



FRAMING THE CIRCULAR ECONOMY AS AN EU RECOVERY OPPORTUNITY



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Abstract

Recovery from the Covid-19 crisis presents an important and unique opportunity for the EU to accelerate its transition towards a climate-neutral and circular economy. While there is little dispute about the opportunities offered by the funds available for the low-carbon and circular economy, the longer-term impact on Europe's decarbonisation trajectory will depend on the choices made in the National Recovery and Resilience Plans and on how the overall policy framework is adapted.

After describing the EU recovery plan, this paper discusses various policy instruments – both new and existing – to create demand for circular materials and lower-carbon products, illustrated by examples of four resource and carbon-intensive sectors, namely construction, steel, textiles and plastics. Acknowledging the immediate need for short-term economic recovery and employment creation, opportunities to accelerate the transition are there, for example in future-proof infrastructure, no-regret projects, and in industry and construction, even if the short-term employment effects may not be significant. Investment will need to be coupled with reforms that enable new circular and low-carbon value chains to develop. A major challenge is the continuous monitoring of the sustainability impacts of the Plans, drawing lessons from the last global financial crisis where monitoring of the environmental effects of stimulus programmes was for the most part absent.



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Contents

- Introduction 1
- 1. Circular economy in the EU recovery plan 1
- 2. Evidence on economic opportunities and job creation..... 5
- 3. Measures to stimulate demand (Instruments)..... 7
- 4. Circular economy and industrial value chains 11
- 5. Summary and conclusions 16
- References 18

Introduction

‘Do no harm’ and ‘build back better’ have become the defining maxims for the EU’s post-Covid-19 recovery. While there is little disagreement that the recovery should be ‘green’, there needs to be focus on the details. The Next Generation EU, in conjunction with the EU budget (MFF) agreed on 11th December, look on paper to be the long-awaited accelerator of the paradigm shifts that have been discussed at a high level but only partially acted upon since the 2008 global financial crisis, and even earlier.

Europe was a leader in sustainable finance before the pandemic and continues to push for a green, i.e., low-carbon circular economy recovery. This is not necessarily the case everywhere. A global comparison, for example by ING Think (2020) shows that very few countries in Asia have adopted such stimulus approaches with a strong environmental and climate resilience focus. According to Bloomberg,¹ government stimuli of the world’s 50 largest economies had reached \$12tn in late May, with only about 0.2% of this amount being targeted towards climate priorities.

Various lessons from the previous crisis are useful for the Covid-19 crisis. According to an assessment by Hepburn et al. (2020), green stimulus policies have certain advantages when compared with traditional fiscal stimulus packages; for instance, investments in clean energy infrastructure can be very labour intensive during the early stages and provide cost-reduction benefits in the long run. Targeted investments in projects such as improving the energy efficiency of buildings have provided the twin benefits of sustaining jobs and economic activity in the sector and emissions reduction benefits (OECD, 2020). Based on a survey of experts from finance ministries, central banks and other organisations, Hepburn et al. (2020, p.16) identify five elements of policy that seem to have the potential to contribute to both economic and climate goals:

- “clean physical infrastructure investment,
- building efficiency retrofits,
- investment in education and training to address immediate unemployment from COVID-19 and structural unemployment from decarbonisation, what is described as ‘just transition’ in the EU,
- natural capital investment for ecosystem resilience and regeneration,
- clean R&D investment.”

A number of these policy items may apply to the circular economy.²

1. Circular economy in the EU recovery plan

Against the backdrop of the challenges posed by the Covid-19 crisis, on July 21st the European Council reached an agreement on the recovery plan (Next Generation EU) that will accompany the Multiannual Financial Framework (MFF) for the period 2021-27. The agreement was

¹ See: <https://www.bloomberg.com/features/2020-green-stimulus-clean-energy-future/?sref=Oz9Q3OZU#toaster>.

² For an overview of recovery measures that are compatible with global climate change and European Green Deal priorities, see Elkerbout et al. (2020).

approved on December 11th with minor amendments agreed with the European Parliament. The commitments laid down in the agreement aspire to provide the baseline for not only rebuilding the EU economy, but also driving the green and digital transformations. In financial terms, the package has a total value of €1.8 trillion, of which about 1.07 trillion equals the size of the multiannual financial framework for the period 2021-27, while the remaining €750 billion is equal to the Next Generation EU (NGEU) recovery instrument. The latter consists of €390 billion in grants and €360 billion in loans that will be available for member states under certain conditions. The agreement has been termed historic because for the first time it introduces the principle of debt mutualisation, with the European Commission borrowing funds on the capital markets, on behalf of the EU, to finance the NGEU.³

The commitment to the climate objectives of the Paris Agreement is underpinned in the agreement by a target to use 30% of MFF and NGEU funds for climate investment, representing an increase of 10% compared to the respective target⁴ for the 2014-20 EU budget.⁵ Other prominent climate-related features of the agreement include an invitation to the European Commission to prepare proposals on a carbon border adjustment mechanism and on a revised EU Emissions Trading System (ETS), with a possible extension to aviation and maritime, and potentially buildings and road transport as well. The text of the Council agreement does not include any specific circular economy objectives,⁶ although the introduction of a levy on non-recycled plastic packaging waste as an instrument to raise new own resources is envisaged.

Most of the support will be provided through the Recovery and Resilience Facility (RRF)⁷. Access will be subject to the approval of the so-called national Recovery and Resilience plans prepared by member states. These plans, which must follow the European Commission (2020a; 2020b) guidelines, will be assessed⁸ by the European Commission via the European Semester mechanism⁹ against the criteria of contributing to the growth potential, job creation, economic and social resilience and green and digital transition of the country (which including the minimum 30% allocation to climate action). The assessment of these plans will take the form

³ See more details: <https://www.consilium.europa.eu/media/45109/210720-euco-final-conclusions-en.pdf>.

⁴ See European Council (2013).

⁵ Reflecting concerns over the current methodology for calculating the level of climate-related expenditures (see: European Court of Auditors, 2020a; Bas-Defossez et al., 2020), the agreement envisages the development of a new methodology in addition to annual reporting by the European Commission.

⁶ The circular economy is mentioned only once in the agreement under the objectives of the LIFE programme which aims to support “the transformation of the Union into a clean, circular, energy efficient, low carbon and climate resilient society” (European Council, 2020, pp. 47).

⁷ The Recovery and Resilience Facility is the biggest individual programme under NGEU, with a total value of €672.5 billion, of which €360 billion are loans and €312.5 billion are grants. The object of the instrument is to help Europe overcome the challenges of the crisis while at the same time supporting its resilience and green and digital transition. Other NGEU programmes are ReactEU (€47.5 billion), Horizon Europe (€5 billion), InvestEU (€5.6 billion), Rural Development (€7.5 billion), Just Transition Fund (€10 billion) and RescEU (€1.9 billion).

⁸ The Commission assessment would need to be approved by the Council.

⁹ The European Semester provides a framework for the coordination of economic policies across the European Union, for more info see: https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester_en.

of reports prepared by the European Commission for each country's Recovery and Resilience Plan. They will replace the country reports of the 2021 cycle of the European Semester (European Commission, 2020c).

Contributions to the 'green' transition contain both a climate and an environmental perspective. With regard to the former, member states will need to explain how their plan will contribute to achieving the 2030 climate and energy targets, as well as the climate neutrality objective, by 2050. There is also a need to "specify the impact of the reforms and investments on the reduction of greenhouse gas emissions, share of renewable energy, the energy efficiency, energy system integration, new clean energy technologies and the electricity interconnection" (European Commission, 2020a, p. 5).

Circular economy is included under the intended environmental goals of these plans and in this context member states are invited to show how the plans will help achieve objectives in the areas of sustainable use and protection of water, waste prevention and recycling, pollution prevention control and the greening of urban areas, among others. When deciding on investments member states will need to take into account the criteria in the EU Taxonomy Regulation (EU) 2020/852¹⁰ – recognised sustainability criteria – while all actions in the plans would also need to be underpinned by the 'do no significant harm principle' (European Commission, 2020a).

Regarding the measurement of the 'green' impact of the plans, member states will need to "specify whether the reform or investment fully contributes (100%), partially contributes (40%) or has no impact (0%) on each of the objectives" (European Commission, 2020a, p. 20).¹¹ For both climate and environmental objectives this should be done following the methodology for climate tracking that is used for the Cohesion Fund (European Commission, 2020b). Given that the cost of a reform or investment (combined with its 'tag' of 0%, 40% or 100%) can only provide an indication of whether it contributes to climate and environmental objectives, member states will be "invited to provide an assessment of the direct and indirect impact of the proposed reform or investment" (European Commission, 2020a, p. 20).¹²

The methodology is based on the so-called Rio Markers system developed by the OECD (2016). The OECD system specifies the following guidelines for the application of the markers:

Rio Marker 2 (100%): An activity can be marked as "principal" when the objective (climate change mitigation, climate change adaptation) is explicitly stated as fundamental in the design of, or the motivation for, the activity.

¹⁰ The Regulation provides an EU-wide classification system for environmentally sustainable economic activities to enable investors focus on more sustainable technologies and businesses, for more details, see: https://ec.europa.eu/commission/presscorner/detail/en/qanda_19_6804.

¹¹ According to the guidance document version published in September 2020.

¹² However, the European Commission's (2020a) guidance document does not provide more details of how this assessment should be carried out.

Rio Marker 1 (40%): An activity can be marked as “significant” when the objective (climate change mitigation, climate change adaptation) is explicitly stated but is not the fundamental driver or motivation for undertaking and designing the activity.

Rio Marker 0 (0%): Not targeted means that the activity was examined but found not to target the objective in any significant way.

However, the implementation by the European Commission of the OECD Rio Markers system for the EU budget has been criticised in a report for the European Parliament by Nesbit et al. (2020). It deplors the lack of “an objective assessment of the stated motivation of the expenditure” (p 15); it focuses only on the contribution made in practice. On the estimation of this contribution, the report also identifies that “different levels of rigour appear to be applied to different programmes” (p15). Thus, while for infrastructures the report finds the methodology to be generally robust, it notes the lack of justification for the marker in the area of agricultural subsidies. Here, also the European Court of Auditors (2016) considers that change in the market for direct payments to farmers from 30% to 40% was not based on real improvements in climate delivery.

In addition to the recovery measures package is the normal Multiannual Financial Framework, for which member states need to present a Common Support Framework explaining the overall strategy and objectives of the use of the funds, which are then transformed into specific operational programmes with clear measures to be financed. Unlike the exceptional nature of the Next Generation EU, which supports general government expenditures in different areas of the economy, the EU budget has to be allocated to programmes and measures and co-finance investment in specific projects, not current expenditures.

The Multiannual Financial Framework includes an important investment element under InvestEU, a revamped version of the present EFSI (European Fund for Strategic Investments) offering guarantees, loans, equity and technical assistance for critical investments in Europe, mainly through the European Investment Bank (EIB) Group. In this way the EIB is reforming and redirecting its priorities towards sustainable investments. The EIB’s influence in redirecting private investment to more sustainable areas could substantially assist in promoting circular economy solutions. The circular economy is, however, not yet fully operationalised; in any case it is largely underdeveloped compared to the work undertaken to identify low carbon investments to support the transition.

ReactEU, an expansion of the EU Cohesion Policy of the Next Generation EU, will complement the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Fund for European Aid to the Most Deprived (FEAD).¹³ It will therefore need to follow the Common Provision Regulations.¹⁴ This is also the case for the extension to the Just Transition Fund in the

¹³ See: https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_574.

¹⁴ The COM (2018) 375 proposal for a regulation laying down the provision for the European Structural and Investment Funds is in the process of being adopted after the Council agreement on the Multiannual Financial Framework and the Next Generation EU.

MFF in the Next Generation EU, which will have to follow the regulation for the Just transition Fund.¹⁵

The Horizon Europe research programme continues. Whether and how the circular economy will be handled in Horizon Europe is as yet unclear. The circular economy is neither a technology nor a sector. Nevertheless, we should expect that specific calls for research proposals, e.g. how to develop circular approaches efficiently and/or steer the behaviour of socio-economic actors towards the adoption of circular approaches. This could take the form of a Strategic Research and Innovation Agenda on Circular Economy for the EU and the member states, identifying the sectors where research on the circular economy is necessary, as well as the programmes that are required.¹⁶

2. Evidence on economic opportunities and job creation

The circular economy is considered to offer benefits in terms of growth, new sources of value creation and jobs by policymakers in Europe and beyond.

A number of studies using *ex ante* modelling analysis have provided estimates that support the economic prospects of the circular economy (OECD, 2017). A report by Ellen MacArthur Foundation & McKinsey Center for Business and Environment (2015) is among the most cited of these and has calculated that technological and organisational innovations in the mobility, food systems and built environment sectors could increase Europe's resource productivity by 3% by 2030 and provide annual benefits¹⁷ of €1.8 trillion. Estimates have also been made for different member states; for example, Bastein et al. (2013) have calculated that in the Netherlands improving circularity in various sectors could provide an added value of €7.3 billion per year, while the Ellen MacArthur Foundation (2015) has estimated that there could be a boost of 0.8-1.4% to Denmark's GDP via circularity approaches.

Available studies identify a positive yet modest impact, also in relation to net job creation. At the EU level, a macro-econometric model by Cambridge Econometrics et al. (2018), found that 700,000 additional jobs could be created in Europe through transition to a circular economy. The study also projected divergent impacts in different value chains, with some sectors such as recycling and repair services experiencing jobs gains, while others such as the production of raw materials and durable goods being likely to face a decline in employment. Another report, by Wijkman & Skånberg (2015), based on an input/output, model estimated that creating a

¹⁵ The COM (2020) 22 final proposal for a regulation establishing the Just Transition Mechanism Funds is in the process of being adopted after the Council agreement on the Multiannual Financial Framework and the Next Generation EU.

¹⁶ See CICERONE (2020). In addition, Núñez Ferrer and Stroia (2020) developed a policy paper in consultation with various stakeholders to provide recommendations for how to advance EU innovation policy to meet the Green Deal Circular Economy goals.

¹⁷ These benefits would be yielded through a reduction in Europe's resource use and the economic effects related to this reduction (Ellen MacArthur Foundation & McKinsey Center for Business and Environment, 2015).

more material-efficient, circular and performance-based economy could lead to the creation of more than 700,000 additional jobs in five member states.¹⁸

Some of the key expected benefits of a more circular economy, namely improved productivity, costs savings and the reduced risk of resource dependence, for example, are becoming increasingly important in the context of the Covid-19 crisis that has affected businesses and the EU economy as a whole. Material Economics (2020a) estimates that putting the EU in an ambitious circularity trajectory by 2030 could help reduce resource cost in the mobility, housing and food value chains by 15% and achieve savings of €535 billion.¹⁹ Around 30% of these savings (i.e. €160 billion) could be achieved through targeted actions to support circularity approaches included in the national recovery programmes.

Studies on the impact of recovery programmes on different member states have also started to emerge. For instance, Vardakoulias (2020) estimates that if Greece used €8.2 billion of the Recovery and Resilience Facility, which is equivalent to about half of the funds available for the country under this programme, this could generate 120,000 jobs. A large share (i.e. about 43,000 jobs) of this employment creation would come from investments, coupled with structural reforms²⁰ to help create circular economy markets.

Employment effects from the transition to a circular economy will vary across different regions depending on sectoral composition, the availability of natural resources and economic dependence on material-intensive industries. The effects of these structural changes in the economy will have differing impacts on workers; they will create new skill requirements and possible skill imbalances.²¹ While some of these imbalances could in theory be tackled by shifts in skill supply and demand in the labour market, supporting policies would be needed for the re-training and ‘upskilling’ of certain categories of workers (Laubinger et al., 2019; Chateau et al., 2018). A variety of potential new skill requirements has been identified in the literature, including skills in design and technological applications, recycling and repair, engineering, sharing products or services (Cambridge Econometrics et al., 2018; Laubinger et al., 2019). Evidence from the countries’ recovery packages prepared in response to previous financial crisis indicate that there was insufficient focus on skills (OECD, 2020). According to the OECD, the domestic skill composition is among the key aspects that need to be taken into account by governments when designing their recovery plans and strategies.

¹⁸ Specifically, the report estimated that more than 50,000 additional jobs would be created in both Sweden and Finland, 100,000 in the Netherlands, 200,000 in Spain and 300,000 in France.

¹⁹ Savings of this scale would arise through increasing capital productivity and utilisation, improved efficiency and retaining the value of products, materials and resources for as long as possible (Material Economics, 2020a).

²⁰ Examples of such reforms include tax incentives for products or business models designed with circular principles, end-of-waste criteria for certain materials, expansion of infrastructure for collection of different waste streams and requirements for use of secondary raw materials in public tendering procedures, see more details (in Greek) https://wwfeu.awsassets.panda.org/downloads/wwf_comments_ce_roadmap_nov2020.pdf.

²¹ According to Laubinger et al. (2019), the complex effects of structural changes in the economy such as skill imbalances and future skill composition have not yet been extensively documented in the literature.

While public money in the form of grants or loans will be able to produce some results, lasting impacts will require that private investment follows, which in turn will need regulatory changes and measures to boost demand.

3. Measures to stimulate demand (instruments)

Recovery measures will need to be 'ready-to-go' or at least help stimulate new and future-proof growth opportunities in addition to creating jobs. A number of instruments such as taxes, labelling, regulation or Contracts for Differences (see Sartor & Bataille, 2019) exist to create demand for new, lower carbon and circular materials.

Taxes and labelling

A first measure would be to stimulate market demand for 'green', i.e. low carbon and sustainable/circular products, or more generally, technologies. Easy-to-implement measures can be applied in areas where there is a relatively small cost difference between a low-carbon and a higher carbon solution or between low and high levels of 'circularity'. Tax breaks or the labelling of recycled materials could be two such measures. Examples of tax breaks have already been seen across different member states; Belgium has introduced a reduced VAT rate²² of 6% for demolition & reconstruction activities²³ while Ireland, the Netherlands, Slovenia, Luxembourg and Finland have introduced VAT reductions for certain repair services (Ecopreneur, 2019a). There could be different options for different materials and products; for aluminium, tax differentiation could be linked to the energy input, e.g. low-carbon energy, for example.

However, the more complex the differentiation becomes, the more accounting and measurement systems will need to reflect this complexity. This also relates to new emerging technologies that may bring new challenges; determining the amount of feedstock to be used in new plastics derived from the chemical recycling process may be a complex task technically, for example.

When it comes to energy, accelerating the coal phase can create space for renewables and other sustainable technologies and new industrial clusters to revive the coal-intensive regions. Given the relative competitiveness of renewable technologies – with some exceptions – the main task is to focus on the enabling framework, notably the already mentioned coal phase-out together with the just transition plan, infrastructure, market conditions and possibly cross-border governance provisions for off-shore wind. It will then be left to industrial policy as part of its focus on value chains to ensure that jobs and other economic benefits accrue in the EU.

This will require the right framework, together with **policy instruments**.

²² See: https://finances.belgium.be/fr/particuliers/habitation/construction/demolition_et_reconstruction#q1.

²³ Earlier peer-reviewed research by Dubois and Allacker (2015) concluded that financial incentives in the form of lower VAT rates would be more effective in terms of energy savings for demolition and reconstruction projects than for renovation projects.

Green public procurement

There is particular scope for investment in circular economy processes that seek to reutilise resources and eliminate waste, as outlined in the EU's new Circular Economy Plan (European Commission, 2020d) The public procurement directives provide the necessary framework to introduce Green Public Procurement (GPP), often including concepts such as sustainable Public Procurement (SPP), Pre-Commercial Procurement (PCP), and Public Procurement for Innovative Solutions (PPI).²⁴ To date, the uptake is limited and insufficient to address low-carbon or circular economy challenges (Núñez Ferrer, 2020).

While guidelines and technical support seem to be available, the voluntary nature of good practices contains a limitation. Minimum GPP criteria and targets, and phasing in compulsory monitoring as proposed by the European Commission will be able to address this somewhat. Another step would be to make available easily available off-the-shelf tools relating for example to circular economy considerations to ensure that member states can follow through in practice.

Organisations such as ICLEI - Local Governments for Sustainability or the Procura+ network or the JRC have been working on technical criteria for some time. Delegated acts or technical requirements for sectoral directives should make green public procurement mandatory (as is the case for the Energy Performance of Buildings Directive (2018/844/EU) and the Clean Vehicles Directive (2019/1161/EU)).

Many products and their components are not of EU origin and the demand for compliance would in some cases affect non-EU producers that depend on EU demand. Basic aspects such as including end of life reuse and/or recycle should become mandatory; tools for full lifecycle considerations to assist public authorities to adopt circular solutions will remain a challenge (Núñez Ferrer, 2020).

Carbon contracts for difference (CCfDs)

Carbon contracts for difference would be one policy tool that could support the deployment of low-carbon materials by addressing specific weaknesses in the current climate policy mix: risk and uncertain returns, both of which can deter investment. The returns on investment for investments made in ETS sectors are particularly uncertain as the carbon price fluctuates by design.

²⁴ Sustainable Public Procurement (SPP) aims at balancing the three pillars of sustainable development – economic, social and environmental – when procuring goods, services or works. Through Green Public Procurement (GPP) public authorities seek to purchase goods, services and works with a reduced environmental impact throughout their lifecycle compared to goods and services, which have the same primary function. Public Procurement for Innovative Solutions (PPI) aims at R&D and innovation by buying the process of innovation (early adopter) or buying the outcomes of innovation. Pre-Commercial Procurement (PCP) is a method used by the public sector to challenge the private sector to propose innovative solutions to achieve the objectives of the contractor. In reality, procurement processes are often a mix of the different elements.

With a carbon contract for difference, a desired carbon price for investments can be decided *ex ante*, with the issuer of the CCfD (e.g. a government, or an institution delegated by the European Commission) paying out the difference between the ‘strike price’ and the actual carbon price (or alternatively, the recipient refunding the payment if the actual carbon price exceeds the agreed strike price). Carbon contracts for difference are therefore similar to regular contracts for difference (CfDs) as a means of subsidising desired production, with the main difference being that a CCfD targets carbon cost differentials specifically, whereas regular CfDs can create stability for revenues in general.

In a practical sense, a CCfD with a strike price above the actual carbon price enables a company or investor to buy ETS allowances on the market and sell them for the strike price, thereby generating revenue. An approach for setting the strike price is also required. Here, competitive tenders could be used so that a degree of competition and price discovery is present. If member states used CCfDs, competition would be important in order to comply with state aid rules.

A CCfD, or regular CfDs, are potentially powerful instruments to incentivise climate-neutral production. It does, however, potentially come at a significant fiscal cost. The hard budget constraints of the common EU budget may impose a limit. Furthermore, CCfDs work best for specific products (included in the ETS) whereas to promote circularity specifically, policies that target broader value chains may be desirable.

Carbon pricing and the ETS

The EU ETS covers about 40% of total EU GHG emissions, including many of the same sectors that are also the focus of the EU’s circular economy strategy, such as basic materials, plastics and textiles. Even if the latter two are among the smaller ETS sectors in terms of emissions, the impact of the ETS – and its interaction with other (circularity) policy measures – can nevertheless be significant. The ETS price signal provides a clear disincentive for carbon-intensive production. Where alternatives are readily available, the ETS can drive immediate operational changes – as has been seen with coal-fired power generation.

In a circular economy strategy, the role of the ETS is worth reflecting on, especially as scarcity will invariably grow. With the declining cap, it provides the long-term direction of travel for EU climate policy. It has implications for the construction value chain, with basic materials being covered. Furthermore, electricity use is also covered, which may be increasingly important for buildings as heating becomes more electrified. Additionally, there are ongoing discussions about extending the ETS, potentially to the heating sector (today mostly based on fossil fuels) as well. The ETS could therefore play an arbitrage role between materials and operations (i.e. energy use) to drive emissions reductions.

An additional role for the ETS might be to efficiently deal with overcapacity. Much like increased energy efficiency for the electricity sector, increased resource efficiency through improved circularity may drive down demand for the primary production of materials. The ETS could then address overcapacity by providing an incentive to reduce the operations of the most carbon-intensive facilities first.

There is also the question of whether the ETS can directly incentivise increased circularity or other innovation more generally. While more than just a carbon price signal is needed to drive transformational change, the ETS price can nevertheless support the business case for lower-carbon and circular investments, provided there is some confidence in the price trajectory. Here, credibility plays a major role. The commitment shown to the ETS, through the European Green Deal but also at the onset of the pandemic, has reinforced its political credibility, as evidenced by recent highs in the ETS price. Equally important is the role that the ETS can play in the sustainable finance taxonomy. The ETS benchmarks – used to ensure that free allocation volumes are based on the most efficient installations – can inform what could be considered ‘sustainable’ investments. More generally, the accurate, precise data that is collected for all ETS sectors make it easier to assess emissions intensities.

State aid

Commissioner Vestager has indicated that granting additional state aid could also support the EU in reaching its climate goals – a green bonus. State aid is subject to EU rules and member states have to give notice of any state aid over certain thresholds. State aid that is deemed to negatively impact the internal market and fair competition may be rejected, as it is in violation of Article 107 of the Treaty on the Functioning of the European Union (TFEU). However, in areas the EU considers to be justified by objectives of general interest, it may consider some aid to be compatible with the internal market. Some areas were already identified in the Treaty as benefiting from this clause in the Treaty. In the wake of Covid-19, the state aid control system has already been relaxed, with the European Commission signalling that it will give its green light to much of the notified state aid linked to addressing the pandemic,²⁵ given the need to reverse the considerable impacts of Covid-19 on EU economies and to preserve employment.

Nevertheless, in the future when the state aid system becomes more restrictive again, there may be potential to provide a more relaxed regime to aid that supports important circular economy related investments. Another aspect that could be considered is for the European Commission to impose stronger limitations for state aid notifications that do not take into account the need to shift towards more sustainable ‘green or circular’ systems. If the European Commission were to choose this route, it should formulate extensive state aid guidelines so that the criteria on which the assessment is based are transparent and clearly linked to EU policies and regulations.

There is also the risk that extensive state aid would further exacerbate divergences between EU member states, owing to different fiscal capacities. This could be also addressed through reinforced support through the EU budget, to alleviate the fiscal discrepancies. There are therefore intrinsic limits to state aid control as a tool to achieve other policy objectives, as it depends on member states’ willingness to fiscally commit in the first place. While the definition

²⁵ See the consolidated version of the temporary framework for state aid measures to support the economy in the current Covid-19 outbreak: https://ec.europa.eu/competition/state_aid/what_is_new/TF_consolidated_version_amended_3_april_8_may_29_june_and_13_oct_2020_en.pdf.

of state aid can be broadly interpreted, member states – and ultimately the EU Courts – may have differing interpretations of which national policies constitute state aid, without which the notification process and compatibility assessment do not enter into play.

4. Circular economy and industrial value chains

Among the key ambitions of the Industrial Strategy published by the European Commission in March 2020 is the creation of new markets for climate neutral and circular products supported by novel industrial processes and clean technologies. Stimulus measures could boost efforts to reduce the environmental impact of energy-intensive industries. Shifting to a net-zero emissions trajectory requires significant investments in industrial processes and techniques, particularly in ‘hard-to-abate’ sectors such as plastics, cement, steel and heavy-duty road transport.²⁶ The funds that will be available in the context of the Recovery and Resilience Plans have never been available before on this scale and will provide an opportunity to accelerate the development and adoption of novel approaches across key resource-intensive sectors, including textiles, construction, steel, electronics, mobility, food and plastics. The focus should be on activities that today can create jobs but in areas where there could be a realistic contribution to decarbonisation via circular approaches in the next two decades or so.

The construction value chain, as well as the steel, textiles and plastics sectors discussed below are a mix of carbon-intensive sectors and sectors that may be the target of material efficiency policies. The construction value chain includes basic materials that are covered by the ETS, as well as energy inputs. The steel sector is the largest industrial ETS emitter while plastics and textiles production are also included in the ETS, albeit with smaller emissions but high relevance for resource use more generally.

Construction

The construction Industry is responsible for over 30% of the extraction of natural resources, as well as 25% of the solid waste generated in the world (Benachio et al., 2020) by using materials in the construction of buildings and disposing them at the end of life. In Europe, the construction sector consumes around 40% of energy and resources (Jofre, 2011), while as mentioned in European Commission President Ursula von Der Leyen’s “New European Bauhaus” initiative,²⁷ 40% of all GHG emissions can be attributed to buildings and infrastructure. Waste could be reduced if materials were kept in a closed – as much as possible – loop use to retain their maximum value.

A complicating factor is the value chain that involves multiple actors – often uncoordinated and with conflicting interests, such as contractors, installers, architects, managers of buildings operations, and suppliers and producers of material, equipment and energy (see, for instance,

²⁶ As described in the EU long-term climate strategy for 2050 European Commission, (2018a)

²⁷ See https://ec.europa.eu/commission/presscorner/detail/en/AC_20_1916.

De Groote & Lefever, 2016).²⁸ More importantly, there is no integration of the value chains as there is for parts of the automotive industry, for example. This means that carbon savings accruing in parts of the value chain are typically not accounted for in the whole building. End consumers, i.e. those using the buildings, i.e. tenants, have no information about the carbon content of a building, as they would have for example about the thermal efficiency of a house or apartment. All other inputs along the value chains are not calculated; typically, carbon is subject to specific rules, for example under the ETS, and efficiency standards, etc.

This means that there is little incentive to use low-carbon materials such as low-carbon cement or steel, even if the cost increase for the building is very small, if not negligible. Using low-carbon cement or steel may increase the overall cost of a building by as little as 1%²⁹ but since a lower carbon (materials) house does not provide additional value to the house owner, typically lower-carbon materials (e.g. low-carbon cement, steel, chemicals, aluminium etc. or wood) are not incentivised. The choice of materials is made by the builders based on price and functionality, sometimes aesthetics but seldom carbon, also because low-carbon materials are not easily available on the market. As energy-intensive industries, construction materials are typically regulated separately; in the EU this is under the ETS. The focus is on materials, not the full value chain. This reduces incentives to cut emissions, such as by electrifying quarries.

Construction materials are characterised by a long service life and the built infrastructure remains in the economic system for many years. The conventional perspective on supply chains, however, neglects the aspect of a long service life. Allowing for a widened perspective on supply chains and innovation processes will require going beyond sectors and sub-sectors (World Economic Forum, 2016). This could open new opportunities for innovation that encompass materials, processes, services and new business models (Köppl & Schleicher, 2019).

A first step is to develop credible carbon accounting rules to establish the carbon content of a building, to provide guidance to the construction value chain and notably the real estate industry. A material passport might be the end result. It might well be possible that product differentiation – high-carbon versus lower-carbon houses – is enough to create some demand for low-carbon buildings and thereby for circularity and low-carbon materials.

Provided credible accounting rules exist, governments might be able to set ‘carbon budgets’ obligations or targets for houses, e.g. based on surface or volume. Such a move would trigger not only competition between materials but also between carbon from operation, e.g. energy use for heating and cooling and embedded carbon in materials.

²⁸ There is a marked contrast to other industrial value chains in terms of numbers and variety, for example in the automotive or energy-intensive industry.

²⁹ A study by Rootzén and Johnsson (2017) shows that production costs for a residential building only increased by 1% when using zero carbon cement. Cost differences for steel – although illustrated here for the car industry – are similar, see Rootzén and Johnsson (2016).

Steel

Low-carbon and climate neutral steelmaking is in theory possible by means of hydrogen and carbon capture and storage. Electric Arc Furnaces running on scrap steel (rather than primary produced iron, or direct-reduced iron, which requires hydrogen) allow for steelmaking using only electricity. However, the supply of scrap is limited and the circular economy could therefore contribute to the scale at which electric arc furnaces could be expanded. In its 2030 Impact Assessment the European Commission expects some of these technologies to reach maturity by 2040, but lead markets are necessary to scale production and enable cost reductions through learning before that date.³⁰

From a market perspective, it also matters whether there is a specific market for green steel. Consumer information, standards, or product labels could play a role here (see above). This allows interested customers to procure steel that is differentiated from conventional carbon-intensive steel, possibly even in spite of cost differences. A sustainable product policy foreseen under the Circular Economy Action Plan could support this.³¹ Likewise, in other parts of the steel value chain, a guarantee of origin system could support green steelmaking through the hydrogen route.

Textiles

The textile and clothing industry is a complex industrial value chain, encompassing activities such as transforming both natural (cotton, flax, wool, etc.) and synthetic (polyester, polyamide etc.) fibres into yarns and fabrics and producing a multitude of products for clothing, furnishing and technical applications (EURATEX, 2020a). With around 160,000 companies and 1.5 million employees the industry makes an important contribution to the EU industrial landscape (EURATEX, 2020b). Accounting for a household consumption with a value €520 billion, the EU-28 is currently the leading world market for textile and clothing products (EURATEX, 2019).

While the sector is of significant economic importance for the EU, the high consumption levels of textiles have various environmental consequences, ranging from pressure on land, materials and water use to water pollution and contribution to CO₂ emissions (EEA, 2019; Manshoven et al., 2019).

The production and handling of textiles in the EU-28 in 2017 required 1.3 tonnes of primary raw materials and 104 m³ of water per person, although the majority of this consumption (85% for materials and 92% for water) took place outside the EU since it is a net importer of textiles. Textiles production is also a GHG emissions-intensive process with around 15-35 tonnes CO₂ equivalent generated per tonne of textiles produced (EEA, 2019). It has been estimated that in 2015 global emissions from textiles production were equivalent to 1.2 billion tonnes of CO₂,

³⁰ See section 9.4.2.7 of the 2030 impact assessment: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020SC0176&from=EN>.

³¹ See section 9.11.5 of the 2030 impact assessment.

which exceeded the collective emissions from international flights and maritime shipping (Ellen MacArthur Foundation, 2017).³²

Unsustainable consumption patterns are further amplified by a high generation of textile waste³³ and low collection rates, which vary between 11% and 75% across the EU depending, among other factor on the availability of infrastructure and the density of collection points (Watson et al., 2018; Manshoven et al., 2019). The sorting of collected textiles is usually a manual process as currently there are few large-scale sorting facilities across the EU (Ellen MacArthur Foundation, 2017). Added to this, significant quantities of unsorted collected textiles either end up in Eastern Europe for sorting or are exported to third countries.

Reintroducing textiles into the production process of new high-quality materials is virtually non-existent since the vast majority of collected textiles are used in downcycling applications or end up in landfill and incinerators. This is due to the diverse mix of materials and substances in textiles and lack of technologies for the separation of polyester/cotton fibre blends (Manshoven et al., 2019; Šajin, 2019).

The revised EU Waste Directive 2018/851 adopted in May 2018 for the first time requires all member states to set up separate collection systems for textiles by 1 January 2025. This means that countries will need to improve their collection mechanisms within a very short time. Increasing collection rates will lead to large volumes of unsorted textiles, indicating that countries should look into comprehensive approaches for both the collection and sorting of textile material.

The development of large-scale automated sorting facilities³⁴ requires high upfront investment and as such the recovery funds available could provide investment opportunities. More effective sorting would also increase the reuse potential of textiles. As for the recycling of non-reusable textiles into new fibres, continuous support is needed for R&D activities or to bring promising solutions³⁵ to the market at a large scale (Hemkhaus et al., 2019).

Removing regulatory bottlenecks can support the investment climate in this sector. Such bottlenecks include issues related to the definition of used textiles (Watson et al., 2018; Ellen MacArthur Foundation, 2017), limited availability of information on substances and content of textiles (Roos et al., 2019) and the absence of eco-design requirements (Ecopreneur, 2019b).

³² In the EU, according to EU Transaction Log data, the GHG emissions directly caused by textiles production are less than half a million tonnes. Thus, the emissions arise rather from the wider global value chain.

³³ Data on textile collection rates are presently scarce; according to some estimates the majority (75%) of the 5.8 million tons of textiles that are annually discarded across the EU are landfilled or burnt in incinerators (Beasley & Georgeson, 2014).

³⁴ Examples of emerging sorting technologies and facilities include [FIBERSORT](#) which uses a spectroscopic technique based on molecular absorptions to sort different fiber type and the [Spitex](#) large-scale facility in Sweden in which sorting of textiles by color and fiber composition is based on a near-infrared light system.

³⁵ For instance, [Worn Again](#) provides a recycling solution involving separation, decontamination and extraction of polyester and cellulose from non-reusable textiles and polyester bottles and [Renewcell](#) which turns textiles into slurry and then pulp free of contaminants and other non-cellulosic content.

Measures to stimulate demand such as tax breaks or premiums and green public procurement can boost demand for circular products and services. Harmonised end-waste-criteria at the EU level for textiles could also provide demand signals. Another approach is to combine obligations for companies with incentives under extended producer responsibility (EPR) schemes; in France, companies that introduce textile products into the market with a certain share of recycled fibres are subject to a reduced EPR fee (WRAP, 2018).

Plastics

Owing to their numerous functionalities³⁶ and low cost, plastics have enjoyed exceptional growth in production for decades and are used extensively across a multitude of sectors including packaging, construction, electronics, automotive and agriculture (Chalmin, 2019; European Court of Auditors, 2020b). The global production of plastics amounted to 360 million tonnes in 2018, 62 tonnes of which were produced in Europe.³⁷ During the same year, about 29 million tonnes of plastic were collected in the EU, of which the majority (68%) was either incinerated for energy recovery or ended up in landfills with the rest (33%)³⁸ being recycled. Performance across Europe also varies significantly, with member states still showing high landfilling and/or incineration rates (PlasticsEurope, 2019). Damage to terrestrial and marine ecosystems, generation of CO₂ emissions³⁹ and health risks are some of the impacts linked to such high levels of plastic production and waste (European Court of Auditors, 2020b). Primary plastics production in the EU results in about 3.2 million tonnes of GHG emissions, while the manufacture of other plastic products adds another 300,000 tonnes.⁴⁰

In 2018 the European Commission published a strategy on plastics which was followed by legislative actions such as a ban on certain single-use plastic items and various high-level industry commitments. While the strategy has led to decisive action at the EU level in several areas, resolving the considerable challenges linked to plastics production will require a focus on integrated solutions across the whole plastics value chain in the coming years (Ellen MacArthur Foundation, 2020; The Pew Charitable Trusts & SYSTEMIQ, 2020). Some solutions with a long term-outlook can be promoted through the recovery plans and strategies put forward by member states.

In this context, further investments in physical infrastructure for collection, sorting and treatment of plastic waste are required. When building their recovery strategies and in line with the requirements stemming from EU legislation, countries with high landfilling rates may

³⁶ Among some of the functions of plastics include food safety, prolongation of food product shelf life and contribution to car or planes manufacturing with light materials (European Commission, 2018b).

³⁷ Figures include EU-28 plus Norway and Switzerland.

³⁸ It should be noted that a recent estimate by Material Economics (2020b) has provided a much lower estimate (11%) regarding the share of collected plastics that turn into recycled plastics.

³⁹ According to available estimates, around 4 tonnes of CO₂ emissions are emitted per tonne of final plastic product, while incineration of plastic results in 0.5 tonnes of CO₂ per tonne (Chiappinelli et al., 2020).

⁴⁰ Based on data from the EU Transaction Log (NACE codes C13).

prioritise investments over infrastructures that maximise the value of recovered materials, for circular economy purposes, for example to the detriment of incinerators.

Investment in new recycling processes is also needed, given that most recycled plastics are currently used in downcycling applications (Material Economics, 2020b). Some options for breaking plastics into new feedstock are already commercially available but require high-quality pre-sorting of waste (i.e. pyrolysis), while others are at the development phase and face cost obstacles. One such example is hydrocracking which requires inputs of hydrogen and is costly, hampering the further development of this technology (Chiappinelli et al., 2020; Solis & Silveira, 2020).

Also in this sector, instruments such as public procurement and tax incentives can support demand for recycled plastics in the short and medium term. Minimum rules for recycled content in certain plastic products could create incentives (European Parliament, 2018). Incorporating recycled content in products is an area where innovation is still needed; the French recovery and resilience plan envisages financial aid for studies in this domain.⁴¹

Recovery strategies should also promote activities that go beyond the mere recycling of products; for example, the French national recovery plan proposes support for actions such as R&D for alternatives to single-use plastic, repair centres and projects that reduce the use of single-use plastics in health facilities. Furthermore, countries may assess ways to promote the reuse of plastics; the Netherlands is one such case to have announced targets for plastic packaging that comprise reuse in addition to recycling, which is required by the EU rules.⁴²

5. Summary and conclusions

There is a recognition that in overcoming the impacts of the Covid-19 crisis, an opportunity beckons to reshape Europe's industrial landscape and accelerate the transition to a low-carbon economy. The commitments made in the agreement on the MFF and Next Generation EU and the scale of the funds that will be available in the coming years allow for this ambition.

As a new means of framing the sustainable management of resources, the circular economy has received significant attention in policymaking circles, largely due to its potential to reduce GHG emissions⁴³ and other environmental impacts while generating growth and jobs benefits. As such, it is relevant for both the EU's 'build back better' recovery effort and the objective of cutting greenhouse gas emissions by 55% by 2030.

Access to the funds that are available as part of the economic recovery will be provided on the basis of national Recovery and Resilience Plans, currently being prepared by member states. They include suggestions both for investments and reforms to contribute in the longer term to

⁴¹ See <https://platform2020redesign.org/countries/france/>.

⁴² See <https://www.government.nl/latest/news/2020/07/03/state-secretary-van-veldhoven-launches-new-campaign-to-combat-packaging-waste>.

⁴³ About half of GHG emissions are related to resources management (OECD, 2018).

growth, jobs and green transition. The latter can include both climate and environmental objectives.

According to guidance published by the European Commission (2020a), the circular economy fits within the intended environmental goals of these plans and member states can decide on investments to support actions such as building industrial symbiosis sites, promoting circular business models, resource efficient production, sustainable consumption, and repair and reuse activities. In pursuing these transition goals, member states can also decide on various other climate or environment-related investments, for example the renovation of residential buildings, energy-efficiency investments, clean energy (e.g. hydrogen) and/or charging infrastructure and the restoration of land-based carbon sinks. Such climate and environmental investments can find applications in several resource-intensive sectors such as textiles, construction, steel, electronics, mobility and plastics.

While opportunities exist to invest in novel approaches across a range of resource-intensive sectors, the scale of contribution of these plans to the EU's decarbonisation trajectory will depend on the choices made in national Recovery and Resilience Plans. Ideally, focus should be on investments that can have long-term impacts, for example putting an economy on a transition trajectory rather than aiming for incremental change. There will be trade-offs between rapid job creation and boosting economic growth and longer-term sustainability. Also, decision-making on complex long-term investments, notably in the field of infrastructure (e.g. hydrogen) will take time as it will require good planning and collaboration between various actors including government officials, investors and those in industry.

When it comes to circularity processes, investment should be coupled with reforms and ideally prioritise solutions that seek to address the production and consumption of products on a value-chain basis. For plastics and textiles this might mean a focus beyond existing end-of-life management options and instead the development of new processes and innovations across product lifecycle stages.

The National Recovery and Resilience Plans will need to specify the degree of contribution to climate and environmental objectives, including an assessment of the direct and indirect impacts of proposed investment and reform. To date, it is uncertain how the climate and environmental (including circularity) impacts of these plans will be measured and monitored in practice. There seem to be no adequate processes and metrics for detailed monitoring. Experience from previous global financial crisis has shown that countries did not extensively monitor the environmental effects of stimulus programmes (see Agrawala et al., 2020). This also raises questions about how to ensure consistency with the priorities and country-specific recommendations of the European Semester and whether and how assessment procedures can be developed to guarantee a recovery that is combined with resilience and sustainability in practice.

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