OLIVA GIBBS

The AI Boom:

Opportunities and Outlook for the Oil & Gas Industry

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Topics for Discussion

I. The History of Artificial Intelligence

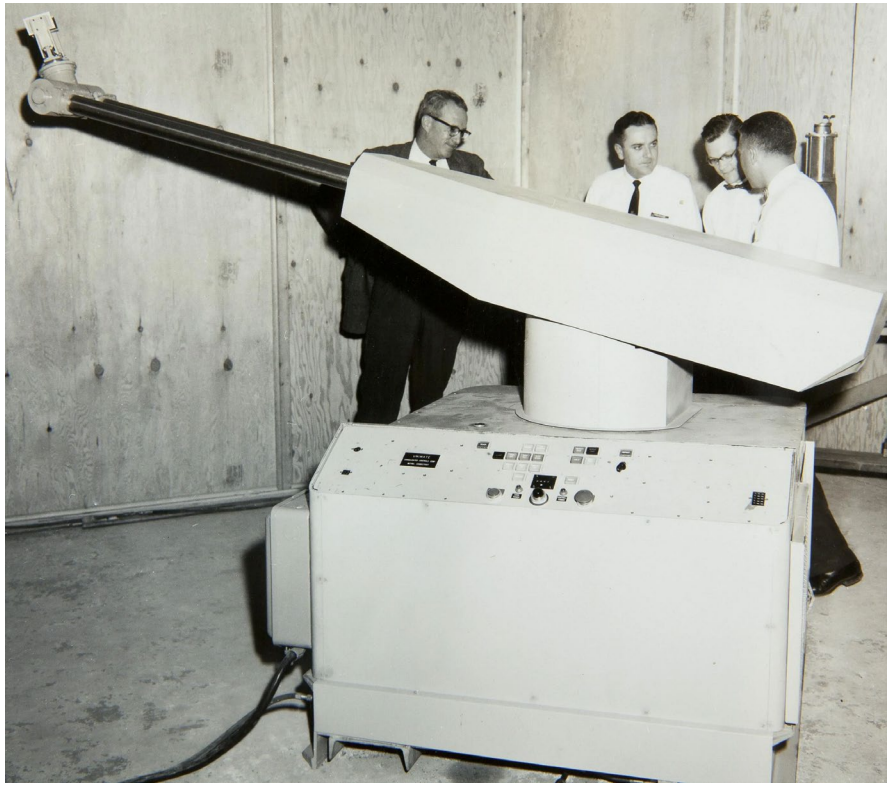
II. Natural Gas and AI Data Centers

III. Carbon Capture and Sequestration (CCS) for Natural Gas-Powered AI Data Centers

IV. Opportunities for Oil and Gas Professionals

The History of Artificial Intelligence

The History of Artificial Intelligence



- **1950**
  - Alan Turing published “Computing Machinery and Intelligence”
- **1956**
  - John McCarthy coined the term “artificial intelligence” at a summer workshop
- **Early 1960s**
  - First industrial robot, Unimate, was built

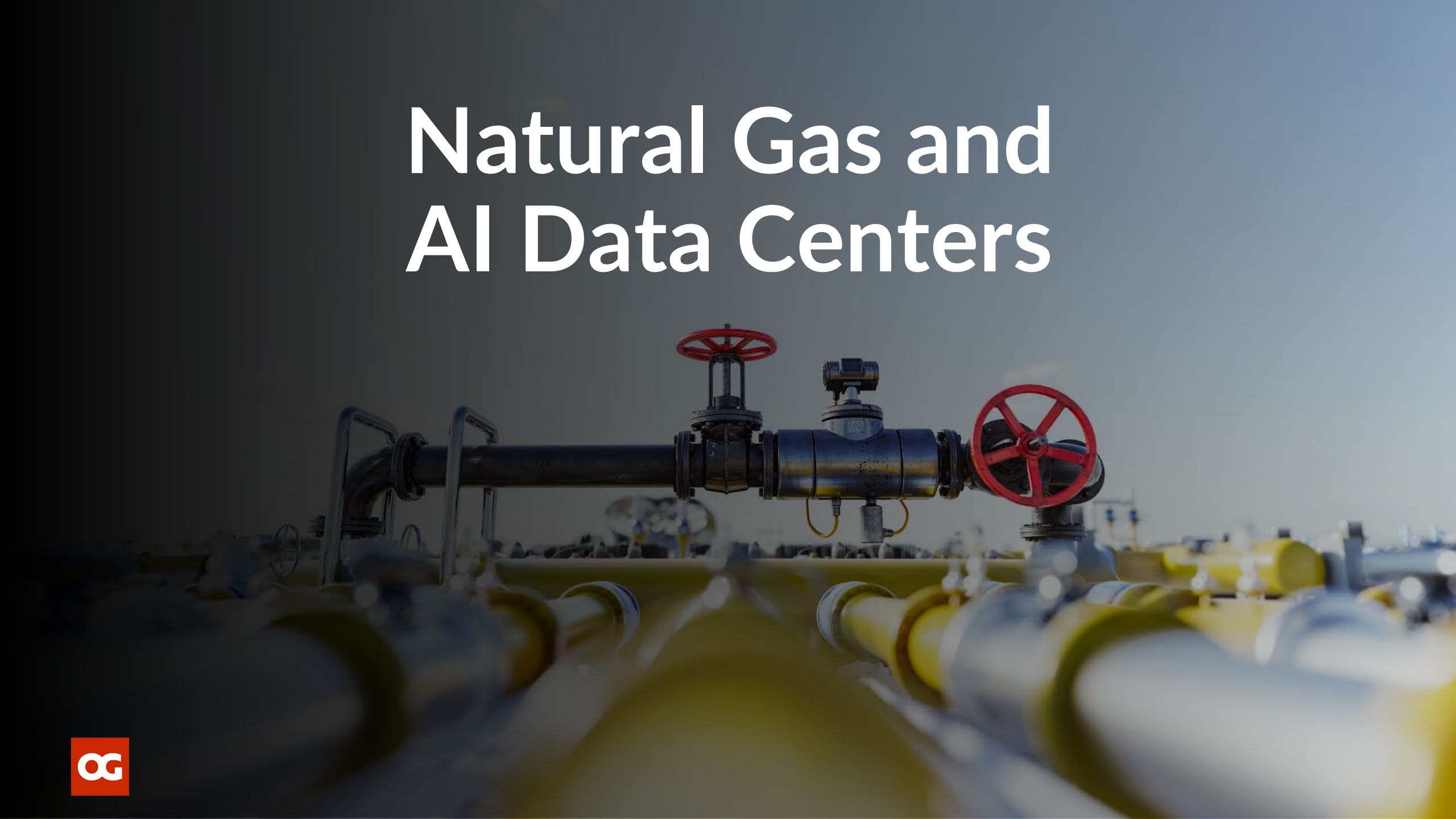
The History of Artificial Intelligence

- **Mid 1960s**
  - ELIZA is an early natural language processing program designed to mimic human conversation
- **1980s**
  - Jabberwacky is a program designed to learn from human input and simulate conversation
- **Today**
  - AI is more advanced than ever
  - Model training involves adjusting billions of parameters through repeated computations that require immense processing power

What is an AI data center?

- A facility that houses specific IT infrastructure needed to train, deploy, and deliver AI apps and services
- Requires advanced network storage, energy, and cooling capabilities to handle AI workloads

Natural Gas and AI Data Centers



Natural Gas and AI Data Centers

- **Natural Gas**
  - One of the most reliable sources of energy
  - Infrastructure to produce and transport natural gas to power AI data centers is already in place
  - Natural gas must be converted into electricity by turbines, which are in short supply and difficult to acquire

How Natural Gas Becomes Electricity

- Natural gas is drilled, collected, and transported by pipelines to a treatment plant that removes water/waste, then sent to a power plant
- Natural gas is then converted to electricity in one of three ways:
    - **Boiler**
        - Water is boiled creating steam that spins a turbine and generates electricity
    - **Combustion Turbine**
        - Pressurized gas turns the blades of a turbine connected to a generator
        - Magnets spin inside the generator and create an electric current
    - **Both**
        - The energy created by one turbine generates more energy in another turbine
        - After one engine completes a conversion cycle, heat exhaust is transferred to a heat exchanger
        - A second engine extracts energy from the heat to begin its own conversion cycle
- Electricity is then sent through power lines to be used for residential, commercial, industrial, or transportation

Natural Gas Pipelines and AI Data Centers

- Three types of natural gas pipelines:
  - **Gathering pipelines**
    - Transport the natural gas collected from wellheads to a central collection point like storage facilities, processing plants, or transmission pipelines
  - **Transmission pipelines**
    - Move high volumes of natural gas from the production and processing plants, storage facilities, and distribution centers
  - **Distribution pipelines**
    - Deliver natural gas to homes, businesses, and facilities

Natural Gas Pipelines and AI Data Centers

- **AI Data Center Projects**
  - Some of the largest projects are in areas with the densest transmission pipelines
  - The high concentration of pipelines in these regions give natural gas a competitive edge for becoming the main source of power for these projects
    - **Texas**
      - Over 58,500 miles of pipelines
      - Project Stargate is a $500 billion joint venture investment between Oracle, Softbank, and Open AI, building AI data centers that are each half a million square feet.
    - **Louisiana**
      - Over 18,900 miles of pipelines
      - With a $10 billion investment, Meta Platforms is constructing a 2GW+ AI data center close to the size of Manhattan
    - **Oklahoma**
      - Over 18,500 miles of pipelines
      - Core Scientific and AI hyperscaler CoreWeave are building a 100MW facility
      - Google has invested over $4.8 billion in its Mayes County, Oklahoma data center campus

Government Incentives for Natural Gas

- **One Big Beautiful Bill Act**
  - Signed into law on July 4, 2025 by President Donald Trump
  - Lifts restrictions on the Inflation Reduction Act on tax deductions for intangible drilling costs
    - Often between 60% and 80% of total costs

Turbine Supply and Demand from AI Data Centers

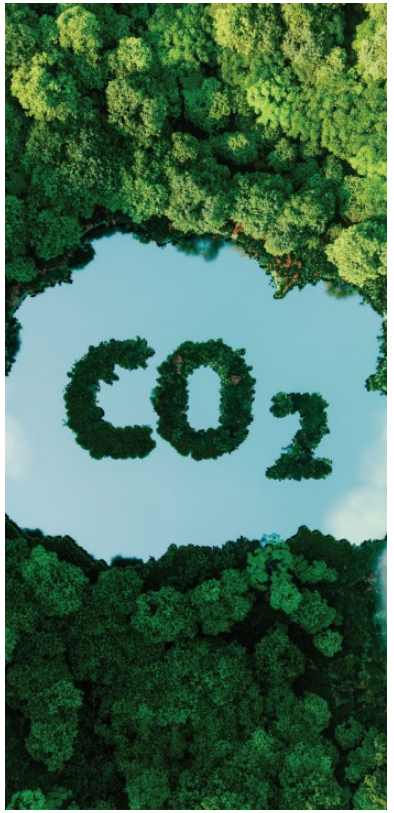
- **Supply Chain Problems**
  - US utilities are projecting rapid growth driven by AI, electrification, and industrial expansion nearly the equivalent of adding a new California, Texas, and New York to the bulk power system
  - Mitsubishi Power, GE Vernova, and Siemens Energy are the major turbine suppliers
    - Mitsubishi turbines ordered today will not be delivered until 2028-2030
    - Siemens has a record backlog of €131 billion (US$148 billion).
    - GE Vernova new turbines will not be available until late 2028 at the earliest
  - If turbine supply doesn't increase, utility production cannot keep up with consumption
  - Costs of turbines have increased, costing the rate payer more money

- **Near Term Solutions**
  - Energy efficient solutions, virtual power plants, grid-enhancing technologies, clean pre-powering, and hybrid "power couples" sited at existing fossil generator points of interconnection

CCS for Natural Gas-Powered AI Data Centers

Carbon Capture and Sequestration

- **CCS Technology**
  - Can capture up to 90-95% of CO_2 emissions from natural gas power plants
  - The US electrical grid emits 340-420 kg CO_2e/MWh on average; but when paired with CCS technology, a gas-powered plant emits only 80-120 CO_2e/MWh on average
  - While alternative energy forms emit less CO_2 , gas powered plants are more dependable, cost effective, and flexible
    - CCS costs $70-100/MWh while nuclear costs $77/MWh and solar costs $87/MWh
    - Without CCS, gas powered plants cost $37/MWh
    - CCS is necessary for large-scale gas-powered plants to be environmentally sustainable
    - Even with the higher cost, CCS is still fiscally competitive with alternative forms of energy
    - Scale and regulatory incentives can further reduce gas powered CCS plant costs



Regulatory Incentives for CCS

Section 45Q Federal Tax Credits

CO_2 End-Use	Credit Values Under the 2018 FUTURE Act	Credit Values Under the Inflation Reduction Act	Credit Values Under the One Big Beautiful Bill Act
For dedicated secure geologic storage of CO_2 in **saline or other, geologic formations**	**$50/metric ton** for CO_2 captured from industry, power, and direct air capture	**$85/metric ton** for CO_2 captured from industry & power; **$180/metric ton** for direct air capture	**$85/metric ton** for CO_2 captured from industry & power; **$180/metric ton** for direct air capture
For **carbon reuse projects** to convert carbon into useful products (e.g., fuels, chemicals, products)	**$35/metric ton** for CO_2 captured from industry, power, and direct air capture	**$60/metric ton** for CO_2 captured from industry & power; **$130/metric ton** for direct air capture	**$85/metric ton** for CO_2 captured from industry & power; **$180/metric ton** for direct air capture
For secure geologic storage of CO_2 in **oil and gas fields**	**$35/metric ton** for CO_2 captured from industry, power, and direct air capture	**$60/metric ton** for CO_2 captured from industry & power; **$130/metric ton** for direct air capture	**$85/metric ton** for CO_2 captured from industry & power; **$180/metric ton** for direct air capture

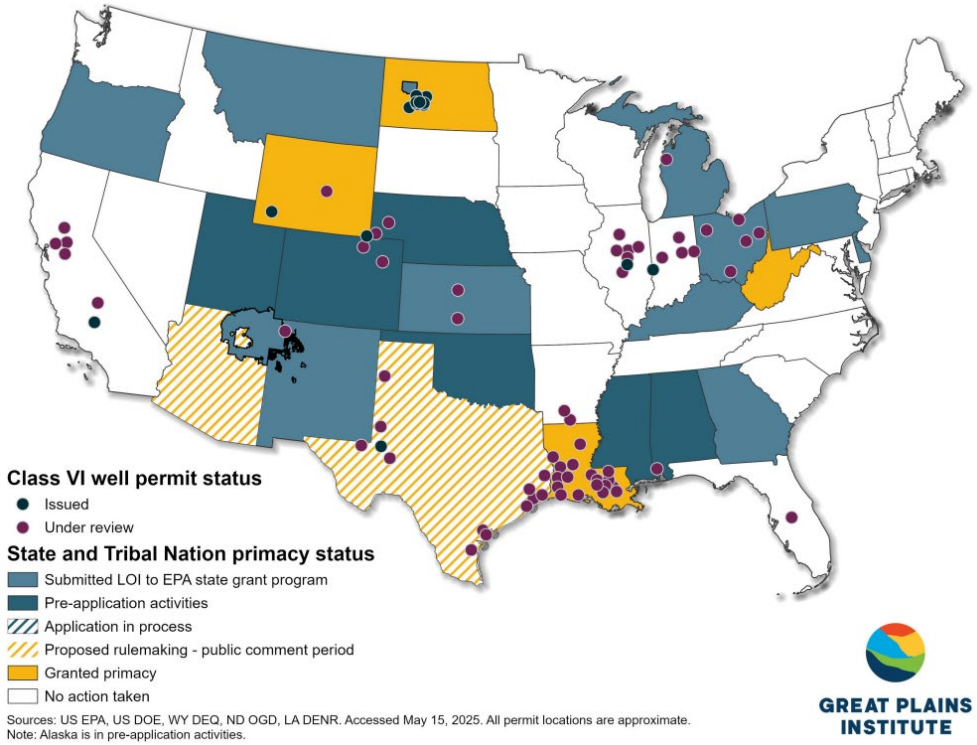
State Primacy

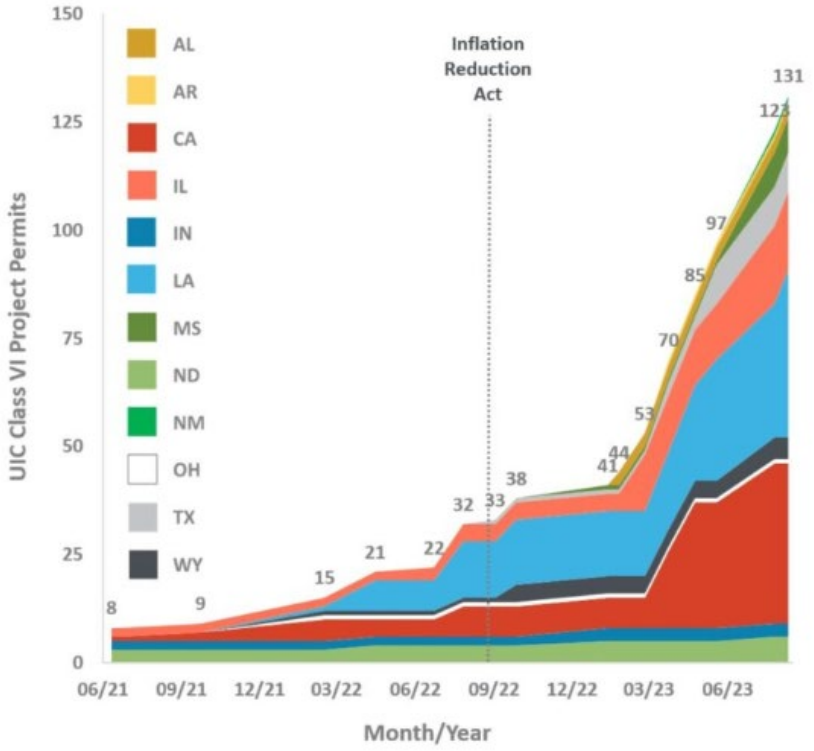
- **Class VI Wells**
  - Carbon must be stored in Class VI wells, which is the most EPA regulated class of disposal wells
  - The EPA must grant a state primacy over Class VI wells to allow them the authority to regulate and permit these wells under the EPA's requirements
  - Class VI well permits are the most stringent regulatory hurdle for CCS
  - So far, only Louisiana, North Dakota, West Virginia, and Wyoming have been granted primacy

State Primacy

- **EPA CCS initiative**
  - Federal government has expedited the primacy application process
  - The EPA approved Texas' application for primacy in July 2025
    - The Texas Railroad Commission will be able to regular and permit Class VI wells as soon as December 2025
    - Captured carbon can be sequestered in Texas, rather than having to be transported long distances to a state with primacy
    - The decrease in transportation costs has resulted in Exxon, Oxy, and other supermajors announcing construction projects for natural gas-powered plants in Texas
    - Proximity to natural gas and the ability to sequester carbon provides a huge advantage for siting natural gas power plants

Applications for Primacy and Class VI Well Permits





Impact on AI Data Centers

- OBBBA reforms to Section 45Q tax credits establish uniform and substantially more valuable incentives for carbon capture
  - Gas powered plants are now an attractive option to provide electricity to AI data centers
- Integrating CCS into data center infrastructure allows operators and investors to maximize available federal carbon capture incentives while managing long term expenditures and policy uncertainties
- Pairing natural gas power with advanced CCS technology provides near-term solutions for emission reduction, operational reliability, and flexible output capacity
- Tax credits and regulatory incentives tilt the financial equation towards aggressive adoption of natural gas-powered electricity that is environmentally sustainable through CCS

Opportunities for Oil & Gas Professionals

Leveraging Skillsets

- **Landmen**
  - Traditionally, landmen have been crucial in the success of oil and gas operations
  - AI will play a significant role in site selection and data analysis
  - Landmen can become subject matter experts on platforms like Land App

Leveraging Skillsets

- **Attorneys**
  - Operating AI data centers present complex legal challenges
  - Operators will need guidance on energy procurement negotiations, environmental compliance, data security, and intellectual property protection

Leveraging Skillsets

- **Oil and Gas Professionals**
  - AI proliferation poses a unique opportunity for the industry due to the immense energy required to power AI data centers
  - Uniquely positioned to leverage their ability to negotiate agreements concerning the land these data centers will be built and the natural gas operations that will power them
  - In the ever-changing AI realm, oil and gas professionals will be called on to provide guidance and expertise on a plethora of matters

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