

Energy transition: Sidelined, stalled or stepping on the gas?



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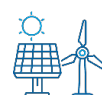
Key takeaways

- The energy transition is in a period of nonlinear progress but still offers fertile ground for selective investors.
- Tensions between energy-transition and energy-security goals, costs and shifting demand are reshaping prospects in many industries.
- Massive green stimulus, changing regulations and the potential for lower interest rates are creating powerful tailwinds that could propel diverse opportunities for years to come.
- We see compelling long-term opportunities in autos, cooling for data centers, heat pumps, renewable energy and power grids.

Some of the information in this material may include forecasts, hypothetical data, company examples and segments, which are shown for illustrative purposes only.

The global tilt toward cleaner energy powers attractive growth potential

Global growth forecasts for 2030¹



Source	Electric vehicles (EVs)	Data center cooling	Heat pumps	Renewables	Grid investment
2030 forecast estimates	US\$1.7T revenues	US\$30B revenues	US\$167B revenues	1,275 GW power generation (gigawatts)	US\$490B investment
Average annual growth rate (2024 to 2030, implied by 2030 forecast)	>14%	>12%	>9%	~12%	~9%

Sources: Capital Group, Horizon Grand View Research, International Energy Agency and Research and Markets.

Introduction: Reality bites, but opportunities remain bright

A major car rental company decides to sell one-third of its U.S. electric fleet. Some of the world's largest integrated energy firms scale back their targets for renewables. The German government reduces subsidies for heat pump installations.

Recent developments such as these underscore that the energy transition has entered a period of nonlinear progress. In many instances, strategic plans are being recalibrated to reflect practical realities. Consider automakers, for example. Companies have revisited their planned product mixes for coming years amid slower-than-anticipated growth in consumer demand for electric vehicles (EVs).

Even firms whose business lines are not directly involved in the transition are finding it harder to make the progress they had once expected as part of their decarbonisation plans. As Capital Group's global head of ESG, Jessica Ground, recently explained, the next leg of the journey toward lower emissions looks more challenging: "I've had several revealing conversations with companies that have laid bare a key challenge around energy transition. After plucking the low-hanging fruit of managing their own Scope 2 emissions – arising from purchased electricity, typically – further progress is not easy."

Tensions between energy goals, security, costs and increased demand are reshaping prospects for certain industries. The energy transition is, therefore, unlikely to be as uniform, smooth or quick as some commentators had previously expected (especially amid the unusual economic environment of the first couple of years of the COVID-19 pandemic). It does, however, continue to gain powerful direct and indirect support from stimulus worldwide. Alongside the 2022 U.S. Inflation Reduction Act, the most substantial official programs include REpower EU in the European Union, GX in Japan and the five-year plan

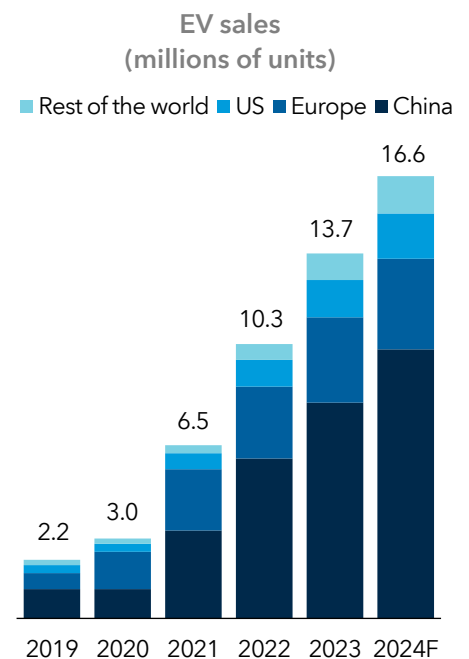
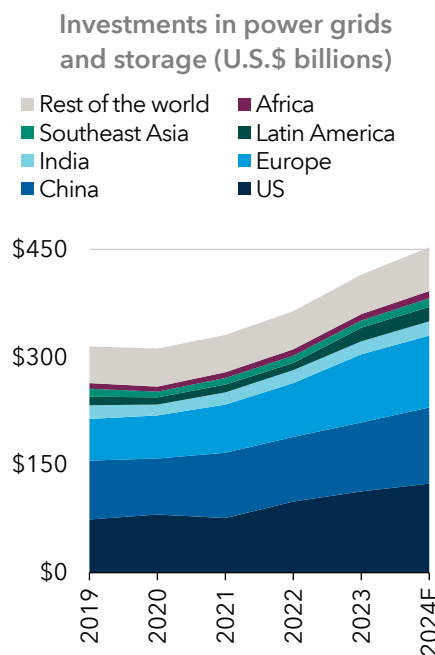
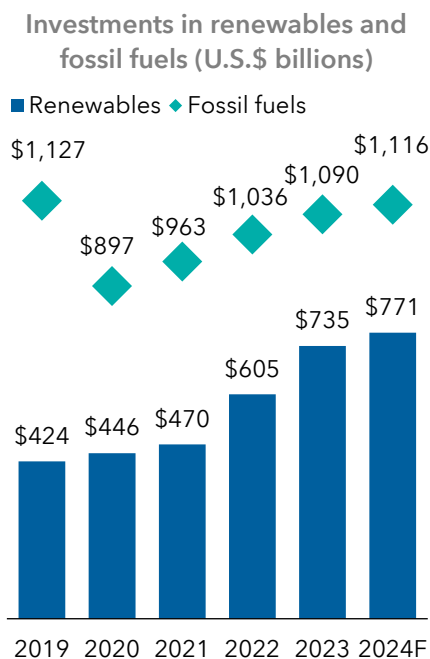
1. 2030 forecast estimates and growth rates: heat pump (Horizon Grand View Research), data center cooling and EV (Research and Markets), and renewables and power grid (International Energy Agency).

on renewable energy development in China. Around the world, many governments (and indeed, companies) remain strongly committed to supporting the energy transition.

Clean energy-related projects, such as solar farms that require substantial financing to get off the ground, may also benefit if key global interest rates continue their recent declines. Analysis by the energy data and analytics firm Wood Mackenzie in April 2024 suggested that a two percentage point increase in the prevailing level of interest rates can raise “the levelized cost of electricity” (a measure of lifetime costs) for a renewables project by as much as 20%, compared with only 11% for certain gas plants.

Whether you consider the rise of renewables, growth of grids or advances in EV sales, there is much that longer term investors can get excited about.

From renewables and grids to EVs, global clean energy is on the rise



All global historical data and 2024 forecasts are as of July 2024, from the International Energy Agency (IEA).
Sources: Capital Group and IEA.



Kaitlyn Murphy

Equity Investment
Analyst

"We are in an EV minicycle that could run through 2026."

1. Autos: Similar destination, slower journey

The proliferation of EVs is one of the more visible signs of the global energy transition. According to the International Energy Agency (IEA), global EV sales grew by about 25% in the first quarter of 2024, compared to the same period a year earlier. Based on current policies, the IEA expects that nearly half of all cars sold in 2035 could be electric. And, if various countries meet their announced energy- and climate-related pledges, that proportion could rise to two-thirds. (See exhibit below.)

And yet, despite all the data suggesting otherwise, recent media coverage may have created the impression that the EV boom is in the rearview mirror. Arguably, all those headlines proclaiming an EV sales slump lack nuance and long-term perspective.

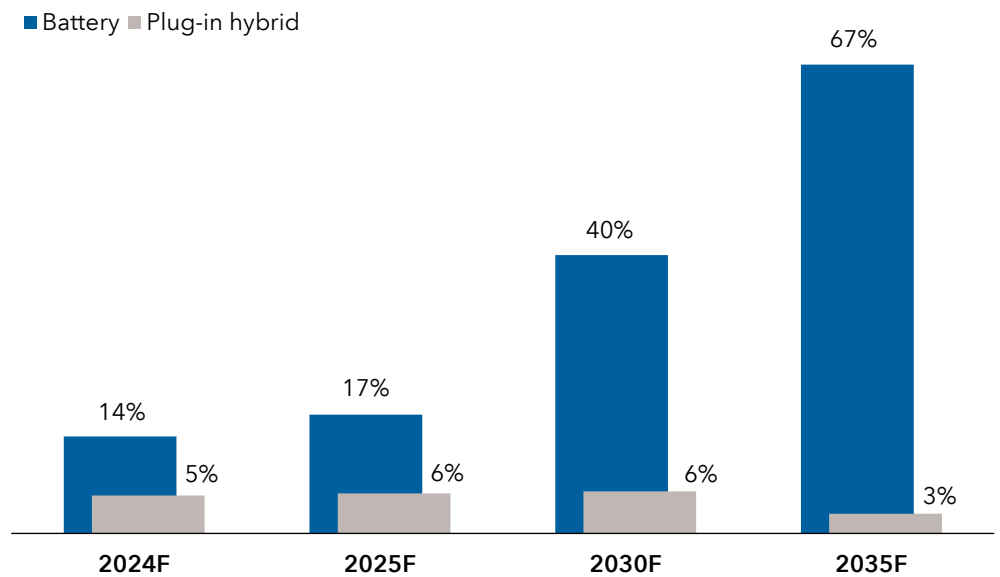
Demand growth has slowed globally, but it is important to underscore that market conditions vary. In China, for example, battery-only EVs, plug-in hybrids and extended range vehicles are cheaper than comparable internal combustion engine (ICE) vehicles and account for close to 40% of auto sales in 2024. On the other hand, that proportion is under 10% in the U.S., where higher interest rates and affordability have contributed to softer demand. Growth has continued, albeit at a slower pace.

"We are in an EV minicycle that could run through 2026," explains equity investment analyst Kaitlyn Murphy. "U.S. sales growth may moderate for a few years, and we've seen some automakers reduce spending and production targets for that market."

A closely watched potential tipping point for EV adoption in the U.S. – when EVs sell without a price premium over comparable ICE vehicles – has likely been pushed out a few years. Looking across the globe, a majority or near-majority of buyers in many countries seem comfortable with paying a premium of up to 10%, according to a recent YouGov consumer survey. Higher upfront costs for EVs can still result in a lower total cost of ownership, which quantifies total costs incurred by a vehicle owner over time.

Global EV sales could reaccelerate later this decade

Forecast EV percentage share of global light vehicle sales – battery and hybrid EVs



The 2035 sales mix in Europe could include >90% battery EVs, according to a forecast by EV-Volumes. In 2023, following years of debate, EU member countries agreed to largely end sales of new carbon-emitting passenger cars and vans by the end of 2035. Following efforts by Germany and Italy, among others, continued sales of ICE vehicles will be permitted – if they run only on certain synthetic fuels.

Forecasts by EV-Volumes as of April 2024.

Sources: Capital Group, EV-Volumes and HSBC.

For example, the IEA recently estimated that – after five years of fuel and maintenance costs – the cumulative cost of a typical medium-sized ICE vehicle bought in Germany in 2022 could be 10% to 20% higher than a comparable battery EV (whose upfront cost was 10% to 20% higher than its ICE equivalent).

The structural upfront cost gap between EVs and ICE vehicles is hard to overcome until manufacturing issues resolve and certain new platforms become operational. In the U.S., ICE-EV parity is still a "when, not if" question, according to Murphy.

On the demand side, improvements in charging times, charging infrastructure, driving ranges and model choice will also help entice more consumers as EV prices become more affordable. Until all these different pieces in the EV "puzzle" come together, sales of hybrid vehicles could continue to grow for longer than some industry watchers initially thought.

Against this changing global backdrop, auto manufacturers are jockeying for position with varying strategies. In the U.S., Ford's recent strategic reset presents an interesting example of evolving opportunities and risks facing auto original equipment manufacturers (OEMs). While it has lagged some peers' efforts in EVs overall, Ford is working hard to catch up and recently increased its near-term emphasis on hybrids.





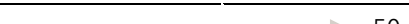
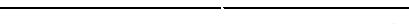
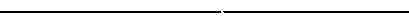
As a part of its reset on EV strategy, Ford canceled a planned three-row EV SUV, while committing to spend 30% of capital expenditure in research and development on EVs. This is 10 percentage points lower than previously

earmarked. "These vehicles need to be profitable," commented John Lawler, the firm's chief financial officer. "And if they're not profitable, based on where the customer is in the market, we will...make those tough decisions."

In August 2024, Ford announced a US\$400 million write down for EV manufacturing assets and cautioned this could be augmented with a further US\$1.5 billion in subsequent quarters. For context, the firm's earnings guidance for 2024 was US\$10 to 12 billion.

Autos with electric dreams that could become reality in the next decade

EV sales as a percentage of total sales: 2023 and future ambitions for select automaker OEM brands

Automaker	EV sales as a % of 2023 total sales Range of percentages for select brands	Future EV sales ambitions as a % of total sales Range of percentages for select brands (target years)
Ford	2-4% 	50-100% (2030)
GM	6-15% 	100% (2030/2035)
Hyundai	7-23% 	34-74% (2030)
Nissan	1-12% 	35-98% (2026/2030)
Stellantis	0-14% 	50-100% (2027/2028/2030)
Tata Motors	1% 	>80% (FY2029)
Volkswagen	0-15% 	50-100% (2030/2033)

Analysis by HSBC, based on company reports and individual corporate estimates as of April 2024. Company/brand percentage sales data and ambitions for GM, Stellantis, Tata and Volkswagen refer to battery electric vehicles, specifically. All other company/brand data are for battery and/or plug-in hybrid electric vehicles.

Sources: HSBC, company reports.



Drew Macklis

Equity Investment
Analyst

"Tesla finds itself between growth waves currently. Even so, I view it as having among the fastest rates of learning and adaptation of any company in the world."

It's important to underscore, Ford is still developing two EV platforms: Gen 2 for larger vehicles (launch pushed back to later in 2027) and a "skunkworks" (experimental research group) mandated to produce profitable EVs. The first EV model from Ford's secretive facility in California (led by Tesla's former chief platform engineer, Alan Clarke) is expected to be a mid-sized truck.

The Michigan-based firm has an opportunity to lead on the light commercial vehicle segment where it, along with GM, has a dominant market share and a sticky customer base due to brand loyalty. The commercial vehicle segment accounts for 33% of Ford's sales; other OEMs do not have such a high exposure to this segment. "Until new platforms are up and running, EVs represent a substantial fixed cost base for OEMs to bear," adds fixed income analyst Danny Jacobs.

In Europe, Stellantis is an example of a firm that is dedicating significant capital to reimagining its product mix. The company's electrification strategy had been viewed as relatively conservative, but EV sales growth now puts it on track to achieve majority EV revenue by the end of the decade. In recent times, EVs have accounted for about 14% of global revenues; Stellantis is aiming for 50% in the U.S. and 100% in Europe by 2030. (See table on previous page.)

Often viewed as a bellwether for the EV market, Tesla has also been adapting rapidly to the changing landscape. The firm has leaned into manufacturing improvements and has cut costs broadly to help improve EV affordability, using the generated savings to reduce vehicle prices for consumers and fund lease incentives in select markets.

"Tesla finds itself between growth waves currently due to a combination of interest rates and evolving consumer preferences. Even so, I view it as having among the fastest rates of learning and adaptation of any company in the world," says equity investment analyst Drew Macklis. "Importantly, it also has a portfolio of innovations – in manufacturing processes, vehicle architecture, software and battery systems."

2. Cooling: AI's rise adds to data center demand

Manufacturers of cooling and heating products are at the center of multiple megatrends: energy transition, sustainable buildings and artificial intelligence (AI).

Global growth in demand for heating, ventilation, air conditioning and refrigeration has been sustained by three secular trends:

- **Regulatory requirements and pressure from consumers and shareholders for more environmentally friendly heating and cooling.** Many countries around the globe have schemes to promote heat pump installations. In the U.S., for example, the Biden administration's 2022 IRA includes tax credits and rebates of up to US\$2,000 and US\$8,000, respectively.
- **Higher global temperatures.** Hot days are becoming even hotter and more frequent. In response, demand for air conditioning is climbing – boosted by urbanization and rising wealth in certain countries.
- **The rise of AI.** This technology is amplifying demand from data centers for conventional and novel cooling systems. Data centers have proliferated as internet-connected technologies and cloud storage become ubiquitous. Larger data centers hold tens or hundreds of thousands of servers, which collectively generate considerable heat. Cooling systems are, therefore, critically important because overheating can cause server failures or data loss.



Emma Doner

ESG Senior Manager

"Cooling currently represents about 40% of electricity usage for data centers."

How much more power hungry could AI make data centers? Goldman Sachs estimated that processing an average ChatGPT query requires around 10 times more electricity than a typical search engine query. Google noted AI and its data center buildout as among the drivers of higher emissions in recent years (up 48% for the five years through 2023).

Mindful of their net-zero emissions goals, Google and other hyperscalers (large cloud service providers) are paying close attention to cooling tech. "Cooling currently represents about 40% of electricity usage for data centers," says ESG senior manager Emma Doner. "Beyond placing data centers in milder climates, more efficient cooling systems have the potential to drive down both costs and carbon intensity."

Clusters of data centers are forming around the globe. For example, North Virginia includes the densest concentration of data centers in the world, with potentially double-digit annual growth for years to come. (See following exhibit) Concerned by the possible repercussions for homes and other consumers, regulators and state governments are increasing their focus on data centers' electricity usage.

Vertiv is one example of a company that is looking to use innovative technology to meet the cooling challenges posed by AI. According to the company, its flagship air-cooled, free-cooling products are up to 75% more efficient than comparable legacy systems, while its management and control technology can further boost efficiency.

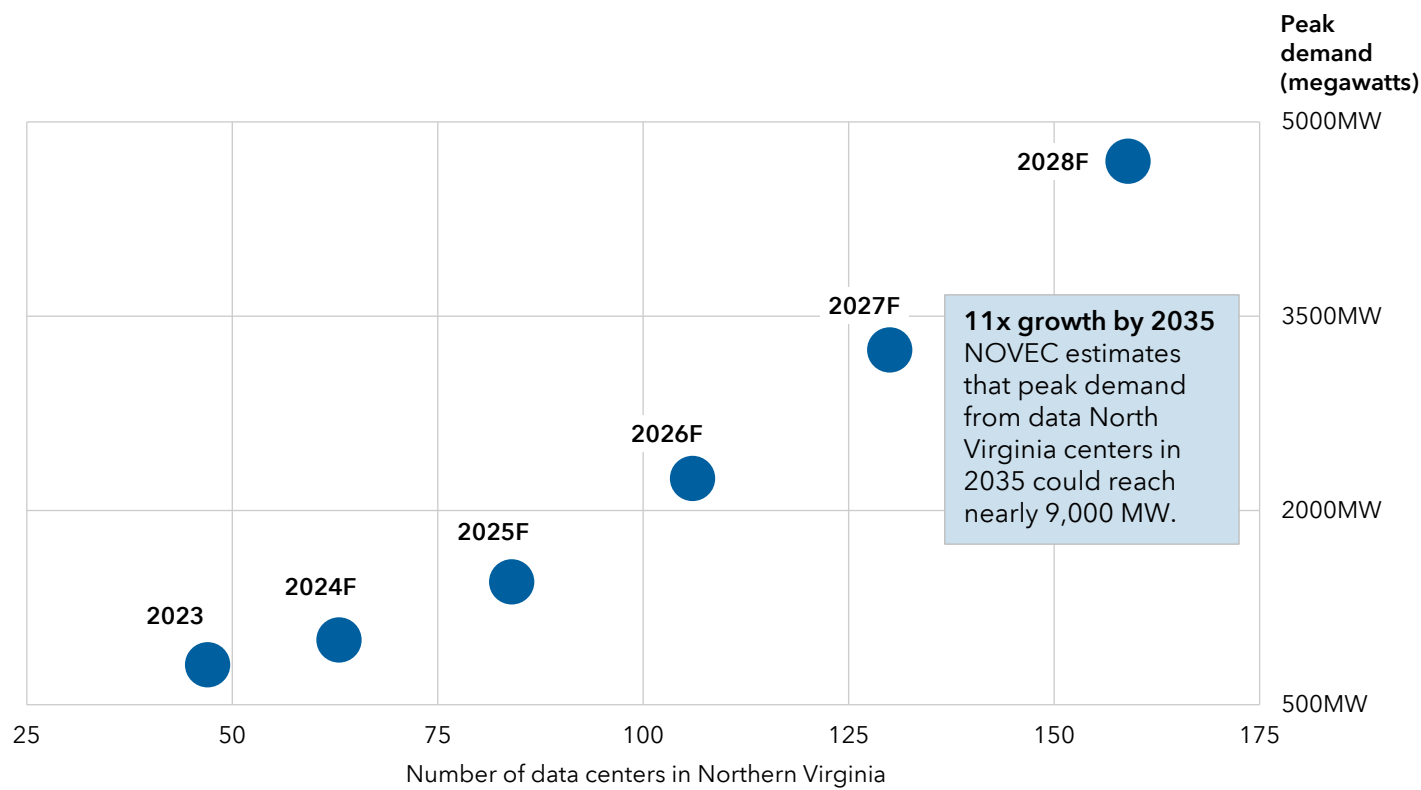
Anticipated growth in data centers and tighter sustainability regulations could accelerate growth for certain heating, ventilation and air conditioning (HVAC) OEMs, says equity investment analyst Maggie Yang. "The ceiling on growth at present is more on the supply side. I don't think we're close to seeing the full extent of demand. The winners in this space could see their multiples re-rate further."

Others agree. "I'm bullish on the data center buildout and the tailwind it could provide to various suppliers," says equity investment analyst Nate Burggraf. "That being said, we've seen AI-optimism drive stock valuations way up, so it's especially important to be selective."

For grids, the rise of AI is a mixed blessing. While the technology will likely account for a much larger share of capacity in the future, its superior computational and analytical capabilities could also play a profound role in creating smarter, more efficient grids. Its use to improve predictions of supply and demand is already gaining a foothold across the energy industry. Predictive

maintenance – flagging potential faults ahead of time via continuous performance monitoring and analysis – is another application where use of AI could flourish.

Data with destiny: Power demand from data centers will likely skyrocket
Illustrative example: Potential growth trajectory for data centers in Northern Virginia



Northern Virginia Electric Cooperative (NOVEC) forecasts developed as of August 2023, based on identified projects through the end of July 2023 and econometric models estimated with metered load data through the end of July 2023.
Source: NOVEC.



Shinya Takemasu
Equity Investment Analyst

“Cyclical headwinds have weighed on many HVAC firms, and we’ve seen year-on-year sales declines. This is a rarity for the industry, and I don’t expect it to last.”

3. Heat pumps: Short-term sales cooldown, long-term growth

At the other end of the thermometer, heat pumps are an interesting market where some of our investment professionals also see compelling long-term opportunities. Unlike traditional combustion-based technology, these electric systems work by transferring heat to where it is needed (typically, from outside a building to inside). As a result, heat pumps are three to five times more energy efficient than traditional fossil fuel systems. In other words, they create much less heat in relation to the energy they consume.

This technology is, therefore, viewed as a key enabler for decarbonisation and energy-efficiency targets in the U.S., European Union and beyond. For example, a 2024 agreement among environmental agencies in nine northeastern U.S. states is aiming for heat pumps to make up 65% of residential heating, air conditioning and water heating sales by 2030, with the proportion rising to 90% ten years later.

Companies are trying different strategies to win more of this resilient demand. Consider Carrier, for example. The U.S.-based firm divested fire, security and refrigeration businesses and bought Germany-based Viessmann Climate Solutions. Around 40% of Viessmann's revenues are heat pump-related – historically, the fastest growing part of its business. Around two-thirds of those revenues originate in Germany, Italy, France and Poland, where Viessmann's strong brand contributes to its products' price premiums.

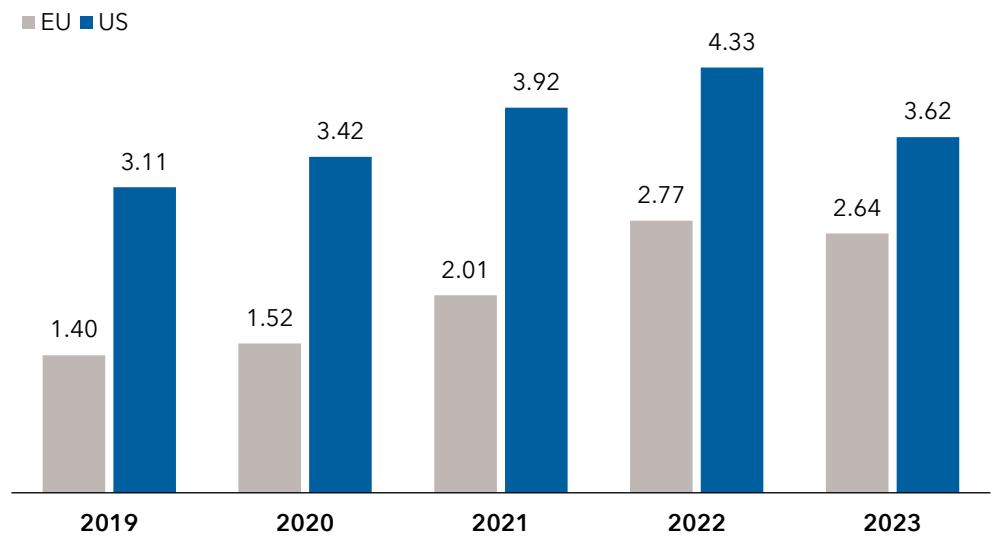
Unlike most of its competitors, Viessmann has an economic moat through its distinctive distribution model: It mostly sells directly to installers (rather than distributors) and has cultivated strong brand loyalty and customer relationships over decades.

Various developments have contributed to the industry-wide pullback in European heat pump sales that Viessmann and its peers have had to navigate in recent quarters. Potential changes to subsidies and national and European Union climate plans have played their part. In Italy, for example, the removal of government support may have put off potential installations.

Still, longer term prospects look compelling. "Cyclical headwinds have weighed on many HVAC firms, and we've seen year-on-year sales declines. This is a rarity for the industry, and I don't expect it to last," explains Shinya Takemasu, an equity investment analyst. "Global leaders in this segment could still have a long growth runway as global housing stock increases, penetration rates climb, and they are able to make careful use of their pricing power."

Blowback for heat pumps: Recent setbacks followed years of rising sales

Heat pump sales in the EU and U.S. (millions of units)



U.S. data are air-source units-only. EU data include multiple types of heat pump.

Sources: U.S. Air-Conditioning, Heating, and Refrigeration Institute, The European Heat Pump Association.



Bobby Chada
Equity Investment
Analyst

"For long-term investors, this could shape up to be a golden age for grids."

4. Energy and utilities: Powerful potential in renewables rollout

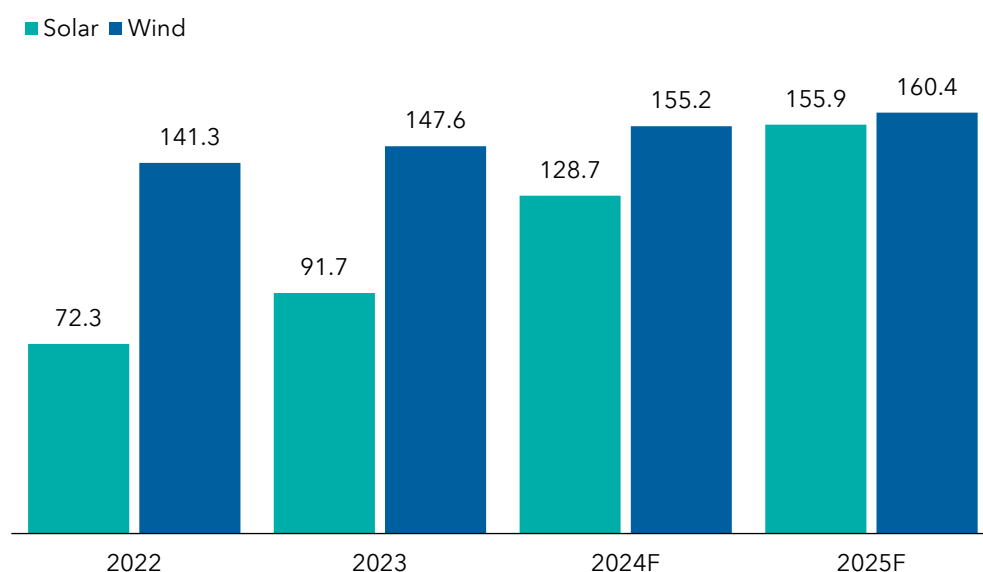
Fossil fuels will, by necessity, likely play a key role in the global energy mix in the next decade or two. Views on the outlook for the composition of primary energy usage and how that might change over time vary. In its 2024 Energy Outlook, for example, oil super major BP said it expected global oil demand could peak in 2025.

In power generation, capital expenditures on fossil fuel power decreased 10% in 2023, to US\$90 billion. Conversely, solar and wind power drove a record-breaking US\$735 billion investment in renewables in 2023, according to the IEA. Shrugging off concerns about the profitability of certain firms and higher interest rates, renewables have deployed rapidly in the U.S., EU and Asia.

Almost half of global solar investment in 2023 was in China, but declining module prices have also helped fuel solar's growth in the U.S. and elsewhere.

Here comes the sun: Solar is catching up with wind in the U.S.

U.S. renewable electric power sector generation capacity for solar and wind (thousands of megawatts)



Source: U.S. Energy Information Administration, Short-Term Energy Outlook. (Forecasts for 2024 and 2025 as of July 9, 2024).

In the EU, renewables' share of public electricity generation exceeded 50% for the first time, in the first half of 2024. Over the same period, 65% of electricity on the German grid came from renewables.

Earnings growth among utilities in the EU looks poised to accelerate, according to equity investment analyst, Bobby Chada. (See table.)

Renewables and grids to power more growth for European utilities?

Illustrative examples: Estimated potential earnings growth attributable to renewables and grids

Company	Renewables EBITDA (CAGR)		Grid EBITDA (CAGR)	
	Last five years	Estimate for next five years	Last five years	Estimate for next five years
Utility A	7%	12%	-1%	9%
Utility B	4%	20%	6%	14%
Utility C	10%	13%	4%	11%
Utility D	5%	5%	1%	4%

Four companies selected from the 25 largest European utilities by market capitalization. Estimates for potential compound annual growth rate (CAGR) of earnings before interest, taxes, depreciation and amortization (EBITDA).

Source: Capital Group. Analysis as of April 2024.

"We may be at a tipping point, with faster growth from both regulated grid businesses and renewables potentially sustaining for the coming decade and beyond," Chada says. "Recent valuations among European utilities haven't reflected the future prospects I anticipate. For long-term investors, this could shape up to be a golden age for grids."

The grid capital expenditure (capex) that could underpin more rapid growth potential is, in effect, unavoidable. “Keeping the lights on” in Europe amid growing power demand will require the grid to adapt:

- **Old infrastructure.** In November 2023, the European Commission noted that about 40% of the European power distribution grid was more than 40 years old (with, according to Chada, typical asset lives of 45 to 50 years).
- **New locations.** The decline of coal-fueled power plants (often in proximity to coal fields), increased urbanization, and new population centers mean that the locations of supply and demand have changed.
- **New supply.** Removing grid constraints and speeding up connection queues will get the most out of renewables and other new sources of power.
- **New demand.** Electrification – of transportation, heating and certain parts of heavy industry – and data center expansion are creating sources of demand that simply did not exist a few decades ago. Morgan Stanley analysis suggested that, as measured by electricity consumption, European data center capacity will increase fivefold by 2035.

Of course, firms will need to be sufficiently financially strong to support higher capex. “In the next decade or so, balance sheets will matter even more than usual,” Chada adds. In many European markets, regulators limit returns relative to equity (or asset base, capital or cost of capital) for fixed periods of up to five years. Across the continent, these “allowed rates of return” are resetting higher – which should help bolster corporate coffers.

Renewables will likely be both a significant contributor to growth and a major investment area for years to come. The headwinds of higher inflation and higher funding costs may be easing.

Dependent on the specific technology and location, Chada’s analysis suggests European utilities firms could earn double-digit internal rates of return from renewables projects. Supply chains are a risk in the growth outlook that our investment professionals are keeping an eye on. Transformers and cables are among the costlier items. Supply is tight, and the lag between order and delivery has lengthened – 18 months or longer is typical for transformers.

We are already seeing considerable progress in grid modernization and expansion. Germany-based E.ON, for example, is at the forefront in Europe. Nearly 90% of the generation capacity connected to the firm’s grid in 2023 was due to renewables.

Utilities outside of Europe are also making strides. For example, just over one-third of the electricity that California-based PG&E delivered to its retail customers in 2023 was from renewables. Large-scale solar accounted for the lion’s share, and the utility has also connected more than 800,000 customers with rooftop solar to the grid.

The nuclear option: A vital and growing role in the global energy mix

Nuclear energy appears poised for a comeback. The rise of AI, according to equity portfolio manager Mark Casey, has been a key driver in reigniting the conversation: "Big tech data centers require uninterrupted power 24 hours per day. Of the main types of fuel that can provide uninterrupted power on demand, only nuclear power generates no carbon dioxide emissions. The more committed a tech company is to achieving a carbon neutrality target, the more likely it is to use nuclear power."

Despite continued safety and environmental concerns, today's combination of growth drivers increases the odds that nuclear will maintain its share of the global energy mix:

- **Decarbonization targets.** National, local and company-level decarbonization targets will be difficult to achieve with renewables alone. Nuclear can provide a steady supply of electricity (with no carbon dioxide emissions from power generation) to complement renewables and energy storage.
- **Policy support.** Production tax credits for nuclear (U.S. 2022 IRA, inclusion in the EU Taxonomy and further government incentives across Canada, China and India, for example) have boosted lifetime renewals and new builds.
- **Energy independence and security.** Policy stances have shifted since Russia's 2022 invasion of Ukraine. Germany and Belgium temporarily extended the life of remaining reactors. Japan revived plans to reinstate nuclear, and France and the U.K. reaffirmed their plans for new assets.
- **Technological innovations.** Similar to existing nuclear power stations, small modular reactors (SMRs) split atoms apart to produce energy. SMRs have unique capabilities that make them useful as off-grid solutions for data centers and other energy-intensive industries. We're also keeping an eye on advances in nuclear fusion (producing energy like the sun does, by smashing together atoms). Fusion technology's commercial viability has infamously been "about 20 years away" for decades.

Related to its efforts to integrate more renewables (whose power generation varies), PG&E has invested heavily in battery storage. As of March 2024, PG&E had brought more than 2,100 megawatts of new incremental battery storage capacity online, with an increase of about 70% planned in 2025. Batteries allow utilities to store excess solar or wind power and avoid turning to natural gas to meet higher demand in the evenings.

"Among U.S. utilities broadly, demand growth is leading to higher capex and rate base growth," says equity investment analyst Dominic Phillips. "Investments in transmission and distribution will support ongoing generation and storage buildout. All else being equal, that should be supportive of earnings." The rate base is a measure of assets that U.S. regulators use to figure out an allowed rate of return for a utility.

Final thoughts: Recalibration not reversal

In a period when energy transition-related goals and timelines are being recalibrated, investors who can take the long view will find a rich opportunity set. Our focus here is on opportunities and risks in a handful of areas, but there are repercussions across the global economy.

The tailwind from massive fiscal stimulus is already helping propel changes. Stable-to-lower interest rates could provide an added boost to activity in coming years.

Just like experienced travelers who are partway through a lengthy journey, however, our investment professionals recognize that disruption, detours and new destinations are quite possible.

Investors should be prepared for politics, regulation, trade policy and legal rulings that add uncertainty to the outlook. In the U.S., for example, a recent 2024 Supreme Court ruling overturned the Chevron Deference. In simple terms, this was an earlier ruling indicating that, if a federal statute was ambiguous or left an administrative gap, judges should defer to federal agencies' interpretations. As a result of the 2024 ruling, federal agencies such as the U.S. Environmental Protection Agency may have less latitude to set rules. While federal policy has been an important driver of EV adoption in the U.S., we believe that lower manufacturing costs, more competitively priced models and state-level incentives could sustain demand growth. Ongoing global concerns about the cost of living and energy security also create political risks for the energy transition.

Investors in the energy transition should, therefore, carefully consider the broader context— and be selective. Domestic and international politics may shift policies, regulations and trade flows, and these, in turn, can affect which companies thrive and which struggle.

That being said, it is important to recognize that huge changes are already underway and that the direction of travel seems set. Turbines are turning, batteries are charging and times are changing.

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