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## Strategic Roadmap for Digitalisation and AI in the Energy Sector

## Introduction

Digitalisation is reshaping our lives, and the energy sector is no exception. As underlined by Mario Draghi's report on the future of European Competitiveness[1], **Europe must harness the 'digital revolution' and invest decisively in AI and data infrastructure to safeguard its competitiveness and be able to lead the clean-energy transition.**

**Ensuring sovereign control of AI models and algorithms** is essential to achieving Europe's **strategic autonomy and boost our competitiveness**. In this context, a **digitalised energy system is no longer an option but a necessity.**

**Global players are already taking decisive steps in this direction. In the U.S., the AI Strategy[2] and the Genesis Mission[3] position AI as a strategic asset for the energy sector.** They focus on deploying advanced AI models and algorithms across grids and clean energy technologies, securing U.S. global leadership over critical AI technologies, computing infrastructure and data. **In China, the National Plan for AI-Energy Integration[4] sets out a coordinated strategy to embed AI across the energy system.** It prioritises large-scale deployment of AI in power grids and renewables, the alignment of computing power and electricity supply, and the domestic development of data, algorithms and models to be a global leader in AI applications in energy by 2030. As Europe wants to be a leader in the global clean energy transition, it is important it comes with an ambitious roadmap in this domain.

The digitalisation of the energy sector **unlocks key opportunities for both businesses and citizens**. The International Energy Agency (IEA) estimates[5] that deploying **existing AI applications in power plant operations and maintenance** could generate global annual savings of EUR 95 billion by 2035. In Europe, estimates[6] show that by 2030, **demand-side flexibility could substantially improve power system efficiency and sustainability**, delivering EUR 4.6 billion in generation cost savings, avoiding EUR 9 billion in unserved energy, and reducing renewable curtailment by 15.5 TWh. These impacts could translate in annual savings of EUR 11–29 billion in investment needs across the EU by 2030, while direct benefits could translate into potential reductions in consumer electricity costs of more than EUR 71 billion per year.

At the same time, the **digitalisation of our economies implies an increased energy consumption**, with potential impacts on all consumers in terms notably of decarbonisation, prices, or access to grids. The IEA estimates that, in advanced economies, data centres alone will drive more than 20% of the growth in electricity demand between now and 2030[7]. It is therefore essential that digitalisation keeps representing an opportunity benefiting integration, rather than a challenge for our energy system. The energy and digital transitions must go hand in hand to help achieve our goals in terms of competitiveness, affordability and decarbonisation.

**This Strategic Roadmap sets out a path to a digitalised European energy system where AI is to deliver secure, clean and competitive energy for all consumers.** By 2030, the actions set out in this strategy will help support the growth of the digital sector in the EU in a sustainable manner, with positive impacts for energy consumers thanks to a responsible use of resources and an increased use of digitalisation to support business models that bring benefits

[1] The future of European competitiveness: A Competitiveness Strategy for Europe , M. Draghi, 2024
[2] U.S. Department of Energy, Artificial Intelligence Strategy, October 2025
[3] The White House: Launching the Genesis mission
[4] The State Council: Plan on AI-energy integration and Forbes: China's new AI Strategy explained
[5] IEA - Energy and AI, World Energy Outlook Special Report, 2025
[6] SmartEn report: Demand-side flexibility: quantification of the benefits in the EU
[7] IEA - Energy and AI, World Energy Outlook Special Report, 2025

to citizens and businesses (e.g. through a better use of flexibility). Cross-border exchange or pooling of data will also help putting the EU in the international map of artificial intelligence, by developing AI foundation models that respect European data rules and values.

**This Strategic Roadmap builds on the Digitalisation of Energy Action Plan[8],** which it updates, reflecting the latest developments of fast-evolving digital technologies and AI, as well as the input of **the AI Continent Action Plan[9] and the Apply AI Strategy[10]**.

## 1. Pillar I – Energy for AI

Europe's energy system faces sharply rising electricity demand across industry, buildings and mobility. Against this backdrop, Pillar I addresses data centres as a rapidly growing source of electricity demand, ensuring their system integration supports security of supply and clean energy objectives.

### Action 1: Promote tripartite agreements to integrate sustainably data centres in the energy system

**Data centres are critical to Europe's competitiveness and digital sovereignty,** underpinning all digital services, including those needed for the energy transition. Data centres should also benefit local economies and provide opportunities for horizontally integrated digital value chains. The Cloud and AI Development Act (CADA) aims to at least triple the EU's data centre capacity in 5-7 years.

**From an energy system perspective, modern data centres are large electricity consumers whose rapid expansion poses growing challenges for Europe's energy system**. Connection requests are increasing sharply, with individual sites requiring capacities comparable to major industrial sites. This growth is geographically concentrated in a limited number of hotspots[11], increasing the risk of congestion in both distribution and transmission networks.

**Although data centres currently account for around 2% of EU electricity consumption, their demand is expected to more than triple,** as installed capacity is expected to grow from approximately 10 GW in 2024 to around 35 GW by 2030[12]. This additional demand compounds the broader increase driven by the electrification of industry, transport and households. If not proactively managed, these developments risk undermining security of supply, exacerbating grid congestion and increasing electricity prices, especially considering data centres' capacity to outbid other energy consumers for access to energy[13]. The Commission provided guidance on grid connections[14] and guidelines on future proof network charges[15], which established a toolbox of measures to help optimise the connection of energy users, including data centres. This includes measures to speed up the processes to connect to grids, and to better use locational (tariff or fee) signals that facilitate the selection of places to build new projects.

**Integrating data centres into the energy system requires more than the provision of grid connections; it calls for coordinated planning, system operation and a sustainable energy supply.** Timely information on data centre developments is essential for network operators to

[8] Digitalising the energy system - EU action plan (COM (2022)552 final)
[9] AI Continent Action Plan (COM(2025)165)
[10] Apply AI Strategy (COM(2025) 723 final)
[11] Notably around Dublin, Frankfurt, Amsterdam and Paris, but also in Spain, Italy, Belgium, Poland and the Nordic regions.
[12] McKinsey & Company – Article 'The role of power in unlocking the European AI revolution' 2024.
[13] Action Plan for Affordable Energy, COM(2025) 79
[14] Commission notice - Guidance on efficient and timely grid connections, C(2025) 8473 final
[15] Commission notice on Guidelines on future proof network charges for reduced energy system costs, C(2025) 4010

plan grid investments and manage connections efficiently. At the same time, data centres can support system stability by providing flexibility services such as load shifting, emergency shedding and ancillary services, as targeted incentives can align data centre demand with new clean energy supply. Public authorities also require robust data to support planning and permitting and to maximise waste-heat reuse. Proven examples already deployed in Europe[16] should be replicated.

**A structured European dialogue will help create a replicable model for tripartite agreements between the relevant actors**, namely public authorities, data centre operators, and energy-related parties. Such agreements can set out voluntary commitments by the relevant parties to facilitate the sustainable integration of data centres in the electricity grids, generate additional supply of clean energy, foster data centres' flexibility to support the electricity system and local developments (e.g. flexibility and locational incentives, Flexible Connection Agreements, retail contracts remunerating flexibility), and improve their energy performance.

To steer policy, robust information is needed on present and future energy consumption of data centres. Building on the reporting requirements of the Energy Efficiency Directive and leveraging on its cooperation with the International Energy Agency, the Commission will provide a long-term scenario-based assessment of the data centres' energy use in Europe, and set up an important tool for monitoring the trends in their energy consumption.

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| How and when | The Commission will:<br>• **Develop a common EU template for local agreements between data centre developers, energy-related parties and public authorities in the Member States for the sustainable integration of data centres into the energy system.** (Timing: A declaration of intent stating the willingness of the parties to cooperate in the framework of a tripartite agreement is adopted alongside this Strategic Roadmap; model tripartite agreement will be published and promoted in the second half of 2026)<br>• **Publish a study assessing the energy consumption of data centres in Europe under different growth scenarios** (Timing: by 2027) |
| Impact | Ensure that the EU objective of tripling the data centres' capacity is fully compatible with the energy security, decarbonisation and affordability goals; maximise synergies with district heating; create value locally. |

**Action 2: Raise the energy performance of data centres**

To reconcile the rapid growth of digital infrastructure with climate and energy objectives, data centres must become leaders in energy efficiency and flexibility. Alongside this Roadmap, the Commission is adopting the **Data Centre Energy Efficiency Package**. The Package will (i) introduce a rating scheme for data centres, covering energy efficiency, water efficiency, renewable energy use, waste heat reuse and flexibility, based on the existing reporting scheme; and (ii) launch the process for establishing minimum performance standards for data centres in Europe, building on the rating scheme and the Energy Efficiency Directive.

[16] Microsoft's data centre will provide sustainable heat for the city of Espoo in Finland

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| How and when | The Commission will:<br>• **Establish a European rating scheme for data centres**. (Timing: Rating scheme adopted by 2026; first labels in 2027)<br>• **Propose and adopt minimum energy performance standards for new and existing data centres**. (Timing: Legislative proposal by 2027; first standards applying from 2030 for new facilities) |
| Impact | Increase transparency and promote sustainable development of digital infrastructure; optimisation of projected energy and water consumption. |

## 2. Pillar II – Digitalisation and AI for the energy system

Pillar II focuses on making the energy system smarter and data-driven by deploying digital and AI solutions. At the heart of this transformation are modern, digital grids, which provide the real-time visibility, interoperability and control needed for AI to optimise energy use.

### Action 3: Smarten grids to optimise the energy system

As the energy sector advances towards electrification and decarbonisation, **electricity grids are becoming the backbone of an integrated and resilient energy system**. As highlighted in the European Grids Package[17], **grids must become both smarter and stronger.**

Smart grids maximise the use of assets, they enhance affordability and resilience through faster responses and enable system integration by unlocking flexibility across demand, generation storage, heating and mobility. For example, Utrecht has launched Europe's first vehicle-to-grid (V2G) car sharing network[18], integrating shared electric vehicles (EVs) into the local grid. Using bidirectional charging, EVs store surplus solar power and feed it back during peak demand, supporting grid stability. At the individual level, studies estimate that EV owners could save between EUR 450 and EUR 2,900 per year by using smart and bidirectional charging[19].

The need to invest in strengthening the European grids is undisputable[20]. Additionally, the need to make them smarter is clearly recognised[21,22]. However, such investments are hampered by current practices that still favour expansion of grids without smart solutions, fragmented approaches to digitalisation across the EU, and uncertainties regarding new technologies' efficiency.

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| How and when | The Commission will:<br>• Together with the Agency for the Cooperation of Energy Regulators (ACER) and the Council of European Energy Regulators (CEER), **establish smart** |

[17] COM(2025) 1005 final
[18] Utrecht becomes Europe's first city with a V2G electric car-sharing service
[19] Plugging into potential: unleashing the untapped flexibility of EVs, Eurelectric, 2025
[20] More than EUR 1.2 trillion should be invested over the period 2024-2040, out of those, EUR 730 bn are envisaged for distribution grids and EUR 430 bn for transmission grids.
[21] European Council conclusions (30 May 2024, Advancing Sustainable Electricity Grid Infrastructure) call on the grid operators to cooperate and develop smart grid projects.
[22] The European Parliament resolution of 19 June 2025 on electricity grids: The backbone of the EU energy system (2025/2006(INI)) stresses the key role of smart grid solutions and urges the EU actors and the Member States to increase the digitalisation of the energy system.

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| | **grid indicators[23] to guide investments towards smart and digitalised grids** (Timing: EU catalogues of indicators finalised by mid-2026)<br>• Together with stakeholders, and building on the smart grid indicators, **develop recommendations** to address regulatory and non-technical barriers **for the deployment of smart grid technologies** as well as ensure better coordination on public procurement (Timing: 2027)<br>• Together with the TSOs and DSOs, **support the development and deployment of digital twin solutions in the EU grids[24]** (Timing: Blueprint by ENTSO-E and EU DSO Entity ready and promoted by mid-2026, exchange of best practices among operators in 2027) |
| Impact | Increase smart and digital investments in electricity grids and monitor their development |

**Action 4: Support research, innovation and market uptake for a smart, AI-enabled energy system**

A smart energy system requires sustained research and innovation (R&I) efforts as well as market uptake and scale up of innovations. The **EU's R&I programme, Horizon Europe, invests in innovative energy system solutions**. Over the 2021–2027 period, around EUR 1 billion has been earmarked for energy systems, grids and storage[25]. The 2026–2027 work programme[26], allocates about EUR 100 million for advanced solutions for electricity grids, and EUR 75 million for AI-based solutions. A further EUR 190 million will support R&I for digital solutions for renewable energy systems, building renovations and energy efficiency tools.

The Commission delivers support for mobilising private financing and de-risking digitalisation investments in R&I and deployment through multiple programmes[27]. This will continue in the next multiannual financial framework[28].

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| How and when | The Commission will:<br>• Through Horizon Europe, **support innovative solutions for smart energy systems** (Timing: dedicated calls in the work programme 2026-2027)<br>• Through the Scaleup Europe Fund[29]**, boost investments in strategic clean energy technologies scaleups** (Timing: first deals by the end of 2026)<br>• Through the European Innovation Council (EIC), propose **a challenge[30] on 'AI for clean energy'** to de-risk breakthrough technologies (Timing: challenge launched in 2027; first projects selected in 2028) |

[23] Indicators that are able to measure the increase in performance of grids due to smart solutions
[24] ENTSO-E and EU DSO Entity identified common use cases for digital twin solutions in EU grids, which call for a strategic collaborative approach to implementation.
[25] As part of an overall EUR 15 bn total financial allocation to Horizon Europe projects in the energy, transport, and climate.
[26] Commission Implementing Decision on the adoption of Horizon Europe WP 2026-2027 (C/2025/8493 final)
[27] For example, through the Recovery and Resilience Facility, Horizon Europe, Digital Europe, CEF Energy and LIFE-CET
[28] Through European funds, and targeted national and regional programmes, without prejudice to the outcome of the negotiations on the next MFF proposal and in accordance with the objectives set out in the regulations establishing those funds and programmes.
[29] Scaleup Europe Fund: a multi-billion late-stage, growth fund, aiming to invest in the most promising European companies
[30] The EIC Accelerator Challenges are open calls for proposals in areas where breakthrough technologies can have a major impact on EU objectives; selected projects benefit from funding for scaling breakthrough technologies to the market.

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| | • **Develop energy-specific actions under RAISE** - the Resource for AI Science in Europe[31], (Timing: design in 2026; launch action in 2028) |
| Impact | More than EUR 200 million invested, over the next two years, in R&I for digital and AI solutions for energy; in the long run, a vibrant ecosystem of innovators and researchers is created; clean energy technologies scale in global markets. |

**Action 5: Deploy AI across the energy value chain**

AI solutions are spreading across the energy system as assets, processes, and markets become more digital. But digitising individual actors isn't enough: a truly smart European energy system needs an integrated "intelligence layer" that supports local applications—from optimising renewable generation to enabling smart, bidirectional EV charging. Cross-sector AI foundation models (renewables, industry, buildings, mobility) could provide this layer.

Trained on sufficiently big datasets, and fine-tuned for specific assets, companies or use cases, **AI foundation models are particularly important for electricity grids**[32]. By integrating diverse operational, weather and market data, they can significantly improve critical functions such as forecasting, congestion management, fault detection and investment planning.

**A global race is underway to develop AI models for energy and early leaders will gain a major advantage in next-generation energy services.** Professor Draghi highlights that in 2024 the U.S. produced forty large foundation models, China fifteen, and the EU just three[33]. With Europe already strong in industrial automation[34], it can leverage this base to develop sovereign secure AI models trained on European data by European firms and lead the next wave of intelligent energy technologies.

In line with the Apply AI Strategy, the Commission will **support the development of AI foundation models for grid management and planning,** serving as a digital backbone of the energy system. Beyond grids, AI can play a transformative role across multiple segments of the energy system and to the benefit of the public sector, businesses and citizens. For example, in **renewables**, it optimises real-time plant control, boosts assets performance, and minimises curtailment, while in **the nuclear sector** AI enhances safety and efficiency through predictive maintenance, anomaly detection and advanced modelling. For **buildings and neighbourhoods**, drawing on data from the European Building Stock Observatory[35], AI can support renovation planning.

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| How and when | The Commission will:<br>• Support, through Horizon Europe, **the development, training and testing of AI models for grid management, as well as for self-consumption and energy sharing in energy communities** (Timing: dedicated calls in work programme 2026 (€30 million) and 2027 (€20 million), first models in 2028) |

[31] European AI in Science Strategy
[32] AI-based operations & maintenance optimization could save up to $110 billion annually by 2035 in fuel and O&M costs according to the Widespread AI adoption scenario of the IEA (2025), Energy and AI, IEA, Paris
[33] One year after the Draghi report: what has been achieved, what has changed
[34] IEA - Energy and AI, World Energy Outlook Special Report, 2025
[35] EU Building Stock Observatory

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| | • Support, through Horizon Europe, **the development of AI foundation models and solutions beyond grids,** across the energy value chain (Timing: consortia set up in 2028)<br>• In cooperation with the Energy Poverty Advisory Hub, develop and promote digital and AI-based solutions **for national and local authorities to target energy-poor households** with policy measures (Timing: design phase in 2026–2027; roll-out from 2028 onwards)<br>• Support the development of **a pilot digital permitting portal with generative AI technologies** that streamline permit review, drawing on leading Member States' practices (Timing: design in 2027; roll-out in 2028) |
| Impact | The energy system integrates higher shares of renewables, operates smarter and more resilient grids and markets; energy efficiency gains in industry and buildings; consumers have the tools to lower their energy bills. |

## 3. Pillar III – Data for AI and the energy system

**Effective data exchange and data interoperability are critical for enabling flexibility services in a smart energy system and for developing AI foundation models.** The existing legal landscape[36] provides important building blocks but remains fragmented, as highlighted by stakeholders[37] and experts[38]. Current frameworks fail to establish the institutional architecture, operational structures or cross-border coordination mechanisms, required for a Common European Energy Data Space (CEEDS).

### Action 6: Establish a European energy data exchange framework

To address these shortcomings, foster new business models, accelerate flexibility services and enable the development of sovereign European AI models, the Commission will **establish the Common European Energy Data Space (CEEDS)**. The CEEDS will define harmonised procedures for access to data, minimum interoperability standards, safeguards for sensitive data, and mechanisms for lawful secondary use of energy data for public-interest purposes. By providing common interfaces, rules and trust services at EU level and by operating on an **opt-in basis**, the CEEDS will bring certainty on data exchange modalities for market actors and enable cross-border scaling of smart energy services.

The CEEDS will consist of **two EU entities**. The **Energy Data Hub** ('The Hub') will increase interoperability for smart energy services, coordination of national energy data hubs and implementation of EU-wide data exchange requirements to boost for example flexibility or aggregation business models, with eventual gains for consumers. The **Energy Data Lab** ('The Lab') will support the development of European AI foundation models that can help optimise and model the energy system in respect of European data rules. They will be placed under a **Board** (the CEEDS Board), serving as the strategic governance framework (see annex).

[36] Regulation (EU) 2023/2854 (Data Act); Electricity Directive (EU) 2019/944; Electricity Regulation (EU) 2019/943; Energy Performance of Buildings Directive (EU) 2024/1275; Renewable Energy Directive (EU) 2018/2001; Alternative Fuels Infrastructure Regulation (EU) 2023/1804 and related Implementing Acts

[37] 'Limited access to high-quality data', 'Data privacy concerns', 'Lack of data interoperability' were identified as the main barriers to deploy smart and AI solutions in energy, in the Open Public Consultation for this Roadmap.

[38] Operational Conclusions and Key Takeaways, 3rd joint meeting of D4E, STF and CoW, Berlin, 4-5 November 2025

The Data for Energy (D4E) expert group[39], together with the Sustainable Transport Forum (STF)[40] and the Coalition of the Willing on bi-directional Charging[41], are preparing joint recommendations on how to implement cross-border data exchange for demand response and smart and bi-directional electric vehicle charging. Building on this work and on pilot projects[42][43], and with the financial support notably of Horizon Europe 2026/2027[44], the Commission will scale up towards a data exchange framework.

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| How and when | The Commission will:<br>• **Establish and operate the Common European Energy Data Space (CEEDS)**; if need be, via legislative tools (Timing: Q1 2027)<br>• **Cooperate with and coordinate cooperation among Member States** to set up national data exchange systems for flexibility and bi-directional charging. |
| Impact | Europe will have an established energy data exchange framework; a single market of smart energy services can scale across Europe; and its first AI foundation models for grid operations, trained in European AI factories and jointly owned by European grid operators |

## 4. Securing the energy-AI nexus: trust, talent and global cooperation

### Action 7: Increase safety, security and trust in digital and AI solutions

As digital technologies and AI are integrated into critical energy infrastructures, associated risks can grow. To ensure successful deployment, the Energy Data Lab will establish a **Community of Practice**[45] to share best practices with partners and the wider stakeholders. The Community will focus on **safety frameworks and mechanisms for transparency, explainability, and human oversight** to ensure AI technologies do not pose systemic risks for critical energy infrastructure. It will also promote a voluntary incident reporting system to share learnings and risk mitigation strategies, and help develop a **trusted and transparent environment** for deployers.

In line with the AI Act, the Commission will issue **guidance on high-risk AI systems**. Building on this guidance, the Lab will monitor deployment of high-risk AI use cases in critical energy infrastructures and **support the deployment of AI regulatory sandboxes**.

With the energy sector's shift towards electrification, digitalisation, and connectivity, its **vulnerability to cybersecurity threats has intensified**. A typical gas and electricity utility experienced more than 1,500 attacks weekly in 2024, a figure that has tripled compared to four years prior[46]. In coherence with Union-wide horizontal legislation[47], **the Commission will**

[39] A sub-group of the formal Commission Smart Energy Expert Group
[40] The Sustainable Transport Forum (STF)
[41] Coalition of the Willing on Bidirectional Charging – Joint Report
[42] INSIEME deployment project, funded by the Digital Europe Programme
[43] Five Horizon Europe projects (EDDIE, Enershare, Data Cellar, Synergies, Omega-X) have advanced data space technologies. These technologies are currently being deployed in sixteen Member States through INSIEME, a deployment project funded by the Digital Europe Programme. Furthermore, three Horizon Europe projects (EnerTEF, AI-Effect, EnergyGuard) are piloting Testing and Experimentation Facilities for energy AI models.
[44] For example, through topics HORIZON-CL5-2026-11-D3-23 and HORIZON-CL5-2027-02-D3-24
[45] The Communities of Practice Playbook
[46] IEA - Energy and AI, World Energy Outlook Special Report, 2025
[47] The Cyber Resilience Act (Regulation (EU) 2024/2847), the Directive on measures for a high common level of cybersecurity across the Union – NIS2 (Directive (EU) 2022/2555), and sector-specific legislation such as the Network Code on cybersecurity for electricity cross-border flows (Delegated Regulation (EU) 2024/1366).

**promote the development and use of sovereign AI-powered tools for vulnerability detection, continuous monitoring, anomaly detection and automated incident response in critical infrastructures including in energy**.

Lastly, energy security increasingly hinges on **resilient supply chains** and the cybersecurity of individual components. Critical threats arise from bundled hardware-software services susceptible to vendor failure, or from reliance on a single or high-risk supplier.

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| How and when | The Commission will:<br>• Within the Energy Data Lab, **establish a Community of Practice** for testing and validating AI, and monitor the deployment of high-risk AI applications in critical energy infrastructures (Timing: by end of 2027)<br>• Work with Member States to **establish regulatory sandboxes, for testing and validation of energy AI applications** (Timing: by the end of 2027)<br>• Develop sovereign **AI tools to identify supply chain vulnerabilities** for clean energy technologies. (Timing: launch work in 2026) |
| Impact | Resilient and secure critical energy infrastructures; regulatory certainty for deployers of AI systems; improved clarity on supply chain vulnerabilities. |

### Action 8: Invest in skills and capabilities

Digitalisation of energy demands a workforce blending sector-specific knowledge with AI and digital literacy. Traditional specialisation is no longer enough and hybrid, highly adaptable profiles that bridge these domains are essential.

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| How and when | The Commission will:<br>• Launch a EUR 10 million **DSO Academy** under the LIFE-CET programme to build in-house digital and AI skills of **distribution system operators** (Timing: Calls from the 2026 LIFE-CET work programme onwards)<br>• Under the Pact for Skills, **broaden the Large-scale Skills Partnership on the digitalisation of the energy system**, targeting digital and AI skills for energy (Timing: targets adopted in 2026; progress review in 2029)<br>• **Leverage Erasmus+ to promote projects**[48] **focusing on digital and AI skills for energy professionals** (Timing: ongoing from 2026 onwards) |
| Impact | Improved digital and AI skills, with a focus on small-scale energy companies |

### Action 9: Leading international cooperation

Coordinated European action is essential to shape global energy and digital governance towards mutual benefits for the EU and our partners. To this end, the European Commission will cooperate with likeminded partners and intergovernmental organisations[49], through their

[48] For example the project SG-SKILL, focusing on smart-grids job profiles

[49] Such as the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA) and the Organisation for Economic Co-operation and Development (OECD)

AI workstreams. Together with the industry, it will strive towards harnessing, deploying and scaling the innovative potential of AI, while addressing its energy-related challenges.

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| How and when | The Commission will:<br>• **Work with likeminded partners under relevant international fora[50],** to advance the implementation of the G7 Energy and AI Work Plan (Timing: Continuous work starting in 2026)<br>• Work with Citiverse - EDIC[51], local authorities and financial institutions, **to launch a global initiative on digital and AI tools for cities**, to accelerate urban energy transitions[52] and address energy poverty (Timing: gather interested cities by 2027; launch first demonstrations by 2028)<br>• In the framework of 'AI of Public Good initiative', **support knowledge transfer of 'AI in energy' solutions, to medium- and low-income countries in the global south** (Timing: Designing and developing of the solutions in 2027; first demonstration in 2028) |
| Impact | Fostering international cooperation on the energy-AI nexus. Shape global energy and digital governance prioritising the deployment of trusted and safe AI. |

## 5. Governance of the Strategic Roadmap

### Action 10: Ensure efficient implementation

Geographical disparities in AI readiness, could lead to uneven progress across Europe. Targeted action is needed to ensure balanced development and strengthen local digital capabilities. Achieving a digitalised and AI-proficient energy system by 2030 is ambitious but attainable objective, if actions are coordinated and progress is measured.

As an immediate next step, the Commission will work with Member States and stakeholders, to define **key performance indicators and set concrete milestones and trajectories for energy system digitalisation and AI adoption over the coming decade**, covering data infrastructure, smart grids, AI applications and skills.

Considering the outcomes of the initial results derived from this Roadmap, the Commission will assess options to strengthen the role of digitalisation and AI in the Energy Union's governance framework in the context of the update of the Governance Regulation of the Energy Union and Climate Action[53].

Furthermore, in line with the Draghi report, the Commission will explore by the end of the year, improving and centralising the energy statistics to support informed decision-making by industry, academia, investors and policymakers.

To coordinate the implementation of this Roadmap to 2030 and beyond, the Commission will convene an annual **Energy Digitalisation Forum** starting in 2026. The Forum will bring together representatives from Member States, regulators, system operators, industry, research

[50] Including the Group of Seven (G7) and the Clean Energy Ministerial (CEM)
[51] Citiverse
[52] The Global Gateway Early-Stage Investment Mechanism could contribute to supporting this initiative.
[53] Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action.

organisations and civil society to review progress on the Strategic Roadmap, identify barriers and propose corrective actions, exchange good practices, and address emerging developments that may require policy intervention.

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| How and when | The Commission will:<br>• Define **key performance indicators and set trajectories** for energy system digitalisation and AI adoption (Timing: continuous starting in 2026)<br>• Convene an annual **Energy Digitalisation Forum** starting in 2026 |
| Impact | Balanced development of digital and AI capabilities across Europe; effective implementation; enhanced cross-border collaboration; policy coherence |

## Annex - Indicative structure of the envisaged Common European Energy Data Space

The CEEDS will be operationalised through two EU entities, **the Energy Data Hub** ('The Hub') and **the Energy Data Lab** ('The Lab'), under the umbrella of a CEEDS Board, serving as the strategic governance framework.

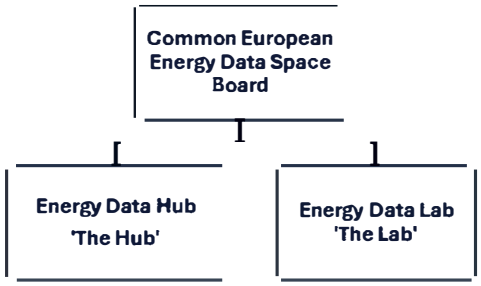


*Figure 1 – Indicative structure of the envisaged Common European Energy Data Space*

### The Energy Data Hub

'The Hub' will define harmonised digital procedures, common data models and interoperability rules for accessing and sharing real-time energy data with the objective of fostering a market for smart energy services across existing national and market-based systems. It will promote the use of the EU Digital Identity Framework and the European Business Wallet and relevant EU frameworks. The Hub will provide a trusted, efficient data-exchange framework to enable smart energy services while protecting consumers. As a priority, the Hub will focus on **demand-side flexibility and smart and bidirectional charging of electric vehicles**, building on the Joint Recommendation of relevant expert groups[54]. Subsequently, the scope will expand to key areas of the energy transition like smart buildings and digital twins of the electricity grid to bolster security of supply and competitiveness.

National data exchange systems are crucial for the uptake of smart energy services, yet **only six Member States** have implemented one. Therefore, the Hub will coordinate and support the development of national data hubs and support the implementation of the relevant legislative framework.

### The Energy Data Lab

The Data Union Strategy[55] introduces "Data Labs" as trusted, secure environments that connect data spaces with AI developers and provide the tools, expertise and safeguards to make high-quality datasets usable for AI innovation.

As announced in the Data Union Strategy, an **"Energy Data Lab" ('the Lab')** will be established, to facilitate **data pooling among stakeholders to jointly develop and test AI foundation models for the energy sector**. The Lab will facilitate access to European high-performance computing (HPC) and AI infrastructure (AI factories) and offer trusted access to data, with GDPR-compliant safeguards for personal and commercially sensitive information. The Lab will support **public-interest research & innovation in AI for energy, and particularly the development of European AI foundation models, starting with electricity grid management and planning**, where the greatest impact and immediate benefits can be delivered. Further AI models will be developed, across the energy value chain.

[54] The Smart Energy Expert Group, the Sustainable Transport Forum (STF) and the Coalition of the Willing (CoW) on bidirectional charging
[55] Data Union Strategy: Unlocking Data for AI (COM(2025)835 final)