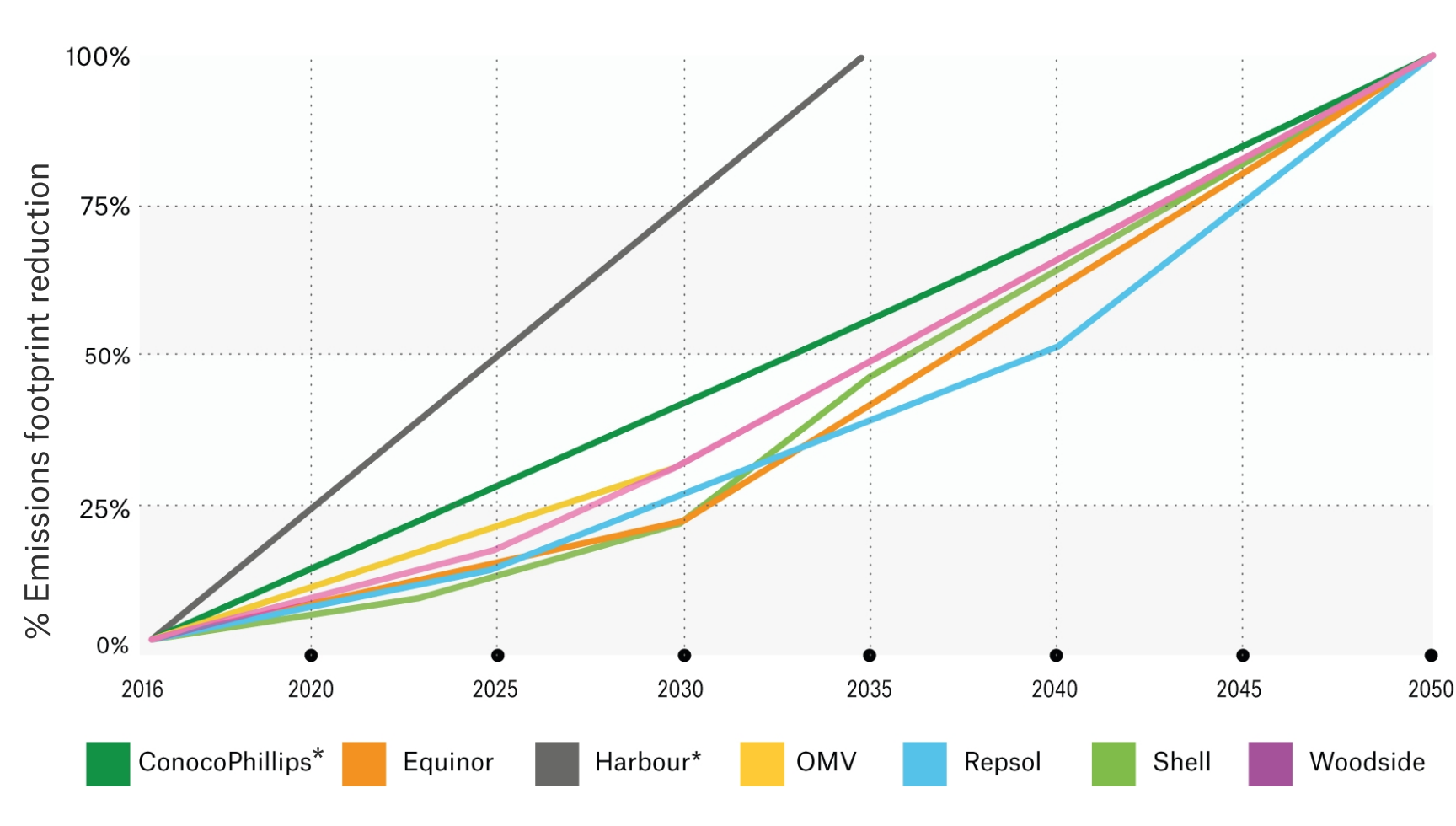


The problem - emissions overheating the world

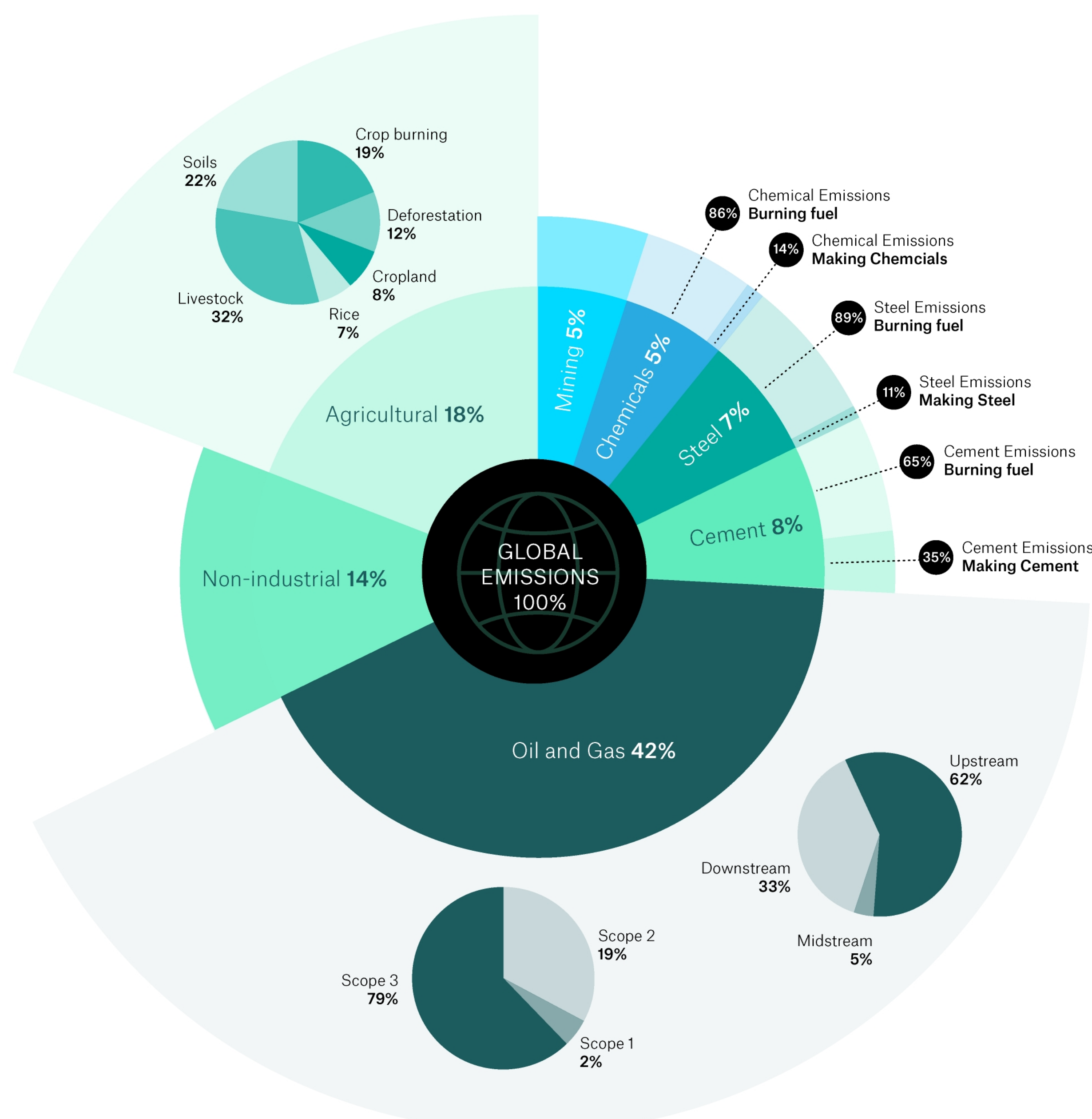
Over ¾ of anthropogenic emissions are a result of industrial activities, with the lion's share due to the oil, gas and coal industry. The majority of these emissions lie in scope 3 – the more difficult bit! These issues are being dealt with by industry to varying degrees – some with structured science-based targets and others hoping something will turn up. However, a light has been focused on emissions and industry is responding by pulling on one of the key levers they control – technology!

The path to net zero.

Most oil and gas companies have a target – some focused on scope 1 & 2* and others prepared to take on the challenge of tackling scope 3 as well.



Scope 1: Direct emissions from your operations
 Scope 2: Emissions related to bought in energy
 Scope 3: Indirect emissions associated with your value chain

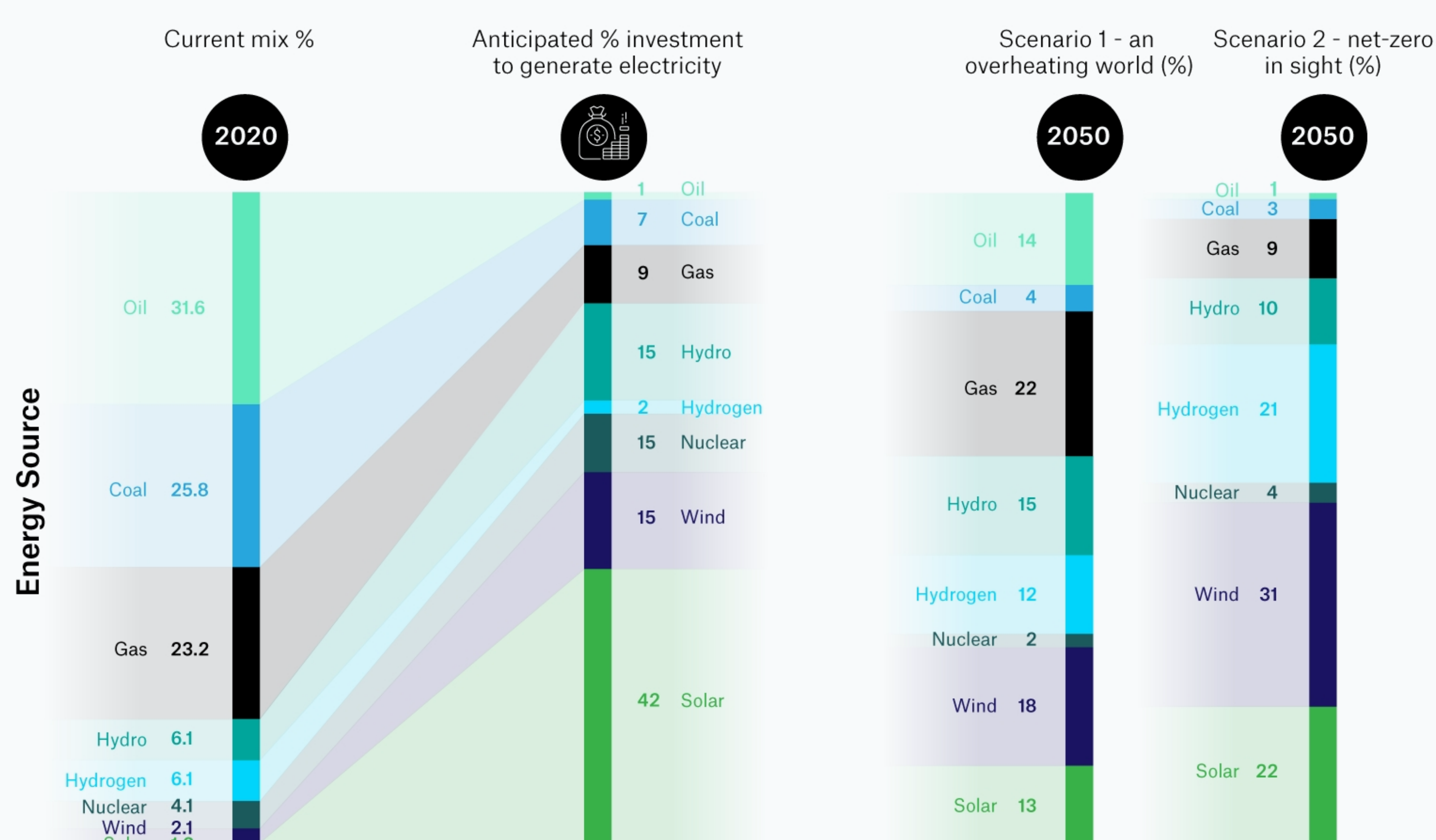


Getting to net-zero

Don't emit, or capture what you emit

Industry has been busy looking for solutions to GHG emissions for many years and the mix of technologies to produce sustainable, renewable fuel exist. As renewable technologies get deployed and innovation takes hold, the cost of energy sources has consistently decreased. For example, the cost of a MWh from solar power has decreased by 90% between 2009 and 2020.

Further investment will be required to fund change between now and 2050 (trillions of dollars) – but the vision statement to get to net zero exists and work is ongoing regarding how to get there.

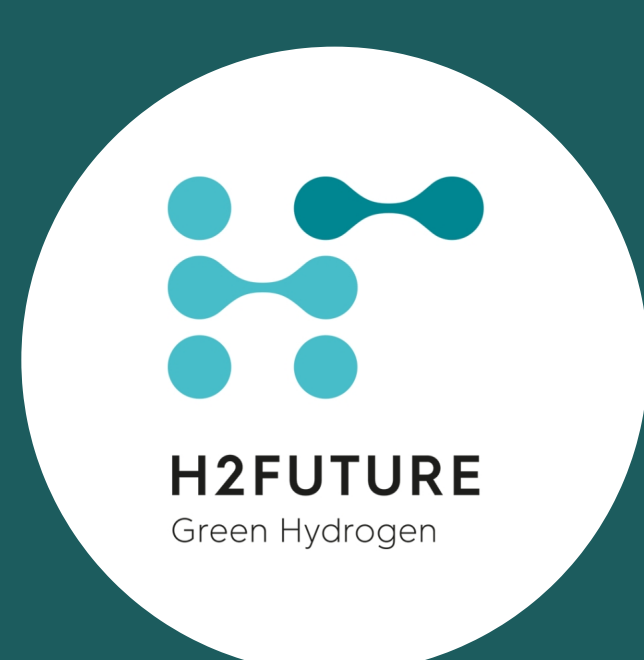


Integration of technologies to decarbonise - the change is underway



PosHYdon pilot, Dutch North Sea

- The pilot is a joint project between Nextstep, TNO and Neptune Energy
- Neptune Energy began a pilot in 2019 to develop the world's first offshore green hydrogen production plant
- The pilot integrates three different energy resources: offshore wind, offshore gas and offshore hydrogen (produced from seawater)



EU-funded H2FUTURE project

- Developing one of Europe's largest green hydrogen plants in Austria
- The pilot plant has commenced operation producing green hydrogen with the aim to replace fossil fuels in steel production over the long term
- The pilot plant has a capacity > 6 megawatts and is based on Proton Exchange Electrolysers (PEM) technology



CO₂ mineralisation using alternative cement

- Solidia Technologies has developed a process incorporating the use of an alternative cement that is high in calcium silicate minerals and a curing chamber with an increased CO₂ atmosphere
- The cement cures by reacting with CO₂ rather than water which is then permanently stored as a mineral carbonate within the binder
- The technology has been tested by several pre-cast customers in North America and Europe



Hybrid Power Plant

- ENI's hybrid plant will integrate solar, energy storage and a form of conventional power generation
- The plan is to upgrade a current oil and gas plant, which at present is fed only by conventional power generation
- The upgrade will enable a reduction in CO₂ emissions as well as savings on fuel

Technology is one of many challenges being addressed

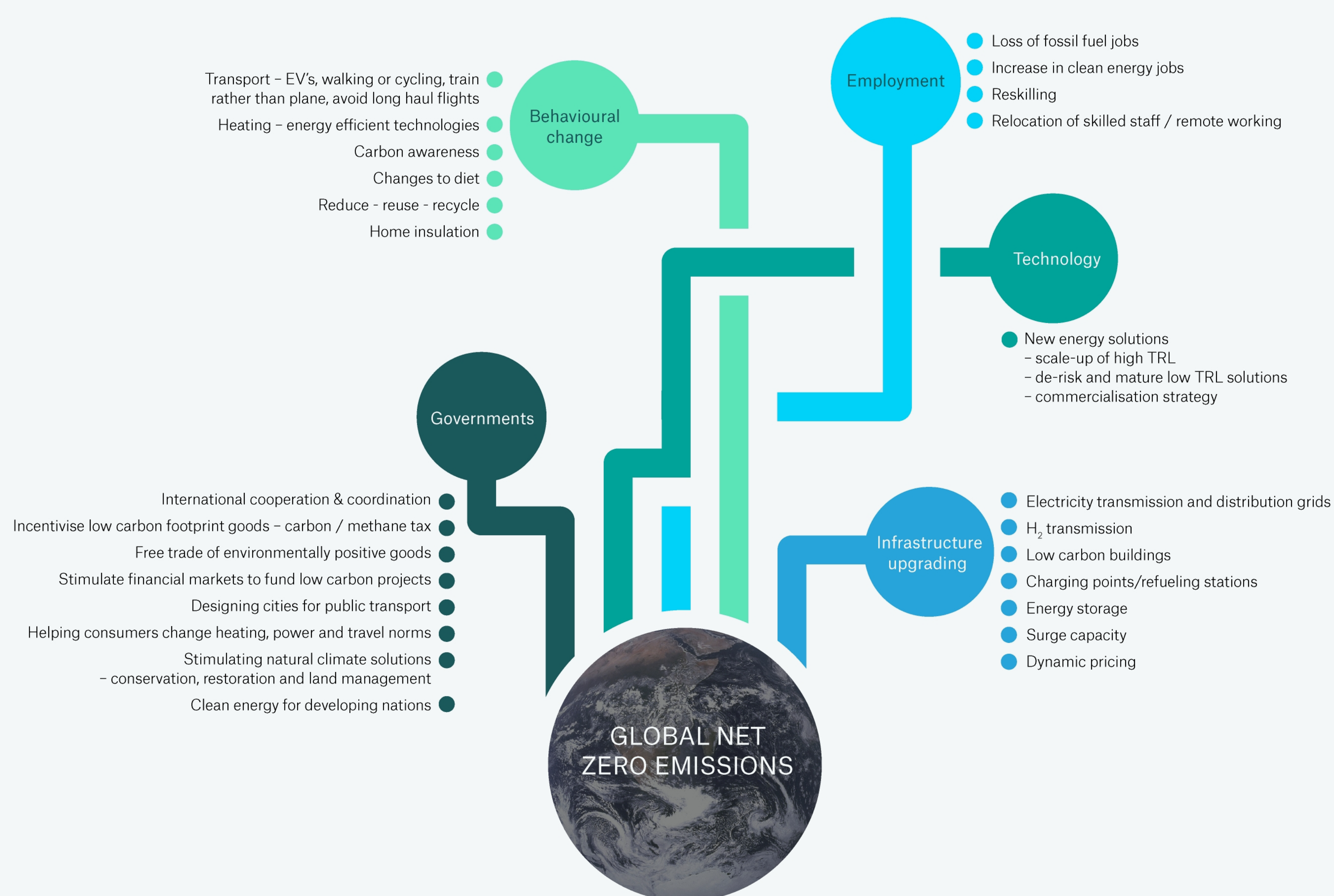
There are many elements to global decarbonisation – technology is not the biggest challenge.

Infrastructure needs to be upgraded to allow for bidirectional transmission of more electricity and new energy.

Employment and reskilling to service new energy jobs will need to take place on a huge scale.

A fundamental change in consumer attitudes will be needed to address lower energy consumption behaviours.

Lastly, governments will need to drive and stimulate change on a local, regional and global level, providing incentives for countries to adopt low carbon solutions.



sagentia innovation

Sagentia Innovation works across the industrial, chemicals and energy sector and in particular with traditional Oil & Gas national and international organisations and service providers as they now address issues of sustainability and emissions reduction and seek to make their business ever more efficient through automation. Most E&P companies are looking to identify opportunities outside the core E&P market as they look for longer term energy transition. We are also active with the new energy companies that are emerging driving low carbon energy creation. We also organise and manage a number of industry networks and JIPs, under the OTM brand.

For more information about how we can support, advise and deliver your business objectives and science and technology focused projects, get in touch:

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