Regulating the Environmental Impact of AI in European Law. Technology Stakes and Legal Challenges

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Abstract

The paper is based on the premise that the ambivalent impact of AI – a tool to promote protection and a factor in increasing the ecological footprint – is also manifested in terms of the environment. Reflecting this duality, European law seeks to balance the potential of AI to promote the green transition (AI for the environment) with the imperative to limit the environmental and carbon footprint of new technologies (sustainable AI). In this regard, relevant regulations encourage the use of AI to achieve the EU's goal of achieving climate neutrality in 2050, pollution management, biodiversity monitoring, energy optimisation and the fight against climate change. At the same time, environmental sustainability is a requirement of the AI value chain (the obligation of energy efficiency, transparency and green design). It is also an aspect of corporate social responsibility. The results of the study show that, regarding the European legal framework for AI – the AI Act [Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence] and the Council of Europe's Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law – we are in the presence of general regulations regarding the environmental impact of AI, which transfer the substance of the problem to the level of voluntary rules (Code of Practice for General Artificial Intelligence, 2025), a process that generates major legal challenges in the face of important technological stakes.

Keywords: *AI Act; IA Framework Convention; environmental law; environmental impact of AI; the sustainability of environmental AI.*

JEL Classification: K32, K39

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1. Introduction

The ambivalent impact of artificial intelligence (AI) technologies is manifested in environmental matters as well, acting both as a tool for promoting protection and improving environmental quality, or capable of manifesting itself as a factor

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aggravating the ecological footprint in general and the carbon footprint in particular. Indeed, AI is first and foremost a significant opportunity for economic and social actors to promote performance and innovation. It enables automation of processes, improvement of productivity, and analysis of massive amounts of data in order to maximize decision-making. The impact is all the more crucial as it encourages more efficient resource management and allows for better anticipation of challenges related to security and predictability. At the same time, public environmental action is increasingly integrating artificial intelligence to accelerate the ecological transition, while also seeking to reduce the environmental footprint of digital technology. On the negative side, AI has an increasingly significant environmental impact, mainly due to the massive energy and water consumption of data centers, and the training and use of generative models increase greenhouse gas (GHG) emissions and climate system disruption. From this perspective, it has already become necessary at the global level to develop a transnational, pluralistic, and independent assessment of the risks, opportunities, and impacts of artificial intelligence, and a first step in this direction was the creation of the Independent International Scientific Panel on AI[2].

In Europe, such dynamics are structured around the concerns related to the use of AI for monitoring, modeling, and optimizing resources, while the high energy, water, and critical mineral consumption of generative AI requires the promotion of frugal and responsible AI[3]. According to European theory and practice, public action at the intersection between environment and artificial intelligence is structured around two major axes: the use of AI as a tool for the eco-climate transition and the regulation of its own environmental impact. Determining the situation in all its complexity, including the related complex solutions, both regulatory and institutional, requires, in accordance with certain procedures and based on appropriate assessments[4], admitting it falls within

[2] Created on the basis of the *Pact for the Future* adopted on 22 September 2024, whose annex, the Global Digital Compact, expressly provided for it, its structure having been formalized by the UN General Assembly resolution of 27 August 2025 (A/RES/79/325), the Panel is intended to promote a scientific understanding of issues based on evidence, to lead to assessments of opportunities, risks, and impacts, and, at the same time, to open an inclusive forum for discussion between States and stakeholders. For an overview, please see: Eléonore Favero Agostini, "Création d'un groupe scientifique international indépendant sur l'IA par l'ONU: une avancée majeure pour la gouvernance mondiale," *Dalloz Actualité*, March 10, 2026, https://www.dalloz-actualite.fr/flash/creation-d-un-groupe-scientifique-international-independant-sur-l-ia-par-l-onu-une-avancee-maj.

[3] From an environmental perspective, learning and interfacing massive models have an energy cost that requires careful consideration and in-depth analysis. The studies of certain authors highlight the complexity of accurately measuring the carbon footprint of these large models, while also revealing their significant impact. One solution is to think about AI from the perspective of sobriety; frugality consists in setting a resource envelope (computing, memory, data, energy) from the start and designing models capable of adapting to it. The idea is not to sacrifice performance, but to prioritize sobriety, optimize each stage, choose the architecture for data collection, going through more relaxed learning methods, in order to reduce the environmental footprint, broaden access to AI, and promote truly useful applications. To this effect, it is important to advance in terms of the criteria and methods of assessment in this field. Ludovic Arga et al., *Frugal AI: Introduction, Concepts, Development and Open Questions* (2025), HAL, https://hal.science/hal-05049765.

[4] Cary Coglianese and David Lehr, "Regulating by Robot: Administrative Decision Making in the Machine-Learning Era," *Georgetown Law Journal* 105 (2017): 1147–1223.

the scope of concerns regarding the AI's legal framework.

Reflecting such developments and positions, the concerns regarding the regulatory framework and governance of these issues are structured differently at international, European Union, and national levels[5]. Thus, the UN system, the main international framework for debate and regulatory initiatives relating to digital cooperation and artificial intelligence governance, promotes a perspective of integrating new technologies into sustainable development objectives and emphasizing the AI's environmental sustainability. In this context, a set of soft law documents has emerged, which point towards the premises for further developments of a legal regime for sustainable AI. At European level, the legal framework on AI – Regulation (EU) No. 2024/1689 of 13 June 2024 laying down harmonized rules on artificial intelligence (the AI Act or AIR) and the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law of 21 May 2024 (AI Framework Convention) - addresses, to a certain extent, the relationship between the environment and AI, complemented by voluntary rules on environmental sustainability. It also tends to complement and combine in this regard with the regulatory framework on corporate environmental responsibility, by promoting sustainability indicators in the use of eco-responsible artificial intelligence.

2. Sustainable Development and Sustainability: Synonymous or Different Concepts?

Specialist doctrine and relevant practice offer us two main positions when it comes to defining and understanding the two concepts. The former regards them as synonymous and interchangeable; the latter sees them as different and, in some respects, even contradictory. This starts from the idea of a theoretical and practical succession between them, meaning that sustainable development, already a worn-out notion on the verge of being abandoned, will be gradually replaced by sustainability or ecological and social transition. Therefore, we would be looking at two concepts that need to be distinguished from one another, differentiated by the meanings they imply. The former only acquires meaning in relation to the intended purpose; it relates to the type of development and, ultimately, to the type of desired society. The term sustainability belongs to an instrumental and partial rationality, linked to a particular object, field, or territory. Therefore, it belongs to the sphere of means and concerns the best way to achieve a goal under the constraint of scarce resources. But determining the goal is beyond sustainability. In addition to this distinction, it should be recognized that both concepts may have implications that could be partially antagonistic. Sustainability would imply a double limitation; the first consists in confining sustainable development solely to the issue of compatibility between growth and environment, thereby diminishing the richness of biological, ethical, and other relationships; the second results from eliminating the issue of the objectives pursued, being limited to the

[5] Nathalie A. Smuha, "From a 'Race to AI' to a 'Race to AI Regulation': Regulatory Competition for Artificial Intelligence," *Law, Innovation and Technology* 13, no. 1 (2021): 57–84, https://doi.org/10.1080/17579961.2021.1898300.

conditions stipulated[6]. In an intermediate position, the *sustainability* paradigm would suggest the adoption of an integrative approach to economic, environmental, and social issues and would serve as a leveraging factor for sustainable development. In this perspective, among its various specific applications, energy sustainability would stand out as an application of the paradigm *lato sensu* in the field of energy and in connection with the broader concept of energy transition. Finally, AI's environmental sustainability would fit into the same perspective of particularizing the impact of the development and implementation of new technology on the environment and climate, in the sense of aggravating the related ecological footprint[7]. In any case, digital technology is not just a business sector, but also a genuine and radical industrial revolution because its effects are felt in all areas of society, and even more so in the fields of artificial intelligence and of environmental protection. Presented by the supporters of dematerialization as a key part of the solution, this is a major element of the issue, as it increases the carbon footprint it generates[8].

From a legal perspective, sustainability appears to be a concept still *in statu nascendi*[9]. Its application consists in a reference to a kind of assessment standard or type of argumentation, the content of which, in terms of positive law, remains to be specified. Despite the ubiquity of the term "sustainable development," its corresponding legal content is difficult to define in concrete terms and remains uncertain. The difficulty is not only conceptual, but also technical, insofar as the indicators used to assess and define the objectives of sustainable development are far from inspiring unanimity among the scientific community. Given such critical remarks, it is necessary to interpret sustainable development and, consequently, sustainability as a legal standard,[10] which points to the need for balance between immediate benefits and various costs (in particular social and environmental costs). The sustainability standard thus defined remains fairly configured *in abstracto* with the help of precise criteria but does not seem unsuitable for guiding legal interpretation and argumentation *in casu*. The enforceability of sustainability from a legal standpoint remains largely dependent on context, particularly on the existence of appropriate jurisdictional mechanisms. The absence of such mechanisms helps explain the insufficiency of sustainability requirements in terms of compliance or the absence of binding rules and regulatory authorities independent of the actors concerned.

Such a context favors the proliferation of soft law regulations also in this field.

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[6] Romain Felli, "La durabilité ou l'escamotage du développement durable," *Raisons politiques*, no. 60 (2015): 149–60, https://shs.cairn.info/revue-raisons-politiques-2015-4-page-149?lang=fr.

[7] Jacques Mestre, "Quelques mots introductifs", in *Durabilité et droit économique*, ed. W. Chaiehloudj, S. Dupouy, and Jacques Mestre (Paris: LexisNexis, 2025), 2.

[8] Fabrice Flipo, *Le développement soutenable et ses critiques: Vers une transition sociale et écologique?*, 2nd ed. (Paris: Bréal, 2025), 126.

[9] Wojciech Zagorski, "Égalité, dignité, durabilité? En guise d'introduction," in *La durabilité saisie par le droit*, ed. Pierre Serrand, Wojciech Zagorski, Piotr Szwedo, and Lena Helinska (Paris: Mare & Martin, 2023), 15.

[10] Nicolas de Sadeleer, *Environmental Principles: From Political Slogans to Legal Rules*, 2nd ed. (Oxford: Oxford University Press, 2020), 14; Virginie Barral, "Sustainable Development in International Law: Nature and Operation of an Evolutive Legal Norm," *European Journal of International Law* 23, no. 2 (2012): 377–400, at 385–90, https://doi.org/10.1093/ejil/chs016.

The undefined nature of its content and the absence of jurisdictional mechanisms lead to the preference for such soft law rules as, for example, ESG (Environmental, Social, and Governance) or corporate social and environmental responsibility.[11] Defined as the voluntary integration of social and environmental concerns into production, commercial, and third-party activities, ESG is making progress in various areas, such as financial markets, and is also of particular interest in the field of digital services and AI applications.

3. Environmental Sustainability of Artificial Intelligence Systems: the UN Vision.

The issue was first addressed in the United Nations Environment Assembly Resolution of 12 December 2025 on environmental sustainability of artificial intelligence systems[12] which follows on from the UN's soft law initiatives on both sustainable development and the promotion of new digital and AI technologies. Indeed, while the concept of sustainable development and its auxiliary concept of sustainability have gradually crystallized in international documents over the past 34 years, since 1992 (the Rio Declaration on Environment and Development and all the principles it contains, as well as the final document "The Future We Want," adopted by the UN Conference on Sustainable Development Rio+20), the involvement of information and communication technologies in promoting its objectives was noted in 2015, and in recent years their relationship to the environment, climate change, and the circular economy or the field of waste. The starting principle of UNEP Resolution 719 is that AI has dual effects on the environment, which means that it is "important to take advantage of the possibilities and benefits that artificial intelligence systems offer for the environment and to minimize their impact on it". The main means of reducing AI's environmental impact, from a holistic perspective, is considered to be the integration of the concept of sustainability into the design, development, implementation, and use of AI systems.

In line with the soft law nature of the resolution, it merely calls on "Member States and all stakeholders" to promote the sustainability of artificial intelligence and to cooperate to that end, as well as to take, in accordance with their national policies and laws, measures to improve the quality, accessibility, and interoperability of environmental data, while maintaining confidentiality and ensuring data protection, and to support the strengthening of national public environmental data systems in developing countries.

Of course, the resolution represents the beginning of a process to develop soft law in the field of AI's environmental sustainability at international level within the UN, which can be continued and developed. In this regard, it can rely on the conclusions that

[11] Kenneth W. Abbott and Duncan Snidal, "Hard and Soft Law in International Governance," *International Organization* 54, no. 3 (2000): 421–56, https://doi.org/10.1162/002081800551280.

[12] United Nations Environment Programme, United Nations Environment Assembly, "Environmental Sustainability of Artificial Intelligence Systems," UNEP/EA.7/Res.9 (2025), https://docs.un.org/en/UNEP/EA.7/Res.9.

will emerge from the works of the recently established Independent International Scientific Panel of AI and, following the model of the affirmation of international climate law, could lead to a move towards the adoption of a framework convention on AI that addresses, as an important dimension, its environmental sustainability and represents the basis for further legal developments in the field.

4. EU: Standardized Sustainability

For a long time, the issue of the impact of AI systems on fundamental rights has been addressed from the perspective of the right to privacy and personal data protection. The AI Act has broadened the perspective to encompass all fundamental rights. The main objective pursued by the EU legislative act is to "ensure that AI systems placed on the Union market and used are safe and comply with the applicable legislation on fundamental rights and EU values"[13]. They are therefore classified under the AI Act according to the risks they pose to health, safety, and fundamental rights of individuals. The paradigm shift occurs because, within its framework, the respect for fundamental rights by AI systems is achieved through technical standardization or normalization. This refers to the processes of adopting, by consensus, within one or more standardization bodies authorized for this purpose, "technical or quality specifications with which current or future products, production processes, or services may comply"[14]. It should therefore enable the translation into technical specifications of the essential requirements applicable to high-risk AI systems, including those relating to the respect for fundamental rights[15]. The extension of technical standardization to this area is undoubtedly one of the main innovations of the AI Act. While harmonized rules must now allow for a high level of protection of "public interests" in the broad sense, they have so far focused on aspects related to human health and safety.

It should be noted, however, that such an extension of the application process encounters significant difficulties, particularly related to the specific nature of monitoring the respect for fundamental rights. This is because two different regulatory perspectives are called upon to work together in this way: European technical standardization, which is part of a world of technological expertise derived from standardization bodies and harmonized technical standards, which have only weak legal enforceability.[16] Then, the matter of fundamental rights, in turn, is based on the principle of proportionality, in which case the judge occupies a central place and follows a line of reasoning of comparing the interests present. Analysts in the field raise the question

[13] Gregory Lewkowicz and Ritha Sarf, "Taking Technical Standardization of Fundamental Rights Seriously for Trustworthy Artificial Intelligence," *La Revue des juristes de Sciences Po*, no. 25 (February 2024): 42-46.

[14] Regulation (EU) No. 1025/2012 of the European Parliament and of the Council of October 25, 2012, on European standardisation, recital 1, 2012 O.J. (L 316) 12.

[15] Harm Schepel, *The Constitution of Private Governance: Product Standards in the Regulation of Integrating Markets* (Oxford: Hart Publishing, 2005), 121–24.

[16] Rob van Gestel and Hans-W. Micklitz, "European Integration through Standardization: How Judicial Review Is Breaking Down the Club House of Private Standardization Bodies," *Common Market Law Review* 50, no. 1 (2013): 145–82.

of how, founded on a risk-based approach involving the use of European technical standardization, the AI Act has the legal resources necessary to deal with issues related to fundamental rights, especially given that it only allows partial access to the judge.

Pursuant to Art. 1 of the AI Act, its subject matter is to "promote the uptake of human-centric and trustworthy artificial intelligence (AI), while ensuring a high level of protection of health, safety, fundamental rights enshrined in the Charter, including democracy, the rule of law and environmental protection, against the harmful effects of AI systems in the Union and supporting innovation". EU policy on AI aims to ensure the development of AI by guaranteeing an "ecosystem of excellence" designed to stimulate research and innovation and encourage businesses to adopt AI solutions and a "trustworthy ecosystem" to build trust in AI among citizens and businesses and, ultimately, their commitment to the digital transition. In order to generate such trust, it is necessary to build "human centric" AI systems that must have three characteristics: be lawful, ethical, and robust. It has a strategic interest in promoting a legal and ethical framework founded on its core values and in line with the Charter of Fundamental Rights, initiating and publishing a series of official documents to this end. An analysis of its standpoints reveals a vision according to which AI systems would have to meet four imperatives based on guaranteeing fundamental rights: respect for human autonomy, prevention of any infringements, fairness, and explainability. They are broken down through seven requirements: human agency and oversight; technical robustness and safety; privacy and data governance; transparency; diversity, non-discrimination and fairness; societal and environmental well-being and accountability. In order to operationalize these ethical imperatives, the European Union has opted for a risk-based regulatory approach. The AI Act has thus introduced a "pyramid" of risks, so as to adapt the type and content of the stipulated legal requirements also according to the intensity of the impact on the contextual and natural environment. A sustainability in terms of which environmental reporting remains still weak.

4. A European Model of AI's Environmental Sustainability. The Role of the AI Framework Convention

Following a proliferation of soft law documents between 2018 and 2019, the EU and the Council of Europe have placed greater emphasis on promoting legal texts in order to respond more effectively to the important challenges in this field. From this perspective, 2024 represented both a peak and a starting point in the development of a European law on AI. Indeed, two fundamental legal texts were adopted almost simultaneously within the two continental cooperation structures: the AI Act of the EU and an international treaty in the form of a framework convention under the auspices of the Council of Europe. Among their common points, the two legal documents share a concern to reaffirm the scope of human rights, democracy, and the rule of law in order to maximize the benefits of this technology and incorporate them into a legal framework under European law, with a view to extrapolating the approach to a global context.

The two fundamental legal texts adopted in 2024 at European level define a risk-based regulatory approach and establish a continental model with a strong vocation

for expansion beyond regional geographical borders, thus marking the global process of placing artificial intelligence within a regulatory framework. *Regulation (EU) 2024/1689 of 13 June 2024 laying down harmonized rules on artificial intelligence* (AI) sets out requirements and obligations for all providers and deployers of AI systems that have been accessible in the EU since then, creating a uniform legal framework for placing on the market and using these systems as such. By assimilating AI systems with products, the text uses the same techniques as those used in other industrial sectors, such as certification, in order to create a trustworthy framework for consumers. In fact, the EU legislator has sought not to hinder innovation by gradually intensifying regulatory constraints depending on the risks generated, in addition to support measures such as regulatory testing spaces. In an integrative vision, but one that also seeks to express the particularities of the matter, the AI Act is also characterized by a "risk pyramid" approach, very different from that of the GDPR, resulting from the "new approach" or "new legislative framework."[17] In addition to prohibiting the use of AI systems regarded as "unacceptable," those that pose a high degree of risk are regulated — medical devices, industrial aeronautical and automotive machinery, equipment intended for education and training, etc. However, the AI Act is not intended to be the only regulation applicable to businesses, which is related to AI. It is part of a much broader legal corpus, to which it is added. As such, in addition to this main framework, AI regulation *lato sensu* is expected to cover numerous areas of law. Besides the texts that protect personal data, there are also those related to intellectual property law, such as the directive on copyright and related rights in the single market. Massive data exploitation is inseparable from the development and mitigation of models. "Data quality" is, in fact, one of the stakes that justified the drafting of AIR, particularly in the field of high-risk AI, as training models based on synthetic data leads, as is well known, to the degradation thereof. Finally, the entry into force and implementation of the AI Act will also raise difficulties in the field of business law or contractual practices, as well as in relation to due diligence operations, which will have to integrate the unprecedented risks generated by these new technological tools, particularly with regard to civil, criminal, and administrative liability. While it is certain that the increase in the power and variety of AI uses and the application of the AI Act will profoundly disrupt many areas of law, it is difficult to predict the measures to avoid or mitigate them.

Through this relevant legal text, EU appears to be relying once again on the famous "Brussels effect"[18], especially since its scope is extraterritorially open, and it is worth noting that other legislative acts are already drawing inspiration from the European model, notably California Assembly Bill No. 2013, adopted on 28 September 2024, and Canada's proposal for an "Artificial Intelligence and Data Act".

The *Council of Europe Framework Convention on AI and Human Rights, Democracy and the Rule of Law* was negotiated between 2022 and 2024 within the

[17] Michael Veale and Frederik Zuiderveen Borgesius, "Demystifying the Draft EU Artificial Intelligence Act—Analysing the Good, the Bad, and the Unclear Elements of the Proposed Approach," *Computer Law Review International* 22, no. 4 (2021): 97–112, https://doi.org/10.9785/cri-2021-220402.

[18] Anu Bradford, *The Brussels Effect: How the European Union Rules the World* (New York: Oxford University Press, 2020), 1-6.

Committee on AI (CAI), after two years of preparation by the Ad Hoc Committee on AI (CAHAI), officially adopted by the Committee of Ministers on 17 May 2024 and opened for signature in Vilnius on 5 September 2024. The parties, including EU, are required to adopt legislative, administrative, and technical measures to achieve the established objectives, allowing States significant flexibility in establishing moratoriums or prohibitions[19]. This was accompanied by the approval by the AI Committee (CAI) in November 2024 of the HUDERIA methodology as a comprehensive tool for assessing the risks and impacts of AI systems on human rights and democratic values. The framework convention aims to ensure that AI is used in accordance with the existing international rules on human rights, democracy, and the rule of law. It requires States Parties to ensure the protection of human rights, the integrity of democratic processes, and respect for the rule of law requirements throughout the entire life cycle of AI systems. It lays down a series of principles for the use of AI that States are required to follow and calls for a right to AI action and procedural safeguards, as well as establishes mechanisms to assess AI risks and negative impacts. The parties enjoy considerable flexibility in choosing legislative, administrative, or other measures to implement the Framework Convention. It does not prescribe any specific prohibition on the application of IA, but only requires the Parties to assess the necessity of imposing moratoriums or prohibitions. The measures to be taken should follow a phased and differentiated approach, depending on the probability and severity of the negative impacts of specific AI systems on human rights, democracy, and the rule of law. The international regulatory document distinguishes between AI-related activities carried out by public actors — to whom the provisions of the convention apply directly — and those undertaken by private actors. With regard to the latter, the Parties are required to respond to the risks and impacts arising from their activities in a manner consistent with the objective of the Convention. This requirement implies taking appropriate measures. In addition, they must indicate, in a declaration, the measures they intend to take in relation to private actors in order to achieve the objective of the Framework Convention. The field of "Defense" is excluded from its scope. Regarding "National security," States are not required to apply the Framework Convention, but they may do so. In all cases, the existing rules on human rights, democracy, and the rule of law must be respected. The field of "Research and Development" is excluded from the scope of the document, with a few exceptions.

Although focused on human rights, democracy, and the rule of law, the document integrates, in its own context, the principles of environmental sustainability and responsibility throughout the entire life cycle of AI systems. In this perspective, AI development is subject to a sustainability requirement, with the aim of ensuring that AI systems are environmentally friendly. The parties to the Convention undertake to assess and mitigate the negative impacts of AI on the environment, given the high energy and water consumption of data centers. The use of new technologies is encouraged to support sustainability goals, such as those of EU, while ensuring that their

[19] Mircea Duțu, "Dreptul Consiliului Europei privind inteligența artificială (IA)" ["Council of Europe Law on Artificial Intelligence (AI)"], *Dreptul*, no. 6 (2025): 48–89.

environmental footprint does not exceed their benefits. Last but not least, in terms of transparency, AI systems must be auditable and traceable, which includes taking environmental impact into account in risk assessment[20].

Within the European model, the provisions of the Framework Convention correlate and combine with those of the AI Act and its relevant subsequent acts, thus outlining the specific regime for environmental sustainability of AI.

5. EU Law's Response to Sustainable AI

The issue of the impact of artificial intelligence technologies (design and use) on the environment was introduced and unfortunately remained, with regard to the AI Act, during the trilogue phase (the three-way negotiations between the European Parliament, the Council of the EU, and the European Commission). The explanation is relatively simple, but is likely to highlight the volatility of political options and the twists and turns of legal regulations in this field. Indeed, it was initiated as a draft legislative act and followed in its early stages by approval in a context of maximum concern for promoting the Green Deal's "Fit for 55" legislative program, it was marked, in the final stage of adoption, by the strong setback of the eco-climate initiative, under the impact of international circumstances, electoral repositions and new strategic priorities. Thus, a proposal to amend the draft regulation submitted by the European Parliament on 14 June 2023, but which was not ultimately retained in the final adopted form, included requirements and experiences with environmental considerations, in application of the principle of societal and environmental well-being that were much more relevant and favorable, such as:

- an AI presenting a significant risk of environmental damage should be considered as high risk;
- in terms of risk analysis, it was requested to include those related to the environment;
- an impact analysis (study) was requested on the negative effects of AI on the environment;
- it was proposed that high-risk AI should record its energy consumption and resource use, and that environmental impacts should be measured (or calculated) for each stage of the AI's life cycle.

So, the idea was to place environmental protection on the same level as the protection of health, safety, and fundamental rights. Unfortunately, such welcome measures were not accepted under pressure from conjunctural developments. Currently, Annex III lists the areas in which AI systems may be considered high risk, mainly due to their potential impact on fundamental rights or security: critical infrastructure management, biometrics, or even immigration, those related to the environment being absent. This list could, of course, be amended by the European Commission by means of delegated acts in accordance with the procedure laid down in Article 7 of the AIR, to include AI systems whose environmental footprint is disproportionate to the expected

[20] Andrei Duțu-Buzura, *Tratat de dreptul mediului* [*Treatise on Environmental Law*] (Bucharest: Universul Juridic, 2025), 125.

benefits, depending on new positions, both ecological and AI-related. The classification of these systems as "high environmental risk" could be based on the definition of an acceptability threshold, supported by accurate information, such as that relating to energy demand in computing capacity. Consequently, the various components of AI's environmental footprint depend on the respective demand, in particular energy consumption, the use of resources such as water or metals needed to build underlying infrastructure (servers, microchips, etc.). A realistic assessment of the global situation and the place of both regulation and EU in the game of relevant interests indicates that such a reposition is not currently relevant.

Finally, Article 95 provides for the initiation of voluntary codes of conduct for assessing and reducing the impact of AI on "environmental durability" (especially techniques for improving energy efficiency)[21] and the transfer of the issue to the area of voluntary, soft law standards. In such a situation, an analysis of the substance of the issue at hand, namely environmental protection in the context of AI use, from the perspective of the European regulatory framework, requires the use of the term "environmental durability", which is also present in the regulatory text, but not defined in the AI Act either, though with more explicit references to the area of interest.

In conclusion, it may be noted that, in substance and in the long term, the legal perspective of EU's AI law regarding the impact of this technology on the environment is expressed in recitals 4 and 5 of the AI Act, which reflect the ambivalence of its effects in this regard. Thus, according to these texts, AI is a family of rapidly evolving technologies that contribute to a wide range of economic, environmental, and societal benefits across the entire spectrum of industries and social activities. Among the positive results mentioned in this regard are those related to energy efficiency and resource use, environmental monitoring, conservation and restoration of biodiversity and ecosystems, as well as climate change mitigation and adaptation (recital 4). At the same time, depending on the circumstances surrounding its specific application and use, as well as its particular level of technological development, AI can pose environmental risks and cause ecological harm; therefore, its use must be restricted within the framework of sustainable development. At the same time, for the time being and, in this

[21] Alain Bensoussan, Jérémy Bensoussan, Virginie Bensoussan-Brulé, *Le règlement européen sur l'intelligence artificielle: Synthèse, points clés et analyse article par article* (Brussels: Bruylant, 2025), 641–48. Specifically, the envisaged but unimplemented environmental provisions were, for the most part, confined to the recitals of the Preamble, namely: recital 46bis recalled that "AI systems can have a significant impact on the environment and consume a lot of energy during their life cycle", while recital 28bis referred to the idea of "the fundamental right to a certain level of environmental protection". The latter principle had to be considered when assessing the severity of the damage, when it was caused by an AI system and had consequences for the environment. According to the proposed amendments, an AI system could be deemed to pose a high level of risk when it entails a significant risk of environmental damage. Like systems involving a high degree of risk, all AI systems were to be "developed and used in a sustainable and environmentally friendly manner", as stipulated in Article 4 bis of the regulation. In the opinion of the same authors, although the regulation does not define its essential requirements as such, the cross-cutting environmental topic is reflected in the following elements: the need to achieve environmental objectives (recital 142), compliance with ethical principles, such as societal and environmental well-being (recital 27), environmental protection (recital 48 and Article 1), environmental sustainability (recital 165), codes of conduct (Article 95) and environmental crime (Article 5 and Annex III) (op. cit., p. 43).

context, the conditions set forth in the AI Act remain in effect.

5.1. AI Act: A Voluntary Perspective on Environmental Sustainability[22]

Under the conjunctural constraints of the moment of its final adoption (June 2024), the AI Act establishes a vision that emphasizes the impact of AI on human rights, while environmental concerns remain secondary, sent to be subject to *soft law* regulations.

Thus, Of the four mentions of the phrase in the AI Act, three of them target the integration of the ecological dimension into codes of conduct for the voluntary application of specific requirements, without imposing a (legal) obligation on the actors in the IA value chain. Practically, article 95 of the Regulation stipulates that the AI Office and the Member States encourage and facilitate the drawing up of codes of conduct intended to foster the voluntary application to AI systems, other than high-risk AI systems, of some or all the requirements set out in Chapter III, Section 2 (requirements for high-risk AI systems). They may be included, in particular, in "assessing and minimizing the impact of AI systems on environmental sustainability, including as regards energy-efficient programming and techniques for the efficient design, training and use of AI". Such a flexible and voluntary approach to sustainability is confirmed and somewhat nuanced by the provisions of recital 165 of AIR, which states that "Providers and, as appropriate, deployers of all AI systems, high-risk or not, and AI models should also be encouraged to apply on a voluntary basis additional requirements related, for example, to the elements of the Union's Ethics Guidelines for Trustworthy AI, environmental sustainability".

At a strictly formal analysis of the texts in the field, torn from the conjunctural context, such a voluntary approach on environmental sustainability in terms of the ecological impact of AI seems surprising, given that, for example, Regulation (EU) 2021/1119 of 30 June 2021 establishing the legal framework for achieving climate neutrality (but adopted during a period of Greel *Deal boom*) "sets out a binding objective of climate neutrality in the Union by 2050" and also "a binding Union target of a net domestic reduction in greenhouse gas emissions for 2030" (Article 1). The third reference to environmental sustainability is related to Article 112 of the AI Act (Evaluation and Review) and establishes a review clause, stipulating that, by 2 August 2028 and every three years thereafter, the European Commission will assess the impact and effectiveness of voluntary codes of conduct in encouraging the application of the requirements set out "including in relation to environmental sustainability" [Article 112 (7)]. Therefore, an evaluation of the codes is planned three years after the date on which the codes must be ready (2 May 2025, pursuant to Article 56 of the AIR)[23].

Finally, the fourth and last mention of environmental sustainability in the

[22] See also Andrei Duțu-Buzura, "Environmental Durability (Sustainability) in the Equation of Artificial Intelligence Development," in *Encyclopedia of Contemporary Constitutionalism*, ed. Javier Cremades and Cristina Hermida (Cham: Springer, 2026), 1–23, https://doi.org/10.1007/978-3-319-31739-7_239-1.

[23] Andrei Duțu-Buzura, "Mediul și AI Act" ["The Environment and the AI Act"], *Pandectele Române*, no. 4 (2025): 40–47.

regulatory context is found in Article 59 (Further processing of personal data for the development of certain AI systems of public interest in the AI regulatory sandbox) and concerns the authorization of certain further processing of personal data permitted in the regulatory sandbox. Consequently, under the AI regulatory sandbox mechanism, personal data lawfully collected for other purposes may only be processed for the purpose of developing, training, and testing certain AI systems, provided that certain conditions are cumulatively met. Among these is the requirement relating to the purpose pursued by the AI system, which must be developed "for safeguarding substantial public interest", which includes also "a high level of protection and improvement of the quality of the environment, protection of biodiversity, protection against pollution, green transition measures, climate change mitigation and adaptation measures" [Article 59 (1) point a II], as well as "energy sustainability" (III). As noted, at first glance, the direct and firm objective of these provisions is to facilitate the development of AI systems that are conducive to environmental protection, but when placed within the context of the cumulative conditions that must be met, their significance is drastically limited. For example, the data must be "necessary for complying with one or more of the requirements referred to in Chapter III, Section 2", the section devoted to obligations for high-risk AI systems, which contains no provisions on environmental sustainability. Such restrictive regulatory circumstances also occur with regard to energy sustainability and its repercussions in this field.

In conclusion, even the four instances of the phrase "environmental sustainability" in the text of the AI Act are insufficient to cover the issues of the ecological impact of the use of AI technologies. Being placed at the level of non-mandatory, voluntary requirements to be integrated into codes of conduct, they mean that the dimension of environmental sustainability has been insufficiently and inadequately established, in flagrant contradiction with eco-climatic realities and even with the ambitions of environmental protection and climate neutrality provided for and assumed in other EU policies and regulations. Such deficiencies are partially supplemented by the introduction of requirements to document the energy consumption of certain AI systems.

However, it can be argued that, in principle, the European Commission promotes a broad conception of the fundamental rights enshrined in the Charter, encompassing the assumptions of indirect protection. It thus considers that Regulation (EU) 2024/1689 will strengthen categorical rights as well as respect for societal rights, such as the right to a high level of environmental protection (Art. 37), including with regard to the health and safety of persons[24].

5.2. Supple and Insufficient Requirements in Technical Documentation Related to the Environmental Impacts of High-Risk AI Systems and AI Models

In the same vein as placing the issue under corporate social responsibility (CSR)

[24] Céline Castets-Renard, "Principe de non-discrimination et intelligence artificielle, siège d'un 'constitutionnalisme numérique'", in *Le constitutionnalisme numérique* [*Digital Constitutionalism*], ed. François-Xavier Millet (Brussels: Bruylant, 2026), 112, 105-126.

and given the soft law nature of the relevant regulations, the AI Act opted for a transparency regime rather than a liability regime with regard to technical documentation[25]. As a matter of principle, providers of general-purpose AI models have a particular role and responsibility throughout the AI value chain, but given that the models they provide may form the basis of a series of downstream systems, often provided by downstream providers, which requires a good understanding of the models and their capabilities, both to enable their integration into related products and to fulfill their obligations under the AI Act or other EU legislation[26]. Consequently, it is necessary to provide proportionate transparency measures, including drafting and keeping up-to-date documentation and providing information about the general-purpose models for use by downstream providers. The technical documentation is intended to be made available, upon request, to the AI Office and the competent national authorities.

Thus, for high-risk AI systems, the provisions of Article 11 (point 1) of the regulation, in conjunction with the provisions of Annex IV (point 2, c) require providers to document "the computational resources used to develop, train, test and validate the AI system", which does not directly include energy consumption. This omission makes it more difficult to compare different systems, as it would require anyone wishing to assess the environmental costs associated with a system to estimate them indirectly, based on information about the computational resources used. Similarly, the provisions of Article 53 (point 1), in conjunction with point 2(d) of Annex XI, require the providers of general-purpose AI models to record in their technical documentation "the computational resources used to train the model (e.g. number of floating-point operations), training time, and other relevant details related to the training", as well as "known or estimated energy consumption of the model". It can be noted that the fact that this requirement concerns the development phase of the model and not its interference (use) phase limits its meanings and implications. And this is even though relevant studies show that during the latter phase, which is often ignored, energy consumption is much higher. Other criticisms relate to the fact that models published under open-source licenses are excluded from meeting these requirements, as they are not subject to any environmental transparency obligations or the absence of consideration of water consumption, another important environmental resource linked to AI use.

Of course, in a general assessment and with a systematic view, even if it deserves credit for integrating environmental criteria into the documentation obligations (requirements) provided for in the AI Act, these remain fragmented, focusing on computing capabilities and energy consumption in the development phase, and thus less effective in achieving environmental objectives. However, even with these limitations, the prospect of integrating a form of environmental accountability into the AI Act is

[25] Sasha Luccioni, Bruna Trevelin, and Margaret Mitchell, "The Environmental Impact of AI," Hugging Face, September 3, 2024, https://huggingface.co/blog/sasha/ai-environment-primer; Philipp Hacker, "The European AI Liability Directives—Critique of a Half-Hearted Approach and Lessons for the Future," *Computer Law & Security Review* 51 (2023): 105871, https://doi.org/10.1016/j.clsr.2023.105871.

[26] Bensoussan, Bensoussan-Brulé, and Bensoussan, *Le règlement européen sur l'intelligence artificielle*, 455.

somehow opening up, through an "ecologically favorable interpretation" of certain texts of European legislation.

5.3. Code of Conduct on Environmental Sustainability

The provisions of art. 95 (1) of the AI Act state that the AI Office and the Member States shall encourage and facilitate the drawing up of codes of conduct, including related governance mechanisms, intended to foster the voluntary application to AI systems, other than high-risk AI systems, of some or all of the requirements set out in Chapter III, Section 2 *(High-risk AI systems. Requirements for high-risk AI systems)*, taking into account the available technical solutions and industry best practices allowing for the application of such requirements. They aim at the voluntary application of specific requirements to all AI systems based on clear objectives and key performance indicators to measure the achievement of those objectives, including "assessing and minimizing the impact of AI systems on environmental sustainability, including as regards energy-efficient programming and techniques for the efficient design, training and use of AI" [Article 95 (2) points a) & b) of AI Act]. They therefore promote voluntary adherence to certain rules, taking into account technical solutions and best industry practices, encourage the use of AI applications in a way that minimizes environmental impact, promotes AI culture, ensures inclusion and diversity, and prevents negative impacts on vulnerable groups. Codes of conduct are therefore essential elements of self-regulation of the AI market by operators, and their drawing up and application, with the limitations linked to the binding and specific nature of compliance with the requirements laid down, aim to raise the level of trust in all AI systems by generalizing, in whole or in part, the requirements imposed on high-risk systems.

5.3.1. General-Purpose AI Code of Practice

Published on 10 July 2025 and drawn up by the European Commission in collaboration with the AI Office established under the AI Act, the Code is the result of a multi-stakeholder process between AI model providers, academic experts, regulators and civil society, and represents a major step forward in operationalizing the obligations imposed by Article 53 (obligations for providers of general-purpose AI models) and Article 55 (obligations of providers of general-purpose AI models with systemic risk).

Although it is not legally binding, it serves as a soft law instrument designed to guide relevant actors in applying the requirements of transparency, copyright compliance, and systemic risk management. It also aims to reconcile legal certainty and the promotion of innovation in the digital single market. Unfortunately, the environmental sustainability aspects of AI systems are reduced to its energy dimension and thus have an indirect role in terms of eco-climatic impacts.

Therefore, regarding model documentation, Measure 1.1 requires signatories to draw up and keep up-to-date complete model documentation for at least 10 years after the model has been placed on the market. It should also include data on energy

consumption during training and inference. We can say that, limited to energy consumption and insufficient in terms of its efficiency, the Code integrates the environment in the sense that it requires providers to promote transparency on energy footprint and measures to reduce environmental impact; the assessment and mitigation of systemic risks, including environmental costs, are encouraged through systems such as the AI frugal benchmark, which opens the way for the interested entities to be able to complete the respective issue with pertinent provisions.

6. Conclusions

In an era dominated by general concerns about climate change and the green transition, the development of new technologies, led by those involving artificial intelligence, cannot escape this context and avoid the relevant connections. At the same time, AI's strong societal transformative potential places it at the heart of a development model that is strongly influenced by the concept and practices of sustainable development. From this perspective, AI's main environmental challenges are related, on the one hand, to harnessing the technological benefits for environmental protection and, on the other hand, to mitigating the negative impact on the environment (the ecological footprint), both of which fall within the framework of AI's environmental sustainability. Its sustainable aspect refers to the main environmental implications of the technology, namely energy, water, and mineral resource consumption, so that sustainable AI is regarded as consisting of the development of energy-efficient artificial intelligence systems, for the purpose of mitigating their environmental impact, particularly with regard to greenhouse gas emissions resulting from the use of fossil fuels. From this perspective, the environmental sustainability of AI has become a topic of interest in EU law through the AI Act, specifically the provisions aimed at reconciling technological development with carbon neutrality objectives. At the same time, the major dependence of the issue on the general socio-economic and even geostrategic context, given the global implications of AI, currently works in favor of maintaining priority of innovation and keeping environmental requirements in the background.

The general requirement for trustworthy AI (which includes protecting health, ensuring safety, and safeguarding the environment) is reflected in the requirements established for high-risk AI systems (which must incorporate risk analyses, including environmental impact assessments, namely energy, water, and resource consumption required for training/design), transparency and codes of conduct (by encouraging providers of AI, particularly general-purpose models - GPAI - to adopt voluntary codes of conduct aimed at improving energy efficiency and mitigating environmental impact) and standardization (establishing harmonized rules to define, from a technical standpoint, standards for compliance with sustainability requirements). EU law regulations address various aspects of AI's environmental footprint: energy consumption, water use, or life cycle (the environmental impact covering all aspects of AI, from design to training and infrastructure use), among others.

As a general trend, already present and established in the AI Act, the regulation of AI's environmental sustainability is shifting toward voluntary standards, codes of

conduct, and, more broadly, soft law provisions. This does not mean, however, that traditional legal institutions concerning, for example, environmental permits or liability for environmental damage could not be triggered, with the specific features applicable in this area as well.

Although still in its early stages, it is obvious that AI offers an opportunity to support the environmental component of CSR[27] and represents a track that is worth exploiting in the future, in order to strengthen the environmental sustainability of new technologies. There is no doubt that AI systems have already helped many companies better manage their water and energy consumption, as well as their waste production. Legal regulations are beginning to take into account the relationship between AI and the environment, but they remain too general and lack specificity[28]. Future legal regulations should focus on efforts to address the exchange of public and private environmental data, take into account the issue of digital pollution, by encouraging the development of environmentally responsible AI systems. At the same time, it would be necessary to multiply the legal instruments designed to encourage AI companies to be more environmentally responsible, under the threat of civil lawsuits in the event that AI systems cause environmental damage. Last but not least, the reaction of the jurisprudence to the new environmental challenges of AI is also expected, in the context of the increasing role of litigation in the realization of the relevant right.

The establishment of the Independent International Scientific Panel on AI as an instrument of global governance in this field, charged with conducting impartial, evidence-based assessments capable of guiding the debate and shaping future flows of regulatory decision-making, opens up new prospects for the development of relevant soft law sources. In this way, it will be able to provide consistent and compelling analyses of the risks and environmental impact of AI, thereby supplying the UN system, which is already deeply concerned with eco-climatic issues, with relevant information and conclusions that would justify specialized initiatives in this area. Conducting relevant studies in collaboration with the IPCC or IPBS, with the necessary adjustments, would provide a solid foundation for the concept and legitimately justify public action - at the international, European, and national levels - including in its regulatory dimension aiming to establish and guarantee the environmental sustainability of AI. Regardless of the current balance of interests in this area, marked by the absolute priority of promoting technological innovation, the eco-climate challenge continues to be in focus, as new developments in the environmental sustainability of new technologies take shape.

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[27] Elisa Morgera, *Corporate Environmental Accountability in International Law*, 2nd ed. (Oxford: Oxford University Press, 2020), 70 et seq.

[28] Sarah Beret, "Artificial Intelligence and the Environmental Component of Corporate Social Responsibility," in *L'entreprise et l'intelligence artificielle: Les réponses du droit* [*Business and Artificial Intelligence: Legal Responses*], ed. Alexandra Mendoza-Caminade (Toulouse: Presses de l'Université Toulouse 1 Capitole, 2022), 129–47.

Bibliography

1. Abbott, Kenneth W., and Duncan Snidal. "Hard and Soft Law in International Governance." *International Organization* 54, no. 3 (2000): 421–56. https://doi.org/10.1162/002081800551280.
2. Arga, Ludovic, et al. *Frugal AI: Introduction, Concepts, Development and Open Questions*. HAL, 2025. https://hal.science/hal-05049765.
3. Barral, Virginie. "Sustainable Development in International Law: Nature and Operation of an Evolutive Legal Norm." *European Journal of International Law* 23, no. 2 (2012): 377–400. https://doi.org/10.1093/ejil/chs016.
4. Bensoussan, Alain, Jérémy Bensoussan, and Virginie Bensoussan-Brulé. *Le règlement européen sur l'intelligence artificielle: Synthèse, points clés et analyse article par article*. Brussels: Bruylant, 2025.
5. Beret, Sarah. "Artificial Intelligence and the Environmental Component of Corporate Social Responsibility." In *L'entreprise et l'intelligence artificielle: Les réponses du droit* [*Business and Artificial Intelligence: Legal Responses*], edited by Alexandra Mendoza-Caminade, 129–47. Toulouse: Presses de l'Université Toulouse 1 Capitole, 2022.
6. Bradford, Anu. *The Brussels Effect: How the European Union Rules the World*. New York: Oxford University Press, 2020.
7. Castets-Renard, Céline. "Principe de non-discrimination et intelligence artificielle, siège d'un 'constitutionnalisme numérique.'" In *Le constitutionnalisme numérique* [*Digital Constitutionalism*], edited by François-Xavier Millet, 105–26. Brussels: Bruylant, 2026.
8. Coglianese, Cary, and David Lehr. "Regulating by Robot: Administrative Decision Making in the Machine-Learning Era." *Georgetown Law Journal* 105 (2017): 1147–1223.
9. Duțu-Buzura, Andrei, "Environmental Durability (Sustainability) in the Equation of Artificial Intelligence Development," in *Encyclopedia of Contemporary Constitutionalism*, ed. Javier Cremades and Cristina Hermida (Cham: Springer, 2026), 1–23, https://doi.org/10.1007/978-3-319-31739-7_239-1.
10. Duțu-Buzura, Andrei. "Mediul și AI Act" ["The Environment and the AI Act"]. *Pandectele Române*, no. 4 (2025): 40–47.
11. Duțu-Buzura, Andrei. *Tratat de dreptul mediului* [*Treatise on Environmental Law*]. Bucharest: Universul Juridic, 2025.
12. Duțu, Mircea. "Dreptul Consiliului Europei privind inteligența artificială (IA)" ["Council of Europe Law on Artificial Intelligence (AI)"]. *Dreptul*, no. 6 (2025): 48–89.
13. European Parliament and Council of the European Union. Regulation (EU) No. 1025/2012 of October 25, 2012, on European Standardisation. *Official Journal of the European Union* L 316, November 14, 2012, 12–33. https://eur-lex.europa.eu/eli/reg/2012/1025/oj/eng.

14. Favero Agostini, Eléonore. "Création d'un groupe scientifique international indépendant sur l'IA par l'ONU: une avancée majeure pour la gouvernance mondiale." *Dalloz Actualité*, March 10, 2026. https://www.dalloz-actualite.fr/flash/creation-d-un-groupe-scientifique-international-independant-sur-l-ia-par-l-onu-une-avancee-maj.
15. Felli, Romain. "La durabilité ou l'escamotage du développement durable." *Raisons politiques*, no. 60 (2015): 149–60. https://doi.org/10.3917/rai.060.0149.
16. Flipo, Fabrice. *Le développement soutenable et ses critiques: Vers une transition sociale et écologique?* 2nd ed. Paris: Bréal, 2025.
17. Gestel, Rob van, and Hans-W. Micklitz. "European Integration through Standardization: How Judicial Review Is Breaking Down the Club House of Private Standardization Bodies." *Common Market Law Review* 50, no. 1 (2013): 145–82.
18. Hacker, Philipp. "The European AI Liability Directives—Critique of a Half-Hearted Approach and Lessons for the Future." *Computer Law & Security Review* 51 (2023): 105871. https://doi.org/10.1016/j.clsr.2023.105871.
19. Lewkowicz, Gregory, and Ritha Sarf. "Taking Technical Standardization of Fundamental Rights Seriously for Trustworthy Artificial Intelligence." *La Revue des juristes de Sciences Po*, no. 25 (February 2024): 42–46.
20. Luccioni, Sasha, Bruna Trevelin, and Margaret Mitchell. "The Environmental Impacts of AI—Primer." *Hugging Face*, September 3, 2024. https://doi.org/10.57967/hf/3004.
21. Mestre, Jacques. "Quelques mots introductifs." In *Durabilité et droit économique*, edited by W. Chaiehloudj, S. Dupouy, and Jacques Mestre. Paris: LexisNexis, 2025.
22. Morgera, Elisa. *Corporate Environmental Accountability in International Law*. 2nd ed. Oxford: Oxford University Press, 2020.
23. Sadeleer, Nicolas de. *Environmental Principles: From Political Slogans to Legal Rules*. 2nd ed. Oxford: Oxford University Press, 2020.
24. Schepel, Harm. *The Constitution of Private Governance: Product Standards in the Regulation of Integrating Markets*. Oxford: Hart Publishing, 2005.
25. Smuha, Nathalie A. "From a 'Race to AI' to a 'Race to AI Regulation': Regulatory Competition for Artificial Intelligence." *Law, Innovation and Technology* 13, no. 1 (2021): 57–84. https://doi.org/10.1080/17579961.2021.1898300.
26. United Nations Environment Assembly. "Environmental Sustainability of Artificial Intelligence Systems." Resolution UNEP/EA.7/Res.9, December 12, 2025. https://docs.un.org/en/UNEP/EA.7/Res.9.
27. Veale, Michael, and Frederik Zuiderveen Borgesius. "Demystifying the Draft EU Artificial Intelligence Act—Analysing the Good, the Bad, and the Unclear Elements of the Proposed Approach." *Computer Law Review International* 22, no. 4 (2021): 97–112. https://doi.org/10.9785/cri-2021-220402.
28. Zagorski, Wojciech. "Égalité, dignité, durabilité? En guise d'introduction." In *La durabilité saisie par le droit*, edited by Pierre Serrand, Wojciech Zagorski, Piotr Szwedo, and Lena Helinska. Paris: Mare & Martin, 2023.