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ENERGY FOR A JUST AND GREEN RECOVERY DEAL: THE ROLE OF THE INDUSTRIAL RELATIONS IN THE ENERGY SECTOR FOR A RESILIENT EUROPE

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REJENERAXION:
Europe National Baseline Report

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Abstract

Driven by decarbonisation policies, the energy transition in Europe - whose energy system is dominated by fossil fuels - is underway but needs further acceleration to match the climate targets of the EGD, Fit for 55 Package, RepowerEU and implement security plans. To this aim the systemic nature of the energy transition is to consider. The changes that occur in this economic sector affects the emission balance in industry, transport, construction among the other and an integrated approach is to apply to each interconnected field: social, technical, economic, legal, environmental as well as at their intersections. Indeed, the road to clean energy is a global and complex process with profound social implications that goes beyond the technological and economic dimensions and directly affects more than 20 million European workers in the energy industry. Trade unions pushed for the just energy transition approach to include the social dimension - in terms of inclusiveness and fairness - in the decarbonisation processes and the role of the social dialogue and industrial relations is fostered for the anticipation and management of the distributional effects of climate policies on the energy sector alongside with the promotion of economic growth, decent work, social equality and sustainable development. Aimed at including social partners in the policy dialogue and the governance of decarbonisation through social dialogue, this paper provides an interpretative framework on the energy transition at European level from the perspective of the just transition approach.

JEL Classification:

Q30; Q56; Q42; J50; J81; J80

Keywords:

just energy transition, social dialogue, industrial relations, decarbonisation distributional effects, decent work, employment/environment dilemma

THE ENERGY SECTOR IN EUROPE[1]

1. AN INTRODUCTION

This document forms the **European Preliminary Report** of the *REJEnerAXION project* (Project no. 101052341*)* which aims to analyse and strengthen the role and contribution of industrial relations structures, including social dialogue, in fostering a "socially just transition" on the road to clean energy, with reference to the objectives of the European Green Deal (EGD) and through the Recovery and Resilience Facility Plans. An early result in the first year of activity is the outlining a **shared interpretative framework on the energy transition among the partners** from the point of view of the current situation, the dynamics and players involved, the instruments and effects resulting from the conduct of the paths towards decarbonisation in Europe. The social partners and the instruments of social dialogue have already mobilised in this regard, encountering obstacles and difficulties but also achieving some initial successes. In this direction, therefore, the report provides a targeted selection of data and information, from the **perspective of the just energy transition**, organised as follows: the first section introduces the contextual elements and what is at stake in relation to the transformations of decarbonisation; the second runs through the main legislative and regulatory interventions affecting ecological and energy transition; the third part presents the main characteristics and trends in the energy sector, accompanied by an in-depth analysis of the effects of the transition; finally, the last part illustrates the main players in industrial relations, the positions and actions of the social partners in the field of climate and energy policies, paying special attention to innovative practices of social dialogue at European level.

Regarding the **current situation and what is at stake,** globally, the EU is one of the most important economies and trading blocks, behind the US but ahead of China. Together, China, the US and Europe are responsible for about half of global energy consumption and emissions, and make up almost 60% of global GDP (SAPEA 2021). **In Europe, the energy sector** is characterised by extreme heterogeneity, due to differences between the MS in terms of population and demographics, economy and industrial development, energy sources and infrastructure, legal frameworks and democratic preferences (EERA 2021, Hafner 2022). The energy policy mix is also very diverse and has seen changes over the last two decades. The energy system is still dominated by fossil fuels, with natural gas playing an important role in north-western countries and Italy, while coal is a major resource for the energy systems of the central and eastern countries. Thanks to technological developments, changes in economic structures, and energy policies, as well as relocation, energy and carbon intensity have decreased in Europe in recent decades.

[1] This paper is part of the project "REJEnerAXion - Energy for a just and green recovery deal: the role of the industrial relations in the energy sector for a resilient Europe", a European Union co-funded research project (101052341/SOCPL-2021-IND-REL) aimed at analyzing and strengthening the role of innovative industrial relations structures, including social dialogue, to respond in a socially fair and balanced way to the main challenges and opportunities offered by a clean-energy transition at national and European level.

The project partners are: Fondazione Di Vittorio (Italy, project coordinator); Federazione Italiana Lavoratori Chimica Tessile Energia Manifatturo – FILCTEM CGIL (Italy); Fundacion 1° de Mayo (Spain); Association travail emploi Europe société-ASTREES (France); wmp consult – Wilke Maack (Germany); Laboratoire d'Etudes sur les Nouvelles formes de Travail, l'Innovation et le Changement, LENTIC, Université de Liège (Belgium); Instytut Spraw Publicznych (Poland); Central European Labour Studies Institute CELSI (Slovakia (and Hungary). Supporters are: European Federation of Public Service Unions- EPSU (EU); European Trade Union Institute – ETUI (EU). Website: https://www.rejeneraxion.com/.

The aim of the paper is to provide the main results of research reports at a national level based on desk analysis and qualitative research (in-depth interviews with stakeholders) considering the transformations taking place in the energy sector oriented towards clean energy and their impacts on the world of work and the role of industrial relations and social dialogue for a just transition.

From an economic point of view in the period 2010-2020 the energy sector saw a decline, both in absolute terms and in terms of share of gross value added. In 2020, the sector generated 250 billion euros as economic activity, or 8% of European GDP. As regards the workforce, in 2019 the European energy sector had 7,500,000 workers (in supply, power generation and distribution, and in end-uses relating to vehicles and efficiency) (IEA 2022c). Despite the reductions in the mining and quarrying sectors between 2015 and 2020, the number of enterprises increased by 77.3% (to 177,377 in 2020), driven by the NACE sectors of *Electric power generation, transmission and distribution* (+79.4%) and *Manufacture of gas, distribution of gaseous fuels through mains (*+192.5%) (EC 2022a). On the emissions side, emissions from the energy sector decreased by 44% in Europe between 1990 and 2019, well before the pandemic (Ancygier 2020). Currently, the sector is responsible for more than 75% of the EU greenhouse gas emissions due to energy use, but only one third of these come directly from the power sector (EERA 2021). Renewables contributing to electricity production have exceeded the share of fossil fuels in Europe since 2018 and were 41% in 2020, while in energy dependence, which has increased over the decade to a share of 57.5% in 2020, all the MS have been net energy importers since 2013.

It is against this backdrop that the **energy transition** is taking place, in the context of the economic and societal transformations needed to achieve climate neutrality by 2050 through collective zero net emissions by the 27 MS. Driven by decarbonisation policies, energy transition on the European continent is already underway, but needs further acceleration to match the climate targets of the Fit for 55 Plan and implement energy security plans to manage the effects of the price crisis and Russia's invasion of Ukraine. What is new is not the transition itself but the fact that it is **policy- and not market-driven**. Moreover, the transition is **systemic in nature**, so it cannot be tackled by looking only at the energy sector, given that the changes that occur in one economic sector (industry, transport, construction, etc.) have immediate repercussions on the emissions balance in the others. Rather, the energy sector has to be read as an integral part of the entire economic system.

Moreover, energy transition is a **global and complex process with profound social implications.** As such, it not only concerns the technological dimension but also the socio-political and socio-economic ones. To understand and intervene in this process with the tools and resources of social dialogue, therefore, it is also necessary to consider other dynamics related to digitisation, circularity, sector coupling and system integration, policies, regulations and markets, citizenship, cultures, lifestyles and energy practices (EERA 2021). In relation to the disruptive social and economic effects that are the result of the transformations of the energy transition, which revolve around the difficult dilemma between employment and environment and will directly affect more than 20 million European workers in the industry (IndustriALL GU 2022), the European Trade Union has recently re-proposed the **just transition approach** (IndustriALL 2022a), which over the years has seen different and unclear interpretative evolutions. A **just energy transition** implies that decarbonisation processes include the social dimension in terms of inclusiveness and fairness both with respect to the results (the characteristics of the social and employment scenarios of the post-carbon economy) and its process (how to arrive at the post-carbon economy and society from the current situation) (Mandelli 2022). In this scenario, therefore, industrial relations and social dialogue can help guide the energy transition in a socially balanced manner with interventions aimed at anticipating and managing its distributive effects at different levels.

The text of the report was completed on 9 January 2023, making use of data, information and trends for the period 2010-2020 collected by consulting institutional documents and websites, reports and international, European and national level scientific publications published since the early 2000s and limited to what was available as of November 2022.

2. EUROPEAN POLICY AND LEGAL FRAMEWORK FOR ENERGY TRANSITION

2.1. Policy and legal framework for the energy transition

In line with the commitments defined by the Paris Agreement (**December 2015**)[2] and the guidelines of the *Energy Union Package* that outlined the MS strategy (**February 2015**)[3], in **November 2016,** looking at the *Clean Energy for all Europeans Communication*[4], the EC promulgated the fourth ***Clean Energy for All*** energy package (or *Winter Package*). To support the clean energy transition, the package included legislative initiatives on the energy performance of buildings, risk preparedness in the electricity sector, renewable energy, energy efficiency, the internal market for electricity and the Agency for the Cooperation of the Energy Regulators[5]. *Clean Energy for All* also included the non-legislative ***Coal regions in transition initiative***, launched in 2017 to mitigate the social consequences of the low-carbon transition in the regions concerned and, most importantly, defined the governance system of the *Energy Union strategy*[6] around the climate and energy targets for the period 2021-2030. With reference to the package and to translate the European directives into national legislation, MS were asked to draw up *National Climate and Energy Plans*, subject to approval and monitoring by the Commission.

Following growing concerns about the global effects of rising temperatures, in the document ***A Clean planet for all*** (**November 2018**)[7] the Commission outlined its strategic and long-term vision advising climate neutrality for 2050, emphasising the need to address socio-economic issues through participatory means and the involvement of social partners. This was followed in **December 2019** by the publication of the ***European Green Deal***, the EU's current growth strategy from a cross-policy perspective, which, in setting out an integrated, long-term plan for decarbonisation, placed energy transition at the centre of the policy agenda. EGD measures included the ***European Climate Law*** (officially adopted in **June 2021**), which introduced into legislation the targets of carbon neutrality by 2050 and the reduction of GHG emissions by 55% by 2030. The *European Investment Plan* (also known as the *Sustainable Europe Investment Plan*) constitutes the main financial component of the EGD (in **January 2020,** it foresaw the mobilising of a minimum of €1 trillion of investments over 2021-2027).

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2 The Paris Agreement is instrumental in achieving the UN Sustainable Development Goals and in particular SDG #13 on climate change and climate action

3 The package covers five interconnected dimensions: energy security, the internal energy market, energy efficiency, decarbonisation and research, innovation and competitiveness. Communication on a Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy (COM/2015/80)

4 Communication on Clean Energy for all Europeans (COM/2016/860)

5 Directive (EU) 2018/844 on the energy performance of buildings, Regulation (EU) 2019/941 on risk preparedness in the electricity sector, Directive (EU) 2018/2001 on the promotion of the use of energy from renewable resources, Directive (EU) 2018/2002 on energy efficiency, Regulation (EU) 2019/943 on the internal market for electricity and Directive (EU) 2019/944 on common rules for the internal market for electricity, Regulation (EU) 2019/942 establishing a European Union Agency for the Cooperation of Energy Regulators

6 Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action

7 Communication on a Clean Planet for All: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (COM/2018/773)

To create a connection between the EGD and *the European Pillar of Social Rights*, in **January 2020** the Communication *A Strong Social Europe for Just Transitions* defined the priorities to make climate, digital and demographic transitions more inclusive, equitable and people-centred. Subsequently, in the aftermath of the crisis, to compensate for losses during the pandemic and to activate economic recovery, in **July 2020,** the EC launched ***NextGeneration EU (NGEU)***, a package of economic measures and stimuli for the period 2021-2027 around four priorities (green and digital transitions, macroeconomic stability and fairness) for a total of 806.9 billion euros. NGEU included the *Recovery and Resilience Facility (RRF)* for 723.8 billion euros, to be divided among the MS on the basis of the submission of National Plans, making the disbursement of funds conditional on the approval of the plans and their progress[8]. Next Generation EU finances, among others and for 10.9 billion euros, the ***Just Transition Fund (JTF)*** (see paragraph 2.2.). Although the package called for a strengthening of the social dimension, some analyses suggests that this aspiration has fallen by the wayside (Mandelli 2022, Rainone and Pochet 2022). Building on policies implemented by the *Clean Energy for All* package and on the framework of the *EGD*, other important reference documents for the energy transition were proposed or approved in 2020: the strategy on the integration of the energy system in Europe and the proposal for *A hydrogen strategy for a climate-neutral Europe* (**July 2020**), the strategy on the energy efficiency of buildings *Renovation Wave Strategy* (**September 2020**), the *New Circular Economy Action Plan* and the *New Industrial Strategy for Europe*[9] (later updated in 2021) in **November 2020.** In the same year, the EC published (**July 2020**) the *Skills Agenda for Europe for Sustainable Competitiveness, Social Equity and Resilience*[10] addressing the challenges of the twin transition (green and digital) and adopted the plan *Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit of our people* (**September 2020**).

In **June 2021,** the *European Climate Change Adaptation Strategy* was adopted, which looks at fast, systemic and knowledge-based societal resilience measures. In the same month, the ***European Climate Law*** made the 2050 climate neutrality target binding for the EU, setting the goal of a net emission reduction of 55% compared to 1990 by 2030, obliging MS to align their NEEAPs with the new target, and establishing an independent body to monitor progress and assess an EU carbon budget to 2050, on the basis of which an intermediate emission cut target to 2040 would be set. To align climate-energy targets and measures with the new 55% target in **July 2021**, the EC presented the **Fit for 55** package, which provides concreteness for the delivery of the ambitious green transition targets. The 13 regulatory proposals include, among others, the definition of new targets for renewables and energy efficiency[11], the introduction of the ***Carbon Border Adjustment Mechanism (CBAM)***, which is currently scheduled to enter into force in October 2023 (considered to be environmentally correct but difficult to implement) (Raza et al. 2022) and the

8 MS are bound to allocate at least 37% of funds to support climate objectives and to apply the "do no significant harm" principle with respect to possible negative environmental impacts (Mandelli 2022). As of December 2022, between loans and grants, 138.7 billion euros have been distributed in the six policy pillars: green transition (14.46), digital transformation (7.70), smart, sustainable and inclusive growth (21.52), social and territorial cohesion (14.98), health and economic, social and institutional resilience (19.75), policies for the next generation (3.73). Retrieved in https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/disbursements.html?lang=en(7 January 2023)

9 Communication on Powering a climate-neutral economy: An EU Strategy for Energy System Integration (COM/2020/299), Communication on Renovation Wave for Europe: greening our buildings, creating jobs, improving lives (COM/2020/662); Communication. A new Industrial Strategy for Europe (COM/2020/102 final).

10 Communication COM 2020/274

11 By June 2022 EU countries agreed on a Council position on most of the Fit for 55 proposals, negotiations with the European Parliament are ongoing on these proposals. Retrieved on January 7 2023 from https://www.consilium.europa.eu/en/policies/climate-change/

proposal for further ***reform of the Emission Trading System (ETS)***, the main policy instrument to regulate emissions from the industrial system (which was first defined in 2003).

In response to the climate challenge and the energy emergency exacerbated by the risks of Russian fossil fuel dependency, in **May 2022** the EC published the *EU Save Energy Plan* and the *European Gas Demand Reduction* plan and, above all, the ***REPowerEU*** plan, which is part of the Fit for 55 package. In the short term, the plan aims to reduce imports from Russia by at least two-thirds by the end of the year, while in the long term it aims to strengthen climate undertakings by accelerating renewables and efficiency, with coal and nuclear playing a marginal role. A few months after the activation of the plan, in **October 2022** the *European Energy Research Alliance (EERA)*[12] published the *REPowerEU Manifesto* which, based on the studies and analyses conducted, identified five critical areas concerning the implementation of REPower EU, with respect to which urgent improvements are recommended. The critical areas refer to: prioritising reduction in energy demand; differentiating between electricity and heat; strengthening the energy system integration perspective; considering timeframes, synergies and trade-offs; addressing limitations and bottlenecks of accelerated deployment of low-carbon technologies. Finally, it seems appropriate to recall the perplexities raised in the European debate around the European Parliament's approval of the proposed amendment of the Supplementary Delegated Act concerning the climate mitigation objective of the European Regulation establishing the **taxonomy of sustainable economic activities**. The approval of the amendment in **July 2022** led to the inclusion in the list of public and private investments also of electricity generation plants fuelled by nuclear energy and gas (which had previously been excluded).

2.2. Institutional initiatives to support a just transition to clean energy

As a central element of the EGD in **January 2020**, the Commission activated the ***Just Transition Mechanism (JTM)***, which aims to assist with the economic and social costs of the transition in coal- and carbon- intensive regions, diversify their economies, promote the employment of at-risk workers, achieve energy savings and switch to new sources. The JTM has been granted 150 billion euros for the period 2021-2027 and has three pillars of financing: the ***Just Transition Fund (JTF)*** (established in **June 2021** for 19.3 billion euros), a public sector loan facility that combines Commission grants with European Industrial Bank (EIB) loans, and a dedicated Just Transition Scheme under *INvestEU (ECA 2022)*. To access the fund, MS were required to prepare ***Territorial Just Transition Plans (TJTPs)***. By December 2022, 38 TJTPs across 16 MSs had been approved, mobilising more than €14.2 billion[13]. To support the regions and key players involved, the ***Just Transition Platform (JTP)*** was activated in **June 2020,** building on the previous 2017 *Coal Regions in Transition Initiative (CRIT).*

A degree of perplexity has been expressed concerning the **effectiveness and functionality of the TJTPs**: because too much attention has been paid to coal regions compared to carbon-intensive areas, the focus on employment effects is limited to fossil fuel industries, and because of a lack of monitoring and evaluation activities. Furthermore, the critical positions expressed by a number of stakeholders at the European and national level, who are involved in different capacities in the scale of responsibilities for the

12 Consisting of more than 250 public research centres and European universities active in low-carbon energy research

13 Retrieved 9/12/22 Just Transition Platform in https://ec.europa.eu/newsroom/regio/newsletter-archives/42492

planning and implementation of the instrument, show that to date it is still unclear whether and to what extent the effects of the interventions are able to deal with the social inequalities resulting from the interventions and transformations of the transition (SAPEA 2021, Abram et al. 2022). In effect, in relation to the use of coal region funds, the same evaluation report of the European Court of Auditors (November 2022) states that **there is a risk** that the funds have been and will be spent without the transition taking place (due, among other things, to the limited duration of the programme and the rebound effect related to the use of coal following the invasion of Ukraine). The last JTP Conference (October 2022)[14] also raised numerous critical issues concerning the transition from the planning to the implementation phase of the JTP. In this regard, the CEE Bankwatch network[15] identified a specific set of **obstacles** concerning: rapid contracting timeline and extensiveness of process; political instability in many countries; social dissatisfaction; danger of misuse of funds (short timeline and fast process); low capacities of local and regional authorities; lack of experience in spending EU funds (some regions doing that for the first time); high public mistrust and low civic participation in some Central and Eastern European Countries; insufficient funding (generally JTF does not supply enough funding for all the needs of these regions); lack of transparency and bad governance; gaps in political will; low environmental and climate ambitions and knowledge.

Finally, regarding the just transition, in **June 2022,** the European Council adopted *Recommendations aimed at ensuring a fair and inclusive transition towards climate neutrality*, which, referring to the *European Pillar of Social Rights*, include aspects such as social protection and emphasise that the transition does not only concern coal- and carbon-intensive regions. As a result of these recommendations, MS are urged to take measures to inclusively manage those most exposed to the negative effects of the transition, paying attention to the labour and social aspects related to energy and environmental climate policies. With respect to this document, some European observers (ETUI 2022) reiterated their concerns that, despite everything, the "social dimension of the EGD remains underdeveloped", "the initiatives to address these challenges remain fragmented", and "a robust EU just transition framework should, among other things, provide for a legislation on the anticipation and management of change (...) and promote social dialogue and stakeholder involvement at all levels" (ETUI 2022).

14 https://energy.ec.europa.eu/just-transition-platform-conference-october-2022_en

15 15 https://bankwatch.org/

3. MAJOR TRENDS IN THE ENERGY SECTOR

3.1. Main Features of the Energy Sector

GROSS AVAILABLE ENERGY in 2020 reached 57,767 PJ, **the lowest level** recorded in the EU since 1990 (8.1% lower than 2019 due to measures to combat the COVID-19 pandemic), with a decreasing trend in the previous decades as well. As a matter of fact, following the 2008 crisis and after a recovery in 2010 consecutive decreases were observed until 2015, when the trend reversed again. However, 2018 and 2019 once again saw a drop in gross available energy, although not nearly as significant as the one registered in 2020 (EUROSTAT 2022c).

ENERGY DEPENDENCY The energy available to the EU is partly produced in the MS and partly imported from third countries. In 2020, the EU imported 57.5% of the energy needed for its own consumption, while domestic production reached 42.5%. **Dependence on supplies from outside** the EU has grown over time, in relation to changes in production, consumption and the composition of the energy mix. In 1990 the dependence was 50%, in 2008 it reached 58.4%,followed by 60.5% in 2019, dropping to 57.5% in 2020. Since 2013, all 27 MS have been net energy importers[16]. Between 2010 and 2020, the import shares of oil and its derivatives, crude and NGLs and natural gas increased, while the share of hard coal remained stable, and that of solid fossil fuels decreased slightly (EC 2022a). In 2020, 24.4% of the EU's foreign energy needs **depended on Russia**, the main supplier of all the main energy commodities: 44% of gas, 26% of oil and 54% of coal (EUROSTAT 2022d). In 2022 due to the war in Ukraine, the supply of natural gas imported from Russia dropped to 9% (September 2022), partially replaced by the import of liquefied natural gas from Norway and the USA (EC 2022h).

ENERGY MIX The composition of available energy in the EU is very heterogeneous, determined by the availability of different energy sources by country, such as coal, gas, oil, hydropower and other renewable energy potential, as well as differing policies in favour or against specific energy sources (fossil fuels, nuclear or renewables). The energy mix has changed in recent decades, largely due to measures to decarbonise energy, with a reduction in oil and, to a lesser degree, natural gas (followed by nuclear and coal)[17] against a gradual but continuous growth in renewables (SAPEA 2021). Fossil fuels still dominate the energy system, with some diversity across the continent. Natural gas is relevant in North-Western European countries and Italy, due to past domestic production which led to the establishment of a well-developed network of pipelines. Coal still plays an essential role in the energy systems of Central and Eastern European countries (Germany, the Czech Republic and Poland). Other countries, notably France, Norway, Sweden and Switzerland, have a lower carbon energy mix mainly thanks to nuclear and hydro. In 2020, the composition of the energy mix at European level was: 34.5% total petroleum products, 23.7% natural gas, 17.4% renewable energy, 12.7% nuclear energy, 11.5% solid fossil fuels and 0.2% other (EUROSTAT 2022d, Hafner 2022).

PRIMARY ENERGY PRODUCTION As of 2018, renewable sources used for primary energy

16 Malta, Cyprus and Luxembourg had the highest percentage levels in 2020 (above 92%), while Estonia, Romania and Sweden have the lowest (10.5, 28.2 and 33.5% respectively).

17 17From the point of view of phasing out coal by 2022, ten MS are coal-free, eleven have ensured phase-out by 2030 and six (Bulgaria, Czech Republic, Germany, Croatia, Romania and Slovenia) have planned to reach the target even later (Mandelli 2022).

production in Europe overtook the share of fossil fuels, which, together with oil, natural gas and nuclear energy, showed a **decreasing trend over the period 2010-2020**. The largest decrease concerned natural gas (-62.4%), followed by fossil fuels (-43%) and oil and its derivatives (-35.1%). Over the same period, energy production from renewables increased by 39.2%, as did that from non-renewable waste (30.2%). Adjusted for differences between MS, renewables represented, on average, the largest energy resource in 2020 (41%), followed by nuclear (31%), solid fuels (18%), natural gas (7%) and crude oil (4%). In 2022, as many as 19 MS increased their 2030 targets for the use of renewables in light of the effects of the energy price crisis and the invasion of Ukraine (EUROSTAT 2022a, 2022c).

GROSS ELECTRICITY PRODUCTION in the EU shows a **decreasing trend since 2008**, when it reached its peak value (2,994 TWh). Thereafter, production decreased to 2,781 TWh in 2020 (-4.2% compared with 2019 and
-7.1% compared with the 2008 peak value) (EUROSTAT 2022a, 2022c). A reduction in gross electricity generation was also recorded in 2022 (Bednorz 2022).

ELECTRICITY GENERATION MIX In 2021, the electricity generation mix was composed of 45% renewables and biofuels, 26% nuclear, 14% natural gas and 14% coal, and 1% oil and derivatives[18]. The renewable sources that produced electricity in 2020 were as follows: wind (36%), hydro (33%), solar (14%), solid biofuels (8%), other sources (9%). **Coal was the main source for electricity generation until 2013**, when it was overtaken by renewables[19]. Between 2013 and 2020, the burning of coal to generate electricity in the EU decreased by 11 percentage points (from 25% to 14%), while renewables grew by 11 percentage points (from 27% to 38%).

PRIMARY AND FINAL ENERGY CONSUMPTION Regarding the 2020 **energy efficiency targets** for primary and final energy consumption, the moderately decreasing trend (since 2005) was accentuated in 2020 by the pandemic but was followed by an increase in 2021. In fact, primary energy consumption in 2021 (1,309 Mtoe) increased by 5.9% compared to 1,235 Mtoe in 2020 (although lower than the target of 1,312 Mtoe). Nevertheless, the values of primary consumption in the EU in 2020 and 2021 are the lowest recorded since 1990 (EUROSTAT Dec 22). Final energy consumption, which had peaked in Europe in 2006 and declined in the following years, also increased in 2021 (968 Mtoe), above the 2020 target of 959 Mtoe. The distribution of final energy consumption among economic sectors in 2020 sees industry in first place (32%), followed by transport (26%), households (25%9), services (12%) and agriculture and forestry (3%). On the whole, the reduction in final energy consumption in industry (driven by energy efficiency measures and a shift towards a more service-oriented economy) tends to be outweighed by the increase in the transport sector (that nonetheless is slowing down its progress). In buildings, energy efficiency improvements are outweighed by the increasing number of appliances and increasing floor areas. As far as the 2030 targets are concerned, primary consumption in 2021 is 16.1

18 In 2020, the MS consuming more than 70 per cent of their electricity from renewables were Austria and Sweden, while the shares from renewables of Malta, Hungary, Cyprus, Luxembourg and the Czech Republic were below 15 per cent (EC 2022b).

19 Between 1990 and 2020, hard coal production decreased by 77% and lignite production by 55%. Less domestically produced coal was sometimes replaced by imports or other fossil fuels (ECAP 2022 on EUROSTAT data)

percentage points away from the current targets, while final consumption is 14.4 percentage points away (at the time of writing, an amendment to the Energy Efficiency Directive 2021 is in the process of being approved to increase the energy saving target to 40% for final consumption and 42.5% for primary energy consumption). The trends outlined above indicate that in order to achieve the 2050 targets, the reduction of final and primary consumption will have to take place at a faster pace than today (EC 2022h, 15EUROSTAT 2022h).

ENERGY CONSUMPTION PROVIDED BY RENEWABLE SOURCES Over the past two decades, **renewable energy consumption has increased rapidly throughout all MSs**. In 2020, the EU reached 22.1% of renewables contributing to ***gross final energy consumption***, exceeding the 2020 target of 20%[20] (in 2004 the contribution of the RES was 9.6%). The share of renewables increased between 2019 and 2020 by 2.2 percentage points, facilitated by the reduction of energy consumption due to Covid. All MS, except France, met or exceeded their targets, although the percentages varied widely (Sweden at 60.1%, followed by Finland 43.8% at one extreme and Malta at 11% and Luxembourg at 12% at the other). Also with regard to the share of renewables in final energy consumption by 2030, the revision of the European Renewable Energy Directive is on track to raise the target from the current 32% to 42.5% in order to reduce dependence on Russia and other countries. The consumption of energy from renewables in 2020 is 42% for electricity generation, 50% for heating and cooling and 8% for transport. To date, switching to renewable energy sources in transport and heating and in certain industrial applications has been more challenging than in the electricity sector, where some technologies are already cost-competitive. Furthermore, deployment needs to also include industrial processes that are harder to decarbonise, such as steel or cement manufacturing (EC 2022h, EUROSTAT 2022b).

ENERGY INTENSITY OF THE ECONOMY is a proxy for energy efficiency. According to EUROSTAT[21], over the last decade **all MS have improved their energy intensity**, with variations between MS, as a result of technological developments, changes in the structure of the economy and energy policies. Also, delocalisation of industrial production outside of Europe plays an important role in reducing energy and carbon intensity, shifting the related energy consumption and carbon emissions to third countries (carbon leakage) (Hafner 2022).

RISKS FOR ENERGY SUPPLY CHAIN The energy transition has already brought about changes in the energy sector, with repercussions on the sub-industries of the value chain, leading to the activation of new industrial pathways or the transformation of certain stages. The growing demand for technologies supporting electrification and the shift towards renewables for energy production have already contributed, for instance, to extending and expanding supply chains for energy[22]. In this regard some potential **risk areas** concerning bottlenecks in their functioning, that affect procurement, manufacturing, logistics and construction, were identified. These risk areas include: *volume shortage* (supply chain cannot deliver the

20 Including a 14% share of biofuels to be achieved by all Member States in their energy use in road and rail transport

21 EUROSTAT, *online data codes: nrg_ind_ei*

22 Extended value chains of renewable energy supply include: Inputs (logging, mining, processing; intermediate goods; biofuel feedstocks); equipment manufacture/component assembly; logistics; project construction and installation; grid connection as applicable; operations and maintenance; energy delivery as applicable; decommissioning (materials handling: site restoration), repowering (IRENA 2022).

quantity of material or component required at sufficient scale, either due to lead times or fundamental limits); *price volatility* (material or components are exposed to market forces that lead to consistently rising volatile prices); *geographical sourcing dependency* (material or component production is significantly concentrated in a region where social, regulatory or geopolitical factors could affect trade off); *long lead times* (material or component takes a long time to be procured); *quality* (material or component may suffer from low quality due to huge increase of demand and decreased quality controls to speed up the process) (McKinsey&Co 2022).

3.2. Environmental Trends in The Energy Sector

Over the past two decades, increased renewable energy consumption, together with policies to develop energy efficiency and energy savings implemented throughout all the Member States have contributed to the substantial **reduction of greenhouse gas emissions across the EU energy system**, enabling the EU to achieve its 20% renewable energy target in 2020. The COVID-19 pandemic also reduced electricity use in 2020, while the increase in renewable electricity supply caused a further drop in the greenhouse gas emission intensity of electricity generation. As a matter of fact, in 2020 the EU power sector emitted, on average and generating 1 kilowatt hour, one third less CO2 than it did just a decade ago. But due to the so- called rebound effect, the post-COVID-19 economic recovery led to an increase in the use of energy and electricity in 2021, with a renewed use of fossil fuels for power generation leading to higher emissions of greenhouse gases across the EU, especially in the energy sector, compared with 2020. This also caused a sharp increase in the greenhouse gas emission intensity of EU power generation: in 2021 generating 1 kilowatt hour emitted, on average, one-fifth more CO2 than in 2020 (yet still 18% less than it did just a decade ago)[23].

3.3. Economic Trends In The Energy Sector

The **EU energy sector** (considered as mining of coal and lignite, extraction of crude petroleum and natural gas, manufacture of coke and refined petroleum products and electricity, gas, steam and air conditioning supply) has been **in decline over the past decade** both in absolute terms and in the share of gross value added. As an economic activity energy **generated an added €250 billion to the economy**, accounting for about 8% of global GDP[24]. In light of the fact that energy is essential for production as well as consumption, the results of a study[25] on the effects of the recent energy crisis on European industrial production, conducted following the Declaration of the Business Europe Council (BusinessEurope 2022) which expresses great concern for industry, are interesting. Analysing the development of the industrial production index in the short term (October 2021-October 2022) and in the medium term (2012-2022), the main European industrial sectors showed three different ways of responding to the energy crisis, rising prices and inflation: 1) some sectors saw a structural expansion over the last ten years but reduced production between October 2021 and October 2022, presumably due to the energy crisis (furniture, textile fibres, manufacturing of non-metallic minerals including ceramics, glass, cement and marble and rubber

23 EEA, GHG Proxies, accessed January 10 2023 at https://www.eea.europa.eu/data-and-maps/data/approximated- estimates-for-greenhouse-gas-emissions-5/2017-ghg-proxies

24 JRC, accessed January 10 2023, at https://joint-research-centre.ec.europa.eu/scientific-activities-z/energy-sector- economic-analysis_en

25 Observatory on Italian Public Accounts, *Energy crisis and the risk of displacement of European industry*, 23 December 2022 (Galli 2022)

and plastics production); 2) other already mature sectors saw a worsening in both the short and the long term (basic metal processing and the iron and steel sector; 3) the electronics, chemical and automotive industries, on the other hand, showed an improvement in both the short and long term.

Companies in the European energy sector[26] between 2015 and 2020 show an increase of 77.3 per cent (from 100,060 to 177,377 in total) with substantial differences between the various categories. The number of companies in the mining and quarrying sector decreases (to a greater or lesser extent) with the exception of B06 (extraction of crude oil and natural gas) – which shows a slight but significant increase from 220 to 246 companies (+11.8%) – and B091 (support activities for petroleum and natural gas extraction), which increases from 851 to 1,022 companies (+20.1%). The C19 category (manufacture of coke and refined petroleum products) fell slightly, while that of electricity, gas and steam and air conditioning supply (D35) increased from 89,200 to 162,100 enterprises over the period (+81.7%). Electric power generation, transmission and distribution (D351) and manufacture of gas, distribution of gaseous fuels through mains (D352) grew by 79.4% and 192.5% respectively.

3.4. Employment Trends In The Energy Sector

3.4.1 Impact on employment of the energy transition

The energy transition has effects on the entire labour market due to changes in energy production (the shift towards renewables) and the way energy is stored and consumed (e.g. in the shift from combustion to electric engines). The dynamics associated with energy efficiency and the circular economy also have employment effects in terms of production processes, procurement and supply chains (more labour-intensive than in the fossil fuel industry). Although estimates on the employment effects of the energy transition differ, all (macro-economic) analyses agree on a **net gain of about 1.4 million jobs by 2030** in the EU, following a decline between 2010 and 2020 and a recovery in 2021.The recovery is driven by renewables, as the number of jobs created by installing new capacities of renewable energy and complementary technologies are significantly higher than the number of jobs associated with the production and supply of fossil fuels and nuclear energy generation. In 2020-2021, direct and indirect workers in renewables in the EU totalled more than 1,200,000: the majority in bioenergy (314,000), then wind (298,000)[27] and solar (235,000)[28]. This is followed by 142,000 workers in liquid biofuel, 89,000 in hydropower, 64,000 in biogas, 60,000 in geothermal energy and 5,200 in concentrating solar power (CSP). The result, however, depends on the different sectors, the different energy technologies across their value chains and the characteristics regarding economic and labour market structures of each territory, region or MS. In some industries, regions and labour market segments the net impact may even be negative[29].

Conventionally, in transitions the labour market impacts concern the creation, elimination, substitution and destruction of jobs: some will be lost, others can be recovered by reorientation and training measures,

[26] Tracked by EUROSTAT according to NACE codes for the energy sector (EC 2022a)
[27] Europe accounts for roughly 40% of the world's wind manufacturing output (IRENA 2022).
[28] 21.4GW will be installed in the EU-27 in 2021, more than was installed in previous years (IRENA 2022).
[29] IRENA 2022, 2020; Černý 2021; CEDEFOP 2021; Czako 2020; ENEL Foundation 2019; IEA 2022; Ram 2022; ILO 2018;
Mandelli 2021; IndustriALL 2022

and still others will undergo transformations to meet the needs of the RES and energy efficiency sectors (plumbers, electricians and carpenters). The first effects of the energy transition will concern efficiency-related jobs and energy production, while the changes related to the introduction of RES will be gradual, with numerically more significant effects[30] but with reduced time perspectives in terms of working conditions (Černý 2021; IRENA 2020, 2022; CEDEFOP 2021). **Job losses** affect profiles that are becoming obsolete in fossil fuel production and other sectors (conventional automotive and emission-intensive industries: steel, chemicals, cement and ceramics). Overall, it is estimated that **825,000 workers** in the European fossil fuel industry will have **to be redeployed by 2050** (about 1.45% of the EU labour market) while CEDEFOP (2021) estimates a potential loss of 286,000 jobs in the mining and quarrying, coke and refined petroleum and gas, steam and air conditioning sectors between 2020 and 2030. The coal mining sector alone (which has already drastically reduced its activities since 2013) could lead to the loss of another 86,000 workers after 2020 (about half of the jobs in the sector) (Mandelli 2021, 2022; Ouziaux 2021; ECA 2022).

Regarding gender composition, the energy sector exhibits a **very low female employment**, representing only 0.5% of total female workers (1.3% for men) in the EU28 in 2019. Women are particularly under-represented above all in management functions, though slight overall progress has been registered between 2008 and 2019, where the share of women increased from 20% to 23%. Geographical differences show Northern and Western Europe MS with higher female participation in comparison to Southern and Eastern Europe MS. Further differences are noticeable between the energy sub-sectors: the participation of women is lowest in the traditional coal mining sector (only 11%), while the electricity and gas sector registered a 25% share in 2019 (Ouziaux 2021, IEA 2022). To address the gender gap in the energy sector and foster inclusivity, the EC set up the ***Equality Platform for the Energy Sector*** that met twice in 2022[31].

3.4.2. Skill needs and training in the energy transition

In addition to employment, low-carbon policies have an impact on the profiles and skills of the workforce, both in terms of content and how they are employed. The **energy sector's workforce** is already made up of **skilled workers** (45% have tertiary, vocational or university education and only 10% are low-skilled), but the clean energy industry (more than others) will need additional skilled workers, also in anticipation of the development of new technologies (which currently employ only a fraction of the workers in the sector). The issue of skill endowment for energy workers is complex, as the skill sets needed for the energy transition need to be integrated and updated, but change profoundly in relation to the industry, job functions and characteristics of the regional dimension in which industrial ecosystems operate. Moreover, while it is emphasised that **the demand for new skills** tends to favour technicians and professionals over manual workers, at the same time it is pointed out that **totally new profiles** will also need to be developed

[30] Many studies demonstrated that the exploitation of renewable for electricity production creates a greater number of jobs than that from conventional power sources: for every megawatt of installed power capacity renewable can create between 1.7 and 14.7 times more jobs than natural gas-based power generation and up to 4 times more jobs than those supplied with coal-fired power generation (Ram 2022)

[31] https://energy.ec.europa.eu/topics/energy-strategy/equality-platform-energy-sector_en

(e.g. nanotechnology engineers, energy auditors, system inspectors, high-skilled electricians with digital competences, hi-tech farmers with digital competences). In addition, the same scope of skills and talents needed will also have to include transversal soft skills (in addition to technical skills) to enable all workers to anticipate and manage multi-dimensional changes in energy systems[32]. Depending on the endowment of the different skill sets, some workers from declining sectors (such as electricians or skill and equipment operators in the coal sector) can easily be transferred to another sector (e.g.to solar photovoltaics or wind power) through short courses or on-the-job training, given their ability to work in risky environments and to perform both manual and sophisticated technology tasks. But since new and old jobs do not necessarily emerge in the transition in the same regions, more jobs might disappear than appear in the same region also due to workers' **obsolete skillsets** (IEA 2022c, ENEL 2019).

A phenomenon that has plagued the European workforce in industry and especially in renewables for years concerns the **skill shortage** not only of technical but also of strategic skills. Solar companies have difficulty finding safety experts, construction managers and cyber security professionals (with adequate training and experience), while the wind industry has difficulty recruiting skilled middle-management project engineers. In fact, the Renewable Energy Job Barometer indicates that in renewables the "most wanted" profiles to have emerged are the ones with high technical skills: engineers in various disciplines (i.e. mechanical, process, construction, production, etc.), research engineers and field technicians (though mentioning that the needs for technical skills should include not only graduates but also technical figures such as plumbers, electricians, installers, etc.) (ENEL 2019).

The enhancement of **active labour policies** is strategic in order to **manage the skill mismatch**, to favour the shift between sectors, to reduce market exclusion, and to promote the inflow of a young workforce with a female component, in addition to mapping skills needs and anticipating demand for new and emerging profiles. In this direction, measures aimed at workers in the energy sector have been implemented through flexible re-skilling and up-skilling training programmes, with short modules and forms of on-the-job support or with lifelong learning interventions, paying attention to older workers. Furthermore, looking at young people entering the labour market, from a medium- and long-term perspective an intervention is recommended in vocational education and training and tertiary education. The *European Skills Agenda is* moving in this direction, while different key players in the sector (companies, universities, etc.) in agreement with some trade unions and employers' organisations have launched experimental initiatives (ENEL 2019).

3.4.3. Impact of the energy transition on working organization and working conditions

The decarbonisation of energy systems, driven by actions to improve their efficiency, the propensity to reduce consumption, the increase in energy production from renewable sources and the drive towards electrification, is subject to the development and introduction of **new technologies** at various levels of the value chain and the **transformation of the industrial processes** (both upstream and downstream). In turn, low-carbon transformations activate **new industrial value chains** (such as those related to batteries and hydrogen). These processes lead to profound changes in the organisation of work, due to the

32 In this respect, IndustriAll's Manifesto for Just Transition, among others, refers to analytical and cross-sectoral thinking, strategic skills, teamwork and innovation orientation, and an attitude of continuous lifelong learning.

restructuring of production and work processes, with all that this entails in terms of the redistribution of workers between sectors and regions, which depend above all on the contexts (industrial eco-systems, territories, sectors).

In this framework, the **involvement and consultation of workers** are indispensable, not only to improve the working environment (less physical risks, less intensity of work and greater safety) and work wellbeing (working and employment conditions, motivation, retention, opportunities for on-the-job learning), but above all to counter possible resistance to the introduction of organisational changes or new technologies (the latter, in fact, depending on how they are deployed, can be read as harbingers of advantages or disadvantages for workers with respect to their autonomy, efficiency, supervision at work, flexibility, health and safety) (Bednorz, 2022). In the energy transition, **social protection and wage levels** are also subject to change, in view of the fact that, on the one hand, workers in the oil and gas extraction and production industries have the highest wages in the energy sector and higher wages than in other economic sectors (IEA, 2022c) and, on the other, that new sectors such as renewables are often characterised by greater precariousness and less union representation (ILO, 2022b).
The changes of the energy transition also affect **occupational health and safety**: although the highest accident rates are recorded in the extraction and processing of fossil fuels, followed by coal and biomass (in the coal industry, the fatality rate per terawatt-hour is 1,230 times higher than in the solar energy industry), risks and hazards are also widespread in the renewables sector (from electrocution, falls, conducting work in enclosed and confined spaces, fires and toxic fumes, and so on). The accident rate of offshore wind is four times higher than that of offshore gas and oil installations, for example. The introduction of new technologies further exposes workers to new and previously unknown risks and hazards related to the adoption of new materials and chemicals, the speed of their deployment and new ways of organising work.

3.4.4. Impact of the energy transition at territorial level

In the light of the negative impacts in some regions of the MS affected by decarbonisation measures (which in some cases are perverse effects or the outcome of poor design), some studies have also considered the economic and social impacts of the energy transition, with the intention of overcoming the **all-measuring and technocentric tendency** that is inadequate with respect to the complexity and intersectional effects of the transformations taking place (EERA 2021). The nature of this report does not allow for an in-depth examination of the **phenomenology of the negative effects**, but intends to consider the **reciprocal influence between the technical and social dimensions** of the innovation processes linked to the energy transition.

With regard to the **social dimension,** these effects concern: the increase in poverty and social inequalities, the relocation of certain groups of residents (migration), the brain drain and outflow of young people, the change in social demography, the transformation of territorial social identity, the increase in the need for psychosocial and mental health services, prevention and support for minors and vulnerable subjects, etc.
With regard to the **economic dimension,** the negative effects concern: deindustrialisation in the territories and the relocation of production, the weakening of the local productive fabric (including small

and medium-sized enterprises that feed the value chain or provide services and goods), the absence of replacement industrial eco-systems capable of attracting public and private investment, the weakening of public services related to health, education, social services, security and active labour policies, the collapse of the housing market, the reduction of private investment in the territory's productive network, and so on. The negative effects are felt to a greater extent by groups that are disadvantaged, vulnerable and at risk of social exclusion even before the energy transition which, in turn, accelerates the increase in pre-existing social and economic inequalities. These different and possible outcomes pertain to the area of analysis concerning the **distributional effects of the double transition policies**, where the concept of **energy justice**[3333] is sometimes applied to emphasise the moral and equality dimensions inherent in the production and use of energy**.**

3.4.5. Energy transition drivers, barriers and dilemmas

The **drivers of the energy transition** that emerge from the analysis of the documentation can be traced (with margins of overlap) to broader areas concerning policies, technology, R&D and the societal dimension. The **policy** drivers refer to: the increased dissemination of energy technologies (according to an approach grounded on more granular technologies, to avoid industrial scale manufacturing and relevant financial investments); the reduction of energy demand; sector coupling and system integration (to connect the power sector with the industry and transport sectors); public and private investment in low-carbon assets and infrastructures (including value chains converting to electricity technologies); defragmentation of policy-making across disciplines, activity sectors and energy carriers; deployment of effective economy-wide carbon prices; political commitment and concrete policy actions and measures; adoption of a policy mix for managing transformation processes. Drivers attributable to the **application of technologies** include: the efficient integration of electricity from renewables combined with flexible demand and energy storage systems; the development of synthetic fuels (as a form of indirect electrification of the industrial and transport sectors); the use of hydrogen for power generation (to increase the flexibility of the energy system); digitisation. From the **R&D** point of view, investments are central, especially for technologies aimed at setting up the architecture of the new technology-intensive energy system, while with respect to the **societal dimension,** the embedding of the energy transition in society and the approach of energy justice to inform energy decision-making are highlighted. Last but not least, **external shocks** were also included among the drivers of the energy transition, such as the invasion of Ukraine which raised the issue of energy autonomy and intensified the debate on energy poverty.

The **barriers**, in addition to including the counterpart of the drivers listed above, refer to elements that mainly concern policies of: the adoption of a technocentric approach focused only on the energy sector; the delay in preparing, placing on the market and scaling up technologies for decarbonisation; the inadequate endowment of funds; the slowness of bureaucratic and administrative procedures (which in Italy lead to the blockage of the investments envisaged by the PNIEC and PNRR); the lack of involvement in multi-level governance of key players such as cities and regions; the lack of involvement of workers and their representatives in the areas/sectors concerned; social resistance to the acceptance of the energy

[33] "A global energy system that fairly distributes both the benefits and burdens of energy services and that contributes to more representative and inclusive energy decision making" (Sovacool 2017, Bray 2021).

transition; skill-shortage and mismatch; dependence on foreign countries for the raw materials needed for renewable technologies.

The coming together of different and apparently conflicting demands regarding the economic, social and environmental dynamics underlying current climate and environmental policies refer to the broader **eco-social-growth dilemma**. Within the framework of industrial relations, the most significant dilemma is represented by the direct contraposition between **employment and the environment** and is aimed at finding solutions that are able to reconcile environmental and climate requirements and the protection of decent employment of workers, while safeguarding the competitiveness of the European economy, to which just transition policies contribute. International analyses on energy transition have highlighted other controversial relationships, such as the contradiction inherent in promoting ambitious long-term sustainability goals starting from the promotion of time-limited and underfunded actions and measures that address short-term concerns.

4. SOCIAL DIALOGUE, INDUSTRIAL RELATIONS AND INNOVATIVE PRACTICES IN SUPPORT OF THE ENERGY TRANSITION

4.1. The context of European social dialogue and energy transition

For some time now, the main international institutional players have agreed that **social dialogue** at its different levels is**,** along with others, an **indispensable tool** for including the social partners in the processes of governance that are necessary first to define and then to implement measures to decarbonise the economy and society in a way that is inclusive and environmentally sustainable (ILO 2015, EC 2018, 2022, Bednorz 2022). Recently (October 2022), within the framework of the seminar promoted by the EuropePlatform for Just Transition[3434], the role of social dialogue and collective bargaining was again indicated as a **precondition for the proper formulation and implementation of Just Transition Territorial Plans**, to improve the management of these processes and mitigate their negative effects on the labour market, workers and local communities, by anticipating the identification of opportunities related to the transformations taking place in the territory and of the skills (totally new or additional) that are necessary to support the workers at the centre of these dynamics.

The international literature (ILO 2022, Akgüç 2019) has identified a number of factors that influence the **effectiveness of social dialogue as a governing mechanism of the Just Transition**. These factors relate to the capacities of the social partners: to translate the results of the social dialogue into practices and policies (of instrumental effectiveness or policy), to set the political and public policy agenda (agenda effectiveness) and to critically analyse policies with a view to formulating the recommendations required to achieve the objectives, taking into account all the socio-economic aspects (analysis capacity). These, in essence, are **conditions** that will allow the social partners to respond to the challenges of the Just Transition within the framework of European tripartite social dialogue, so that they can intervene in the governance of these processes as **social agents** (also by ensuring communication between the different levels of social dialogue). In turn, the European social partners have identified the **indispensable elements to ensure that the double transition (digital and green)**,in addition to being beneficial to companies and workers, **is effective and just**: a fair redistribution of the costs and revenues related to the transformations between consumers, companies and governments; the active management of structural changes, based on the preparation of transition plans that include better social security measures and active labour policies; quality jobs; the adoption of effective concrete solutions and not only theoretical ones to the problems and difficulties of the transition (Bednorz 2022).

The centrality of social dialogue for the governance of the Just Transition has to be read, though, in the broader **context of the weakening of this institution**. Since the crisis of 2008, the social partners and European social dialogue have, in fact, come under severe pressure due to cuts in state budgets that have had serious repercussions on social policies. Subsequently, the pandemic contributed to a slowdown in social dialogue activities, which intensified in 2021 in the national tripartite dimension – with the resumption of negotiations and collective agreements (shifting the focus from mitigation measures for

[34] https://energy.ec.europa.eu/just-transition-platform-conference-october-2022_en

COVID-19 to more traditional industrial relations issues) – but without recovering previous levels in terms of the number of agreements and workers protected by the agreements. Moreover, although at the European level horizontal relations between the social partners are strong, major difficulties are reported from several quarters in the multilevel dimension and in relations between cross-industry and sectoral partners (Eurofound 2022b). The social partners themselves, moreover, are today expressing great dissatisfaction with the possibilities of social dialogue to intervene in the major challenges of the double transition (complaining, for example, about the absence of binding agreements between the partners and the excessive use of opinions and statements, the sub-optimal functioning of the sectoral social dialogue committees and a problem of representativeness of some organisations caused by structural changes in the labour market and economic sectors) (Bednorz 2022, Eurofound 2022b). It is no coincidence that in November 2022, the European social partners formulated their **concerns regarding the initiatives for the European Semester 2023**, while already in spring 2022, the European Commission had started consultations with the social partners to activate a *European initiative to strengthen European social dialogue* in support of the double transition, aimed at "improving relations between sectoral social dialogue and European policy-making, supporting European sectoral social dialogue to better respond to structural changes and new economic developments, and facilitating the European contribution to a future- proof sectoral social dialogue"[35].

The weakness of European social dialogue is also in line with **the weakening of trade unions** over the last two decades for reasons ranging from structural change and production patterns, to the rise of non-standard working conditions, global economic integration and pressure on companies to compete. Europe has an average union density of 25% (with peaks between 50 and 65% in the Nordic countries and Belgium), which was 42.9% in 1995 (EU-15); the average collective bargaining coverage has decreased from 82% in 1995 (EU-15) to 71% in 2018, while the average employers' density has remained fairly stable (Bednorz 2022, OECD 2019). With reference to union density and levels of collective bargaining, European MS can be grouped into four clusters that meet the characteristics indicated in the box below and that constitute the reference environment for social dialogue interventions.

Tab. 1 – European MS breakdown categories according to union density and collective bargaining level

- A **first group is** characterised by higher rates of collective bargaining coverage and union density (includes Nordic countries and Belgium)
- A **second group** includes the countries of Continental Europe (Austria, France, Germany, Italy, the Netherlands,Portugal and Spain) and is characterised by a coverage level of over 50% and higher than the unionisation rate
- The **third group** covers countries with a union density or collective bargaining coverage percentage between 30and 50 per cent (e.g. the Czech Republic and Romania)
- The **fourth group** concerns Ireland and other Central and Eastern European countries, where both union densityand collective bargaining coverage are below 30%.

In this context, in many quarters the challenges posed by the twin transitions are seen as an **opportunity to revitalise trade unions**, from the perspective of membership (collective bargaining enables them to

[35] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13229-Strengthening-social-dialogue-in- the-European-Union-_it

offer protections to workers in declining industries or to steer them towards new employment prospects), opportunities for renewal (by harnessing resources that enable them to exercise different forms of power) and worker involvement in the challenges of anticipating and managing the effects on work organisation, workers, territories and communities affected by the twin transitions (Rugiero 2022, Kalt 2022, Bednorz 2022).

4.2. Structures, keyplayers and limits of the European social dialogue

The promotion and strengthening of the European social dialogue depends on the **industrial relations systems** in the different countries, which are the environment in which the social partners define actions related to the energy transition. In this respect, the classification prepared by Eurofoundation on the basis of the Index of Industrial Democracy (IDI) and the characteristics of the collective bargaining systems of the MS, divides them into six broad categories (clusters) (Eurofound 2018, Bednorz 2022).

Tab. 2 – MS classification according to IDI and collective bargaining systems

Cluster	**Countries**	**IDI score**	**Key Characteristics**
#1 Social partnership	Austria, Belgium, Luxembourg, Netherlands	High	- A high degree of centralisation and coordination, high collective bargaining coverage rates and the routine involvement of social partners in policymaking - The relative weakness of trade unions and strength of employer organisations - Extensive legal rights granted to works councils and board-level employee representation rights - Above-average social dialogue at the company level
# 2 Organised corporatism	Germany, Denmark, Finland, Sweden	High	A two-tier system of centralised-decentralised collective bargaining (at national, sectoral, and company levels) Strong trade unions Co-determination rights established by law and extended by national and sectoral agreements The best performance in terms of social dialogue at company level
# 3 State-centred associational governance	France, Italy, Portugal, Slovenia, Spain, Greece (2008-2012)	Medium	- Relatively strong collective bargaining institutions, although quite uncoordinated and dependent on state regulation - Low trade union densities - Limited works councils and board representation - Weak performance in social dialogue at company level

# 4 Company-centred governance	Croatia, Hungary, Slovakia	Low	-Decentralised, uncoordinated collective bargaining and low coverage rates of collective agreement - Low trade union density - Comparatively high performance in terms of representation rights at company level (statutory regulation of works council rights) - Low scores for company-level social dialogue
# 5 Voluntarist associational governance	Bulgaria, Cyprus, Czech Republic, Ireland, Latvia, Lithuania, Malta, Romania, Greece (2013-17)	Low	-Stronger associational governance (compared to clusters 4 and 6) - Relatively strong employer organisations - The lowest scores for representation rights at company level (voluntary employee participation and no board-level employee representation rights) - Low scores for company-level social dialogue
# 6 Market oriented governance	Estonia, Poland,UK	Low	-Very low levels of (uncoordinated and decentralised) collective bargaining - Weak social partners - Rights of works councils or employee representation mandated by law, partly because of institutional adaptation in line with Directive 2002/14/EC - Different scores for company-level social dialogue (higher in Estonia and the UK, lower in Poland)

Source: Bednorz 2022

Also at European level, social dialogue can be **bilateral and trilateral, cross-industry and sectoral**. The partners involved in the **European cross-industry social dialogue** are the European Trade Union Confederation (ETUC) (the only organisation representing workers) and three confederations of employer associations: Business Europe (formerly UNICE), CEEP (European Centre for Public Enterprise) and SMEunited (formerly known as UEAPME, European Union of Craft and Industries and Small and Medium- Sized Enterprises). The European **sectoral DS** involves the European Trade Union federations and their employer counterparts through the **European Sectoral Social Dialogue Committees (SSDC)** which meet periodically. At the date of the latest available analysis (Eurofound 2019) there were 43 European sectoral committees, representing (collectively and in 2019) 185 million workers (over 80 per cent of the EU workforce). Based on the vertical mechanisms of the Social Dialogue, SSDCs foster bottom-up communication, channelling possible national issues into the European dimension. As mentioned above, the social partners have been pointing out the **limitations of the effectiveness and**

functioning of SSDCs for several years (Akgüç 2019). The following table shows the social partners in the sectors most sensitive to the just energy transition.

Tab. 3 – Social Partners of the European Sectoral Social Dialogue

	Social Partners	Sectors of the European Sectoral Social Dialogue						
		Chemistr	**Electric**	**Ind.Estr.**	**Gas**	**Metal**	**Paper**	**Steel**
Organisations trade unions	IndustriAllEuropean Trade Union	■	■	■	■	■	■	■
	European Federation of Public Service Union (EPSU)		■		■			
Organisations employers	European Chemical Employers Group (ECEG)	■						
	Union of the Electricity Industry (EURELECTRIC)		■					
	European Association of Mining Industries (Euromines)			■				
	European Association for Coal And Lignite (EURACOAL)			■				
	European Industrial Minerals Association (IMA Europe)			■				
	European Aggregates Association (UEPG)			■				
	European Association of PotashProducers (APEP)			■				
	The European Union of the Natural Gas Industry				■			
	Council of European Employers of the Metal, Engineering and Technology-Based Industries (CEEMET)					■		
	Confederation of European Paper Industries (CEPI)						■	
	European Steel Association (EUROFER)							■

Source: EC, accessed January 10 2023, at https://ec.europa.eu/social/main.jsp?catId=480&langId=en

The **European Tripartite Social Dialogue (TSS)** links the social partners to the European institutions through consultation or concertation processes, creating a **bridge between the European Union's policy agenda and the policies and actions of the social partners** at different levels through their member organisations (Eurofound 2022). Recently, the ETUC also pointed out the limitations of the **Tripartite Social Summit**: *"It is an important forum (...). However, to take full advantage, the ETUC recommends the Presidents establish a working group to include the social partners to review the format. The SPT should also be linked*

to a broader tripartite agenda with a longer time frame developed jointly." (ETUC 2020). Similarly, underlining the low involvement of the social partners in the **European Semester,** the ETUC (October 2022) asked the European Commission to prepare a more binding and structural framework that, while respecting national practices, obliges governments to consult the social partners according to quality criteria and to report on the effectiveness and results of this involvement (ETUC 2022c).

Finally, the approximately 1,250 **European Works Councils (EWCs)** allow workers in large companies and multinationals to experience the European dimension. Here, too, the trade unions challenged these institutions (used to provide information and not to foster workers' participation through consultations) and called for **regulatory changes** that would ensure adequate standards to be applied to information and consultation activities, the possibility of involving trade union representatives in the EWCs and allowing for comparison with other labour representative institutions, and the possibility of training (ETUI 2019, Bednorz 2022).

According to analysis regarding the **prevailing topics of the European social dialogue** (Akgüç 2019), these can be traced back to three main areas concerning: a) skills, training and employability; b) health and safety, wellbeing at work; c) working conditions (regulation of working time, contract types, etc.). The reference instrument for European social dialogue activities is the **Work Plan,** which, for the **period 2019-2021**, has provided the guidelines for joint action on policies affecting the labour market, paying attention to the impact of digitalisation and social, demographic and environmental transitions. At the cross-industry level in 2020, a framework agreement on digitisation was agreed upon, while at the sectoral level in 2021 alone, in addition to formulating proposals on measures to be taken in connection with the COVID-19 pandemic, some 30 initiatives were promoted concerning distance working, the rights of workers with disabilities, climate change and seasonal work. The new Work Programme **2022-2024** identified six **priority areas for action**: telework and right to disconnect; green transition; youth employment; work-related privacy and surveillance; improving skills matching in Europe; capacity building.

4.3. Position of the European social partners

The European social partners share the **awareness that the twin transitions (digital and green) are inevitable, interconnected and interdependent,** given their place in the broader context of globalisation, liberalisation, the flexibilisation of the labour market, the pandemic crisis and the invasion of Ukraine. Within this framework, despite the inevitable asymmetries and possible conflicts between the common objectives and respective social aims, the social partners **are working together** at different levels (from the European to the company level) in a bilateral or tripartite way, in the awareness that their actions can only go in the direction of further pushing the two transitions, according to a proactive and not neutral or obstructive approach (Eurofound 2021a, Bednorz 2022).

The **positioning of the social partners with respect to the just transition** and, where possible, the just energy transition, emerges from the analysis of the main documents shared and signed in 2021 and 2022 starting, first of all, with the **Work Programme 2022-2024**(June 2022) divided into six priority areas (see section 4.2). The description of the *Green transition* priority emphasises how the latter, together with

decarbonisation, the circular economy and digitalisation, contributes to "changing jobs, tasks and creating new jobs while others are disappearing". In this regard, an effective involvement of the social partners is called for in order to "raise awareness and identify solutions that can be adapted to the specificities of sectors and implemented at local level". The priority ***"improving skills matching in Europe"***, which is directly related to the "Green transition", concerns the need to involve the social partners in *skills intelligence* activities (forecasting of needs, updating of job profiles) in order to ensure that workers have access to quality jobs and employers to a workforce with the necessary skills.

Still looking at joint positions expressed by the European social partners, the **recommendations** concerning the "Circular economy in the framework of Social Dialogue"(December 2021) and those formulated in relation to "Skills, innovation and the provision of, and access to, training" (November 2021) are worth mentioning. In the first case, the need to discuss and negotiate within the framework of social dialogue and collective bargaining institutions on strategies for just transition according to the circular economy paradigm was reaffirmed. From the perspective of the just transition, the recommendations concerning skills, innovation and training emphasised (again) the urgency of equipping every worker with the necessary skills to successfully adapt to the changes of the double transition.

Of particular interest are the **individually expressed positions of some cross-industry European partners** on just transition in the same period (2021 and 2022). In June 2022, the **ETUI** (ETUC's research and training centre) expressed a very critical position in its policy brief *The EU's patchy 'just transition' framework is not up to meeting its climate ambitions* (Akgüç 2022), which states that the social dimension of the European Green Deal is extensively undersized and that current climate change mitigation measures risk increasing social inequalities in the absence of other complementary actions. A selection of observations and recommendations from the policy brief are given in the table below.

Tab. 4 – Observations and recommendations for an EU Just Transition Framework

PRELIMINARY CONSIDERATIONS

- Initiatives to address challenges to deal with the impacts of the transition on affected workers, regions and vulnerable individuals remain fragmented
- A robust EU just transition framework should, among other things, provide for legislation on the anticipation and management of change (...)
- A robust EU just transition framework should promote social dialogue and stakeholder involvement at all levels, and ensure that new green jobs are good jobs in line with the ILO Decent Work agenda and the European Pillar of Social Rights (...)

RECOMMENDATIONS FOR THE DEVELOPMENT OF A ROBUST JUST TRANSITION FRAMEWORK

- More analytical work is necessary to map existing and expected developments and the effects of decarbonisation on regional and local labour markets
- A legislative framework should be developed for the anticipation and management of change in the context of just transition with meaningful workers' participation and citizens' involvement, anchored in respect for fundamental rights
- The Just Transition Fund needs to be extended in its scope, scale and resources to provide

support for workers in the transition to new jobs with measures targeted to specific sectors (automobile, energy intensive industries, and so on) tailored to national and regional specifics

- A proper Social Climate Fund should go beyond being a corrective tool for the ETS2 and deal with a broader range of the distributional effects of climate policies, implementing targeted measures against energy and transport poverty, supporting and facilitating the affordability and accessibility of low carbon technologies to lower income households
- Regional development initiatives are needed to help carbon intensive regions towards a sustainable low-carbon economy
- Social dialogue and stakeholder involvement at all levels (EU, national, regional and plant level) in managing change towards a zero-carbon economy should be promoted
- It should also be ensured that newly created green jobs are also good jobs in terms of contract type, social security, wages and working conditions in line with the ILO decent work agenda and the European Pillar of Social Rights.

Source: (Akgüç 2022)

The ETUI policy brief (2022) comes a few months after the **ETUC**'s comments (December 2021) on the European Council's proposal for recommendations to ensure that the EU's transition to a climate-neutral and economically sustainable economy is fair and leaves no one behind[3636]. Confirming its appreciation for the attention paid to the social and labour dimensions of the transition, the ETUC points out, however, that it is not enough to address recommendations to the MS without making it binding to take measures to create new quality jobs and offer opportunities and adequate alternatives to the workers most at risk. Indeed, the **ETUC** called for the Fit for 55 package to be equipped with a *Just Transition Legal Framework* based on granular mapping and analysis of the effects of transition on employment and workers' skills in the different countries, regions and sectors concerned *(...Climate policies – adopted through the very concrete Fit for 55 package – should be accompanied by concrete legislative proposals on the social and labour aspects. Adopting hard laws for climate aspects while leaving the choice to Member States to tackle the social impacts constitutes a double standard and does not send the right signal to EU citizens that Europe is there to protect them).*

In the same period (2020-2022), European representatives of employer organisations expressed their own positions and recommendations around the just transition paradigm more or less directly. With respect to the *Fit for 55* package, **BusinessEurope** pointed out (November 2021) that it is necessary "not to overlook the challenges and costs of the transition, which will be significant and therefore need to be carefully assessed and addressed to minimise their magnitude" while explicitly referring to the socio-economic effects of just transition in the report *Greening the economy: employment and skills aspects* (October 2021). **SGI Europe** reaffirmed the centrality of its role in ensuring that the green transition does not lead to a further increase in inequalities in the Institutional Report on its activities (2021) and joined (March 2022) the *Manifesto for a Green, Just and Democratic European Economic Economy* signed by a coalition of civil society

[36] ETUC, https://etuc.org/en

organisations, think tanks, employers' organisations and trade unions, academics and experts from the MS (to call for the reform of the EU fiscal rules, in view of the fact that *"the aim of economic policy across Europe must not be to simply reduce debt. The economy needs to serve the reduction of socio- economic, intergenerational and gender inequalities, the realisation of social rights and the protection of climate and environment"* (EEB 2022). Finally, in 2020 **SMEunited** formulated its position regarding the Just Transition Mechanism and the Just Transition Fund (*SMEunited fully supports the two-pillar approach for a Sustainable Europe Investment Plan spurring the transformation of the EU's economy, which aims at financing transition and leaving nobody behind (Just Transition Mechanism*).

As far as the **European sectoral social partners are concerned**, while **IndustriAll** and **EPSU** also formulated proposals, recommendations and statements as individual organisations (a selection of which are presented in the following paragraphs), the employer organisations expressed themselves regarding the just energy transition mainly through the sharing of joint statements with IndustriAll (in all cases identified in the period) and EPSU (for a selection of them).

The most interesting action with respect to the energy transition in the period is the **Manifesto for the Just Transition of IndustriAll** (May 2022), which explicitly calls on European policymakers to ensure that the transition is fair for all workers and that it preserves and creates good, quality jobs. The manifesto states, inter alia, that a **failure to align ambitions relating to the environment with equally stringent ambitions relating to the social dimension puts the entire European Green Deal at risk**. Already in September 2021 IndutriAll and its members, among other things, in welcoming the European Green Deal had pointed out that the measures and resources to ensure a fair transition for the workers involved were not sufficient and called for a strengthening of the social dialogue, to avoid the possibility of a repeated series of actions in conflict with the interests and rights of workers in some MS jeopardising the Green Deal.

In turn, between 2020 and 2022, **EPSU** declared its appreciation for the Green Deal while signalling the need to manage the decarbonisation process in a socially just manner (2020, *the European Green Deal – Challenging consensus on market-based solutions to fight climate breakdown*), while in March 2022 it published the policy brief *Right to affordable, clean energy for all Europeans* (together with the EAPN- European Anti Poverty Network) to state that energy poverty cannot be solved by "letting the market play its game". Furthermore, in May 2022, with reference to the policy brief *Clean Energy for all Europeans* (March 2022) EPSU shared its concerns about the future of energy in Europe and energy poverty in light of the worsening global situation.

As regards instead the **European social partners of the sectoral employer organisations** they have formulated positions, made recommendations or made demands related to the just transition mainly through the formulation of joint statements and other types of documents. The table below lists the main documents signed between 2020 and 2022 and includes a particularly interesting antecedent (November 2017), represented by the *Joint Statement on a Just Energy Transition*, because it was formulated by the electricity social partners (**EPSU, EURELECTRIC** and **IndustriALL**).

Tab. 5 – Selection of documents

October 2022 – Joint Statement **EUROFER** and **INDUSTRIALL**, Actions are needed to safeguard the European steel sector and jobs

October 2022 – Joint Statement **CEEMET and INDUSTRIALL** (and others), Declaration: Actions are needed to ensure a JT framework to the European automotive workforce

July 2022 – Joint Statement **EPSU, INDUSTRIALL** and **EUROGAS**: in view of the devastating effects of the pandemic crisis on the economy and industry, the social partners recognise the centrality of the third energy package and the need to create the necessary conditions to foster the development of a competitive renewable and low carbon gases sector, ensuring quality employment in the sector in Europe

December 2021 – Joint letter to the Climate and Environment Ministers of **EUROFER** and **INDUSTRIALL** ('A sustainable and just transition pathway for industry and workers') with recommendations concerning the revision of the Emission Trading System (ETS) and the establishment of a Carbon Border Adjustment Mechanism (CBAM)

December 2021 – Joint Statement **EPSU**, **EURELECTRIC** and **IndustriALL** on Just Transition in the Electricity Sector. The social partners ask the European and MS institutions for:

- Coherent and concrete Just Transition frameworks;
- A European Observatory of Just Transition in the various regions and sectors, involving social partners;
- A European strategy for the electricity sector and the transition of its workforce and the establishment of a coherent regulatory framework in which the sector operates;
- A concrete monitoring of European devices and national plans regarding the different funds allocated to help the transition;
- A European framework on the anticipation and management of change;
- A requirement for countries to implement inclusive governance and participatory mechanisms, social dialogue and full transparency of transition planning;
- Investment and clear European and national guidelines for the adaptation of workplaces to climate change;
- The speeding up of new power generation projects;
- The development of new business models;
- The anticipation of skills needs and providing workers, especially those entering the sector, with a skills update/upgrade to guarantee a well-functioning electricity industry and to ensure workers' employability

October 2021 – Joint document (Coalition Briefing *Delivering the Just Transition: the social gap in the Fit for 55 package for automotive workers and workers in the wider mobility eco-system*) **CEEMET, IndustriALL, ETUC and others** stating that the Fit for 55 package does not include concrete measures or actions to anticipate and manage labour transformations in transport-related services and automotive industries

November 2020 – Joint Statement from the social partners of the European sectoral social dialogue on gas, **EPSU, INDUSTRIALL** and **EUROGAS** (confirming commitment to the decarbonisation of the economy from a just transition perspective)

November 2017 – Joint Statement on a Just Energy Transition, **EPSU, EURELECTRIC** and **IndustriALL**, emphasising the need to pay attention to the creation of quality employment, training and retraining of

workers, involvement of social partners and local communities to ensure a just and clean transition

4.4. Actions and initiatives of the social partners at European and national level

Although there is a widespread awareness among the European social partners that workers need to acquire or integrate new skills and that some negative socio-economic effects on the territories and workers affected by the transformations represent concrete obstacles to a just transition, according to the most recent information **social dialogue initiatives** (including collective bargaining agreements) **are relatively scarce** and **no cross-sectoral agreements have been formulated at European level** on the green transition. **European sectoral approaches to green transition** are also few and mainly aimed at expressing positions, recommendations and comments (Bednorz 2022). In view of the few observed cases of European sectoral social dialogue, it is worth recalling an initiative in May 2020, promoted by both social partners in the automotive sector through a press conference, which had two main objectives: on the one hand, to promote the recovery of the automotive industry by stimulating sales and production and, on the other, to support the transition to a carbon-neutral future of the industry itself by adopting a series of measures that included the activation of training and up-skilling of workers, the introduction of elements to improve occupational safety, the increase of wages, the promotion of investments in technologies, etc. (Eurofound 2021a).

In the European dimension, it is also noted that the **involvement of the social partners** in the formulation and implementation of policies related to the twin transition varies in **terms of modalities and intensity** depending on the sectors, for a number of reasons indicated by trade unions and employers' organisations. Firstly, because of the often unfavourable institutional contexts; secondly, because the social partners lack the expertise to participate in debates on the future of work, carry out analyses, identify issues and challenges, formulate priorities and dictate the agendas for the just transition effectively; and thirdly and finally, because of the uneven distribution of material and financial, technical, strategic and organisational capacities in the social partners' umbrella organisations (these capacities are present at European level and in the broader organisations) (Bednorz 2022).

There is, however, no shortage of references to innovative social dialogue practices related to the just energy transition where **social partners are most active**, i.e.**in the national dimension and predominantly at the sectoral level**. In this dimension, divergences in social dialogue due to the nature of the parties involved weigh most heavily, with employer organisations concerned about the risk that decarbonisation policies may reduce competition or produce competitive disadvantages, while national trade union organisations are primarily concerned with ensuring the just transition, retraining, meeting new training needs and employment conversion, while paying attention to the financial impact on workers (Eurofound 2021). Concerning social dialogue responses at national level, a study conducted by the ILO in 19 countries on 5 continents on decarbonisation policy initiatives identified **three modes of response to just transition** in the countries surveyed: 1) high-risk climate countries whose policy debate is mainly about how to prevent and manage the effects of climate change on the economy and society; 2) countries where the focus is on the effects of decarbonisation and the need to develop new sectors and activities in regions affected by the closure of coal-fired plants (such as Slovenia); 3) countries that formulate policies to encourage companies to change their production processes in order to reduce emissions and foster the creation of green jobs as a complement to measures aimed at managing the impacts of climate change and

decarbonisation (Ireland, the Netherlands and Spain, among others) (ILO 2022a).

According to a recent analysis of the relationship between unionisation and green and digital transitions in Europe (Bednorz 2022), **national green transition agreements** are particularly sensitive to the perceived social risks and the need for a fair and equitable transition by proposing measures that, for different sectors, include working retirement compensations, social security, pre-retirement leave, pay rises or training programmes for quick reincorporation into the workforce. By way of example, reference is made to some agreements at national level, which include: the *Renewal of the industry-wide agreement for the electricity sector* in Italy (2019) (which provided a single reference framework for all workers in the sector and contains specific clauses on training to ensure employability and support for workers), the *Tripartite agreement for Just Transition* (Spain, 2020), which defines the framework for the closure of coal-fired power plants while safeguarding employment levels in the most affected areas, the *Coal Phase-Out Act* in Germany (2021) aimed at restructuring the coal and mining sectors and establishing state compensation for redundant workers over the age of 58, the *National agreement for the shutdown of the Polish mining industry* in Poland (2021) that in connection with the gradual closure of all mines by the end of 2049, secures employment for workers until retirement, social security benefits of 80% of the received salary, preretirementleave or economic compensation for liquidation (Bednorz 2022).

With regard to the **sectoral dimension at national level**, other examples of collective action by the social partners relating to the effects of the green transition include, in Sweden, the extension to all sectors of the labour market, in support of the green transition, of the measures envisaged by the ***job security councils*** (set up in 1970 by the social partners to manage and offer services to redundant workers); in Germany, a ***Coal Commission*** **was** set up in 2018, comprising trade unions, NGOs, regional and federal authorities, academics and other key players, which deals with the coal phase-out paying attention to the management of the social dimension of the transition; in Spain, a pact was signed between the social partners and the government to make an investment of €250 million in the local communities of the territories marked by the progressive closure of mining activities, which provides for continuous training and early retirement; in Italy, a collective agreement was renewed between the social partners and Italian companies in the power generation sector, in the context of the transition; in Denmark, the Confederation of Danish Industry and the CO-Industry trade union signed a collective agreement that, among other things, provides for training measures for workers to enable them to meet new needs, the adoption of new technologies to improve efficiency levels and the development of Danish production, and structured ways of joint work between employers and workers to achieve the objectives of the green transition.

Finally, with regard to the specific contribution of **trade unions** in the context of national decarbonisation initiatives in Europe, a recent study (Metta 2022) analysed a targeted selection of **72 initiatives** in the automotive, energy, mining and energy-intensive sectors (some as far back as 1989, most from 2013 onwards). The approaches of the trade unions are, on the whole, characterised by a proactive attitude (ranging from a proactive to a reactive orientation), albeit with differences due to different interpretations of the opportunities that may arise from decarbonisation. **Measures promoted** within the framework of social dialogue practices to support just transition include re-skilling programmes, social protection,

improvement of working conditions, worker mobility, securing future employment, inclusion of just transition principles, securing access to rights to training and qualifications. **Social dialogue instruments** include – inter alia – collective agreements, the establishment of monitoring and evaluation committees, and the consultation of trade unions and workers at different stages of initiatives to support transition processes. The **limitations** that weigh on the action of trade unions involved in national initiatives around decarbonisation concern: the inadequacy of the knowledge and expertise needed to analyse, act, plan and implement the steps to anticipate, manage, schedule and monitor the transition; the limited capacity to influence decisions and the agenda of decarbonisation measures; the limited capacity to intervene determined by the shorter time dimension of the actions compared to the longer time of the transition processes.

5. BIBLIOGRAPHY

Abram, S., Atkins, E., Dietzel, A., Jenkins, K. et al., (2022), 'Just Transition: A whole-systems approach to decarbonisation', *Climate Policy*, 22:8, 1033-1049, DOI: 10.1080/14693062.2022.2108365

Adapt (2021), *E-Journal of International and Comparative LABOUR STUDIES*, Vol. 10, n.1/2021, Modena: ADAPT University Press

Adapt Servizi (2021), *Skills, innovation and the provision of, and access to, training, Final Report* November 2021, Brussels: EC

Akgüç, M. and Baiocco, S. (2019), 'Comparative policy recommendations on improving social dialogue articulation and effectiveness in Europe', EESDA Project, *Enhancing the Effectiveness of Social Dialogue Articulation in Europe* (VS/2017/0434), accessed January 10, 2023 at https://www.ceps.eu/ceps-publications/comparative-policy- recommendations-on-improving-social-dialogue-articulation-and-effectiveness-in-europe/

Akgüç, M., Arabadjieva, K. and Galgóczi, B. (2022), *Why the EU's patchy 'just transition' framework is not up to meeting its climate ambitions. Policy recommendations*, ETUI Policy Brief 2022.06, Brussels: ETUI

Akgüç, M., Martisova, M., Szüdi, G. and Nordlund, C. (2019), 'Stakeholders' view on and experiences with the articulation of social dialogue and its effectiveness', Enhancing the Effectiveness of Social Dialogue Articulation in Europe (EESDA) (VS/2017/0434), accessed January 10, 2023 at https://www.ceps.eu/ceps- publications/stakeholders-views-on-and-experiences-with-the-articulation-of-social-dialogue-and-its- effectiveness/

Ancygier, A., Fuentes, U. and Shrestha, H.B. (2020), *Decarbonisation pathways for the EU Power Sector. Policy framework, main drivers, case studies and scenario analysis, lessons learned for alignment with the Paris Agreement*, New York: Climate Analytics

Beckfield, J., Evrand, D.A., Sampson, R.J. and Waters, M.C. (2020), *Social Impacts of Energy Transition, Working Paper Series*, Cambridge/Massachussets: MIT/Harvard University

Bednorz, J., Sadauskaitė, A., Czarzasty, J. And Surdykowska, B. (2022), *Unionisation and the twin transition. Good practices in collective action and employee involvement,* Luxembourg: European Parliament

Biswas, S. et al. (2022), 'Ending the Energy-Poverty Nexus: An Ethical Imperative for Just Transitions', *Science and Engineering Ethics*, (2022) 28:36, accessed January 10, 2023 at https:// doi.org/10.1007/s11948-022-00383-4

Bray, R. and Ford, R. (2021), *Energy Justice POINTs: Policies to create a more sustainable & fairer future for all*, Briefing Paper, Project ALIGN, accessed January 10 2023 at https://pureportal.strath.ac.uk/en/publications/energy-justice- points-policies-to-create-a-more-sustainable-amp-f

Bray, R., Montero, A.M., Ford, R., (2022), 'Skills development for a 'just' net zero energy transition', in *Environmental Innovation and Societal Transitions* 42 (2022), 395-410

Brutschin, E., Schenuit, F., Ruijven B. and Riahi, K. (2022), 'Exploring Enablers for an Ambitious Coal Phaseout', *Politics and Governance*, Vol. 10, Issue 3, 200-2012, accessed January 10, 2023 at https://doi.org/10.17645/pag.v10i3.5535

BusinessEurope (2021), *The 'Fit for 55' Package. Position Paper, November 2021*, accessed on January 10, 2023 at https://www.businesseurope.eu/publications/fit-55-package-businesseurope-position-paper

BusinessEurope (2022), *Stockholm Declaration BusinessEurope's Council of Presidents, 24-25 November 2022*, accessed on January 10, 2023 at https://www.businesseurope.eu/publications/stockholm-declaration-businesseuropes-council-presidents

Camera dei Deputati-Servizio Studi (2022), *Cambiamenti climatici*, accessed January 10, 2023 at https://temi.camera.it/leg18/temi/tl18_cambiamenti_climatici.html

CAN (2022), *CAN Europe's transformation pathway recommendations for the steel industry,* accessed on January 10, 2023 at https://www.caneurope.org

Caspar, S., Rieff, J. and Roelen, E..(2019), 'Sustainability and governance: the role of social dialogue?', in ESDE*, Employment and Social Developments in Europe 2019*, Brussels: EC

CEDEFOP (2018), *Skills forecast. Trends and challenges to 2030,* Luxembourg : EU Publications Office

CEDEFOP (2021), *The green employment and skills transformation: insights from a European Green Deal skills forecast scenario,* Luxembourg : EU Publications Office, accessed on January 10 2023 at https://data.europa.eu/doi/10.2801/112540

CEE Bankwatch Network (2020), *Territorial Just Transition Plan Checklist. How to make TJTPs climate and people driven, Briefing*, accessed January 10, 2023 at https://bankwatch.org/publication/territorial-just-transition-plan-checklist

CEE Bankwatch Network (2022a), 'Are transitioning regions heading towards climate neutrality in a socially just way?', *Just Transition Project Implementation Checklist*, accessed January 10, 2023 at https://bankwatch.org/project/just- transition

CEE Bankwatch Network (2022b), *Status of the Territorial Just Transition Plans in central and eastern Europe, October 2022 update*, Briefing, accessed January 10, 2023 at https://bankwatch.org/wp-content/uploads/2021/07/2020- 07-09_TJTP-briefing-3_final.pdf

CEEMET (2022a), *Council Recommendation on ensuring affair transition towards climate neutrality. Analysis 21/03/2022*, Brussels: CEEMET

CEEMET (2022b), *The effects of the Green Transition on the MET industries*, Paper 29/03/2022, Brussels: CEEMET CEEMET (2022c), *CEEMET Position Paper on Tackling Labour & Skills Shortages in The MET Industries, Position Paper*

322/22 – 08/11/22, Brussels: CEEMET

Černý, M., et al. (2021), *Employment effects of the renewable energy transition in the electricity sector. An input-output approach*, Working Paper 2021.14, Brussels: ETUI

Clean Energy Industrial Forum (2022), *Joint Declaration on Skills in the Clean Energy Sector*, accessed on January 10 2023 at https://commission.europa.eu/news/clean-energy-industrial-forum-underlines-importance-deploying- renewables-2022-06-16_en

Climate Transparency (2022), *Climate Transparency Report. G20 Response to the Energy Crisi: Critical for 1.5°C*, accessed January 10 2023 at https:// www.climate-transparency.org

Council of the European Union (2022), *Council Recommendation on ensuring a fair transition towards climate neutrality*, 9107/22, Brussels

Crippa M., Guizzardi D., Banja M., Solazzo E., Muntean M., Schaaf E., Pagani F., Monforti-Ferrario F., Olivier, J.G.J. (2021), *GHG emissions of all world countries*, EUR 30831 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-41547-3, doi:10.2760/074804, JRC126363

Czako, V. (2020), *Employment in the Energy Sector. Status Report 2020*, JRC Science for Policy, Brussels:EC

Czako, V. and Murauskaite-Bull, I. (2022), 'Energy poverty and skills related aspects of the just transition of European coal regions-overlaps and data gaps, *ECEEE Summer Study Proceedings*, accessed January 10 2023 at https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/

De Pous, P., Patuleia, A., Brown, S. and Rosslowe, C. (2022), *More renewable, less inflation. Restoring EU economic stability through investment in renewable, Briefing Paper*, E3G/EMBER, accessed on January 10th 2023 at https://www.e3g.org

Deloitte Insights (2021), *The future of power. Scenarios to evolve the European electricity sector*, accessed January 10 2023 at https://www2.deloitte.com/content/dam/insights/articles/de164494-the-future-of-power/J21138_DI- The-future-of-power.pdf

Doerflinger, N. and Thomas, A. (2020), 'Trade union strategies on climate change mitigation: Between opposition, hedging and support', *European Journal of Industrial relations*, 26 (4), accessed January 10 2023 at DOI: 10.1177/0959680120951700

Dufour, L., Roth, J. and Picciarello, A. (2022), *In Search of a Triple Win: Assessing the impacts of COVID-19 responses on the clean energy transition, inequality, and poverty*, IISD Brief, Manitoba: IISD

EEA (2020), *Growth without economic growth. Briefing n. 28/2020*, accessed January 10 2023 at doi: 10.2800/781165 EEA (2022a), *Energy prosumers in Europe. Citizen participation in the energy transition, EEA Report N. 01/2022*,

Luxembourg: EEA

EEA (2022b), *Trends and projections in Europe 2022, EEA Report N. 10/2022*, Luxembourg: EEA

EEA and EUROFOUND (2021), *Exploring the social challenges of low-carbon energy policies in Europe. Briefing*, Luxembourg: Publications Office of the European Union

EEB (2022), *Manifesto for a green, just and democratic European economy*, accessed January 10, 2023 at https://eeb.org/wp-content/uploads/2022/03/manifesto_EN.pdf

EERA (2021), *Clean Energy Transition. White Paper*, Brussels: EERA EERA (2022), *REPowerEU Manifesto*, Brussels: EERA

Enel Foundation (2019), *Just E-volution 2030. The socio-economic impacts of energy transition in Europe*, Milano: The European House/Ambrosetti

ENERGYCITIES (2021), *How to engage energy poor and vulnerable consumers in the energy transition? Just Transition Working Group, Final Report*, Brussels: ENERGYCITIES

EPRS (2020), *European Green Deal Investment Plan. Main elements and possible impact of the coronavirus pandemic*, Brussels: EPRS

EPSU (2020), *Challenging consensus on market-based solutions to fight climate breakdown. EPSU Position on the European Green Deal*, Brussels: EPSU

EPSU and EAPN (2022), *Right to affordable clean energy for all Europeans*, Brussels: EPSU and EAPN

ETUC (2019), *ETUC position for an inclusive European Green Deal. Adopted at the ETUC Executive Committee of 23 October 2019*, Brussels: ETUC

ETUC (2020), *Negotiating a fair future: reinforcing the role of Social Dialogue. Resolution. Adopted at the ETUC Executive Committee of 9-10 December 2020*, Brussels: ETUC

ETUC (2021a), *Assessment of autumn package and ETUC priorities for the European Semester 2022, Endorsed at the virtual Executive Committee Meeting of 8-9 December 2021*, Brussels: ETUC

ETUC (2021b), *ETUC position: A Just Transition Legal Framework to complement the Fit for 55 package. Adopetd at the Executive Committee Meeting of 8-9 December 2021*, Brussels: ETUC

ETUC (2021c), 'Just Transition: Urgent to turn good recommendations into binding measures'*, Press release 21 December 2021*, Brussels: ETUC

ETUC (2022a), *ETUC Position for an EU Social Taxonomy of Sustainable Investments. Adopted at the virtual Executive Committee Meeting of the 16-17 March 2022, Brussels: ETUC*

ETUC (2022b), *ETUC for Sustainable Growth and Social Progress. ETUC Resolution adopted at the Executive Committee Meeting of 27-28 October 2022*, Brussels: ETUC

ETUC (2022c), *The role and involvement of Social Partners in the European Semester and EU economic governance.*

ETUC document discussed at the Executive Committee Meeting of 27-28 October 2022, Brussels: ETUC

ETUC, BusinessEUROPE, SGIeurope, SMEunited (2020), *European social partners' joint contribution Report by Andrea Nahles on social dialogue 18/12/20*, Brussels

ETUC, BusinessEUROPE, SGIeurope, SMEunited (2021a), *European social partners' Recommendations on circular economy in the framework of social dialogue,* Brussels

ETUC, BusinessEUROPE, SGIeurope, SMEunited (2021b), *Skills, Innovation and the Provision of, and Access to, Training.*

Recommendations November 2021, Brussels

ETUC, BusinessEUROPE, SGIeurope, SMEunited (2022a), *Annual Sustainable Growth Strategy 2023. Social Partners' Consultations. Employers' Views*, Brussels

ETUC, BusinessEUROPE, SGIeurope, SMEunited (2022b), *European Social Dialogue Work Programme 2022-2024*, Brussels

ETUI (2019), *Can anybody hear us?,* Brussels: ETUI

ETUI (2022), 'Trade unions papers and positions", *News,* June 14, 2022, Brussels: ETUI

EUI, Robert Schuman Centre (2022), *Between Crises and Decarbonisation: Realigning EU Climate and Energy Policy for the New 'State of the World'*, Policy Brief, : Florence : EUI, accessed January 10 2023 at doi:10.2870/887824 EURACTIVE (2021), *A Just Transition? The Barriers to Central and Eastern Europe Making the Leap from Coal. Special*

Report, accessed January 10 2023 at http://eurac.tv/9T8z

Eurobarometer (2022), *Fairness perceptions of the green transition*, Brussels: EC, accessed January 10 2023 at https://europa.eu/eurobarometer/surveys/detail/2672

Eurobserver (2021), *The state of renewable energies in Europe. Edition 2021*, Paris: Eurobserver

Eurofound (2018), *Measuring varieties of industrial relations in Europe: A quantitative analysis*, Luxembourg: Publications Office of the European Union

Eurofound (2019a), *Dialogo sociale settoriale europeo: fatti e cifre*, Luxembourg: Publications Office of the European Union

Eurofound (2019b), *Energy scenario: Employment implications of the Paris Climate Agreement*, Luxembourg: Publications Office of the European Union

Eurofound (2020a), *Capacity building for effective social dialogue in the European Union*, Luxembourg: Publications Office of the European Union

Eurofound (2020b), *Working Conditions in sectors*, Luxembourg: Publications Office of the European Union

Eurofound (2021a), *Distributional impacts of climate policies in Europe*, Luxembourg: Publications Office of the European Union

Eurofound (2021b), *Tackling labour shortages in EU Member States*, Luxembourg: Publications Office of the European Union

Eurofound (2022a), *Collective bargaining and social dialogue – Back to normal in 2021?,* accessed January 10 2023 at https://www.eurofound.europa.eu/publications/article/2022/collective-bargaining-and-social-dialogue-back-to- normal-in-2021

Eurofound (2022b), *Reinforcing social dialogue in the context of the move towards the green and digital transitions: Background paper*, Dublin: Eurofound

Eurofound (2022c), *Representativeness of the European social partner organisations: Electricity sector*, Sectoral social dialogue series, Dublin: Eurofound

Eurogas (2022), *Joint Statement on Unbundling provisions of the Gas Package revision and a Just Transition*, Brussels: Eurogas

EuroMines (2022), 'Metals for Clean Energy. New Study highlights EU supply risks', in *General News,* 25/04/2022, accessed on January 10 2023 at https://www.euromines.org/news/metals-for-clean-energy-new-study-highlights- eu-supply-risks

European Commission (2018), *Structural Support Action for Coal and Carbon Intensive Regions*, November 2018, Brussels: EC

European Commission (2020), *Un'agenda per le competenze per l'Europa per la competitività sostenibile, l'equità sociale e la resilienza, Comunicazione della Commissione al Parlamento Europeo, al Consiglio, al Comitato Economico e Sociale Europeo e al Comitato delle Regioni*, COM (2022) 274, Brussels: EC

European Commission (2021), *Recovery and Resilience Scoreboard. Thematic analysis. Clean Power,* Brussels: EC
European Commission (2022a), *EU energy in figures. Statistical Pocketbook 2022*, Brussels: EC

European Commission (2022b), *EU Energy Snapshot*, Brussels: EC

European Commission (2022c), *SET PLAN Progress Report 2022. Research and innovation for repowering the energy system*, Brussels: EC

European Commission (2022d), *State of the Energy Union 2022. Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*, COM (2022) 547, Brussels: EC

European Commission (2022e), *Transitions Performance Index 2021. Towards fair and prosperous sustainability*, Luxembourg: EC

European Commission (2022f), *EU Save Energy, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions,* COM (2022) 240 final, Brussels: EC

European Commission (2022g), *Progressi riguardo alla competitività delle tecnologie per l'energia pulita. Relazione della Commissione al Parlamento Europeo e al Consiglio,* COM (2022) 643 final, Brussels : EC

European Commission (2022h), *State of the Energy Union 2022,* COM (2022) 547 final, Brussels : EC

European Commission, JRC (2018),'Jobs and skills in the energy transition', *SETIS-Magazine*, Issue n.19-December 2019, Brussels: EC

European Court of Auditors (2022), *EU support to coal regions. Limited focus on socio-economic and energy transition, Special Report 22/2022*, Luxembourg : ECA

EUROSTAT (2022a), *Shedding light on energy in the EU. 2022 Interactive edition*, Brussels: EC

EUROSTAT (2022b), *Renewable energy statistics. Statistics Explained (Data extracted in January 2022)*, accessed January 10 2023 at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Renewable_energy_statistics

EUROSTAT (2022c), *Energy statistics – an overview. Statistics* Explained (Data extracted in February 2022), accessed January 10 2023 at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-

_an_overview

EUROSTAT (2022d), *EU energy mix and import dependency. Statistics Explained (Data extracted on 4 March 2022)*, accessed January 10 2023 at https://ec.europa.eu/eurostat/statistics-explained/

EUROSTAT (2022e), *Electricity production, consumption and market overview, Statistics Explained (Data extracted in May 2022)*, accessed January 10 2023 at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity_production,_consumption_and_market_overview

EUROSTAT (2022f), *Greenhouse gas emission statistics – emission inventories. Statistics explained (Data from June 2022)*, accessed January 10 2023 at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Greenhouse_gas_emission_statistics_-_emission_inventories

EUROSTAT (2022g), *Electricity and heat statistics. Statistics Explained (Data extracted in June and July 2022)*, accessed January 10 2023 at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity_and_heat_statistics

EUROSTAT (2022h), *Energy efficiency statistics. Statistics Explained (Data from 16 December 2022),* accessed January 10 2023 at https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_efficiency_statistics

Fems, S. (2021), *Protecting workers' health and safety in renewable energy*, London: Prospect

Gährs, S., Aretz, A., Rohde, F. and Zimmermann, H. (2021), 'Digitalizing the Energy System in a Sustainable Way', *Sustainability of digitalization*, ÖkologischesWirtschaften Online-Ausgabe O1.2021 (36), Berlin: GermanWatch
Galgóczi, B. (2019), *Phasing out coal – a just transition approach,* Working Paper 2019.04, Brussels: ETUI

Galgóczi, B. (ed.) (2019), *Towards a just transition: coal, cars and the world of work*, Brussels: ETUI

Galli, G., Garlaschi, M., Neri, F. and Orlando, C. (2022), 'Crisi energetica e rischio di spiazzamento dell'industria europea', *Il Commento,* 23 dicembre 2022, Milano: OCPI

Gasser, M., Pezzutto, S., Sparber, W. and Wilczynski, E. (2022), 'Public Research and Development Funding for Renewable Energy Technologies in Europe: A Cross-Country Analysis', *Sustainability* 2022, 14, 5557, accessed January 10 2023 at https://doi.org/10.3390/su14095557

GCSA (Group of Chief Scientific Advisors) (2021), *A Systemic Approach to the Energy Transition in Europe*, Scientific Opinion n. 11, June 2021, Brussels: EC

Gutierrez, J., E. in collaboration with Tomassetti, P. (2020), 'Labour and Environmental Sustainability. Comparative Report', *Agreenment: A Green Mentality for Collective Bargaining*, Modena: ADAPT University Press

Hafner, M. and Luciani, G. (eds) (2022), *The Palgrave Handbook of International Energy Economics*, Cham: Palgrave, accessed January 10 2023 at https://doi.org/10.1007/978-3-030-86884-0

Hoppe, T. and Miedema, M. (2020), 'A Governance Approach to Regional Energy Transition: Meaning, Conceptualization and Practice', *Sustainability*, accessed January 10, 2023 at https://www.mdpi.com/2071-1050/12/3/915

IEA (2021), *Net Zero by 2050. A Roadmap for the Global Energy Sector*, IEA accessed January 10, 2023 at www.iea.org IEA (2022a), *Renewables 2022. Analysis and forecast to 2027*, IEA accessed January 10, 2023 at www.iea.org

IEA (2022b), *Skills Development and Inclusivity for Clean Energy Transitions*, IEA, accessed January 10, 2023 at www.iea.org

IEA (2022c), *World Energy Employment*, IEA, accessed January 10, 2023 at www.iea.org IEA (2022d), *World Energy Outlook 2022*, IEA, accessed January 10, 2023 at www.iea.org

IISD (2018), *Fossil fuel phase-out and a just transition: Learning from stories of coal phases-outs*, Manitoba: IISD

ILO (2015), *Guidelines for a just transition towards environmentally sustainable economies and societies for all*, Geneva: ILO

ILO (2022a), *Social Dialogue Report 2022. Collective bargaining for an inclusive sustainable and resilient recovery*, Geneva: ILO

ILO (2022b), *The future of work in the oil and gas industry. Opportunities and challenges for a just transition to a future of work that contributes to sustainable development, Technical meeting on the future of work in the oil and gas industry* (Geneva, 28 November-2 December 2022), Sectoral Policies Department, Geneva: ILO

IndustriAll (2022a), *Nothing about us without us. A Just Transition Manifesto*, Brussels: industriAll, accessed January 10 2023 at https://news.industriall-europe.eu/p/justtransition

IndustriAll (2022b), *The energy prices crisis and the EU's answers. IndustriAll Europe's perspective, Policy brief*, Brussels: industriAll

IndustriALL et al. (2021), *Delivering the Just Transition: the social gap in the Fit for 55 pakcage for automotive workers and workers in the wider mobility eco-system*, Brussels: IndusriALL

IndustriAll GU, INEEP, FES (2020), *Energy transition, national strategies and oil companies: what are the impacts for workers? Special Report November 2020*, Geneva: IndustriAll GU

IndustriAll GU (2022), *A trade union guide of practice for a Just Transition*, Geneva: IndustriAll GU

IndustriAll, ECEG (2020), *Joint statement of the European Social Partners in the Chemical, Pharmaceutical, Rubber and Plastics Industries, the European Chemical Employers Group and industriAll European Trade Union, on the Chemical Strategy for Sustainability*, accessed January 10 2023 at https://news.industriall-europe.eu/documents/upload/2020/10/637393895242171969_ECEG-iAE%20Joint%20statement%20CSS_Final.pdf IndustriAll, EPSU, eurelectric (2017), *Statement on a Just Energy Transition*, accessed January 10 2023 at

https://www.epsu.org/sites/default/files/article/files/JustEnergyTransition%20-%20leaflet.pdf

IndustriAll, EPSU, eurelectric (2021a), *Joint Statement on Just Transition*, accessed January 10 2023 at https://cdn.eurelectric.org/media/5640/jt_declaration_ssdc_electricity_2021_final_signed-2021-030-0579-01-e-h- 6E64E8FA.pdf

IndustriAll, EPSU, Eurelectric (2021b), *Strengthen the role of national social partners and vet providers to build skills interlligence in the electricity sector. Full report*, Brussels: IndustriAll, EPSU, Eurelectric

IndustriAll, EPSU, Eurogas (2020), *Joint Statement from the social partners of the European sectoral social dialogue on gas*, accessed January 10 2023 at https://www.epsu.org/article/securing-high-skilled-green-jobs-gas-sector- integral-just-transition

IndustriALL, EUROFER (2021), *A sustainable and just transition pathway for industry and workers, Joint letter to EU Ministers of Climate & Economy, 17 December 2021*, Brussels

IndustriALL, EUROFER (2022), *Urgent action needed to safeguard the European steel sector and jobs. Joint Statement*, Brussels

IRENA (2020), *Measuring the socio-economics of transition: Focus on jobs*, Abu Dhabi: IRENA IRENA (2022), *World Energy Transitions Outlook 2022: 1.5°C Pathway*, Abu Dhabi: IRENA

IRENA and ILO (2022), *Renewable energy and jobs: Annual review 2022*, IRENA: Abu Dhabi and ILO: Geneva

Jakob, M. and Steckel, J.C. (2022), *The Political Economy of Coal. Obstacles to Clean Energy Transitions*, New York: Routledge

Janda, K., Sajdikova, L. (2022), *Institutional Description of the European Green Deal Investment Plan Framework, Working Paper*, Hamburg : ZBW Leibniz Information Centre for Economics

JRC (2020), *Clean technologies in coal regions: opportunities for jobs and growth*, accessed January 10 2023 at https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/cleanenergy-technologies- coal-regions

JRC (2022a), *European Climate Neutral Industry Competitiveness Scoreboard 2021,* Brussels: EC

JRC (2022b), *Towards a green and digital future. Key requirements for successful twin transitions in the European Union*, Brussels: EC

Just Transition Platform (2022a), *6th Just Transition Platform Conference, 24-26 October 2022, Proceedings*, Brussels: EC

Just Transition Platform, (2022b), *Newsletter, 9/12/2022*, Brussels: EC

Kalt, T. (2022), 'Agents of transition or defenders of the status quo? Trade union strategies in the green transitions', *Journal of Industrial Relations*, 2022, vol 64(4) 499-521, accessed January 10 2023 at DOI: 10.1177/00221856211051794

Krawchenko, T.A., Gordon, M. (2022), 'Just Transitions for Oil and Gas Regions and the Role of Regional Development Policies', *Energies* 2022,15, 4834, accessed January 10 2023 at https://doi.org/10.3390/

Manca, L. and Schreuder, J.H. (2022*), The state of youth engagement in the implementation of the EU's Just Transition Mechanism,* CEE Bankwatch Network, accessed January 10, 2023 at https://bankwatch.org/publication/the-state- of-youth-engagement-in-the-implementation-of-the-eu-just-transition-mechanism

Mandelli, M. (2022), *Mapping eco-social policy mixes for a just transition in Europe*, Working Paper 2022.15, Brussels: ETUI

Mandelli, M. and Novelli, L. (2022) 'Trade unions facing the eco-social-growth trilemma: prospects and hurdles for a just transition solution to the Taranto crisis', Brussels: ETUI

Marcu, A., Imbault, O., Czyczerski, B. and Bonfiglio, E. (2022), *Gas and nuclear energy in the EU taxonomy,* ERCST Reflection Note, accessed January 10 2023 at www.ercst.org

Marcu, A., Imbault, O., Czyczerski, B. and Bonfiglio, E. (2022), *The EU taxonomy: what next?* ERCST Policy Brief accessed January 10 2023 at www.ercst.org

McKinsey&Co. (2022), *Building resilient supply chains for the European energy transition*, accessed January 10, 2023 at https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/building-resilient-supply- chains-for-the-european-energy-transition

Metta, J., Guisset, A., Vereycken, Y., Van Overbeke, T., Bachus, K., Hofgärtner, R., Lenaerts K. and Meylemans, L. (2022), *Building Capacities And Strategies Of Trade Union Involvement In Shaping A Just Transition Towards A Sustainable And Decarbonised Industry*, accessed January 10 2023 at https://news.industriall-europe.eu/documents/upload/2022/5/637878700440463393_IVA_GeneralReport_TUandDecarbonisation_Final.p df

Molina Romo, O. (2022), *The role of tripartite social dialogue in facilitating a just transition: Experiences from selected countries, ILO Working Paper 76*, Geneva: ILO

Most, D., Schreiber, S., Herbst, A., Jakob, M., Martino, A. and Poganietz, W. (eds) (2021), *The Future European Energy System. Renewable Energy, Flexibility Options and Technological Progress*, Cham: Springer

Nahles, A. (2021), *Report on strengthening EU social dialogue*, Brussels: EC

Normann, H.E. and Tellman, S.M. (2021), 'Trade unions' interpretation of a just transition in a fossil fuel economy',

Environmental Innovation and Societal Transitions, 40 (2021), 421:434

OECD (2019), *Social Dialogue in the 2030 Agenda. Thematic Brief, Global Deal. Together for decent work and inclusive growth*, Paris: OECD

Ouziaux, S., Mouffe, M. (2021), *ASSET Study: Collection of gender-disaggregated data on the employment and participation of women and men in the energy sector*, Brussels: EC

Pai, S., Harrison, K. and Zerriffi, H. (2020), *A systematic review of the key elements of a just transition for fossil fuel workers*, Clean Economy Working Paper Series April 2020(WP 20-04), Ottawa: EEPRN

Platform for coal regions in transition Secretariat (2020), *Sustainable employment and welfare support. Webinar Series, 18 June 2020*, Brussels: EC

Quadrelli, R., Risquez Martin, A., Taghavi-Moharamli, P., Grassi, G., Rossi, S., Oom, D., Branco, A., San-Miguel, J., Vignati, E. (2022), *CO2 emissions of all world countries – JRC/IEA/PBL 2022 Report*, Luxembourg: Publications Office of the European Union, accesed January 10 2023 at doi:10.2760/07904, JRC130363.

Rainone, S. (2022), *From deregulatory pressure to laissez fair: the (moderate) social implications of the EU Recovery Strategy*, Brussels: ETUI

Rainone, S. and Pochet, F. (2022), *The EU Recovery strategy. A blueprint for a more Social Europe or a house of cards?, Working Paper 2022.18*, Brussels: ETUI

Ram, M., Osorio-Arena, J.C. et al. (2022), 'Job creation during a climate compliant global Energy transition across the power, heat, transport, and desalinisation sectors by 2050', *Elsevier Science Direct, Energy 238 (2022) 121690*, accessed January 10 2023 at https://www.researchgate.net/publication/353743334_Job_creation_during_a_climate_compliant_global_energy

_transition_across_the_power_heat_transport_and_desalination_sectors_by_2050

Ramboll (2021), *Social Impacts of Climate Mitigation Policies and Outcomes in Terms of Inequality. Final Report*, accessed January 10 2023 at https://ramboll.com/-/media/files/rm/rapporter/social-impacts-of-climate-

mitigation-policies-and-outcomes-in-terms-of-inequality/eea_just_transition_final-report_31march21_revised- clean.pdf?la=en

Raza, W., Tröster, B. et al. (2022), 'The EU's Carbon Border Adjustment Mechanism is ecologically justified but difficult to implement', in *Social Europe*, 14 December 2022, accessed January 10 2023 at https://www.socialeurope.eu/avoiding-carbon-leakage-adjustments-needed

Rösch, L.B. and Epifanio, D. (2022)*, Just transition in 7 central and eastern European countries. What works and what does not*, CEE Bankwatch Network, accessed January 10, 2023 at https:// https://euagenda.eu/upload/publications/2022-04-just-transition-in-7-ceecs.pdf

Rugiero, S. (2019), 'Decarbonisation in the Italian energy sector. The role of social dialogue to achieve a just transition in the Enel case', in Galgóczi, B., *Towards a just transition: coal, cars and the world of work*, 109-133, Brussels: ETUI Rugiero, S. (2021), 'Sindacato e transizione energetica tra nuovi orientamenti culturali e pratiche di giusta transizione',

Quaderni di Rassegna Sindacale, Numero speciale QRS 2/21, 63-73, Rome: Ediesse

Rugiero, S. (2022), 'The social dimension of decarbonisation: the socio-ecological transition of the hard-to-abate industries in Italy', Brussels: ETUI

Ruppert Bulmer, E., Pela, K., Eberhard-Ruiz, A. and Montoya, J. (2021), *Global Perspective on Coal Jobs and Managing Labor Transition out of Coal*, Washington, DC: World Bank

Sabato, S. and Fronteddu, B. (2020), *A socially just transition through the Europea Green Deal?,* Working Paper 2020.08, Brussels: ETUI

SafetyOn (2021), *2021 Onshore Wind Health and Safety incident data report*, SafetyOn, accessed January 10 2023 at https://safetyon.com/_data/assets/pdf_file/0003/933744/SafetyOn-2021-incident-data-reportjk3-Final.pdf

SAPEA (Science Advice for Policy by European Academies (2021), *A systemic approach to the energy transition in Europe,* Berlin: SAPEA, accessed January 10, 2023 at https://doi.org/10.26356/energytransition

SGIeurope (2022a), *Activity Report 2021*, Brussels: SGIeurope, accessed January 10, 2023 at www.SGIeurope.org SMEunited (2020), *Position Paper on the Just Transition Mechanism and the legal proposal for a Just Transition Fund*,

Brussels: SMEunited

SolarPowerEurope (2022), *EU Solar Jobs Report 2022. Addressing the solar skills challenge,* Brussels: SolarPowerEUrope

Solidar (2021), *Just Transition Monitor. Mapping the state of Just Transition in the European Union*, accessed January 10 2023 at

https://www.solidar.org/system/downloads/attachments/000/001/412/original/Just_Transition_Monitor_2021.p df?1639657769

Sovacool, B. et al. (2017), 'New frontiers and conceptual frameworks for energy justice', *Energy Policy*, 105. pp. 677- 691, accessed January 10 2023 at http://sro.sussex.ac.uk

Stehrer, R. (2022), *Short- and medium-term sectoral employment forecasts 2021-2027,* Working Paper 2022.16, Brussels: ETUI

SUPEREERA (2021), *Energy System Integration: Research Challenges and Opportunities Ahead*, accessed January 10 at https://www.eera-set.eu/

SUPEREERA (2022), *REPowerEU. Challenges and Opportunities Ahead*, Policy Brief, accessed January 10, 2023 at https://www.eera-set.eu/

TNI and TUED (2021), *Energy Transition or Energy Expansion?,* New York and Amsterdam: TNI and TUED TUED (2018), *Trade unions and just transition. The Search for a Transformative Politics*, New York:TUED

Vandenbussche, T. (2021), *A just energy transition: Tapping into a century of ideas*, Discussion Paper/Sustainability Prosperity for Europe Programme, Brussels: EPC/FriedrichEbertStiftung

Velicu, I. and Barca, S. (2020), 'The Just Transition and its work of inequality', *Sustainability: Science, Practice and Policy*, 16:1, 263-273, accessed January 10 2023 at DOI:10.1080/15487733.2020.1814585

Verdun, A. and Vanhercke, B. (2021), 'Are (some) social players entering European recovery through the Semester back door?', in *Social policy in the European Union: state of play 2021*, accessed January 10 2023 at https://scholarlypublications.universiteitleiden.nl/handle/1887/3278563

Vona, F. (2021), *Managing the Distributional Effects of Environmental and Climate Policies: The Narrow Path for a Triple Dividend,* ENV/WKP (2921)20, OECD, accessed January 10 2023 at https://www.oecd- ilibrary.org/environment/managing-the-distributional-effects-of-environmental-and-climate-policies_361126bd-en WEF (2022), *Fostering Effective Energy Transition*, 2022 Edition, Insight Report May 2022, World Economic Forum,

accessed on January 10, 2023 at https://www.weforum.org/reports/fostering-effective-energy-transition-2022/ Wehnert, T. (2020), *Transition strategies. How to design effective strategies for coal regions in transition. Toolkit,*

Brussels: EC

Wuppertal Institute (2022), *Just Transition Toolbox for coal regions*, Wuppertal: Wuppertal Institute