ART — Analysis and Research Team

RESEARCH PAPER

Green transition: navigating social challenges for a sustainable future

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Tensions along the way to a green society

Climate change is an **undeniable and accelerating reality**. Never in the last 3 to 5 million years has the concentration of CO2 in the atmosphere been so high, nor has the increase ever been so rapid[1]. The conclusions of the European Council in October 2019 recognised climate change as an **existential threat** to humanity[2]. Climate change is one of the foremost concerns of European citizens, who overwhelmingly support the shift towards a greener future[3]. The imperative of the green transition is indisputable and pressing, leaving no room for postponement. The key question is how to achieve it effectively.

The EU has set ambitious goals in recent years and has taken the lead globally, aiming to achieve climate neutrality by 2050. These objectives mark a revolutionary shift towards sustainability. **However**, a combination of global and economic **challenges has emerged** since these goals were set, ranging from the tumult caused by the COVID-19 pandemic to wars such as those in Ukraine and the Middle East, alongside surging inflation and fiscal constraints within the EU.

This complex backdrop has brought the social challenges accompanying the green transition into focus. Despite apparent citizen support, enthusiasm decreases when confronted with trade-offs. Economic and financial concerns take precedence, as highlighted in a 2023 EIB survey that showed **reluctance** among respondents **to fully embrace the costs of the transition**[4].

This is not merely a transition but a fundamental revolution demanding a profound overhaul of socio-economic models and mindsets. The scale of the transformation requires a staggering **investment by 2030 of up to €1.7 trillion**, equivalent to **11 times the Marshall Plan**[5], a reality that has not been fully grasped by public opinion. Some observers liken it to the **magnitude of a large-scale wartime operation**, emphasising the key role of the state in navigating this shift[6]. While the transition offers **substantial opportunities for individuals and societies**, it will simultaneously have an asymmetric impact across Member States, EU regions and social groups, posing a risk to cohesion in the European Union.

As a result, **tensions have appeared** between the imperative of the green transition and citizens' aspirations for a stable life. This dynamic has led to the emergence of a **green transition fatigue**, evident in calls for a regulatory pause, notably voiced by some political leaders[7]. Furthermore, even mainstream parties are considering watering down green commitments due to concerns over the short-term costs of the transition[8]. Protests by farmers across Europe illustrate these enduring tensions[9].

Individuals might increasingly feel caught between two existential threats: the risks of climate change on one side and the economic dangers to their livelihoods on the other. This tension might be increasingly exploited by populist parties seeking quick political gains. In the near future, if its social challenges are not addressed carefully, the **green revolution risks being paused** or even worse, rejected.

Yet, framing this tension as an either/or scenario would only deepen polarisation. The green transition is not just a choice but a necessary response to an existential threat. The crucial question is how to accomplish it effectively. **The success of the transition goes hand in hand with its economic and social viability**. In steering this historic shift towards sustainability, it is imperative to carefully balance its opportunities and risks, as well as acknowledging the hopes and fears it engenders among citizens.

> *"The success of the green transition goes hand in hand with its economic and social viability."*

With this in mind, the first part of the paper offers an **overview of the main opportunities and risks** linked to the green transition across six different sectors. These sectors, with their distinct nature, are poised to significantly impact individuals in the coming years. This overview does not aim to be exhaustive but rather to offer **insights into the main social implications of the green transformation**. It also includes the potential costs of inaction against climate change, covered alongside the opportunities of the transition.

The success of the green revolution relies largely on the ability of decision-makers to address and respond to the social challenges it poses. Both the EU and national governments play key roles in **steering and implementing effective policies** in this regard. The second part of the paper outlines essential principles **to ensure a successful trajectory for the transition**.

How will the transition impact individuals and societies?

Employment & Jobs

The transition could result in **a gain of about 200 million and a loss of about 185 million direct and indirect jobs globally by 2050**[10]. As job creation and destruction might **not affect the same regions, sectors or social categories**, labour market frictions will need to be managed. EU initiatives such as the **Just Transition Mechanism**[11] play a crucial role in mitigating the impacts of the transition on employment.

Hopes & Opportunities

JOB GROWTH

The transition is poised to yield a net increase of approximately 15 million direct and indirect employment opportunities worldwide by 2050[12]. Within the EU, it is anticipated to foster the generation of approximately 1 million jobs by 2030 (equivalent to approximately 0.5% of the current workforce), escalating to 2 million jobs by 2050, notably encompassing middle-skilled, middle-income roles within the energy and construction sectors.

INNOVATIVE VALUE CREATION

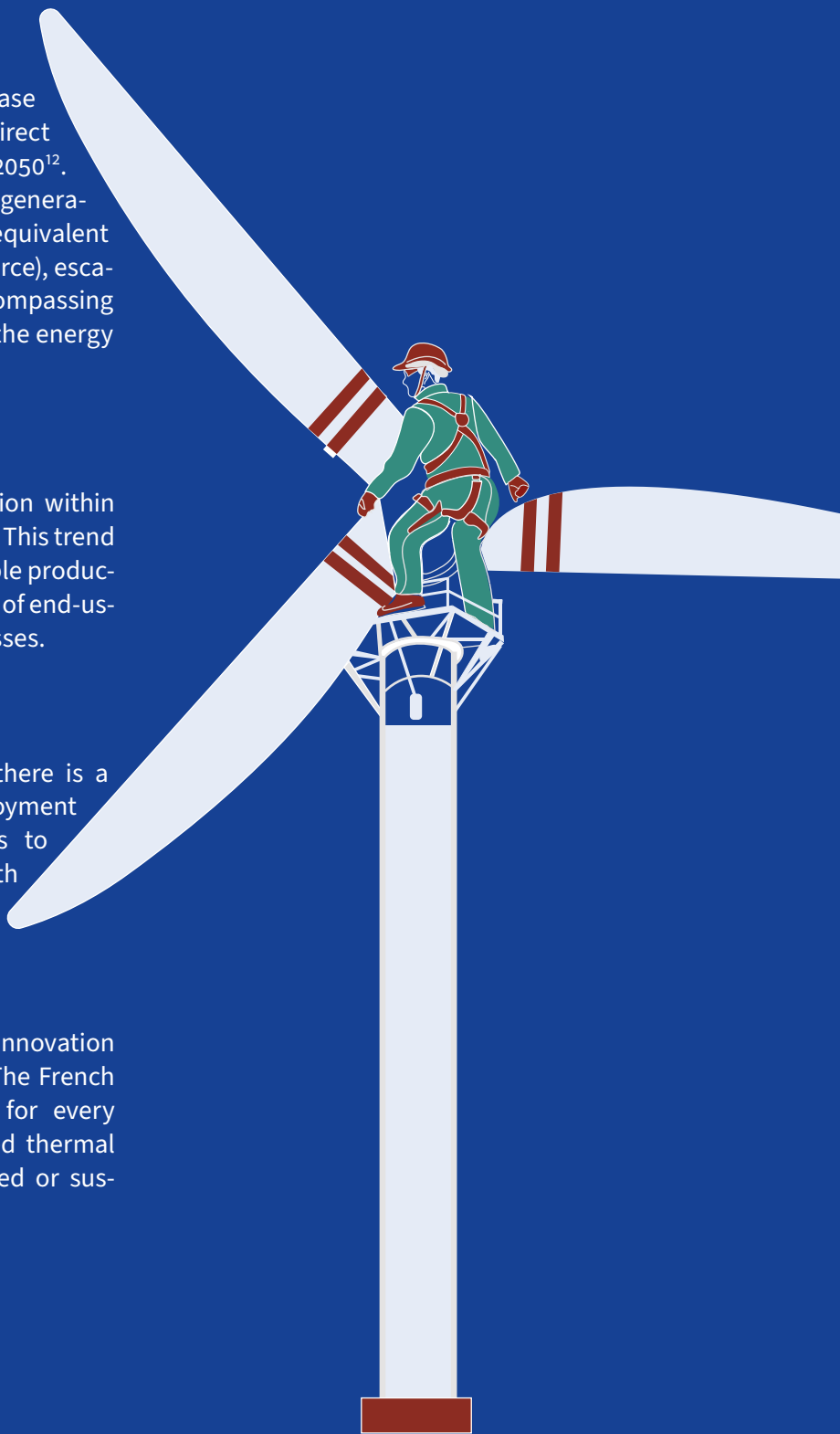
Green jobs are poised to catalyse innovation within value chains centred around sustainability[13]. This trend will give rise to more localised and sustainable production chains, fostering increased engagement of end-users in product design and production processes.

MISSION-DRIVEN CAREERS

Particularly among younger generations, there is a growing inclination towards seeking employment that fosters engagement and contributes to shaping the future. This aspiration aligns with the ethos of green jobs[14].

BOOSTING INNOVATION

Investing in green technologies will drive innovation promoting new businesses and new jobs. The French Ministry for Ecology has estimated that for every €1 million of investment in property-related thermal renovation, around 14 jobs could be created or sustained[15].



2 million additional jobs
in the EU by 2050

Fears & Risks

EMPLOYMENT FRICTIONS
The impact of job creation will vary across Member States and sectors and will take time to fully manifest, with the risk of tensions due to the short-term loss of jobs.

SECTORS AT RISK
Sectors with high emissions are at risk: steel and cement together account for approximately 14% of global CO2 emissions, but they also generate an important share of GDP. Transforming these sectors might have a heavy impact on employment.

REGIONAL DIFFERENCES
Certain regions face a greater impact than others. For instance in Silesia (Poland), the proportion of jobs at risk stands at 6.7%[16] owing to its strong reliance on coal and lignite mining.

RESKILLING CHALLENGES
The reskilling process may prove challenging, particularly for workers in energy-intensive industries who have undergone extensive training for specialised skills. This challenge is further compounded for individuals in the later stages of their professional careers.

ADDED WELFARE COSTS
The imperative to enhance education and reskilling, alongside the digital transition, may incur substantial welfare expenses. The European Commission estimated that investment needs for retraining, reskilling, and upskilling in the manufacture of strategic net-zero technologies range from €1.7 billion to €4.1 billion depending on the scenario[17].

Housing & Construction

Housing accounts for **40% of energy consumption and 36% of greenhouse emissions in the EU**, and is also recognised as **a fundamental right**. This presents a challenge in balancing environmental objectives with the social imperative of ensuring access to sustainable housing. The **EU renovation wave strategy** seeks to address both objectives, targeting the renovation of 35 million buildings and potentially creating **up to 160 000 additional green jobs in the construction sector by 2030**[18].

Hopes & Opportunities

COST SAVINGS

More energy efficient buildings will make it possible in the medium-term to lower operational costs and promote sustainable living, providing savings for homeowners and occupants.

ADDRESSING ENERGY POVERTY

A strategic focus on upfront investments in renewable energy sources, targeting the most vulnerable populations, presents a significant opportunity to alleviate energy poverty. Failure to act could lead to an average increase in energy costs across Member States by 2050 compared to 2019. Projections indicate a rise ranging from 1.83% in Spain, to nearly 30% in countries such as Romania, Italy, and Portugal[19].

ENHANCING ENERGY SECURITY

Reducing energy consumption in homes and moving away from fossil fuels for heating would also mitigate Europe's dependence on imports and reduce the impact of volatile fossil fuel prices[20].

POSITIVE DIGITALISATION

Digitalisation plays an important role in many ways, ranging from efficiency improvements in construction processes to monitoring the environmental impact of materials or supporting a more intense use of existing buildings (e.g. office sharing). It can also provide alternative options for space requirements (virtualisation) and increase efficiency in the use of energy and resources[21].

CLIMATE RESILIENCE

Renovation is also an opportunity to improve the resilience of buildings to climate change including possible extreme weather events. The transition will also foster innovation and research into sustainable materials.

35 million buildings
targeted by the EU renovation wave strategy

Fears & Risks

MASSIVE RENOVATION EFFORT

With approximately 100 million housing units in Europe, a staggering 97% of which will require upgrading, decarbonising this vast number presents formidable challenges. From substantial investment requirements to the logistical complexities of implementation, including the need for a sufficiently skilled workforce and adequate materials[22]. In France alone, 37 million housing units would need to be upgraded, at a cost of €50 billion per year until 2050[23].

ESCALATING COSTS AND DELAYS

With a sharp increase in demand for materials and labour but a stable supply, prices might rise, amplifying the overall expense of the transition and posing affordability challenges. Additionally, shortages in skilled labour and materials may cause notable delays in renovation efforts, potentially slowing down the transition.

SOCIAL TENSIONS

The combination of rising costs, delays due to insufficient numbers of skilled workers and legislations imposing stringent deadlines for meeting green standards[24] may create tensions with homeowners, who are often expected to shoulder the cost of renovation, with implications for rented units where the majority of the cost might be passed on to tenants through rent hikes. This poses a significant challenge, particularly for tenants already grappling with soaring housing costs, precipitating a concerning trend known as "renovictions", where tenants face eviction due to renovation activities[25].

Transport & Mobility

Road, aviation, rail, maritime, and other forms of **transportation contribute approximately 25% of the EU's total greenhouse gas emissions and 19% of global CO_2 emissions annually**. This sector is also responsible for approximately **5% of EU GDP** and **employs more than 10 million people in Europe**[26]. It is critical to European businesses and global supply chains. The **EU objective is to achieve a 90% reduction in transport-related greenhouse gas emissions by 2050**.

Hopes & Opportunities

HEALTH GAINS

Shifting to sustainable modes of transport enhances public health by reducing emissions, congestion, noise levels and improving air quality.

INNOVATIVE SOLUTIONS

Service-oriented and shared mobility, alongside emerging micro-mobility options, have the potential to diminish the environmental footprint of transportation. These advancements may obviate the need for cars in short-distance travel, encouraging healthier lifestyle choices[27]. For longer distances, giving preference to less CO2 intensive modes of transport, such as trains, could yield significant benefits.

NEW TECHNOLOGIES

Breakthroughs in technology, particularly those enabling efficient energy storage for heavy-duty transport over long distances, have the potential to revolutionise decarbonisation efforts. Such innovations would unlock new pathways toward achieving sustainable transportation solutions.

GREENER URBAN SPACES

Prioritising greener mobility is an opportunity to redesign urban spaces and elevate urban liveability. With cities currently responsible for approximately 70% of global greenhouse gas emissions and driving around 80% of overall economic growth, this shift holds immense potential for mitigating environmental impact and fostering sustainable urban development[28].

90% reduction of transport emissions
in the EU by 2050

Fears & Risks

COSTLY INFRASTRUCTURE
The EU is projected to require as many as 6.8 million public electric vehicle charging points by 2030, necessitating an estimated €280 billion investment in charging infrastructure and extensive upgrades to the power grid[29].

AFFORDABILITY
Making eco-friendly options accessible, particularly electric vehicles, remains a crucial hurdle. Price constitutes a barrier for many, hindering wider adoption.

ENERGY SCARCITY
Some experts advocate for implementing quotas, for example for air travel, to preserve limited resources for essential functions[30]. However, such measures may face pushback from individuals concerned about their freedom of travel. Anyway this process may be driven by the cost of sustainable aviation fuel which is expected to rise to between $900 and $2,300 per ton in 2050, compared with around $500 currently[31]. Flying could become unaffordable for all but the very rich.

RURAL-URBAN GAP
Access to alternative transport options remains unequal between cities and rural areas. One-size-fits-all solutions will not work. Targeted strategies are needed to bridge this gap and ensure fair access for all.

RENEWAL OF HEAVY ASSETS
Transitioning from older, polluting airplanes and maritime vessels to cleaner alternatives will be a lengthy process given the lifespans of these assets, spanning decades. Accelerating the shift to newer, sustainable options may require unpopular measures.

Agriculture & Food

Agriculture plays a pivotal role in the green transition, **occupying nearly 40% of the EU's land area**[32]. The food system of the EU generates approximately **30% of its total greenhouse emissions**[33]. Sustainable farming practices are key to safeguarding soil health and biodiversity. However, the transition towards such practices poses a significant challenge, evident from the recent farmers' protests across Europe.

Hopes & Opportunities

ADAPTATION AND MITIGATION

Farmers will increasingly face challenges caused by climate change, as it risks pushing around 30% of food production outside the safe climatic space[34]. Embracing sustainable farming practices is essential to mitigate these effects, preventing soil degradation and averting the loss of biodiversity, including the decline of pollinators.

LOCAL FOOD SYSTEMS

Embracing local food production and distribution networks can reduce carbon emissions from transportation, support small-scale farmers, and strengthen rural communities. If climate consequences are priced in, certain food might become more affordable.

HEALTHIER DIETS

The trend towards healthier dietary choices, particularly embracing more plant-based diets, holds the potential for widespread benefits to public health, thereby resulting in positive outcomes for national healthcare systems.

EDUCATION AND AWARENESS

Increasing public awareness of the benefits of sustainable agriculture can foster consumer demand for eco-friendly products and drive industry innovation towards more sustainable production methods.

FOOD WASTE REDUCTION

Approximately 30% of the world's food is lost or wasted every year[35]. Implementing circular economy principles provides an opportunity to address this issue and optimise the use of resources.

Sustainable farming is key
for soil health and biodiversity

Fears & Risks

DIFFICULT SHIFT
Food producers may resist change, especially when it involves deviating from conventional, decades-old practices. Implementing measures to ensure emission-efficient farming will involve significant upfront costs, which can be challenging to sustain in a period of already strained financial resources, especially for small-scale farmers[36].

PRESSURE ON FARMERS
The rapid changes requested by the transition may worsen the existing challenges faced by farmers. For instance, in France, the suicide rate is estimated to be 31% higher among farmers than in the rest of the population[37].

CHALLENGE TO TRADITIONS
Agriculture is a sector where economic interests overlap with deeply rooted traditions. Although altering our dietary habits could bring substantial advantages for the environment, it poses a significant long-term challenge and could become an issue exploited by populist parties. Data indicate that meat production has remained largely stable over the last 15 years in Europe[38]. In Italy, parliament has enacted legislation prohibiting the sale of lab-cultured meat[39].

HIGHER COSTS
Household expenditure on food might increase due to the higher costs of organic food, potentially deepening social disparities. Moreover, the shift to organic farming may result in reduced yields.

INCREASED DIVISIONS
As transition costs rise, stakeholders may convey contrasting messages depending on national or political interests. For instance, several EU Agriculture ministers demanded more influence, compared to environmental ministers, in shaping sustainable policies[40]. Tensions may also rise between promoting local food and advancing free-trade agreements (e.g. with Mercosur)[41]. Moreover, the EU may face blame for the social repercussions of green policies affecting farming[42].

Health & Wellbeing

Globally, the healthcare sector is responsible for **4.4% of greenhouse emissions**[43], more than aviation and shipping together[44]. If the healthcare sector were a country, it would be the fifth-largest greenhouse gas emitter on the planet. Taking measures to decrease the sector's carbon footprint is crucial in the global effort to combat climate change. Furthermore, adaptation and mitigation initiatives are poised to yield **substantial benefits for human health**.

Hopes & Opportunities

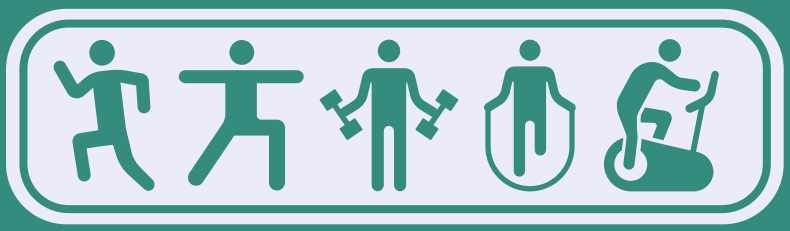
COST SAVINGS
Taking immediate action to optimise and reduce energy consumption in healthcare facilities could bring direct benefits in terms of savings.

CIRCULAR ECONOMY
Embracing green practices has the potential to not only decrease material usage and waste, but also diminish reliance on raw materials[45].

REDUCED DEATHS
Each year, air pollutants such as fine particulate matter are responsible for 250 000 premature death in the EU. Action taken in recent years has already resulted in a 41% reduction in premature deaths[46], but further measures could enhance this trend.

LIMIT THE IMPACT OF EXTREME WEATHER
The climate emergency poses a public health emergency. For instance, without more effective adaptation and mitigation policies, Europe could witness an average of 120 000 premature deaths attributable to heat every summer by 2050[47].

LESS STRAINED HEALTHCARE SYSTEM
Climate change not only endangers the well-being of individuals but also places significant strain on national systems, compromising their capacity to respond effectively. The threat is especially severe among the most vulnerable groups, such as children and the elderly.



IMPROVED QUALITY OF LIFE
Moving towards healthier diets, sustainable transports and greener environments could improve the quality of life and mitigate health issues, such as heart-related events.

The transition will bring substantial benefits
for human health

Fears & Risks

CONSIDERABLE INVESTMENTS
Plans to decarbonise the healthcare sector face substantial investment costs in the short-term, necessitating state support during a period of constrained financial resources.

SUPPLY CHAIN ISSUES
Adoption of new technologies and sustainable materials in the heath sector would require synchronised adjustments in the supply chain, potentially leading to delays or inefficiencies during the transition period.

TREATMENT ACCESS
The integration of advanced and eco-friendly medical technologies could elevate costs in the short-term, making it challenging to maintain universal access to certain advanced treatment.

Behavioural & Psychological

The success of the green transition requires considerable **behavioural changes** that will inevitably have significant **psychological consequences on individuals**. Striking a **balance** between these factors is vital for a successful and sustainable move towards a greener future.

Hopes & Opportunities

CHANGE IS POSSIBLE

The COVID-19 pandemic has shown that in the face of an unprecedented global crisis, substantial behavioural changes can occur for the greater good[48].

REGULATORY FRAMEWORK

Public policies can effectively shape citizen behaviour, promoting sustainable consumption patterns and fostering a broader commitment to climate action[49], including with subtle interventions and green signalling that could guide individuals towards eco-friendly choices.

ENGAGING CITIZENS

Global climate movements, exemplified by initiatives such as Fridays for Future, have demonstrated the potential to influence public awareness and behaviour towards environmental concerns[50].

BEHAVIOURAL SPILLOVERS

Public policies have the potential to encourage eco-friendly behavioural spillovers. For instance, endorsing remote work could bring environmental benefits, as well as presenting an opportunity to incentivise individuals to enhance the energy efficiency of their homes[51].

Behavioural changes are key
for the success of the green transition

Fears & Risks

RESISTANCE TO CHANGE

Humans often resist change due to a natural inclination towards familiar routines and reluctance to embrace the unknown, posing challenges for the adoption of new, eco-friendly behaviours. This becomes pertinent with the profound changes required by the green transition, including for instance the increasing need to shift current ownership models (e.g. cars) which may initially involve a decrease in comfort.

RISK OF SHORT-TERMISM

Humans are inclined to perceive uncertainty as a risk or a threat[52], with a direct impact on electoral preferences. This itself carries the risk of short-termism and suboptimal decision-making among individuals responsible for strategic choices[53].

POLARISATION OF SOCIETIES

The resistance to change and pushback from segments of society content with the status-quo may exacerbate polarisation, also leading to intergenerational conflict. This polarisation could be further intensified by the unequal impact of green transition measures, potentially deepening existing inequalities in the short-term.

SOCIAL PROTESTS

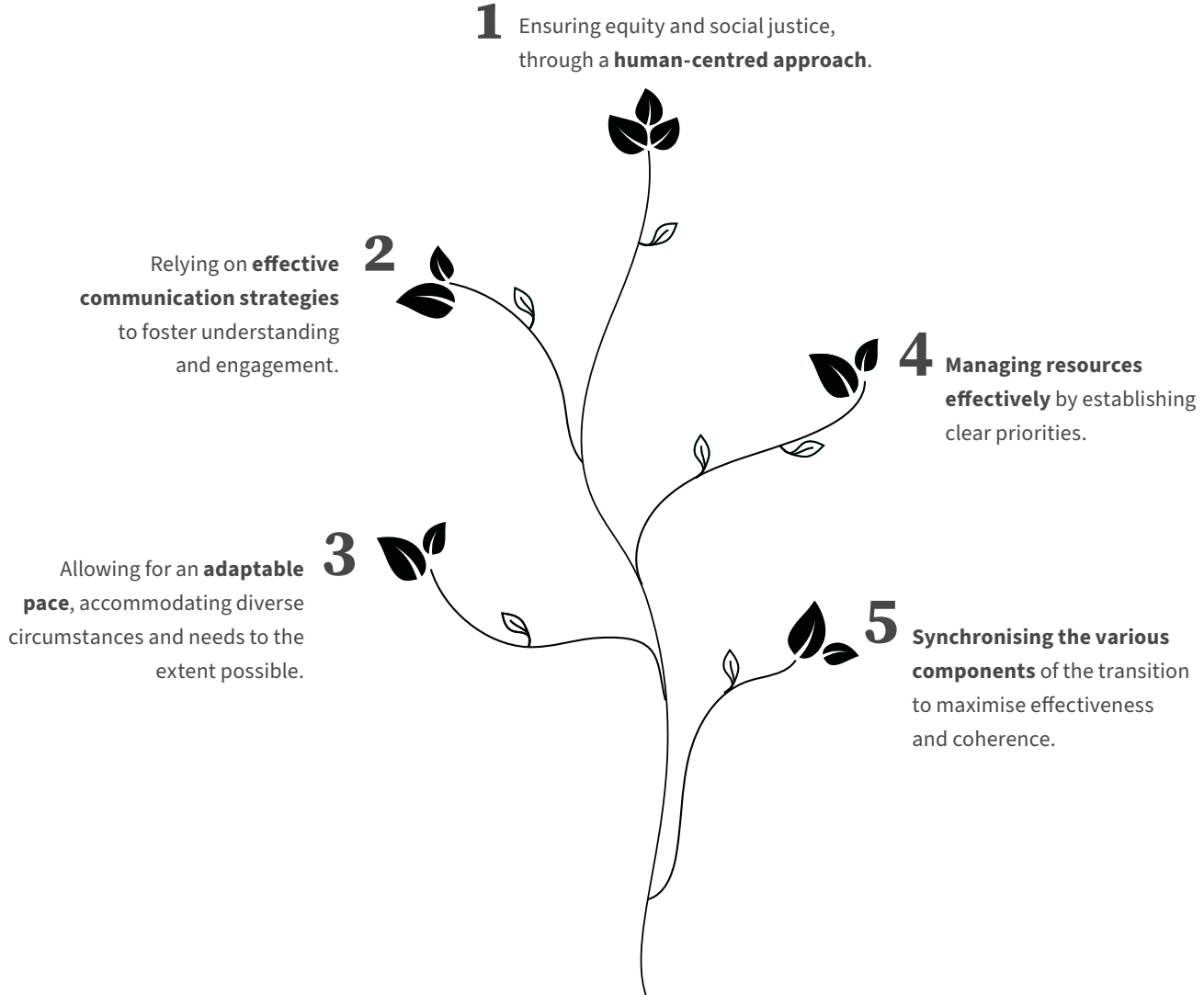
The scope and pace of the transition, involving an overhaul of lifestyles, may trigger reactionary resistance, with grassroots movements emerging in several Member States. This has been evident in instances such as the yellow-vest protests in France[54] or the recent farmers' protests around the EU[55].

Principles for a green and socially viable transition

The **green transition** marks a pivotal moment **filled with opportunities and hopes** for society, **but also risks and fears**, an inherent aspect of any transformative process. Whilst it is crucial to highlight the social challenges, it is also essential to acknowledge that unmitigated climate change presents even greater threats to citizens' livelihoods and well-being.

The **consequences of inaction** or insufficient action **are already tangible and escalating**. Climate-related extremes have resulted in estimated **economic losses** of €650 billion in the EU over the last four decades, with over €110 billion incurred in 2021 and 2022 alone[56]. Beyond the financial toll, these disasters exact a **heavy human toll**, causing displacement, illness, and loss of life[57]. Delaying the transition would only exacerbate these costs[58], and climate change will inevitably disrupt the stability people seek in their lives.

The **green transition is** not merely an option, but **an imperative** response to an existential threat. The central **question revolves around how to achieve it effectively**. The way policies are designed and implemented can significantly shape our ability to address the inevitable social challenges arising from the transition. Five principles seem critical in navigating the transition towards success:



1 Human-centred approach

To ensure the success of the green transition, policies should **prioritise fairness and social justice**. The EU has already confronted significant challenges to social cohesion in recent years, stemming from the fall-out of various crises, including the COVID-19 pandemic, Russia's war of aggression against Ukraine and the conflict in the Middle East. Transitioning towards a greener economy presents additional risks. High-income regions show the highest potential for economic growth, while low-income regions risk lagging further behind[59]. In the short-term, the **transition may worsen existing economic disparities** among Member States and regions, potentially leading to social tensions.

It is crucial for both the EU and national governments to **establish robust support and protection measures** tailored to the needs of individuals and the capacity for change within each region. Several steps have already been taken in this regard. The Council adopted a recommendation in June 2022 inviting Member States to take measures with a view to ensuring a fair transition towards climate neutrality[60], while measures such as the Social Climate Fund[61] and the Just Transition Mechanism[62] have been launched to provide concrete support. However, deeper engagement and **additional redistributive measures are needed**, as current funding levels may not suffice to adequately address the negative social impacts of the transition[63]. Equitable access to upskilling and reskilling opportunities is also essential to empower individuals on the changing labour market[64].

A top-down, one-size-fits-all approach should be avoided in favour of actively **involving citizens and civil society in decision-making** processes[65]. Collaboration and understanding, rather than imposition, should be the guiding principles for navigating the path forward. Social dialogue at all levels and inclusive governance are critical for securing long-term public support. While the majority of the European population currently supports the green transition, public opinion can shift rapidly. The current rise in **pessimism about socio-economic conditions** and declining living standards[66] **must be addressed** to prevent these concerns from escalating into anger. In the absence of a human-centred approach, such sentiments could fuel extremism and jeopardise the green transition entirely.

2 Effective communication strategies

As green fatigue gradually emerges and consensus declines[67], it is crucial to **develop a fresh political narrative** that upholds the goals of the transition. The belief that the shift would pay for itself, which prevailed when debt costs were close to zero, is no longer aligned with reality[68].

To rebuild trust, policymakers could present the costs of the transition as **investments in achieving specific positive goals**[69], emphasising the considerable individual benefits they bring[70]. Moreover, these investments can help mitigate the more severe social and environmental repercussions of climate change and extreme weather events. 2023 marked the hottest year on record, with global temperatures already reaching the 1.5°C limit set by the Paris Agreement[71], a trend that is projected to further worsen.

It is imperative to convey to the public that **transitioning towards a more sustainable economy** is not optional and offers significant advantages for citizens. It is not merely a concern of the privileged few, but it rather **serves the collective interest**, guaranteeing a better future for all. Furthermore, this transformation has the potential to enhance the EU's global competitiveness[72]. By reducing reliance on fossil fuels, the EU could **bolster strategic autonomy**, provided this shift does not create new dependencies on alternative resources such as raw materials and rare earths.

A positive narrative could stress that the **costs** of the transition are **equitably distributed**, thanks to solidarity mechanisms and redistributive measures. This is key to preventing polarisation and to pre-empting populist parties' attempts to exploit the social challenges of the green policies for short-term electoral gains[73]. Effective **communication can help maintain continuous popular and political support**, while at the same time averting a "blame Brussels" narrative, which is already emerging, as seen in the farmers' protests across Europe.

3 Adaptable pace

While pursuing a human-centred approach with effective communication strategies, it is essential to carefully **consider the pace of the transition**, a concern echoed by political leaders and mainstream parties alike[74]. Rushing policies toward net-zero emissions without **allowing sufficient time for societal and economic adjustments** may risk generating significant short-term challenges, including social cohesion issues and potential backlash from the public[75]. However, delaying the green transition would necessitate a sharp transition in the medium-term, with the risk of weakening the economy and significantly higher costs[76].

In an era grappling with formidable global challenges and limited resources, executing a transition akin to a large-scale wartime operation is an arduous task. Recognising signs of public fatigue and allowing for a **more adaptable pace in limited policy areas** may be seen as an **empathetic response to the social groups most affected by the transition**, rather than a failure of the transition itself. At the same time, research shows that reducing uncertainty through reliable policy commitments is key to ensuring buy-in from industries and investors[77]. Therefore, caution may be needed to avoid giving an impression of weakening commitment to the green transition.

As a union of highly developed nations, the EU may arguably have a leadership role in the global fight against climate change. Yet, **there may be scope for limited adaptations** to the pace of the EU's transition **without endangering global efforts**, especially when considering that Europe contributes only 6.7% of global emissions[78]. Moreover, there are significant differences worldwide in the perception of the threat posed by climate change[79], a factor that can easily be exploited by populists aiming to capitalise on people's discontent. Thus, while championing emission

reductions, **the EU will have to strike a balance** to avoid sudden large-scale disruptions to its economic and social cohesion that may foster negative sentiments toward the transition and hinder its overall progress.

4 Efficient resource management

Transitioning to a sustainable economy requires **substantial investment**, both for implementing technological changes and ensuring social equity throughout the process. This will **strain public finances**, which have already been stretched thin by consecutive crises in recent years. It is estimated that Europe's cumulative incremental investments towards net-zero emissions could reach around €1.7 trillion by 2030[80]. Such investments will impact Member States differently, depending on their capacity to capitalise on transition opportunities and their financial resources, potentially leading to **increased public debt**. In this context, **taxation reform** may be necessary, as the shift to renewable energies reduces revenue from fuel and gasoline levies[81].

Furthermore, the issue of raw material supply will become critical. The green transition relies on **raw materials** that **may soon face shortages**. As things stand, by 2030 the EU may struggle to meet the demand for wind power and electric vehicles due to insufficient global supply of key raw materials[82]. Lithium, an essential component of batteries with limited substitutes and recycling options, may face shortages as early as 2025[83]. Geopolitical tensions also pose a threat, affecting not only availability of fossil fuels but also critical materials.

These challenges highlight the **key role of the state** and draw attention to the **need for governance mechanisms** to effectively manage financial and material resources through the establishment of clear priorities. In the current economic and social climate, each of the three primary financing methods – taxation, spending cuts, and increased debt – presents its own set of challenges[84]. Rather than attempting to address all the issues simultaneously, it is **crucial to prioritise** and focus initially **on areas where the highest impact is achievable**[85]. In doing so, it is also important to recognise that while significant short-term financial needs may require increased reliance on debt, delaying action would only result in greater costs for future generations[86].

5 Synchronisation of transition components

Similar to any major societal and technological transformation, the **green revolution triggers a series of interconnected changes** with far-reaching implications for virtually every aspect of our lives. **Delays in key components** crucial for a decarbonised socio-economic system **can disrupt daily routines** and generate negative sentiments towards the transition. When promoting the adoption of electric cars, for instance, it is imperative to concurrently develop a robust charging infrastructure while ensuring that power comes from non-fossil sources.

To navigate this complex process, it is crucial to strategically coordinate investments across different levels and encourage **collaboration among diverse stakeholders**, spanning both the public and private sectors. The **EU and the national governments play key roles** in planning and synchronising these efforts.

Particular attention should be given to the **availability of skilled workers**. Effective public interventions are essential for tackling projected shortages in green skills, especially in sectors such as construction experiencing heightened demand due to the transition[87]. These interventions should focus on developing skills for the evolving green economy, enhancing adult learning and training programs (reskilling and upskilling), and facilitating smooth job transitions.

> *"Policy makers have agency to actively shape and guide the green transition."*

Also, in anticipation of a scarcity of raw materials, robust policies are required to mitigate risks associated with dependency on these materials and prevent potential delays in the transition. A **comprehensive approach** is necessary **to ensure the EU's access to essential resources**, encompassing the diversification of supply sources, the protection of supply chains, the enhancement of EU production capabilities, the research into substitutes for critical materials, and the promotion of recycling initiatives[88].

At the core of these endeavours lies the responsibility of the state to **design timely policies**. Policymakers have agency to actively shape and guide the transition. This requires **foresight, strategy and implementation at all levels** – EU, national and local – to ensure that the green revolution benefits society as a whole[89].

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