



# Country Analysis Brief: France

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## Overview

**Table 1. France's energy overview, 2021**

	Crude oil and other petroleum liquids	Natural gas	Coal	Nuclear	Hydro	Other renewables	Total
Primary energy production (quad Btu)	0.03	0.00	0.00	3.73		1.08 <sup>a</sup>	4.84
Primary energy production (percentage)	0.6%	0.0%	0.0%	77.1%		22.3%	100.0%
Primary energy consumption (quad Btu)	3.18	1.61	0.25	3.73		0.97 <sup>a</sup>	9.73
Primary energy consumption (percentage)	32.6%	16.5%	2.6%	38.3%		10.0%	100.0%
Electricity generation (TWh)	2.32 <sup>b</sup>	40.97 <sup>b</sup>	4.76 <sup>b</sup>	360.70	58.86	64.35	530.42
Electricity generation (percentage)	0.4%	7.7%	0.9%	68.0%	11.1%	12.1%	100.0%

Data source: U.S. Energy Information Administration, International Energy Statistics

Note: We aggregate hydroelectricity and renewables as *other renewables* for primary energy production and consumption. We aggregate crude oil and other petroleum liquids, natural gas, and coal fuel sources as fossil fuel-derived fuel sources for electricity generation. Quad Btu=quadrillion British thermal units. TWh=terawatthours.

<sup>a</sup>Includes hydroelectricity

<sup>b</sup>Fossil fuel proportions based on *Energy Institute Statistical Review of World Energy*

- In 2021, France accounted for 13% of energy [production](#) and 13% of energy [consumption](#) in OECD Europe (Table 1).
- France has the largest share of electricity generated by nuclear energy in the world at 68% (Table 1, Figure 5), the largest amount of nuclear energy generated in Europe at 361 terawatthours (TWh) (Table 1), and [the second-largest nuclear capacity at 61 gigawatts \(GW\), second only to the United States, which had 95 GW of installed capacity](#) in 2021.
- In 2023, France's largest electrical utility company was nationalized, at the cost of €10 billion, to better manage the fallout from the higher energy costs following Russia's invasion of Ukraine.<sup>1, 2</sup>
- Although Russia's natural gas only accounted for 17% of total French natural gas imports in 2020, since Russia's invasion of Ukraine, France has become a more significant importer and hub for liquefied natural gas (LNG), especially from the United States. As a result, France now receives LNG volumes for domestic consumption and re-exports to the rest of Europe.<sup>3, 4</sup>
- Aiding in LNG imports, France has just received its first floating storage regasification unit (FSRU) mid-September 2023. The FSRU was placed in Le Havre and has an LNG processing capacity of 177 billion cubic feet per year (Bcf/y).<sup>5</sup>
- In 2017, France banned production and exploration of oil and natural gas on French soil by 2040. France was [producing](#) 15,000 barrels per day (b/d) of crude oil at the time of the ban.<sup>6</sup>
- French strikes primarily relating to pension reforms have disrupted operations at oil refineries and nuclear power plants, resulting in energy and fuel shortages nationwide in 2022 and 2023.<sup>7, 8</sup>

## Petroleum and Other Liquids

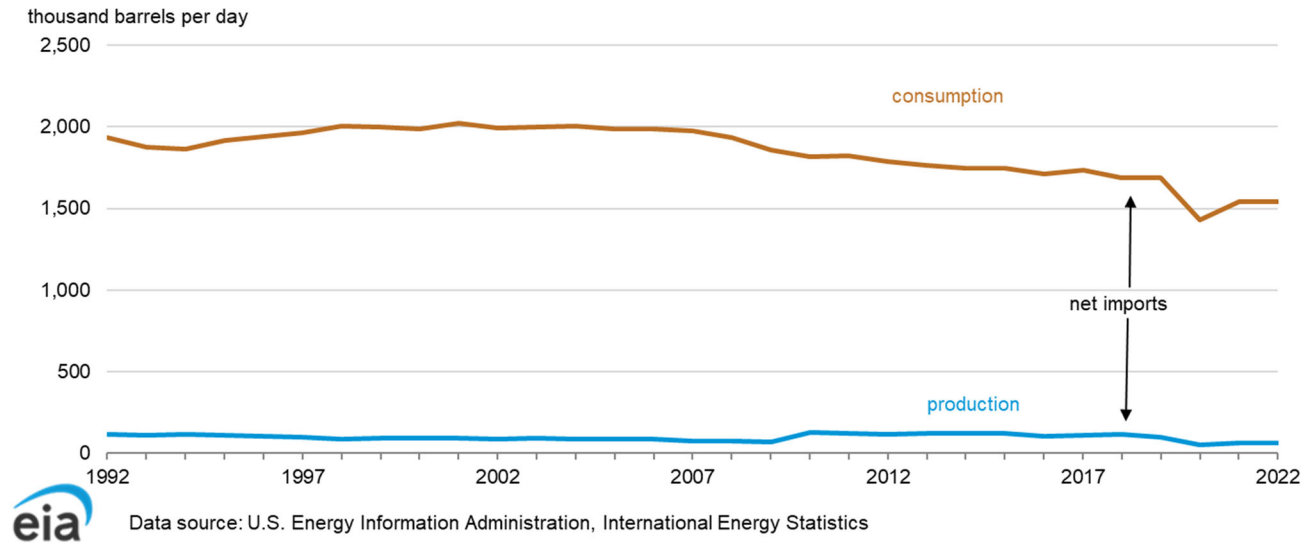
- France’s proved oil reserves totaled 83 million barrels as of January 1, 2023.<sup>9</sup>
- France is the first country to ban production and exploration of oil and natural gas by 2040. While production was very low at the time of the ban in 2017, oil and natural gas output has continued to decline since then (Figure 1).
- France consumed 1.5 million barrels per day (b/d) of oil in 2022 (Figure 1). France’s oil consumption has trended down since reaching 2.0 million b/d in 2003–04.
- France’s six oil refineries (Table 2) have had operations halted several times since 2022, predominately because of worker strikes, which has led to shortages of domestic petroleum products.<sup>10, 11, 12</sup>

**Table 2. France’s refineries, 2022**

Refineries	Ownership	Location	First year of operations	Crude oil capacity (barrels per calendar day [b/cd])	Vacuum distillation capacity (b/cd)
Donges	TotalEnergies	Donges	1935	219,000	97,008
Feyzin	TotalEnergies	Feyzin	1964	109,000	38,364
Fos-Sur-Mer	Exxon Mobil Corp.	Fos-Sur-Mer	1965	126,350	0
Gonfreville l’Orcher	TotalEnergies	Gonfreville- l’Orcher	1933	253,000	83,400
Port-Jérôme- Gravenchon	Exxon Mobil Corp.	Port-Jérôme- sur-Seine	1933	231,800	0
Lavera	Petroineos	Martigues	1933	207,100	72,200
<b>Total</b>				<b>1,146,250</b>	<b>290,972</b>

Data source: *Oil & Gas Journal*, 2022 Worldwide Refining Survey

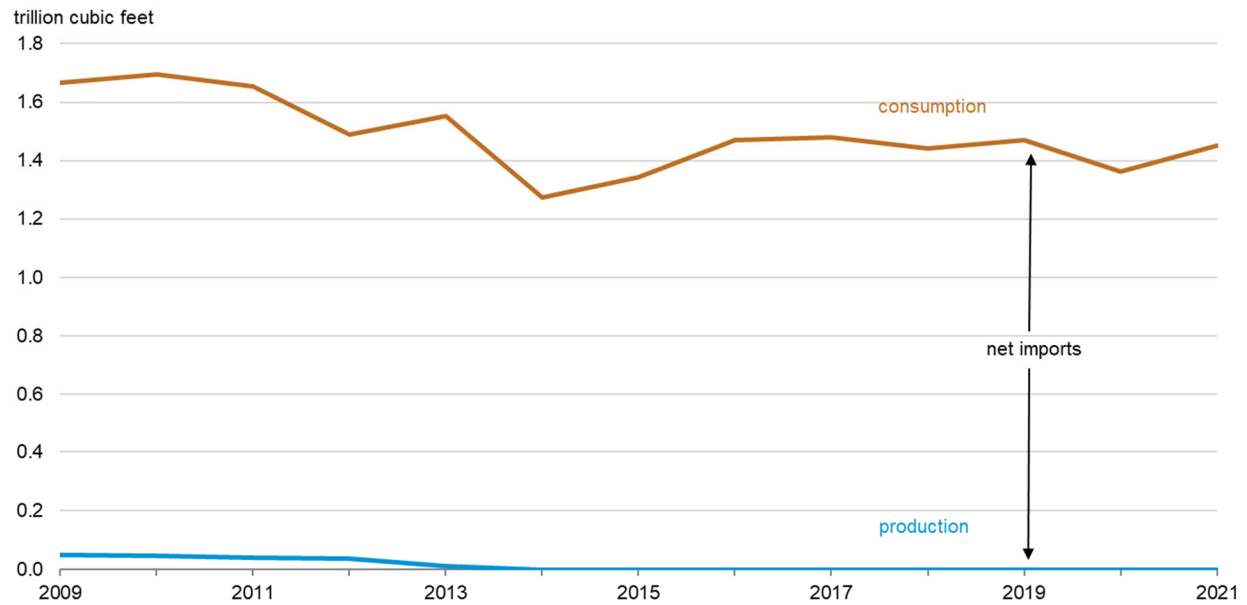
Figure 1. France's petroleum and other liquids production and consumption, 1992–2022



## Natural Gas

- France's proved natural gas reserves were 590 Bcf as of January 1, 2023.<sup>13</sup>
- France has effectively no production of dry natural gas, but it consumed 1.5 Bcf of dry natural gas in 2021, all of which was imported (Figure 2). France's natural gas consumption will likely be lower in 2022 due to higher-than-normal winter temperatures and Russia's full-scale invasion of Ukraine.<sup>14</sup>
- GRTgaz is the dominant company in national gas distribution, while EDF, a vertically integrated utility company, is the leading alternative supplier of natural gas in France.<sup>15</sup>

Figure 2. France's dry natural gas production and consumption, 2009–2021

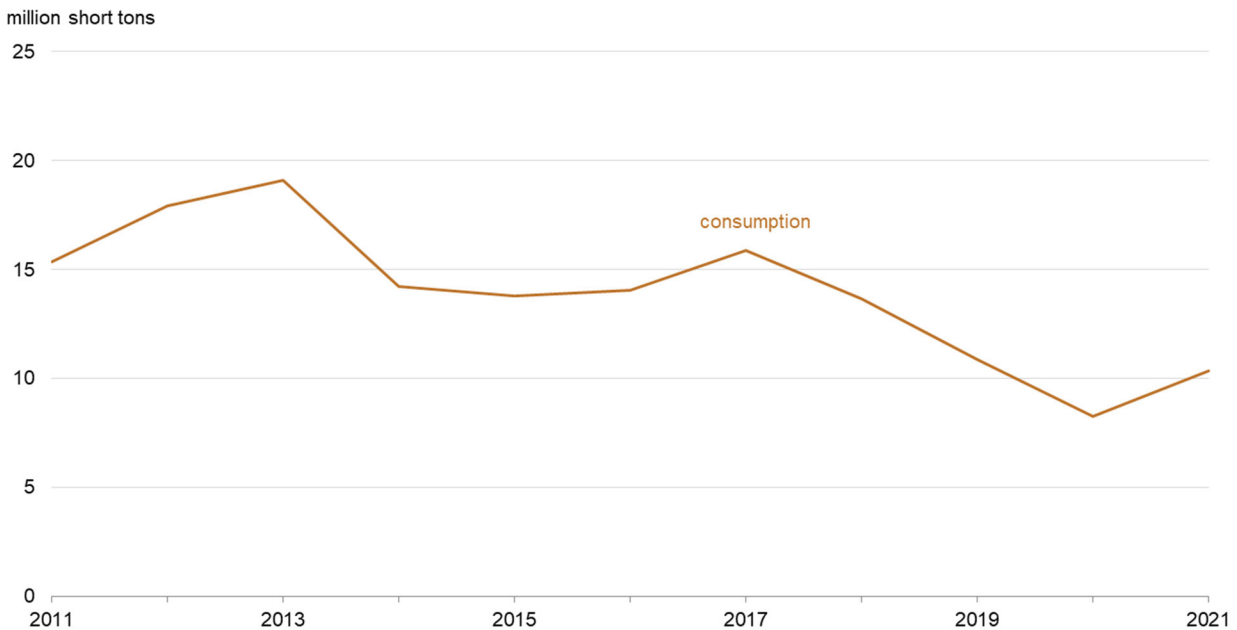


Data source: U.S. Energy Information Administration, International Energy Statistics

## Coal

- France has no recorded [coal reserves](#), and it does not produce coal.
- All France’s coal demand is met by imports (Figure 3). In 2021, France [consumed](#) 10.4 million short tons of coal, while producing no coal.
- The European energy crisis in 2022 led France to recommission a coal power plant in Saint-Avold temporarily into 2023 to make two operational coal plants in the country, the plant in Cordemais with 1.2 GW of capacity and the plant in Saint-Avold with 600 MW of capacity. Both plants were extended to operate into 2024 to avoid energy shortages.<sup>16</sup>

Figure 3. France's coal consumption, 2011–2021



Data source: U.S. Energy Information Administration, International Energy Statistics

## Electricity

- In 2021, France **generated** 530 terawatt-hours (TWh) of electric power and maintained an installed generation capacity of 142 gigawatts (GW). France's **installed nuclear capacity** of 61 GW in 2021 was second only to that of the United States.
- France has the largest share of electricity generated by nuclear power in the world at 68% (Table 1, Figures 4 and 5) and the largest amount of nuclear energy generated in Europe at 361 TWh (Table 1) in 2021.
- French Parliament recently voted to accelerate construction of six to eight new nuclear reactors, including construction at the Penly power plant site in 2024 instead of the previous 2026 target.<sup>17</sup> The French government seeks to replace some of the aging reactors in the fleet with newer nuclear power plants (Table 3). The Flamanville EPR reactor (water pressurized reactor) is also under construction at a cost of €13.2 billion and is expected to start operations in 2024.<sup>18</sup>
- France generated 530.4 billion kilowatt-hours (kWh) of electricity and consumed 447.4 billion kWh, resulting in one of the largest electricity surpluses in the world (Figure 4). France was the largest exporter of electricity in the world in 2021.
- The recently nationalized utility company EDF (and its vertically integrated subsidiaries ERDF and RTE) is the primary company when it comes to electricity generation, retail markets, transmission, and distribution of energy in France. ERDF manages 95% of electricity distribution networks in France. Several laws try to encourage competition with EDF, but its market share remains high.<sup>19</sup>
- EDF notably restarted all of its 32 nuclear reactors (out of the total 52 nuclear reactors that operate in France) in 2022 to relieve some of the energy shortages that winter. Many of the

reactors were shut down because of maintenance relating to corrosion.<sup>20</sup> Autorité de Sûreté Nucléaire (ASN), the regulatory authority that oversees nuclear power, has approved EDF to repair further corrosion-related damage from 2023 through 2025.

**Table 3. France's nuclear power plants, 2023**

Plant	Location	Model	First year of operation <sup>a</sup>	Reactor capacity (megawatts)	Number of reactors	Total capacity (megawatts)
Belleville	Belleville-sur-Loire	Pressurized water reactor	1987	1,310	2	2,620
Blayais	Braud-et-Saint-Louis	Pressurized water reactor	1981	910	4	3,640
Bugey	Saint-Vulbas	Pressurized water reactor	1978	910	2	3,580
Cattenom	Cattenom	Pressurized water reactor	1986	1,300	4	5,200
Chinon B	Avoine	Pressurized water reactor	1982	905	4	3,620
Chooz B	Chooz	Pressurized water reactor	1996	1,500	2	3,000
Civaux	Civaux	Pressurized water reactor	1997	1,495	2	2,990
Cruas	Cruas	Pressurized water reactor	1983	915	4	3,600
Dampierre	Dampierre-en-Burly	Pressurized water reactor	1980	890	7	3,560
Flamanville	Flamanville	Pressurized water reactor	1985	1,330	2	4,230
Golfech	Golfech	Pressurized water reactor	1990	1,570	1	2,620
Gravelines	Gravelines	Pressurized water reactor	1980	1,310	2	5,460
Nogent	Nogent-sur-Seine	Pressurized water reactor	1987	910	6	2,620
Paluel	Paluel	Pressurized water reactor	1984	1,310	2	5,400
Penly	Penly	Pressurized water reactor	1982	1,300	4	2,660
St. Alban	Saint-Alban-du-Rhône	Pressurized water reactor	1985	1,330	2	2,670
St. Laurent B	Saint-Laurent-Nouan	Pressurized water reactor	1981	1,335	2	1,830
Tricastin	Bollène	Pressurized water reactor	1980	915	2	3,660
<b>Total</b>					<b>60</b>	<b>62,960</b>

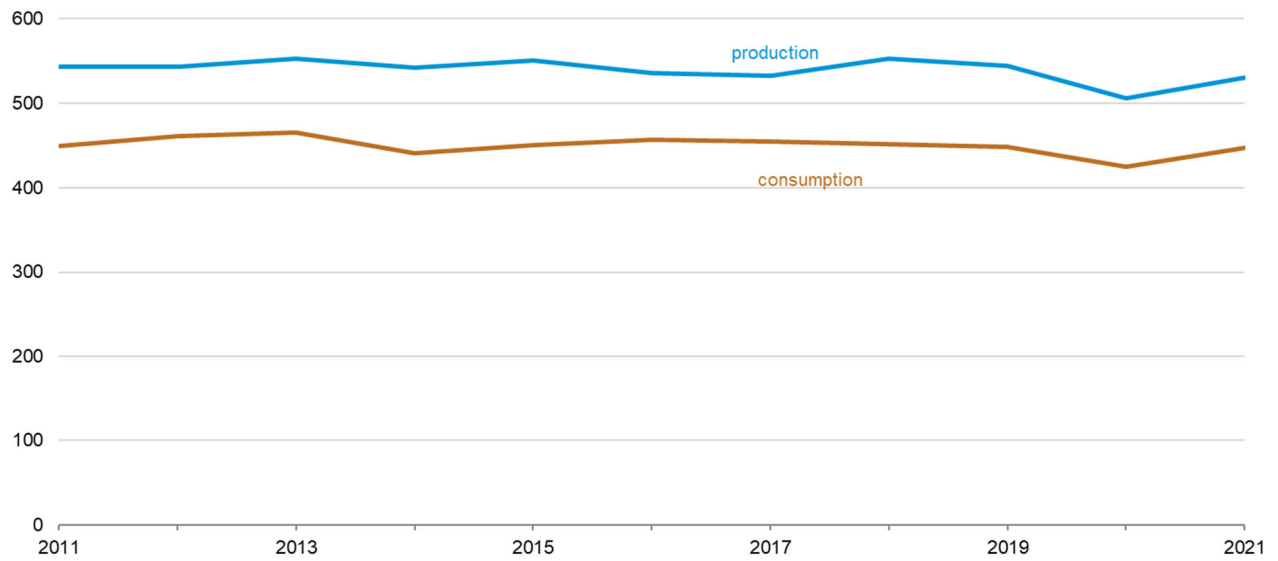
Data source: World Nuclear Association

<sup>a</sup>Operation of first reactor



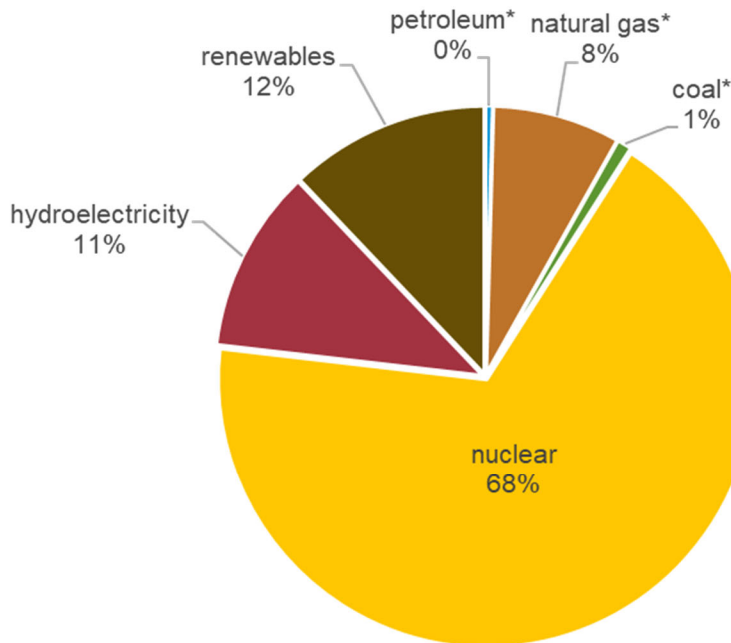
Figure 4. France's electricity production and consumption, 2011–2021

billion kilowatthours



Data source: U.S. Energy Information Administration, International Energy Statistics

Figure 5. Electricity generation by fuel, 2021

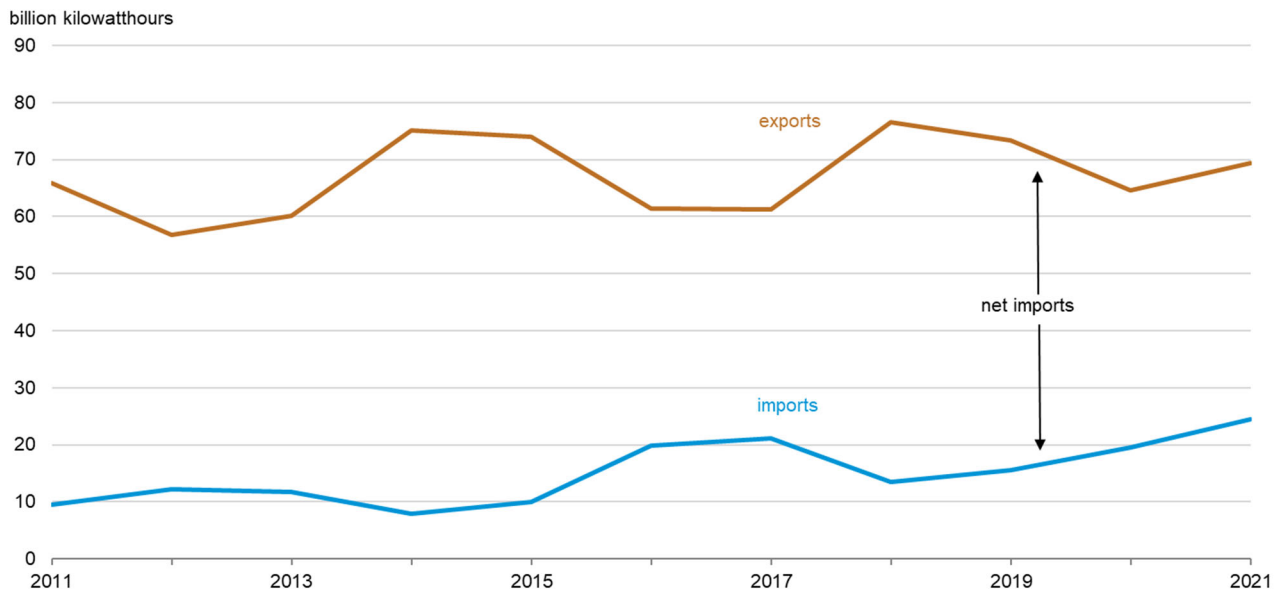


Data source: U.S. Energy Information Administration, International Energy Statistics  
 \*Fossil fuel proportions based on bp Statistical Review of World Energy 2022

## Energy Trade

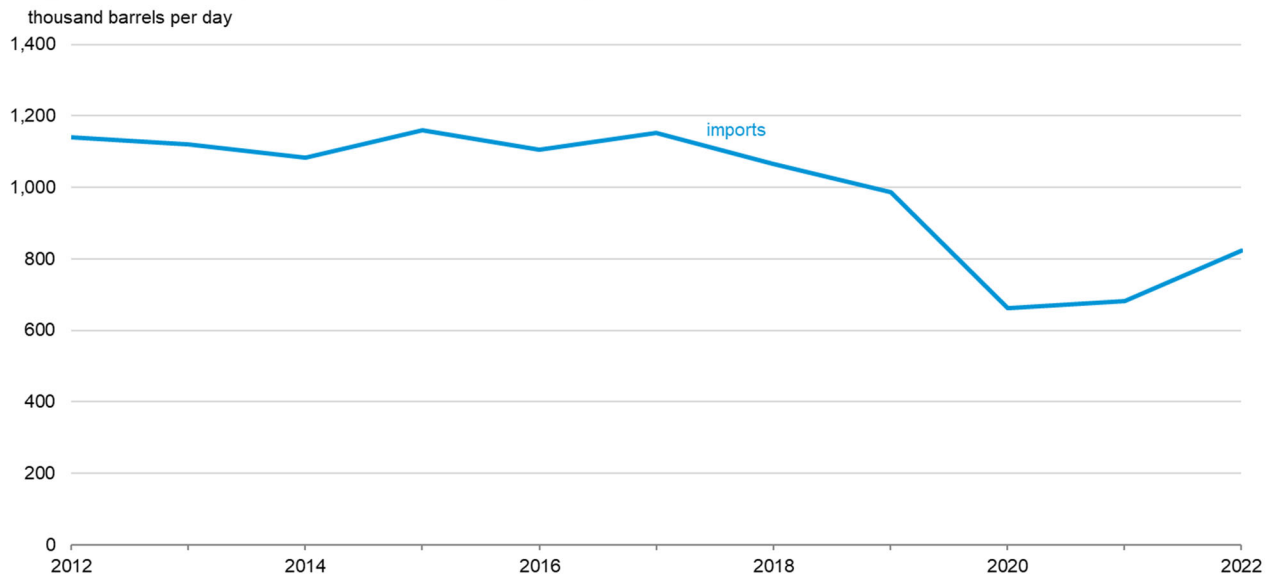
- France was the world's top **net exporter of electricity** in 2021, and it has been a top net exporter historically. France net exports of electricity were 45 billion kWh in 2022 (Figure 6). France has nearly reached 70 billion kWh of net exports on multiple occasions since the first time reaching 70 billion kWh of net exports in 1995.
- France's total electricity imports totaled 24.5 billion kWh, and exports totaled 69.4 billion kWh in 2021. Most of the electricity exports went to Switzerland (25%), Great Britain (23%), Italy (22%), and Spain (17%) in 2021.<sup>21</sup>
- France imported more than 822,000 b/d of petroleum and other liquids in 2022, which was a slight uptick from a previous downward trend since 2017. It has only exported a small amount of petroleum and other liquids since 2011.
- France imported 1.6 trillion cubic feet (Tcf) of natural gas, while exporting 188.9 Bcf in 2021 (Figure 8). Natural gas flows through France likely increased 32% to 5.7 Bcf/d in 2022 primarily because of a 203% surge in LNG imports at 3.1 Bcf/d. The largest share of the imported natural gas came from Norway via the Franpipe pipeline at 1.7 Bcf/d.<sup>22,23</sup> Due to its excess natural gas supply, France has begun re-exporting to neighboring countries such as Germany primarily via the Dunkirk-Zeebrugge pipeline routing through Belgium.<sup>24</sup>
- France was the top LNG importer in the EU in 2022, and current plans call for the expansion of import capacity. Correspondingly the country's fifth LNG import terminal, Le Havre, is under development and will have a capacity up to 177 Bcf/y with the recent addition of the first FSRU Cape Ann, which would boost the total LNG import capacity above 1.4 Tcf/y.<sup>25,26</sup>
- France and Spain are planning an underwater pipeline from Marseille to Barcelona that will pump green hydrogen, renewable energy, and natural gas for a limited time to alleviate temporary shortages related to Europe's current energy crisis.<sup>27</sup>
- France is an importer of petroleum products, and its exports have been steadily trending downward since 2011 (Figure 9).
- France relied primarily on European neighbors Netherlands, Belgium, and Spain for its petroleum products at 28% of imports in 2021; Russia was its top individual partner at 19% of total imports (Figure 10). EU consumption of Russia's natural gas dropped in 2022, but French data are not currently available.
- Some occasional disruptions due to strikes in 2022–23 have affected all facets of French energy trade. Domestic refinery production disruptions related to strikes have also caused France to rely more on imports for petroleum products relative to 2021 (Figure 9).<sup>28</sup>

Figure 6. France's electricity imports and exports, 2011–2021



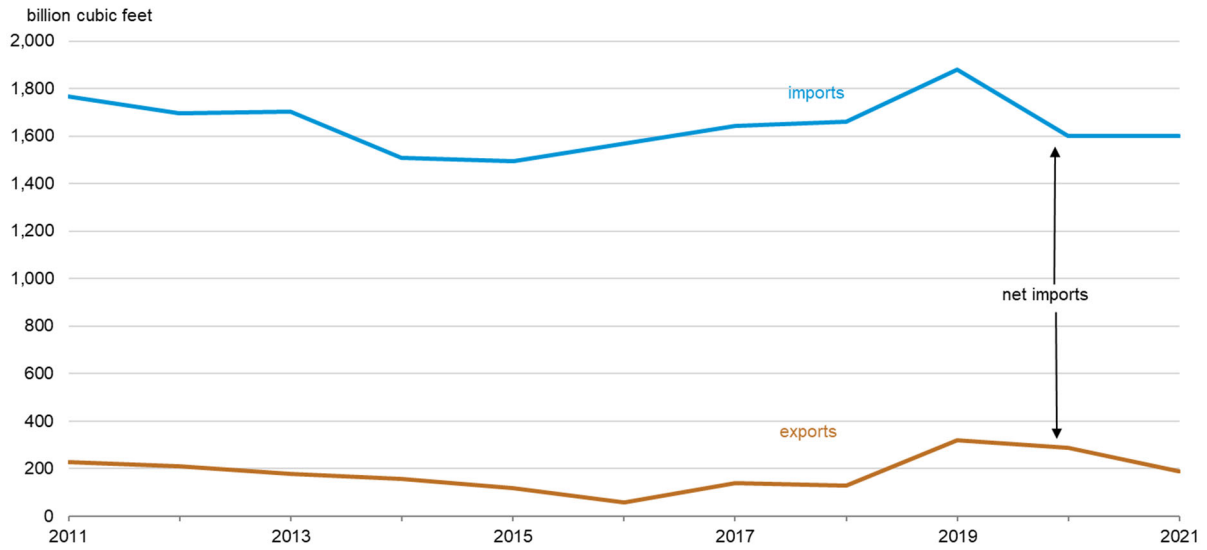
Data source: U.S. Energy Information Administration, International Energy Statistics

Figure 7. France's petroleum and other liquids imports, 2012-2022



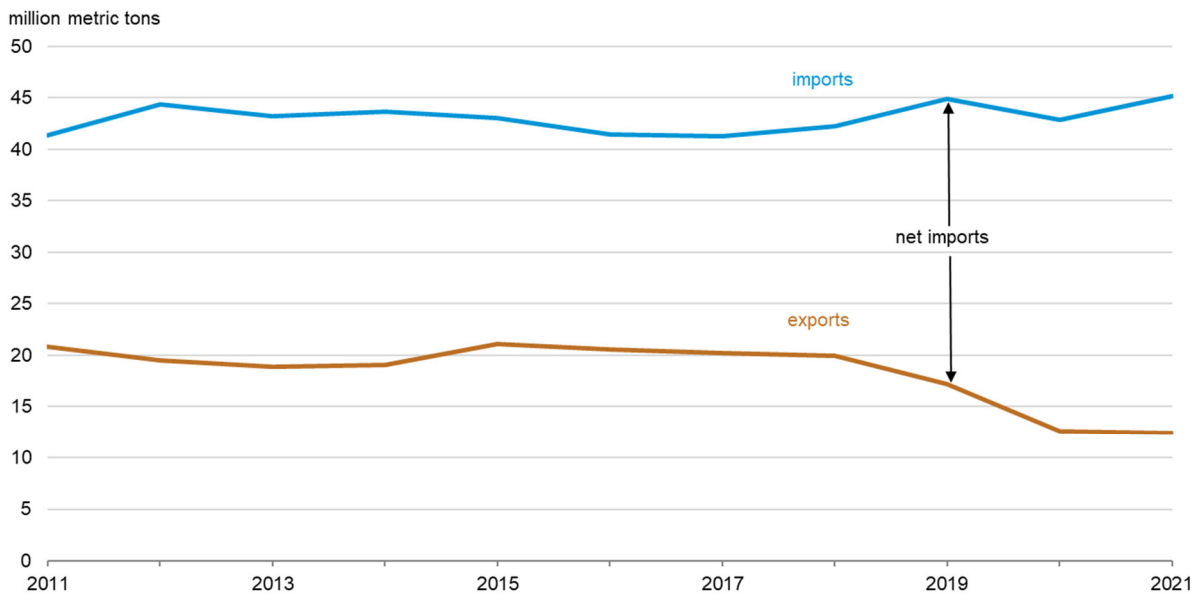
Data source: U.S. Energy Information Administration, International Energy Statistics

Figure 8. France's natural gas imports and exports, 2011–2021



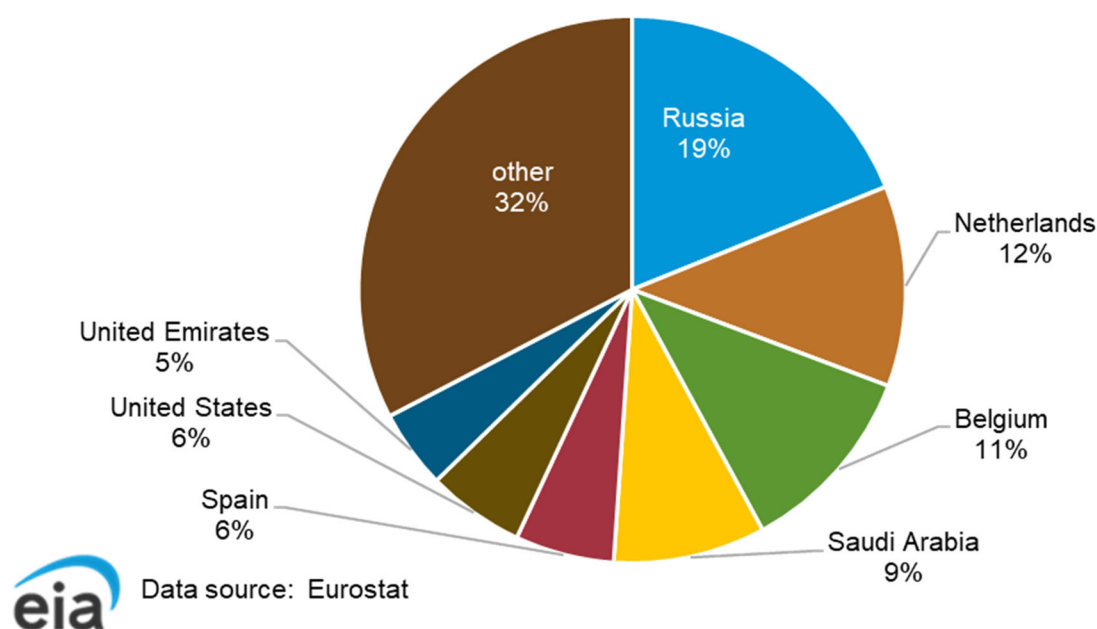
eia Data source: Eurostat

Figure 9. France's petroleum products imports and exports, 2011–2021



eia Data source: Eurostat

Figure 10. Source of France's petroleum products, 2021



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<sup>5</sup> Mike Weber, "France welcomes first floating storage regasification unit," *Newbase*, September 28, 2023, <https://newsbase.com/story/france-welcomes-first-floating-storage-regasification-unit-294482?source=europe-oil-and-gas-monitor>

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