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How Much Has Shale Gas Saved U.S. Consumers?

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Abstract

It may seem like a distant memory now, but as of the mid-2000s, U.S. natural gas production had been flat for a decade, and the U.S. was importing liquefied natural gas (LNG), and with plans to import much more. Then shale gas happened. Advances in hydraulic fracturing and related technologies caused U.S. natural gas production to increase significantly, and the U.S. went from being a net importer of natural gas to being one of the world's largest exporters. This paper calculates how much shale gas has saved U.S. natural gas consumers. Using price differences between the United States, Europe and Japan, we calculate that U.S. natural gas consumers have saved \$4.5-\$5.3 trillion between 2007 and 2025, equivalent to \$237-\$276 billion annually. Access to low-price U.S. natural gas has been particularly valuable during major supply shocks such as the war in Ukraine, and the benefits of shale gas have been experienced broadly across sectors and states.

Key Words: Energy Demand, Natural Gas, Liquefied Natural Gas (LNG), Hydraulic Fracturing

JEL: Q41, Q42, Q48

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1 Introduction

It may seem like a distant memory now, but back in the mid 2000s, U.S. natural gas production had been flat for a decade, and the U.S was importing LNG – not exporting it – and with plans to import much more. As of February 2007, for example, there were four additional U.S. LNG import terminals under construction and another 10 U.S. LNG import terminals had received approval from FERC.¹

Then shale gas happened. Advances in hydraulic fracturing and horizontal drilling opened up vast new areas to development and dramatically increased U.S. natural gas production. Figure 1 plots monthly U.S. natural gas production. Since Daniel Yergin and Robert Ineson wrote about “America’s Natural Gas Revolution” in the Wall Street Journal in November 2009, U.S. natural gas production has approximately doubled, driven overwhelmingly by shale gas.

Along the way, the United States went from being a net importer of natural gas to one of the world’s largest net exporters. The United States has been the world’s largest LNG exporter since 2022, and in 2025 the United States exported 9 billion Mcf of natural gas.²

This paper calculates how much shale gas has saved U.S. natural gas consumers. The paper first compares natural gas prices in the United States, Europe, and Japan. Prices diverged sharply in 2007, with a timing that closely corresponds to the growth of shale gas. The paper then uses these price differences, together with information about U.S. natural gas consumption, to calculate various measures of savings, as well as to examine the pattern

¹U.S. Department of Energy, Energy Information Administration, “U.S. Natural Gas Imports and Exports: Issues and Trends 2005”, released February 2007.

²U.S. Department of Energy, Energy Information Administration, “The United States Became the World’s Largest LNG Exporter in the First Half of 2022”, July 25, 2022. See also U.S. Department of Energy, Energy Information Administration, “U.S. Natural Gas Exports”. These exports include both pipeline and LNG. In 2025, LNG exports were 61% of total U.S. natural gas exports, with the rest exported via pipeline to Canada and Mexico.

of savings across time, sectors, and geography.

The paper finds that U.S. natural gas consumers have saved \$4.5-\$5.3 trillion since 2007, equivalent to \$237-\$276 billion annually.³ Incorporating demand elasticity the savings are \$174-\$201 billion annually. These large savings reflect that the U.S. natural gas market is very large. U.S. natural gas consumers now use 30 billion Mcf of natural gas annually. Combine this high level of consumption with price differences that have averaged \$9-\$11 per Mcf, and it makes sense that the savings from shale gas would be very large.

U.S. natural gas consumers include electric power, industrial, residential, and commercial. We find that 38% of savings went to electric power customers, with 30%, 19%, and 13% for industrial, residential, and commercial customers, respectively. In terms of geography, Texas has saved more than any other state, and Louisiana has saved the most per capita.

We are aware of only two other papers that calculate how much shale gas has saved U.S. consumers, both written over a decade ago. Mason et al. (2015) uses a price elasticity of demand of -0.5 to calculate that the 26% increase in U.S. natural gas production between 2007 and 2014 implies \$71 billion in increased consumer surplus annually.⁴ Hausman and Kellogg (2015) estimate supply and demand elasticities to calculate that shale gas has increased consumer surplus by \$101 billion annually.⁵ Our calculation of savings is more than twice as large. U.S. natural gas consumption has grown 27% since those papers were written, increasing savings proportionally. But more importantly, the larger magnitude

³All dollar amounts in the paper have been normalized to reflect USD 2025 using the CPI All Items.

⁴Mason et al. (2015) calculate \$4.36 billion monthly in USD 2015 dollars which is equivalent to \$71 billion in USD 2025 annually.

⁵Hausman and Kellogg (2015) use their estimated elasticities to calculate what the price would have been in 2013 (their base year) without the expansion in supply. They conclude that shale gas reduced U.S. natural gas prices in 2013 by \$3.45 per Mcf (equivalent to \$4.70 in USD 2025), with consumer surplus increasing \$74 billion in USD 2013 (equivalent to \$101 billion in USD 2025).

reflects our alternative approach, which uses prices in Europe and Japan as the counterfactual.

This paper contributes to the broader economic literature on shale gas. Previous research has examined, for example, the impact of shale gas on the housing market (Muehlenbachs et al., 2015; Bartik et al., 2019), the labor market (Feyrer et al., 2017), induced innovation (Acemoglu et al., 2023; Dugoua and Gerarden, 2025), the displacement of coal-fired electricity generation (e.g Knittel et al., 2016; Cullen and Mansur, 2017; Fell and Kaffine, 2018; Linn and Muehlenbachs, 2018), and the mortality impacts of reduced winter heating costs (Chirakijja et al., 2024).

2 Price Differences

Figure 2 plots natural gas prices in the U.S., Europe, and Japan. Between 1995 and 2006, prices followed each other reasonably closely. During that period, prices for Europe and Japan were both within \$1 per Mcf of the U.S. price, on average. See Table 1.

Then prices diverged sharply. Every single month between 2007 and 2025, the U.S. price was below or equal to the price in Europe and Japan. Relative to Europe, U.S. prices have averaged \$9 lower per Mcf. Relative to Japan, U.S. prices have averaged \$11 lower.

Shale gas is the single best explanation for these large price differences. The timing of the divergence closely corresponds with the growth of shale gas, with price differences appearing right at the inflection point for U.S. natural gas production.

Prices also reflect other demand and supply shocks. For example, the large spike in European natural gas prices in 2022 reflects the Russian invasion of Ukraine in February 2022. The price data do not include the Iran War in 2026, but as of April 2026, prices in the

U.S. were below \$3, compared to \$14 in Europe and \$19 in Japan.

Prices do not equalize due to transportation constraints. Natural gas takes up a lot of space, so it must be transported by pipeline or cooled to around -162°C to liquefy it for ship transport. Several U.S. LNG export facilities came online during this period, but that was not enough to equate natural gas prices between the United States and the rest of the world.

More U.S. LNG export facilities are coming. U.S. exporters have announced new facilities that would approximately double the US LNG export capacity by 2029.⁶ Increased U.S. LNG exports will put downward pressure on prices in Europe and Japan and upward pressure on U.S. prices.

3 Savings for U.S. Consumers

U.S. natural gas consumers have benefited enormously from low-price natural gas. We calculated savings by multiplying U.S. natural gas consumption (in Mcf) by the price difference (in \$ per Mcf) between the U.S. and one of the two other price benchmarks. For example, in 2025 U.S. natural gas prices averaged \$8.7 per Mcf lower than European natural gas prices, and U.S. natural gas consumers used 30 billion Mcf, so the implied savings for 2025 were \$261 billion.

Table 2 reports total and average savings. We calculate that shale gas has saved U.S. natural gas consumers a total of \$4.5-\$5.3 trillion since 2007. Savings are \$4.5 trillion when calculated relative to the price in Europe, and \$5.3 trillion when calculated relative to the price in Japan. This is equivalent to \$237-\$276 billion annually, or \$716-\$833 annually per

⁶U.S. Department of Energy, Energy Information Administration, “North America’s LNG export capacity could more than double by 2029”, October 26, 2025.

capita.

As a point of comparison, LED light bulbs have been calculated to have the potential to save U.S. consumers \$56 billion annually.⁷ LED light bulbs use 80% less electricity compared to traditional incandescents, have been called a “once in a century disrupter” and were the basis of the 2014 Nobel Prize in Chemistry. However, we are finding that the annual savings from shale gas are 4 to 5-times larger.

Table 3 reports savings by sector. Of the savings, 38% went to electric power customers, compared to 30%, 19% and 13% for industrial, residential, and commercial customers, respectively. This reflects the level of consumption between sectors and underscores the widespread use of natural gas across sectors.

Table 4 reports savings for the top ten states. Texas was the largest beneficiary, with \$34 billion in savings annually. California, Louisiana, Florida, and New York were the next four with \$19, \$13, \$13 and \$11 billion in annual savings, respectively, and consumers in these five states received 38% of total savings.

Figure 3 plots annual savings per capita by sector. The pattern for electric power highlights the large savings in the Southeast, where electric heating and air conditioning are particularly common (Davis, 2025). The pattern for the industrial sector highlights Louisiana, a state with a high concentration of petrochemical production and petroleum refining. For residential and commercial customers, the pattern reflects the natural gas used for space heating, which is particularly common in the upper Midwest.

This geographic pattern is calculated based on state-level consumption of natural gas.

⁷U.S. Department of Energy, Energy Efficiency and Renewable Energy, “Adoption of LEDs in Common Lighting Applications”, August 2020. The \$56 billion annually is based on 100% saturation of LED lightbulbs throughout all residential and non-residential uses, retail prices, and assumes no rebound effect. Under the same assumptions, the authors calculate annual savings of \$15 billion annually based on saturation levels as of 2018.

This makes sense for the residential and commercial sectors because natural gas is used primarily for space heating, which is then enjoyed at the same location. But it makes less sense for the electric power and industrial sectors. Electricity generated in one state is often consumed in another state. Similarly, fertilizers, chemicals, and plastics produced in Louisiana can be consumed throughout the United States or beyond.

Relatedly, an implicit assumption in these calculations is that natural gas prices pass through to retail prices. Hausman and Kellogg (2015) document one-to-one pass-through for natural gas retail prices but not one-to-one pass-through for ammonia and plastic. For globally-traded commodities such as ammonia and plastic, the benefits of low-price natural gas have likely been mostly captured by U.S. manufacturers.

4 Discussion

The underlying assumption in these calculations is that without hydraulic fracturing and other technological advances associated with shale gas, the United States would have been importing LNG and thus U.S. consumers would have been paying the prices observed in Europe or Japan. We are not arguing that there would have been zero U.S. gas production, just that the *marginal* unit would have been supplied by LNG. This is a simple, transparent approach to calculating the savings from U.S. shale gas, and is supported by the evidence presented earlier with regard to U.S. LNG imports and the lack of price differences prior to 2007. However, several important caveats are in order.

First, these calculations assume that U.S. demand for natural gas is perfectly inelastic. Thus, consumer surplus is a rectangle with height equal to the price difference and width equal to total U.S. natural gas consumption. Of course, in practice, demand is not perfectly inelastic, so in a counterfactual without shale gas, higher prices would have reduced demand

and therefore consumer surplus. In the online appendix, we incorporate a non-zero demand elasticity using estimates from Hausman and Kellogg (2015), and find that it reduces the calculated savings to U.S. consumers by 27%.

Second, these calculations also assume that non-U.S. prices would not have changed. But, had the U.S. been importing LNG, that would have pushed further upward the prices in Europe and Japan. This would have resulted in even larger measures of savings. Understanding the size of this effect would require understanding the long-run supply curve for natural gas in LNG exporting countries. We do not attempt to model this explicitly, but it is worth emphasizing again that this would *increase* calculated savings, working in the opposite direction as the previous caveat.

Third, and relatedly, these calculations ignore that the observed non-U.S. prices reflect U.S. LNG exports. For example, were it not for U.S. LNG exports, prices in Europe and Japan would have gone even higher in 2022 with the Ukraine war. We do not model this, but, like the previous caveat, this would further increase the calculated savings from shale gas, particularly after 2016 as U.S. LNG exports increased.

Finally, and probably most importantly, these calculations ignore environmental impacts. A comprehensive analysis would incorporate both direct effects of increased U.S. natural gas production, including groundwater contamination (Hill and Ma, 2022) and methane leaks (Sherwin et al., 2024), as well as indirect effects of natural gas displacing other forms of energy with higher or lower carbon intensity. A recent paper looks at the related question of the carbon impacts of U.S. LNG exports (Abuin, 2025), but more research is needed.

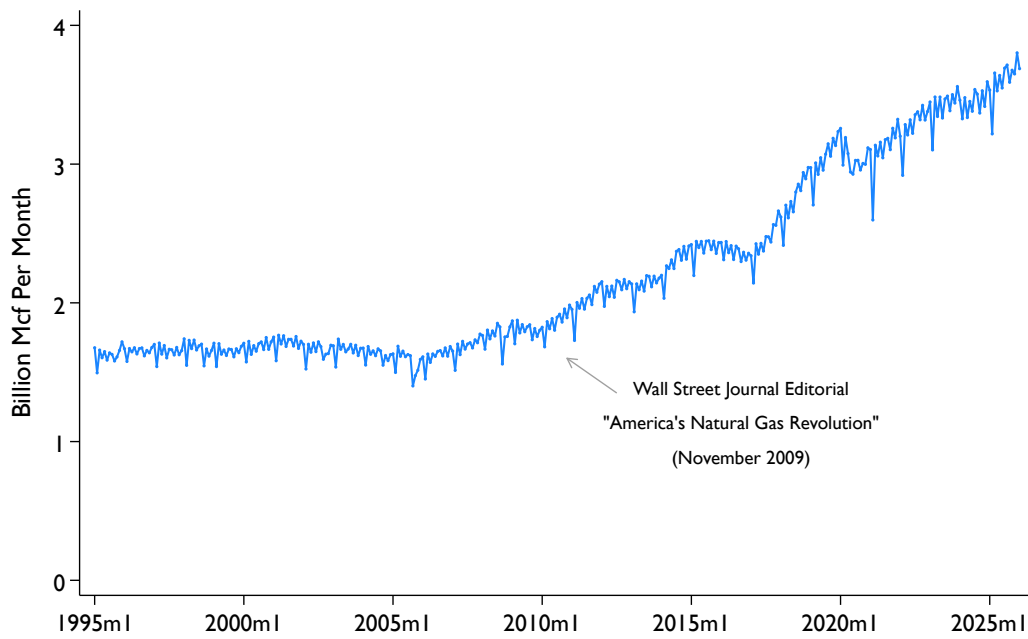
5 Conclusion

Shale gas was initially hailed as a “revolution”, yet by 2026, we almost take for granted the vast amounts of natural gas production made possible by advances in hydraulic fracturing and related technologies. As with many innovations, nobody was talking about it, then everyone was talking about it, and then it became commonplace.

Major supply shocks are an important reminder. The war in Ukraine sent natural gas prices through the roof in Europe, making U.S. consumers very happy to have shale gas. The Iran war is similar. Our data do not include 2026, but LNG prices doubled in the first 10 days of March 2026, and attacks on LNG infrastructure in Qatar and elsewhere pushed prices up even further. Once again, U.S. prices barely budged. This insulation from major supply shocks is, in a large way, the result of shale gas.

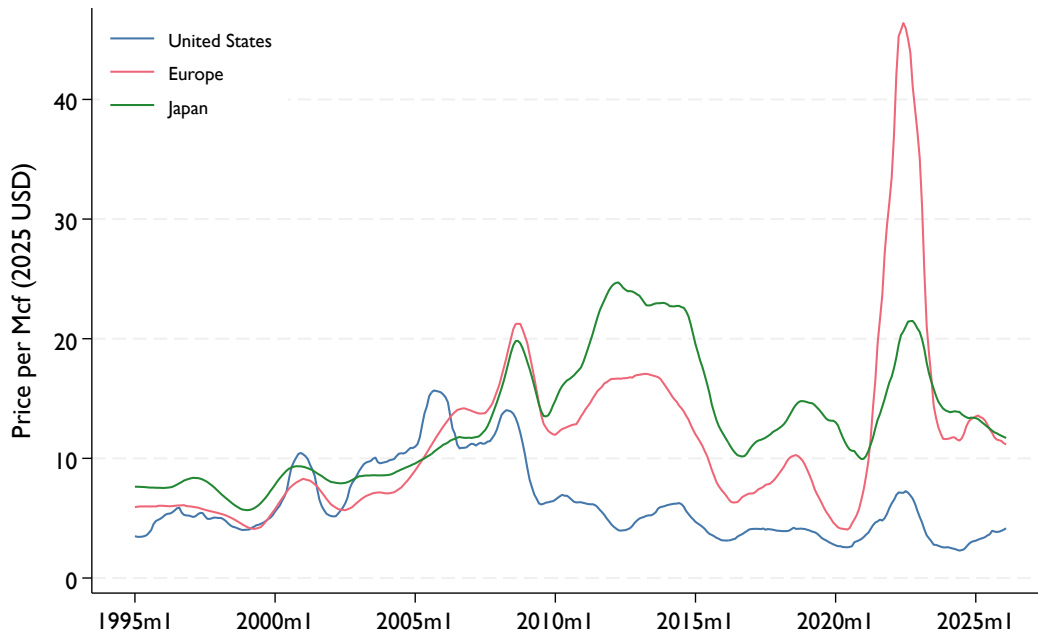
The economic benefits of shale gas have been widely enjoyed by virtually everyone in the United States. If you heat your home with natural gas and use a lot of electricity, plastic and fertilizer then you have benefited more than average. However, because natural gas is an important input into so many production processes, it is not an exaggeration to say that every single person in the U.S. has enjoyed lower prices because of shale gas.

Figure 1: U.S. Natural Gas Production



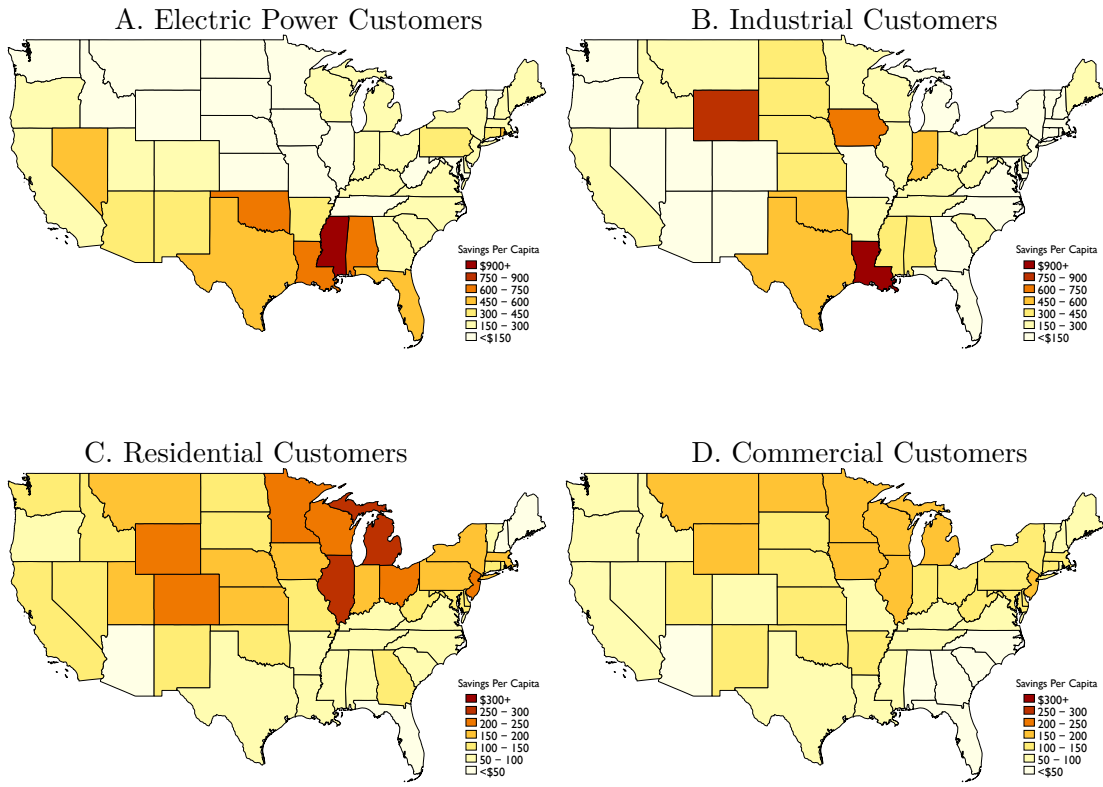
Notes: This figure plots monthly data from U.S. Department of Energy, Energy Information Administration, "U.S. Natural Gas Marketed Production".

Figure 2: Natural Gas Prices in the US, Europe and Japan



Notes: This figure plots 12-month rolling averages based on monthly data from the World Bank, Commodity Markets Outlook, Historical Data. The three price benchmarks are (1) U.S. natural gas prices at Henry Hub, (2) European natural gas prices at Netherlands Title Transfer Facility, and (3) LNG import prices in Japan. Prices have been normalized to reflect 2025 dollars.

Figure 3: Annual Savings Per Capita, By Sector



Notes: These maps plot annual savings per capita by sector, averaged over the period 2007-2025.

Table 1: Natural Gas Prices in the US, Europe & Japan

	U.S.	Europe	Japan
Pre-Shale (1995-2006)	7.7	7.3	8.5
Post-Shale (2007-2025)	5.3	14.3	16.1

Note: This table reports average natural gas prices per Mcf for three price benchmarks. Monthly data from the three price benchmarks come from the World Bank, Commodity Markets Outlook, Historical Data. Prices have been normalized to reflect 2025 dollars.

Table 2: Savings for U.S. Consumers, 2007-2025

	Relative to Europe	Relative to Japan
Total Savings (in Trillions)	\$4.5	\$5.3
Average Annual Savings (in Billions)	\$237	\$276
Average Annual Savings Per Capita	\$716	\$833

Note: Annual savings were calculated by multiplying U.S. natural gas consumption by the price difference between the U.S. and one of the two other price benchmarks, as indicated in the column headings. For example, in 2025 U.S. natural gas prices averaged \$8.7 per Mcf lower than European natural gas prices, and U.S. natural gas consumers used 30 billion Mcf, so the implied savings for 2025 were \$261 billion. Per capita savings were calculated using the U.S. population as of 2020. All dollar values have been normalized to reflect 2025 dollars. Consumption quantities come from U.S. Department of Energy, Energy Information Administration and reflect total gas delivered to consumers.

Table 3: Annual Savings By Sector, 2007-2025

	Relative to Europe	Relative to Japan	Relative to Europe	Relative to Japan
	<u>in Billions</u>		<u>in Percent</u>	
Electric Power Customers	\$93	\$106	38%	38%
Industrial Customers	\$71	\$84	30%	30%
Residential Customers	\$43	\$51	19%	19%
Commercial Customers	\$30	\$36	13%	13%
Total	\$237	\$276	100%	100%

Note: This table reports annual savings by customer type. Calculations were done similarly to the previous table, but based on U.S. natural gas consumption by customer type. EIA also tracks a fifth category of customer “vehicle fuel delivered” but this category is very small and has been combined with commercial customers.

Table 4: Annual Savings By State, 2007-2025

	Relative to Europe	Relative to Japan
	<u>in Billions</u>	
1. Texas	\$34	\$40
2. California	\$19	\$23
3. Louisiana	\$13	\$15
4. Florida	\$13	\$15
5. New York	\$11	\$14
6. Pennsylvania	\$10	\$12
7. Ohio	\$10	\$11
8. Illinois	\$9	\$11
9. Michigan	\$8	\$9
10. Indiana	\$7	\$8
All Other States	\$102	\$118

Note: This table reports annual savings for the top ten states. Calculations were done similarly to the previous table, but based on U.S. natural gas consumption by state.

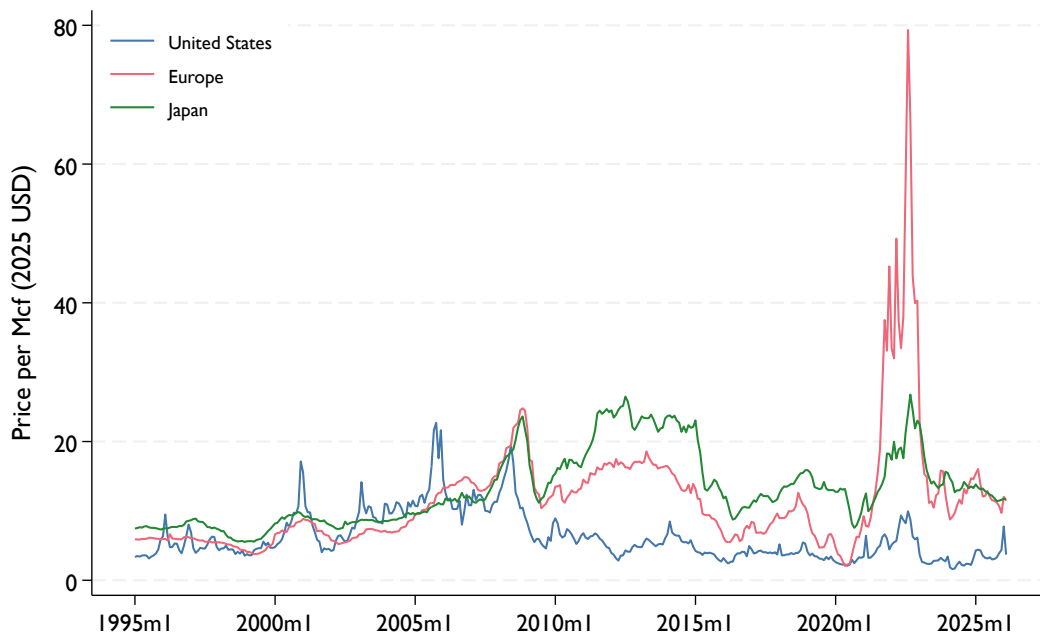
References

- Abuin, Constanza**, “Power Decarbonization in a Global Energy Market: The Climate Effect of U.S. LNG Exports,” *Working Paper*, 2025.
- Acemoglu, Daron, Philippe Aghion, Lint Barrage, and David Hémous**, “Climate Change, Directed Innovation, and Energy Transition: The Long-Run Consequences of the Shale Gas Revolution,” *National Bureau of Economic Research Working Paper*, 2023.
- Bartik, Alexander W, Janet Currie, Michael Greenstone, and Christopher R Knittel**, “The Local Economic and Welfare Consequences of Hydraulic Fracturing,” *American Economic Journal: Applied Economics*, 2019, 11 (4), 105–155.
- Chirakijja, Janjala, Seema Jayachandran, and Pinchuan Ong**, “The Mortality Effects of Winter Heating Prices,” *Economic Journal*, 2024, 134 (657), 402–417.
- Cullen, Joseph A and Erin T Mansur**, “Inferring Carbon Abatement Costs in Electricity Markets: A Revealed Preference Approach Using the Shale Revolution,” *American Economic Journal: Economic Policy*, 2017, 9 (3), 106–133.
- Davis, Lucas W**, “What Matters for Electrification? Evidence from 70 Years of US Home Heating Choices,” *Review of Economics and Statistics*, 2025, 107 (3), 668–684.
- Dugoua, Eugenie and Todd D Gerarden**, “Induced Innovation, Inventors, and the Energy Transition,” *American Economic Review: Insights*, 2025, 7 (1), 90–106.
- Fell, Harrison and Daniel T Kaffine**, “The Fall of Coal: Joint Impacts of Fuel Prices and Renewables on Generation and Emissions,” *American Economic Journal: Economic Policy*, 2018, 10 (2), 90–116.
- Feyrer, James, Erin T Mansur, and Bruce Sacerdote**, “Geographic Dispersion of Economic Shocks: Evidence From the Fracking Revolution,” *American Economic Review*, 2017, 107 (4), 1313–1334.
- Hausman, Catherine and Ryan Kellogg**, “Welfare and Distributional Implications of Shale Gas,” *Brookings Papers on Economic Activity*, 2015.
- Hill, Elaine L and Lala Ma**, “Drinking Water, Fracking, and Infant Health,” *Journal of Health Economics*, 2022, 82, 102595.
- Knittel, Christopher, Konstantinos Metaxoglou, and Andre Trindade**, “Are We Fracked? The Impact of Falling Gas Prices and the Implications for Coal-to-Gas Switching and Carbon Emissions,” *Oxford Review of Economic Policy*, 2016, 32 (2), 241–259.
- Linn, Joshua and Lucija Muehlenbachs**, “The Heterogeneous Impacts of Low Natural Gas Prices on Consumers and the Environment,” *Journal of Environmental Economics and Management*, 2018, 89, 1–28.
- Mason, Charles F, Lucija A Muehlenbachs, and Sheila M Olmstead**, “The Economics of Shale Gas Development,” *Annual Review of Resource Economics*, 2015, 7 (1), 269–289.

Muehlenbachs, Lucija, Elisheba Spiller, and Christopher Timmins, “The Housing Market Impacts of Shale Gas Development,” *American Economic Review*, 2015, *105* (12), 3633–3659.

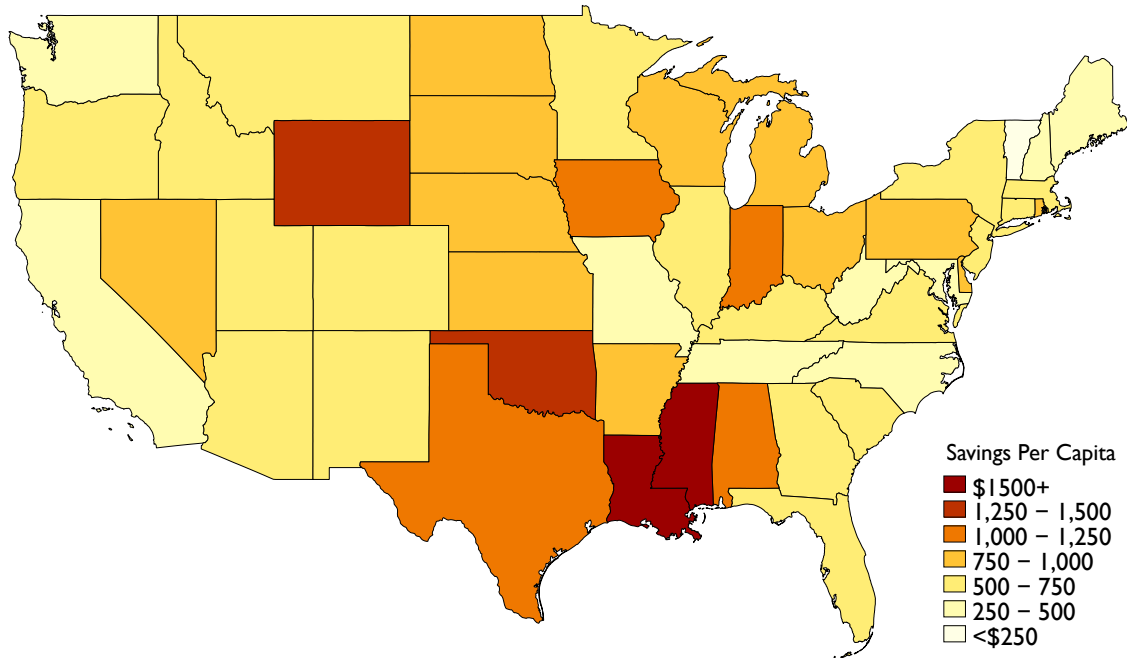
Sherwin, Evan D, Jeffrey S Rutherford, Zhan Zhang et al., “U.S. Oil and Gas System Emissions From Nearly One Million Aerial Site Measurements,” *Nature*, 2024, *627* (8003), 328–334.

Appendix Figure 1: Natural Gas Prices in the US, Europe and Japan, Without Smoothing



Notes: This figure is identical to Figure 2 except it plots raw monthly prices rather than 12-month rolling averages. As with the figure in the paper, prices have been normalized to reflect 2025 dollars.

Appendix Figure 2: Annual Savings Per Capita, Across All Sectors

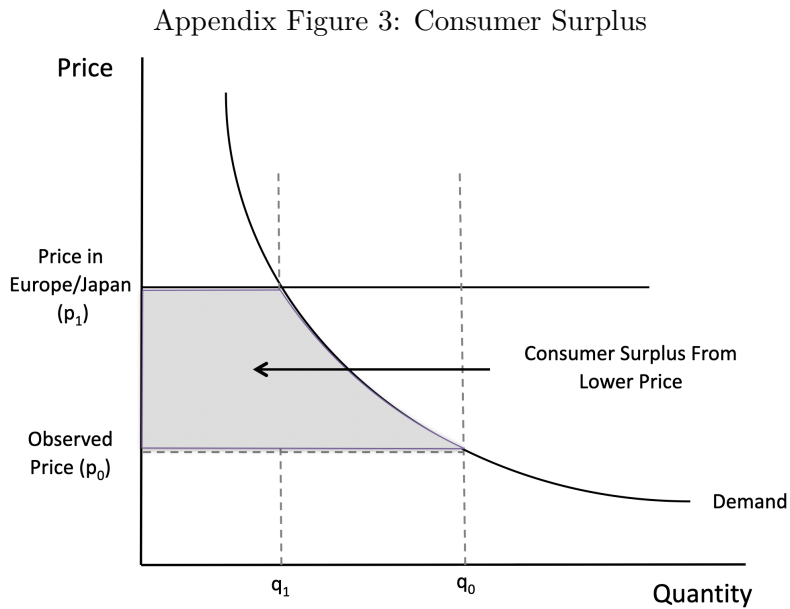


Notes: This map is similar to Figure 3 but plots total savings per capita by state 2007-2025, rather than sector-by-sector. Louisiana and Mississippi have the highest savings per capita due to the large amount of natural gas used in those states by electric power and industrial customers. States with the lowest savings per capita include Vermont, New Hampshire, and Maine, which have relatively little natural gas consumption in the electric power or industrial sectors and historically have used more heating oil than natural gas for heating.

A Demand Elasticity

The calculations in the paper assume that U.S. demand for natural gas is perfectly inelastic. Thus, consumer surplus is calculated as the area of a rectangle with height equal to the price difference and width equal to the observed level of U.S. natural gas consumption. In this section, we incorporate demand elasticity using estimates from the literature. This section provides all the details but the bottom line is that incorporating demand elasticity reduces the calculated savings to U.S. consumers by 27%.

We assume that U.S. demand for natural gas is described using a constant elasticity demand function, $q = Ap^\epsilon$ with a scale parameter A that varies across sectors and years, price p , and elasticity ϵ . For the elasticity (ϵ) we used estimates of the long-run elasticity of demand for natural gas in the United States from (Hausman and Kellogg, 2015). In particular, the assumed elasticities are -.20, -.23, -.57, and -.47 for the residential, commercial, industrial, and electric power sectors, respectively.



Let p_0 and p_1 denote the observed price and the counterfactual price, respectively, and let q_0 and q_1 denote the observed and counterfactual consumption levels.

The demand function is used to predict consumption under counterfactual prices and to calculate the change in consumer surplus. We first calculate the scale parameter (A) for each sector and year, using the assumed demand elasticity (ϵ) and the observed price (p_0) and the level of consumption (q_0).

We then use the demand function, including the calculated scale parameter (A), to predict consumption at the counterfactual price. The change in consumer surplus for a particular sector and year can then be calculated as the shaded area in Figure 3. This can be described as with the following equation,

$$CS = \int_{p_0}^{p_1} Ap^\epsilon dp.$$

Evaluating the integral yields,

$$CS = \frac{A}{(1 + \epsilon)} [p_1^{(1+\epsilon)} - p_0^{(1+\epsilon)}].$$

It is helpful to go through an example. In 2025, the price of natural gas (p_0) in the United States was \$3.7 per Mcf, and consumption (q_0) in the industrial sector was 8.6 billion Mcf. Rearranging the demand function to solve for A yields,

$$A = q_0 p_0^{-\epsilon} = 8.6 * 3.70^{0.57} = 18.1.$$

At the counterfactual price \$12.4 the demand function implies that consumption would be equal to,

$$q_1 = A p_1^\epsilon = 18.1 * 12.4^{-0.57} = 4.3.$$

Thus, the demand function implies that at this higher counterfactual price, natural gas consumption in 2025 in the industrial sector would have been 4.3 billion Mcf.

Using the equation above, consumer surplus is equal to,

$$CS = \frac{18.1}{(0.43)} [12.4^{(.43)} - 3.7^{(.43)}] = 50.4$$

Thus, consumer surplus in the industrial sector in 2025 is calculated to be \$50.4 billion.

Appendix Table 1 provides year-by-year calculations. The underlying calculations were made sector-by-sector, and then we take sums for the final three columns. The annual average 2007-2025 of \$174 billion can be compared to the \$237 in Table 2 which assumes perfectly inelastic demand. Incorporating the price elasticity of demand reduces the estimated consumer surplus by 27%.

Appendix Table 1: Consumer Surplus Calculations With Demand Elasticity

Year	Price in the U.S. (\$ per Mcf)	Price in Europe (\$ per Mcf)	Observed Consumption (billions Mcf)	Counterfactual Consumption (billions Mcf)	Consumer Surplus (\$ billions)
2007	11.3	13.8	21.3	18.8	50
2008	13.7	20.8	21.4	16.7	133
2009	6.2	13.6	21.0	13.0	120
2010	6.7	12.7	22.1	15.1	108
2011	5.9	15.6	22.5	12.6	157
2012	4.0	16.7	23.4	9.9	181
2013	5.3	16.9	23.8	11.9	186
2014	6.2	14.2	24.4	14.8	149
2015	3.7	9.6	25.0	14.1	108
2016	3.5	6.4	25.2	17.5	60
2017	4.0	7.8	24.8	16.7	75
2018	4.2	10.2	27.6	16.2	124
2019	3.4	6.3	28.3	19.4	68
2020	2.6	4.2	27.7	20.9	38
2021	4.7	19.6	27.7	11.8	251
2022	7.3	46.0	29.2	9.6	578
2023	2.8	14.4	29.4	11.0	190
2024	2.3	11.7	29.8	11.4	157
2025	3.7	12.4	30.2	14.5	174
Average	5.3	14.4	25.5	17.3	174

Note: This table provides year-by-year calculations for consumer surplus based on the estimated long-run elasticities in Hausman and Kellogg (2015). The calculations of counterfactual consumption and consumer surplus were made sector-by-sector, and then summed. The annual average 2007-2025 of \$174 billion can be compared to the \$237 in Table 2 which assumes perfectly inelastic demand. Incorporating the price elasticity of demand reduces the estimated consumer surplus by 27%.