

Digitalisation: Empowering the Energy Transition

Position Paper Alliander

alliander

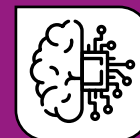
Wider application of artificial intelligence

Opportunities for artificial intelligence within the energy system and energy market, and how we are accelerating this process as a grid operator.

Digitalisation is essential to further increase the sustainability of the energy system

The energy transition will require a huge effort to replace and extend the existing electricity grid. Over the coming years this will once again double the amount of work we have to do. We have realised that simply working harder will not be enough to achieve our goals. That means we are entering a new phase. This phase requires us to concentrate wholly on execution. We are therefore fully committed to digitalisation.

Digitalisation is crucial to the success of the energy transition. A digital energy system is more adaptable and more controllable. A digital energy market can resolve grid issues more quickly and boost economic activity in the Netherlands. A digitally enabled grid operator is more productive and collaborates more effectively with its stakeholders. One digital priority set out in the Alliander Digitalisation Strategy 2024-2030 is the wider application of artificial intelligence (AI).



Digital priority: Wider application of artificial intelligence

Alliander makes broad use of AI to increase employee efficiency, automate processes and support decision-making across the entire organisation.

AI is already delivering many benefits

We currently use AI in more than thirty different places within the organisation. We have developed our own AI systems, especially for our core processes. Examples include short-term grid congestion forecasts, drawing up investment proposals and the examples on the next page.

We use AI for



Temperature estimates

By estimating the temperature of cables, we can optimise their use without overloading them.



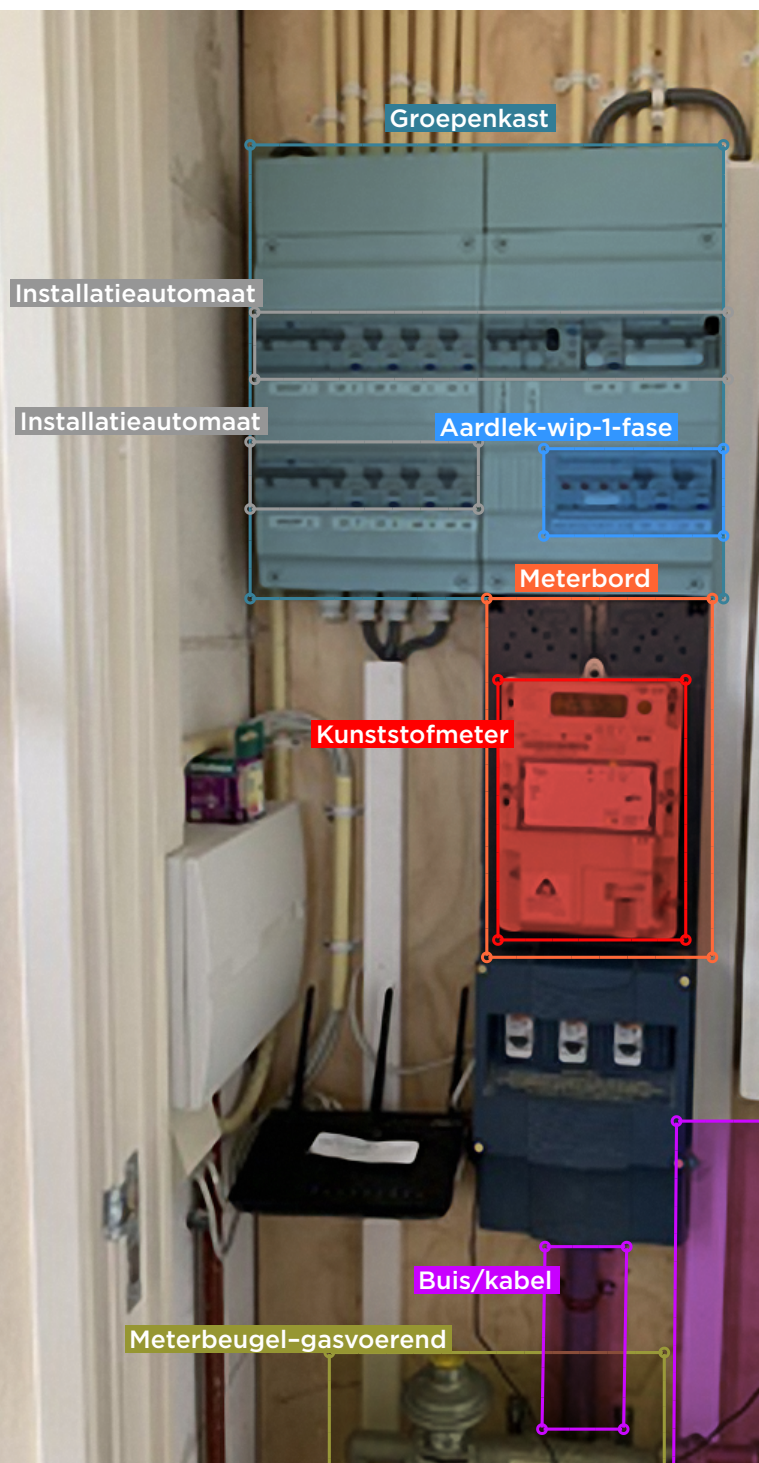
Meter box recognition

AI allows us to automatically recognise components used in meter box from photos. This makes it possible to automate the planning of work.



Outage prediction

By analysing signals, we can use AI to produce models that predict future grid outages.



We also use AI to support our work, from programming to searching within documents. This enables us to work more quickly, more intelligently and more efficiently. In Alliander's AI lab, which is part of the ICAI¹, we work together with scientists and academics to ensure that relevant AI research is carried out. Our Data & Analytics platform team offers the right technical building blocks so teams building AI systems can do this quickly and capably.

AI will only be used responsibly

We will use AI if it can be used responsibly. One potential risk is the use of AI-generated data in decisions. Here we need to pay attention to, for example, biases, fairness and reliability. It is important to deploy AI in an ethical way and to ensure that outcomes are explicable.

We are also looking at the computing power required to train and use the model. This is because it has an environmental impact, including high energy and water consumption. To ensure this, Alliander has drafted an AI policy, we design our systems based on an AI governance framework, and our

¹ ICAI is a national collaboration where knowledge institutions, industry and the government work together on technology and talent development in the area of artificial intelligence



More opportunities to use artificial intelligence

We are already making use of AI today, but this is just the beginning. Over the coming years millions of smart appliances will be connected to the grid. AI plays an important role across the whole of the Alliander organisation, for example in the following areas:

Energy grid reconstruction

We do not always know all the components in our complex grid. With the help of AI we can improve our grid model, for example by recognising voltage patterns. An accurate model is essential for predicting grid congestion. We can also detect switch positions, for example, to allow correct modelling of the situation in real time.

(Measurement) data validation

Good data quality is essential for digitalisation and for the development of AI. AI can also support data governance and management. By using AI, we can assess data and automatically detect and correct data errors, for example.

Improving energy flows

The cost and environmental impact of grid losses are substantial and increasing. These losses mainly result from the heat released when electricity is transported. With the help of AI we can guide electricity flows through the grid in the cheapest and most efficient way, using a fully automated process.

Customer integration into the grid

We are constantly improving our integration process and are increasingly making use of capacity restriction contracts. This means that the maximum capacity is not always available to customers. In this way we also optimise costs and, consequently, customer tariffs. AI enables us to calculate the available capacity.

Controlling customer appliances

In the future, we will control customer appliances in an automated way to alleviate congestion and optimise use of the grid. This is because the ability to ramp up and down depends on congestion in our grid. These appliances – which will eventually number in the millions – will only be controllable at such a large scale with the help of AI.



AI governance practice provides risk classification and oversight of AI systems.

Growing together towards a digital, sustainable future

AI creates significant opportunities for Alliander to transform its role within the energy system and energy market. By investing in AI, centrally coordinating the acceleration process, expanding collaborations and investing in training and knowledge development, we can transform the challenges posed by the energy transition into opportunities for growth, efficiency and sustainability.

Alliander Digitalisation Strategy 2024-2030

Want to learn more about the Alliander Digitalisation Strategy 2024-2030?

Scan the QR code.



Accelerating on multiple fronts

The energy transition requires us to accelerate in the area of AI and apply AI more quickly and more broadly within the organisation. To achieve this, we will work on the following interventions in the areas of technology, processes and organisation:

Coordinating and prioritising the acceleration of AI:

The use of AI is currently not coordinated. We therefore do not know for sure if we are using AI in the most promising places and are taking sufficient advantage of rapid external developments. We will coordinate the accelerated use of AI, prioritise those areas where the support AI can provide is most promising and where productivity improvements are greatest, and register all initiatives in one overview. For acceleration, preference will be given to buying solutions over developing them ourselves.

Expanding collaborations

We will expand our AI collaborations with other grid operators, industry and academic institutions. We will also develop models together, since the more data we have, the more reliable the models will be. We are also looking at federated learning, especially when it comes to privacy-sensitive data.

Investing in training and knowledge development

The opportunities offered by AI must be widely known across the organisation. Only then will we be able to ensure that automation with the help of AI is incorporated into roadmaps and the challenge can be met. People also need to recognise the dangers and risks of AI. We are therefore making training courses widely available, both inside and outside the Digitalisation department.