RePowerEU: Sustainability Policies For Europe and Greece

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Intro

The globe is currently experiencing a severe energy shortage, with nations all over the world being impacted by extremely high and unstable prices, notably for fossil fuels. The Russian Federation, which is the largest exporter of natural gas and the second largest exporter of oil, through its military assault against Ukraine has also severely disturbed the global energy grid. According to the statement by the President of the European Parliament, "We are facing an extraordinary situation, not only because Russia is an unreliable supplier, as we have witnessed over the last days, weeks, months, but also because Russia is actively manipulating the gas market". In the pursuit of achieving the EU's goal to reduce net greenhouse gas emissions by at least 55% by 2030 and climate neutrality by 2050, the European Parliament introduced the "Fit for 55" package. The said package consists of a number of suggestions for updating EU law and launching initiatives to ensure that EU policies are in line with the established climate goals. This request is also granted under the REPowerEU plan among others. In order to rapidly reduce dependence on Russian fossil fuels by accelerating the green transition, RePowerEU builds on the "Fit for 55 package" and completes the efforts on energy security of supply and storage.

Thesis

Throughout this research paper we will be exploring and investigating the effectiveness of the REpowerEU and other sustainability policies in the EU and Greece and their aims for the use of renewable energy sources and more specifically solar, wind and biomethane. In order to minimise greenhouse gas emissions, encourage sustainable development, and raise the proportion of renewable energy in member states' overall energy consumption, the EU has set ambitious goals. The REPowerEU program was introduced in the EU and Greece in 2022 with the goal of accelerating investments in renewable energy projects as the member-states move towards low-carbon economies. The program's

progress toward achieving these aims will be examined in this paper, together with the difficulties encountered and the political actions needed to resolve them. The analysis will be supported by a thorough analysis of data and literature. The results of this research will offer insightful information about how policy measures have helped Greece promote renewable energy and will have wider ramifications for other EU member states dealing with comparable issues.

Solar

The European Union (EU) has set a goal to become climate neutral by 2050, and solar energy is a significant component in achieving this ambition. In the past, solar energy had not been exploited to its full potential. For example, in 2012, solar energy in Europe had a total capacity of 17.2 gigawatts (GW), which was a decline from the previous year (2011) of 22.4 GW. This indicates that investment in renewable energy was not a priority and thus not enough. By the end of 2020, the EU had installed 136 GW of solar PV. This helped generate around 5% of the total electricity in Europe.

Today, the EU Solar Energy Strategy's aim is to accelerate the deployment of solar energy in the European Union. The strategy aims to bring online 320 GW of solar photovoltaic by 2025 and almost 600 GW by 2030. The benefits of such expansion will not only reduce dependence on Russia's fuels, but also make Europe a more sustainable region and energy secure. The European Commision will invest more than EUR 26 billion between now and 2027 to fund this project, most of which will be private but subsidized by public funding including EU funds.

In 2020, Greece developed (nearly) 1 GW of solar energy. The country managed to construct 913 MW of new Photovoltaic systems and managed to connect its largest island, Crete, to the mainland power network through what is believed to be the world's longest subsea AC cable (174 km). This project will have a substantial impact in reducing diesel-fired electricity. The project cost EUR 397 million and was financed by domestic and European funds. The interconnector will meet a third of Crete's energy demand and there are now plans for a second, larger interconnector to be built, to be completed in 2023. It has the potential to save around EUR 400 million on energy bills per year.

A substantial percentage of the solar power will be generated by photovoltaic rooftops, which are estimated to supply up to 25% of the EU's electricity consumption. The European Union's policies have helped reduce Photovoltaic costs by around 82% over the last decade, making it a very affordable and favorable source of energy. The EU is now trying to pass legislation that makes the

installation of solar rooftops compulsory for all new public buildings that have a useful are larger than 250 square meters (about the area of a tennis court) by 2026, and for all existing public buildings with useful are larger than 250 square meters by 2027; this will apply for all new residential buildings by 2029. PV rooftops are quick and easy to install and can therefore result in huge contributions of renewable energy supply. These installations are possible on residential, public, and industrial buildings which can protect consumers from high energy prices and the environment, as well as create new job opportunities, new businesses, and model start-ups.

For instance, Greece has opened the largest double-sided solar farm in Europe, which was built by Greece's largest oil refiner Hellenic Petroleum. The 204 MW solar park was built in the Northern Greek town of Kozani, with the aim of accelerating green energy and ending reliance on Russian gas by 2027. To help achieve this, Greece aims to almost double its installed capacity from renewables to about 19 GW by 2030. The park will help supply power to 75,000 households, helping supply cheap and clean energy, as well as connect to the country's power grid.

Furthermore, floating Photovoltaic (FPV) solutions mean that surface water can be used for solar generation. Offshore solar installations can offer exciting potential for expansion. Further innovation efforts will help make floating PV more durable in the marine environment and help reduce maintenance costs. This may suggest that new hybrid energy systems can co-generate solar and hydroelectricity achieving synergies and resulting in many benefits. Solar electricity can be generated during the day complementing the hydroelectricity generated during the night.

In addition to this, Greek construction company and energy provider GEK Terna has announced that they will be investing EUR 170 million in the building of three floating PV power plants with a combined capacity of 265 MW at three different water reservoirs in Western Greece. The company said the three projects were part of its plan to deploy around 3 GW of renewable energy capacity over the next five years. Of this capacity, around 1.8 GW is already in operation, under construction or ready for construction in Greece, the US, Central and Eastern Europe.

Since Greece has been ranked second (worldwide) in solar energy production potential with 17.5% just behind Spain at 19%, this can suggest that the use of solar energy in the European region can help reinforce and help regain industrial leadership. The EU can significantly expand its manufacturing base due to its

highly competitive and innovative environment and on top of all, keeping their carbon emissions much lower than other industrial countries.

Wind

Wind is a clean, free and abundant energy source used to generate electricity. Wind turbines work on a simple principle: the wind makes their blades spin, creating kinetic energy. A generator then converts this kinetic energy into electrical energy. The amount of wind energy that was used in the 1990s depended on various factors such as the availability of wind resources, the installed wind capacity, and the electricity demand in different regions. According to the International Energy Agency (IEA), the total electricity generation from wind power worldwide in 1990 was only around 2.5 terawatt-hours (TWh). By 1999, this figure had increased to around 20 TWh. However, wind power still accounted for only a very small share of global electricity generation, estimated at less than 0.1% in 1999.The use of wind energy grew significantly in the 2000s, as many countries around the world began to increase their investments in wind power and establish policies to promote renewable energy. According to data from the IEA, global electricity generation from wind power increased from around 20 TWh in 1999 to around 260 TWh in 2009, representing an average annual growth rate of over 25% during the decade. The 2010s were a decade of continued growth and expansion for wind energy, as many countries around the world increased their investments in renewable energy. According to data from the IEA, global electricity generation from wind power increased from around 260 TWh in 2009 to around 1,200 TWh in 2019, representing an average annual growth rate of over 15% during the decade.

To strengthen Europe's energy security, REPowerEU aims for wind energy to grow from 190 GW today to at least 480 GW in 2030. This requires the simplification of permitting and concerted action to strengthen Europe's wind energy supply chain. It also requires massive investments in offshore grid infrastructure, port facilities and vessels. On 18 May 2022 European Commission President Ursula von der Leyen participated in an Offshore Wind Summit alongside other European leaders from Germany, Denmark, Belgium and Netherlands. In a joint declaration they pledged to raise the combined North Sea offshore wind capacity of the four countries to 150 GW by 2050. To reach climate neutrality by 2050 offshore wind needs to grow from 15 GW in the EU today to 300 GW by 2050. With the signature of the Esbjerg Declaration, Belgium, Denmark, Germany and the Netherlands committed to delivering half of these 300 GW in their parts of the North Sea alone.

There are several current projects in Greece that focus on the use of wind energy, as well as several EU-funded projects that aim to support the development and deployment of wind power in the country. For example, Kafireas Wind Farm is a large-scale wind power project currently under construction in central Greece. Once completed, the wind farm will have a total capacity of 154 MW, making it one of the largest wind power projects in the country. A second example is Naxos Wind Power Project, another large-scale wind power project currently under development in Greece. The project aims to install a total of 22 wind turbines on the island of Naxos, with a total capacity of 66 MW.

Overall, Greece has 4.5 GW of wind energy installed today, all onshore, covering more than 18% of its electricity demand. But the potential for wind energy in Greece is much bigger, especially for offshore wind. Greece's National Energy and Climate Plan (NECP) envisages a total of 7 GW of wind energy by 2023.

Biomethane

In the context of the support for the development of the REPowerEU plan, the Commission has also proposed an action plan to produce 35 bcm of biomethane annually by 2030, as sustainable biogas and biomethane by industry could save up to 35 bcm of natural gas until 2030, in addition to what is anticipated under the Fit for 55 proposals. In heating, electrical, and industrial applications, biomethane acts as a simple and direct replacement for natural gas. For instance, in Europe during 2014, there were over 360 facilities for the generation of biomethane, which represents a 23% growth from 2013, while in 2011, around 18 billion kWh of power were produced from biogas.

More specifically, the aforementioned action plan to increase biomethane production includes investments totaling EUR 37 billion and the formation of a cooperation between industrial biogas and biomethane to promote the value chain for renewable gases. In order to phase out the imports of Russian fossil fuels, which are already costing European taxpayers almost EUR 100 billion annually, additional investments totaling EUR 210 billion are required until 2027. A possibility for Member States to deliver a portion of the European Agricultural Fund for Rural Development via the Recovery and Resilience Facility is also included in the Commission's proposal for REPowerEU chapters in recovery and resilience plans. This provides the Member States with the opportunity to suggest specific changes and investments for the benefit of farmers that may help to boost the production of sustainable biomethane. Furthermore, it should be mentioned that the

Recovery and Resilience Facility, which provides additional EU funding, is at the center of the REPowerEU Plan's execution. In order to direct investments toward REPowerEU priorities and implement the essential reforms, Member States should include a REPowerEU chapter in their Recovery and Resilience Plans (RRP).

In accordance with the action plan, the Commission also created an industrial partnership for the production of biogas and biomethane by, among others, working with Member States to develop national policies for fuels, fostering international cooperation, partnering with national governments and gas network providers to cut costs, encouraging international cooperation and funding more accessible. Additionally, the Commission's proposal for REPowerEU chapters in RRPs gives Member States the chance to suggest specific reforms and investments that will benefit farmers and lead to a rise in the production of sustainable biomethane.

The European Union is already striving to establish a partnership with Ukraine on renewable gases, such as biomethane and hydrogen. Energy efficiency, renewable energy, renewable hydrogen and biomethane are prioritized. This process will receive technical and financial support from the European Union. By accelerating the transition to sustainable energy and adapting the economy and infrastructure to new energy sources and suppliers, the REPowerEU Plan will drastically reduce the reliance on Russian fossil fuels.

In the case of Greece, the objective of the Greek gas grid operator, known as "DESFA," and its Bulgarian counterpart, "Bulgartransgaz," is to embark on a significant upgrade of their individual gas infrastructures. Their aim is to enhance their capabilities to transmit renewable gas, thereby facilitating the integration of sustainable energy sources into the gas grid. This ambitious endeavor focuses primarily on two types of renewable gases: hydrogen produced using renewable energy sources and biomethane derived from organic waste such as human or animal sewage, as well as food waste. By incorporating renewable gas into their existing infrastructure, DESFA and Bulgartransgaz aspire to contribute to the transition towards a greener and more sustainable energy sector. Hydrogen, generated through electrolysis powered by renewable energy, can serve as an efficient and clean alternative to conventional fossil fuels. Biomethane, on the other hand, presents an opportunity to utilize organic waste materials, thereby reducing environmental pollution while simultaneously producing a valuable energy source. Through this collaborative effort, Greece and Bulgaria aim to establish themselves as leaders in renewable gas transmission, fostering a greener and more environmentally conscious energy landscape in the region.

Conclusion

Overall, through the various policies including REPowerEU, the EU has been successful in improving energy efficiency in many countries as well as making energy bills more affordable and creating numerous job opportunities in energy industries. The Russian Federation's invasion of Ukraine and subsequent sanctions proved that energy dependence can have adverse effects, and the EU acted swiftly in promoting measures that reduce this dependence.

To continue growing and becoming less dependent on energy generated from fossil fuels (coal, oil ect.), Greece has taken part in numerous partnerships and alliances, such as the EU clean Hydrogen Alliance, which aims to support the development of a hydrogen economy in Europe. Another opportunity for Greece's economy is the Mediterranean Solar Plan, which aims to increase the use of photovoltaic solar panels to exploit the potential solar energy that can be generated by Mediterranean countries like Greece. This alliance has already helped with the funding of solar projects before and will continue to be significant in supporting the Greek economy to reduce its carbon footprint. There are many other alliances and projects that Greece can take part in, such as: European Union's Horizon 2020 (helps fund renewable energy projects), International Solar alliance, the International Renewable Energy Agency, and the United Nations Framework Convention on Climate Change. Each of these projects and alliances offer exciting potential regarding the transition that Greece can make regarding the reduction in carbon emissions and becoming a completely clean and energy secure country.

References

European Commission, *COMMISSION STAFF WORKING DOCUMENT : IMPLEMENTING THE REPOWER EU ACTION PLAN: INVESTMENT NEEDS, HYDROGEN ACCELERATOR AND ACHIEVING THE BIO-METHANE TARGETS*, 2022,link: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022SC0230

European Commission, *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGION: EU Solar Energy Strategy*, 2022, link: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0221

European Commission, *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS: REPowerEU Plan*, 2022, link: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0230

European Commission, *Offshore renewable energy,* 2023, link: https://energy.ec.europa.eu/topics/renewable-energy/offshore-renewable-energy_en

European Commission, *REPowerEU: A plan to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition*, 2022, link: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3131

Wind Europe, *Offshore Wind Energy*, 2023, link: https://windeurope.org/policy/topics/offshore-wind-energy/