

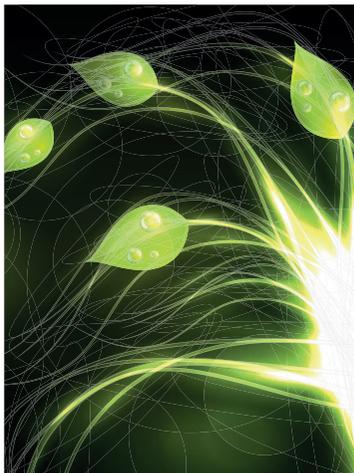


# Green energy – How to outsmart disruption and future-proof business models

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It's five years since the Paris Climate Agreement on global emissions was instigated. Time moves quickly, but policy and change don't always maintain the same pace. As Lenin, not a noted capitalist, but a fine observer of trends, said in 1918: "There are decades where nothing happens – and there are weeks when decades happen." 2020 was such a year.

The energy transition – in Europe first, and potentially now in the US – has been moving fast, accelerated by the global pandemic:



- As part of the European Green Deal, the European Commission will raise its greenhouse gas emission reduction target by 15 percent, to 55 percent of 1990 levels, by 2030.
- US President Biden is promising a similar net-zero carbon target by 2050, and has rejoined the Paris Agreement.

With more robust global political climate ambitions, green growth is an increasing driver of greater value for energy and utility companies, as well as for corporates across all sectors. With 2020 a green watershed, the authors outline key opportunities that leaders need to seize to future-proof their businesses and increase shareholder value.

Global political climate ambitions now look more robust, and this creates many strategic opportunities and challenges.

This article outlines why green growth has created greater shareholder value for both energy and utility companies, and why focus on sustainability will generate value for all corporates. In addition, we examine some of the hottest new investment opportunities for companies in the energy sector.

## Green significantly outperforms black

Over the last decade, green investments have become more mainstream, driven by strong policies and subsidies, declining costs, low interest rates, high fuel prices, and changes in public and consumer opinion.

In 2019, for example, three-quarters of new investment in electricity went into renewables, the utilization rates of coal generators fell to 53 percent, and fossil fuel demand for electricity decreased significantly.

And then came the COVID-19 pandemic. According to the IEA<sup>1</sup>, demand for fossil fuels is likely to have collapsed in 2020 by 7–8 percentage points, while demand for renewables is likely to have risen, albeit slightly. Renewables accounted for 90 percent of new generating capacity in 2020 and will continue to grow strongly. We forecast that installations over the course of 2020–2025 globally will grow by 8 percent per annum for wind and 13 percent per annum for solar.

With the cost of wind and solar power declining rapidly and priority dispatch obliging grid operators to turn to these generating sources first, renewables have outperformed conventional power. In turn, this has been reflected by strong stock market performance. Green utilities, developers, independent power producers, and even wind and solar original equipment manufacturers (OEMs) have significantly outperformed the markets (see Figure 1), providing investors with higher returns than carbon-intensive businesses.

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1. IEA WEO – October 2020



Figure 1: Evolution of share price (2016–2020) – price on January 21, 2021

Source: Degiro, Arthur D. Little analysis

Government support to stimulate and increase green investments remains high, while new financing methods (see also the accompanying article, “The Green Gambit – Investing for corporate strategic advantage in the post-COVID-19 world”) further help unlock innovation:

- The European Commission has launched a EUR1 billion call for research and innovation projects that respond to the climate crisis.
- The US Congress has passed legislation aiming to stimulate new R&D programs for solar, wind, carbon and energy storage to fund energy efficiency projects and upgrade the electric grid. This funding of up to USD35 billion will contribute to making clean investments cheaper and more widespread.
- President Biden is expected to soon detail the US’s USD2 trillion green investment plan, which will also provide strong impetus.

However, notwithstanding government initiatives, shareholder value will remain, as always, the most powerful driver for corporate focus on growth and robust business models in the face of a disruptive environment. Here, we look at some of the current green-growth opportunities in the oil & gas, utility and wider corporate sectors.

## 1: The oil & gas sector is changing and must transform even faster

Peak oil demand may have occurred in 2019 and 2020, with a lower future oil-price paradigm. This has profound ramifications for the sector and looks set to create stranded hydrocarbon assets and falling shareholder valuations. The industry may be at a strategic tipping point, with many oil & gas companies reallocating capital investment into greener fields, including hydrogen.

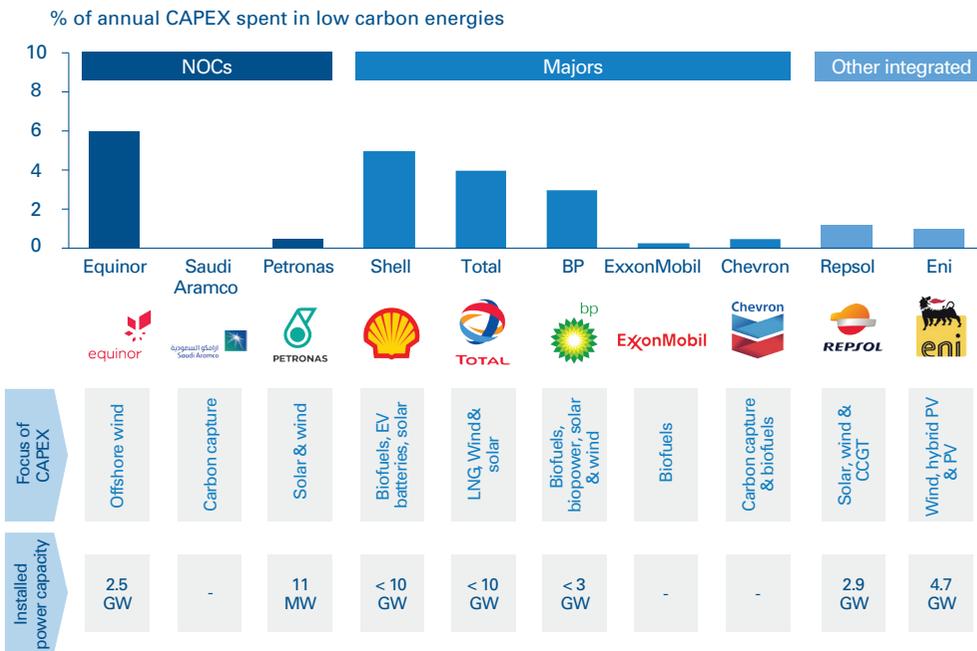


Figure 2: O&G companies’ green reconversion (illustration)

Source: Company information, Arthur D. Little analysis

The switch to broader sources of energy production is clearer among European companies. However, after early unsuccessful experiences in renewables, American oil majors had shifted focus back into oil & gas before the COVID-19 pandemic. This means that around 70 percent of the petroleum sector’s renewable capacity is currently provided by European majors Total, Shell and BP. Utility-scale renewable projects (notably offshore wind) are a highly promising opportunity for Big Oil, as companies can leverage their unparalleled ability to operate large capital projects and manage assets throughout their entire life cycles.

## Clean investment: Look beyond the obvious areas for opportunities

As oil & gas companies have seen, value destruction is accelerating the decarbonization agenda. Consequently, Equinor, BP, Shell, Eni, Total and Repsol have made significant new strategic announcements regarding their ambitions to become net carbon zero. This is driving accelerated competition for clean energy assets and technology, especially where oil & gas players are repositioning, such as in offshore wind.

However, green investment is not just about solar or wind power. There are a multitude of green and low-carbon opportunities and enablers now available to investors (with their viability sometimes varying by region, for example, waste to energy and hydrogen), as illustrated in Figure 3.



Energy generation	Storage & hydrogen	Energy network	Energy mobility	Recycling	Energy procurement	Energy efficiency
<b>Wind energy</b> onshore, offshore (e.g., floating)	<b>Electrochemical storage</b> onshore, offshore (e.g., floating)	<b>Engineering and procurement</b>	<b>Electric charging</b> Charging point operator, mobility service provider	<b>Waste water treatment</b>	<b>Green energy procurement</b>	<b>Green buildings</b>
<b>Solar energy</b> large scale, behind-the-meter...	<b>Mechanical storage</b> hydro, flywheel...	<b>System integration</b>	<b>EV batteries manufacturing</b>	<b>Waste to energy</b>	<b>Distributed assets installation</b>	<b>Green audit</b>
<b>Biogas energy</b>	<b>Green hydrogen</b>	<b>Operations &amp; maintenance</b>	<b>Vehicle-to-grid (V2G)</b>		<b>Corporate PPAs</b>	<b>Energy efficiency measures</b>
<b>Virtual power plant (VPP)</b>	<b>Carbon capture and storage</b>					

Figure 3: Illustration of possible green energy-related investments

Source: Arthur D. Little

Almost all oil & gas players have made the choice to develop solar and wind assets. Many have also made complementary investments in energy storage and/or electric vehicle-charging infrastructure. Several, including Shell, Total, BP, Chevron, ExxonMobil and Eni, are allocating resources to carbon capture and storage (CCS).

Hydrogen is also aiming to be an important driver of the decarbonization of heavy industry, as well as of parts of the transportation sector. Significant initial investment in large-scale clean hydrogen, storage and transmission projects is underway, although there are still major technological, infrastructural and legislative challenges that must be overcome to ensure the development of the required infrastructure. Current EU targets require production costs to be halved, envisaging an additional 80–120 GW of dedicated solar and wind infrastructure explicitly for hydrogen production by 2030 if all projects are realized. We see over 20 applications in which green<sup>2</sup> hydrogen is likely to be the lowest-cost solution in the coming years – across transportation and fertilizer, steel, and petrochemical production. However, this will require the recycling and repurposing of a number of former carbon-intensive assets – such as existing gas and other pipeline infrastructure, as well as salt caverns, depleted gas fields and aquifers to store either hydrogen or carbon.

To focus on the right investments, a thorough assessment of each opportunity and its portfolio fit is required for a company to determine the focus of its future strategy. This is usually performed based on profitability criteria, barriers to entry (such as regulation), competitive landscape, strategic and purpose-fit and achievable synergies, and divestment strategy.

Companies expanding their activities into new areas will probably aim to develop diversified portfolios of investments, with some mature assets and technologies (e.g., solar, wind), as well as others (such as hydrogen and CCS) that still need to prove themselves from a technical and financial performance perspective, although these investments may provide first-mover advantages.

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2. Green hydrogen is distinct from “grey” hydrogen, which is created using fossil fuels and dominates current supply

## 2: Utility-scale renewable generation is already mainstream, but there are substantial opportunities for further green growth

Green energy supply already accounts for a significant share of the total capacity of several global utility players, as highlighted in Figure 4 below. At least in Europe, green energy is no longer a differentiator, but a “must have” to survive in competitive environments. Aside from public awareness of climate issues, the decline of traditional generation assets such as coal requires energy companies to shift their strategies decisively into greener options. Multiple utilities have formally split their portfolios, creating new green-related business units or separate companies in order to explore new opportunities in more agile ways, which might be more difficult under their legacy frameworks.

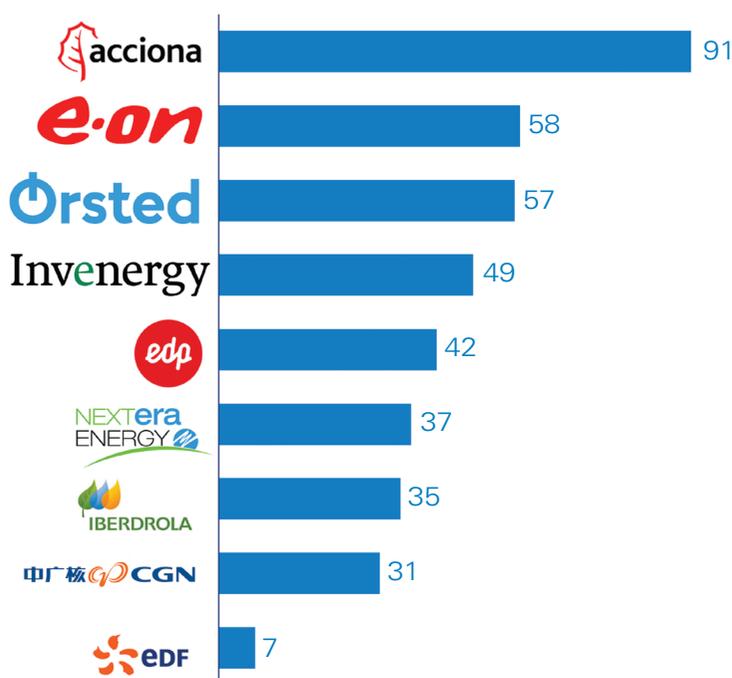


Figure 4: Renewable capacity as percentages of total respective capacity (2019)

Source: Company information, ADL analysis

## **Adopting a portfolio approach to green investment**

The rapid reduction in renewable cost curves over the last decade has made the investment case positive, which means they no longer require subsidies. However, the increase in intermittent power entering the grid has, at times, put downward pressure on pricing. On a sunny and windy day at times of low demand, electricity prices can become negative. These instances of low or negative electricity prices need to be considered in any investment appraisal. However, the rise of other assets, technologies and concepts, such as battery storage, demand-side management, and interconnections can have a countervailing effect on these costs. Together, these can dramatically improve the profitability of the initial renewable investments and make revenues more sustainable over time.

If we look more closely at new technologies such as battery storage and green hydrogen, today the business case is barely or not at all profitable for single applications. Instead, it is vital to invest in a portfolio of activities and revenues (hence “revenue stacking”) to make the overall business case attractive. Profitability will then depend strongly on the capacity of the assets to respond to multiple scenarios. At the same time, utilities should not underplay the importance of first-mover advantage in forming world-class and exclusive partnerships or entering areas where scale and location may be important.

## **There are many strategic opportunities for energy utilities**

There is enormous potential and need for change in the energy sector as technology, new capital inflows and competition drive the evolution of new business models. Strategic opportunities for energy companies include, for example:

- **New finance capabilities, e.g.:**
  - Advanced hedging/trading capabilities and risk management tools to manage more complex “revenue stacked” portfolios
  - Financing structures such as weather-hedging tools and fixed production guarantees, asset de-risking, and third-party finance for Energy-as-a-Service (EaaS) business models (see also below)
  
- **New technologies and markets, e.g.:**
  - Technologies such as floating solar and floating wind, as well as hydrogen (see also Insights for the executive below)
  - Technology testing and trialling, even before the economic business case is proven, such as pilot storage, hybrid and hydrogen projects
  
- **New business models, e.g.:**
  - Offtake management and new demand models, such as corporate power purchase agreements (PPAs), especially green hydrogen
  - Acceleration of partnerships and M&A, such as between OEMs/developers/utilities and capital providers
  
- **Storage and network management, e.g.:**
  - Portfolio- and project-level hybridization (i.e., deploying multiple energy sources)
  - Storage deployment and better use of emerging storage fleets in the electric vehicle (EV) market
  - New approaches to manage the ever-widening gap between the demand for agile changes in the grid, and the inherent inertia in implementing network infrastructure modifications
  - Follow-on services such as power-system integration, stability and management

### **3: All corporates should reinforce sustainability, regardless of sector**

Never has the green agenda been more important to corporate strategies – not just for the regulated and unregulated energy sector, but also for automotive and other energy-intensive industries such as chemicals, construction materials, metals and food & beverage, as well as those impacted by the drive towards the “electrification of things” – heating, cooling, transportation, industrial processes and further beyond.

#### **This is driven by:**

- Increasingly strict sustainability-related legislation (for example, the global Sustainable Development Goals, climate change and the circular economy)
- The growth of sustainable financing (see also the accompanying article “The Green Gambit – Investing for corporate strategic advantage in the post-COVID-19 world”)
- Greater voluntary action by the private sector
- Increased technological innovations

All of these create new stakeholder expectations of a company’s sustainability performance; they present new business opportunities and require strategic moves in the wider corporate landscape, as well as for energy companies. Sustainability is no longer seen as solely a marketing or cost topic. Today, the sustainability agendas of many companies are central to their strategies, driving the entire organization to behave and operate in a more efficient way to avoid increasing carbon costs and benefit from cheaper renewable energy.

Over the last years, many large corporates have committed to carbon neutrality well ahead of EU regulations, leveraging offerings from energy companies such as energy retailers and energy service companies (ESCOs) to go green and reduce their energy consumption – for example, through corporate power purchase agreements and energy efficiency measures. (See Figure 5.)



**Figure 5: Examples of sustainability strategies followed by corporations**

Source: RE100, EV100, press releases, Arthur D. Little

In the automotive sector, OEMs and EV specialists are now expanding their business scope and exploring electric vehicle-related services, including energy supply, charging infrastructure, energy storage and smart grid solutions. For example, Volkswagen’s new Elli brand, launched in 2018, provides green energy and charging solutions for electric car drivers and fleet managers, directly competing with energy retailers.

## **New partnership models for green energy: Leveraging the ecosystem**

In the accompanying article, “The Green Gambit: Investing for corporate strategic advantage in the post-COVID-19 world”, we address the importance of companies adopting strategies to exploit the potential of new partner ecosystems for green growth. For companies looking specifically at energy opportunities, this is equally the case.

Energy incumbents have tended to acquire emerging players, for example, Shell buying Limejump (an aggregator), Sonnen (smart energy storage systems) and EOLFI (a renewable energy developer that specializes in floating wind). Additionally, companies will often need to create strong partnerships with key convergent industry players to establish shared technology hubs. Examples include NUVVE forming a joint venture with EDF to develop flexible solutions related to EV charging, as well as EDF working with Renault to develop shared offerings and experiment with electric mobility solutions in isolated regions and big cities.

For corporates looking to invest in energy efficiency as part of sustainability goals, new business models such as the EaaS model are increasingly attractive. Large energy efficiency investments may have payback periods in the four- to seven-year range, well outside the normal capital investment payback criterion of one to three years, depending on the industry. In the EaaS model, the burden of managing and operating such investments is transferred to specialized vendors such as ESCOs. The vendor takes ownership of risks related to the technology selection, financing, and implementation, allowing the corporate customer to lower or eliminate up-front investment and study costs. Many large corporations are exploring this path, which is enabling them to focus on their core businesses while ensuring sustainability targets can be met.

## Insights for the executive

Change has been imminent and incipient for some time, but 2020 marks the year of the green watershed. It now seems more likely that we will see an accelerating number of companies investing in innovative and green solutions, rather than maintaining investment in legacy businesses that appear to offer decreasing profitability.

In summary, we expect seven key focus areas for green energy investment in the next decade:

- Generation related: New development opportunities in new markets and technologies, especially offshore wind, floating wind and floating solar
- Storage related: Battery storage, (green) hydrogen and CCS investments. Although these are challenging from a purely economic point of view, public policies and funding are stimulating these investments
- Energy network related: Grid stabilization and balancing opportunities are very real in many sectors to supplement revenues, reduce costs and play a role in the energy transition, such as through demand-side response (retail) and aggregation of batteries and supply/demand (fleet/logistics). Green hydrogen could also play a role here
- Electric mobility related: Electric vehicle charging infrastructure and adjacent sources of revenues, e.g., vehicle-to-grid, injecting EV battery electricity into the grid, and the necessity to aggregate those sources of energy
- Other forms of clean mobility: Sources including hydrogen, CNG, LNG, electricity for shipping, trucks and buses

- The hydrogen economy: The production, transmission and storage of green hydrogen
- Clean energy procurement and energy efficiency-related activities: The corporate sourcing of clean energy (including in-front-of-the-meter/behind-the-meter sourcing strategies) through corporate PPA structuring – both direct and virtual, as well as analyzing new energy management models such as the EaaS model – which is enabling corporations to envisage investment in energy efficiency measures without on-balance capex

In the post-COVID-19 environment there is an even stronger rationale for companies to take action now on green energy to future-proof their business models and outsmart disruption, rather than simply waiting for costs to decline. With a favorable investment climate, supportive regulation, new partner ecosystems, better technologies and new business models, green energy investments are more capable of delivering robust returns now than ever before.

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