Evaluating the European Union's Green Deal Role in Climate Change Mitigation and Sustainability Transitions (2030-2050)

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ABSTRACT

The European Union's Green Deal (EGD) represents one of the most ambitious policy frameworks aimed at addressing the pressing global challenges of climate change and environmental degradation. It is a very pivotal step that has been engaged towards addressing the concurrent challenges of desertification and climate change as the EU seeks to examine the structures put in place to ensure that they meet up with their objective of becoming carbon neutral by 2050. From a human forcing greenhouse gas theoretical position, this qualitative contribution making use of interviews and observation techniques by interrogating the actions and inactions of man as the main driver of climate change in Europe.

Semi-structured interviews were conducted with a diverse group of stakeholders, including policymakers, environmental NGOs, industry representatives, and community leaders. In parallel, observation techniques were employed in both formal and informal settings such as public climate forums, municipal planning meetings, and grassroots environmental campaigns to document behaviours, interactions, and decision-making processes related to climate change mitigation and adaptation The study identifies that, in order to achieve the ambitious climate goals of the European Green Deal by 2050, the EU must strengthen its efforts in several key areas like: accelerating renewable energy deployment, improving energy efficiency, promoting sustainable agriculture, and enhancing climate adaptation measures are critical. We argue that, the EU in itself cannot achieve this goal unless they engage global climate governance. Climate change mitigation implementation mechanisms were studied from the different EU member countries. Lessons can be drawn from this ongoing policy in the EU which may be relevant to other researchers, practitioners, and policy formulators.

Keywords: Evaluation, European Green Deal, Climate Change Mitigation, Sustainability, Transitions.

INTRODUCTION

The European Union's Green Deal is a comprehensive action plan to transform the EU into a modern, resource efficient, and climate neutrality economy by 2050.It aims to achieve this by reducing greenhouse gas emissions, promoting a circular economy, and ensuring a just transition for all. It is very pertinent to note that, this deal was launched in December 2019 seeking to transform Europe's society and economy by not only reducing greenhouse gas emissions but also to foster sustainable economic growth, protect biodiversity, and equally protect resilience against both the existing and future environmental threats. [1]The EGD does not just make European economies to be ecologically viable, but it is as well a very inclusive policy which cuts across the board Hoon et al (2022).

Climate change is the most pressing environmental challenge plaguing Europe in particular and the world at large. This is because, [2]degradation has affected many or most ecosystems on the planet and this has generated

[1]Hoon, L., &Pype, K. (2022). EUROPEAN GREEN DEAL: CONTEXT, GOALS, AND INTERNAL STRUCTURE. In *HOW CAN THE EU DELIVER A SOCIALLY JUST GREEN DEAL?: LOOKING AT THE EUROPEAN GREEN DEAL THROUGH A JUST TRANSITION LENS* (pp. 7–10). Open Society Foundations. http://www.jstor.org/stable/resrep42959.5

[2]Verstraete, M. M., & Schwartz, S. A. (1991). Desertification and Global Change. *Vegetatio*, *91*(1/2), 3–13. http://www.jstor.org/stable/20038708

a high sense of public awareness by public policy makers to treat climate change and desertification as matters of urgency including Europe Verstraeteet al. (1991). Though not all of Europe is currently affected by climate change, the Southern regions of Europe with countries like Spain, Italy, Greece, and the Mediterranean countries are highly affected as a result has put a very significant portions of their lands at risk due to unsustainable systems of agriculture, deforestation and effects of global warming.

The EU Green Deal addresses these challenges through a comprehensive set of policies and strategies, including the Climate Law, the Biodiversity Strategy, the Farm to Fork Strategy, and the Forest Strategy. These initiatives aim to integrate climate action with sustainable land management practices, promote biodiversity conservation, and foster the resilience of ecosystems and communities.

This paper seeks to explore the EU Green Deal and its objectives towards climate change, its strategies in combating these environmental challenges, and equally analysing the Green Deal's policy framework, implementation strategies, and regional effects.

Theoretically, this paper builds on the foundation of the Human Forcing Greenhouse Gases theory which holds that, the greatest aspect of environmental variability and changes are traceable to human actions which influences the climate system. Thus, mankind's greatest influence on the climate is not its greenhouse gas emissions, rather, its transformation of the earth's surface by clearing forests, irrigating desserts, and building cities. It did opine that, we can't dispute the role of natural factors and the environment towards climate variations and changes. But human influences are very significant and involve a diverse range of first-order climatic forcings including, but not limited to the human inputs of Carbon dioxide (CO^2). The human forcings theory advances the argument that although the natural causes of climate variations are and changes are undoubtedly indispensable;[3] the human influences are quite significant and are dominated by the emissions into the atmosphere of greenhouse gases (Solomon 2009:413).Thus, the primary adverse effects on climate variability in the coming decades ahead are traceable to this factor of human activities.

The issues that humans faces with these forcings include the increasing demands of the human population, urbanization, changes in the natural landscape, and land management, long term weather variability, and change, animal and insect dynamics, industrial and vehicular emissions and so forth (Solomon 2009:41).

It is now very evident that, Europe is becoming warmer and affected by the onslaught of climate variability. Science has affirmed that, these changes are due to human activities. Statistically speaking, in this century, the average annual temperature in Europe has drastically increased by about 0.8ºC (Kovats :1999). Warming has been particularly great during the past two decades and in the middle to high latitudes. In the Alps, [4]temperature increase has exceeded 1ºC above the mean. Northern Europe has become wetter, but a region encompassing the Mediterranean and Central Europe has become significantly drier as a result of human activities. Scientists of the Intergovernmental Panel on Climate Change (IPCC) anticipates that, a 1ºC-3.5ºC increase in average global temperature by 2100. Although there is considerably uncertainty in forecasting regional and local changes in Europe, it is most likely that these observed trends will continue.

This qualitative contribution is laid out in themes, to allow for effective thematic engagements, of the phenomena of the EU's efforts in enhancing climate change and desertification mitigations. It closely assesses the contribution of the different EU member states aimed at implementing the Green Deal from its moment of inception in 2019 while identifying what they have implemented so far and how far they are still to go on the policy.

Both published and unpublished materials which included the consultation of key EU Green Deal policy documents were utilized in generating relevant content for this work.

[3]Solomon, C.S (2009) Climate Change: The Need to Consider Human Forcings Besides Green House Gases.Institute of Washington, D.C.

[4]Kovats, S.R (1999). Climate Change and Human Health in Europe. BMJ Publishing Group Ltd.

The EU is a very strategic player in global politics, linking both the global South and global North. Which means whatever policy they introduce; it has a tendency to affect the international space. Findings from this study will therefore be applicable in similar situations.

The EU Action Plan in Combating Climate Change via the EU Green Deal

Reduction of Greenhouse Gas Emissions

Renewable Energy Expansion

Germany

Germany's Energiewende (energy transition) policy has boosted renewable energy capacity, making renewable account for over **50% of the electricity mix** in recent years. [5]Note should be taken of the fact that, Germany is the leader of renewable energy in the world. But what is in store in Europe heads for 20 percent renewable energy target as of the year 2020, Schleicher (2011). As a means to promote the use of renewable energy by Germany in the last decades, the government has provided massive subsidies for this transition process.

There is a central legislative act in Germany which is called in German (Erneuebare-Energien-Gesez). [6]The core elements of this act are a technology-specific feed-in tariff that guarantees the purchase of green power at a very fixed price over a long period of time. This gives credence to renewable energy sources over conventional electricity sources, Bohringer et al, (2017). The Erneuebare-Energien-Gesez is a long-term strategic energy transition plan for Germany which stipulates that, Germany will have no nuclear plants by 2022.

In addition to that, [7]the country will have about 40 to 45 percent of total power generation coming from renewable sources of energy by 2035, 55 to 60 percent by 2030 and 80 percent by 2050, Nazakat et al, (2018).

Great lesson was drawn from the experience of the Fukushimadiashi Power Plant gas disaster in Japan which led to mass destruction. Prior to this disaster, it was believed that nuclear-energy was the best and most reliable form of energy which is self-sufficient. After this incidence, even Japan and a host of other countries went back to nuclear energy amidst its destructive tendencies but Germany happened to be the only country that made a firm decision that by 2022. There must be a shutdown of all its nuclear energy power plants. Today, Nazakat et al, (2018), more than 1.4 million German household cooperatives are generating their own solar and electricity. More than 1.5 million renewable power plants have been installed in Germany since 1990. Currently, roughly 33 percent of Germany's electricity is most likely from renewable.

Denmark

Wind Energy Leadership

In terms of wind energy**,** Denmark is a global leader in wind energy, both onshore and offshore. The country has invested heavily in wind farms, contributing to over **50% of its electricity production** coming from wind power within and beyond the Scandinavian region. Generally speaking within the European context,[8] the climate and

[5]Schleicher-Tappeser, R. (2011). New challenges for renewable energy in Germany. *ReNew: Technology for a Sustainable Future*, *115*, 70–77. https://www.jstor.org/stable/renetechsustfutu.115.70

[6]Böhringer, C., Landis, F., & Reaños, M. A. T. (2017). Economic Impacts of Renewable Energy Promotion in Germany. *The Energy Journal*, *38*, 189–209. http://www.jstor.org/stable/26294157

[7]NAZAKAT, S., CUNNINGHAM, T., HEDBERG, A., & YAO, L. (2018). GERMANY'S ENERGY TRANSFORMATION: IT'S NOT EASY BEING GREEN. In *ASSESSING THE ENERGIEWENDE: AN INTERNATIONAL EXPERT REVIEW* (pp. 16–17). Konrad Adenauer Stiftung. http://www.jstor.org/stable/resrep17543.6

Gavard, C. (2015). *Carbon Price and Wind Power Support in Denmark*. Fondazione Eni Enrico Mattei (FEEM). http://www.jstor.org/stable/resrep01122

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energy package is actually aimed at meeting the European Union (EU) climate target energy target of which Demark is very much committed in achieving this task Gavard (2015).

Denmark has a long wind power history which includes several support policies which has been changed over the time. Historically, onshore wind support policies began in Denmark as far back as in 1976 (Energistyreslen; Jaureguy, Naudin, 2010).Currently, the Danish government is putting a lot in place to promote wind energy support which includes the granting of subsidies, greed integration measures and feed-in tariffs.

Denmark is investing a lot in technological advancement in this sector because this area demands a lot of technical knowhow. In terms of off-shore wind development, the Danish government has been at the forefront especially in the agricultural domain which happens to be the life wire of that society by encouraging the growth and establishments of large scale-wind farms. In terms of research, Danish companies alongside research institutions are collaborating to develop quality wind turbine technology and grid integration solutions.

The million dollar question now is how does this actually contribute to the enhancement of the EU Green Deal's vision 2050? First and foremost, Denmark actually serves the plate of being an inspiration and benchmark to the entire EU community in this domain of wind energy. An example that so many will copy. Secondly Denmark is actually helping in knowledge sharing or technology transfer because, they engage in collaboration and transfer links initiatives. Lastly, through policy influence, Denmark has played a very pivotal role in shaping EU policies to renewable energy and climate change.Denmark's leadership in wind energy has been instrumental in driving the EU's transition towards a low-carbon economy. Its experience and expertise have provided valuable insights and lessons for other countries seeking to replicate its success. As the EU continues to pursue its climate neutrality goals, Denmark's role as a pioneer in wind energy will remain essential.

Energy Efficiency Programme

Denmark.

Denmark has implemented comprehensive energy efficiency measures in buildings and industries, reducing overall energy consumption and emissions. We can best assess the different energy efficiency programmes in Denmark by looking at their energy goals. First and foremost, Denmark has a long term energy vision which is to achieve carbon neutrality by 2050 with a commitment target to reduce greenhouse gas emissions by 70 percent in 2030 as compared to the 1990 levels. The history of the Danish high investment and commitment in renewable energy can be drawn from the pre-1970 era when the country had no policy in energy. Over 90 percent of their energy was obtained from oil through the rich oil Arab nations because [9]Denmark is one of those unfortunate countries that are not really blessed with rich natural resources but for a few amount of wood and a little quantity of lignite which means that almost everything is to be eventually imported from abroad, Rudiger (2014).Things took a U-turn when these rich oil Middle Eastern countries began to skyrocket oil prices and threats on market boycotts, the Danish government for the first time in 1973 retaliated by creating veritable energy policies which was done in the form of energy saving campaigns. [10]Denmark has created an alternative plan to the traditional nuclear power which seems to be more dangerous and unreliable considering the lessons drawn from the Fukushima plant experience in Japan, Rudiger (2016). They have actually put their main focus on renewable energy as the most reliable source of energy.

Promotion of Renewable Energy: The Green Deal promotes transition to renewable energy sources, thereby reducing dependency on fossil fuels and lowering the current level of carbon emissions.

[9]Rüdiger, M. (2014). The 1973 Oil Crisis and the Designing of a Danish Energy Policy. *Historical Social Research / Historische Sozialforschung*, *39*(4 (150)), 94–112. http://www.jstor.org/stable/24145529

[10]Rüdiger, Mogens. "Designing the Energy Future.: Two Narratives on Energy Planning in Denmark, 1973-1990." InRüdiger, Mogens. "Designing the Energy Future.: Two Narratives on Energy Planning in Denmark, 1973-1990." In *Electric Worlds / MondesÉlectriques: Creations, Circulations, Tensions, Transitions (19th–21st C.)*, edited by Alain Beltran, Léonard Laborie, Pierre Lanthier, and Stéphanie Le Gallic, NED-New edition., 481–96. Peter Lang AG, 2016. http://www.jstor.org/stable/j.ctv9hj6hk.24.

Spain

Solar Energy Expansion

When it comes to solar energy investment, Spain happens to be one of the lead countries in Europe that has invested a lot in this sector especially in regions like Andalusia which actually contributes significantly to the country's national network. Spain is far more advantaged in solar energy as compared to other European countries thanks to its access to abundant sunlight. It equally benefits from governmental support and technological advancement.

By 2050, Spain is expected to significantly contribute to the EU's anticipated carbon neutral status. Spain practically enjoys a geographical advantage over so many EU countries because it enjoys one of the highest levels of solar irradiation in Europe. This has created a very fantastic foundation for solar energy in Spain. Also, as at 2023, Spain was one of the lead European countries in terms of solar energy capacity with over 20 GW of installed solar photovoltaic (PV) capacity and it has an ambitious plan to expand it. It is just so amazing to see that Spain is on the right track in putting on so much investment in solar because, [11]in just one hour, the sun delivers more energy on Earth than it is just used currently in one year, Zeman et al , (2007).

Spain's significant investments in solar energy are set to play a transformative role in both its national energy strategy and the broader EU Green Deal objectives. By 2050, Spain will be a key contributor to the EU's climate neutrality goal, through decarbonizing its energy system, reducing greenhouse gas emissions, and promoting technological innovation in renewable energy. Spain's solar expansion is not only a pathway to a greener future but also a driver of economic growth, energy security, and leadership in the global renewable energy transition.

Wind Power Development

Spain is also a major player in wind energy, with extensive onshore and offshore wind farms enhancing its renewable energy portfolio. Spain is one of those countries that have been able to export her experience in wind power development in a bid to gain and enjoy international foot prints. [12]For its modest beginning, wind power of recent in Spain reached for two hours a historic peak supply of 59.6 percent of Spain's electricity demand without having the latitude to destabilise network security, Barcelona (2012). Spain's success into this venture can be traceable to two factors which includes economic incentives and technical advancements.

A milestone by the Spanish government in this sector is seen that Spain has invested a lot in offshore wind development. This is very vital for the energy transition process of every economy. Electricity systems are discussed from generation through transmission and distribution to retail demand, including how wind energy impacts investment in marginal (peak time) generating assets. [13]The discussion also examines issues that could limit the usefulness of wind power in Spain since she is not one of the lead economies in Europe, at the high penetration rates now envisioned which includes: the inability to store electricity, the need for fast-responding backup-generating capacity, network instability, low-capacity factors, and inappropriate incentives, Kooten (2016).

Italy

Geothermal Energy Utilization: This is an energy which comes from reservoirs of steam and hot water beneath the surface of the earth, Kilic (2006)[14]. It plays an exceptional role in every economy that is undergoing a

[11]ZEMAN, M., MELSKENS, J., SEMANOVÁ, M., & VODERADSKÁ, Z. (2007). Photovoltaic Solar Energy: Key to a Sustainable Energy Future. *International Issues & Slovak Foreign Policy Affairs*, *16*(4), 36–52. https://www.jstor.org/stable/26591030

[12]Barcelona, R. G. (2012). Wind Power Deployment — Why Spain Succeeded. *Renewable Energy Law and Policy Review*, *3*(2), 146–149. http://www.jstor.org/stable/24324743

[13]van Kooten, G. C. (2016). The Economics of Wind Power. *Annual Review of Resource Economics*, *8*, 181–205. https://www.jstor.org/stable/26773362

[14]Kilic, F. C. (2016). Geothermal Energy in Turkey. *Energy &Environment*, *27*(3–4), 360–376. https://www.jstor.org/stable/90006618

transition from fossil fuel use to renewable energy. It has been proven that, geothermal energy is one of the most friendly energy type used to generate electricity because of its little or no harm in the environment. Italy is one of the pioneers of geothermal energy which dates back to as far as the 20th century when the world's first geothermal energy plant was constructed in Larderello. Today, geothermal energy is an integral part of Italy's strategy for transitioning to a sustainable energy system. By harnessing its geothermal potential, Italy is not only advancing its own energy transition but also contributing to the broader objectives of the **EU Green Deal**. The role of geothermal energy in Italy is vital for achieving carbon neutrality by 2050 and supporting the EU's vision of a sustainable and climate-neutral Europe.

The main reason why Italy is playing this lead role in geothermal energy expansion is partly because of the fact that, she is very blessed and endowed with the natural resources which actually supports this technology. Italy is one of those rare European countries that is conspicuously blessed with geothermal potentials in regions like Tuscany, Lazio, and Campania, where large geothermal fields are located due to the country's volcanic geology. It is equally important to note that, Italy is ranked among the top geothermal energy producers in Europe, with an installed capacity of approximately **900 MW**, supplying around **2%** of the country's electricity. Most of this capacity is concentrated in Tuscany, where large geothermal fields, such as Larderello, are located.

Till date, Enel Green Power is the only geo-electricity power producer in Italy. The gross electricity generated so far till date has reached about 6.3 billion kWh, Manzella et al, (2019).Electric generation from geothermal energy in Italy is at present confined in southern Tuscany, in the fields of Larderello, Travale-Radicondoli and Mt. Amiata. As to the future, favourable prospects for such generation may arise from deep drilling in these fields and in their surrounding areas, as well as from a few other continental and insular areas.

Italy's strategic investment in geothermal energy is a cornerstone of its energy transition, aligning closely with the **EU Green Deal's** objectives of decarbonization, energy security, and sustainable economic growth. By expanding geothermal power generation, enhancing geothermal heat applications, and fostering innovation, Italy is not only reducing its carbon footprint but also helping the EU meet its ambitious **climate neutrality goal by 2050**. Through its geothermal expertise, Italy is positioned as a leader in Europe's renewable energy transition, showcasing how geothermal energy can play a vital role in the continent's green future.

Hydro-Power Projects in Italy

While the use of atomic energy for industrial purposes across the world in general and Europe in particular is still a mystery and is equally under research, the need for the utilization of inexhaustible use of power generated from water is still a point of emphasis in Europe, Mutton (1951)[15].The main reason why Italy is investing much on hydro power projects is simply because it is less expensive and gives better results, Tutela (2020)[16]. Italy for a very long time has made remarkable use of hydro power resources to meet a significant portion of its electricity needs which has earned her the credentials of being one of the top hydro power users in Europe. Moreover, Italy's investment in hydropower infrastructure and modernization supports the broader goals of the **EU Green Deal**, which aims to make Europe carbon-neutral by 2050.

Geography is a very vital component that has favoured Italy into this venture. It is very important to note that, Italy's geography, particularly the **Alps** and the **Apennines**, offers ideal conditions for hydropower generation. The northern regions, especially Lombardy, Piedmont, Trentino-Sosucuth Tyrol, and Veneto, have substantial hydropower resources due to the presence of large rivers, lakes, and favourable elevation gradients. We cannot eliminate the presence of veritable dams available in Italy such as the Po and Adige rivers that are great potentials for power generation. Italy's installed hydropower capacity is around **22 GW**, with hydropower accounting for about **15-20%** of the country's total electricity generation Voith (2022). Italy ranks as the **second-largest hydropower producer in the EU** after France.

[15]Alice F. A. Mutton. (1951). Hydro-Electric Power in Western Europe. *The Geographical Journal*, *117*(3), 328–342. https://doi.org/10.2307/1791857

[16] http:www.freeriversitalia.eu

Italy's strategic use of hydropower is critical to its energy transition, aligning with the **EU Green Deal's** goals of decarbonization, energy security, and economic growth. Hydropower's ability to provide reliable, renewable electricity makes it a cornerstone of Italy's efforts to reduce carbon emissions and move toward a climate-neutral future. By modernizing existing infrastructure, expanding small-scale hydropower, and integrating hydropower with other renewable technologies, Italy is contributing significantly to the EU's vision of a **carbon-neutral Europe by 2050**.

Energy Efficiency Improvements

The best way to ensure a perfect reduction of energy consumption and emissions is by enhancing energy efficiency across all sectors which is at the helm of the EU's Green Deal. We shall observe that of France and the Netherlands.

France

Firms in France have allocated almost a tenth of their total of the EE improvements which is less than the US and EU average.

[17]It is worth noting that firms in France are more likely to invest in EE improvements when they implement advanced management practices European Investment Bank (2020).

Building Renovation Programs

France has implemented extensive programs to renovate residential and commercial buildings, improving insulation and reducing energy usage. These initiatives have led to significant reductions in heating and cooling demands. Building renovation is very important towards the achievement of the EU Green Deal because, buildings play a very significant contribution in energy consumption and carbon emissions. The construction and operation of buildings accounts for about **40% of energy use** and **36% of CO_2 emissions** in the EU. To meet the **EU's climate neutrality target by 2050**, comprehensive renovation of Europe's building stock is essential, focusing on improving energy efficiency, reducing emissions, and enhancing living standards.

France has a building innovation scheme which is called ADEME. Its function is to help finance projects, from research to implementation, in waste management, soil conservation, energy efficiency, renewable energy, air quality, raw material savings, noise abatement, circular energy transition, food waste abatement and building renovation programs, Forestier (2018). The Climate action plan of France was presented in July 2017, to set up a target for France to achieve the EU ambitious target of becoming carbon neutral by 2050. It took a bigger commitment for France to align with the Paris Agreement to become a reality for the people of France and Europe in general.

The building sector in France was never left out on this commitment. It is very important to note that, the building sector constitutes a priority sector of energy savings and equally of greenhouse-gas reductions, the scale of which justifies a great incentivisation and support efforts targeting households and building trades. To be precise, the National Low Carbon Strategy is targeting a 49% cut in greenhouse-gas emissions from buildings by 2030 and carbon neutrality by 2050, DEBP- Article 2a (2018).

It is very strange to note that according to records from the Building Performance Institute of Europe (BPIE), for the moment, about 97% of buildings in the EU which amounts to about 30 Billion m^2, is not is not considered as energy efficient, and 75% to 85% is most likely still to be in use by 2050, BPIE (2018), which is very disappointing to the supposed policy. Hence much needs to be done and the action begins right now.

[17]European Investment Bank. (2020). FRANCE – ENERGY EFFICIENCY. In *Going green: Who is investing in energy efficiency and why it matters* (pp. 51–54). European Investment Bank. http://www.jstor.org/stable/resrep52445.14

To conclude, France's building renovation programs are essential for reducing the energy consumption and carbon footprint of the country's building stock. These initiatives are aligned with the **EU Green Deal**, supporting Europe's long-term climate and energy goals. By focusing on deep renovations, energy poverty reduction, and green job creation, France is not only addressing its own climate challenges but also contributing to the broader EU vision of a **climate-neutral, sustainable Europe by 2050.**

Industrial Energy Efficiency

France has adopted a kind of energy efficient technologies and processes, which is eventually going to lower their carbon footprints.[18] Reduction in carbon dioxide emissions and energy consumptions are the two main objectives of the EU energy policy Flues et al (2013). France is very meticulous about its iron and steel industry which is a bone of contention in carbon emissions. The iron and steel sector in France has been chosen as an example for analyzing energy impacts in industries because of its high share in France's impacts in carbon emission in the industrial sector (EEA, 2013; Eurostat 2012). As far as Europe is concerned, France is one of the largest industrial economies. And being an example to the EGD, they have embarked on carbon emission projects at the industrial level and equally made greater attempts to increase industrial competitiveness.

In terms of industrial energy consumption in France, the industrial sector accounts for about for about 25% of the energy consumption in that country with energy-intensive industries such as steel, cement, chemicals, and aluminums being the largest consumers.[19]This is in conformity with the 2015 E3G launched initiative calling on G20 countries to make energy efficiency and infrastructure priority as a motivation to get funding Amon and Holmes (2015).

Despite the efforts made by France so far, it is worth noting that, energy efficiency industries faces very big challenges in decarbonizing. This is because this process requires very huge amount of energy especially within sectors that involves steel, cement and petro-chemicals. For this to be achieved, they require high technological innovation and investments.To counteract this, France has implemented quite a number of projects that will enhance this process which includes the National-Low Carbon Strategy (Stratégie Nationale Bas-Carbone, SNBC). This is France's major road map to attain carbon neutrality by 2050. Here, they have set out specific targets for reducing GHG emissions in various sectors including industry, agriculture and the enhancement of a circular economy. As a booster to this, industries have received lots of financial incentives for implementing energy efficiency measures such as, optimizing the production process and installing the energy management system. In the face of a twin EU energy challenges, in climate change and security of supply of efficient energy, energy efficiency is now considered a pillar in the economy of Europe in general and France in particular. [20]This has eventually enabled Europe and France to limit their dependency on fossil fuel, Boute (2013).

The Netherlands

Green Building Standards

[21]Green infrastructure programs are considered as planning opportunities to promote sustainable and resilient development**,** Schiappacasse, & Müller (2015). In the Netherlands, very stringent measures have been adopted to promote green buildings, promoting sustainable construction practices and energy efficient buildings. In Central Europe, the Netherlands is a pace setter in sustainable development and has embraced the challenge of embarking on the promotion of green buildings as a bid to meet up with the EGD vision 2050.

[18]Flues, F., Rübbelke, D., &Vögele, S. (2013). *Energy Efficiency and Industrial Output: The Case of the Iron and Steel Industry*. FondazioneEni Enrico Mattei (FEEM). http://www.jstor.org/stable/resrep00998

[19]AMON, A., & HOLMES, I. (2015). *WHAT IS HOLDING BACK ENERGY EFFICIENCY FINANCING IN G20 COUNTRIES?*E3G. http://www.jstor.org/stable/resrep17783

[20]BOUTE, A. (2013). Energy Efficiency as a New Paradigm of the European External Energy Policy: The Case of the EU–Russian Energy Dialogue. *Europe-Asia Studies*, *65*(6), 1021–1054. https://www.jstor.org/stable/26593823

[21]Schiappacasse, P., & Müller, B. (2015). Planning Green Infrastructure as a Source of Urban and Regional Resilience – Towards Institutional Challenges. *UrbaniIzziv*, *26*, S13–S24. http://www.jstor.org/stable/24920944

Buildings in the Netherlands comprises of about 30% of the nation's total energy consumption, Paulina (2024).[22]It has been quite challenging for the Dutch to sail through this rigorous exercise because a very large portion of buildings in the Netherlands are very old and energy inefficient but for those cities that underwent reconstruction after the war like Rotterdam. Again, energy poverty has eventually affected some regions in the country with lower income household. As a deterrent, the Netherlands has adopted a series of mix regulatory measures like financial incentives, technological innovations driving energy in both existing and newly constructed buildings. The Netherlands has developed strict energy efficiency regulations that go beyond EU-wide standards, accelerating the transition to **sustainable construction**. A good example is the Nearly Zero-Energy Buildings (NZEB) Standards which is very much in line with the EU's Energy Performance of Building Directives (EPBD). It is thanks to this that the Netherlands is properly positioned to lead the green building technology.

The Netherlands has positioned itself as a leader in green building initiatives, playing a crucial role in the EU's path to climate neutrality by 2050. Through stringent regulations, financial incentives, and innovations in sustainable construction, the Netherlands is reducing energy consumption and emissions from its building stock, contributing to the broader objectives of the **EU Green Deal**. These efforts not only help the Netherlands meet its own climate targets but also support the EU's vision of a **sustainable, climate-neutral, and just Europe by 2050**.

Areas Where the EU Needs to Strengthen Efforts to Combat Climate Change

Most importantly, we must bear in mind that, the EU Green Deal is Europe's roadmap for making the continent climate neutral by 2050. In as much as the continent have underscored and started implementing their objectives to attain the aforementioned goal, its imperative to note that, there are very significant gaps that are still to be covered before we can say for sure that the goal is achievable.

Accelerating the Transition to Renewable Energy

The development resources for grid energy are still very insufficient. Thus, they will have to invest in energy storage solution to address the problem of energy crisis.

Addressing Land Use and Agriculture

[23]The EU must increase and allocate more funding for research and development of renewable energy technologies such as solar, wind and hydrogen. The aim of the EU is to generate at least 45% of its energy from renewable sources by 2030. Even though they have made some progress but they have some member states that are very much lagging behind because not every member state buys the vision of the Green Deal equally. Amongst the respective EU states, some are very inconsistent with the level of progress while others are. The race for the energy transition into renewable energy is not working for all because some are still very reliant on the use of fossil fuel while others are seriously working hard towards green energy. Looking at the current case in Russia since the crisis began against Ukraine, 26 of the member states agreed to detach themselves from the Russian oil market but the prime minister of Hungary did refuse because he is still a very strong ally with President Putin.

Currently, 42% of the world's population depends on agriculture for its livelihood, and agriculture drives the economy of most developing countries. Therefore, human life on our planet depends on its sustainability, Azner et al, (2019). Despite the fact that the EU has done quite some work to address land use and agriculture, yet much still needs to be done because their efforts are still considered to be very weak. They need to promote sustainable land management practices such as agro forestry, reduce greenhouse gas emissions and equally promote biodiversity. The EU equally still needs to go a long way in forest restoration because much of it has

[22]Schiappacasse, P., & Müller, B. (2015). Planning Green Infrastructure as a Source of Urban and Regional Resilience – Towards Institutional Challenges. *UrbaniIzziv*, *26*, S13–S24. http://www.jstor.org/stable/24920944

[23]Aznar-Sánchez, J. A., Piquer-Rodríguez, M., Velasco-Muñoz, J. F., & Manzano-Agugliaro, F. (2019). Worldwide research trends on sustainable land use in agriculture. *Land use policy*, *87*, 104069.

been has been lost through wide spread of infrastructural development like the construction of roads, houses and industries. It would be difficult for these structures to be demolished; hence, they must create artificial forests where lands are still available and impose proper biodiversity programs. The goal of this should be for the purpose of enhancing forest sequestration.

RECOMMENDATIONS

In line with findings of this study, the researchers therefore put forward a number of recommendations, highlighting the need for;

The EU should ensure that they focus on ecosystem restoration and biodiversity conservation.

Economic policy reforms through adequate funding which is a very vital tool for the large scale investment needed for the transition into green energy.

Strengthening international cooperation as a catalyst for the EU Green Deal's success.

Promotion of public awareness through adequate sensitization within the EU zone.

Circular economy and waste reduction through banning of single use plastics and promoting recyclable materials.

Just transition and job creation through retraining workers in fossil fuel industries for green jobs.

CONCLUSION

To achieve the ambitious climate goals of the European Green Deal by 2050, the EU must strengthen its efforts in several key areas. Accelerating renewable energy deployment, improving energy efficiency, promoting sustainable agriculture, and enhancing climate adaptation measures are critical. In addition, stronger carbon pricing, faster fossil fuel phase-outs, increased green innovation, and robust biodiversity conservation efforts are essential to ensure that the EU meets its climate targets and transitions to a sustainable, low-carbon future.

BIBLIOGRAPHY

1. Amon, A., & Holmes, I. (2015). What is holding back energy efficiency financing in G20 countries? E3G. http://www.jstor.org/stable/resrep17783
2. Aznar-Sánchez, J. A., Piquer-Rodríguez, M., Velasco-Muñoz, J. F., & Manzano-Agugliaro, F. (2019). Worldwide research trends on sustainable land use in agriculture. Land Use Policy, 87, 104069.
3. Barcelona, R. G. (2012). Wind power deployment—Why Spain succeeded. Renewable Energy Law and Policy Review, 3(2), 146–149. http://www.jstor.org/stable/24324743
4. Böhringer, C., Landis, F., & Reaños, M. A. T. (2017). Economic impacts of renewable energy promotion in Germany. The Energy Journal, 38, 189–209. http://www.jstor.org/stable/26294157
5. Boute, A. (2013). Energy efficiency as a new paradigm of the European external energy policy: The case of the EU–Russian energy dialogue. Europe-Asia Studies, 65(6), 1021–1054. https://www.jstor.org/stable/26593823
6. European Investment Bank. (2020). France – Energy efficiency. In Going green: Who is investing in energy efficiency and why it matters (pp. 51–54). European Investment Bank. http://www.jstor.org/stable/resrep52445.14
7. Flues, F., Rübbelke, D., & Vögele, S. (2013). Energy efficiency and industrial output: The case of the iron and steel industry. Fondazione Eni Enrico Mattei (FEEM). http://www.jstor.org/stable/resrep00998
8. Gavard, C. (2015). Carbon price and wind power support in Denmark. Fondazione Eni Enrico Mattei (FEEM). http://www.jstor.org/stable/resrep01122

9. Hoon, L., & Pype, K. (2022). European Green Deal: Context, goals, and internal structure. In How can the EU deliver a socially just Green Deal?: Looking at the European Green Deal through a just transition lens (pp. 7–10). Open Society Foundations. http://www.jstor.org/stable/resrep42959.5
10. Ibrahim, F. (1993). A reassessment of the human dimension of desertification. GeoJournal, 31(1), 5–10. http://www.jstor.org/stable/41145900
11. Kilic, F. C. (2016). Geothermal energy in Turkey. Energy & Environment, 27(3–4), 360–376. https://www.jstor.org/stable/90006618
12. Kovats, S. R. (1999). Climate change and human health in Europe. BMJ Publishing Group Ltd.
13. Mutton, A. F. A. (1951). Hydro-electric power in Western Europe. The Geographical Journal, 117(3), 328–342. https://doi.org/10.2307/1791857
14. Nazakat, S., Cunningham, T., Hedberg, A., & Yao, L. (2018). Germany's energy transformation: It's not easy being green. In Assessing the Energiewende: An international expert review (pp. 16–17). Konrad Adenauer Stiftung. http://www.jstor.org/stable/resrep17543.6
15. Rüdiger, M. (2014). The 1973 oil crisis and the designing of a Danish energy policy. Historical Social Research / Historische Sozialforschung, 39(4 (150)), 94–112. http://www.jstor.org/stable/24145529
16. Rüdiger, M. (2016). Designing the energy future: Two narratives on energy planning in Denmark, 1973–1990. In A. Beltran, L. Laborie, P. Lanthier, & S. Le Gallic (Eds.), Electric Worlds / Mondes Électriques: Creations, circulations, tensions, transitions (19th–21st C.) (pp. 481–496). Peter Lang AG. http://www.jstor.org/stable/j.ctv9hj6hk.24
17. Schleicher-Tappeser, R. (2011). New challenges for renewable energy in Germany. ReNew: Technology for a Sustainable Future, 115, 70–77. https://www.jstor.org/stable/renetechsustfutu.115.70
18. Schiappacasse, P., & Müller, B. (2015). Planning green infrastructure as a source of urban and regional resilience – Towards institutional challenges. Urbani Izziv, 26, S13–S24. http://www.jstor.org/stable/24920944
19. Solomon, C. S. (2009). Climate change: The need to consider human forcings besides greenhouse gases. Institute of Washington, D.C.
20. Van Kooten, G. C. (2016). The economics of wind power. Annual Review of Resource Economics, 8, 181–205. https://www.jstor.org/stable/26773362
21. Verstraete, M. M., & Schwartz, S. A. (1991). Desertification and global change. Vegetatio, 91(1/2), 3–13. http://www.jstor.org/stable/20038708
22. Zeman, M., Melskens, J., Semanová, M., & Voderadská, Z. (2007). Photovoltaic solar energy: Key to a sustainable energy future. International Issues & Slovak Foreign Policy Affairs, 16(4), 36–52. https://www.jstor.org/stable/26591030