# AI & Energy: Powering the Future Intelligently

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# AI Strategy Experts

- Specialized AI advisory firm helping organizations turn AI potential into business reality, fast
- Proven methodology for aligning AI initiatives with business goals
- Driving building impact in weeks, not years
- Working with organizations across Europe and the Middle East
- Human-centric and ethical approach to AI implementation

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# Historical Context: The New Industrial Revolution

- At the end of the 18th century, the steam engine transformed the world
- Few understood how it would forever change energy, work, and the environment
- Today, we stand at the threshold of a new revolution: Artificial Intelligence
- Unlike the industrial revolution, we have the chance to design this one with foresight

# Global Impact: The Data Center Explosion

- Global data center electricity use projected to double from ~460 TWh in 2022 to over 1,000 TWh by 2026
  - Equivalent to Japan's entire electricity consumption
- In Europe: data center energy demand projected to triple by 2030 (to 300-450 TWh)
- In the US: data centers could constitute 30+% of all new electricity demand through 2030

# The Scale Challenge: AI's Energy Appetite

- **2022-3:** State-of-the-art AI clusters used ~10 MW
- **2024-5:** Top clusters (xAI ) now require 150-250 MW
  - equivalent to powering Thessaloniki
- **2026+:** AI factories:
  - OpenAI's Stargate project is projected to require 2+GW

    Equivalent to powering Slovenia

# Behind the Numbers: Why So Much Energy?

- Training GPT-4 required 15-20 MW of power
  - equivalent to a city like Chania
- A single H100 GPU draws 700W of power - millions deployed worldwide
- Google:  AI will require more than 500 kW per IT rack before 2030
- ChatGPT has 400M weekly active users
- Not just electricity: A 10 MW data center uses ~250,000 $m^3$ of water annually
  - equivalent to serving 14,000 people

# The Energy Innovation Opportunity

- AI is not just an energy consumer but a catalyst for energy transformation
- Major tech companies are driving renewable energy growth:
  - Amazon & Microsoft each procuring >20 GW of renewables
- Microsoft restarting Three Mile Island nuclear plant for AI
- Heat reuse innovation: Microsoft heating 40% of Helsinki with data center waste heat
- Long-term PPAs (Power Purchase Agreements) are financing clean energy deployment

# Nefos Consulting's AI in Energy Matrix

| | Lower Complexity | Higher Complexity |
|---|---|---|
| Higher Business Impact | • Predictive maintenance for critical assets<br>• Customer usage analytics and segmentation<br>• ESG analytics and carbon footprint reporting | • Intelligent grid management<br>• Virtual power plants and DER orchestration<br>• Integrated renewable forecasting and optimization |
| Lower Business Impact | • Energy consumption monitoring and reporting<br>• Operational reporting automation<br>• Knowledge management for technical expertise | • Grid-scale dynamic reconfiguration<br>• AI-driven microgrid controllers<br>• Climate resilience modeling for energy infrastructure |

*Our proprietary framework helps organizations prioritize AI investments for maximum business impact while managing energy considerations*

# AI in Energy Business Impact

- **Ørsted:** AI system increased wind farm output by 5% and reduced unplanned downtime by 20%
- **National Grid:** AI improved load forecasting accuracy by 15%, saving $300M annually
- **E.ON:** Research showed AI-driven predictive maintenance could reduce grid downtime by up to 30%
- **Avista Utilities:** Cut high-bill site visits by 27% using AI energy disaggregation
- **Microsoft:** AI reduced data center cooling energy by 40%, cutting facility power by ~15%

*Nefos Consulting business value design thinking helps identify AI use cases that are tailored to each client's specific challenges and goals*

# Use Case: Predictive Maintenance for Energy Assets

**Business Challenge:**

- Unplanned outages cost utilities €150,000+ per hour
- Traditional maintenance: either too late (reactive) or too early (calendar-based)

**AI Solution:**

- AI monitors equipment via sensors, detects anomalies before failures occur
- Digital twins simulate asset behavior under various conditions

**Real Results:**

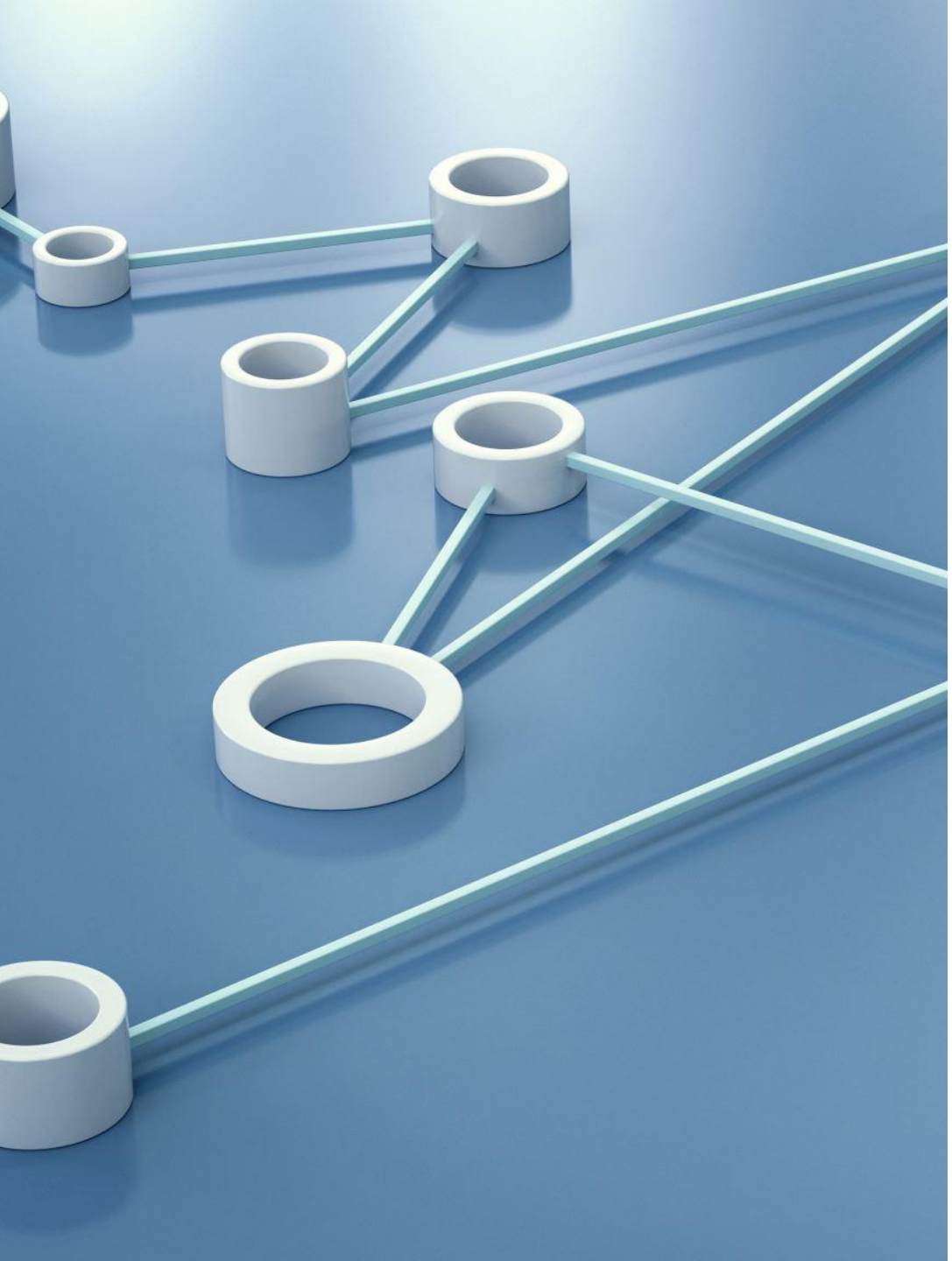
- E.ON: 25% fewer failures, 89% prediction accuracy
- 15-20% maintenance cost reduction
- 3-5x ROI within 18 months

**Implementation Keys:**

- Start with high-value assets with existing sensor data
- Blend AI recommendations with human expertise

# Greece's AI Factory ambition meets Energy Reality: The Time is Now

- ~14 additional data centers being planned in GR
- Substantial renewable energy capacity makes Greece attractive for sustainable AI
- Challenges in energy prices, grid, storage
- The Big Question Mark is the demand for cloud & AI services



# Greece's AI in Energy Opportunity: The Time is Now

- The rise of **AI-first Enterprise**
- Strategic opportunity: become a regional leader in **AI-powered energy innovation**
- Organizations that act now will
  - **Lead** their sector
  - Leapfrogging their **productivity**
  - **Reimagining** what is now possible with AI
- **Nefos Consulting** is uniquely positioned to help Greek energy organizations navigate this opportunity aligned to their missions

Nefos Consulting

# Thank you

Contact us to:

- Schedule your AI Capability Maturity Assessment
- Request our AI in Energy whitepaper

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