



A hitchhiker’s guide to the decarbonisation universe



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Global efforts to cut carbon emissions are driving vast flows of capital and creating a multi-year tailwind for select companies. A portfolio focused on ‘decarbonisation’ therefore offers investors the potential to:

- **Gain exposure** to an area of long-term structural growth
- **Offset carbon** risk in other investments
- **Make a positive** impact by financing businesses tackling one of the planet’s biggest challenges

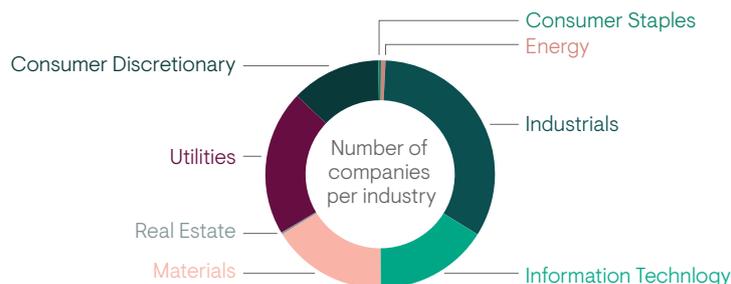
But how do you actually invest in ‘decarbonisation’? For most people, this is terra *incognita*. Fortunately, though the decarbonisation investment universe may be unfamiliar, it is no longer uncharted territory.

The diverse, undiscovered decarbonisation universe

Our Global Environment strategy has mapped a global universe of companies driving decarbonisation. Using proprietary energy models and detailed carbon analysis, the Strategy has identified businesses earning at least 50% of their revenues from areas impacted by decarbonisation, and that offer products and services that are quantifiably more carbon-efficient than the alternative.

- 1. Large:** Global Environment’s bespoke universe comprises ~700 companies, with a combined market capitalisation of US\$6.5 trillion.
- 2. Diverse:** Companies benefitting from decarbonisation tend to be in the industrials, utilities, energy, technology, materials, chemicals and automotive sectors (i.e., about 60% of GICS sectors). They also exist across the value chain, from makers of components, to service providers, to end-product distributors.
- 3. Undiscovered:** Decarbonisation companies account for only 10% of the MSCI All Country World Index by weight. Investors in broad benchmarks will have limited exposure to them.

Mapping the decarbonisation universe by industry



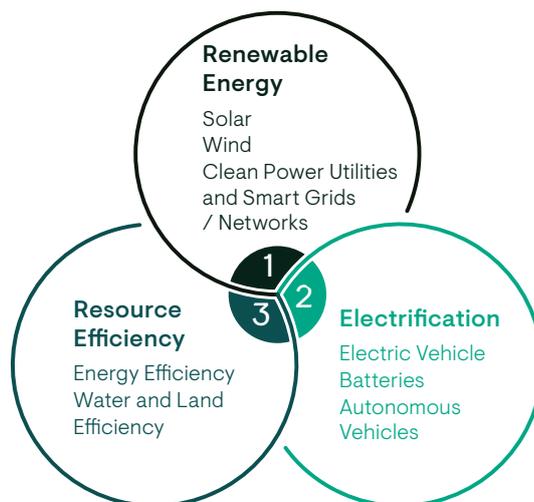
Source: Ninety One, February 2019. For further information on indices and investment processes, please see the important information section.

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The three paths to decarbonisation

Rather than dividing the decarbonisation universe into traditional industries, it can be more useful to view it in terms of the three pathways to a lower-carbon economy: renewable energy, electrification and resource efficiency.

Below we offer a guide to the pathways, with a small selection of the types of business within each.



1. Renewable energy

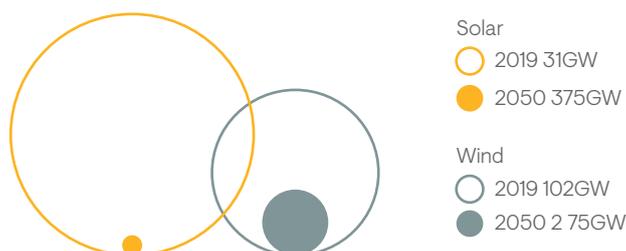
To limit global temperature rises to safe levels, a complete change in how we generate electricity is required.

Sample businesses Investment notes

Low-carbon regulated utilities The cost of wind and solar generation is falling in many parts of the world, not only versus new-build fossil-fuel plants but also relative to the marginal operating cost of existing generation capacity. This is creating a huge opportunity for regulated utilities to decarbonise their generation mix and rapidly grow their regulated asset base. We only invest in utilities whose generation mix is lower than the average of the grid, thereby avoiding carbon emissions. But sector dynamics vary by country, and investors must consider policy-related drivers and risks.

Wind and solar power producers Renewable power capacity is growing in all major economies. By 2050, the amount of solar and wind energy capacity in the US is forecast to be 1,100% and 150% higher, respectively, than it was at the start of 2019. Independent power producers will play a big role in the build out of renewable energy infrastructure, alongside regulated utilities. As with regulated utilities, sector dynamics vary by country and investors must consider policy-related drivers and risks.

Solar and wind energy capacity in the US



Source: BNEF

Renewable energy equipment From makers of wind-turbine blades and solar-panel components to whole-system manufacturers, a broad spread of companies supply the renewables sector. However, some of the technologies are easily replicable, meaning that not all of these companies possess defensible competitive positions.

Waste to energy providers With waste-per-capita increasing in many countries and limited landfill capacity, as well as mounting concern over landfill pollution, the need for waste-to-energy solutions is growing. Waste to energy can be a low-carbon solution, though that depends on the average footprint of the grid in which it is located.



2. Electrification

Electrification is key to controlling emissions and saving energy. It will entail an overhaul of ground transportation, with a move ultimately towards self-driving electric vehicles and mass electrification of heating and many industrial processes.

Sample businesses Investment notes

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| Semiconductor companies | Electrification is a significant driver of semiconductor demand. For instance, electric vehicles (EVs) require double the semiconductor content of internal combustion engine cars, and many multiples of the power semiconductor content. With cars becoming smarter and more connected, advances in semiconductor technologies are a key driver of e-vehicle development. Longer term, new materials (like silicon carbide) are on the horizon that will make power semiconductors more efficient. Monitoring technology change is key to picking winners in the sector. |
| Software providers | McKinsey estimates there will be 20.5 million self-driving vehicles by 2030, from almost nothing today. Alongside semiconductor makers, specialist mobility software providers will be needed to enable the shift towards smarter transport. |
| Transport sensors | The future of transport is electric and connected. This transition will require huge increases in sensor content per car, including radar, lidar, ultrasonic sensors and electric current sensors. |
| Battery technologies | Batteries hold the key to electrification. Companies active in this area include battery makers, battery-component suppliers and battery capital equipment manufacturers. In-depth analysis is vital to understand which pieces of the supply chain are likely to maintain margins and long-term sustainable returns. Given the use of precious metals in batteries, commodities expertise and ESG analysis is particularly key for investors. |



3. Resource efficiency

Less discussed than the other themes, resource efficiency is a crucial aspect of decarbonisation.

Sample businesses Investment notes

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| Electric efficiency | From the generating plant to the consumer, the electrical grid requires efficiency solutions at every stage. The broad range of products that apply here include meters and sensors. |
| Energy efficient heating, appliances and lighting | Heating needs not only to be electrified but made more efficient. Appliances and lighting also need to reduce their energy usage. 60W LED bulbs can save up to 75-80% of energy relative to traditional bulbs. |
| Building materials | Around 30% of greenhouse gas emissions come from buildings, making building efficiency a key area of decarbonisation. Higher building-efficiency standards in various countries are driving demand for insulation and a range of other products. |

A map – and a clear sense of direction

Of course, mapping the universe is just the first step. Decarbonisation is a nascent and disruptive area, consequently requiring careful navigation.

For this reason, the Global Environment strategy invests in a focused portfolio of leaders in their fields, targeting companies with three key attributes: growth potential, sustainable returns and competitive advantage. That's because when you're taking a road less travelled, you need more than a map. It's also crucial to have a clear sense of direction.

General risks: The value of investments, and any income generated from them, can fall as well as rise. Past performance is not a reliable indicator of future results. If any currency differs from the investor's home currency, returns may increase or decrease as a result of currency fluctuations. Commodity prices can be extremely volatile and significant losses may be made.

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