HARD TO ABATE, READY TO START

What do heavy emitters have to do to decarbonize?

ABU DHABI SUSTAINABILITY WEEK

MASDAR

Contents

03 A MESSAGE FROM MASDAR'S CHAIRMAN (AND COP28 PRESIDENT-DESIGNATE)

04 A MESSAGE FROM MASDAR'S CEO

05 EXECUTIVE SUMMARY

07 1. FINANCING IS THE BIGGEST CHALLENGE

16 2. PUBLIC SECTOR AND PRIVATE SECTOR COME TOGETHER TO DECARBONIZE

23 3. FUEL FIX OR FUEL SWITCH? HOW TO JUSTIFY THE INVESTMENT

30 MASDAR'S ROLE IN DECARBONIZATION

31 ACKNOWLEDGMENTS

32 RESEARCH DEMOGRAPHICS

A message from Masdar's Chairman (and COP28 President-Designate)

How can we make the energy transition real? How can we have a positive impact? Finding answers to these questions has been the focus of all my work since 2006, when I was asked to set up and run Masdar. We have been successful. Today, Masdar is a global clean energy leader and one of the world's largest producers of renewable energy. But the energy transition has to be accelerated in every region and for every industry. The hard fact is that – overall – the world's efforts to contain climate change are way off track. If we want to achieve humanity's ambition and keep a goal of 1.5C alive, then during the remainder of this decade, the world must cut global greenhouse gas emissions by 43 percent. And yet, I'm optimistic. Governments all around the world have agreed on the fundamentals. Key pledges and commitments are in place. Now, at this year's COP28 in the United Arab Emirates, it is time for action.

We must deliver substantive change in the real economy. One of the biggest challenges, of course, is the decarbonization of hard-to-abate sectors like transport, cement, steel, aluminum, and other heavy industries. And abate we must, because taken together these industries account for nearly half of all global CO_2 emissions.

This report is a starting point. It helps both governments and hard-to-abate industries identify the biggest hurdles for much-needed change and points towards pathways for decarbonization. There is one line in the report that really stands out for me: "Although decarbonizing these industries will be challenging, it is not impossible."

To succeed, we have to focus on three dimensions of change:

1. On the supply side, we have to start by putting finance solutions in place which make it possible for companies in hard-to-abate sectors to speed up their decarbonization efforts. This has to be accompanied by regulations that will shape the business case for decarbonization and encourage businesses to act.
2. On the demand side, we must encourage the decarbonization of procurement. This can be achieved through industry standards, but also through harmonized tax rules. In many cases, it's simply a question of buyers' intent. Take cement, which accounts for 7 percent of global emissions. The public sector accounts for 60 percent of all global demand; procurement that makes decarbonization a key performance indicator would instantly change the business case for carbon neutral manufacturing of this crucial building material.
3. Innovation will be the technical enabler of the energy transition of hard-to-abate industries. With the right financial tools, deadlines, and regulatory incentives, we will see a rapid scaling up of investments in technologies that deliver net-zero business models.

Here at Masdar, we are driving the energy transition – in the UAE, and around the world. We want to help all industries find the right pathways for change.

Our report suggests that – right now – around half of all industry leaders are optimistic that their sector can decarbonize. I have made it my personal priority to convince all business leaders that change is possible. I want to ensure that the case for change becomes so compelling that these industries will not be hard to abate, but become impossible not to abate.

COP28 is a significant opportunity for progress on this challenge. We look forward to hosting you all in the United Arab Emirates, where together we can make this a COP of concrete outcomes and practical solutions.

HE Dr Sultan Ahmed Al Jaber
UAE Minister of Industry and Advanced Technology, COP28 President-Designate, and Chairman of Masdar

A message from Masdar's CEO

As the world continues to grapple with the effects of climate change, decarbonization has become one of the most important tasks of our generation in our efforts to reach collective net-zero ambitions.

While significant progress has been made towards these objectives, there is still much more that needs to be done, especially in sectors that are traditionally more difficult to decarbonize.

As the host of Abu Dhabi Sustainability Week (ADSW), one of the largest sustainability events in the world and a catalyst for climate action, Masdar has partnered with FT Longitude, part of the Financial Times group, to develop this report entitled 'Hard to Abate, Ready to Start' in an effort to further the dialogue around decarbonization. hard-to-abate sectors, from steel and aluminum manufacturers to transport and heavy industry, are vital to our economy. At the same time, these sectors are responsible for nearly half of global CO_2 emissions, underscoring the importance of supporting these industries in their decarbonization journey. Fortunately, clean energy solutions represent a promising path forward for these sectors.

At Masdar, a global clean energy powerhouse active in over 40 countries, this is something that we have seen firsthand in our 16-year history of pioneering clean energy around the world.

In aviation, one of the hardest sectors to decarbonize, we are working with leading industry partners to capitalize on the potential of green hydrogen for use in Sustainable Aviation Fuel (SAF), establishing a green hydrogen demonstrator project at Masdar City in Abu Dhabi, UAE.

We are also seizing the opportunity that green hydrogen represents for other hard-to-abate sectors as well. Whether it's forming a multi-billion-dollar strategic alliance to help drive the UAE hydrogen economy, or developing green hydrogen electrolyzer capacity in the UK, Egypt and elsewhere, Masdar recognizes the promise that green hydrogen holds for a decarbonized tomorrow. And around the world, we are developing utility-scale, world-class clean energy projects utilizing onshore and offshore wind and solar, as well as waste to energy technologies, to help decarbonize electricity generation for industrial and residential uses alike.

Our firm belief in the power of clean energy to decarbonize hard-to-abate sectors is reflected in our ambitions to grow our global renewable energy capacity to 100 GW, and our green hydrogen production capacity to one million tons per year, by 2030.

As this report notes, executives from hard-to-abate sectors share the belief that clean energy has the most potential for the decarbonization of their industries, with over half of respondents identifying renewable energy as their top area of focus for decarbonization.

And, perhaps most importantly, there is a renewed sense of optimism among executives that achieving net-zero in hard-to-abate sectors is possible, with half of those surveyed indicating that they believe it is more feasible now than it was just a few years ago.

This optimism is something that I share. While the road to decarbonization will certainly be challenging, I know that by continuing to work together to accelerate the deployment of clean energy solutions, we can make decarbonization easier for hard-to-abate sectors.

Mohamed Jameel Al Ramahi
CEO, Masdar

Executive summary

Cement, steel, aluminum, petrochemicals, shipping, aviation, heavy industry and manufacturing companies will play a decisive role in mitigating climate change. In 2019, industry and transport together accounted for 46 percent of CO_2 emissions from energy and industrial processes,[1] so inaction in these hard-to-abate industries today could derail the Paris Agreement.

The good news is that although decarbonizing these industries will be challenging, it is not impossible. Senior executives in these industries say they are more optimistic about their businesses achieving net-zero than they were a few years ago.

Their main reasons for pursuing decarbonization are less driven by net-zero targets set by governments – they are more motivated by business-critical considerations, such as remaining financially competitive on a global scale. This is especially true of energy-intensive companies operating in competitive export markets.

Difficult but not impossible

Companies know that they need to keep up the momentum in investment if they are to thrive in a net-zero economy. Trillions are required to decarbonize these industries – and while the public sector has a crucial role to play in helping to scale up emerging technology and new infrastructure, the private sector will need to step up. We found that most hard-to-abate industry companies expect to increase their decarbonization budgets over the next two to three years.

So what will be the priority areas for investment?

Developing emissions-reduction technologies such as carbon capture, utilization and storage (CCUS), hydrogen production, and electric arc furnaces are critical, as they require substantial financial upfront investment and off-take agreements.

Renewable energy, meanwhile, continues to be rolled out globally, and it offers cost-competitive opportunities for emissions reductions. But electrification with renewables is not a one-size-fits-all solution for heat and energy-intensive industries.

So the future of hard-to-abate industries will now depend on the creation of innovative financing solutions, new partnerships to reduce the risks of costly infrastructure and technology, and new cross-sector value chains. As we enter 2023, the UN's annual climate conference, COP28, hosted by the United Arab Emirates will be an important forum to focus on finding solutions for hard-to-abate industries and promote partnerships for progress towards the Paris Agreement goals.

[1] https://www.iea.org/reports/transforming-industry-through-ccus

How are these industries tackling net-zero?

We surveyed 500 senior executives working in energy, industry and transport across Europe, Asia-Pacific, the Middle East and North America to find out how they are decarbonizing.

KEY FINDINGS

Decarbonization budgets are a significant source of concern: less than a third of industry executives (30 percent) say their budget will be adequate to meet their needs. However, 70 percent do expect an increase in decarbonization budgets over the next two to three years.

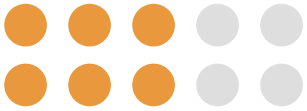
63%

For 63 percent of respondents, the main motivations to decarbonize are business-critical reasons, such as remaining financially competitive and mitigating the future cost of a carbon border tax. Only 24 percent say that mitigating climate change is a priority.

54%

Renewable energy (54 percent), energy efficiency (47 percent) and circular economy applications (37 percent) are respondents' focus areas of decarbonization activity. Many companies are only just getting started with feasibility studies for large-scale investments in technologies such as blue and green hydrogen and CCUS, so these are more of a longer-term priority.

There is more optimism in the Middle East and North America about the business case for low-carbon technology than in all other regions. In the US, the Inflation Reduction Act, could signal a shift towards prioritizing investment in a net-zero economy.



Six in 10 are taking steps to reduce emissions but have not yet set net-zero targets. Of these, 53 percent say that a lack of reliable financing is the main reason for this.

1/2

Half believe that achieving net-zero is more feasible now than just a few years before.

1.

FINANCING IS THE BIGGEST CHALLENGE

Half of the executives in hard-to-abate industries are optimistic about achieving net-zero. What is holding back the other half?

Conversations about sustainability and emissions reductions have only recently entered the boardrooms of heavy emitters such as transport and industry. Tony Douglas, the former CEO of Etihad, remembers an annual general meeting of IATA in 2018, when aviation sustainability and net-zero by 2050 were not on the agenda.

"It wasn't even in any of the fringes," he says. "Fast forward to the IATA conference in Boston in 2021, and the whole of IATA's membership signed up to a global pledge to net-zero by 2050 – net-zero had become mainstream. It was linked to just about every other thing that went on."

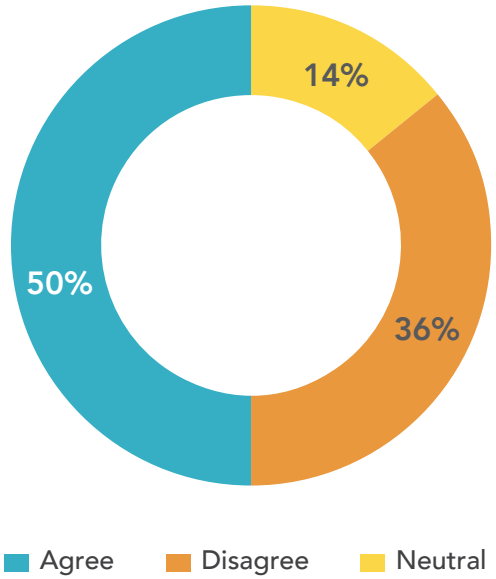
This might explain why, in our survey, 50 percent of executives from hard-to-abate industries believe that net-zero is more achievable than they previously thought – it was not being discussed to the extent that it is today.

But companies in these hard-to-abate industries are still hesitant to commit to deadlines for decarbonization. The majority of respondents (60 percent) say their companies are taking steps to reduce emissions but have not set a target date for completion. Aluminum and petrochemicals businesses are particularly reluctant to commit to timelines.

Just over a third (36 percent) have expressed targets for 2050, with above-average commitments in Europe (44 percent) and North America (45 percent). Even fewer respondents have declared 2030 targets (4 percent).

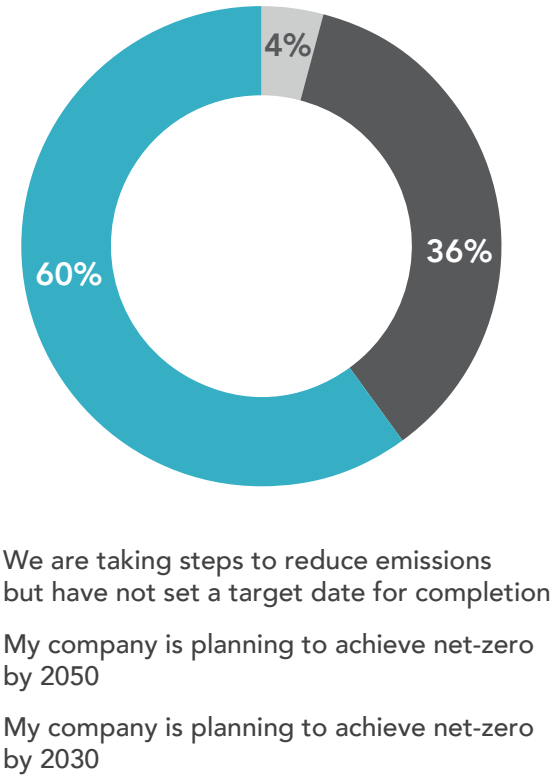
Senior executives are more confident that achieving net-zero is possible in hard-to-abate industries

Achieving net-zero in my business seems more achievable today than I ever would have thought possible just a few years ago.

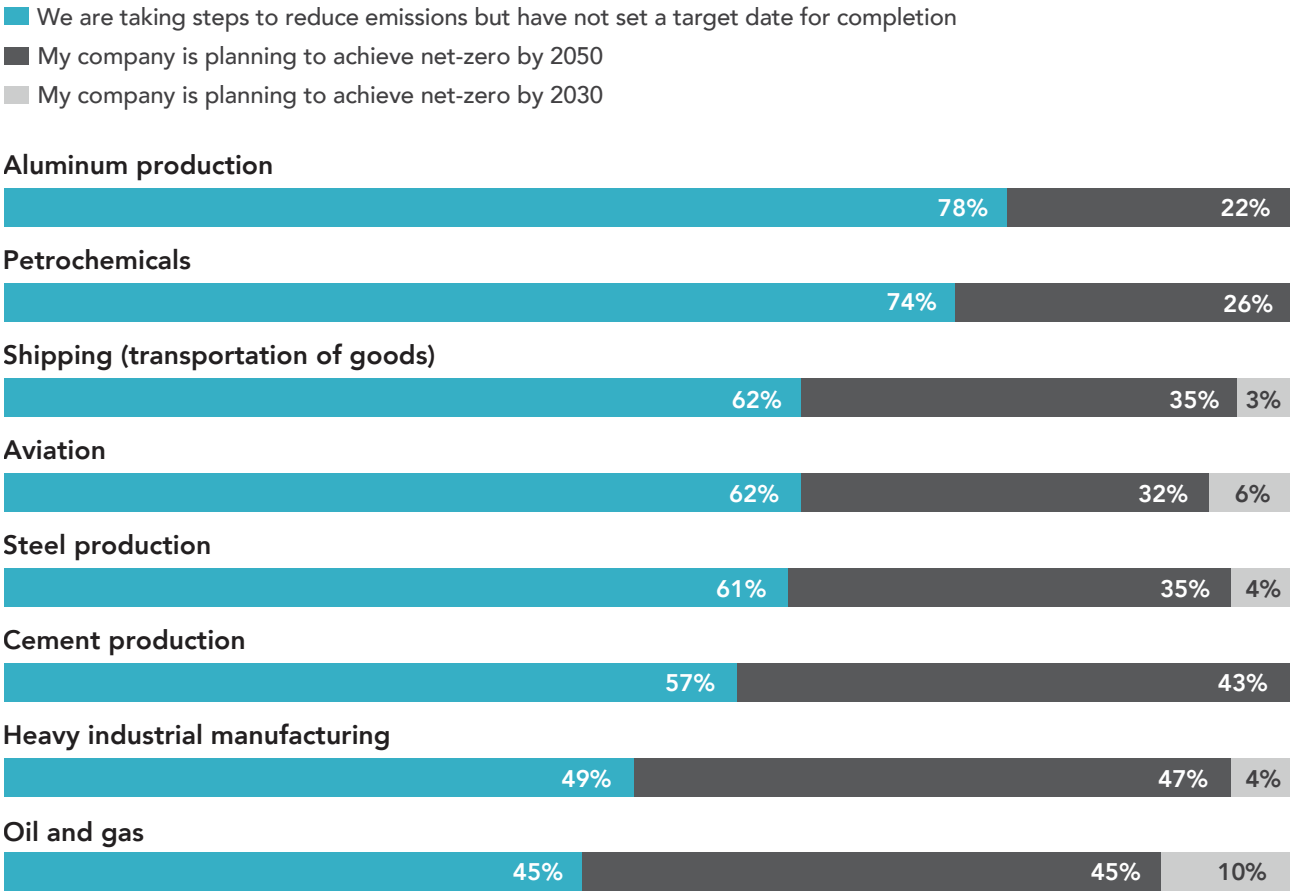


Most companies have no deadline for decarbonization

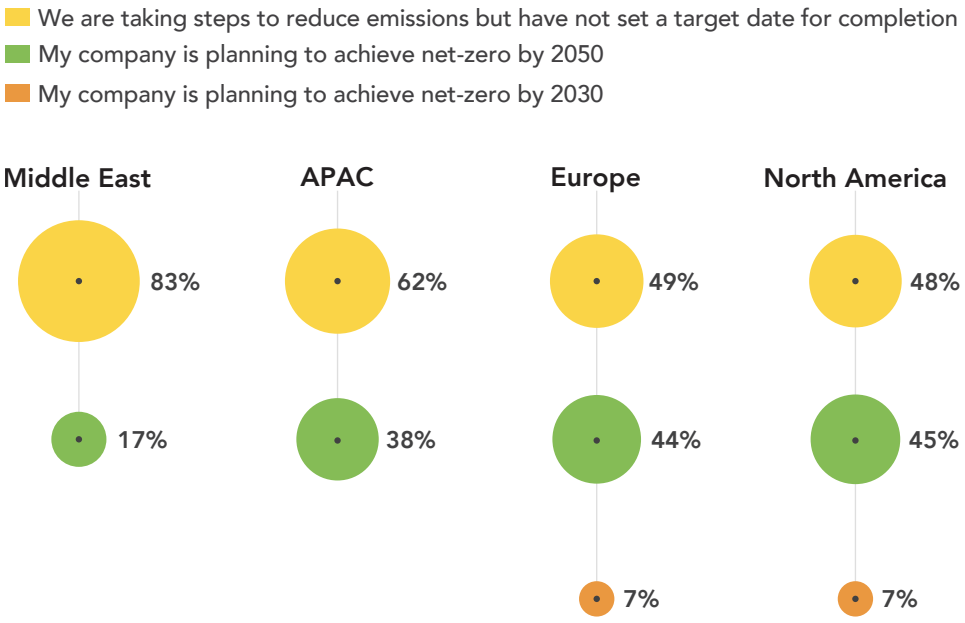
Which of the following statements best describes your company's plans for decarbonization?



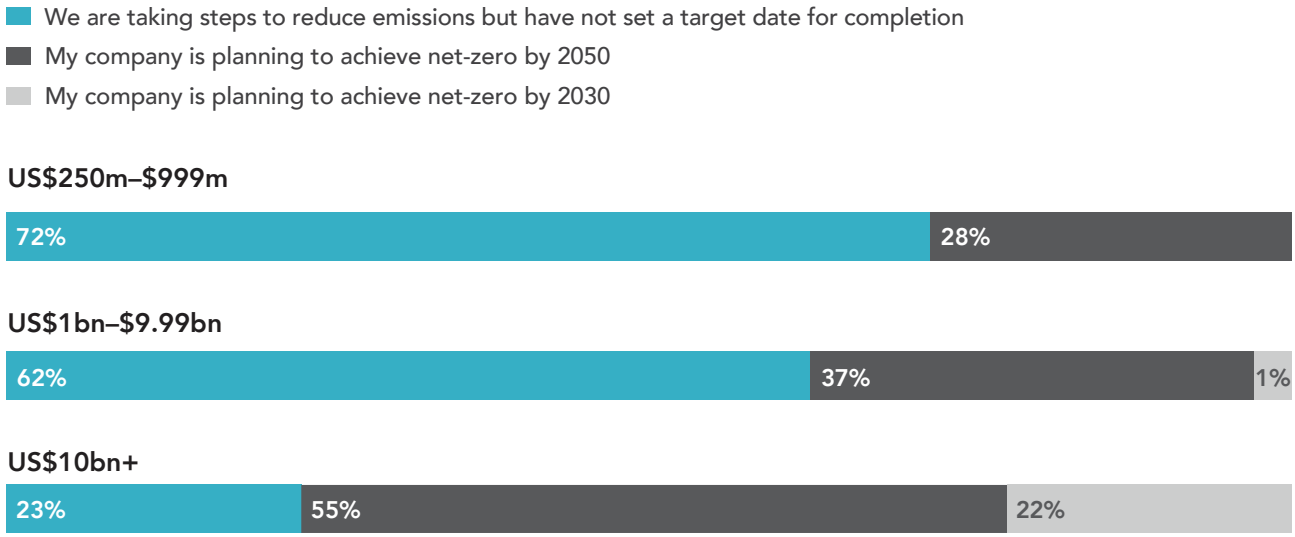
By sector



By region



By global annual company revenue



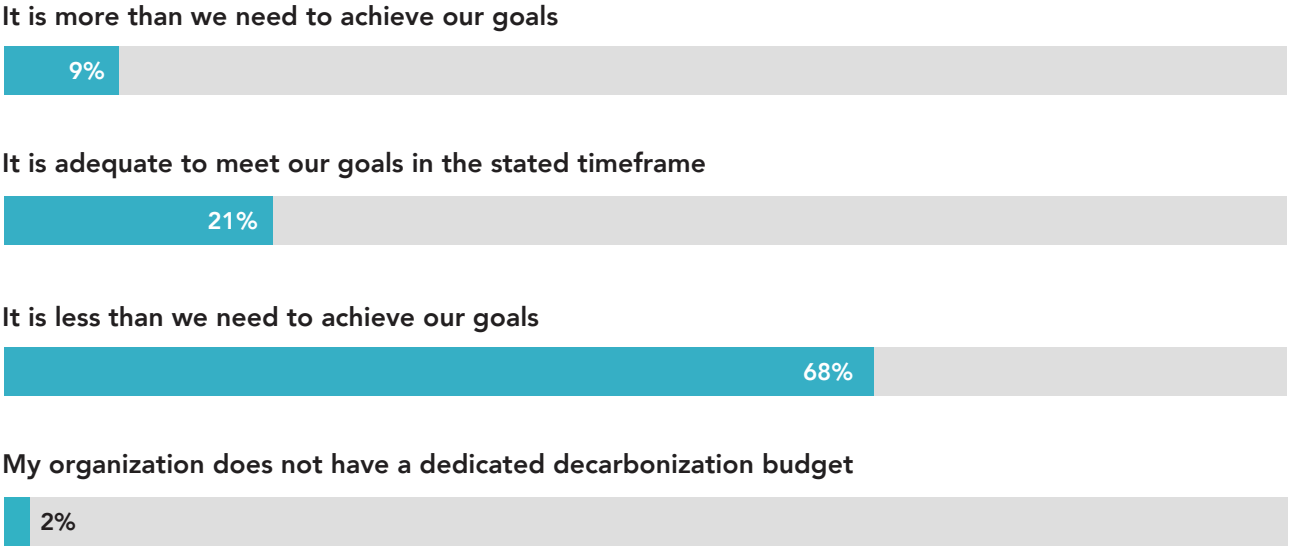
Money matters most

Decarbonization requires resources for planning and implementation. So it is unsurprising that the companies that are most committed to setting targets are also the biggest by revenue size: 78 percent of companies with global annual revenues of more than $10 billion have set targets.

And 53 percent of respondents that have not yet set net-zero targets say the main obstacle is the lack of reliable financing.

Finance is stopping companies from setting decarbonization timelines

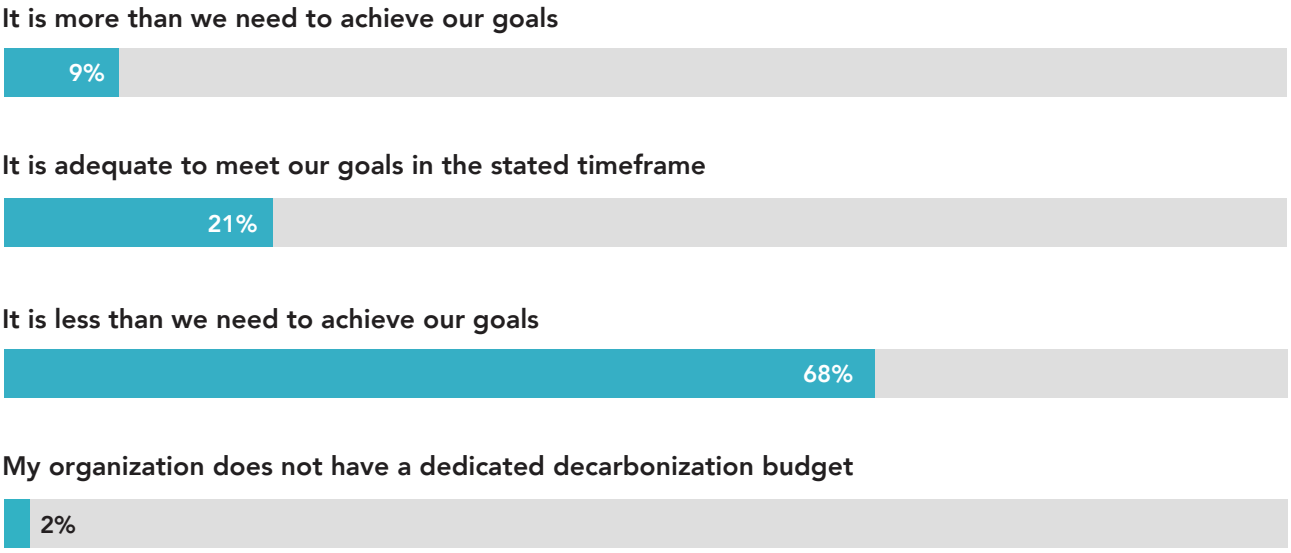
You said your company has not set a timeline for its decarbonization efforts. What explains that?



But budgets are also a concern for companies that have targets. Only 30 percent of all executives believe that their decarbonization budget will be at least adequate to support their goals.

Budgets dedicated to decarbonization activity are not big enough

At the current time, which one of the following statements best describes the budget that your organization is dedicating to its decarbonization activity?



A challenging economic environment overshadows net-zero

Cutting emissions from heavy industries requires new infrastructure, value chains, and technology, which all require investment. That is a challenge when many industrial and transport companies are still trying to recover financial losses from the economic activity slump from the Covid-19 pandemic.

"We can't focus on our net-zero targets," says an executive from an industrial company based in Europe. COVID-19 disruptions have caused a cash crunch for his business.

In order to decarbonize, the steel industry alone is estimated to need more than US$200 billion to transition steel assets to net-zero compatible technologies, and between US$5.2 trillion and US$6.1 trillion to set up enabling infrastructure by 2050, including carbon capture and green hydrogen supply.[2] The aviation sector, meanwhile, will need about $300 billion each year between 2022 and 2050.[3]

This tension is evident in the research. More than half of the respondents (54 percent) say that the financial squeeze from supply chain constraints, high energy prices for energy buyers and market pressure to keep costs low make it difficult for companies to justify investment in decarbonization.

[2] https://missionpossiblepartnership.org/action-sectors/steel/

[3] https://missionpossiblepartnership.org/wp-content/uploads/2021/10/MPP-Aviation-Transition-Strategy-2021.pdf

Pressure to keep costs low is the biggest obstacle to decarbonization

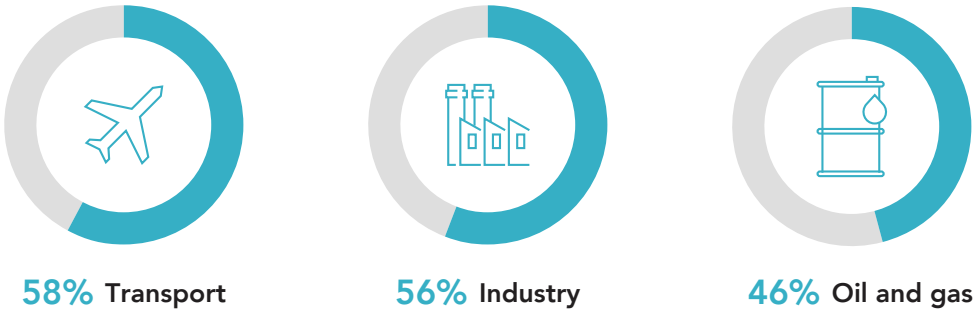
What are the biggest challenges that your company faces in its efforts to decarbonize?

Market pressure to keep costs low for energy and/or raw materials

Establishing a solid business case for sustainability

Poor-quality environmental data and reporting

Market pressure to keep costs low for energy and/or raw materials by sector



58% Transport **56% Industry** **46% Oil and gas**

Half of companies might now be more confident about achieving net-zero, but financing that transition continues to be a challenge. Executives are now talking about net-zero and how their industries can achieve it, but many still struggle to pay for it.

2.

PUBLIC SECTOR AND PRIVATE SECTOR COME TOGETHER TO DECARBONIZE

Who needs to come to the table to finance decarbonization for hard-to-abate industries?

New regulatory regimes, such as the European Carbon Border Adjustment Mechanism (CBAM) that imposes levies on importers to the EU, will encourage companies in hard-to-abate industries to act. Companies in countries where decarbonization is harder to achieve worry about their ability to compete in the EU. In contrast, European companies fear they'll have to pass down the cost to consumers in export markets. The need to create fair global regimes that enable companies to stay commercially viable and competitive in a net-zero economy is a deciding factor in making progress.

The considerable upfront investment required for certain types of decarbonization technology or change in the value chain can put certain sectors, such as cement, at a disadvantage. Besides renewable energy, many decarbonization solutions or alternative fuels are still unavailable on a commercial scale, forcing first movers to finance pilots without a clear return on investment. And that is a risk to their business model.

> "The challenge is how to bring affordability into a place that creates more demand. And in so doing accelerates the means through which supply is available. How you do that is massively complicated"
>
> **TONY DOUGLAS**
> Former CEO, Etihad

Referring to aviation fuels, Tony Douglas notes, the necessary scale of capital investment and the commitment to a long-term pathway as the challenges when deciding on the best of the sustainable fuel combinations. "We've tried to back all the horses at the moment as opposed to being presumptuous enough to understand which one's likely to be the winner."

"The challenge is how to bring affordability into a place that creates more demand. And in so doing accelerates the means through which supply is available. How you do that is massively complicated," says Douglas.

Private capital is likely to boost budgets

Companies are putting plans in place to finance these changes. Over the next two to three years, 70 percent of respondents expect an increase in their decarbonization budgets. Oil and gas companies expect the greatest budget increases: 31 percent are expecting more than 10 percent.

Seven in 10 companies expect to spend more on decarbonization over the next two to three years

Over the next two to three years, what change do you expect your business to make to its decarbonization budget?

It will increase by more than 25%

9%

It will increase by 11–25%

22%

It will increase by 1–10%

39%

It will stay approximately the same

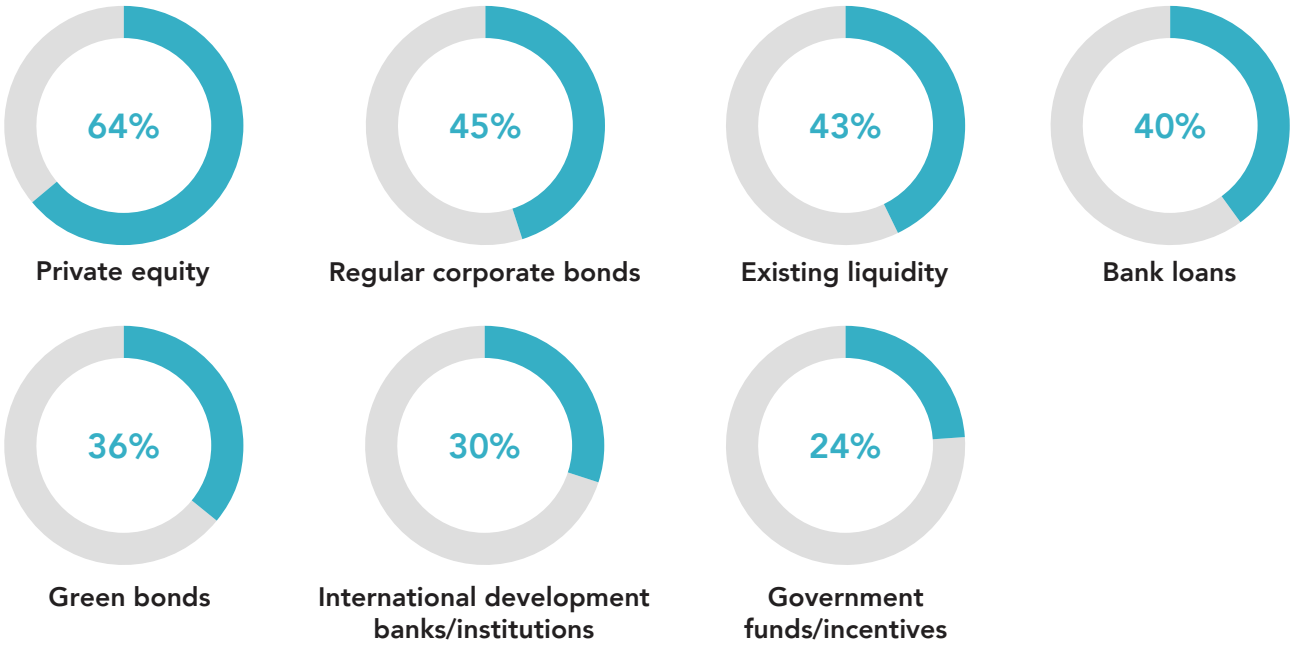
25%

It will decrease

5%

Where will that funding come from? From private equity, according to 64 percent of respondents – and 74 percent of respondents in North America. Their confidence in private equity's ability to provide this funding could come from the higher tolerance PE firms have for assets with lower ESG ratings and/or high emissions than public companies.

Companies expect private equity to be their top source of decarbonization finance over the next two to three years



Over the next two to three years, which of the following financing solutions do you expect your business to prioritize to support its decarbonization activity?

Government also needs to step in

Private companies and financiers will not get hard-to-abate industries to net-zero on their own – they also need government support: 41 percent of respondents believe it will be impossible to reach their country's net-zero ambitions without more government funding.

One of the biggest drivers to decarbonize will be carbon taxes, says James Busche, CEO of InterGroup Mining, but he warns that this will cause short-term pain.

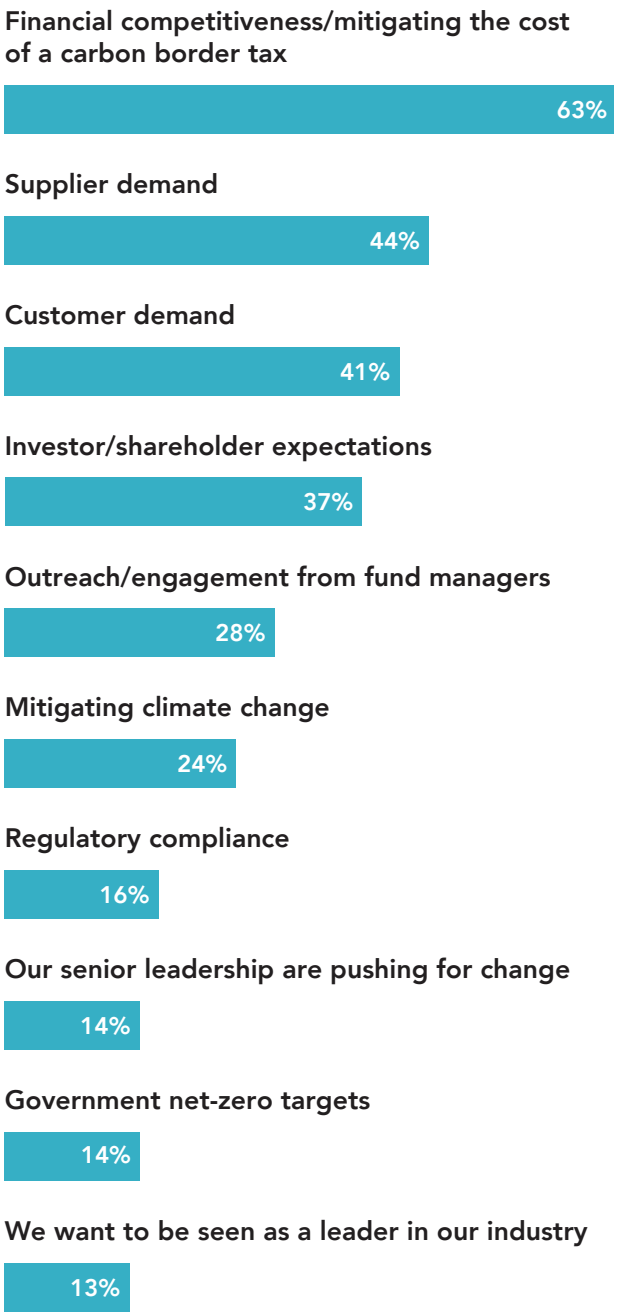
"Carbon taxes contribute to people ultimately doing the right thing – but there's pain in the short term, which is why we haven't done it already. It might mean lowered profits, increased product cost and a reduced supply for a period of time," he says. "But if we create both incentives and disincentives appropriately, without shutting businesses down and making people go cold in their homes, then goals for 2030 or 2035 are very achievable."

Many companies are worried as the EU rolls out a carbon border tax. Not decarbonizing will leave them with higher costs, but decarbonizing could make them less cost competitive globally if the tax is not applied consistently across markets.

The possibility of assets being stranded and devalued in a net-zero economy is daunting – especially in such a difficult economic environment.

This helps to explain why, for 63 percent of survey respondents, remaining financially competitive and mitigating the cost of a potential carbon border tax is among their primary reasons to decarbonize.

Financial competitiveness is companies' top reason to decarbonize



What is your organization's main motivation for pursuing decarbonization?

"Companies will do anything they can do to lower emissions in a way that has a financial pay-off for them, so that will probably be the initial driver," says Busche. "We need governments to charge people for the pollution that they actually create."

Incentives and partnerships show the way

Only 24 percent of the executives in the survey expect to receive financial support from their government to achieve decarbonization goals and targets.

That is a problem, because to implement costly infrastructures such as electric arc furnaces or CCUS for industries such as steel and cement, companies need funding partners to de-risk their investments – similar to the subsidies and tariffs solar and wind energy received to make them competitive.

> "A cost of carbon could be a competitive advantage for EGA. Mechanisms like those proposed in Europe do increase the urgency of the business case to decarbonize, but also have the potential to remove resources from the industry to invest"

ABDULNASSER BIN KALBAN
CEO, Emirates Global Aluminium

"A cost of carbon could be a competitive advantage for EGA. Mechanisms like those proposed in Europe do increase the urgency of the business case to decarbonize, but also have the potential to remove resources from the industry to invest," says Abdulnasser Bin Kalban, CEO of Emirates Global Aluminium (EGA).

"The burden may also end up being passed to consumers. These decisions are for governments, and our role at EGA is to be competitive in every scenario. We believe decarbonization is essential for our long-term competitiveness whether measures like CBAM are enacted or not."

EGA has focused for decades on technology development, progressively improving the efficiency of the Hall–Héroult process of smelting aluminum. The company's latest technology uses some 37 percent less electricity to produce each tonne of aluminum compared to technology from the early 1980s, and bringing down EGA's greenhouse gas emissions to 35 percent below the global industry average.

But an even larger proportion of the emissions reductions required can only be achieved through cooperation with other industries, says Bin Kalban. "This includes decarbonizing electricity generation, and the development of green hydrogen." EGA has struck an agreement with the UAE's Ministry of Energy and Infrastructure to join the UAE hydrogen leadership initiative.[4] This initiative will explore the role of hydrogen in decarbonizing industry.

Bringing new technologies to scale by introducing measures that can reduce uncertainty and foster innovation will play a crucial role in decarbonizing hard-to-abate industries. So government needs to come up with well-thought-out incentives for industry in order to get its support for national net-zero targets.

[4] https://www.thenationalnews.com/business/energy/2022/09/26/ega-joins-uae-hydrogen-initiative-to-support-countrys-decarbonisation-push/

3.

FUEL FIX OR FUEL SWITCH? HOW TO JUSTIFY THE INVESTMENT

Business cases for decarbonization technology and many alternative fuels are difficult to build because commodity prices are volatile and new value chains do not yet exist.

> We have announced a strategic initiative with TAQA, Dubal Holding and EWEC that would unlock significant further development of solar power generation capacity in Abu Dhabi, progress power asset and generation optimization, and decarbonize EGA's aluminum production

ABDULNASSER BIN KALBAN
CEO, Emirates Global Aluminium

Many of the technologies required to decarbonize hard-to-abate sectors already exist, but they are at various stages of development. The International Energy Agency (IEA) estimates in its "net-zero pathway" that nearly half of the CO_2 emissions savings by 2050 will depend on technologies such as hydrogen electrolyzers and direct air capture and storage, but which are not available on a commercial scale today.[5] But decentralized renewable energy sources, where electrification is possible, and energy efficiency are the obvious choices for first steps.

Emirates Global Aluminium's CEO Abdulnasser Bin Kalban says decarbonizing the electricity supply is by far the largest single opportunity to reduce EGA's greenhouse gas emissions.

"In 2021, EGA became the first company in the world to produce aluminum using solar power, with BMW Group as our main customer for this metal. We were able to do this through a partnership with Dubai Electricity and Water Authority."

"And we have announced a strategic initiative with TAQA, Dubal Holding and EWEC that would unlock significant further development of solar power generation capacity in Abu Dhabi, progress power asset and generation optimization, and decarbonize EGA's aluminum production," says Bin Kalban.

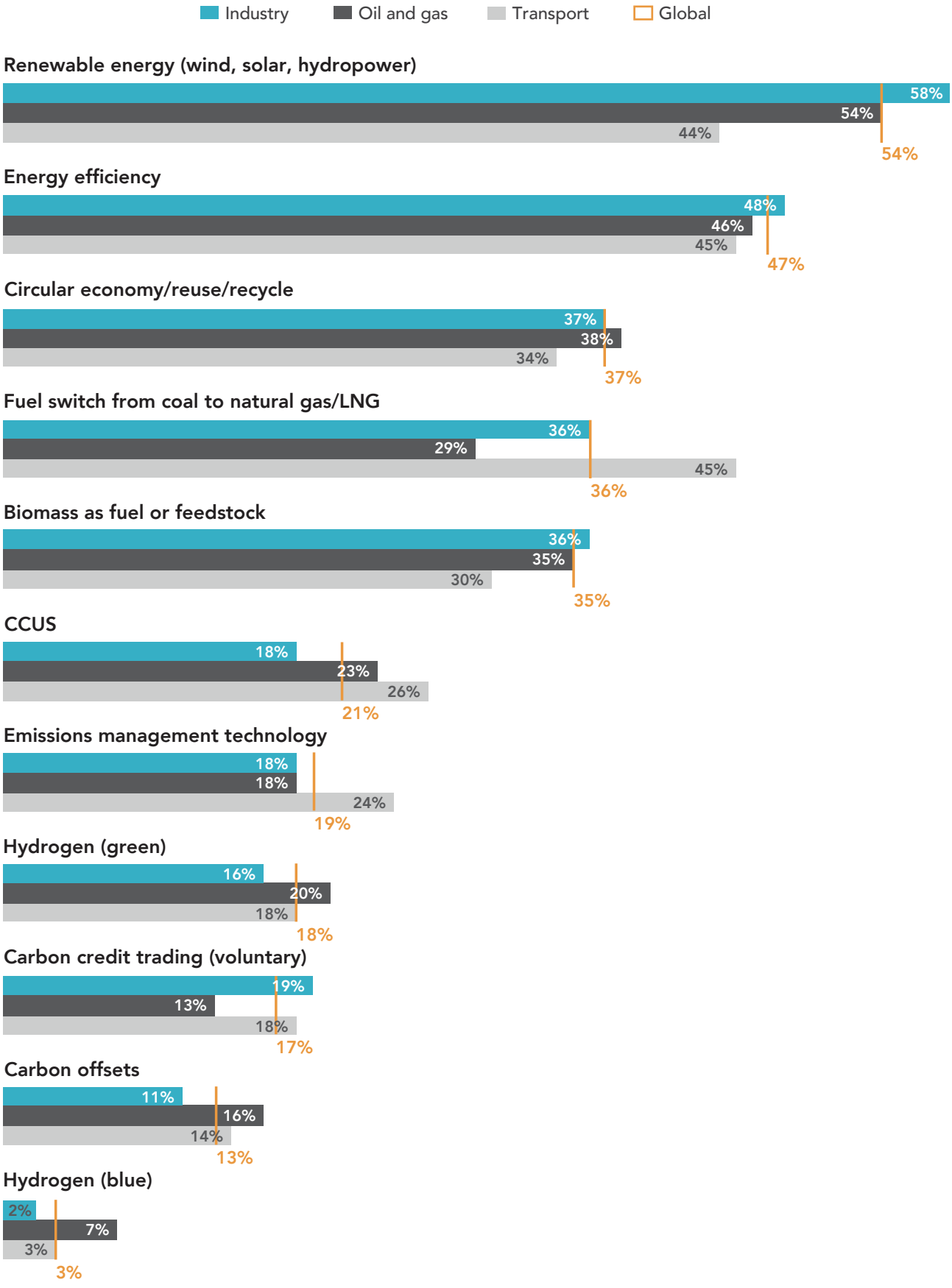
More energy-intensive industries such as steel, cement, aluminum and chemicals manufacturing need a solution that requires more than renewable energy to decarbonize heat or to capture carbon. Scaling up hydrogen and CCUS is still in the starting blocks, but there is enough interest and investment in these technologies to suggest that they will be scaled up in time.

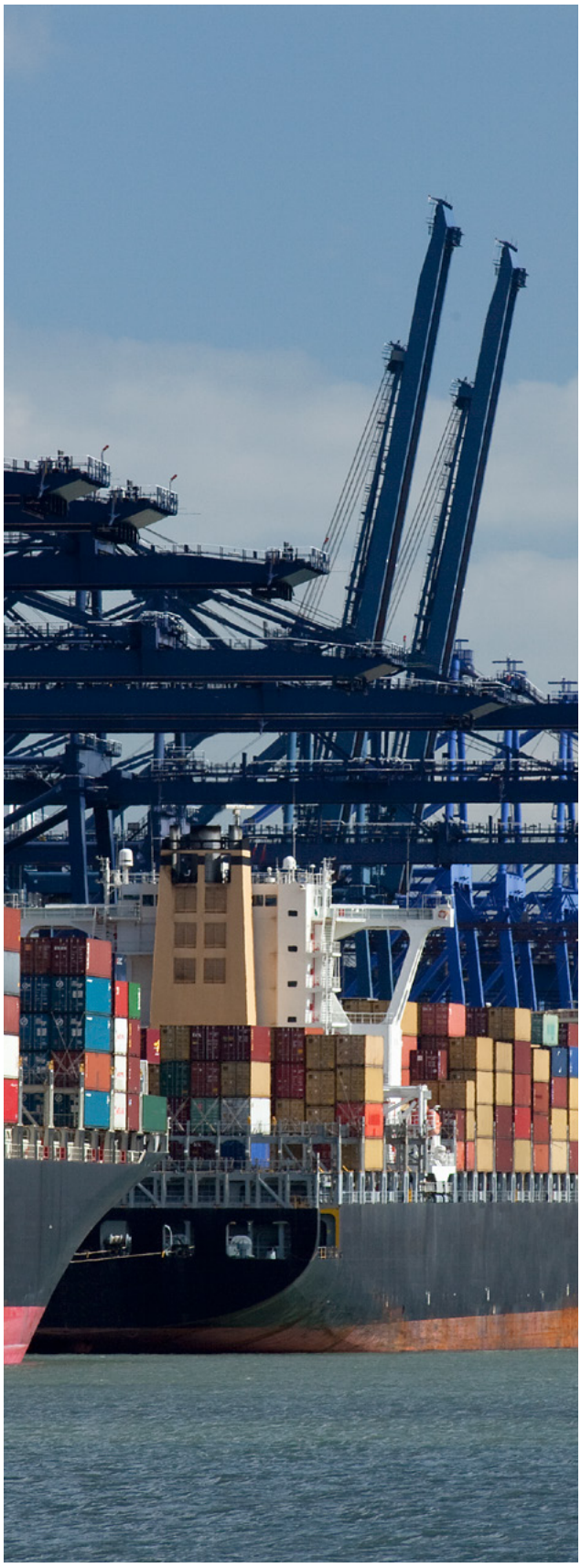
"There are clearly many factors at play, ranging from consumer appetite to pay a premium for sustainable products in the current economic environment, to a perhaps accelerated move away from hydrocarbons in the energy mix for political reasons," says Bin Kalban.

[5] https://www.iea.org/reports/net-zero-by-2050

Renewables are the main investment priority for companies' decarbonization activity

Which of these investments are you prioritizing as part of your decarbonization activity?





The slow progress on both blue and green hydrogen may be down to the business case weakening amid record-high gas and electricity prices. The cost of producing blue hydrogen, for instance, is now 36 percent higher than the UK government estimated in 2021.[6] And 43 percent of the respondents say that the spike in energy prices has made green hydrogen, which is produced from renewable power sources, less attractive.

This emphasizes the need for collaboration: if public and private sector organizations work together, they can find new value chains where hydrogen can be incorporated to decarbonize industry.

Kristen Siemen, Vice President and Chief Sustainability Officer of GM, which in 2021 partnered with Bill Gates' Breakthrough Energy Catalyst to advance green technology, believes progress through cross-industry private sector partnerships is just as important.

"It's important for companies in the private sector to come together and pool funds and investments to really try and tackle some of these really tough areas to decarbonize," says Siemen.

"The advantage is that we'll be able to find those new technologies and advancements, and work together to make them more of a reality, as opposed to each of us going off on our own and maybe not focusing the funding and the energy where it needs to be," she says.

In our survey, 41 percent say that the business case for low-/zero-carbon technology in their sector is sufficient considering the cost of change.

Siemen says she thinks about GM's sustainability goals in the same way as safety and quality goals. "The question is how do you build in sustainability initiatives up front so that they are part of the business plan? Our sustainability goals and our business goals are really one and the same."

[6] https://ieefa.org/articles/blue-hydrogen-costs-36-higher-uks-2021-estimate-would-increase-gas-import-dependency

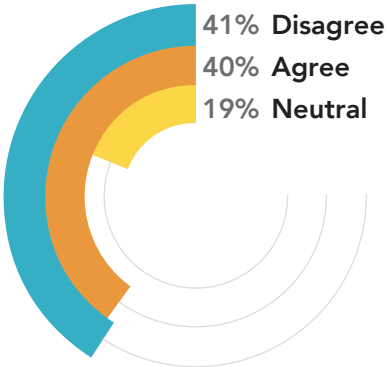
"Our transition to all-electric fleet, and skipping the hybrid phase was for that reason alone. It was a business decision and a climate decision".

In North America, the percentage of respondents optimistic about the business case rises to 46 percent. This might be a sign of the positive momentum that has followed the passing of the US Inflation Reduction Act in August 2022: the Act includes, for instance, tax credits for green hydrogen that could halve its cost in some locations.[7]

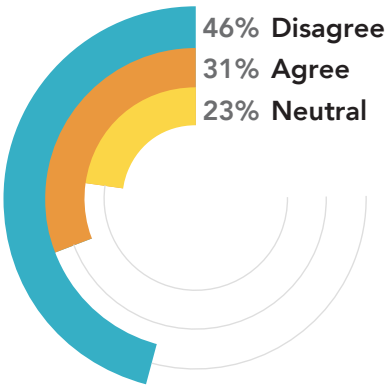
Companies in North America are less likely than others to say that the business case for low/zero-carbon technology is insufficient considering the cost of change

The business case for low/zero-carbon technology in my sector is insufficient considering the cost of change.

Average



North America



[7] https://www.ft.com/content/249a3412-dfeb-40e5-a147-77cc5d4d0689

By definition, it is difficult for hard-to-abate sectors to reach net-zero. But if they introduce cost-efficient measures such as securing clean energy supply, achieving energy efficiency through digital solutions and embedding circular economy practices where available, it will help in the short term. In the meantime, companies can get on with working out the feasibility of more intensive transformations in their value chains and energy systems.

Growing optimism needs back-up from private finance and public partnership

Our survey demonstrates that optimism is growing in hard-to-abate industries that they can meet the challenging target of achieving net-zero by 2050.

But companies are under pressure to plan ahead for a net-zero economy. And it is getting more challenging as they face the current recession, soaring inflation, and high energy and natural resources prices.

While much capital has been committed in recent years to achieve emissions reductions, the targeted deployment of such capital has been slow for hard-to-abate industries.

Companies are worried about financing their decarbonization efforts because many of the 'frontier' technologies required to cut emissions are not available on a commercial scale yet. So it is not surprising that many companies struggle to make a business case for decarbonization.

While legislative pressure is driving hard-to-abate sectors to decarbonize, executives' expectations for subsidies from governments are low; instead, they are turning to private equity for funding.

Through smart policymaking and financial de-risking, government collaboration with industry and investors can remove uncertainty and encourage innovation while increasing efficiency and lowering the costs of technologies. These are preparations for a net-zero future that hard-to-abate industries have to make sooner rather than later.

Hosted by

MASDAR

Masdar's Role in Decarbonization

Since inception in 2006, Masdar has been at the forefront of the UAE's clean energy strategy, developing utility-scale renewable energy projects, advancing innovation in clean technologies and adopting a smart first-mover approach in green hydrogen.

By 2009, Masdar had built its first 10-megawatt (MW) photovoltaic (PV) solar plant – at the time the largest in the region – at its flagship sustainable urban development, Masdar City. Today, Masdar is active in more than 40 countries around the world, with a portfolio of clean energy projects with a combined capacity of more than 20 gigawatts. That is enough to displace more than 30 million tonnes of carbon dioxide per year – equivalent to removing 6.5 million cars from the road.

Under the new shareholding structure of Abu Dhabi National Energy Company (TAQA), Mubadala Investment Company (Mubadala) and Abu Dhabi National Oil Company (ADNOC), Masdar is targeting a renewable energy portfolio with a capacity of at least 100 gigawatts (GW) by 2030, with the aspiration to double that in future years.

In addition, Masdar's new green hydrogen business will rapidly scale up and target an annual green hydrogen production capacity of up to 1 million tonnes by 2030, equivalent to saving more than 6 million tons of CO_2 emissions.

Masdar has been exploring green hydrogen production since as far back as 2008, and is now accelerating investment to advance the sector, with Masdar and the UAE set to take a leading role in the hydrogen economy.

Looking to develop and invest in key projects and build a scalable platform in strategic markets to meet domestic and international demand for green hydrogen, Masdar is targeting key segments, including aviation, ammonia, steel, maritime, power, refining, and heavy-duty transportation.

Key projects that Masdar has already invested in include the development of a demonstrator project in Abu Dhabi – supported by partners including Siemens Energy, TotalEnergies, Marubeni Corporation, Department of Energy in Abu Dhabi, Etihad Airways, Lufthansa Group and Khalifa University – to explore the production of green hydrogen and sustainable aviation fuels in the UAE.

Masdar has also signed an agreement with ADNOC and bp to explore production of sustainable aviation fuels and is taking a stake in bp's HyGreen Teesside project in the UK to produce green hydrogen. Masdar is also working with France's ENGIE on a US$5 billion green hydrogen strategic alliance, with the two companies working with Fertiglobe to establish a 200 MW green hydrogen plant in the UAE.

Africa holds tremendous potential for green hydrogen development, with a joint Masdar-Abu Dhabi Sustainability Week report estimating it could capture as much as 10 percent of the global market by 2050. Masdar announced last year it is developing projects with a range of Egyptian organizations to develop green hydrogen plants in the country with a combined capacity of 4 GW.

While renewables and green hydrogen will be Masdar's key business focus, the company is also active in a range of clean technologies, including battery storage, desalination and waste-to-energy. Achieving net-zero by 2050 is likely to require not only rapid deployment of available solutions but also continuing investment and innovation in other clean technologies – Masdar will continue to address this going forward.

Acknowledgments

We would like to thank the following people for their contributions to our research:

ABDULNASSER BIN KALBAN
CEO, Emirates Global Aluminium

JAMES BUSCHE
CEO, InterGroup Mining

TONY DOUGLAS
Former CEO, Etihad

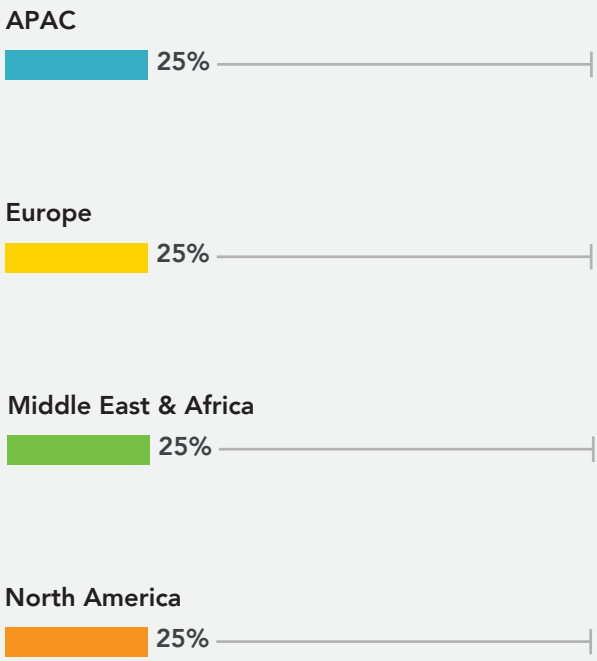
KRISTEN SIEMEN
Vice President and Chief Sustainability Officer, GM

Research demographics

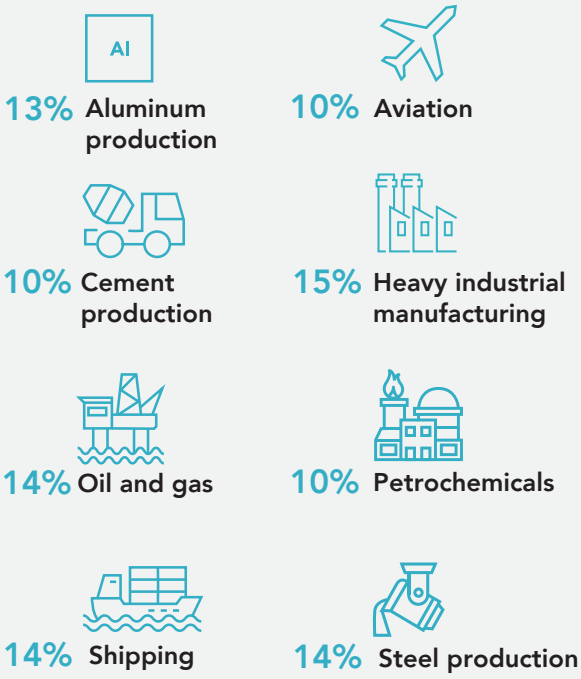
This survey was conducted between July and September 2022.

500 respondents

REGIONS



SECTORS



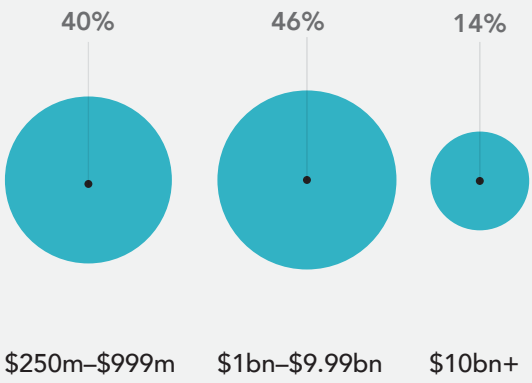
COUNTRIES

- Australia
- Canada
- China
- France
- Germany
- Hong Kong
- India
- Saudi Arabia
- Singapore
- UAE
- UK
- US

SENIORITY

50% C-suite
50% General roles

GLOBAL ANNUAL COMPANY REVENUE



*Please note that, due to rounding, data points in this report may not always add up to 100 percent.