Brookfield

INSIGHTS
May 2021

TRANSITION INVESTING

Transforming Businesses for a Zero-Carbon World

Executive Summary

- By incentivizing behavior, credible public policy can provide the foundation for the transition to net zero—and governments are stepping up their efforts.
- Major companies are committing to net-zero targets and developing transition plans backed by scientific metrics.
- Across industries, business transformation will require a rapid move away from fossil fuels (and toward renewable energy sources), the decarbonization of existing production processes, the electrification of industries, and the installation of energy-efficient technologies.
- Helping businesses transform is a value creation opportunity. The need for new products and solutions to reduce carbon emissions is creating a compelling business proposition for providers of capital—one that generates a positive impact on a company's activity and leads to measurable outcomes in the real world.
- While technological innovation will help, it is not a prerequisite for success. Today, companies can work with partners with substantial operating expertise to implement—and build out—existing, commercially scalable technologies that can put them on a path to net zero.

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Introduction

Climate change poses unprecedented risks to the global economy—and, of course, to all our livelihoods.

With the United Nations Climate Change Conference (COP26) occurring this November in Glasgow, some countries are ramping up their efforts to combat these risks. The U.K., the host country of COP26, announced a new pledge to reduce carbon emissions by 78% by 2035, compared with 1990 levels.[1] Meanwhile, the U.S., which rejoined the Paris climate accord this year, pledged to cut greenhouse gas (GHG) emissions by 50% by 2030, compared with 2005 levels. Lastly, the German government, in response to a ruling by the constitutional court that it was unfairly burdening the younger generation, raised its target for reducing carbon emissions by 2030 from 55% to 65%. It also brought forward its net-zero target by five years—to 2045 from 2050.[2]

Governments have also been focusing on "green" budgets. The U.K.'s 10-point plan includes big new targets for offshore wind generation, investment in low-carbon hydrogen production capacity, and the introduction of a ban, in 2030, on the sale of new petrol cars.[3] And the Biden administration's proposed $2.3 trillion infrastructure plan includes funding for projects like electric vehicle charging stations and the expansion of transmission lines for wind and solar electricity.[4]

Carbon prices are another policy lever that governments can pull. They create incentives for decarbonization by incorporating the cost of greenhouse gas emissions into the price of goods and services. The result is that companies—and investors—will need to consider the future cost of carbon, since it will lead to changes in the way they allocate capital.[5] And carbon pricing has shown to be a powerful tool: Emissions from sectors covered by the EU's Emissions Trading System are estimated to have fallen by 21% from 2005 to 2020.[6]

While carbon prices are operational or in the planning stages in many jurisdictions around the world, most of them price carbon at only $40 or less per ton.[7] In Canada, however, the government is now legislating a steady increase in the carbon tax such that it reaches C$170 per ton by 2030 from the federal price of C$40 per ton today.[8] Overall, governments are making progress, but they still have a long way to go.

~1,300

companies have committed to Paris-aligned emissions reduction targets[9]

The combination of credible public policies like green budgets and carbon pricing can have a powerful effect: Increasingly, businesses that produce too much carbon will have to invest in solutions. Conversely, the technologies and activities that are part of the solution will be increasingly valuable.

All this will lead to a supercharging of investment in greener technologies—and a decline of businesses that cannot adapt. Morgan Stanley's pledge to reach net-zero emissions in its lending portfolio by 2050 demonstrates that the message is resonating. If the flow of credit is the lifeblood of our economy, then the absence of it can be lethal.

The path to net zero will be about much more than divesting carbon-emitting businesses or reducing the use of carbon-intensive goods and services. It will be about working closely with these essential businesses to decarbonize them on a path to net zero. For many companies, this will be a massive undertaking—and a costly one.

Investment needs to flow toward an even greater buildout of renewables—and in various regions, a substantial conversion of carbon-intensive industries to cleaner and more sustainable methods of production.

The opportunity lies in providing capital and operating solutions to the end users and producers of carbon—particularly electric utilities, technology companies, heavy industries (e.g., steel, cement and transport), oil & gas companies, consumer products companies and real estate. While these sectors are some of the world's biggest carbon emitters, they are essential to how our economy works today and will work in the future. Here, we highlight how their business models can adapt to a lower carbon world.

Electric Utilities

Given its reliance on fossil fuels to meet energy demand, the power generation sector is responsible for an outsized portion of global greenhouse gas emissions.

Massive investment, therefore, will be required to transition the power sector. According to a report co-authored by Boston Consulting Group (BCG) and the Global Financial Markets Association (GFMA), an estimated investment of over $50 trillion will be needed globally over the next three decades to increase renewables capacity and improve grid flexibility and reliability.[10]

In other words, it's an opportunity for private capital to participate in the decarbonization of electricity grids. The shift is fueled by a push to reduce GHG emissions to meet increasingly stringent carbon reduction targets. In the U.S., for example, some states have legislated requirements for electric and gas utilities to reach a net-zero goal. Moreover, renewable portfolio standards, which are policies designed to increase the use of renewable energy sources for electricity generation, have now been adopted by over 60% of U.S. states. Yet, relative to Europe, the U.S. still has work to do (see Figure 1); the EU's new 2030 climate target plan will further accelerate the deployment of renewables.

Markets are also increasingly rewarding businesses that are decarbonized or are on a pathway to meeting net-zero targets through valuation premiums and reductions in the cost of capital.[11] For example, RWE, one of Germany's largest utilities, transformed itself into Europe's third-largest renewables player following a 2019 asset swap with E.ON. RWE's decision to increase its renewable power assets, made in tandem with its plan to eliminate coal, set the business on a net-zero path. Subsequently, RWE's valuation metrics improved.

A successful transition relies on power and utility companies transforming their generation mix to significantly favor renewables or low-carbon energy production. In the U.S., Goldman Sachs forecasts wind and solar power capacity additions

FIGURE 1

Europe Outpaces the U.S. in Renewables

2019

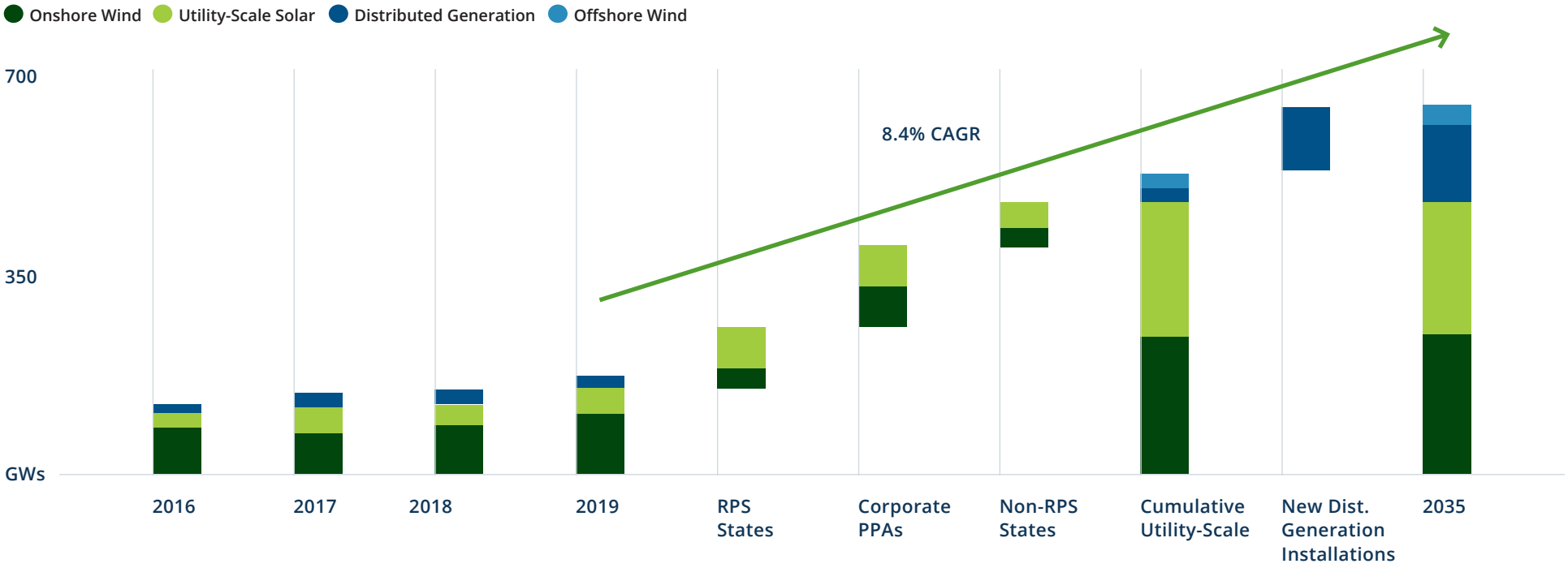
	EU	U.S.
Power Generation	~3,000 TWh	~4,000 TWh
Share of Renewables	~40%	~20%
Solar/Wind Capacity	~325 GW	~165 GW
Solar/Wind Addition	27 GW	18 GW

Source: EIA, IRENA, Goldman Sachs Global Investment Research. TWh—Terrawatt-hour. GW—Gigawatt.

FIGURE 2

Renewables Are Projected to Grow in the U.S.

Year-End 2019 through 2035



Source: Goldman Sachs. GWs—Gigawatts. CAGR—Compound annual growth rate. RPS—Renewable portfolio standard. PPAs—Power purchase agreements.

of 463 GW by 2035; this would represent a 262% increase in capacity from 2019 levels (see Figure 2).[12] Some of these companies have the capital and skills to do it themselves, but many do not.

Utilities will need to lower emissions consistent with country emission reduction strategies, such as the Biden administration's aggressive goal for the U.S. power grid to achieve 100% carbon-free electricity by 2035. Yet, as the path to 1.5°C is not linear, companies that generate power—and that also set targets consistent with the pathways recommended by the Science Based Targets initiative's (SBTi) sectoral decarbonization approach (SDA)—need to reduce emissions rapidly over the next decade relative to their historical levels (see Figure 3).[13]

Utilities with more coal in their power generation stack, therefore, have more work to do. These utilities need to get off coal—and then transition to anything else. As one example, they might transition from coal to gas—and eventually to

renewables once they are able to store that energy for deployment around the clock.

Transitioning from coal to gas, however, is not a simple process. The utility will need to build a pipe to transport the gas to its facility—it also will need to re-line the boilers and bring new gas turbines in, work with a systems provider to help procure a long-term gas agreement, and measure and monitor its CO2. Those are all complex challenges, and they come at a cost. Determining that cost and identifying who can help with the transition are necessary additional steps.

And yet, along the net-zero continuum, converting from coal to gas only takes the utility halfway there. Utilities are looking to grow their renewables footprint, but they must also factor in how regulators will view their capital plans.

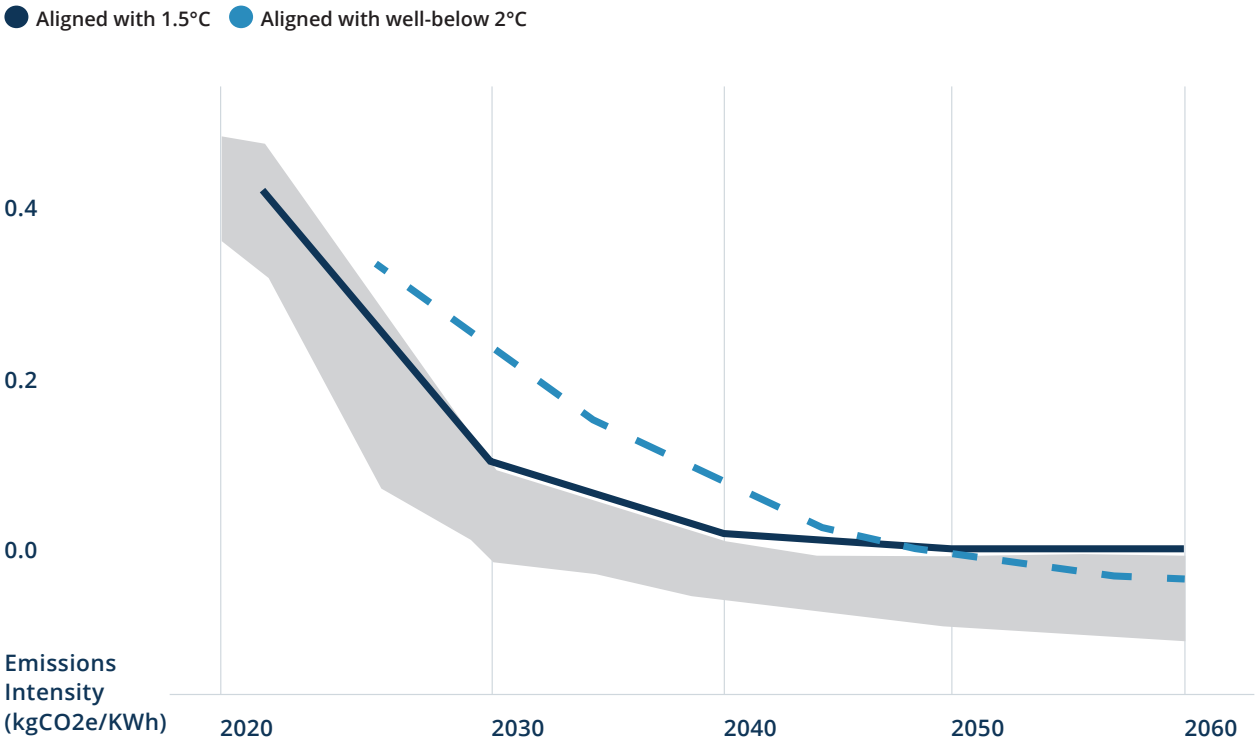
For a U.S. utility that generally operates under traditional rate base/rate of return regulation, the next questions that follow are: Will the regulator allow that utility to recover the cost of new generation investments from ratepayers? Will the regulator let the utility use ratepayer money to figure out how to decarbonize? Or would it reject that capital plan, fearing cost overruns?

The more attractive solution might be to have an experienced third-party company bear that risk. Not only does this leave taxpayers out of the equation, it comes with other clear advantages. These types of operators often already have deep relationships

FIGURE 3

Utilities Need to Reduce Emissions Quickly

SDA Pathways for the Power Sector



Source: SBTi.

with original equipment manufacturers (OEMs)—companies like GE and Siemens that not only build equipment like generators and turbines, but then put them to work. These relationships can help smooth the process of coming to a commercial agreement and solving any problems along the way.

Of course, some power users will not want to wait. Those with large Scope 2 emissions will seek more distributed generation with dedicated renewables capacity. Meanwhile, providers that can offer solutions in multiple geographies will likely earn a premium.

Technology Companies

Tech companies like Amazon, Google, Microsoft, Facebook and Apple are quickly becoming some of the largest consumers of electricity. These companies need large amounts of power to run their servers and keep them cool. Given the computing power necessary to satisfy the rise of cloud computing, artificial intelligence and machine learning, this amount will continue to grow.[14]

Data centers run on huge amounts of energy—which makes the biggest technology companies major buyers of clean power (see Figure 4). These counterparties are looking to achieve their own decarbonization goals, and they want solutions providers that can help—specifically, by taking them off the brown grid and putting them on the green grid.

This has led to the rise of green data centers, which run on carbon-free electricity from hydropower, wind and solar. Microsoft and Google have committed to shift to 100% renewable energy supply for their data centers by 2025 and 2030, respectively.[15] To get there, these counterparties must enter into green power purchase agreements (PPAs). These agreements define all the commercial terms for the sale of electricity—in this case, it's between the tech company, who is buying power, and a seller, who is generating that power.

New development of clean energy generation can also be required—this is the concept of "additionality." Here, the contract supports the funding and buildout of a new renewables development, thereby increasing clean energy capacity—making the contract the catalyst for a positive impact.

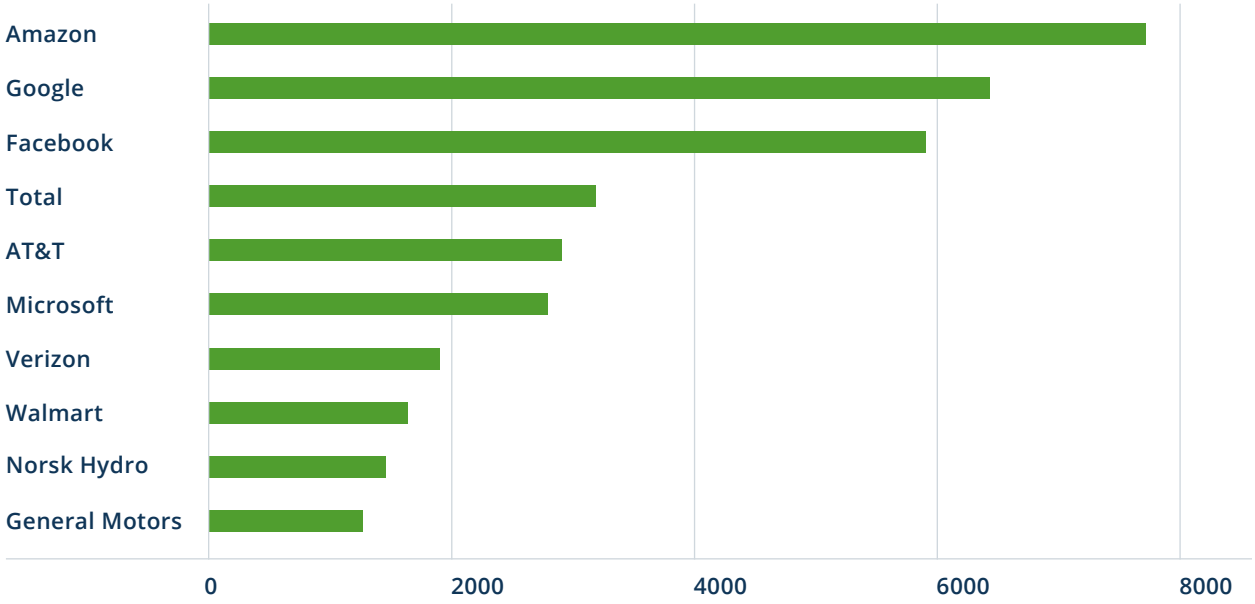
Tech companies are looking for a solutions provider that can help them with decentralized power production, green PPAs and other requirements. In Ireland, for example, new wind projects are underway that will be tied to PPAs that will ultimately power Facebook and Amazon data centers.

Partnering with the largest technology companies means that solutions providers need to be on the leading edge of where the market wants to go—and how the electricity grid is transforming.

FIGURE 4

Tech Groups Are the Biggest Corporate Buyers of Green Energy

Global Cumulative Offsite Power Purchase Agreements, 2000 to present (MW DC)



Source: BloombergNEF, Financial Times. MW DC—Megawatts of direct current.

Heavy Industries

To some extent, the opportunity set to transform businesses is simply where the emissions are. With that in mind, heavy industries, like steel, cement and long-haul trucking, are ripe for transition (see Figure 5).

Steel

Steel is vital in modern economies. It's used in the construction of buildings, bridges, cars, trucks and wind turbines. Global demand for steel has increased more than threefold over the past 50 years—and will continue to rise as economies grow, urbanize and enhance their infrastructure.[16]

According to the International Energy Association (IEA), the iron and steel sector is responsible for about 8% of final global energy demand and 7% of energy sector CO2 emissions (including process emissions).[17] Among heavy industries, the iron and steel sector consumes more energy than any other sector besides chemicals (see Figure 6a). But the issue—and opportunity—is around its use of coal. This is because the steel sector is the largest industrial consumer of coal; in fact, coal provides almost 75% of the steel sector's energy demand.

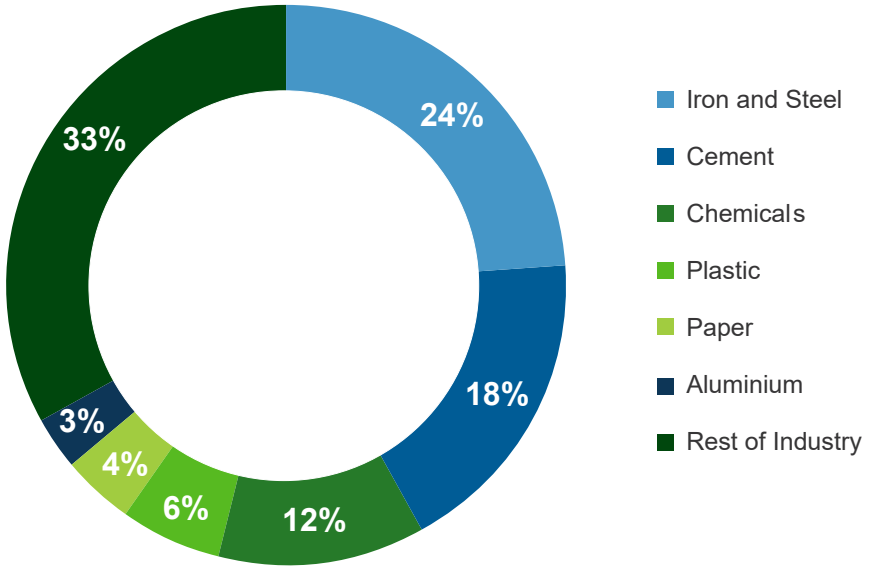
75%

of the steel sector's energy consumption comes from coal

FIGURE 5

Opportunities to Decarbonize Heavy Industries

Total Industry CO2 Emissions (2017)



Source: Annualreviews.org, Financial Times.

Coal is used to generate heat and to make coke—and coke is the fuel instrumental in the chemical reactions needed to produce steel from iron ore in blast furnaces. However, the unavoidable byproduct of these reactions is carbon dioxide.

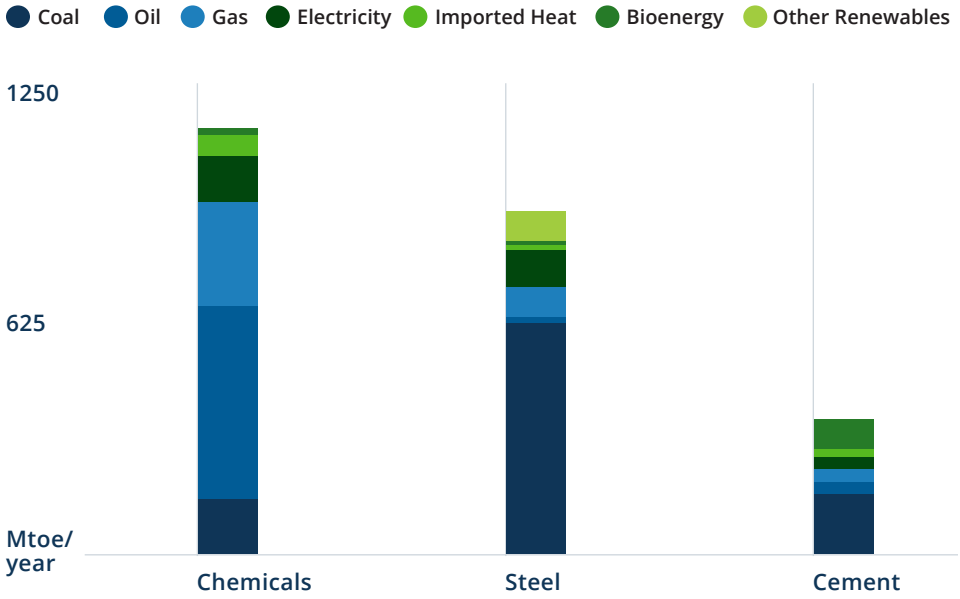
Surveying the landscape of heavy industries, when it comes to CO2 emissions, the iron and steel sector comes in first, generating 2.6 gigatons of carbon dioxide (Gt CO2) emissions annually (see Figure 6b).

But heavy industry sectors are generally considered hard to abate for a reason. Consider the two main process routes for how steel is manufactured today: integrated steelmaking and electric steelmaking (see Figure 7). From a carbon-emitting perspective, the electric route is preferred over integrated steelmaking. Average emissions of CO2 per ton of steel are dramatically less—0.5 tons of CO2 using scrap metal, versus 1.8 tons of CO2 using iron ore. Yet steelmakers can't

FIGURE 6A

Heavy Industries Consume a Lot of Energy

Final Energy Demand by Fuel

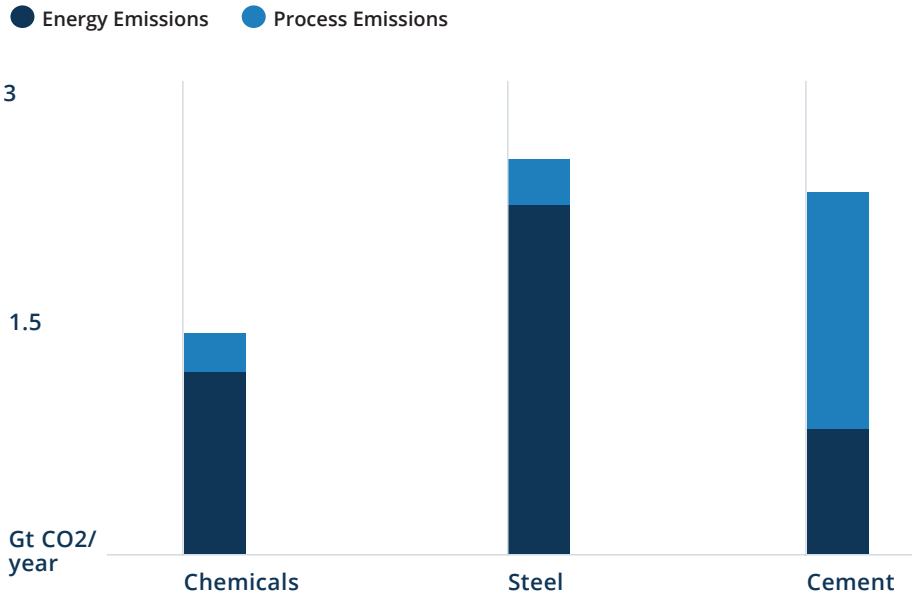


Source: IEA, "Iron and Steel Technology Roadmap." Mtoe—Millions of tonnes of oil equivalent.

FIGURE 6B

Steel's Energy Emissions Are High

Direct CO2 Emissions



Source: IEA, "Iron and Steel Technology Roadmap." Gt CO2—Gigatonnes of carbon dioxide.

simply increase their share of electric steelmaking because cost is a major issue, as the large installed base is incredibly expensive to change. Also, the necessary scrap metal is in finite supply, and that supply falls short of global needs.[18]

The opportunity to transition, especially for European steelmakers, is with a new process that creates "green" steel. Produced with an electric arc furnace, this is steel that uses DRI as the feedstock, but it's produced with hydrogen that is powered by renewable energy. While costs are currently too high to be competitive, "green" steel would eliminate most CO2 emissions.

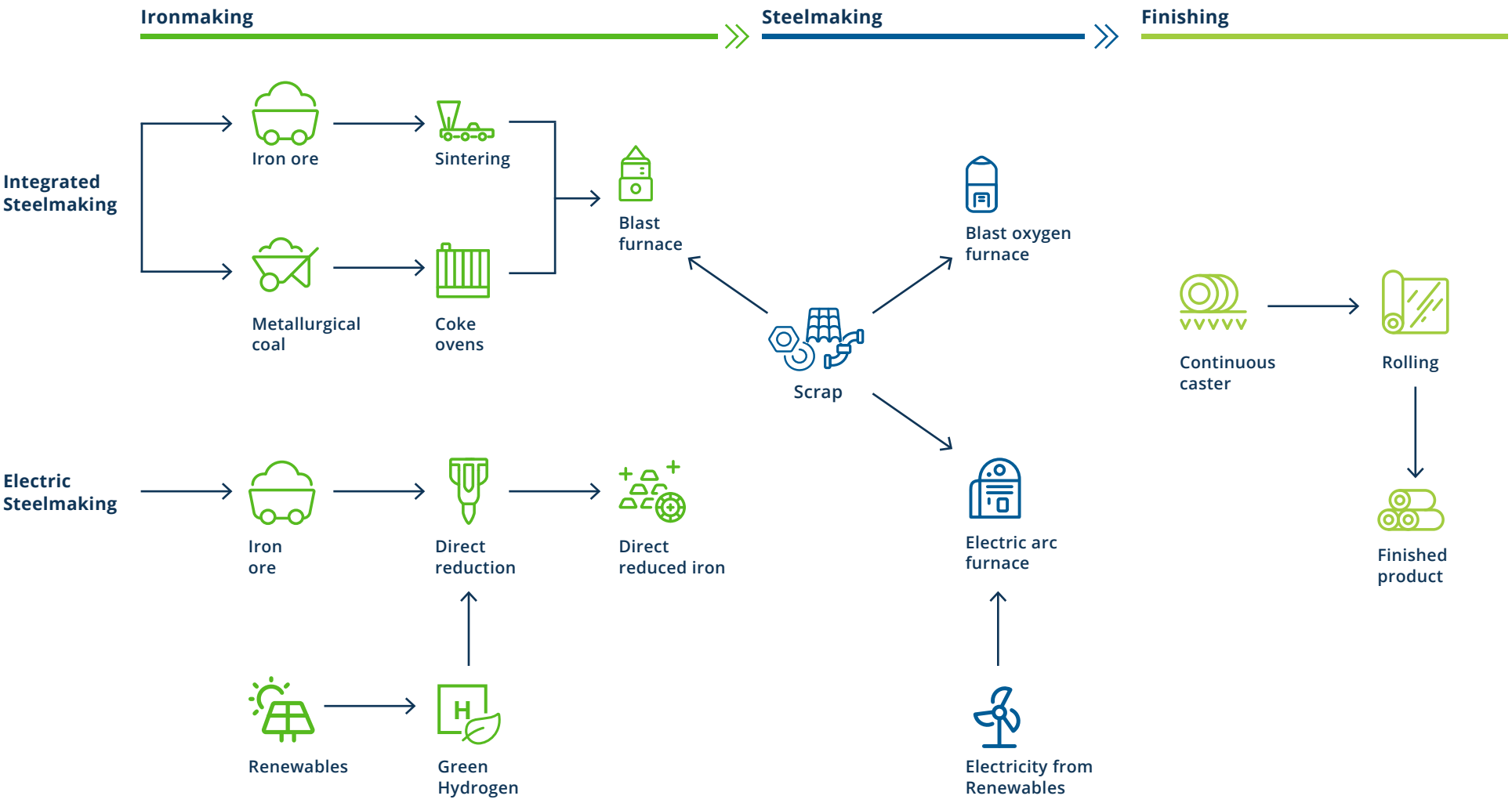
The thesis around the decarbonization of steel, in simple terms, can therefore be thought of in two steps. The first step is the switch from blast furnaces to electric arc furnaces. Not only is significant capital necessary here, but so is knowing how supply chains can be reconfigured. The second step involves using green power to support electric arc furnaces, as well as having green power and hydrogen support the DRI process. For both, knowledge of how to scale up hydrogen and renewable power projects is required.

Note that under this hydrogen route, energy demand could materially increase over the next three decades. Therefore, the transition to EAFs will materially increase demand for renewable energy. Fortunately, renewables are already cost-effective.

FIGURE 7

Decarbonizing Steel Requires More Electric Steelmaking—and More Renewables

Major Steelmaking Process Routes



Source: BHP, Brookfield Asset Management.

Cement

Cement is essential, but it's also highly carbon intensive. The industrial process that yields cement accounts for 8% of global greenhouse-gas emissions.[19] In fact, if cement were a country, it would be the world's third-largest emitter, behind China and the U.S.[20] But what if the cement-making process evolved over the next decade such that the carbon emitted precipitously dropped?

The implementation of carbon capture and storage (CCS) is one possible solution. CCS is the process of capturing CO2 formed during power generation and industrial processes—and storing it so that it's not emitted into the atmosphere. While carbon capture technologies are already used in various industrial processes, they could also apply to cement. HeidelbergCement, for example, is building an industrial-scale CCS plant in Brevik, Norway. When the facility is finished in 2024, the end result will be a 50% cut in emissions from the cement produced at that plant.[21]

Transportation

Emissions in the transportation sector—which accounts for 16% of the energy sector's GHG emissions—come from the use of internal combustion vehicles powered by fossil fuels. But the decarbonization pathway differs depending on the type of vehicle. For short-haul vehicles, the solution is to replace the fleet with electric vehicles. For long-haul transportation, like trucking and aviation, it will require the use of green hydrogen or biofuels.

For short-haul vehicles, the trends are already moving in the right direction (see Figure 8). Governments are implementing climate-friendly policies to drive business transformation. The U.K.'s pledge to phase out all sales of cars using only petrol or diesel by 2030 is a strong example. In February 2021, Ford declared that it will stop selling cars in the U.K. and Europe with any form of internal combustion engine by 2030.[22]

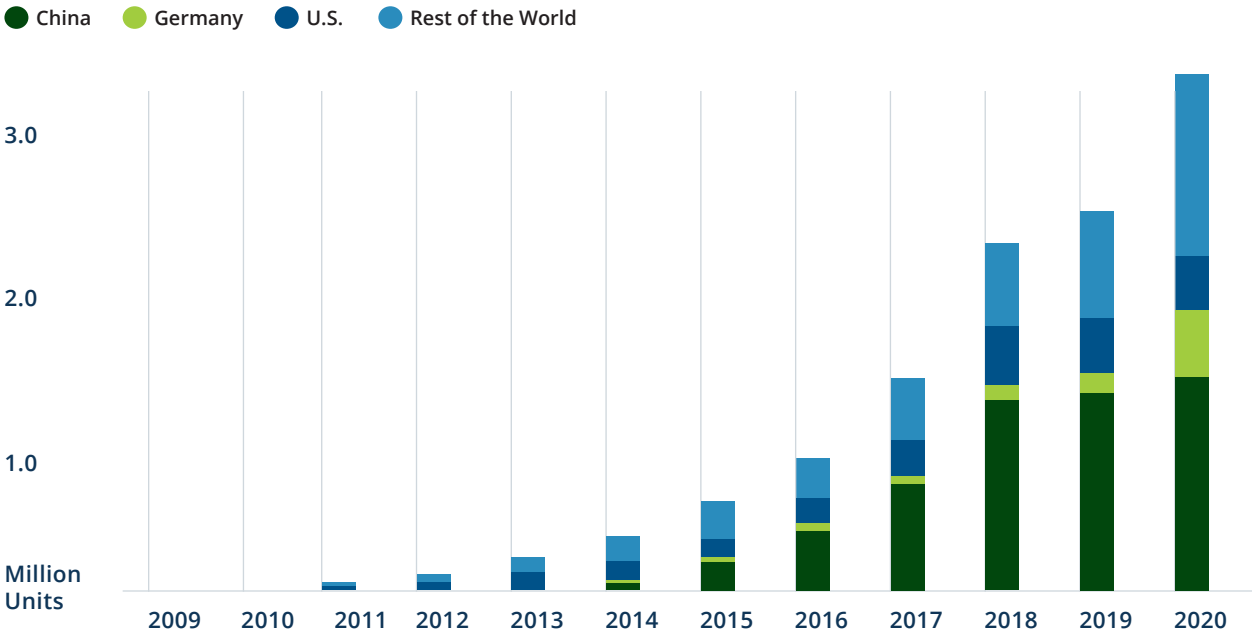
16%

of the energy sector's GHGs are attributed to transportation

Competitive realities, as well as broader consumer acceptance of electric vehicles, are also spurring progress. General Motors announced its plans to get out of the internal combustion game—and sell only zero-emission cars and trucks by 2035.

FIGURE 8

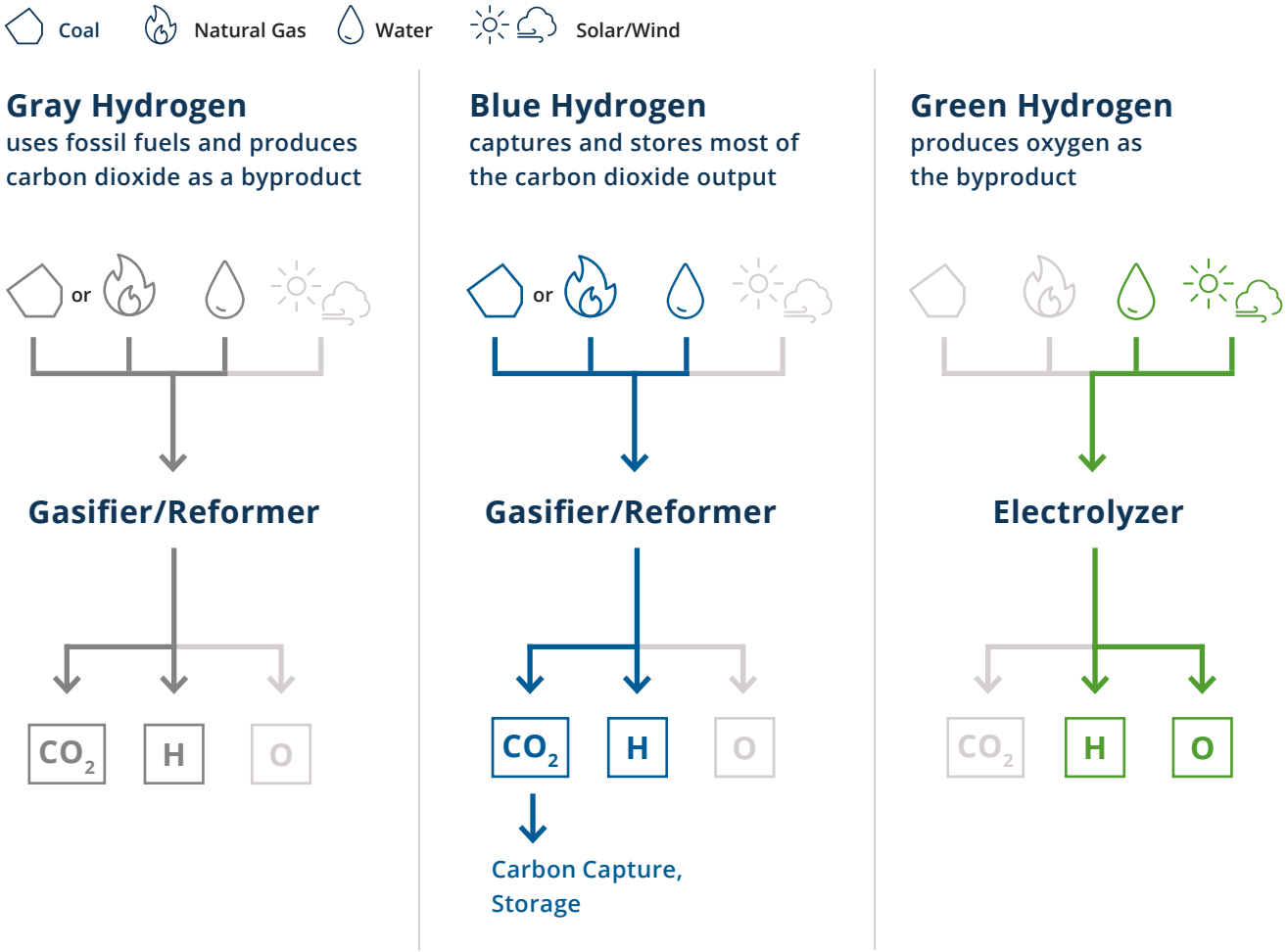
Global Electric Vehicle Sales Keep Rising



Source: EV-Volumes, Financial Times. Includes plug-in hybrids and battery electric cars.

FIGURE 9

Green Hydrogen Is a Completely Clean Form of Energy



Source: Bloomberg.

Volvo has said it would be all-electric by 2030.[23] Meanwhile, Volkswagen plans to sell 1 million electric or hybrid cars this year—a near-tenfold increase since 2019.[24]

Not only will the electrification of the auto sector continue, but so will the decarbonization of the electricity that powers that now-electrified sector. Both are required for the transition to net zero.

While electric vehicles excel at short-haul travel, more infrastructure, such as charging stations, will need to be built up[25]—and this is another area where private capital can help.

Breakthroughs continue to be made in battery technology, but electrification likely will not be the solution for long-haul vehicles, like 18-wheelers.[26] In the U.S., much of the nation's freight is delivered via medium- and heavy-duty trucks. These vehicles account for more than 20% of the freight industry's greenhouse gas emissions even though, in the U.S., they make up less than 5% of the road fleet.[27]

Eventually, green hydrogen could be used in long-haul freight and trucking. Because these modes of heavy transport are difficult to electrify, many will still have to run on gas. And since green hydrogen is a completely clean form of energy, it offers a path to the global goal of decarbonization (see Figure 9).

Oil & Gas

Oil & gas companies will need to transition their businesses to a lower-carbon future. According to the IEA, 15% of global energy-related GHG emissions come from the process of extracting oil and gas from the ground and transporting it to consumers. However, this figure doesn't include Scope 3 emissions, which will thus lead to a step change in how oil & gas companies think about the transition.

Energy majors have been among the most innovative companies of the last century (see Figure 10); as evidence, consider the recent shale gas revolution. They will have to use this expertise to reposition themselves to become the producers of carbon-free power generation that will support the next century. First, they need to decarbonize the production and transportation of fossil fuel energy as much as possible. And second, to maximize the returns on their existing assets, they'll need to develop lower carbon solutions that include CCS and hydrogen.

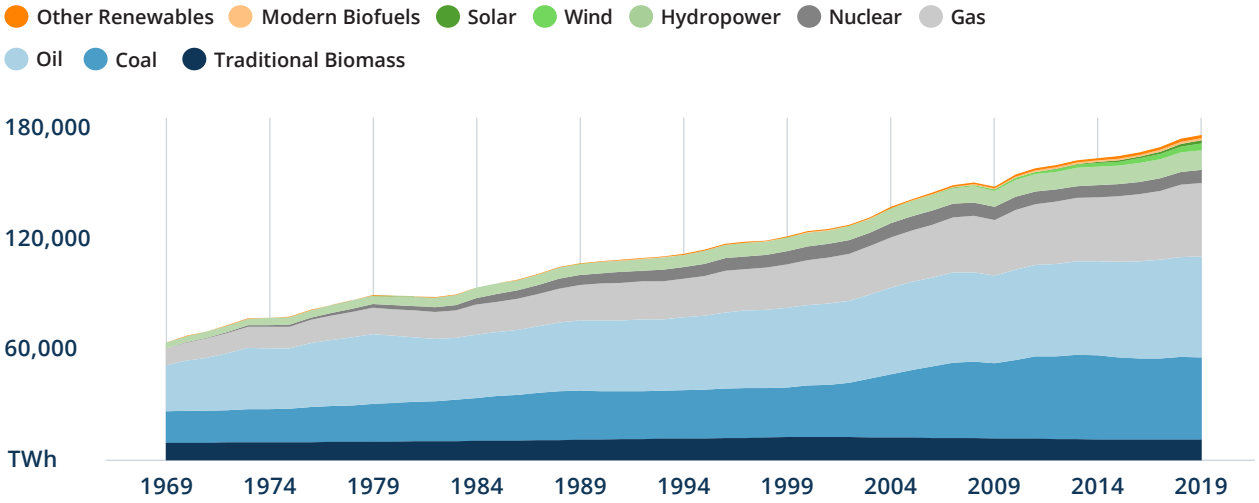
15%

of the energy sector's GHGs come from the process of extracting oil and gas out of the ground and transporting it to consumers

FIGURE 10

Energy Majors Have a History of Being Innovative

Global Primary Energy Consumption by Source



Source: OurWorldinData.org, Vaclav Smil (2017), BP Statistical Review of World Energy.

Therefore, the opportunity here is to help these companies quickly invest in what might be non-core today but will be core in the future. BP, for example, plans on cutting its fossil fuels production by 40% by 2030, and will simultaneously increase spending on low-carbon technologies. The net effect of these efforts could be a 30% reduction in BP's greenhouse gas emissions.[28]

Yet, for carbon-emitting companies that cannot adapt, the net effect of carbon prices will be declining margins, thus pressuring cash flow and impacting the value of their businesses.

Capital markets, of course, have already taken notice. Over the past decade, the market capitalizations of some oil & gas supermajors have drifted lower.[29]

To be clear, oil is not going away any time soon. Therefore, finding ways to reduce the amount of carbon the oil & gas industry emits into the atmosphere is part of the solution. Companies are beginning to understand that decarbonizing their businesses is part of their value proposition to investors. But many of these businesses need a partner with experience to help them put a net-zero plan in place—so they can start their decarbonization journey.

It is likely these oil & gas companies will be incentivized

to participate with a solutions provider, and share in the economics, because they want to protect, or enhance, the long-term value of their existing franchise.

But importantly, once oil & gas companies see a way to deliver their products in a decarbonized manner, in scale, they will see the benefit in investing in technologies that might be slightly uneconomic today—like CCS or green hydrogen—because it gives them a viable path to realizing value from their existing assets over a longer period of time.

Morgan Stanley, in its base case, forecasts that energy, together with chemicals and power, addresses a $225 billion market globally for CCS in 2050.[30] Among global CCS capacity, Morgan Stanley notes that approximately 50% is in the U.S. Much of this is synergistic with existing businesses—captured through natural gas processing and sequestered in enhanced oil recovery.

Furthermore, as oil & gas companies look to "green up" their business for the energy transition, their midstream assets could be converted into critical infrastructure of new technologies. However, the commercialization of a technology like carbon capture and storage will require both significant capital and a drop in cost.[31]

In the shorter term, the transition will be weighted toward renewables. But as other technologies prove themselves out and grind their way down the cost curve, the business transformation theme will move beyond renewables to these other technologies. Forward-thinking policies like carbon taxes will help accelerate that process.

Decarbonizing the European Steel Industry

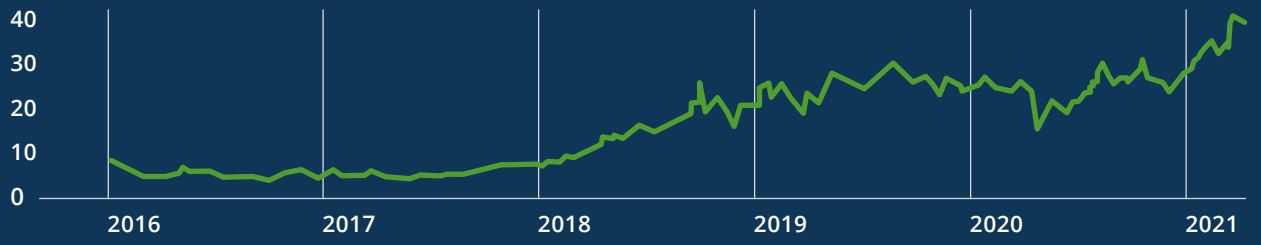
European steelmakers are currently trying to develop more environmentally friendly, low-carbon steel manufacturing techniques.[32] But the investment necessary for key European steelmakers to transition will be significant. For example, ArcelorMittal, Europe's biggest steelmaker, has estimated that decarbonizing its facilities on the continent—such that it is in line with the EU's mission to eliminate greenhouse gas emissions by 2050—will cost between €15 billion and €40 billion.[33]

Joint ventures with experienced partners could help with green steel—specifically, with the buildout of its production facilities. While credit markets are wide open, and borrowing costs are historically low, there are still creative ways in which private capital can help European steelmakers accomplish both their financial and environmental objectives.

FIGURE 11

EU Carbon Price Has Risen Five-Fold Since 2018

EU ETS (€ Per Tonne)



Source: Refinitiv, Financial Times

EU regulation should accelerate the timing of these objectives. Part of the EU's plan hinges on the price of polluting becoming high enough so that it incentivizes industry players to decarbonize. The EU's emissions trading system (EU ETS) is the mechanism for this framework. The EU ETS works on the "cap and trade" principle—and is the EU's key tool for reducing greenhouse gas emissions cost-effectively.[34]

Expectations that the EU will tighten the supply of emission allowances over time have led to a steadily increasing EU carbon price. Over the past three years, the price has increased five-fold—to more than €40 per ton today (see Figure 11).[35] This politically influenced mechanism furthers the need for players in heavy industries, like steel, to go green.

Real Estate

Lastly, real estate will also need to transform—especially since 18% of energy sector emissions come from buildings.[36]

Sustainability can be incorporated into every stage of a building's life span, from initial planning through end-of-life operation. For buildings to "go green," energy reduction must be one of the key initiatives. Areas for investment include distributed generation, smart meters, HVAC (heating, ventilation, and air conditioning), district energy, boiler electrification and building management systems. Furthermore, with more customers seeking environmentally friendly products, sustainable building materials are another area of investment.

According to the U.S. Energy Information Administration, HVAC represents the largest source of GHG emissions within the average commercial and residential building.[37] And given that HVAC systems are large users of energy, partnership opportunities should arise from the transition to net zero.

District energy systems are also attracting interest, as they provide a more sustainable way of heating and cooling buildings. In fact, cities like Toronto, Chicago, Houston and Paris are already using the district energy concept to reduce their energy use—and carbon emissions. District energy systems are increasingly climate resilient, and they can help cities reduce their primary energy consumption for heating and cooling by up to 50%.[38]

Conclusion

In 2021, according to the IEA, global energy-related CO2 emissions are on course for their second-largest annual increase ever—reversing most of last year's decline caused by the COVID-19 pandemic.[39] Clearly, the time for all of us to act is now.

Effective, credible public policy provides the foundation for addressing climate change. It can incentivize companies to take more aggressive action to reduce their carbon footprint. But while the will to transition their business might be there, the way is often unclear. Private capital and operational expertise can assist in many ways—in transitioning power generation portfolios to green capacity, in electrifying the operating processes of heavy industries, and in developing and supporting new technology and related infrastructure. Putting it all together, it's an opportunity to create real value.

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[1] References to "carbon" are generally being used in place of "carbon dioxide equivalent" (CO_2e), which includes other greenhouse gases such as methane, nitrous oxide, etc. References to "carbon dioxide" are used when we specifically mean CO_2.

[2] Financial Times, https://www.ft.com/content/75956e41-57b1-4c55-981e-aec7a21560a0, May 5, 2021.

[3] https://www.gov.uk/government/news/pm-outlines-his-ten-point-plan-for-a-green-industrial-revolution-for-250000-jobs

[4] https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/

[5] Financial Times, https://www.ft.com/content/0412fb34-8691-4443-bc85-0103ee99cf70, Feb. 3, 2021.

[6] European Commission via GFMA and BCG, "Climate Finance Markets and the Real Economy," December 2020.

[7] GFMA and BCG, "Climate Finance Markets and the Real Economy," December 2020.

[8] The Globe and Mail, https://www.theglobeandmail.com/opinion/editorials/article-the-conservatives-just-had-a-carbon-price-epiphany-good-for-them-good/, April 16, 2021.

[9] TCFD, "2020 Status Report," October 2020.

[10] GFMA and BCG, "Climate Finance Markets and the Real Economy," December 2020.

[11] Goldman Sachs Research, "Carbon emissions are increasingly becoming priced in equity multiples," Jan. 21, 2021.

[12] Goldman Sachs Research, "Headed to 640 GWs of US renewables by 2035—clean energy growth remains robust," Jan. 4, 2021.

[13] SBTi, https://sciencebasedtargets.org/resources/files/SBTi-Power-Sector-15C-guide-FINAL.pdf, June 2020

[14] Financial Times, https://www.ft.com/content/0c69d4a4-2626-418d-813c-7337b8d5110d, Feb 10, 2021.

[15] https://blog.google/outreach-initiatives/sustainability/our-third-decade-climate-action-realizing-carbon-free-future/

[16] IEA, https://www.iea.org/reports/iron-and-steel-technology-roadmap, October 2020.

[17] IEA, https://www.iea.org/reports/iron-and-steel-technology-roadmap, October 2020.

[18] BHP, https://www.bhp.com/media-and-insights/prospects/2020/11/pathways-to-decarbonisation-episode-two-steelmaking-technology/, Nov. 5, 2020.

[19] World Economic Forum, https://www.weforum.org/agenda/2019/09/cement-production-country-world-third-largest-emitter/, Sep. 18, 2019.

[20] The Globe and Mail, https://www.theglobeandmail.com/business/article-in-the-race-to-clean-dirty-industries-these-new-technologies-give-hope/, March 1, 2021.

[21] HeidelbergCement, https://www.heidelbergcement.com/en/pr-15-12-2020, Dec. 15, 2020.

[22] Financial Times, https://www.ft.com/content/7d103a33-d303-4b3d-add0-18eabcfd096b, Feb. 17, 2021.

[23] Wall Street Journal, https://www.wsj.com/articles/never-mind-peak-oil-global-forecaster-calls-peak-gasoline-11615988228?mod=searchresults_pos2&page=1, March 17, 2021.

[24] Financial Times, https://www.ft.com/content/f8806bbb-1f4b-4cc0-8145-30d33a0d7829, March 16, 2021.

[25] Financial Times, https://www.ft.com/content/8e69d4da-00d2-4ada-96f0-b5dc5c7ca40a, Jan. 25, 2021.

[26] GatesNotes, https://www.gatesnotes.com/Energy/Moving-around-in-a-zero-carbon-world, Aug. 24, 2020.

[27] Reuters, https://www.reuters.com/article/idUSKBN2A52ML, Feb. 5, 2021.

[28] Wall Street Journal, https://www.wsj.com/articles/houstons-big-oil-conference-goes-green-as-energy-transition-accelerates-11614695646?mod=searchresults_pos2&page=1, March 2, 2021.

[29] Financial Times, https://www.ft.com/content/179e64c9-a264-4a06-811f-b1d07d90fbd0, Feb. 7, 2021.

[30] Morgan Stanley Research, "Carbon Capture: A Hidden Opportunity?", April 14, 2021.

[31] Financial Times, https://www.ft.com/content/05aa2bfe-ddb2-464a-b890-feac455ba2e6, April 20, 2021.

[32] Financial Times, https://www.ft.com/content/b07c8a83-4b0c-4f96-8ff0-789c51b6e46b, Nov. 10, 2020.

[33] Financial Times, https://www.ft.com/content/d61df553-ae4a-4311-95fc-9d40861ac9bd, May 6, 2021

[34] European Commission, https://ec.europa.eu/clima/policies/ets_en

[35] Financial Times, https://www.ft.com/content/301e9fde-8211-42bf-8bdb-decbc763aacc, Feb. 25, 2021.

[36] Climate Watch & the World Resources Institute, 2020.

[37] Credit Suisse Research, "Biden Administration Policy Preview: Clean Energy and Infrastructure Investment Plan," Feb. 21, 2021.

[38] District Energy in Cities Initiative, http://www.districtenergyinitiative.org/

[39] IEA, https://www.iea.org/news/global-carbon-dioxide-emissions-are-set-for-their-second-biggest-increase-in-history, April 20, 2021.

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