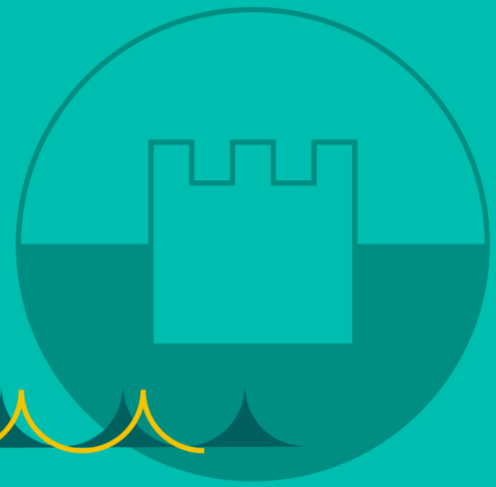
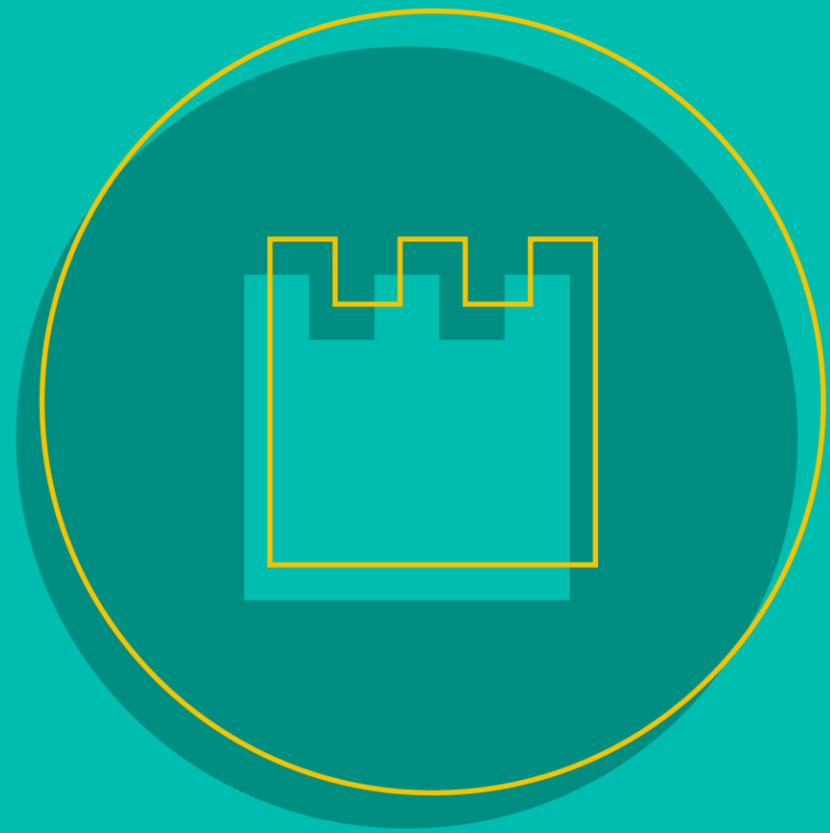
DECEMBER 2024

MORNINGSTAR Industry Landscape





European Utilities

Utilities build, maintain, and operate the infrastructure to deliver energy and water.

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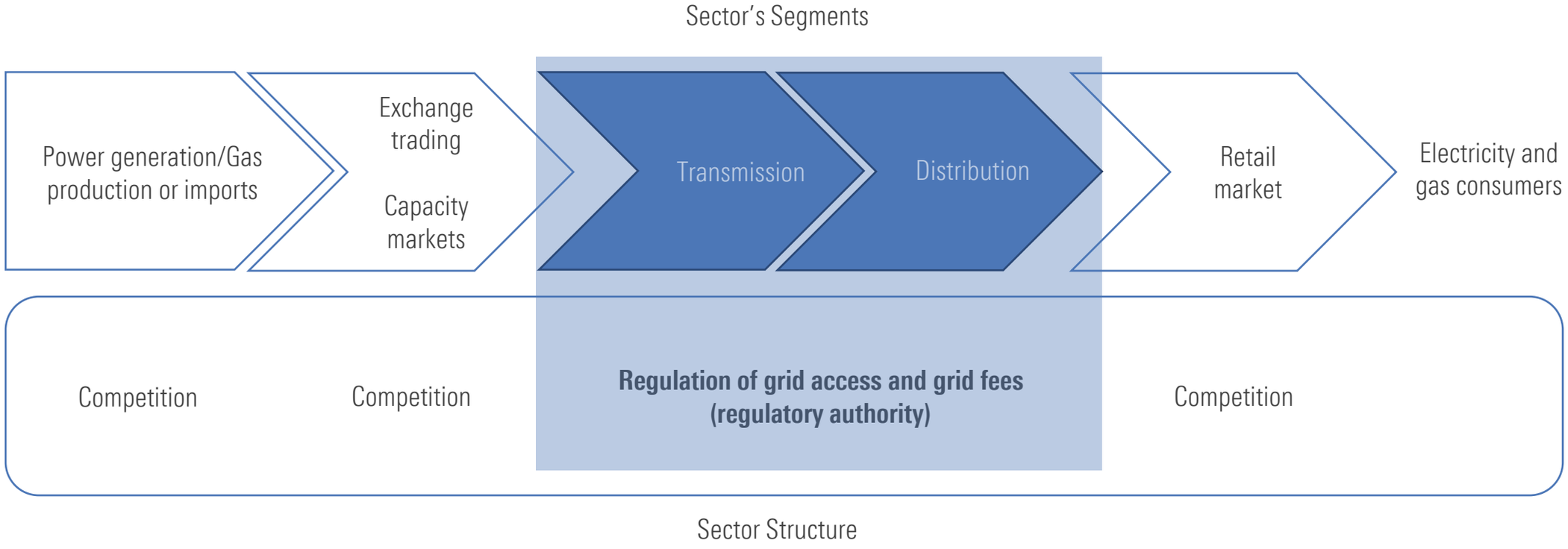
Executive Summary

European utilities operate across the gas and electricity value chain, most of which is liberalized.

Upstream and Downstream Segments of the Utilities Value Chain Are Liberalized

Most utilities operate across all or part of the electricity and gas value chain. Unlike in the US, European utilities are mostly liberalized. The retail markets were liberalized in the late 1990s. Liberalization led to the creation of wholesale power markets in the early 2000s. Although the EU pushes for unbundling—the separation of different activities within the value chain—fully integrated utilities still exist in Europe. These utilities must ensure operational independence between their various entities across the value chain.

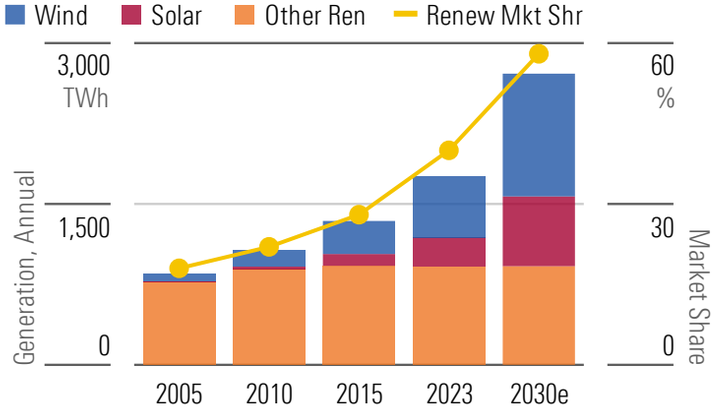
Only Transmission and Distribution Are Regulated



Source: Morningstar.

Key Industry Themes

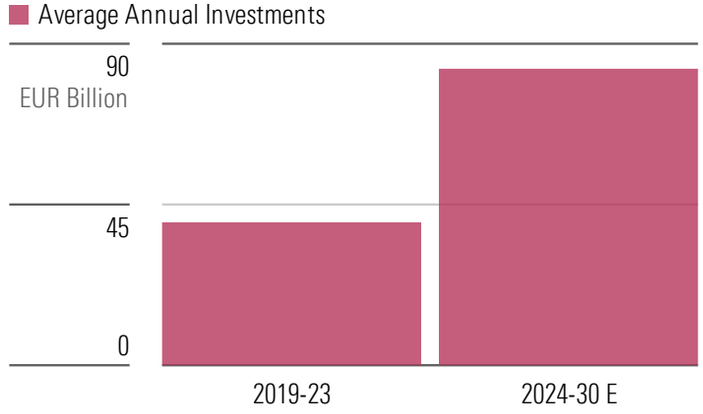
Renewable Energy Growing Rapidly in Europe



Falling costs for wind and solar energy projects, along with high EU renewable ambitions and countries' support, have led to a jump in investment during the last decade. Renewable energy accounted for 45% of European electricity generation in 2023, equal to thermal power generation for the first time.

Growth will continue as costs come down and falling interest rates ease financing and enhance value creation. Although growing faster, solar will not overtake wind by 2030.

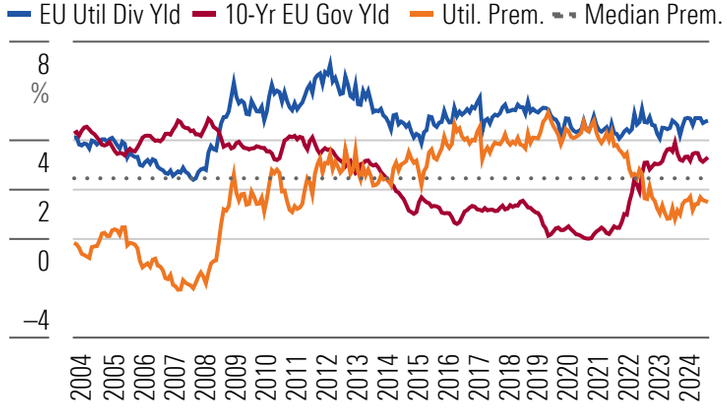
Electric Grid Investments to Boom by 2030 in the EU



Grid investments have lagged renewables installations for many years, resulting in costly congestion issues and connection queues for renewables and data centers.

To address the problem, the European Commission launched an action plan for grids in November 2023, calling for EUR 584 billion of investments by 2030 or EUR 83 billion annually, nearly double the average annual investments of the past five years.

Utilities Typically Offer Attractive Yields



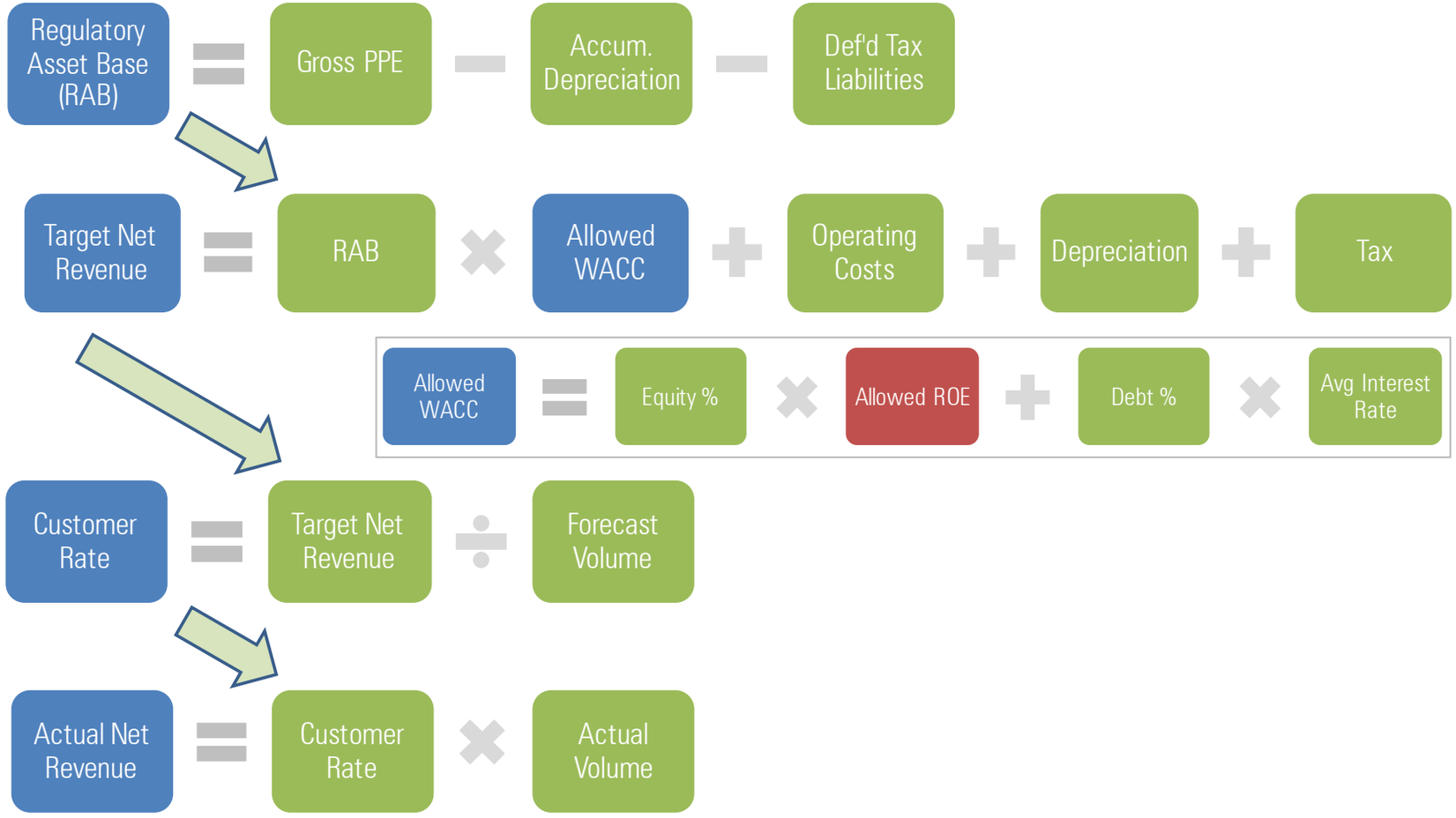
Utility stocks are often considered proxy income investments because of their high dividend payout ratios. Utilities' yield premium to the largest European economies' average government bond yields peaked in 2020 as interest rates hit their lows. Since 2020, the premium has shrunk in the wake of rising bond yields. At 1.5%, the current premium is below the 2.4% historical median since 2004. We don't expect the sector yield to converge with the latter, which has been inflated by the long period of low interest rates between 2014 and 2021.

Source: Ember, Morningstar.
Note: Europe refers to the EU plus the UK. Data as of Nov. 2024.

Regulated Utilities: How Regulators Set Customer Rates

Typical Ratemaking Allows Utilities To Earn a Return On Their Invested Capital

National regulators use a variety of ratemaking structures to ensure utilities recover their operating costs, depreciation, taxes, and interest expenses.



Source: Morningstar. Data as of November 2024.

Utilities Financial Statement Analysis: Income and Cash Flow Statements

2023 Income Statement

Income Statement (EUR million)	2023
Operating revenue (1)	49,335
Cost of goods sold (2)	(26,033)
Operating & maintenance (2)	(6,136)
Depreciation & amortization (3)	(5,444)
Taxes (not income), other (4)	(2,749)
Operating Income	**89,697**
Equity income (5)	239
Interest expense (6)	(2,187)
Other pretax expense (income)	(21)
Income taxes	(1,610)
Other aftertax expense (Income)	(2)
Minority (7)	(591)
Hybrid coupons (8)	(203)
Net Income	**4,803**

Cash Flow (EUR million)	2023
Cash from operations (9)	12,130
Capital expenditures (3)	(9,693)
Free Cash Flow	**2,437**
Debt issuance (retirement) (10)	2,465
Equity issuance (repurchases)	(2,787)
Common dividends (11)	(1,879)
Net interest expenses	(2,181)
Other	356
Cash Flow From Financing	**(4,026)**

(1) Operating revenue is derived from customer bill payments and sales on wholesale markets. Energy price volatility can cause big swings in gross revenue, but no impact on earnings.
(2) COGS mainly comprise energy procurement costs, while operating and maintenance costs include labor and outside services.
(3) High D&A costs reflect the sector's capital intensity. Investments in grid and renewables inflate this number with capital expenditures' 78% upside to D&A reflecting high-growth investments.
(4) Taxes (not income) chiefly include taxes on power production.
(5) Equity income comprises the results of minority stakes in renewable projects.
(6) Interest expenses are high due to the sector's high leverage and funding of investments in renewables, weighing on earnings accretion together with D&A.
(7) Minority accounts for the contribution of international subsidiaries and offshore wind farms.
(8) Utilities usually exclude hybrid coupons from the recurring net income calculation.
(9) Cash from operations is calculated as net income + D&A + minorities + financial interests and changes in working capital. Working capital variation is seasonal, ballooning during the first half and reversing during the second half.
(10) Debt issuance is raised mostly for funding maturities associated with high investments in grid and renewables, and for dividends distribution.
(11) Common dividends represent an implicit dividend payout ratio of 73%.

Source: Data from Iberdrola for 2023.

Utilities Financial Statement Analysis: Balance Sheet and Credit Metrics

2023 Balance Sheet

Balance Sheet (EUR million)	2023	Balance Sheet (EUR million)	2023
Cash and cash equivalents (1)	3,019	Common equity	43,111
Accounts receivable	8,906	Minority interests	8,931
Inventory	2,828	Hybrid bonds (5)	8,250
Net PPE (2)	90,309	Accounts payable	12,450
Goodwill (3)	8,375	Total debt (6)	61,867
Other intangibles (4)	11,880	Provisions (7)	5,456
Investments (4)	1,306	Deferred tax liability	7,766
Other assets	23,410	Other liabilities	2,202
Total Assets	**150,033**	**Total Equity and Liabilities**	**150,033**

Key Credit Metrics (2023 Industry Average)

Debt/capital	56%
FFO/debt	23%
Net debt/EBITDA	3.1

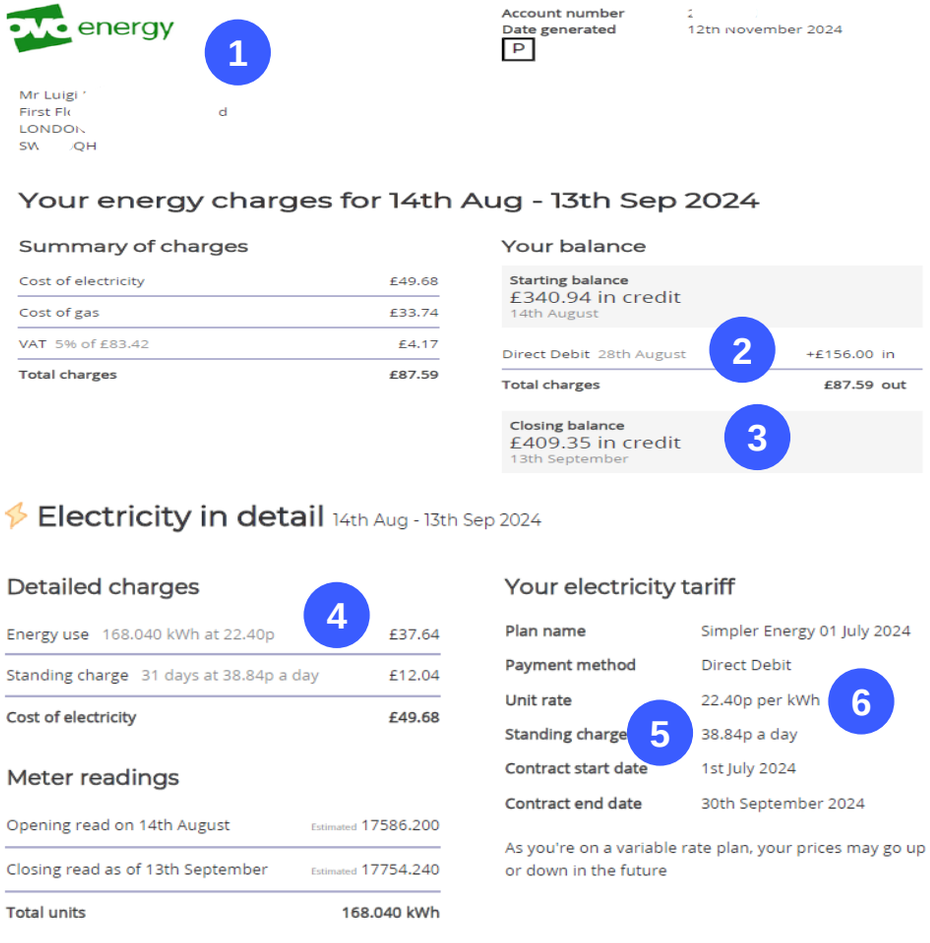
(1) Cash and cash equivalents are resources reinvested or paid out to investors.
(2) Net property, plants, and equipment are relatively high due to the significant capital intensity of the utilities sector.
(3) Goodwill is relevant given utilities' inclination for external growth.
(4) Other intangibles mainly comprise concessions, while investments represent stakes in renewables projects.
(5) Hybrid bonds are financing instruments largely used in this industry as rating agencies typically account for half of their amount as equity. Analysts consider them as debt to value the company.
(6) Total debt is high as leverage is used to finance high investments in grid and renewables, and dividend distribution. Utilities with the highest share of regulated businesses will have higher leverage, which is consistent with high cash flow visibility. Conversely, companies with less regulated businesses will have lower leverage due to higher cash flow volatility and the need to post collateral for trading.
(7) Provisions include decommissioning liabilities. Utilities reserve cash and accrue liabilities to cover remediation costs when assets are no longer in service. Decommissioning liabilities will be the highest for companies with nuclear exposure, whether the plants are in service or not. If material, these liabilities should be included in companies' leverage calculations. In that case, economic net debt, including those liabilities, is preferable to financial net debt. Renewables developers also bear material decommissioning liabilities.

Source: Data from Iberdrola for 2023

Interpreting a Typical Utility Customer Bill

Utility Bills Are Often a Mystery to Most Customers

Investors only collect a small portion of what customers actually pay.



1 Customer Type

Utilities charge different rates for different customer groups. Residential customers tend to pay the highest rate, but also are high-cost to serve.

2 Direct Debit

Residential customers' monthly payments are often usage-decoupled. This smooths earnings across the year, but can cause high fluctuations in working capital.

3 Closing Balance

This is the difference between what the consumer paid since the beginning of the year and what he or she consumed. At the end of the period, the consumer will make or receive a payment to clear the balance.

4 Energy Usage

Demand typically peaks in the winter for electric and gas utilities. Demand peaks in the summer for water utilities. Utilities' working capital rises during periods of high consumption and decreases during periods of low consumption.

5 Standing Charge

This is a fixed daily fee that covers the cost of maintaining the energy network, as well as administrative expenses, such as meter readings and customer service.

6 Unit rate

It includes the energy procurement or production costs supply and all pass-through taxes and fees.

Source: OVO Energy.

European Utilities Coverage List

Morningstar Covers 20 Utilities in Europe

	Consensus P/E		EV/EBITDA	FCF yield	Dividend yield	ND / EBITDA	5 Yrs EPS CAGR	5 Yrs Div. CAGR	2024e ROIC	P / FV	Moat	Star Rating
	2024e	2025e	2024e	2024e	2024e	2024e						
Orsted	17.1	14.2	9.3	-20.3%	0.0%	3.1	NM	NM	6.0%	0.68	None	4
Acciona Energia	21.2	15.4	8.3	-0.5%	2.3%	3.8	-2.1%	-1%	3.0%	0.79	None	4
EDPR	39.2	20.4	10.5	-13.4%	2.0%	3.0	11.5%	5%	3.8%	0.60	None	5
Neoen	79.0	49.4	18.0	-13.5%	0.0%	7.0	20%	19%	5.4%	0.99	None	3
Renewables Median	**30.2**	**17.9**	**9.9**	**-13%**	**1.0%**	**3.4**	**11.5%**	**4.9%**	**4.6%**	**0.73**		
Centrica	6.8	9.0	4.0	6.3%	5.0%	(1.4)	-16%	12%	51.9%	0.71	None	5
RWE	10.4	14.5	7.3	-8.1%	3.8%	1.4	-19.0%	6%	6.7%	0.65	None	5
EDP	10.3	11.2	8.1	-4.2%	6.2%	3.3	-5.2%	1%	10.4%	0.65	None	5
SSE	11.1	10.6	11.1	-2.1%	4.5%	2.9	6.9%	8%	8.4%	0.73	None	4
Engie	6.8	8.5	4.7	3.5%	8.2%	3.1	-5.4%	-2%	7.6%	0.83	None	4
Naturgy	11.9	12.9	8.0	-1.0%	6.0%	2.5	-2.9%	0%	9.5%	0.91	None	4
Enel	10.4	10.2	6.8	2.4%	6.6%	2.5	3.5%	4%	7.8%	0.93	None	3
Endesa	12.2	11.5	7.2	6.7%	5.9%	1.9	13.9%	4%	8.7%	1.06	None	3
Iberdrola	15.8	14.9	8.2	-0.4%	4.8%	3.0	5.2%	5.2%	7.3%	1.06	None	3
Verbund	14.0	16.3	6.2	3.5%	3.2%	1.0	-14%	-15%	12.0%	1.18	Wide	2
Diversified Median	**10.8**	**11.4**	**7.2**	**1%**	**5.5%**	**2.5**	**-4.0%**	**3.7%**	**8.5%**	**0.87**		
E.On	10.7	10.9	7.2	-4.6%	4.8%	4.4	3.7%	4.0%	7.3%	0.70	Narrow	4
Snam	12.0	12.0	12.4	-1.6%	6.7%	6.4	1.1%	3.5%	5.8%	0.95	None	4
Redeia	18.1	17.7	10.4	-4.7%	4.8%	4.2	-1%	0%	4.6%	0.97	None	3
National Grid	13.8	13.6	11.4	-5.2%	5.7%	5.0	4.3%	-2.7%	4.9%	1.01	None	3
United Utilities	36.7	22.5	11.6	0.4%	5.6%	8.4	-1%	15%	4.2%	1.12	None	2
Regulated Median	**13.8**	**13.6**	**11.4**	**-5%**	**5.6%**	**5.0**	**1.1%**	**3.5%**	**4.9%**	**0.97**		
Veolia	13.2	12.1	7.2	2.9%	5.6%	2.8	8.2%	7.4%	6.7%	0.73	Narrow	4
Sector Median	**12.7**	**13.3**	**8.2**	**-1%**	**4.9%**	**3.1**	**1.1%**	**3.8%**	**7.0%**	**0.87**		

Source: Morningstar. Data as of Dec. 4, 2024.

Economic Moats

Most European utilities lack moats given the high proportion of deregulated businesses.

Summary of Moat Ratings and Sources

Most European utilities are diversified utilities with regulated and liberalized operations, primarily power generation, including renewables and retail energy supply businesses.

Regulated Businesses

The economic moat source for regulated networks is efficient scale due to service-territory monopolies. The critical criteria for ascribing a moat to a regulated utility or business is the level of its allowed returns compared with its cost of capital. Regulated networks' returns tend to be lower than in the US, with returns on equity around 7-8% versus 10% in the US. As a result, most regulated utilities or businesses don't earn an economic moat.

Liberalized Businesses

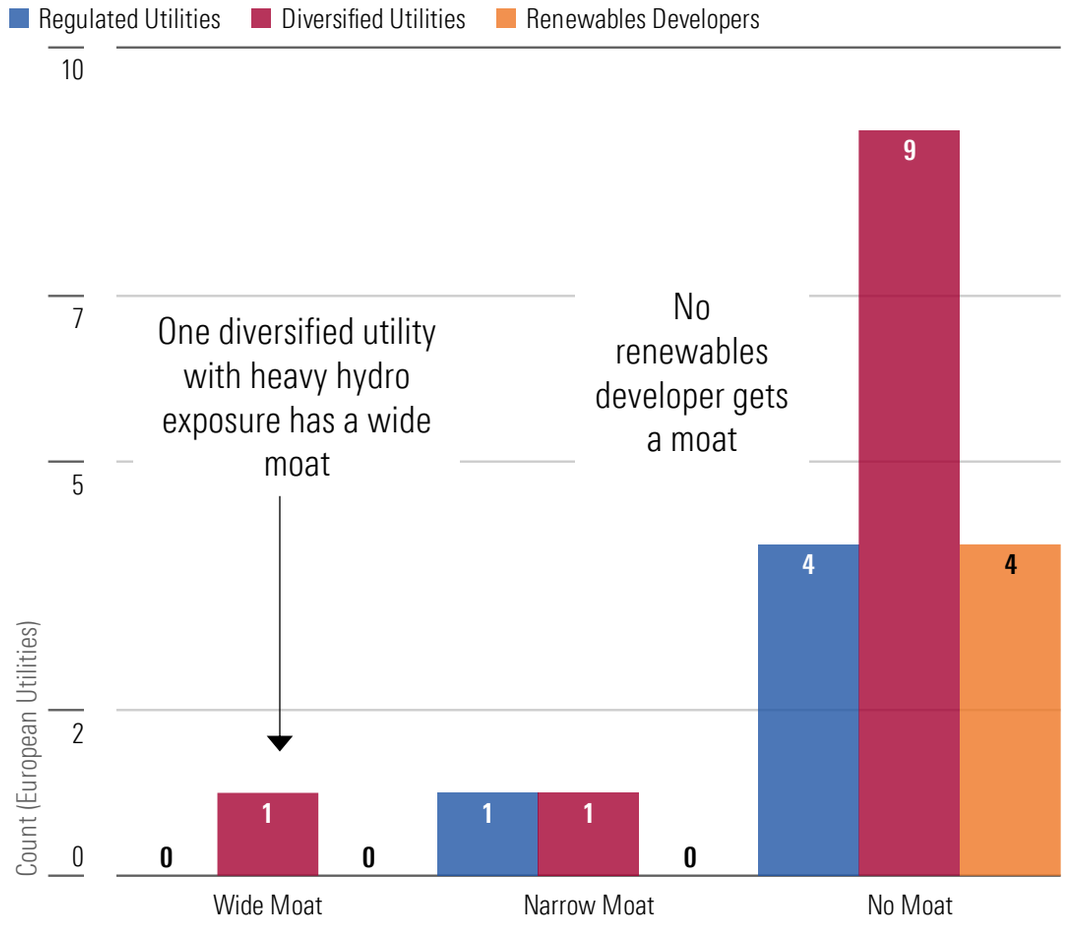
Power production typically has no economic moat as returns on capital are subject to volatile energy prices. The only exception is hydroelectric generating plants, which have very low operating costs, long operating lives, and site restrictions.

Renewables development has no moat because of the absence of barriers to entry.

Retail energy supply has no moat because the absence of product differentiation and low switching costs drive fierce competition.

Hazardous waste management businesses are generally moaty, given the difficulty of obtaining regulatory permits, an intangible asset, which acts as a barrier to entry.

Most Utilities Have No Moats



Source: Morningstar. Data as of November 2024.

Regulatory Environments Play a Key Role in Determining Moats

Allowed returns and indexation to inflation diverge across countries. The regulatory environment in which regulated networks are located is a key factor of the moat rating. The most favorable regime is the UK due to its high allowed returns and full indexation to inflation. Germany is also favorable due to high incentive schemes for exceeding allowed returns through operational outperformance. Italy scores positively due to high allowed returns. Spain and France score negatively due to the absence of inflation indexation and low returns.

UK, Germany, and Italy Have Strong Regulatory Frameworks

Country	Inflation Indexation	Allowed returns				Regulatory Ranking
		Regulatory period	Distribution	Regulatory period	Transmission	
UK	Regulated revenue and RAV are indexed	2023-28	**Nominal WACC: 6.1%**	2021-26	**Nominal WACC: 5.3%**	+
Germany	Yes. Annual adjustment of the cost base	2024-28	**Nominal WACC: 4.7%**	2024-28	**Nominal WACC: 4.7%**	+
France	Yes. Returns and revenue	2024-28	**Nominal WACC:4%**	2024-28	**Nominal WACC: 4.1%**	-
Spain	No indexation	2021-26	**Post-tax WACC: 5%**	2021-26	**Post-tax WACC: 5%**	-
Italy	Yes. Full protection against inflation.	2024-27	**Post-tax nominal WACC: 6%**	2024-27	**Post-tax nominal WACC: 6.2%**	+

Sources: Morningstar.

Note: French regulatory regime is for gas networks since French electricity networks owners are not listed. In most other countries, regulatory features are the same for electricity and gas networks.

Regulated Utilities' Mixed Regulatory Exposure Can Depress Returns and Prevent Moats

Unlike US utilities, most European regulated utilities get no moat as allowed returns are either short of their weighted average cots of capital or offer a margin of safety that is too limited. Out of the five regulated utilities we cover, only E.On has an economic moat. It is the only one that will achieve economic profits over the next five years due to exposure to the favorable German regulatory regime, where there is room to outperform allowed returns thanks to incentives for outperformance.

Mixed Regulatory Exposure Hits Regulated Utilities' Capability to Generate Excess Returns

	Germany	UK	UK Water	Spain	Italy	US Northeast	CEE
Country Regulatory Outlook	+	+	=	-	+	-	+

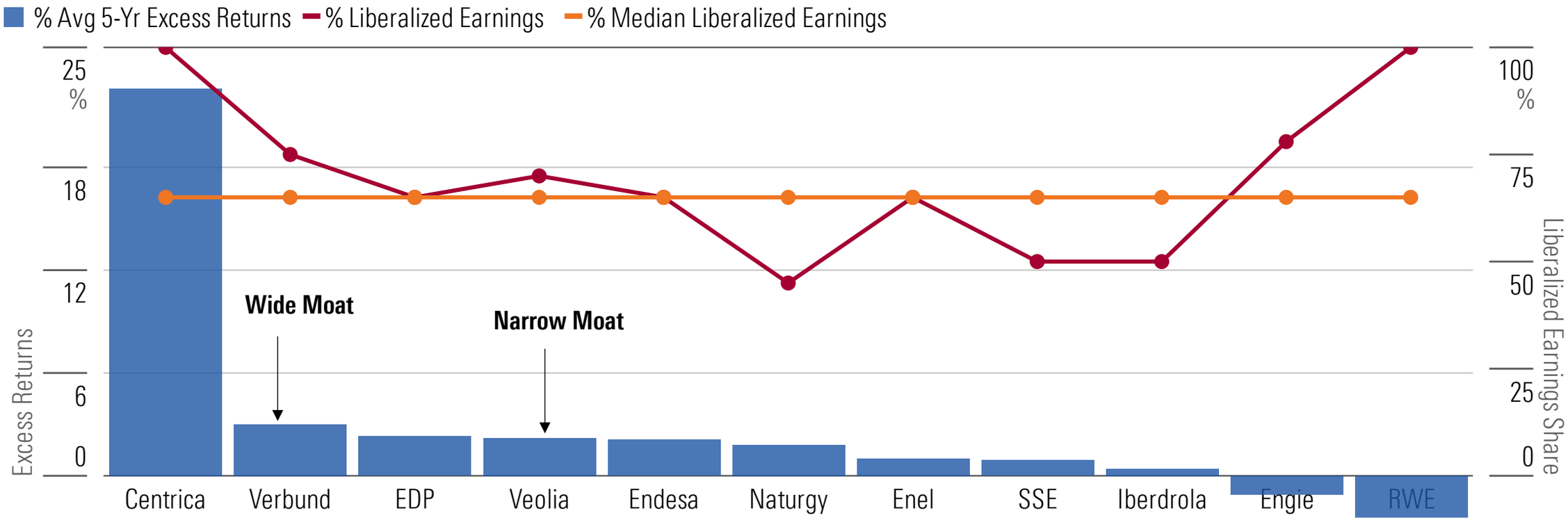
Company	Excess Returns (%)	Moat	Company Regulatory Outlook	Germany	UK	UK Water	Spain	Italy	US Northeast	CEE
E.On	1.10%	Narrow	+	◔						◔
Snam	0.10%	None	+					●		
Redeia	-0.60%	None	-				●			
United Utilities	-0.60%	None	=			●				
National Grid	-0.80%	None	=		◔				◔	

Source: Morningstar.
Note: CEE=Central and Eastern Europe.

Most Diversified Utilities Earn No Moat Due to the Weight of Nonmoaty Liberalized Businesses

We estimate that the 11 diversified utilities we cover will achieve excess returns of 1.8% on a median basis over the next five years, which is much better than regulated utilities. Still, only two companies get an economic moat rating as no-moat liberalized businesses predominate across the board. The percentage earnings contribution from (mostly non-moaty) liberalized businesses, largely power generation and retail energy supply, amounts to 65% on a median basis. The latter can earn high returns on capital as it is asset-light.

Most Diversified Utilities Will Not Achieve Economic Profits in the Next 5 Years



Sources: Morningstar.

Renewables Developers Do Not Earn Moats

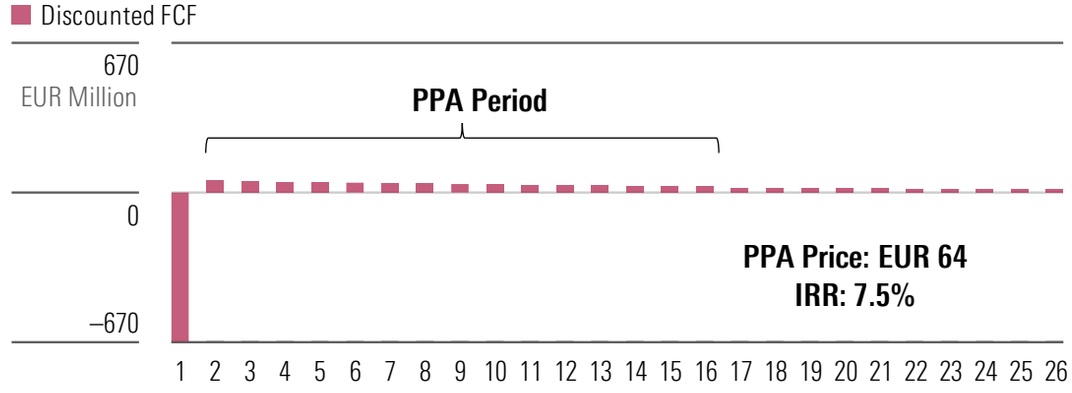
Renewables developers do not typically earn a moat.

Wind and solar plants require significant upfront investment and long-term revenue certainty, so their power is typically sold at fixed prices for 10 to 15 years through power purchase agreements, chiefly contracted with corporate buyers. Therefore, those projects' value creation is highly geared toward PPA prices.

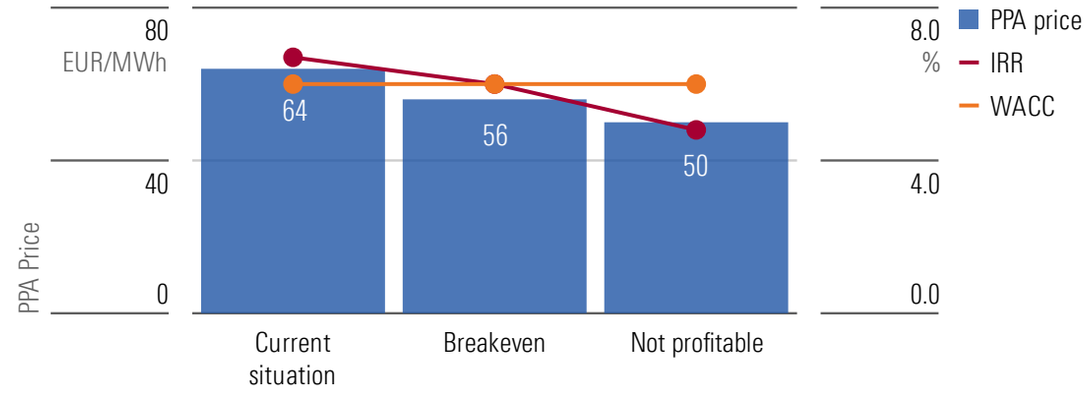
The absence of barriers to entry in renewables development could lead to lower PPA prices so that projects only earn the cost of capital. This would prevent firms from earning excess returns on project developments alone, leaving them more reliant on leverage and farm-downs. The latter could also become more difficult as the number of new projects being developed exceeds the number of buyers, weighing on prices.

We calculate that an average solar PV project in Europe achieves a 7.5% IRR with the current PPA price of EUR 64/megawatt-hour. With a PPA price of EUR 54/MWh, it would reach breakeven with a 6% IRR. With a PPA price of EUR 50/MWh, it would be value-destructive with a 4.8% IRR.

Solar PV Plant's Free Cash Flow Profile With a PPA Price of EUR 64/MWh



Solar PV's Value Creation Highly Dependent on PPA Prices



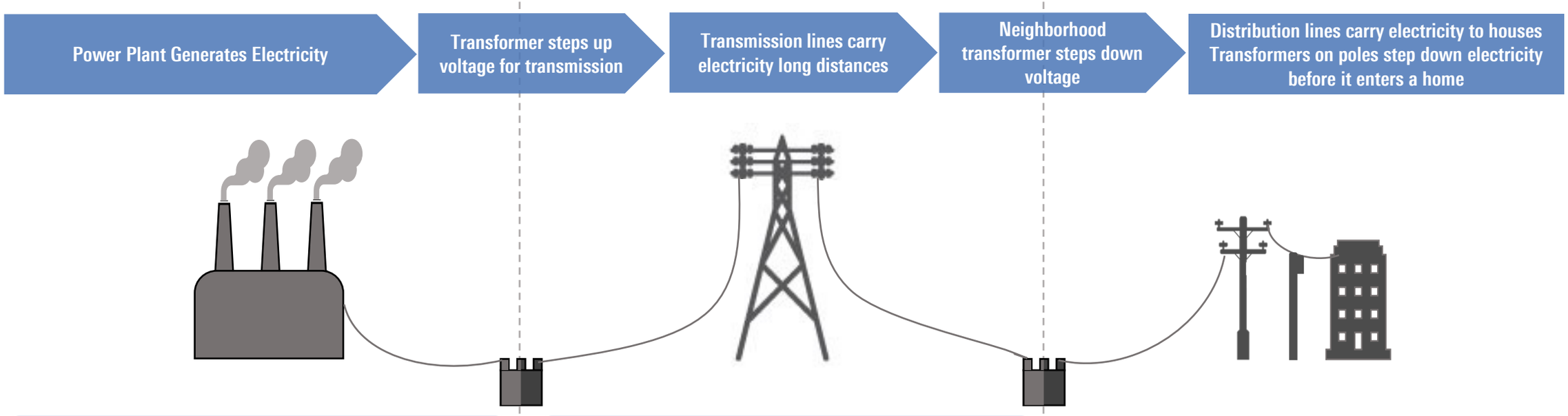
Source: Morningstar.

Industry Basics

Utilities operate throughout the energy value chain from production to distribution.

Electric Utilities Maintain and Operate Power Plants and Networks

Electric Utilities Produce and/or Distribute Electricity Across One or Various Countries



Power Generation
Power producers sell into wholesale markets or through bilateral contracts and can get fixed payments for keeping their plants online in countries with a capacity market.

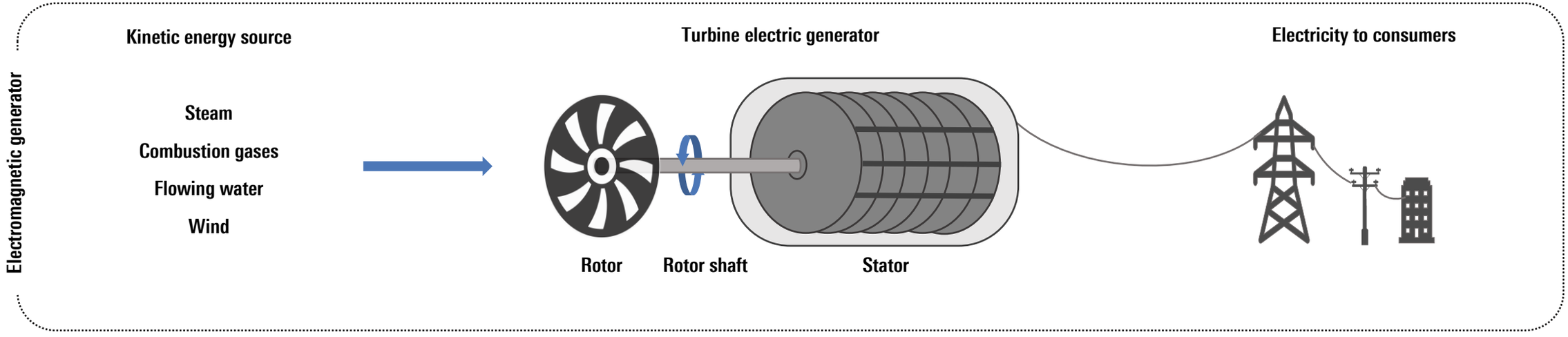
Transmission
National regulators use cost-based ratemaking to set customer rates for high-voltage transmission. Transmission grid operators are responsible for grid stability and reliability. They call on the cheapest available source of power to meet electricity demand.

Distribution
Rate-regulated monopolies serving customers in a specific territory.
Operating and capital costs are socialized across all customers based on national rate regulation frameworks.

Source: Morningstar.

Many Types of Power Generation Technologies

Steam Turbines Are Most Common, but Combined-Cycle and Renewable Energy Technologies Are Growing



Steam Turbine

- Fuel is burned to create heat and steam, which drives a turbine.
- Fuel sources include coal, nuclear, solar thermal, and geothermal.
- Represents about 35% of European Union power generation, but is falling as renewables grow and coal and nuclear plants are retired.

Combustion Turbine

- Hot gases typically from burning natural gas or refined liquids (fuel oil, gasoline, and so on) drive a turbine.
- These are a small, but important share of total generation because they can supply power quickly when electricity demand peaks or when renewables are not available.
- Internal combustion engines used for backup.

Combined-Cycle

- Combustion gases from one turbine generate additional electricity in another turbine.
- Represents about one quarter of European electricity generation. Very high efficiency.

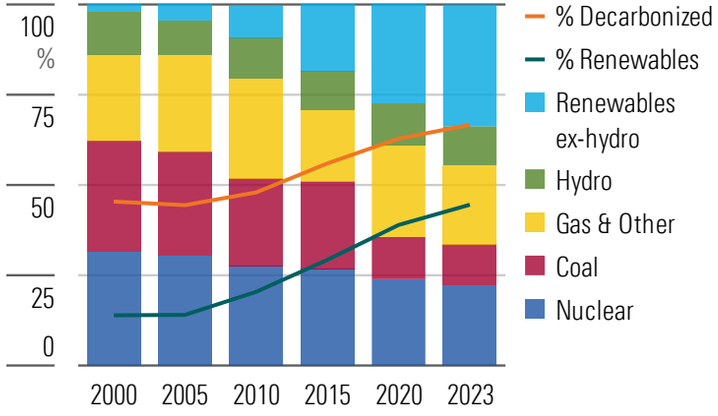
Renewable Energy, Other

- Water and wind turn turbines directly.
- Solar power uses photovoltaic cells to convert sunlight into electricity.
- Heat and power combined are popular for large industrial and co-located buildings (government, healthcare, and education).

Source: EIA. Data as of November 2024.

Growth in Renewable Energy Changing the Power Generation Mix Across Countries

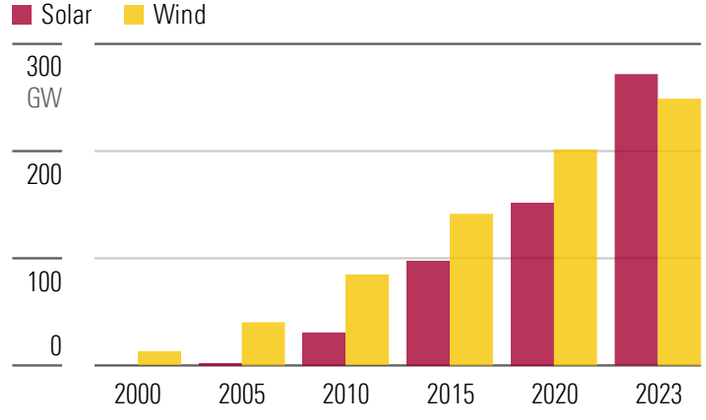
Renewables' Share Has Surged in Europe …



Renewables, including hydro, accounted for 45% of European power generation in 2023, up from 14% in 2005. Rapid growth in wind and solar capacity has displaced other sources of power generation, especially coal, whose share has fallen 66% since 2005.

Including renewables, hydro, and nuclear, the share of Europe's decarbonized power generation grew from 44% in 2005 to 67% in 2023 as the surge in wind and solar capacity largely offset the decline in German nuclear power generation.

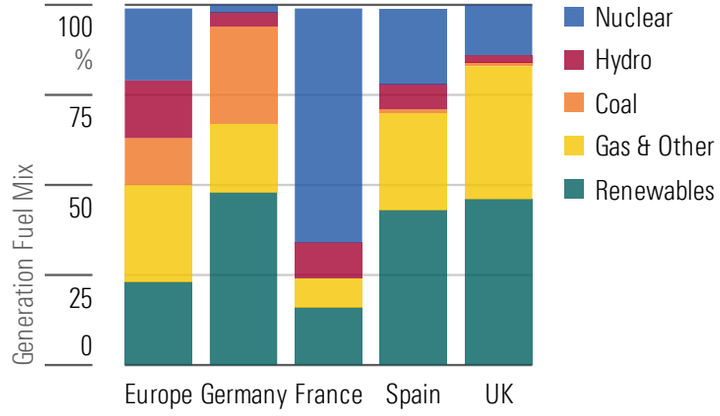
… Thanks to Rapid Growth of Solar and Wind



Since 2005, solar PV and wind capacity have surged thanks to declining construction costs driven by technology improvements, generous subsidies, and heightened EU climate ambitions.

Solar PV growth has accelerated recently, resulting in it overtaking wind in 2023.

Power Generation Mix Varies Across Europe



In Germany, Spain, and the UK, renewables account for about 50% of power generation. France is unique in that it relies heavily on nuclear energy.

Gas is the second largest power source, accounting for 27% of European generation. It is also the most flexible and complementary to intermittent renewable power.

Only in Germany is the share of coal still meaningful, where it provides reliable baseload power after the country shut down its last nuclear plants in 2023.

Source: Ember, Morningstar, Data as of November 2024. Note: Europe refers to the EU and the UK.

Wholesale Power Markets Determine Power Prices Through Supply/Demand, Replacing Regulated Prices

The gradual opening of the European electricity market to third-party access planned by the first energy package of the European Union in 1996 led to the development of wholesale power markets. Bilateral contracts and power exchanges started to emerge at a national level. Wholesale power prices were set based on market supply/demand, replacing the traditional regulated prices.

In the early 2000s, several European countries launched national or regional power exchanges, which became the platform for setting wholesale power prices.

In 2003, the second energy package pushed for further opening of the market, enabling cross-border electricity trading and the formation of regional wholesale markets.

In 2009, the third energy package enhanced cross-border co-operation and integration of electricity markets, mainly through the development of market coupling. Market coupling further integrated national wholesale markets by allowing electricity to be traded across borders more efficiently, ensuring wholesale prices better reflect supply/demand conditions across the region.

Power markets are divided into bidding zones, each with one price per-market-time unit. The prices between bidding zones are coupled through auctions or continuous trading, ensuring that grid capacity is allocated most efficiently. Hence, the high importance of grid operators or transmission system operators.

Main European Power Exchanges

Source: EU4energy.

The Merit Order System Favors Renewables

The Merit Order System Prioritizes the Cheapest Source of Power …

Under the merit order system in place in Europe, grid operators dispatch plants starting with the lowest-cost producers to meet this demand.

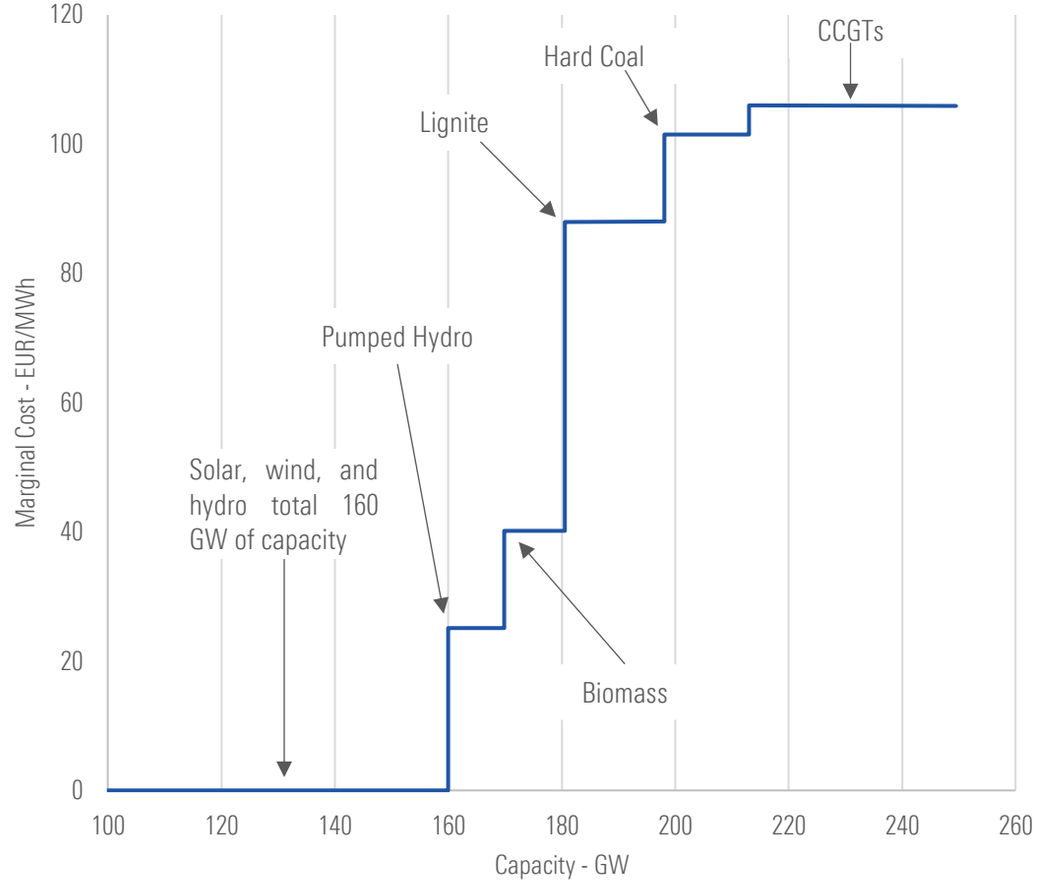
Renewable sources like wind, solar, and hydropower typically have no marginal costs because they do not require fuel and do not emit carbon, and in turn, are called on first. Nuclear power also has a low operating cost and follows renewables in the ranking. Fossil fuel plants (biomass, coal, gas, and so on) have higher marginal costs due to the costs of fuel and CO2 emission allowances. They also have higher operating costs. As demand increases, more expensive plants are called on to supply power.

… But the Electricity Price Is Set by the Most Expensive Source

As coal plants are being withdrawn from most European countries, combined-cycle gas turbines are becoming the most common marginal source of power and are determining the price of power. Even though cheaper plants like renewables supply electricity, they are paid the market price determined by the most expensive plant needed to balance supply/demand.

Germany's Merit Order Curve

Power Sources With Zero Marginal Cost Largely Dominate



Source: Morningstar, Bundesnetzagentur.

Wholesale Power Prices Are Driven by CCGTs

CCGTs Role in European Power Pricing: Efficiency, Costs, and Margins

CCGTs are the marginal source of power in most European countries and require power prices to exceed operating costs to produce power.

Most of their costs are related to gas and determined by dividing the gas market price by the plant's efficiency. The latter measures how effectively the plant converts natural gas energy into usable electricity. CCGTs' efficiency averages between 50% and 62%.

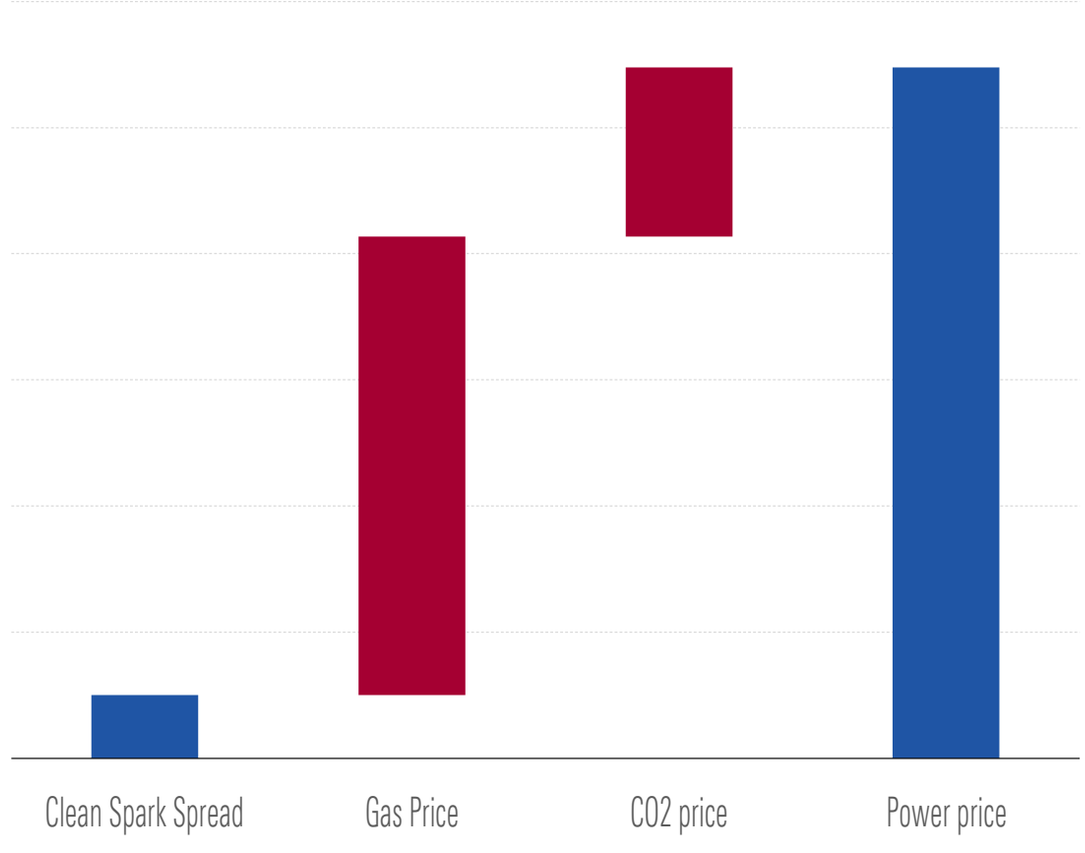
As the most efficient CCGTs will produce first, it is sensible to use their efficiency when estimating the CCGT's breakeven cost to set the market power price.

The clean spark spread, that is the unit gross margin of a CGGT, is determined by subtracting CO2 and gas input costs from the power price. For the CO2 cost, multiply the market CO2 allowance price by the carbon intensity of CCGTs, which amounts to 0.4 on average.

To ensure CCGTs provide adequate supplies for the market, clean spark spreads must be high enough to cover the variable operating and maintenance costs, which are around EUR 2 MWh to EUR 4/MWh.

Power Prices Must Cover CCGTs' Running Costs, Mostly Made of Gas and CO2

Power Sources with Zero Marginal Costs Largely Dominate

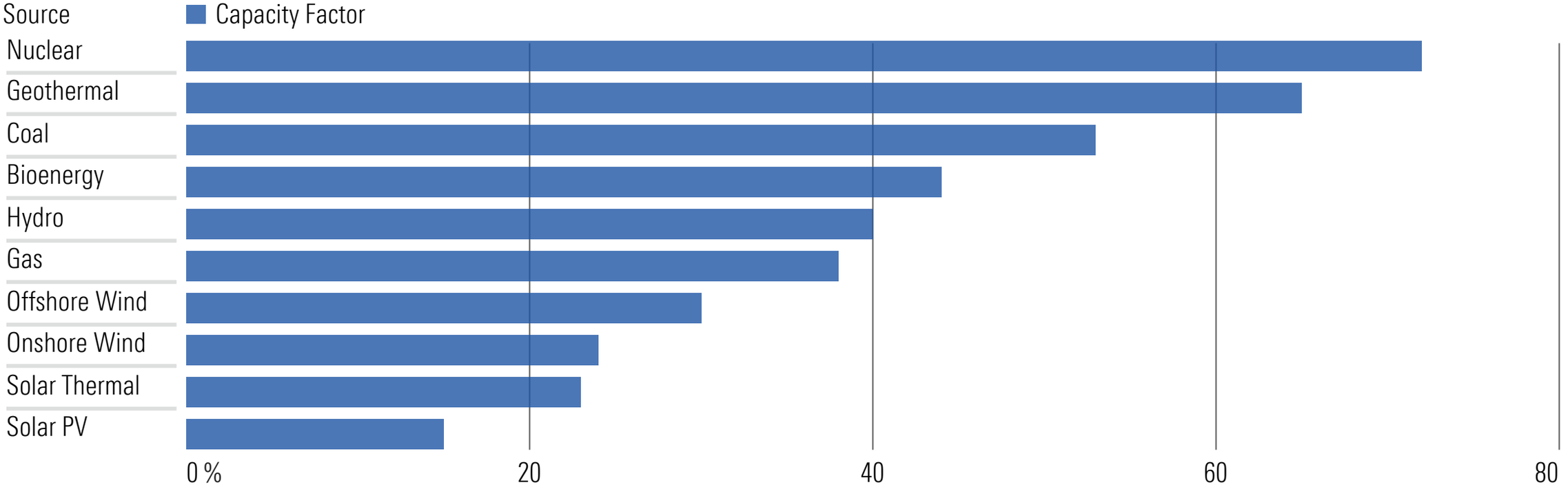


Source: Morningstar.

Capacity Factors Vary Greatly Across Difference Power Sources

Capacity factors, or the percent of the day the generation form is running, vary widely. Nuclear's high capacity factor is favored for its reliability, with renewables' capacity factors significantly lower due to the intermittency of wind and solar. Consequently, renewables need back-up capacity, which is typically provided by CCGTs as they are the most flexible power source.

Renewable Energy Has Among the Lowest Capacity Factors



Source: Rystad.

Capacity Markets Are Expanding in Europe to Keep Backup Baseload Power

Capacity Markets Ensure Much-Needed Baseload Power

As intermittent renewable power grows, backup baseload power from conventional power plants like CCGTs is needed. The volatility of wholesale power prices implies limited earnings visibility for conventional power plants, so utilities can be tempted to shut them down and not build new ones.

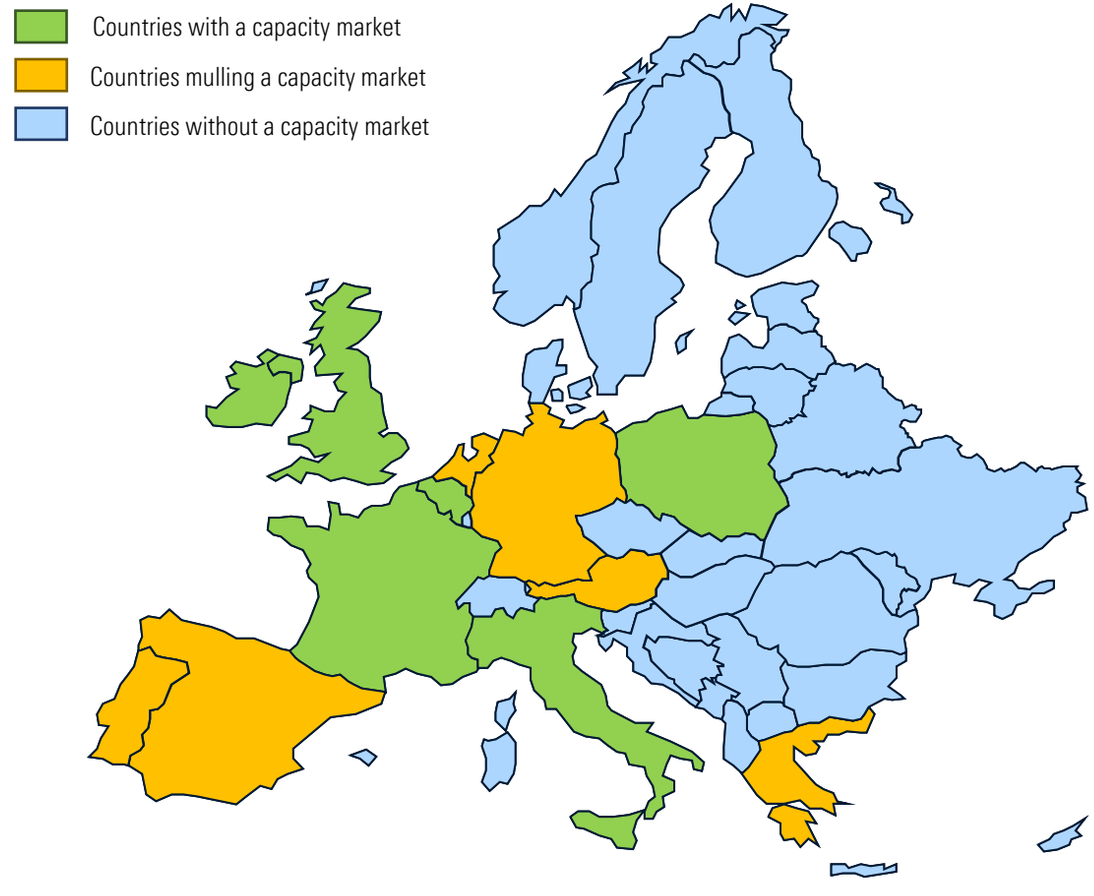
Some European countries have implemented a capacity market in which plant owners receive a payment for the capacity they pledge to keep online or build. This provides an additional income stream, so more markets will increase producers' earnings.

Capacity Markets Are Expanding Across Europe

The UK was the first to implement a capacity market in 2014. Power generators bid to secure capacity several years in advance. The French capacity market, introduced in 2017, is a decentralized capacity mechanism where suppliers must secure capacity certificates to cover their peak demand. Suppliers buy these certificates from capacity providers, who are power plant owners.

The Italian capacity market, introduced in 2019, is like the UK's one. Belgium's centralized capacity market, introduced in 2021, was required to compensate for the shutdown of most of its nuclear plants by 2025. Germany is mulling a capacity market as it needs more baseload power to compensate for the shutdown of nuclear and coal plants. Other countries like the Netherlands, Spain, Portugal, and Austria are also considering capacity markets.

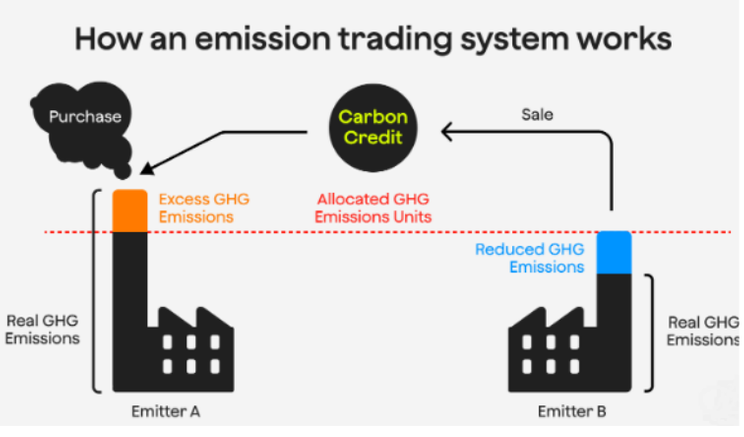
Capacity Markets in Europe



Source: Morningstar.

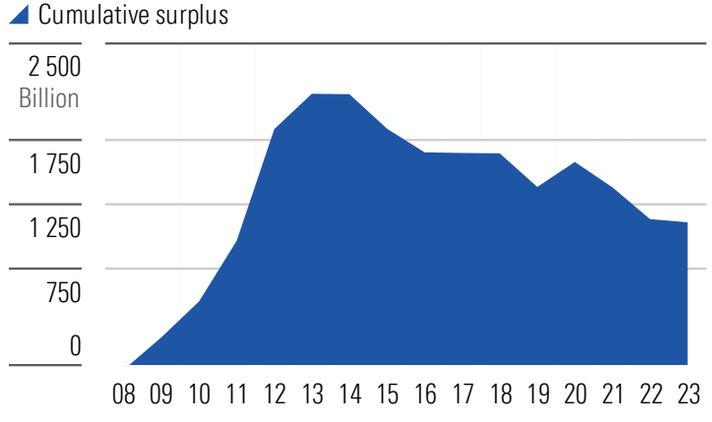
The EU Emission Trading Scheme, a Decarbonization Tool That Had to Be Fixed

The EU ETS Operates on a Cap-and-Trade Principle



The European Union was the first region to implement a carbon market when it created the EU emission trading scheme in 2005. The EU caps total emissions from certain sectors like power generation and industry. The cap decreases every year. Companies receive or buy emission allowances, allowing them to emit one metric ton of CO2. If a company emits less than its allowance, it can sell the surplus, but if it exceeds its allowance, it must buy more or face penalties. These allowances are traded on the market.

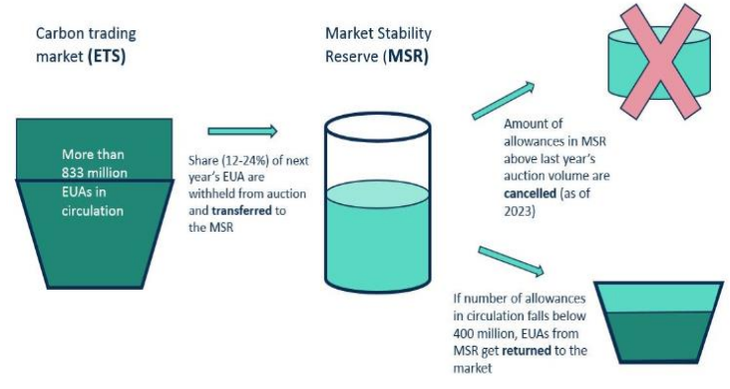
Allowances Surplus Ballooned Until 2014



After the global financial crisis, the supply of carbon allowances (from free allocations, auctions, and international credits) far exceeded demand from the EU ETS-covered sectors (power generation and industry), creating an oversupply that peaked at 2.1 billion allowances in 2013.

Backloading 900 million allowances between 2014 and 2016 reduced the surplus to 1.5 billion-1.6 billion. In 2017, reforms introduced a market stability reserve, which was implemented in 2019 to decrease the surplus further.

The Market Stability Reserve



The Market Stability Reserve aims to improve the system's resilience to major shocks by adjusting the supply of allowances to be auctioned. Its main features are:

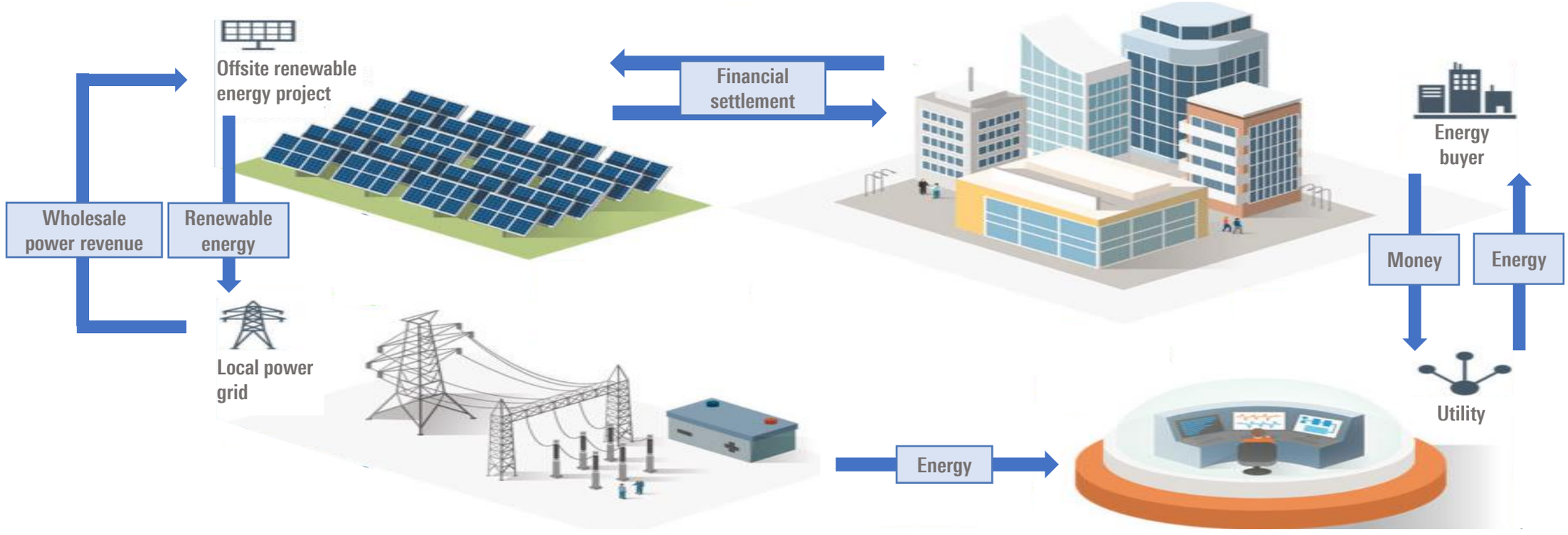
- Allowances of 900 million backloaded in 2014-16 were put in the MSR.
- Should the surplus of allowances exceed 833 million, 24% of it is placed in the MSR through a reduction in the annual auctions of allowances.
- Since 2023, volumes of allowances in the MSR have been capped at the level of auctions in the previous year. Excess allowances are canceled.

Source: Senken, Clean Energy Wire, European Union, Morningstar.

Power Purchase Agreements Underpin Renewables Growth

Wind and solar plants require significant upfront investment and long-term revenue certainty, so their power is typically sold at fixed prices for 10-15 years. Before 2020, most of these plants received fixed prices from publicly subsidized auctions. Around 2020, power purchase agreements became more common with corporate buyers seeking greener energy and stable electricity costs. The most popular PPA type is virtual or synthetic, allowing companies to offset carbon emissions without physical energy delivery.

Virtual PPAs Dominate in Europe



Source: Urban Grid.

Electricity Transmission Networks Are the Backbone of the Power System

The electric transmission system includes high-voltage (110-765 kilovolts) transmission lines and substations with transformers that step up voltage from generators or step down voltage for the distribution networks that supply homes and businesses.

ENTSO-E: Coordinating Europe's Electricity Transmission for Market Coupling

The European Network of Transmission System Operators was established in 2009 to implement the market coupling, aimed by the third energy package. It represents 40 electricity transmission operators from 36 countries. TSOs are responsible for the bulk of electric power on the main high-voltage electric networks. They provide grid access to the electricity market players (for example, generating companies, traders, suppliers, distributors, and directly connected customers) and ensure that grid capacity is allocated most efficiently for market coupling. There is one TSO per country, except in Germany.

Transmission Rate Regulation Varies Across Europe

National regulators use cost-based ratemaking to set customer rates for transmission. Regulation varies across European countries, resulting in different allowed returns and pass-through of inflation.

Transmission Investments: Benefiting Utilities and Customers Alike

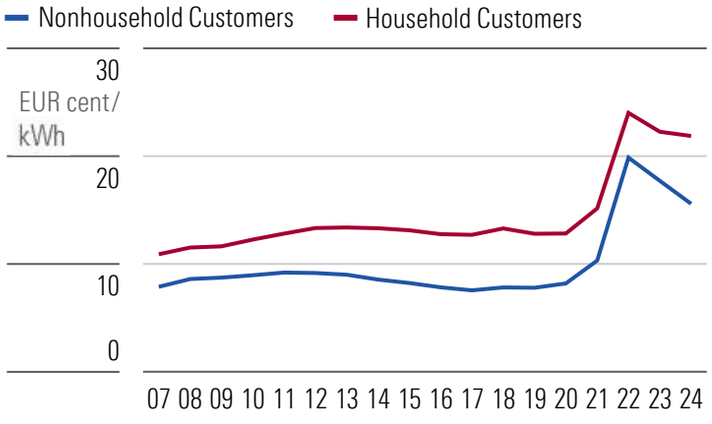
Transmission charges account for about 10% of a customer's average bill. Transmission investments are a win-win for utilities and customers: Investment leads to earnings growth for utilities while customer bills hardly change. More efficient transmission can reduce energy supply costs.

European TSOs

Source: ENTSO-E. Data as of November 2024.

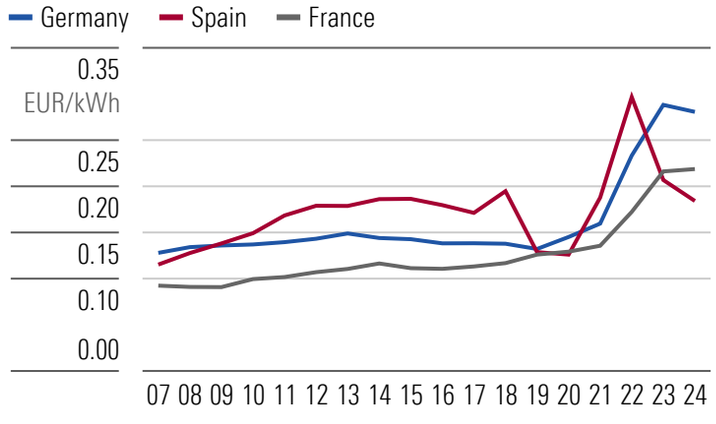
Retail Electricity Prices Vary Across Europe

Households Pay Higher Rates



Nonhousehold customers pay lower electricity tariffs as they pay less network costs since they are cheaper to serve and have lower taxes to preserve their competitiveness.

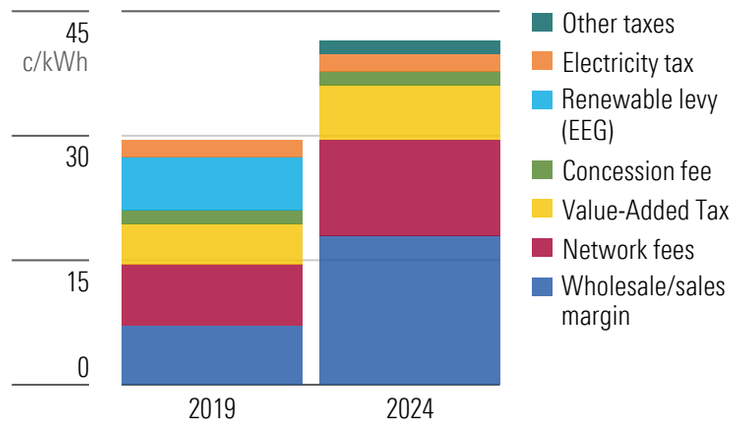
Retail Electricity Prices Vary Greatly Across Europe



Retail prices differ across Europe mainly due to the level of various taxes included in tariffs and wholesale power prices, which can vary depending on the energy mix of the country and its connections with other countries.

Spain has one of the lowest due to the governmental measures implemented during the energy crisis that decoupled wholesale power prices from gas prices by capping the latter for CCGTs.

Households' Bill Structure in Germany



Due to the energy crisis, the share of wholesale power prices in retail electricity prices increased to 43% in 2024 from 24% in 2019.

The second-highest component is network fees, which account for nearly 30% of the total.

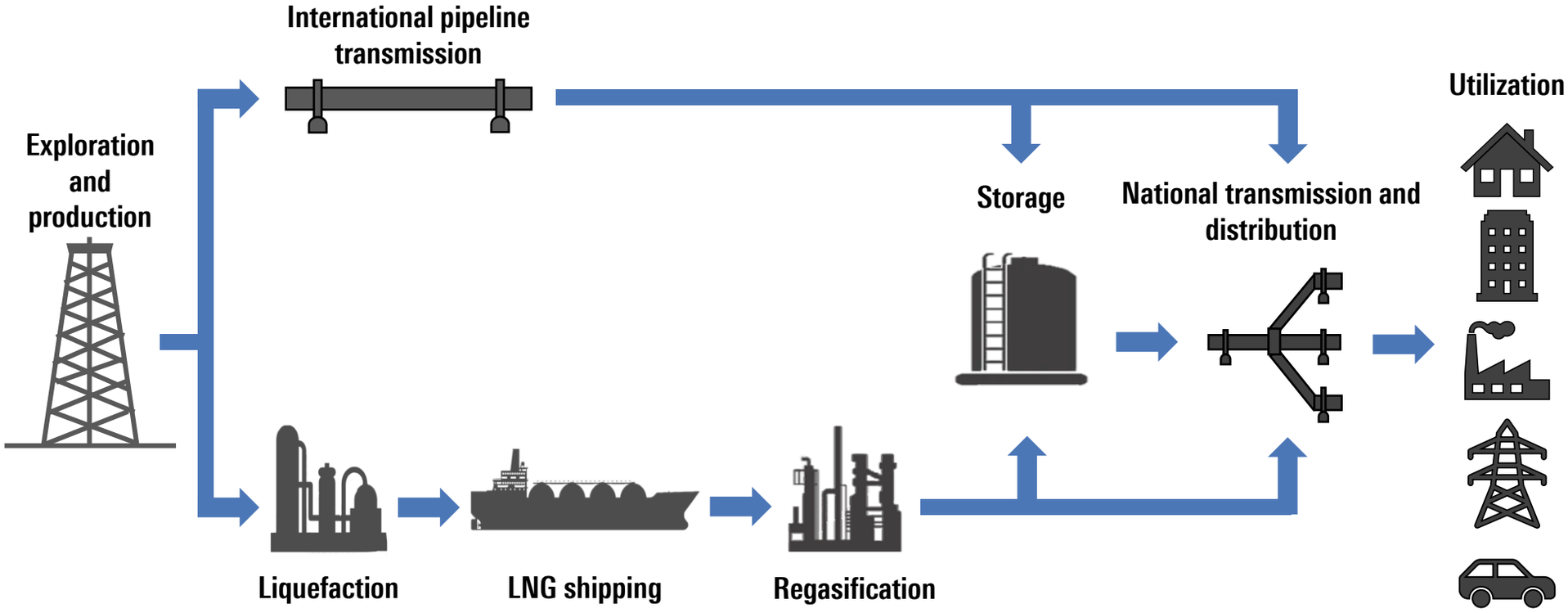
The renewable levy that funds the feed-in tariffs received by plant owners used to account for 22% of the total in 2019. It has been suspended since the energy crisis.

Source: Eurostat, Morningstar.

Gas Utilities Focus on Distribution

Unlike electric utilities that might be involved in the entire value chain, gas utilities are typically only in distribution and retail. Gas distribution revenue is based on regulated customer rates based on the recovery of operating and capital costs to build and maintain the system. Retail's net gas revenue is a pass-through of wholesale gas prices plus a low-single-digit supply margin. Unlike electric grids that must adapt to soaring renewables, investments are not increasing for gas networks, meaning that earnings growth is very limited.

European Utilities are Mostly Absent from the Upstream of the Gas Value Chain



Gas distribution utilities typically serve residential, commercial, and industrial customers, which combined represent about 60% of delivered gas.

Gas storage can be regulated in some countries like France or unregulated like in the UK or Germany.

Source: Morningstar.

Water Utilities Focus on Serving Many Small Customers

Public Companies Dominate the Water Distribution Market

Globally, public companies or local entities, typically municipalities, dominate the water distribution market. The share of private companies varies across regions. The UK has the largest private utilities group in Europe through a monopoly market structure. France and Spain are hubs for global leaders Veolia, Suez, and Aqualia. However, there is a trend toward municipalization.

Water Distribution Business Is Mostly Regulated, Except in France

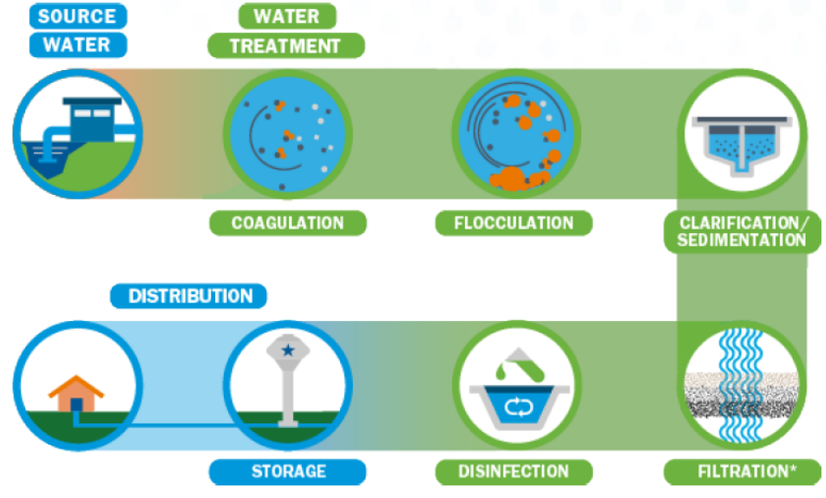
In countries like the UK or the US, water utilities are regulated like energy grid operators. In exchange for a monopoly, the regulators set tariffs to prevent companies from overcharging customers while ensuring that they achieve a fair return that encourages them to invest. In France, there is a concession model where the private operators handle the investments during the duration of a concession, but might have to return the assets to a competitor or municipality if the concession is not renewed.

In most geographies, water tariffs are indexed to inflation. Water volumes are mostly weather-driven and therefore, are higher during summer. Overall, the water distribution business is defensive with limited growth.

Water Distribution Business Focused on Households

Water utilities mainly serve households, which account for only 10% of water demand in Europe. This is because people in households consume drinkable water, which requires a lot of treatment, unlike other sources of water used for hydropower or agriculture.

Water Utilities Own and Operate Treatment, Storage, and Distribution



Residential Customers Are a Small Share of Total Water Usage in Europe

	%
Agriculture	30.00
Power generation	35.00
Industry	10.00
Public services	15.00
Households	10.00

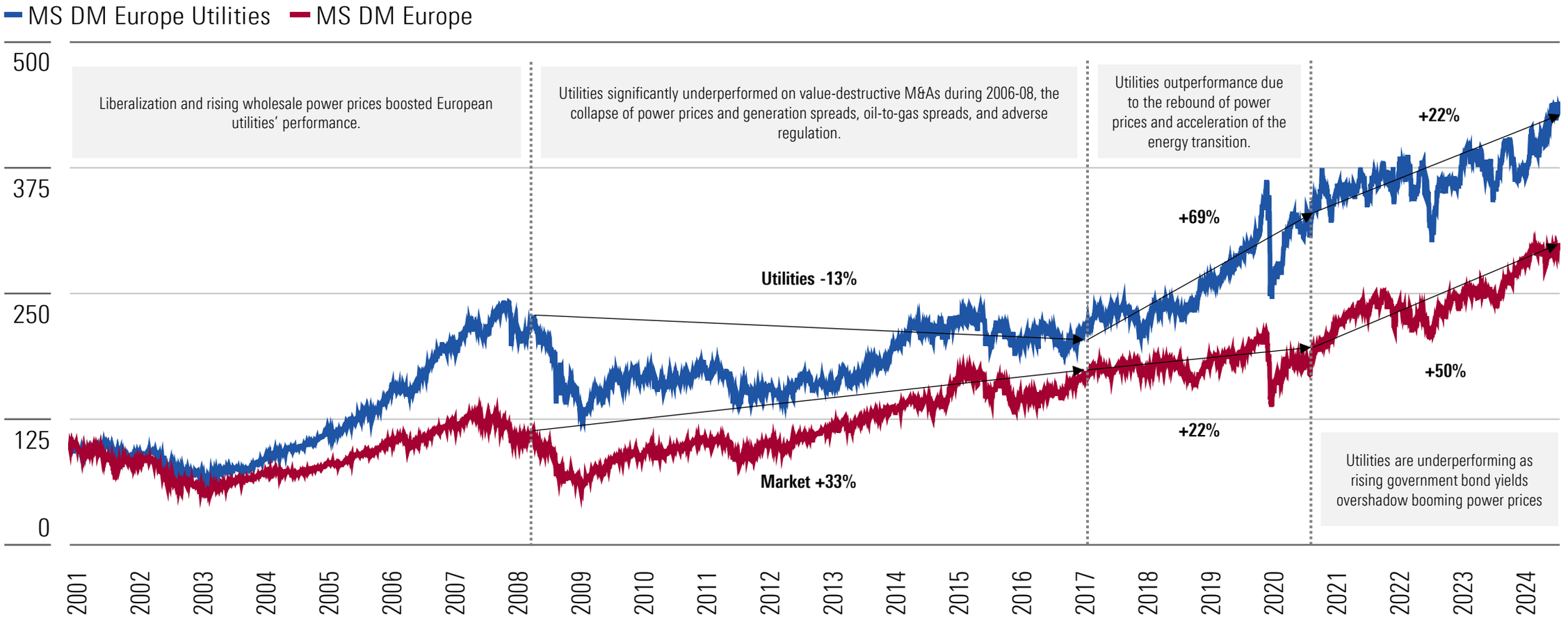
Source: Morningstar, America Water Works, European Commission.

Outlook: Profitability and Returns

Investors' returns are geared to interest rates, dividends, and wholesale power prices.

Utility Returns vs. Market

Utilities Geared to Commodity Cycles and Interest Rates



Source: Morningstar.

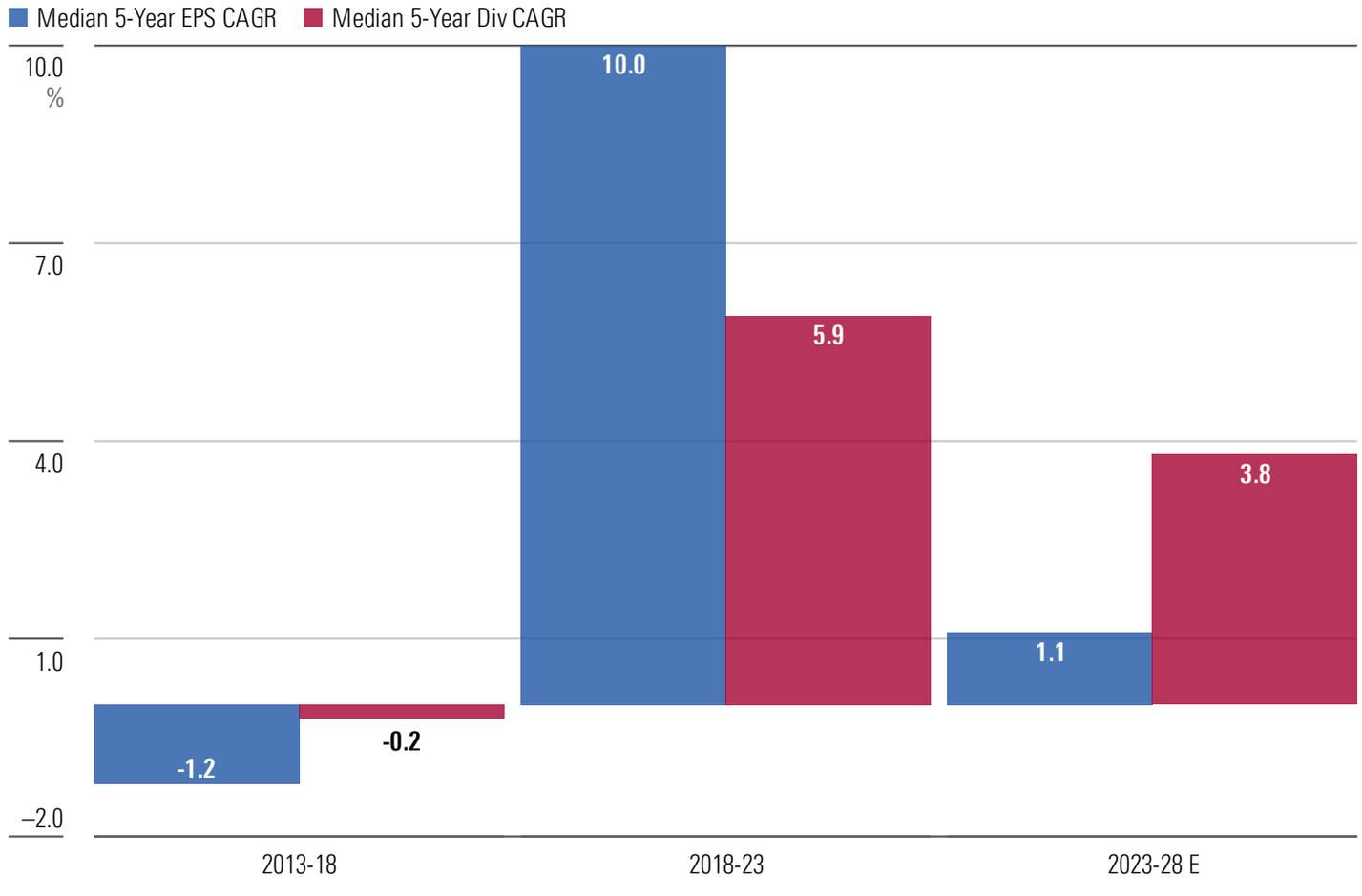
Utilities' Exposure to Commodity Prices Drives Erratic Earnings and Dividends

Bearish commodity prices drove the earnings and dividend decline between 2013 and 2018. Although, commodity and power prices troughed in early 2016, the impact on earnings was delayed because of hedging.

The bullish commodity cycle that peaked with the energy crisis of 2022-23 drove high earnings and dividend growth.

Accordingly, we project tepid median EPS growth of 1.1% because of the record profits posted in 2022-23 by the companies most exposed to commodity prices and our midcycle power price assumptions that are much lower than the achieved power prices in 2022-23. Nonetheless, we posit that companies will be able to grow their dividends faster than earnings thanks to strong balance sheets underpinning higher payout ratios.

Earnings and Dividends Are Geared to Commodity Cycles



Source: PitchBook for historical data, Morningstar for forecasts.

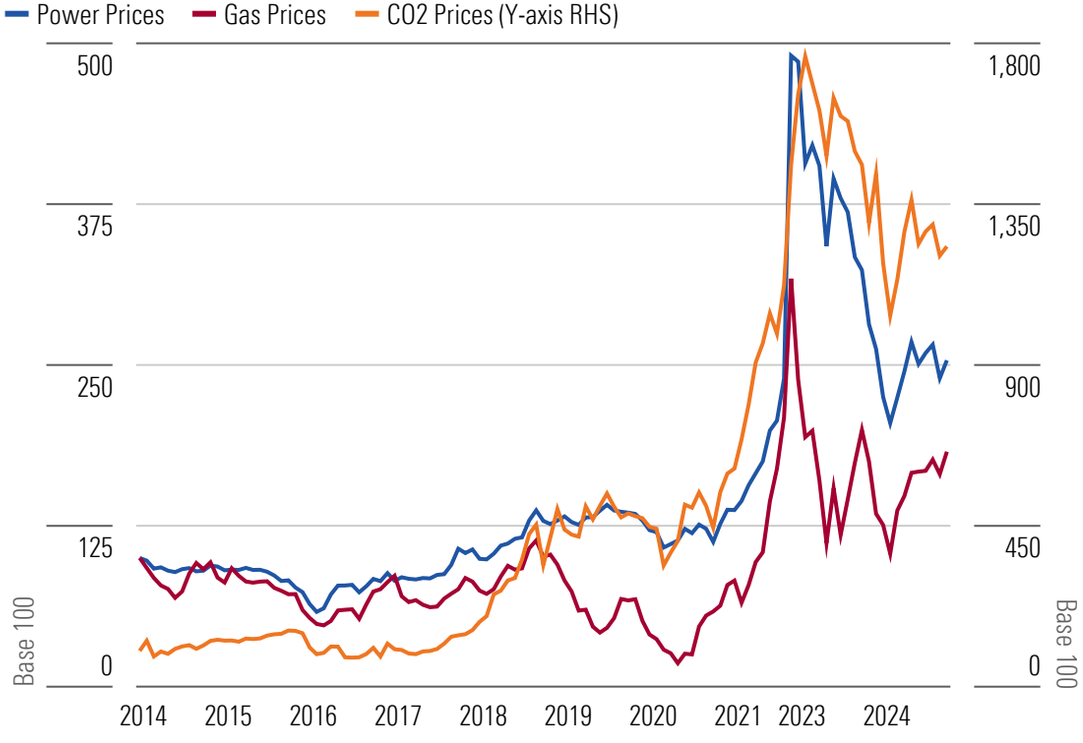
Outlook: Power Prices

We forecast power prices to normalize in the wake of gas and CO2 allowances prices.

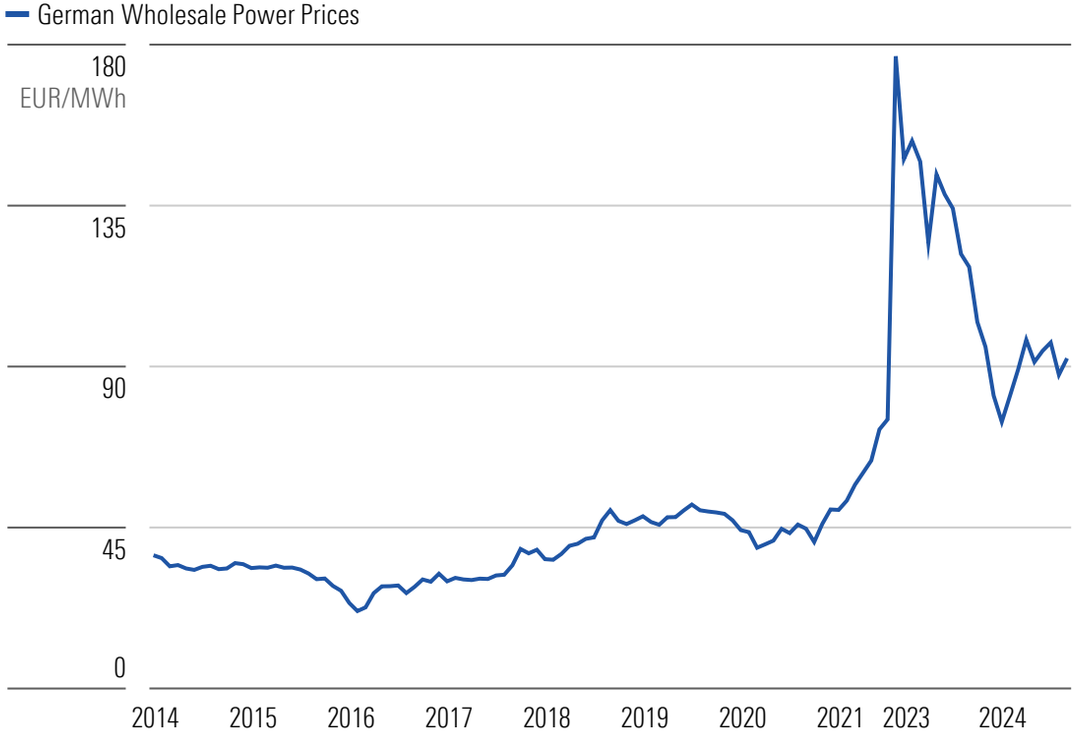
European Wholesale Power Prices Are Driven by Gas and CO2 Prices

High gas prices drive higher coal-to-gas switch prices, which in turn drive higher CO2 allowances and power prices. In 2017, the rebound in CO2 prices driven by the EU ETS reforms spurred a rebound in power prices. Over 2021-23, skyrocketing gas prices pushed wholesale power prices to extreme levels. They have since receded, but remain well above levels during the pre-energy crisis and are in line with gas prices.

Power, Gas, and CO2 Allowances Prices Are Highly Correlated



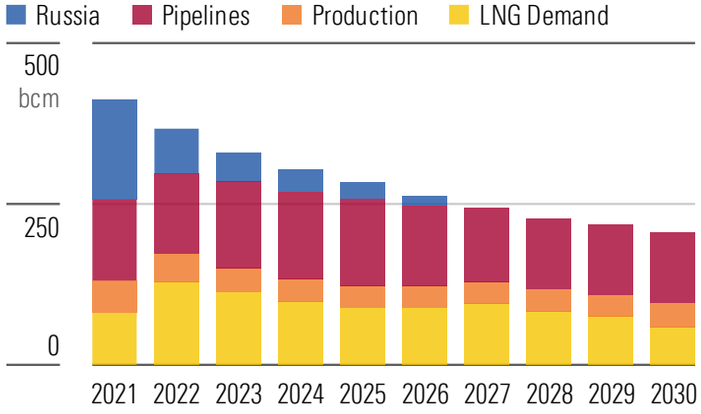
German Wholesale Power Prices Remain Well Above Pre-Energy Crisis Levels



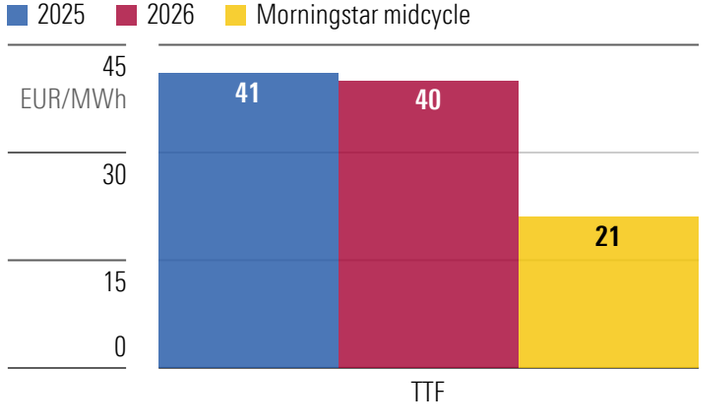
Source: Morningstar.
Note: the period between August 2021 and November 2022 have been cut off for readability since prices reached extreme levels then.

Gas Prices Should Fall Due to Upcoming US LNG Capacity Additions

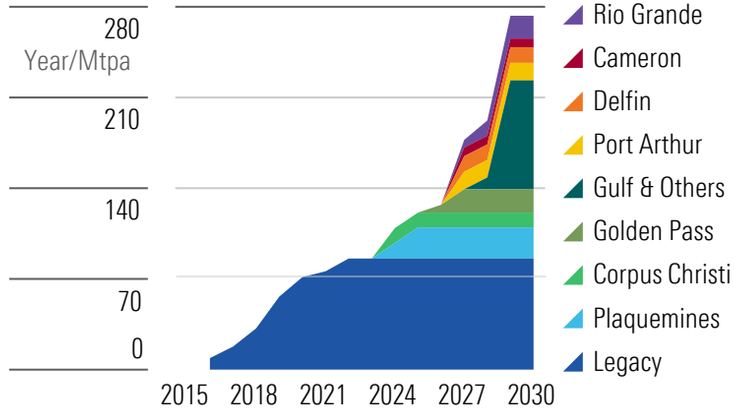
US LNG Will Remain the Marginal Source of Power



Our Midcycle Assumption Is Below Current Forwards



US LNG Export Capacity to Double



US LNG Will Remain the Marginal Source of Gas

We project a tapered decline in EU gas consumption, implying LNG consumption of 59 cubic meters around 2030. Given the ease of rerouting flows thanks to destination flexibility embedded in contracts, we expect US LNG to remain the marginal source of gas supply in Europe. Therefore, US LNG should continue setting European gas prices in the medium term.

We Forecast a EUR 21/MWh Midcycle Gas Price

We forecast midcycle European gas prices to align with the breakeven price needed to cover long-term marginal costs and earn 12% full-cycle returns on new investment in US LNG export terminals. This points to a $7.40/million Btu price or EUR 21/MWh. We believe the current higher market price is a result of concerns over the expiration at the end of 2024 of the gas transit deal between Ukraine and Russia, which accounts for 5% of European gas consumption, and tensions in the Middle East.

New LNG Capacity Will Weigh on European Prices

The commissioning of a new US LNG liquefaction terminal will double export capacity by 2027, pushing European gas prices to our midcycle assumption.

Source: Eurostat, Morningstar, EIA.
Note: 2025-2030=forecast.

CO2 Prices Should Ease in the Wake of Falling Gas Prices

Coal-to-Gas Switching

To be effective, CO2 allowance prices must be above the coal-to-gas switching prices, above which CCGTs become more profitable than coal-fired power plants. Therefore, there is a positive correlation between gas and CO2 allowances prices. However, allowance prices have been well below coal-to-gas switching prices for many years because of the massive surplus of allowances after the global financial crisis.

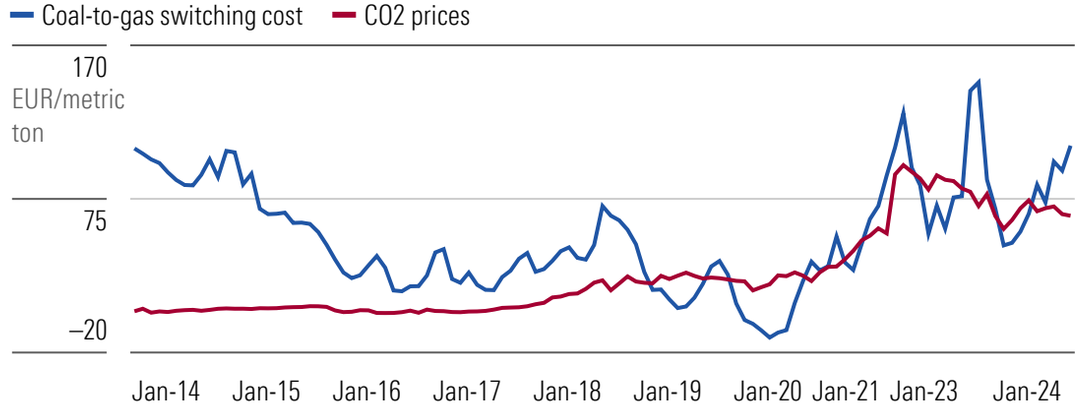
Allowance prices rebounded thanks to 2017 reforms. However, in 2021 and 2022, they soared due to skyrocketing gas prices caused by the energy crisis. The current CO2 allowance price is below the coal-go-gas switch price due to oversupply.

We Project CO2 Allowance Prices to Halve

We expect CO2 allowance to eventually converge to coal-to-gas switch prices due to the increase in the annual reduction in the supply of allowances from 2.2% to 4.2% from 2024 onward. Meanwhile, our expectation of a fall in European gas prices, driven by US LNG capacity additions, will largely offset the decline in the thermal coal price from $145/metric ton currently to $105/metric ton that we forecast. Consequently, we project a midcycle coal-to-gas switch price of EUR 33/metric ton, twice as low as the current price.

Coal-to-gas switch prices are positively correlated to gas prices and negatively correlated to coal prices. Should current gas prices persist, there is a lot of upside to our forecast for CO2 allowances.

CO2 Allowance Prices and Coal-to-Gas Switching



Coal-to-Gas Switch Prices Are Highly Dependent on Gas and Coal Prices

API2 Coal Price USD/metric ton	TTF Gas Price - EUR/MWh				
	10	21	30	40	50
80	-4	50	95	144	194
105	-21	33	78	128	177
145	-47	7	52	101	151
160	-57	-4	42	91	140

Source: Thunder Said Energy, Morningstar.
Note: the period between August 2021 and November 2022 is cut off for more readability since prices reached extreme levels then.

Coal-to-Gas Switch Prices Are Highly Dependent on Gas and Coal Prices

CCGT Will Remain the Marginal Source of Power

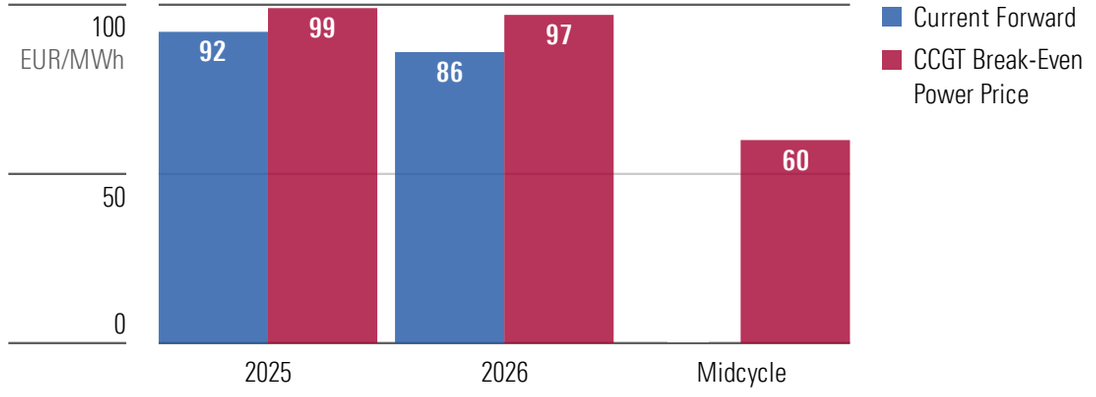
We expect CCGTs to remain the marginal source of power and therefore determine power prices in most of Western Europe. Hence, CO2 and gas prices will continue to be the key drivers of power prices. Based on our CO2 and gas price forecasts, we project long-term power European power prices of EUR 60/MWh.

Current 2025 and 2026 forward power prices are slightly below CCGTs breakeven prices due to current subdued electricity demand.

Higher Power Prices for Longer Would Boost Our Earnings Forecasts

There are upside risks to our long-term power price estimate (blue box), should current CO2 and gas prices persist (red box). Should this be the case, it would boost our earnings estimates and valuation.

We Forecast a Midcycle Power Price of EUR 60/MWh



Midcycle Power Price Could Be Much Higher if Current CO2 and Gas Prices Persist

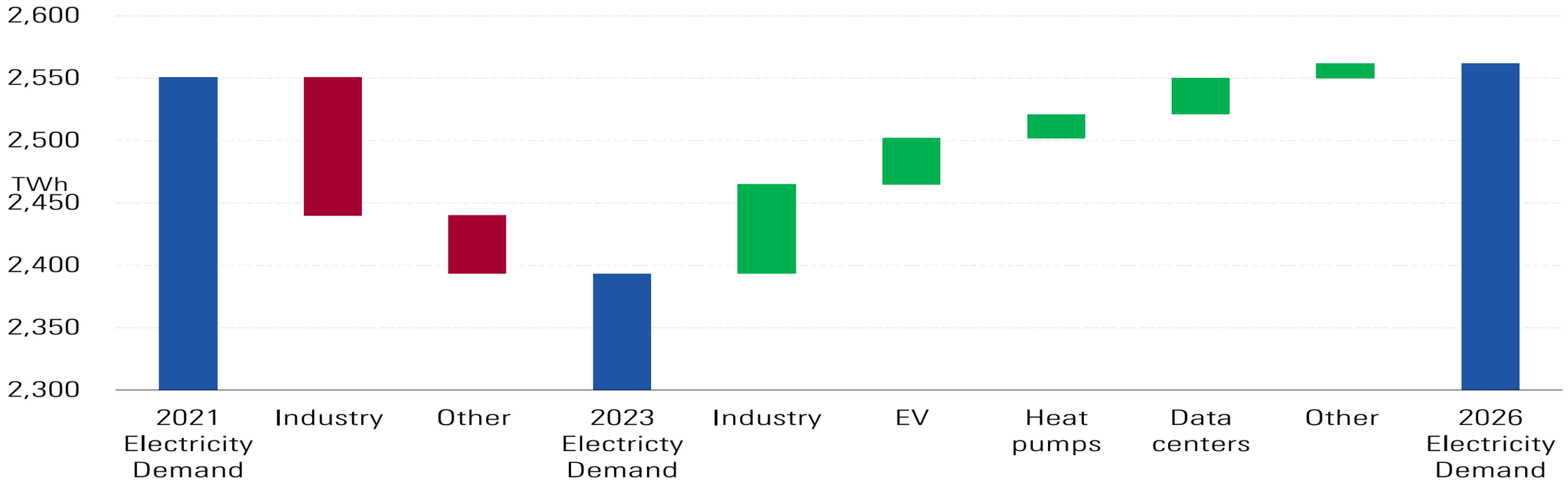
CO2 Price EUR	TTF Gas Price - EUR/MWh			
	15	21	30	40
20	43	56	75	96
33	48	60	80	101
65	54	67	86	97
101	73	86	105	106

Source: Morningstar

Electricity Demand to Recover by 2026

The rebound in electricity demand expected, driven by an industrial recovery and the growth of data centers, should help wholesale power prices close the gap with CCGTs' breakeven prices.

Electricity Demand to Recover by 2026 Thanks to Industry and Electrification



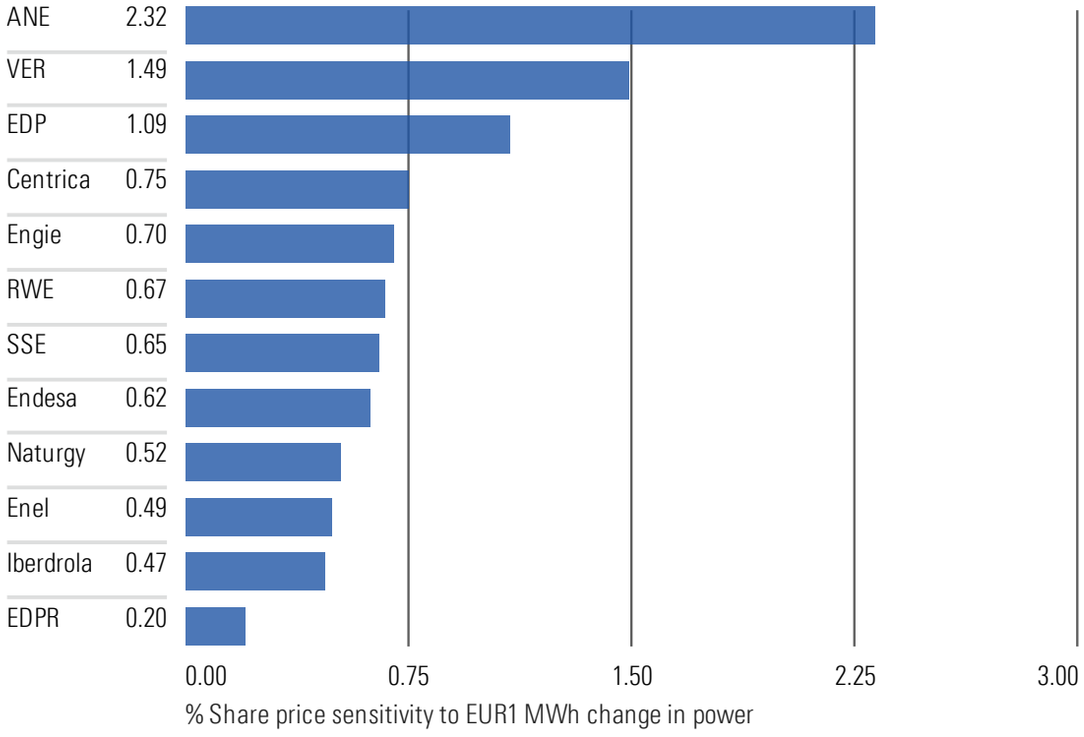
Source: IEA

Electric Utilities: Valuations Geared to Power Prices and CSS

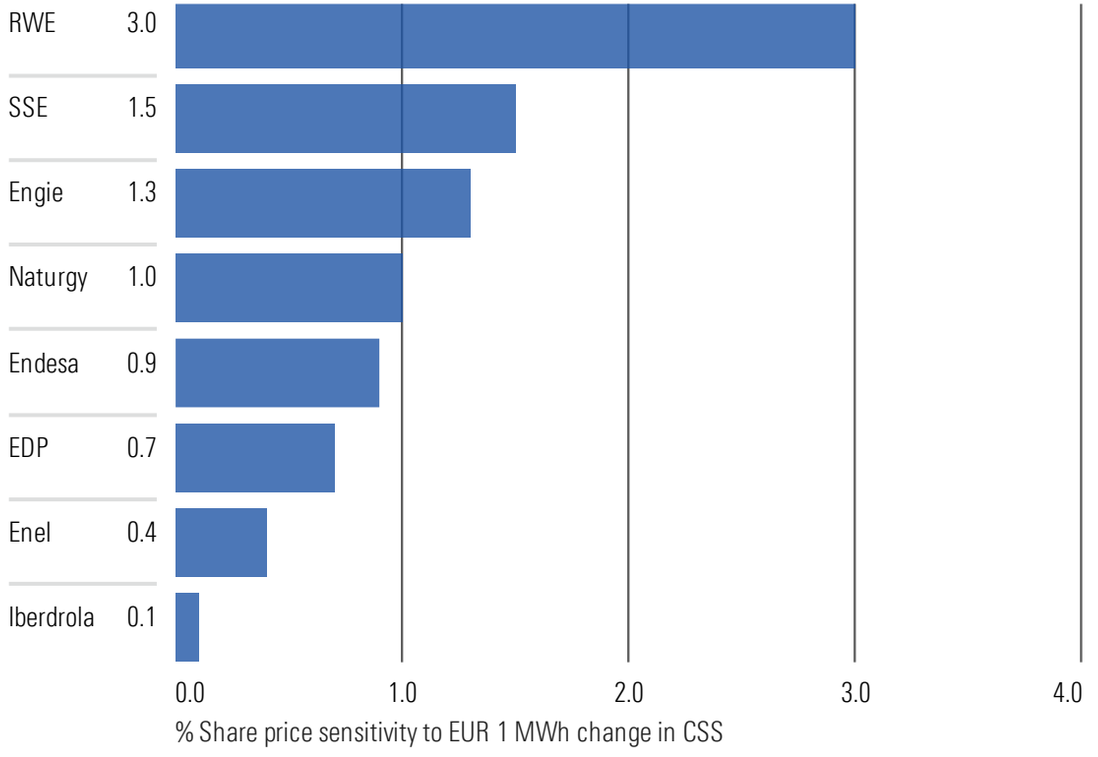
The valuation sensitivity to power price changes depends on the amount of nonthermal power generation: hydro, nuclear, and liberalized wind and solar. These plants benefit from higher power prices without being hit by higher CO2 or gas costs.

Companies most exposed to CSS variations are those with a lot of CCGTs like RWE, SSE, and Engie.

Acciona Energia and Verbund Boast Higher Sensitivity to Power Price Changes



RWE and SSE Exhibit the Highest Valuation Sensitivity to CSS



Source: Morningstar.
Note: based on share prices of December 4.

Outlook: Renewables

Renewables to continue booming in Europe.

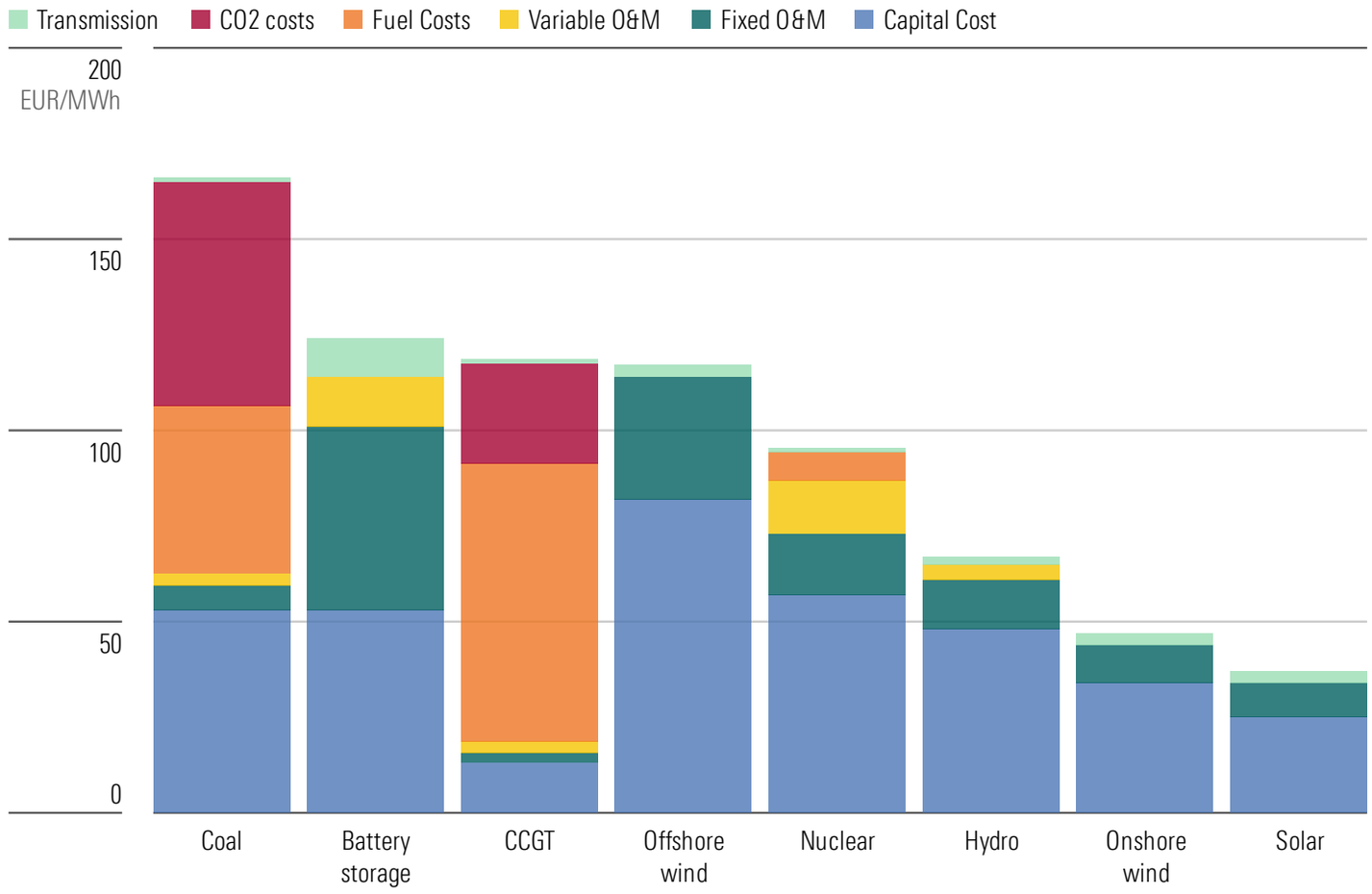
Renewable Energy Economics Supports Continued Development

The levelized cost of energy is a metric used to compare the cost of generating electricity from different sources over their lifespans. It represents the average cost per unit of electricity produced, accounting for all expenses, including:

- Capital costs: initial investment in infrastructure, such as building the plant or installing equipment.
- Operating and maintenance costs: ongoing expenses to keep the system running.
- Fuel costs: for plants that use fossil fuels, biomass, or other fuel sources.
- CO2 costs: the cost of buying CO2 allowances to cover the plant's CO2 emissions in regions with a carbon market like the EU or the UK.
- Transmission costs: the total cost of delivering electricity to end users.

Thanks to the absence of CO2 and fuel costs, and limited operating and maintenance and capital costs, solar and onshore wind are much more competitive than conventional sources of power. This underpins their high growth.

Levelized Cost of Electricity Supports Continued Onshore Renewable Build-Out



Morningstar (left), EIA (right) for nonfuel costs. Data as of November 2024.
Note: O&M=operating and maintenance. Calculated with current gas, coal, CO2 allowance, and uranium prices of EUR 40/MWh, $145/metric ton, EUR 65, and $80/lbs, respectively.

Solar PV to Largely Outgrow Wind

Solar to Continue to Boom by 2030

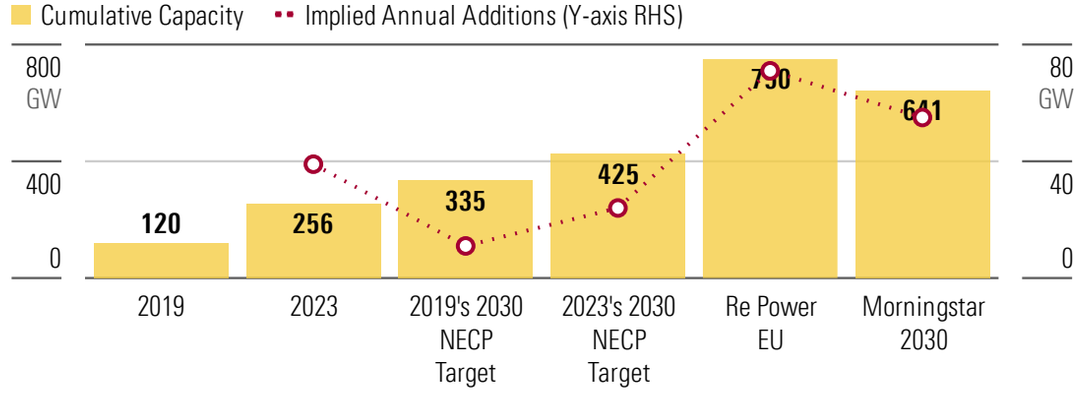
On an aggregate basis, the last national energy and climate plans submitted by the member states to the European Commission in 2023 pointed to cumulative solar PV capacity of 425 gigawatts in 2030, well above the 335 GW from 2019 NECPs due to increased renewables ambitions of the Fit for 55 EU plan in the meantime. Still, the former looks conservative since it implies annual additions of 24 GW by 2030, almost half of the 45 GW between 2019 and 2023. Meanwhile, the REPowerEU plan calls for 750 GW of solar by 2030, implying 71 GW of annual additions. We forecast 58 GW of annual additions by 2030 involving 662 GW of cumulative capacity that year. Improving economics for solar, greater solar power system efficiencies, and adoption of battery storage, will enable solar to continue to outgrow wind.

Countries and EU's 2030 Targets Look to Bullish to Us

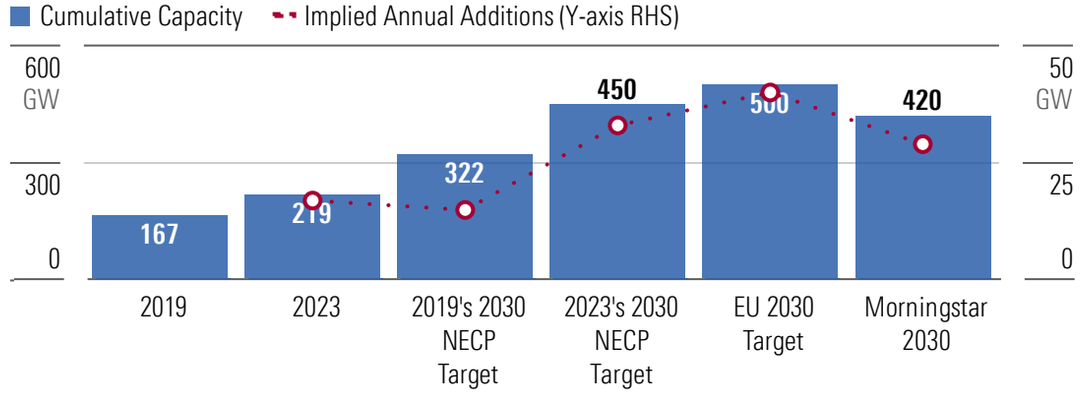
The 2023 NECPs point to 450 GW of wind capacity in 2030, twice as much as the capacity in 2023. Meanwhile, the REPowerEU plan targets 500 GW of wind in 2030. The NECP implies 33 GW of annual additions, nearly twice as high as the 17 GW between 2019 and 2023. We think this is too bullish and forecast 420 GW of installed wind capacity in 2030 involving 29 GW of annual additions.

On the bottom line, we project 600 GW of additional wind and solar PV by 2030, requiring investments of about EUR 600 billion that will support utilities' earnings.

We Expect Solar PV Capacity to Surge 150% by 2030



We Expect Wind Capacity to Almost Double by 2030



Source: Morningstar, Eurostat, European Commission.

Solar and Onshore Wind Projects Are Profitable in the Current Environment; Offshore Wind Needs Public Support

European Solar PV Projects Currently Have a 7.5% IRR

Selling Price EUR/MWh \ Construction Costs - EUR k/MW	400	500	700	900	1,000
45	9.0%	6.7%	3.8%	2.0%	1.3%
60	13.3%	10.4%	6.7%	4.5%	3.6%
64	14.4%	11.3%	7.5%	5.1%	4.2%
70	16.0%	12.6%	8.5%	6.0%	5.1%

With limited operating costs, renewables projects' returns are largely dictated by construction costs, power output, selling prices, and weighted average cost of capital. We typically use a 6% WACC, in line with the industry's standards. In Europe, the current average construction cost for solar PV plants is EUR 700 k/MW, the current average PPA price is EU64/MWh. At these conditions we calculate solar PV projects in Europe achieve a 7.5% IRR, meaning they are value-accretive. Solar PV projects would only be value-destructive if construction costs significantly increase, which is unlikely given Chinese overcapacity.

European Onshore Wind Plants Achieve an 8.7% IRR

Selling Price EUR/MWh \ Construction Costs - EUR k/MW	1,000	1,200	1,400	1,600	1,800
60	7.0%	5.3%	4.0%	3.0%	2.2%
70	9.1%	7.2%	5.7%	4.6%	3.6%
90	12.9%	10.5%	8.7%	7.3%	6.2%
100	14.7%	12.1%	10.1%	8.6%	7.4%

Onshore wind plants are more costly than solar PV with a current average unit construction cost of EUR 1,400 k/MW. Therefore, the PPA price is higher, currently at EUR 90/MWh. With these conditions, we calculate that onshore wind plants in Europe yield an 8.7% IRR, making them highly value-accretive. They would turn not profitable if construction costs were to rise and selling prices were to tumble, which is unlikely given the positive correlation between the two.

Offshore Wind Economics Are More Challenging

Selling Price EUR/MWh \ Construction Costs - EUR k/MW	1,900	2,500	3,375	4,200	5,250
80	9.2%	6.4%	3.8%	2.2%	0.7%
90	11.1%	8.0%	5.1%	3.4%	1.8%
97	12.5%	9.1%	6.0%	4.1%	2.5%
110	14.8%	11.0%	7.6%	5.5%	3.7%

Less mature, offshore wind has been hit more by inflation. At the current average unit construction cost of EUR 3,375 k/MW, we calculate that a selling price of EUR 97/MWh is needed for the project to break even. Unlike onshore wind and solar, most offshore wind farms sell their power at feed-in tariffs based on public auctions. The awarded price at September 2024 auctions in the UK, the largest offshore wind market after China, amounted to EUR 90/MWh-EUR 95/MWh. However, there are tax deductions from investments in the UK that make the projects profitable. Overall, the industry depends on public support.

Source: Morningstar, LevelTen Energy, IRENA.

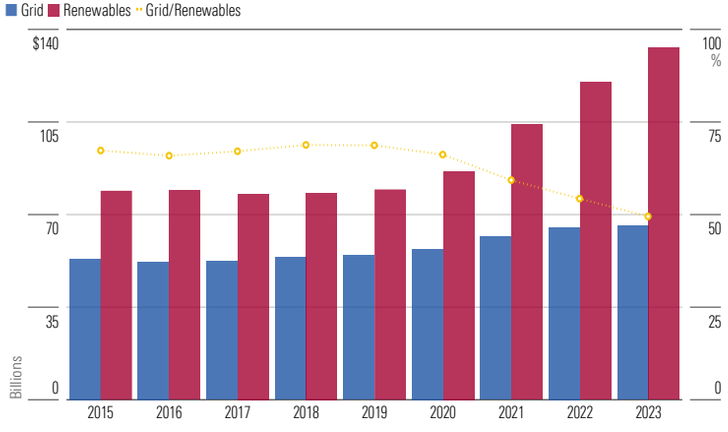
Note: IRR calculations are based on average load factors in Western Europe of 15% for solar PV, 25% for onshore wind, and 48% for offshore wind. Offshore wind's construction costs exclude transmission costs.

Outlook: Electricity Grid

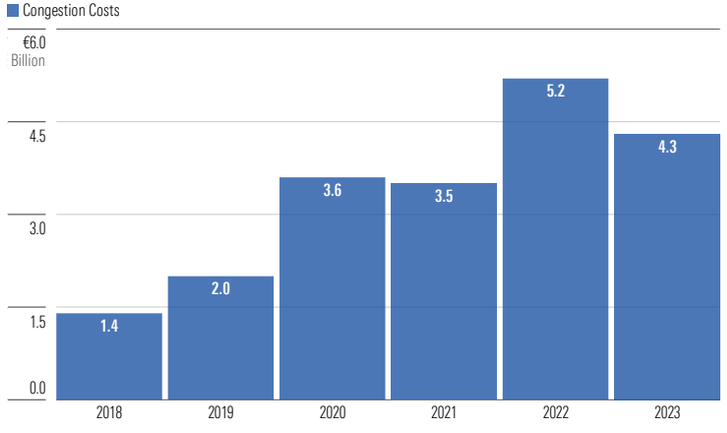
Investments are soaring while regulation is improving.

Grid Investments Lag Renewables Installations, Drive Congestion, and Cause Ballooning Connection Queues

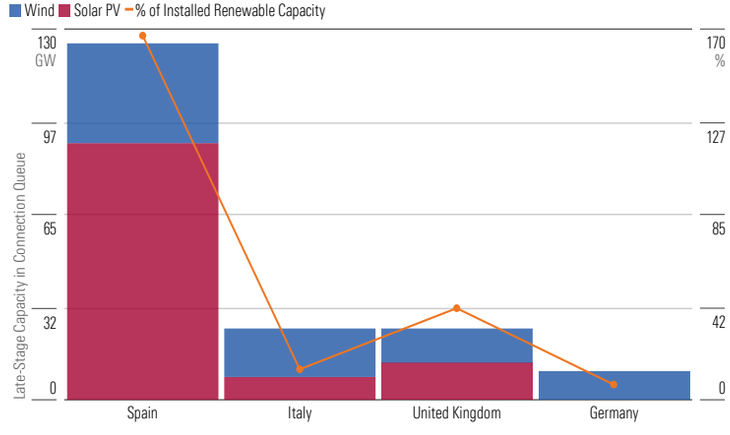
Renewables Investments Are Double the Grid's Ones



Congestion Costs Are Rising



Renewables Connection Queues Are High in Europe



Material Underinvestment in European Power Grids

In Europe, renewables power investments have grown by 6.7% annually since 2015 while electricity grid investments have only grown by 2.7%, resulting in the grid/renewables investment ratio deteriorating from 0.67 in 2015 to 0.49 in 2023, well below the 0.73 recommended by the IEA. The reasons for this include permitting issues, Nimbyism, and the high costs of grid investments.

Congestion Costs Rose Threefold From 2018-22

As a result of the massive underinvestment in the power grid, congestion costs are soaring. Congestion happens when renewable output must be curtailed due to a lack of grid capacity. In this case, a more expensive source of power closer to electricity consumption, typically a CCGT, is called on by the grid operator to produce power. In addition, the CCGT would charge the grid operator for its contribution to the grid's stability or ancillary services. Germany alone accounts for EUR 2.5 billion of congestion costs.

Projects on the Sidelines Are Soaring

Because of grid underinvestment, renewables projects remaining on the sidelines, pending their connection to the grid, are ballooning. Spain holds the highest proportion of late-stage renewables projects in the connection queue to installed capacity at 170%. In the UK, it took renewables projects four years to connect to the grid in 2022 on average. A developer requesting a grid connection today would only be able to connect between 2030 and 2038.

Source: ACER, IAE, Morningstar.

Germany Will Account for Most of the Electricity Grid Investments Step-Up

Germany Will Increase Its Transmission Investments Massively

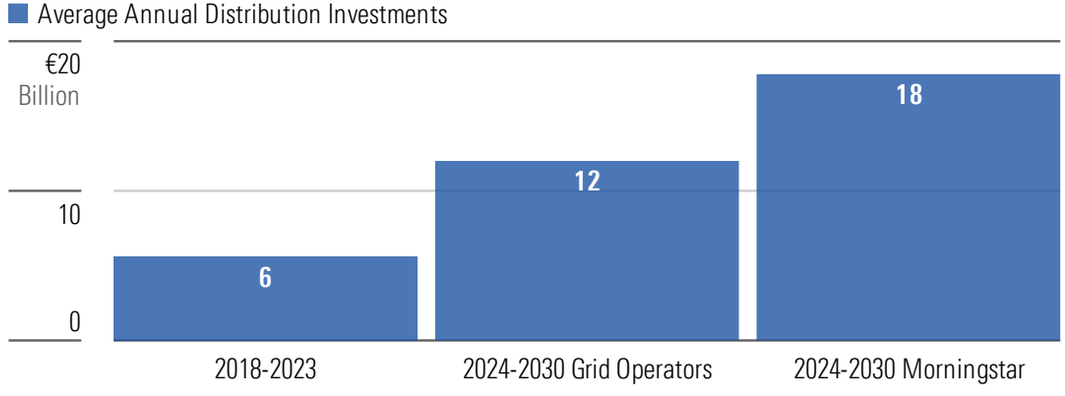
The European Commission launched an action plan for grids in November 2023, calling for EUR 584 billion of investments by 2030, or EUR 83 billion annually, nearly double the average annual investments of the past five years. Regarding transmission, Germany will account for more than half of the investments in Western Europe with EUR 13.5 billion of annual investments, more than three times as high as the 2022 amount. The investments will be chiefly dedicated to constructing transmission lines between the north of the country, where the bulk of the wind power is generated, and the south where industrial demand is concentrated.

It Will Also Lead on Distribution Investments

German electricity distribution operators told the national grid regulator that they need to invest EUR 110 billion over 2024-33, plus EUR 10 billion to replace existing power lines, involving EUR 12 billion of annual investments. We estimate that those estimates have upside due to Germany's high renewables ambitions. We anticipate that Germany will install 23 GW of wind and solar plants annually to reach its 80% decarbonized electricity production target by 2030. This will require EUR 17.8 billion of annual investments by applying the average of EUR 0.77 billion per GW of new renewable capacity between 2022 and 2030 of distribution grid investments.

Germany Will Account for the Bulk of Electricity Transmission Grid Investments

We See 50% Upside to Consensus' Distribution Investment Forecasts in Germany

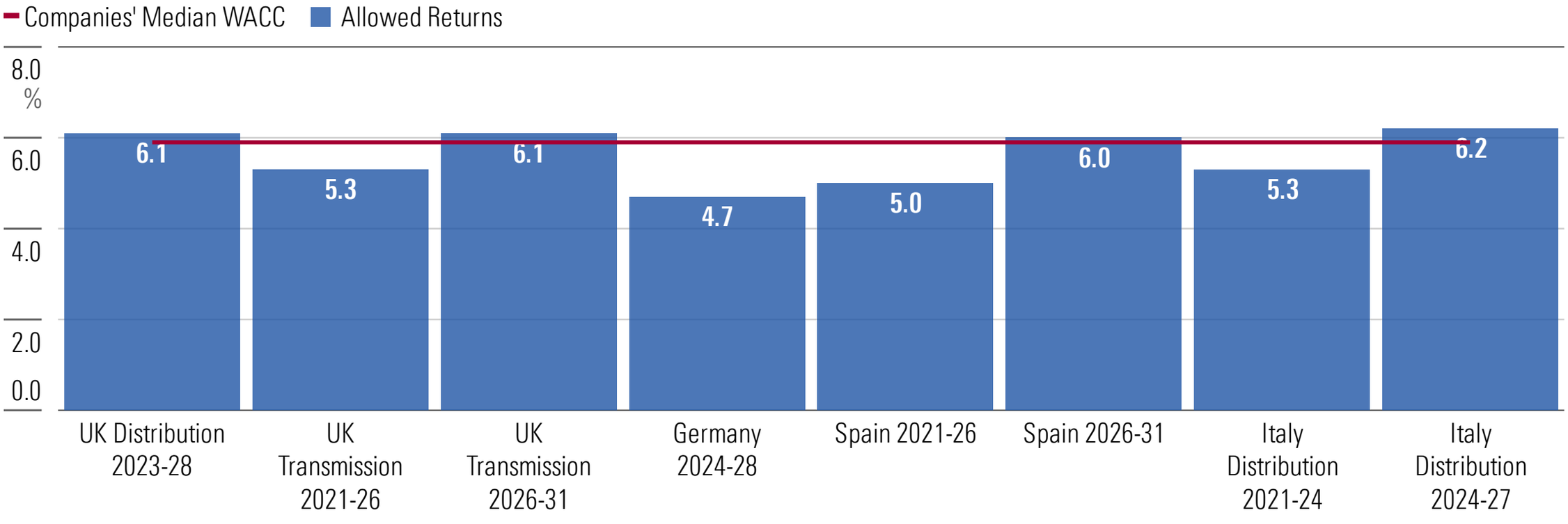


Source: Morningstar, IEA, Fraunhofer ISE, Bundesnetzagentur.
Note: 2025-30=forecast.

Grid Regulation Is Improving Across Europe

Rising interest rates and international competition to attract capital to build infrastructure are driving higher allowed returns for grids across Europe. Italian distribution networks' returns were raised by 80 basis points in 2024. Likewise, we expect UK transmission's allowed returns to be raised in line with distribution networks' returns. Last, we project Spanish networks' returns to be raised by 100 basis points as of 2026. Higher returns combined with the electricity investments step-up will boost earnings.

Current and Future Grid's Allowed Returns on Capital



Source: Morningstar.
Note: Median WACC of companies with meaningful exposure to electricity networks. 2026-31=forecast.

ESG Snapshot

Rise of renewable energy is reducing utilities' emissions risks.

Summary of Sustainalytics ESG Risk Ratings

According to Sustainalytics, European utilities have lower environmental, social, and governance risks than other industries, with 70% of our covered utilities having a Negligible or Low ESG Risk Rating versus 32% for other industries. None of them have a High or Severe ESG Risk Rating.

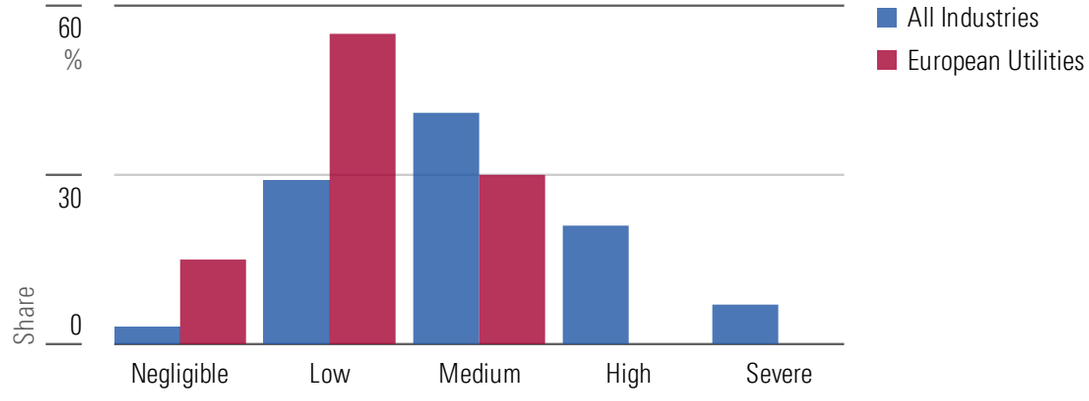
European utilities' low ESG risks reflect the material decarbonization of their power generation mix over the last decade and their business mix since grids have a low ESG risk.

The four most relevant material ESG issues of the sector are:

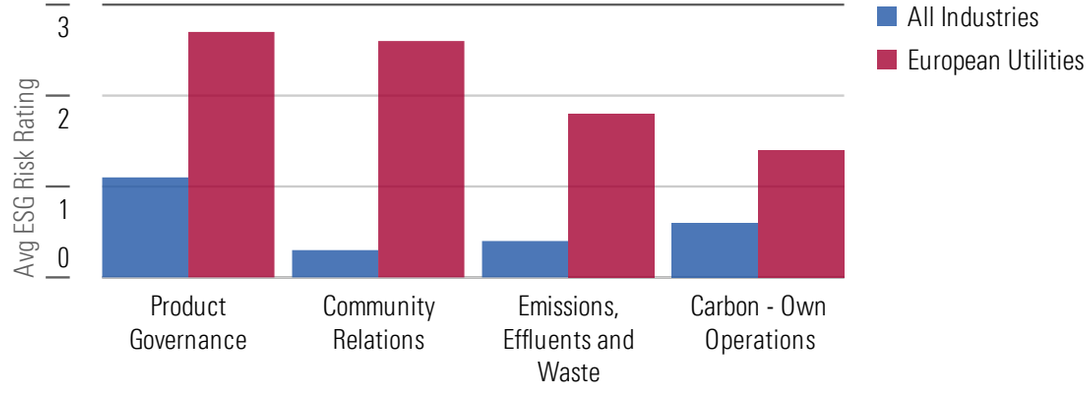
- Product governance: it stems from public anger over the price of gas and electricity.
- Community relations: typically related to solar and wind projects and big hydro dams that can face significant opposition and adversely affect local residents, potentially resulting in international protests and lawsuits.
- Emissions, effluents, and waste: typically related to nuclear plants and the cost of nuclear waste storage.
- Carbon-own operations: related to carbon emissions of power plants.

Out of those four MEIs, only the last two affect our valuations. For emissions, effluents and waste, we incorporate in our valuation the provisions to decommission nuclear plants and store their waste. For carbon-own operations, our earnings forecasts incorporate the price of CO2 allowances that the companies need to buy to cover their emissions in the European Union and the UK.

European Utilities Tend to Have Lower ESG Risk Ratings Than Other Industries



Product Governance and Community Relations Are Top MEIs



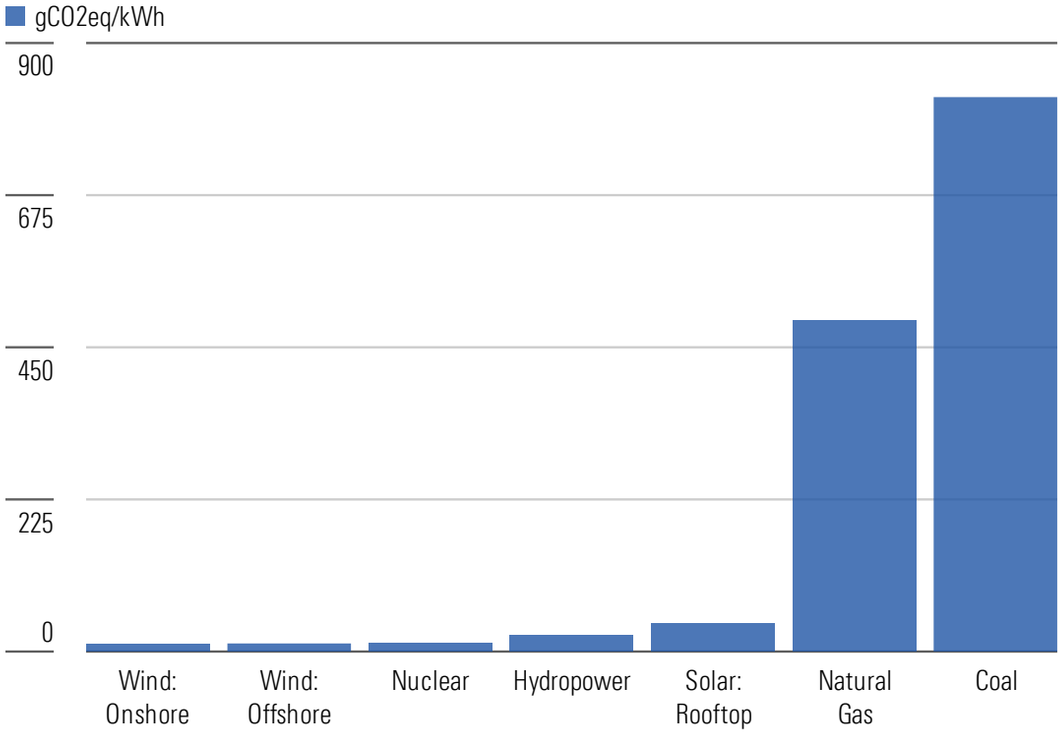
Source: Sustainalytics. Data as of November 2024

Adoption of Renewables Driving a Sharp Decline in CO2 Emissions

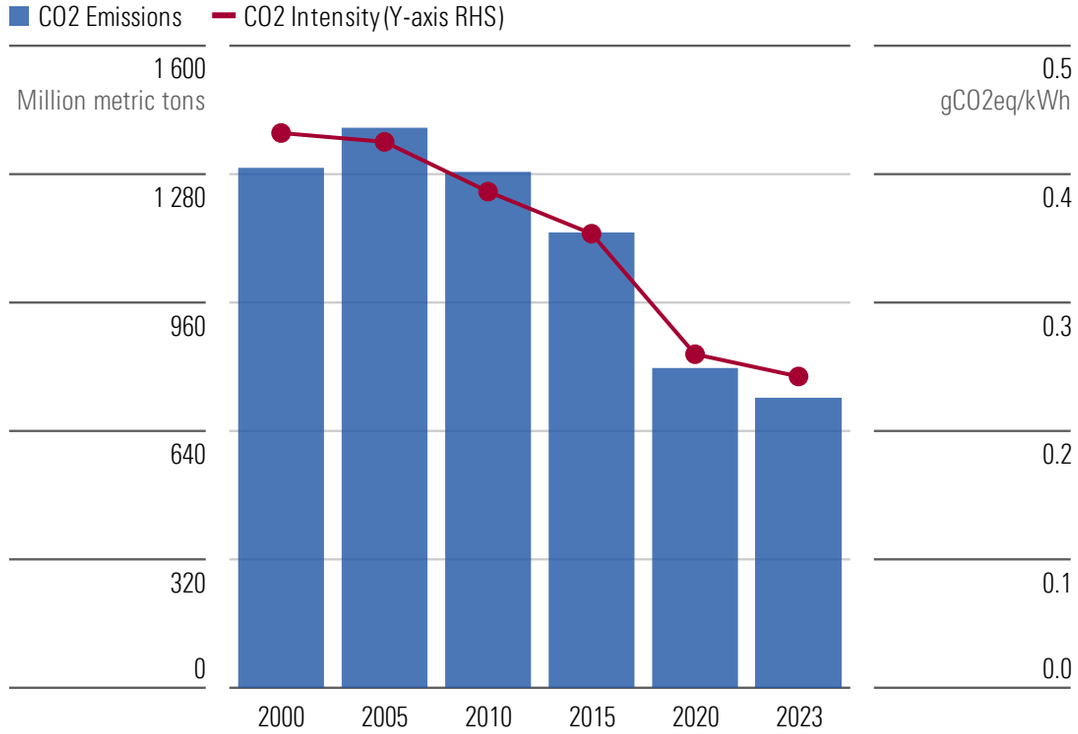
Coal is by far the most polluting source of power, emitting nearly 900 grams of CO2/kWh of produced power. CCGTs emit less than half the CO2 of coal plants. Hydropower, nuclear, and wind power emit almost no CO2.

Due to the decline in coal power generation and the jump in power from wind and solar, CO2 emissions tumbled by 44% in Europe between 2005 and 2023. Meanwhile, the average carbon intensity of European power generation dwindled from 0.43 to 0.24.

Coal Is the Most Polluting Source of Power



Power Generation's Carbon Intensity Almost Halved Since 2005



Source: Ember, Morningstar.

Electricity Is Key to Facilitating Major Reductions In Greenhouse Gas Emissions

Energy production and consumption represent more than 90% of EU greenhouse gas emissions. Electricity is the only low-cost, scalable technology available today that can facilitate major emissions reductions.

Electric Power

Although carbon emissions from electric power generation have been falling rapidly during the last decade, they still represent nearly 30% of total greenhouse gas emissions.
Utilities' role: Invest in renewable energy to replace coal and gas generation. Invest in transmission and distribution networks to integrate and support new renewable energy sources effectively.

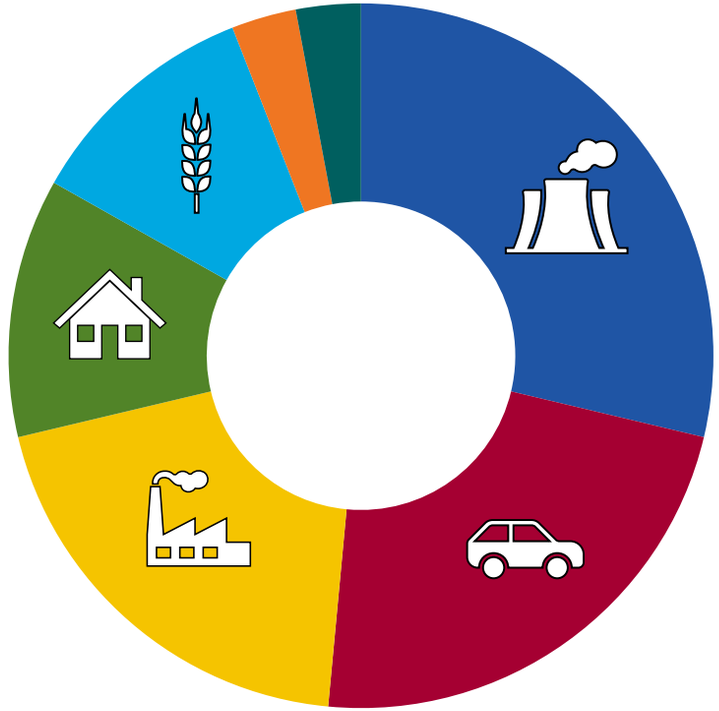
Residential, Commercial, and Industry

Emissions from homes, businesses, and factories that use gas and oil total more than 30% of carbon emissions.
Utilities' role: Build out the distribution network to support electrification of buildings and industries.

Domestic Transportation

Cars, trucks, buses, and domestic flights account for nearly a quarter of European emissions.
Utilities' role: Support home, public EV charging.

Utilities Are Vital to the Clean Energy Transition



Category:	%
Electric Power	29
Domestic Transportation	23
Industry	20
Residential & Commercial	12
Agriculture	11
International Aviation	3
Waste	3

Source: Statista. Data as of November 2024.

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