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THE ENERGY STRATEGY AND ENERGY POLICY OF THE EUROPEAN UNION[3]

Energy integration is considered to play a key role in the successful development of the European Union. It is assumed that purely market-based mechanisms in this sector, according to the neo-liberal model, can secure a constant supply at low prices. This is the basis of the Union's energy policy, launched by the European Commission (EC). The main goal of this paper is to examine the adequacy of this model and the extent to which the energy policy succeeds in achieving its objectives. There is a difficult combination of technological, economic and political factors expressed in the Union's energy mix. In particular, the document examines the gap between neo-liberal free-market postulates and the practices of modern protectionism, assessing the sustainability of the EU's energy strategy and policy, which often avoid taking efficiency into account. Significant attention is paid to the link between energy and national security, as well as the politically justified intervention of the European Commission in energy projects related to energy supplies for the whole Union. Our research is based on statistics for a long period of time, allowing a comparison between stated intentions and achieved results. Our results stress on the direct link between energy, foreign policy and national security. This link, the cause of the unsatisfactory results, casts doubt on the full integration of the industry and contradicts the views of the Commission.
Keywords: energy strategy; energy efficiency; "Green Deal"; European Commission; common energy policy; electricity market; nuclear energy, neoliberal model; protectionism
JEL: F52; Q42

1. Introduction

The issue of the European Union's energy strategy and policy can only be understood in the general context of integration. Integration itself can be analyzed not through the usual integration theories depending on the political situation, but only if it is placed on a solid formal basis. This article analyzes the production and distribution of electricity – with about

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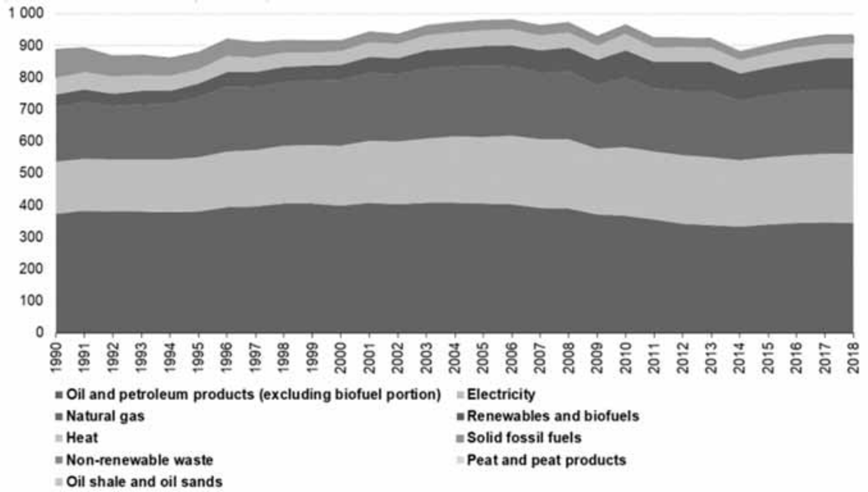
a quarter in the total volume of final energy consumption. (Equal with gas). Consumption of oil fluctuates around a third of the whole.

Figure 1

Energy consumption by fuel, EU-27, 1990-2018, mill. tonnes of oil equivalent



Source: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Final_energy_consumption_by_fuel,_EU-27,_1990-2018_(million_tonnes_of_oil_equivalent).png.

As the Union's energy strategy "Green Deal", proposed by the European Commission, suggests a total restriction of fossil fuels, there are expected significant and politically motivated changes in these ratios. The consumption of oil should be reduced, while the consumption of gas could increase – both for heating and in electricity generation. The electricity consumption should also increase in transport, while diminishing for heating (The total reduction in consumption by around 25,000 GWh in 2020, according to Eurostat data, is linked to Covid-19 control measures and is likely to be temporary). How this should happen depends heavily on the energy policy of the European Union.

So far, the European Union's attempts at constructing and imposing common energy policy deliver partial results. The aim of building an EU internal energy market is to increase energy efficiency by connecting national and regional electricity transmission networks and to establish common market rules across the EU. The European Commission efforts lead to very slow progress, and resistance comes from key member states, whose sovereignty in the energy field remains largely preserved. The attitude to the production and supply of electricity is special because it affects national security and requires guarantees of continuity of supply while maintaining control. The assumptions that electricity markets may combine high competition with low prices (so far) are not confirmed by practice, both for technical and economic reasons.

As the Commission lacks economic arguments, it seeks ways of administrative and political influence. Sometimes this contradicts the interests of the big Member States. As a result, a solid Union energy strategy is lacking.

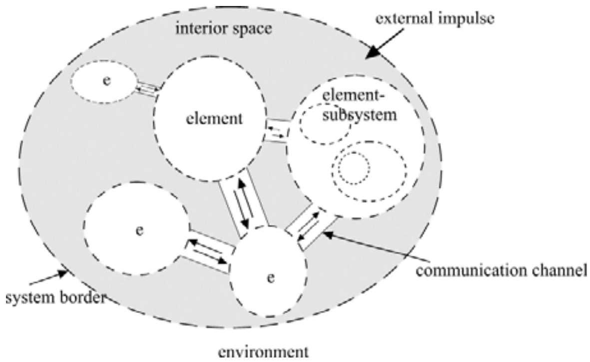
1. Methodological Basis – System Approach and Energy

The combination of the General Theory of Systems (Bertalanffy, 1968) with the Theory of Functional Systems (Anokhin, 1971) and Cybernetics (Wiener, 1954) allows for the analysis of European integration as a process of formation of an open system. For the correct understanding of the process are equally important both the exchange between system and environment (including energy) and the efficiency of internal system connections (including energy transfer between system elements.) Synergetics further develops the systematic approach in the dynamic model and allows to determine the moment at which the system performs a phase transition.

Figure 2 includes all the basic concepts applicable to the EU as a system.

Figure 2

Schematic representation of the system



Source: own development.

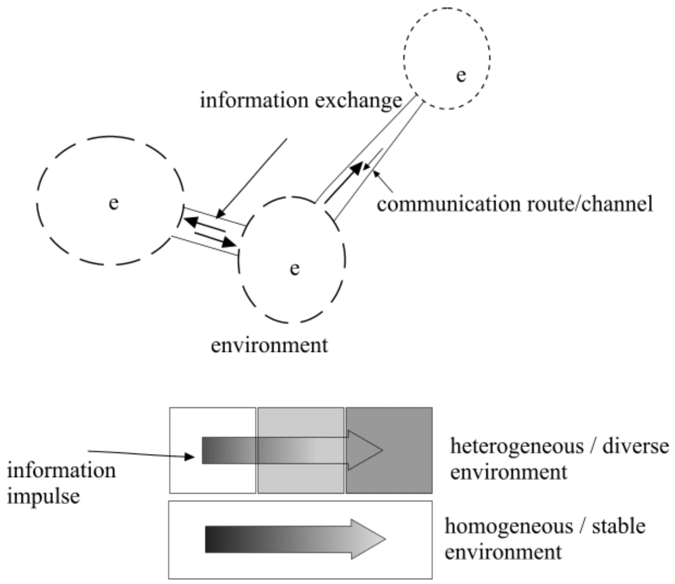
The most important condition for building and balancing an open system is its energy security. The presence of own energy sources makes the task easier – a minimum amount of energy exchange with the environment requires less border control. The volume of the system can also be important – in accordance with the laws of thermodynamics – increasing the volume reduces the relative energy consumption and increases energy efficiency.

If the equilibrium of an open system is maintained by energy imports, then the main question is to what extent the system is able to effectively control its external sources. The dynamic environment, with frequent abrupt changes, makes this control more difficult. The role of external energy impulses becomes decisive. The logical behaviour of an open system is to strive for energy self-sufficiency. This desired end result is in itself a system-forming factor isomorphic to different classes of systems (according to Anokhin). That is why, in recent years, facing the dynamics of the environment, the EU is trying to develop as an energy independent system. In this situation, the solution of the problem is sought in all possible directions, with deteriorating initial conditions:

1. The union' energy resources are very limited: compared to its competitors, it has the smallest deposits of widely used energy.
2. Besides the EU is socially very heterogeneous. Due to recent rounds of enlargement, the Union is probably too large to be managed effectively. Its management scheme was conceived and implemented under other conditions. The large volume not only brings advantages, as mentioned above, but also imposes limitations, according to Norbert Wiener's (1954, p.158) thesis that "*... The community extends only so far as there extends an effectual transmission of information. ..*" The actual transmission without distortion and loss of usefulness, without turning into "noise" or "infinite fluctuations" as defined by Claude Shannon (1948), becomes difficult. Long communication routes in a heterogeneous internal space inevitably cause information losses and impose an upper limit on the effective volume.

Figure 3

Information losses due to lengthening and narrowing of the communication routes, including in a complex/diverse environment



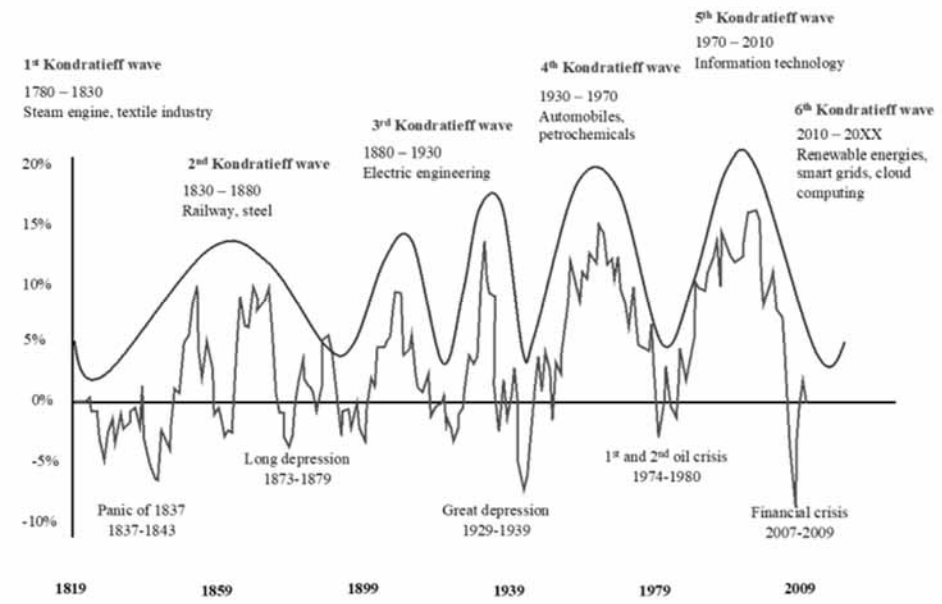
Source: own development.

Such an example gives the loss of electricity during transmission dependent on the length of the electrical conductor (ohmic resistance), discussed below.

But the synergistic analysis of integration, including of the EU energy market model, must be considered in dynamics. The development and use of energy sources depend on the interaction of three groups of factors: technological, economic and political. According to numerous experts, these three groups of factors correspond to the Theory of Long Cycles in Economics (Kondratiev's Waves):

Figure 4

Scheme of Kondratiev cycles -1



Source: https://timreview.ca/article/1327.

Despite the controversial points in the theory, most scientists acknowledge the existence of several Kondratiev's Waves. These waves fit partially into the distinction "Industry 1.0", "2.0", "3.0" and "4.0", according to Kaletsky. (2011) From the energy point of view, the following can be noted: European integration began during the slowdown of coal as a primary energy source (ECSC). The Community enters then two energy phase transitions – from coal to oil and gas (in the 1960s) and, partially, from oil and gas to nuclear energy. An attempt is currently being observed for a third such phase – from fossil fuels and nuclear energy to renewables (RES).

Technological factors usually play a leading role during such changes. They set a new solution, after which, in the phase of technological maturity, the economic factors take the lead: the new technological solution becomes economically profitable. Finally, political factors set the legal basis of the new energy and deal with the social consequences of abrupt changes. The current transitions meet several requirements at the same time: energy sources must be easily accessible, supply must be secure, energy supply and distribution must be highly efficient.

Failure to meet any of these conditions allows for the search for new technological solutions. In the European Union political factors can suppress the remaining factors. Although it must solve serious economic and social problems, the ECSC is primarily a political project – national control over coal (and steel) must prevent a new arms race superiority and the next war between Germany and its neighbours. The development of nuclear energy in France and some other countries has been accelerated by the October War and the ensuing oil crisis. Leading fears are connected with the politically unstable Middle East. During the current transition to new energy sources, political considerations again play an important role.

2. Basic Energy Parameters

Energy is the basis of public life, it provides both industrial and household consumption. It must meet several requirements at once, some of which are difficult to reconcile with each other. Energy supplies must be constant in quantity and quality (standard), and the price must be socially acceptable.

The various energy sectors in the EU are intertwined – transport consumes almost a third of the energy in the Union, but only a small part of this consumption is at the expense of the produced electricity. Equally insignificant is the share of electricity for heat production. At the same time, natural gas can be successfully used both for heat production (20% of total gas consumption in Germany) and for electricity production. While the transport and consumption of heat can be currently separated from the production of electricity, the flexibility of gas as an energy carrier has increased its importance in recent years. The mentioned „Green deal" can significantly change the energy mix.

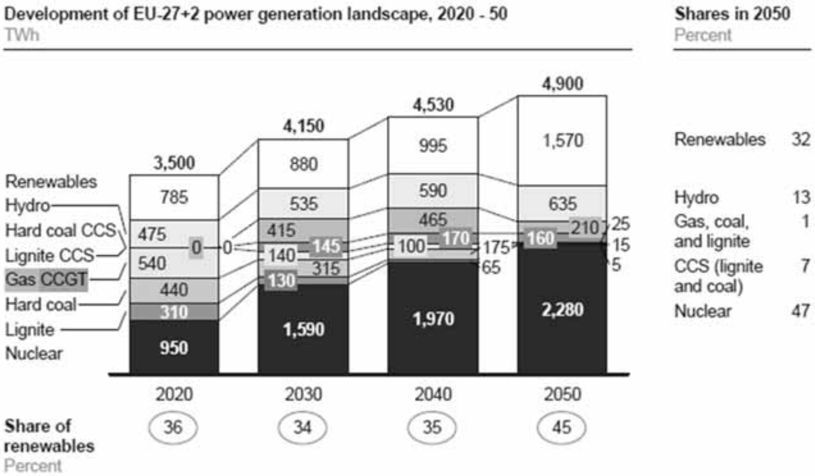
When choosing an energy solution, the above groups of factors are combined in different ways. The leading benchmark is energy efficiency, but this is never enough: in land transport, the actual efficiency of an internal combustion engine measured at the wheels is about 22.5% for a diesel engine and 18% for a gasoline engine (The use of diesel engines in water transport has a higher rate).

The electric cars preferred by environmentalists have an efficiency measured at the wheels between 75 and 85% at power up to 100 KWT. An efficiency of 95% has been announced for the Tesla Model S electric motor, and with the use of a single-speed gearbox, the final wheel efficiency is 94%. To this, however, should be added the calculated efficiency along the entire chain from electricity generation to battery charging of the electric vehicle. The total efficiency of electric trains depends on the efficiency of the electricity producer, reduced by the mechanical losses and the losses on the electric network – in good condition of the network, the efficiency significantly exceeds that of the wheeled transport, including of electric cars.

Coal and other types of fossil fuel plants are still the main producers, but their efficiency is between 33 and 37%. This leads to much lower endpoints, which makes comparison and choice of solution very difficult. Combined cycle gas turbine (CCGT) plants have an efficiency between 40 and 55%, which should keep their place in the total electricity production in the EU until 2050.

Figure 5

Predicted development of EU power generation



Source: McKinsey & Company, "Transformation of Europe's power system until 2050", 2010.

Between 2011 and 2017, several producers (among them Mitsubishi, General Electric and Siemens AG) claimed to reach 60% and more efficiency, using more advanced technologies.

But high efficiency does not necessarily mean cost reduction if achieved with expensive technologies. Here the technological factors are intervened by the economic ones, which offer other possible solutions. These factors also affect the use of internal combustion engines. Thus, the classic steam engine has an efficiency between 4 and 10%, but the low rate is offset by the abundance and low cost of energy (coal) in the 18th and 19th centuries and the steam engine formed the basis of the First Industrial Revolution. Abundance and low costs of oil prior to the first energy crisis (1973) also justified the use of diesel power plants.

It seems that market pricing provides a more accurate guide when choosing an energy solution, with efficiency remaining only one of the elements included in the efficiency indicator. The common indicator EROI (EROI = Energy Delivered / Energy Required to Deliver that Energy) solves the problem of combining the two groups of factors. The study of D. Weißbach et al. (2013) gives an idea of the biggest problem with alternative energy sources – their low energy efficiency, especially in photovoltaics.

According to their calculations, the "EROI" of solar panels is 4 units, and the "EROI" of wind turbines is 16 units. That is, during its life cycle, solar panels will generate 4 times more energy than was spent on their creation, and wind turbines, respectively, 16 times more energy (average for European countries). Under normal market conditions and constant production, solar panels will pay for themselves in terms of energy for more than six years, and wind farms – for a year and a half. But with renewable energy sources, energy generation depends on natural conditions – wind, light. They require storage systems or power compensators. Thus, due to the introduction of buffer measures, the total "EROI" of solar panels drops to 1.6 units, and the "EROI" of wind farms to 3.9 units.

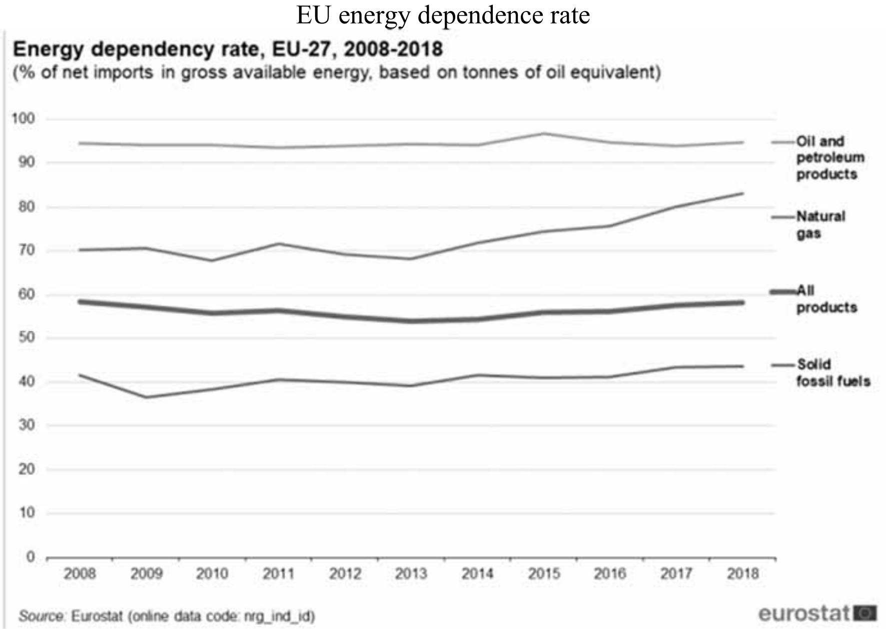
Thus, a coal-fired power plant pays for energy in 2 months, and a gas-fired one – only in 9-12 days. However, if energy consumption for coal and gas extraction and transportation is added, then their energy return will be 10 and 11 months, respectively. Hydropower plants pay for energy in 3 years, and nuclear power plants pay for energy in just 2 months (Weißbach et al.).

Wind energy today is the most efficient alternative energy source. However, the low energy coefficient "EROI" cannot maintain the current standard of living in developed countries, which requires a total "EROI" of all energy sources of 25-30 units. Nuclear power plants (NPP) have "EROI" from 85 to 105, depending on the efficiency of uranium enrichment technology, i.e. if the use of RES is necessary at all, then the most profitable is the combination of wind farms with NPPs.

But even this is not enough: in the European Union today, energy production and consumption are intervened for reasons that are not driven by high efficiency. In accordance with the systemic laws mentioned in the first part, self-sufficiency and independence from external supplies are sought, even if this means a higher cost of extracted energy. These considerations are understandable (Figure 6).

Figure 6

EU energy dependence rate



Source: https://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_statistics_-_an_overview.

To this are added considerations imposed by the pursuit of high quality of life – a clean and safe environment. The price should be not low, but socially acceptable. But this is already a political issue. Political considerations call for subsidized electricity production from photovoltaic panels in the EU, the price of which remains relatively high (In Bulgaria, in 2010, the subsidy amounted to <= 5 kW €0.405/kWh > 5 kW €0.372/kWh, 8 times the regulated market price!). And the efficiency of mass-produced photovoltaics ranges between 12-16%.

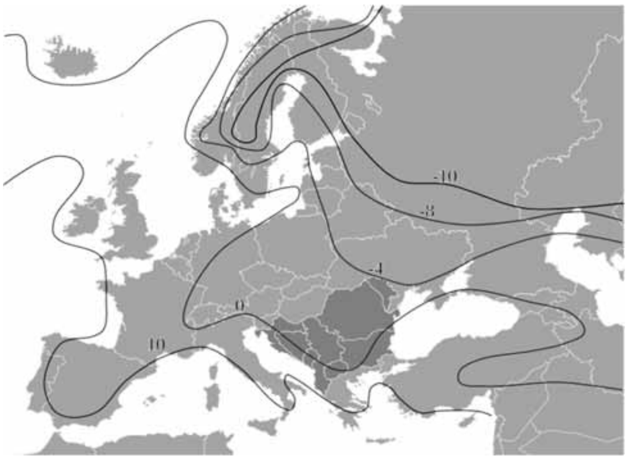
Depending on the weight of the groups of factors, each economy chooses or historically develops a model for energy production, distribution and consumption, and local characteristics are of great importance. The issue is not only the availability/lack of energy resources, but also, for example, the seasonality of consumption, the presence of traditional social structures (e.g. mining settlements inhabited by several generations of miners), traditional long-life technological structures (NPPs), cultural attitudes and demographic structure of the population (conservatism or social mobility), etc. In some cases, the model can be illustrated by the so-called energy mix, allowing energy production to follow consumption (There is still no effective way to "store" electricity at a large magnitude). At the same time, power plants have the task not only to produce electricity, but also to ensure uninterrupted supply – i.e. the energy mix must allow flexibility.

3. Geographical and Technological Features of the EU, Energy Mix

The geographical diversity in the EU is considerable. Due to the cold winter in the EU member states of Central and Eastern Europe, consumption is pronounced seasonally.

Figure 7

Zero isotherm in Europe in January

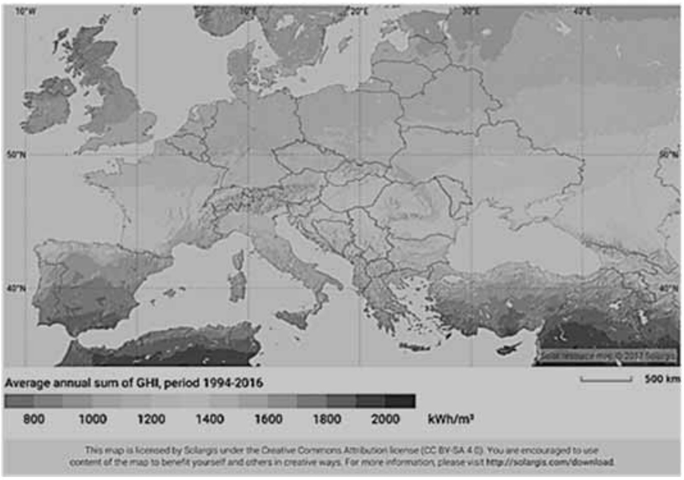


Source: https://ru.wikipedia.org/wiki/Isotherma_Erope_average_year.svg.

Favourable conditions (constant winds with speed in the required range) are along the Atlantic coast and the Central European Plain. The intensity of solar radiation is high in Southern Europe, and favourable conditions for hydropower are available mainly in Italy, Austria and Sweden (Also in Switzerland and Norway, which are in fact part of the EU's internal energy market).

Figure 8

Solar radiation in Europe

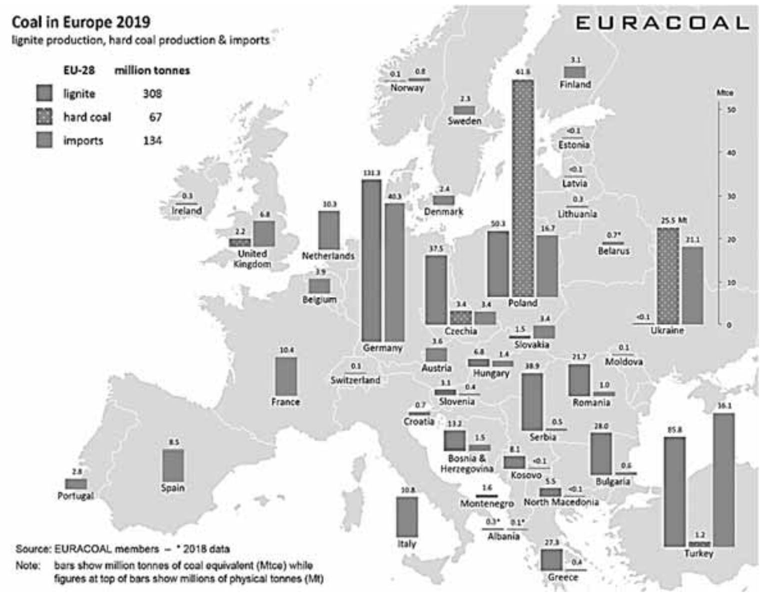


Source: https://solargis.com/maps-and-gis-data/download/europe.

There are serious coal reserves in Poland, Germany, less in the Czech Republic, Bulgaria and Romania. In Germany, however, due to the depletion of a large part of the surface deposits, the extraction is at a high cost.

Figure 9

Coal reserves in Europe

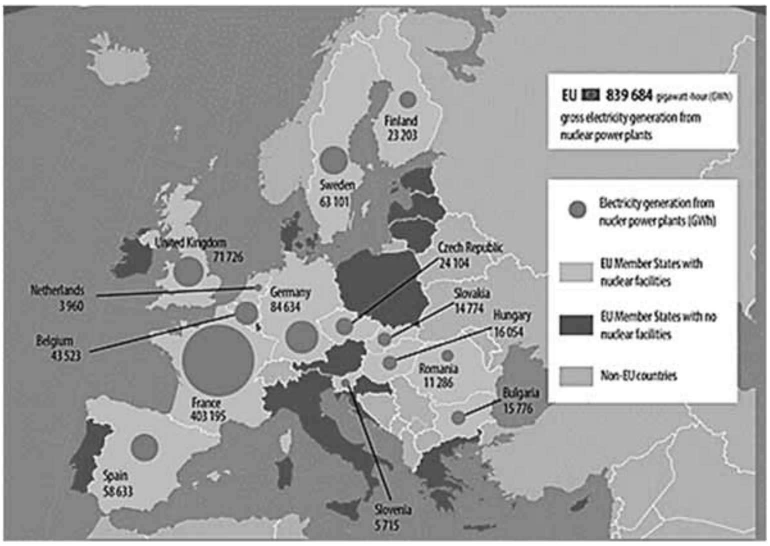


Source: https://euracoal.eu/info/euracoal-eu-statistics/.

Added to this is the very uneven distribution of nuclear power plants with a very long service life.

Figure 10

Nuclear electricity in Europe

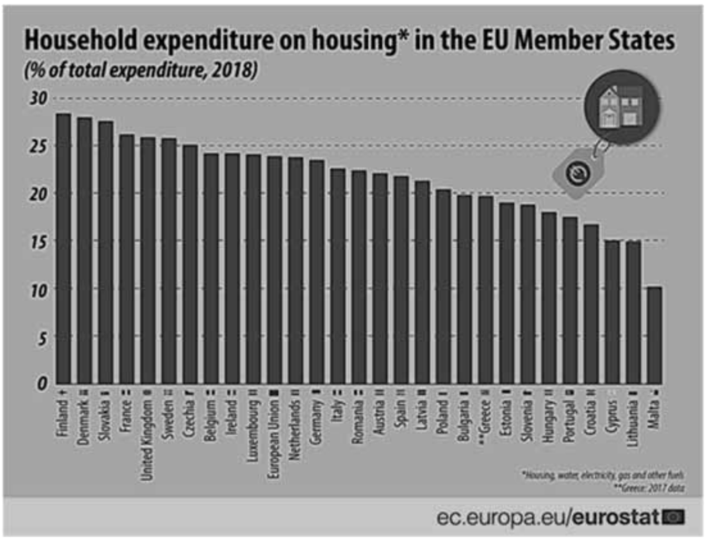


Sourse: https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180504-1.

There are also major social differences in the Union, including electricity costs.

Figure 11

Household expenditures in the EU



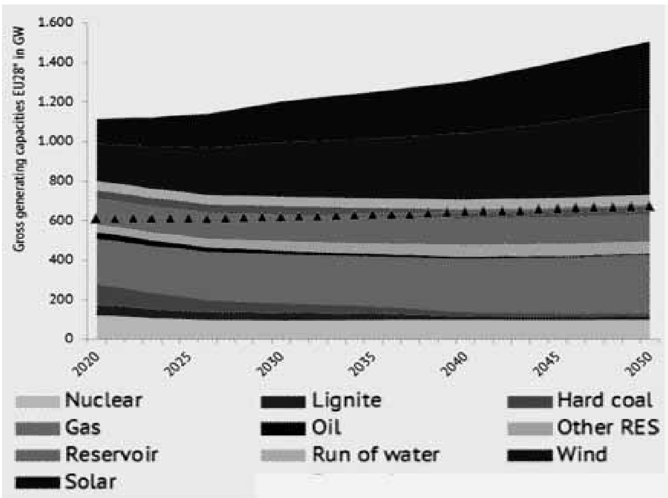
Source: https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20191127-1.

This makes it clear why it is very difficult to draw up a common EU energy strategy, together with the policy that should serve it. E.g. Poland, which relies heavily on coal, is only now planning to build an NPP. In Slovakia and Hungary, coal has been largely replaced by imported natural gas, but the overall picture is similar. The incomes of the population in most CEE countries are below the EU average and this makes it difficult to switch to green technologies.

As a whole, the EU includes highly developed countries with achievements in high-tech industries, incl. in energy. All advanced technologies are used in the production, distribution and distribution of energy. The scarcity of energy forces the emphasis to be placed on energy-saving technologies, which again calls for investment. The various natural features mentioned above give a very colourful picture of the main production facilities and, ultimately, a very diverse energy mix, allowing good coverage of both constant and variable consumption.

Figure 12

EU energy mix, including planned change



Source: Energy Brainpool, "Energy, transport and GHG emissions Trends to 2050 – Reference Scenario 2016".

The distance (driving route) between Tallinn and Lisbon is 4,167.55 km. This means that the transmission of electricity even between the two endpoints of the Union is theoretically possible: since the 1980s, an effective maximum length of the electricity transmission route of 7000 km has been established, with a transmission price between $0.005 and $0.02 per kWh (Deep Resource, Observing the world of renewable energy and sustainable living, 2017). In fact, this means that if Estonia buys electricity from Portugal, the agreed quantity will be delivered at the Portuguese border to the neighbouring market, and the corresponding volume will be delivered across the Estonian border from the nearest power plant with minimal losses along the route. For this purpose, an AC power grid with a single standard has been built, and technological innovations require the consideration of alternative solutions – such as a 'smart' electricity grid and an HVDC Grid.

To the technological and natural conditions described so far must be added the political and economic considerations discussed in the following sections.

These two groups cannot be completely separated at present, but there has been an interesting interaction between them in recent decades. In the 1980s, neoliberalism emerged as the leading ideology, and in particular, the scheme in which the free market and free competition guided the economy, and economic considerations, in turn, dictated politics. This paradigm, expressed in the Washington Consensus, determines the development of EU energy after the mid-1980s – towards privatization and deregulation. However, after 2006-2007, and especially after the onset of the global crisis, political considerations related to security and quality of life began to take precedence over economic ones, as exemplified by the “Green Deal”. At present, these considerations are intertwined in a complex way in energy strategy and policy: the search for high efficiency, e.g. is concerned that EU imports 53% of the energy sources it consumes (Figure 6).

The fear of “climate change” not only imposes restrictions on energy production and consumption, but also places high demands on the Union’s foreign policy, which must make similar sacrifices on the part of competing countries. In December 2019, EC President Ursula von der Leyen proposed to the citizens of the Union a “New Green Deal” and supported the achievement of a climate-neutral economy by 2050. Currently, the EU aims to reduce greenhouse gases by at least 40% to 2030 compared to 1990 levels, but the new Commission plans to raise the target for the next decade to 50 or 55% (von der Leyen, 2019). One of the mechanisms used is the imposition and permanent increase of the specific “carbon dioxide emission right” tax, which should lead to the phasing out of coal, natural gas and oil as an energy source.

In the name of achieving long-term strategic goals, free competition is distorted and set within certain limits, and efficiency is partially sacrificed. Coal loss can also cause other major problems, as flexible renewables are highly dependent on natural conditions and virtually completely independent NPPs lack flexibility.

In addition to this is the growing pressure for a gradual ban on diesel engines, but not in favour of railway transport, but in favour of electric vehicles, despite the low efficiency (see above) and unresolved problems with the disposal of used batteries. And charging electric cars with electricity produced by renewable energy sources, especially photovoltaics, is the worst possible energy solution. It combines low efficiency (including the construction of new infrastructure with incalculable costs) with the insecurity of supply and unpredictable environmental problems.

4. Building a Single Energy Market and Energy Union

The aim of building an internal energy market of the EU is to increase energy efficiency by connecting national and regional electricity and gas transmission networks and to establish common market rules across the EU. Part of these efforts is to build sufficient energy links between all the countries by 2020. The strategy includes, as a minimum, a cross-border electricity trade target of 10% for all Member States by 2020, whereby the European

Commission hopes to put pressure on energy prices, to reduce the need of building new power plants, to reduce the risk of interruptions or other forms of grid instability, to improve the reliability of renewable energy supplies and to promote market integration. The Member States agreed in January 2018 on the Commission proposal to invest €873 million in clean energy infrastructure, funded by the Connecting Europe Facility (CEF).

However, only 17 of the Member States have reached so far the objective mentioned above. The target is carried forward to 2030. Despite the increased number of gas and electricity links between the countries and the rules governing emergency aid, 150 more interconnections for natural gas and electricity will be required, according to a list of priority energy projects published by the Commission in March 2018 (Commission implementing decision, 2018). With regard to electricity, the parties have the difficult task of rearranging the market in order to accommodate the increasing share of still subsidized energy from renewable energy sources (RES), as well as imposing rules to promote the use of electricity of these energy sources and improving energy efficiency. Rules are in place in the EU to ensure that the Member States help each other if the gas supply is interrupted – negotiated after difficult negotiations. The agenda is to impose the same rules for electricity, and to clarify the reserves that must be accumulated if the Union fails to meet its 27% target for renewable energy.

Overall, the Commission proposes major policy changes for the period from 2021 to 2030, starting with changes in the legal basis of the Union electricity market and the greenhouse gas trading system. Guarantees of mutual assistance in the case of gas shortages should also be ensured. The aim is, after gaining the support of the Council of the EU and the European Parliament, to complete the Energy Union by 2019. According to Shevčovič (2017), former Vice-President of the European Commission: "*No longer a policy but a well-framed reality*". However, the common energy market – a vital part of the energy union project, failed to be completed by the deadline – 2015.

Member States are opposed to ideas, such as payments to a fund, if they fail to fulfil their renewable energy obligations or if they do not open their RES support schemes to outside companies. The risk of renationalization of energy policy during crisis fluctuations remains serious. Not only the energy crisis of 1973 (which subsequently turned into a structural one), but minor turmoil de facto reversed unification processes, forcing each country to look separately for ways to deal with the difficulties. Amidst of the cold wave that swept Europe in the early days of 2017, Romania, e.g. refused to provide "emergency assistance" to Bulgaria, urging the latter to activate the "cold reserve" (actually, the emergency actions included decreasing of frequency and curtailing of consumers or export) in order to avoid a power crisis. However, in order to ensure consumption, electricity exports have been stopped for almost a month. The export ban, imposed in many EU countries on the coldest days that winter, also had political motives (Anca Gurzu, 2017), and put the European Commission and Jean-Claude Juncker's plans for an Energy Union to the test.

One sign of incompleteness of the integration process in this area are the partial competences of the supranational governing bodies. The European Commission gained partial competences for supranational energy policy only in 1983, when the following objectives were formally set: supplying energy at acceptable prices, without endangering citizens' health and without harming the environment, and establishing a single internal energy market. However, Article 194 of the Treaty of the EU currently provides that certain areas of energy policy are areas of shared competence, which mirrors the slow transition to a common energy policy. However, each Member State reserves the right "to determine the conditions for the use of its energy resources, to choose between different energy sources and to determine the overall structure of its energy supply" (Article 194). That means, that the general development of the energy sector, incl. supply, energy mix, structure of production and consumption, etc., remains mainly at a national level.

The European Commission has more serious competences with regard to coal and nuclear energy – here, it can act autonomously and directly as a supranational supervisory authority (see the European Coal and Steel Community and Euratom), respectively, as an international representation with respect to third countries. Regarding oil, gas and electricity, the Commission confines itself to fulfilling regulatory framework competences agreed with the Council of the European Union. It should be noted that, because the bulk of the energy is imported, the energy policy is directly related to the issue of the common foreign and trade policy, which requires long-term coordination of interests throughout the EU institutions. In the area of foreign policy, e.g. The European Commission has virtually no powers, unlike foreign trade. It can influence the energy policy indirectly through its competences in the fields of competition and environment.

The sovereignty of national states in the field of energy remains largely preserved. Due to the complex allocation of energy competences between national states and supranational institutions, the EU is still far from developing a common energy strategy and pursuing a common energy policy, which should ensure the achievement of strategic objectives in these areas. There are major differences between the Member States on key issues – energy mix, energy market, relations with partners – customers and suppliers, etc. Member States conduct their own energy policies in accordance with their economic and foreign policy interests, with their own resources and needs. As in other areas directly relevant to national security, more influential Member States are reluctant to compromise their national interests if they are not sufficiently protected in common energy projects. Through the Emissions Trading System and the cross border trade regulations (but also through informal pressure), the supranational authorities are on the way to gain more influence on the energy mix of the Member States of less economic and political weight.

For the first time, the Lisbon Treaty includes texts on energy, which should provide the legal basis for shared competence in energy policy. According to the opponents of a federalized union, Art. 176 of the Treaty represents a serious violation of national sovereignty with regard to energy policy. The stated objectives are:

(a) completion of the energy market;

(b) securing the energy supplies;

(c) promoting energy efficiency and development of new and renewable energy sources;

(d) interconnection of energy networks.

They are subject to co-decision by the Council of the EU and the European Parliament.

However, it is specifically stated that these measures do not affect the right of a Member State to determine alone the conditions for using its own energy resources, to choose between different energy sources and to determine the overall structure of its energy supply. The pressure for more centralization has increased tangible in the last 4-5 years. The institutional and conceptual ambiguities in EU energy policy are best reflected in the problems of developing the electricity market.

4.1. Building a single electricity market

This market is among the few sectors of the EU Internal Market, together with medicines and weapons that have not yet been fully liberalized. Energy Union plans must ensure that electricity is moved and traded freely, even in times of crisis. The EC's efforts, which in this case have tangible competences, lead to very slow progress towards a single electricity market, and the resistance comes from key member states that want to pursue their own industrial and energy policies.

Their protectionism runs counter to the neoliberal model, which has prevailed, with some fluctuations, throughout the entire period of functioning of the EU Single Market – the heart of the European Union. At the heart of all practical action since signing the Treaties of Rome so far, and especially since 1986, is the conviction that the merge of individual national markets benefits all actors in the process through optimizing the production cost, approaching so the ideal point of intersection between supply and demand. Modern liberal thinking does regard the free movement of factors as a key for encouraging the optimal competition. It accepts relatively closed regional trade associations only insofar as a large regional market is preferable to many small, closed markets, so that the benefits of free trade can be realized at a regional level, if it is impossible to realize them immediately at a world level.

The program for completion of the EU Internal Market adopted in 1986 is based on the latest edition of the liberal theory expressed in the Washington Consensus. It places emphasis on the "free market", rejects the "state intervention" in the economy and relies on the "civil society" as a possible additional regulator. In the 1980s and 1990s, the adherence to these principles has become a leading political practice in most EU countries.

The Single Market project reflects precisely this philosophy and enjoys sufficient political support, but mainly during good economic conditions, and its principles are not fully implemented in all market sectors. In times of economic crisis, breaches of obligations already undertaken by the Member States on compliance with market rules are increasing, and initiatives to transfer the liberal approach to the remaining regulated market sectors are frozen. It is most difficult to impose uniform rules for all production and supply of energy, including electricity. In an attempt to impose some order, the European Commission launched in 2015 a State aid sector inquiry aimed at gathering information on capacity mechanisms to examine whether they ensure sufficient electricity supply without distorting competition or trade in the EU Single Market. It should complement the Commission's Energy Union Strategy to create a connected, integrated and secure energy market in Europe (European Commission, State aid to secure electricity supplies, 2015).

However, the European Commission remains a major supporter of the electricity market liberalization and seeks to assert that an efficient and fully functioning single European energy market will give consumers a choice between different electricity supply companies and access to all suppliers, especially to smaller ones. Such a market should help the EU to overcome the economic crisis. As a result of European Commission efforts, the so-called Third Energy Legislative Package was adopted in March 2009. The document aims to move forward the liberalization of European electricity (and gas) markets. Under the new regulatory framework, Member States could choose between three different strategies for decoupling electricity generation from the operation of the transmission network:

- complete unbundling of ownership of the transmission infrastructure;
- creation of an independent system operator (ISO);
- Establishment of an Independent Transmission Operator (ITO).

The emphasis is on the efficient separation of energy production and supply from the grid. Unbundling should prevent grid operators from favouring their own energy production and supply companies on the market. For effective competition, the transmission system operators must guarantee non-discriminatory access to the transmission network of different electricity and gas providers, which is the third party access (TPA) principle (Boneva, 2014). (It remains unclear what the compensation should be for the owner of an existing network that allows competitors to access it. It also remains unclear what would motivate investors to invest in new grids who should provide power from energy independent sources.)

According to the principles of neo-functionalism, integration in the energy field (basic for social development) should provoke a chain reaction in other economic sectors and areas of public life towards further centralization of the Union. Although the process of integration, started with the European Coal and Steel Community, didn’t exactly evolve according to the neo-functional logic, federalist officials continue to strive for control of the energy market, which the application of common internal market rules would provide them. In pursuit of this objective, they seek to establish a common strategy for the sector with obligatory for the Member States’ rules set out in the Green Paper (see above) and related to the so-called 20/20/20 targets of the Europe 2020 strategy to increase the share of renewable energy and reduce energy consumption.

Despite the EC’s efforts, the progress towards a single energy market, incl. towards a single electricity market, is slow. In the supply of electricity, the European Commission reported in November 2005 that there was a lack of integration between the national markets. This is due to the low level of cross-border trade (only about 11% of total consumption by 2005) due to existing barriers to access, inadequate use of infrastructure and poor connectivity between many Member States. Five years later, there is still a high degree of concentration in most national markets, with national companies controlling on average about 70% of the markets.

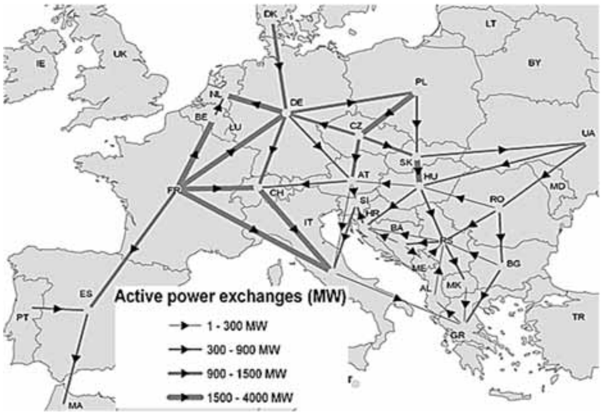
In an attempt to speed up the process, the European Network of Transmission System Operators for Electricity (ENTSO-E) was set up in Brussels on 19 December 2008 (A similar body – ENTSO-G, has been created for gas systems). ENTSO-E includes 42 transmission system operators and practically enforces its rules across the continent, excluding Russia and Belarus. The creation of ENTSO-E is linked to the adoption of the European Union’s Third Legislative Package on Gas and Electricity Markets (2007), which seeks to enhance integration between Member States’ markets as well as market elements in pricing.

The objective of ENTSO-E is to encourage closer cooperation between European energy transmission system operators in order to support the implementation of EU energy policy and to achieve the objectives of European energy and climate policy, which change the very nature of the energy system. ENTSO-E's main objectives are to integrate renewable energy sources (RES), such as wind and solar energy, into the electricity system and to build the internal energy market, which is vital for achieving accessibility, sustainability and security of supply. "*ENTSO-E aims to be the focal point for all technical, market and policy issues related to transmission system operators and the European network, engaging with consumers of electricity systems, EU institutions, regulators and national governments*" (Who Is ENTSO-E?) The Baltic States are currently joining ENTSO-E, unlocking from the energy network inherited from the USSR.

Figure 13 shows the main flows of cross-border trade in electricity, along with a network that is generally sufficiently built, with uniform technical standards. The general standard solves one problem – it turns the environment for the movement of information into a homogeneous one (Figure 3). The second problem remains to be solved – increasing the efficiency of transmission.

Figure 13

Cross-border electricity network and transmission volume by 2017



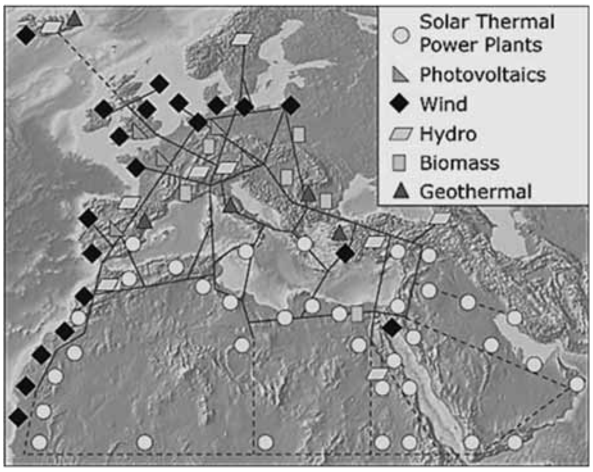
Source: https://deepresource.wordpress.com/2017/06/05/european-power-grid/.

This task solves the construction of a new kind of 'smart' electricity grid – but this requires a very precisely built, mostly very flexible energy mix, to integrate energy from conventional, centralized generation sources with the production from renewable sources. The plans also envisage the creation of a European super grid to interconnect the various European countries and regions around Europe's borders – including North Africa and Turkey – with a direct high-voltage current (HVDC) power grid.

It is envisaged that a European super grid would optimize the production through sharing the most efficient power plants in the entire region, and also to allow for wider use of renewable energy, incl. wind energy (Atlantic coast) and solar energy (North Africa). (These plans should take into account the political implications, though, for example, the civil war in Libya).

Figure 14

European super grid



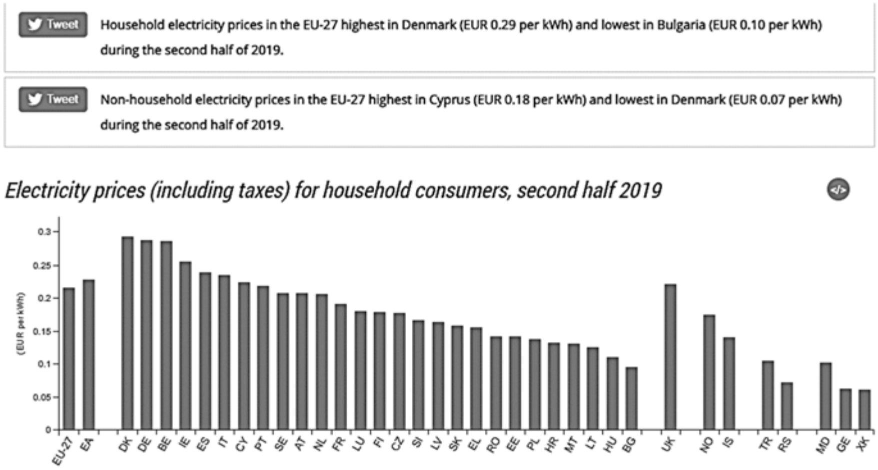
Source: https://deepresource.wordpress.com/2017/06/05/european-power-grid/.

20 years after the start of liberalization, the legal basis for the common electricity market is in place. The market is divided into regional exchanges and is based on the assumption that trading opportunities within these areas are unlimited. The trade between bidding zones is limited to the level of the cross-border capacity, however, the cross-border infrastructure is used at only 30-35% of its capacity, according to the European Agency for the Cooperation of Energy Regulators, ACER (Simon, 2018). This creates technical boundaries but also political obstacles to the feasibility of cross-border trade. With the exception of Italy, Sweden and Denmark, stock exchange areas coincide with the political boundaries of countries. Significant price differences remain between them: from €9.1 per megawatt/hour in Estonia to €26.8 in Denmark in 2009. For 2017 the differences are similar for households: from €9.6 per megawatt/hour in Bulgaria up to €30.9 in Denmark for households. In industry, the differences are smaller: from €6.5 per megawatt/hour in Sweden to €14.8 in Denmark. (Europe's energy portal, 2019) In 2019 the situation remained unchanged (Figure 15).

It is clear that differences of two to three times between the lowest and the highest final price (including taxes) do not testify to the existence of a free electricity market. Apart from this, in Denmark, for example, the price difference between the two consumer groups is more than three times, while in Bulgaria it is less than 20%. This indicates that there are also major differences in pricing patterns across the Member States (including taxes, excise duties, environmental allowances etc.), i.e. energy policy remains first and foremost national, also because of its close connection with other areas such as security, social balance, etc.

Figure 15a

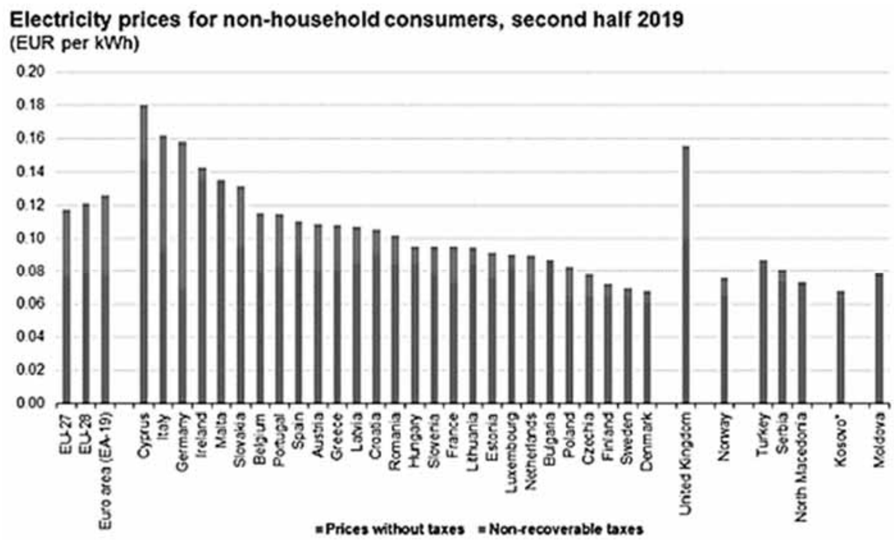
Electricity prices for households in the EU



Source: https://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_price_statistics.

Figure 15b

Electricity prices for industry in the EU



Source: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Electricity_prices_for_non-household_consumers,_second_half_2019_(EUR_per_kWh).png.

There are several ways to explain this:

It has been argued that France and Germany, as the largest producers and consumers, are sabotaging the Commission's efforts to free up the market because of the interests of leading energy companies, but that does not describe the whole problem. Indeed, in Western Europe still persist the “economic patriotism”, which, in addition to classical protectionism, also includes purposeful industrial policy. According to the New Political Economy (Watson and Higgott, 2008), restrictions on trade in certain areas are explained not by free-market defects but by political considerations. The state is expected not only to protect its internal market from external competition, but also to guide domestic enterprises’ policies. By influencing the structure and size of enterprises, “national champions” are created in certain industries, which, by their size and by legal measures, can resist, for example, of attempts to be absorbed by foreign competitors.

The clearest example of such an approach is France, whose governments are pursuing a deliberate policy of creating and supporting “national champions”, incl. through direct intervention in their management. (The legacy of the so-called “dirigisme”, between 1945 and 1975.) Governments not only intervene in individual cases, but also seek to control overall development, incl. through deliberate law that hinders the penetration of foreign businesses in a number of industries deemed “strategic”. There is public consensus on the fact that large, “symbolic” French enterprises (such as “Arcelor”, “Danone”, “Societe Generale”, “Casino”, “Saint-Gobain”, “Thomson”, “Carrefour”, “Vivendi Universal”, etc.) must remain “French” and enjoy special protection against ingestion. Foremost among them is the state-owned “Electricity de France” (EDF), the world’s largest utility provider, with € 69.6 billion in revenue for 2017 (The EdF Group – 2017 Annual Results).

In Germany, industrial policy is not as focused and coherent as in France and often remains out of the public eye. The state does not intervene openly in the economic development or in the management of the individual enterprises, but is mainly concerned with the imposition and compliance with the framework conditions. Government interventions do not follow as much a strategy for economic development as they save jobs in critical cases. There is no official policy of keeping “national champions”, but large companies are secretly given subsidies. Often, the executive branch authorizes mergers between companies despite antitrust legislation, on the grounds that mergers that have arisen become competitive within the EU or even in the global market. This is the case, for example, with the merger between VEBA and VIAG in 2000, which launched E.ON and later the merger between E.ON and Ruhrgas in 2003. Today the company is a key player in today’s electric oligopoly of the German market.

In both countries, and not only in them, the attitude to the production and supply of electricity (gas, water) is special because it affects national security and requires guarantees of continuity of supply while maintaining control (usually through state monopolies). Electricity is a particular, vital commodity for social development, and countries, especially social ones, have little desire to fall depending on private producers and suppliers. There are strong fears that free pricing may also lead to higher prices in backward, sparsely populated areas with poor infrastructure, further increasing their backwardness.

The pursuit of liberalization is also confronted with a problem that is being ignored by supporters of the free market. Energy consumption is slightly price-elastic. Low elasticity always works in favour of the formation of monopolies or oligopolies. The cartelization of the market is possible even with a larger number of market participants. In this case, transmission networks facilitate this process: in the case of the apparent inability of each provider to build its own network to the consumer, issues related to equal access to the available network, its ownership and operation, etc., remain unresolved.

Separation of production from distribution is intended to break the possible monopoly of the sole (in most cases) unit of production facilities and the network, but on the other hand, it impedes vertical integration in enterprises and eliminates the resulting production savings. Electricity supply technology implies a technological monopoly, but it easily becomes an economic monopoly. A large enough electricity market can easily be geographically cartelized. And the privatization of production and distribution can further worsen market conditions. However, the state monopoly is subject to political control and restrictions: the government has direct responsibility for the monopolist's activities and cannot ignore the mood of the voters (consumers). State monopolies are also directly tied to the state energy strategy, which has a long time horizon and does not put a rapid return on investment in the first place. Private electricity providers are not bound by such considerations and do not pay the political cost of abusing a monopoly position.

The examples from countries with a liberalized electricity sector seem to confirm these concerns. The California energy crisis of 2000-2001 is driven by price increases, uncertainty in supply and large-scale market speculation (Johnston, 2007). Contrary to expectations, deregulation did not encourage the opening of new capacity. On the contrary, in January 2001, producers began closing down capacity to further increase the cost of energy, which had already jumped 8 (!) times between April and December. (Said, 2001) In 2007, the US Department of Energy published a study where it states that between 1999 and 2006, electricity prices in the free-market states increased more than in the regulated markets (Annual Energy Review 2006, 2007).

In the EU, the liberalization of the electricity market began in the 1990s with the provision 96/92 / European Commission of 1997, which envisaged the gradual opening of the market by 2007 (30% to 2000, 35% by 2003). Till 2000 Sweden, the United Kingdom, Germany and Finland had already fully opened the markets to free, incl. external, competition. Since then, however, there has been evidence that, under the changed conditions, suppliers are once again dictating market rules through the formation of private oligopolies.

The EDF mentioned above, until 2004, was a fully state-owned enterprise and until 1999, it was a monopoly supplier of electricity to the French market. Under the pressure of the European Commission (Electricity Market Regulation Directive), state participation has been reduced to 85%. From 4% in 2000, the market share of EDF's competitors reached 21% in 2006, and by legal decision of June 2010, the monopoly was formally decommissioned (EDF must sell up to 25% of its competitors' production capacity in the case of GDF Suez, in which the State still holds 35% of the capital) (Electricity price statistics, 2020). The French electricity market is currently the most open to competition after Germany and the United Kingdom. However, the price of electricity for households increased from € 10 per megawatt/hour in 2000 to €16.7 per megawatt/hour in 2017 for households. (European Commission, Market analysis), Taking into account all factors (inflation, fluctuations in the common currency and energy sources worldwide, etc.), this increase is not in support of the expected benefits of liberalization. The assumption that the electricity market may combine high competition with low prices (so far) is not confirmed by practice.

The British market is most often cited as an example of complete liberalization. As a result of the legislative measures, the number of suppliers there has increased from three large (and five small) enterprises to more than 40 (including E.ON and EDF), with the largest market share of one supplier reduced by 48% on 21%. Wholesale electricity prices have fallen by 40% since 1997 compared to 2000. The price movement then, however, almost completely coincides with the price movement in the related neighbouring French market – from €10 per megawatt/hour in 2000 to $17.7 per megawatt/hour for 2017 for households.

In Germany, the example is even more disappointing. The German market is, in fact, distributed among four major suppliers: E.ON, RWE, EnBW and Vattenfall. There, the average price of electricity fell by 20% immediately after market liberalization, but subsequently increased again to mark an overall increase of 113% (from €24 per megawatt/hour to €51 per megawatt/hour) between 2001 and 2006 According to the Union of Energy Consumers, customers in Germany pay € 13.5 billion more annually for electricity due to stock speculation of large companies that buy mass electricity from smaller ones, thereby increasing the prices of the energy exchange. The electricity is then resold at a high profit, and the base price for customers is the price of the more expensive producers. Thus, the company, which has a cost of €17 for 1 megawatt of power, gets €50. These machinations raise the price of electricity by 30%. The gains of Germany's four largest concern E.ON, RWE, EnBW and Vattenfall (with a total share of 80% of total production), jumped to more than €17 billion in 2006. And by 2019, electricity prices there are still among the highest in the EU (Figure 15). It is no coincidence that Germany, together with France, is at the forefront of a large group of countries that oppose the EC's attempts to liberalize the EU electricity market, according to its ideas.

Judging from the result, it can be seen that, despite the explanations (too liberalized or, on the contrary, not sufficiently liberalized), retail electricity prices have increased by about 3% annually since 2008, according to European Commission acknowledgements in the second report on energy prices and costs in Europe in 2016 (Andre Tauber, 2015). At the same time, the fall in the prices of internationally traded energy commodities (mainly crude oil, whose price has decreased by 60% since 2014), reduced the cost of energy imports in the EU by 35% since 2013. Gas prices, e.g. have fallen by 50% since 2013 – due to lower global demand for energy, increased shale gas supplies in the US and better access to liquefied natural gas (LNG) in Europe, and low oil prices. The European Commission noted the increasing convergence of prices across Europe, as evidence that the EU's internal energy market is functioning, but had recognized that household energy costs (excluding transport fuels) increased up to 5.8% of their total expenditure, as opposed to 5.3% in 2008. For the poorest households, energy expenditure reached 8.6% in 2014.

The task of keeping price growth within acceptable limits is performed by the national energy regulators, united in The Council of European Energy Regulators (CEER), striving *"...to facilitate the creation of a single, competitive and sustainable internal market for gas and electricity in Europe*" (https://www.ceer.eu). On the one hand, 'regulated prices' is a concept which is in sharp contrast to the concept of a free market and competition. On the other hand, the citizens of the EU have the right to expect a positive rather than a negative economic effect of integration, which should also be the major focus of European Commission efforts.

4.2. Lack of consensus in nuclear energy

Nuclear energy generates very efficient electricity compared to coal-fired power plants. One ton of natural uranium can produce more than 40 million kilowatt-hours of electricity. This is equivalent to burning 16,000 tons of coal or 80,000 barrels of oil. Coal and oil combustion are major sources of greenhouse gases, and nuclear power plants do not contribute to global warming. But attitudes towards nuclear energy are the weakest point in attempts to build a common EU energy strategy. Euratom was established in 1957 with the original purpose of creating a specialist market for nuclear power in Europe, by developing nuclear energy and distributing it to its member states. But over the past 60 years, progress in the Community has been very uneven.

While the number of nuclear reactors worldwide is growing, only in the EU is the trend reversed. (In the USA, their number decreased from 104 to 96 within the last 16 years, but the total nuclear electricity generation capacity and its share in the total consumption remain constant. See Nuclear explained. US nuclear industry, EIA, 2019.)

In general, for the Union, nuclear energy has the weakest support in public opinion (20% approval) compared to all other types, but with serious differences in individual member states, which are strongly influenced by the short-term situation. In early 2018, an EP opinion acknowledged that "*nuclear energy is a low-carbon alternative to fossil fuels and represents a critical component in the energy mix of 13 of the 27 EU Member States, accounting for almost 26% of electricity produced in the EU*" (European Parliament, Fact Sheets on the European Union, 2020).

However, with the fall in hydrocarbon prices and the outbreak of the financial crisis, and especially after the 2010 Fukushima accident, discussions on further investment in nuclear energy have stalled. France, for example, in response to the October War and the crisis of 1973, developed nuclear energy to minimize dependence on external energy supplies, including from the politically unstable Middle East. Nuclear power produces up to 75% of the country's electricity, which ranks it first in the world. The country will rely on this technology in the future. In February 2014, the country's parliament approved a program to extend the life of reactors in the amount of 55 billion euros, including €15 billion for the replacement of massive parts in all 58 reactors, €10 billion for additional security measures related to the Fukushima accident and €10 billion for strengthening protection against external influences (including anti-terrorism measures). The main part of the program must be implemented by 2025. Despite all the fluctuations in the political situation, public support for this policy remains constantly high.

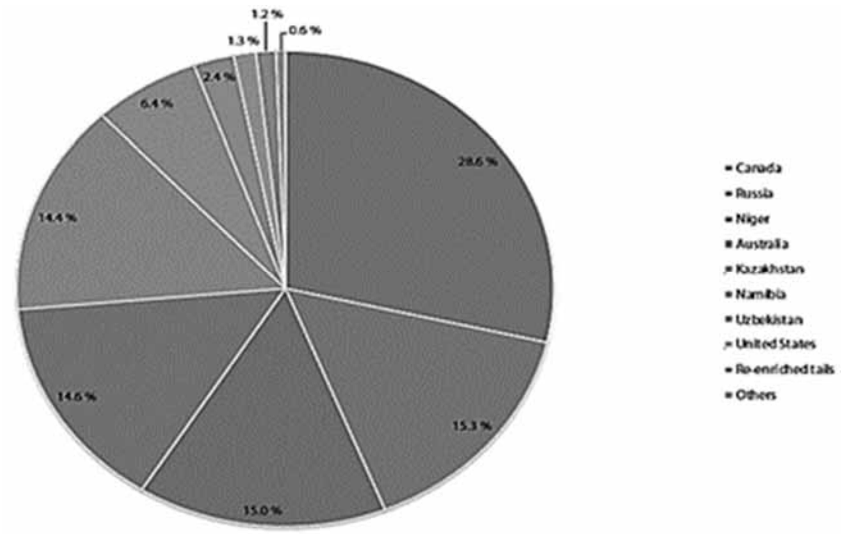
Germany, on the other hand, has pursued a policy of abandoning nuclear energy since 1998, although a 2007 poll shows that 67% of voters oppose plans to shut down nuclear power. (Nuclear Power in the European Union, 2020) Following the Fukushima accident in 2010, the decision to phase out nuclear energy became irreversible. Italy is so far the only country that has closed all its nuclear power plants and completely abandoned nuclear energy. Belgium (with a share of 53% nuclear power and 40% coal in electricity production), like Germany, has a long-term policy of abandoning nuclear energy. Spain (21% share of nuclear power) continues to rely on NPPs without expansion plans. Lithuania sacrifices its Ignalina nuclear power plant on entry into the EU, Austria and Poland for political, economic or technical reasons suspend their nuclear programs before the launch of their first nuclear power plant, although Poland (95% share of coal!) no longer rules out a turnaround in this aspect. In the Netherlands (4% nuclear power) and Sweden (35-40% nuclear power), there are fluctuations, recently the policy has turned in favour of nuclear energy. Greece, Denmark, Ireland, Latvia, Luxembourg and Portugal have abandoned their nuclear capacity plans.

Thus, in the EU, there are countries that do not question the nuclear power, there are hesitant (like Bulgaria), and there are countries – Austria, Greece, Malta, Cyprus, Ireland, Latvia and Belgium, which have pursued a firm 'anti-nuclear' policy over the last decade.

Obviously, the consensus seems impossible, and precisely on the only energy technology that has both great production potential and eliminates major risks in fuel supplies: the EU relies on uranium supplies from Russia (26.5%), Kazakhstan (18.5%), Canada (17.8%), Niger (13%) and Australia (12%) (Archive: Consumption of energy, 2017). In this case, it is important that there is no such clear dependence on one main supplier as is the case with other energy sources.

Figure 16

Imports of uranium into the EU



Source: „EURATOM Supply Agency, Annual Report 2017", http://ec.europa.eu/euratom/ar/last.pdf.

Nuclear energy is able to produce the necessary energy and, to a large extent, replace carbon energy sources (electricity for transport). However, accumulated prejudices, due to cultural differences, prevent the mobilization of resources at the community level to build new facilities that require large initial investments, as well as to seek an acceptable solution for the storage of waste in production. Instead, the share of energy produced at NPPs decreased by 16.7% between 2006 and 2018 (Nuclear energy statistics, 2020). Attempts to permanently shut down existing or decommissioned NPPs continue, reducing the chances of achieving both goals at the same time: reducing dependence from external supplies and reducing damage to nature („*Do no significant harm*", Regulation 2020/852 of the European Parliament and of the Council).

5. Energy Security and External Challenges

Energy security deals primarily with the dependence on gas imports (through tankers, oil can be supplied from multiple starting points). It is desirable for the EU countries to have at least three different sources of gas, with supplies paid on the market course. This broad topic should be considered separately.

Concerns about energy dependence are mostly related to Russian supplies. But they are not just about the gas market. Until joining the EU, the Baltic countries had their own uninterrupted source of electricity – the Ignalina nuclear power plant, built during the Soviet era with two power units with a capacity of 1300 MW each. After 2005, the power plant was closed under the Accession Treaty, but the Baltic countries became an energy-deficient region. Both Belarus and Russia are ready to supply electricity to the Baltic States at low prices. The energy systems of Belarus, Russia, Estonia, Latvia and Lithuania form the so-called "BRELL Electric Ring", the work of which is coordinated under a 2001 agreement.

But in early 2017, the Center for Energy Security (NATO) prepared a secret report on the risks of energy dependence of the Baltic countries on supplies from Russia. As a result, the three countries in September 2017 decided to withdraw from BRELL by 2025. Electricity prices are expected to rise by about 15 to 30%. European electricity tariffs are significantly higher than Russian ones. For comparison, electricity is sold to Russian consumers at a price of 0.058 USD per kWh for households and 0.085 USD for businesses (Uche-Soria and Rodríguez-Monroy, 2020). At the same time, Belarus is launching the Ostrovets NPP. The plant is located only 25 km from the Lithuanian border. For political reasons, the Lithuanian side refuses to buy electricity from Minsk, urging the Belarusian authorities to stop the project.

In addition, the total cost of synchronizing the Baltic electricity grids with that of the EU is €1.5 billion, with a total GDP of €90 billion for third countries. The European Union is expected to fund 75% of the costs for the first phase. At the same time, the dismantling of the Ignalina nuclear power plant requires a total of 3 billion euros. The aid from the EU budget covers part of the amount, but there is no decision yet on the remaining 1.2 billion euros. The Baltic countries are relatively isolated. The combined impact of the six pillars: sustainability, renewable energies, energy efficiency, self-consumption regimes, electrification of energy demand and electrical interconnections (Uche-Soria and Rodríguez-Monroy, 2020) predicts consolidation of the energy poverty there with all possible social and hence political implications.

6. Conclusion

The EU attempts of constructing a common energy policy show signs of systematic behaviour, but not always the reaction to the challenges is clear and one-way. Economic, political and security considerations related to the dependence on strategic raw materials and energy imports are closely intertwined with those of nature protection and quality of life. At present, there is no common energy policy in this vital sector (despite the expectations of functional transfusion theory), which is not yet the behaviour of a completely open system. There are still neither suffusion links between the different energy sectors, nor is there (so far) a tangible link with the Single Market.

Efforts to impose a common energy policy continue to deliver partial results, but they are based partly on miscalculations and false predictions. The Union's energy strategy is lacking, and efforts to build it often neglect technological and economic factors.

A **SWOT analysis** of the EU's energy strategy and policy could be presented as follows:

1. **Strengths:** EU's energy strategy
   - covers a region with dimensions that allow efficient energy distribution and consumption;
   - tries to reduce external energy dependence;
   - recognizes the risks of adverse effects of human activities on the environment;
   - stimulates the development and use of new technologies and imposes high technical standards.
2. **Weaknesses:** EU's energy strategy
   - exaggerates the risks of adverse effects of human activities on the environment. The strategy is based on controversial political considerations, neglecting technological and economic factors;
   - does not properly take into account the Union's energy "poverty" and sacrifices the only energy sources it possesses – coal, neglects nuclear energy and relies on uncertain alternative sources;
   - exposes for political reasons the relations with important external energy suppliers to unnecessary risks;
   - relies too much on economically unjustified alternative energy sources and offers an unsustainable energy mix;
   - risks losing international competitiveness and straining relations with major partners and competitors.
3. **Opportunities:** EU's energy strategy should
   - analyze accurately and rethink the risks to the environment;
   - analyze accurately and rethink the consequences of the "Green Deal" for the social balance in the member states;
   - find a consensus on nuclear energy and to mobilize resources for its development, including using advanced technologies;

- revitalize Euratom.

4. **Threats:** EU's energy strategy should **not**
    - spoil further balance between technological, economic and political factors;
    - maintain the current political situation, which requires "green" but wrong solutions to long-term energy problems;
    - prolong the inadequate interventions in North Africa with all negative consequences for the possibility of energy supply from the region.

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