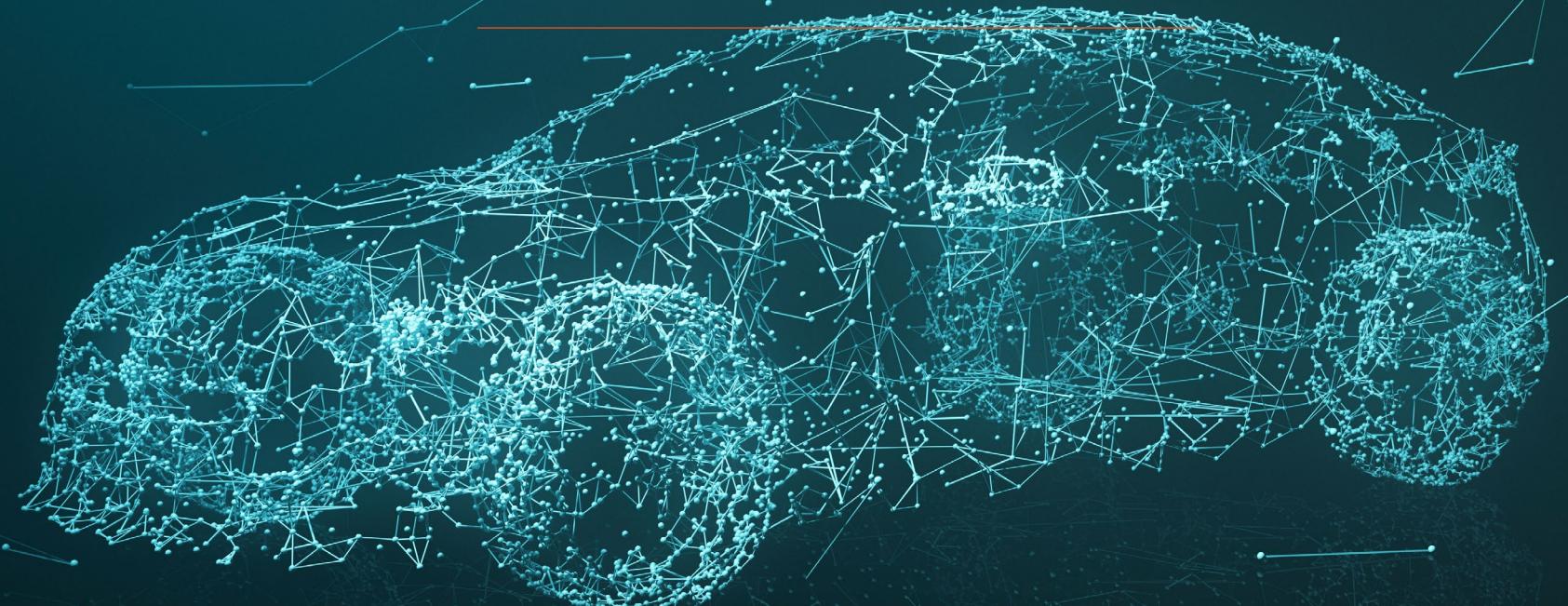




CHARGING AHEAD



OPPORTUNITIES IN ELECTRIFICATION

AT A GLANCE

- The transition to a low-carbon future requires further electrification of the economy, particularly if we are to meet the targets set out in the Paris Agreement.
- This will recast current markets and create new ones, while other segments face long-term decline.
- A carbon-neutral society will require most vehicles to be electrified (or hydrogen-powered), and a reshaping of our power infrastructure.
- This piece looks at the emerging value chain for delivering this supporting infrastructure and identifies the characteristics of potentially winning businesses in the electrified economy.
- There are significant opportunities for those investors with a clear view of the factors needed for success.



MOVING TO A LOW-CARBON FUTURE

As part of a transition to a low-carbon future, further electrification of the economy has become a necessity, bringing with it opportunities for investors.

As combatting the effects of climate change rises up the global agenda, there has been growing governmental commitment to cut carbon emissions. It is not yet clear, however, exactly how this goal will be achieved.

In broad terms, there are three interconnected factors that will determine whether we can reach net zero by this deadline:

1. Energy generation will have to migrate to **renewable sources**
2. Energy **distribution, storage and exploitation** will need to adapt
3. **Carbon capture and storage technology** will need to be developed

Over the past two decades there has been a surge in the use of renewable energy, with research showing it to provide 20% of the global power mix in 2020, up from 8.5% in 2010. Carbon capture and storage, on the other hand, is yet to prove its efficacy on a large scale.

The changes within distribution, storage and exploitation are most likely to yield opportunities for mid-market investors, as diesel, gas and petrol are replaced by electrified solutions and the wider energy system adapts to cope with renewable generation. New and growing markets will include electric vehicles (EVs) and the areas required to support their widespread adoption, including battery storage and distribution networks.

CIL believes that there are significant opportunities for investors as electrification increases across industries – but identifying the attractive opportunities may be difficult, requiring a clear view of factors needed for success in the space.

This paper looks at the fundamentals driving this ecosystem, the emerging infrastructure that will support an electrified economy and the factors investors should be looking for in potential targets.



REACHING NET ZERO

Becoming truly carbon neutral is an ambitious target and one which will require a fundamental shift in many industries. There are five key drivers that must force the changes required. Investors interested in the sector should watch these closely.



REGULATION

Governments must put policy and support mechanisms in place to drive low-carbon solutions. This will include tax and incentive regimes, development of market frameworks, mandated standards (e.g. efficiency of new-build housing) and subsidies to support investment in innovation and consumer adoption.



CONSUMER ENGAGEMENT

As the level of consumer interest in combatting climate change grows, the demand for – and the adoption of – low-carbon alternative products (such as EVs) will increase as consumers modify their behaviour. This will help to manage global energy consumption with greater efficacy.



TECHNOLOGY DEVELOPMENT

The pace of innovation must continue, both by improving the efficiency of existing appliances and developing the infrastructure to support changing consumer behaviour, such as a network of charging points for EVs. New technologies to support decarbonisation (such as carbon capture) must also be developed and implemented at scale.



ECONOMIC GROWTH

Strong economic performance improves the ability of industry, governments and consumers to invest in new technology and ensure innovation and efficiency-building.



ENERGY EFFICIENCY

The energy efficiency of appliances and the thermal efficiency of buildings must also increase through the use of thermal insulation and heat pumps. Gas boilers will need to be replaced by electric alternatives.

CHANGING GLOBAL POWER MIX

The continuing electrification of economies will recast current markets and create new ones, while other segments, such as combustion engines, face long-term decline.

As the use of coal and oil declines, and the proportion of solar and wind grows, the global power mix is changing. Behind this change are improvements in technology which have drastically reduced the cost of renewable energy. Since 2010, for instance, the cost of solar and battery storage has reduced by 85% each and the cost of wind power has reduced by 49%.

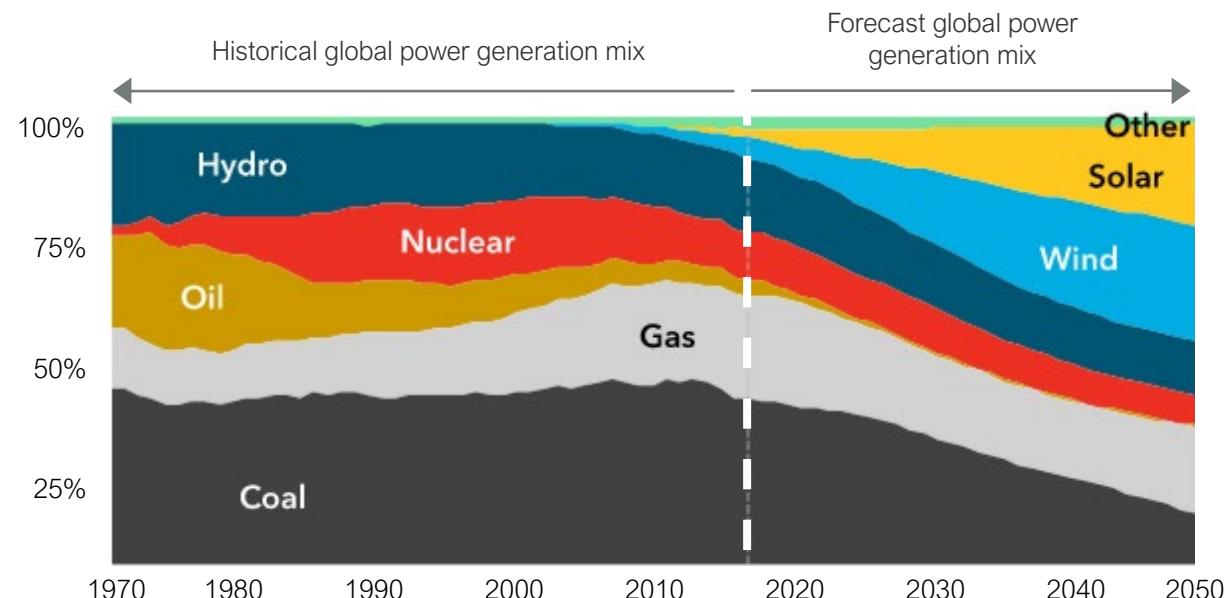
It is expected that the cost of renewable energy will continue to reduce as consumers and regulators become increasingly engaged in combatting climate change and industry investment follows.

This dynamic is mirrored in the forecast for EVs. Since 2010, the cost of lithium-ion batteries has been declining rapidly, which in turn brings down the prices for consumers and fuels the potential for further innovation and adoption.

Global electricity generation mix

Source: BloombergNEF 2020

Note: pace of change could be faster or slower based on regulation



THE IMPORTANCE OF REGULATION

The regulatory environment is key to shaping the development of electrification. However, it also creates some risks for investors as governments and their agencies try to balance competing objectives.

Governments are implementing commitments to change through regulation. For example, the UK Government has been implementing its commitment to the Electricity Market Reform (EMR), a policy that aims to incentivise investment in low-carbon electricity. Its aims are threefold:

Affordability

Operation of a competitive marketplace, such that costs to consumers, in terms of tax and energy bills, are minimised.

Maintain security of the supply chain

Build and maintain a diverse electricity supply, sufficient to cope with the increases/changes in demand.

Reduce carbon emissions

A pledge to reach net-zero by 2050.

To achieve all three aims simultaneously, regulators must intervene and regulate from time-to-time. EMR is an iterative process – when the market diverges too far from the stated aims, regulators seek to steer the market back towards the desired path. Therefore, the nature of the system leads to ‘lumpiness’ in the market. This can mean periods of high investment in certain projects followed by a cessation or changes in direction, which can sometimes lead to a technology or process developing, attracting investment, and then facing regulation that threatens its licence to operate.

With so many interconnecting factors at play, there remains significant uncertainty around how electrification markets will develop. This is evidenced by the National Grid's future energy scenarios – which outlines four credible outcomes:

1. Steady progression

The pace of transition continues at a similar rate to today

2. Consumer transformation

A shift towards local generation and increased consumer engagement

3. System transformation

Improving energy efficiency is a priority, local energy schemes flourish, and consumers are engaged

4. Leading the way

Large-scale solutions are delivered, and consumers are supported to choose alternative heat and transport options

Scenario two, three and four meet the 2050 net zero target. Yet, if the five drivers which we laid out in the previous section are not acted upon, it may well be more likely that countries follow the first scenario and do not reach their goals.

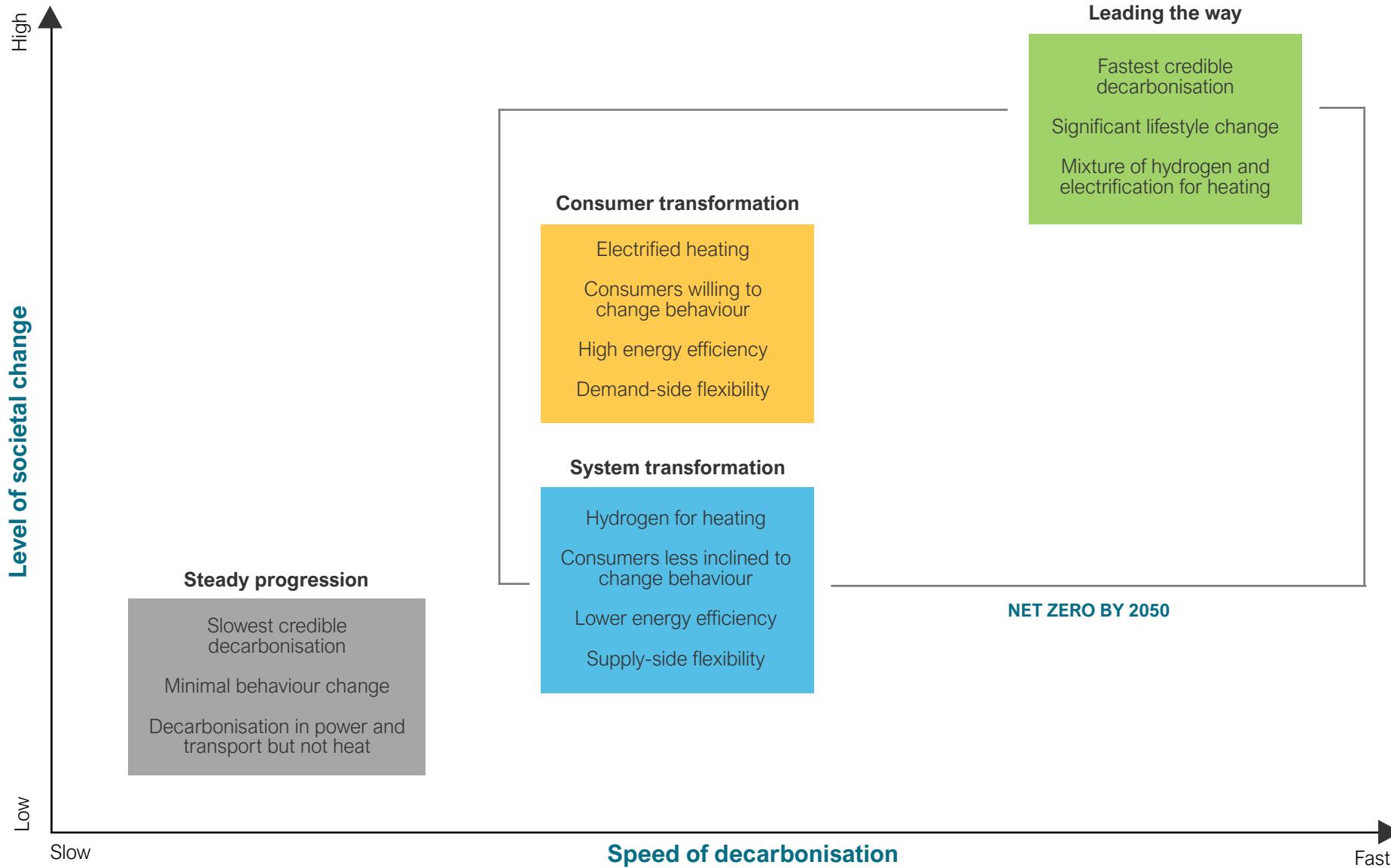
Case study:

Norway has been at the forefront of EV adoption for many years, with the world's highest proportion of EVs per capita. The country aims to have stopped the sale of fossil-fuelled cars by 2025, and the latest figures show that it is on track to meet this ambitious target – 89% of all cars sold in Norway during October 2020 were either EVs or hybrids. But how have they achieved this shift in consumer uptake in such a short space of time?

By introducing comprehensive subsidies and incentives targeted towards EV ownership, Norway has managed to move from 20% of all new cars in 2017 being EVs to 55% in just three years. These incentives include no annual road tax, access to bus lanes, no import taxes and a 25% VAT exemption on EV purchases, among many others. The Norwegian Government also heavily invested in the charging infrastructure to support this shift, a segment which, while kickstarted by government funding, is moving into the hands of private companies.

FUTURE ENERGY SCENARIOS

Source: Future energy scenarios 2020, National Grid



BEYOND ELECTRIC VEHICLES

The adoption of EVs is increasing, but they currently represent just a small proportion of all vehicles. A carbon-neutral society will require most vehicles to be electrified (or hydrogen-powered), and for these vehicles to be supported by investment in charging infrastructure.

EVs are a key focus for the electrification market, but adjacent verticals will also need to see similar levels of investment and policy support from governments if we are to reach net zero by 2050.

Energy storage

Renewable power generation is variable, intermittent and weather-dependent. As a result, energy storage will become significantly more important both at grid-scale and locally.

Industry output

Industry emissions are in slow decline, albeit partly driven by the offshoring of manufacturing. To reach a carbon-neutral society, this will need to continue, supported by increased energy efficiency, reduced carbon emissions and the introduction of hydrogen and electric-powered technologies.

Building design

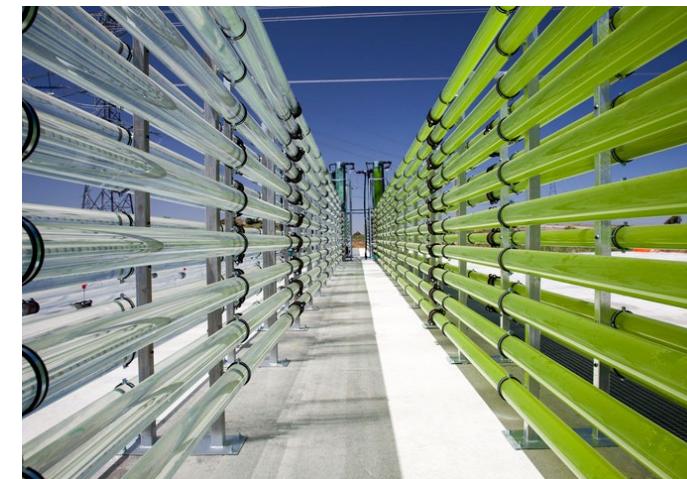
Building emissions have seen limited improvement in recent years, but improved energy efficiency standards will require new heating systems to be low-carbon from 2035. Additionally, CIL's research shows that 92% of facilities managers expect investment in smart controls to increase to meet the demand for stronger energy performance.

Power generation

Further investment in renewable generation and route-to-market infrastructure (particularly in the case of off-shore solar or wind generation) is needed. More decentralised power generation will increase the need for high-voltage equipment and services.

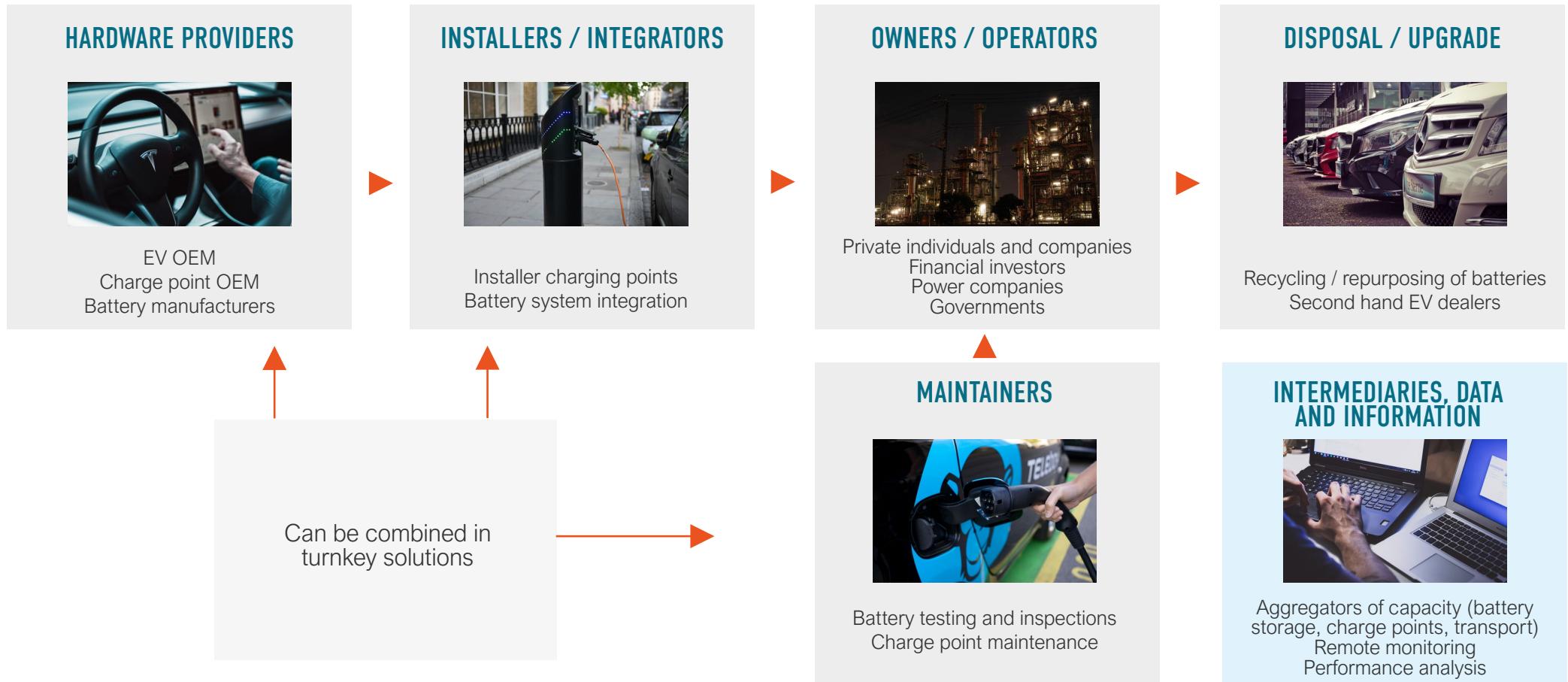
Carbon capture and storage (CCS)

It is currently not possible to capture and store carbon on a large scale. In order to meet net zero by 2050, CCS will need to be operational by the mid-2020s and operating at scale by the 2030s.



THE EV VALUE CHAIN

The portfolio of assets required to deliver a more electrified economy is diverse and multifaceted. Value chain roles to support the delivery of systems will emerge as the markets develop.



THE EV VALUE CHAIN

Each potential vertical brings with it challenges and opportunities for investors. Here we lay out the strengths and challenges for each.

Hardware providers, such as EV and battery manufacturers, will own and leverage technical IP, enabling them to capture a large share of market value.

However, they will face increasing technological risk and their products could become commoditised.

Installers and integrators can be OEM and technology agnostic, operating across the spectrum of the electrified economy. This skill is also not always an easy extension for OEMs.

However, companies that operate in this space are exposed to investment dynamics and require a local presence.

Owners and operators, such as power companies, have an embedded role in the electrified economy and as such can capture a large share of value. This value is often underpinned by regulation and market development.

Maintainers who offer services such as battery testing and inspection are affected by similar dynamics to installers, albeit with a more steady demand profile. While this is not always an easy extension for OEMs, they will require a local presence plus they may have to displace the OEM or installer to gain access to contracts.

Disposals and upgrades are a complex part of the value chain with an unclear natural owner. However, the right commercial model is key to success in this vertical.

Finally, **intermediaries, data and information services** can be asset-light, requiring less CapEx, and are easily scalable. However, they will face challenges in proving value to consumers and could face disintermediation by others in the value chain.



IDENTIFYING OPPORTUNITY

Many large incumbents and disruptors are already invested in electrification, making large bets to secure their place in the market.

Tesla is probably most well-known for its EVs, but it is also working to popularise household battery storage, releasing its Powerwall in 2015 – a wall-mounted solar battery which minimises reliance on the grid. Other large brands are working to get ahead in the electrified economy, with Tesco partnering with Volkswagen to install free-to-use charging points for EVs at larger stores.

Despite the involvement of big players, there will be attractive opportunities for mid-market PE investment, particularly in the wider value chain where there is currently no clear owner. We outline some of these verticals here.



Battery recycling and repurposing offers a complex value chain with a multitude of sources and end destinations. Uncertain values provide opportunity for arbitrage, for instance by using old EV batteries for static storage.

Battery testing and maintenance presents a recurring and critical need for suppliers and a fragmented and hard-to-reach customer base.

Battery management and optimisation services will create an IP-led and asset-light industry which has a low share of cost but a high impact on performance.

Grid transformation specialists will be needed to support network operators as they reorganise to support EVs, distributed generation, renewables and storage.

Charging points installers and maintainers will operate across a fragmented network, with a local route density which it will be hard for OEMs and asset owners to serve.

Specialist vehicles such as buses and off-highway vehicles have unsophisticated OEMs and converters, while volumes may not be attractive to scale players.

Domestic and commercial battery storage, again, serve a fragmented and hard-to-reach customer base where local adaption and integration is required.

Maintenance of distributed generation and storage is exposed to a complex and geographically distributed customer base.

A WINNING FORMULA

The electrification market will need to evolve significantly in a short time to meet net zero. As such, there are significant opportunities for those investors with a clear view of factors needed for success in the space and some appetite for risk.

CIL believes that there are four characteristics that investors should look for when identifying potential target acquisitions in the electrified economy.

1. A flexible business model

This is crucial to ensuring that businesses can grow, even as the technology and market environments develop around them. Targets must be open to new ways of working with customers and partners to ensure success. On the other hand, inflexible or rigid business models may suffer as markets develop.

2. OEM agnostic

Providers should remain OEM agnostic. Being tied to a limited range of OEMs creates risk if the OEM product is not competitive or well-aligned with market needs.

3. Access to several roles

Attractive businesses will operate across the value chain, as the profitability and popularity of different value-chain segments may vary over the coming years.

For instance, there will likely be a shift from the installation of equipment to the maintenance of equipment. In the medium term, there will be a focus on growing charging infrastructure, but eventually this will plateau, maintenance and replacement market becoming more important.

4. Technical capability

Services that provide relatively low technical input could become commoditised and increasingly competitive as the market grows and others look to enter or gain share.

GET IN TOUCH

CIL provides growth strategy and due diligence support to management teams and investors. We are rigorous in our approach, confident in our conclusions and expert at what we do.

To discuss any of the points raised in this piece, please get in touch.



Jon Whiteman
Partner
jwhiteman@cil.com



Axel Leichum
Partner
aleichum@cil.com



Tim Perera
Associate director
tperera@cil.com



Laurence Ludgate
Associate director
lludgate@cil.com



30 King Street, London, EC2V 8EH
131 South Dearborn Street, 14th Floor, Ste. 1415, Chicago, IL 60603

cil.com