



AMERICAN
EXPLORATION
& PRODUCTION
COUNCIL

Energy 101 – Energy Fundamentals for Policy Outreach & Engagement
IOGCC Annual Conference

September 23, 2005

Good morning, and thank you for the opportunity to be here today

Who We Are



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- National trade association representing leading, independent oil and natural gas exploration and production companies in the U.S.
- We work to educate and collaborate with policymakers to create sound policies that enable safe and responsible development of America's extensive oil and natural gas resources



Wendy Kirchoff
Senior Vice President of Policy



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I am WK, the Senior Vice President of Policy at AXPC, the American Exploration Production Council.

AXPC is a national trade association representing about 30 of the leading independent oil and natural gas exploration and production companies in the US across every U.S. basin

At AXPC we focus on educating and collaborating with policymakers to support federal policies that enable the safe, responsible development of American energy resources

AXPC Members

Leading Independent Upstream US Producers



As many of you know, independents produce the majority of US oil and natural gas in this country, especially onshore.

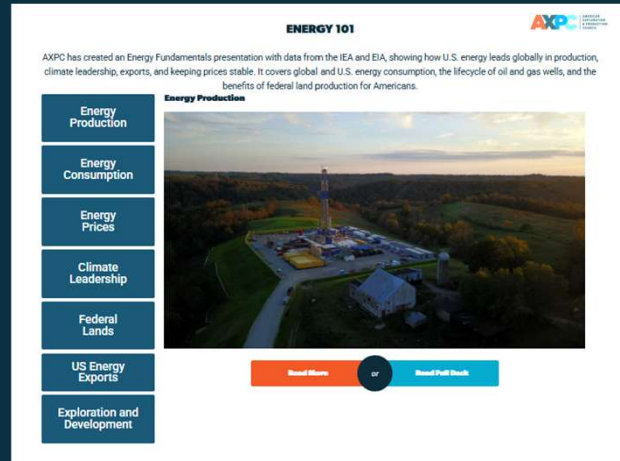
Our thirty-ish members alone represent just under half of onshore production, so a pretty big piece of the pie – in terms the upstream operators who are powering strategic energy security and driving U.S. energy leadership globally.

AXPC Strategic Initiative:

Energy Education

- Increase the energy fluency of policymakers
- Provide informative resources to help educate policymakers and stakeholders on the fundamental context and value of American energy

Energy Fundamentals



axpc.org/education

I am here today to talk to you our Energy Education initiative for policy outreach and engagement.

As many of you know, energy policy is both complicated and constantly evolving.

In Washington, that complexity is magnified—not only because the issues are technical and interconnected, but also because the people working on them change so quickly.

Congressional offices and agencies see staff come and go every year, and with election, each transition, that institutional knowledge walks out the door.

We often find ourselves having to re-start the conversation from square one

Fielding the same fundamental questions—about where our energy comes from, how it's used, and what are the tradeoffs created by different policy choices.

Critical baselines and context needed for understanding and evaluating sound energy policies.

That reality is what led to this initiative and the creation of our **Energy Fundamentals** materials.

These slide decks aren't meant to advocate for a particular policy—they're fact-based, visual resources designed to give policymakers a clearer understanding of energy in context, especially US oil and natural gas...

Our goal was simple:

- First, to **make the complicated accessible**—so that whether someone is brand new to energy policy or experienced, the tools are relevant, easy to understand, and readily available
- And second to **offer a tool you can use**. These slide decks are meant to be shared, reused, and built upon
 - ~ 60 diff slides visually illustrating fundamental data and analysis
 - Sited and sourced from independent publicly available resources
 - Updated annually

At the end of the day, our value in producing these materials is to make sure conversations with policymakers begin from a solid foundation of facts and energy in context.

We've had a very positive response from policy makers in DC on this effort, not only as we've been incorporating these resources in our efforts representing upstream independents, ...but policymakers themselves and their staff are able to use them for their briefings, outreach and stakeholder engagement efforts.

Energy Production



I am going to run through a subset of the latest update for 2025. As well as touch some additional resources that we've built on in response to the feedback we've received from folks on the need for additional fundamentals.

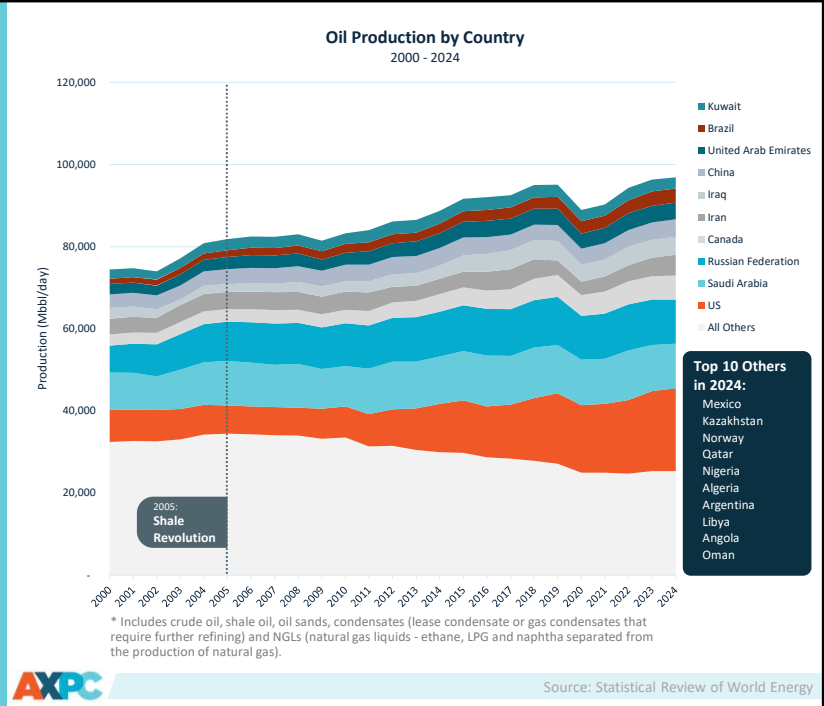
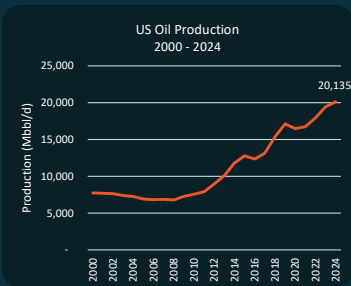
My goal is to make you aware of these resources available to you. Happy to try and answer questions ...and always interested in feedback

First up...looking at production

The US Produces More Oil than Any Country in History

In 2024, global oil production averaged around 97,000 Mbb/d. The **US produced around 20,000 Mbb/d**

- The US produced ~21% of global production
- The next largest producers, Saudi Arabia and Russia, produced 11% and 11% respectively



The U.S. produces more oil than any country in history.

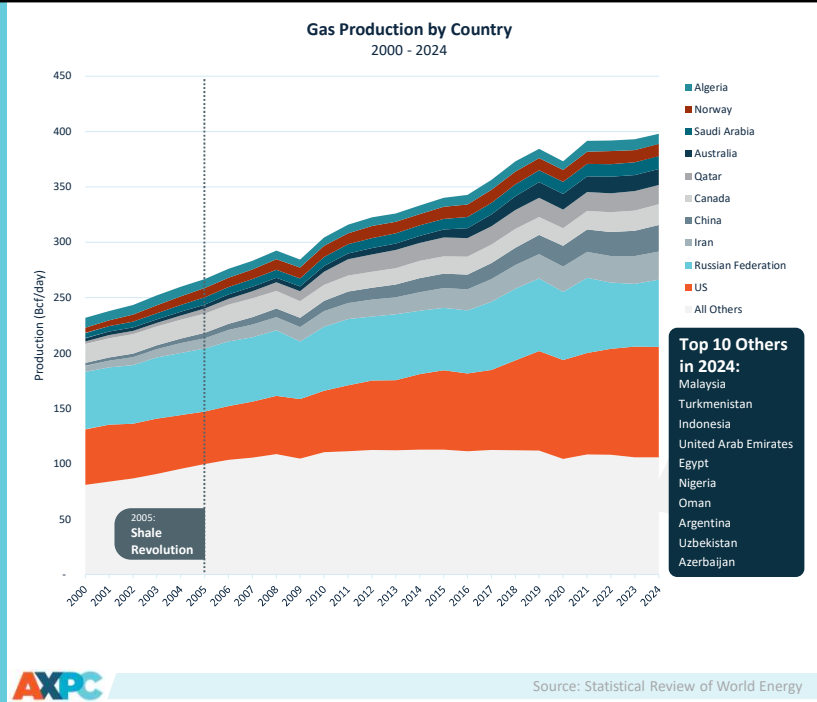
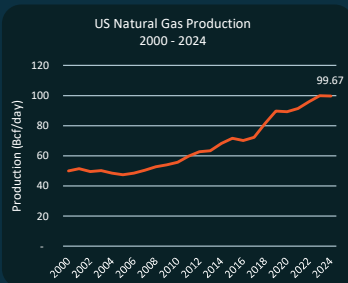
In 2024, U.S. production was about 20 million barrels per day — 21% of global supply.

That is almost equivalent to the next two largest producing countries, Saudi Arabia and Russia combined.

The US is the World Leader in Natural Gas Production

In 2024, global gas production was ~145,000 Bcf. The US produced ~36,000 Bcf

- The US produced ~25% of the world's natural gas
- The next largest producers, Russia and Iran, produced 15% and 6% respectively



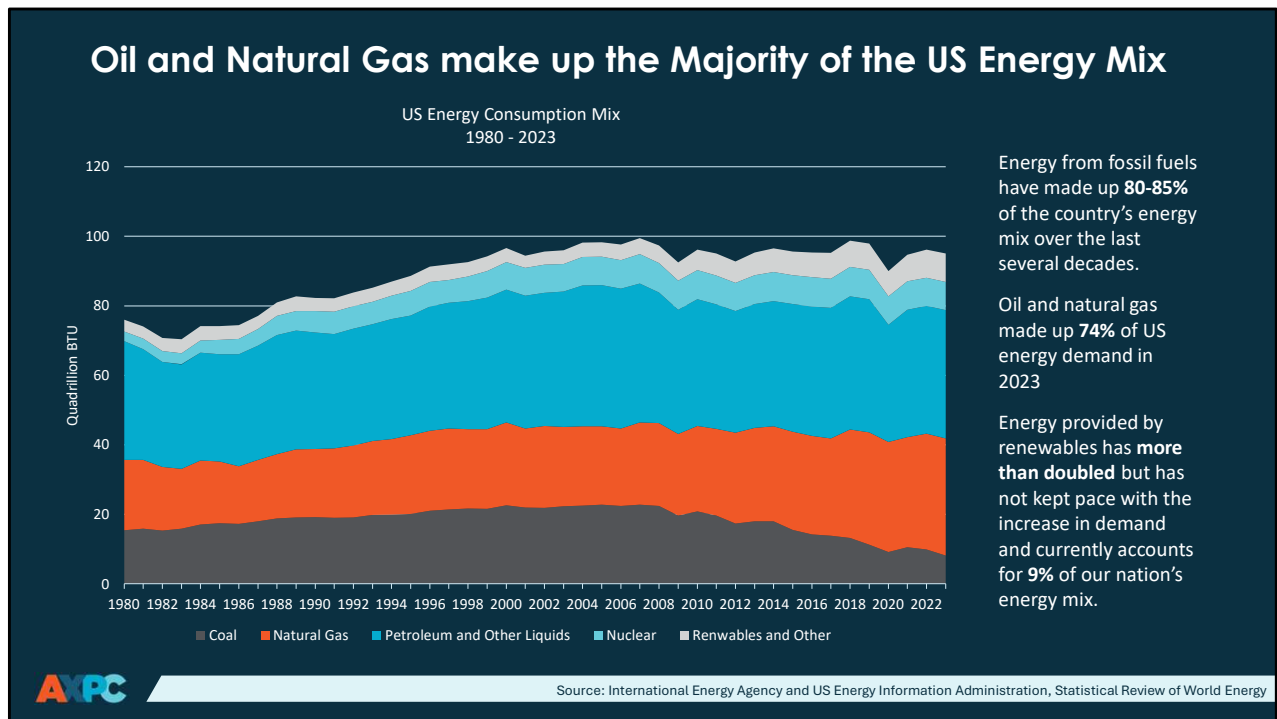
The U.S. is the world leader in natural gas production.

We produce about 25% of global gas supply — more than Russia and Iran combined.

The US is really energy dominant in terms of oil and natural gas

And this leadership supports both domestic reliability but has been key strategic advantage for the US, for global stability and energy security.

Energy Consumption

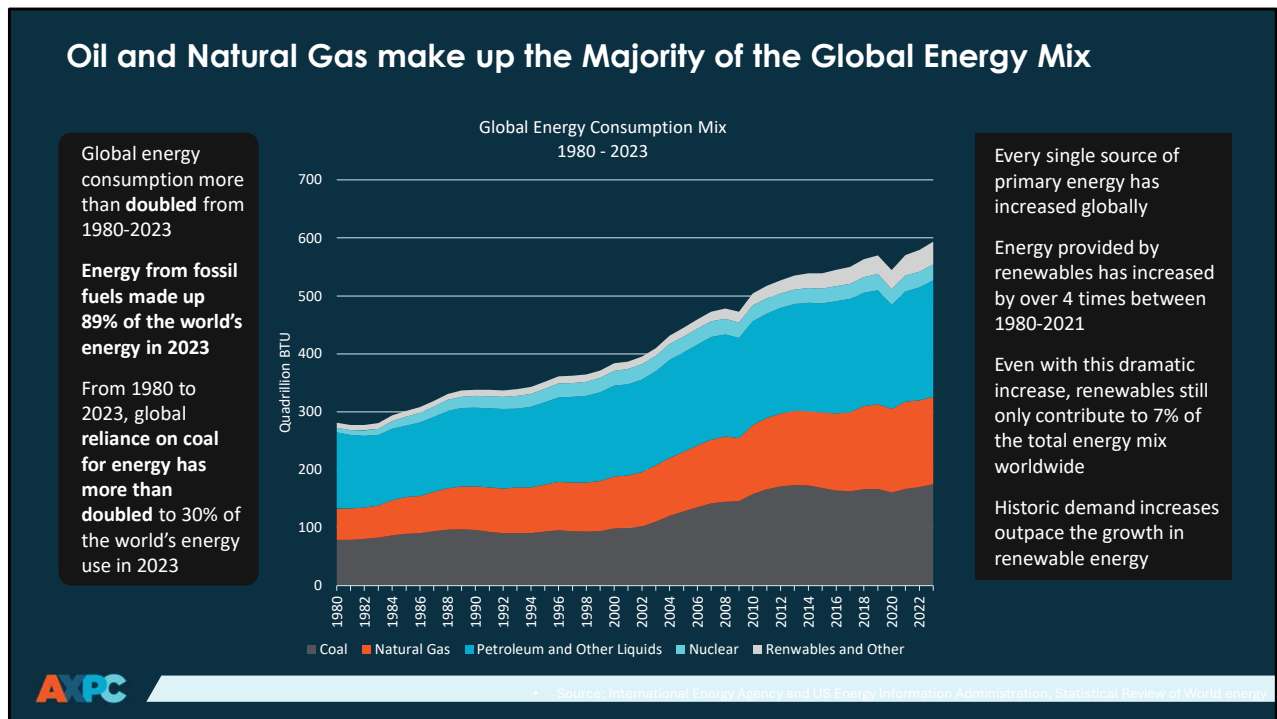


Oil and natural gas remain the backbone of the U.S. energy system.

Despite growth in renewables, oil and gas use still makes up the majority of U.S. consumption today.

For decades, fossil fuels have made up 80%+ of US energy consumption, and these days oil and natural gas comprise about 74% of use energy demand.

Oil and Natural Gas make up the Majority of the Global Energy Mix



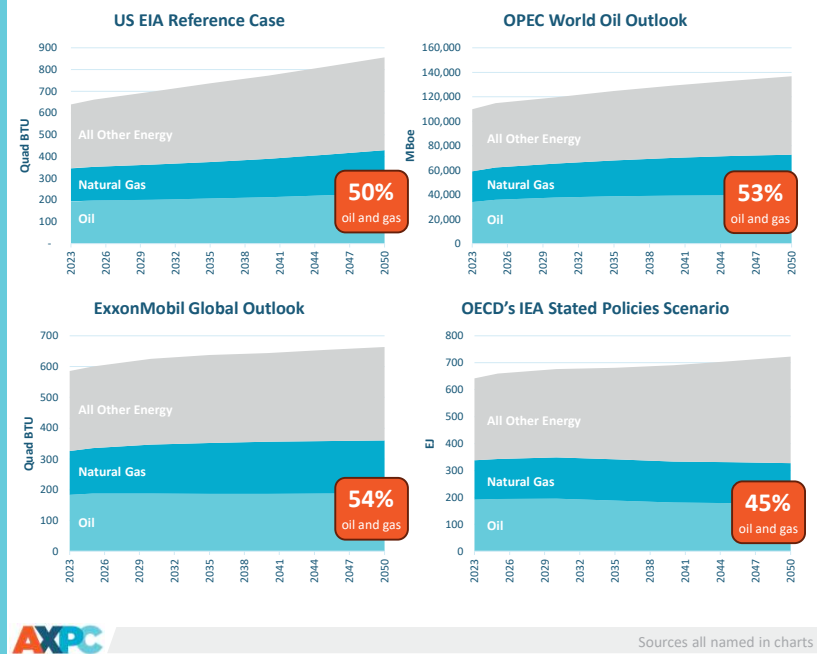
Globally, oil and natural gas remain the dominant sources of energy.

Even with rapid growth in alternatives, O and NG continues to power most of the world.

Historic demand increases that we are seeing are really outpacing even the dramatic growth in alternatives

Oil and Natural Gas will Remain a Long-term Source of Global Energy

In all modeled scenarios, oil and natural gas will continue to constitute a significant portion of the energy mix out to 2050 and beyond



In every modeled scenario, oil and natural gas remain part of the energy mix through 2050 and beyond.

This underscores the importance of responsible production and innovation to continue increasing our efficiency and reducing the impact of operations on the landscape.

It also underscores the importance of oil and natural gas at the table, because that demand will be around a long time....and many estimate likely to increase

Billions of People Still Lack Access to Reliable Electricity

The share of the total population with access to energy has steadily increased over the last two decades

Despite this progress, for the first time in decades, the number of people without access to electricity increased in 2022

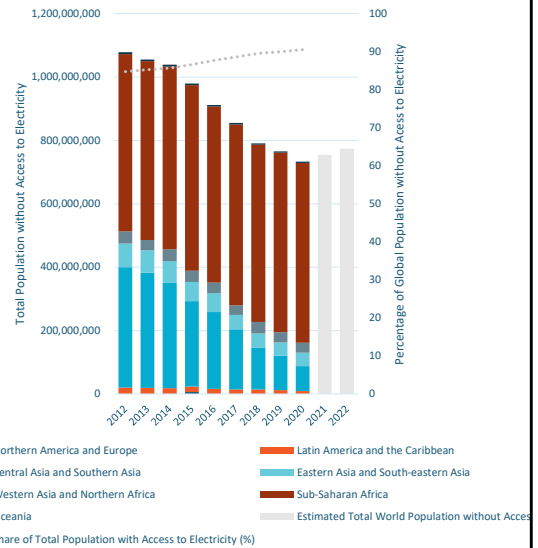


In 2020 an estimated **3.5 BILLION PEOPLE** or over **40%** did not have *reliable* access to electricity of the global population



In 2023 an estimated **666 MILLION PEOPLE** or **8%** did not have *any* access to electricity of the global population

Historical and Projected Electricity Access by Region



Source: Energy Progress Report, SDGs; International Energy Agency; The Payne Institute; Energy for Growth Hub

The reason for this is that billions of people still lack access to reliable electricity....40% of the global population. And over 600 million have no access to energy.

Energy poverty is a global challenge the world cannot ignore, its actually considered THE key indicator for evaluating quality of life in different countries ...and why it has been one of the UN's Sustainable Development Goals to achieve universal energy access by 2030.

Which is why developing countries around the world will continue to chase affordable, available energy for their people, even despite climate concerns in some cases.

Climate Leadership

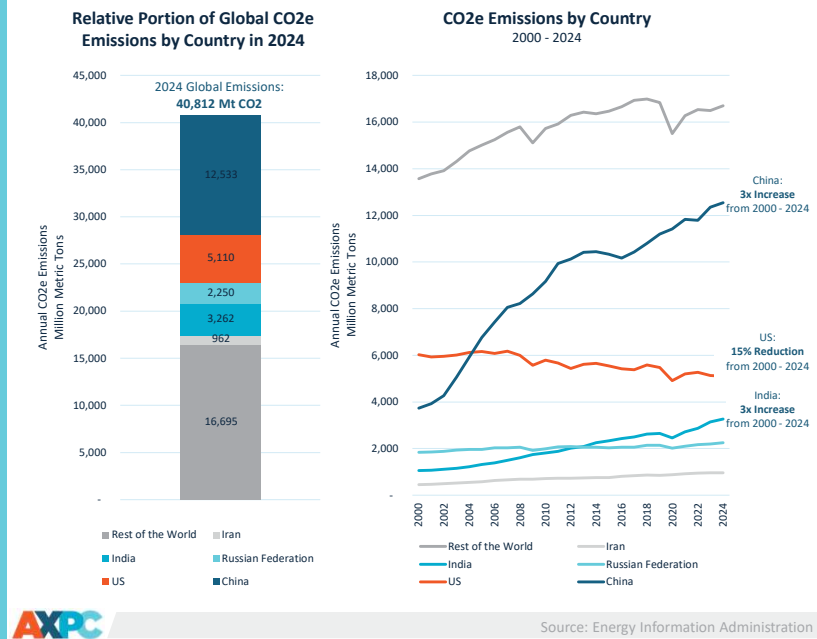


Emissions without Borders: Global Trends

The US was responsible for 13% of the global CO₂e emissions in 2024. The US also **reduced overall emissions by 15%** between 2000 and 2024

China was responsible for 31% of global CO₂e emissions in 2024. China **more than tripled CO₂e emissions** between 2000 and 2024

Energy policy and emission reduction strategies must think **globally** to effectively reduce emissions at scale



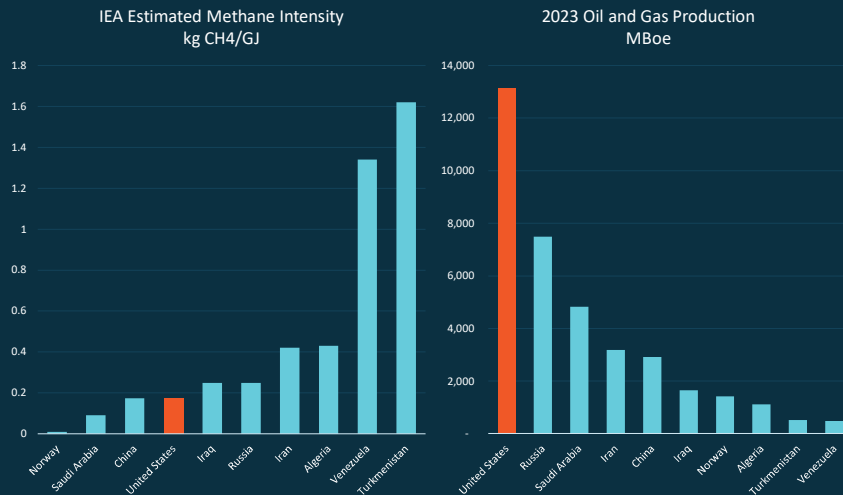
The U.S. has demonstrated real climate leadership, reducing overall emissions by 15% since 2000 even as production has increased.

The U.S. now produces oil and natural gas with some of the lowest emissions intensity in the world.

By contrast, China has more than tripled its emissions over the same period and now accounts for nearly one-third of global CO₂.

Work is not done, but U.S. progress shows that innovation and responsible production can and have been delivering both energy and emissions reductions

US Production of Oil and Gas is among the Cleanest and Essential to the Global Energy Marketplace



The IEA estimates the Methane Intensity of oil and gas producing countries

The methane emissions intensity of oil and gas production varies widely with the best-performing countries score more than 100 times better than the worst

US production is among the lowest in methane intensity while highest in total production

US Energy is critical to providing the world with clean energy at scale



Source: 2024 Global Methane Tracker, IEA

As global demand continues, U.S. production provides not only energy security but also a lower-emissions alternative compared to many other producing nations.

Here looking specifically at methane intensity, IEA analysis shows US production has one of the lowest methane intensity while having the highest total production in the world....

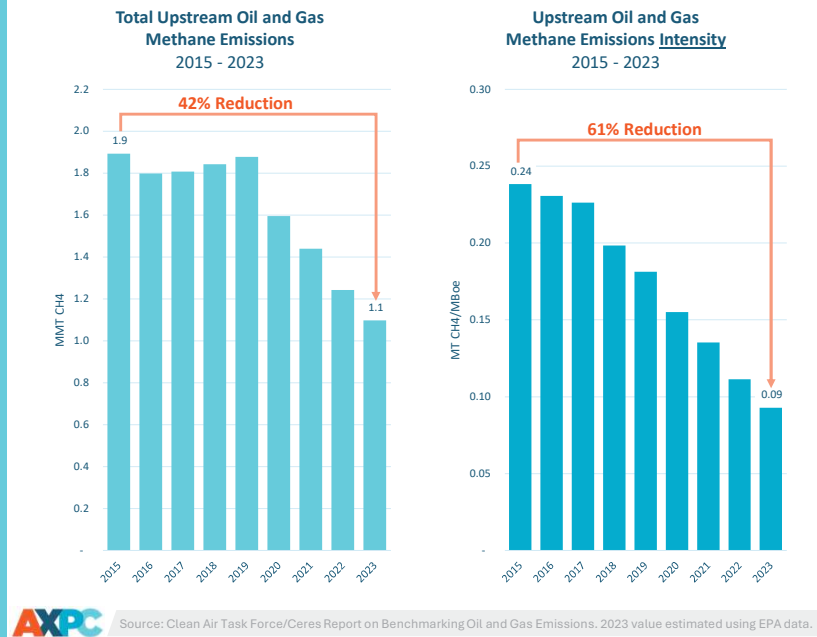
At scale, U.S. oil and gas production is among the cleanest in the world, reflecting strong environmental standards and operational practices.

US Innovation and Operating Practices have Driven Industry Emission Reductions

Based on an analysis by CERES and the Clean Air Taskforce, the upstream oil and natural gas industry has reduced its methane intensity by 61% and total methane emissions by 42% since 2015

As emissions plummet, total US production of oil and natural gas increased by almost 50% over the same period

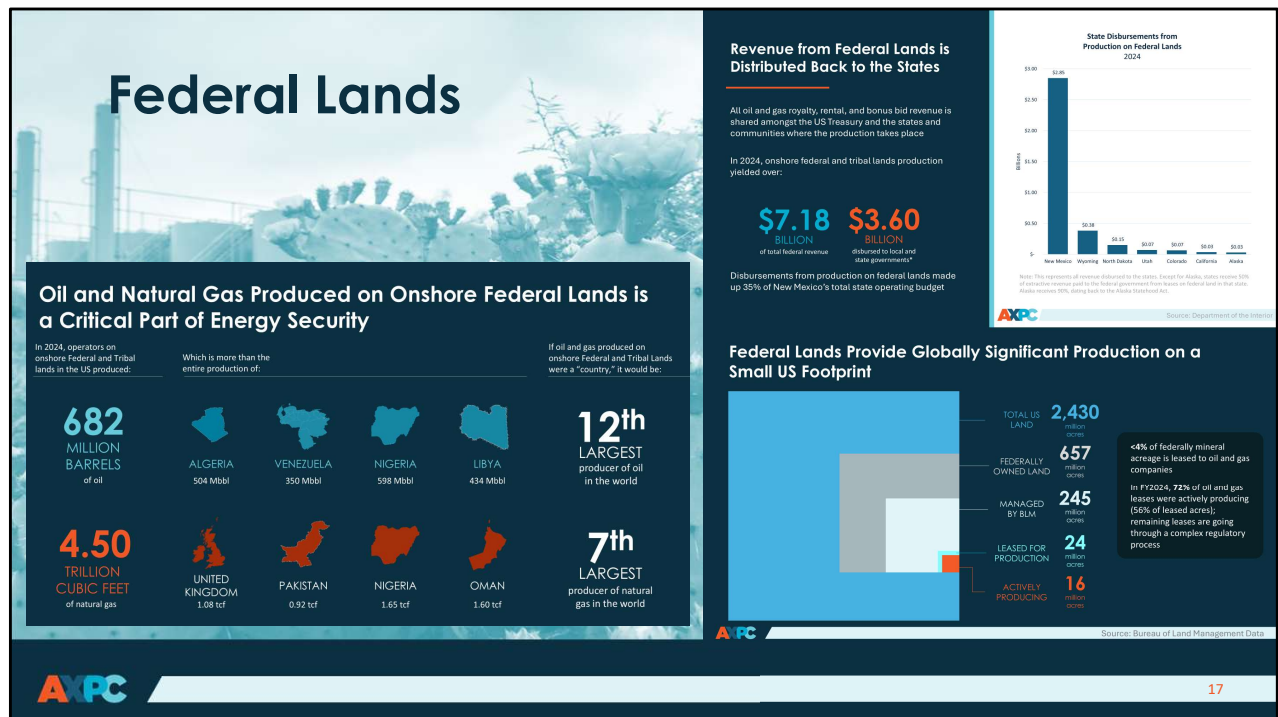
The US upstream oil and gas industry has led the way in emission reductions through technology innovation and improved operating practices



This progress is the result of innovation, technology deployment, and industry-led best practices — US producers are really global leaders in developing and deploying methane detection technologies and mitigation

U.S. producers have driven down methane intensity by 61% and total methane emissions by 42% since 2015.

At the same time, production of oil and natural gas grew by nearly 50%, showing that growth and emissions reduction can go hand in hand.



Other sections in our Energy 101 materials look at federal lands

Data shows how Federal lands remain a vital part of U.S. and global production.

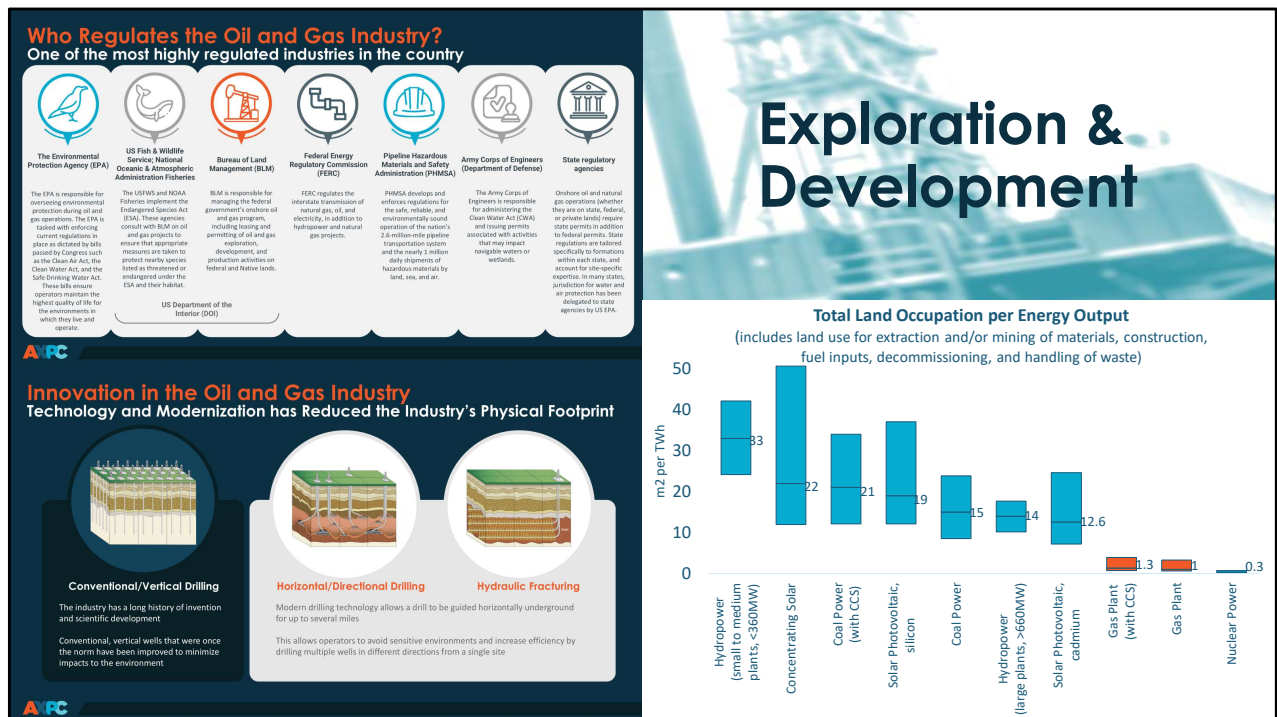
If the federal onshore program was a country....it would be the 12th largest oil producer in the world and the 7th largest natural gas producer.

And this is from less than 4% of the federal mineral subsurface being leased

And as of FY2024, 72% of those lease are actively producing, or just over half the mineral acreage. The majority of the remaining leases are still in the primary term moving towards first production.

And all of the leases contribute significant revenues to the federal treasury and to states and local communities.

Ensuring timely, responsible permitting federal minerals is still key to meeting energy needs, meeting economic needs, and maintaining strong environmental standards.



Some of our materials go through some of the basics of exploration and development

Who regulates oil and gas, what activities are regulated, of course looking at things like hydraulic fracturing and how combined with horizontal drilling it has helped to dramatically reduce surface impacts of development

Comparing total land footprint of natural gas to other forms of energy production...NG produces more energy per square meter than any other, except nuclear.

....there is really a lot more data and materials like this in the energy fundamental materials.

Additional Focus Area



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Electric Grid Fundamentals
The Role of Natural Gas

1

State of Play

2

Our Current Grid

3

Return to Era of
Demand Growth

4

Moving Forward



But success leads to more work....

After a couple iterations of the initial energy 101 materials.....and with the rapidly growing interest in grid reliability especially with the explosive growth of AI....

We started to get asked a lot of questions on natural gas and the grid. An area where a lot of folks are really trying to get their arms around the basics.

So we created an additional set of materials

Key Electric Grid Concepts



Dispatchable

or dispatchable generation refers to electric energy resources that are available to be accessed for energy on demand. Examples of dispatchable resources include natural gas and coal.



Intermittent Power

or intermittent generation refers to electric energy resources that are not always available for on demand energy access due their nature. This includes renewables such as wind and solar, which are not always available due to varying weather conditions, (i.e. cloud cover or low/no wind speeds).



Grid Reliability

is the ability to meet demand with adequate supply 24/7/365. Maintaining reliability is critical to the safety and stability of residential, commercial, and industrial customers.

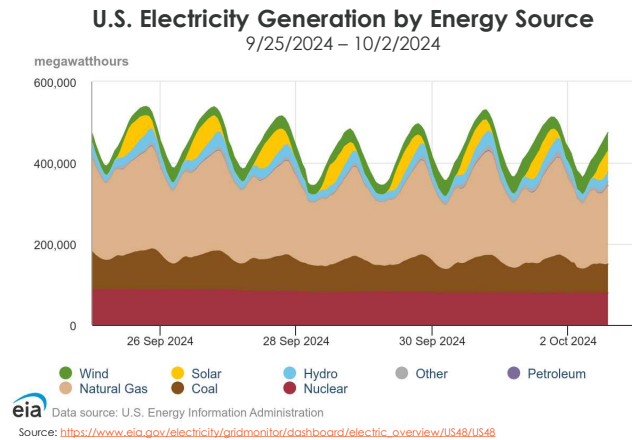
- Extreme weather events (heat, cold, or natural disasters) can lead to **increased demand** while simultaneously causing supply delays due to this increased demand or physical disruptions generation and/or transmission.
- Natural gas is key to meeting U.S. and global energy reliability with the U.S. remaining the **largest** natural gas producer in the world and electric power being the **largest** U.S. consuming sector of natural gas.

Looking at key concepts to know when looking at grid reliability....like dispatchable power versus intermittent power

How does the electricity grid work?

Supply and Demand

- In order to ensure adequate energy supply, grid operators monitor the electricity demand from users throughout the day.
- This projected demand is compared to the supply levels and used to determine the supply-demand equilibrium.
- **Demand must closely and carefully be met by supply at all times to avoid energy waste, power shortages, and/or overloading the system.**



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And how the grid actually works.

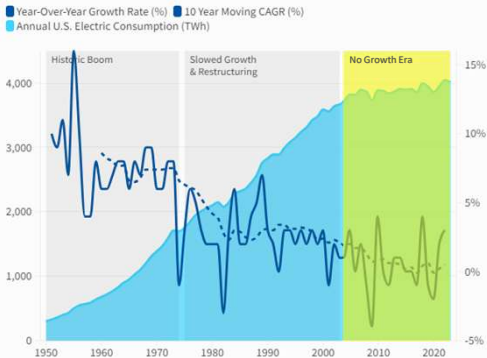
Grid operators constantly balance supply and demand which fluxuates continually throughout the day

If supply falls short, we face shortages and blackouts; if supply overshoots, we risk waste and instability.

Maintaining that balance every second of every day is the central challenge of grid management.

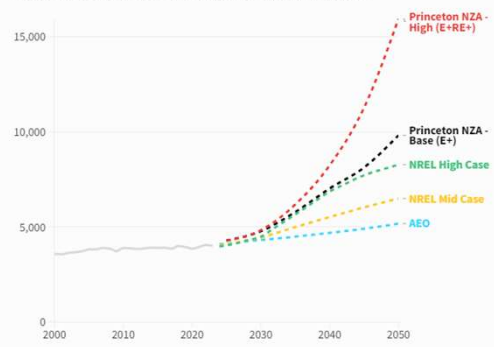
Historic Trends and Uncertain Growth Pace

The Past 20 Years have been an Era of Stability, Flatlined Electricity Growth



CSIS ENERGY SECURITY AND CLIMATE CHANGE PROGRAM

We Now Face Certain Load Growth, but Uncertain Speed & Scale



CSIS ENERGY SECURITY AND CLIMATE CHANGE PROGRAM

Source: <https://www.csis.org/analysis/strategic-perspectives-us-electric-demand-growth>

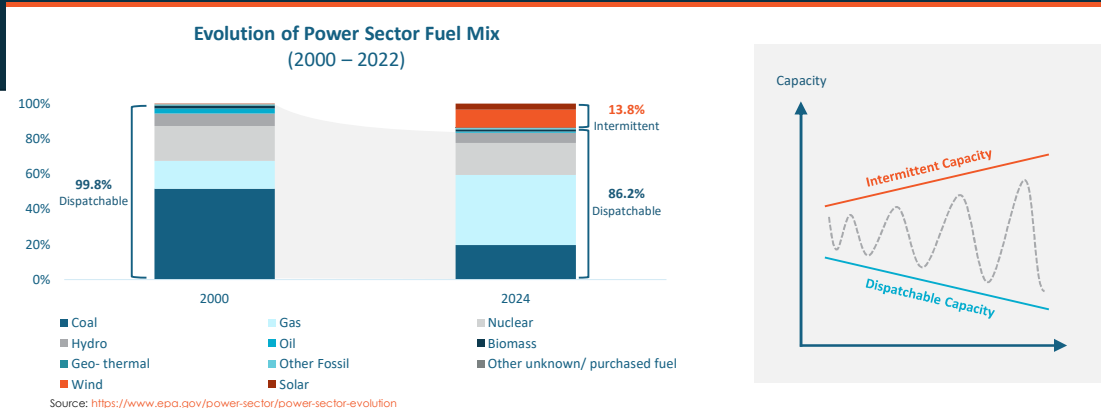


Electricity demand is growing at a pace not seen in decades.

AI, data centers, electrification, and industrial growth are all pushing power demand higher.

It is clear, we must plan ahead to meet this surge.

Structural Changes in Power Generation Will Have Consequences



The U.S. electric power sector has changed significantly over the past several decades

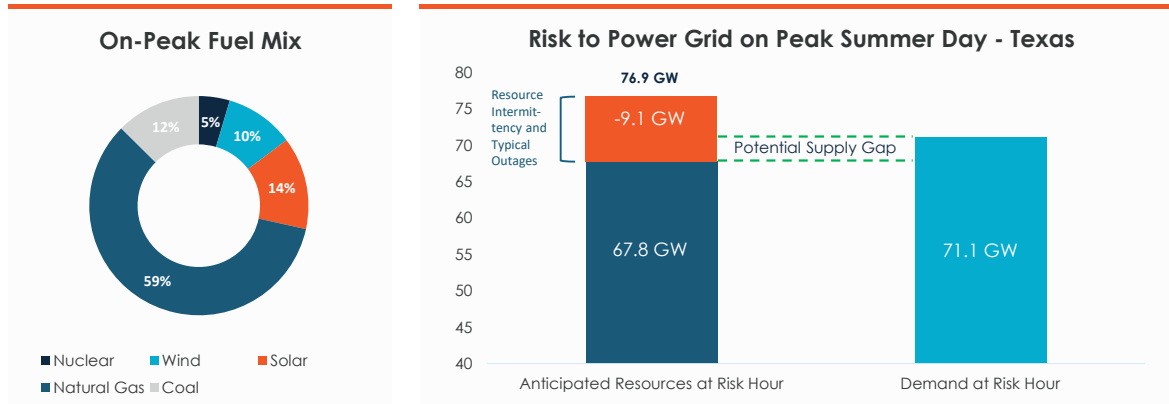
Rapid electrification is driving up demand, while some dispatchable resources are retiring.

Electricity generation technologies are changing as older generation sources retire and new sources, including gas, wind, solar, and battery storage, come online.

This creates reliability risks that must be addressed.

How tight is the supply and demand of our grid currently?

SUMMER SCENARIO – TEXAS



Key Takeaway: Electric grids around the country face increasingly smaller reserve margins.

Source: NERC

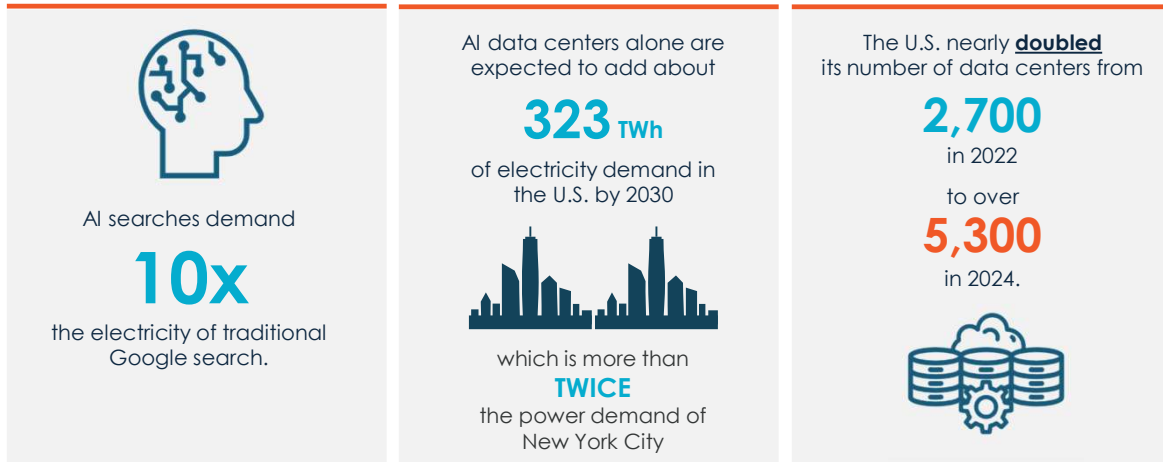


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We have some case scenario type slides that illustrate how Our grid is tighter than ever, with less margin for error.

Accelerating Power Demand

The emergence of AI is driving data center buildout and forecasted power demand.



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AI of course is expected to exponentially add pressure

AI data centers alone are expected to add 323 TWh of electricity demand in the U.S. by 2030 — more than twice the power demand of New York City.

The U.S. nearly doubled its number of data centers in just two years, from 2,700 in 2022 to over 5,300 in 2024.

This rapid growth underscores the unprecedented strain new technologies will place on the grid.

Future Natural Gas Supply and Demand

Natural gas generated 43% of U.S. electricity in 2023, the largest of any resource used in the country.

Recent analyses have confirmed the role of natural gas in supporting growing electricity demand, finding that natural gas will be a critical component of a reliable electric grid.



U.S. power consumption will increase by

28.7 GW

from data centers by 2030.



Data center construction will result in a

20% ↑

in natural gas demand from power generators through 2030.



Natural gas demand could increase by

10 bcf/d by 2030

a **28% increase** over the 35 bcf/d consumed by the U.S. power sector.

Analyses confirm natural gas will remain **critical to meeting rising power demand**.

Natural gas provided **43% of U.S. electricity in 2023**, more than any other source.

Natural gas offers **dispatchable, reliable power** to balance intermittent renewables. Ensuring stable gas supply is essential for both reliability and affordability as demand accelerates.

Newest Addition – Economic Impact Study



Independent Producers Fuel America's Economy

Independent oil and gas producers drive America's energy dominance and economic strength. **Upstream, onshore independents accounted for the overwhelming share of national production, investment, and economic impact of the U.S. upstream sector from 2022-2024, according to a study conducted by Rystad Energy, including 87% of the sector's total economic contributions in 2024.**

Independents deliver reliable and secure energy that powers the U.S. economy, catalyze the creation of millions of jobs, and provides substantial government revenues that strengthen communities across the country. **The foundation of America's energy security is built on the investment and innovation of independent producers.**

Independent Operator Share of Onshore Activity (2022-2024)



85%

Of Produced Crude Oil, Condensate, and NGLs



90%

Of Produced Natural Gas



95%

Of Producing Wells Operated



90%

Of New Wells Drilled



90%

Of Capital and Operating Expenditures



AXPC commissioned this report to provide a deeper, more comprehensive analysis of the upstream oil and gas industry's economic impact in the U.S., with a specific focus on distinguishing the contributions of independent producers. This level of detail offers a clearer understanding of the industry's role in driving production and economic growth, jobs, and revenues.

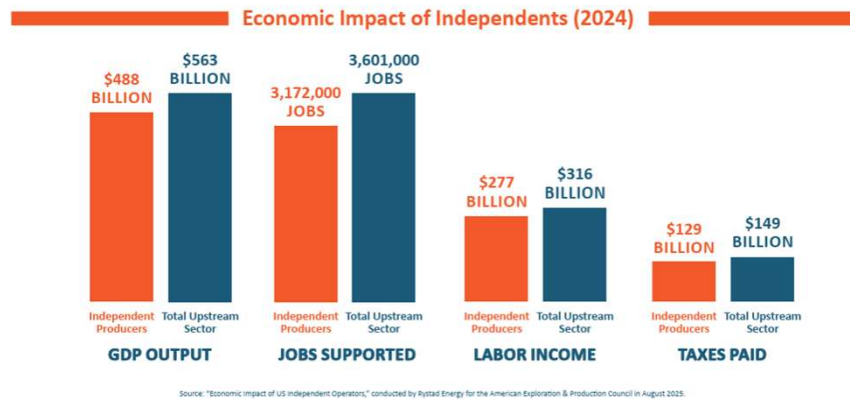
Rystad's analysis quantifies the **upstream oil and gas industry's economic impact** in the U.S.

Findings highlight the sector's role in supporting **jobs, state revenues, and overall GDP growth.**

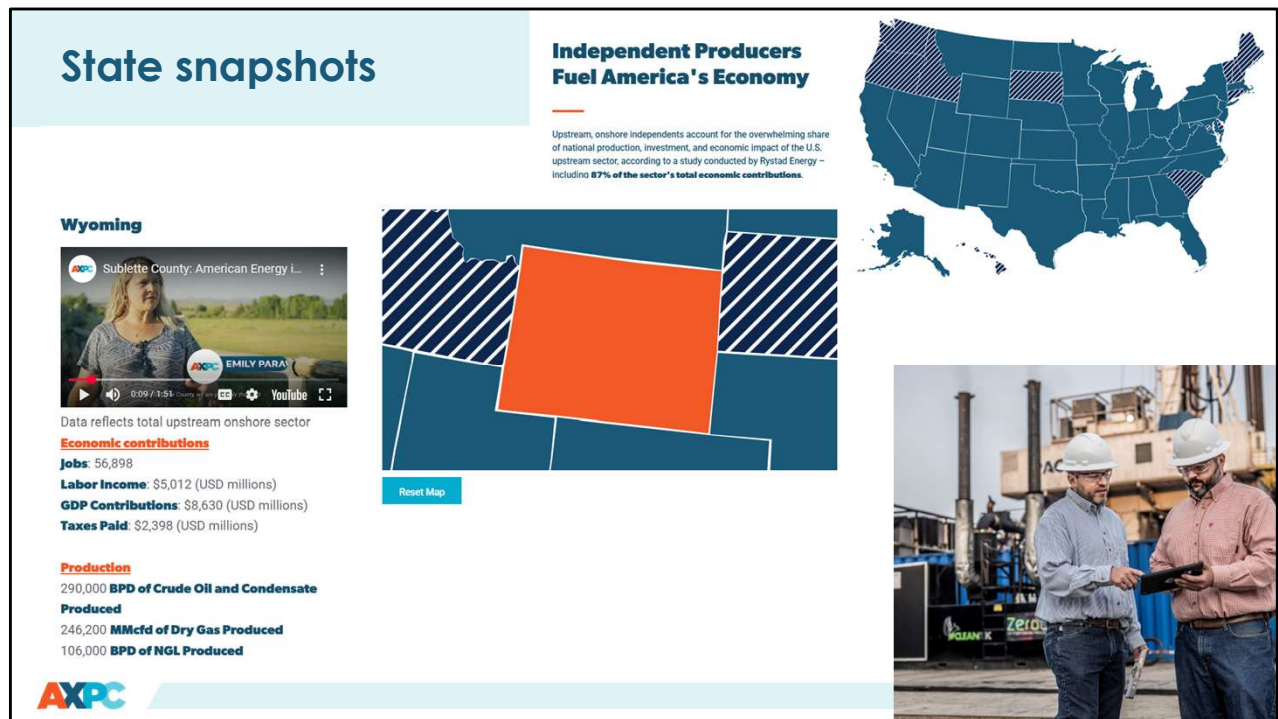
Demonstrates that beyond energy supply, upstream production is a **driver of economic stability and prosperity** nationwide.

Rystad Analysis of the upstream oil and gas industry's economic impact in the U.S.

- Production trends
- Capital and operating expenditures
- Domestic upstream market trends
- Economic contribution Assessment



The study looks at.....



State-by-state data illustrates the local impact of oil and gas production.

Highlights include employment, tax revenues, royalty contributions, and economic multipliers.

Underscores how individual states benefit directly from a strong and responsible energy sector.



These Energy Fundamentals materials are designed to be practical — something you can use directly in your own outreach, whether that’s briefing a colleague, engaging with community stakeholders, or preparing for a policy discussion.

They give you a consistent, fact-based foundation to frame energy issues, so conversations begin from shared understanding rather than misconceptions.

As energy demand grows and policy debates evolve, having accessible, accurate resources will be critical at both the state and federal levels.

Our goal is simple: to make sure you have the tools you need to communicate clearly about the role of U.S. oil and natural gas in reliability, affordability, emissions progress, and economic strength.