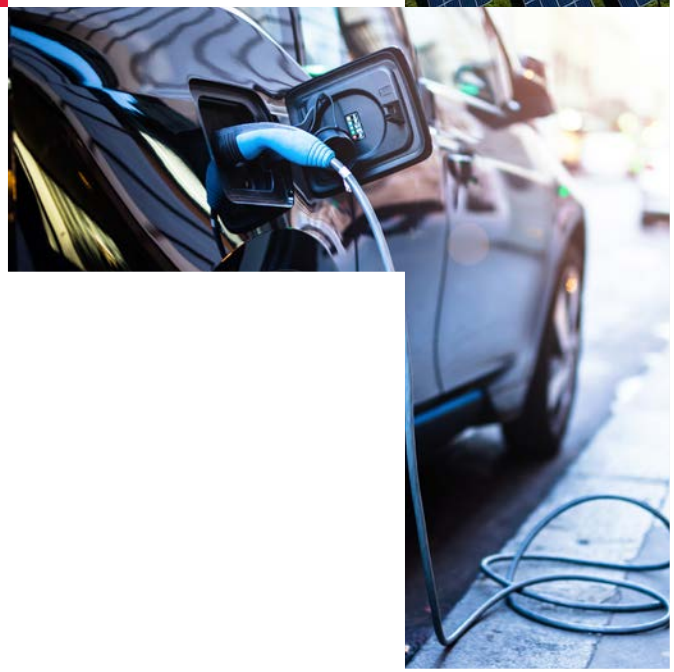


Solving the energy puzzle

Moving to a decarbonised future

CGI

Moving to a decarbonised future

With the world population increasing and living standards rising, we see a greater demand for energy globally than ever before. Climate change is accelerating and intensifying, as illustrated by the publication of the World Meterological Organisation (WMO) and the Intergovernmental Panel on Climate Change (IPCC) reports. Regarding net zero targets and reducing the impact of climate change, the largest polluters have recently announced targets to reduce emissions by 2050-2060 and are now looking to accelerate to achieve these.

At the end of 2015, all global leaders agreed a collective response to climate change, by pursuing efforts to hold the increase in global temperature below 2 degrees Celsius as part of the Paris Agreement.

This means the carbon emission rate has to peak around 2020 and emissions reduce by over 80% by 2050 to achieve net zero by the end of this century.

This drives the **decarbonised energy future**, moving away from the hydrocarbon's molecule basis to the electron, or cleaner alternative energy-based value chains.

The key drivers of decarbonisation include:

- Citizen, customer (B2C and B2B), employee and community demand
- Global and local government policy and targets
- Operational cost reduction
- Investor pressure
- Environmental concerns

As these drivers intensify and converge, all energy, oil and gas and utilities organisations are publicly announcing goals related to reducing emissions, utilising renewable energy and addressing climate-related risks.

At CGI we meet with business and IT executives annually to gather their perspectives on the trends affecting their enterprises, including business and IT priorities, spending, and investment plans.

Within the energy and oil and gas industries, senior executives from many of these organisations reported that they all either already had a plan in place or were developing a strategy to reduce reliance on fossil fuels and transition to a cleaner energy value chain.

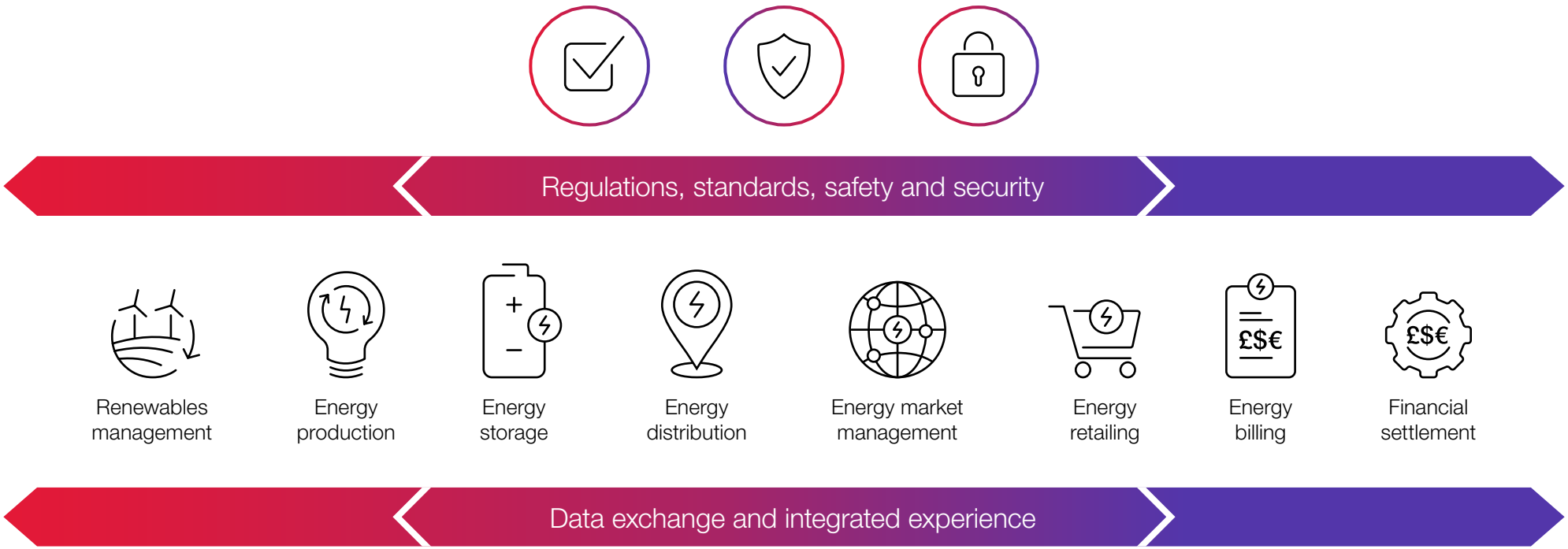
Others saw the energy transition as an opportunity to transform themselves via long-term scenario planning over the next 10 to 30 years.

At CGI we have been working with some of these industry leaders and technology partners to understand this better. For us to achieve decarbonised energy transition we need to look at the whole energy value chain closely.

The future value chain model may look similar to today's in theory. However the strain on each part of the future energy value chain comes from less maturity at each stage when we consider all low carbon and cleaner energy products and services.

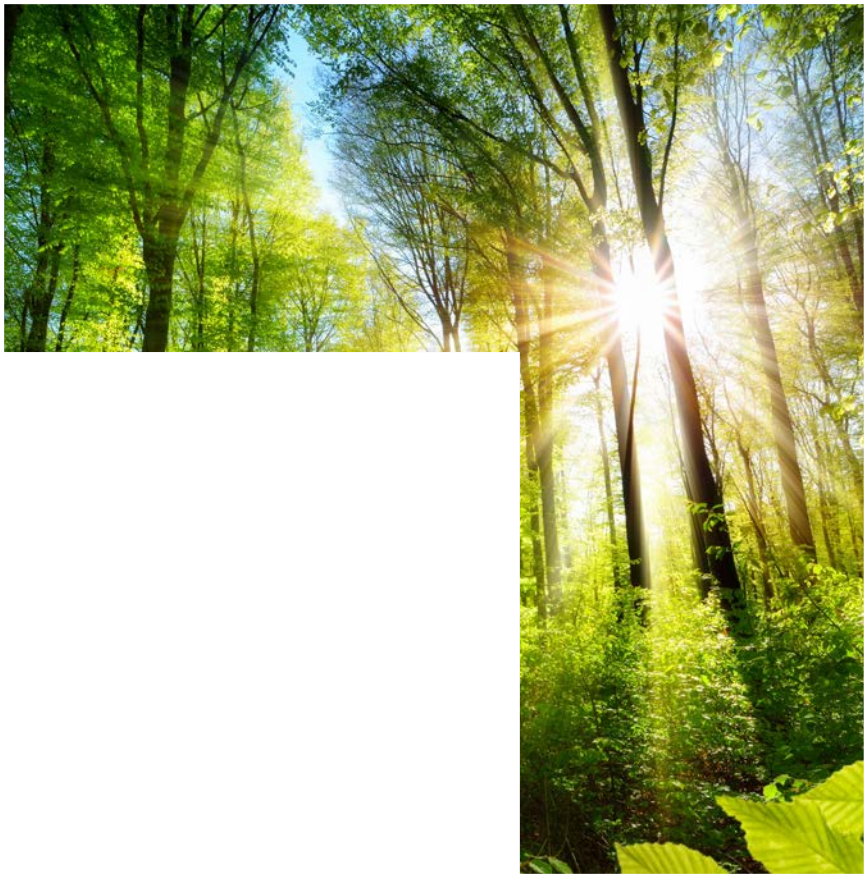
Future of energy

Example of transformation value chain



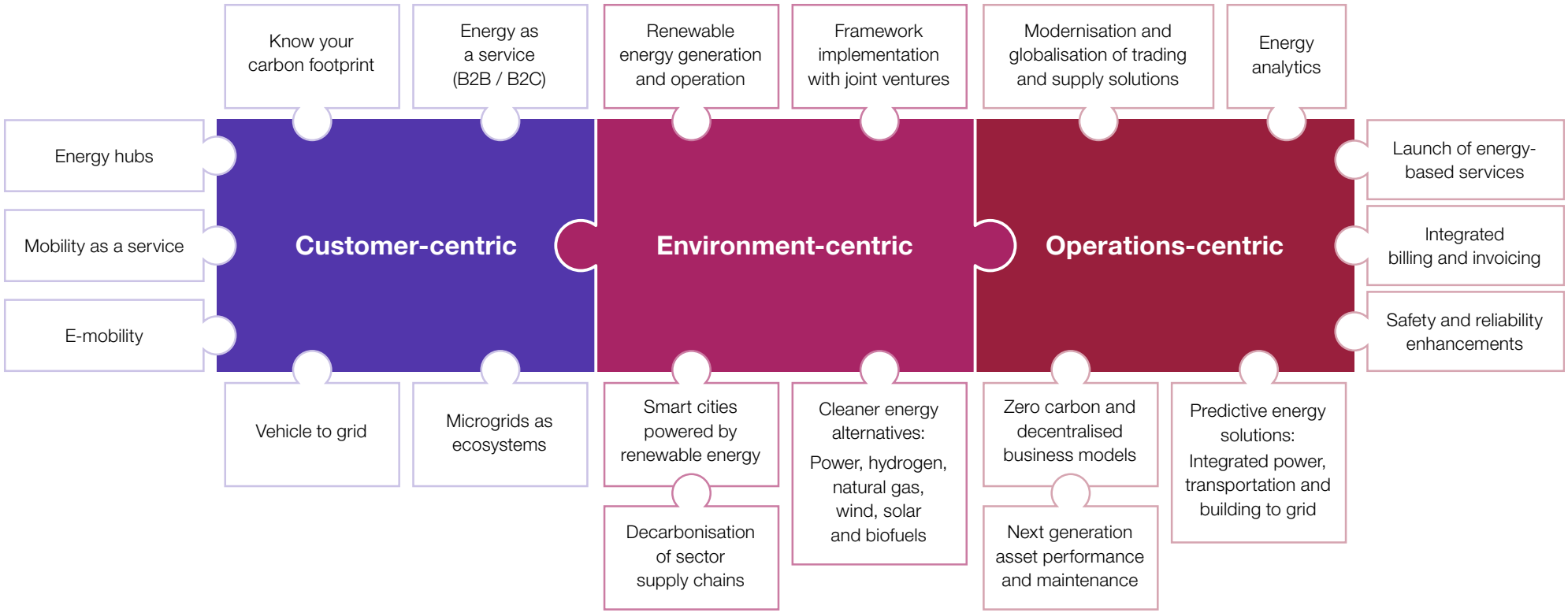
Each component of the value chain applies to many alternative energy sub sectors (including solar, wind, biofuels and hydrogen) and needs to be closely reviewed. Existing processes must be recalibrated to achieve key milestones in this journey.

Previously the main discussion point was power-related; how one moves from selling hydrocarbons to selling electrons. Far greater recognition is now emerging that it is not just individual puzzle pieces that need to be solved, but the entire energy puzzle itself; how do you integrate all the different elements across the entire value chain? Our view of the decarbonised energy transition shows how various initiatives can bring together an integrated experience.



Decarbonised energy transition

Navigating transformation - strategic versus tactical



In order to make tangible progress, there are a number of elements in parallel which need to be addressed from the change in customer demand. These elements cover the increasing focus on alternative cleaner energy for automotive from both a business and consumer perspective, the sustainability and net zero ambitions both for the organisations and for their customers, and then how to manage operations and optimise costs at the same time in a challenging market.

We believe to succeed in the energy transition journey an organisation will need to drive transformation from three perspectives:

- **customer-centric**
- **environment-centric**
- **operations-centric**

Customer-centric

Challenges

Customer demands are changing, whether it is the move away from traditional fuels to cleaner energy alternatives, or customers looking for an aggregating agent or service consolidator to act as a single source for all their energy-related needs.

This is a fundamental change in the role of energy organisations, to become service providers that meet customer demand for quick, easy and personalised experiences that satisfy their evolving needs. Understanding the customer is the first element but then organisations can use that insight to improve the customer experience and provide them with new services and products that will drive revenue growth.

Considerations and solutions

Customers want to opt for the most suitable and sustainable energy provider based on their evolving needs. If a provider can create a single packaged offering with various energy-related elements that are usually sold separately to satisfy all the emerging needs of the customer – then it will be known as Energy as a Service (EaaS).

Some attributes could be:

- B2C customers pay a periodic subscription fee and not per unit consumed with flexibility to sell back to the grid.
- B2B customers benefit from predictable subscription payments rather than capex asset purchases or incurring capital expenditure.

The concept of prosumers will be key in the future meaning everyone can generate and consume energy.

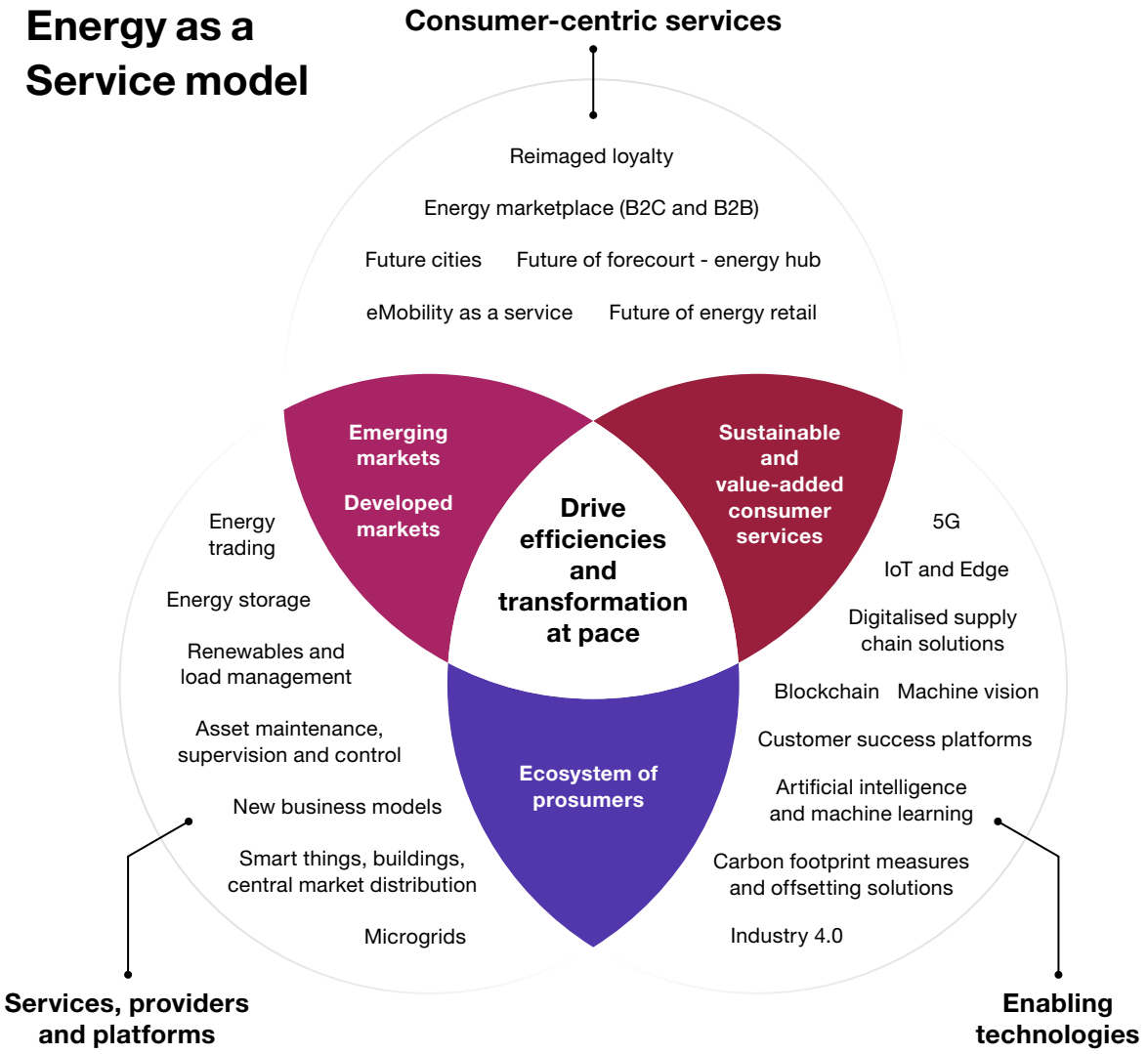
Energy as a Service (EaaS) would be a synchronised and sustainable platform, where millions of smart physical assets interconnect.

There would be a coordination and distribution of both energy and information in real time, enabling a myriad of interactive products and services to be traded in both a B2C as well as B2B capacity.

There are several transition steps before such an end state can be achieved, but multiple entities from local corporations to cities are gearing up for such a future. Regulation-driven decarbonisation will drive some of these transition steps.

At CGI, we are developing the future energy platform that has the digital building blocks deployed to help our clients transition into a EaaS model.

Energy as a Service model



Mobility

Mobility is another related aspect of this energy transition puzzle. It has been long predicted that car and fleet owners would soon abandon traditional vehicles powered by fossil fuels and go electric. But after years of hype, promotion and government incentives, electric vehicles (EVs) still represent a very small percentage of the market globally.

However, car buyers and fleet owners across the globe are starting to give electric vehicles a second look. Why? Because new showroom arrivals have altered the initial perception of battery-powered cars as short-range, low-speed capsules to futuristic, high-tech EVs that are fun to drive. Countries are also stopping new sales of cars powered by fossil fuels, an example of this is in the UK where new sales of diesel and petrol cars will be banned after 2030.

Consumer perceptions are changing, with many now seeing them as desirable cars of the future. As well as this, plummeting battery prices have enabled car manufacturers to introduce new, more wallet friendly models with longer ranges. On the horizon, the mobility ecosystem in particular will comprise of car sharing, ride-sharing and autonomous vehicles all strongly complementing EVs, further increasing their adoption.

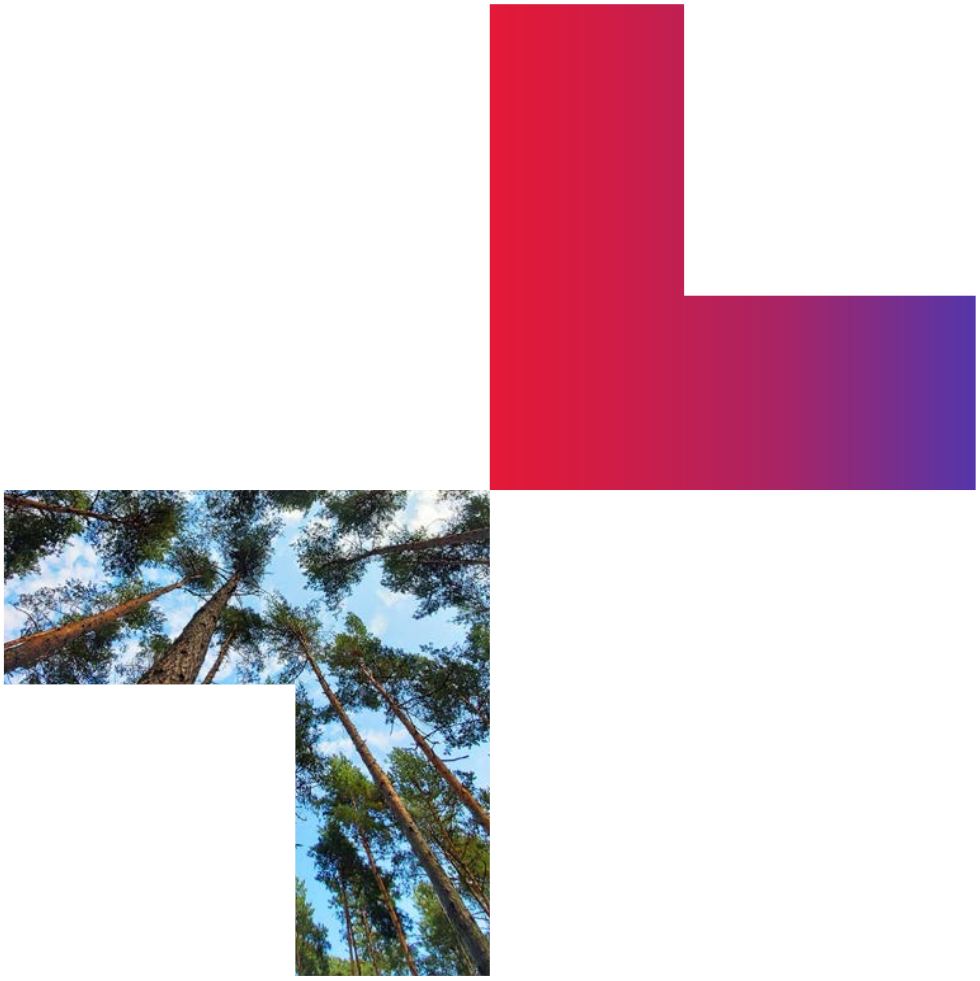
At CGI, we recognise that new mobility management or mobility-as-a-service companies may own fleets of vehicles that circulate almost continuously, with or without drivers, picking up passengers who have hailed them, typically through smartphone apps. Autonomous ride-hailing vehicles may be used about 40 percent of the day, compared with less than 5 percent for privately owned vehicles. Keeping this in mind we have developed our Mobility as a Service (MaaS) offerings to assist MaaS operators in focusing on what's essential for their customers.

Environment-centric

Challenges

Where the public leads, policymakers eventually follow. Environment-related strikes, protests and marches around the globe have illustrated that both employees and customers mean business when it comes to emission reductions and the impact on our environment. With large swathes of the public demanding action on climate change, many governments now have a mandate to set carbon-reduction targets and enact green legislation. Many of the organisations have taken these changes in policy on board and have now started to refine their outlook and strategy to create a roadmap to sustainability - however this is still in early stages of development.

Apart from the policy, carbon pricing schemes are being introduced to accelerate progress toward their goals. More than 40 governments worldwide have now adopted a price on carbon, either through direct taxes on fossil fuels or through cap-and-trade programmes. These programmes have so far produced mixed results. Some are perceived to be wildly successful while others are viewed as ineffective and expensive at a time when energy customers cannot bear the added costs.



Through an investor lens, cash business with decent profitability is still crucial. However investor pressure has been particularly intense and direct as activists and policy regulators want the oil and gas majors to move towards a sustainable future achieving their net zero targets earlier than projected. In 2020, UBS announced that it would no longer fund offshore drilling in the Arctic. Multiple banks in the USA, including Wells Fargo & Company and Goldman Sachs, had previously announced similar policy shifts. Investors want to understand the long-term investment strategies of oil and gas companies in a world seeking to limit the increase in global temperatures to well below 2°C.

Moving forward, sectors will have to come up with accelerated plans regarding sustainability and start achieving the declared milestones using cleaner energy alternatives and optimised processes. These include:

- Aviation
- Marine and shipping
- Commercial road transport
- Mobility
- Lubricants
- Chemicals
- Other sectors like
  - Agriculture
  - Forestry
  - Construction

Earlier this year, a national court ruled that a major European oil and gas company must cut its CO2 emissions by 45% compared to 2019 levels. Across the Atlantic, home to traditionally more conservative oil and gas companies, a green activist group placed three administrators on the board of a major North American oil and gas company.

Events like these could well be a turning point in the energy sector's history for driving more environment-centric solutions.

Considerations and solutions

The energy majors have already started expanding their renewables portfolio, which is driving power generation away from coal-fired thermal generators. Investments range from onshore wind, offshore wind, floating offshore wind, solar, hydrogen and natural-based solutions including biogas and algae.

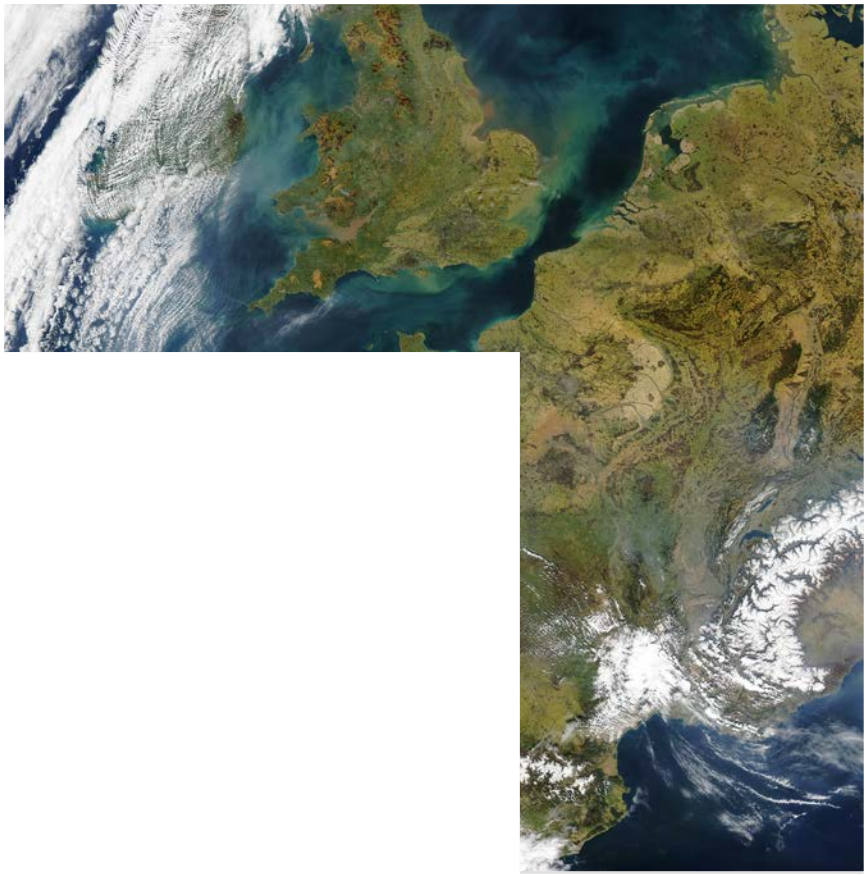
However, there are also the energy needs of developing economies where cheap oil will be difficult to replace. Hydrogen, in particular, green and blue hydrogen seems to be the silver bullet that may accelerate decarbonisation efforts and also revitalise energy companies' strong connection to consumers. By leveraging years of experience and know-how in logistics, distribution and B2C interactions, energy companies can support a hydrogen future.

At CGI we are proud of being a responsible company, committed to achieving a more inclusive and sustainable world. We work with our clients, partners and supply chain to reduce the environmental and social impacts of the products and services we build and support, and those we use. When it comes to rising to these challenges, we see these as opportunities that will require major transformations across the business and technology value chains.

A lot is already happening and technology is at its core and we are helping clients leverage new technologies and incorporate them into their business operations at pace and scale.

This ranges from using space technology and earth observation to track methane emission and recommend measures to control and reduce it. Modular carbon capture and offset solutions to help organisations to measure progress against these set targets, and building future energy open data-driven platforms will help unlock the value of data.

As part of our commitment, we are involved in the COP26 Business Leaders Group, helping explore UK business leadership on net zero and how business can contribute to the success of the 26th UN Climate Change Conference of the Parties (COP26). COP26 takes place during a critical time with the planet in the throes of climate change. It is more crucial than ever to bring together governments, businesses and community leaders to increase action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change.



Operations-centric

Challenges

In the parts of the puzzle outlined, the challenges are driven by the evolving customer needs, policy changes, activists, investor interests and government directives.

The energy sector will increasingly consider oil and gas, power generation and utilities to drive synergies and efficiencies. Oil and gas lends itself to being a global commodity because it can be easily stored and transported without degrading. The electricity sector regulation is much more localised and this is where the challenge lies.

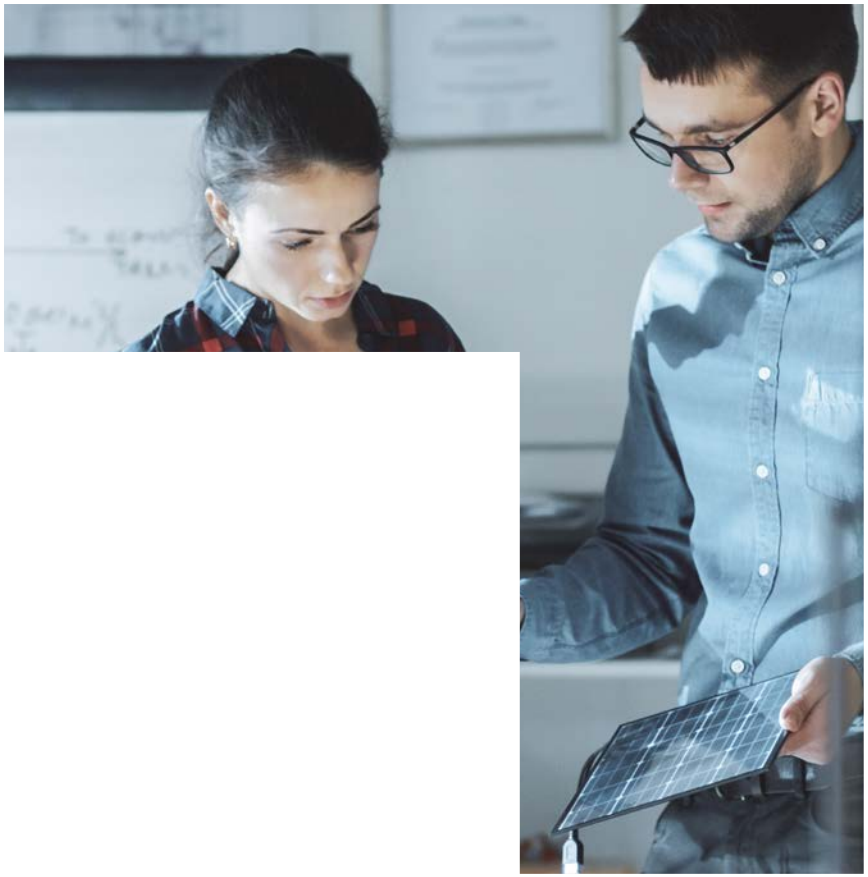
Electricity sector regulation is only becoming more localised or federated than before as supply shifts from central generating plants to decentralised energy resources.

Here lies the next challenge of integrating into new low carbon business models that have end-to-end visibility and traceability from consumption to distribution to trading and finally to generation. This would be a sizable and complex operational landscape to manage.

Achieving efficiences within the value chain will start to bind energy organisations of all kinds closer together.

Considerations and solutions

Energy operational excellence is composed of several critical factors that must be managed in an integrated way to sustain a high level of operating performance. Many energy organisations are beginning or on the journey of energy transition and they will have to finalise the key measures of improvement and move through the different levels of operational maturity.



Each of the four levels is underpinned by data and technologies that drive efficiency, insights and increasing capabilities. To progress through the levels, an energy organisation will need a lot of innovative solutions to be integrated to achieve efficient and connected operational excellence.

Other than B2C and B2B factors, which influence the end-to-end operational visibility and efficiency requirements, the speed of uptake in EVs will be equally important both by customers and by fleet operators. The question around vehicle charging, how, where and when it takes place, could have the greatest impact. Given that most cars are parked 90-95 per cent of the time, they do not need to charge every day or whenever the car is not being used.

Most vehicles can also programme charging times to make use of off-peak electricity pricing. Households with off-street parking, and those using slow lamppost or residential on-street chargers, can do it overnight to avoid peak periods. This could be part of a ecosystem of connected storage solutions that charge when demand is low and discharge during times of higher demand. Bi-directional vehicle-to-grid (V2G) charging is a relatively new concept being pushed as a method to manage these peak demands. The idea is that a charged car battery can send its power back to the grid during peak periods. Aggregated over tens of thousands of cars, this can provide a meaningful amount of power.

Smart mobility and how to integrate transformational changes like V2G into mainstream operations brings many complexities and operational challenges, and here flexibility and interoperability is key.

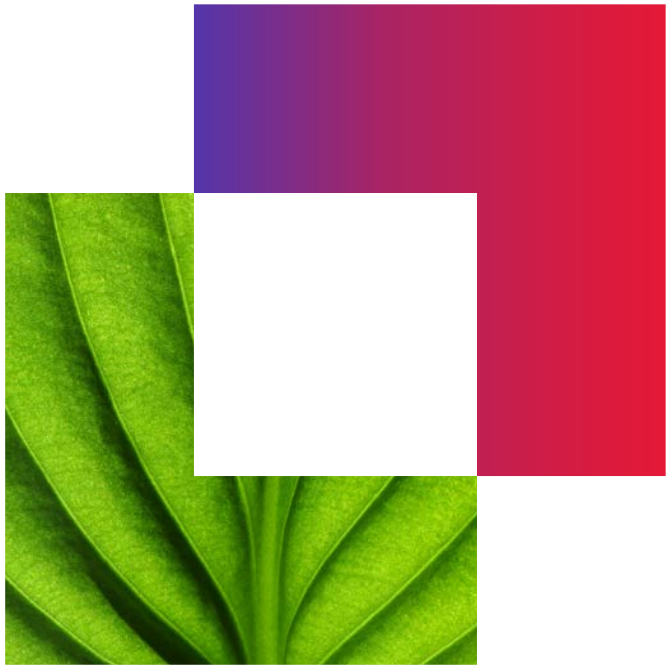
Improved collaboration, communication and data sharing among all market players is also becoming even more critical and we work with organisations across industries to embrace these new business models. At a day-to-day operational level, this could be using video-assisted collaboration to resolve issues and incidents across several organisations in different industries or benefiting from real-time supervision and control of assets that significantly reduces downtime support. More broadly across a market, this could be data platforms which exchange all types of data and help market players meet the needs of the rapidly evolving market.

Some of these could be the operational building blocks that provide a revised foundation for accelerating operational maturity as the industry evolves.

Conclusion

As the energy industry is on the cusp of a paradigm shift transforming their business models, many companies are simultaneously considering decarbonisation pathways for their existing businesses, often proactively working with ecosystem partners to accelerate that process.

The puzzle hasn't been solved yet but we at CGI can help accelerate these initiatives as they evolve, and together with our clients across different industries reach the next layer of maturity in this long journey ahead.



About CGI

Founded in 1976, CGI is among the largest IT and business consulting services firms in the world.

We are insights-driven and outcomes-based to help accelerate returns on your investments. Across 21 industries in 400 locations worldwide, our 78,000 professionals provide comprehensive, scalable and sustainable IT and business consulting services that are informed globally and delivered locally.

Our commitment: Insights you can act on.

For more information, visit **cgi.com/uk**
or email us at **Enquiry.UK@cgi.com**

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