise and protect workers, including carbon taxes. For instance, rather than spending their carbon tax revenue, Denmark returns it to firms on the condition that the capital is used for sustainability transition investments.[22] Denmark's carbon tax is one of the few successful carbon tax implementations and has since decreased emissions while aiding the expansion of the renewable energy sector and related jobs.

Alternatively, states can implement contingent carbon taxes. Here, states would utilise exactly the types of data reporting frameworks favoured by BlackRock (plus other metrics such as the Scopes framework) and use the threat of carbon taxes as a contingent liability that can be imposed on a firm's balance sheet if they do

20 *Financial Times* (n.d.), «How to Save Climate Policy from the Culture Wars», www.ft.com/content/25f0d270-f528-4789-b390-37ad7f9d091b. And see M. Mildenberger, E. Lachapelle, K. Harrison, and I. Stadelmann-Steffen (2022), «Limited Impacts of Carbon Tax Rebate Programmes on Public Support for Carbon Pricing», *Nature Climate Change*, 1–7, https://doi.org/10.1038/s41558-021-01268-3.

21 To exemplify, the price of gasoline goes up due to the tax. The revenue agent rebates the tax to the consumer as an offset. As such, the pressure to stop using gasoline, and thus disempower the producer, fades as the tax effectively becomes a subsidy. See M. Mildenberger, *Carbon Captured* (Cambridge, MA: MIT Press), 238.

22 M. Prasad (2008), «On Carbon, Tax and Don't Spend», *New York Times*, March 25, www.nytimes.com/2008/03/25/opinion/25prasad.html.

not meet specific transition targets derived from these frameworks.[23] Beyond carbon taxes, conditionality can also be applied to bailouts. Recently, the French government awarded a €5 billion Covid-19 bailout to the car company Renault, but it was contingent upon their moving towards EV batteries and keeping factories in France open to protect key jobs.[24] This application of conditionality, crucially, not only moves towards decarbonisation, but also protects workers and includes them in the transition. This offers citizens an alternative future to the status quo.[25] There are many applications of conditionality that will vary by context. As Markard writes, policy learning and adaptation to context will be key moving forward.[26]

Regulations, investment, and spending that are conditional can create a strong incentive for business to join in the transition[27] without being able to «pass the buck» onto either workers or the state. With asset holders deprived of the ability to «short squeeze» everyone else, the state can stop worrying about moral hazard and get serious about leveraging its balance sheet to keep both sides happy. Workers do not get taxes without labour benefits or representation, and asset holders get positive incentives to take on the risk (investment) needed to make the transition work without perverse subsidies. After all, we can worry about moral hazard all we like, but at the end of the day it is easier to (partially) insure asset holders than it is to disempower them. Although this may be discomfiting to those who see the transition as an opportunity to transform the asset structure of the economy, limited time means more limited goals and priorities. That is, if you want a green transition, it may be one where making asset holders «whole» becomes the only justice framework that can decarbonise fast enough.[28] But that does not mean that they get to short squeeze everyone else in the process.

23 E. Lonergan and C. Sawers (2022), *Supercharge Me*, London: Agenda Books.

24 *DW* (2020), «France Unveils Stimulus Plan Worth €8 Billion for Car Industry», May 27, www.dw.com/en/france-unveils-stimulus-plan-worth-8-billion-for-car-industry/a-53578294.

25 D. Rosenbloom, J. Markard, F. W. Geels, and L. Fuenfschilling (2020), *Why Carbon Pricing Is Not Sufficient to Mitigate Climate Change—and How «Sustainability Transition Policy» Can Help*, Proceedings of the National Academy of Sciences, *Proceedings of the National Academy of Sciences* 117(16): 8664–8668.

26 See J. Markard in this publication.

27 J. Meckling , N. Kelsey, E. Biber, and J. Zysman (2015), «Winning Coalitions for Climate Policy», *Science* 349(6253): 1170–1171, www.science.org/doi/10.1126/science.aab1336.

28 After all, private finance has the most untapped capital ready to mobilize. See van Lerven (2022) in this series.

CLAUDIUS GRÄBNER-RADKOWITSCH AND JAKOB HAFELE

Why Fostering Socio-economic Convergence in the EU Is Necessary for Successful Climate Change Mitigation

Introduction

With the European Green Deal, the European Union (EU) has set itself an aspirational agenda to address the climate crisis. The Corona Recovery package underlines this intention, as 37 % of the funds provided have to be spent for the green transition. Similarly, the recently adopted «Fit For 55» package includes policies that aim for a 55 % reduction in emissions by 2030. These are only two examples that underline the ambition of the EU for a green transformation – an ambition that is supported by a majority of EU citizens, who wish for a green European economy that guarantees sustainable employment and business opportunities.[1]

However, while indeed many EU citizens perceive the green transition as an opportunity, for others it appears as a challenge that may undermine their economic status and threaten their material prospects. For people who are currently employed as miners, for firms that make their profits in the steel sector, and for countries whose main energy sectors are fossil fuels, a green transition is often not perceived as a necessary step towards a modern and sustainable EU, but rather as a menace to their socio-economic future.

The problem underlying these concerns on the national level is that EU member states follow different development models. Whereas the economic development models of some countries are compatible with – or even built on – a green transition, the economies of others are very emissions-intensive. In effect, the prospects to gain from a green transition are distributed unequally among member states. This applies particularly to Eastern European countries, which managed to catch up in economic

1 European Commission (2021), *Special Eurobarometer 513: Climate Change*, Brussels: European Commission; European Commission (2021), *Special Eurobarometer 509: Social Issues*, Brussels: European Commission.

terms to other European countries, but did so with a very emissions-dependent growth model. In other words, their socio-economic development path rests to a considerable degree upon non-sustainable activities. Many people in these countries fear that once the opportunity to pursue these activities is taken away, they will suffer socio-economic consequences and become – again – left behind in terms of wealth compared to the richer member states. What they are lacking is an alternative and more sustainable but equally attractive economic avenues to close the income gap with the rest of Europe.

As long as this remains the case, important ecological reforms are likely to be blocked by these countries for political economy reasons. They fear the end of the economic catching-up process that they experienced in the previous years. Their wish to catch up is built upon one of the fundamental economic promises of the EU, which was first formalised in the Treaty of Maastricht: the promise of an economic convergence among member states. But without adequate policies, the green transition bears the danger of fuelling economic polarisation within the EU, and of forfeiting political support from short-term losers of the necessary reforms.

Therefore, it is vital to take these concerns seriously and address them[2] for both political reasons – many of the green reforms must be adopted unanimously by the member states – as well as normative reasons, since the promise of a convergence of living standards was one important argument for convincing many Eastern European countries to join the EU in the first place. This requires the EU to develop both a new narrative of socio-economic convergence as well as an economic policy agenda that supports the countries in developing a green economy. If it fails to do so, the necessary political support for the green transition will crumble – with devastating long-term effects for the EU and, most likely, our planet. In other words, the challenges of climate change mitigation and socio-economic convergence in the EU are inextricably linked and must be addressed together.

This paper explores the interrelations between climate change mitigation and socio-economic convergence in the EU as well as the underlying political and scientific controversies. Based on that, it is argued that a multi-level industrial policy can be utilised to deliver on the promise of a green economy that fosters socio-economic convergence.

Socio-economic convergence and climate change mitigation

The challenge of climate change mitigation is well known. Despite the EU reducing its CO_2 emissions in the last 13 years, the speed and scale of the EU's policy agenda are not sufficient to meet the self-set targets of a 55% reduction by 2030 and net zero by 2050, even under very optimistic assumptions about the implementation of

2 See A. Andreoni in this publication.

promised climate policies of member states.[3] Inevitably associated with this is the challenge of socio-economic convergence within the EU: There is an increasing gap among the various member states in terms of their socio-economic well-being. The deeper reasons for this persistent gap lie in the different economic and political situations of the member states and their distinct starting positions when they joined the EU. Economically speaking, member states developed different engines of economic development by specialising on distinct economic activities – that is, they are following different *development models*, some of which are, unfortunately, incompatible with each other.[4]

Grouping countries according to their development models results in the four-part taxonomy summarised in Table 1: First we have the so-called core countries, which are characterised by a strong industrial base and high living standards. The firms in these countries have accumulated a lot of technological knowledge («capabilities») that allows them to produce and export very sophisticated products few others can provide on the world market. Typical examples of these highly competitive and export-oriented countries are Austria, Germany, and Sweden. Periphery countries, on the other hand, lack this technological superiority, meaning that they cannot stabilise their economic development through exports. They are often forced to stabilise it via debt – a strategy that was rendered unfeasible during the financial crisis of 2008. Thus, countries such as Greece, Italy, and Portugal are experiencing persistent socio-economic calamities. The third country group encompasses so called catch-up economies such as Poland and the Czech Republic, which are mainly located in the east. These economies started off with much lower living standards when they joined the EU, but they were able to develop a strong manufacturing sector by attracting international companies with low factor costs (especially wages). The last category consists of states such as Luxembourg and Ireland, which lay their focus on financial services and high foreign investment inflows accompanied by high tax *revenues*

3 European Environmental Agency (2021), *EEA Report No 13/2021: Trends and Projections in Europe 2021*, Copenhagen: EEA Publishing. Moreover, although environmental stressors are usually computed and regulated using a production-based approach (i.e. the emissions are accounted for wherever they occur), consumption and production activities in the EU are responsible for much more emissions abroad, a fact that becomes visible when one adopts a consumption-based approach (i.e. emissions are accounted for wherever the final products are consumed or processed further; for more details, see e.g. A. Tukker, H. Pollitt, and M. Henkemans (2020), «Consumption-based Carbon Accounting: Sense and Sensibility», *Climate Policy* 20(sup1): 1–13, https://doi.org/10.1080/14693062.2020.1728208). Thus, the number of production-based emissions present a lower bound for the challenge ahead.

4 See also J. Kapeller, C. Gräbner, and P. Heimberger (2019), *Wirtschaftliche Polarisierung in Europa*, Berlin: Friedrich-Ebert-Stiftung, www.fes.de/wirtschaftliche-polarisierung-in-europa; C. Gräbner, P. Heimberger, J. Kapeller, and B. Schütz (2020a), «Is the Eurozone Disintegrating? Macroeconomic Divergence, Structural Polarisation, Trade and Fragility», *Cambridge Journal of Economics* 44(3): 647–669, https://doi.org/10.1093/cje/bez059; C. Gräbner and J. Hafele (2020), *The Emergence of Core-periphery Structures in the European Union: A Complexity Perspective* (ZOE Discussion Papers 6), Bonn: ZOE, https://zoe-institut.de/wp-content/uploads/2020/09/zoe-dp6-graebner-hafele-core-periphery.pdf.

(but low tax *levels*) from the financial sector. This model often works at the expense of other member states, since countries such as the Netherlands regularly serve as tax havens for transnational companies, which would otherwise have paid higher taxes in other EU countries. For instance, estimates suggest that the «Netherlands alone is responsible for other EU members losing more than $10 billion of corporate tax revenue every year.»[5]

Table 1: The country groups that emerge from the different development models currently pursued in the EU

Group	Driver of development	Characteristics	Members
Core	Technological superiority on the world market	– High GDP per capita levels – Importance of industrial production – Production of complex products – Relatively low unemployment	– Austria – Belgium – Denmark – Finland – France – Germany – Sweden
Periphery	Credit (unsustainable)	– Lower export shares – Relatively high public debt – Tendency to current account deficits – Relatively high unemployment	– Cyprus – Greece – Italy – Portugal – Spain
Catch-up economies	Low factor costs, emerging industries	– Relatively low levels of wages and GDP per capita – High degree of foreign ownership – Small service sector – Important manufacturing sector	– Bulgaria – Croatia – Czech Republic – Estonia – Hungary – Latvia – Lithuania – Poland – Romania – Slovakia – Slovenia
Finance	Financial services	– High debt levels of private firms – Important share of finance in terms of gross output – High foreign investment inflows – Large incomes from wealth taxes	– Cyprus – Ireland – Luxembourg – Malta – Netherlands(*)

Source: C. Gräbner, P. Heimberger, J. Kapeller, and B. Schütz (2020b), «Structural Change in Times of Increasing Openness: Assessing Path Dependency in European Economic Integration», *Journal of Evolutionary Economics* 30(5): 1467–1495, https://doi.org/10.1007/s00191-019-00639-6.

(*) Some might find it surprising that the Netherlands are not classified as a core country. Yet, a close inspection of its economic structure as well as its crucial role as a tax haven within Europe clearly justify its place in the Finance group. See, for instance, Cobham and Garcia-Bernardo (2020), *Time for the EU* (see note 5).

5 A. Cobham and J. Garcia-Bernardo (2020), *Time for the EU to Close Its Own Tax Havens*, Tax Justice Report, https://taxjustice.net/reports/time-for-the-eu-to-close-its-own-tax-havens.

Historically, the emergence of these different development models can be traced back to the formation of the European Economic Community, the predecessor of the EU. Already in the 1980s, with the accession of Greece, Spain, and Portugal into the Community, countries with fundamentally different levels of technological capabilities were integrated into a common market. However, over time these discrepancies in their initial starting positions did not level out. Rather, they were self-reinforcing, culminating in an ongoing divergence. In other words, the accumulation of technological capabilities turned out to be highly path dependent. This means that because it is easier to accumulate more capabilities when one already has many of them – a *the-rich-get-richer-like* phenomenon – countries with fewer initial stocks of capabilities do not catch up to the others naturally.[6]

This mechanism results in persistent differences in capabilities, which some scholars already in the 1980s expected would lead to recurring structural crises.[7] At the very latest, the economic crisis of 2008 showed that these predictions were right. It uncovered the gross domestic product (GDP) growth of large parts of the Southern European peripheries in the years before the crisis as a phase of «growth without development»[8]: Their GDP growth was based on debt-driven consumption and tourism rather than the development of economic capabilities.[9] As a consequence, it is much more difficult for those countries to recover from economic shocks, such as the current Covid-19-induced crisis, than for countries that build their economic development on the accumulation of technological capabilities and the production of complex goods and services. Thus, just as with the economic crisis of 2008, the Covid-19 crisis is fuelling further polarisation between core and peripheral countries.[10]

6 M. Aistleitner, C. Gräbner, and A. Hornykewycz (2021), «Theory and Empirics of Capability Accumulation: Implications for Macroeconomic Modelling», *Research Policy* 50(6): 104258, https://doi.org/10.1016/j.respol.2021.104258.

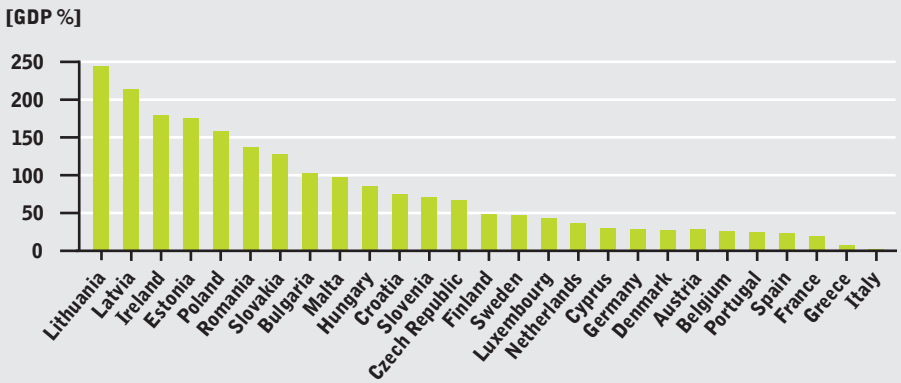
7 For example, S. A. Musto (1981), «Die Süderweiterung der Europäischen Gemeinschaft», *Kyklos* 34(2): 242–273, https://doi.org/10.1111/j.1467-6435.1981.tb01187.x.

8 D. Nohlen (1985), «Ungleiche Entwicklung und Regionalpolitik in Südeuropa (Italien, Spanien, Portugal). Eine Einführung», in *Ungleiche Entwicklung und Regionalpolitik in Südeuropa (Italien, Spanien, Portugal)*, ed. R. Schultze and D. Nohlen (Bochum: Brockmeyer), 9–16.

9 Gräbner and Hafele (2020), *The Emergence* (see note 4).

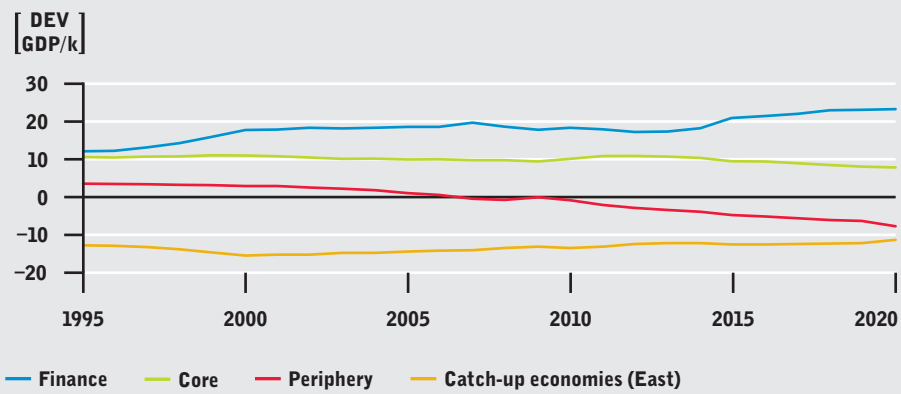
10 C. Gräbner, P. Heimberger, and J. Kapeller (2020c), «Pandemic Pushes Polarisation: The Corona Crisis and Macroeconomic Divergence in the Eurozone», *Journal of Industrial and Business Economics* 47(3): 425–438, https://doi.org/10.1007/s40812-020-00163-w; C. Odendahl and J. Springford (2020), *Three Ways COVID-19 Will Cause Economic Divergence in Europe* (CER Policy Paper No. 2020), London, Brussels, Berlin: Centre for European Reform, www.cer.eu/sites/default/files/pb_econdiv_20.5.20.pdf.

Fig. 1a: Income polarisation within the EU, and the potential catching up of the East (1995–2020)
Cumulated growth GPD p.c. (PPP)



Source: World Bank (data); own calculation and chart.

Fig. 1b: Income polarisation within the EU, and the potential catching up of the East (1995–2020)
Deviation from average income (average GDP p.c. (PPP), country groups see table 1)



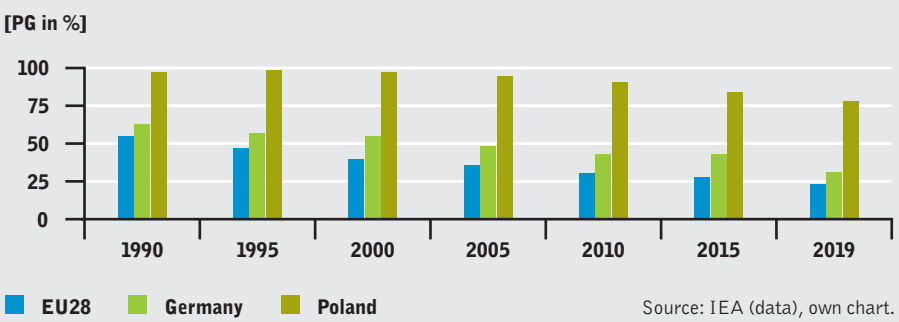
Source: World Bank (data); own calculation and chart.

These divergence patterns show an intricate link to the challenge of climate change mitigation, and it is most visible for the case of Eastern European countries. As one can observe in Figure 1a, several Eastern European countries seem to be catching up economically, since their overall GDP growth in the period 1995–2020 considerably exceeds that of most other member states. Figure 1b confirms this impression,

at least for catching up to the Southern European countries,[11] but it also shows that this is partly due to the relative decline of incomes in the Southern periphery, and that the gap with the highly financial countries is widening.

The development model that allowed these Eastern economies to catch up at least to some extent, however, relies on an industrialisation that comes with considerable ecological costs. Eastern countries' economic growth and their employment opportunities are more dependent on environmentally harmful activities than is the case in other EU countries. Moreover, these countries are more reliant on environmentally harmful energy sources. Figure 3a below illustrates this by showing the main sources for power generation in Germany, representative of the European core countries from Table 1, and Poland, representative of the Eastern European catch-up economies. The data points to a pronounced asymmetry: Poland is much more dependent on fossil fuels, indicating that the transition costs for putting Poland on a 1.5°C-compatible emission-reduction pathway are much more severe than for Germany, for instance. This is true for most economies in Eastern Europe. Figure 2c provides complementary insights by displaying the per capita number of patents in environmentally efficient areas. Again, the data points to a very unequal distribution of patenting activities, hinting at an unequal distribution of capabilities in these areas. In this context, countries such as Sweden and Germany are much more likely to benefit from a green transition at the EU level than, for instance, Poland or Greece.

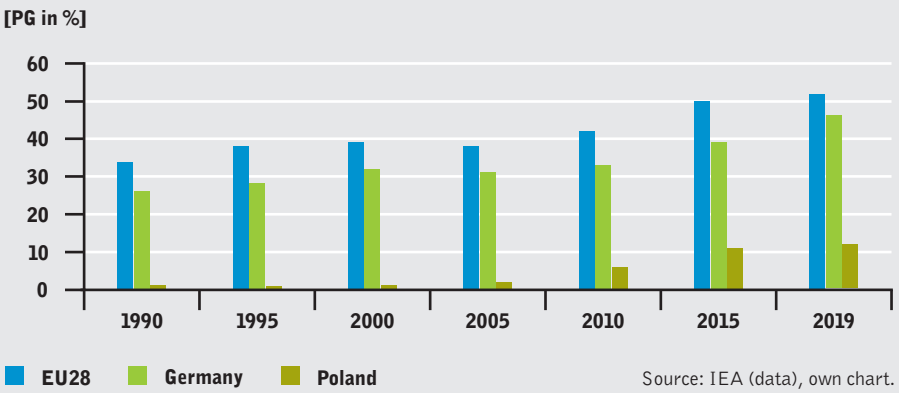
Fig. 2a: The unequal distribution of costs and opportunities among EU member states
Sources for total power generation: Coal and oil



Source: IEA (data), own chart.

11 This fact should not be taken too optimistically: First, the catching-up of the Eastern countries is at least to some degree the flipside to the economic problems of the Southern European countries, which were losing considerable export opportunities to the Eastern countries due to their lower factor costs (see Gräbner et al., note 3); second, not only is the socio-economic situation of Southern European countries problematic in itself, it is also not clear yet whether the Eastern countries are «catching up» to these detrimental pathways of the European south, or whether they are indeed approaching the richer countries in Central Europe; see Gräbner et al. (2020a), «Is the Eurozone» (see note 4).

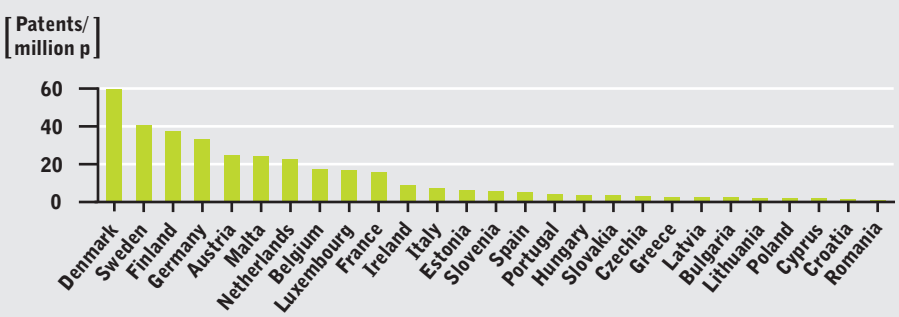
Fig. 2b: The unequal distribution of costs and opportunities among EU member states
Sources for total power generation: Low carbon sources



Source: IEA (data), own chart.

Note: Panel 2a highlights that Poland exhibits more than twice the dependency on fossil energy sources than Germany, which implies higher prospective costs during a transition towards renewable energy. Panel 2c points to a very unequal distribution of green technology-based patents. This detachment renders countries such as Poland practically incapable of elevating themselves to the same level as leading-edge performers in the green technology segment.

Fig. 2c: The unequal distribution of costs and opportunities among EU member states
Patents in environmental-related areas (patents per million people)



Source: OECD and World Bank, 2017 (data); own chart.

In effect, stronger regulations – and corresponding transformations – as envisaged by the European Green Deal represent a serious threat to the project of economic convergence in the EU. This means that especially countries whose industries are

based on emissions-intensive production and that show a low level of innovation in green technology areas must be offered a new and optimistic narrative of socio-economic convergence, one that is not threatened but instead strengthened by ecological reforms envisioned by the EU. Otherwise, important ecological reforms are likely to be blocked by these countries for political economy reasons.

Synergies, conflicts, and the need for industrial policy

Although addressing these interrelated challenges represents an unprecedented difficulty for EU policy-makers, there are potential synergies in the solutions to those problems that so far have remained underexplored. For instance, relocating essential supply chains from other continents to European peripheries might not only improve upon the resilience of the European economy, but it could also create employment opportunities and sources of value added for the economies of the member states, thereby supplying a new avenue for catching up economically. At the same time, this strategy could reduce emissions, both domestically as well as abroad, by replacing outsourced production facilities with more emission-efficient production facilities in the EU and further reduce emissions through shorter transport routes.[12]

However, such onshoring would come with considerable costs, and it would require active location policies as well as a trade policy that effectively puts a price tag on all social and ecological harm induced by imported goods throughout the overall production and delivery process. Without such a pricing scheme, it seems unlikely that goods produced (almost) entirely within the Union would be able to compete with international alternatives.[13] If the consideration of social and ecological calamities increases the prices of goods on the European market, this could also incentivise producers to abstain from exploitative practices outside the EU, given that the European market represents a quite relevant sales area for many companies.

Another difficulty with such an endeavour is that, although it potentially allows for the construction of a new catching-up model, considerable transition costs are likely to occur: Workers in industries that need to be phased out because of the ecological damages associated with them (e.g. the coal-mining industry in Poland) will not immediately find jobs in the newly onshored industries – and might even have difficulties acquiring the skills required in the new industries.[14]

12 This cannot, however, substitute for a debate about European consumption patterns: Wood et al. (2019) show that many production activities associated with European consumption patterns can neither be fully avoided nor onshored to the EU itself, since e.g. the relevant resources cannot be extracted from European territory; see Wood et al. for a more detailed discussion and quantitative evidence: R. Wood, K. Neuhoff, D. Moran, M. Simas, M. Grubb, and K. Stadler (2019), «The Structure, Drivers and Policy Implications of the European Carbon Footprint», *Climate Policy* 20(sup1), S39–S57, https://doi.org/10.1080/14693062.2019.1639489.

13 A carbon border adjustment mechanism could also prevent widespread carbon leakage, where industries outsource their carbon-intensive productions in regions with lower ecological restrictions, causing severe damage to the local – and subsequently the global – environment.

14 For the role played by public services in this context, see A. Coote in this publication.

This shows that only a coherent set of EU-wide policies with a strong multi-level governance component can address the challenge effectively. One key element of such a set of policies is a place-based, self-determined industrial policy that allows regions to develop resilient industries. Based on recent findings in the industrial policy literature,[15] we suggest that such an industrial policy should account for the following three key principles (see also Figure 3):[16]

- **Adaptability** of policies to allow for the flexibility needed to react to unforeseen challenges and to do justice to the nature of complex innovation processes.[17] The Montreal Protocol on the ozone layer, the rise of electric vehicles, and Europe's success in controlling water pollution, which are some of the biggest successes in environmental policy, were achieved with this experimentalist approach to policy-making.[18]
- **Context appropriateness** to do justice to the fact that the same rules affect countries on different development trajectories differently, and different reforms are needed in core, periphery, catch-up, and financialised countries. This also allows for a better use of existing country-specific technological capabilities and institutional arrangements.[19]
- **Coherence** to create policy packages that maximise synergies instead of focussing on single policies with the risk of creating unnecessary trade-offs.[20] Here, it is important to also factor in long-run trade-offs such as resource depletion and climate trade-offs to make sure that established industries are resilient.

15 For example, H.-J. Chang (2009), *Industrial Policy: Can We Go beyond an Unproductive Confrontation?* www.tek.org.tr/dosyalar/Chang-ABCDE-09.pdf; J. Lin and H.-J. Chang (2009), «Should Industrial Policy in Developing Countries Conform to Comparative Advantage or Defy It? A Debate between Justin Lin and Ha-Joon Chang», *Development Policy Review* 27(5): 483–502; M. Mazzucato (2015), «Which Industrial Policy Does Europe Need?», *Intereconomics* 50(3): 120–155; M. Pianta, M. Lucchese, and L. Nascia (2020), «The Policy Space for a Novel Industrial Policy in Europe», *Industrial and Corporate Change* 29(3): 779–795.

16 See also C. Gräbner and J. Hafele (2020), *The Emergence* (see note 4).

17 M. Peneder (2016), «Competitiveness and Industrial Policy: From Rationalities of Failure towards the Ability to Evolve», *Cambridge Journal of Economics* bew025; D. J. Teece (May 2017), «Towards a Capability Theory of (Innovating) Firms: Implications for Management and Policy», *Cambridge Journal of Economics* 41(3): 693–720.

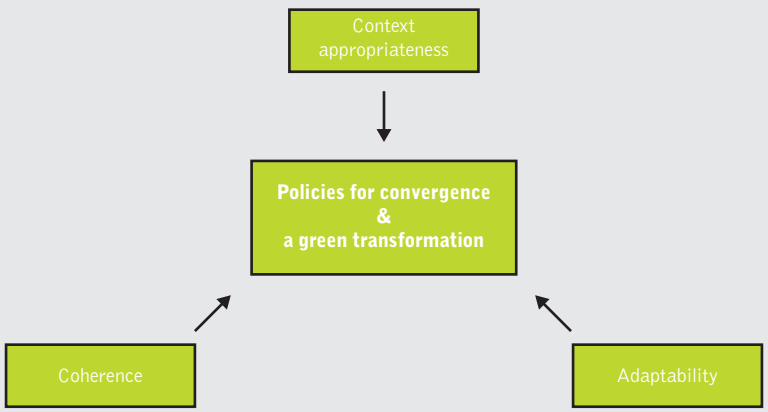
18 D. Victor and C. Sabel (2022), *Fixing the Climate: Strategies for an Uncertain World*, Princeton, NJ: Princeton University Press.

19 C. A. Hidalgo et al. (2007), «The Product Space Conditions the Development of Nations», *Science* 317(7): 482–487; H.-J. Chang (2010), «Institutions and Economic Development: Theory, Policy and History», *Journal of Institutional Economics* 7(4): 473–498.

20 For an EU Commission discussion on the topic, see e.g. European Commission (2016), «Data, Information and Knowledge Management at the European Commission», Communication C(2016)6626, https://ec.europa.eu/transparency/documents-register/detail?ref=C(2016)6626&lang=en, and also European Commission (2019), «2019 EU report on Policy Coherence for Development», Staff Working Document SWD(2019)20, https://ec.europa.eu/transparency/documents-register/detail?ref=SWD(2019)20&lang=en.

A coherent, adaptable, and context-appropriate industrial policy can support the accumulation of productive capabilities and the growth of green industries in peripheral European countries.[21] Actively steering European economic development in this direction lays the groundwork for a successful green deal by offering peripheral countries economic development prospects that respect planetary boundaries.

Fig. 3: The three principles of an adequate policy response at the EU level



Source: own chart.

Conclusion

If the EU is to tackle the climate crisis effectively, it must find new models for economic convergence, otherwise it will most likely fail on both fronts. This paper has argued that an active industrial policy that is context appropriate, coherent, and adaptable can be utilised to address this challenge. Nevertheless, one must acknowledge that the necessary green transition on the EU level comes with transition costs, challenges, and opportunities that affect distinct people, firms, and countries very differently, and hence bears the threat of rising inequalities, both within and among countries. Central to the success of a green transition is, therefore, the EU's adequate reaction to this fact. This reaction can then enable and facilitate a green transformation that really leaves no one behind.

21 In accordance with the principles of context-appropriate policies, this paper does not set out to suggest concrete policy instruments, since the endeavour to develop a coherent policy strategy fulfilling the criteria expounded above would go beyond the scope of this analysis. For instance, the process would require discussions with decision-makers to clearly define policy goals, and subsequently analysing all existing policies within their institutional context, taking into account their contributions and contradictions to these goals.

ANNA COOTE

The Case for a Social Guarantee: Universal Access to Life's Essentials

Introduction

The internationally agreed goal of reducing carbon emissions to «net zero» certainly calls for a rapid transformation of the economy. But the economy is not just a bundle of interacting mechanisms – such as investment, debt, interest rates, trade, competition, supply chains, pricing, consumption patterns, and so forth – to be tweaked by experts. Rather, it is a social construct that involves processing human and environmental resources. And it is a means, not an end in itself. To restate the obvious, «we live in societies with economies, not economies with societies».[1] So the «Great Turnaround» must focus on people as well as the planet and put human as well as ecological needs at the heart of economic change.

This paper starts from the premise that the end to which the economy is a *means* is human and planetary well-being, calibrated to be mutually reinforcing. It introduces a framework for policy and practice know as the Social Guarantee (SG), which has three goals. The first is to *satisfy basic human needs* in order to improve and support well-being for all. The second is to *develop collective systems and structures* for satisfying needs. The third is to support planetary well-being by satisfying needs in ways that are both *universal and sufficient* – that is, by meeting «the needs of the present without compromising the ability of future generations to meet their own needs».[2] This signals an emerging recognition in new economic thinking that social justice and ecological sustainability are interdependent goals that can only be achieved together. It goes well beyond the European Commission's proposal for a Social Climate Fund, which seeks only to compensate «vulnerable households» for the regressive effects of climate mitigation.

The paper begins by explaining what is meant, in this context, by human needs and how needs differ from wants. It explores the role of the Social Guarantee in shaping collective provisioning of in-kind benefits to satisfy needs, and how

1 J. Barry (2016), «Green Political Economy: Beyond Orthodox Undifferentiated Economic Growth As a Permanent Feature of the Economy», in *The Oxford Handbook of Environmental Political Theory*, ed. T. Gabrielson et al. (Oxford: Oxford University Press), 304–317.

2 Brundtland Commission (1987), *Our Common Future* (Oxford: Oxford University Press).

meeting needs in ways that are both universal and sufficient can bring multiple gains for human and planetary well-being. It then sets out ways in which this approach can make a substantial contribution to a green transformation.

Understanding human needs

What is required for the «Great Turnaround» is a reimagining of entire economic systems, grounded in an understanding of what everyone needs to survive, to participate in society, and to flourish – and a recognition that the primary purpose of the economy should be to satisfy those needs.

Theorists have defined basic human needs as «participation, health and critical autonomy».[3] These are the things that none of us can live without. There is broad, evidence-based consensus about what they are. Theories of human «capabilities» (which are distinct from, but overlapping with need theory) hold that «affiliation, bodily integrity and practical reason» are basic necessities for anyone to live a life that they value.[4] And since these definitions were first articulated (more than 30 years ago), one other factor has come sharply into focus: What people need most fundamentally is a sustainable ecosystem – a planet that is thriving, not burning or drowning.

Basic human needs, as defined above, are universal across time and space. The detail of how they are met varies widely between locations, cultures, and generations. However, certain generic «need satisfiers» are fairly constant: We call these *«life's essentials»*. As well as a safe planet, they include (not a definitive list) clean air and water, nutrition, care, education, housing, energy, security, transport and – these days – access to the internet.[5]

Human needs are not the same as wants. We often want what we need, but we do not need everything we want. Want is generally self-defined and inherently insatiable: We can always want something else and something more. Needs on the other hand can be objectively defined and are satiable. You can reach a point where your needs are met sufficiently, and having more would be redundant or even harmful – think of food, security, and transport, for example.

The Social Guarantee: A framework for universal sufficiency

The Social Guarantee aims for *universal sufficiency*, recognising that *everyone* should have *enough* to meet their needs. There are well-established methods for deciding what is sufficient, notably the minimum income standard determined through

3 L. Doyal and I. Gough (1991), *A Theory of Human Need* (London: Palgrave Macmillan).

4 M. Nussbaum (2000), *Women and Human Development: The Capabilities Approach* (Cambridge: Cambridge University Press).

5 A. Coote and A. Percy (2020), *The Case for Universal Basic Services* (Cambridge: Polity Press).

qualitative research in the United Kingdom (UK).[6] In the context of the Social Guarantee, sufficiency implies both the adequate and appropriate quality of what is provided to meet needs as well as constraints on excessive resource use or consumption, so that needs can be met for all, now and in the future. This aligns with Raworth's vision of a «safe and just space for humanity»: between a floor consisting of secure social foundations, below which no one should fall, and a ceiling consisting of planetary boundaries, which cannot be breached without imperilling the ecosystem that sustains life on Earth.[7] Insisting that economies should aim above all to carve out this «safe and just space» is consistent with Barth and Jacobs' stipulation that economic policy should focus «not on achieving growth, but on meeting society's primary goals».[8] It marks a radical departure from orthodox economics, where the imperative is to satisfy wants and preferences, which have no limits, through market transactions.

Meeting human needs

While some of life's essentials can be purchased individually through conventional markets, others are beyond the means of all but the rich. All require some degree of collective effort – through public services (education and health care, for example) or through various combinations of services, public subsidies, and government regulation – to ensure they are genuinely accessible and affordable for all who need them (as in the case of water, energy, housing, child care, transport, and internet access). Even where food is concerned (which people typically expect to buy for themselves), collective measures are required to ensure universal access to food that is sustainably produced and sufficiently nutritious.

The concept of a Social Guarantee arises from this analysis.[9] It comprises not only *a living income* derived from a fair wage and an income guarantee, but also a range of *universal services*. The latter term (which is the main focus of this paper) covers services and a range of other collective activities – including taxation, investment, and regulation – to enable everyone's needs to be met. The SG revives the collective ideal featured in post-war welfare states and learns from their successes and shortcomings to create a framework for contemporary policy and practice.

A «framework» is distinct from a manifesto or blueprint. Since each of life's essentials can only be met effectively through systems and structures that are customised for the purpose (a provisioning system for housing would be very different from one for transport or education), the SG framework offers a principled approach

6 Joseph Rowntree Foundation (2021), «A Minimum Income Standard for the United Kingdom in 2021», www.jrf.org.uk/report/minimum-income-standard-uk-2021.

7 K. Raworth (2017), *Doughnut Economics: 7 Ways to Think like a 21st Century Economist* (London: Random House).

8 See J. Barth and M. Jacobs in this publication.

9 See www.socialguarantee.org; see also L. Akenji et al. (2021), *1.5 Degree Lifestyles: Towards a Fair Consumption Space, Hot or Cool Institute*, Chap. 6.

that can be applied in every case. Briefly summarised, this includes: universal entitlement according to need rather than ability to pay; subsidiarity of provisioning; diverse models of ownership of provider organisations, all governed by public interest obligations; sufficient and sustainable service quality and provisioning practices; decent pay and conditions for service workers; democratic control of strategic decisions; and citizen/resident engagement in co-design and co-production of services.[10]

This framework can be seen as the social pillar of a green transformation. It reflects many aspects of President Joe Biden's social safety plan (from child care, home health care, and housing, to paid sick leave and free school meals), which has yet to pass through Congress.[11] It echoes the idea of a «just and inclusive transition», which is a goal of the Green Deal of the European Union (EU), but it goes beyond its current focus on employment, energy, and housing. It is closely aligned with the EU's Pillar of Social Rights, but with a stronger emphasis on ensuring universal access to all of life's essentials. Furthermore, by offering a coherent set of principles that can be applied in a range of different socio-economic contexts, it can help to shape the kind of «economic convergence» across the EU that Grabner and Hafele argue is a prerequisite for tackling the climate crisis.[12]

Implementing the Social Guarantee

While the Social Guarantee is a big, radical idea, it is pragmatic in that it can be put into practice on a small, local scale and developed incrementally, learning from experience within and between countries. There are numerous practical examples in which some or all of the SG principles are applied to satisfy human needs by collectively providing one or more of life's essentials.

For example, Norway offers an enviable model for child care. It has well-qualified staff, relatively high staff-child ratios, a consistent form of child care setting (the kindergarten), and continuity of care from age one to six as the norm. It combines «a legal guarantee to a place for all children with fees that are both low overall and income-related».[13] Where housing is concerned, the town of Freiburg in southwest Germany is reportedly a trailblazer for sustainability, involving «far more than simple technological conversion» of housing stock by promoting «urban eco-living, facilitated by a strong long-term vision, national policy frameworks and a focused

10 See www.socialguarantee.org/principles; see also A. Coote (2021), «Exploring the Case for Universal Services», in *Economic Policies for Sustainability and Resilience*, ed. P. Arestis and M. Sawyer (Cambridge: Palgrave), 230–232.

11 T. Luhby and K. Lobosco (2021), «Here's What's in Biden's Build Back Better Plan», *CNN*, November 19.

12 See C. Gräbner-Radkowitsch and J. Hafele in this publication.

13 A. Ellingsaeter (2014), «Towards Universal Quality Early Childhood Education and Care: The Norwegian Model» in *An Equal Start? Providing Quality Early Education and Care for Disadvantaged Children*, ed. L. Gambero, K. Stewart, and J. Waldfogel (Bristol: Policy Press), 53–76.

commitment to change and community engagement».[14] Other examples include free public transport in Estonia,[15] housing co-operatives in Denmark,[16] funding for long-term care in Germany,[17] and free meals during school holidays in Finland.[18] Many well-documented cases can be found elsewhere,[19] but I cannot do justice to them here.

Potential benefits: Equality, efficiency, employment

These examples highlight the value of services as *in-kind benefits*, which are highly redistributive, as they are worth much more to those on low incomes. A study of services providing education, health care, social housing, child care, and elderly care as «in-kind benefits» free at the point of use in countries of the Organisation for Economic Co-operation and Development found that the poorest 20 % of these populations would have to spend 76 % of their disposable income if they had to pay for them out of pocket, compared with an average of 29 %.[20]

It is increasingly apparent that collectively provided services tend to give better value for money than individual market transactions. This is because they can achieve economies of scale, whereby people share what is provided (think of public transport and child care centres) and eliminate excessive profit extraction (compare housing co-ops with private landlords). They can avoid advertising and other transaction costs associated with multiple individual consumer choices, as well as moral hazards that are encountered when profit incentives combine with unequal knowledge in markets. Public services have been accused of inefficiencies to justify introducing market rules. However, privatisation, competition between providers, and «customer» choice have largely failed to improve outputs, let alone outcomes. These failings have been greatly exacerbated by public spending cuts and by efforts to cope with a global pandemic.

14 N. Falk and J. Rudlin (2018), Learning from International Examples of Affordable Housing (London: Shelter), 13.

15 Smart Transport (2020), «How Tallinn Provides Free Public Transport for 420,000 People», www.smarttransport.org.uk/features/how-tallinn-provides-free-public-transport-for-420-000-people.

16 Stories.coop (n.d.), «25. KAB – How Cooperative Housing Works in Denmark», https://stories.coop/stories/kab-how-cooperative-housing-works-in-denmark.

17 C. Glendinning and M. Wills (2018), «What Can England Learn from the German Approach to Long-Term Care Funding?», http://blogs.lse.ac.uk/politicsandpolicy/german-approach-to-long-term-care-funding.

18 See Big in Finland (n.d.), «Children Eat for Free in Helsinki in the Summer», https://en.bigin-finland.com/children-eat-free-helsinki-summer.

19 Coote and Percy (2020), *The Case*, pp. 57–107 (see note 5).

20 G. Verbist, M. Forster, and M. Vaalavuo (2012), *The Impact of Publicly Provided Services on the Distribution of Resources: Review of New Results and Methods* (OECD Social, Employment and Migration Working Papers No. 130), www.oecd-ilibrary.org/social-issues-migration-health/the-impact-ofpublicly-provided-services-on-the-distribution-of-resources_5k9h363c5szq-en.

Furthermore, investment in services can generate employment at all skills levels across all regions and localities, because people need services wherever they live. Recent research from the New Economics Foundation has shown that an investment of £962 million in UK social care would create nearly 50,000 social care jobs in one year alone.[21] Most services are labour-intensive and most jobs are low-carbon, dependent on human relationships, and not easily automated: Teaching, caring, and health services are obvious examples. Investing more in these essential services can offer routes out of dependence on industries that depend on fossil fuels.[22]

Defending democracy

Effective action on climate change depends on democratic consent, unless governments turn towards authoritarianism by pressing ahead regardless. Defending democracy means addressing the causes of political inertia, polarisation, and resistance. People who resent fuel taxes, for example, are worried about falling living standards, lack of opportunity, and threats to perceived «freedoms» to carry on as usual.[23] They feel disenfranchised and abandoned, assuming, with some justification, that powerful elites are feathering their own nests. The same feelings drove public support for the Brexit campaign, once the EU was made a scapegoat for everything distant and disempowering. The Social Guarantee can help to reframe climate action as a key component of a political programme that aims to ensure that everyone gets what they need. Technical measures to cut harmful emissions become part of a package that includes public investment in universal services that supply life's essentials. What is more, the SG is not a «safety net» to avoid destitution, or a «bribe» to keep potential rioters at bay: It is a way of signalling that meeting people's basic needs is a political priority and central to the planned transformation.

A policy pathway to green transformation

In this section, I briefly summarise ways in which the Social Guarantee can contribute to the social and ecological goals of the Great Turnaround.

A supportive ethos

To ensure universal access to life's essentials, this approach embodies an ethos of collective responsibility and a needs-based approach to human welfare, based on sufficiency. As such, it offers a robust framework for policy and practice that is closely aligned with the goal of living well within limits.

It seeks to build solidarity and mutual support among people and groups in ways that cannot be achieved by systems based on market transactions alone. By

21 D. Button and A. Coote (2021), *A Social Guarantee: The Case for Universal Services* (London: New Economics Foundation), 21.

22 See C. Gräbner-Radkowitsch and J. Hafele in this publication.

23 See D. Driscoll and M. Blyth in this publication.

encouraging an awareness of interdependence and developing practical experience of collective responsibility, it can help to create favourable conditions for society to «play a pivotal role in imposing limits» on individual freedom to consume more than is required to live a good life.[24] Put another way, there is security in knowing that everyone can have enough as long as no one has too much more than they need.

Provisioning in the public interest

The SG framework can influence provisioning systems so that they remain within ecological limits. Universal services are provided through a wide range of social and public institutions at national and local levels. Hospitals and schools are examples. Although they are run by for-profit companies, and although «market rules» such as competitive tendering have pervaded parts of the public sector, there remains – in Europe if not in the United States (US) – a critical mass of democratically controlled public-interest organisations that spend public funds to deliver services to meet people's needs. Where investment and management are in the public domain, they can influence what materials are used, what the sources of energy are, how waste is managed, and how emissions are controlled – all within upper and lower limits that aim to secure well-being for all within planetary boundaries.

Where health care is concerned, for example, market-led provisioning systems are manifestly unable to organise collectively in the public interest: that requires government intervention – either by directly controlling provider organisations or by regulating non-state providers. In the US, the carbon footprint of health care (which is largely market-led) is two and a half times greater than in the UK, and three and half times greater than in several European countries, where health care is wholly or partly controlled by government.[25] Meanwhile, the UK's National Health Service (NHS) has a detailed, long-term plan to deliver net zero.[26] For the year 2020/2021 it reported that its planned emission reductions were on target: «By the end of the financial year the NHS will have reduced emissions by 1,260 kilotons — the equivalent of 1.7 million flights from London to New York.»[27] While it is true that private corporations could – and must – be equally ambitious, they are constrained by (among other factors) competition rules and obligations to shareholders.

Inherent in the SG framework is a stipulation that all organisations that receive public funds to provide universal services subscribe to public interest obligations, which include the requirement to cut emissions and safeguard natural resources. This entails a system of *social licensing*,[28] which can be built into contracts with suppliers,

24 D. Fuchs (2019), «Living Well within Limits: The Vision of Consumption Corridors», In *Routledge Handbook of Global Sustainability Governance*, ed. A. Kalfagianni, D. Fuchs, and A. Hayden (Routledge), 296–307.

25 P. Pichler et al. (2019), «International Comparison of Health Care Carbon Footprints», *Environmental Research Letters* 14(6), https://dx.doi.org/10.1088/1748-9326/ab19e1.

26 See NHS England (2021), *Delivering a Net Zero NHS – One Year Progress*, www.england.nhs.uk/wp-content/uploads/2021/09/item4-delivering-net-zero-nhs-updated.pdf.

27 See https://twitter.com/nhsengland/status/1446070329084891148.

28 J. Froud and K. Williams (2019), *Social Licensing for the Common Good*, https://renewal.org.uk/social-licensing-for-the-common-good.

who can be selected for their ability to deliver – through their own practice and what they supply (on sustainability rather than simply on price).

Public consumption and collective behaviour change

The Social Guarantee puts collective (or public) consumption on the agenda in the effort to achieve net zero.[29] It offers a route to *collective behaviour change*, not only by shaping the practice of provider organisations, but also by influencing consumption patterns of people using services. For example, a free bus service can discourage other, more energy-intensive forms of travel. Housing policies can be designed not only to create zero-carbon homes made from renewable materials, but also by planning homes as part of neighbourhoods that have vegetable allotments, amenities for repairing, sharing, and recycling goods, active travel and good public transport links – all of which encourage residents to tread more lightly on the planet. Child care services can be managed in ways that raise awareness about sustainable consumption and encourage it in practice. Schools can directly support healthy eating and sustainable diets. And so forth.

Sufficient consumption: Maintaining limits

The SG supports sufficient levels of consumption, both by underpinning the lower limit and by helping to constrain excess. Where the lower level is concerned, it helps to maintain the social foundation of a safe and just space for humanity, as I have noted. It can also help to constrain excessive consumption in (at least) two ways: by changing attitudes and by redirecting resources.

Attitudes can change if collective provisioning becomes an acceptable – even popular – way to secure much of what is necessary for everyone to live well within limits. People would have less to fear in terms of scarcity and inequality, and this would help to shift norms and expectations, influencing what people want to buy and what they consider «enough», while raising awareness of the negative effects of material accumulation.

At the same time, funding universal services is likely to require higher taxation, unless debt rises. Even where a tax system is proportional rather than progressive, higher disposable incomes are likely to be brought below the level they would otherwise be, reducing luxury consumption (all else being equal). High levels of greenhouse gas emissions are strongly associated with upper-income groups: The higher the income, the more energy-intensive lifestyles are ratcheted up through second homes, multiple flights, more private vehicles, household gadgets, sports equipment, yachts, heated pools, and so forth. At the other end of the income scale, where people shift from poverty to having enough, their ecological footprint may increase, but not on a scale that remotely compares with the rich.[30] For optimal

29 A. Coote (2021), «Universal Basic Services and Sustainable Consumption», *Sustainability: Science, Practice and Policy* 17(1), 32–46.

30 L. Chancel (2017), *Unsustainable Inequalities* (Cambridge, MA: Harvard University Press), 65–77; I. Gough (2017), *Heat, Greed and Human Need* (Cheltenham: Edward Elgar), 146–170.

impacts on ecological sustainability, a tax system would include a progressive income tax alongside wealth and inheritance taxes, as well as taxes on energy-intensive luxuries – and tax revenues would be invested in collective measures to meet needs.

In conclusion

The Social Guarantee refocuses progressive politics on human relations, on how we care for each other, and on the importance of investing in the social infrastructure on which the rest of the economy depends. It draws on current thinking about the foundational economy,[31] the care economy,[32] and sustainable economic prosperity.[33] It offers a coherent, ethical, and well-evidenced basis from which to address such issues as investment, regulation, and carbon mitigation. The main reasons why this approach should be central to the Great Turnaround can be summarised as follows:

1. *Moral imperative.* If the goal is to transform the economy and it is recognised that every individual has a right to life's essentials, including a safe planet, then this should be the starting point for transformation.
2. *Political incentive.* People need to feel secure and able to live well to build trust and create the conditions for democratic consent. Giving priority to meeting people's needs addresses some of the underlying causes of inertia, resistance, and political polarisation.
3. *Practical pathways.* Universal services contribute directly by generating low-carbon jobs across localities, by supporting people through the transition, and by bringing shared purpose and democratic control to bear on transforming energy-intensive areas of need such as housing, transport, and food.

Finally, it is important to stress that the Social Guarantee is not a single policy lever but a proposed route for policy-making across a range of different areas that supply life's essentials. The framework is shaped by distinctive values, favouring collective action to meet shared needs – now and in years to come. But how far these proposals are able to fulfil their promise depends on how services are devised, organised, and funded, where power lies, models of ownership, how people participate, conditions of eligibility, and how entitlements are realised. The SG agenda can start small and local, building incrementally, but its ambitions go well beyond piecemeal reform. It is essentially about changing whole systems to achieve a sustainable future.

31 J. Froud and K. Williams (2018), *Foundational Economy*, (Manchester: Manchester University Press).

32 See Women's Budget Group (2020), *Creating a Caring Economy: A Call to Action*, www.thewomensorganisation.org.uk/wp-content/uploads/2020/11/WBG-Report-Final_.pdf.

33 T. Jackson (2017), *Prosperity without Growth*, https://timjackson.org.uk/ecological-economics/pwg.

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Economic policy for a green and just transition

The long-term challenges have lost none of their significance – be it climate breakdown, species extinction, the increase in inequality, or demographic change. On the contrary, they harbour enormous crisis potential in themselves.
The contributions in this publication want to provide food for thought on what a long-term economic policy could look like. The authors need to build on both the promises and disappointments experienced with projects such as the «Energiewende» in Germany, the Green New Deal, and the environmental programme of the Biden administration.
The challenge is to craft a strategic approach that can set the course for long-term success – with regard to the climate crisis, increasing inequality, and creating financial stability.

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