

AI and Sustainability in Game Development

This is a jointly prepared summary

by Manchester Metropolitan University, Sustainable Games Alliance and STRATEGIES

25/06/2026



The difference between Game AI & Generative AI

Most of the sustainability risks discussed here do not apply to traditional game AI. Finite state machines, behaviour trees, and procedural generation are locally run, deterministic, fully measurable, and low-impact. These techniques have powered games for decades without the heavy energy, compute, or hardware demands seen in today's cloud-based generative AI systems. Sustainability concerns entirely arise from large, general-purpose commercial GenAI (e.g., frontier LLMs), models trained on massive, often copyright-infringing scraped datasets, and undisclosed energy, water, and labour inputs.

The Sustainability Bottom Line

Training and inference energy use from general-purpose AI is rising rapidly, and as a result adopting these systems is currently unlikely to align with any company's climate goals. However, if you do explore AI tools, there are key questions you can ask to minimise their impact and reduce associated risks:

- Do I need a 'Swiss-Army-Knife' general-purpose model, or will a smaller, task-specific model suffice?
- Does this tool solve a real problem in my workflow?
- Does it add genuine capability or just speed?
- Does it support long-term skills and quality?
- What are the authorship, copyright, and ethical training risks?
- Is there disclosure about datasets and data cleaning/tagging labour?
- Is there lifecycle information about this particular tool?
- Does the company disclose data on the carbon and energy costs of training and inference, water use, or the energy mix for data centres where the model is hosted?

Recommendation – Go Task-Specific, Use “Small” AI

Where AI is necessary, choosing smaller, task-specific models can:

- Dramatically reduce energy use and emissions
- Lower costs by avoiding expensive token-based API calls
- Reduce reputational and legal risks
- Slow the pressure for new, resource-intensive hardware cycles
- Provide more transparency and control (especially if fine-tuned in-house)

Lack of Transparency = Uninformed Decisions

Despite the hype around “AI efficiency,” developers still lack the basic information needed to assess environmental, ethical, and financial impacts. Most general-purpose AI models do not disclose training emissions, water use, data-labour conditions, or the energy mix of the data centres that run them.

Without lifecycle data, meaningful comparison between one or another AI tool – or between AI and lower-impact alternatives – is impossible. This opacity reflects system-level incentives, not individual developer choices. Frontier AI companies tightly control data about training, carbon footprint, and upstream impacts, making accountability nearly impossible at the studio level. This is another reason to prefer smaller models or tools, and providers who are more transparent.

Risk management considerations to guide AI adoption decisions

Rising financial costs. Many AI tools are currently heavily subsidised, and do not reflect the full costs of training and inference; prices are expected to rise, increasing the risk of vendor lock-in.

GHG/Scope 3 exposure. As standards and transparency expectations increase, Cloud AI use will increasingly appear in carbon accounting tools, and potentially reflect high emissions costs compared to other areas of your business.

Reputational risk and player backlash. Studios using AI-generated art or dialogue increasingly face player backlash, with communities quick to label such content as ‘AI slop,’ undermining trust and damaging the game’s reputation even before release.

Efficiency. Despite promises of efficiency, AI tools can increase workload by producing errors that require rechecking, rewriting, or redoing—slowing teams down rather than speeding them up. Research across multiple business use-cases shows that AI tools can fail to increase productivity, and even heighten cognitive load and increase risk of burnout.

Copyright and legal risk. General-purpose models trained on massive scraped datasets carry significant copyright uncertainty because developers often have no visibility into what copyrighted material was used to train them.

Coordinated advocacy

Supply chains, fossil-fuelled data-centre expansion, lack of data and extractive labour practices sit outside any one studio’s control. Coordinated advocacy through the SGA and similar organizations will be essential for obtaining greater transparency, and ensure training and inference impacts are minimised. Advocate for:

- Mandatory lifecycle emissions disclosure
- Standardised reporting for training and inference
- Transparency about energy procurement and data-labour practices
- Guidance that protects employees and the climate

Sources

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About Manchester University

Manchester Metropolitan is home to the Manchester Game Centre, which combines expertise in game design with expertise in game design for social change. MGC Researchers in the Department of Natural Sciences at Manchester Met have expertise in climate change science, environmental management, and carbon literacy training.
<https://manchestergamecentre.org/>



About the Sustainable Games Alliance

The Sustainable Games Alliance (SGA) is a non-profit cooperative founded by the world's leading game entrepreneurs and environmental researchers with one goal: to make the games industry the leader in sustainability by setting ambitious and achievable standards for environmental and social responsibility. SGA has members including PC, console & mobile game developers, research groups, and local as well as pan-European trade associations.
<https://sustainablegamesalliance.org/>



About the STRATEGIES research project

Sustainable Transition for Europe's Game Industries (STRATEGIES) is a Horizon Europe funded project that supports Europe's game industries in realising their potential as drivers of sustainable innovation, contributing to achieving the goals of the European Green Deal and delivering an economy that works for the people. STRATEGIES consists of fifteen partners from nine different countries covering all the main regions of Europe. It includes six universities, four NGOs, and five game companies.
<https://www.strategieshorizon.eu/>

