AI and Energy Will Reshape the World
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George Atsalakis, Associate Professor, Data Analysis and Forecasting Lab,
Technical University of Greece

The expectation that the impact of various disruptions — including geopolitical tensions, the effects of climate change, technological breakthroughs, and vulnerabilities in supply chains — will increase significantly over the next 5 to 10 years highlights a pivotal trend in strategic energy management. States and businesses are increasingly recognizing the need to prepare for uncertainty as an integral part of their operational planning.

The exponential rise of new technologies suggests a broad consensus regarding the inevitability of these challenges and the substantial impact they could have on global business activities. This expectation is driving companies to adopt more robust and flexible strategies to mitigate risks.

Furthermore, the focus on preparedness reflects a shift toward a more proactive approach to business strategy. Rather than reacting to disruptions as they occur, decision-makers must proactively integrate risk management into their core business models. This includes scenario planning, stress testing, and continuous monitoring of global trends to anticipate and mitigate potential impacts before they materialize. A new global challenge that must be taken into account is artificial intelligence in the energy sector.

The progress of artificial intelligence is often described in waves. The first wave of AI was perceptual AI. The second wave, which has emerged over the past five years, is generative AI. Generative AI has learned to understand the meaning of information and to translate it. It can comprehend English and convert it into text or images. In essence, generative AI functions as a global translator that understands human language.

We are now in the wave where AI not only understands and generates, but also solves problems and recognizes conditions it has never encountered before. It achieves this through reasoning.

By applying rules, laws, and principles it has learned in the past, AI breaks down the problem step by step. And even though it has never solved that specific problem before, it can reach a solution through reasoning. This is one of the unique capabilities of intelligence — and we now find ourselves in what is called the reasoning AI wave.

Models of reasoning AI enable the creation of digital robots known as *agentic AI*, or "robotic agents." An AI agent can understand the task it has been assigned, operate autonomously, learn, read, and use tools such as calculators, web browsers, and spreadsheets, and then return to complete the task it was given. Thus, these agentic AIs are essentially robots — a digital workforce.

The next wave — and this is where the world’s major industries will benefit — will see artificial intelligence understanding concepts such as the laws of physics: friction, inertia, cause and effect — the idea that if something tilts, it might fall.

The relationship between artificial intelligence and energy is bidirectional: energy contributes to artificial intelligence, and artificial intelligence contributes to energy.

A) The Contribution of Energy to Artificial Intelligence

Artificial intelligence is unique not only because it is set to drive evolution within its own domain, but also because it will profoundly impact other sectors—such as the economy, politics, and even the way wars are conducted.

Dominance in the field of artificial intelligence requires immense computational power, sufficient energy supply to power the vast data centers behind AI, and the human resources needed to develop new and innovative algorithms.

The growing impact of artificial intelligence on energy consumption is a critical factor that must be considered. The sharply increasing energy demand driven by new technologies like AI is expected to result in a significantly more energy-intensive environment, as the adoption and proliferation of technological innovations continue to accelerate.

Energy will be needed in all its forms—renewable or non-renewable. Whatever is required must be made available, and quickly. There are already plans for 10-gigawatt data centers dedicated solely to data translations (or transformations). To grasp the scale: a typical U.S. nuclear power plant generates about 1 GW. How many such plants could realistically be built in a single year?

The utility industry has been caught "asleep at the wheel" by the rise of artificial intelligence. While we are all familiar with predictions about how new technologies spread exponentially, we have not adequately calculated the speed at which energy demand will rise as a direct consequence of these technologies. A single ChatGPT query requires **17 times more energy** than a typical Google search. If just one simple AI chat consumes 17 times the energy, then simply multiplying this across all potential use cases for AI and other energy-intensive technologies paints a picture of a truly energy-hungry future—one that could hinder AI adoption due to either:

- a lack of sufficient grid infrastructure to deliver the necessary electricity, or
- the prohibitive cost of that electricity.

It is well understood that when demand rises but the supply of energy is not available at the moment it is needed, the price of energy increases.

The rapid growth in demand for artificial intelligence has already forced tech companies to turn toward nuclear power plants as a reliable source to fuel their AI operations.

B) The Contribution of Artificial Intelligence to Energy

The transition to green energy is unlike any previous energy transition. Past transitions were additive—each new source of energy added to, rather than replaced, the existing ones. Oil, discovered in 1859, overtook coal as the world’s dominant energy source and became number one by the 1960s—about a century later. However, the current energy transition will not be driven by price, as in the past, but by policy and technology. Today’s global energy mix consists of approximately 27% coal, 31% oil, 24% natural gas, and only 12% renewables.

Artificial Intelligence in Nuclear Fusion

There is already a colossal nuclear fusion reactor in existence: the sun. It appears every day, converting about 4.5 million tons of mass into energy every second—and it requires no maintenance. It is remarkable: it doesn't need refueling, scheduling, or maintenance costs, and yet it continually produces energy. If we fail to capture energy from this natural reactor—the sun—through new technological innovations, we will need to construct reactors on Earth that produce energy through nuclear fusion.

Artificial intelligence can play a pivotal role here by accelerating experimental simulations in both directions: helping us capture solar energy and store it in affordable battery systems (which themselves still need to be invented), and assisting in the development of Earth-based nuclear fusion reactors.

Artificial Intelligence as a Geopolitical Force in Energy

Artificial intelligence in the energy sector has the potential to transform geopolitics. Traditionally, geopolitical power stemmed from dominance over physical space—air, land, and sea—with outer space emerging as a fourth domain during the Cold War. Historically, geopolitical influence has been exerted through economic, political, and military means.

If AI can accelerate the production of energy through nuclear fusion, this would shift the power dynamics among nations. Nuclear fusion promises clean, cheap, and abundant energy. The emergence of faster, more capable AI models—especially through the development of "digital twins" (virtual replicas of physical systems)—will significantly contribute to this direction and revolutionize the energy sector.

It is no coincidence that governments are fiercely competing not only for the materials required to power AI but also for the human talent necessary to develop and operate it.

It remains uncertain whether artificial intelligence will continue to be a race dominated by the U.S. and China. For most countries, the cost of entry will be prohibitively high, widening the gap between the "haves" and the "have-nots" in terms of access to AI. European nations are striving to catch up. The United Kingdom and France, for instance, are investing in their domestic capabilities to avoid falling behind.

And we must not forget: citizens around the world desire cheap and abundant energy in order to create and enjoy the achievements of modern civilization.