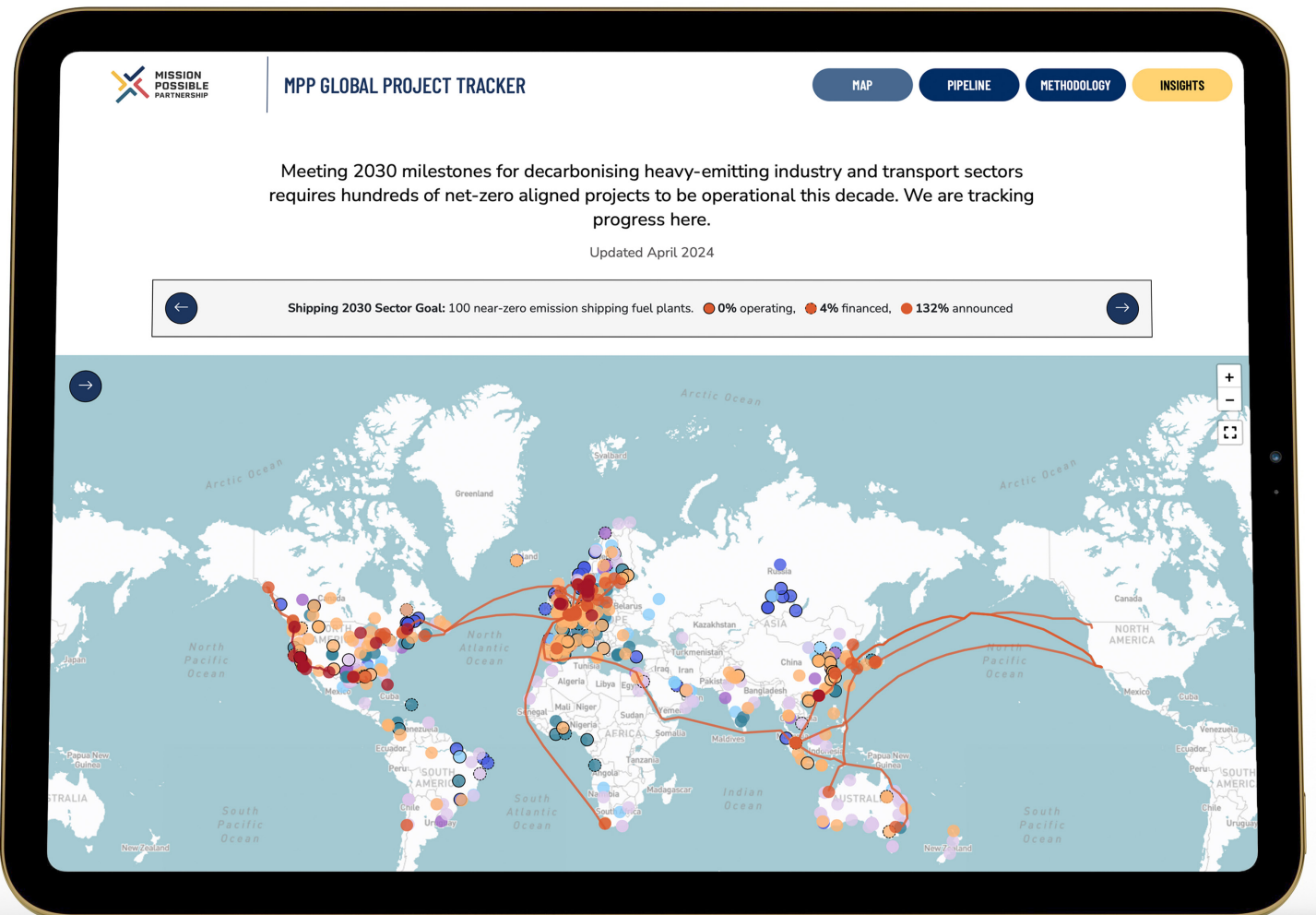


# MPP GLOBAL PROJECT TRACKER: MAPPING THE PIPELINE TO 2030 GOALS FOR INDUSTRIAL DECARBONISATION



# INTRODUCTION

The MPP quarterly Global Project Tracker: mapping the global pipeline to 2030 goals.

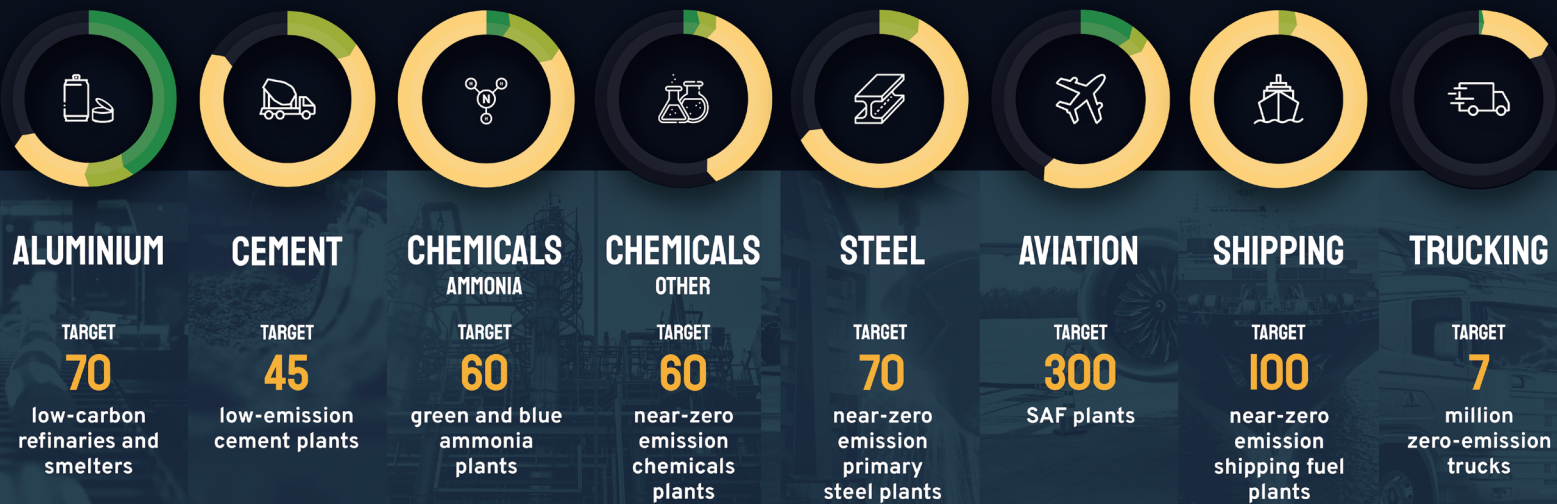
**Industrial decarbonisation has started, but urgent action is needed to accelerate progress towards securing the investment case required to get the global harder-to-abate (HTA) industry and transport sectors on track to meet decarbonisation targets.**

Mission Possible Partnership's new Global Project Tracker shows the progress of vital decarbonisation projects. It reveals a growing pipeline of net-zero-aligned projects yet warns that rapid acceleration is needed to

bridge a gap of almost 600 commercial-scale, net-zero-aligned plants and millions of zero-emission trucks.

MPP urges collective action by governments, companies, and financial institutions to unlock the investment barriers to fast-track progress to avoid the real risk of heavy industry and transport sectors—those accounting for almost a third of all global emissions—missing deployment milestones to make net-zero, 1.5oC aligned possible.

## INDUSTRIAL DECARBONISATION HAS STARTED BUT NEEDS TO ACCELERATE TO MEET 2030 TARGETS



Data source - MPP Global Project Tracker (2024)

● In operation    
 ● Final Investment Decision (FID) reached    
 ● Announced    
 ● Unidentified

# I. INTRODUCING THE MPP GLOBAL PROJECT TRACKER

The Global Project Tracker brings insight into the decarbonisation progress of the seven heavy industry and transport sectors which cause around 30% of all global CO<sub>2</sub> emissions: aluminium, cement, chemicals, and steel in industry, and aviation, shipping, and trucking in transport.

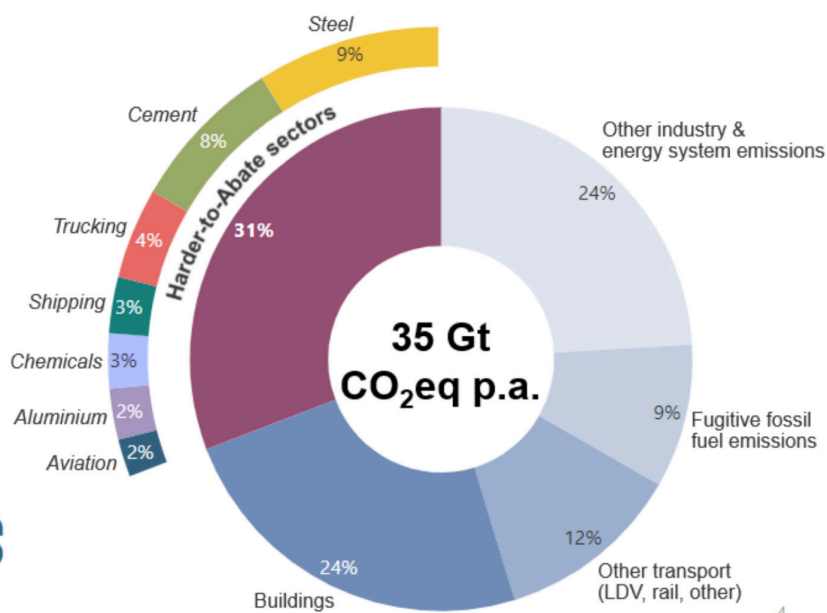
Mission Possible Partnership is leading the research to track progress across sectors and regions on investments into net-zero aligned assets as 'announced', 'Final Investment Decision (FID)', and 'operational' projects. The tracker is updated quarterly

and measures progress against an overall target set by MPP's industry-backed 2030 real-economy milestones for each sector.

These milestones provide a forward-looking indicator of momentum towards the deployment of assets and the potential capacity of clean technologies required to be on track for a 1.5C-aligned trajectory. The milestone for each sector is represented by the number of commercial-scale decarbonised plants or zero-emission trucks required, denoting the critical mass of projects that must be operational by 2030.

**HEAVY INDUSTRY & TRANSPORT SECTORS ARE THE LARGEST CONTRIBUTOR TO GHG EMISSIONS RESPONSIBLE FOR 1/3<sup>RD</sup> OF GLOBAL ENERGY EMISSIONS**

**Scope 1 & 2 Greenhouse Gas Emissions from the energy system**  
Allocated to consuming sector in 2020



Note: Global Scope 1&2 emissions shown with GWP 100 used for non-CO<sub>2</sub> emissions. LDV = light-duty-vehicle  
Sources: IEA (2022), GHG Emissions from Energy; Mission Possible Partnership (2020)

It typically takes 4-6 years for a project to become operational with full commercial deployment after FID, therefore projects must reach the critical FID milestone within the next three years to be on track for these 2030 goals.

By providing a clear visual representation of all the net-zero aligned assets and projects - by location and sector - the tool will help industry groups identify potential partners or green hubs, allow financial

institutions to see potential investment options, and let policymakers track progress in their regions and inform their decision-making.

The tracker underpins MPP's focus on unlocking projects, and support for clean industrial hubs to bring more commercial-scale, zero-emissions industrial projects to FID. This will help create the broader market conditions needed to drive HTA sectors towards a decarbonised future.

MPP's 2030 milestones set out the decarbonisation challenge facing each of the seven sectors in meeting its decarbonisation goals by the end of the decade. They indicate the minimum viable real economy targets.



## ALUMINIUM

- **70 new low-carbon smelting and refinery plants**
- 43% of aluminium production to come from recycling by 2030



## AVIATION

- **300 Sustainable Aviation Fuel (SAF) plants**
- 40 Mt of SAF (for 10-15% of SAF in aviation supply globally)



## CHEMICALS

- **60 green and blue ammonia plants and 60 other near-zero emission 'other' chemicals plants**
- 50Mt of near zero emissions ammonia produced



## SHIPPING

- **100 zero emission shipping fuel plants**
- 5% zero emission fuel in international shipping



## CONCRETE

- **45 commercial-scale carbon capture, usage and storage plants**
- These would need to deliver 160 million M3 concrete



## TRUCKING

- **7 million zero-emission trucks by 2030**
- 1.6 million overnight depot chargers
- 600K public high-speed chargers for battery electric trucks



## STEEL

- **70 (near) zero emission steel plants**
- 170 Mt of near-zero-emissions primary steel produced

The tracker compares actual investment progress against the MPP's 2030 pipeline targets (in bold above), which represent around 70% of the emissions abatement needed to keep the sectors with their

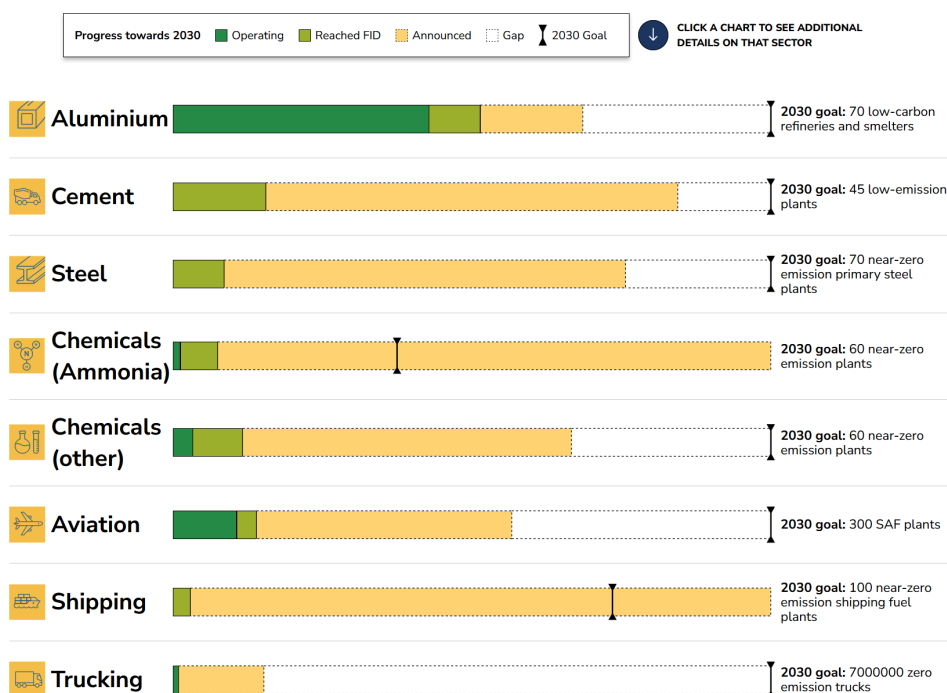
sectoral carbon budgets by 2030 and on track for net zero 2050. The remaining 30% can be achieved through energy and materials efficiency.

# 2: PROGRESS TOWARDS 2030 MILESTONES (APRIL 2024)

The Tracker has revealed that across the seven heavy industry and transport sectors, exponential progress is needed. Industrial decarbonisation has started but rapid acceleration is needed to meet critical 2030 milestones.

The clock is ticking – no sector is on track and time is running out to get them on course. The pipeline is growing but almost 600 decarbonised plants must break ground in the next few years to meet 2030 net-zero targets, and millions of zero-emission trucks must be on the road by the end of the decade.

Most progress is seen in aviation, with Sustainable Aviation Fuel (SAF) blending mandates and subsidy schemes driving projects to operation in Europe and the US, and 15% of the target has passed FID. There has been a marked increase in the green ammonia pipeline, with announcements exceeding the 2030 targets, supported by demand signals from the shipping and fertiliser sectors. The question remains around how quickly these plans can reach commercial scale.



## Current progress (as of April 2024):

- Meeting MPP’s industry-backed 2030 milestones for decarbonising heavy-emitting sectors (derived from STSs) requires more than seven hundred (**705**) net-zero-aligned plants and **millions** of zero-emission trucks to become operational by 2030.
- 68** net-zero-aligned plants are now online and **42** are at FID – the near-term target that can enable construction this decade. Bridging this gap and scaling near-zero solutions adequately means a 7-fold increase in the number of plants that have achieved FID.
- Industry ambition and commitment is growing; wave of projects has been announced in 12 months. Plans to build **473** plants are identified on the tracker, representing huge opportunity to reduce the current FID gap by **80%**.
- Yet the pace of progress is too slow. Economic and policy barriers mean announced projects can become stalled and don’t move fast enough to FID. The pipeline is at risk, no sector is currently on track and time is running out to get them on course.

# 3. INSIGHTS – SECTOR TRENDS

## ALUMINIUM

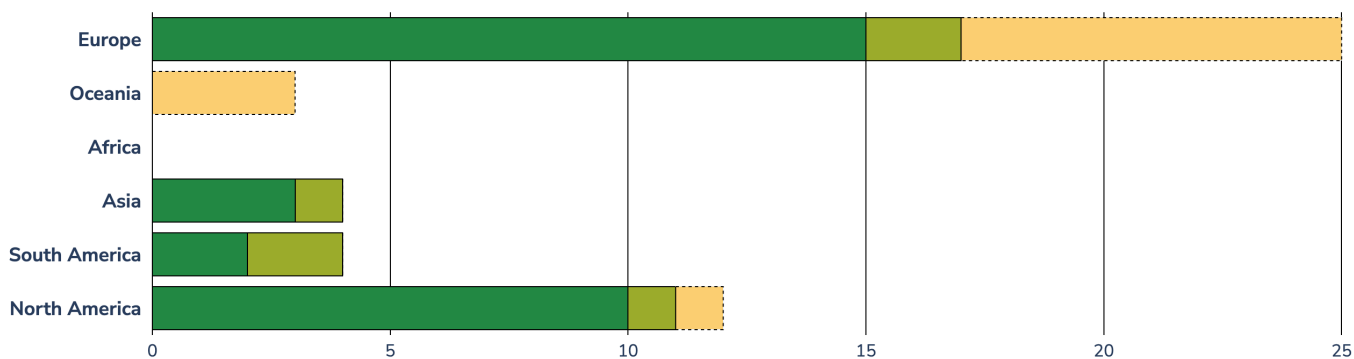
**1.1**  
billion tonnes of CO2  
emissions yearly

**2%**  
of total global  
emissions

**80%**  
demand growth  
by 2050



Project status: ■ Operating ■ Reached FID ■ Announced



- In the last 12 months the number of announced projects tripled from 4 to 11 and the number of projects reaching FID increased from 2 to 6, as major industrial consumers started to partner up with producers.
- More investment is required for inert anode technology, which is still only at testing stage.
- The first carbon capture pilots have been announced in France with industrial deployment aimed for late 2020s.
- Producers are now securing long-term renewable energy Power Purchase Agreements (PPA) to power production, with China – 60% of global production – leveraging hydropower.
- Globally some 30 projects are already operating with renewable electricity, including in Canada, Norway and Russia.

**Call to action:** To unlock FIDs more investment, piloting and demonstration is required to address the green premium by reducing technology production costs for alumina and working with electricity suppliers and grid operators to procure renewable power and address grid firming and storage for aluminium.

# CEMENT

**3RD**

largest industrial energy consumer

**7%**

of yearly global human-made CO2 emissions

**2ND**

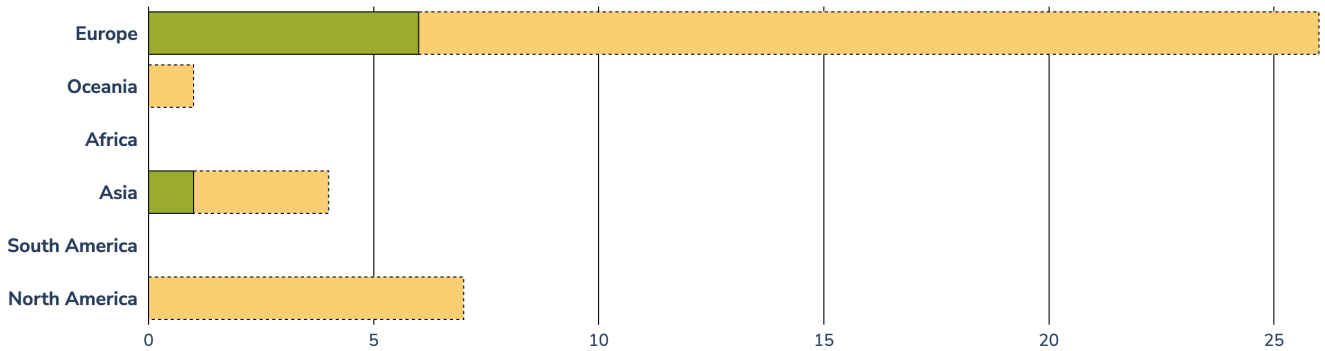
most used material on Earth



## Cement



Project status ■ Operating ■ Reached FID ■ Announced



- Construction has commenced on the first full-scale carbon capture sites in Europe and Canada.
- Decarbonised demonstration projects have now progressed to the crucial FID stage in Japan and China.
- Cement plants positioned near sequestration storage and transport facilities stand to gain a competitive edge and so are progressing faster.
- The industry is actively exploring other decarbonisation levers such as alternative fuels and supplementary cementitious materials (SCMs) to mitigate environmental impact.
- Price premiums of up to 120% and insufficient political support are hindering the offtake from decarbonised plants. Robust public procurement initiatives are needed to mitigate this “green premium”.

**Call to action:** To unlock FID for near-zero emission production, companies must harness public financing support, including grants and tax credits, to bolster the development of carbon capture and storage (CCS) infrastructure and combat high energy intensive operating costs.

# CHEMICALS

3%

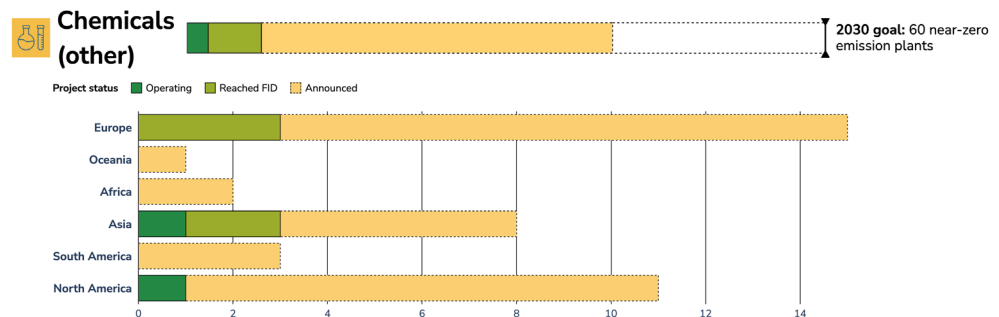
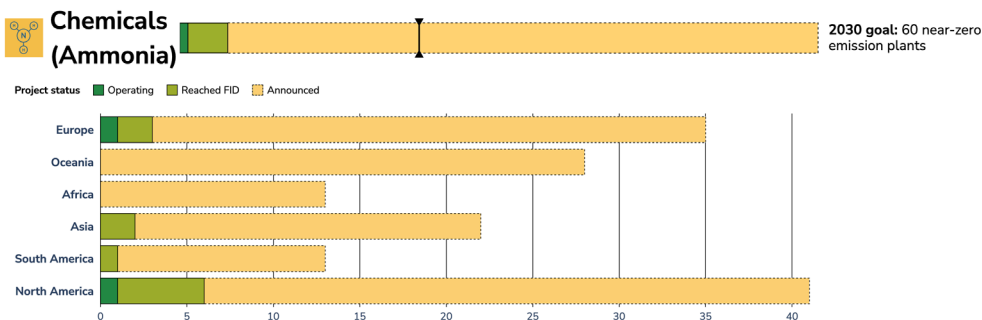
of global of yearly CO2 emissions

5TH

largest emitter in the world if the industry were a country

400%

growth in green demand by 2050



- There has been a marked increase in the green ammonia investment pipeline which represents 70% of the chemicals announcements, predominantly for export.
- This increase includes a ramp-up of announcements in India, supported by government ambition on locally produced green ammonia for fertilizer and offtake agreements with Japanese importers.
- Unlocking FID requires financing and long-term offtake agreements to be secured, as today much of the sector operates on short-term contracts.
- As well as the sensitivity of the market to the green premium, barriers to offtake are created by long, complex and fragmented value chains for green ammonia derivatives.
- The fertiliser market shifts from country by country. India, for example, is doubling down on the use of hydrogen in the development of green ammonia but it is small scale and is being hindered by the need for large subsidies which create push back from farmers over the cost implications.

**Call to action:** Collaboration across the crucial value chain links such as fertilizer producers/suppliers, farmers and consumer goods companies is needed to ensure equitable distribution of cost and risk along the value chain and to shield the agricultural sector from the cost burden of decarbonised plants.

# STEEL

**7%**  
of total energy  
sector emissions

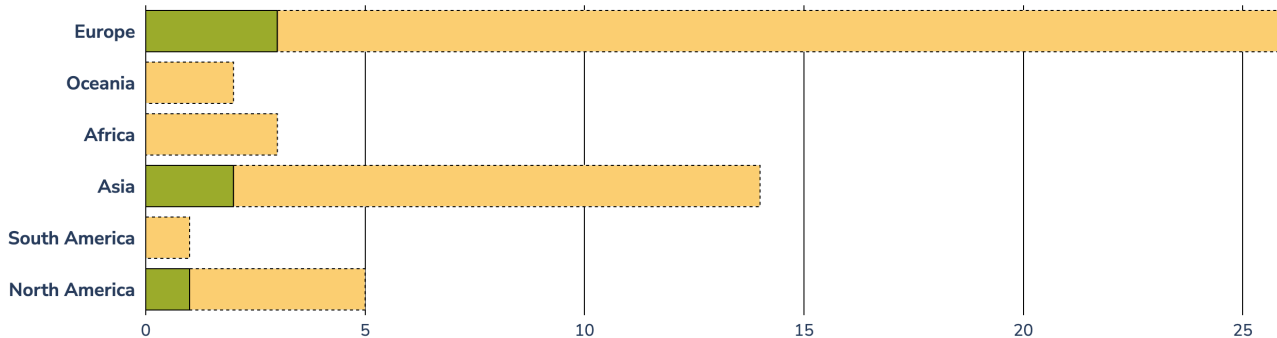
**700M**  
new cars on the  
road equivalent

**30%**  
projected growth  
by 2050



## Projects by continent

Project status ■ Operating ■ Reached FID ■ Announced



- The conditions for the growth of green steel are emerging with 42 announced projects around the world, including in the Middle East and Brazil.
- Following early momentum in Europe, three more projects have reached FID in the past 12 months, including in Canada and China, bringing the total to 6 at FID.
- Hydrogen remains the frontrunner solution for deep decarbonization vs. CCS. One project in China is already using high levels of hydrogen for iron production at commercial scale - but not yet 100% hydrogen use for truly near-zero emissions production.
- A key driver of momentum to date has been clear policy signals such as carbon pricing and border adjustments in the EU, where the majority of projects have been announced.
- Robust policy support, particularly upfront funding and forward offtake agreements, have been instrumental in the FIDs secured so far.

**Call to action:** Additional FIDs will require significantly more offtake agreements, as well as greater certainty of supply of affordable clean hydrogen.

# AVIATION

**2-3%**

of total global CO2 emissions

**1M**

homes' energy use equivalent

**100%**

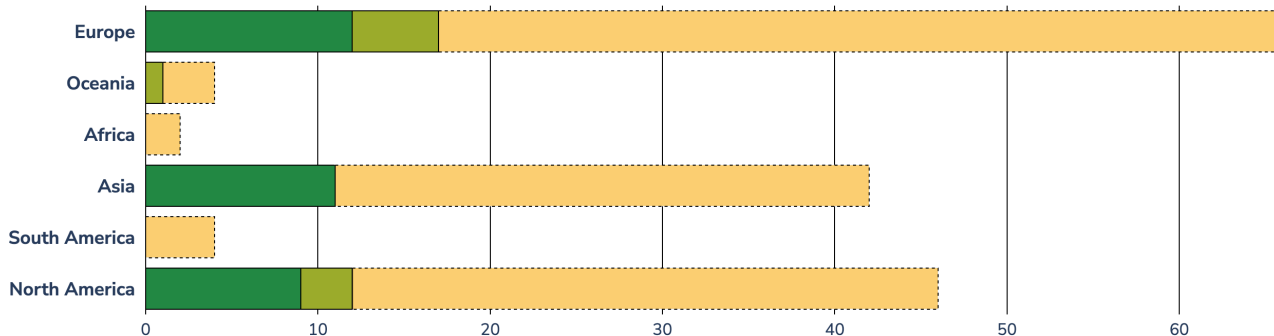
projected increase in airline traffic by 2035



## Aviation



Project status ■ Operating ■ Reached FID ■ Announced



- In the last 12 months announcements about SAF projects have almost doubled (from ~90 to 145) as well as the number of operational plants (from ~15 to 33)
- SAF blending mandates and subsidy schemes are driving this supply and demand side momentum – primarily in the US and in Europe.
- Current SAF supply is less than 1% of global aviation fuel use.
- Fuel production volumes are increasing, but limited to biofuels, foremost HEFA.
- Power-to-Liquid (PtL) SAF projects are not getting to FID due to their initially high costs. However, PtL has a particularly high cost reduction potential and could outcompete biofuels economically in the long run.

**Call to action:** First movers need to demonstrate bankability of Power-to-Liquid and Advanced Biofuel projects to unlock larger volumes of SAF by 2030.

# SHIPPING

3%

of total global  
CO2 emissions

12

tanker trucks of  
gasoline equivalent

50%

emissions growth  
by 2050



## Shipping

2030 goal: 100 near-zero  
emission shipping fuel  
plants

- The shipping industry is placing increasing orders for new zero-emission capable ships.
  - Methanol dual-fuel engine ships have gained ground, with 200 new ships on order, many of these container vessels. A scale up in manufacturing of ammonia engines is also underway, indicating a potential long-term dominance of ammonia.
  - Today just one zero-emission fuelled ship is in operation, using green methanol on a voyage by Maersk.
  - Ordered ships are usually dual powered, which could still operate on heavy fuel oil by 2030 if the alternative fuels supply chain is not scaled up. However, many companies ordering ships do not have firm plans to off-take green methanol or green ammonia.
- Meanwhile, there has been a wave of announcements in methanol and ammonia plants, with viable offtake for the shipping sector.
  - The Methanol Institute states that 7Mt of methanol is in the pipeline.
  - One very large 1.4Mt capacity methanol plant in Texas is at front end engineering and design stage (FEED) and close to FID. In China, it is expected that 500kt is progressing to FEED.
  - Despite the wave in announcements, the fuel capacity in the pipeline is not sufficient to supply all the methanol ships on order.
  - It is harder to link green ammonia production plants to the shipping sector, due to early development of vessels and safety concerns.
- Producers are seeing shipping as the major offtaker and new global shipping fuel regulation from the International Maritime Organization (IMO) would provide a forcing mechanism and signal that shipping becomes the first offtake sector.

**Call to action:** There is a need to address friction in offtake agreements, suitable financing instruments, stronger regulatory mandates, and port infrastructure to accelerate progress on green corridors and achieve the IMO goal of zero-emission fuels to make up 5% of international shipping fuels.

# TRUCKING

40%

of road transport emissions

300%

increase in road freight by 2050

4<sup>TH</sup>

worst CO2 emitter if the industry were a country



## Trucking



2030 goal: 7000000 zero emission trucks

Electric truck sales are at the beginning of an expected exponential sales curve.

- Over 90% of medium- and heavy-duty truck models are already available as battery electric (BET) versions. BETs are currently the dominant technology, although the number of hydrogen fuel cell (HET) models has doubled in the last year.
- At least 66,000 trucks (according to IEA, Global EV Outlook 2023) are now operational globally.

- Chinese manufacturer BYD has announced its electric heavy duty trucks production capacity is already 1 million per year, with international sales including an order from India's largest port operator.
- Policy mandates and subsidies in the EU & US are driving manufacturing progress.
- Daimler Truck, Accelerera and PACCAR recently partnered on a \$3 billion investment taking advantage of federal subsidies to set up a 21-gigawatt hour (GWh) factory to manufacture LFP battery cells.

**Call to action:** Investment in EV network infrastructure is essential to get BEV trucks on the road. Truck charging stations will draw multi-megawatts of power and operators today are already developing their own charging stations exceeding 25 MW to enable green trucking corridors on busy routes.

# 4. DRIVERS OF PROGRESS & HOW TO CLOSE THE GAP

The Tracker reveals that companies have issued a wave of project announcements in the past 12 months, indicating a growing industry ambition and a shift towards more favourable conditions emerging in some locations. Plans to build 473 commercial-scale decarbonisation plants are identified on the Tracker, which if brought to FID would reduce the current milestone gap by 80%. However, many projects struggle to get from announcement to FID, which means the current rate of progress is too slow.

Analysis suggests that several cross-sector themes are emerging as key to accelerating progress, and specific market conditions are responsible for driving companies to move projects faster towards FID. Evidence is emerging on levers and actions that could stimulate conditions and help to create vital acceleration in the pipeline towards the 2030 decarbonisation targets.

Observations from the Tracker:

## 1. Bridge the green premium

- **Co-location near enabling infrastructure, leveraging synergies via hubs and lowest cost clean energy geographies can reduce the green premium and drive investment momentum:** As demonstrated by the tracker, the location of projects close to complimentary industrial sectors or supporting infrastructure, such as transportation or the supply of raw materials including green hydrogen, is key to creating secure sources of feedstock and offtake. Industries are starting to realise the benefits of partnership with grid operators, ports and community groups and the economies of scale created. This is an increasingly important factor in driving investment momentum and in helping projects move towards FID. For example, **The Transatlantic Clean Hydrogen Trade Coalition** shipping route from Houston to Rotterdam is being established to enable green import and export infrastructure. In addition, green hydrogen hubs are emerging globally, such as one at the **Port of Pecém in Ceará, Brazil**.

- **The cost of fossil fuels must be increased by pricing carbon and redirecting support from fossil to abated technologies:** The tracker highlights that details surrounding investment incentives remain unclear such as, for example, in the US where tax credit rules particularly for hydrogen and SAF offtake contracts are yet to be finalized. Creating transparency around incentives is crucial to striking the vital offtake deals.

## 2. Support technology deployment

- **Investment in critical technologies needed for each industry must be prioritised and fast tracked to delivery: Focus on more mature and established technologies** such as renewables for aluminium, battery electric trucks and biofuels for aviation is helping to develop market confidence and expectation from decarbonisation projects. The tracker shows that this has enabled them to progress faster to FID than nascent technologies with higher green premiums due to their relatively immature technology readiness.
- **Support for early technology demonstration and upscaling must be provided at government and industry level.** This support has been seen in Canada where a public-private partnership to develop nascent inert anode technology for aluminium led to new project announcements. With most investment now going into more predictable mature technologies, the tracker shows that investors are layering together different technologies in the same project to help manage risk.

## 3. Create early demand & new markets

- **Markets must be seeded and encouraged by setting near-term targets and enabling the formation of green commodity markets:** The tracker shows how the pipeline is gathering momentum in regions which have introduced robust sectoral policies or financial guarantees from

public institutions. These policies provide market confidence and are the reason some sectors are starting to go faster than others. For example:

- Daimler Truck, Accelera and PACCAR recently partnered on a \$3 billion investment taking advantage of federal subsidies to set up a 21-gigawatt hour (GWh) factory to manufacture LFP battery cells.
- **Mandates must be used to encourage decarbonisation strategies and investment:** These policies help secure long-term opportunities from clean solutions and adjust the competitiveness of a product in different markets. For example:
  - SAF blending mandate in Europe which will gradually increase from 2% in 2025 to 63% in 2050.
- **Secure and committed off-take agreements for decarbonised output must be established and underpinned by long term government policy:** **Committed offtake agreements for decarbonised** products such as shipping offtake from Green Ammonia or Methanol plants, increases the chance that a project will reach FID, particularly when backed by robust policy and greater transparency over willingness to pay a green premium. For example:
  - Deals such as United Airlines' purchase of SAF from Cemvita over 20 years, and Microsoft's 10-year SAF deal with World Energy demonstrate that supply must now meet this demand.

#### 4. Roll-out enabling infrastructure

**Regulatory frameworks governing infra-structure for Carbon Capture and Storage and Hydrogen storage development must be clarified and prioritised to guide and secure investment decisions: Government infrastructure planning agencies** and geological survey institutions must provide support to fast-track CCS and H2 storage development, de-risk the exploratory stage and develop hydrogen salt and rock caverns. Developers should make use of depleted oil and gas reservoirs to accelerate CCS project development.

**Investment to improve infrastructure waste management must be accelerated.** Collection, sorting, recycling infrastructure is required, in particular in emerging economies. Incentivised recycling schemes such as Extended Producer Responsibility (EPR)

schemes and investment to decarbonised end-of-life waste management projects by adding CCS on incinerators and introducing controlled landfill are vital.

**Sustainable Biomass is a limited resource that needs to be allocated to its most important use-cases.** Scarce sustainable bioresources should be directed to use-cases with most emissions savings vs. available alternative solutions (e.g. construction). The decentralised nature of biogenic feedstock challenges the economic viability (costly collection and transportation).

**Accelerate power grid build-out and improve power market design:** The expansion, redesign and build out of global power grids must be accelerated to accommodate renewable generation and power market reform which underpins these infrastructure investments. The development of renewables energy infrastructure by local and cross-sector consortia with communities as an integral part of the overall industrial planning process offers the advantage of providing predictable pricing and locks in the involvement of local groups in planning and permitting.

#### 5. De-risk project financing

- **Develop new, innovative financing mechanisms to encourage investment in decarbonisation, especially in emerging economies:** The investment market must work more closely with industry to increase infrastructure investment as part of transition financing. This means helping clients to invest not only in single clean technology plants, but in helping them to establish a portfolio to invest in the next ten plants in their pipeline. The tracker shows that this opportunity represents one of the biggest potential transfers of capital in decades.
- **Financial institutions must play a key role in addressing real risks and market failures such as pricing long-term contracts:** First-of-a-kind (FOAK) investments from first movers have been seen across the HTA sector, as early favourable market conditions were exploited. We now need to see these investments continue to find a place in investment portfolios across the next five years. Many competitors are waiting for more favourable market conditions and more secure returns before committing investment to move projects from

innovation to scaling up phase. This de-risking will likely involve public investment to guarantee loans or provide grants or tax credits such as those provided by the US Inflation Reduction Act. Accelerating projects towards FID is now an exercise in which industry must balance the perceived risk of committing to short term capital investment against the real long term risk of failing to tackle decarbonisation.

- **MPP urges collective action by governments, companies and financial institutions to unlock investment barriers and fast-track the progress needed in the next three years:** While project developers are committed to investing in decarbonisation projects, decisions are being made against a backdrop of extreme uncertainty caused by global economic fluctuations, changing patterns of demand and the local political uncertainties caused by many countries heading into national elections.

## 5. ASSUMPTIONS AND METHODOLOGY

The Tracker uses the number of plants or trucks as a key indicator of forward-looking momentum and potential capacity. With more data, we plan to assess the capacity forecasted and the impact on potential avoided emissions.

Energy and materials efficiency – which can address a third of heavy industry and transport emissions – is not directly reflected in the Tracker. This can include increased fuel efficiency, recycled content in products, or increased construction efficiency.

Separate methodology presenting definitions of FID per sector, as well as technologies and deployment scales in scope can be found on the [live tracker](#).

We have stress-tested the data with many partners but know that, given the scale of the industries, not all data points the world over may be included.

MPP is keen to work with individuals and organisations with information to help to further develop the Tracker. Please make contact or share information using the “Help us improve this map” button built into the Tracker.

The database will be updated quarterly, to reflect updates to publicly available data sources and MPP internal review.

The tracker is intended as an aggregated information source to inform policymakers, financiers, and industries on the pipeline of projects around the world by mapping publicly available information at asset level including sector, technology, pipeline status, capacity and timeline where available.

<https://tracker.missionpossiblepartnership.org>