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Investigation of the future of electric mobility in the EU: the dependency on the USA

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Abstract

The article aims to investigate the future of electric mobility in the EU as a dependency on the USA. Therefore, the political changes in the USA were investigated, as well as how they might influence European electric mobility. The future of European electric mobility is investigated based on competition in the European and U.S. energy markets. In the 1990s, the United States' energy production and consumption were dominated by fossil fuels, with petroleum, natural gas, and coal being the primary sources. The U.S. also relied heavily on imports. By 2023, the U.S. energy mix had diversified significantly, with petroleum and natural gas still leading at 38% and 36% of energy production, respectively, but with notable contributions from renewable energy sources (9%) and nuclear energy (9%). The shift towards renewable energy has been influenced by political dynamics, with Democratic administrations promoting clean energy policies and international climate agreements while Republican administrations focusing on fossil fuel extraction and energy independence. U.S. foreign policy also plays a crucial role in shaping energy imports and exports, with geopolitical factors and trade agreements impacting the energy landscape. The political climate, particularly the return of Donald Trump to the presidency, could significantly affect domestic and international energy policies, including the development of renewable energy and the market penetration of electric vehicles. In this article, the author investigates the theoretical connection between the U.S. presidency, U.S. energy policy, and its effect on the EU energy policy and electric vehicle market penetration.

Keywords

Fossil fuels; Energy mix; Renewable energy; Energy policy; Electric vehicles

1. Introduction – The energy mixture of USA in the 1990s

To examine and understand the cognitive connection between the energy policies of the USA and the EU, from the future of electric mobility in the EU could be derived, the author has investigated the past of the USA from this point of view. Therefore, the energy mix of the USA is presented first (the 1990s and 2020s).

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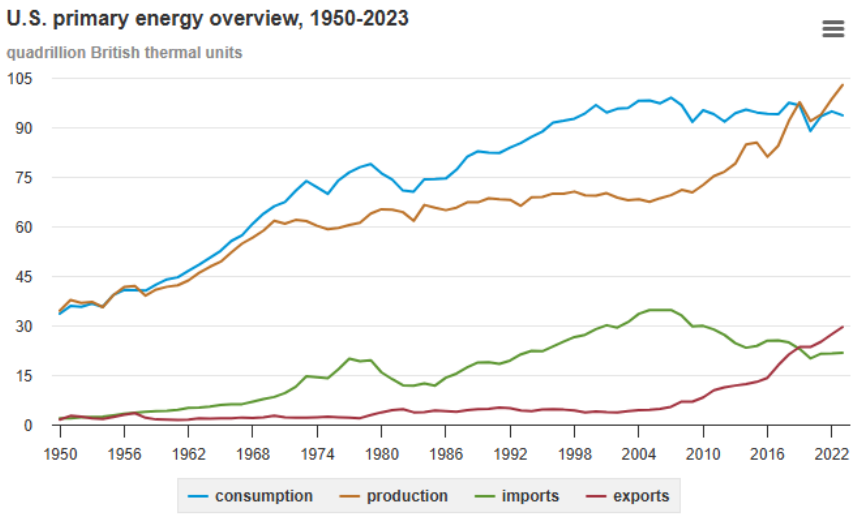

Figure 1. U.S. Primary Energy Overview 1950–2023
Source: EIA (2024a)

The energy mix in the United States in the 1990s can be described as follows (EIA, 2024a).

Crude oil: in the 1990s, it produced about 7-8 million barrels per day (b/d). Imports in the 1990s were around 8-9 million barrels per day(b/d).

Natural Gas: Natural gas production was about 18-20 trillion cubic feet yearly. Imports from Canada were around 2-3 trillion cubic metres per year.

Coal: U.S. coal production was about one billion tonnes per year.

Nuclear power: In the 1990s, U.S. nuclear power generation was about 600-700 billion kWh annually.

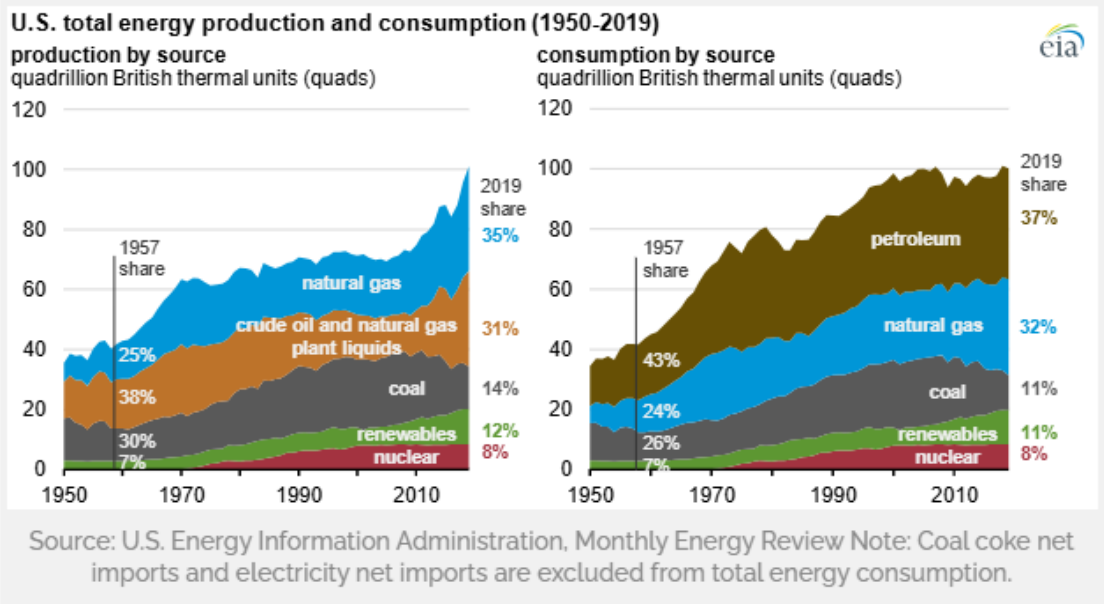

Figure 2. U.S. total energy production and consumption (1950–2019)

Source: EIA (2024a)

URL: https://www.hellenicshippingnews.com/in-2019-u-s-energy-production-exceeded-consumption-for-the-first-time-in-62-years/

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The current energy mix in the United States (Fig. 2) is diverse and consists of the following main sources (2019). Petroleum: 38% of energy production. Natural gas: 36% of energy production. Coal: 9% of energy production. Renewable energy sources account for about 9% of energy production. Within that, wind energy is 18%, solar energy is 11%, hydropower is 10%, and biomass and other renewables are the remaining parts—nuclear energy is 9% (Harris et al., 2018).

Energy consumption by sector (2023) in the U.S.: Electricity generation: 32% of energy consumption, Transport: 28% of energy consumption, Industry: 23% of energy consumption, Residential: 11% of energy consumption, Commercial: 6% of energy consumption. The U.S. energy mix has undergone significant changes in recent years, particularly due to the growing role of renewable energy sources. Fossil fuels continue to dominate, but renewables and nuclear energy also play a significant role in the country's energy supply (EIA, 2024b).

2. Political influence on renewable energies

The list of the presidents of the United States since the 1990s:

- Bill Clinton (Democrat) – 1993–2001
- George W. Bush (Republican) – 2001–2009
- Barack Obama (Democrat) – 2009–2017
- Donald Trump (Republican) – 2017–2021
- Joe Biden (Democrat) – 2021–present
- The next president, who will take office in 2025, will again be Donald Trump, who won the 2024 election as a Republican.

There is a clear connection between U.S. renewable energy policy and the party that holds the presidency (Fang, Parida, 2024). The main differences between the Democratic and Republican Party can be concluded as the Democratic Party supports renewable energy. The Inflation Reduction Act (IRA), passed during the Biden administration in 2022, provides significant incentives for developing renewable energy sources such as solar and wind power. The Democratic presidents Barack Obama and Joe Biden have supported U.S. participation in international climate agreements, such as the Paris Climate Agreement. Democratic administrations often introduce stricter environmental regulations to reduce greenhouse gas emissions and promote clean energy (Bordoff et al., 2024).

The Republican Party is in favour of extracting and using fossil fuels like oil, natural gas, and coal. Under Donald Trump, the U.S. has left the Paris Climate Agreement, and several environmental rules have been scrapped. Republican administrations always emphasise energy independence and dominance, increasing domestic fossil fuel extraction (Tyson and Kennedy, 2024). Additionally, Republican administrations tend to introduce fewer regulations to encourage growth in the energy industry and reduce burdens on businesses (Dews and Gross, 2024).

2.1 How the energy policy of the U.S. influences the decisions of import energy mix

U.S. foreign policy significantly impacts the country's energy import mix. The U.S. has close relations with major energy exporters, such as Canada and Mexico. Canada, for example, is the largest supplier of natural gas and oil to the U.S. Geopolitical conflicts, such as wars in the Middle East, can affect oil prices and the security of supply. U.S. foreign policy aims to secure and maintain energy supplies in these regions. The U.S. can impose sanctions on major oil exporters like Iran and Venezuela, reducing the amount of oil imported and increasing prices. U.S. trade agreements, such as the USMCA (United States–Mexico–Canada Agreement), facilitate energy imports and exports with neighbouring countries (Kern, 2006).

The U.S. rejoined the Paris Agreement in 2021, on the first day of the Biden administration. The country's participation in the Paris Climate Agreement influenced the country's energy policy, particularly developing renewable energy sources and reducing greenhouse gas emissions.

2.2 How could U.S. policy affect EU energy imports?

The victory of the Republican Party, particularly Donald Trump's return to the presidency, will affect European energy imports in several ways. Trump's policies are clear: increase fossil fuel production, especially oil and natural gas. This will increase U.S. exports of LNG (liquefied natural gas) to Europe, reducing our dependence on other sources, such as Russia.

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Trump is expected to backtrack on tougher climate policy measures, including withdrawal from the Paris Climate Agreement, which will weaken the momentum for global climate action. The EU will need to take a greater role in international climate policy. Trump's "America First" policy will likely cause trade tensions with the EU, and new tariffs and trade restrictions may make energy imports and exports more difficult, affecting European energy prices and the security of supply. Trump's administration is also set to reduce support for renewables, which could slow the U.S. green transition, creating an opportunity for the EU to strengthen its position in the clean technology market and increase its competitiveness (Tagliapietra and Trasi, 2024).

3. Comparison of energy prices

A comparison of energy prices between the United States and Europe from the 1990s to the present, based on purchasing power parity, clearly shows how energy prices have developed.

In the 1990s, it was clear that Europe had higher average electricity prices than the U.S. due to higher taxes and regulatory costs. In Germany, for example, prices ranged from USD 0.20 to 0.25/kWh. Conversely, the USA had average electricity prices of around USD 0.08–0.10/kWh. In the 2020s in Europe, prices increased significantly, especially due to the energy crisis. In Germany, prices are around USD 0.30–0.35/kWh. The USA has consistently maintained lower prices, ranging from USD 0.13 to 0.15/kWh.

In the 1990s, European natural gas prices were higher due to import dependency. Prices were around USD 5–7/MMBtu. Meanwhile, prices in the USA were lower, around USD 2–3/MMBtu. In the 2020s in Europe, prices increased significantly, especially due to the Russian–Ukrainian conflict and the energy crisis. Prices are now in the range of USD 20–30/MMBtu, but in the U.S., prices remained lower, at around USD 4–6/MMBtu.

Gasoline prices in Europe in the 1990s were higher due to higher taxes. Prices were around USD 1.50 to 2.00 per litre. In the USA, prices were lower, around USD 0.50-0.70 per litre. In the 2020s, in Europe, prices remained higher, at around USD 1.80–2.20 per litre, but in the USA, the prices remained lower at around USD 0.80–1.00 per litre (https://www.statista.com/topics/839/gas-prices).

4. Market penetration of electric vehicles

4.1 Market penetration of electric vehicles in the US

A victory for the Republican Party, particularly Donald Trump's return to the presidency, could have significant implications for the uptake of electric vehicles (EVs) in the U.S. (Kocsis Szürke et al., 2023; 2024). Trump's administration is expected to avoid stricter emissions standards and other environmental regulations promoting EV penetration. This is to slow EV market penetration and reduce incentives for manufacturers to develop EVs. The Republican administration may also reduce or eliminate tax incentives for EV purchases, such as the up to $7,500 tax credit provided by the Inflation Reduction Act (IRA). This can reduce the demand for EVs due to fewer or lower financial incentives. The rollout of EV charging networks is critical to the uptake of EVs, and slower development could hinder growth. Changes to regulations and subsidies could create market uncertainty, deterring manufacturers and investors from developing and producing EVs, particularly those who have made significant investments in the EV market (Guerra, 2024).

4.2 Market penetration of electric vehicles in the EU

A Republican Party victory in the U.S. will undoubtedly indirectly impact the uptake of electric vehicles (EVs) in Europe. Here are some of the impacts. The Republican Party's possible decision to reduce subsidies for EVs and relax emission standards will inevitably slow the uptake of EVs in the U.S., which may indirectly affect the European market. This is because U.S. car manufacturers are expected to have fewer resources for EV development, slowing down innovation and technological progress globally. The Republican Party's leadership may increase trade tensions between the U.S. and the EU, affecting the flow of EV components and technologies. Tariffs and trade restrictions may make it harder for European car manufacturers to enter the U.S. market and source components from the U.S. Regulatory changes in the U.S. may create market uncertainty, deterring global investors from developing and producing EVs, especially those that have made significant investments in the EV market. The slowdown in EV development in the U.S. might allow European carmakers to strengthen their position in the global market, while stricter EU emission standards and support programmes will further stimulate EV development and uptake in Europe (Lynch et al., 2023).

5. Conclusion

The U.S. energy mix has changed significantly recently, with renewables growing. Fossil fuels remain dominant, but renewables and nuclear energy are also key components of the country's energy supply.

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The Democratic Party is unequivocally committed to renewable energy, has introduced the most stringent environmental regulations, and is a key participant in international climate agreements. In contrast, the Republican Party is steadfast in its support of fossil fuel extraction, emphasising energy independence and dominance and introducing a limited number of regulations. This stark difference between the parties has far-reaching implications for U.S. energy policy and renewable energy development.

U.S. foreign policy has a significant impact on the energy import mix. Geopolitical alliances and conflicts, trade policies and sanctions, and energy independence and security all play a crucial role. These factors contribute to the stability and diversification of the country's energy supply.

A Republican Party victory is expected to have mixed effects on European energy imports. Exports of fossil fuels from the U.S. may increase, but trade tensions and climate policy backtracking might pose challenges for the EU. The EU must strengthen its climate policy and technological competitiveness to adapt to these changes.

Energy prices in Europe are higher than in the U.S., especially for electricity and natural gas. The U.S. has lower energy prices because it produces more energy and has lower taxes. In Europe, higher taxes and regulatory costs push up prices.

The Republican Party's victory in the U.S. will undoubtedly lead to indirect impacts on the uptake of electric cars in Europe, notably through regulatory changes, trade tensions and market uncertainties. European car manufacturers must adapt to these changes and strengthen their development and innovation efforts.

The EU plans to take several steps to reduce fossil fuel use and meet climate change targets. The European Commission's 'Fit for 55' package targets reducing the EU's greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels. Only zero-emission vehicles will be allowed in new cars starting in 2035. The EU will extend the Emissions Trading Scheme (ETS) to maritime transport and strengthen requirements for aviation. The EU's target is for 40% of energy consumption to come from renewable sources by 2030. This includes increasing the share of wind, solar and other clean energy sources. The EU will introduce a carbon cap and trade mechanism, imposing a tax on imported products such as steel, cement, and aluminium to protect European industry from cheaper and more polluting imports. The EU has set tougher energy efficiency targets, including improving the energy efficiency of buildings and industrial plants. The European Commission has proposed the creation of a Climate Social Fund to help households and small businesses invest in energy efficiency and buy electric vehicles. Meanwhile, the EU aims to phase out subsidies for fossil fuels and instead support renewable energy sources.

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