

EU27 vs US: Comprehensive Energy Policy Analysis

Nuclear, Renewable, and Shale Gas Energy Sources

A detailed analysis of energy policies and trends in the European Union and United States

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Executive Summary

This comprehensive report analyzes the energy policies and energy mix evolution of the European Union (EU27) and the United States from 1990 to 2024. The analysis covers nuclear energy, renewable energy sources, and natural gas (as a proxy for shale gas) to provide a complete picture of energy transition strategies in both regions.

Metric	EU27	US	Difference
Nuclear Energy (2024)	10.1%	7.6%	+2.5%
Renewable Energy (2024)	22.3%	12.1%	+10.2%
Low Carbon Total (2024)	32.4%	19.7%	+12.7%
Fossil Fuel Dependence	67.6%	80.3%	-12.7%

Nuclear Energy Analysis

Nuclear energy has been a cornerstone of both EU27 and US energy strategies, providing stable, low-carbon baseload power. The analysis reveals distinct approaches and outcomes in both regions.

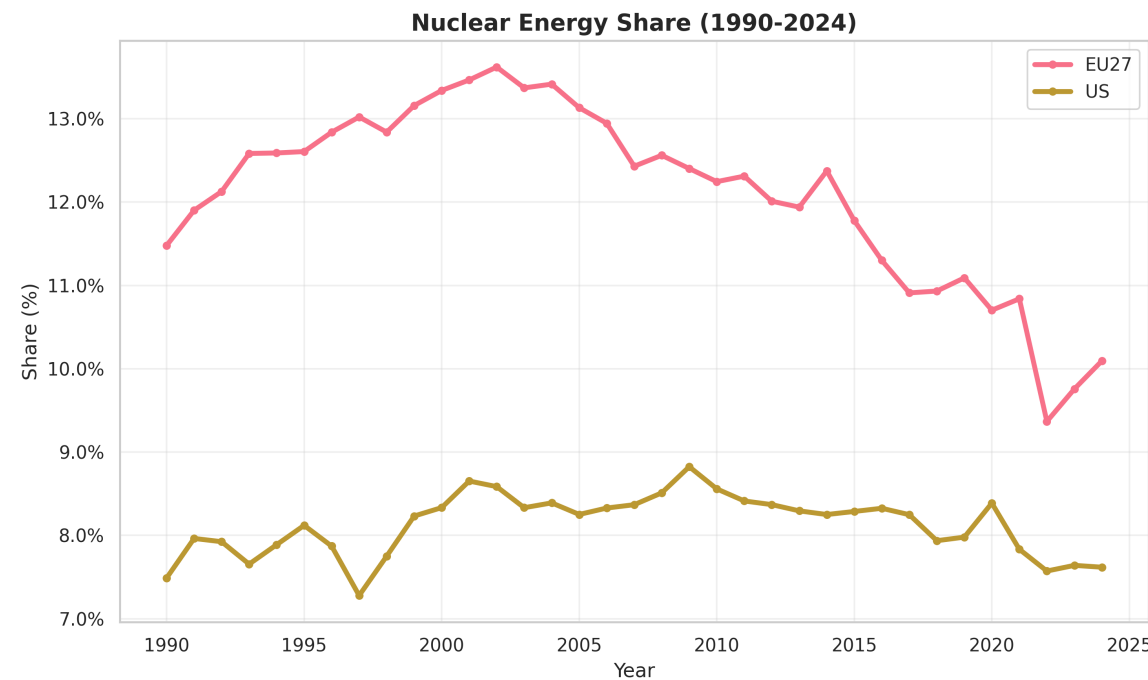


Figure 1: Nuclear Energy Share Trends (1990-2024)

Key Observations:

- EU27 maintains higher nuclear energy share (10.1% vs 7.6% in 2024)
- Both regions show declining nuclear trends since 1990s
- EU27 nuclear decline: 11.8% → 10.1% (2015-2024)
- US nuclear decline: 8.3% → 7.6% (2015-2024)
- Nuclear energy remains crucial for low-carbon energy mix

Renewable Energy Development

Renewable energy has been the fastest-growing energy sector globally, with both EU27 and US showing significant progress, though at different rates and with different policy approaches.

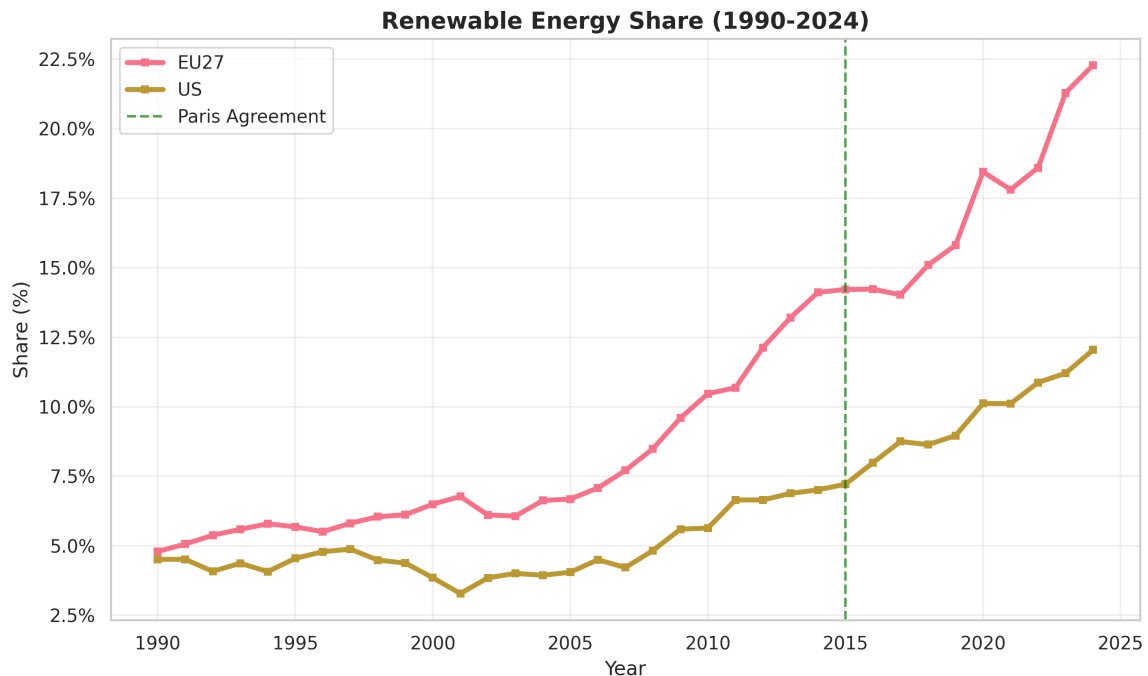


Figure 2: Renewable Energy Share Trends (1990-2024)

Key Observations:

- EU27 leads in renewable energy adoption (22.3% vs 12.1% in 2024)
- Paris Agreement (2015) accelerated renewable growth in both regions
- EU27 renewable growth: 14.2% → 22.3% (2015-2024)
- US renewable growth: 7.2% → 12.1% (2015-2024)
- EU27 shows more aggressive renewable energy policies

Natural Gas and Shale Gas Impact

Natural gas serves as a proxy for shale gas analysis, particularly in the US context. The shale gas revolution that began around 2008 has significantly impacted US energy mix and policy.

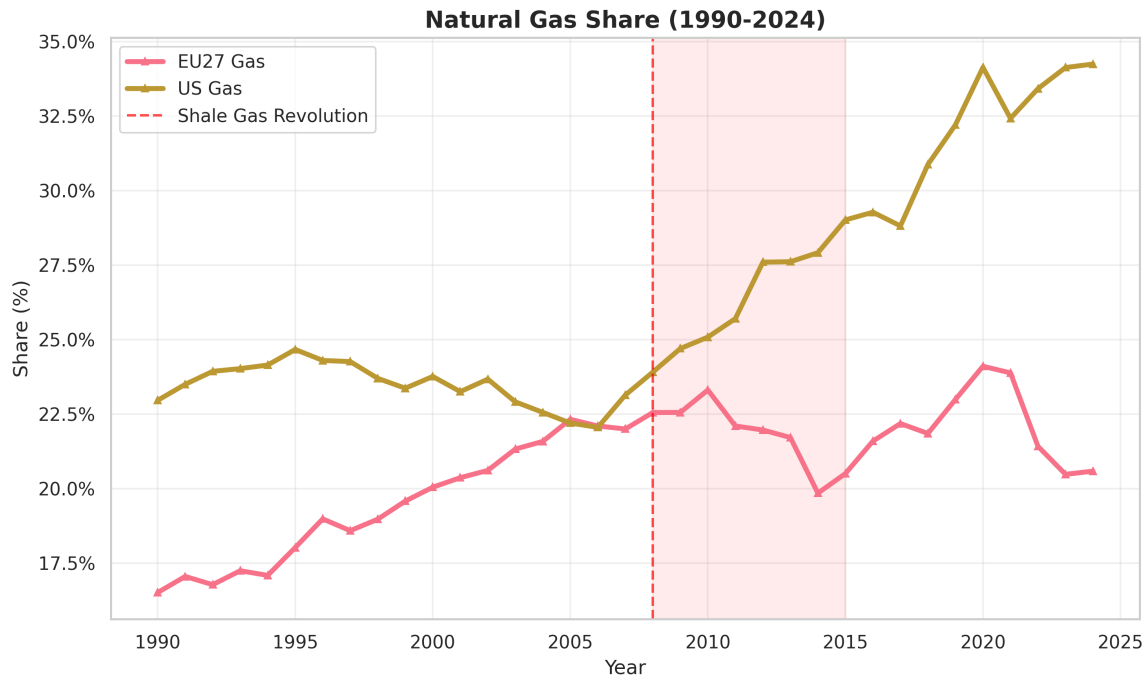


Figure 3: Natural Gas Share Trends (1990-2024)

Key Observations:

- US shale gas revolution (2008) transformed energy landscape
- Natural gas became more competitive and abundant in US
- EU27 maintains more stable gas consumption patterns
- Shale gas enabled US to reduce coal dependency
- Gas serves as transition fuel in both regions

2024 Energy Mix Comparison

The current energy mix provides insights into the effectiveness of different policy approaches and the progress toward low-carbon energy systems.

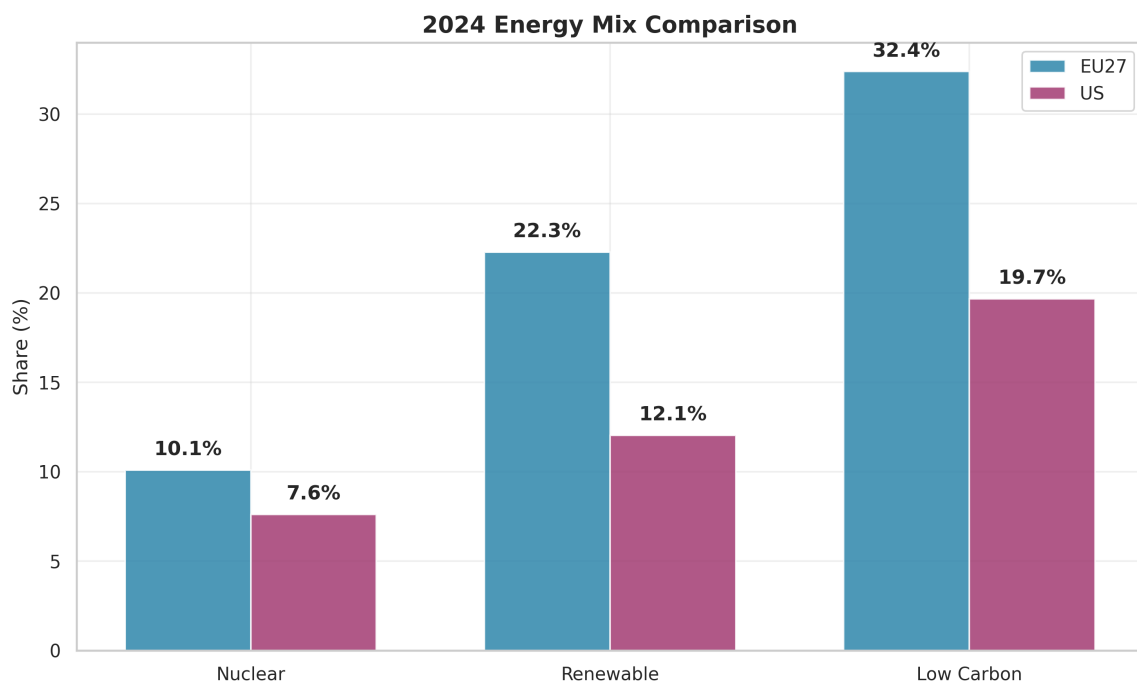


Figure 4: 2024 Energy Mix Comparison

Policy Recommendations

For EU27:

- Continue aggressive renewable energy deployment
- Consider nuclear energy lifetime extensions
- Strengthen energy efficiency policies
- Maintain carbon pricing mechanisms

For US:

- Accelerate renewable energy infrastructure
- Develop next-generation nuclear technologies
- Implement federal renewable energy standards
- Leverage shale gas for transition period

For Both Regions:

- Set ambitious 2050 carbon neutrality targets
- Invest in energy storage and grid modernization
- Develop hydrogen economy infrastructure
- Strengthen international energy cooperation

Methodology

This analysis uses data from Our World in Data (OWID), a comprehensive database maintained by Oxford University. The data covers energy consumption, energy mix, and CO2 emissions from 1900 to 2024. EU27 data represents the current European Union member states, while US data represents the United States. Natural gas data serves as a proxy for shale gas analysis, particularly relevant for the US shale gas revolution that began around 2008.

Data Sources

- Our World in Data Energy Dataset: <https://github.com/owid/energy-data>
- Our World in Data CO2 Dataset: <https://github.com/owid/co2-data>
- Data Period: 1990-2024
- Last Updated: August 2025
- Data Quality: University-level academic standards