A roadmap to *sustainable AI* in the public sector

Capgemini

Executive summary

The public sector needs AI. But can AI be sustainable?

For strategic planners and policy makers in the public sector, this report examines the pros and cons of AI as it relates to sustainability. It explores the dual nature of artificial intelligence, with its significant energy and resource consumption on one hand, weighed against its potential to deliver transformative environmental benefits.

We explore:

- The challenges and opportunities of AI in the public sector
- The unique position of the public sector in the context of sustainable AI
- The role of AI in environmental protection
- A sustainable AI roadmap for public administrations
- Case studies on AI for sustainability

The best way forward is a balanced, deliberate approach to AI adoption in the public sector. By following a sustainable AI strategy, public sector leaders can harness the benefits of AI, reduce emissions, and set a powerful example for others to follow. Here's what that looks like.

Two branches of thought

The energy and hardware resources needed to power AI are a growing sustainability challenge. Our recent survey found that Gen AI already accounts for 2.6% of an organization's carbon footprint, and will reach 4.8% in just two years.[1] Given this cost, why would any environmentally aware organization choose to add AI to their processes?

That's one side of the leaf. The flipside is the use of Gen AI to improve sustainability. These include transformative gains for the environment, and even the potential to lower emissions overall. Governments should use AI – but they should do so in a sustainable way.

We propose a sustainable AI road-map for the public sector – one that helps public servants maximize public value from AI without adding to the sustainability challenges we already face. We're at a turning point in our history, and leadership from the public sector is vital. Adopting sustainable AI practices not only reduces emissions; it sets a powerful example for the world to follow.

The special challenge of the public sector

The private sector has wasted no time adopting Gen AI. Our research found that the public sector is also interested – 64% of public sector organizations are already exploring or actively working on Gen AI initiatives.[2] But they're moving more cautiously, and for good reasons. Their responsibility is for the public good, so before taking an action, public servants need to carefully assess the effects on multiple levels: who it affects now and in the future, how it affects them, and what effect will it have on our environment. In our recent conversations about AI with public sector clients, this last question has raised the most concern. Our research bears that out, with 75% of government organizations expressing concern about the environmental impact of Gen AI.

1. Developing sustainable Gen AI, Capgemini Research Institute, https://www.capgemini.com/wp-content/uploads/2025/01/ Final-Web-Version-Report-Sustainable-Gen-AI-2.pdf
2. Data foundations for government: from AI ambition to execution, Capgemini Research Institute, https://www.capgemini. com/wp-content/uploads/2025/05/Capgemini-Research-Institute-report_Data-foundations-for-government_From-AI-ambitionto-execution-2.pdf

A typical government department starts off with a much smaller carbon footprint than many private companies, which means that IT-related emissions are a much greater proportion. 25 – 30% is typical. Adding Gen AI may push that all the way up to 40 or 50%.

Or not. Adopting AI with no plan would, in fact, drive up emissions. But with the right strategy, the benefits of AI far outweigh the drawbacks. We'll show that sustainable AI is not only possible; with a well-managed sustainable AI strategy, it's to be expected.

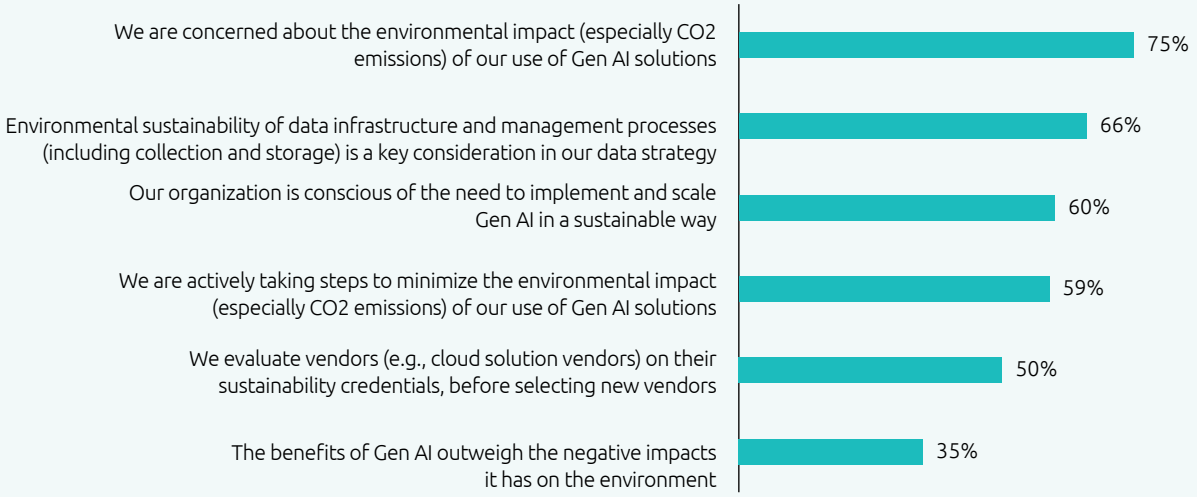
75%

of government organizations express concern about the environmental impact of Gen AI.

59%

are taking action to reduce the impact.

Percentage of respondents who agree with the following statements

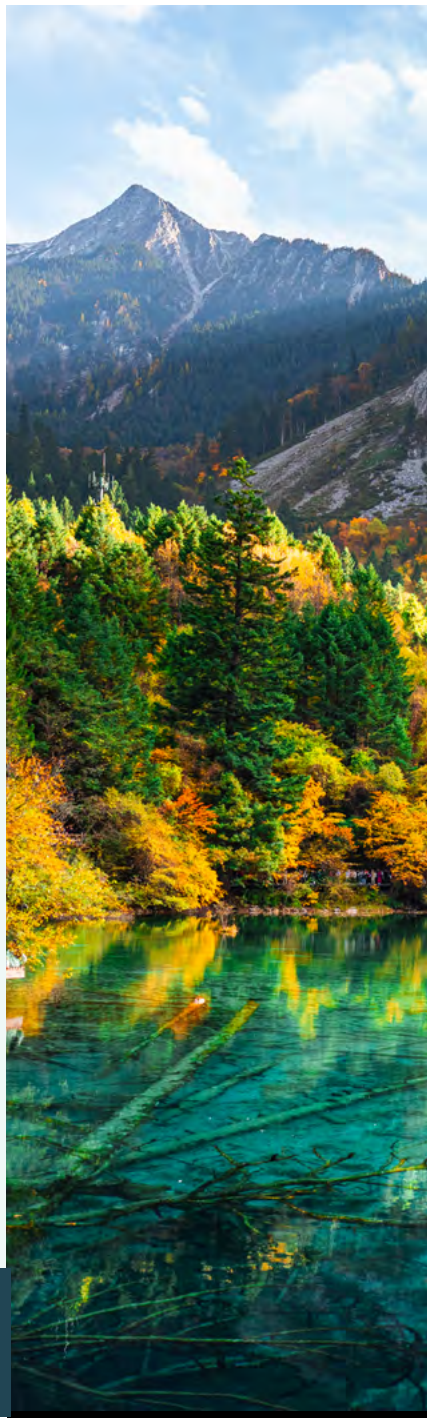


Source: Capgemini Research Institute, Data mastery in government survey, December 2024-January 2025, N = 350 public sector organizations (two respondents from each: one from the IT/data function and one from a line of business (LOB).

AI can cut emissions by saving time

Cutting energy waste is fundamental to reducing emissions. We insulate windows, shut off our engines at stop lights, and turn off lights when we leave the room, all to save energy. Gen AI takes efficiency a step further, enabling workers to cut time and resources (including electricity) from all sorts of daily tasks. One study demonstrated 15.5% gains in efficiency for government workers who were allowed to use Gen AI in their work.[3] That's time and resources that can be eliminated or applied to higher value tasks. Add in more targeted tools, training and experience, and the gains will likely be considerably higher.

One way that Gen AI adds efficiency is by increasing each employee's ability to serve the public. Processes are often held up when they fall outside of the norm. Applying for a fishing license – piece of cake. Applying for a permit to install a small, homemade generator in a stream for personal use… that may take some research. Gen AI reduces the time needed for that kind of research dramatically. (If you're in a place where Gen AI is permitted, try asking it now, and see what you find.)



Case study

Using AI to predict earthquakes

In 2008 an earthquake struck Sichuan, China, wreaking a devastating human and environmental toll. In response, China established Acoustic & Electromagnetic to AI (AETA) to predict earthquakes before they hit. In 2021 they partnered with Capgemini to hold the AETA Earthquake Prediction AI Algorithm Competition.

600 teams from 28 countries took part. In the end, the winning team used AI to raise AETA's one-week prediction rate from 30% to 75%, with a stunning 88% for same-day predictions.

For the billions of people living near fault lines or in tsunami zones, this type of innovation will bring incalculable benefit.

Curious to learn more?
Ask CoPilot!

Sample prompt: *Which team won the AETA-Capgemini earthquake competition?*

How do AI and Gen AI compare when it comes to predicting earthquakes?

3. Produktiv oder problematisch? KI im Praxistest der Verwaltung, eGovernment Verwaltung Digital, https://www.egovernment.de/produktiv-oder-problematisch-ki-im-praxistest-der-verwaltung-a-f92968e30123b6fdd0be83aca7e53b68/?p=2

In use: the AI-driven Energy Command Center

The Energy Command Center is a great example of AI yielding more fruit and less weeds.[4] Developed by Capgemini and Schneider Electric with a mix of traditional AI, machine learning, logistics, algorithms, and IoT technologies, this platform monitors all building assets that consume energy, including data centers and critical environment rooms like labs and electronic assembly areas. It provides information about energy usage, and makes suggestions on areas to improve. Based on our results, this tool alone typically reduces energy consumption by 30%.

Increasing efficiency is the foundation of carbon footprint management. But emissions are just one factor. Let's see what happens when AI is applied to a wide range of sustainability challenges.

AI supports environmental protection

The UN promotes 17 Sustainable Development Goals, broken down into 169 targets.[5] Researchers at the journal Nature found that "AI can act as an enabler for 134 targets (79%) across all UN Sustainable Development Goals (SDGs)." For SDGs related to the environment, that rose to a remarkable 93%.[6]

Some of this comes down to efficiency, as AI speeds up processes and removes time-consuming tasks, like merging datasets or extracting values. Other activities are just now becoming possible (or at least practical), thanks to AI – among them measuring and describing slow changes to an ecosystem based on satellite images or tracking endangered animals. These advancements are not just theoretical – they're beginning to reshape how we understand the world around us.

4. Powering Sustainability with Capgemini's Energy Command Center (ECC), Capgemini Website, https://www.capgemini.com/solutions/energy-command-center/

5. The 17 goals, United Nations, https://sdgs.un.org/goals

6. The role of artificial intelligence in achieving the Sustainable Development Goals, nature communications, https://www.nature.com/articles/s41467-019-14108-y

The dust is settling

Artificial Intelligence is becoming an integrated part of our IT usage, as a report we released earlier this year makes clear:

"Eighty percent of organizations have increased their investment in generative AI since 2023, and 20% have maintained their investment level... 24% of organizations have integrated generative AI into some or most of their locations or functions. This represents an increase compared to only 6% reported just 12 months ago."[7]

Most public sector organizations are already exploring or actively working on Gen AI initiatives, and 90% are planning to explore, pilot, or implement agentic AI in the next two to three years.[8] The U.S. is already ramping up adoption, as seen in a list of use cases released by the Department of State. Examples range from analyzing satellite images to identify fires or damage, to mapping out the relationships between stakeholders involved in key issues, to predicting political unrest.[9]

So far, the EU has taken a more guarded approach. Moving forward, we can expect a balance to develop, with a space for innovation bounded by clear guidelines. New technology brings new responsibilities, and as Gen AI adoption increases, so does the responsibility to ensure sustainability, ethical standards, and societal impact.

Case study

Flukes and good fortune

Lisa Steiner, marine, has dedicated her life to studying sperm whales in the Azores. Whales are identified by their tail fins, or "flukes," which bear patterns as unique as fingerprints. However, varying photo quality often made it difficult to distinguish one fluke from another, leading to a painstaking identification process and less reliable results.

On one expedition, Steiner was demonstrating this technique to a group of volunteers, which happened to include an employee of Capgemini. Before long, Steiner, Capgemini and AWS had developed a machine learning tool that identified each individual whale instantly and automatically.

The result is a clearer picture of sperm whale migration patterns, spanning decades – essential knowledge for protection efforts.

Curious to learn more?
Ask ChatGPT!

Sample prompts: *After collaborating on fluke research, did Lisa Steiner and Capgemini ever meet again?*
Did this solution use AI, Gen AI or machine learning?

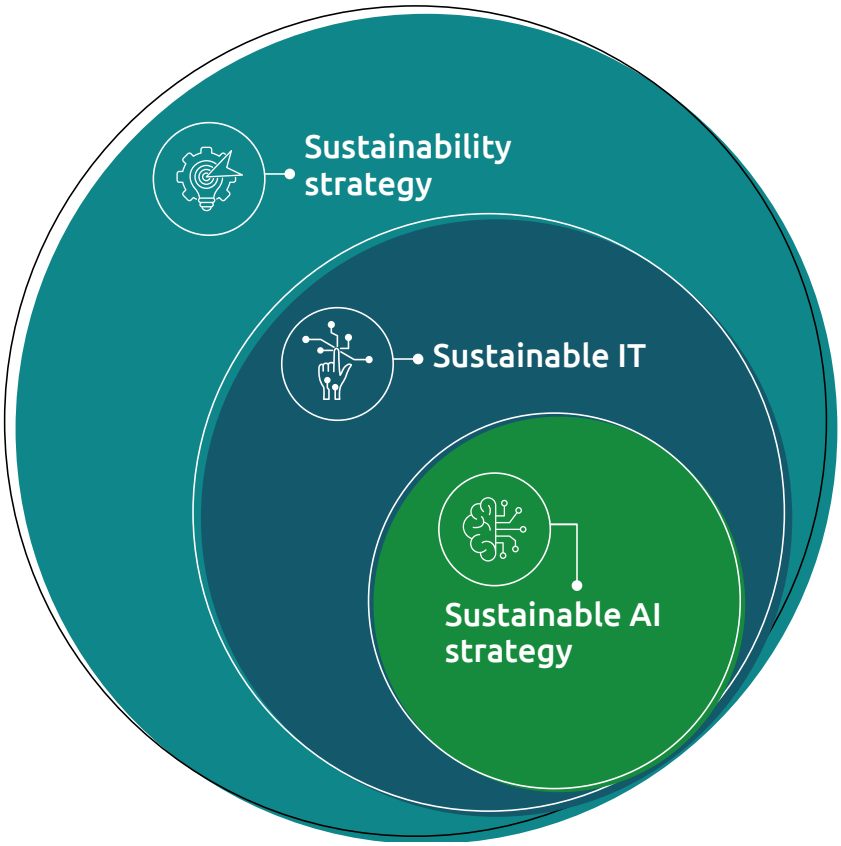
7. Generative AI in organizations 2024, Capgemini Research Institute, https://www.capgemini.com/insights/research-library/generative-ai-in-organizations-2024/

8. Data foundations for government, Capgemini Research Institute, https://www.capgemini.com/insights/research-library/data-mastery-in-government/

9. Department of State AI Inventory 2024, U.S. Department of State, https://2021-2025.state.gov/department-of-state-ai-inventory-2024/

A strategy for sustainable AI

To become sustainable, AI must be integrated into existing sustainability efforts. Sustainable IT is a set of practices that reduce the environmental impact of IT operations, including optimizing power consumption and developing sustainable software. Applying this same approach to AI shifts the balance, so that organizations can enjoy the benefits while minimizing the drawbacks. The first step is defining a vision.



What goes into a vision?

A strong vision helps define overarching goals and aligns all stakeholders in a common direction. The Gen AI vision of the German Federal Ministry of the Interior (BMI) provides a strong example:

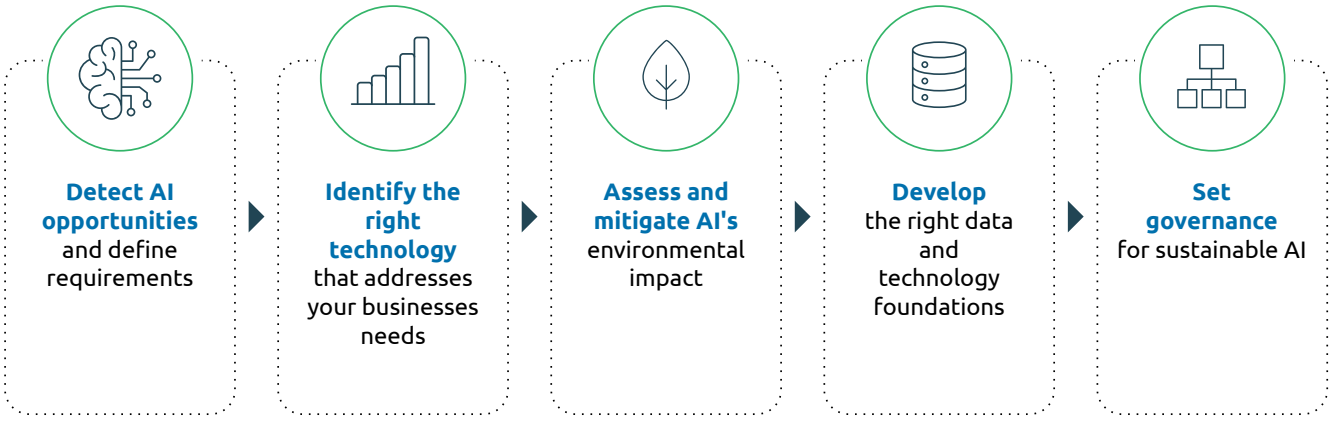
The Vision of BMI

Approach: The BMI views artificial intelligence as a key technology for modernizing administration and addressing current challenges such as administrative digitalization and cybersecurity. The use of AI aims to increase efficiency, relieve employees, and improve services for citizens. At the same time, the BMI is committed to ensuring that AI is used responsibly and in compliance with fundamental rights. It plays a central role in managing the federal IT infrastructure, modernizing administration, and developing security standards.

BMI Vision: "We use AI in an opportunity-oriented and responsible manner for our society. Our mission guides the daily work of all employees in the department. It emphasizes the benefits of AI in the context of our diverse administrative work."

Creating a roadmap

Your transformation roadmap leads you towards your vision, enabling effective use of resources and helping you overcome resistance along the way.



Here are five steps that can help you build a sustainable AI roadmap to keep up with the pace of change, and get the best that AI has to offer while systematically reducing your AI footprint. While we naturally recommend starting from the beginning and progressing systematically, every organization is at a different point in its journey. Therefore, the roadmap should be seen as a modular set of recommendations, and you should begin where you currently stand.

What to consider in your sustainable AI strategy?

1. Identify AI opportunities and define requirements

- What are the most impactful use cases for AI in your organization?
- Where can AI help reduce resource consumption and increase efficiency, for example by automating repetitive tasks or optimizing energy-intensive data analysis?
- What technical requirements do these use cases include, such as on-premises vs. public or hybrid cloud?
- Have you assessed your AI maturity? Where do capability gaps remain?

2. Technology selection

- What technology best meets your needs?
- Do you need Gen AI or could less energy-intensive tools like traditional AI or machine learning suffice?
- What sustainability parameters should be considered across the entire AI lifecycle – from development to deployment and operation?
- Where Gen AI is best, does it need to be pre-trained, or can you fine-tune an existing model?
- Do you need partners for your project, especially in the context of digital sovereignty?
- How do your potential technology partners compare from a sustainability standpoint?
- Are your AI vendors transparent about sustainability in their service level agreements?

3. Including a sustainability lens

- For a new solution, what will be the positive impact on sustainability?
- What will be the negative environmental impact?
- Have you conducted a cost-benefit analysis to determine whether AI is the most effective solution for the specific problem – financially and in terms of resource consumption?

4. A wide-angle view of sustainable data management

- All data management requires energy. What are the energy requirements of your alternatives?
- Is your data being held and processed in a modern facility with sustainable practices?
- A complex arrangement of data systems will tend to raise energy needs – could your data management be simplified?
- How will AI affect your data needs, positively and negatively?

5. Governance and guidelines

- Which green IT experts, environmental management officers and developers can you partner with?
- How can you monitor the impact and effectiveness of AI deployments, including sustainability, to ensure they deliver the desired outcomes?
- Can you improve your employees' prompt engineering to reduce interactions and processing time?

To turn back, or to lead?

Progress is rarely a straight line. The industrial revolution brought abundance, together with pollution. The digital revolution has connected the world like never before, but has also put a strain on energy and rare minerals. We stand in the doorway of the AI revolution. Private companies and citizens are streaming past, eagerly exploring the fruits of progress on the other side. Public sector organizations that turn back here are missing a world of opportunity. But neither should they rush in unprepared.

By following a methodical approach, public sector decision makers can dramatically lower the drawbacks of AI and Gen AI, while maximizing the benefits. They can begin to enjoy new efficiencies and capabilities and reach their goals faster, including environmental goals. Above all, they can fulfil their role as models for the public, leading the way into this new age intelligently, safely and sustainably.

Case study

Preserving the Mojave Desert

The Mojave Desert is home to a fragile ecosystem that's threatened by unauthorized off-highway vehicles. The Nature Conservancy is dedicated to protecting this unique environment, but with nearly 47,000 square miles of land to manage, they needed a better way to analyze the terrain.

In 2022, they joined forces with Capgemini. Using computer vision and machine learning technologies, Capgemini developed an AI tool that analyzes satellite imagery to identify trails created by off-road vehicles. This data is then compared with other relevant information, such as the nesting areas of protected species like the Mojave Desert tortoise.

The result is a powerful tool that enables The Nature Conservancy to identify and measure land degradations, and then execute protective measures like warning signs and fencing where they're most needed. Michael Clifford, Nevada Conservation Scientist at The Nature Conservancy, summed up: "Capgemini's solution has the possibility of helping to monitor degradation to the desert at scale."

Curious to learn more?
Try Gemini!

Sample prompts: *Does Capgemini's Mojave solution measure change over time?*
What other solutions are out there for monitoring land degradation?

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