MISSION POSSIBLE PARTNERSHIP

Innovation Zero x MPP

The Mission Possible Partnership is a movement of climate leaders and companies driving industrial decarbonisation across the entire value chain of the world's most carbon-intensive heavy industry and transport sectors: aluminium, cement, chemicals, steel; and aviation, shipping, trucking.

These 'hard-to-abate' industries account for a combined 30 percent share of all global carbon dioxide emissions. MPP and partners have developed sector-specific roadmaps to decarbonise these sectors, with quantitative 2030 targets, endorsed by more than 200 companies.

How fast those sectors reach net zero emissions will make or break the world's chances to stay well below a 2°C rise in global temperatures by mid-century.

MPP is delighted to support Innovation Zero as an official Strategic Partner. Our work to date has demonstrated that there is a technical and economic path to net zero in each of those sectors, and that rapid progress is possible before 2030 by deploying technologies which are available or near market-readiness.

Breaking down barriers to First Projects requires radical collaboration across sectors and vectors – spanning energy suppliers, industry off-takers, demand and investment among other stakeholders. By supporting the Innovation Zero conference series, MPP is keen to learn directly from industry, and to enable cross-sector coordination in the development of commercial-scale First Projects.

The Challenge

MPP has mapped announced decarbonisation projects in these seven sectors globally to identify a pipeline of First Projects, spanning industrialised and developing economies. Thanks to groundbreaking support from the Bezos Earth Fund, we are working collaboratively in two US green industrial hubs to tackle critical barriers to investment. We aim to replicate this type of support at scale across multiple geographies.

Given the urgency of securing a first wave of projects before 2025, the focus of MPP's activities is to catalyse and support as many zero carbon, commercial-scale First Projects to reach final investment decision (FID) in this decade. For breakthrough projects to reach FID, industry leaders need greater confidence that zero carbon industry and mobility can be profitable – or at least will not incur significant financial losses.

A growing number of companies in hard-to-abate sectors have announced first zero carbon, commercial-scale projects. But the project pipeline still falls short of where we need to be to reach global climate targets. Most announced projects have not reached final investment decision (FID).

Too many elements of the business case for green industrial plant remain uncertain. Zero carbon technologies are still relatively expensive compared to existing, high-carbon options. Most are yet to benefit from the learning curve effects and cost economies of deployment at scale – as we have seen for solar, wind, and battery technologies over the past 10 years.

Costs of zero or low-carbon production can be brought down where projects can secure cheap clean energy supply, government subsidies, or lowers cost of capital unlocked by innovative financing mechanisms. At the same time, revenues can increase when markets adopt carbon prices or increased taxes on high-carbon products – and if buyers are ready to pay an additional premium for a greener product.

In summary, industry can't do it alone.

MPP is uniquely positioned in these hard-to-abate sectors as an interface between industry and other critical stakeholders in the ecosystem – energy suppliers, buyers, governments, financial institutions – to collaboratively transform a doubtful business case into a compelling and successful investment story.

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2030 Milestones

MPP is working across value chains to mobilise multiple stakeholders to improve the business case for investment. Our 2030 Milestones represent bold but achievable ambitions for installed low and zero emissions industrial infrastructure within 1.5 degrees-aligned sectoral carbon budgets, for example: the tally of green ammonia plants, zero emissions trucks, or low carbon aluminium smelters required in this decade, to make net zero viable by 2050.

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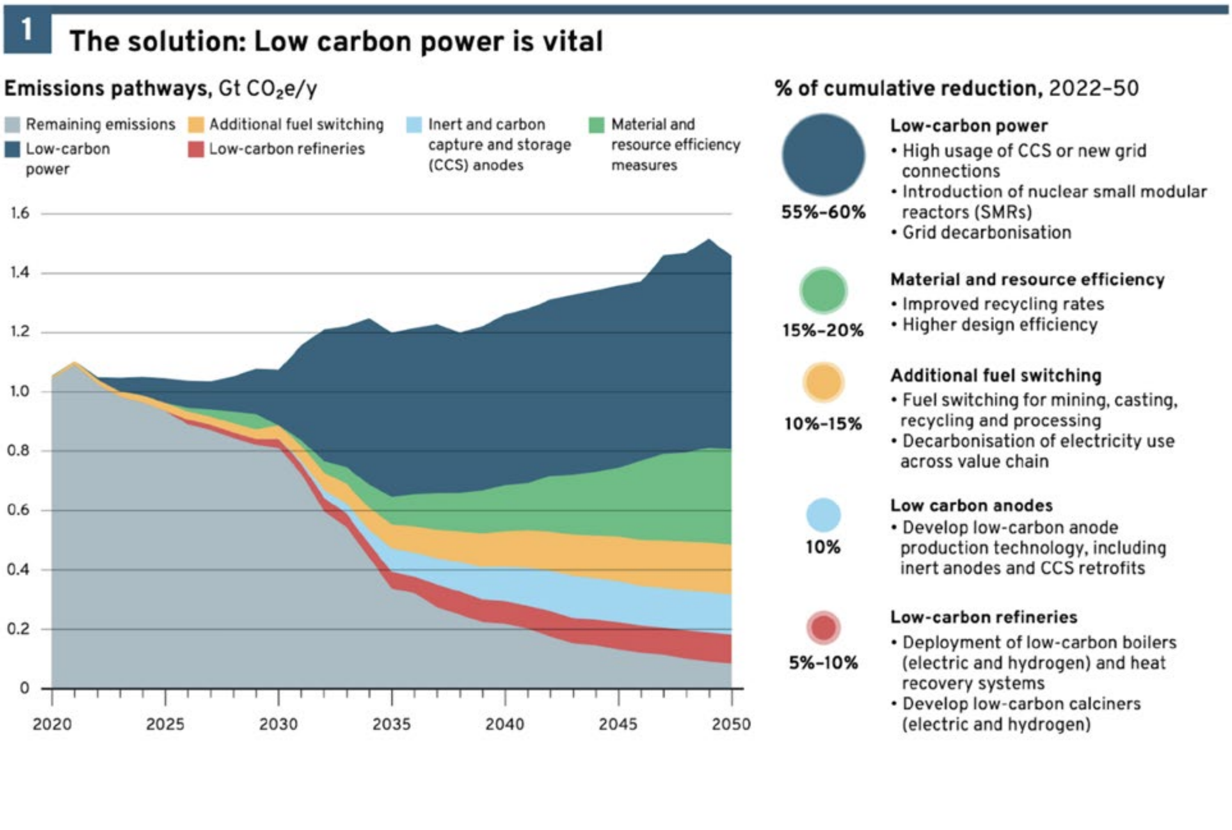
Sector Transition Strategies

MPP's Sector Transition Strategies (STS) have been endorsed by market leaders and more than 200 industrial companies, with further endorsements in progress prior to publication of a cement and concrete transition strategy in Q2 2023.

Click to play

ALUMINIUM

Accounts for 2% of global emissions. Demand growth of 80% forecast by 2050.



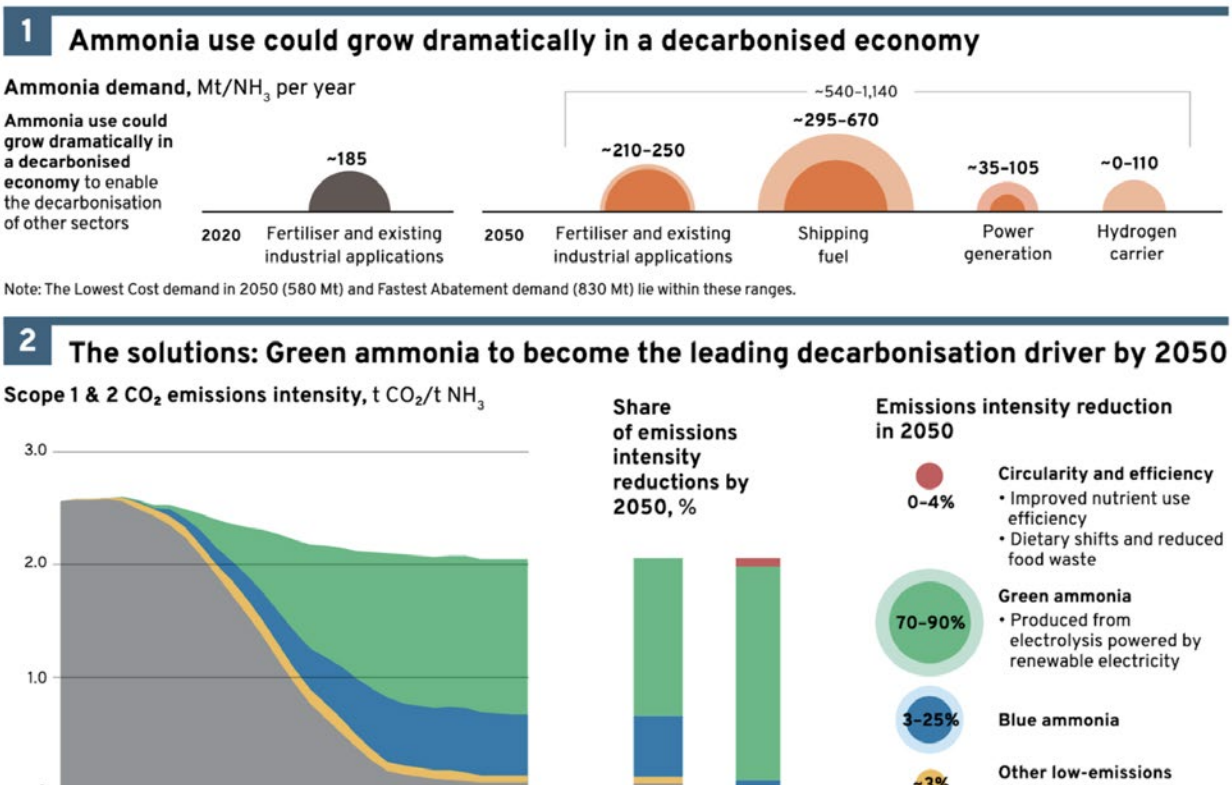
Insights

- A path to net zero by 2050 is technically and economically possible, requiring a mix of levers within the primary sector and the wider aluminium value chain.
- Rapid action is required for the sector to adhere to a 1.5°C pathway. Power decarbonisation by 2035 is necessary but not sufficient, with almost half of cumulative emissions savings requiring additional levers.
- Clean power is the biggest decarbonisation lever: 1,000 TWh of low-carbon electricity is required by 2035, up from 250–300 TWh today.
- Location matters for how smelters and refineries decarbonise. There is significant variation in availability of local low-carbon power and in how quickly the local grids can decarbonise.
- Secondary aluminium plays a critical role in the expanding aluminium market, increasing from 33% of total demand (33 Mt/y) in 2020 to 54% (81 Mt/y) in 2050.
- Material efficiency can play a critical role in ensuring that aluminium is used effectively, potentially reducing demand by 29 Mt and limiting growth to 50%.
- Cumulative investment of approximately US$1 trillion across the primary production value chain will be needed to deliver a 1.5°C pathway, of which the larger part is in clean power supply.
- Low-carbon aluminium will cost up to $400/t more to produce by 2035 than conventional aluminium. However, cost increases vary significantly from producer to producer.
- The sector can reduce emissions by 2050 by up to 95%. Further breakthrough technologies or a limited number of offsets will be needed to deliver a net zero sector, and require a variety of coordination across the value chain, policymakers and regulators.

The full Aluminium Transition Strategy is available here.

CHEMICALS/AMMONIA

Ammonia production accounts for 8% of global emissions. The shipping sector alone can make or break demand for near-zero emissions ammonia. Forecast growth could rise 400% by 2030.



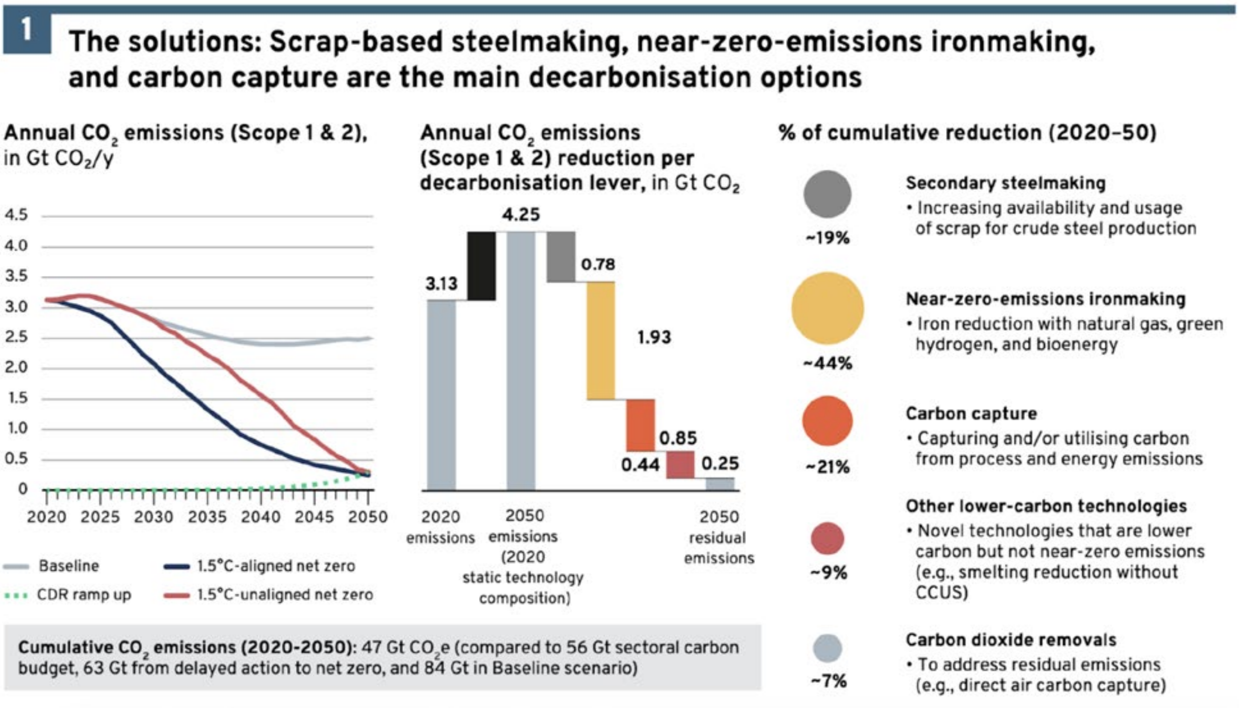
Insights

- Ammonia production currently accounts for ~1% of global emissions and ~33% of global chemical Scope 1 emissions.
- The key to net-zero ammonia production is to eliminate emissions of the hydrogen input.
- Both green and blue ammonia have a role to play, but green is likely to dominate over time.
- In addition, it is crucial to reduce Scope 3 emissions, which lie mostly in the fertiliser sector
- Delivering 580–830 Mt of ammonia by 2050 would entail dramatic change to the energy system, with annual renewable energy requirements of 3,700–7,100 terawatt-hours (TWh) by 2050.
- Decarbonising the hydrogen input for ammonia production will require direct investment of $59 billion–$105 billion annually.
- Supply-side efforts to scale up near-zero-emissions ammonia production should start now, to enable our 2030 threshold of 40–140 green ammonia plants and 15–25 blue ammonia plants in operation.
- Scaling supply of near-zero-emissions ammonia by 2030 requires an unprecedented converging of efforts from policymakers, industry players, and financial institutions.
- Demand-side policy mechanisms for new ammonia use cases can improve cost-competitiveness in relevant markets, and phase out highly emitting alternatives. Targeted demand-side policy support is required to certify, adopt, and expand ammonia's new application as a marine fuel.

The full Chemicals/Ammonia Transition Strategy is available here.

STEEL

Accounts for 7% of energy sector emissions. Estimated 30% demand growth by 2030.



Insights

- Bringing the iron and steel sector on a path to net-zero emissions by 2050 is technically and economically possible. Achieving it will require deployment of multiple available and emerging technologies.
- Although the pathways of both scenarios reach net zero by 2050, early progress in the 2020s is essential if the steel sector is to stay within its sectoral carbon budget.
- Progress in the 2020s has implications for the mix of steelmaking technology in 2050.
- There is no silver bullet for decarbonising steelmaking, but a greater role for scrap and material efficiency, disruption of the blast furnace, and significant build-out of direct reduced iron–based steelmaking are likely.
- Decarbonisation trajectories for critical steel-producing regions will be shaped by existing assets, energy resource availability, policies, and regional demand for steel. Peak steel demand and increasing scrap availability in China combined with rising demand and increasingly affordable green hydrogen in India will do the most to shape steel sector emissions on a path to 1.5oC.
- Almost all technologies will have residual emissions, which will need to be addressed to achieve net zero by 2050.
- Commercialisation and deployment of technologies to achieve net zero will require major investment, both in and outside the steel industry, in the range of $170–$200 billion annually.
- Lower- and near-zero-emissions primary steel will cost more. Public policies and value-chain coordination will be needed to address this premium, especially in the 2020s.
- The transition to net zero will have significant resource implications, with large increases in required hydrogen, electricity, and natural gas inputs, but a stark decline in coal.
- The key action this decade is to expand the pipeline of near-zero-emissions primary steelmaking. To accomplish this, policymakers need to create a level playing field and support a first wave of projects, industry needs to ramp up supply of and demand for near-zero primary steel, and finance must direct capital towards near-zero-emissions projects.

The full Steel Transition Strategy is available here.

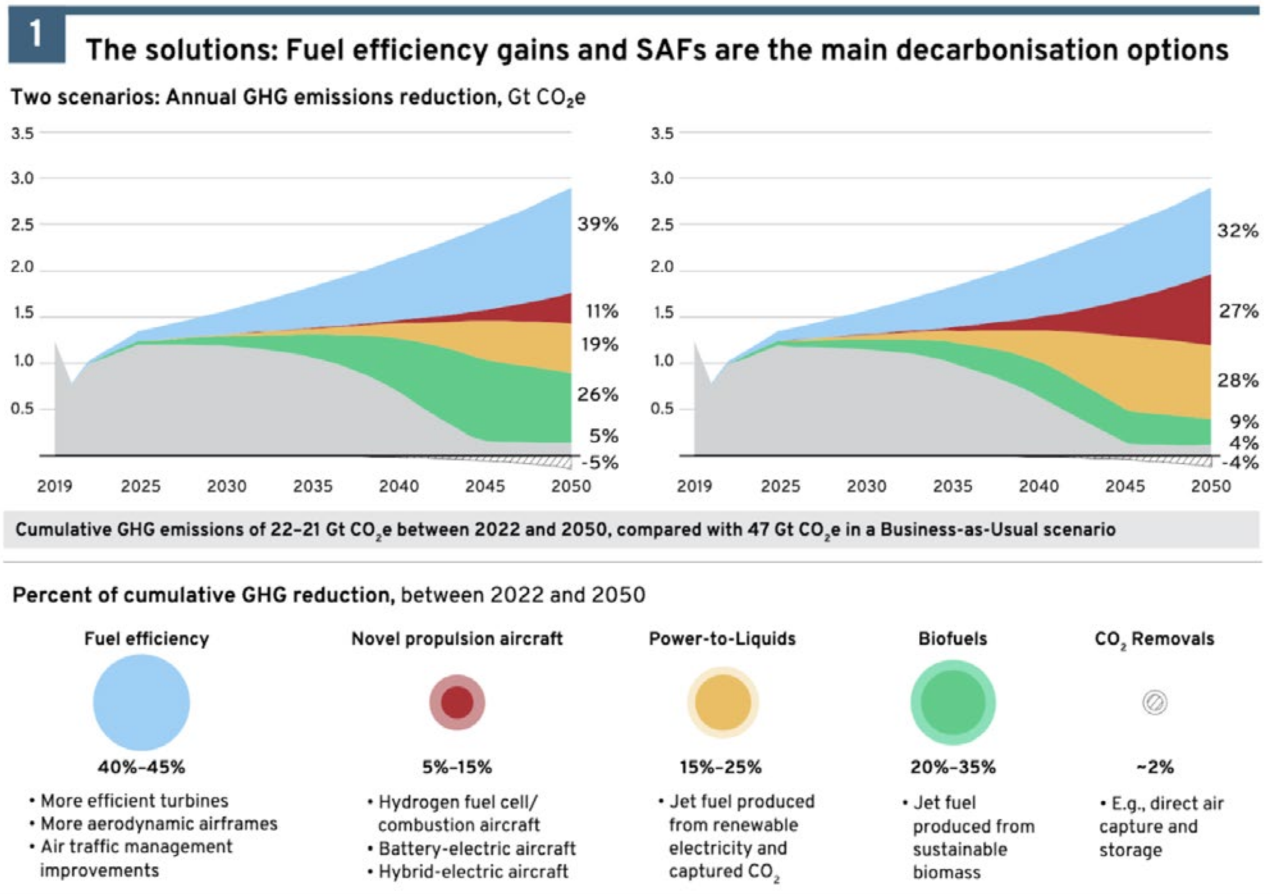
CONCRETE AND CEMENT*

Accounts for 7% of global emissions.

*Under review pending sector transition strategy for release June 2023

AVIATION

Energy usage equivalent to one million homes. Airline traffic forecast to increase 100% by 2035.



Insights

- Bringing aviation on a path to net-zero emissions by 2050 requires a doubling of historical fuel efficiency gains of aircraft, a rapid roll-out of Sustainable Aviation Fuels (SAFs), and the market entry of novel propulsion aircraft in the mid-2030s.
- Aviation can comply with a sectoral 1.5°C carbon budget if all levers are pulled. Achieving net zero by mid-century avoids cumulative GHG emissions of 25–26 Gt CO2e.
- Average annual investment from 2022-2050 to reach net zero is estimated at about US$175 billion, about 95% of which would be required for fuel production and upstream assets.
- Current project pipelines for SAF production need to be scaled up by a factor of 5-6 by 2030.
- The faster the cost decline in renewable electricity generation, the higher the expected market share of PtL. If electricity costs do not drop rapidly, biofuels are likely to dominate the market.
- Hydrogen and battery-electric aircraft can make global aviation more efficient starting in the late 2030s and supply up to a third of the final energy demand in 2050.
- Net zero aviation by 2050 could require an additional 5,850 terawatt-hours (TWh) of renewable electricity (5% of the expected global demand), 95 million tonnes of hydrogen (10%–20% of the expected global demand), and 12 exajoules (EJ) of sustainable biomass (up to 25% of expected global sustainable biomass availability) per year in the PRU scenario — this is about double the electricity and hydrogen, but only one-third of the biomass, in the ORE scenario.
- Aircraft fuel efficiency gains and operational improvements could avert more than 15 Gt CO2e of cumulative GHG emissions at zero or even negative abatement costs.
- Although average fuel costs are increasing in the net-zero scenarios, the cost of flying could remain stable, being counterbalanced by efficiency gains.
- Carbon dioxide removal (CDR) solutions are needed to remove residual emissions from renewable fuels but are not a replacement for deep and rapid in-sector decarbonisation.

- Policymakers must create a level playing field for fossil jet fuel and SAFs. Industry collaboration across the value chain can ramp up SAF demand and supply.

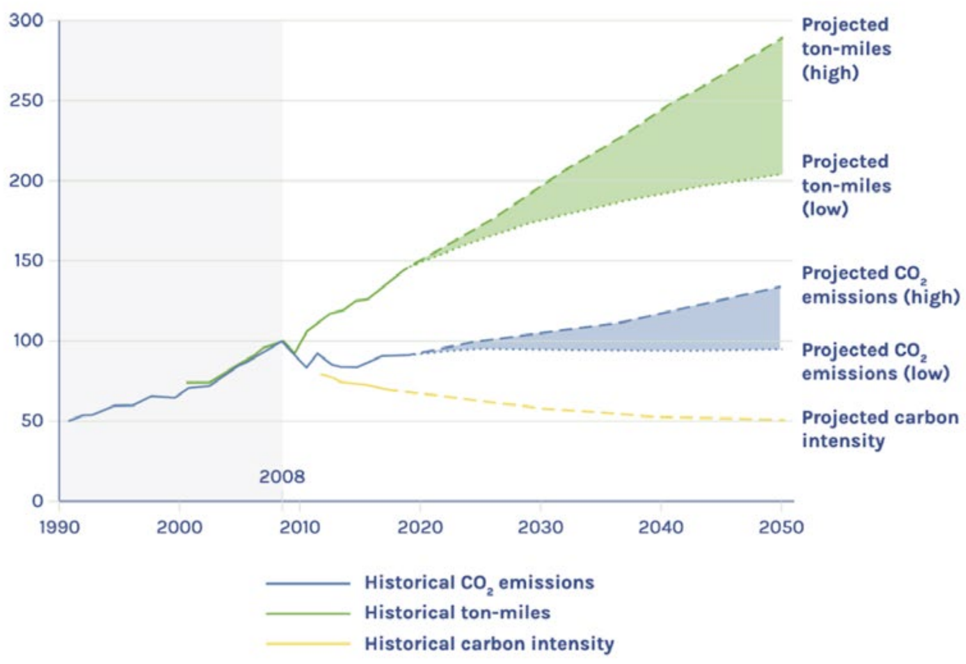
The full Aviation Transition Strategy is available here.

SHIPPING*

Accounts for 3% of global emissions.

*Published by The Getting to Zero Coalition with support from MPP

Figure 2: Trends in CO2 emissions, transport demand, and carbon intensity under current policy[4] .



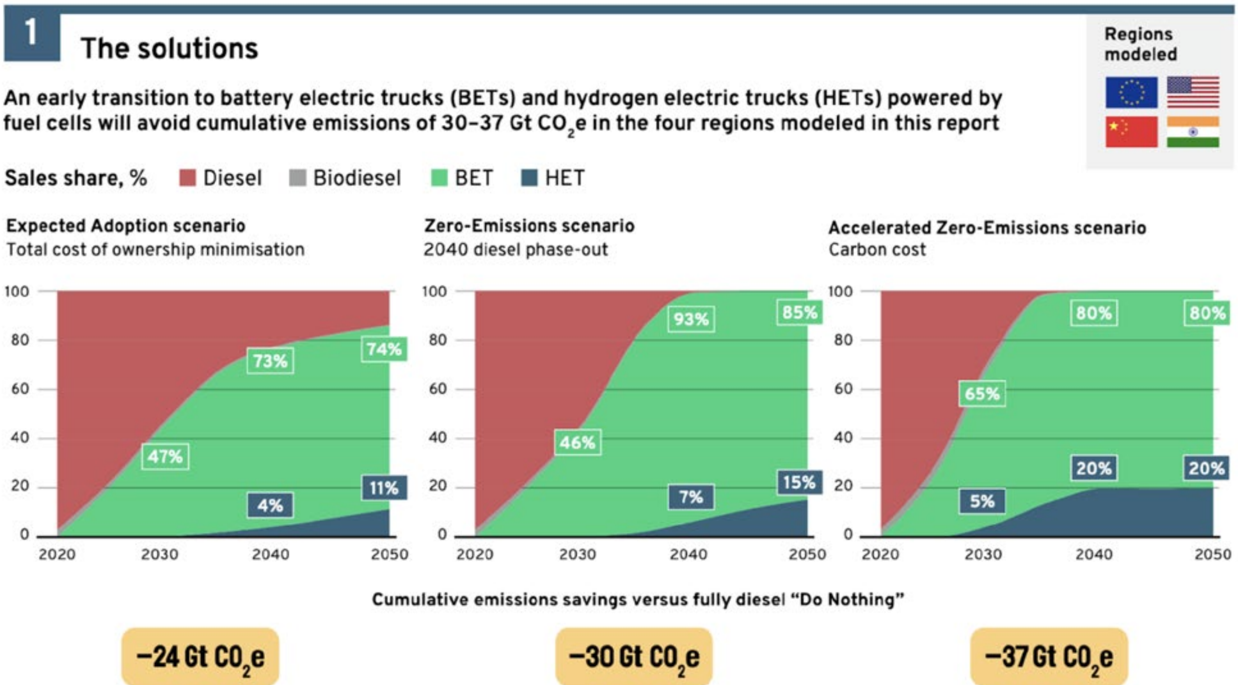
Insights

- The necessary transition is feasible – it can and must accelerate.
- The transition is not all about the IMO. Far from undermining the IMO's authority, national and regional regulation have an important role to play.
- The fuel pathway is not predetermined, but will be laid brick-by-brick, and all actors have a responsibility to ensure it is well built.
- There are abundant opportunities for SZEF use this decade. Enabling this early use requires concerted action now

The full Shipping Transition Strategy is available here.

TRUCKING

Accounts for 40% of road transport emissions. Road freight forecast to rise by 300% by 2050.



Insights

- A swift, decisive move to zero emissions trucks (ZETs) and rapid rollout of infrastructure are needed to achieve net zero by 2050.
- Most ZETs expected to reach TCO superiority with diesel trucks between 2025 and 2034.
- Policy incentives for ZET uptake can avert 6-13 Gt of cumulative CO2e emissions by 2050.
- Achieving zero-emissions trucking is cheaper than continuing to burn fossil fuels. Higher vehicle costs will be more than recouped through lower operating costs.
- Financing the transition in developing economies will require more capital, creating new opportunity for global climate finance providers.
- Innovative business models and financing instruments can leverage ZETs' lower operating costs to mobilise capital to meet purchasing costs.
- Enabling policy and coordinated regulation of supply and demand, for vehicles and refuelling infrastructure, can reduce fleets' risk during this transition.
- Fleet operators need more public charging and hydrogen stations, a more mature ZET production value chain, and enough grid power for both EV charging and hydrogen production.
- Today, fleets are already operating successful with ZETs. Their experience can identify the bottlenecks to be addressed in the larger market in order to kick-start the transition to ZETs.

The full Trucking Transition Strategy is available here.