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CLIMATE CHANGE AND BUILT ENVIRONMENT: THE LEGAL ASPECTS

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***Abstract**: The EU approved the 40% binding greenhouse gas emission reduction target under the UNFCCC and the Paris Agreement, which makes the previous Kyoto Protocol' mechanism and the EU legal rules necessary to change or renew them in some fields. The Regulation (EU) 2018/1999 of the European Parliament and of the Council establishes a legal framework for the elements of planning, reporting and control which is indispensable for the Energy Union and Climate Action under the scope of the Paris Agreement's. Nevertheless, the legal instruments for managing climate change are far beyond one act, therefore after some basic information about framework of the legal system, the governance mechanism will be presented, which is based on the system of plans, and reports relevant for the period 2021-2030.*

***Keywords:** Law, climate change, energy union, climate action.*

1. HISTORICAL BACKGROUND

1.1 *The United Nation Framework Convention on Climate Change (UNFCCC)* [1]

Dinah Shelton defined the international organization's normative regulations as soft law without connection to its form. A multilateral treaty as same as other normative regulations and he finds that these treaties rarely force direct obligations on any entities for example states. [2]

The UNFCCC came into force on 21 March 1994, and now 198 Parties have already ratified the Convention [3]. In the UNFCCC was the first time when the Parties defined that the climate change has anthropological causes directly or indirectly. But - as Sands who distinguished 7 principles in the and with the connection to the Convention - the „common but differentiated responsibilities and respective capabilities" principle could become a base of some disagreement. [4] This principle is enshrined in the Rio Declaration [5] and it is very liked by many authors, as it is appearing in many of the EU's basic documents in the climate change policy. This principle was the base of disagreement about anthropogenic causes which separated the politicians as well as the countries. [6] The Convention gave the definition of absolute human interference, in Costa Rica, just in 1999 and with connection the IPCC's third assessment report [7].

The UNFCCC provides for some obligations, but, as an international agreement, the UNFCCC lacks the tools of enforcement, as Sheldon pointed out as well. [8] For the Parties of the Convention's one of the most important objectives is that, they shall to stabilize greenhouse gas concentrations "*at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system*." [9]

The OECD countries, as industrialized countries in the Convention were expected to do their utmost to cut emissions on home ground. They also include the European Economic Community (it is EU after 1992) and the Central and Eastern European countries with economics under transition process to market economy, like Hungary. Annex I countries were expected to reduce emissions to 1990 levels by the year 2000. Each developed and Annex I countries shall adopt national policies on climate change and take corresponding measures to mitigate and limiting the GHG's anthropogenic emissions and protect, as well as and enhance, GHG's sinks and reservoirs. These nations also agreed to support climate change activities in, the Convection's definition and time, developing countries by providing financial support for action on climate change. To help them, OECD countries shall share technology with developing countries. A system of grants and loans has been set up and is managed by the Global Environment Facility. Annex I's countries are required to report regularly on their climate change policies and actions under the Convention by submitting an annual inventories' report of their greenhouse gas (GHG) emissions.

Finally, I need to mention the Conference of the Parties (COP), as the supreme body, which was created by the Convention also.

1.2 *The Kyoto Protocol* [10]

The Kyoto Protocol was the main instruments for tackling climate change before Paris Agreement. As a Protocol, it is linked to the UNFCCC, as well nowadays the Paris Agreement It was adopted in Kyoto, on 11. December in 1997, in the 3th Conference of the Parties (COP 3), but – because of its own rules - it only came into force on 16 February 2005. [11] In 1997 the Kyoto Agreement was established by 38 states and one regional economic integration, the EU. Its entry into force was regulated by Article 25, which has an own limits: „*on the ninetieth day after the date on which not less than 55 Parties to the Convention, incorporating Parties included in Annex I which accounted in total for at least 55 per cent of the total carbon dioxide emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession*.". The problem with coming to force was some OECD countries, whose signed earlier, but not ratified it later, most known example are the United States of America or Australia. The causes behind the gap between signing and ratification could be some, for example David G. Victor identified two of them, firstly the hot air syndrome, after the high cost of mitigation for countries (like China) which were developing countries at the time when they signed the agreement but became developed (OECD, Annex 1) countries in the meantime. [12] In the end, Australia ratified the Protocol on 3 December 2007, so the Protocol could enter in the force. [13]

The Protocol's most elementary rule was the mitigation target. In Annex B recorded the quantified commitments of the Annex I parties. Guaranteed that their aggregate anthropogenic CO_{2e} (which is calculated by the global warming potential method) emissions do not exceed their assigned amounts and the same time they reduce their overall emissions of GHGs by at least 5 per cent. The EU's reduction target (8 percent, set collectively rather than by the Member Staes, as individual countries) was broken down into legally binding national targets. Other hand the EU's reduction target was legally more enforceable than the Protocol's any other Parties target. In 2002, which was the first period commitment period of the Protocol, the European Union approved it by a Council Decision, 2002/358/EC. [14].

Other important obligation for the Parties is improve their of energy efficiency in the relevant sectors of economy, and if we see this in the sub level, the EU established some important legislative documents with connection to the energy policy like energy efficiency, biofuels, renewable resources, etc. And the Green Deal, as a comprehensive regulatory tool, but not a secondary legal source also connected. [15]

The Protocol's first commitment period was between 2008 and 2012, the second 2013-2020, which became the basic planning time periods later in the EU. The emission's base year was 1990 for most of the parties, but for example the countries under economic transition process had legal opportunity to divergence, like Hungary. The assigned amounts shall be calculated in accordance with the quantified emission limitation and reduction commitments as stipulated in Annex B and the GHGs are listed in Annex A. Each GHG is make predictable by its total warming impact relative to CO2 over a set period – usually a hundred years, which is the CO_{2e}. In the Protocol they identified four gas and two group of gases as GHGs. The mitigation, as GHGs emission reduction target is supported with other measures like promoting policies, and research, new and renewable forms of energy, carbon dioxide sequestration technologies and the best available technologies in environment.

To reach its goal, the Protocol has some new rules. If you compare the UNFCCC and the Protocol you can recognize that their goals (or targets) mostly the same, in contrary the methods to achieve them are different. The Protocol is absolutely more efficient in this area, which is a good example the difference between the more general Convention and the more executive type of Protocol. All the Annex I Party has the responsibility, „*in achieving its quantified emission limitation and reduction commitments under Article 3, in order to promote sustainable development*", under Article 2. Annex I Parties should implement and/or further establish policies and measures in accordance with its national circumstances. They must promote sustainable forest management, which is the LULUCF rules and sector, where they use practices in afforestation and reforestation and sustainable agriculture, considering climate change considerations as well. [16] The Parties have decided that removals and emissions of greenhouse gases resulting from specified activities shall be accounted for in the fulfilment of the emission targets under the Kyoto Protocol. Emissions resulting from deforestation activities shall be deducted from the total quantity of emissions that an Annex I Party is permitted to emit during its commitment period. Under Article 3.4 of the Kyoto Protocol, Parties could choose additional human-induced activities related to LULUCF, specifically forest, cropland, grazing land management and revegetation, to be included in its accounting for the first commitment period. The LULUCF regulated by not just the Kyoto Protocol's, but it has its own international and legally binding documents, the Marrakesh Accords.

Article 2 encourages reforms in some relevant economic sectors to aimed at promoting policies and measures which limit or reduce emissions of GHG, for example the transport sector. The issue of limitation and/or mitigation of methane emissions in waste management, as well as in the production, transport and distribution of energy are also dealt with.

An other interesting part in the Article 2 is the fifth: „*progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments*." This rule is older than the Protocol, stipulated by Organisation for Economic Co-operation and Development, and well known as polluter pays principle. Which is make the polluter financially responsible for the environmental damage, which was caused by him, this, original rule is very strict, so the nowadays environmental law uses it with large exceptions, because originally it excludes even subsidies to the polluter to reduce the pollution.
Although some of the Parties didn't agree on the economical solution, the Protocol has three tools to achieve the goals of Article 2. [17] These are: clean development mechanism – CDM, join implementation – JI and emission trade. As Labatt and White wrote in their book, the EU disagreed with the economical tools, it encouraged the command and control-type rules. [18]

A Clean Development Mechanism project shall deliver emission reductions that are additional to those that would have occurred in the absence of the project. Such projects shall undergo a rigorous and transparent process of registration and issuance. Under Joint Implementation, a Party included in Annex B to the Kyoto Protocol, having an emission reduction or limitation commitment, may acquire Emission Reduction Units (ERUs) generated by an emission-reduction or removal project implemented in the territory of another Annex B Party. Each ERU shall be equivalent to one metric ton of carbon dioxide (CO_2) and may be applied towards the fulfilment of that Party's commitment under the Kyoto Protocol. Paterson, in these two elements of the Convention, highlights the general responsibility problem between Northern and Southern countries and the different position, because developed countries were agreed, the developing countries were sceptic. [19] Bohm' opinion about JI is the problem is measuring, because JI is a flexible mechanism [20]. Other authors, like Streck and Lin criticized the other tools, the CDM, because of its complexity. [21]

The most well-known and the base economical tool is the third one, the emission trade, where the CDM's and JI's achievements could be eligible. The emission trade is the main tool of the GHG markets in some country and in the EU. It is interesting that EU also didn't agree with the economical tools in the Protocol, but they established the EU ETS just few years later, which is the most efficient instruments in the EU climate change policy.

Theoretically the emission trade has an economical base, that is the bubble policy and the theory by Ronald Coase, he tried to find an economical solution to handle environmental problems, which means they have to internalize it to the economy, as an externality. [21] The theorem is: that in a word of perfect competition, perfect information, and zero transaction costs the allocation of resources in the economy will be efficient and will be unaffected by legal rules regarding the initial impacts of cost resulting from externalities. [22] The theory unfortunately has some weakness, as Stigler pointed out, because the economics examples, used by Coase is simplified for example the high number of participants and the cost of transactions, which is not included by the original Coase' model. [23] The most interesting question in connection with the Coase Theorem is the legal aspects, because the freedom of choice, example if you have money, you can buy emission permission in the market, or you can choose other solution as production reduction. Mitigation, as a target is always obligatory, but the was how to reach this target changeable, so the respectability is higher than the normal command and control type of regulation in public administration.

in the Article 18, The Protocol made the opportunity to enforce its implementation and established the Conference of the Parties (COP) as its basic organ. At its first session, the body shall adopt appropriate and effective procedures and mechanisms to identify and address cases of non-compliance with the provisions of this Protocol. These shall include, inter alia, the development of an indicative list of consequences, considering the cause, nature, degree, and frequency of non-compliance.

1.3 *Post-Kyoto Era* [24]

After the Protocol started the first commitment period, in 2009, Copenhagen the first COP meeting was held where they accepted the Copenhagen Accord [25]. 114 states signed the Accord, so not whole of the Protocol's parties and its legal form is a decision. It declared a new objective for 2020, limited the increase of the global temperature below 2 °C, but the required increase objective is not more than 1,5 °C. This last objective was only mentioned as a long-term target and the Accord didn't arrange the details, only transfered it to a future implementing document.
In 2010 the next COP meeting was held in Cancun, Mexico, where unfortunately a new consensual and legally binding international agreement wasn't achieved, other hand, the base year of the second commitment period of Kyoto Protocol was defined in the Cancun Agreement. Also creating a baseline for the Annex I Parties to fulfil their emission reduction targets using the Kyoto Protocol's mechanisms like the emission trading. The global

warming potentials shall be used internationally how to calculate the CO_{2e} from anthropogenic sources of emissions and removals by sinks in the second commitment period. The reference level by Annex I Parties in the Agreement's Appendix I. The 2nd decision of CMP.6 was engaged to LULUCF. They also decided one of the economical supportive bodies, the Green Climate Fund, which scope is capacity-building needs improvement in developing countries. They also encouraged the Parties to improve the implementation in capacity-buildings. The 1/CP 16 decision established the Cancun Adaptation Framework, which is main topic is the other part of climate change's regulation the adaptation, not the mitigation, like earlier.
The COP's 17th meeting was in Durban, on year later. The most significant solution was that the countries settled the common agree they will accept the new binding international agreement, not later than 2015 and, because this date they established the second commitment period of the Protocol for the continuity. [26]
Two years later, in the COP's 19th meeting in Warsaw, the Parties asked the WG DP to accelerate the work for the new binding international agreement to 2015, Paris. [27] The draft was finalized by the end of 2014 and in Lima, 2014, at the end COP20 accepted the draft for the Paris Agreement.

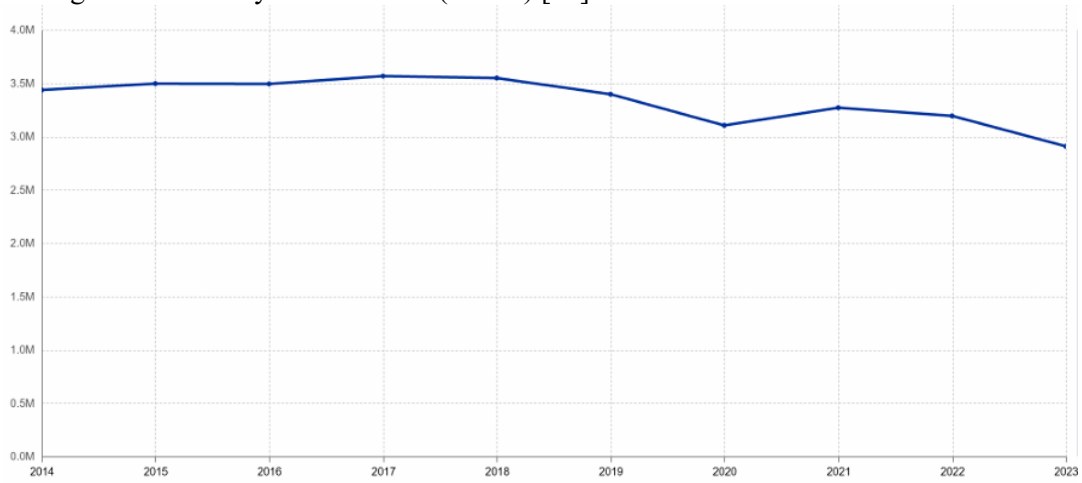
2. NOWADAYS IN INTERNATIONAL LEGISLATON, THE PARIS AGREEMENT [28]

In the COP' next meeting (21th) The Paris Agreement, as planned, was adopted in Paris, between 30th November and 11th December 2015. [29] Finally, 195 countries have committed to reducing their greenhouse gas emissions in the Agreement. [30]
The goals is in the Article 2 of the Agreement: „*holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change"*. From to the Intergovernmental Panel on Climate Change – the most well-known international organization in climate change research - if temperature increase of over 2°C it would cause serious consequences, like a greater frequency of extreme climate events, like flash flood or heatwaves. In COP15 session the parties agreed to keep global warming not more than 2 °C compared to the preindustrial era. [31]
Not to overshoot this limits the global greenhouse gas emissions need to be reduced by 40-70% by 2050 estimated by climate experts and the final target is the carbon neutrality which needs to be reached by the end of the century [33]. The Stern Review which was published by the UK Government in 2006, managing global warming is estimated to cost about 1% of global GDP annually, whereas inaction could result in losses of at least 5%, and in a worst-case scenario, up to 20% of global GDP. [34]
The Parties must prepare and submit their national climate action plans (NDCs) because of the planning rules and details in the Article 4, paragraph 2. The NDCs shall send to the UN and they publish it on the UNFCCC website, first year was 2020 and after every 5 years. In 2023 the UN published the NDC Synthesis Report for synthesizing the relevant information contained in the published NDCs. Analysing the relevant information from NDCs the total global GHG emissions (without LULUCF) are estimated to be around 53.2 (51.6–54.8) Gt CO_2 equivalent in and 51.6 (48.3–54.8) Gt CO_2 equivalent in 2030 [35]. Unfortunately, the best estimate of peak temperature in the twenty-first century from NDCs is in the range of 2.1–2.8 °C depending on the underlying assumptions [36].
In 2024, the question rightly arises as to how effective the Paris Agreement is in tackling climate change. The soft law nature of international treaties is a fundamental determinant of the answer to this question, but it should not be neglected that environmental problems do not recognise national borders, so the international level is the most optimal choice. Unfortunately, the North-South problem is much more strongly reflected in the Agreement, but there is still room for improvement in this area, especially regarding the dissemination of truly green investments. At present, these investments represent opportunities for emission trading rather than facilitating the spread of mass environmental solutions.

3. EUROPEAN UNION AS REGIONAL LEVEL IN CLIMATE LEGISLATION

The European Union means one entity – as one Party as well - whole of the international climate change legislation as an economic integration, the change is only in the number of member states and the name. In UNFCCC it had 15 countries, as European Economic Community, nowadays it means 27 MS and EU. The difference between regional and international level is the enforcement ability. The EU's legislative system has different type of rules, but most of the rules are enforceable if a MS fails to follow the common rules European Committee or/with Court of Justice of the European Union (Curia). Without any more explanation the easiest way to understand, international law is soft law, EU's law is hard law which is based on rule of law [39].

Total Greenhouse gas emissions by source sector (EU 27) [40]



Time frequency: Annual Unit of measure: Thousand tonnes Air pollutants and greenhouse gases: Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2 equivalent, PFC in CO2 equivalent, SF6 in CO2 equivalent, NF3 in CO2 equivalent) Source sectors for greenhouse gas emissions. [41]

3.1 *European Climate Law*

Before the European Climate Law (ECL) is discussed, we need to talk about the European Green Deal, because ECL is the most important legislative consequences of the Deal's goal, although more than a dozen legislation was modified or established till today. [42] The Deal was a communication from the EU Commission in 2019 [43]. It reinforced the Commission's commitment to tackling climate change, established a new growth strategy and aims to protect, conserve and enhance the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and impacts [44]. To deliver the European Green Deal, EU needs to rethink policies for clean energy supply across some policies. Every action or policy of the EU must contribute to the European Green Deal objectives; thus, it sets out a plan of action, included a roadmap for the concrete actions. The Deal's most important and exact rule for the whole EU is that there could be countries with no net emissions of greenhouse gases in 2050. The transition to climate neutrality requires changes in all the policies and a collective effort from the economy and society.

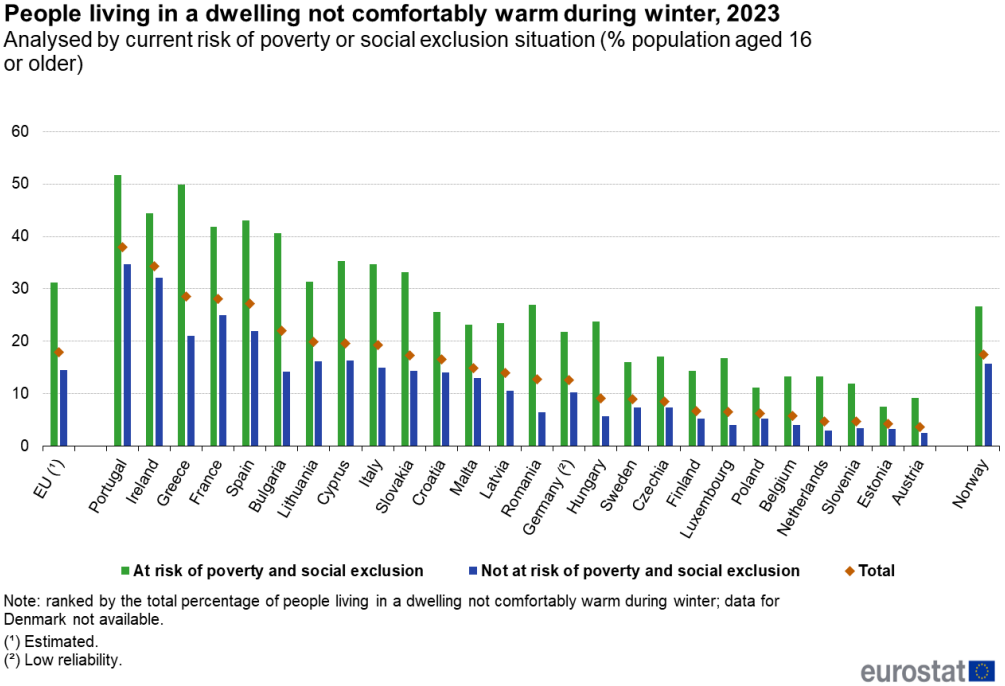
However, it is important to mention that the European Green Deal is not a law – by classical definition – this is the reason why the Climate Law needs to be discussed.

The Regulation – a form of law with the goal of unification – establishes the framework for the irreversible and progressive reduction of anthropogenic GHGs emissions by sources and improvement of removals by sinks regulated in the Union law. The regulation declared the climate-neutrality objective as the Deal did earlier, with the binding target toward 2030 which is: the domestic reduction of net greenhouse gas emissions by at least 55 % compared to 1990 levels by 2030 [45]. Meanwhile the regulation calls the Commission to make a legislative proposal to amend the regulation which includes the Union 2040 climate target. For this reason, the regulation established a lot of exact rules to the Commission how to prepare the amend. For the scientific advice in climate change the act established a scientific advisory board in the European Environmental Agency's system. Following the Paris Agreement, the EU established rules for the adaption. The adaptation is a pillar of the Kyoto Protocol and later international agreements, based on the IPCC reports. The Paris' targets mean that the climate will definitely change, the global average temperature reaching 1.1°C above pre-industrial level by 2019. [46] The anthropological based change is 0.2°C per decade. [47] The Earth needs to prepare for the inevitable changes, that means adaptation in climate change.

The European Union's legal system supports climate change at many levels and from many directions, providing the right legal framework. Implementation by Member States is key, and fortunately the legislation contains adequate rules for monitoring and feedback. These rules are not remote to national public administrations and authorities are prepared to enforce the legislation. It is of course a matter of each Member State's sovereignty how effective they are in transposing EU rules, so the Fit for 55 rules' positive derogation regime is a particularly good solution.

3.2 *Built environment, energy union and climate change*

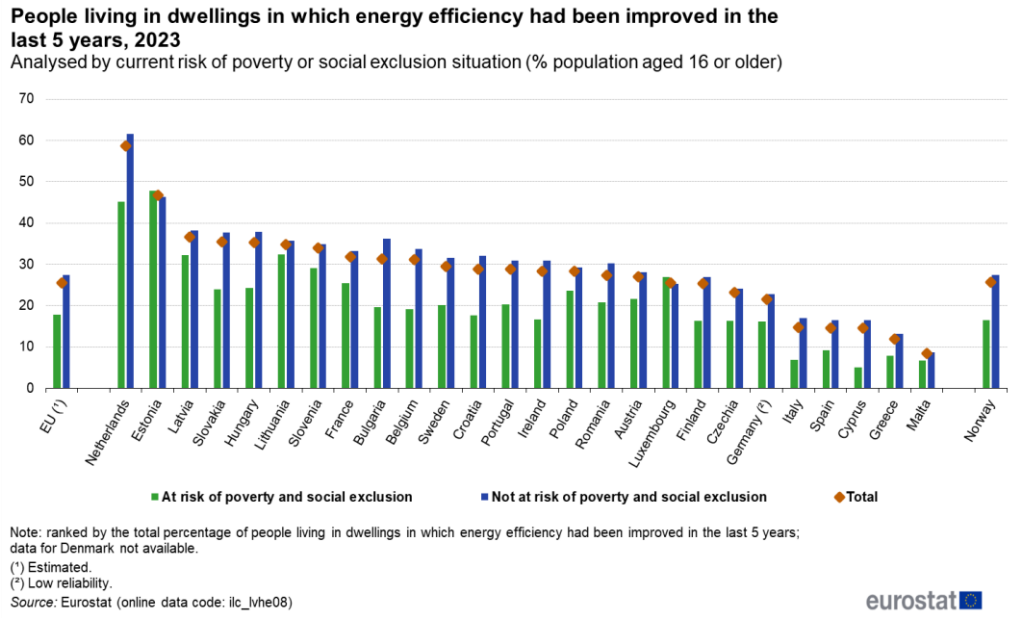
Just three materials – concrete, steel and aluminium – are responsible for 23 % of overall global emissions today. [48] Within the total share of emissions from building and construction (37 %), the majority (11 %) is indirect operational emission from residential buildings: energy use intensity and energy source. Information on climate risks needs to be embedded into the architectural design, delivery and retrofitting of housing. [49]
If you remember, the European Council in 2014 established for key target, and three of them had base with energy policy, more exactly: an indicative target of improvement in energy efficiency of at least 27%, later 32%; share of renewable energy consumed in Union of at least 27%, later: 32,5%; and electricity interconnection of at least 15%. [50]



[51]

The Energy Union included five elements: energy security, the internal energy market, energy efficiency, decarbonisation and research, innovation and competitiveness. [52] Because of the Member state's different legislative and economical state, the EU had to establish a supranational level mechanism, without this the target's enforceability is questionable. This is the reason behind the Regulation. This mechanism is based on strategies and plans both international and national, the Member state's progress reports at the end the Commission's monitoring reports. The Regulation made the energy efficiency as first principle.
The energy efficiency as a target has a direct connection with the built environment in a long-term strategy which is the renovation both the national residential and non-residential buildings. There is no differentiation in this task by ownership (public or private buildings) Buildings account for 40% of total energy consumption in the Union. [53] For this the Ms's long-term strategies should contain the elements and cover the emission reduction and improvement of removals in individual sectors including building sector as well as industry or transport for example. As an obligation from the Regulation the Member States have to report their efforts in energy efficiency in integrated national energy and climate progress report to the Commission. The Commission shall submit the report to the European Parliament and the Council by 30 October of every year. Every second year it contains an overall progress report on the renovation of the national stock of residential and non-residential buildings. This obligation for the Commission to inform the Parliament and the Council about the progress could improve the legislative and enforcement process. The Commission can start the infringement procedure if a Member State fails to implement the EU law to help and enforce them for the appropriate process.
After this some Member States established ambitious national energy and climate plans and some of the Member states documented "early efforts", which indicated a new approach for the EU, who wanted to use these plans as good examples for other Member States. Not just because of this, but for the energy efficiency targets the Directive 2012/26/EU should be recast, which concluded the Directive 2023/1791/EU. We follow this Directive after the Regulation because of this legislative tool differentiation, the regulation needs unification, the directive needs approximation. This latter allows more freedom for the Member States in the execution. The Directive 2023/1791

EU establishes a common framework of action "*to promote energy efficiency within the Union in order to ensure that"* the Union's targets on energy efficiency and improve it some cases. "*This Directive lays down rules designed to implement energy efficiency as a priority across all sectors, remove barriers in the energy market and overcome market failures that impede efficiency in the supply, transmission, storage and use of energy. It also provides for the establishment of indicative national energy efficiency contributions for 2030."* [54] The Directive in the first paragraph defines the buildings as non-energy sectors, where behind an exact value limit the energy efficiency is a mandatory element in plannings, policies and major investments. The value threshold is high, which means the main obligated party is the public entities, but as first step it is necessary, because of the exemplary role of public sectors. This role is regulated under the 5th Article and has an exact target for them: the total final energy consumption of all public entities added to be reduced by at least 1,9% each year, compared to 2021. At the end, the buildings have a main role here as well. A Member State must ensure that at least 3 % of the 250 square meter or more total floor area of regulated indoor climate buildings that are owned by public sector is renovated each year and to be convert into at least nearly zero-energy buildings or zero-emission buildings. [54] And if they use a building which fits this rule, but not owned by them, they have the obligation for establishing contractual clauses for the building to become at least a nearly zero-energy building or zero-emission building. In a circular economy extending a building's life is the most valuable option where renovation generating 50-75 per cent fewer emissions than new construction.



[55]

Beside energy efficiency the energy savings are also important and it has progressive targets in time ahead, which has a 10-year period with annual obligations.

Of course, this Directive established a progress report to the Member States as a duty earlier , but it is not independent documentum and it is also part of the integrated national energy and climate progress reports with a comprehensive heating and cooling assessment. This obligation for planning is also important for the next target of energy efficiency, because the Member States has exact duties in energy consumption. In the year 2030 compared to the projections of the 2020 EU Reference Scenario the reduction of energy consumption could be of at least 11,7%. Which means the Union's final energy consumption amounts to no more than 763 Mtoe. [56] Member States shall make efforts to collectively contribute to the indicative Union primary energy consumption target amounting to no more than 992,5 Mtoe in 2030. [57] This target is a collective reduction target, so the Member States had to establish their own targets, under the Directive rules. And as in the Regulation as here, the The Commission shall evaluate whether the national measures adopted by Member States are adequate to achieve the Union's energy efficiency targets.

Any targets which come from the Directive could help to reach the energy management system and the energy audits. The companies with an average annual consumption which is higher than 85 TJ of energy from all energy carriers, over the previous three years, have to implement an energy management system. And the enterprises with an average annual energy consumption between 10 TJ and 85 TJ, over the previous three years and taking together all energy carriers, are subject to an energy audit. For the reduction of energy consumption, the Directive established some rules for the consumption meters, which could be competitively priced, accurate and remote

reading. They encourage installing smart meters and improving bills to provide better and comprehensive information for the people. Without accurate information – for example the cost of the energy - you could not plan and control your consumption, and every consumer is important for the common target not just the states or the EU. And the protection is also important, so the EU established the main elements: the contracts for heating, cooling and domestic hot water. For the protection the Directive uses a new group: the vulnerable customers in energy and energy poverty.
Unfortunately, as with the built environment in general, funding is the key to individual efforts. Legislation provides the framework and the EU has built up an appropriate funding system to address environmental problems. The main key to this is channelling to the individual, for which the statutory deadlines may allow more scope for Member State regulation to drag on than is supposed to be necessary, but it should also be borne in mind that the different economic situations in Member States require specific solutions. It is not possible to treat 27 Member States with different economic situations in a uniform way, and the EU has not been able to show sufficient consistency in this respect, even towards the eurozone members.

4. CONCLUSION

The built environment - as human made environment - includes parts unrelated to our topic, but every part needs energy when we build them or use it. I chose buildings, because EU mostly – but not exclusively – focused on this field in the legislative acts. A sustainable built environment aims to reduce negative impacts on the environment and improve the quality of life as the World Green Building Council declared. Climate change has a considerable negative impact on lifestyle which looks like a vicious circle. More heatwaves indicate more indoor cooling necessity which needs energy. This energy could origin from sustainable resources or the traditional way: non-renewable resources. The building and construction sector is by far the largest emitter of greenhouse gases, accounting for a staggering 37% of global emission. [58] They are responsible for around 40% of energy and process-related CO_2 emissions. [59] Buildings number in EU27, in 2020 was 111,58 m and the total floor area (sqm) 27 229 m. [60]

The production and use of building materials such as cement, steel, or aluminum have a carbon footprint also. Concrete is the most-used material in the building sector, and the cement as part of concrete, contributes 7% of global carbon emission. [61] similarly to iron and steel industry at 7.2%. [62] If we want to decarbonise conventional material like cement, steel, aluminium, plastic, glass, etc the key point is electrifying and decarbonising the energy what was used to be produced. Of course, above all we need to establish and build longer life-cycle buildings and urban infrastructure.
In 2021, the direct emissions due to fossil fuel use were at 324.74 Mt cO2eq in residential sector and 129.90 Mt CO2eq in services sector. [63] The residential sector GHG emission significantly decrease since 2005, but the lowest point was in 2014 (the highest was in 1996 with 971,71 MtCO2eq) as you can see in the EU's Building Stock Observatory' website. The direct emission is a little bit slower decreasing than the indirect. The available information shows a little increasing again after 2020.

EU established the nearly zero-energy rules for buildings helping the process, but most of the people live and use old buildings, not new ones. The most residential and services building was constructed between 1946 – 1969, this type of buildings in 2020 was 3 591 m sqm. [64]. In 2020. about 14.8% of total population was living in a dwelling with leaking roof, damp walls rotten windows, frames or floor. [65] This is why was important established the renovation rules in the Regulation and the Directive.
EU declared no climate rules without energy and mostly energy efficiency. The Member States established numerous acts to reach the Paris Agreements target and for the adaptation to inevitable changes in climate, I focused on this article just the buildings and energy connection, but important to know climate change cause and consequences connected in every part and EU has a lot of legislative acts in this field. Climate change legal regime is huge for example the most important tools in EU the Emission Trade System (ETS) also connected with buildings as well as energy through the Member States. That means integrated policy in EU.
Buildings present a clear and evident potential for further increasing energy efficiency, and the renovation of buildings is an essential and long-term element with economies of scale in increasing energy savings. For example, the building automation and control system which was used in the Directive could provide active energy management not just the public buildings and entities but private sector as well. Or the better and more understandable information also important, see the Directive rules for meters and bills. If you know and understand how many energies you could and need to use, and what is the different between the two, energy efficiency could be obvious. In 2021, households consumed 64,4% for space heating which is cca 0,3 m TJ increasing since 2018,

but between 2018-2020 the space heating was mostly the same, between 6,6 and 6,7 m TJ. Which is similar in cooking, domestic hot water, cooling and other, that is means 2021 is the increasing year in total energy use. [66] Or renovation also a key point, very important to support the energy efficiency and less energy consumption as a result in a renovation. By the European Environment Agency's public database, the energy consumption in 2021 was 10941.66 PJ in residential sector and 5420.89PJ in services sector. [67] In 2010 it was 11 687,5 PJ in residential and 5 865,3 PJ in services. [68] It was reduced till 2011, but after increase till 2013. [69] The lowest was in 2014 with 9831,6 PJ and 5171,9 PJ. The energy consumption was increased after 2020 in 2021 the final energy consumption was at 10941,66 PJ in residential sector and 5420,89 PJ in services sector. [70] So, if we see this data, the EU rules which regulated the consumption is very important, more people need more energy - and of course, it is matter from which source the energy comes – but if we can change our behaviour and use less energy - as we did before 2020 - we can reach results. This is one of the EU's Directive' target.
It needs financial help for citizens, and the EU financial system could help the Member States and the citizens also. Other hand, a public building could be not just a good example for the people but help the sustainable industry and a more stabilised industry could offer better option – technically and financially – for the citizens. The social aspect of energy poverty interesting, in 2022, 6.9% of the total population was having arrears on their utility bills, while 9.3% could not keep their home adequately warm over the cold periods. [71] Which is the base why EU climate change laws established the energy poverty as definition and the Directive has exact rules to protect them, like in Article 24.

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