Paper 02: The Energy Paradox of Artificial Intelligence: balancing production vs demand

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Abstract:

Generative Artificial Intelligence (AI) is rapidly transforming every industry. The energy sector, with its inherent complexity and data intensity, is particularly well-positioned to benefit from AI applications.

Yet, while the advantages of AI in improving production are significant, its adoption also brings a less discussed challenge: the increase in energy demand required to power AI models and the datacenters. For us electrical & digital engineers, this creates a paradox : AI simultaneously acts as both a driver of energy efficiency and a consumer of considerable energy resources.

The objective of this paper is to explore this AI Energy Paradox by assessing the balance between the gains and the costs it imposes on the energy system.

The paper will be structured in 4 sections:

1. Definition and Use Cases
2. Production Benefits
3. Energy Demand Impact
4. Net Assessment