

THE ENERGY SITUATION OF THE EU: CHALLENGES AND PERSPECTIVES

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Abstract: *The paper addresses the energy situation of the EU, as well as elucidates some possibilities for overcoming the energy crisis that has gripped the whole of Europe. The study focuses on the assessment of the EU’s energy efficiency strategy as well as the review of the EU’s strategic priorities in overcoming the energy crisis. Thus, the paper aims at the evaluation of the dynamics of electricity consumption in the EU countries, as well as the elucidation of the share of renewable energy in each of the EU countries. At the same time, special attention was directed to elucidating the dynamics of greenhouse gas emissions at the EU level as well as its sources. Another side of the research was aimed at identifying the trend of the evolution of electricity prices in the EU states, but also the measures that were taken by the states in order to provide electricity. The research methodology focused on the use of the following methods: analysis, synthesis, induction, deduction, abduction, documentation, comparative analysis, scientific abstraction. In conclusion, we can note that the EU countries faced an unprecedented crisis, which disrupted the entire activity of the member states. The crisis changed the priorities, reshaped the electricity insurance systems, redefined the policies of the member states, a fact that allowed them to adapt quickly and identify solutions to overcome the crisis. Thus, we can note that increasing investments in alternative energy sources, concluding international agreements to increase energy efficiency, represent only a few solutions that can help member states overcome the EU’s energy crisis.*

Key Words: *energy system, energy crisis, electricity, EU, energy efficiency, energy efficiency policy.*

JEL Classification: *Q40, Q42, Q47.*

1. Introduction

From a macroeconomic point of view, the energy sector represents one of the most important sectors of the European Union, given the fact that it ensures the efficient functioning of the other branches of the national economy. Studying the developments on the energy market, we notice that, in recent years, serious problems have emerged with which the economy of the European Union is confronting.

The global financial crisis, the pandemic crisis, the war in Ukraine, have had a negative impact and have amplified the energy supply problems of the European Union, inducing an upheaval in the energy supply policy of countries all over the world.

As the European Union is a country dependent on imported energy resources, this has a negative impact and accentuates the problems of managing the EU’s energy system. In recent years, the situation in the EU’s energy sector has worsened even more, due to deficiencies in the country’s supply of energy resources.

The dependence on the import of energy resources creates serious problems in the energy sector of the EU and reduces the possibilities of providing energy resources for the economy of the member states. On the other hand, due to the low share of domestic energy resources and the dependence on imported energy resources, major problems are accentuated in ensuring the continuity of the supply of energy resources of the EU member states.

2. Material and method

The general objective of the research is to analyse the energy situation of the EU in the context of the current energy crisis.

The adjacent objectives of the research are:

1. Researching the content of the EU energy efficiency strategy;

2. Elucidating the dynamics of electricity consumption and prices of EU member states;
3. Evaluation of the dynamics of the share of energy from renewable sources in total energy produced in the EU member states;
4. Identifying the dynamics of gas emissions and its sources in the EU member states.

The present study places at the epicentre of the research, as a fundamental method, the content analysis, through the lens of which the international reports of the EU, the energy efficiency strategy, which helped us to elucidate the evolution of electricity consumption in the EU member states. We aimed at identifying the dynamics of greenhouse gas emissions, as well as the sources of these emissions in each EU member state. At the same time, the researched documentation allowed us to score the share of the energy from renewable sources from the total energy in the EU member states.

The comparative analysis allowed us to evaluate the dynamics of the indicators proposed for analysis, to identify the evolution trend, in different countries, as well as to draw relevant conclusions as a result of the research carried out.

3. The content of the EU energy efficiency strategy

One of the priorities of the EU Energy Strategy is to increase the energy efficiency, mainly by reducing the EU's overall energy consumption and by managing energy in an efficient way. Improving the energy efficiency helps achieve energy savings, protect the environment, mitigate the climate change and reduce the EU's dependence on external oil and gas suppliers.

In tangible terms, lower energy consumption means reducing primary energy consumption, which is the total domestic energy demand, and final energy consumption, which is the energy in fact consumed by end users, not including what the energy sector needs in itself, as well as its transformation and distribution.

In 2020, the primary energy consumption fell to its lowest level since full data records were available (1,236 million tonnes of oil equivalent (Mtoe)). This is 5.8% below the EU efficiency target for 2020 (not more than 1 312 Mtoe primary energy consumption) and 9.6% above the EU 2030 target (not more than 1 128 Mtoe). The final energy consumption also fell significantly (to 907 Mtoe), 5.4% below the 2020 target (not more than 959 Mtoe final energy consumption) and 7.2% above the 2030 target (not more than 846 Mtoe).

Analysing the energy efficiency trend over the last ten years at the EU level, primary energy consumption decreased steadily from 2011 to 2014, then increased until 2017, before decreasing again in 2018 and 2019. Final energy consumption, has also decreased continuously from 2010 in order to achieve its closest level, its target of 2014, then increased until 2018 to decrease again in 2019.

Between 2019 and 2020, the primary and the final energy consumption have registered significant drops, largely due to restrictions related to COVID-19. Primary consumption decreased by 8.7%, a historic decrease, and the final energy consumption by 8.0%, a major decrease since 2009.

Compared to 2010, primary energy consumption decreased in 25 Member States by 20% or more in Greece (-28%), Denmark (-23%), Estonia (-22%), Italy (-21%) and Malta (-20%). Final energy consumption fell in 21 Member States, with the largest decreases in Greece (-25%) and Italy (-20%) (Figure 1.) (EUROSTAT, 2022).

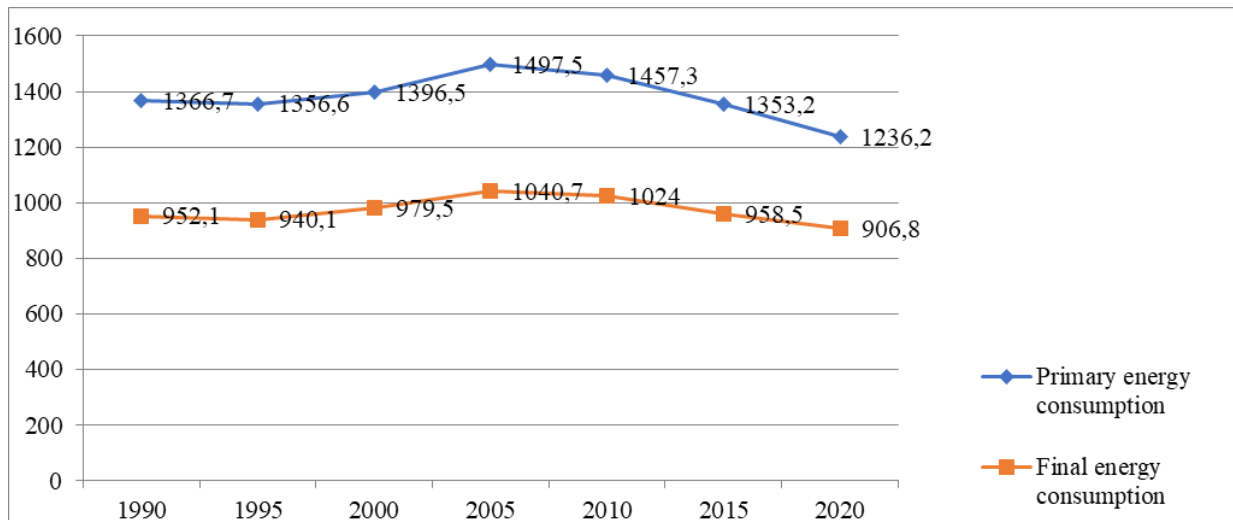


Figure 1. Electricity consumption in the EU countries, 1990-2020, Mtonnes

Source: Eurostat, <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-4b.html?lang=en>

4. Share of energy from renewable sources in the EU states

In the last 10 years, there has been a phenomenal increase in renewable energy sources at the EU level, which contributes perfectly to the increase in energy efficiency. At the EU level, the share of renewable energy sources in energy consumption has steadily increased from 9.6% in 2004 to 22.1% in 2020, thus exceeding the EU target of 20% renewables by 2020, the new EU target for 2030 is 32% (EUROSTAT, 2022).

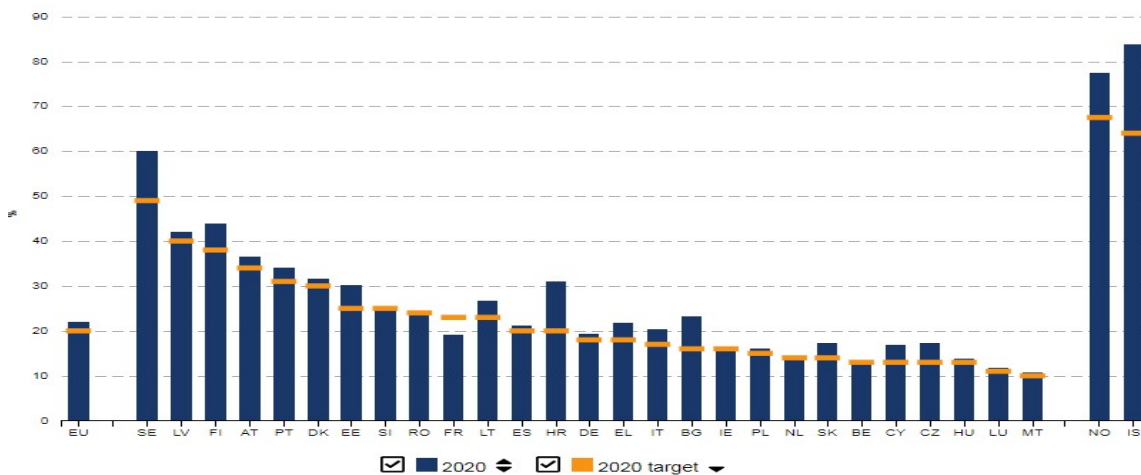


Figure 2. Share of energy from renewable sources in the EU states, 2020

Sursa: Eurostat, <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-4c.html?lang=en>

Of the member states, Sweden had the highest share of renewables (60.1% of energy consumption) in 2020, followed by Finland (43.8%) and Latvia (42.1%). Whereas, Malta (10.7%), Luxembourg (11.7%) and Belgium (13.0%) recorded the lowest shares of renewable

sources in energy consumption. The differences come from the variations in the endowment with natural resources, especially in the potential to build hydropower plants and in the availability of the biomass. All Member States increased their share of energy from renewable sources between 2004 and 2020, with seventeen doubling their share.

5. Reducing gas emissions - a decisive factor in achieving sustainability in the EU

Climate change is a threat to sustainable development. After years of extensive research, the scientific community agrees that human-made greenhouse gas (GHG) emissions are the dominant cause of the increase in the earth's average temperature over the past 250 years. Human-made GHG emissions are primarily a by-product of burning fuels in power plants, cars or homes. Agriculture is also a source of GHG emissions.

EU greenhouse gas emissions fell steadily from 2010 to 2014, rose slightly between 2015 and 2017, and fell again in 2018. In 2019, emissions fell by almost 4% compared to 2018, the biggest drop since 2009.

In 2019, EU GHG emissions were more than 1 billion tonnes lower than in 1990. This corresponds to a 24% reduction from 1990 levels, which is more than the EU's 20% reduction target by 2020. The new objective for 2030 represents a 55% reduction in GHG emissions compared to 1990 (EUROSTAT, 2022).

GHG emissions were below 1990 levels in 22 Member States. The biggest reductions, over 50%, were registered in Estonia, Romania, Lithuania and Latvia (Figure 3.).

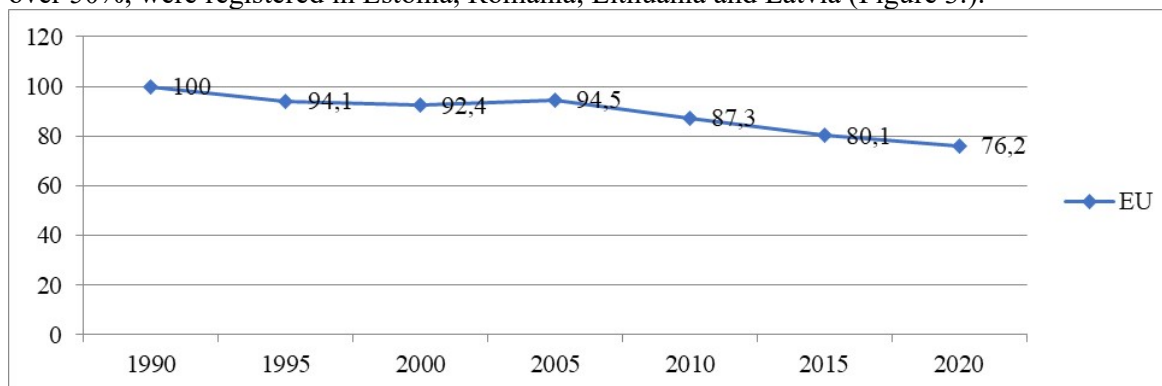


Figure 3. Greenhouse gas emissions at the EU level, 2020

Source: Eurostat, <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-4a.html?lang=en>

Analysing the sources of greenhouse gas emissions in the EU, we can mention that in 2019, energy-producing industries, the burning of fuels by users and the transport sector, all had the same share in total greenhouse gas emissions (25.8% each). Compared to 1990, the share decreased for all sectors except transportation, where it increased from 14.8% in 1990 to 25.8% in 2019, and agriculture, whose share increased slightly from 9.9% to 10.3% (Figure4.).

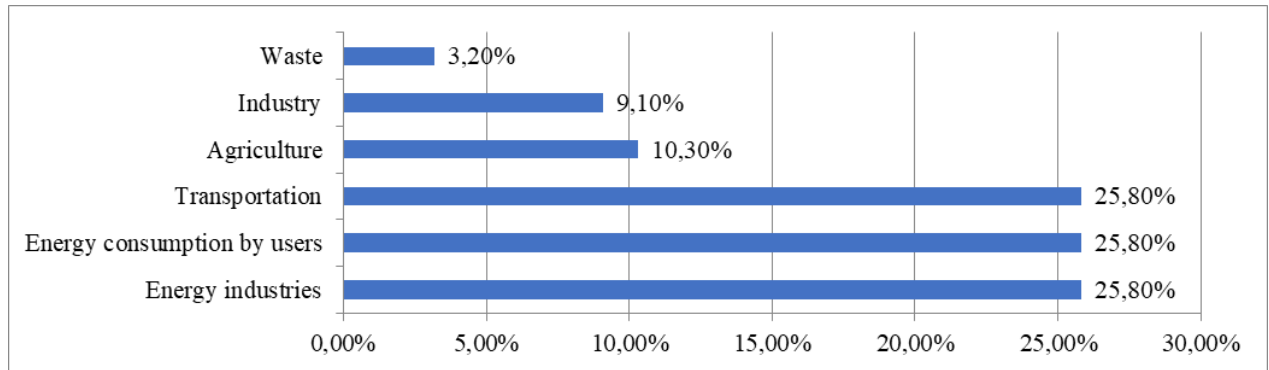


Figure 4. Sources of greenhouse gas emissions (GHG) in the EU, 2020

Sursa: Eurostat, <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-4a.html?lang=en>

6. Dynamics of electricity and natural gas prices in EU member states

Researching the electricity prices in the EU in 2020, we can see that the highest household electricity prices are in Denmark and Germany. In order to compare the electricity and gas prices between Member States, national prices have been converted into euros.

In the second half of 2021, the household electricity prices were the highest in Denmark (€34 per 100 kWh), Germany (€32 per 100 kWh), Belgium and Ireland (both €30 per 100 kWh), while the lowest prices were recorded in Hungary (10 EUR for 100 kWh) and Bulgaria (11 EUR for 100 kWh). Taxes accounted for more than half of the price of electricity in Denmark and Germany, while their share was the lowest in the Netherlands, where the value was negative (-3%), followed by almost 6% in Malta, 17% in Bulgaria and 19% in Ireland (Figure 5.) (EUROSTAT, 2022).

Natural gas prices for household consumers were highest in Sweden (€19 per 100 kWh), Denmark (€12 per 100 kWh), the Netherlands and Spain (both €11 per 100 kWh) and lowest in Hungary (€3 per 100 kWh), Croatia, Lithuania, Slovakia and Latvia (€4 per 100 kWh each). The share of taxes and duties in the price of gas was the highest in the Netherlands (58%) and the lowest in Greece (6%).

Gas prices for non-household consumers are highest in Finland, Sweden and Denmark. For non-household consumers, electricity prices in the second half of 2021 ranged from €22 per 100 kWh in Greece to €8 per 100 kWh in Finland.

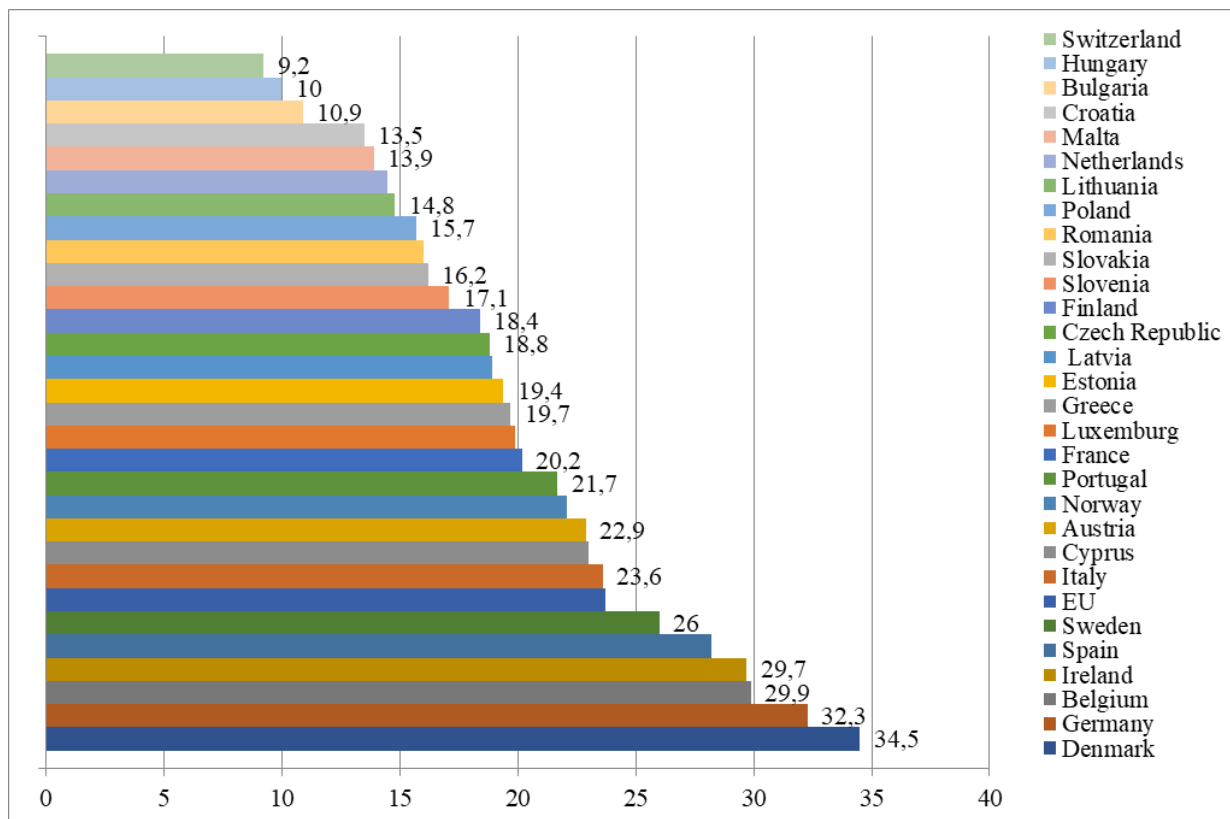


Figure 5. Electricity prices in EU countries, 2020

Source: Eurostat, <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-3c.html?lang=en>

Natural gas prices for non-household consumers in the second half of 2021 were highest in Finland (€10 per 100 kWh), Sweden and Denmark (€8 per 100 kWh) and lowest in the Czech Republic, Slovakia, Belgium, Portugal and Spain (€3 for 100 kWh each).

7. Conclusions

Following the methodological approach carried out in the present study, we can reiterate the following conclusions:

1. The European Union has effective strategies designed to contribute to increasing energy efficiency, it has well-defined strategic goals, where each member state is responsible for readjusting its national policies in order to achieve these strategic goals.

2. The EU sets concrete strategic priorities in terms of energy efficiency, where it aims to reduce gas emissions by 40% by 2030, as well as to increase energy efficiency in EU member states by 30%, as well as to increase the share of energy from renewable sources with 27%. Thus, we believe that the predetermined objectives of the EU for the year 2030 will be achieved, especially now that the EU is in the situation of searching for new sources of electricity supply, and certainly by 2030 within the EU states the share of energy produced will increase from renewable sources, being more ecological and cheaper. This will positively influence the European Union's electricity supply, but will also increase the energy efficiency of the member states.

3. Between 2019 and 2020, primary and final energy consumption saw significant declines, largely due to restrictions related to COVID-19. Primary consumption decreased by 8.7%, a historic decrease, and final energy consumption by 8.0%, the largest decrease since 2009.

4. At EU level, the share of renewable energy sources in energy consumption has steadily increased from 9.6% in 2004 to 22.1% in 2020, thus exceeding the EU target of 20% renewables by 2020, the new EU target for 2030 is 32%. Of the member states, Sweden has the highest share of renewables (60.1% of energy consumption) in 2020, followed by Finland (43.8%) and Latvia (42.1%). Whereas, Malta (10.7%), Luxembourg (11.7%) and Belgium (13.0%) recorded the lowest shares of renewable sources in energy consumption.

5. In 2019, GHG emissions in EU Member States were more than 1 billion tonnes lower than in 1990. This corresponds to a 24% reduction from 1990 levels, and exceeds the EU's 20% reduction target by 2020. The new objective for 2030 represents a 55% reduction in GHG emissions compared to 1990.

6. Analysing the sources of greenhouse gas emissions in the EU, we can mention that in 2019, energy-producing industries, the burning of fuels by users and the transport sector, all had the same share in total greenhouse gas emissions (25.8% each).

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