European Parliament

AIDA Working Paper
on Artificial Intelligence and the Green Deal

following the AIDA public hearing on 27 January 2021

Introduction:

The Special Committee on Artificial Intelligence in a Digital Age (AIDA), set up in September 2020 to explore EU and global AI developments and their impact on the EU economy, **organised a public hearing on "AI and the Green Deal" on 27 January 2021**, in association with the Committee on the Environment, Public Health and Food Safety (ENVI).

The green and digital transition both feature high on the European Parliament's agenda. The "twin transitions" towards climate neutrality and digital society have also been emphasised in several key strategic documents guiding the EU's decision-making in the current five-year period, such as Commission President von der Leyen's Political Guidelines and the European Council Strategic Agenda for 2019-2024.

The questions that guided this AIDA hearing included: How can the EU unlock the potential of AI in the fight against climate change and in the work done to protect the environment? Can AI help in making the EU's economy more circular and in fulfilling the UN Sustainable Development Goals (SDGs)? What will be the role played by AI in the green recovery after the coronavirus crisis? How will AI contribute to the green and digital transition, and what steps need to be taken to unleash AI's full green potential?

In addition to the positive aspects, it is also important to keep in mind the possible weaknesses AI has and the challenges its use can pose to the ambitions of the Green Deal. How can the EU make sure AI uptake does not lead to excess energy consumption? What are the most prominent environment and climate risks related to the use of AI, and what can be done to mitigate them? How can AI be deployed to contribute to a reduction of energy consumption and to a lower impact on the environment?

These questions and more served as the starting point for the hearing, whose aim was to look at the role and potential of AI in fulfilling the goals of the EU's Green Deal strategy. Speakers included decision-makers, representatives of academia and practitioners.

The hearing was organised against a background of increasing EU legislative and policy activity linked to making climate change action a reality. The EU aims to make its economy sustainable and the continent climate neutral by 2050. The main tool to achieve this, the European Green Deal, was launched by the von der Leyen Commission in December 2019. Digital and new technologies are expected to play a key role. Furthermore, the green transition, along with the digital transition, is likely to have an important part in Europe's sustainable recovery from the Covid-19 crisis.

At the outset of the hearing, the AIDA Chair, Dragoş Tudorache, stated: "Global warming is an existential threat to humankind that needs to be countered by coordinated action at the global level. Nothing short of a global response will suffice. AI can help us build better cities that are more efficient, increase agricultural efficiency, increase energy efficiency, monitor the environment and make climate predictions, model complex ecological systems or even the Earth, and carbon-optimise most areas of human activity that contribute to global warming. With the right safeguards in place, AI can be a global solution to global problems. We need to deploy it to help us solve the climate crisis."

The ENVI Chair, Pascal Canfin, concurred that the debate was timely as the Green Deal legislation is currently under preparation. He said that the insights gained from the hearing can be taken into account in the ongoing legislative work, especially on crucial questions such as how to achieve climate neutrality by 2050 with the help of AI.

Key takeaways:

It has been estimated that ICT technologies are capable of reducing 10 times more greenhouse gas emissions than their own footprint, according to Clara de la Torre, Deputy Director-General of DG CLIMA, European Commission. This is important as the ICT sector currently accounts for more than 2% of global emissions and the share is expected to increase. Ms de la Torre highlighted the **Green Deal data space called "GreenData4All"**, a concrete project combining data and climate action, which was mentioned in the "European strategy for data". There are several funding possibilities for tackling climate change with AI, and Ms de la Torre mentioned the new Recovery and Resilience Facility (RRF) in which **37% has been earmarked for the Green Deal and 20% for digital projects.**

Shereen Zorba, Head of the Secretariat of the UN Science-Policy-Business Forum on the Environment (UN-SPBF) and Chief of Science-Policy-Business Interface at the UN Environment Programme (UNEP), spoke about the potential of AI in creating a greener and a more sustainable future from the viewpoint of multilateral cooperation, as technology or environmental impacts know no borders. **More environmental data means more insights and more progress, but Ms Zorba related that a lot of necessary data is not available yet.** For example, when reporting on environmental indicators of UN SDGs, 68% of the needed data does not yet exist. Currently, no country has laws in place for ethical and responsible AI for the planet, and according to Ms Zorba, it will be interesting to see if companies will self-monitor in this area or if governments will step in to regulate. Ms Zorba conveyed her hope to continue these discussions with the AIDA committee in the future.

Europe currently has - through ESA, Copernicus, EUMETSAT and Member States' satellites - global leadership in Earth observation, and "space is taking the pulse of our planet", ESA Director of Earth Observation Programmes, Josef Aschbacher, told AIDA Members. This data, with the help of Earth system modelling, AI, machine learning and supercomputers will be turned into "digital twins" of the planet in a long-term project that starts in 2021. The digital twins will help simulate impact that people have on the planet and pose 'what if' scenarios - what would the impact be if coal power plants were turned off earlier? What if cars would use sustainable energy instead of gas and diesel? The digital twins are linked with the Commission's **DestinE** project.

Circular economy, recycling and the idea of using fewer resources were some of the key issues mentioned by Guillaume Pitron, journalist and the author of "The Rare Metals War: the dark side of clean energy and digital technologies" book, as means for achieving the green and digital transitions. In his presentation, Mr Pitron highlighted the need for smart mining and ethical sourcing of raw materials, sharing information on secondary resources, building resource efficient new materials, and the role of AI solutions in all of the above.

Postdoctoral researcher at ETH Zürich and Chair of Climate Change AI, Lynn H. Kaack, is one of the writers of the study entitled **"Tackling Climate Change with Machine Learning"**. In her presentation, Ms Kaack stressed the need to create dedicated **multidisciplinary research centres** to ensure that necessary skills and resources are available, as the work of machine learning specialists and climate change experts does not naturally overlap. Ms Kaack also spoke about **democratisation of AI literacy and implementation capacity** and said that usually AI engineers are expensive and tech companies have the most success in hiring, so other organisations are often left with a shortage of AI talent. Furthermore, Ms Kaack argued that **if we want AI to help in climate action in a 2050 timeline, AI should be applied the right way from the start. She also said that AI should not replace other decarbonisation technologies, but rather leverage them.**

The Sustainability Steward of Mozilla, Cathleen Berger, told the AIDA Members that the volume of data stored across the world, which is also used to train AI, will grow up to 175 zettabytes by 2025. **The data centres will have a significant environmental footprint** - in terms of land used to build the centre, water used to cool the facility, rare earths used in the hardware, as well as electricity and connectivity needs. Ms Berger said that the **benefits of AI must be assessed in the light of the actual costs and environmental footprint, but noted that measuring this** is **incredibly complex**. She mentioned the emissions assessment conducted at Mozilla in 2020, and said that it is very hard to measure energy used to run their products specifically, and that estimates were therefore used instead. In her presentation, Ms Berger advocated for regulation for environmental impact assessments in the tech sector, and said that best practices, comparable results, clear standards, effective tools and transparency are needed.

The time to use the full potential of AI on climate change is now, stressed Victor Galaz, Deputy Director and Associate Professor of Stockholm Resilience Centre and Program Director at Beijer Institute of Ecological Economics, **as currently agenda-setting is underway and there is momentum and sense of urgency in society.** Though in his opinion "our knowledge about whether AI actually does offer large climate benefits is highly limited, and all assessments that have been made so far are preliminary, and at times (...) too optimistic". Mr Galaz said that the EU needs to have "a clearer agenda on how AI could help support planetary stewardship and resilience". Developing better overview capabilities and using its influence as a large investor in the technologies are also crucial for the EU, he stated.

Political groups' contributions:

The European People's Party Group (EPP)

The EPP Group stresses the importance of enabling digital technologies such as AI, in order to better design climate and environmental policies; and believes that the proper investment in digital research, technology development and innovation is instrumental for Europe's industry to increase global competitiveness while contributing to the climate goals.

Acknowledging that the tech sector's environmental footprint has increased in recent years, the EPP believes that the sector has a positive environmental handprint for other sectors, especially helping them increase resource efficiency, leading to a lower environmental impact.

The EPP Group believes that EU economies have to become greener, cleaner and more digital, following the Covid-19 pandemic. We highlight the importance of projects, such as Digital Twin Earth, presented in the hearing. Furthermore, we call for more clarity on the measures to address the carbon footprint of AI in the review of the "Coordinated Action Plan on Artificial Intelligence" for 2021 and also in the future legal proposals on AI, since environmental sustainability was one of the objectives of the EC Communication on "Building trust on AI".

The Progressive Alliance of Socialists and Democrats Group (S&D)

We call for ethical rules requiring AI to be sustainable and environmentally responsible. AI technologies should be developed, deployed and used towards achieving the green transition and the EU's environmental goals of climate neutrality and circular economy. To this end, the EU should prioritise investments in research and breakthrough technologies and it must strongly support AI talent - both keeping it in Europe and attracting it from abroad. AI and the data economy have a huge potential to reduce carbon emissions by at least 10% across all sectors by 2025, such as through energy-, resource and material-efficiency, carbon-optimizing and climate predictions. Processing, storage and sharing of data should have a reduced carbon footprint as much as possible. The "green" AI assessment and compliance (such as impact on natural resources, energy consumption, waste production, carbon footprint, climate change and environmental degradation) should be among the mandatory requirements to authorise any high-risk AI technologies in the EU. AI developers deployers and users should be responsible for any harm caused to the environment in accordance with the applicable environmental liability rules.

The Renew Europe Group

Digital technologies can give the EU the competitive edge to lead the smart environmental transition and boost the impact of environmental policies. By leveraging the ever-growing data volumes we produce and collect, AI can help perform better data analytics, monitoring and processing to deliver improved environmental performance and risk reduction.

This promising feature of AI to become effective and inclusive would nonetheless require appropriate infrastructures (e.g. networks, computing power, sensors) and skills. It is therefore paramount that EU investments under climate and digital spending are directed to support these foundations and enable the broadest possible uptake.

At the same time we should not overlook that AI relies on technologies and devices with high energy consumption and impact on our ecosystem. In order to avoid causing the very problems we are aiming to address, we need to thoroughly assess the real environmental and social costs and benefits of AI and related digital solutions. To be reliable, such assessment will need to include not only AI experts but all relevant stakeholders, coupled with with robust methodology and tools.

The Identity and Democracy Group (ID)

The Green Deal target set by the Commission to achieve zero carbon emissions by 2050, combined with the current process of digitisation, are causing problems in the supply of rare materials. These commodities are essential to the development of the technologies used both in digital processes and in carbon-free energy production and storage.

Batteries, chips and digital devices, all using rare and non-replaceable materials, are raising two potential issues:

1. Social and ecological: the extraction of these materials risks causing profound ecological damage and mining activities could disrupt local social and economic structures, paving the way for overexploitation of indigenous peoples;

2. Strategic: China's role as a major extractor and producer of these materials is likely to create a dangerous dependence of European industry on non-EU suppliers who may not meet European standards.

Therefore we suggest implementing a 100% recycling strategy for all electronic devices and recovering as many rare materials as possible to develop a sustainable European rare materials mining industry, compliant with EU regulations.

The Greens/European Free Alliance Group (EFA)

AI can help reaching the European Green Deal's goals but its benefits must be balanced with its environmental footprint and a systemic approach. We must acknowledge the impact of training and running AI on the environment to avoid an acceleration of current environmental degradation (pressure on raw material, biodiversity loss, pollution). We take note that no cost-benefit impact assessment of AI was realized at this stage. A sustainable AI will require eco-design standards, interdisciplinary research centres and the development of an environmental assessment scheme to be able to quantify digital environmental impact through a harmonized methodology based on the Life-Cycle Assessment approach. There is a need to mobilize private and publicly owned environmental data of public interest. Currently used data is heterogeneous, hardly exploitable or simply unavailable. We need to oblige sharing of B2G, B2B, and G2all data, and ensure standardization and interoperability to make policy-wise decisions.

The European United Left/Nordic Green Left Group (GUE/NGL)

"Digital revolution" is often presented as a key driver for fighting climate change. However, without a massive U-turn in our productive and consumption model, the digital sector will double its carbon footprint by 2025. Smart and affordable solutions to reduce electricity consumption have to be supported taking into consideration a fair and just transition and decarbonizing the energy sector. Some technological developments are questionable and carbon neutral options should be considered preferable in their development (e.g.: IoT).

The Left promotes digital sobriety and increasing the lifespan of devices (against planned obsolescence), as well as designing for circularity.

Public policies and investments are corner stones in this process, and public administrations should lead by example and reinforce environmental criteria also in their public procurements.

The Left stands for European data centres in order to reduce our dependence on foreign and private ones, with a medium-term objective of 100% renewable energy use.

Europe must urgently secure a strong ICT recycling chain and enforce the ban on the export of hazardous waste (based on the Basel Convention).