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Will the Climate Pay the Price as the EU Strives to Become a World Leader in AI?

– An analysis of how the EU incorporates climate commitments into its AI legislation

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Kommer klimatet betala priset för EU:s strävan att bli världsledande inom AI?
– En granskning av hur EU integrerar klimatåtaganden i sin AI lagstiftning

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Abstract

The adverse effects of climate change pose a threat that requires enhanced climate action on a global scale. Within the EU, this has been acknowledged through the adoption of the European Climate Law along with core environmental principles, such as the polluter pays principle. These measures aim to mitigate the environmental impacts within the EU, supporting the EU's objective of becoming a climate-neutral continent by 2050. In pursuit of this objective, the EU has undertaken several climate commitments.

At the same time, the EU has presented an ambition to position itself as a global leader in AI by becoming the world's first AI continent. As part of this strategy, the EU has adopted the AI Act, seeking to promote the development and deployment of trustworthy AI within the Union. However, the AI Act does not explicitly address the environmental impacts associated with the increasing deployment of AI systems. Although the regulatory framework demonstrates awareness of potential risks by categorising AI systems according to their level of risk, environmental considerations are notably absent from the AI Act. Instead, AI is primarily framed as a tool capable of mitigating the adverse effects of climate change, rather than as a technology that generates significant environmental impacts. This is noteworthy given that the types of AI systems being implemented, especially the generative AI and GPAI models, have a significant impact on the environment. This is due to these systems being considerably more resource-intensive than earlier generations of AI models.

In light of this, the EU must take such environmental considerations into account when developing a framework for AI systems. Despite this, the AI Act does not incorporate the objectives established in the European Climate Law in a way that would ensure the development and deployment of climate-friendly AI across the Union. This thesis therefore examines alternative approaches to AI regulation. In particular, it examines whether the adoption of a new act or directive would be a more appropriate regulatory response, taking into account considerations of innovation, global competitiveness and the practical implications for EU businesses. Accordingly, an AI Climate Directive is deemed to be the most appropriate solution, as such a framework would allow the EU to address the existing regulatory gaps by incorporating key environmental principles into AI deployment.

List of Abbreviations

AI	Artificial Intelligence
AI Act	Artificial Intelligence Act
CAGR	Compound Annual Growth Rate
CFREU	Charter of Fundamental Rights of the European Union
DL	Deep learning
DNSH	Do no significant harm principle
ECL	European Climate Law
EU	European Union
EU ETS	European Union Emissions Trading Systems
FLOPs	Floating Point Operations
GHG emissions	Greenhouse gas emissions
GPAI	General-purpose AI models
GPU	Graphic processing unit
Green Deal	The European Green Deal
ICT	Information and communication technology
LLMs	Large language models
ML	Machine learning
NLP	Natural language processing
SMEs	Small and medium-sized enterprises
TEU	Treaty of the European Union
TFEU	Treaty of the Functioning of the European Union

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1 Introduction

1.1 Background

The existential threat of climate change requires enhanced action by the European Union (EU) and its member states, acknowledged in the EU through the European Green Deal.[1] Further, it is implemented within the EU through the European Climate Law (ECL).[2] The ECL was adopted on the 30th of June 2021, to ensure that all policies set within the EU contribute to the goal of achieving climate neutrality.[3] Whilst the EU has made significant progress on adaptation to climate change, the progress in itself has continuously been uneven across different areas of the union.[4]

At the same time, the use of artificial intelligence (AI) has rapidly increased within businesses in the EU as an increasing number of businesses implement AI systems into everyday use.[5] Alongside this, the EU has established the first comprehensive legal framework on AI, presented by any major regulator, the Artificial Intelligence Act (AI Act).[6] Further, the AI Act establishes harmonised rules for the regulation of AI technology, intending to ensure a high level of protection for fundamental rights and the environment. This is to ensure protection against the harmful effects of AI systems whilst still supporting innovation.[7]

However, the increased use of AI entails significant environmental impacts, such as the excessive use of energy and water to sustain data centres that house AI servers.[8] Although the

[1] European Commission, 'European Climate Law' (European Commission) <https://climate.ec.europa.eu/eu-action/european-climate-law_en> accessed 27 November 2025.
[2] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality.
[3] European Commission, 'European Climate Law' (European Commission) <https://climate.ec.europa.eu/eu-action/european-climate-law_en> accessed 27 November 2025.
[4] European Commission, 'European Climate Law' (European Commission) <https://climate.ec.europa.eu/eu-action/european-climate-law_en> accessed 27 November 2025.
[5] Eurostat, 'Usage of AI Technologies increasing in EU enterprises' (23 of January 2025) <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20250123-3> accessed 29 November 2025.
[6] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence.
[7] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Recital 2.
[8] United Nations Environment Programme, 'AI has an environmental problem. Here's what the world can do about that' (*United Nations Environment Programme,* 21 September 2024)

EU has recognised a desire to address risks associated with an increase in AI usage, there is still a noticeable absence within the AI Act concerning the environmental impacts resulting from the increased AI usage.[9]

Given these developments, there is a need to examine whether the AI Act sufficiently incorporates the environmental objectives which are set out in the ECL. As AI's environmental impact grows, the question arises whether the existing provisions of the AI Act adequately address these impacts, or whether additional climate-related obligations are necessary to adapt to ensure adequate climate protection across the EU. Following this, it becomes essential to evaluate not only to what extent the AI Act incorporates any climate-related objective, but also whether the AI Act is the appropriate legal framework for doing so.

1.2 Purpose of the Thesis and Research Questions

The purpose of this thesis is to analyse whether the AI Act incorporates and reflects the objectives of the ECL, or whether further actions are required for the AI Act to sufficiently meet these obligations. In addition to this, a further aim is to assess whether the AI Act is an appropriate framework in which to incorporate climate-related issues, given its specific purpose. This is of significance to businesses operating within the EU, as the combination of the AI Act, which has introduced compliance obligations for AI developers and deployers, and the ECL, which establishes binding, long-term climate targets, is increasingly affecting businesses. Furthermore, clarifying the incorporation of climate objectives into AI regulation may have direct implications for innovation and competitiveness for businesses in the EU, since businesses now must balance technological advancements with an increased environmental responsibility. Moreover, the thesis aims to determine what would constitute an appropriate solution for EU businesses that ensures environmental protection and promotes innovation.

<https://www.unep.org/news-and-stories/story/ai-has-environmental-problem-heres-what-world-can-do-about> accessed 28 November 2025.

[9] N Aszódi, 'The EU's AI Act: Dangerously Neglecting Environmental Risks' (*AlgorithmWatch,* 2022) <https://sustain.algorithmwatch.org/en/the-eus-ai-act-dangerously-neglecting-environmental-risks/> accessed 29 November 2025.

Against this background, the thesis addresses two research questions:

1. To what extent does the Artificial Intelligence Act incorporate the objectives of the European Climate Law, and are further amendments required to ensure full compliance with the European Union's climate commitments?
2. To what extent does the Artificial Intelligence Act provide an appropriate legal framework for incorporating the climate-related objectives set out in the European Climate Law in relation to AI? To what extent could other legislative measures be more appropriate for businesses?

1.3 Method and Material

1.3.1 EU Legal Method

To fulfil the purpose of the thesis and coherently account for the current regulations, there are two legal methods which are applied throughout. The primary method applied is the EU legal method. Within the framework of the EU legal method, there are several interpretation methods which can be applied, such as the teleological interpretation method, the textual interpretation method, and the method of interpretation based on the context of the legal rule.[10]

The primary interpretation method applied in this thesis is the teleological method, as the approach allows for a broader interpretation of the AI Act and the ECL. This method entails an interpretation of the legislation not solely based on its textual wording, but also in light of the broader legislative context and the intended purpose of the legislation. Here, the regulatory purpose is of great importance in interpreting the law. Within secondary law, such as the acts applied, the recitals provide the necessary information to understand the intent.[11] Further, the teleological method may be understood as fulfilling three primary purposes. First, it furthers the aim of the legislation. Secondly, it prevents unreasonable or unintended

[10] J Reichel, 'EU-rättslig metod' in M Nääv and M Zamboni (eds), *Juridisk metodlära* (3rd edn, Studentlitteratur, 2025) 201.
[11] K Riesenhuber, 'Interpretation of EU Secondary Law' in K Riesenhuber (ed), *European Legal Methodology* (Volume 7, Ius Communitatis Series, 2017) 249.

consequences which may arise from a strictly literal interpretation. Thirdly, it addresses the legislative gaps that may exist within EU law.[12]

This interpretative method is of particular relevance when the EU legislation is vague and imprecise, something which is frequently common within EU regulations.[13] Within the framework of the teleological method, the purpose of the legislative act shall determine the interpretation and the application of the act. [14] In this regard, the objective of the act can be understood as the function that the legislation is intended to fulfil.[15] Once the primary objectives of the act have been identified, it becomes possible to address cases that present interpretative difficulties.[16] In this thesis, the objectives of the act are identified by systematically inventorying and listing the relevant legislative purposes in order to assess their relative weight. Here, the considerations that support and oppose certain interpretations are then selected and weighed against one another, thereby providing a basis for the subsequent analysis.[17]

Using the teleological method for examining the purpose of the AI Act and the ECL, it allows for an assessment as to whether these legislations effectively fulfil their intended purposes. Furthermore, this clarifies whether additional legislation, such as new regulations, are required to focus entirely on the climate-related aspects of AI.

1.3.2 Legal Dogmatic Method

In addition to the EU legal method, a legal dogmatic method is applied throughout the thesis. The legal dogmatic method applied is based on the theory of legal doctrine, consisting of legislation, preparatory works, and other relevant legal sources.[18] A legal dogmatic analysis involves an examination of legal sources in order to determine the content of the applicable law and how the legislation should be interpreted within its specific legal context.[19]

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[12] J Hettne and I Otken Eriksson, *EU-rättslig metod: teori och genomslag i svensk rättstillämpning* (2nd edn, Norstedts Juridik, 2011) 168.
[13] J Hettne and I Otken Eriksson, *EU-rättslig metod: teori och genomslag i svensk rättstillämpning* (2nd edn, Norstedts Juridik, 2011) 168.
[14] J Hettne and I Otken Eriksson, *EU-rättslig metod: teori och genomslag i svensk rättstillämpning* (2nd edn, Norstedts Juridik, 2011) 114.
[15] B Lehrberg, *Praktisk juridisk metod* (14th edn, Iusté, 2022) 270.
[16] B Lehrberg, *Praktisk juridisk metod* (14th edn, Iusté, 2022) 270.
[17] B Lehrberg, *Praktisk juridisk metod* (14th edn, Iusté, 2022) 273.
[18] C Sandgren, *Rättsvetenskap för uppsatsförfattare* (6th edn, Norstedts Juridik, 2025) 52.
[19] C Sandgren, *Rättsvetenskap för uppsatsförfattare* (6th edn, Norstedts Juridik, 2025) 52.

Furthermore, the method is based on established sources of law, seeking to identify both the existing legal rules and areas in which further legislative development may be required.[20]

Throughout the thesis, the method is applied to provide both *de lege lata* and *de lege ferenda* argumentations.[21] Further, the method is applied to determine the currently applicable law and to assess whether legislative change is necessary to meet the obligations established in the ECL. While the de lege lata analysis establishes the existing legal framework,[22] the de lege ferenda analysis evaluates whether the current regulatory framework is sufficient or whether new legislative measures should be introduced.[23] This constitutes a central component of the legal dogmatic method, which not only aims to describe the current legal landscape, but also critically assesses it.[24] In this thesis, the method is therefore applied to conduct a critical legal dogmatic analysis of the existing AI framework, which may be considered insufficient regarding climate commitments, thereby motivating the proposals for legal developments.[25] Consequently, the legal dogmatic method is applied primarily in the analytical section of the thesis, where particular emphasis is placed on de lege ferenda considerations regarding the potential need for new legislative measures.

1.3.3 Source Materials

The source materials used throughout the thesis vary depending on the focus of each of the chapters. The primary source materials used consisted of the AI Act and the ECL. These regulations, adopted under the Treaties of the European Union, constitute *secondary law*. Secondary law includes regulations, directives, and non-legislative acts.[26] Given that both the AI Act and the ECL are regulations, they are the primary legal materials applied throughout the thesis. Additionally, the recitals of the regulations are used to analyse the objectives of the

[20] B Lehrberg, *Praktisk juridisk metod* (14th edn, Iusté, 2022) 201.
[21] J Kleineman, 'Rättsdogmatisk metod' in M Nääv and M Zamboni (eds), *Juridisk metodlära* (3rd edn, Studentlitteratur, 2025) 44.
[22] B Lehrberg, *Praktisk juridisk metod* (14th edn, Iusté, 2022) 201; Å Gunnarsson and E-M Svensson, *Rättsdogmatik: som rättsvetenskapligt perspektiv och metod* (Studentlitteratur, 2023) 105.
[23] B Lehrberg, *Praktisk juridisk metod* (14th edn, Iusté, 2022) 201.
[24] J Kleineman, 'Rättsdogmatisk metod' in M Nääv and M Zamboni (eds), *Juridisk metodlära* (3rd edn, Studentlitteratur, 2025) 44.
[25] J Kleineman, 'Rättsdogmatisk metod' in M Nääv and M Zamboni (eds), *Juridisk metodlära* (3rd edn, Studentlitteratur, 2025) 44–45.
[26] J Hettne and I Otken Eriksson, *EU-rättslig metod: teori och genomslag i svensk rättstillämpning* (2nd edn, Norstedts Juridik, 2011) 168.

Regulations. While recitals themselves are not legally binding, they offer valuable insight into the reasoning and objectives of a regulation.[27]

Additional source materials include relevant legal articles, studies examining the impact of AI on the climate, online journals, and official documentations published by the European Commission concerning the relevant regulations. Whilst not all source materials are directly related to the legislation, they are still necessary to provide a technical and contextual background. This, for example, regarding how AI systems function and how AI systems are implemented in businesses. Whilst they are not primary or secondary legal sources, they are deemed necessary to fully understand the subject matter at hand.

Moreover, it should be further emphasised that the materials used, aside from the secondary law, have certain limitations. Given the rapidly evolving nature of the field, the available research is not always widely established. Nevertheless, these sources offer valuable contextual insight for the thesis. However, they do not carry the same legal authority as legislative acts and should therefore be treated as a supplementary source rather than a primary legal source. Consequently, some source materials used may be considered limited as they do not carry the same legal authority as official regulations.

1.4 Delimitations

The focus of the thesis is the climate-related aspects of the AI Act and the purpose and obligations of the ECL. Therefore, this thesis is limited to an analysis of the applicable EU legislation and its preparatory works to understand the underlying objectives of the regulations. Aspects other than climate-related ones are therefore not taken into consideration. Furthermore, the thesis adopts a business-oriented perspective when considering AI implementation, with an additional objective of evaluating the potential impacts that the regulatory frameworks will have on businesses within the EU.

[27] C Ramberg, A Bersher and others, *Rättskällor - en introduktion i kritiskt tänkande* (2nd edn, Norstedts Juridik, 2024) 50.

1.5 Previous Research

The existing research concerning the AI Act and the ECL has primarily focused on the regulations independently. However, recent research has highlighted the absence of climate-related considerations in the AI Act when assessed against the framework established by the ECL.[28] This thesis moves beyond previous research by considering whether the aims of the regulations necessitate additional legislative measures. Furthermore, this thesis adopts a business-oriented perspective, a perspective which has previously not been explored in earlier research.

1.6 Disposition

The thesis consists of six chapters to provide a coherent overview and assessment of the relevant legal framework. This further enables an analysis of the integration of climate obligations into the AI Act, before moving into a discussion as to what the most appropriate solution is for EU businesses.

Chapter one serves as an introduction by presenting the background, identifying the problem statement, and introducing the purpose of the thesis. Further, it explains the methodological approach and the materials applied, as well as the delimitations and comments on previous research. *Chapter two* provides an in-depth overview of the technical background of AI and its environmental impacts, which is essential to provide an understanding of how AI-related environmental impacts will affect businesses operating within the EU. *Chapter three* examines the purpose of the AI Act. Further, it examines any climate-related considerations which are included in the Act and explains the EU's approach to the implementation of AI systems. *Chapter four* provides an outline for the ECL by examining its objectives and the obligations established for legislation within the EU. Moreover, it explains central concepts within the EU which are necessary for the analysis. *Chapter five* offers a detailed analysis based on the previous chapters, assessing the extent to which the AI Act incorporates the climate-related objectives within the ECL and an evaluation of whether it is the appropriate

[28] S Staigvilas, 'The Missing Climate Dimension in the EU AI Act: Parsing the World's First Comprehensive AI Regulation Through the Lens of the European Green Deal' (2025); T Turcinovic, 'Environmental Considerations in the EU's Artificial Intelligence Act: An Analysis of the AI Act's Approach to Regulating the Negative Environmental Impact of AI' (Stockholms Universitet, 2025); I Ibrahim, E Zaidan and others, 'The AI ACT and its green blind spots: Hidden environmental risks in the AI lifecycle' (2026).

legislative framework. Thereafter, a final analysis is made as to whether an alternative approach to AI Climate legislation can be necessary. Lastly, *chapter six* offers some concluding thoughts on the thesis.

2 AI Systems

2.1 Introduction

This chapter introduces the development of AI systems, providing the reader with an understanding of the underlying technological concepts which have enabled the emergence of modern AI systems. Building on this, the chapter further includes an examination of both the positive and negative environmental impact of AI systems, thereby introducing a central aspect of the thesis. Establishing an understanding of how AI systems function is necessary to facilitate a more in-depth discussion of their environmental impacts. Additionally, the chapter examines how AI systems are being implemented into businesses, providing important context for later assessments of the significance an increased AI deployment will have for businesses moving forward.

2.2 The Development of AI Systems

AI first emerged as a concept in the 1950's, as an information and communication technology (ICT) which was imagined as a way for human intelligence to be recreated by machines.[29] It is encompassed by technologies that allow computers and systems to mimic human learning in terms of general comprehension, problem-solving, decision-making, creativity, and the ability to take autonomous action.[30] An AI systems intelligence lies in its capacity to perceive data, analyse it, and subsequently react to it.[31]

AI systems have become increasingly embedded in multiple sectors of society, with applications extending to both personal and professional contexts. It is employed in a wide array of services designed to enhance efficiency and convenience, including translation tools, navigational systems, and virtual assistants. Beyond simply everyday applications, AI systems are progressively being integrated into more advanced fields, such as disaster forecasting, financial analytics, and healthcare.[32]

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[29] S Muggleton, 'Alan Turing and the development of Artificial Intelligence' (2014) 3-4; A Nordgren, 'Artificial intelligence and climate change: ethical issues' (2023) 1.
[30] C Stryker and E Kavlakoglu, 'What is artificial intelligence (AI)?' (IBM Think, 9 August 2024). <https://www.ibm.com/think/topics/artificial-intelligence#:~:text=Artificial%20intelligence%20(AI)%20is%20technology,can%20see%20and%20identify%20objects.> accessed 1 December 2025.
[31] KR Chowdhary, *Fundamentals of Artificial Intelligence* (Springer, 2020) 1.
[32] C Balkenius, P Gärdenfors and others, 'Artificiell Intelligens' (Nationalencyklopedin) <https://www.ne.se/uppslagsverk/encyklopedi/l%C3%A5ng/artificiell-intelligens> accessed 7 January 2026.

A universally agreed-upon definition of an AI system does not exist as its meaning has been subject to multiple reinterpretations over time.[33] Similarly, the EU has revised its definition throughout the drafting process of the AI Act before it ultimately formalised a legal definition for AI systems as:

"*A machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments"*[34]

As this definition provides a foundation for understanding how AI systems may function, the development of AI can further be conceptualised as a progression through multiple layers. At its broadest level, AI refers to the development of machines capable of replicating human behaviour, as it is the science and engineering of intelligent machines.[35] Within the scope of AI systems, there are several different subfields of learning.[36]

The first layer of learning models is *machine learning* (ML) models. ML models are based on algorithms which are capable of detecting patterns throughout large data sets and learn to make their own predictions using processed data, rather than just receiving programming instructions.[37] In this learning process, AI systems transform the information provided into a new form, which is stored for future use.[38] Typically, ML models are employed in computing tasks where designing and programming explicit algorithms with a good performance is unfeasible, with typical applications including email filtering.[39]

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[33] KR Chowdhary, *Fundamentals of Artificial Intelligence* (Springer, 2020) 2-3.
[34] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 3.1.
[35] McKinsey & Company, 'What is AI (Artificial Intelligence)' (McKinsey, 3April 2024) <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-ai> accessed 2 December 2025.
[36] O Campesato, *Artificial Intelligence Machine Learning and Deep Learning* (Mercury Learning and Information, 2020) 1.
[37] P Ongsulee, 'Artificial Intelligence, Machine Learning and Deep Learning' (15th International Conference on ICT and Knowledge Engineering, 2017); O Campesato, *Artificial Intelligence Machine Learning and Deep Learning* (Mercury Learning and Information, 2020) 24.
[38] KR Chowdhary, *Fundamentals of Artificial Intelligence* (Springer, 2020) 377.
[39] P Ongsulee, 'Artificial Intelligence, Machine Learning and Deep Learning' (15th International Conference on ICT and Knowledge Engineering, 2017); O Campesato, *Artificial Intelligence Machine Learning and Deep Learning* (Mercury Learning and Information, 2020) 24.

Moreover, within the frame for ML models, there is a subfield of *deep learning* (DL) models.[40] The DL models are models which are an advanced branch of ML models, as they are capable of ingesting data and processing it through multiple iterations.[41] Using artificial neural networks, they can perform multiple iterations that can learn increasingly complex features of any data set.[42] The DL models continuously use the output from the previous layer as an additional input, therefore becoming unsupervised by learning multiple levels of features of data. When the input layer receives an input, it then passes on a modified version of the input to the next layer, allowing the algorithm to use multiple processing layers.[43] Whilst DL in itself is progressing, it is within the frame for DL models that issues regarding bias in algorithms begin to emerge as the models focus on finding patterns in datasets, whilst generalising those results is a more difficult task.[44]

Lastly, there are the most advanced DL models, which are the *generative AI* models. Generative AI is a branch of DL models that use exceptionally *large language models* (LLMs), which are capable of learning especially abstract patterns. In doing so, the LLMs become able to not only process data, but also capable of producing original content, including literature, images, and videos.[45] Common examples of generative AIs include *ChatGPT, Copilot,* and *Google Gemini.*[46] Generative AI models rely entirely on training data made by people, therein "learning" to generate content by extracting patterns from already existing media which it has been trained on.[47] Additionally, there are types of generative AI models which are referred to as *General Purpose AI* (GPAI) models. GPAI models are a type of AI model capable of performing a wide range of tasks. For example, these models are capable of generating language, text-to-images, and text-to-video outputs.[48] Further, these models can in turn be classified based on the amount of floating-point operations (FLOPs) it

[40] O Campesato, *Artificial Intelligence Machine Learning and Deep Learning* (Mercury Learning and Information, 2020) 19.
[41] KR Chowdhary, *Fundamentals of Artificial Intelligence* (Springer, 2020) 436.
[42] KR Chowdhary, *Fundamentals of Artificial Intelligence* (Springer, 2020) 436.
[43] P Ongsulee, 'Artificial Intelligence, Machine Learning and Deep Learning' (15th International Conference on ICT and Knowledge Engineering, 2017).
[44] O Campesato, *Artificial Intelligence Machine Learning and Deep Learning* (Mercury Learning and Information, 2020)102-103.
[45] P Ongsulee, 'Artificial Intelligence, Machine Learning and Deep Learning' (15th International Conference on ICT and Knowledge Engineering, 2017).
[46] University Center for Teaching and Learning, 'The Prompt: What is Generative AI?' (University of Pittsburgh) <https://teaching.pitt.edu/resources/what-is-generative-ai/> accessed 6 January 2026.
[47] Z Epstein, A Hertzmann and others, 'Art and science of Generative AI' (2023).
[48] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 3(63); EU Artificial Intelligence Act, 'Overview of Guidelines for GPAI Models' (Artificial Intelligence Act, 30 July 2025) <https://artificialintelligenceact.eu/gpai-guidelines-overview/> accessed 17 December 2025.

has. A FLOP is a way to approximately estimate what the model is capable of, as it is a standardised way of measuring the number of calculations a computer is capable of performing.[49] Any model trained using more than 10^{25} FLOPs is under the AI Act presumed to be a GPAI model given the extent of its computational capabilities.[50]

Regarding AI's contribution to climate change, this thesis focuses primarily on generative AI and GPAI models as these categories are associated with having the largest environmental impacts.[51] The emissions of AI systems vary considerably depending on the model type and computational capabilities. Previous studies have indicated that natural language processing (NLP) models are among those associated with the highest emissions, a finding further reinforced by the recent emergence of generative AI and GPAI models, many of which are built using NLP.[52] This development is particularly significant given the rapidly increasing deployment of generative AI across a wide range of implementations.[53]

2.3 The Environmental Impact of AI Systems

2.3.1 Positive Environmental Impacts

AI systems have the potential to play a significant role in supporting climate action while simultaneously promoting sustainable AI development and fostering economic growth within the EU.[54] Through the promotion of innovation and a strategic allocation of investments, the EU can ensure that the deployment of AI delivers on both environmental and economic benefits, thereby contributing to a more sustainable future. Thus, AI systems have the potential to play an important role in supporting the EU's broader sustainability objectives.[55]

AI systems can serve as a helpful tool for climate change mitigation. The systems are capable of, through optimisation algorithms and predictive modelling, ensuring a more efficient

[49] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Recital 111; S Boldo, C-P Jeannerod and others, 'Floating-point arithmetic' (2023).
[50] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 51.2.
[51] N Bashir, P Donti and others, 'The Climate and Sustainability Implications of Generative AI' (An MIT Exploration of Generative AI, March 2024) <https://mit-genai.pubpub.org/pub/8ulgrckc/release/2> accessed 4 December 2025.
[52] A Nordgren, 'Artificial intelligence and climate change: ethical issues' (2023) 3.
[53] N Stern, M Romani and others, 'Green and intelligent: the role of AI in the climate transition' (2025).
[54] N Stern, M Romani and others, 'Green and intelligent: the role of AI in the climate transition' (2025).
[55] N Stern, M Romani and others, 'Green and intelligent: the role of AI in the climate transition' (2025).

energy use, thereby ensuring a more secure supply of energy as well as increased resilience.[56] For example, AI is positively contributing to climate change mitigation through its ability to process extensive amounts of data. In doing so, AI systems can detect patterns in climate datasets and forecast future trends, such as mean temperature changes on a global scale, along with anticipating extreme weather events.[57] For example, whilst flooding results in large economic damages each year, Google has launched a Floodhub, which is able to detect a potential flood several days in advance and therefore is able to issue warnings. Due to this, damages can be avoided.[58] As such, these systems allow for a forecasting of weather, improving disaster alert systems and allowing for more dynamic adaptation measures.[59]

Additionally, the data centres which run these AI systems generate excessive amounts of heat. This excessive heat can be diverted to heat homes, with initiatives like this already taking place in Sweden and Finland. In Sweden, an initiative has been started with the aim of creating a data centre industry where no heat generated by data centres is wasted. Instead, the heat shall exclusively be diverted to warm homes.[60] Further, Microsoft is building an entire data centre region in Finland. This region is set to become the world's largest scheme to recycle waste heat from these data centres. Once completed, the data centre is predicted to heat one of the largest cities in Finland, along with two other municipalities and is as a result predicted to eliminate local carbon emissions by 2030.[61]

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[56] L Reitmeir and S Lutz, 'What direct risks does AI pose to the climate and environment?' (Grantham Research Institute on Climate Change and the Environment, 12 September 2025) <https://www.lse.ac.uk/granthaminstitute/explainers/what-direct-risks-does-ai-pose-to-the-climate-and-environment/> accessed 4 December 2025.

[57] J Cowls, A Tsamados and others, 'The AI Gambit: Leveraging artificial intelligence to combat climate change - opportunities, challenges, and recommendations' (2023).

[58] N Stern, M Romani and others, 'Green and intelligent: the role of AI in the climate transition' (2025).

[59] N Stern, M Romani and others, 'Green and intelligent: the role of AI in the climate transition' (2025).

[60] M North, 'Here's how data centre heat can warm you home' (*World Economic Forum,* 18 June 2025) <https://www.weforum.org/stories/2025/06/sustainable-data-centre-heating/> accessed 19 January 2026; Microsoft, 'Microsoft announces intent to build a new datacenter region in Finland, accelerating sustainable digital transformation and enabling large scale carbon-free district heating (*Microsoft,* 17 March 2022) <https://news.microsoft.com/europe/2022/03/17/microsoft-announces-intent-to-build-a-new-datacenter-region-in-finland-accelerating-sustainable-digital-transformation-and-enabling-large-scale-carbon-free-district-heating/> accessed 19 January 2026; J Macpherson, 'Finland, Sweden Warm Up to Data Centre District Heat Amid Lingering Sustainability Concerns' (*The Energy Mix,* 10 December 2025) <https://www.theenergymix.com/finland-sweden-warm-up-to-extractionwater-intensivedata-centre-district-heat-amid-lingering-sovereignty-concerns/> accessed 19 January 2026.

[61] M North, 'Here's how data centre heat can warm you home' (*World Economic Forum,* 18 June 2025) <https://www.weforum.org/stories/2025/06/sustainable-data-centre-heating/> accessed 19 January 2026; Microsoft, 'Microsoft announces intent to build a new datacenter region in Finland, accelerating sustainable digital transformation and enabling large scale carbon-free district heating (*Microsoft,* 17 March 2022) <https://news.microsoft.com/europe/2022/03/17/microsoft-announces-intent-to-build-a-new-datacenter-region-in-finland-accelerating-sustainable-digital-transformation-and-enabling-large-scale-carbon-free-district-heating/> accessed 19 January 2026; J Macpherson, 'Finland, Sweden Warm Up to Data Centre District Heat Amid Lingering Sustainability Concerns' (*The Energy Mix,* 10 December 2025)

Further, there are AI systems emerging that are designed to have a positive impact on the climate. For example, a new generative AI model called Euria was launched in 2025.[62] Euria focuses on ensuring that none of the energy used to power AI is wasted by being powered by 100% renewable energy, whilst also ensuring that all the excess heat produced is redirected into the district heating network in Geneva.[63]

2.3.2 Negative Environmental Impacts

The deployment of advanced AI models, such as generative AI, requires vast resources, with global demands expected to increase tenfold between the years of 2023 and 2026.[64] As fossil fuels continue to account for over 60% of the electricity generated globally, the increasing energy requirements of AI systems are intensifying greenhouse gas (GHG) emissions.[65] In addition to this, the data centres required to run AI systems represent one of the fastest-growing sources of global emissions, therefore continuing to further escalate the issue. As a result, the use of AI causes direct environmental harm.[66]

Furthermore, the operation of these AI systems is dependent on the existence of large data centres, as only the data centres can provide the special infrastructure required to properly train, deploy, and deliver applications and services of AI systems.[67] For generative AI to fully operate, it requires a computer which will allow it to process the vast amounts of data it continuously receives, something which most ordinary computers are not capable of, given the vast amount of data sets required. This, along with the storage and processing power

<https://www.theenergymix.com/finland-sweden-warm-up-to-extractionwater-intensivedata-centre-district-heat-amid-lingering-sovereignty-concerns/> accessed 19 January 2026.

[62] Infomaniak, 'Euria: the free, sovereign AI assistant to no longer depend on the American giants' (Infomaniak News, 9 December 2025) <https://news.infomaniak.com/en/euria-sovereign-ai-assistant/> accessed 2 March 2026.

[63] Infomaniak, 'Euria: the free, sovereign AI assistant to no longer depend on the American giants' (Infomaniak News, 9 December 2025) <https://news.infomaniak.com/en/euria-sovereign-ai-assistant/> accessed 2 March 2026.

[64] A Lal and F You, 'Advances and challenges in energy and climate alignment of AI infrastructure expansion' (2025).

[65] L Reitmeir and S Lutz, 'What direct risks does AI pose to the climate and environment?' (Grantham Research Institute on Climate Change and the Environment, 12 September 2025) <https://www.lse.ac.uk/granthaminstitute/explainers/what-direct-risks-does-ai-pose-to-the-climate-and-environment/> accessed 4 December 2025.

[66] L Reitmeir and S Lutz, 'What direct risks does AI pose to the climate and environment?' (Grantham Research Institute on Climate Change and the Environment, 12 September 2025) <https://www.lse.ac.uk/granthaminstitute/explainers/what-direct-risks-does-ai-pose-to-the-climate-and-environment/> accessed 4 December 2025.

[67] A Jonker and A Gomstyn, 'What is an AI Data Center?' (IBM Think) <https://www.ibm.com/think/topics/ai-data-center> accessed 9 December 2025.

required to handle the workload of generative AI, are why the data centres are an absolute necessity to properly deploy AI.[68]

Without these data centres, generative AI would not be able to function effectively, given the lack of processing power and memory capacity in most computers. Further, these data centres are built with specialised hardware, such as graphics processing units (GPUs), which are specifically designed to handle the intensive demand that AI usage creates. The use of this specialised hardware generates significant amounts of heat, which in turn creates a requirement for certain methods for cooling, as the otherwise traditional cooling methods are no longer effective.[69]

Following this, the operation of AI systems requires vast amounts of water to cool the data centres, thereby creating additional environmental pressures, particularly in regions already experiencing water scarcity.[70] In 2023, a single data centre reportedly withdrew 29 billion litres of water, whilst more than 23 billion litres of freshwater were consumed through evaporation for onsite cooling purposes.[71] This further illustrates the substantial water footprint associated with large-scale AI infrastructure, highlighting the importance of addressing water consumption in the context of an escalating global freshwater crisis.[72]

This concern is further reinforced by warnings from the United Nations University, which has reported that the world is in a state of *global water bankruptcy*, as freshwater sources are increasingly depleting. Thus, the growing reliance on freshwater for cooling data centres is likely to become an increasingly significant environmental challenge.[73] Further, research has shown that a single prompt submitted to the GPT-3 model consumes approximately 28

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[68] J Lester, 'Why AI Needs Data Centers - and What It Means for Industry Growth' (AnD CableProducts, 16 April 2025) <https://andcable.com/cable-management/why-ai-needs-data-centers/> accessed 9 December 2025.
[69] J Lester, 'Why AI Needs Data Centers - and What It Means for Industry Growth' (AnD CableProducts, 16 April 2025) <https://andcable.com/cable-management/why-ai-needs-data-centers/> accessed 9 December 2025.
[70] P Li, J Yang and others, 'Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models' (26 March 2025); and J Gupta, H Bosch and others, 'AI's excessive water consumption threatens to drown out its environmental contributions' (May 2024).
[71] P Li, J Yang and others, 'Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models' (26 March 2025) 55.
[72] P Li, J Yang and others, 'Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models' (26 March 2025) 56.
[73] K Madani, *Global Water Bankruptcy: Living Beyond our Hydrological Means in the Post-Crisis Era,* (United Nations University Institute for Water, Environment and Health, 20 January 2026).

millilitres of water, illustrating how even small interactions with AI systems contribute to water scarcity.[74]

Moreover, the continued increase in demand for generative AI has led to new data centres being built in response to keep up with the demand. Following this, research has suggested that the global power demand from the data centres in question will increase by 165% by 2030 in comparison to the 2023 levels. Further, the increased demand has led to major companies, such as Google, collaborating with previously shut-down nuclear power plants in order to fuel the company's AI infrastructure. As such, AI has kick-started a new age of nuclear power.[75] A projected increase in the global power demand, like the above-mentioned, therefore raises further concerns regarding the energy consumption, carbon emissions, and overall sustainability of the development of AI.[76] Overall, the recent increase in AI usage has skyrocketed all indications of its current and future estimated digital ecological impacts. This is further indicated by major tech companies, like Microsoft and Google, having reported a rise in resource use previously unheard of. Further, both companies have announced plans to stop their carbon offsetting and stated that any previous sustainability pledges made will be lost, citing this as a direct result of their large-scale AI roll-out.[77] According to developers, the generative AI models currently on the market are the hungriest digital technologies developed as their supply chains are exceptionally exploitative and destructive, leading to further damaging impacts on the climate.[78]

As AI continues to be increasingly embedded into the daily operations of most business sectors, there is a need for the EU to address the potential risks of a rapid and unmitigated growth in its use.[79] Whilst AI in itself has the potential to support climate actions by being

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[74] P Li, J Yang and others, 'Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models' (26 March 2025) 59.
[75] United Nations, 'Will AI kickstart a new age of nuclear power?' (17 January 2026) <https://news.un.org/en/story/2026/01/1166768> accessed 28 February 2026.
[76] Goldman Sachs, 'How AI Is Transforming Data Centers and Ramping Up Power Demand' (Goldman Sachs, 29 August 2025) <https://www.goldmansachs.com/insights/articles/how-ai-is-transforming-data-centers-and-ramping-up-power-demand> accessed 18 December 2025.
[77] R Rehak, 'Catastrophic Computation: On the Impossibility of Sustainable Artificial Intelligence' in L Hagedorn, U Schmid and others (eds), *Digital Humanism* (DIGHUM, 2025).
[78] R Rehak, 'Catastrophic Computation: On the Impossibility of Sustainable Artificial Intelligence' in L Hagedorn, U Schmid and others (eds), *Digital Humanism* (DIGHUM, 2025).
[79] L Reitmeir and S Lutz, 'What direct risks does AI pose to the climate and environment?' (Grantham Research Institute on Climate Change and the Environment, 12 September 2025) <https://www.lse.ac.uk/granthaminstitute/explainers/what-direct-risks-does-ai-pose-to-the-climate-and-environment/> accessed 4 December 2025.

useful for mitigation and adaptation strategies as previously mentioned, it also poses a threat to the climate, as the infrastructure required to build and operate AI systems are extensive.[80] Therefore, governments must regulate AI systems to minimise their environmental impacts by encouraging the use of renewable energy in data centres and promoting AI systems which are energy-efficient.[81]

2.4 AI Systems in Businesses

The development of generative AI, along with the further expansion of ML and DL models, has laid the groundwork for the future of AI in businesses. Furthermore, recent years have introduced AI applications in entirely new ways for businesses, as it has become integrated into decision-making processes, customer support, and marketing. As the generative AI tools have emerged in a short period, they have become seen as capable of bringing about a revolution in the business sectors.[82]

As AI has continued to be embedded into several aspects of daily life, it has emerged as a transformative technology, reshaping entire industries on a global scale.[83] Beyond simply personal use, AI has become an essential tool for many businesses. With its ability to mimic human intelligence, through a complex series of problem-solving and decision-making processes, it has had a great impact on an array of business processes. Businesses can use AI to enhance their operational efficiency, ranging from customer management to IT optimisation and cybersecurity.[84] With AI technology now capable of being tailored to a specific organisation's requirements, the use of AI in businesses has reportedly doubled since 2017.[85]

The future trajectory of AI is characterised by developments that extend well beyond regular automation. AI systems increasingly demonstrate the capacity to interpret data in real time,

[80] A Nordgren, 'Artificial intelligence and climate change: ethical issues' (2023).
[81] N Stern, M Romani and others, 'Green and intelligent: the role of AI in the climate transition' (2025).
[82] JP Bharadiya, R Kurien Thomas and others, 'Rise of Artificial Intelligence in Business and Industry' (2023) 86.
[83] JP Bharadiya, R Kurien Thomas and others, 'Rise of Artificial Intelligence in Business and Industry' (2023) 86; B Chen, Z Wu and others, 'From fiction to fact: the growing role of generative AI in businesses and finance' (9 August 2023).
[84] JP Bharadiya, R Kurien Thomas and others, 'Rise of Artificial Intelligence in Business and Industry' (2023) 88-89.
[85] C Quiroz-Vázquez and M Goodwin, 'What is artificial intelligence (AI) in business?' (IBM Think) <https://www.ibm.com/think/topics/artificial-intelligence-business> accessed 2 December 2025.

learn from dynamic environments, and act autonomously, something which is reshaping business models entirely. Several learning organisations are developing AI technologies to forecast emerging trends, personalise customer experiences, and optimise supply-chain operations, bringing unprecedented transformations in businesses, with significant changes emerging in terms of financial markets, healthcare, and education.[86]

Furthermore, a 2023 study estimated that generative AI, along with other technologies, may automate activities that can absorb up to 60-70% of employees' work time. The study further identified 63 generative AI use cases that can deliver total value in the range of up to 4.4 trillion US dollars in economic benefits annually.[87] In addition to this, nearly nine out of ten surveyed organisations report regular use of AI within just three years of the introduction of new generative AI tools, signalling the emergence of a new era of AI integration. Although many organisations remain in the early stages of adaptation, the implementations continue to increase.[88]

Within the EU, a total of 19.95% of enterprises reported using at least one form of AI in their enterprise. Additionally, 55.03% of the large enterprises within the EU reported using AI technologies, with Denmark, Finland, and Sweden leading the integration of AI use in their enterprises.[89] Further, 26 EU countries recorded higher shares of businesses using AI technologies in 2025 in comparison to 2024. Within the EU, the information and communication sector showed to have the highest share of enterprises using AI.[90] Amongst the technologies used in EU businesses, there is no predominant AI system reported. The most common uses reported are AI technologies performing an analysis of written language,

[86] B Chen, Z Wu and others, 'From fiction to fact: the growing role of generative AI in businesses and finance' (9 August 2023).
[87] A Singla, A Sukharevsky and others, 'The state of AI in 2025: Agents, innovation, and transformation' (McKinsey & Company, 5 November 2025) <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai#/> accessed 3 December 2025.
[88] A Singla, A Sukharevsky and others, 'The state of AI in 2025: Agents, innovation, and transformation' (McKinsey & Company, 5 November 2025) <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai#/> accessed 3 December 2025.
[89] European Commission, 'Use of artificial intelligence in enterprises' (Eurostat Statistics Explained, December 2025) <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises> accessed 6 January 2026.
[90] European Commission, 'Use of artificial intelligence in enterprises' (Eurostat Statistics Explained, December 2025) <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises> accessed 6 January 2026.

generating images, videos, sound and audio, along with other AI systems that are capable of generating written language or programming codes. This differs depending on the size of the business.[91]

Furthermore, the rapid incorporation of generative AI is predicted to, from 2024 through 2028, generate a compound annual growth rate (CAGR) of 29%. In addition to an increased CAGR, worldwide spending on AI is expected to more than double by 2028, when it is expected to reach a spending of $632 billion.[92] Furthermore, most businesses are allocating budgets across several key areas such as software and platforms, infrastructures and hardware, services and consulting, and training and new talent development.[93] The continued integration of AI into business showcases how AI systems are, in real-time, reshaping entire industries, driving innovation and providing tangible benefits for businesses. As AI continues to develop, more businesses are expected to further integrate these technologies in order to achieve competitive advantages.[94] Thus, this rapid expansion created a need for regulatory responses such as the AI Act. Consequently, understanding both the transformative potential of AI and the regulatory responses following its implementation is vital, since legislative adjustments will have implications for businesses on a global scale.

[91] European Commission, 'Use of artificial intelligence in enterprises' (Eurostat Statistics Explained, December 2025) <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises > accessed 6 January 2026.
[92] International Data Corporation, 'Worldwide Spending on Artificial Intelligence Forecast to Reach $632 billion in 2028, According to New IDC Spending Guide' (IDC, 19 August 2024) <https://my.idc.com/getdoc.jsp?containerId=prUS52530724> accessed 27 December 2025.
[93] A Uzialko, 'How Artificial Intelligence Will Transform Businesses' (Businesses News Daily, 11 November 2025) <https://www.businessnewsdaily.com/9402-artificial-intelligence-business-trends.html> accessed 19 January 2026.
[94] AB Rashid and MAK Kausik, 'AI revolutionizing industries worldwide: A comprehensive overview of its diverse applications' (December 2024) 29.

3 The AI Act and the EU's Approach to AI Implementation

3.1 Introduction

The chapter introduces the AI Act and its objectives, providing the necessary understanding to comprehend the first research question. Further, it outlines the EU's risk classification system under Annex III, laying the groundwork for a later discussion on whether the environmental risks posed by AI systems warrant additional legislative measures. Additionally, the EU's approach to AI implementation across all sectors of the Union is showcased to highlight the approach the EU has taken to AI, with the EU's wish to strive for innovation being at the very forefront of becoming an AI continent.

3.2 Overview of the AI Act

3.2.1 Establishing a Regulatory Framework for AI Systems

The AI Act, established as the world's first comprehensive legal framework for AI governance, formally entered into force on August 1st 2024.[95] The legislation adopts a phased implementation schedule, with provisions concerning general principles and prohibited practices becoming applicable on 2nd of February 2025 while the final rules, including those applicable to high-risk AI systems, will become applicable once the necessary standards are in place to ensure a safe implementation.[96] According to the European Commission, this timeline reflects adjustments made to the implementation following feedback received from stakeholders.[97]

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[95] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 113; European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.

[96] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 113; Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Chapter 1-2 and Article 6; European Commission, *Proposal for a Regulation of the European Parliament and of the Council amending Regulations (EU) 2024/1689 and (EU) 2018/1139 as regards the simplification of the implementation of harmonised rules on artificial intelligence (Digital Omnibus on AI),* COM (2025) 836 final (19 November 2025).

[97] S Mukherjee and BH Meijer, 'EU to delay 'high risk' AI rules until 2027 after Big Tech pushback' (Reuters, 19 November 2025) <https://www.reuters.com/sustainability/boards-policy-regulation/eu-delay-high-risk-ai-rules-until-2027-after-big-tech-pushback-2025-11-19/#:~:text='HIGH%20RISK'%20AI%20USE%20IN%20JOB%20APPLICATIONS%2C%20BIOMETRICS&text=In%20a%20'Digital%20Omnibus'%2C,December%202027%20from%20August%202026> accessed 20 November 2025; Svenskt Näringsliv, 'EU pauses rules on high-risk AI - but companies still have work to do' (Svenskt Näringsliv, 28 November 2025)

Effective governance of AI within the EU is to be achieved by addressing AI-related risks through a binding legal approach, with the primary objective of the Act being to foster the development and deployment of AI within the EU.[98] This is further to be achieved through a risk-based approach, which establishes regulations for AI providers as well as the deployers, depending on the intended use of an AI system.[99]

According to the European Commission, the AI Act was introduced to ensure trustworthy AI within the Union.[100] Whilst most AI systems are said to pose limited to no risks to Europeans,[101] certain AI systems create risks which must be addressed through legislative measures to prevent undesirable outcomes. Therefore, the AI Act includes a system for the AI to be classified in accordance with. The four categories are: unacceptable risk, high risk, limited risk, and minimal risk.[102]

Firstly, an AI system which falls under the unacceptable risk category is strictly prohibited under the AI Act. Examples of prohibited AI systems include those related to social scoring, biometric identification systems, and those deploying manipulative techniques which cause significant harm.[103] These types of AI systems are prohibited within the EU to ensure full protection for fundamental human rights.[104]

Following the unacceptable risk category, there is the high-risk category of AI systems. The high-risk category includes AI systems which may pose serious risks to health, safety, and

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<https://www.svensktnaringsliv.se/english/eu-pauses-rules-on-high-risk-ai-but-companies-still-have-work-to_1244400.html> accessed 3 December 2025; Cade, 'EU Commission to delay high-risk guidance' (24 February 2026) <https://cadeproject.org/updates/eu-commission-to-delay-high-risk-ai-guidance/> accessed 6 March 2026.

[98] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.

[99] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.

[100] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.

[101] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.

[102] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.

[103] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 5.

[104] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.

fundamental rights.[105] Examples of these AI systems include: AI safety components in critical infrastructures, AI tools for employment (such as CV-sorting software used in recruitment processes), and AI solutions used in the administration of justice and democratic processes.[106] These high-risk systems are not necessarily prohibited, instead they require strict obligations before they can be put on the market and become available within the EU. These measures include having appropriate human oversight measures, adequate risk assessments, and the logging of activity to ensure the traceability of results.[107] Since these measures address risks linked to generative AI and GPAI models, some have proposed extending this approach to environmental concerns. However, no such measures have been implemented.[108]

Thirdly, there is the category of limited-risk AI systems. These are AI systems with specific transparency obligations to ensure that users are properly informed when necessary to ensure trustworthy AI. This includes the identification of AI-generated content, which is done in order to ensure that the public is informed on matters considered to be in the public interest, such as the case of deep fakes and texts published.[109] These provisions enter into force as of August 2026.[110]

Lastly, there are AI systems which are deemed to pose minimal to no risk. The majority of AI systems currently in use within the EU fall under this category, examples being video games or spam filters. For these types of AI systems, no further provisions are implemented.[111]

In addition to these categories, certain AI provisions apply to GPAI models. GPAI models are the basis for many AI systems used within the EU, and they can carry systemic risks when widely used.[112] Therefore, the AI Act implements additional rules for the providers of those

[105] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 6.
[106] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Annex III.
[107] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 9 and 13-14.
[108] See for example: S Staigvilas, 'The Missing Climate Dimension in the EU AI Act: Parsing the World's First Comprehensive AI Regulation Through the Lens of the European Green Deal' (2025).
[109] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.
[110] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 113.
[111] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.
[112] European Commission, 'AI Act' (European Commission, <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai> accessed 13 December 2025.

models, including transparency and copyright-related rules. For GPAI models, the providers must continuously assess and mitigate these risks.[113] These provisions are in effect as of August 2025.[114]

3.2.2 The Objectives of the AI Act

The AI Act's objectives are to improve the functioning of the internal market by laying down a uniform legal framework for the development, placing on the market, putting into service, and use of AI systems in the EU to promote the uptake of human-centric and trustworthy AI. All this whilst ensuring a high level of protection for health, safety, and fundamental rights as enshrined within the Charter of Fundamental Rights of the European Union (CFREU).[115] This includes protecting democracy, the rule of law, and environmental protection to protect against the harmful effects that AI systems may bring, whilst still supporting innovation within the EU. In doing so, the Regulation ensures the free cross-border movement of AI-based goods and services.[116]

As AI systems can easily be deployed in a large variety of sectors of the economy and many parts of society, including across borders, they can easily circulate throughout the EU. If there are no uniform rules on AI, the diverging national rules may lead to the fragmentation of the internal market and may therefore decrease legal certainty for operators that develop, import, or use AI systems.[117] Given the major impact that AI systems have on society there is a need to build trust as it is vital for the regulatory frameworks to be developed in accordance with existing EU values. As a prerequisite, AI should be a human-centric technology. It should serve as a tool for people to increase human well-being.[118]

[113] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 50(2).
[114] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 113.
[115] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Recital 1.
[116] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Recital 1.
[117] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Recital 2.
[118] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Recital 3.

3.2.3 The Approach to Environmental Concerns within the AI Act

With the AI Act, the legislators have demonstrated an awareness of both the opportunities presented and the risks associated with the use of AI. Nevertheless, the resulting AI Act has been criticised for a lacking incorporation of environmental considerations, as it emphasises the transformative and innovation-enhancing potential of AI whilst neglecting to adequately regulate its negative impact, including its environmental footprint.[119]

An examination of the recitals reveals a distinctly optimistic view of the potential benefits associated with AI systems, as the Act recognises an array of economic, environmental, and societal advantages, stating:

"*AI is a fast-evolving family of technologies that contributes to a wide array of economic, environmental and societal benefits across the entire spectrum of industries and social activities. By improving prediction, optimising operations and resource allocation, and personalising digital solutions available for individuals and organisations, the use of AI can provide key competitive advantages to undertakings and support socially and environmentally beneficial outcomes, for example in healthcare, agriculture, food safety, education and training, media, sports, culture, infrastructure management, energy, transport and logistics, public services, security, justice, resource and energy efficiency, environmental monitoring, the conservation and restoration of biodiversity and ecosystems and climate change mitigation and adaptation.*"[120]

Furthermore, the AI Act anticipates situations in which the rapid deployment of innovative AI technologies may justify exceptions from the otherwise standard regulatory obligations established. This indicates that AI systems, which are deemed necessary for the health and safety of persons and the protection of the environment, do not need to undergo the same conformity assessments as other AI systems.[121] This is further reflected in the articles of the

[119] See for example: R Riemens and J van Dijck, 'Bigger And Faster Or Better And Greener? The EU Needs To Define Its Priorities For AI' (21 August 2025) <https://www.techpolicy.press/bigger-and-faster-or-better-and-greener-the-eu-needs-to-define-its-priorities-for-ai/> accessed 8 March 2026; Z Warso and K Shrishak, 'Hope: The AI Act's Approach to Address the Environmental Impact of AI' (21 May 2024) <https://www.techpolicy.press/hope-the-ai-acts-approach-to-address-the-environmental-impact-of-ai/> accessed 8 March 2026.

[120] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Recital 4.

[121] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Recital 130.

AI Act, which allow exceptions for high-risk AI systems under certain circumstances. In doing so, this may support the rapid innovation and deployment, but it raises questions regarding how environmental climate objectives will be safeguarded in practice, despite it being cited as a reason to forgo the necessary conformity assessments.[122]

3.3 Additional Action Plans within the EU

The AI Act is a part of a broader set of policy initiatives which aim to support the development of trustworthy AI within the EU. This wider framework further includes the AI Innovation Package, the AI Continent Action Plan, and the establishment of AI factories.[123] Together, these pave the way forward to ensure that modern AI is trustworthy.[124]

With the AI Innovation Package, the EU aims to support European startup companies along with small and medium-sized enterprises (SMEs) in the development of trustworthy AI. This is to ensure that AI systems implemented align with legislation and values found within the EU.[125] In addition, the package aims to facilitate access to supercomputing resources, providing financial support and creating a supportive ecosystem for innovation.[126]

Further, the AI Continent Action Plan has become a way for the EU to become a global leader in AI to promote the development and deployment of AI solutions that benefit society and stimulate the economy. With the AI Continent Action Plan, the EU aims to shape the next phase of AI development, thereby boosting economic growth and strengthening competitiveness in areas such as healthcare and science.[127] Additionally, a main objective of the action plan is to mobilise large investments in AI, which is to be achieved through building large-scale AI computing infrastructure, increasing access to high-quality data, and

[122] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence, Article 46.
[123] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: AI Continent Action Plan,* COM(2025) 165 final (9 April 2025).
[124] European Commission, 'European approach to artificial intelligence' (European Commission) <https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence> accessed 12 February 2026.
[125] European Commission, 'AI Innovation Package' (European Commission) <https://digital-strategy.ec.europa.eu/en/factpages/ai-innovation-package> accessed 12 December 2025.
[126] European Commission, 'AI Innovation Package' (European Commission) <https://digital-strategy.ec.europa.eu/en/factpages/ai-innovation-package> accessed 12 December 2025.
[127] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: AI Continent Action Plan,* COM (2025) 165 final (9 April 2025).

strengthening AI skills.[128] Lastly, it shall promote AI across strategic sectors. When the action plan was suggested, only 13.5% of EU companies had reported the use of AI. The EU wishes to increase this by boosting AI adoption across the Union. Together, these measures are taken to guarantee safety, fundamental rights, and human-centric AI. In addition to this, it aims to strengthen AI uptake, investments, and innovation across the EU.[129]

Moreover, the EU is a part of these action plans, building AI factories across the union.[130] Citing AI Factories as dynamic ecosystems which will foster innovation in the Union, the EU has identified the establishment of AI Factories as a strategic priority.[131] Further, the EU has identified the implementation of data centres as vital to ensure that there is an adequate supply of computational power across the Union.[132] Further, the EU plans to invest in gigafactories all across the Union, with several already being in place. These gigafactories are to have the processing power of over 100 000 advanced AI processors.[133] With this processing power comes a further strain on the environment as well as the grid capacity and water resources within the EU, and to ensure sustainability, the EU is developing a plan for a package set to be released in April 2026.[134]

Other initiatives, such as the GenAI4EU, further promote a widespread integration of AI within EU businesses. Here, European businesses will become part of the GenAI4EU initiative. It is the European Commission's flagship initiative to support the development and

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[128] European Commission, 'Shaping Europe's leadership in artificial intelligence with the AI continent action plan' (European Commission) <https://commission.europa.eu/topics/competitiveness/ai-continent_en> accessed 14 December 2025.
[129] European Commission, 'Shaping Europe's leadership in artificial intelligence with the AI continent action plan' (European Commission) <https://commission.europa.eu/topics/competitiveness/ai-continent_en> accessed 14 December 2025.
[130] European Commission, 'Shaping Europe's leadership in artificial intelligence with the AI continent action plan' (European Commission) <https://commission.europa.eu/topics/competitiveness/ai-continent_en> accessed 14 December 2025.
[131] European Commission, 'Shaping Europe's leadership in artificial intelligence with the AI continent action plan' (European Commission) <https://commission.europa.eu/topics/competitiveness/ai-continent_en> accessed 14 December 2025.
[132] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: AI Continent Action Plan,* COM (2025) 165 final (9 April 2025) 4.
[133] European Commission, 'AI Factories' (European Commission) <https://digital-strategy.ec.europa.eu/en/policies/ai-factories> accessed 13 December 2025.
[134] European Commission, 'In focus: Data centres – an energy-hungry challenge' (European Commission) <https://energy.ec.europa.eu/news/focus-data-centres-energy-hungry-challenge-2025-11-17_en> accessed 4 March 2026; European Commission, 'Minimum performance standards for EU data centres' (European Commission) <https://energy.ec.europa.eu/resources/preparatory-studies/minimum-performance-standards-eu-data-centres_en> accessed 4 March 2026.

deployment of generative AI solutions across Europe's industrial ecosystems. As outlined in the AI Continent Action Plan, the GenAI4EU initiative aims to increase the adoption of AI in EU businesses, highlighting a significant potential for growth, innovation, and competitiveness through an increase in AI uptake within the EU.[135]

Overall, the AI legislation within the EU demonstrates an incredibly optimistic view of AI within the Union. The EU encourages its use to further drive economic growth, societal benefits, and technological innovation. In doing so, the EU firmly believes it will strengthen the EU's position as a global competitive actor, thereby becoming the first AI continent.[136]

[135] European Commission, 'GenAI4EU: Funding opportunities to boost Generative AI "made in Europe"' (European Commission) <https://digital-strategy.ec.europa.eu/en/policies/genai4eu#1720699867912-1> accessed 20 February 2026.
[136] European Commission, 'Shaping Europe's leadership in artificial intelligence with the AI continent action plan' (European Commission) <https://commission.europa.eu/topics/competitiveness/ai-continent_en> accessed 14 December 2025.

4 Overview of the Green Deal and the European Climate Law

4.1 Introduction

This chapter introduces the EU's approach to achieving a climate-neutral future, illustrating the initiatives and plans previously implemented to enable a transition toward a climate-neutral continent. Subsequently, the chapter examines the emergence of the ECL, emphasising its role in promoting an innovative and resource-efficient economy. Finally, the objectives of the ECL are outlined to facilitate a more in-depth discussion on how these objectives should be interpreted and understood.

4.2 The Emergence of a Green Deal

In 2019, the European Green Deal (the Green Deal) was launched. It is a central part of the EU's ambition to become the first climate-neutral continent, guiding the transformation of the Union into a clean, resource-efficient and competitive economy, that is in alignment with the Paris Agreement.[137] As a legally binding international treaty, the Paris Agreement further represents a commitment by all participating parties to reduce GHG emissions and pursue climate change mitigation and adaptation simultaneously. The agreement also establishes a framework for transparent monitoring and reporting of progress toward these climate objectives. Consequently, the EU's climate commitments extend beyond union-level, encompassing broader international obligations.[138]

The Green Deal's necessity is further emphasised by social, economic, and geopolitical developments, which have highlighted a need to shift to clean energies as a driver of economic growth and innovation within the EU.[139] Alongside the adoption of the European Climate Law, the Green Deal delivers on clean investment programmes, support for clean

[137] European Commission, 'The European Green Deal' (European Commission) <https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/story-von-der-leyen-commission/european-green-deal_en> accessed 5 December 2025.
[138] United Nations, 'The Paris Agreement' (United Nations) <https://www.un.org/en/climatechange/paris-agreement> accessed 4 March 2026.
[139] European Commission, 'The European Green Deal' (European Commission) <https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/story-von-der-leyen-commission/european-green-deal_en> accessed 5 December 2025.

industrial competitiveness and promotes circular economy reforms.[140] According to the European Commission, it is part of a growth strategy which shall protect the climate.[141]

4.3 Overview of the European Climate Law and Climate Commitments

4.3.1 The European Climate Law and Environmental Principles

In June of 2021, the EU adopted the ECL which establishes the EU's objective of achieving climate neutrality by 2050, along with achieving net negative emissions thereafter.[142] Through the legislation, the EU's commitment to climate neutrality is transformed into a legally binding obligation, which is in alignment with the Paris Agreement. Consequently, all relevant institutions within the Union and its member states are required to take the necessary measures, at both EU and national levels, to enable the collective achievement of the climate-neutrality objective.[143] In order to achieve the climate-neutrality objective, the EU has set out intermediate climate targets. Thereby, the Union commits to a binding 2030 climate target by a domestic reduction of net greenhouse gas emissions by at least 55% compared to the levels in 1990 by 2030.[144]

In addition to this, the European Commission proposed an amendment to the ECL in 2025. This was done by setting a 2040 EU climate target of a 90% reduction in net greenhouse gas emissions, in comparison to the 1990 levels.[145] In doing so, the proposal suggests that it will bring certainty to investors and foster innovation, thereby strengthening the industry leadership of businesses within the EU.[146]

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[140] European Commission, *The European Green Deal* (Communication) COM (2019) 640 final (11 December 2019).
[141] European Commission, *The European Green Deal* (Communication) COM (2019) 640 final (11 December 2019).
[142] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Article 2.1.
[143] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Article 2.2.
[144] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Article 4.
[145] Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality.
[146] European Commission, *Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality,* COM (2025) 524 final (2 July 2025).

When implementing the ECL the EU emphasised the necessity of addressing the increasing climate-related risks to human health citing frequent heatwaves, wildfires, and floods as examples. The concerns raised are closely related to fundamental rights considerations, including the right to life, in alignment with the CFREU. This seeks to ensure the integration of a high level of environmental protection and the improvement of the environmental quality across all Union policies in accordance with the principle of sustainable development.[147]

The climate actions of the EU and its member states are intended to protect the people and the planet, the economy, public health, and food systems from the adverse effects of climate change. These actions are pursued within the framework of the United Nations 2030 Agenda for Sustainable Development and in pursuit of the objectives of the Paris Agreement.[148] Further, this is done to maximise prosperity and to reduce vulnerability to climate-related risks by enhancing resilience within the EU.[149]

In light of this, the EU's actions are further to be guided by the *precautionary principle* and the *polluter pays principle* as established in the Treaty on the Functioning of the European Union (TFEU). Further, it should consider the *energy efficiency principle* of the EU, and the *do no significant harm principle* as established in the Green Deal.[150] All of these principles are the guiding principles which the EU shall follow in order to ensure a sustainable union. [151]

Firstly, the precautionary principle is one of the fundamental principles within the EU.[152] Enshrined through the TFEU, it seeks to ensure a high level of environmental protection within the EU, doing so through preventative decision-making in the situations of potential risk. What this entails is that the precautionary principle is to be invoked only once three preliminary conditions have been met. The conditions which must be met are the

[147] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 6.
[148] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 9.
[149] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 9.
[150] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 9.
[151] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 9.
[152] Consolidated versions of the Treaty on the Functioning of the European Union (2016/C 202/01) Article 191; European Commission, *Communication from the Commission on the Precautionary Principle,* COM (2000) 1 final (2 February 2000).

identification of potentially adverse effects, the evaluation of the scientific data available, and lastly, the extent of scientific uncertainty.[153] This approach follows an aim to safeguard, not only environmental interests, but also human health, food safety, and other concerns.[154]

Secondly, the polluter pays principle is a part of the core of the EU's environmental policy, stating that those who are responsible for the environmental damage done should also pay to cover the cost of the damage. Further, the polluter should cover the social costs of their actions, considering that prior to the recognition and application of the principle were being externalised from the polluter onto society. Additionally, it is also about getting the polluter from the start to monitor, reduce, remediate, and prevent pollution.[155]

Thirdly, with the energy efficiency first principle, it acts as a guide for EU energy policies and investment decisions to prioritise energy efficiency and lower production costs. The principle mandates that energy-saving measures should be considered and implemented before investing in new energy supply infrastructures. In doing so, the principle aims at maximising energy savings, enhancing cost-effectiveness and ensuring sustainability.[156] A key part of this goal being achieved is through the implementation of the energy efficiency directive.[157]

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[153] Consolidated versions of the Treaty on the Functioning of the European Union (2016/C 202/01) Article 191; European Commission, *Communication from the Commission on the Precautionary Principle,* COM (2000) 1 final (2 February 2000).
[154] Consolidated versions of the Treaty on the Functioning of the European Union (2016/C 202/01) Article 191; European Commission, *Communication from the Commission on the Precautionary Principle,* COM (2000) 1 final (2 February 2000).
[155] European Commission, 'Ensuring that polluters pay – toolkit' (European Commission) <*https://environment.ec.europa.eu/economy-and-finance/ensuring-polluters-pay_en*> accessed 16 December 2025*;* European Commission, 'Polluter Pays Principle' (European Commission) <https://www.era-comm.eu/Introduction_EU_Environmental_Law/EN/module_2/module_2_11.html> accessed 16 December 2025; European Environmental Bureau, 'Polluter Pays Principle - fitness check of its application to the environment' (August 2023) <https://eeb.org/wp-content/uploads/2023/08/EEB-submission-to-polluter-pays-principle-fitness-August-2023.pdf> accessed 16 December 2025.
[156] European Commission, 'Energy Effiency First Principle' (European Commission) <https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-first-principle_en> accessed 16 December 2025; SECCA, 'Energy Efficiency First Principle' (Sustainable Energy Knowledge Hub) <https://secca.eu/knowledge-hub/practices/ee/ee-first/> accessed 16 December 2025. <https://eeb.org/wp-content/uploads/2023/08/EEB-submission-to-polluter-pays-principle-fitness-August-2023.pdf> accessed 16 December 2025.
[157] Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency; European Commission, 'Energy Efficiency Directive' (European Commission) <https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-directive_en> accessed 16 December 2025.

Lastly, there is the do no significant harm (DNSH) principle. The DNSH principle states that no measure, such as a reform or an investment, should cause significant harm to any of the six environmental objectives within the Taxonomy Regulation.[158] These environmental objectives are encompassed by climate change mitigation and adaptation, the sustainable use and conservation of marine resources, the promotion of a circular economy, pollution prevention and control, as well as the protection and restoration of ecosystems to ensure biodiversity.[159] Thus, the EU introduces criteria for determining how every organisation contributes to environmental protection without causing significant harm to the environment.[160]

Moreover, the EU underlines that climate action should be regarded as an opportunity for all sectors of the economy, contributing both to climate objectives and the EU's wish to secure a leading role in terms of innovation. Without prejudice to binding legislation and other EU initiatives, all sectors of the economy should play a role in contributing to achieving climate neutrality by 2050. That is, regardless of whether those sectors are covered by the EU's system for GHG emission allowance trading (EU ETS).[161] Together, these policies and principles provide the basis for the EU's climate objectives, which all policies should follow to ensure an effective protection of the climate.[162]

4.3.2 The Objectives of the European Climate Law

The objectives of the ECL establish a legally binding framework designed to guide the Union's transition toward climate neutrality.[163] Further, the ECL explicitly states that all policies implemented by the EU are to be in alignment with the EU's climate commitments. At its core, the Regulation charts the 2050 climate neutrality objective through all policies, defining it as a long-term direction guiding any further legislative measures. Further, the

[158] Regulation 2020/852 of the European Parliament and of the Council on the establishment of a framework to facilitate sustainable investment, Recital 22.
[159] European Commission, *Technical guidance on the application of 'do no significant harm' under the Recovery and Resilience Facility Regulation* (2023).
[160] Regulation 2020/852 of the European Parliament and of the Council on the establishment of a framework to facilitate sustainable investment, Recital 22.
[161] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 7.
[162] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 9.
[163] European Commission, 'European Climate Law' (European Commission) <https://climate.ec.europa.eu/eu-action/european-climate-law_en> accessed 27 November 2025.

objective requires the transition to be pursued through a socially fair and cost-efficient manner, thereby integrating the EU's environmental ambitions into its principles.[164]

An additional central component of the framework is the legally binding intermediate 2030 target, in which the EU places itself on a concrete emission-reduction path which will hold it accountable and responsible for committing to the climate neutrality goals.[165] Additionally, the Regulation further establishes and implements a system which will allow for monitoring of the progress and, when necessary, trigger any additional corrective measures necessary. Through the implementation of these actions the EU ensures that the transition to a climate-neutral society will become irreversible, thereby also providing predictability for investors and other economic actors, placing the EU at the forefront of a climate-neutral society.[166]

Beyond these measures, the ECL introduces further structural features which are targeted at ensuring coherence across all areas of the Union.[167] It promotes a commitment to engage with sectors which can prepare sector-specific roadmaps, facilitating a transition toward a climate-neutral economy across all business sectors. Moreover, the Regulation strengthens the provisions on climate change adaptation, ensuring that climate change mitigation becomes central in the climate policies instituted across the Union.[168] What these are to achieve is ensuring that the EU is at the forefront of the climate-neutrality transition.[169]

[164] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 4.
[165] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Article 4.
[166] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 6-7.
[167] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 31 and Article 3.
[168] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 31 and Article 10.
[169] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality, Recital 2-3.

5 Climate Objectives in AI Legislation

5.1 Introduction

The following analysis evaluates the AI Act within the broader framework for the ECL, considering how AI regulation is incorporated with the EU's underlying climate objective. Although the Act formally acknowledges certain sustainability concerns regarding AI systems, significant questions remain as to whether this is enough to sufficiently incorporate the specific objectives as outlined in the ECL. It is necessary to assess whether the Act ever goes beyond recognising the potential AI has as a tool to help with climate change mitigation, and whether it embeds climate protection principles into the regulatory framework. Further, the necessity for this to be incorporated is taken into consideration.

Moreover, the analysis examines the extent to which the AI serves as the appropriate legal framework for the incorporation of climate-related objectives. It evaluates whether the scope and the objective of the Act allow it to properly address environmental concerns, or whether the regulation primarily focuses on other objectives, promoting innovation. Further, the analysis determines whether there is an alignment of the AI Act and the EU's climate objectives. In doing so, the discussion aims to clarify if, and to what degree, the AI Act falls short in terms of climate commitments, in turn highlighting areas where further legislative measures may be necessary. Lastly, alternative approaches to AI climate legislation are suggested, with a discussion ensuing of what is most appropriate for EU businesses.

5.2 Climate Objectives within the AI Act

5.2.1 The Incorporation of Climate Objectives within the AI Act

Regarding the first research question, several aspects should be considered. The ECL explicitly states that all policies implemented by the EU are to be in alignment with the climate objectives established in the Union.[170] In contrast to this, the AI Act frames AI systems as tools contributing to climate change mitigation, without elaborating further on environmental concerns and protection in its regulatory framework.[171] Furthermore, as the AI

[170] See section 4.3.
[171] See section 3.2.3.

Act is based on a risk-based approach, the EU has seemingly prioritised only risks when drafting the AI Act.[172] This indicates that the EU has evaluated AI systems from several perspectives, as it has showcased the potential benefits of a widespread AI system implementation.[173] Nevertheless, it raises the question as to whether this recognition is enough for it to align with the climate objectives.

According to the Green Deal and the ECL, all policies implemented must work toward achieving the climate commitments, with achieving climate-neutrality by 2050 within the EU being at the forefront.[174] Despite the objectives of the AI Act being to promote and support the uptake of trustworthy and human-centric AI,[175] it continuously neglects to address several potentially harmful effects associated with AI deployment. As the widespread deployment of these systems affects the environment negatively,[176] this results in a misalignment. Although the AI Act aims to prevent harmful AI systems from entering the market,[177] it does not address the environmental impacts arising from the deployment.

Furthermore, the EU promotes and gives incentives for the widespread adoption of AI systems.[178] With the expressed wish to become a world-leading AI continent,[179] along with the implementation of risk classification systems,[180] the EU seemingly appears to address concerns with the implementation of AI systems across all sectors. Nonetheless, this creates tension between the promotion of innovation and the EU's ability to take environmental accountability.

Alongside this, further tension is created when the EU continues working toward a climate neutrality goal. As such, it becomes clear that the objectives of the ECL are not incorporated into the AI Act to the extent that they should be. Beyond the few environmental provisions it integrates,[181] the AI Act does not incorporate any further climate change considerations, reflecting a focus on the potential benefits of AI rather than addressing its associated risks. As a result, the AI Act adopts a predominantly benefits-oriented approach to climate change with

[172] See section 3.2.1.
[173] See section 3.2.3 and 3.3.
[174] See section 4.2 and 4.3.1.
[175] See section 3.2.2.
[176] See section 2.3.2.
[177] See section 3.2.2.
[178] See section 3.3.
[179] See section 3.3
[180] See section 3.2.1.
[181] See section 3.2.3.

no further climate considerations elaborated on to ensure an AI ecosystem which is reliable for all.[182]

Without the recognition of these potential consequences, the EU is not adequately addressing the climate objectives established in the ECL, thereby falling short of fulfilling the objectives set out in the AI Act regarding the promotion of trustworthy AI. When overlooking the damage created by widespread AI deployment, despite the EU's optimistic view, it should at the very least consider potential risks. Consequently, whilst the AI Act acknowledges the potential of AI to contribute to climate change mitigation and puts emphasis on the protection of fundamental rights, it does not incorporate the climate objectives to a satisfactory extent. Instead, environmental concerns remain an afterthought, leaving gaps in alignment in terms of the AI Act implemented as opposed to the climate commitments established in the ECL.

In contrast to this, one may question whether the AI Act effectively fulfils its objectives insofar as it primarily targets providers and deployers of AI systems. Implicitly, the EU appears to have made the assessment that deployers should, at least to some extent, monitor or account for the climate impacts associated with AI use. However, this raises the issue of whether such an allocation of responsibility is appropriate, particularly given that the most direct environmental impacts arise from data centres rather than the deployers.[183] If the AI Act does not include climate considerations due to the EU having the intention that deployers should not be the ones to bear this burden, this ought to be clearly articulated. Otherwise, it remains unclear whether the responsibility is meant to rest solely on the data centre, who are the party directly responsible for the emissions generated. Clarification in this regard would contribute to enhancing regulatory predictability, thereby enhancing legal certainty for all parties.

Therefore, the omission of climate considerations is not necessarily a regulatory shortcoming. Rather, it may reflect a deliberate choice within the AI Act to exclude all aspects which may fall outside of its regulatory scope. If so, the EU should clarify whether it intends to regulate these environmental impacts, whether it be through alternative legislative frameworks or on the basis that they are already sufficiently addressed elsewhere. As the AI Act is designed to provide an innovation-friendly framework for the development and deployment of AI

[182] See section 3.2.3.
[183] See section 2.3.2.

systems,[184] imposing extensive environmental obligations on deployers may be detrimental to the objective of fostering innovation.

At the same time, if environmental considerations have indeed been omitted deliberately, this omission is not made explicit in the regulation.[185] The lack of transparency should therefore be addressed. From a systematic perspective, it would be beneficial for the AI Act to at least acknowledge the climate impacts following widespread implementation, even if the regulation ultimately concludes that such matters are better governed through other legislative measures. This is of relevance given that different actors within the AI supply chain operate under alternating circumstances, which very well may justify a differentiated regulatory approach.

5.2.2 Assessing the Need to Incorporate Climate Objectives into AI Legislation

Given the limited incorporation of climate considerations within the AI Act, it is necessary to consider whether such objectives should be explicitly incorporated into the regulatory framework, especially in light of the EU's optimistic approach to AI. Therefore, it could be argued that additional regulations are unnecessary, as the AI Act already addresses potential risks associated with AI systems through its risk-based framework.[186] From this perspective, the existing provisions may be considered sufficient to regulate the deployment of AI systems within the Union.

Furthermore, AI systems have the potential to support environmental protection through improved predictive modelling.[187] For instance, AI forecasting tools can assist in predicting floods and other natural disasters, thereby enabling an earlier intervention and reducing the severity of environmental impacts.[188] In this context, concerns may arise that the introduction of stricter environmental regulatory obligations could delay deployment of such AI systems. If AI systems are prevented from entering the market until they are satisfactory according to extensive environmental procedures, the beneficial applications may be postponed. This could result in unintended consequences, as delayed access to predictive models may limit the ability to anticipate and mitigate natural disasters. Moreover, stricter regulatory

[184] See section 3.2.
[185] See section 3.2.3.
[186] See section 3.2.1.
[187] See section 2.3.1.
[188] See section 2.3.1.

obligations may have implications for businesses by slowing the development and deployment of innovative AI solutions that provide both economic and operational benefits. For this reason, careful consideration must be given to finding an appropriate balance between environmental accountability and the continued development and deployment of AI systems.

In contrast, the potential environmental benefits of AI systems may be relatively limited when compared to the environmental costs associated with their widespread deployment. The growing use of AI systems across both everyday activities and business operations,[189] including areas such as supply-chain management, has increased energy demands.[190] While certain AI applications may produce short-term benefits, the long-term environmental impacts associated with increased energy consumption, GHG emissions, and water consumption raise concerns regarding the sustainability of large-scale AI deployment. In particular, the resource demands associated with advanced computing infrastructure, including large-scale data centres and emerging gigafactories,[191] indicate that the environmental footprint of AI systems will grow significantly as they continue to develop and expand.

For this reason, the positive contributions of AI cannot be assumed to justify its increasing environmental costs. Rather, the EU needs to consider stricter regulatory measures or, at a minimum, provide stronger incentives encouraging businesses to adopt environmentally sustainable AI practices. For example, while initiatives such as powering data centres with renewable energy or using waste heat to warm buildings are frequently proposed as mitigation strategies, their large-scale feasibility remains uncertain given the substantial computing power required to run advanced AI systems. Furthermore, improvements in energy efficiency do not necessarily guarantee a reduction in the overall environmental impact. In some cases, greater efficiency can lead to an increase in usage of a certain technology, commonly referred to as the rebound effect, where reduced costs or perceived environmental impacts may encourage higher levels of consumption.

[189] See section 2.4.
[190] See section 2.3.2. and 2.4.
[191] See section 2.3.2.

Given these uncertainties, it is therefore essential for the EU to develop mechanisms capable of monitoring and assessing the environmental impacts of AI systems. Continuous tracking of environmental footprints associated with AI deployment would help ensure that the potential benefits of AI in addressing climate change outweigh the environmental costs associated with its use. This is of relevance in the case of generative AI, whose widespread adoption by both individuals and businesses,[192] raises additional concerns regarding its energy and water consumption. In light of the EU's optimistic stance on AI as a tool for supporting climate mitigation, it is therefore necessary to consider how these environmental impacts can be more effectively incorporated into the EU's regulatory frameworks.

Consequently, the absence of mechanisms within the AI Act to monitor or mitigate environmental impacts represents a regulatory gap. Addressing this gap, whether through additional regulatory provisions or other solutions, is therefore necessary. This is to ensure that the development and deployment of AI systems remain consistent with the EU's broader climate objectives.

5.2.3 Potential Solutions to the Identified Shortcomings

As previously mentioned, a primary purpose of the AI Act is to protect individuals from the harmful effects of AI systems and promote human-centric AI.[193] Nevertheless, this protection remains inadequate if indirect harm, such as in the case of environmental damage, which will ultimately affect all humans' well-being, is not considered. Instead, the AI Act is said to be serving as a tool to ensure a high level of protection for fundamental rights whilst neglecting any climate-related considerations throughout the Act, similarly to other AI action plans moving forward.

Previously, it has been proposed that AI systems with significant environmental impacts, particularly generative AI systems and GPAI models, should be classified as high-risk under Annex III of the AI Act.[194] Such an approach highlights a potential to fill a regulatory gap, allowing the EU to incorporate environmental considerations into an already existing risk-based approach. Although these systems may not pose the same direct risks to

[192] See section 2.4
[193] See section 3.2.2.
[194] See section 3.2.1.

fundamental rights as systems used in recruitment or judicial processes,[195] their operation is associated with substantial computing demands and increased energy consumption, thereby contributing to environmental harm which affects the fundamental rights as enshrined in the CFREU.

If included in Annex III, such AI systems would have adequate risk assessments and ensure traceability in results before being placed on the market and implemented into businesses, further enabling the EU to follow core principles regarding climate change and implement these principles into processes where businesses deploy AI systems. The precautionary principle,[196] for example, could act as a guide for the implementation of AI systems, ensuring a high level of protection from the start, as it would ensure that the decision-making process is done through a preventative lens. Additionally, the polluter pays principle would ensure, through traceability, that the pollution caused by the implementation of these AI systems would also have to be paid for by those causing the pollution. In that way, it would become possible to monitor from the very start and therefore prevent pollution without unnecessary implementation. Further, the DNSH principle,[197] could ensure that no investments are made into AI systems which cause significant harm to the environment.

Additionally, the EU could also ensure that the data centres which they construct adhere to the energy efficiency first principle accordingly. This approach would promote energy-saving alternatives, creating more sustainable solutions even in regions where certain solutions, such as home heating, are not yet feasible. While the EU has indicated plans for these data centres to utilise sustainable energy alternatives,[198] relying solely on renewable resources is insufficient given the unprecedented levels of energy these facilities consume.

Furthermore, while this approach may not completely alleviate environmental damage, it could help the EU in mitigating the adverse effects of climate change and better uphold its commitments under the Paris Agreement and the ECL. Lastly, it could serve as a provisional solution until more comprehensive solutions for regulating AI systems are implemented. Essentially, it would ensure that the EU's ambition to become a global leader in AI does not

[195] See section 3.2.1.
[196] See section 4.2.
[197] See section 4.2.
[198] See section 3.3.

come at the expense of the environment, thereby avoiding potentially catastrophic consequences.

5.3 The Appropriate Legal Framework for Incorporating Climate Objectives

5.3.1 The AI Act as a Framework for the Incorporation of Climate Obligations

Following the conclusion that the AI Act does not comprehensively address climate considerations in its current form, it raises the question of whether the Act is the appropriate framework for the incorporation of the climate objectives outlined in the ECL. Assessing this issue is therefore necessary to determine whether the AI Act should be amended in line with the suggestions outlined above, or whether the EU ought to adopt an entirely new legislation in this area.

Incorporating climate obligations into the AI Act would appear to be a more coherent option, particularly considering the broader framework established by the ECL. Given that the Act already imposes numerous obligations on providers and deployers,[199] amending it to incorporate climate obligations into an already existing framework may enhance legal certainty and regulatory predictability. As legal certainty and regulatory predictability constitute fundamental principles of EU law, it is essential to ensure that parties operating within the EU can understand the rules applicable and thereby anticipate their regulatory obligations. As such, this approach may be particularly appropriate, as it would provide businesses operating within the EU with a single reference point for both the governance obligations and the environmental responsibilities associated with the deployment of AI systems. Moreover, amending already existing regulations would be more efficient than adopting new regulatory measures, as it would allow for climate considerations to be incorporated with AI-specific compliance mechanisms already in place. For businesses, this could result in a more straightforward compliance procedure regarding AI systems.

However, the above-mentioned approach is not without limitations. As the AI Act is designed as a risk-based regulatory framework which primarily targets providers and deployers rather

[199] See section 3.2.1.

than end-users,[200] it may create another regulatory gap. End-users of AI systems largely fall outside the scope of the regulation,[201] despite their use contributing to the overall environmental impact. Simply expanding the AI Act to include climate-related obligations could therefore impose a disproportionately heavy burden on providers and deployers, even though they have limited control over the environmental impact resulting from increased usage by end-users. Given that the principle of proportionality constitutes a fundamental principle of EU law, such an intervention must be assessed in light of whether it is proportionate to the environmental objectives to be pursued. However, such obligations would still place a heavier burden on AI providers rather than deployers in general. As such, their responsibility could instead focus on ensuring that AI systems are designed and implemented in a safe and responsible manner from the outset.

Furthermore, it is necessary to consider whether the AI Act constitutes the appropriate legal framework for the incorporation of climate obligations. The most significant environmental impact associated with AI systems arises from the operation of data centres that provide the underlying computational infrastructure.[202] In this context, deployers such as businesses act only indirectly as contributors to these environmental impacts. Thus, although deployers contribute to an increased demand for computational capacity, they cannot necessarily be regarded as directly responsible for the resulting environmental impact. This indicates that complementary legislative measures may be required, potentially placing regulatory burdens earlier in the chain of emissions. Notwithstanding these potential limitations, the AI Act remains a policy instrument expected to take environmental considerations into account,[203] thereby justifying a continued discussion regarding the appropriate allocation of responsibility. If it is the case that the EU has deliberately omitted environmental considerations from the AI Act for this reason, this should be explicitly addressed and clearly articulated to ensure alignment with climate legislation. Furthermore, such clarification would enhance legal certainty for deployers, which would be in the interest of the EU.

Nonetheless, if climate obligations are to be incorporated into the existing regulatory framework, it is necessary to carefully assess their implications on fundamental principles of EU law, particularly legal certainty, regulatory predictability, and the principle of

[200] See section 3.2.1.
[201] See section 3.2.1.
[202] See section 2.3.2.
[203] See section 4.3.2.

proportionality. Furthermore, it is necessary to determine which regulatory approach would be most appropriate in light of these considerations. Consequently, it is important to examine whether an alternative solution may provide a more suitable framework for climate obligations.

5.3.2 An Alternative Approach to an AI Climate Legislation

An alternative approach for the EU to address the current legislative gap would be to adopt entirely separate legislation. This would allow for a more targeted and comprehensive regulatory framework addressing AI systems and their environmental impact. Such legislation could potentially not only regulate AI systems themselves but also address other sources of emissions within the digital sector while extending obligations to actors that currently fall outside the scope of the AI Act. Depending on the regulatory stringency desired, several regulatory options could be considered. In particular, the EU could adopt either a dedicated AI Climate Act or an AI Climate Directive, or a Digital Sector Climate Act or Digital Sector Climate Directive. To evaluate which approach would be most suitable, it is necessary to examine the potential benefits and limitations associated with each option.

A regulation in the form of an AI Climate Act could ensure a more uniform level of environmental protection across the EU. Although the development and adoption of such legislation could take several years, it would allow environmental obligations to be fully integrated into the implementation and governance of AI systems. Furthermore, a regulation would promote consistency in the environmental protection standards applicable to AI systems throughout the EU, reducing the risk of fragmentation of the internal market, as no member states would be able to adopt only minimum obligations whilst others adopt stricter regulations when implementing it into national law.

Due to this, this approach may be preferable to the adoption of a directive, which typically establishes only minimum harmonisation, allowing member states greater discretion in its implementation. As a result, some member states may choose to adopt only minimum standards, potentially undermining the efforts of those seeking to pursue more ambitious environmental policies. Given the growing environmental challenges associated with the digital sector, including the pressure on natural resources such as water,[204] it is vital that the

[204] See section 2.3.2.

EU strengthens its regulatory framework governing AI. In this regard, adopting a more comprehensive legislation could provide an opportunity for the EU to reinforce its commitments to environmental protection across the Union.

However, depending on the speed of implementation, an act could pose challenges for EU businesses. A rapid introduction of new obligations for AI systems could become difficult to manage, particularly as businesses would need to integrate the EU's core principles into their operations. Transitioning from the current situation with minimal environmental obligations, and therefore limited compliance obligations, to one requiring multiple new compliance measures creates practical and administrative difficulties. Thus, during the preparation of a new legislative act, it would be beneficial for businesses to have time to adapt, ensuring that they are able to meet the obligations once the act comes into force. This is of importance since many businesses have already integrated AI systems into core processes,[205] which can be difficult and costly to modify or remove.

Implementing such changes would also necessitate adjustments to internal procedures to guarantee compliance, contributing to a more harmonised approach across the EU. While this adjustment would be necessary regardless of whether the obligations are introduced through an act or a directive, an act is likely preferable as it prevents diverging national rules leading to fragmentation of the internal market. Further, this is in alignment with the objectives of the current AI Act, which seeks to strengthen the functioning of the internal market.[206] Moreover, a dedicated climate act could enhance legal certainty and regulatory predictability for all parties, regardless of which member state they operate in.

Another possible approach would be for the EU to implement an AI Climate Directive. Compared to an AI Climate Act, a directive may be easier to implement as it provides member states with greater flexibility by establishing only a minimum standard for climate obligations. For businesses, this could simplify the compliance procedure as the implementation into national law would allow for it to be adapted according to each member state's existing legal framework.

[205] See section 2.4.
[206] See section 3.2.2.

However, flexibility is not without risks. If implementation varies significantly between member states, some may adopt strict climate-related AI obligations, whilst others might take a more lenient approach, creating difficulties in the long-term. Such discrepancies could create challenges for businesses operating across the EU. Although a directive may facilitate compliance by allowing a more gradual implementation compared to an act, it could also incentivise certain member states to become more attractive locations for AI providers and deployers. This, in turn, raises the risk of forum shopping and could lead to a fragmented internal market for AI across the EU. The EU would therefore need to actively promote and incentivise environmentally sustainable AI.

Nevertheless, a directive could be easier for member states to incorporate into existing national legislation. For instance, countries with well-established energy or environmental frameworks could incorporate AI-specific obligations without major changes to their national frameworks, while states with less-developed frameworks could adopt simpler measures initially. Additionally, the EU could instead provide incentives for environmentally friendly AI systems, encouraging businesses to voluntarily exceed the minimum obligations and adopt more sustainable practices. This would also ensure that member states implementing more ambitious AI climate obligations would not be put at a competitive disadvantage relative to countries with more lenient obligations.

In terms of adjustments required to compliance procedures, a directive could be more proportionate, as it would allow member states to gradually introduce climate obligations for businesses. This approach would reduce the risk of placing disproportionate burdens on the businesses which have already integrated AI systems into multiple parts of their operations. Thus, it aligns more closely with the principle of proportionality when an act would, in contrast, provide a stronger foundation for enhancing legal certainty and regulatory predictability across the EU.

5.3.3 A Solution for EU Businesses

For EU businesses, several factors must be considered to determine which regulatory approach would be most beneficial. Identifying the most appropriate solution requires weighing the potential benefits against the associated costs. Initially, it would be easier and

more consistent if all obligations were concerned in a single framework, the AI Act. This would allow businesses to address climate considerations alongside other AI obligations, creating a more comprehensive understanding of environmental impacts. Whilst some increase in compliance costs is unavoidable, the distribution of these costs may vary. For larger businesses, incorporating climate obligations into an AI Climate Act may be more manageable than for SMEs, particularly given their resources and the potential environmental costs they generate, in line with the polluter pays principle. In contrast, SMEs may face a disproportionate burden from the same obligations, as two businesses with identical AI systems and environmental impacts would experience more burdensome compliance costs, depending on their size.

Furthermore, it is necessary to consider whether such measures could be implemented in a way that ensures proportionalities for all businesses, regardless of size, across the EU. The EU should therefore encourage the adoption of environmentally sustainable AI systems, providing incentives for businesses to implement environmentally friendly alternatives. In doing so, the EU could help mitigate the environmental impacts of AI systems, in line with its broader objective of achieving climate-neutrality.

Nevertheless, adopting an entirely separate legislation is not without limitations. Imposing additional obligations outside the AI Act would increase compliance costs for EU businesses, and if these costs become excessive, they may instead undermine the EU's competitiveness on a global scale in terms of AI innovation. Thus, there is the potential that the EU's position as a leader on AI innovation is weakened. Consequently, policymakers would need to balance the establishment of a comprehensive climate framework and maintaining proportionality and market competitiveness.

Due to the need for innovation, a climate directive would likely be more suitable and proportionate for EU businesses, as establishing a minimum standard for climate obligations is preferable to having no standard at all. Further, a directive could require that all AI systems meet minimum energy efficiency or emissions criteria, while allowing member states to implement additional measures tailored to their national legislations. This approach ensures that the EU's core values and environmental commitments are maintained without imposing the stricter, more burdensome obligations of an act, which could risk limiting the EU's global competitiveness in AI innovation. Thus, while an AI Climate Act may be necessary from an

environmental standpoint, a directive would offer a more balanced compromise for EU businesses. This is both in terms of ensuring alignment with previous climate commitments, but also promoting innovation and upholding fundamental principles of EU law.

5.4 Final Discussion

Following this, a tension emerges between the EU's ambition to position itself as a global leader in AI and its commitments to achieving climate neutrality. While the EU has previously emphasised the need for coherence across its policy framework, this alignment is now weakened in the context of AI regulation. In particular, the development of the AI Act does not adequately reflect the climate objectives enshrined in the ECL, revealing a disconnect.

Although the AI Act could serve as a platform for integrating environmental obligations, its risk-based approach, limited scope, and innovation-enhancing standpoint would render it inappropriate for a comprehensive climate regulation. A more appropriate solution may therefore be to adopt a separate legislation, such as the climate directive. In doing so, the EU would be able to provide greater clarity for providers and deployers, proportionality, and alignment with the broader objectives established through the ECL. Nevertheless, any such framework would need to be carefully considered to avoid imposing disproportionate regulatory burdens on EU businesses, particularly in light of a competitive global market.

Furthermore, the EU's emphasis on innovation and the economic potential of AI systems, rather than risk mitigation solely, indicates that the introduction of strict climate obligations within the AI Act would create further tensions. Overly burdensome obligations risk undermining the EU's competitiveness, potentially incentivising businesses to relocate outside the EU in order to avoid stricter regulatory obligations. This, in turn, could weaken the EU's position on the global AI market.

Presently, responsibility for addressing the environmental impact of AI deployment is largely left to individual businesses, which represents a regulatory gap. At a minimum, the EU should establish clear standards and guidelines to ensure a consistent and effective approach to mitigating climate impacts. Without it, there is little incentive for EU businesses to act,

particularly when the EU itself does not commit to incorporating climate objectives into its AI framework. Given its legally binding commitment to climate neutrality by 2050, the EU bears a responsibility to ensure that all relevant factors contribute toward this objective. Lastly, the EU risks undermining its own credibility when simultaneously promoting ambitious climate goals whilst failing to address the environmental impacts of a widespread AI deployment.

6 Conclusion

All things considered, there is a misalignment between the EU's ambition to achieve climate-neutrality and its objective of promoting innovation, to become the world's leading AI continent. Moving forward, the EU must critically assess its ability to incorporate previously established climate commitments into its legislative framework, an area in which it has thus far demonstrated shortcomings. In this regard, it may be worth considering the adoption of a climate-focused regulatory framework capable of addressing the environmental impacts of AI systems.

Such an approach would also benefit businesses operating within the EU by providing clearer compliance obligations and enhancing legal certainty. In turn, this could facilitate the transition toward more environmentally friendly business practices. By promoting the development of green AI and implementing the polluter pays principle, the environmental impacts associated with AI could be more equitably distributed across all relevant actors within the internal market.

Presently, the EU continues to prioritise the uptake of AI while insufficiently acknowledging the environmental impacts that such an uptake entails. If the EU seeks to foster sustainable innovation, greater attention must be directed toward the underlying data infrastructure, where the significant environmental impact arises. While AI systems may generate societal and economic benefits, it is the data processing that accounts for a majority of emissions, raising the question of how such infrastructure can be effectively regulated. Although the primary responsibility may lie with the operators, a degree of accountability should be attributed to deployers given their contribution to rising energy demands. Finally, the regulatory choices made by the EU at this stage will determine whether it can emerge as a global leader in both environmental protection and AI innovation, or whether its climate commitments need to pay the price of becoming an AI continent.

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