Energy Infrastructure / Natural Resources: This month, our combined letter tackles the massive topic that is AI's potential impact on energy markets. In 2024, AI was viewed as pure upside: gas and power stocks generated outsized returns, while other (less AI-exposed) subsectors ended the year broadly in the red. As was the case with Shale 20 years ago, investors want to believe that AI will allow cyclical investments to deliver non-cyclical returns. This scenario sounds appealing, but our 2022 paper on capex and inflation shows why high capex and sustained high prices rarely coexist.
If 2024 markets reflected a belief that AI offered pure upside for energy, in 2025 we believe a more nuanced picture will emerge. AI and LNG gas demand will drive high growth through 2035, but this growth will create a ruthlessly price-capped market that is not discounted by today's equity markets.

First, without a massive AI buildout, demand growth in the gas market is set to slow as coal retirements fade. The gas market has already doubled in the last 20 years. Since 2014, growth has further accelerated to rates not seen since the 1960s. Gas needs record AI and LNG growth to maintain last decade's pace.

Second, a powerful and underappreciated feature of the shift to an AI and LNG-dominated market is that gas demand is set to become radically ***more*** price-sensitive. Historically, 80%+ of US gas consumption was price-inelastic. For example, heating, cooking, and baseload power demand typically rises when prices are high, creating the upside volatility that excites investors and traders. By 2035, over half of US gas demand will be price-sensitive (LNG, AI, peaker plants). In other words, this demand has the ability to shut off completely when prices spike. So instead of higher demand driving higher prices, prices will determine demand on a minute-to-minute basis.

Our dispatch curve white paper explained how Shale transformed oil markets with its ability to rapidly turn on or turn off, ending the "super cycles" of the 1970s, 1980s and 1990s. Similarly, as US gas demand becomes increasingly price-sensitive, the likely outcome in the next decade is continued market growth, with prices firmly capped by the marginal economics of LNG and AI.

December 2024 Performance Summary and Market Commentaries

Please find below performance and commentary for our strategies – MLP & Infrastructure and Natural Resources. See performance tables at the bottom of the commentary. For additional information, please contact us at (832) 241-6400 or info@recurrentadvisors.com.

MLP & Infrastructure

Performance review

During the month of December 2024, the Recurrent MLP & Infrastructure Strategy generated net returns of -7.45%, lagging the Alerian MLP Index's (AMZ) -7.19% return by -0.26%. Since the strategy's July 2017 inception, Recurrent's MLP & Infrastructure Strategy has outperformed the AMZ by +39.19% (+2.88% annualized), net of fees. On a gross basis, the Strategy has outperformed by +61.67% and +4.33% respectively. See performance section at bottom for more detail, plus performance detail on the Recurrent Energy Infrastructure Strategy, which seeks to track the MLP & Infrastructure Strategy while excluding MLPs.

Natural Resources

Performance review

During the month of December 2024, the Recurrent Global Natural Resources Strategy fell -8.54% net of fees, lagging the S&P Global Natural Resources Index's –7.07% return. The Recurrent North American Natural Resources Strategy fell -9.05%, roughly in-line with the -9.01% performance of the S&P North American Natural Resources Index.

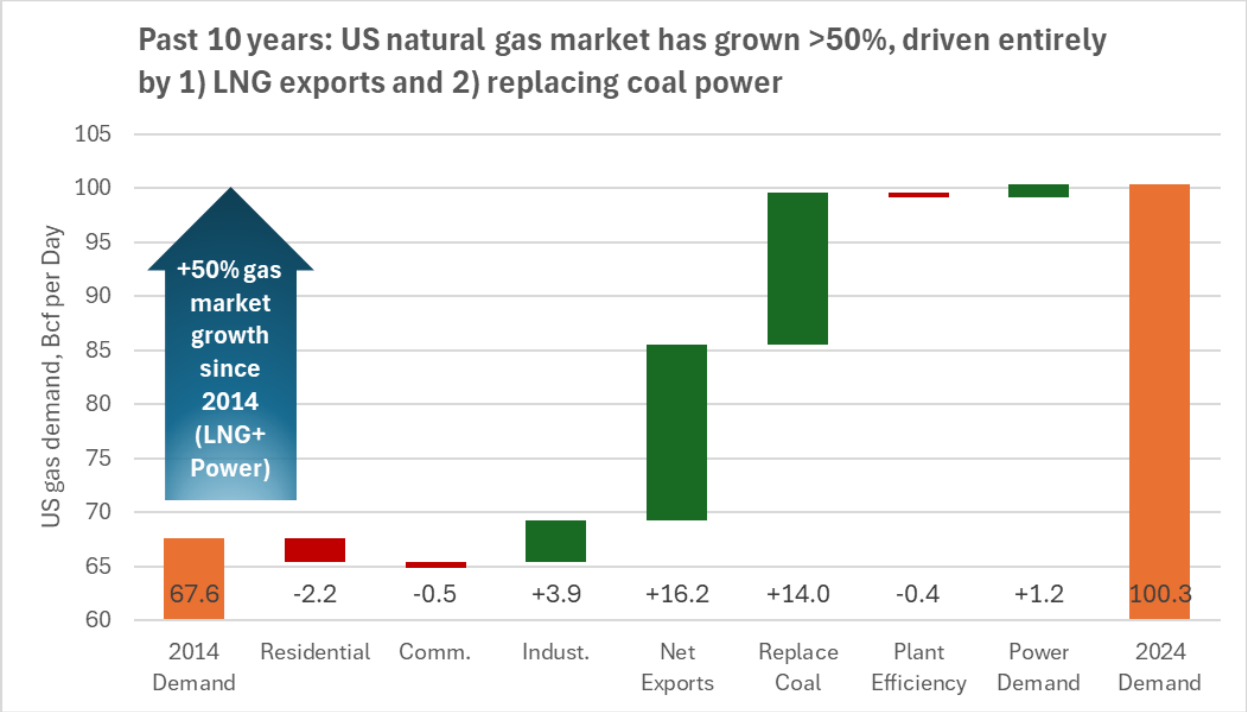
AI arrives as power demand is accelerating and gas demand is slowing

Many investors have assumed a monolithic impact from AI on energy markets – but this ignores the dramatically different states of the power and gas markets

Energy experts are falling over themselves to predict unprecedented changes to the US energy and natural gas markets resulting from expected AI demand over the next 10 years. These broad proclamations typically ignore the fact that AI arrives as power markets and gas markets are in very different places.

On one hand the US gas market is no stranger to volume growth, adding a Russia-equivalent amount of production in the past 20 years (+50 bcf/d, the size of Russia, the 2nd largest producer). Amazingly, demand growth rates have accelerated further in the last 10 years, growing 50% (+30 bcf/d, the size of all EU gas demand). As shown below, this massive growth has been comprised of only 2 major variables: **exports** and **coal replacement**.

This growth has occurred against the backdrop of increasing efficiencies in homes and office buildings (efficiencies shrinking US demand by ~5% in 10 years). Industrial demand has grown +15% since 2014, offsetting losses in residential and commercial. The equivalent ~1.4% annualized growth rate in the industrial sector may surprise readers, given the dramatically improved competitiveness of the US industrial base due to low US natural gas prices compared to global markets.



Source: Recurrent research, US Department of Energy, Energy Information Administration (EIA)

The potential AI buildout pushes the power market to the brink, but saves the gas market from a slowdown

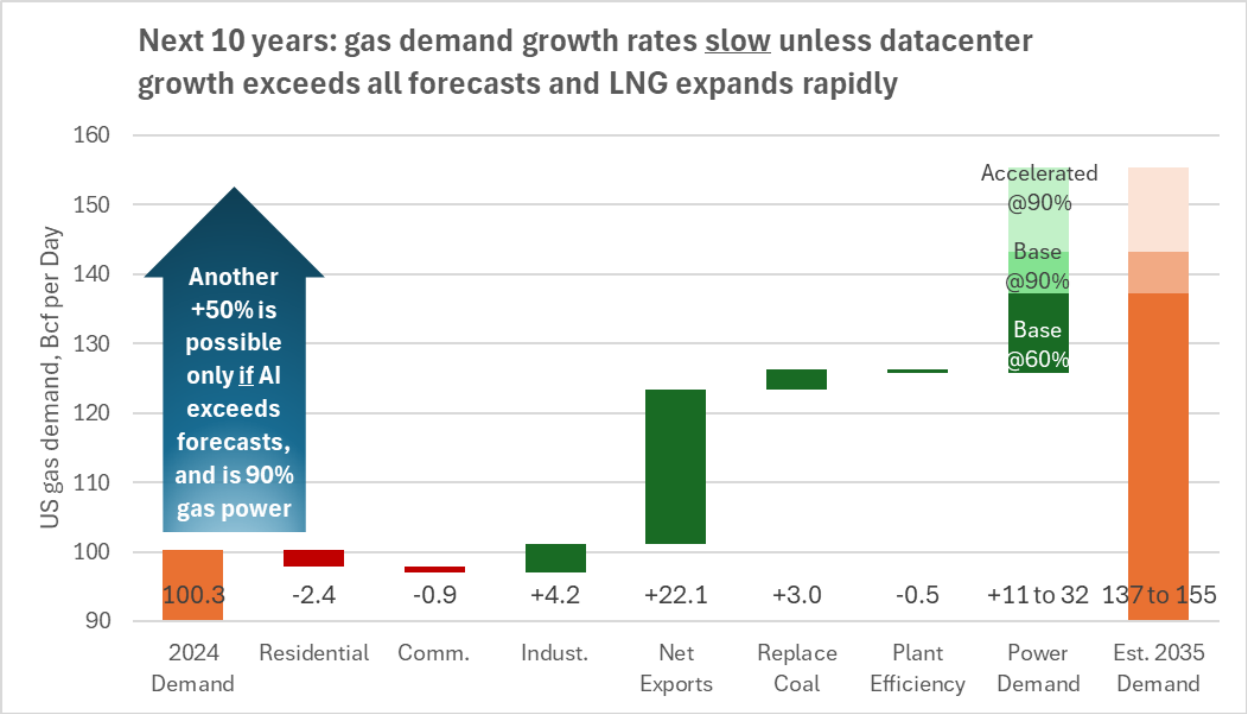
As we examine the drivers of gas market growth above, we see that coal retirements contributed ~half of last decade's demand growth. The benefit from coal plant retirements will fade in the next decade, as the natural gas power fleet is already much larger than the remaining coal fleet and remaining coal plants are generally lower-utilization backup assets. With coal retirements declining, massive AI demand is required to maintain the ~4% growth rate of the last decade, as shown below.

A note on our AI buildout assumptions: much remains unknown, but a rough picture is coming into view: major players such as Microsoft/OpenAI, Amazon, and Meta have provided initial AI capex figures and power requirement estimates implying 50 gigawatts (GW) or more by 2030, implying 400 terawatt hours (twh) in datacenter power consumption by that time. This outlook is supported by a recent Department of Energy (DOE) report which also helped inform our assumptions. Notably, these scenarios do not assume "game changing" semiconductor power efficiencies, nor do they envision any meaningful business or capex slowdown in the tech industry – they are meant to capture upside cases.

To offer context to those who haven't been beaten down by endless AI projections, the aggressive case envisions datacenter power demand growing 20% annually, becoming larger in size than the US residential sector by 2035. In our least aggressive case, datacenters are "only" as big as the entire US industrial sector's electricity consumption by 2035.

These DOE-supported assumptions are our **"base"** case below. We sensitize the **"base"** case with 2 additional power scenarios: AI demand is 60% or 90% gas-powered. This compares to today's US grid,

which is just under 50% gas-powered. We also added an **"accelerated"** case that leading to ~50% larger AI demand vs. our base case.



Source: Recurrent research, US DOE and Berkeley Labs, Energy Information Administration (EIA)

Of course, all projections below assume that the US LNG sector doubles from its already world-leading size…

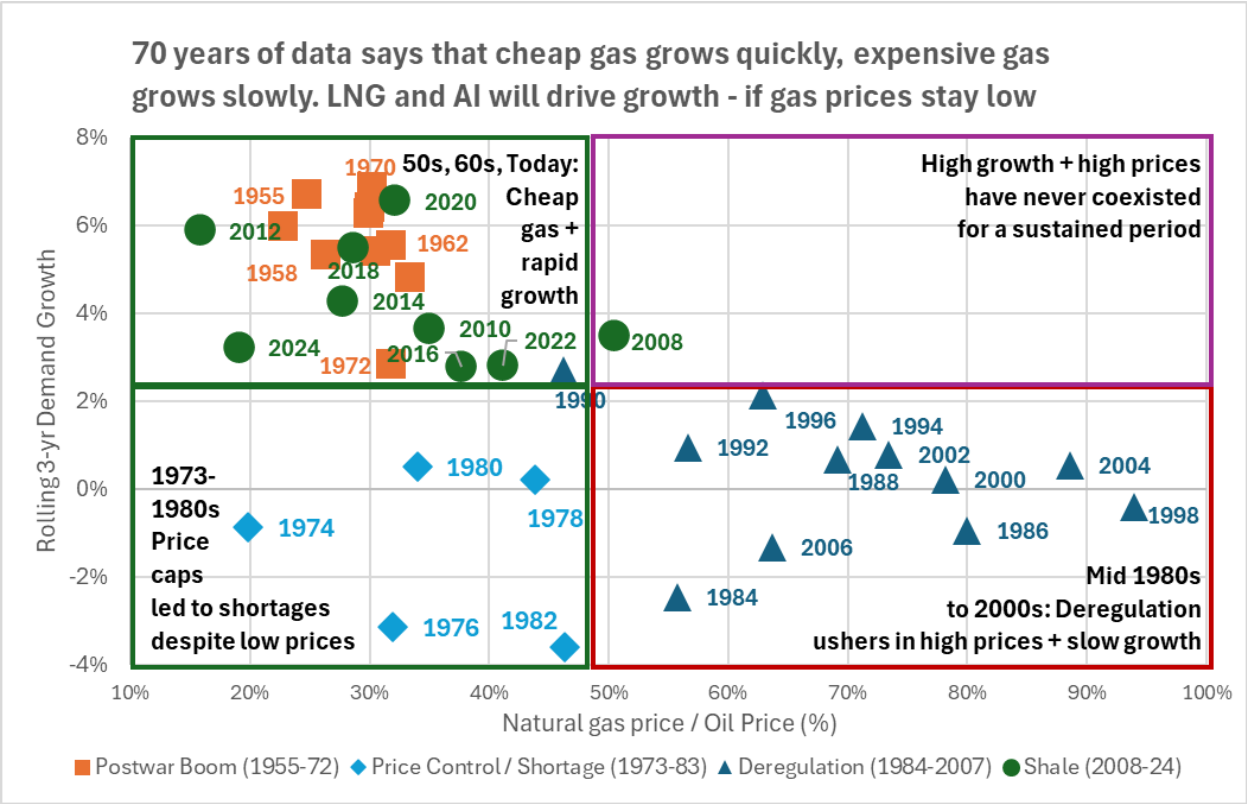
Besides coal retirements, the other key driver of last decade's record gas demand growth was US LNG exports (as well as pipeline exports to Mexico and Canada, which have largely maxed out). Importantly, our gas demand forecast assumes a full ramp up of large-scale, high-likelihood LNG facilities* without any impact of political, regulatory or economic hurdles.

**combined capacity assumes ramp up of Venture Global Plaquemines, Cheniere Corpus Christi 3, NextDecade Rio Grande 1-3, Exxon Golden Pass, Sempra Port Arthur 1-2, Freeport and Cameron expansions, Woodside Driftwood, Energy Transfer Lake Charles, Venture Global CP2*

Investors assume demand causes higher prices… a 70-year study offers evidence that price is the cause, and demand is the effect

It's common for commodity forecasters to project multiyear (or multi-decade) demand growth, and assume that high prices will follow. This magical thinking that cyclical investments will stop generating cyclical returns has caused investors to cheer on management teams who spend capex to grow aggressively, assuming demand will be there to support prices. Over the last several decades, many commodities across different sectors – crude oil in the 1980s and 2010s, North American shale gas in 2008, Australian Iron Ore in the 2010s, Lithium in the past 3 years – have shown repeatedly that high capex can crush prices, even if demand soars.

It is often assumed demand drives prices, but US natural gas exhibits the opposite relationship: sustainably low prices have encouraged new sources of demand. Gas growth has historically slowed dramatically – ranging from -3% to +2% - when prices exceed 40% of oil price on an energy-equivalent basis ($65/barrel x 40% / 6 mmbtus per barrel = $4/mcf gas price). When gas is priced below 40% of oil value, growth has ranged from +3% to +7% annually.



Source: Recurrent research, Bloomberg, US DOE and Berkeley Labs, Energy Information Administration (EIA)

Is depending on AI and LNG demand growth a Faustian bargain for gas?

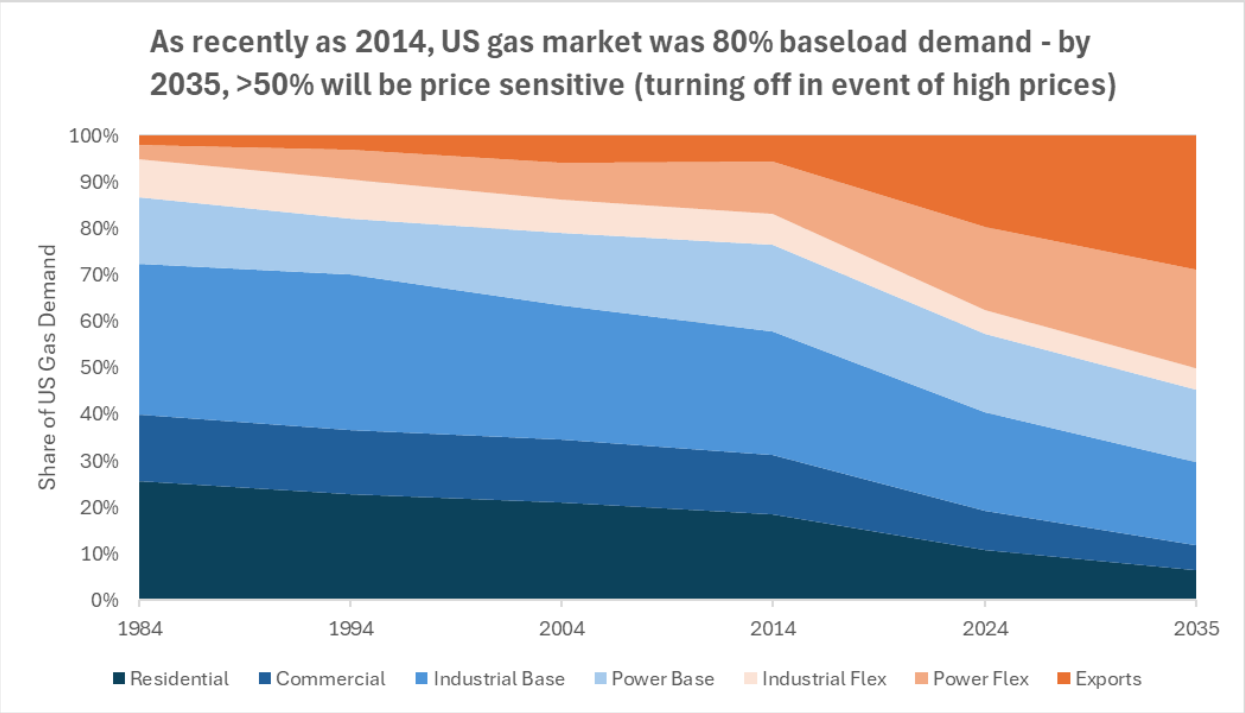
Investors are piling into gas- and power-related investments in hopes that AI and LNG will deliver a period of growth with higher prices. The graph above shows that growth has only coincided with low prices. Dependence on LNG and AI is likely to further cap prices, in exchange for higher demand growth. Here's why:

Historically, the US gas market was dominated by price-inelastic "baseload" demand – cooking, heating and manufacturing – which typically cannot or will not turn off when gas gets expensive. When hurricanes knock supply offline, or winter weather spikes demand, given the price-inelastic nature of demand, the US has historically relied on storage assets to deliver as much as ~40 bcf/d in cold months. Beyond this 40 bcf/d cushion, the only market remedy was price spikes and resulting demand destruction.

With the rise of LNG – and AI on the horizon – American gas demand is set to be dramatically more price-sensitive, or elastic, than ever before. We have already seen how LNG exports can stop at any moment in response to changing economic conditions. During the acute phase of COVID lockdowns, domestic

consumption of gas was roughly flat – while economically-sensitive LNG exports declined by more than 60% in a month.

AI datacenters are being designed in a fashion much more akin to an LNG terminal than a heater. Early forecasts suggest that opportunistic, price-sensitive "training" will represent a much larger share of power use than user queries and searches, which tend to be price-insensitive "baseload" demand. Datacenters have the ability to economically optimize when energy-intensive "AI model training" takes place.



Source: Recurrent research, US DOE and Energy Information Administration (EIA)

Above, we see the dynamic evolution of US gas demand since 1984. At that time, nearly all natural gas demand was relatively price-insensitive, or "baseload". As recently as 2014, ~80% of demand remained relatively price-insensitive. However, a "base case" AI buildout forecast would cause US gas demand to be >50% price sensitive by the early 2030s. By 2035, AI and LNG would have the capacity to curtail demand by +60 bcf/d, providing more shock absorption capacity than the vast gas storage system across the US, and meaning that the price of gas would determine the volume of demand. As prices rise, demand falls, and vice versa. The price-sensitive market structure would behave very differently than most investors' view of demand, which retains a strongly price-inelastic bias.

The resultant impact on natural gas cycles is profound. In a strongly growing and price inelastic demand market, strong growth causes prices to rise until supply can overwhelm demand. However, the price sensitivity of the largest future demand drivers - AI and LNG – means that if prices rise , volume demand will fall immediately and dramatically, limiting price increases and potentially ushering in an multi-decade era of rangebound prices.

As a final thought….what happens if demand grows contrary to our predictions, and AI and LNG capacity expands even as gas prices climb? It would pose an interesting challenge for the US government – should we ration gas in order to make AI competitive - or to supply our allies? Or what if the LNG buyer is China? Perhaps it's a debate best left to Elon Musk and Chris Wright.

This email may contain forward-looking statements. These statements are not guarantees of future performance and undue reliance should not be placed on them. This email also may contain references to indices. Such references are for comparison purposes only and should not be understood to mean that there will be a correlation between the Strategy's returns and any index. All investing involves risk.

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