GULF(2025)ASTENERGY OUTLOOK

Energy Studies













Outline





Outline



Uncertainties

1. Presidential Election

- 2. Economic Outlook
- 3. Decarbonization Efforts: Balancing Cost Competitiveness and Emissions Reductions
- 4. A New Era of Electric Demand Growth?





Presidential Election 1.1

- 1.
- 2. International trade uncertainties?
- 3. The end of supply restrictive policies?

assumes no major change to international trade policies.



Will federal programs and subsidies under the IIJA and IRA continue?

The results of the national elections occurred concurrently with the finalizing of the GCEO. As in all prior GCEOs, the current policy regime is assumed to continue until the policy changes. For example, this year's GCEO modeling assumes IIJA and IRA tax credits and subsidies will continue with the new administration. Further, GCEO





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U.S. Non-Farm Employment



Source: Bureau of Labor Statistics. Current Employment Statistics (CES). Retrieved from FRED. S&P 500 from www.investing.com.



Personal Consumption Expenditures Index and Wage Growth





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Source: Energy Information Administration. Future trends are from Annual Energy Outlook 2023 reference scenario.



Primary Energy Consumption and GDP











Source: International Energy Agency. World Energy Outlook 2024.

World Final Energy Consumption

Stated Policies Scenario



1.2 Economic Outlook

This year's GCEO modeling assumes that wage growth will continue to outpace inflation, and demand for energy globally will continue to rise. GCEO, much like years past, anticipates that long-run energy demand growth will lead to increased U.S. energy exports, especially to the growing developing world.





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one third nationally.





Sources: Emissions data from the Energy Information Administration. Real GDP from the Bureau of Economic Analysis and quoted in billions of chained 2017 dollars, not seasonally adjusted.



Emissions Intensity of GDP (2018-22 Average)

Including Land Use, Land-Use Change, and Forestry



Sources: GDP data from the World Bank and quoted in current PPP. Emissions data from the International Monetary Fund.





4 NOVEMBER 2024

Carbon Border Adjustment Mechanism

European

ommission



کاربن بارڈر ایڈجسٹمنٹ میکانزم SINIRDA KARBON DÜZENLEME MEKANIZMASI MECANISMO DE AJUSTE МЕХАНІЗМ ВУГЛЕЦЕВОГО EN FRONTERA POR CARBONO

CARBONE AUX FRONTIERES

MECANISMO DE AJUSTAMENTO CARBÓNICO FRONTEIRIÇO الألية الحدودية لضبط الكربون MEKANISME

炭素国境調整措置 PENYESUAIAN BATAS KARBON ISIXHOBO SOKUHLENGAHLENGISA UMDA WE-KHABON

碳边境调节机制

CBAM definitive regime (from 2026)



EU importers of goods covered by CBAM will register with national authorities where they can also buy CBAM certificates. The price of the certificates will be calculated depending on the weekly average auction price of EU ETS allowances expressed in €/tonne of CO2 emitted.



EU importers will declare the emissions embedded in their imports and surrender the corresponding number of certificates each year.



If importers can prove that a carbon price has already been paid during the production of the imported goods, the corresponding amount can be deducted.

S.3198 - Foreign Pollution Fee Act of 2023



SEPTEMBER 9, 2024

VIDEO: CASSIDY OUTLINES PLAN TO COMBAT THE CHINESE COMMUNIST PARTY'S GROWING INFLUENCE IN THIRD EPISODE OF THE BILL ON THE HILL SERIES





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Risk or Opportunity?

Decarbonization will continue to challenge existing Gulf Coast energy manufacturing but will also create an opportunity for regional leadership in the development of the production capacity for liquid fuels, chemicals, plastics, fertilizers, and other products historically derived from fossil fuels with lower GHG emissions. Companies are actively considering the most efficient ways to achieve meaningful GHG emissions reductions given the subsidies that are currently available under the IRA. Over the forecast horizon, the GCEO sees decarbonization creating considerable regional capital investment opportunities. Longer-term effects of decarbonization on the region will be determined by the cost to achieve emissions reductions alongside the global market's willingness to pay a premium for less emission intensive products.



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World Electricity Demand

Stated Policies Scenario

U.S. Total Electricity Generating Capacity



Reference Electrification Levels

1.4 A New Era of Electric Demand Growth?

Theoretical Potential Impact on Electricity and Energy Usage

 $\% \Delta$ in El (TV

Electric Vehicles

Heat Pumps

Data Centers

Note: These are meant to be illustration Sources: EV scenario uses data from uses data from NREL's ResStock policy from EPRI.

GCEO anticipates the share of energy in the U.S. economy from electricity to increase over the coming decade, but that much like years past, anticipates that long-run energy demand growth will lead to increased U.S. energy exports, especially to the growing developing world.

ectricity /h)	% ∆ in Energy (quads)	
29.5%	-9.0%	
11.2%	-4.0%	
5.9%	0.9%	
e only, not a pro EIA, FHWA, and	0.9 jection of future changes. I DoE. Heat pump scenario a center scenario uses da	



Electricity as a Percentage of Final Energy Consumption



Source: International Energy Agency. World Energy Outlook 2024.

Stated Policies Scenario





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U.S. Electricity Generating Capacity by Source



Source: National Renewable Energy Laboratory. Solar includes Utility-Scale Solar, Rooftop PV, and CSP. Wind includes both Offshore and Land-based. Natural Gas is combination of Combined Cycle and Combination Turbine. Other category includes Geothermal, Biopower and Oil & Gas Steam.

Reference Electrification Levels

	2034	2038	2042	2046	20
Coal		Natural Gas		Other	
Vind	1	Solar	1	Storage	



Gulf Coast Electricity Generation by Source



Source: National Renewable Energy Laboratory. Solar includes Utility-Scale Solar, Rooftop PV, and CSP. Wind includes both Offshore and Land-based. Natural Gas is combination of Combined Cycle and Combination Turbine. Other category includes Geothermal, Biopower, Oil & Gas Steam, Imports, Curtailment and Storage.

Reference Electrification Levels







Carbon Intensity of U.S. Electricity Generation

Gulf States Carbon Intensity of Electricity Generation



Source: National Renewable Energy Laboratory.

Reference Electrification Levels



1.4 A New Era of Electric Demand Growth?

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Source: Energy Information Administration.



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Source: Energy Information Administration, Baker Hughes Rig Count Overview.

U.S. Rig Count and WTI Spot Price - \$140 -\$120 MTI Spot Price (\$/Bbl) - \$40

WTI Spot Price

2020

2022

2018



- \$20

2024



U.S. Rig Count


















Source: Energy Information Administration.

Regional Crude Oil Production





Source: Energy Information Administration.





Spot price adjusted to current Consumer Price Index. Source: Energy Information Administration.

West Texas Intermediate Prices





Spot price adjusted to current Consumer Price Index. Sources: Energy Information Administration. S&P Global Market Intelligence.



Historical Inflation Adjusted Crude Oil Prices



WTI Spot price adjusted to current Consumer Price Index. Source: Energy Information Administration.









Haynesville Natural Gas Production





Source: S&P Global Market Intelligence.





Source: S&P Global Market Intelligence.









Source: Enverus. DrillingInfo Prodcast.





Source: Enverus. DrillingInfo Prodcast.



2032

Natural Gas Production Forecast









Source: Enverus. DrillingInfo Prodcast.







Natural Gas Production Forecast







Sources: Enverus and Energy Information Administration.

U.S. Value of Production

Historical and Forecast











Gulf Coast Value of Production

Historical and Forecast











Outline





Source: Energy Information Administration.







Source: Bloomberg.

Natural Gas Prices

Historical Comparison



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JKM Natural Gas Prices



Dutch TTF Natural Gas Price



Source: Bloomberg.





Spot price adjusted to current Consumer Price Index. Sources: Energy Information Administration. S&P Global Market Intelligence.

Brent WTI Trends



Natural Gas Pipeline Capacity Additions



Source: Energy Information Administration, Natural Gas Pipeline Projects.

by Project Type







Natural Gas Pipeline Capacity Additions

by Project Status





Outline





Gulf Coast Total Electricity Sales



Gulf Coast Industrial Electricity Sales



Share of Industrial Sales in U.S.







Source: Argonne National Laboratory.





Source: Energy Information Administration.

Electricity Rates



Utility Scale Electricity Generation



Source: Energy Information Administration.

By Source

2018	2019	2020	2021	2022	20
Hydroelectric		Nuclear	Natura	Natural Gas	





2023 Average Industrial Electricity Rates



Source: Energy Information Administration Hawaii (35 ¢/kWh) is excluded from the figure.

¢/kWh

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CO₂ Emissions per MWh of Generation Gulf Coast & U.S.



Note: The emissions data presented include total emissions from both electricity generation and the production of useful thermal output. Source: Energy Information Administration, Form EIA-923 Power Plant Operations Report, Form EIA-860 Annual Electric Generator Report.




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NO_x Emissions per MWh of Generation Gulf Coast & U.S.





SO₂ Emissions per MWh of Generation Gulf Coast & U.S.



Note: The emissions data presented include total emissions from both electricity generation and the production of useful thermal output. Source: Energy Information Administration, Form EIA-923 Power Plant Operations Report, Form EIA-860 Annual Electric Generator Report.



Historical & Future Power Plant Capacity



Source: S&P Global Market Intelligence.

United States





Source: S&P Global Market Intelligence.



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Historical and Future Solar Capacity in MISO Interconnection Queue 50,000 40,000 Solar Capacity in Queue (MW) If all Louisiana solar were 30,000 built out, it would be enough to power 3 million Louisiana 20,000 households! 10,000 -0 2020 2021 2022 2023 2024 2025 2026 2027 Louisiana

Source: Midcontinent Independent System Operator. 2024 includes both completed projects and projects in the interconnection queue. Only projects which have reached a Generator Interconnection Agreement are included.







Outline

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Gulf Coast Energy Manufacturing Investments



Source: Authors' construct.







Source: Energy Information Administration.









Gulf Coast Manufacturing

- Between 2011 and 2023, there was approximately \$258 billion of investment in refining, chemicals, hydrocarbon export, and transition energy in the Gulf Coast region.
- •Approximately \$142 billion, or 55%, is within Louisiana.
- \cdot Currently, there are an additional \$220 billion in announcements, approximately 53% of which are in Louisiana.

Year	Texas				Louisiana				Other GOM				Total GOM			
	LNG	Non-LNG	Transition	Total	LNG	Non-LNG	Transition	Total	LNG	Non-LNG	Transition	Total	LNG	Non-LNG	Transition	T
								(mill	ion \$)	ייייי) \$)						
2024	9,346	5,514	8,164	23,024	17,516	2,626	11,799	31,941	889	-	29	918	27,751	8,289	19,991	5
2025	11,505	4,941	9,389	25,835	13,501	3,261	15,335	32,097	2,226	-	55	2,281	27,232	8,203	24,779	6
2026	10,122	1,763	9,239	21,124	8,683	4,035	13,668	26,387	2,634	-	55	2,689	21,439	5,799	22,962	5
2027	4,226	1,363	9,483	15,073	4,320	3,738	6,687	14,745	1,624	-	30	1,654	10,171	5,101	16,200	3
2028	352	559	8,375	9,285	2,962	2,785	2,375	8,122	471	-	3	474	3,785	3,343	10,753	1
2029	-	118	1,242	1,360	966	908	600	2,474	33	-	-	33	999	1,026	1,842	
2030	-	8	30	38	70	66	41	178	-	-	-	-	70	74	71	
Total	\$ 35,551	\$ 14,267	\$ 45,921	\$ 95,739	\$ 48,019	\$ 17,419	\$ 50,505	\$ 115,943	\$ 7,878	\$-	\$ 172	\$ 8,050	\$ 91,447	\$ 31,835	\$ 96,59 8	\$ 21







Outline





Final Energy Consumption, U.S. and World

Stated Policies Scenario



Source: International Energy Agency. World Energy Outlook 2024.







Source: United Nations. World Population Prospects 2024.

Population Growth by Region







Source: Energy Information Administration.



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Sources: EIA and Bloomberg.

U.S. Gulf Coast Gasoline





Source: Energy Information Administration.

U.S. & Gulf Coast Refining Utilization







U.S. Crude Oil Trade









Source: Energy Information Administration.







Source: Energy Information Administration. Note: 2024 includes months January-August.





Source: U.S. Census Bureau: Economic Indicators Division USA Trade Online.

Gulf Coast Exports to World by NAICS





Gulf Coast Exports to China by NAICS



Source: U.S. Census Bureau: Economic Indicators Division USA Trade Online.



Emissions Intensity of GDP





Emissions Intensity of GDP







Outline







Sources: Enverus, Bureau of Labor Statistics, Energy Information Administration and authors' calculations.

Louisiana Upstream Oil and Gas





Sources: Enverus, Bureau of Labor Statistics, Energy Information Administration and authors' calculations.



ENVERUS



Employment Forecast

Texas Upstream Oil and Gas



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Sources: Enverus, Bureau of Labor Statistics, Energy Information Administration and authors' calculations.















Employment Forecast Louisiana Refining and Chemical Manufacturing



Sources: Bureau of Labor Statistics, Energy Information Administration and authors' calculations.



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Sources: Bureau of Labor Statistics, Energy Information Administration and authors' calculations.





Sources: Bureau of Labor Statistics, Energy Information Administration and authors' calculations.

Employment Forecast

Texas Refining and Chemical Manufacturing







Sources: Bureau of Labor Statistics, Energy Information Administration and authors' calculations.





Sources: Enverus, Bureau of Labor Statistics, Energy Information Administration and authors' calculations.



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Sources: Enverus, Bureau of Labor Statistics, Energy Information Administration and authors' calculations.



Broader Economic Implications

Industry

Upstream Oil and Gas Oil and Gas Extraction Support Activities for Mining **Oil and Gas Manufacturing** Petroleum and Coal Products Manufacturing Chemical Manufacturing Source: RIMS II Multipliers.

Note: Multipliers represent the total change in number of jobs in all

Multiplier









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