In collaboration with Oliver Wyman

WORLD ECONOMIC FORUM

Policy Action to Mobilize Climate Finance, and Market Responses

WHITE PAPER

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Foreword

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Three years into the "decisive decade" of the 2020s,[1] targets for scale and investment coverage in climate solutions are not being met. While the upwards trajectory in capital flows to climate-aligned opportunities is encouraging (Bloomberg data estimates more than $2.5 trillion invested in clean energy in 2023),[2] investment in breakthrough technologies such as clean hydrogen or sustainable aviation fuels (SAF) is still in the low billions, concentrated in a handful of large deals.

However, we have seen encouraging momentum in recent years, driven by a supportive public sector, which has an important role to play in creating the conditions necessary to direct capital towards climate solutions at scale. As argued in the World Economic Forum report *Financing the Transition to a Net-Zero Future*,[3] immediate market-wide stakeholder action is required to facilitate the multifold increase in capital flows needed to deploy, validate and expand critical breakthrough technologies; this relies on co-designed solutions, including innovative financing approaches, new ways of doing business and, importantly, targeted public intervention.

Indeed, while private financing blueprints can act as helpful guidelines for scaling the development of climate solutions, these alone will not drive capital at the speed and scale required to fund the decarbonization technologies necessary to achieve net zero. Bridging the investment gap requires decisive public action that makes use of the lessons learned from the mobilization of capital for renewables over the past decade to increase financier confidence in net-zero transition investments and establish the underlying economic case with more certainty. Targeted intervention from government actors can help generate sustained demand, establish supply chains and unlock finance for breakthrough technologies.[4]

While recent announcements from governments have signalled a clear intent to encourage the funding of climate solutions, financial institutions (FIs) will also have to move from commitment towards action, supported by an enabling policy and regulatory environment. Given the range of climate solutions available and the constraints under which FIs operate, these institutions need breadth and depth of expertise to identify, assess and value investment opportunities in climate solutions, often requiring them to evaluate and manage risks differently. The continued support of the public sector to encourage and enable the transition, and FIs' ability to step up to the challenge and harness their commitments, are both necessary to move the needle towards greater action.

With public incentives in place and a more favourable environment, private finance is being encouraged to capitalize on the strategic opportunity that climate solutions provide. To further the movement of capital, the public sector should continue to drive action through tax incentives to spur production or mandates to commit demand, create certainty by pushing for long-term regulatory support and establish better-defined standards for investments in climate solutions.

The Financing the Transition to a Net-Zero Future initiative of the World Economic Forum, in collaboration with Oliver Wyman, was launched in 2020 to accelerate the mobilization of capital towards early-stage decarbonization technologies. The initiative has engaged a multistakeholder community of financiers, industry stakeholders, philanthropists and public institutions to analyse specific technologies in the steel, aviation and shipping sectors to develop particular mechanisms for the different stakeholders to co-design solutions and identify policy interventions necessary to mobilize private capital.

Executive summary

Recent announcements from governments have signalled a clear intent to encourage the funding of climate solutions.

Public action is needed to drive investment by private finance in climate solutions and meet net-zero goals on schedule, with recent government announcements showing a clear commitment to facilitate the process. This paper focuses on the United States, Europe and the United Kingdom, given the concentration of the Financing the Transition to a Net-Zero Future (FTT) community's presence in these regions, as well as noteworthy examples of relevant policy and regulations. These include the Inflation Reduction Act (IRA) in the US, which promises long-term tax credits to produce clean energy and technology and increase US production of renewable energy, including the Hydrogen Production Tax Credit,[5] and the European "Fit for 55" package, which sets sustainable aviation fuel (SAF) blend mandates[6] among other legislation, and the Net-Zero Industry Act, which ensures a more predictable and simplified regulatory environment.[7] In parallel, private finance has made significant commitments in recent years, with more than 250 institutions across the spectrum of private capital providers, representing more than $80 trillion in assets under management, committing to align their portfolios with net-zero pathways by 2050 through the Glasgow Financial Alliance for Net Zero.[8]

This paper refers to recent public-sector announcements, highlighting the role that the public sector has played in mobilizing investments in sustainable aviation fuel (SAF) and clean hydrogen in the US, Europe and the UK. These solutions will constitute the technology focus of this paper, building on the Financing the Transition to a Net-Zero Future initiative's work to date and reflecting the community's interest in these technologies.

In this renewed context of government support, the paper will consider the market response, and how sustained support from the public sector has been improving commercial viability for investors, all the while outlining the challenges that the financing community continues to face. Finally, the paper will summarize priority actions guiding the public sector's efforts to mobilize private-sector funding, with reference to ongoing sector-specific work at the Forum.

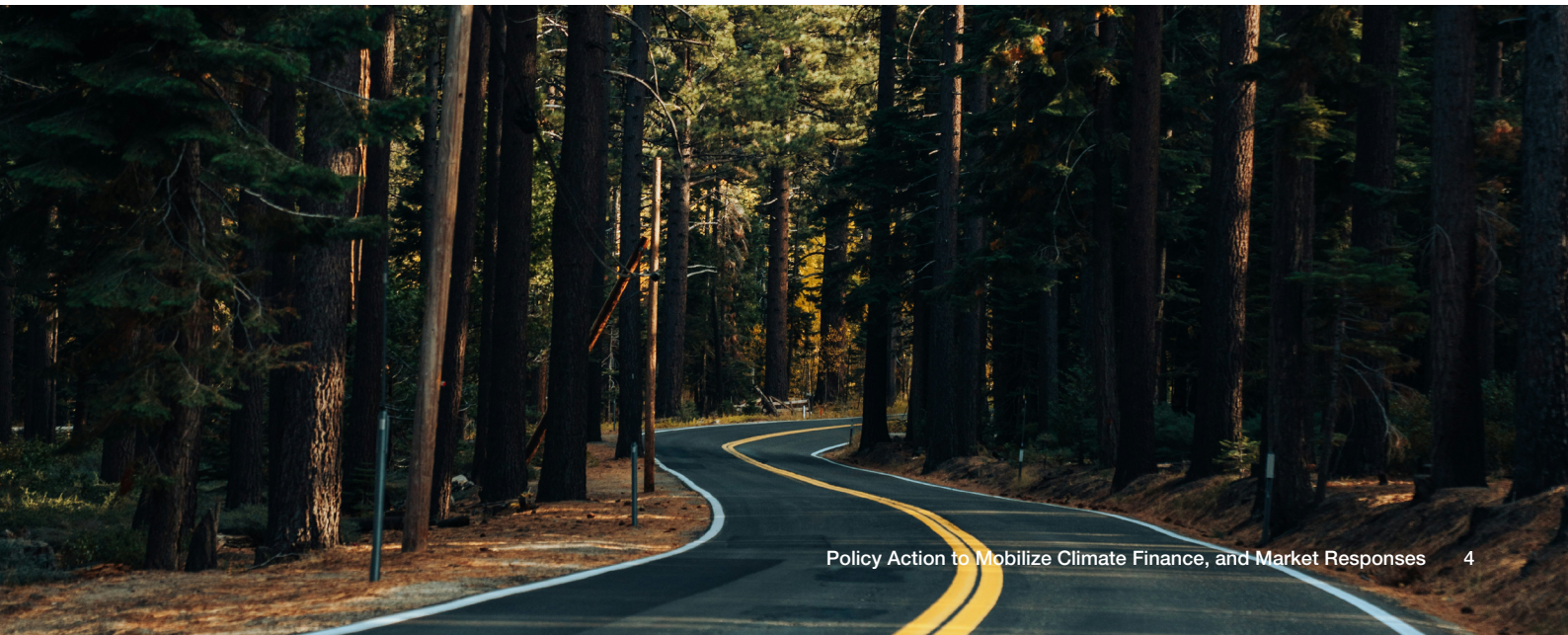
The public sector can take on three roles as it directs investments, as referenced in this paper:

1. **Driving action:** for example, through tax incentives to spur production or mandates to commit demand

2. **Creating certainty:** by pushing for long-term regulatory support

3. **Setting standards:** by establishing better-defined standards for investments in climate solutions (e.g. definitions of what constitutes a clean hydrogen project)

Importantly, the successful deployment of funds for breakthrough technologies rests on close collaboration between all stakeholders involved. Immediate market-wide stakeholder action backed by enabling public policies is required to address the highly likely investment gap towards net zero.

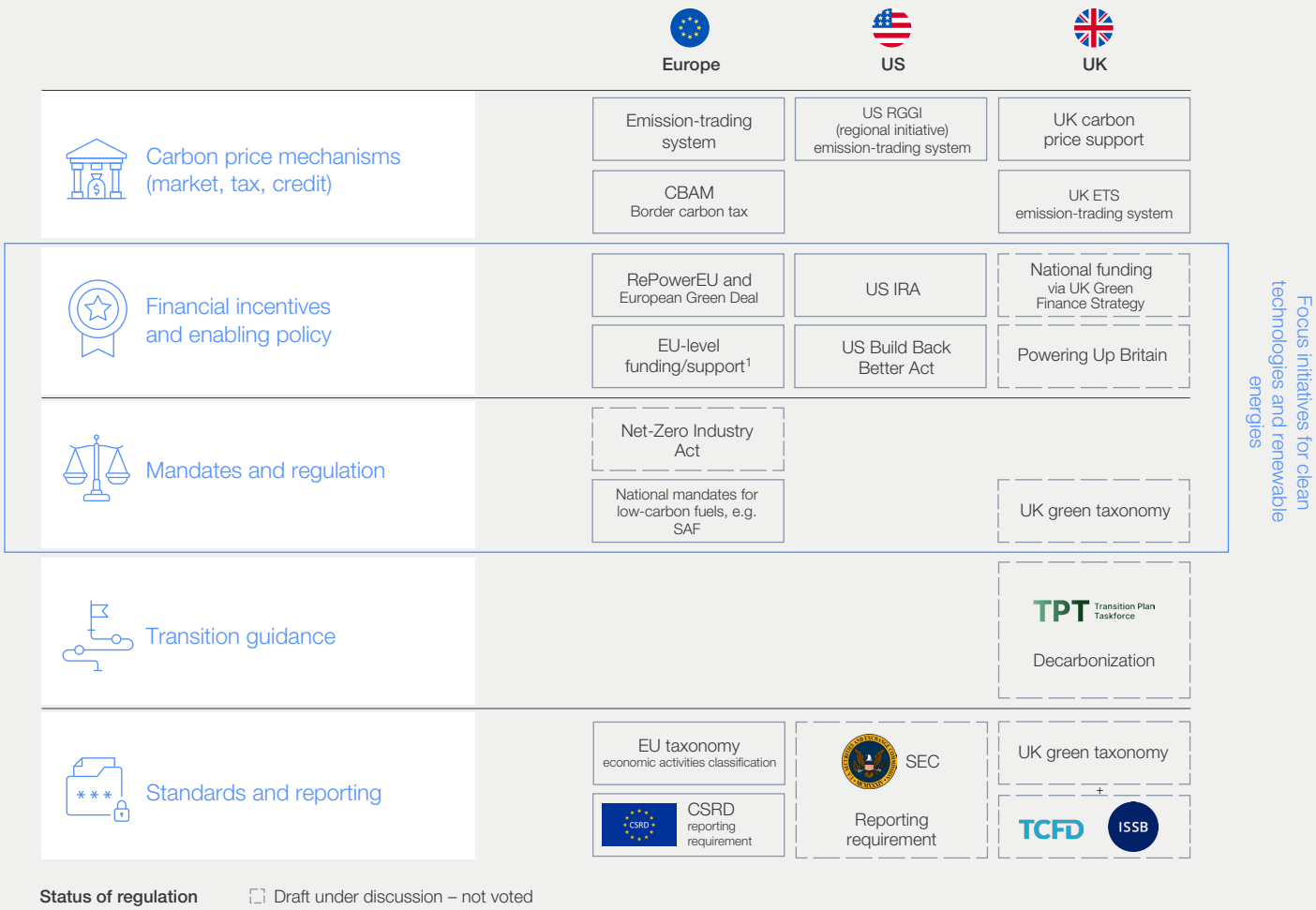


1 Recent public support announcements and accompanying momentum in private investment

The public sector has an important role to play in stimulating private-sector funding for breakthrough technologies.

Recent announcements indicate a clear intent from the public sector to stimulate private-sector funding for breakthrough technologies. Still, the myriad of public or industry mechanisms available can feel confusing and inaccessible. Figure 1 attempts to map the many regulated sustainability-related initiatives in the EU, US and UK. This includes: financial mechanisms related to carbon prices (market, tax or credit); mandates, regulations and enabling policies that affect both clean technologies such as clean hydrogen and SAF and renewable energies; and transition guidance and standards.

FIGURE 1 **Binding sustainability-related initiatives across focus geographies *(non-exhaustive)***



Note: Some countries are in the process of adopting TCFD guidance as a regulation; 1. Funding/support through IPCEIs, EU Innovation Fund (under ETS), the European Hydrogen Bank, European Innovation Council, EIB loans, EU guarantees under InvestEU programme.

Source: Oliver Wyman analysis, in collaboration with the World Economic Forum

As it relates to SAF and clean hydrogen specifically, the US IRA commits specific investments (grants, funding) and tax credits to hydrogen and carbon capture, utilization and storage (CCUS), and low-emission fuels (LEF), including SAF. As detailed in Table 1, $16.4 billion in tax credits has been allocated to hydrogen and CCUS, and $8.6 billion to LEF, which include SAF, representing respectively ~4% and ~2% of the total IRA investment in clean and energy funding of $381 billion, with most of the incentives going to zero-emission power generation.[9] The IRA is expected to spur significant investment in the US economy, with more than $1 trillion expected to be invested in power generation, hydrogen and CCUS over the next eight years.[10]

TABLE 1 | **IRA investments and tax credits by sector (hydrogen and CCUS, and low-emission fuels)**

	Hydrogen and CCUS	Low-emission fuels, including SAF	Total[1]
Investments $ billions	-	-	111.3
Grants	-	-	53.6
Funding	-	-	57.7
Tax credits $ billions	16.4	8.6	280.8
Grants	-	-	45.9
Funding	16.4	8.6	234.9
Key incentives	– Clean hydrogen production or investment credits – Carbon capture and storage production or investment credits	– Production of low-carbon fuels (including SAF, biofuel, biodiesel, renewable diesel)	

$10–20 billion

$20–100 billion

Note: 1. Total includes zero-emission power generation (the largest investment area), manufacturing, conservation and resilience, agriculture, hydrogen and CCUS, infrastructure, low-emission fuels including SAF, electric vehicles and consumer sectors.

Sources: The Bipartisan Policy Center, "Inflation Reduction Act (IRA) Summary: Energy and Climate Provisions", 4 August 2022; Francesca Paris, Alicia Parlapiano, Margot Sanger-Katz and Eve Washington, "A Detailed Picture of What's in the Democrats' Climate and Health Bill", *The New York Times*, 16 August 2022; Committee for a Responsible Federal Budget, "What's in the Inflation Reduction Act?", 28 July 2022; Senate.Gov, "Bipartisan Infrastructure Investment and Jobs Act Summary: A Road to Stronger Economic Growth"; CBO cost estimate; Oliver Wyman analysis

While it is difficult to parcel out the specific amount of European investment committed to clean hydrogen or LEF, the following sections will highlight recent incentives and mechanisms, including other regulatory measures such as SAF mandates that have proved to be an effective tool in committing demand for and thereby spurring the production of and investment in SAF.

It should be noted that various regulatory levers have been applied to SAF and clean hydrogen to drive both demand and supply. Figure 2 provides an overview of regulatory levers to support SAF and clean hydrogen production, and examples for each where applicable, namely:

- Carbon pricing and carbon credit markets, which apply broadly across all climate solutions, and have been shown to be a significant lever in encouraging the production of less carbon-intensive technology
- Research and development (R&D) grants, earmarked to be allocated to R&D projects for the development of climate solutions
- More specifically for the focus technologies, blend requirements and tax incentives that have been highly effective in spurring investments in SAF and clean hydrogen production

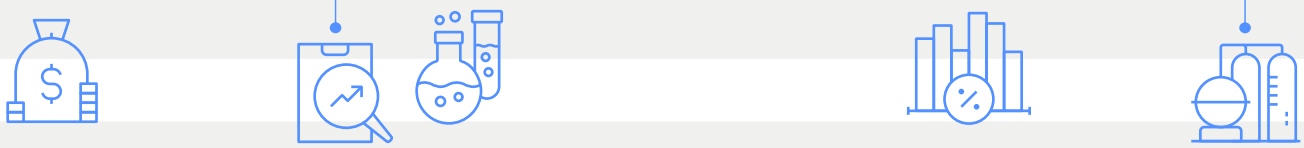
FIGURE 2 **Regulatory levers to support SAF and clean hydrogen production *(non-exhaustive)***

Carbon credit markets: Carbon cap and trade system that allows companies to benefit from operating below the GHG cap

- California's Low Carbon Fuel Standard and Canada's Clean Fuel Standard
- EU Emissions Trading System (EU ETS)

Blend requirements: Minimum requirements of renewable content in fuel

- EU "Fit for 55" regulation demanding 2% SAF blend by 2025, and 6% SAF blend by 2030
- No direct blend requirement for clean hydrogen[1]



Carbon pricing: Carbon tax system that imposes additional cost for producing climate solutions

- British Columbia taxes diesel ~40 CPG for carbon emissions
- Germany carbon pricing system as part of Fuel Emissions Trade Law (BEHG)

R&D grants: Earmarked funds, which can be allocated to R&D projects in climate solutions

- EU Innovation Fund will invest €3bn to help build market for hydrogen through the European Hydrogen Bank and €1.8 billion into "clean tech" projects, including SAF projects
- US Build Back Better Act (BBBA) allocating ~$9.5 billion for clean hydrogen initiatives, including the development of regional clean hydrogen hubs and $275 million for grants in SAF production

Tax incentives: Specific tax incentives for blending or producing climate solutions

- Hydrogen Production Tax Credit, awards up to $3 per kg of hydrogen produced to projects with a life-cycle GHG emissions intensity of <0.45 kg CO_2e/kg H_2 through to 2027
- US blender's tax credit and SAF blenders tax credit, which extends up to $1.75 per gallon for SAF through to 2027

Note: 1. The EU "Fit for 55" regulation demands an e-fuel blend mandate (1.2% by 2030), which is indirectly a clean hydrogen mandate.

Source: Oliver Wyman analysis, in collaboration with the World Economic Forum

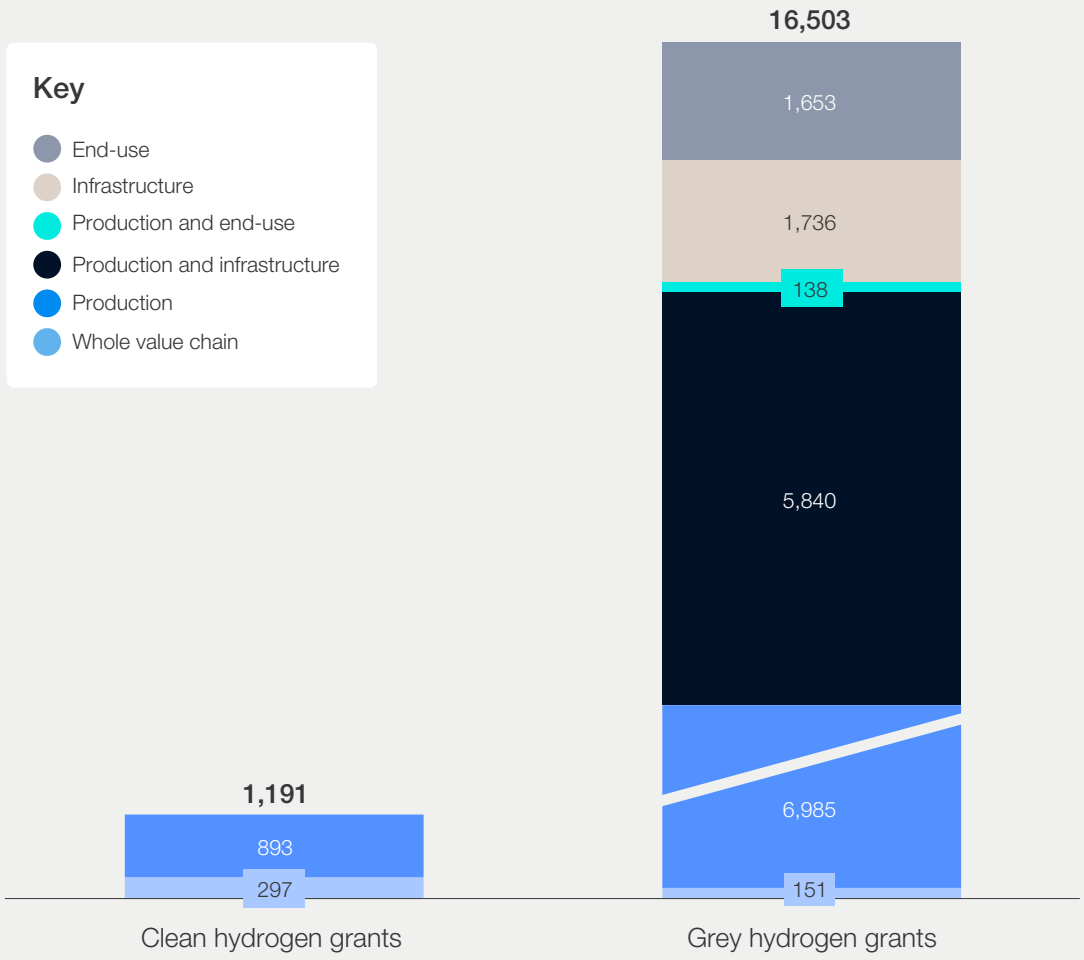
Recent support for clean hydrogen development

Public support for clean hydrogen production[11] and offtake in recent years has been significant, as illustrated in Figure 3 showing current and announced grant programmes available for hydrogen projects' capital expenditure (CapEx).

Recent examples of noteworthy announcements extending beyond grant support and supporting the development of clean hydrogen production include:

- The Netherlands' Stimulation of Sustainable Energy Production and Climate Transition (SDE++) programme, offering long-term contracts for difference (CfD) auctioned annually, up to €13 billion in 2022's annual auction
- The H_2Global Foundation, set up by the German government as a "two-sided" auction for long-term offtake and short-term supply, with the price difference between the two sides subsidized, similar to a CfD, promising €900 million for the first funding window, and with further funding already earmarked for future years
- The UK's Electrolytic Allocation Round, offering £100 million in the first round in revenue support for projects in operation before 2026
- In the US, the IRA announced the 45V Hydrogen Production Tax Credit, which awards up to $3 per kg of hydrogen produced to projects with a life-cycle greenhouse gas emissions intensity of less than 0.45 kg per kg of hydrogen (kg CO_2e/kg H_2)[12]
- Most recently, the European Commission established the European Hydrogen Bank, an auction system to support producers through a fixed-price payment for a maximum of 10 years of operation, committing an initial €3 billion

FIGURE 3 **Current and announced grant programmes available for hydrogen projects' CapEx across part of value change eligible ($ millions)[1,2]**



Notes: 1. Does not include EU Innovation Fund; 2. Based on $1 = 1.56 AUD = 1.36 CAD = €1 = £0.87.

Sources: International Energy Agency, *Global Hydrogen Review 2022: Executive Summary*; Oliver Wyman analysis

In July 2022, the European Commission approved "Hy2Tech", the first of many projected Important Projects of Common European Interest (IPCEI) on hydrogen, through which 15 member states will provide up to €5.4 billion in public funding to 41 projects , and expected to unlock an additional €8.8 billion in private investments. In September 2022, "Hy2Use" was also approved, the second IPCEI on hydrogen, through which 13 member states will provide up to €5.2 billion in public funding to 35 projects, which is expected to unlock an additional €7 billion in private investments.[13] Moreover, the US Department of Energy (DOE) made $8 billion available to fund regional clean-hydrogen hubs across the United States under the Infrastructure Investment and Jobs Act.

This clear signal of the public sector's willingness to provide incentives for clean hydrogen production and directly support projects in this space was accompanied by a significant increase in private investment. In March 2022, Maersk entered partnerships with six leading companies to source 730,000 tonnes of green methanol a year by the end of 2025 to run 12 methanol-fuelled vessels it had ordered in 2021.[14] In October 2022, Cepsa signed a memorandum of understanding (MoU) with the Port of Rotterdam to ship green hydrogen from southern Spain to northern Europe, starting in 2027.[15]

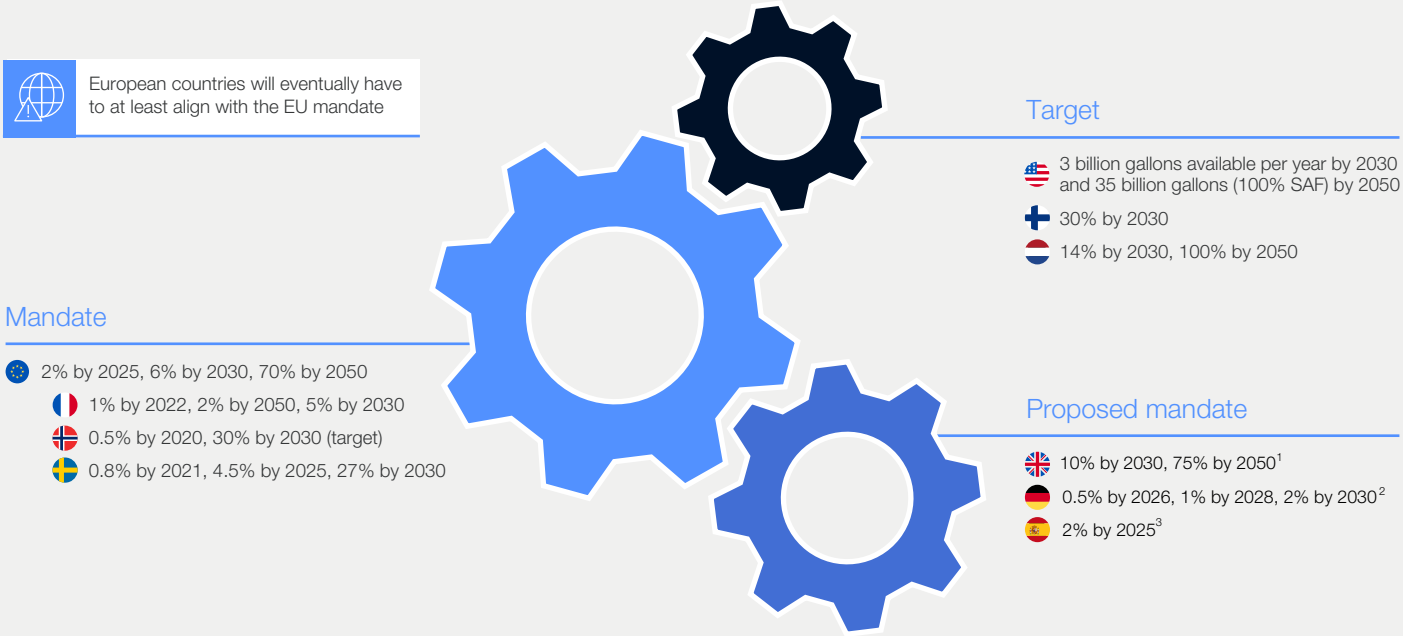
Recent support for sustainable aviation fuels development

Government incentives and regulations to support SAF are changing the assessment of business model risk, supporting both demand and supply.

Until recently, R&D grants have been the most popular lever for government support of SAF. These are earmarked funds that can be allocated to R&D in SAF. Examples include the US Build Back Better Act (BBBA), which allocated $275 million for grants in SAF production, and the EU Innovation Fund, allocating €1.8 billion to clean technology projects including SAF. Since 2020 there have been government announcements of additional support in the form of tax incentives and blend requirements, stimulating further funding. In the US, the IRA extends up to $1.75 per gallon for SAF through to 2027 for blending or producing SAF. S&P Global Commodity Insights viewed the SAF tax credit as significant in closing SAF's price gap relative to renewable diesel (RD).[16]

In July 2021 the European Commission published a package of legislative proposals branded "Fit for 55". One component is the ReFuelEU Aviation proposal to increase the production and uptake of SAF. This includes a blending mandate under which aviation fuel suppliers must ensure that all fuel supplied to aircraft operators at EU airports contains a minimum proportion of SAF, including a minimum share of synthetic fuel.[17] The European blending mandate is expected to have a strong impact on SAF demand.[18] Still, EU SAF mandates have relatively conservative targets, which lag behind most airlines' ambitions – many have set themselves the target of using 10% SAF by 2030. Without strong mandates, FIs will find it difficult to invest to a level that would support higher blends. Figure 4 gives a picture of global SAF targets and mandates, describing three levels of SAF blending initiatives.

FIGURE 4 **Three types of SAF blending initiatives**



Notes: 1. In the UK, the second round of consultations is under way, with the final version of the mandate expected to be introduced to Parliament by the end of 2023; 2. In May 2021, Germany adopted a power-to-liquid (PtL) roadmap that established the suggested target for electricity-based kerosene. No visibility on timeline of adopting this target into law; 3. In Spain, the "Balanced Compromise" initiative is currently in consultations with internal stakeholders. No visibility on timeline of adoption of the 2% mandate.

Sources: Oliver Wyman analysis, in collaboration with the World Economic Forum

The European Commission reached political agreement on the ReFuelEU Aviation proposal in April 2023, requiring fuel suppliers to ensure a minimum share of SAF at EU airports, starting at 2% of overall fuel supplied by 2025 and reaching 70% by 2050. Front-runner countries such as Norway in 2020, followed by France and Sweden, set mandates before the EU had done so, albeit with more conservative targets. On the way to an enforceable mandate, the UK, Spain and Germany currently have proposed legislation in place. Notably, the UK has an ambitious mandate of 10% by 2030, and 75% by 2050. A final version of the mandate is expected to be introduced to Parliament by the end of 2023. It should be noted that Spain and Germany will have to comply eventually with the more ambitious EU mandate.

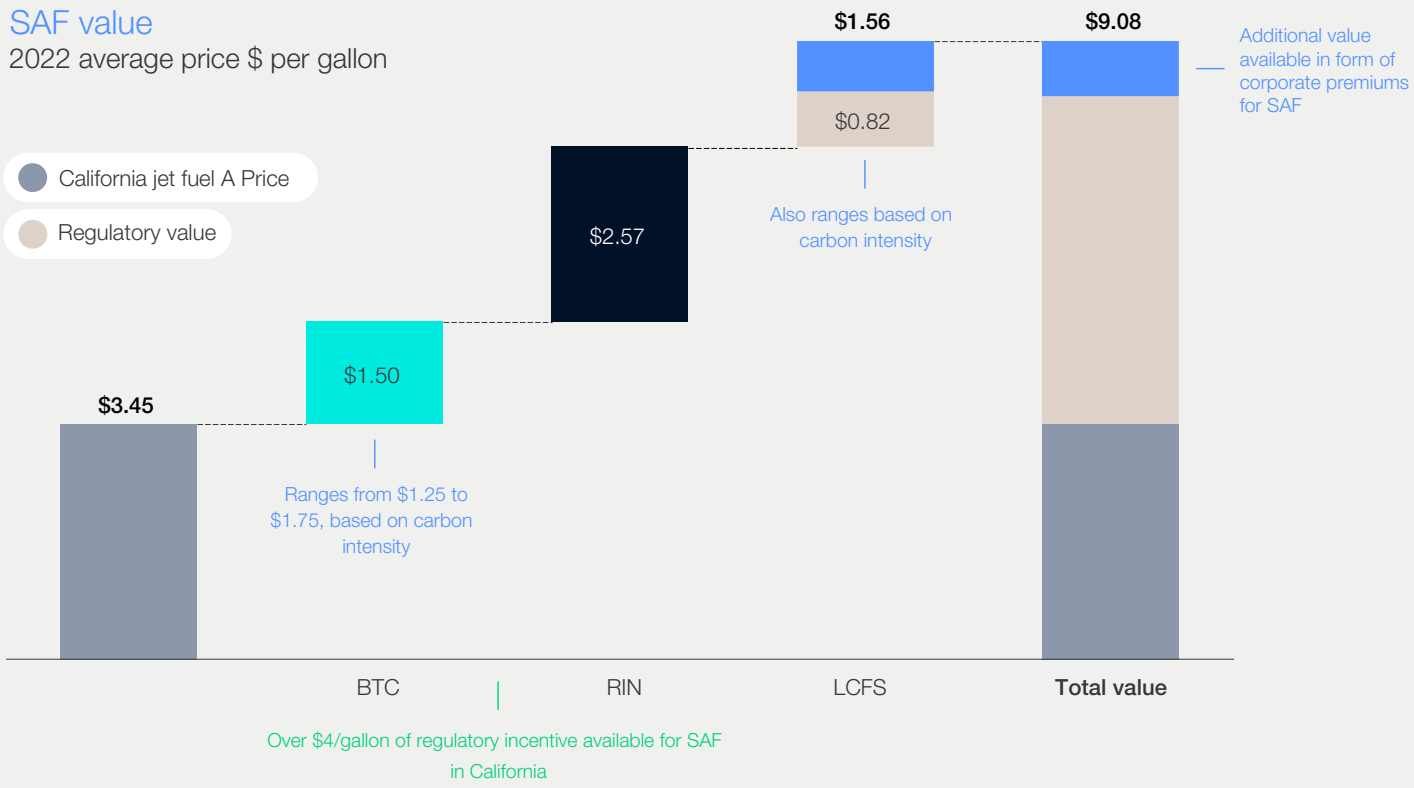
The US, Finland and the Netherlands[19] have opted for soft targets, meaning that clear enforcement mechanisms are not defined, which renders the targets aspirational.[20] Without clear mandates and with short-term incentives (e.g. the SAF blenders tax credit is set to expire in five years in the US), it is difficult for producers to build new capacity, given project timelines. While the industry perception is that the tax credit will be extended, there is no guarantee. The lack of regulatory certainty and mandates places strain on FIs' investment decisions and the ability of producers to seek funding.

Figure 5 depicts a good example of how state and regulatory incentives can interact to create an inducement to concentrate both the production and purchasing of SAF in the state of California. Multiple SAF incentives overlap in the US, creating the motivation to consolidate production and purchasing in high-incentive regions.

It is worth noting that the public sector is also funding the development of SAF through direct investment. Recent examples include Neste receiving funding from the EU Innovation Fund to develop its Porvoo refinery for green hydrogen production and carbon capture and storage.

The upward trajectory in capital flows to opportunities is a positive response to the continued public support for the production of and investment in climate solutions. At the same time, in response to government regulations and incentives around climate solutions, FIs must develop new capabilities crucial to financing and supporting the transition.

FIGURE 5 **State and regulatory incentives for SAF production in California**



Notes: BTC = blenders tax credit; RIN = renewable identification number, LCFS = Low Carbon Fuel Standard.

Source: Oliver Wyman analysis

2

Sustained support from the public sector is improving commercial viability for investors

Financiers are increasingly encouraged to invest, incentivized by sustained support from the public sector.

For both clean hydrogen and SAF the investment case relies on supportive public action. Financial incentives and mechanisms, targets and regulatory mandates encourage action from private finance and industry on the supply side and commit demand. Notwithstanding, FIs can also use flexible investment structures and partnerships with knowledgeable developers, airlines or original equipment manufacturers (OEMs) to facilitate their investments.

For clean hydrogen, public support in the form of CfD and blended finance mechanisms is effective in driving funding, as described below, and the opportunity for financiers to invest in parent companies and partner with developers is further facilitating investments in the space. For SAF, while targets and regulatory mandates help set the standard and commit demand, investment at the SAF plant level and partnerships with airlines help ensure demand and mitigate risk.

2.1 Clean hydrogen

Most of the projects at final investment decision stage today are financed on balance sheets by large incumbent gas or energy producers, and banks have little appetite for senior debt. For most banks today, while risk appetite varies between institutions, bankability still relies on having offtake agreements in place, securing a renewable energy supply via power purchase agreements (PPA) and certifications by independent technical firms to certify and verify the underlying technologies – for example, through engineering, procurement and construction (EPC) wraps or performance guarantees.[21] As a result of such challenges, only a small percentage of clean hydrogen projects have secured investment to date. The International Energy Agency (IEA) estimates that only 4% of proposed clean hydrogen projects reach a final investment decision; the Hydrogen Council's estimate is slightly higher at about 10% of proposed large-scale projects.[22]

Notwithstanding this, there has been promising interest from different parts of the finance value chain, including private equity and venture capital, where players are increasingly looking for opportunities to put smaller stakes to work in early-stage funding and capital markets, encouraged by guidance and principles from the Climate Bonds Initiative on the eligibility of clean hydrogen projects for the use of proceeds under green bonds.[23] Moreover, investments by incumbent oil and gas and energy companies are picking up, as actors think strategically about pivoting towards the energy transition.

Private-sector investment is being encouraged by three main drivers:[24]

- **Sustained support from the public sector** is encouraging private-sector investment in clean hydrogen, building on the significant private investments in projects along the hydrogen value chain in recent years. As discussed earlier in the paper, the public sector has demonstrated a clear signal to create incentives for clean hydrogen. Notably, long-tenor contracts for difference (CfDs) are proving to be an effective tool in helping bridge the green premium that exists between low- or no-emission products and their grey or brown alternatives. For example, the European Commission recently announced a rollout of carbon CfDs, enabling a full switch of existing hydrogen production from natural gas to renewables, and a transition to hydrogen-based production processes in important industrial sectors. Additionally, financing instruments to blend public and private capital can help boost investor confidence and spur project financing. The Connecting Europe Facility is a significant example of this, disbursing grants for the construction of hydrogen refuelling infrastructure that is conditional on additional financing from a financial intermediary.[25]

- **The possibility of investment in industrial incumbents at the parent-company level** substantially decreases the risk profile of investment in clean hydrogen projects. Such investments are typically structured as preferred equity or convertible bonds and come with pre-agreed optionality for project- or asset-level co-investment, simultaneously or at a later point. An example of this is found in the strategic partnership between Fortescue Future Industries (FFI) and Tree Energy Solutions (TES). The €130 million investment by FFI comprised an equity stake in TES and direct investment in the construction of the TES Green Energy Hub.[26] Partners will jointly identify, develop and invest in further assets to give FFI a pathway for access to critical clean hydrogen infrastructure. Building in the ability to co-invest at the asset level as the portfolio of projects develops gives investors further flexibility while also securing access to a pipeline of high-quality projects.

- **The "developer model"** is becoming a front-running approach to hydrogen financing, relying on the selection of a credible industrial sponsor or developer for investment, as opposed to betting on a winning technology. To ensure investor confidence, many questions not limited to technology need to be answered, and the capabilities required to answer them are not yet broadly available to FIs. These include

defining what a clean hydrogen project is and how it operates, assessing what technology to choose from and the reliability of the manufacturers and suppliers of the technology, and questions about whether companies that are more vertically integrated (e.g. those that own or manufacture their own electrolysers) are more or less attractive. While there is a need to develop in-house capabilities to understand and manage the risks associated with investments in clean hydrogen, investors and FIs can respond to some aspects of the capability gap by relying on a sponsor's knowledge of the industry, technology risks and ability to identify offtakers or ship the end-product. This is the model adopted by H_2 Energy, a developer based in Switzerland that has been working on renewable hydrogen projects since 2014.

It should be noted that strategies to address recurring challenges need to be flexible and regionally adaptable. Notwithstanding this, scaling up hydrogen production will require FIs to adapt their capabilities to understand and manage new risks.

2.2 Sustainable aviation fuels

The uptake in recent SAF projects and partnerships investing in SAF highlights the strong interest in SAF investments. As is the case with clean hydrogen production, private-sector investment in SAF is driven by three main catalysts, reliant first and foremost on a supportive public sector:

- **Incentives and regulations** drive high potential margins in SAF, due to the large gap between expected demand (driven by incentives and mandates) and even the most ambitious supply forecasts. Insofar as it accelerates demand, supportive legislation is strengthening the investment case, as previously described. The "Fit for 55" mandate of SAF use for access to EU airports, and the Better Business Bureau, which acts to provide tax incentives in the US, are positive contributors. These returns are enjoyed within short payback periods. Indeed, biofuel projects have been shown to break even within the first few years of production. It should be noted that earlier movers are likely to capture outsized margins.
- **The flexibility of SAF production plants** substantially decreases the risk profile of investments in SAF projects. Investors in SAF plants can benefit from options for SAF plants to produce RD, SAF and other products, allowing for flexibility to adapt to market conditions and the potential to prioritize RD as needed, which has clearer and more ambitious mandates in most regions.
- **Collaboration with knowledgeable partners in industry**, as is the case for clean hydrogen, is encouraging investments in SAF. By partnering with industry experts for SAF investments, including airlines or OEMs, FIs can de-risk investments by helping to ensure the demand for SAF, creating a more advantageous investment/risk/return profile. In this vein, purchase agreements or offtake commitments also help to mitigate exposure to high SAF prices and shift the pricing power away from the few energy players currently driving the SAF market.

Notwithstanding the above, SAF is at earlier stages of maturity when compared with RD, which is slowly beginning to be commoditized. This may decrease interest in a side-by-side evaluation.

2.3 Challenges remain

While the public sector has shown clear intent to support the funding and development of climate solutions, there are still several barriers that impede the mobilization of capital towards breakthrough technologies, including industry and market challenges. Given the international and integrated nature of sectors, systemic issues require global coordination.[27]

On the industry front, supply challenges are broadly driven by a high cost of ownership for new production facilities or critical supporting infrastructure and a shortage of feedstock. On the demand side, a lack of technological readiness of several transition solutions associated with a higher risk profile, and a lack of standardized definitions of "green" production processes and outputs, lead to underinvestment in promising technologies. What's more, the cost differential between existing and green products threatens the soundness of business models. More broadly, there are systemic issues constraining industrial decarbonization that effective policies can help eliminate. For example, enabling sustainable aviation requires sufficient feedstocks and infrastructure.

As described in the 2021 Financing the Transition to a Net-Zero Future report,[28] for financial institutions this translates to:

- **A mismatch in the profile of opportunities**, driven by: (1) the impression that returns are not commensurate with the levels of risk posed; (2) a difference between offered debt financing tenor and financing needs (given capital treatment pressures and broader risk appetite); (3) limited liquidity when financing sustainable decarbonization infrastructure, meaning that project financing needs and the average appetite of infrastructure investors do not match; and (4) the fiduciary duty of longer-term institutional investors unwilling to take on significant levels of risk without de-risking measures

- **A limited pipeline of "bankable projects"**, due to capacity and resource constraints within Fis, leading to a preference for investments in "portfolio-ready projects" and "counterparty-level financing" as opposed to project-specific financing, which tends to require significant time, effort and upskilling of front-office teams

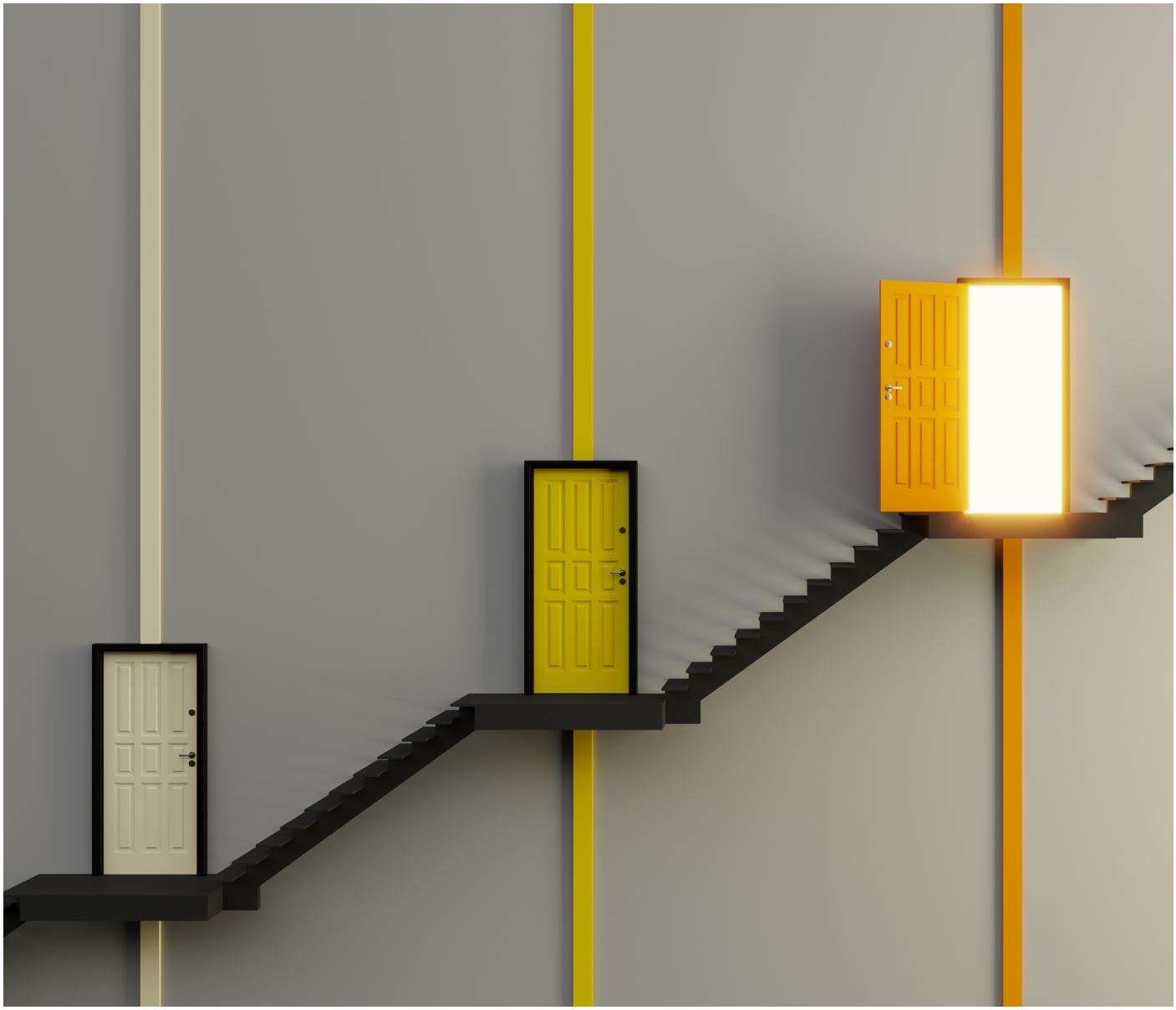
- **Limited data and clarity on pathways** that would otherwise inform their financing strategies, including limited data on the emissions reduction potential of new opportunities, a lack of granular sector transition plans, inconsistent or incomplete climate-related disclosures and limited data on the past performance of comparable investments

Within these constraints, FIs have many challenges to overcome if they are to support and benefit from the transition by funding climate solutions. While the public sector can act to mitigate some of these challenges, only the most ambitious FIs will benefit from the opportunities that climate solutions provide, by successfully adapting their climate strategies to meet the challenge head-on. With recent announcements reflecting a clear signal from the public sector to support the transition and create the enabling environment for investment, private finance must act alongside it. While incentives are important enablers, FIs must also evolve to adapt to the restraints posed by the climate investment universe.

3

Driving action, creating certainty, setting standards – priority areas for continued public support

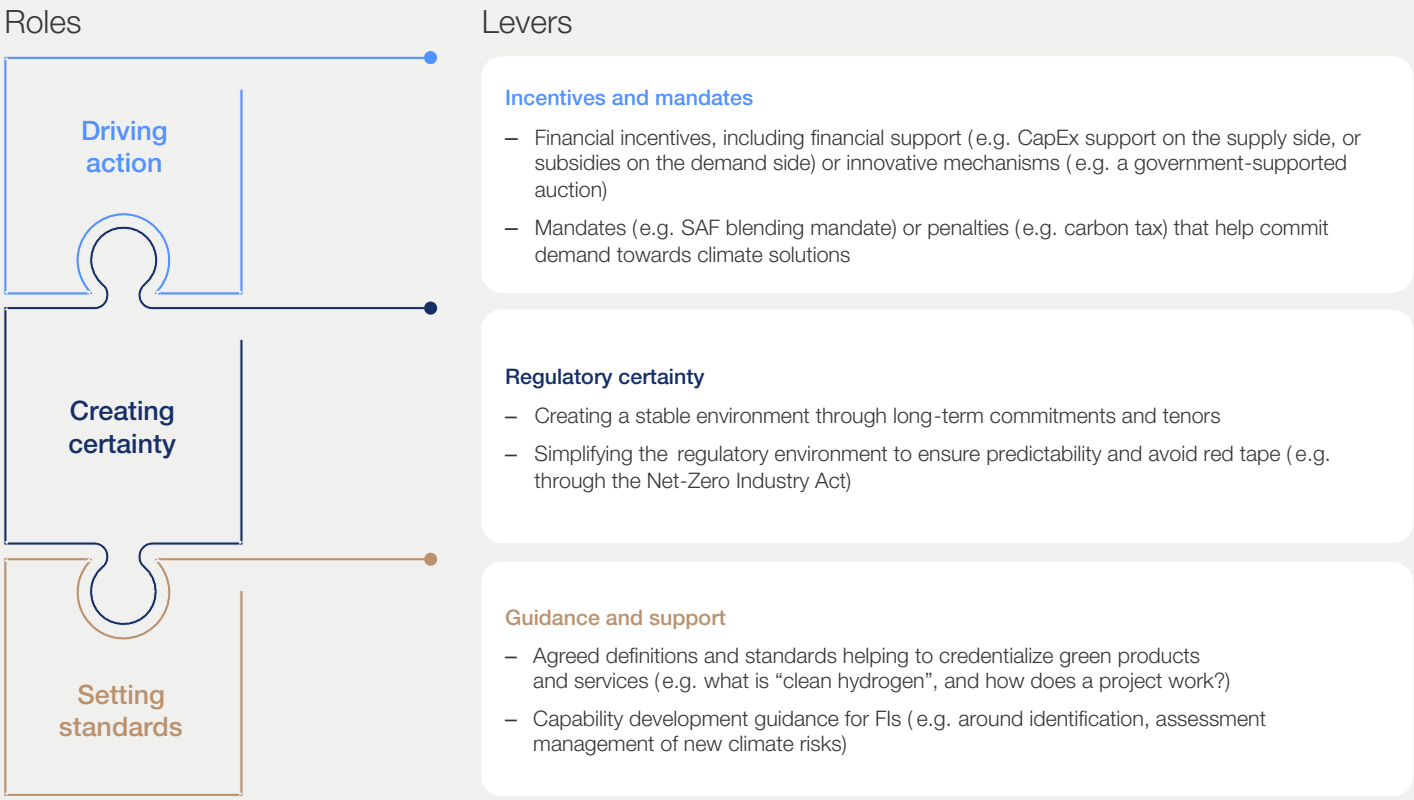
Three focus areas have proven to be particularly effective in driving funding towards climate solutions.



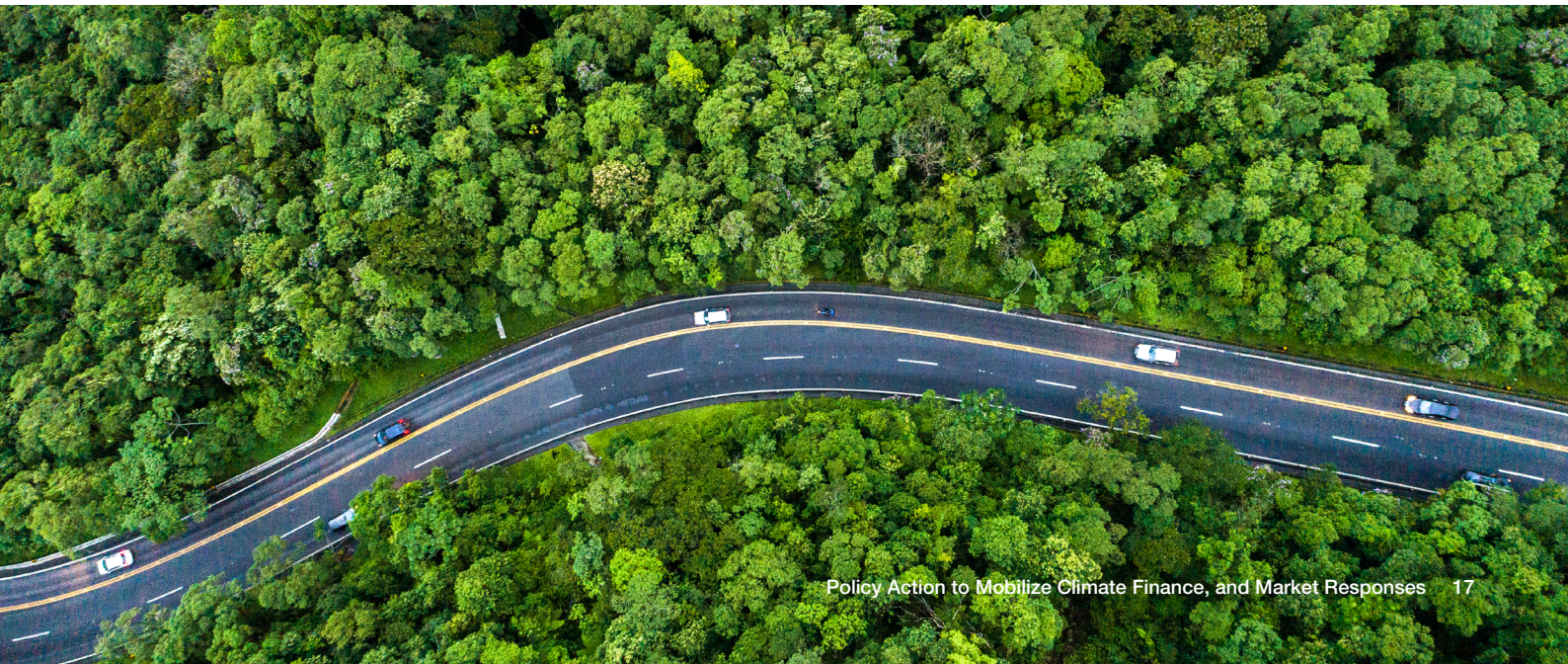
To maximize its effectiveness in driving funding of climate solutions, the public sector should work in three main areas:

- Effective government action focuses on both creating incentives to drive funding for climate solutions (e.g. through tax incentives) and committing demand at the speed required by encouraging action through mandates
- As far as possible, public actors can provide certainty on the long-term backing for current policies to ensure a predictable and simple regulatory environment and drive funding towards climate solutions
- Global standard-setters can look to better define standards relating to climate solutions to help clarify what does and does not support the transition to net zero for investors (e.g. what counts as "clean hydrogen"), ensuring coherence across stakeholders and speed in decisions

FIGURE 6 **Three key roles the for the public sector to support funding for climate solutions**



Source: Oliver Wyman analysis, in collaboration with the World Economic Forum



As referred to elsewhere in this paper, the public sector has an important role to play in **driving action** from other actors, namely producers of the technologies, offtakers of the solutions and financial investors. Driving action may take the form of financial incentives on the demand and supply side, or other mechanisms such as mandates or penalties, to help commit demand towards climate solutions and ensure a steady revenue stream for producers. Incentives are most effective when they are accompanied by mandates that effectively commit demand.

The role of the public sector in **creating certainty** for climate investment has also been alluded to; the public sector does this by guiding actors through regulatory certainty, ensuring a predictable and simplified environment. Regulatory certainty is required to encourage funding from FIs and can act as a powerful de-risking mechanism. To the extent possible, public actors should provide certainty on the long-term commitment of current policies; for example, through longer-term tax credits. The EU has responded to frustrations and criticism accompanying the IRA with a focus on simplifying red tape (e.g. through the legislative proposal of the Net-Zero Industry Act initiative of the Green Deal Industrial Plan) and more subsidies and innovative financial mechanisms; for instance, through the European Hydrogen Bank.

Public support also has an important role to play in **setting standards**; for example, via taxonomies to help credentialize green products and services that ensure actors are aligning with net zero and avoid greenwashing concerns.

Indeed, an increasing amount of regulatory activity surrounding sustainable financing has involved setting definitions and standards for the underlying economic activity being financed. First published in draft format in March 2020, the EU taxonomy defines performance thresholds, or "technical screening criteria", for economic activities, by sector and subsector. The focus on economic activity supports the goal of driving funding towards climate solutions, irrespective of the financial instrument or means of funding. Any investment or lending for a recognized activity counts as sustainable, whether through a loan, project financing or a green bond. There is also a clear push towards harmonizing definitions on sustainable economic activities globally, given the magnitude of global cross-border investment flows. In April 2021, the EU and China announced plans to harmonize taxonomies, with the aim of developing a jointly recognized classification system. Globally harmonious definitions and standards will encourage funding for climate solutions, especially in technologies where significant definitional opacity remains, such as regarding what constitutes clean hydrogen. In September 2023, the US Department of the Treasury released nine principles for net-zero financing and investment by FIs, including guidance on how FIs should support clients to adopt their own transition plans.[29]

4 Looking ahead

Close collaboration between financiers, project developers and policy-makers holds the key to mobilizing climate finance.

While recent announcements by various governments clearly signal that the public sector is committed to creating incentives to fund climate solutions, collaboration with private financiers and industrial stakeholders is needed to reach the speed and scale required.

There is a strong case for continued public support and prioritization of breakthrough technologies to enable the mobilization of funds towards breakthrough climate solutions at the necessary speed and scale. Private actors are encouraged by this renewed government support and are upgrading their capabilities to meet the funding challenge.

Importantly, the successful deployment of funds for breakthrough technologies rests on close collaboration between all stakeholders involved. Immediate market-wide stakeholder action backed by enabling public policies is required to address the highly likely investment gap towards net zero.

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Endnotes

1. While much of the emissions abatement pre-2030 will be driven by existing technologies (e.g. solar), post-2030 abatement relies on breakthrough technologies such as energy efficiency solutions, hydrogen-based fuels, bioenergy and carbon capture, utilization and storage (CCUS) solutions, among others. A prerequisite to the successful expansion and deployment of these breakthrough technologies in the 2030s is their validation at commercial scale in the 2020s. Significant capital needs to be made available this decade for the timely industrial decarbonization of hard-to-abate sectors and a global energy transition, rendering the 2020s a "decisive decade".
2. Based on BloombergNEF analysis of more than 8,000 public companies with explicit revenue exposure to clean energy: Nathaniel Bullard, "The Trillions of Dollars Forgotten When Tracking the Energy Transition", Bloomberg, 17 August 2023: https://www.bloomberg.com/news/articles/2023-08-17/want-to-measure-net-zero-progress-check-clean-energy-sales-figures?leadSource=uverify%20wall.
3. Insight report published in collaboration with Oliver Wyman, under the initiative of the same name: World Economic Forum, *Financing the Transition to a Net-Zero Future*, October 2021: https://www3.weforum.org/docs/WEF_Financing_the_Transition_to_a_Net_Zero_Future_2021.pdf.
4. As argued in a World Economic Forum briefing paper, published in collaboration with Oliver Wyman, under the Financing the Transition to a Net-Zero Future initiative: World Economic Forum, *Closing the Investment Gap: Policies to Accelerate Transition Finance*, May 2022: https://www3.weforum.org/docs/WEF_Closing_the_Investment_Gap_Policies_to_Accelerate_Transition_Finance_2022.pdf.
5. The Hydrogen Production Tax Credit awards up to $3 per kg of hydrogen produced to projects with a life-cycle GHG emissions intensity of <0.45 kg CO_2e/kg H_2 through to 2027.
6. The EU "Fit for 55" regulation demands 2% SAF blend by 2025, and 6% SAF blend by 2030.
7. An important pillar of the Net-Zero Industry Act is "setting enabling conditions", which aims to improve conditions for investment in net-zero technologies by enhancing information availability, reducing the administrative burden of setting up projects and simplifying permit-granting processes.
8. During this time, the Financing the Transition to a Net-Zero Future (FTT) initiative has worked to convene 50+ stakeholders across the financial community committed to financing breakthrough technologies in hard-to-abate sectors, and engaging industrial corporates, technology experts and public-sector actors to ensure a forum for dialogue across geographies and sectors, to share lessons learned and act to increase financier confidence in funding breakthrough technologies.
9. The Bipartisan Policy Center, "Inflation Reduction Act (IRA) Summary: Energy and Climate Provisions", 4 August 2022: https://bipartisanpolicy.org/blog/inflation-reduction-act-summary-energy-climate-provisions/; Francesca Paris, Alicia Parlapiano, Margot Sanger-Katz and Eve Washington, "A Detailed Picture of What's in the Democrats' Climate and Health Bill", *The New York Times*, 16 August 2022: https://www.nytimes.com/interactive/2022/08/13/upshot/whats-in-the-democrats-climate-health-bill.html?name=styln-domestic-policy-bill&region=TOP_BANNER&block=storyline_menu_recirc&action=click&pgtype=Interactive&variant=show&is_new=false; Committee for a Responsible Federal Budget, "What's in the Inflation Reduction Act?", 28 July 2022: https://www.crfb.org/blogs/whats-inflation-reduction-act; Senate.Gov, *Bipartisan Infrastructure Investment and Jobs Act Summary: A Road to Stronger Economic Growth*: https://www.cardin.senate.gov/wp-content/uploads/2022/09/Infrastructure-Investment-and-Jobs-Act-Section-by-Section-Summary.pdf; figures based on CBO cost estimate; Oliver Wyman analysis.
10. Oliver Wyman analysis, as further described in Christine Oumamsour, Todd Bowie, Jake Purvis and Tushar Narsana, "How the Inflation Act Is Reshaping US Energy", OliverWyman: https://www.oliverwyman.com/our-expertise/insights/2023/aug/how-the-inflation-reduction-act-is-reshaping-us-energy.html.
11. As defined by the International Energy Agency, clean hydrogen refers to both hydrogen produced through electrolysis powered from renewable sources (green hydrogen) and hydrogen produced from natural gas in conjunction with carbon capture and storage (CCS) by steam methane reforming (blue hydrogen).
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18. European Commission, "State Aid: Commission Approves Up to €5.4 Billion of Public Support by Fifteen Member States for an Important Project of Common European Interest in the Hydrogen Technology Value Chain", 15 July 2022: https://ec.europa.eu/commission/presscorner/detail/en/IP_22_4544.

19. It should be noted that European countries will eventually have to align with the EU mandate.

20. It should be noted that California established the Low Carbon Fuel Standard (LCFS) in September 2022, designed to encourage the use of cleaner low-carbon transportation fuels in California and encourage the production of those fuels, by allowing regulators to guide the industry through differentiated incentives within a single regulatory framework.

21. As further described in a Financing the Transition to a Net-Zero Future insight report published in collaboration with Oliver Wyman: World Economic Forum, *Financing the Transition to a Net-Zero Future*, October 2021: https://www3.weforum.org/docs/WEF_Financing_the_Transition_to_a_Net_Zero_Future_2021.pdf.

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