

# Artificial intelligence for energy transition

How AI can support sustainability today

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# 3 ways

AI can support  
the energy transition



# Introduction

## The world is at a critical juncture in its relationship with nature

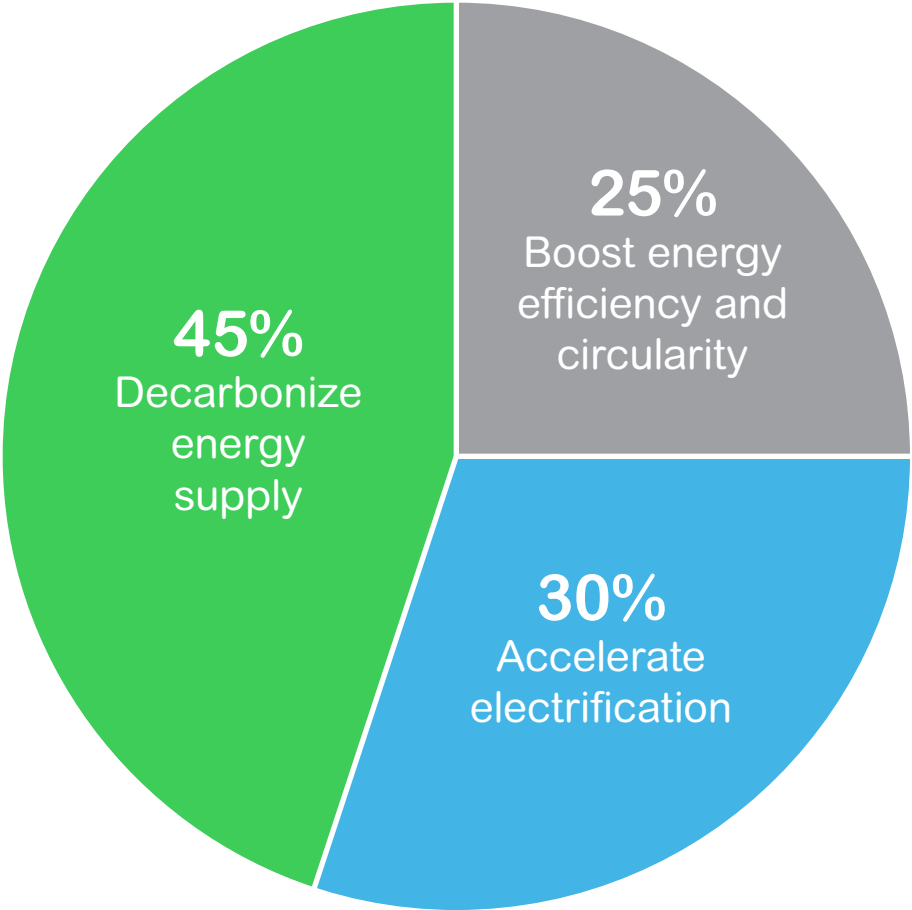
With extreme weather events, biodiversity loss, natural resource shortages, and pollution looming as severe risks for the next decade, the need to reevaluate our relationship with the environment has never been more pressing.<sup>1</sup>

The Global Footprint Network's estimation of [the Earth Overshoot Day](#), coupled with the IPCC's alarming findings on global temperature increase, further underscore the urgency of the situation.<sup>2</sup> As we grapple with the implications of climate change, it is imperative to reduce GHG emissions and embrace sustainable business practices.

### Seeking for a solution

In the quest to collectively conserve resources, especially energy, organizations, and governments globally are seeking innovative and affordable approaches to decarbonize. Both new and existing technology plays a vital role in their efforts, especially given the continued considerable reliance on carbon-intensive energy sources.

**By using existing technologies, we can reduce 70% of CO2 emissions and save 10-15Gt CO2 annually.**



Source: [Schneider Electric Sustainability Research Institute](#)



# The role of AI is growing. It becomes an inseparable part of our life and work

Meanwhile, considered to be as disruptive as PCs and the Internet in the past, AI continues to gain traction across industries.<sup>4</sup> It is becoming an integral part of businesses across various industries - revolutionizing operations and strategies.

This growth is additionally driven by generative AI which seems to be entering many business domains. As stated by McKinsey, in 2023, 79% of respondents who took part in the survey had had at least some exposure to gen AI, and 22% said they had been using it in their work.

**Even though AI is yet to be widely adopted by businesses, AI-powered solutions based on data, algorithms, and machine learning techniques are seen by companies as a gateway to streamlined processes, enhanced customer experiences, and unprecedented levels of efficiency.<sup>5</sup>**



# Can we use AI to solve sustainability challenges?

AI brings more benefits than just the productivity gains and time savings. Artificial intelligence can be of the crucial accelerators of the energy transition. **It is not a technology that can solve all challenges alone, but one without which other technologies and the people who use them for sustainability, are unable to act as effectively.** Why? Simply put, AI makes decision-making smarter, faster, and more precise. Through AI capabilities like monitoring, analyzing, and forecasting based on big data, concrete actions such as responsible and thoughtful use of resources can be made easier and more automatized.

Can we use AI to support sustainability challenges? Yes - AI can help guide people toward decarbonization methods. For example, it can help reduce the carbon emissions of buildings, allowing organizations to get closer to their net-zero objectives.



# Three ways AI can support the energy transition

We firmly believe that the energy transition cannot occur without Artificial Intelligence, particularly on the demand side of the energy equation. When used responsibly, **AI solutions have the potential to reduce overall carbon emissions.**

In this paper, you will learn how **AI can be used today to empower** decision-makers to **accelerate sustainability efforts:**



**AI**

**for efficient energy use**





# Optimizing energy to reduce CO<sub>2</sub> emissions.

The first way to reduce carbon emission is to reduce energy consumption.

Most processes, either industrial processes like manufacturing, or building processes, such as heating or cooling, need to be modeled to be optimized. By creating a model of a process, one can understand key drivers of energy consumption, detect, and fix consumption anomalies, and elaborate several scenarios to reduce the energy needs for the same or similar outcome.

Yet in many cases, it would be a daunting challenge to manually construct a model based on the fundamental laws of physics. For example, creating a complete energy model of a building, would require an army of experts and scientists, not to mention the amount of time. **With artificial intelligence, and especially machine learning, we can build a predictive model much faster, based on the data measured by variety of sensors.**



# Wiser Home Energy Management System

## Smarter renewable technologies

Today investing in renewables is one thing. The other is using them at the maximum of their capacity and optimizing their usage over time.

In a home equipped with renewable energy generation and storage capabilities, all the expectations of energy savings, reduction of consumption and cost savings must be today part of an equation of the larger control system. The Wiser Home Energy Management Solution, in combination with the EFO (Energy Flexibility Optimization) component can deliver such insights with the help of AI.

The solution can ensure that homeowners are able to reduce consumption from the grid, optimizing their use of the renewable technologies they've invested in and reducing CO2 emissions. It can help them reduce cost and even generate revenue through demand response programs.

All that to provide comfort and maximize the potential of green energy.

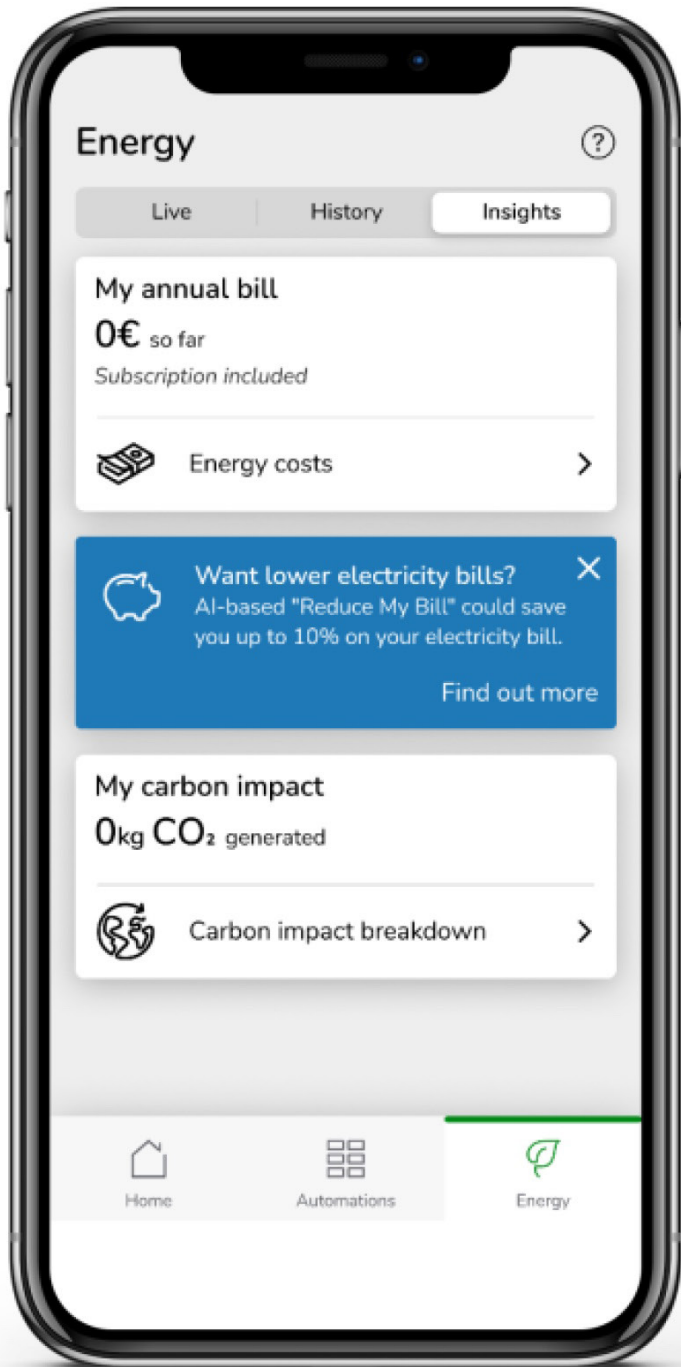


# Reduce your bill, not your comfort

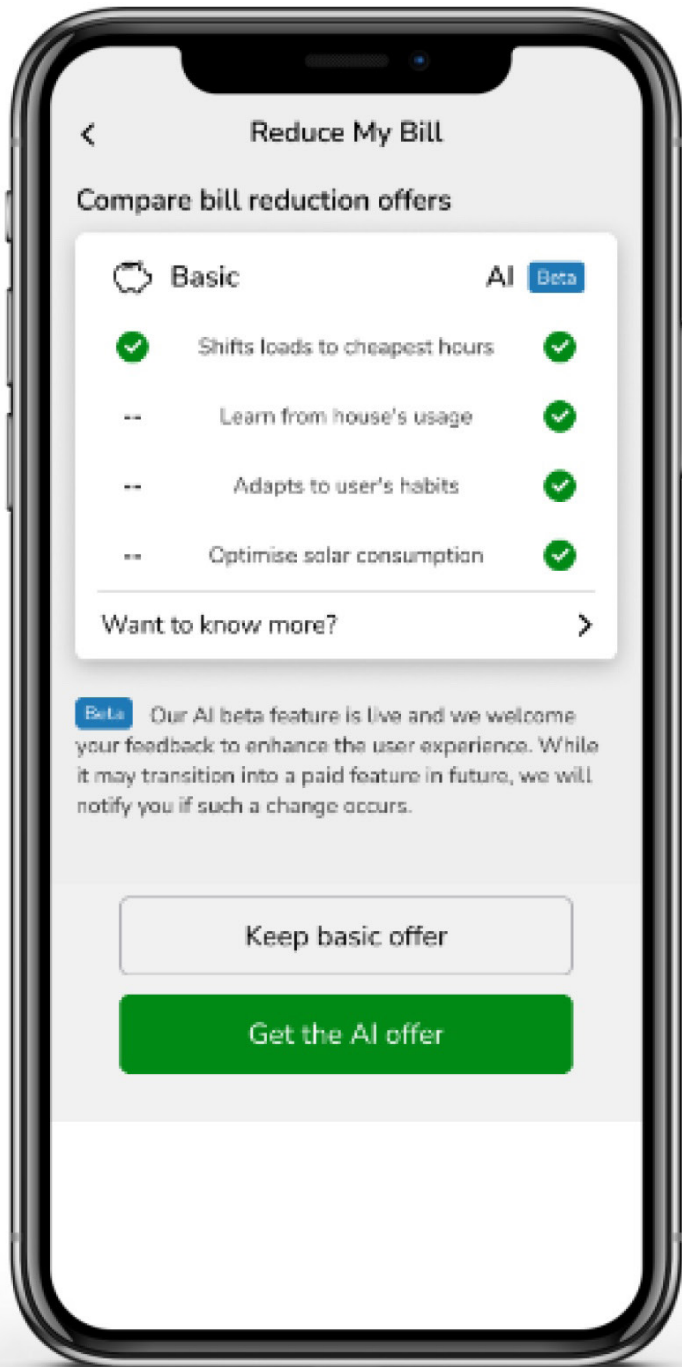


An AI feature in Wiser HEMS allows homeowners to reduce electricity costs by enrolling high energy devices like EV Charger or resistive Water boilers.

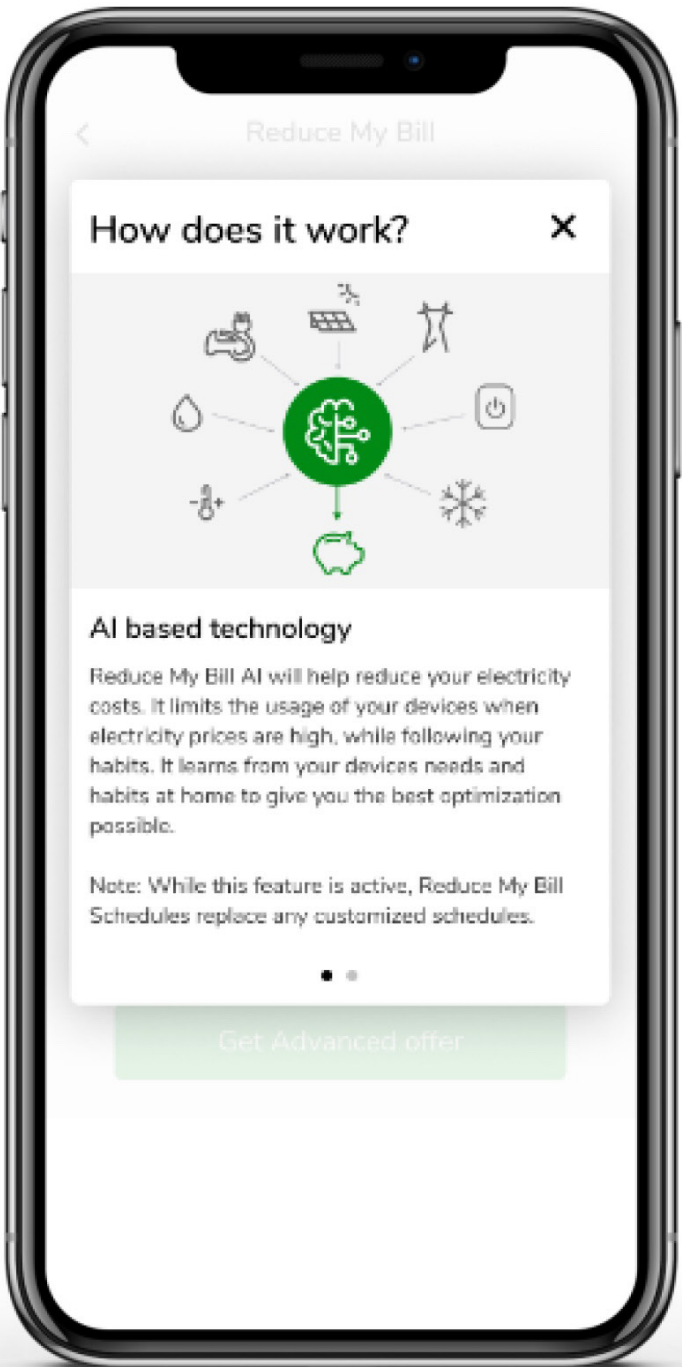
It is used with variable tariffs, such as peak/off-peak tariff, and relies on users to answer routine questions. The AI creates smart schedules for enrolled devices and limits the usage of these devices when electricity prices are high, while following user's habits. It adapts the last 30 days of consumption data from the grid.



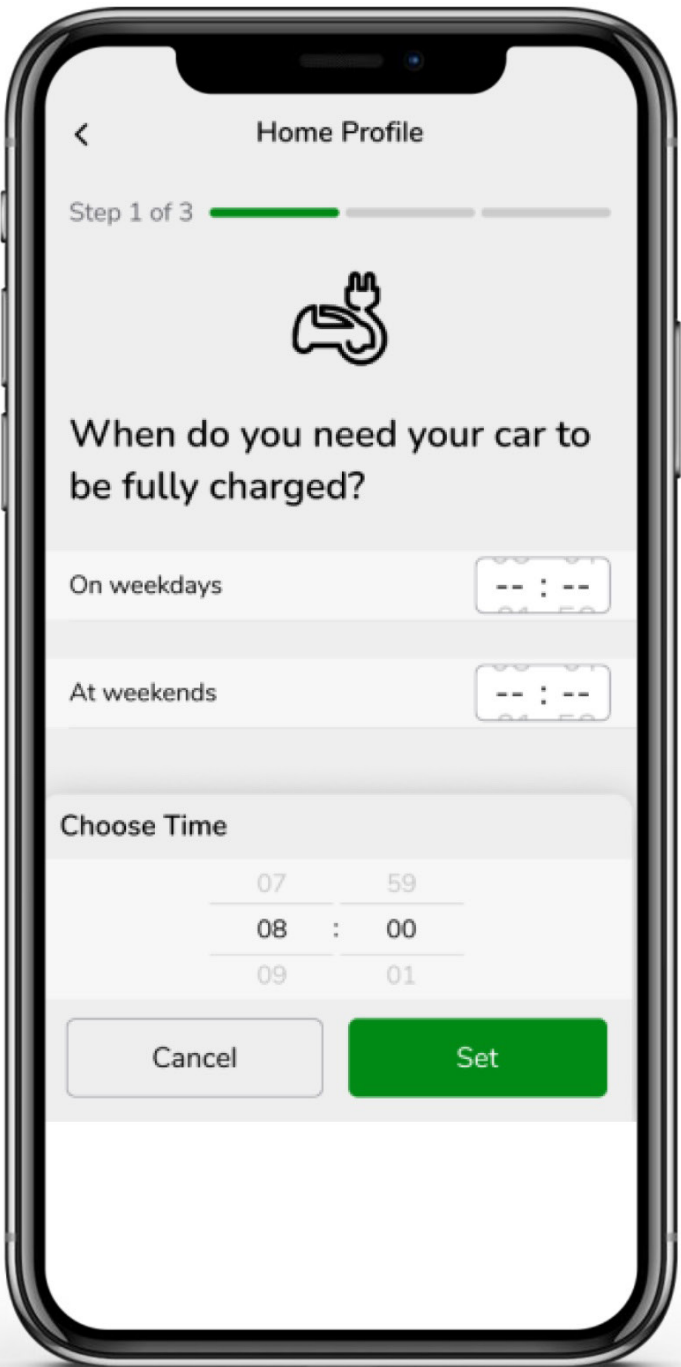
**New feature available**  
User gets notified and sees in Insight the option to enroll



**Advanced Reduce My Bill with AI Upgrade**



**Onboarding on RMB AI**  
Screens to explain the feature



**Home Profile**  
User answers 3 questions to support the algo



Optimizing energy  
demand and mix

with AI



# Optimizing the use of electricity... and decarbonizing the mix

The only abundant source of energy that can potentially be decarbonized is electricity. However, during the peak of demand, electricity is often generated by burning fossil fuels, contributing to carbon emissions and global warming.

**By using AI-based optimization techniques, we can contribute to:**

- 1. Reducing the peak of consumption and help to reduce the overall carbon footprint of electricity.**
- 2. Maximizing the usage of locally generated, renewable energy.**

**Using AI models, we can develop forecasts for both the energy needs and the production of green energy.** Then, by using AI we can manage the energy storage capacity and shift energy consumption in time, reducing the peak of consumption, the use of fossil energy sources, and the overall carbon footprint of electricity.

In a world where millions of homes are equipped with solar panels, electrical vehicles, and batteries, and where distributed energy renewable is everywhere, **AI is needed. It will enable us to operate the grid smarter and to minimize carbon emissions.**



“For electrification, the grid is much more difficult to manage. We believe that we need data and AI to optimize and operate grid energy management at the level of country, building, or factory. That is why we invest in AI and believe it is a key to sustainability.”

— **Philippe Rambach**  
Chief AI Officer at Schneider Electric



# Use Case:

## Implementing the smartest real estate on the market

Schneider Electric and Citycon, the top Nordic owner of mixed-urban centers and commercial properties, partnered to provide the most intelligent and energy-efficient real estate on the market. Citycon's Lippulaiva project, a new urban center in the Helsinki metropolitan area, is 150,000 sq. meters (1.6 million sq. feet) and Finland's second-largest such complex.

**Goals:** Achieve high sustainability through net-zero emissions in terms of energy use, improve energy management, lower energy consumption, and generate revenues.

**Solution:** Thanks to **EcoStruxure Microgrid Advisor**, an intelligent predictive analytics software, the Lippulaiva site has become a prosumer of energy, meaning that through proper energy system management, they can sustain a three-dimensional relationship with energy that includes energy consumption, energy control, and production.

**Results:** The center optimized its entire facility to reduce annual CO2 emissions by 335 tCO2 /year (direct energy savings) and achieved its €3 million investment payback within five years. With the new Lippulaiva city center in Finland, Citycon is commissioning Europe's first energy-self-sufficient, sustainable, and carbon-neutral shopping center.<sup>7</sup>

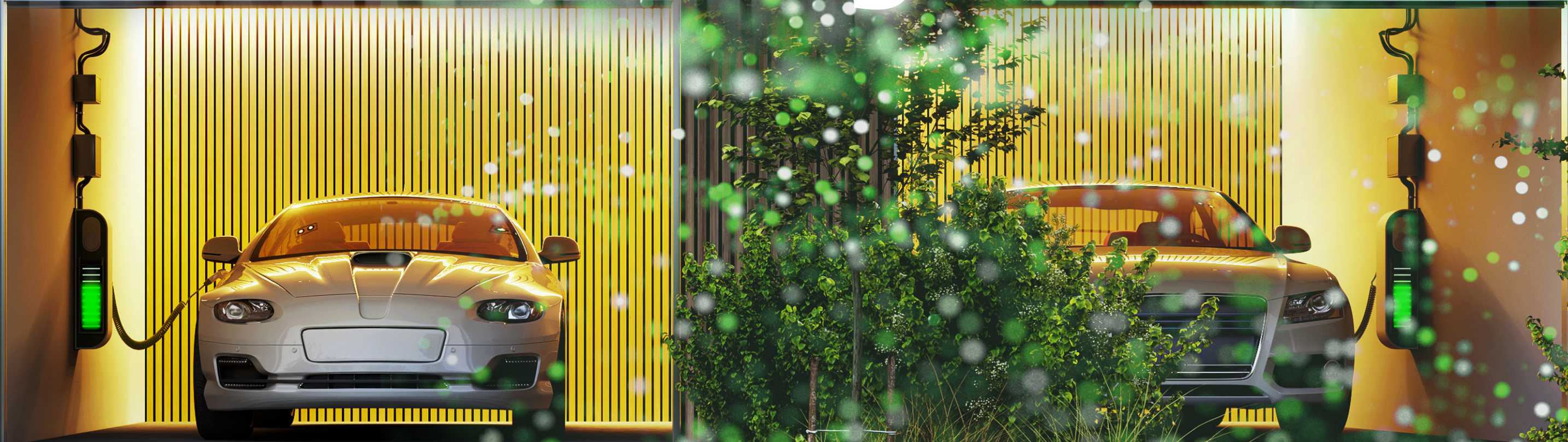


[Watch the video](#)



**Breaking down**

**the barriers  
to sustainability at scale**



# Accelerating sustainability with AI

Many obstacles hinder the adoption of the sustainability-focused solutions mentioned in the previous two chapters of this e-guide. Besides the cost of AI solutions alone, the main barriers are the shortage of skilled technicians and the required investment in foundational technologies such as automation of plants, buildings and homes, or integration of renewable energy sources.

The good news is that by making the deployment of such technologies easier, faster and cheaper, and by automating dull, boring and expensive tasks that delay the adoption, AI can help overcome these hurdles.

For example, **AI-powered tools** can enable home and building owners to access grid topology, panel insights, and electric equipment AI-based services, thereby **facilitating the seamless integration of sustainable solutions at scale.**



The world could be installing **1 TW of solar annually** by the end of this decade – hitting up to **800 GW per year** already in 2027.<sup>9</sup>





# Use Case: Faster, safer, and more accurate estimates.

## Simplifying the acquisition of home EV charging for prosumers to widen adoption of clean energy.

Schneider Electric and Qmerit, North America's leading installer of home and business EV chargers collaborated to develop Panel Insights. Empowered by advanced AI algorithms, the tool evaluates electrical specifications, including available circuit spaces, number of tandem breakers, and total electrical capacity. It does that by instantly analyzing and interpreting a single image of an electrical panel.

**Solution:** This AI-enabled solution was specifically developed for home EV charging installations. The centerpiece of Qmerit's AI solution suite is the Load Capacity Recommendation Engine, which takes the results from Panel Insights to calculate the available capacity in the breaker panel for EV chargers.

**Results:** Panel Insights has bridged the needs of both electricians and EV buyers. The simplified electrical upgrade process helps homeowners reduce costs and improve their satisfaction. Panel Insights improves the accuracy of automatic quotations and results in higher adoption rates of EV installations.

The logo for Qmerit, featuring the word "Qmerit" in a blue, sans-serif font. The letter "Q" is stylized with a circular shape around its top and bottom curves.

# The other side of the AI equation



# Use Case:

## Ensuring responsible and sustainable AI

When talking about AI we should not forget about the other side of the equation. Artificial intelligence is indeed placing a huge demand on data centers because AI computing has high power density and generates more heat. To meet the rising demands for digital bandwidth and electricity, the industry must adopt a comprehensive and standardized approach to environmental sustainability.

Compass Datacenters designs and constructs data centers for some of the world's largest cloud and genAI providers.

**Problem:** Compass Datacenters needed a tailored supply chain that would support the increasing demand from their clients for prefabricated modular data centers.

**Solution:** They partnered with Schneider Electric to bridge uptime, efficiency and sustainability and built a standardized and optimized state-of-the-art integration facility in Dallas, Texas.

**Results:** Through a partnership with Compass Datacenters, we delivered data center solutions to help Compass reach a 4x faster speed-to-market to meeting the growing demand.



# AI: Good or bad for the planet?

**The final verdict on whether AI is good for the planet depends on every single use case that businesses and organizations decide to implement.**

In AI applications aimed at reducing energy consumption and greenhouse gas emissions, the savings must outweigh the energy needed for the development and use of AI models.

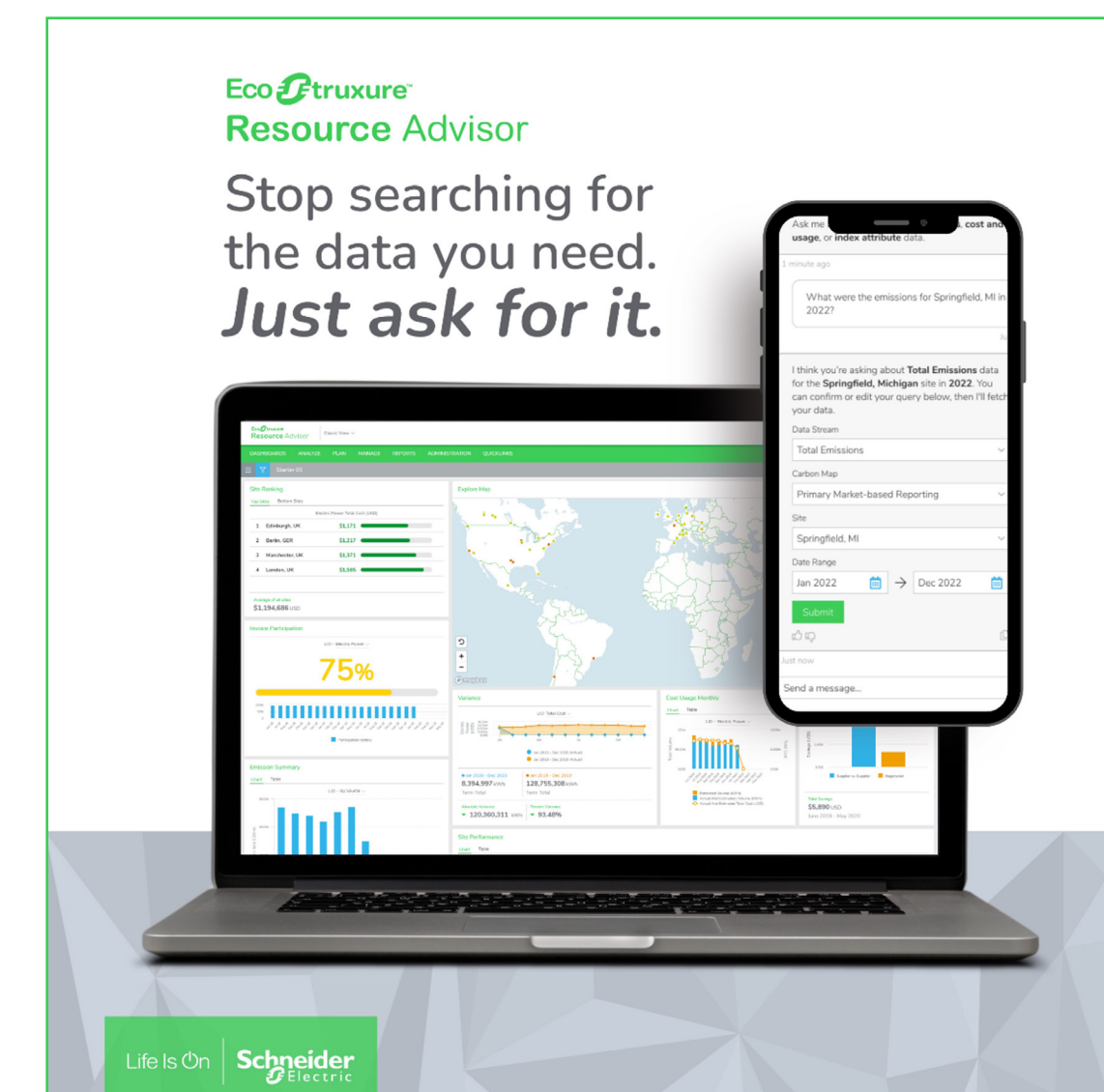
For applications aimed at other objectives, the benefits brought by the application must be weighed against the energy needed for (and emissions resulting from) the development and use of AI models.

Consistently, Schneider Electric is closely monitors and adds sustainability metrics to the usage of AI in our solutions. **In that way, we will bridge sustainability and technology together, ensuring our usage of the technology is responsible, ethical, and serves a meaningful purpose.**

## What about generative AI?

Generative AI can provide a natural interface for the user to interact with a large amount of data, effortlessly. This is particularly useful for **managing ESG reporting, sustainability, and energy data in one place.**

**Our Resource Advisor Copilot** reduces the need for manual navigation and data analysis, allowing every facility manager to simply ask the chatbot a question through natural language and retrieve data. It makes it simpler to track and interpret data, report out, and identify areas of opportunity, strength, and improvement across an increasingly complex resource landscape.



# Leverage the strength of partnerships



# Answer the call to action

If you take away one lesson from this paper, let it be this:

**Bridging digital with sustainability can create a positive impact both for businesses and the planet. Artificial intelligence is one of the crucial accelerators of energy transition in 3 main areas:**

- 1** Optimizing energy use in buildings and industrial processes;
- 2** Reducing the peak of consumption and helping to reduce the overall carbon footprint of electricity;
- 3** Removing barriers to the implementation of sustainable solutions.

Schneider Electric is bringing its domain expertise and technology innovation in all three of these areas. As a trusted partner for efficiency and sustainability, our +350 AI and data specialists around the world are innovating to create sustainable IMPACT with AI. Discover the Schneider Electric AI Hub today.

[Visit AI Hub](#)

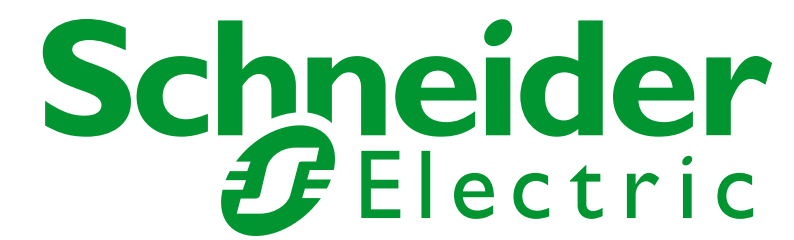


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