Data Centers & Gas – Preparing your Utility Infrastructure for Tomorrow's Power Demands

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Fuelling the Future

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Agenda

1. Overview of Data Center Energy Demand
2. The Critical Role of Natural Gas
3. How to Prepare your Utility

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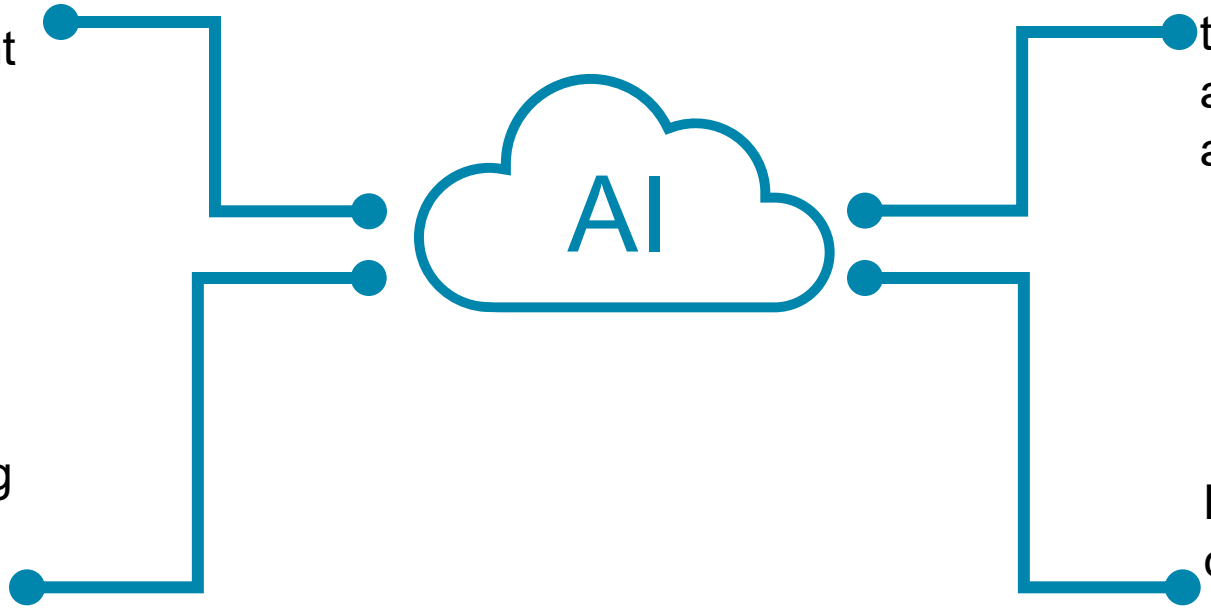
What is AI?

Ability of a computer system to perform tasks that typically require human intelligence

Robotics: machines that can assist people without actual human involvement



Natural Language Processing: the ability to understand speech as well as understand and analyze documents

Machine Learning: using sample data to train computer programs to recognize patterns based on algorithms

Neural networks: computer systems designed to imitate the neurons in a brain

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AI is Driving Energy Demand

Gas-fired power generation offers reliable and scalable energy solutions for growing demands.

AI Access is Growing: Advancements in AI and digitalization rapidly increase energy needs of data centers worldwide, US per-capita energy requirement is currently 540 kWh.

99.99% Up-time Required: Continuous, high-density power is critical to support AI training and inference workloads.

3% of Global Energy Demand: Data center energy consumption may triple by 2030, increasing pressure on energy systems.

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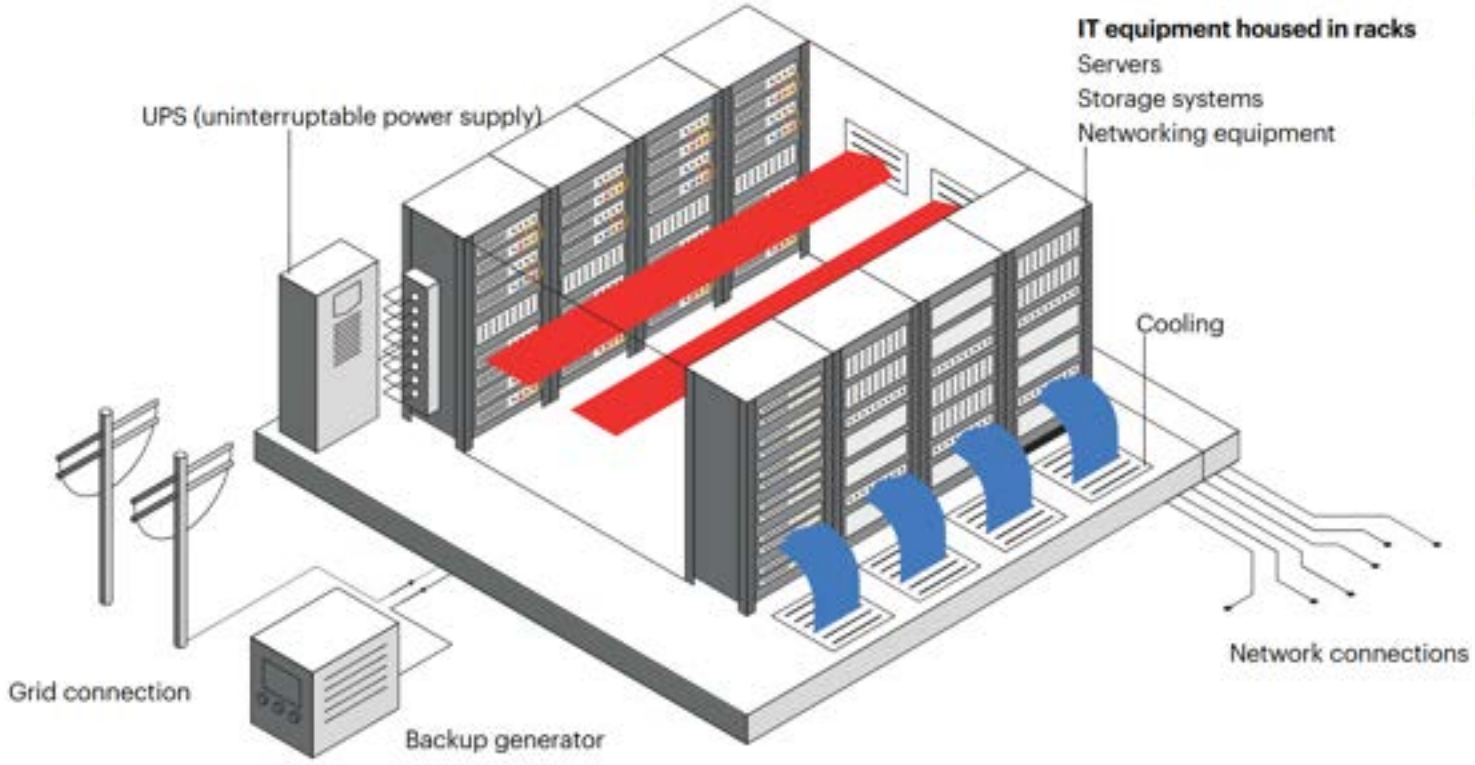
AI and Data Centers – Critical Link

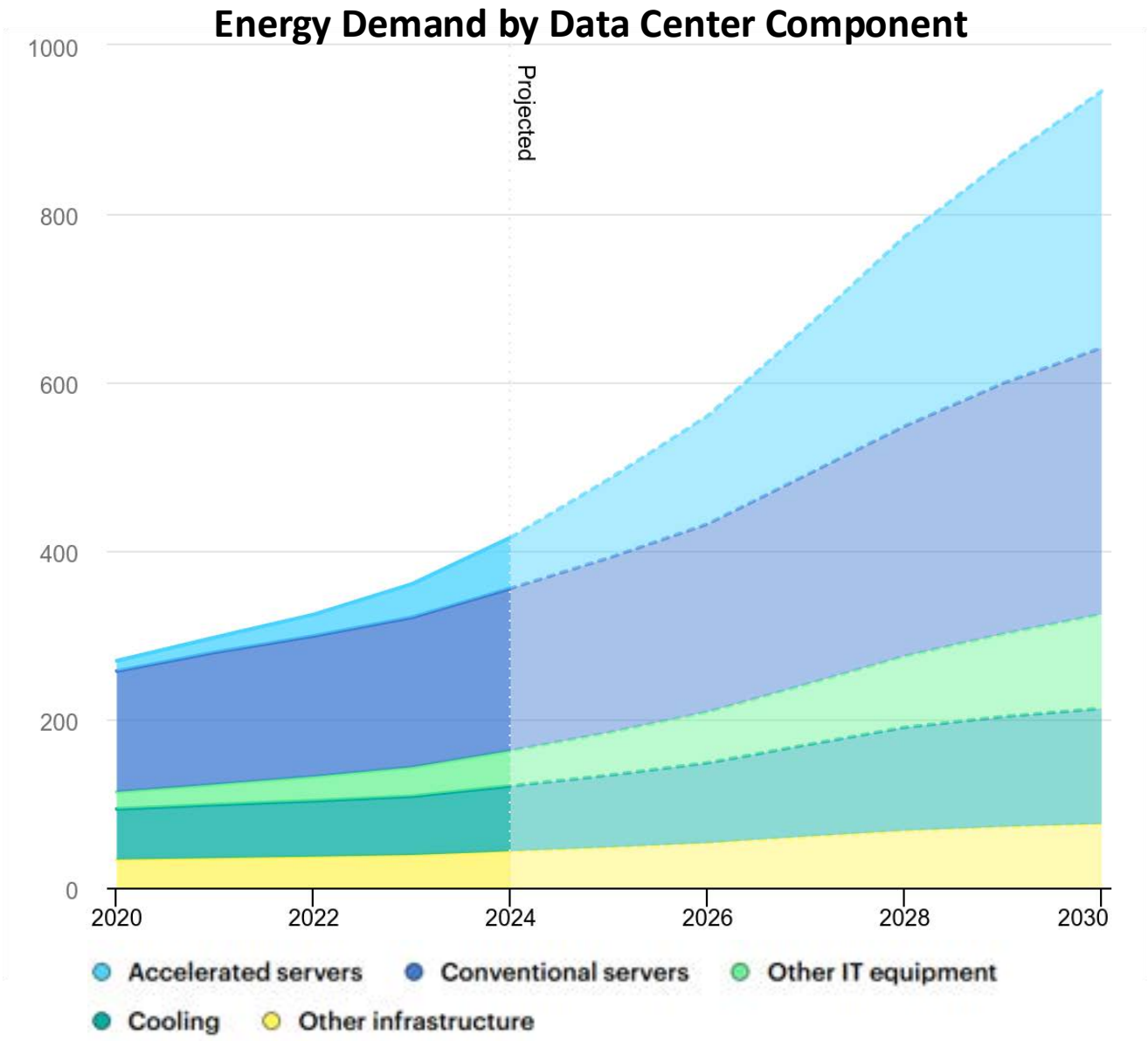
AI requires data centers for storage and power to complete processing



The growth of AI is linked to the expansion of data centers and internet service provider bandwidth

Energy demand from AI – Energy and AI – Analysis - IEA

Energy Demands of a Data Center



- There are opportunities for future efficiency gains
- Huge funding in technology innovation to reduce energy costs of AI
- Climate and local price of energy drastically change the cost of a data center

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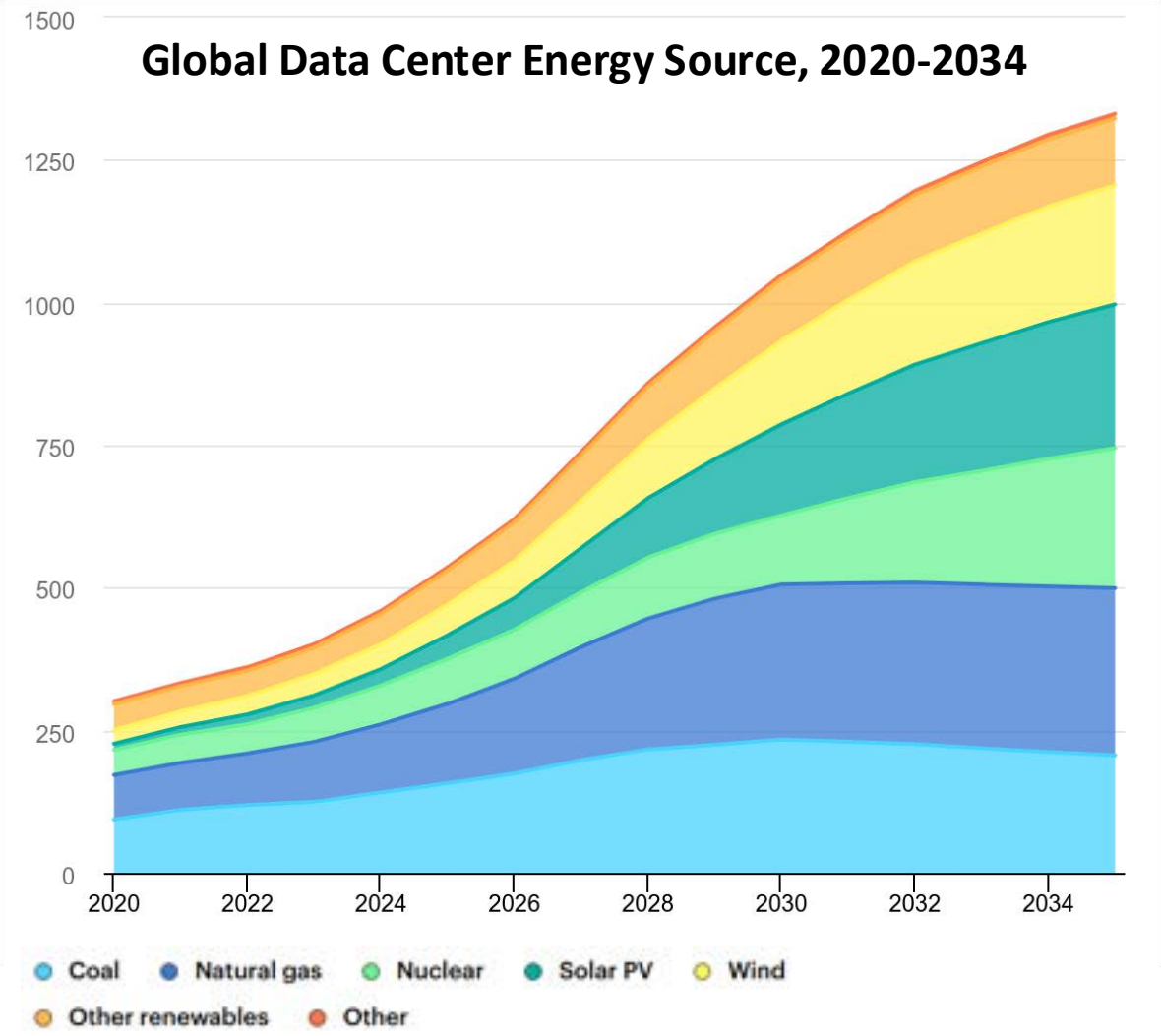
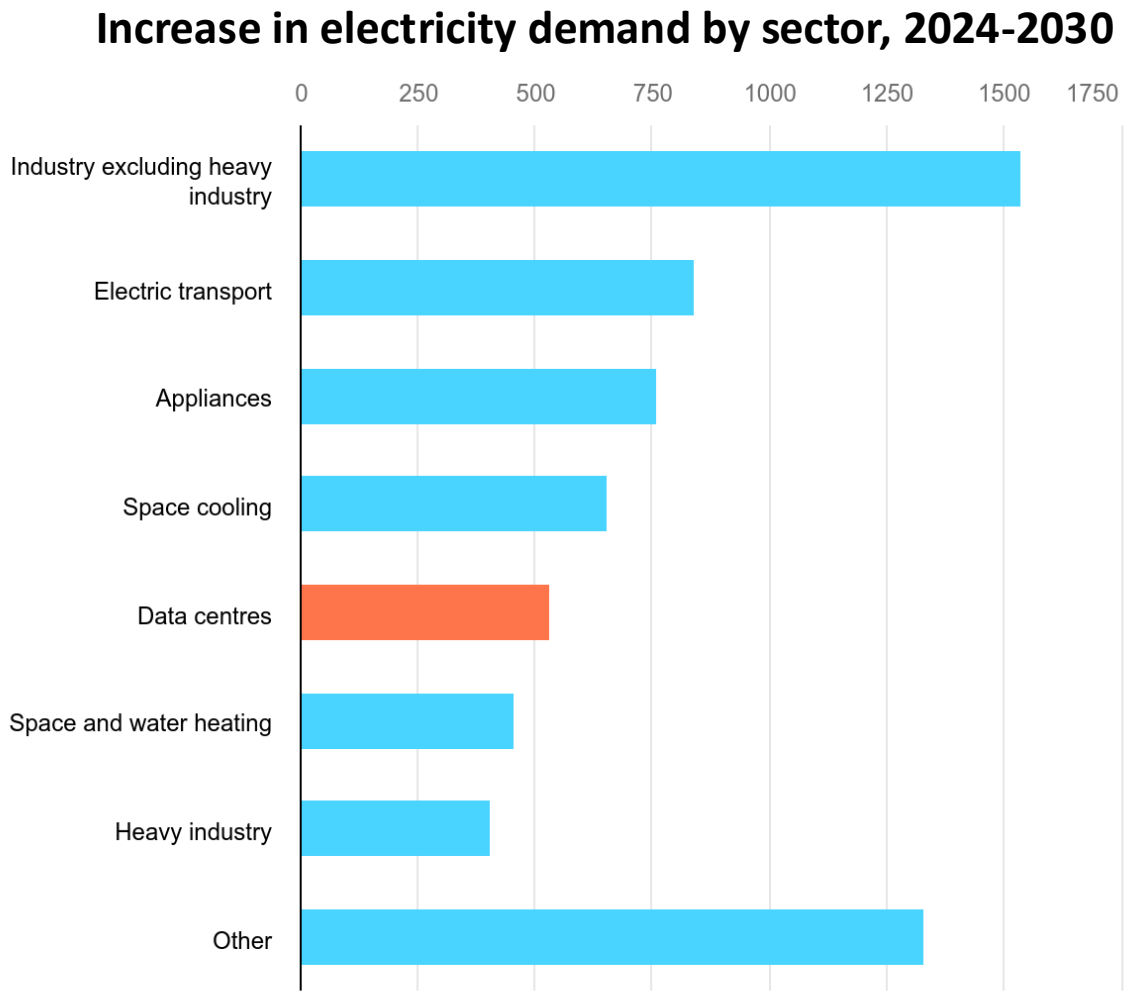
AI Driving Energy Demands: A Quantitative View

AI is expected to be the 5th largest source of electricity growth





Increase in electricity demand by sector, Base Case, 2024-2030 – Charts – Data & Statistics - IEA

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The Critical Role of Natural Gas

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The Role of Natural Gas

Reliable Energy Supply: Natural gas provides consistent and dependable power for AI data centers without interruption.

Rapid Deployment: Natural gas infrastructure can be quickly deployed to meet urgent energy demands effectively.

Dual Energy Role: Supports both grid supply and on-site generation for enhanced energy resilience and flexibility.

Existing Infrastructure and Regulation: There is existing infrastructure near potential data center hot spots that can be leveraged for energy supply.

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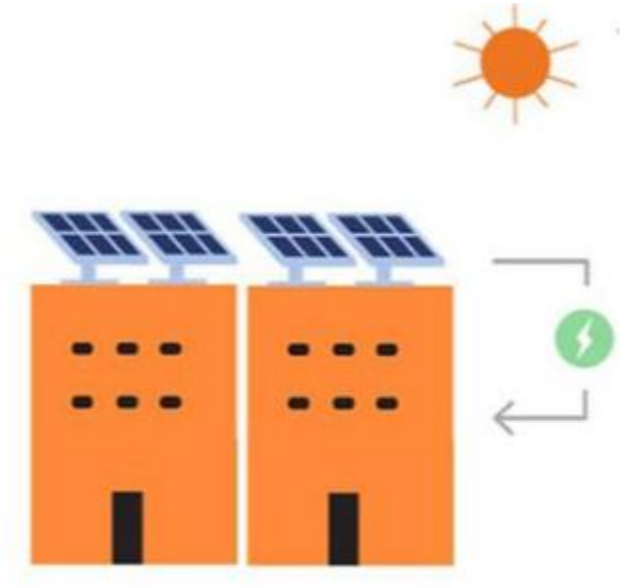
Behind the Meters vs Front of the Meter Energy Supply

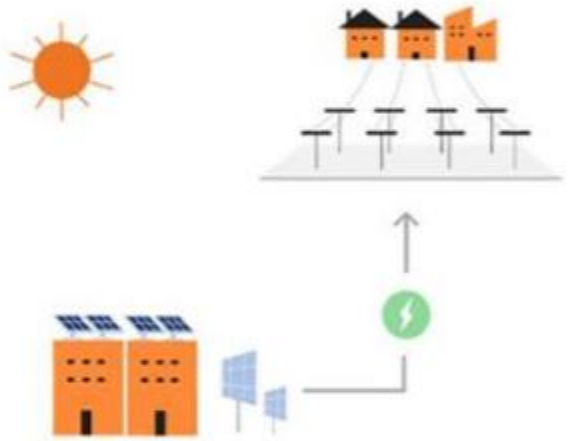
Behind the Meter: on-site power generation consumed directly by the data center



Pros: reliability, deployment speed, cost control / price stability through long term contracts, customizable

Cons: high upfront cost, operational complexity, regulatory hurdles

Front of the Meter: Power sourced from the public grid



Pros: lower initial investment, utility managed reliability, scalability / flexibility, reduced operations

Cons: interconnection delays, potential for grid outages, price fluctuations, demand changes

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How to Prepare your Utility

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Preparing Your Utility for AI

- Infrastructure Expansion
- Strategic Planning
- Advanced Monitoring
- Regulatory Coordination
- Updating Load Forecasting / Scenario Planning
- Collaborative Infrastructure Planning

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Infrastructure Expansion

Infrastructure Expansion

- Increase supply of natural gas and harden assets
- Co-location with data-center (especially for behind the meter)
- Data centers require 99.98% uptime

Entergy (Louisiana) to build 3 gas fired power plants for Meta's data center, investing $3.2B.

Expand pipelines and upgrade interconnection points to meet rising AI energy needs.

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Strategic Planning and Collaborative Infrastructure Planning

Strategic Planning

Collaborative Infrastructure Planning

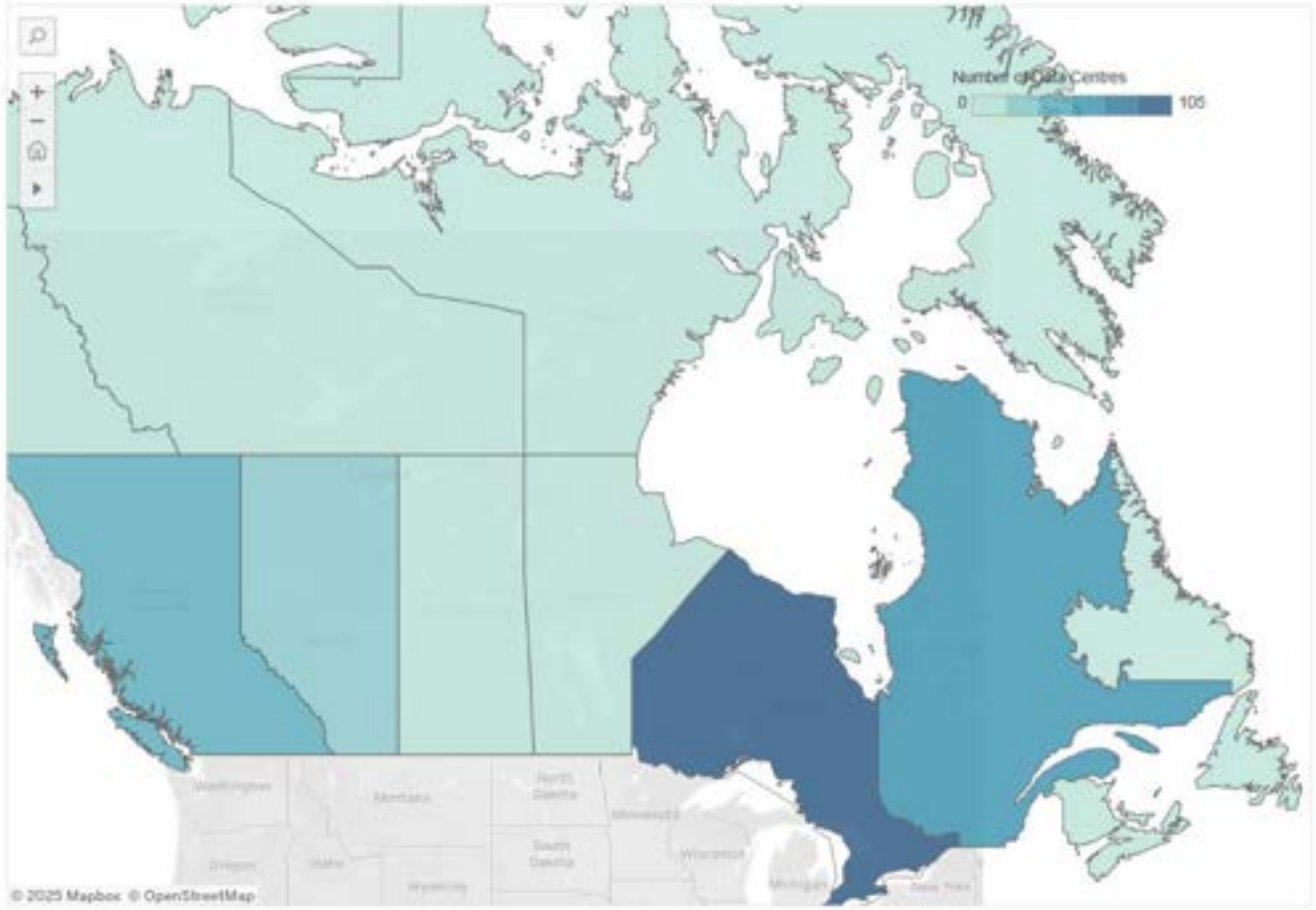
Currently ~240 data centers in Canada, largely located near Toronto

Step 1: Conduct feasibility studies to target high-growth data center regions for infrastructure investment.

Step 2: Working with data center developers to align infrastructure planning for timely energy delivery.

Step 3: Develop cost sharing model and contract to lock in data center and fund the project.

Figure 2: Data centers by province



CER – Market Snapshot: Energy demand from data centers is steadily increasing, and AI development is a significant factor

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Advanced Monitoring

Use digital twins and smart monitoring systems for predictive maintenance and network visibility

Predictive maintenance and asset health

Real time monitoring and optimization

Demand forecasting and load management

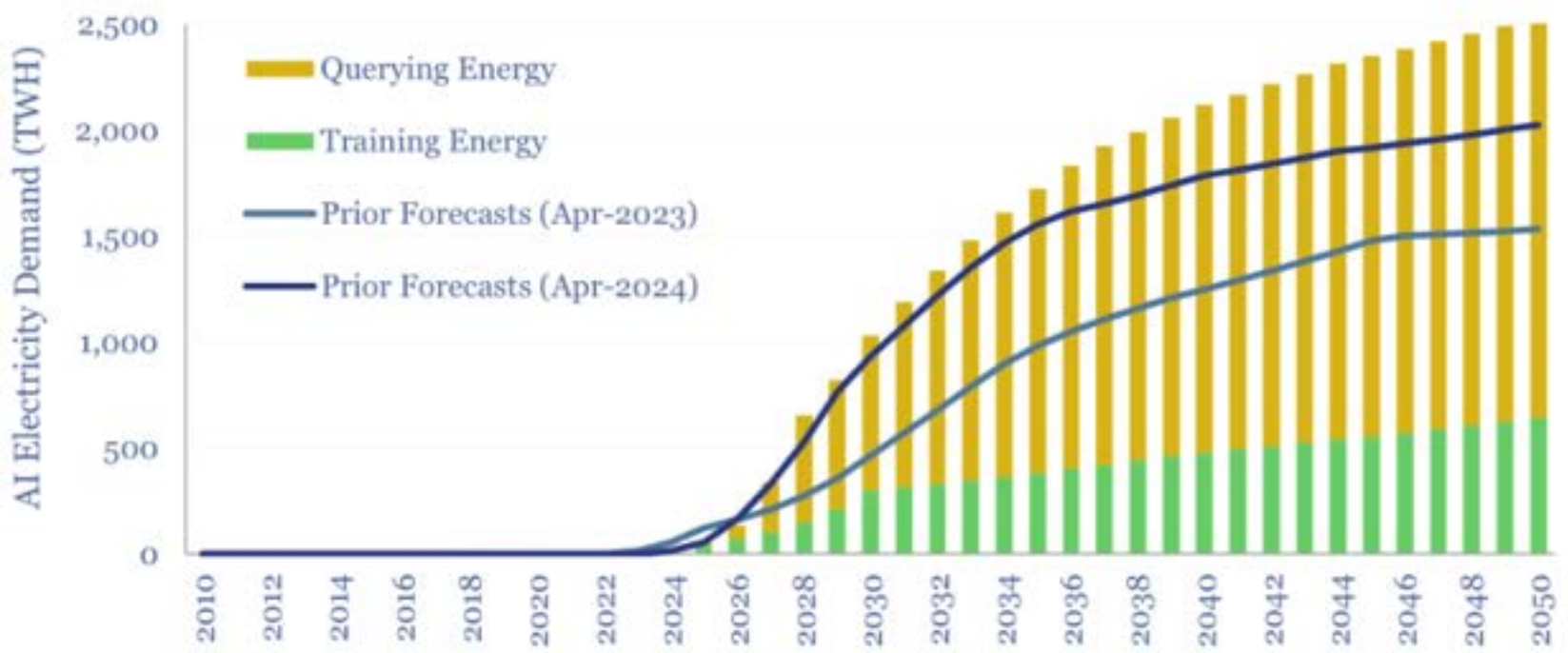
Regulatory compliance and reporting

Customer and stakeholder engagement

Duke Energy, is using AI to enhance methane leak detection and emissions management.

Updating Load Forecasting and Scenario Planning

Include data center energy demand growth in scenario planning and forecasting



- Understand that the predictions for energy growth and AI are not perfect
- Create multiple scenarios involving high density energy usage
- Plan around existing infrastructure where possible

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Regulatory Coordination

No current common model for AI governance exists within Canada

1

Review Current Legislation:

Privacy Act (Australia), General Data Protection Regulation (EU)

2

Create New Legislation:

Denmark's digital ready legislation program

3

Legislation Hurdles for Energy:

Permitting pipelines, cost approval for added infrastructure

Work with local organizations to secure permits and comply with regulations for new projects

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Alberta Case Study

Abundant Natural Gas Supply: 60% of Canada's natural gas

Climate and Land Availability: Lower temperatures reduce cooling cost

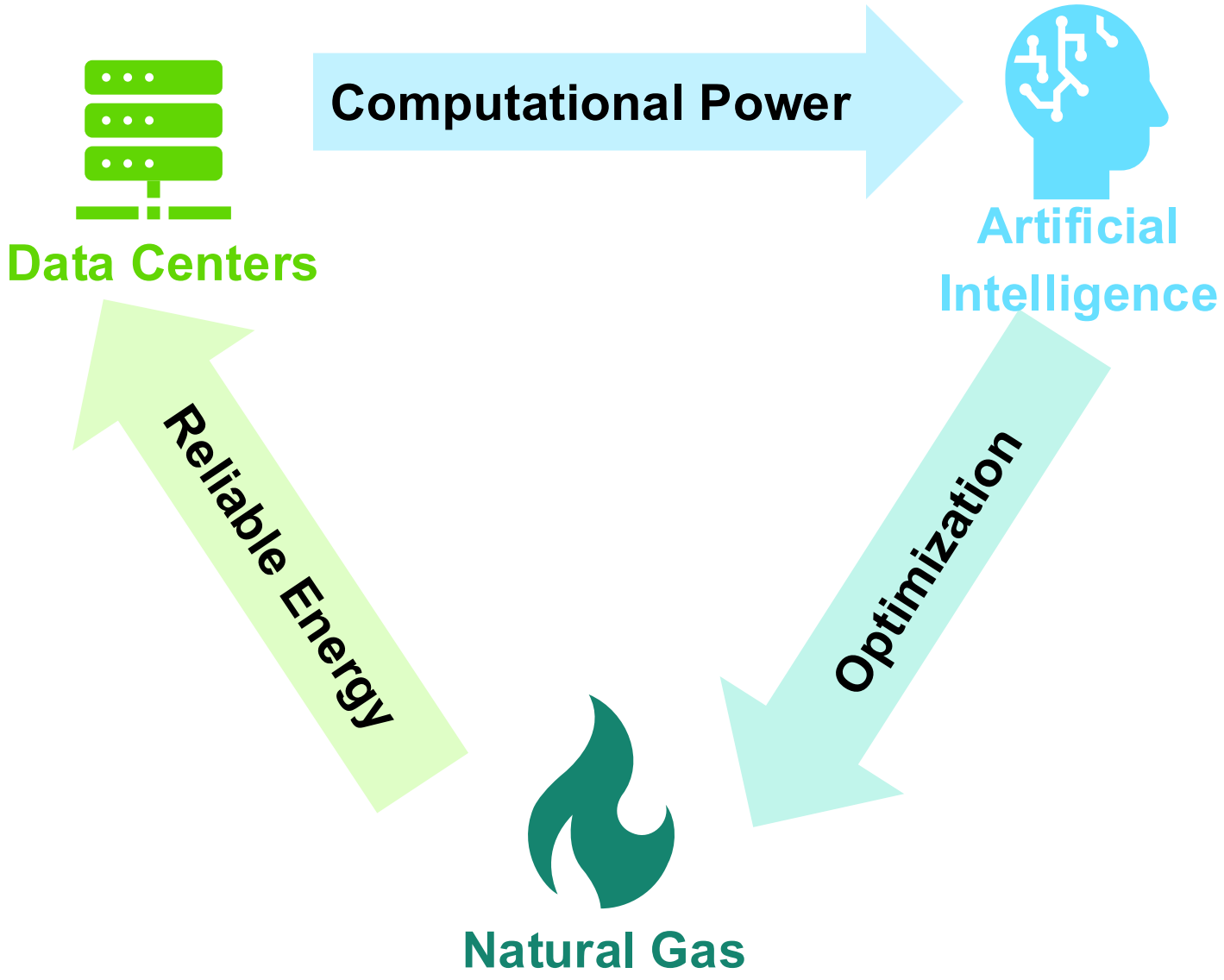
Government Support: $100B AI Data Center Strategy

Deregulated Electricity Market: developers can negotiate direct power purchase agreements

Wonder Valley AI Data Centre Park
Radiant Ridge Energy (Calgary)
Pembina & Kineticor JV (Edmonton)
Pine Cliff Energy Deal (Drumheller)

Conclusion and Takeaway

- There is a symbiotic relationship between all parts of the supply chain
- AI adoption is growing which will drive data center growth
- Leverage existing infrastructure and plan to grow



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