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A Green Deal Industrial Plan for the Net-Zero Age

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1. INTRODUCTION: A GREEN DEAL INDUSTRIAL PLAN FOR THE NET-ZERO AGE

This decade will be decisive for the world to limit the rise in global temperatures and to turbo boost the race to net-zero. The stakes are high and the challenges complex – but there is also a once in a generation opportunity to use this imperative to act as a catalyst to invest in the clean energy economy and industry of the net-zero age.

In the next few years, the economic shape of net-zero age will be firmly set. New markets will have been created, breakthrough clean technologies will have been innovated, developed, and brought to market, and our energy systems transformed. Therefore, those who invest first and faster today will secure their place in this new economy and create jobs for a newly skilled workforce, rejuvenate industrial manufacturing bases, lower costs for people and businesses and be in a prime position to support other parts of the world to decarbonise their own economies.

The scale of the opportunity for European industry puts this need in sharp focus. The International Energy Agency estimates that the global market for key mass-manufactured clean energy technologies will be worth around $650 billion a year by 2030 – more than three times today's level. The related energy manufacturing jobs could more than double in the same time period[1]. The net-zero industry globally is growing strongly, to the extent of demand sometimes outpacing supply.

Europe is ready to speed up and seize the net-zero opportunity. Europe's economic model, built on its Single Market, has brought rising prosperity over the past decades. Europe is a leader on innovation, venture capital and deployment of net-zero technologies. It has a strong starting point – an industry with a track record as a proven trend-setter and standard-setter, with growing levels of digitalisation. manufacturing high quality and innovative products that are used across the world. It has the European Green Deal, setting in stone our net-zero targets and the path to reach them. It has world leading scientists and researchers, consistently developing breakthrough solutions or refining existing technologies.

Europe has also shown how the **green transition can strengthen competitiveness**. The phase-out of Russian fossil fuels has accelerated a new industrial revolution aimed at ending the age of fossil fuels. A wide range of new clean technologies is being developed and deployed across our economy: in transport, buildings, manufacturing, energy, and even creating entirely new markets. Our net-zero ecosystem was worth over EUR 100 billion in 2021, doubling in value since 2020[2].

Europe has also proven its inbuilt resilience to continued change and challenge. Industry is being challenged on everything from high inflation, labour shortages, post-COVID supply chains disruptions, rising interest rates, spikes in energy costs and input prices. This is paired with strong, but not always fair, competition on the fragmented global market. Despite these headwinds, so far, the EU economy has held up remarkably and political unity is paying off. Gas and oil prices have now fallen below pre-war levels. Inflation across Europe dropped for the second consecutive month, and markedly, in December 2022. Unemployment is lower than before the 2008 financial crisis and labour markets continue to perform well.

Europe is committed and convinced that it can speed up net-zero industrial transformation at home and create new forms of clean tech cooperation with our partners abroad. By working together with partners on developing clean technologies, diversifying and

[1] Energy Technology Perspectives (2023), International Energy Agency.
[2] The rise of European Clean Tech – Report, https://dealroom.co/uploaded/2022/04/Dealroom-Talis-Climate-Tech-Europe-2022.pdf

strengthening supply chains, and supporting others on their green transition, the race to net-zero can be good for the planet and for business.

And the encouraging signs are that Europe's partners are also beginning to seize the net-zero industrial opportunities. The United States' Inflation Reduction Act will mobilise over USD 360 billion by 2032. Japan's green transformation plans aim to raise up to JPY 20 trillion (approximately EUR 140 billion) – through 'green transition' bonds. India has put forward the Production Linked Incentive Scheme to enhance competitiveness in sectors like solar photovoltaics and batteries. The UK, Canada and many others have also put forward their investment plans in clean tech. Europe is committed to working with all of those partners for the greater good.

However, trade and competition on net-zero industry must be fair. Some of our partners' initiatives can have undesired collateral effects on our own net-zero industries. More fundamentally, China's subsidies have long been twice as high as those in the EU, relative to GDP[3]. This has distorted the market and ensured that the manufacturing of a number of clean technologies is currently dominated by China, which has made subsidising clean tech innovation and manufacturing a priority of its Five-Year Plan. China's pipeline of announced investments in clean technologies exceeds USD 280 billion. Europe and its partners must do more to combat the effect of these unfair subsidies and prolonged market distortion.

Going forward, competitiveness challenges remain. The era of cheap fossil fuels is now over, calling for an acceleration of the green transition to ensure industry has access to abundant and affordable clean energy. The EU needs to build on its greatest strength, the Single Market, and avoid fragmentation. More needs to be done to facilitate businesses' access to private funding, notably by completing the Capitals Market Union. The net-zero industrial age will be decided by the decisions taken today. Europe must be ready to lead the way, with speed, ambition and a shared sense of direction.

2. A GREEN DEAL INDUSTRIAL PLAN – STAYING AHEAD OF THE GAME

Against this backdrop of seismic opportunity and challenge, Europe needs a new Green Deal Industrial Plan. The Plan will set a path for Europe on its way to climate neutrality and lead the way globally in the net-zero industrial age.

The starting point for the Plan is the need to massively increase the technological development, manufacturing production and installation of net-zero products and energy supply in the next decade, and the value added of an EU-wide approach to meet this challenge together. This is made more difficult by the global competition for raw materials and skilled personnel. The Plan aims to address this dichotomy by focusing on the areas where Europe can make the biggest difference. It also seeks to avert the risk of replacing our reliance on Russian fossil fuels with other strategic dependencies that could impede our access to key technologies and inputs for the green transition, through a mix of diversification and own development and production. The Plan will complement ongoing efforts to transform industry under the European Green Deal and the EU Industrial strategy, in particular the Circular Economy Action Plan. Modernising and decarbonising energy-intensive industries also remains a top priority.

This is why a strong joint European response to boost the net-zero industry is needed. The Green Deal Industrial Plan will play to our strengths: openness, innovation, inclusiveness and sustainability. With the right conditions, the net-zero industry in Europe will play a vital role in transforming the continent into a climate-neutral economy - delivering prosperity in the EU and

[3] Chinesische Subventionspolitik: Effekte auf deutsche Unternehmen (vbw-bayern.de)

leading globally both on technology and on combatting climate change.

This outline for a new **Green Deal Industrial Plan is based on four pillars:**

- **a predictable and simplified regulatory environment;**
- **faster access to sufficient funding;**
- **skills; and**
- **open trade for resilient supply chains.**

2.1. A predictable and simplified regulatory environment

The EU has traditionally relied on a strong regulatory environment for setting conducive conditions for business, for providing quality employment for our workforce and a high level of protection for our environment. These three dimensions can be mutually reinforcing, and finding a balanced calibration between them is not a one-off but a continuous exercise. This is why this year the Commission has introduced an additional 'competitiveness check' on all new regulation to ensure that all potential competitiveness impacts are addressed. A simple, predictable and clear regulatory environment is key to promoting investment. Action at EU level prevents fragmentation between 27 regulatory approaches.

This spring, the Commission will table three key proposals for industrial competitiveness, rooted in the need for reform:

First, **as part of the Green Deal Industrial Plan, the Commission proposes to put forward a Net-Zero Industry Act to underpin industrial manufacturing of key technologies** in the EU. The act would provide a simplified regulatory framework for production capacity of products that are key to meet our climate neutrality goals[4]. The Net-Zero Industry Act would in particular:

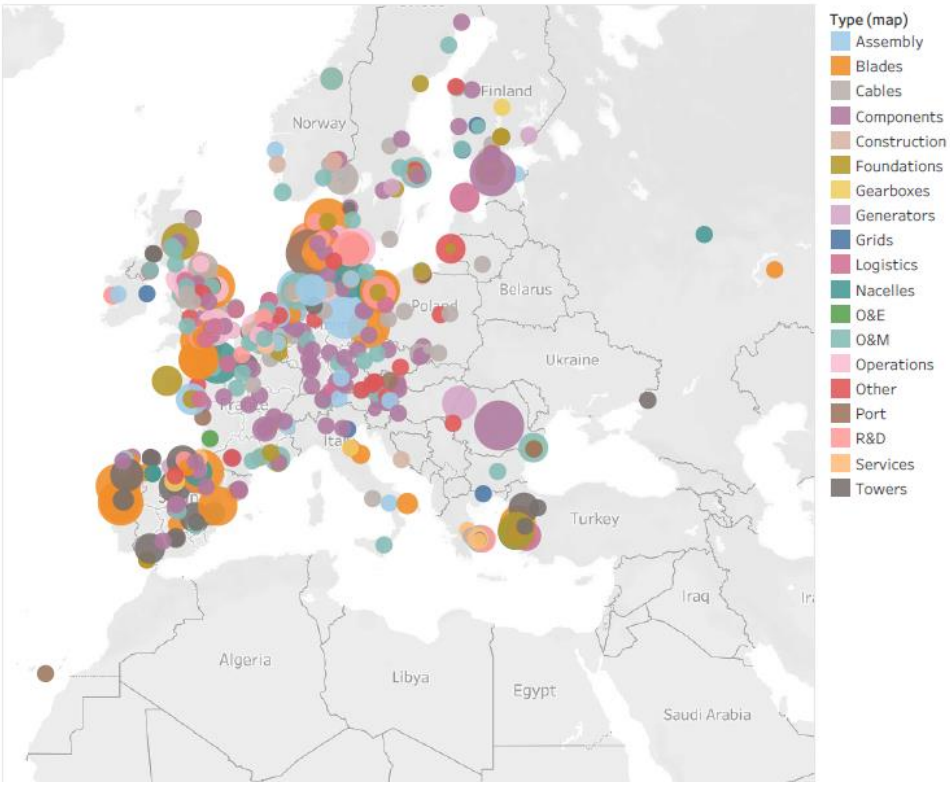
- Following sector-specific analysis, identify **goals for industrial capacity by 2030** where necessary to ensure that strategic dependencies do not put the green transition at risk. It will consider the whole supply and value chain across borders, so that supplies do not become a bottleneck;
- Reduce the length and enhance the predictability of **permitting** processes by defining specific time limits for different stages of permitting, and reinforce Member States' administrative capacity, e.g. by introducing a '**one-stop-shop**' - a sole point of contact for investors and industrial stakeholders during the entire administrative process.
- As European value chains are highly integrated and interconnected in the Single Market (see Figure 1), the Net-Zero Act would define simple and operational criteria for identifying net-zero supply chain projects of strategic interest. This should ensure that all Member States continue benefiting from innovative industrial deployment by promoting **strategic projects, including multi-country projects**. These projects could benefit from accelerated permitting procedures and attract private as well as EU and national public funding.

[4] Taking technology neutrality as a starting point, the Act would build on an assessment of strategic importance and identified needs of manufacturing investment in different types of net-zero products. Technologies that could be considered within scope include advanced biofuels, batteries, carbon capture utilization and storage, renewable energy sources (including biogas, heat pumps, wind and solar, ocean energy), equipment for renewable hydrogen and renewable fuels (in particular for maritime and aviation), novel electricity and heat storage, construction related clean energy technologies.

European standards can help to promote the roll-out of clean and digital technologies. In particular for new industrial value chains, anticipating and developing high-quality European standards could provide EU industries an important competitive advantage – including at global level. They could demonstrate 'marketability' and attract investment in firms that adhere to them. European standards would allow EU industries to scale their technologies across the Single Market – very important for start-ups and SMEs.

- The Act could enable the Commission to request **European standards** promoting the fast roll-out of key technologies[5].

Figure 1 Wind supply chains and jobs are highly integrated in the EU and Europe



Source: Wind Europe. The map presents EU wind manufacturing facilities across its segments. The circles size is proportional to the number of jobs per facility (small circles: 10-50 employees; big circles: over 1000 employees).

To foster innovation, the Commission will assess the possibility to establish **regulatory sandboxes** to allow for rapid experimentation and disruptive innovation to test new technologies.[6] Such regulatory sandboxes may also pave the way for simplification of the

[5] For example, the recycling of raw materials for solar panels or the installation of wind turbines could be facilitated by complying with European standards developed in these fields. It is already possible to develop a standard for the collection, transport and treatment of batteries to enable fast-tracking and simplified procedure for recycling installations complying with that standard.

[6] The Commission intends to publish a guidance showcasing the relevant use cases of regulatory sandboxes, test beds and living labs in order to support policymakers and innovators in their approach to experimentation in the EU by summer 2023.

process of authorisation/certification for placing products in the market. These procedures can now be lengthy, slowing the introduction of innovative products and representing a significant burden especially for SMEs and start-ups.

Second, the Commission will propose a **Critical Raw Materials Act.** The manufacturing of EU net-zero technologies is only possible if access to relevant critical raw materials is ensured, including recycled raw materials to lower Europe's dependence on third countries and boost jobs and growth in the circular economy. This act will aim to provide the EU security of supply, including by facilitating extraction (where relevant), processing and recycling, while ensuring high environmental standards and continuing research and innovation, e.g. to reduce material use and to develop bio-based substitutes. There have already been tangible successes: today, some EU companies are using lignin stemming from wood in batteries, instead of graphite.

Third, **energy**. Russia's weaponisation of energy was a major wake-up call for security of supply and tackling dependencies. The competitiveness of many companies has been severely weakened by high energy prices and the disruptions in several supply chains. This has particularly been the case of the energy-intensive industries[7]. To address the high costs of energy and replace costly fossil fuels with cheaper renewables, important steps have been taken in line with the REPower EU plan. For example, in 2022 wind and solar renewable energy production capacity in the EU exceeded 400 GW, an increase of over 25% compared to 2020[8]. We have set up the EU energy platform to pool gas demand, coordinate infrastructure use and negotiate with international partners, made savings, filled storages and put in place a cap on short-term markets. Several infrastructure projects and interconnections have been completed in both electricity and gas. **In March, the Commission will present a reform of the electricity market design,** for which a public consultation is currently ongoing. Long-term price contracts could play an important role to enable all electricity users to benefit from more predictable and lower costs of renewable power. As set out in the RePowerEU Plan, boosting industrial competitiveness will require both transforming industrial processes, massive speed-up and scale-up of renewable energy and stronger efforts for energy efficiency and reduction of energy demand.

To further stimulate the demand for net-zero products at large scale, various forms of **public action such as public procurement, concessions and incentives to business and end users to use net-zero technologies based on sustainability and circularity can play a big role.** Public authorities in the EU spend around 14% of GDP (around EUR 2 trillion per year) on the purchase of services, works and products. Procurement policy and other public support can play a role in maximising public-interest returns on public money while fostering security of supply through diversification of sources. To this end, the Commission would define sustainability characteristics and possible requirements for net-zero products, using available legal tools and existing EU standards. It would promote a more predictable and uniform demand for net-zero solutions and allow public authorities to set out ambitious sustainability requirements.

The new **EU regulatory framework for batteries** is a crucial element in the EU's transition to a climate neutral economy, by securing competitive and resilient value chains for battery production, reuse and recycling in the EU. Going forward, **the Ecodesign for Sustainable Products Regulation**[9] will apply to a broader range of products and further expand the range

[7] Such as producers of polysilicon used in solar PV or of battery cells manufacturers.

[8] Commission estimates based on data from International Renewable Energy Agency (Irena) and industrial stakeholders.

[9] The EU's ecodesign policy sets harmonized rules for energy-related products on aspects such as energy

of sustainability requirements, in which EU industry excels. The Commission will give a high priority to work on net-zero technologies under the existing and future Ecodesign working plans.

Market transparency is another tool facilitating uptake of technologically and environmentally superior net-zero products. For example, the Commission will propose a **unified energy label** for heat pumps to allow users to compare different technologies[10] by the end of this year.

The Green Deal Industrial Plan will succeed in boosting competitiveness if all actors (authorities, investors, consumers) join forces towards the same objectives. The recently established Clean Tech Europe Platform, the Clean Energy Industrial Forum, together with other relevant stakeholders, would support the plan, coordinate action to meet the investment and manufacturing targets and further promote matchmaking opportunities. The Commission will continue to engage closely with the European Parliament to make the Green Deal Industrial Plan a success.

2.2. Speeding up access to finance

Global net-zero industry has experienced strong growth, with clean energy investments up by 10% in 2022 year on year. **The EU's net-zero industry is competitive, even in our relatively high-energy-price environment. But subsidies abroad are unleveling the playing field. This calls for access to funding for net-zero industry to be extended and accelerated.** This is the second pillar of the Green Deal Industrial Plan.

Already today, the EU and national funding play an important role in fostering net-zero innovation, manufacturing, roll-out and related strengthening of grids and infrastructure.

Under NextGenerationEU, the 27 national recovery and resilience plans funded by the Recovery and Resilience Facility (RRF) already make available EUR 250 billion for green measures, including investments supporting the decarbonisation of industry. Horizon Europe dedicates around EUR 15 billion to climate, energy transition and clean mobility research and innovation. Cohesion Funds make around EUR 36 billion available for energy transition, in addition to Just Transition Fund's EUR 3 billion. Funding for net-zero industrial value chains can be stepped up in scale and speed through targeted state aid. But to avoid fragmenting the Single Market due to varying levels of national support – and varying capacities to grant such support – there also needs to be adequate EU-level funding to facilitate the green transition across the Union as a whole.

2.2.1 National funding

Starting with state aid: EU competition policy provides tools to support the development and deployment of key cutting edge technologies strategic for the green and digital transitions, while preserving the integrity of the Single Market and respecting EU's international obligations. In 2022 alone, the Commission approved aid schemes with an overall budget of EUR 51 billion to deploy new renewable energy production capacity and decarbonise industrial production across the Union. As early as March 2022, following Russia's aggression against Ukraine, the Commission adopted a Temporary Crisis Framework providing a tool for Member States to remedy the negative economic effects created by the war and facilitate structural adjustments to better respond to the resulting economic situation. The Framework has been amended twice and already includes specific provisions on simplified support for renewable energy,

consumption, water consumption, emission levels and material efficiency, stimulating both demand and supply for more sustainable products.

[10] For heat pumps thanks to the energy labelling database EPREL https://eprel.ec.europa.eu/screen/home

decarbonisation technologies and energy efficiency measures.

The Commission now intends to allow further flexibility for the Member States to grant aid in these areas. The Commission will consult Member States on a proposal to adapt State aid rules on a temporary basis, until [end 20XX], to further speed up and simplify, with easier calculations, simpler procedures, and accelerated approvals.

The Commission intends to **adapt state aid rules along five axes**. Four of these will be implemented through the proposed amendment of the Temporary Crisis Framework (TCF), which will be transformed into the **Temporary Crisis and Transition Framework (TCTF)** for State aid:

1. *Simplification of aid for renewable energy deployments;*

   The TCF has already simplified aid for renewable deployments. The draft TCTF would go further, by:

   – extending the provisions to **all renewable technologies** (under RED II) and to renewable hydrogen and biofuel **storage**;
   – eliminating the need for open tenders for **less mature technologies** (for which tenders may work less well); and
   – **extending deadlines to complete projects**.

2. *Simplification of aid for decarbonising industrial processes;*

Decarbonisation aid to industry had already been simplified by the TCF. The TCTF would go further with a number of provisions, such as:

- allowing aid by reference to **standard percentages of investment costs**, based on case experience – for hydrogen use, energy efficiency and electrification.
- More **flexible aid ceilings** per beneficiary in smaller schemes.

3. *Enhanced investment support schemes for production of strategic net-zero technologies, including the possibility of granting higher aid to match the aid received for similar projects by competitors located outside of the EU;*

4. *More targeted aid for major new production projects in strategic net-zero value chains, taking into account global funding gaps.*

These changes would be implemented by dedicated TCTF provisions:

- **to support new investments in production facilities in strategic net-zero sectors, including via tax benefits**. These would aim to ensure a level playing field with other jurisdictions and will be limited in time, targeted to those sectors where such delocalization risk has been identified, and proportionate in terms of aid amounts.
- The provisions on tax benefits would enable Member States to **align their national fiscal incentives on a common scheme**, and thereby offer greater transparency and predictability to businesses across the EU.

The Commission will remain committed to fast procedures under the TCTF, as is already the case for aid approved under the Temporary Crisis Framework, where median approval time under the temporary state aid framework has been 19 days.

5. *Significantly increasing notification thresholds for state aid in these fields*

The Commission will adapt the State Aid rules on this fifth axis by further revising the **Green Deal General Block Exemption Regulation.** In addition to provisions linked to IPCEI projects

(see below), this would give Member States more flexibility:

- to support measures in key sectors, such as hydrogen, carbon capture and storage, zero-emission vehicles and energy performance of buildings, by further increasing thresholds triggering notification to the Commission.
- enlarge the scope of investment aid for recharging and refuelling infrastructures,
- further facilitating training aid for skills.

Today, Europe has five **Important Projects of Common European Interest (IPCEI)**, large development projects undertaken by several Member States to fund new technologies in strategic areas, with strong positive spillovers across borders and for innovation, workers and customers: one in microelectronics, two in batteries and two in hydrogen, with more projects in preparation[11]. Public support of EUR 18 billion for approved IPCEIs is expected to unlock an additional EUR 36 billion in private investments, a leveraging factor of 2.

To accelerate the roll-out of new projects, the approval of IPCEI related projects will be further streamlined and simplified;

- A code of good practices for a transparent, inclusive and faster design of IPCEIs will allow for a streamlined assessment and is to be endorsed by the Member States and the Commission this spring.
- The Commission is also preparing to **speed up the implementation of smaller, IPCEI-related, innovative projects,** in particular by small and medium-sized enterprises, through higher notification thresholds and greater aid intensities under the General Block Exemption Regulation.

2.2.2 EU funding

Achieving the climate and energy policy objectives of Fit-for-55 package require significant investments over the period 2021-2030. The Commission's analysis indicates that over EUR 477 billion of additional investments are needed in the energy system and transport each year by 2030 on top of the historical annual average. Measures under REPowerEU would further require an additional EUR 300 billion cumulative investments by 2030. To support the transition reaching the EU's climate neutral objectives and REPowerEU targets, the EU will have to continue to rely on a competitive net zero industry. Based on industry data, it is estimated that [over EUR 170 billion] of cumulative investments are needed by 2030 in the manufacturing of net zero technologies for solar, wind, battery, heat pumps and hydrogen alone.

Important disparities exist within the EU in terms of support by Member States. For example, while in 2020, 0.57% of EU GDP was allocated to support renewable energy sources, one country allocated almost 1% of its GDP and ten others spent less than half the EU average.[12]

To avoid fragmenting the Single Market due to varying levels of national support, facilitate the green transition across the Union as a whole, and to address the large gap between funding currently available and the financing needs for scaling up the net zero industry, we must also step up EU funding. Accompanying the Green Deal Industry Plan, the EU budget will continue to contribute to targeted and swift funding of Europe's net-zero industry. RePowerEU is our dedicated vehicle, and is boosted by other EU funds which should result in an overall investment in the green transition of more than EUR 380 billion until 2030.

[11] Such as additional batteries and hydrogen, or possibly solar or heat pumps.

[12] Study on energy subsidies and other government interventions in the European Union - Publications Office of the EU (europa.eu). Public support measures include direct transfers to business and consumers; tax expenditures (e.g. tax credits, VAT reduction); income or price support; Research & Development (R&D) support.

RePowerEU

In the next four years, Member States will receive strong support from the EU for implementing green investments and reforms under the **Recovery and Resilience Facility (RRF)**. In the 27 national recovery and resilience plans, EUR 250 billion are dedicated to the green transition. The plans include support to the decarbonisation of industry and to the strengthening of the European supply chains for clean technologies.

The EU support to the transition will now be increased with the additional funding brought to the RRF by the RePowerEU initiative: additional RRF grants (EUR 20 billion) will be available to Member States to promote the greening of industry, to support EU net-zero industry projects, and to assist energy-intensive industries in the face of high energy prices. Member States will also be able to dedicate grants of the Brexit Adjustment Reserve (EUR 5.4 billion) to these objectives. Furthermore, they will be able to use the remaining RRF loans (EUR 225 billion) with substantial pre-financing for these investments and reforms[13].

In order to assist the Member States in implementing the RRF and its RePowerEU component, the Commission published today the **Guidance on Recovery and Resilience Plans**. The Guidance provides flexibility to adjust the plans to the current context, and to prepare RePowerEU chapters. It acknowledges issues arising from the disruption of supply chains, energy prices and inflation and offers to Member States effective solutions to maintain the ambition of the initial plans. The Commission strongly encourages Member States to include in their modified RRPs simple and effective measures to provide immediate support to companies and boost their competitiveness:

- (i) **one-stop-shops** for the permitting of renewables and clean-tech projects to accelerate, digitalize and streamline the processes for obtaining the necessary approvals and permits for building and operating clean-tech projects;
- (ii) **tax breaks** or other forms of support for green, clean-tech investments undertaken by businesses, taking the form of either a tax credit, an accelerated depreciation or a subsidy linked to the acquisition or improvement of green investment assets;
- (iii) and investing in equipping the workforce with **skills** necessary for this industrial transition.

InvestEU Programme

The InvestEU Programme is well placed to boost net-zero investments in Europe. InvestEU is the Union's instrument for catalysing private investments in EU priority areas. Through the EIB, the EIF and 14 other implementing partners, the EU supports public and private investments in clean tech and industrial innovation. Examples of projects that can be supported are RDI of battery technologies, critical raw materials recycling, demonstration plants for manufacturing materials in the supply chain of electric vehicle batteries, hydrogen propulsion technologies, innovative advanced biofuels plants, advanced manufacturing technology equipment in steel processing. InvestEU can mobilise over EUR 372 billion of financing – public, but mainly private - through the backing of the EU budget guarantee of EUR 26.2 billion.

To date the Commission has signed InvestEU guarantee agreements for a total value of EUR 21 billion. On the back of these guarantee agreements, the EIF has already signed InvestEU guarantee agreements with 48 financial intermediaries from 19 Member States for EUR 2.3 billion lending to European SMEs and small mid-caps, and 54 agreements with funds from 13

[13] This comes on top of the existing transfer possibilities of 5% from the cohesion policy funds (up to EUR 17.9 billion).

Member States for equity investments worth EUR 1.9 billion[14].

Examples of InvestEU-supported investments by the EIB and the EIF in the area of clean technology:

- *A EUR 60 million investment by the EIB in a p-CAM (precursor cathode active material) commercial demonstration production plant. P-Cam is used in the supply chain of electric vehicle batteries (high tech lithium-ion battery cells).*
- *A EUR 315 million loan by the EIB to a joint venture for technology and product developments of hydrogen automotive propulsion technologies, and active safety systems.*
- *A EUR 32 million investment by the EIB in support of R&D projects of a manufacturing company in electrification technologies for agricultural machinery and power transmission systems for tractors and off-road vehicles.*
- *A EUR 101 million guarantee by the EIF to a fund in support of early-stage technology companies (venture capital), high growth potential industrial companies; and decarbonisation sector companies (renewable energy projects and sustainability companies).*

To ensure a timely delivery on the objectives of the Green Deal Industrial Plan, InvestEU procedures should be simplified, and its products aligned to current needs. Guarantee agreements and financial products need to be aligned with the revised state aid framework. The Commission will continue to work with EIB, the EU's bank, and other partners to address in an efficient and timely way the financing needs of priority projects, such as IPCEIs.

Funding through InvestEU is heavily frontloaded, as the biggest part of the funding comes from NextGenerationEU. By end 2023 EUR 14.83 billion of the EU guarantee needs to be committed, leaving only EU 11.37 billion for the period 2024-2027. At the same time, one can expect a significant increase in the demand for InvestEU support, given the revised eligibility conditions foreseen under the forthcoming Temporary Crisis and Transition Framework (TCTF). In particular, lifting current financing limitations on manufacturing projects in the areas covered by the TCTF would give rise to an increased demand and use of the EU guarantee by implementing partners. Therefore, the Commission considers it important that the overall funding for InvestEU is increased, in particular for the period covering 2024 until 2027.

Innovation Fund

The Innovation Fund supports the development and first-of-a-kind deployment of technologies and solutions that decarbonise energy intensive industry, boost renewable energy and energy storage (including batteries and hydrogen) and strengthen clean tech supply chains by supporting the manufacturing of critical components for batteries, wind and solar energy, electrolysers, fuel cells and heat pumps.

The revised and upgraded Emission Trading System directive, as agreed at the end of 2022 as part of the Fit for 55 package, allows the Innovation Fund to subsidise, through competitive bidding, 100% of the funding gap for scaling up clean tech deployment and manufacturing. The Innovation Fund can thus act as a European one-stop-shop for such support, thereby reducing the difficulties for investors in stacking different revenue streams and funding sources.

The Commission will launch in autumn 2023 a first auction – or competitive bid - for

[14] In addition, by December 2022 the EIB had signed agreements for 29 operations in 9 Member States for EUR 2.3 billion under InvestEU for financing projects in research and innovation, as well as in sustainable infrastructure and also for social investment and skills.

supporting the production of renewable hydrogen. Winners of this auction will receive a fixed premium for each kg of renewable hydrogen produced over a period of 10 years. This will have a similar impact as the production tax credit in the US IRA, the difference being that the premium, based on the received bids, will make EU support cost-effective, fast and administratively light. Terms and conditions for this first pilot auction, with an indicative budget of EUR 800 million, will be announced in June 2023. This pilot auction will be followed by further auctions or other forms of support for hydrogen production and use that contribute towards the REPowerEU hydrogen targets, thereby covering the EU domestic part of the Hydrogen Bank.

Further building on this experience, the Commission intends to extend the new competitive bidding mechanism for scaling up manufacturing of components for solar and wind energy, batteries and electrolysers, based on an analysis of EU net-zero sector needs, market sizing, and potential project pipeline. Also here, the Innovation Fund support would take the form of a production subsidy, instead of the 60% share of relevant cost that is the current practice of the Fund.

For **the mid-term,** the Commission intends to give a structural answer to the investment needs by proposing **a European Sovereignty Fund** as part of the revision of the Multi-annual financial framework before summer 2023. The aim is preserving a European edge on critical and emerging technologies, from computing-related technologies, including microelectronics, quantum computing, and artificial intelligence to biotechnology and biomanufacturing and clean technologies. This structural instrument will build on experience of coordinated multi-country projects under the IPCEIs and seek to enhance all Member States' access to such projects.

Finally, infrastructure and its financing is key to the conducive net-zero business environment that the Green Deal Industrial Plan seeks to establish. The development and strengthening of a European Hydrogen backbone, full coverage of the TEN-T and other trans-European networks with charging infrastructure and the extension and strengthening of smart electricity grids to accommodate large quantities of renewables require large investment and a strengthening of our regulatory framework. The investment need for net-zero infrastructure is more than EUR [xx] billion in the next decade[15]. Now is the time to map the infrastructure needed with a European mindset. The Commission urges co-legislators to adopt the Alternative Fuels Infrastructure Regulation (AFIR) as soon as possible, to help create a future-proof charging infrastructure. To develop and strengthen hydrogen and electricity infrastructure the Commission will further examine the resource needs of the Connecting Europe Facility and will use the full scope of the revised TEN-E Regulation to accelerate the planning, financing and deployment of crucial (cross-border) infrastructure. Notably the development and adoption of proposals for Projects of Common Interest needs to be accelerated in the coming years. The Commission will also consider further ways, including possible legislative action, to make sure that Member States deliver cross-border energy infrastructure, so that there are no undue delays to the roll-out of the strategic infrastructure.

2.3. Enhancing Skills

The green transition must be people-centred and inclusive to ensure equitable and just outcomes, leaving no-one behind. The European economy counted 4.5 million green jobs in

[15] Staff Working Document REPower EU https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022SC0230&from=EN

2019[16] up from 3.2 million in 2000. The green transition will amplify demands for new skills at all levels, requiring a large-scale up-skilling and re-skilling of the workforce. The battery industry alone estimates it will need an extra 800 000 workers by 2025. In the next decade, there will be fierce competition for talents. The productivity of our industry, the prosperity of our society and our ability to meet the net-zero objectives will depend on our ability to retain and attract workers. **This is why the third pillar of the Green Deal Industrial Plan must focus on skills - green and digital, at all levels and for all people, including women[17], with inclusiveness at the heart** of the Plan.

Demand for talent is acute. Labour shortages, as proxied by the vacancy rate,[18] have doubled in sectors considered key for the green transition[19] between 2015 and 2021 and green transition technical skills are in growing demand[20]. As it is estimated that between 35% and 40% of all jobs would contribute to the twin transition, technical - including digital - skills requirements and education levels in the green economy outpace the economy overall[21]. Overall labour productivity is higher in the green sectors, with for example **productivity in the clean energy sector about 20% higher than on average across the economy**, rendering green skills even more important for future prosperity.[22]

The EU is taking action to address skills related challenges posed by the twin green and digital transition through its overarching framework - the **European Skills Agenda**. The **European Pact for Skills,** which recently celebrated its second anniversary, supports 14 large-scale partnerships in European industrial ecosystems helping them to equip the workforce with the skills necessary for the transition towards a carbon-neutral and digital economy. The partnerships promote coordinated action by companies, workers, public authorities, social partners, education and training providers and employment services. Over 1,000 members have so far signed up, including large multinational companies, SMEs, local training providers, and chambers of commerce. Collectively, **they have pledged to help upskill and reskill 6 million people**. In addition, the Clean Energy Industrial Forum commits to stepping up efforts and investments in the development of skills.

The Digital Education Action Plan, the Digital Decade and the Structured Dialogue for Digital Education and Skills that took place in 2022 have prepared the ground for speeding up actions in reforming education systems and the provision of basic and advanced digital skills across the economy and at all ages. This provides a strong starting point to ensure that the society and businesses alike, can use digital skills for more precision and efficient use of natural resources,

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[16] Based on Eurostat definition of green jobs ('Employment in the environmental goods and services sector')., Eurostat 'Environmental economy - statitics on employment and growth", data, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Environmental_economy_%E2%80%93_statistics_on_employment_and_growth&oldid=583805#Development_of_key_indicators_for_the_environmental_economy.

[17] Female employment rate was 69.5% in Q2 2022 compared to 80.2% for men and 74.9% on average. Employment rate of people aged between 60 to 64 was 48.2% compared to 74.9% on average for the age group 20-64.

[18] Vacancy rate is the proportion of empty vacancies in the total number of vacancies and is considered as one of the best possible measures to indicate labour shortage in a sector.

[19] These sectors include the electricity, steam, gas and air conditionings, transportation, construction and Manufacturing sectors. Data for the Water supply, sewerage, waste management and remediation activities sector that is also regarded as key for the transition are unfortunately not available at the EU level.

[20] Based on the narrow Eurostat definition of green jobs ('Employment in the environmental goods and services sector'). Labour shortages, as proxied by the vacancy rate, have doubled in sectors considered key for the green transition between 2015 and 2021.

[21] ILO report 2019: Skills for a greener future: a global overview, available at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_732214.pdf

[22] JRC Clean Energy Technology Observatory (CETO): Overall Strategic Analysis of Clean Energy Technology–2022 Status Report: https://publications.jrc.ec.europa.eu/repository/bitstream/JRC131001/2022.5375.pdf

for a more positive impact on the environment.

The **European Year of Skills 2023 is a unique opportunity to develop the right skills to** thrive in a rapidly changing economy and to step up efforts. It is time for the EU and its Member States to be bolder and more ambitious in bringing about step changes in the education and skills agenda, and to implement opportunities presented by the EU framework[23]:

- The Commission is working with Member States to set targets and indicators **to monitor supply and demand** in skills and jobs **in the sectors relevant for the green transition.** A gender gap continues to prevail in the clean tech sector. For example, women are under-represented in higher education in Science, Technology, Engineering, and Mathematics (STEM) sub-fields that are highly relevant for the energy sector.[24] In the renewables sector, women account only for one third of the workforce[25], so there is a clear opportunity for harnessing female talent there.
- A **large-scale skills partnership for onshore renewable energy** under the Pact for Skills will be established by February 2023. The partnership will identify commitments and targets and develop a vision of concrete upskilling and reskilling needs for the renewable energy sector in Europe.
- A **Heat Pumps skills partnership** will be established by the end of this year.
- Modelled on the European Battery Alliance Academy[26], the Commission will propose to establish **Net-Zero Industry Academies** to roll out up-skilling and re-skilling programmes in strategic industries for the green transition, such as raw materials, hydrogen and solar technologies.
- Furthermore, we need to attract, and retain top talent to Europe, especially in Science, technology, engineering, and mathematics (STEM). We need to open new pathways for international STEM students and researchers to come to Europe.

Validation of skills, alongside efforts to support the recognition of qualifications across Member States and from third countries, as well as labour mobility policies, can facilitate matching people's skills to employers' needs. People learn in multiple ways and in different contexts outside of formal education and training structures. In order to support this:

- As part of the EU's Skills Agenda, the Commission will adjust **Europass to facilitate recognition of qualifications**. This could allow for a "fast track" to recognition and reduce administrative by supporting automatic authentication of qualifications by employers and training providers.
- The Commission will further propose a '**Skills-first' approach recognizing actual skills alongside qualifications** of EU mobile citizens and third-country nationals.
- In particular, to attract talent from outside the EU, the Commission will apply a skills-based approach to facilitate access of third country nationals to EU labour markets in priority sectors through the development of **an EU Talent Pool** and present a proposal on recognition of qualifications of third-country nationals.

[23] For example: micro-credentials, individual learning accounts, digital skills and education recommendations.

[24] This translates to lower share of patent applications with women inventors (only 20% in all patent classes in 2021 and just over 15% for climate change mitigation technologies), lower share of start-ups founded or co-founded by women (less than 15% in the EU in 2021), and lower amounts of capital invested into women-led companies (only 2% in all-female start-ups and 9% in mixed teams in the EU in 2021). Source: CETO: Overall Strategic Analysis of Clean Energy Technology in the European Union – 2022 Status Report

[25] 32% in 2019, according to the Clean Industry Energy Forum, Joint declaration on skills in the clean tech sector, https://commission.europa.eu/system/files/2022-06/ceif_joint_statement_on_skills.pdf

[26] The European Battery Academy will train, reskill and upskill approximately 800 000 workers by 2025.

More can be done to support people in acquiring new skills. The EU has robust policy frameworks to **financially support skills development,** with Council Recommendations supporting a number of skills reforms in the areas of individual learning accounts, to quality and effective apprenticeships and vocational education and training. Making these policy reforms deliver concrete results in a coordinated fashion across Europe requires both **public and private funding to align, which could includ**e:

- The General Block Exemption Regulation ceiling for aid to SMEs for training will increase from € 2 million to € 3 million.
- Measures providing opportunities to skill workers as part of an IPCEI will be taken into account in assessing state aid compliance of such projects.[27]
- To stimulate increased investment in training in new green technologies and production processes, the Commission will explore the treatment of training expenditure by companies as an investment rather than as an expense or operating cost.

EU funding is also available. The Multiannual Financial Framework 2021-2027 and NextGenerationEU support investments of around EUR 64.8 billion in skilling, re-skilling and up-skilling.[28] Out of those EUR 64.8 billion, the **European Social Fund +** (ESF+) is the main EU instrument to support investments in skills and is making EUR 5.8 billion available for green skills and green jobs.

The **Recovery and Resilience Facility** is providing a significant financial support. 14 Member States are including measures for training on green skills and jobs in their national Recovery and Resilience Plans that, together, amount to around EUR 1.5 billion.

Finally, the **Just Transition Fund (JTF)** is available for new investments in production facilities in strategic clean-tech value chains in Just Transition Regions. JTF earmarked EUR 3 billion for supporting training and skills development of workers made redundant as part of the green transition.

2.4. Trade and resilient supply chains

The EU welcomes initiatives conducted across the world on the road to climate neutrality. The goal of net-zero can be best achieved if clean tech incentives are underpinned by principles of fair competition and open trade. **The fourth pillar of the Green Deal Industrial Plan consists of global cooperation and making trade work for the clean transition.**

The EU draws competitive and political strength from being a trading powerhouse. The EU remains an attractive destination for global investment. We would have not achieved our resilience and overcome the challenges of the past years without the efficiencies that trade brings and the win-win partnerships we developed with third countries. At the same time, an increase in unfair and coercive practices have required us to develop new tools and enforce our rights, in order to maintain a level playing field. Altogether, this reflects the EU's drive towards Open Strategic Autonomy.

Trade openness is an essential element of our strategy to maintain the EU's position as a

[27] Point 18 of the Guidelines on IPCEIs: Communication from the Commission - Criteria for the analysis of the compatibility with the internal market of State aid to promote the execution of important projects of common European interest - OJ C 528, 30.12.2021, p. 10–18.

[28] European Social Fund +, Erasmus, Horizon Europe, European Regional Development Fund, Digital Europe Programme, Recovery and Resilience Facility and the Just Transition Fund.

leader in net-zero technologies. Trade policy keeps the Single Market connected to growth poles outside of our continent while securing access to the inputs critical for the clean transition. On the one hand, open trade creates opportunities for our industry by opening new export markets and creating economies of scale. On the other hand, it provides access to raw materials, parts, components as well as services that our industry needs, given that two-thirds of our imports consists of intermediates.

The EU will work with its partners to promote stability in international trade and strengthen legal certainty for investors and companies by continuing to **support the World Trade Organization (WTO)**, including through its reform. The WTO has a role in supporting climate neutrality by providing a forum for deliberations on trade aspects of the green transition, by clarifying how to promote green investments in a manner that minimises trade distortions, as well as by reinforcing disciplines on subsidies that negatively impact both trade and the climate.

The Commission will also continue to advance the EU's network of **Free Trade Agreements**, while making the most of those already in place through effective implementation and enforcement. In particular, the Commission will work to conclude negotiations with Australia by summer 2023 and make significant progress with India and Indonesia, while exploring possibilities with other partners in the Indo-Pacific. The Commission will also put forward for ratification the agreements with Chile, Mexico and New Zealand and seek to make progress with Mercosur.

The Commission will support the clean transition by continuing to develop other forms of cooperation with partners, beyond more traditional trade agreements. The Trade and Technology Council with the US, and that under preparation with India, establish a new tool for cooperation. Through the work of the dedicated **EU-US Task Force on the Inflation Reduction Act**, the EU and the US are working towards pragmatic solutions to EU concerns, with a view to maintaining and reinforcing Transatlantic value chains and ensuring positive cooperation on the shared interest to achieve net-zero.

The EU has developed **Sustainable Investment Facilitation Agreements (SIFA)** in particular with partners in Africa, in order to make it easier to attract and expand investments while integrating environment and labour right commitments. Climate and energy is a key area for partnerships under **Global Gateway**, the EU's contribution to narrowing the global investment gap worldwide. The Commission proposes that investments in other key partnership areas such as digital or transport should be further aligned with the goal of net-zero.

A number of **new initiatives** will also be developed:

- We will work with like-minded partners to establish a **Critical Raw Materials Club** to deliver on a secure, sustainable and affordable global supply of raw materials essential to our green and digital transition with a competitive and diversified industrial base. Building on existing international initiatives, the Club will develop principles to bring together raw material 'consumers' and resource-rich countries and foster co-operation to allow resource-rich developing countries to move up the value chain.
- We will develop **Clean Tech/Net-zero Industrial Partnerships** promoting the adoption of clean technologies globally and supporting the role of EU industrial capabilities in paving the way for the global clean energy transition.
- We will develop an **export credits strategy** including an **EU export credit facility** and **enhanced coordination of EU financial tools.** These can foster coherence with EU policies such as the European Green Deal or Global Gateway which pledged to invest in infrastructures aligned with pathways towards net-zero emissions.

Openness only thrives where fairness survives. Countries around the world have developed

new initiatives to support the clean transition. Where the public footprint in private markets is outsized, distortions create an unlevelled playing field and unfair competition emerges. A particular concern exists in respect of non-market economies. The EU wants to lead a robust response to address these trends.

In the first place, the Commission will continue to make full use of **trade defence instruments** (TDI) to defend the Single Market from unfair trade practices like dumping and distortive subsidies, with a focus on sectors that are key for achieving the EU's net-zero goal. We will also take further steps to ensure that our measures are not circumvented.

As green incentives proliferate around the world, the Commission will ensure that foreign subsidies do not undermine the competitiveness of the European industry unfairly. The **Regulation on Foreign Subsidies** entered into force on 12 January 2023 and provides an additional tool to investigate subsidies granted by third countries, by considering their specific impact in the internal market. The EU will also work with partners to identify and address distortive subsidies or unfair trading practices relating to IP theft or forced technology transfer in non-market economies, such as China.

The Commission will also promote reciprocity for access to public procurement markets. The Commission will deploy the **International Procurement Instrument** for the first time in 2023, in order to make the case for the EU companies to have equal access to procurement markets in third countries.

Finally, at the time of rising geopolitical tensions, the EU and its Member States should act together to defend their interests. The **EU framework for screening of foreign direct investment** enables effective coordination to safeguard key European assets and protect collective security. We are reviewing the functioning of the mechanism and assessing how its effectiveness can be further improved without jeopardizing our openness to FDI. At the same time, we will coordinate with allies, including in the work programme on economic security put forward by Japan, which holds the Presidency of the G7. The EU's **Anti-Coercion Instrument** will, once adopted, provide proper tools to rapidly respond to economic intimidation.

3. CONCLUSIONS

Europe remains an attractive destination for sustainable investments. The European Single Market over the last 30 years has delivered very significant economic benefits, raising annual EU GDP by 8-9% on average.[29] The European business model is based on openness, the European social model provides education, social protection of workers, as well as health and environmental protection. We offer a business-friendly environment (e.g. quality of infrastructure, rule of law). Together with fair competition and an unparalleled regulatory framework geared towards the twin digital and climate transitions, this is helping to provide the necessary predictability for investors.

The Green Deal Industrial Plan aims to simplify, accelerate and align incentives to preserve the competitiveness and attractiveness of the EU as an investment location for net-zero industry. Together, the EU and its Member States can send a strong signal to business.

In the short term, and especially facing unfair competition against the background of high energy prices, temporary and targeted additional measures are warranted to support European

[29] Discussion Paper 094: Quantifying the Economic Effects of the Single Market in a Structural Macromodel (europa.eu), Jan in't Veld, 2019.

industry. The regulatory environment has to be adapted for a new reality. It should be simpler and faster to better serve the objectives of the EU towards net zero.

This Communication presents the Commission's response to the short-term challenges European industry is facing. The Commission will also heed the European Council's call to present before its March meeting a broader strategy to boost long-term competitiveness in the Single Market, as it celebrates its 30th anniversary.

The Commission stands ready to support industry and society in its transition towards sustainability, promoting investments in new technologies and providing funding where possible and necessary. Investments in a skilled population require training and education to be a crucial part of our future. Because we live in an interconnected world and because the green transition is a reality beyond the EU's borders, the Commission will keep engaging and working with our trade partners, in an open but assertive approach.

The Commission calls on leaders, governments and lawmakers to support the implementation of this plan and is ready to translate it into concrete proposals based on substantiated needs assessments before the March European Council.