

Our approach to
climate action

Terra progress
report 2019

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Foreword – Ralph Hamers

‘From commitment to action’

Climate change is one of the biggest threats the world is facing. Its impact will have far-reaching consequences for society, our customers and ING. That’s why we decided to put our loan book to work to help fight it.



What role can a bank play in the climate crisis? Is it only about mitigating risks, or can we actually drive change? How can we best support clients in making the transition to sustainable business models? One year ago we announced our commitment to steer our portfolio in line with the goals of the Paris Agreement to keep global warming to well-below two degrees, with the ambition to strive for 1.5 degrees. We call our strategy the Terra approach. With Terra, we believe our business can be a positive force in combatting climate change.

The biggest impact we can create is through our loan book. And within this loan book, we believe that what we do finance is more important than what we don’t. Because the transition to a low-carbon society requires different technologies than are available today. The financing required to make this possible is where banks come in.

ING’s commitment to sustainability is nothing new. We were among the first to say “no” to coal-fired power and have helped finance billions worth of investments in renewable energy projects and the circular economy – from green bonds and loans to introducing the world’s first sustainability improvement loan, which provides companies with a financial incentive to become more sustainable. Terra is about measuring and steering our climate impact in a new way to make sure we’re on track in aligning our portfolio with the goals of the Paris Agreement.

[> Foreword – Ralph Hamers](#)

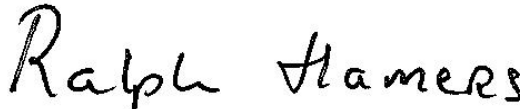
Terra enables us to focus on those sectors in our loan book that generate the most greenhouse gases. It uses science-based methodologies to measure the impact of those sectors on the climate and to set targets for each sector to transition to a low-carbon future. It tells us how far along we are on the path to Paris and what is still needed to get there.

It's quite a challenge to identify one methodology that works for all sectors, given that each sector will have its own transition pathway and each bank prioritises different sectors and assets. Another challenge is that some sectors don't yet have a clearly defined pathway on how to slow global warming, or don't yet have greener technologies available. Per sector, we therefore use the most appropriate methodology that's out there, acknowledging that there are actually many paths to Paris and in the end it's the impact that counts.

Over the past year, we've been working on assessing our lending portfolio and its alignment with climate benchmarks. This report marks a milestone for us – a new phase in our journey. We still have a long way to go – refining methodologies, improving data sources and incorporating the feedback from our partners and clients – but we've definitely moved beyond commitments to action. With this first Terra progress report, we are living up to our promise to transparently deliver results on measuring climate impact, setting targets and steering our portfolio.

I strongly believe that we can only be successful in tackling the climate crisis if we all work together. That's why we looked beyond ING and are building partnerships and coalitions that are bigger than just us. We're working with other banks and governments to set a global industry standard for measuring and aligning our loan books with climate benchmarks. This unity is the key to being effective as a sector and being able to make a real impact. I'm glad to see that others feel this way too, as four banks joined us in our climate commitment in December 2018 and more are pending.

I'm really encouraged by the progress we are making and proud of what we have achieved so far, which you can read about in this first Terra progress report.



Ralph Hamers

CEO ING Group

Foreword – Jakob Thomä



Over a decade ago, the global financial crisis identified an identity crisis in finance, demonstrating a widening chasm between financial markets and the real economy. Asset prices and indeed the broader machinations of finance had started to diverge from economic realities.

Over 10 years on from the crisis, we see a desire to change the narrative – and reality. The work presented in this report is testament of the desire to reposition finance in line with economic and social goals. With economic asset-level data and climate scenarios at its heart, the approach piloted by ING together with 20 other banks creates an understanding of the relationship between financial transactions, the real economy and climate goals. It reaffirms that – in the words of Henry Ford – the highest use of capital is not to make more money, but to make money do more for the betterment of life. It is this spirit that also informs the Terra approach.

Terra and the commitment by ING and other banks to steer their lending portfolios towards the goals of the Paris Agreement and to jointly develop tools and metrics to do so should be understood then, not merely as a series of commitments on climate change. Rather, they should be seen as a wider affirmation of the role of banks as

corporate citizens in the 21st century. It also affirms and responds to the need for a dialogue between banks and the public about how that role will evolve over time.

The path of coordination and collaboration that ING is pursuing is very important because, as outlined in this report, decarbonising one's portfolio does not necessarily equate to reducing emissions in the real economy. Current data availability still constrains the universe of assets that can be meaningfully actioned and steered. Similarly, one bank going alone will likely be limited in its ability. One swallow does not a summer make.

Through transparency and dialogue, ING's Terra approach and similar initiatives across the banking industry can play a critical role in understanding what a bank can do not just to align with, but actively contribute to achieving the goals of the Paris Agreement.

At 2° Investing Initiative, it has been our pleasure to support ING's journey over the past 18 months and the initiatives of its partner banks. The Terra approach represents a breakthrough in allowing for an X-ray of corporate loan books, both today and going forward with regard to clients' activities relative to climate goals.

Terra also marks the first step towards truly understanding what impact a bank can have on contributing to economic and societal goals. While we recognise that we have a long journey ahead of us in understanding that role, the work presented here is a start to that journey.

Jakob Thomä

Managing Director 2° Investing Initiative





The ING Group Terra progress report 2019 is a real step forward: as recommended by the TCFD, it performs robust forward-looking climate scenario analysis to assess and disclose the climate performance of the ING loan books. The chosen sector-based approach is also the most relevant to set actionable climate targets for banks. Hopefully it will build on a 1.5°C scenario when available.”

– Sebastien Godinot, Head of sustainable finance, WWF European Policy Office



This report is an impressive effort by ING. The approach is comprehensive, reveals successes as well as challenges and highlights the need for action across multiple fronts to ensure global emissions reductions are achieved. ING’s example proves there is value in starting this process now and CDP looks forward to working with ING and other banks as these standards develop.”

– Leanne Bouvet, CDP Senior Technical Manager, Financial Services



“We welcome this report as a positive contribution to the much-needed dialogue on the role of banks in climate action. It sets the bar high for transparency on Paris Agreement alignment of lending portfolios. Open collaboration is the only way financial institutions can reach the level of impact needed to address climate change. Sharing insight and learning as well as being honest about challenges is vital on this journey.”

– Eric Usher, Head UN Environment Programme Finance Initiative

1 Introduction

In 2018, ING took a stand and announced our commitment to steer our lending portfolio in line with the goals of the Paris Agreement. Now, one year later, we want to share the progress we've made so far. This report provides a status update on the alignment of our lending portfolio with the well-below two degree goal of the Paris Agreement, including sector targets, timelines and challenges.

Our journey

Climate change is a systemic challenge. No one sector, much less one bank, has the ability to solve it. Open collaboration with civil society organisations, governments and regulators will continue to be vital as we collectively support society's transition with tools aligned with the best available science. But we believe that ING and the financial sector have a significant part to play. By engaging with the sector and pioneering innovative ways to measure and align portfolios, we believe our impact can be amplified.

In 2015, ING joined hundreds of other businesses calling upon governments to set bold ambitions at the UNFCCC's 21st Convening of the Parties in Paris, known as COP21. As history tells us, the result was the Paris Climate Agreement and a global consensus that we need to limit global warming to well below 2°C, striving for 1.5°C, in order to mitigate the worst effects of climate change.

ING applauded this result and endorsed the Paris Agreement. In 2015, we also signed the commitment letter of the Science Based Targets Initiative, pledging to set targets to reduce our climate impact in line with the goals of the Paris Agreement, as soon as a methodology was developed for our sector. And we meant it. We immediately began working on the problem in December 2015, partnering with external environmental consultancy firms and piloting the 'financed emissions' approach. Two years later, we realised that the approach would not allow us to actually set targets and steer our portfolio due to a lack of granular, client-level data and large margins of error in the results.

We never intended to measure for the sake of measuring but always aimed to measure in order to steer. In 2017, we became acquainted with the 2° Investing Initiative (2°ii), a global think tank developing climate metrics for the financial sector. We started working with them to translate their [PACTA](#) (Paris Alignment Capital Transition Assessment) approach, which was developed for equity and bond portfolios, so it can also be applied to lending.

In 2018, ING announced our ambition to steer our portfolio towards the goals of Paris. We were joined shortly afterwards by four peers in the [Katowice Commitment](#), jointly pledging to align our aggregate >€2.4 trillion portfolios with the goals of Paris.

We have also personally and individually engaged with more than 40 banks interested in the work ING is doing and the positive results are visible. Since its launch at ING's offices in London in February 2019, more than [17](#) systemically important banks, including ING, have joined the 2°ii PACTA pilot for banks.

In 2019, ING also joined the Expert Advisory Group of the SBTi Financial Institutions stream to further test and develop science-based target-setting methodologies. Here we worked on the residential real estate approach and saw it confirmed that for the banking sector, a sector-based approach is critical for making progress.

Beyond the PACTA pilot and SBTi-FI working group, we are active contributors to collaborative platforms such as the UNEP-FI Principles for Responsible Banking, where ING co-chairs the coordinating banking sector committee and numerous sub-groups. Finally, ING is an active member of the UNEP-FI TCFD pilot.

We firmly believe developments will continue over time. The journey is far from over. We are committed to working with our partner, 2°ii, our peers within the Katowice Commitment, and our fellow signatories to the United Nations Environmental Programme – Finance Initiative (UNEP-FI's) Principles for Responsible Banking to further refine and develop our approaches. We invite more banks worldwide to join us.

Before diving into the results, we first describe our overarching strategy for steering our portfolio towards the goals of the Paris Agreement: the Terra approach.

The Terra approach

Terra is an inclusive, science-based, forward-looking and engagement-driven approach. With Terra we focus on the sectors in our loan book generating the most climate impact. Drawing upon two main methodologies for target-setting, namely the Paris Alignment Capital Transition Assessment (PACTA) and the Science Based Target Initiative's Sectoral Decarbonisation Approach (SBTi SDA), Terra adheres to a number of

underlying principles. Perhaps the most critical principle is that we steer our portfolio per sector. This **sector-based** approach respects the fact that each sector has its own transition pathway, or 'technology roadmap', for it to contribute to a low-carbon, below-two-degree world. For example, the automotive sector will need to shift to producing more zero-tailpipe-emission vehicles while power generation will need to shift significantly to renewables within a certain timeframe.

This brings us to our second key principle of Terra: we prioritise **'asset-level data'** (ALD) for accurate measurement. The impact our clients make is driven by the types of energy, vehicles, buildings, aircraft, ships and plants that they own, operate or produce. In other words: their assets. Real change will be at the core of our clients' businesses and their strategies for transition. Terra looks at the changes that each sector needs according to the relevant Paris transition pathway, and steers towards these changes.



The impact our clients make is driven by the types of energy, vehicles, buildings, aircraft, ships and plants that they own, operate or produce. In other words: their assets. Real change will be at the core of our clients' business and their strategies for transition. Terra looks at the changes that each sector needs according to the relevant Paris transition pathway, and steers towards these changes.”

This approach also provides opportunities for ING to work with clients on the challenges they face and support them on their journey. We use detailed insights into the trends and changes needed in each sector, which then facilitates discussions with clients about their own strategies. Ultimately, this sector-based approach allows ING to be more effective in steering each portfolio towards Paris.

To be sure, it also comes with its own set of complexities. Taking a sector-based approach means that each sector must be treated, steered and monitored separately. It means that each sector has its own methodology, scope, target and metrics.¹ That’s because each sector’s transition pathway focuses on what the companies in that sector are producing. For example, in power generation, we look at what type of ‘technology’ is producing the power (e.g. wind turbines or gas-fired power stations). The table below gives an overview of our ‘Terra Toolbox’ of methodologies and the metrics used to set targets for each sector.²

What does this all mean? Well, the result is that we need to set **one target per sector** in scope. This means a deeper level of transparency and more-focused strategies; two things ING believes are necessary to move the needle and align our portfolio with the Paris Agreement.

This paper presents our performance, targets, challenges and next steps for each of these sectors: power generation, automotive, commercial real estate, residential real estate and cement. For the remaining four, fossil fuels, shipping, aviation and steel, we provide an update on current progress, initiatives and next steps. We expect to provide quantitative results for these four sectors in 2020.

Table 1 Terra ‘Toolbox’ of methodologies

Sector	Measurement Methodologies	Target-setting Methodologies	Metrics used
Power generation	PACTA ³	PACTA	kg CO ₂ /MWh
Automotive	PACTA	PACTA	kg CO ₂ /km
Commercial real estate (NL)	DeltaPlan	Paris Proof Method	kg CO ₂ /m ²
Residential real estate (NL,DE)	PCAF ⁴	SBTi SDA	kg CO ₂ /m ²
Cement	PACTA	SBTi SDA	kg CO ₂ /tonne cement
In development			
Steel	PACTA	SBTi SDA	kg CO ₂ /tonne steel
Fossil fuels (oil, gas and coal)	PACTA	PACTA/Carbon Tracker Initiative	In progress
Shipping	Poseidon Principles	Poseidon Principles	kg CO ₂ /tonne nautical mile
Aviation	PACTA	SBTi SDA ⁵	kg CO ₂ /passenger km

1 The targets are determined by the applied scenario, which also differs by sector. For example, the energy supply sectors (power) utilise the IEA Sustainable Development Scenario (SDS) which focuses on achieving a median temperature rise of 1.7 -1.8°C while achieving, among other things, universal access to energy while the Beyond 2 Degrees Scenario (B2DS), which aims for an average temperature rise of 1.75°C, is applied to energy demand sectors, as it focuses more on the deployment of the most efficient technologies – a ‘technology push’.

2 These methodologies and applied scenarios are further elaborated upon in the technical annex.

3 PACTA: Paris Alignment Capital Transition Assessment methodology of the 2° Investing Initiative, technology-based, utilising asset-level data and forward looking capital expenditure plans of clients (where possible).

4 PCAF: Partnership for Carbon Accounting Financials – carbon accounting framework which prescribes the use of building energy performance certificates (EPC) as proxy for CO₂ or energy consumption data for residential real estate.

5 SBTi/SDA: Science Based Targets Initiative Sectoral Decarbonisation Approach – sets out sector decarbonisation pathways designed so as to be in line with the IEA ETP’s B2DS scenario using intensity metrics.

2 Our progress

Over the last twelve months we have made significant progress in applying the Terra approach. Terra has allowed us to understand our current performance for five of the sectors in scope so far and set ambitious, time-bound targets for aligning with science-based scenarios. This has mobilised the organisation to set sector sustainability strategies in line with our ambition to steer portfolios towards the Paris Agreement.

Terra has also highlighted the effectiveness of our efforts to support the energy transition of the power generation sector through strong client relationships, a growing renewables business and a tough stance on coal. With that, as of year-end 2018, our power generation portfolio is significantly outperforming the climate scenario.

We are proud of the progress we've made so far, which is the result of leadership that casts a global vision colleagues can get behind.

Highlights

- ING [commits](#) to close to zero coal-fired power generation and thermal coal mining by 2025.
- ING aims for a [net energy positive](#) mortgage portfolio by 2050.
- ING has the ambition to align its Dutch commercial real estate portfolio with the below two-degree goal by 2040 – 10 years ahead of target date.
- ING has joined the Poseidon Principles, committing to support the shipping industry's ambition to reduce CO₂ emissions by 50% in 2050.
- ING has the ambition to increase our aviation portfolio to 50% 'outperforming aircraft' by 2023 (compared to 33% in 2018).
- ING aims for the automotive sector portfolio to outperform the market (in terms of carbon intensity) in the short term.

Below, we present the results of our analysis: ING's climate alignment per sector as measured by Terra via our Climate Alignment Dashboard (CAD). For ING, 'climate alignment' is about steering our portfolio in line with the well-below two-degree goal of the Paris Agreement. Being 'climate-aligned' therefore means that we are outperforming the scenario or are on track with our defined convergence pathway towards the climate scenario target in each sector.

The Climate Alignment Dashboard (CAD)

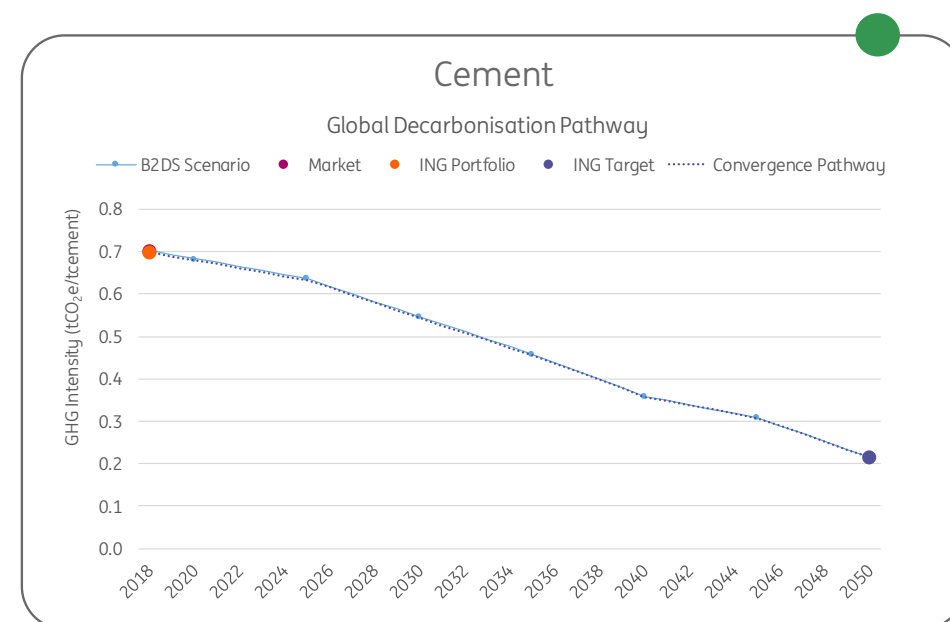
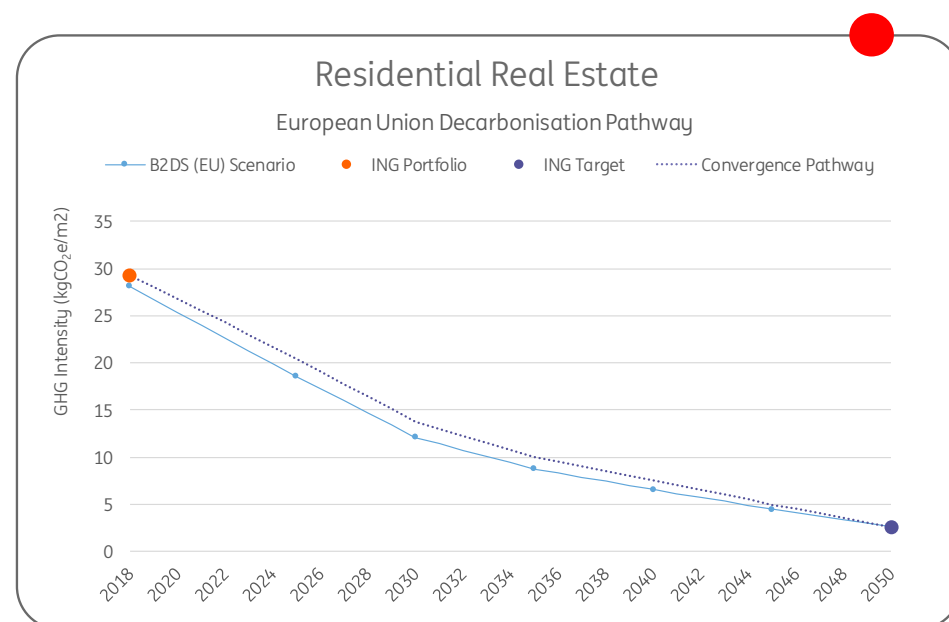
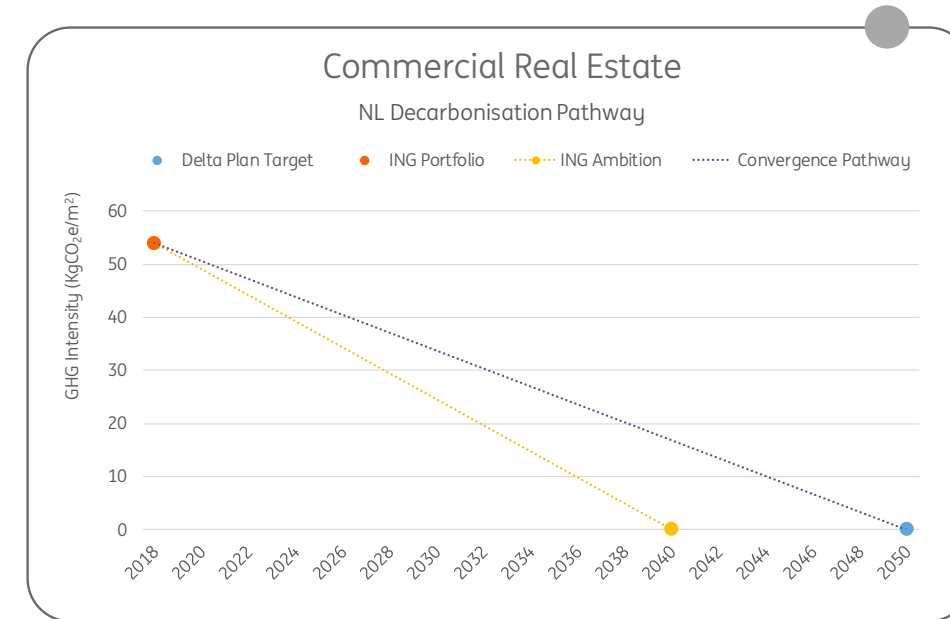
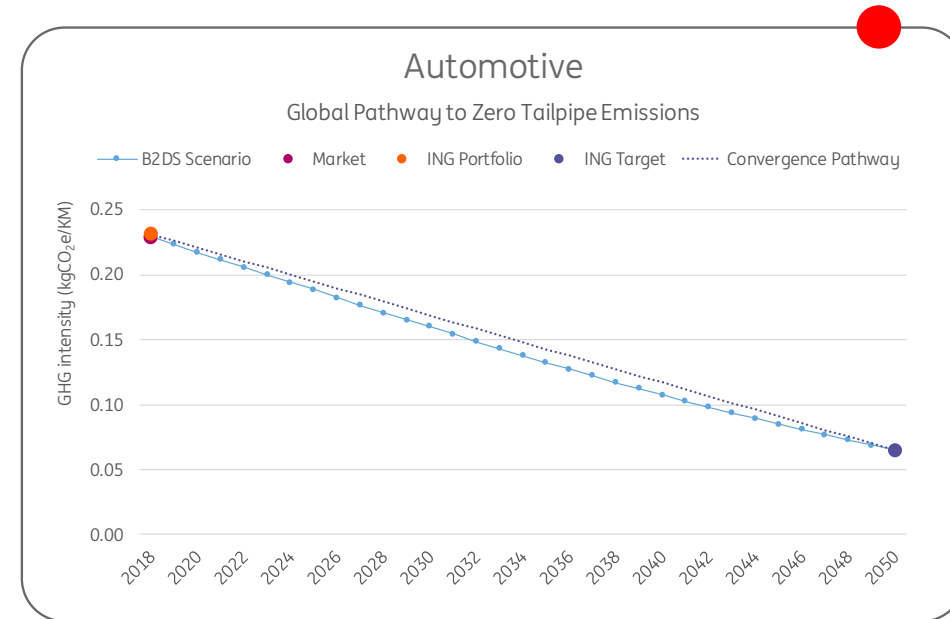
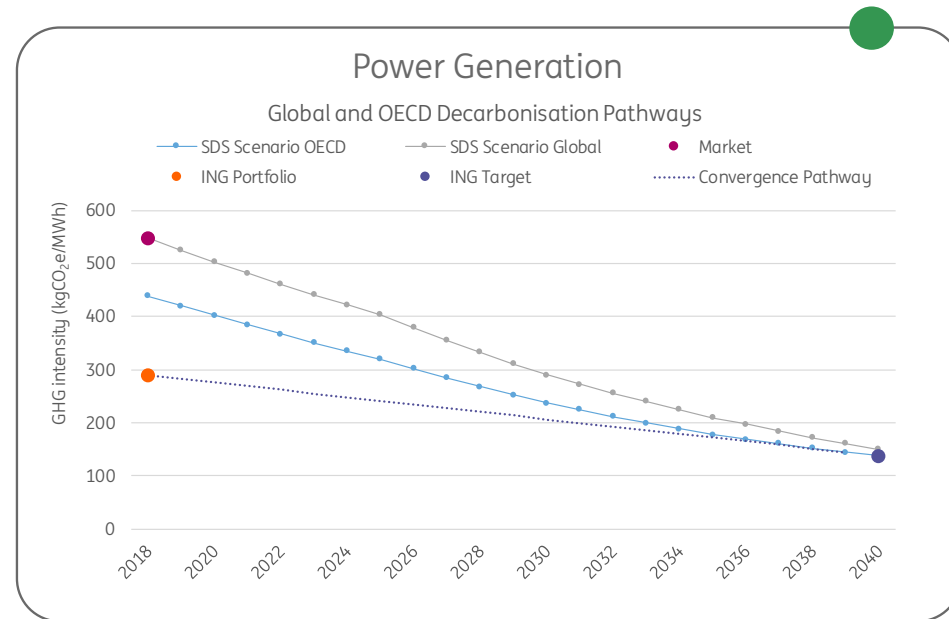
Portfolio view – Outstandings as of year-end 2018

● On track

● Not on track

● Unavailable

○ Under development



The Climate Alignment Dashboard (CAD) demonstrates the CO₂ equivalent (CO₂e) intensity per sector of our portfolio (year-end 2018) compared to the market and the relevant climate scenario.⁶ It also displays the climate alignment target per sector and ING's intended decarbonisation pathway per sector to converge towards the target.⁷ Using a red - green indicator, we show whether the sector portfolio is outperforming the scenario or on track with the convergence pathway (green) or not (red).

In the case of commercial real estate (NL) we do not have the market average data or scenario pathway. Therefore currently we cannot apply the red - green indicator to this sector. Each sector chart will be further discussed in the sector deep-dives below.

ING is committed to transparently reporting on our progress against the set targets for each sector and will continue to do so in the years ahead.

⁶ See [Glossary](#) for definitions.

⁷ While the decarbonisation pathway is indicative of the direction of travel our portfolio needs to take in order to achieve the target, we expect that circumstances will change as we move along the transition pathway. However these short-term changes should not imply that we cannot achieve the long-term target, which is prevailing.

Scope

As mentioned, the analysis focuses on the most climate-relevant sectors, measured by global carbon footprint (sectors globally responsible for approximately a combined 75% of total emissions). Within each sector, we look at the part of the value chain that generates most of the climate impact and that relates to the scenarios applied.

For example, within the power sector, it's the way power is generated that matters most; whether it's produced using renewable energy technology or by fossil fuel combustion. Similarly, for automotive, it's about the car producers and type of vehicle they produce; whether it's an internal combustion engine or a zero-tailpipe emission vehicle. In short, Terra's scope includes the parts of our portfolio that finance power generation, automotive producers, commercial & residential real estate owners, cement producers, steel producers, fossil fuel extraction, aircraft owners and ship owners (see [Technical annex](#) for details).

Arriving at a CO₂e intensity metric per sector

The CO₂e intensities displayed in the CAD are calculated by applying different measurement methodologies (referenced in Table 1). They help us determine the technology mix of the assets owned by our clients and directly or indirectly financed by ING. These technology mixes are then converted to CO₂e emissions intensities.

For example, for power generation, we look at the mix of power generated in terms of production capacity by gas-fired power stations, coal-fired power stations, hydro plants, wind turbines, solar PV, nuclear power plants, etc. Based on this mix and detailed historical production statistics, we derive an emissions intensity per megawatt

hour (MWh) using emissions factors.⁸ We do the same for automotive by looking at the mix of internal combustion engine (ICE), hybrid-electric (Hybrid), and battery electric vehicles (BEV); for real estate by looking at the mix of energy labels per building type; and for cement by looking at the mix of the types of production processes applied. The intensities are normalised per unit of production. In the same way, the relevant climate scenarios and targets are converted into CO₂e intensity pathways. The future CO₂ intensity targets and scenario pathways are determined based on the IEA scenario data⁹, except for commercial real estate which is assigned a 2050 target, with no corresponding pathway, based on the DeltaPlan as described in the sector deep-dive. ING's starting-point for each sector is determined by its respective current performance and the line connecting ING to the future CO₂ intensity targets is what we call the 'convergence pathway'.

Limitations of the CO₂e intensity metric

While converting the sector economic activity output to CO₂e intensity per unit of production provides a clear, simple way of demonstrating our current portfolio composition relative to the benchmark, we acknowledge a number of limitations that are inherent to this conversion.

First, while the client-level-granular data is considered to be precise, the use of emissions factors introduces some uncertainty. To arrive at this figure, we must

translate production *capacity* to estimates of actual production or consumption and then multiply this by localised but average emissions factors.

Any use of average emissions factors or conversions from capacity to production based on estimates means introducing less-accurate input, which will reduce the preciseness of the results. Furthermore, intensity metrics do not provide the full picture. In order to limit global warming to well-below two degrees Celsius, the world will need to remain below certain levels of absolute GHG emissions (between 770 and 1320 gigatonnes).

For this reason, it is important to note that while we currently measure and report on CO₂e intensity per sector, the steering is informed internally by client-level data in line with the PACTA approach, for example. Where possible, we not only focus on what a client currently owns and operates, but also on what they plan to build in the coming years in both a relative and absolute sense and whether or not this will contribute enough to climate goals. For more details on how we steer, see below.

How we steer

There are two main ways ING can influence the CO₂e intensity of our sector portfolios in scope: 1) engage with and support existing clients to shift investments more towards low-carbon technologies, and 2) shift our own capital allocation choices more towards low-carbon technologies and away from high-carbon; like financing more renewables while reducing exposure to coal or financing new clients whose strategies focus on low-carbon activities.

⁸ See [Technical annex](#) for further details.

⁹ Scenario data points for PACTA sectors are translated for the IEA scenarios and provided by 2°ii.

Regarding the former, Terra is first and foremost an inclusion-based strategy. ING believes that we can have the most impact by supporting clients via our products and services and by simultaneously working with the banking sector to scale and leverage this impact. To support client engagement, we have developed client-level CADs which provide in-depth analyses of how individual clients' current performance and future strategies compare to climate scenarios, peers and the market.¹⁰

Despite this, we acknowledge that ING, as a financier, is a facilitator. Our clients are the leaders of their own change, and we are here to help them realise their goals. The CO₂e intensity of our portfolios is therefore also a reflection of the choices and strategies of our clients as well as the economy from a global perspective.

ING has a responsibility in the choices we make as well: what and who we do and do not finance. We are a leader in sustainable finance with a track record of sustainability innovations like the sustainability improvement loan. We're also a leader in the green bond market and have one of the strongest sets of environmental and social risk policies, not to mention stances on coal, in the sector.

This comprehensive set of policies, due diligence processes, ambitions and targets in the risk and opportunity domains will help ING achieve a CO₂ intensity in line with the Paris Agreement. However, it's important to note one thing: while aligning would mean reducing the CO₂ intensity of our portfolio, it does not mean that CO₂ intensity will be reduced for the global sector as a whole, nor will it mean that ING has itself reduced

emissions in the real economy by not financing certain clients or sectors. This is not the claim we are making. Those companies may still exist, even if we aren't the bank financing them.

This is why we value an engagement-centred approach, supporting existing clients' transition pathways, bringing about real change. In addition, we recognise that a challenge this big will be overcome only through a concerted multi-stakeholder effort involving regulators, financiers, governments and consumers alike. For more information on ING's vision for engagement and impact, see the annex.

TCFD Recommendations and the Terra Approach

The results of the Terra Approach, powered by methodologies such as PACTA and the SBTi SDA, are relevant to organisations reporting in line with the recommendations of the Taskforce for Climate-related Financial Disclosure (TCFD) as they provide insight into whether or not certain portfolios are aligning with climate scenarios. The insights also provide metrics for target-setting and reporting and inform strategies within our sectors as is presented within this paper.

The key distinction to be made between Terra and scenario analysis in the conventional sense is that Terra is currently concerned with how ING can contribute to climate change mitigation, rather than how climate change will impact our business. Terra is focused on identifying climate-related opportunities and aligning our portfolio with climate goals.

¹⁰ See [Technical annex](#) for details regarding the client-level analysis and how we steer internally. Forward-looking data is not available for all sectors, for example commercial and residential real estate.

However, the results of Terra can also inform climate risk identification and management, in particular related to transition risk, as Terra can pinpoint under- or over- exposure to low-carbon or high-carbon technologies. However, Terra does not currently quantify financial risk. Rather, Terra can supplement financial risk metrics.

Completing the CAD in 2020

We currently provide results and targets for five of the nine sectors. This is a pioneering approach to climate transparency that we hope will inspire our peers. But we're clearly not finished yet. We have four more sectors to go to cover all key sectors in scope of our Terra approach. We are working hard with our partner, 2° Investing Initiative (2°ii), and peer banks in the pilot to finalise the methodologies for these sectors. We aim to have a quantitative update on these sectors for our next disclosure wave in 2020. For now, we describe our progress and some of the challenges in these sectors below.

3 Sector deep-dives



Power generation

17



Automotive

21



Commercial real estate

26



Residential real estate

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Cement

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Power generation

- Our performance
- Our initiatives
- Sector outlook and challenges
- Next steps



Power generation

Power generation	
Outstandings in scope	€7.6 billion

Power generation is central to the energy transition. The last two decades have seen rapid growth in renewable power generation while electrification of transport and heating combined with growing access to energy has led to an annual increase in demand. Although low-carbon generation has continued to expand, in 2018, 42% of all energy-related CO₂ emissions came from the power sector, making it one of the most material sectors for shifting to low-carbon solutions.¹¹

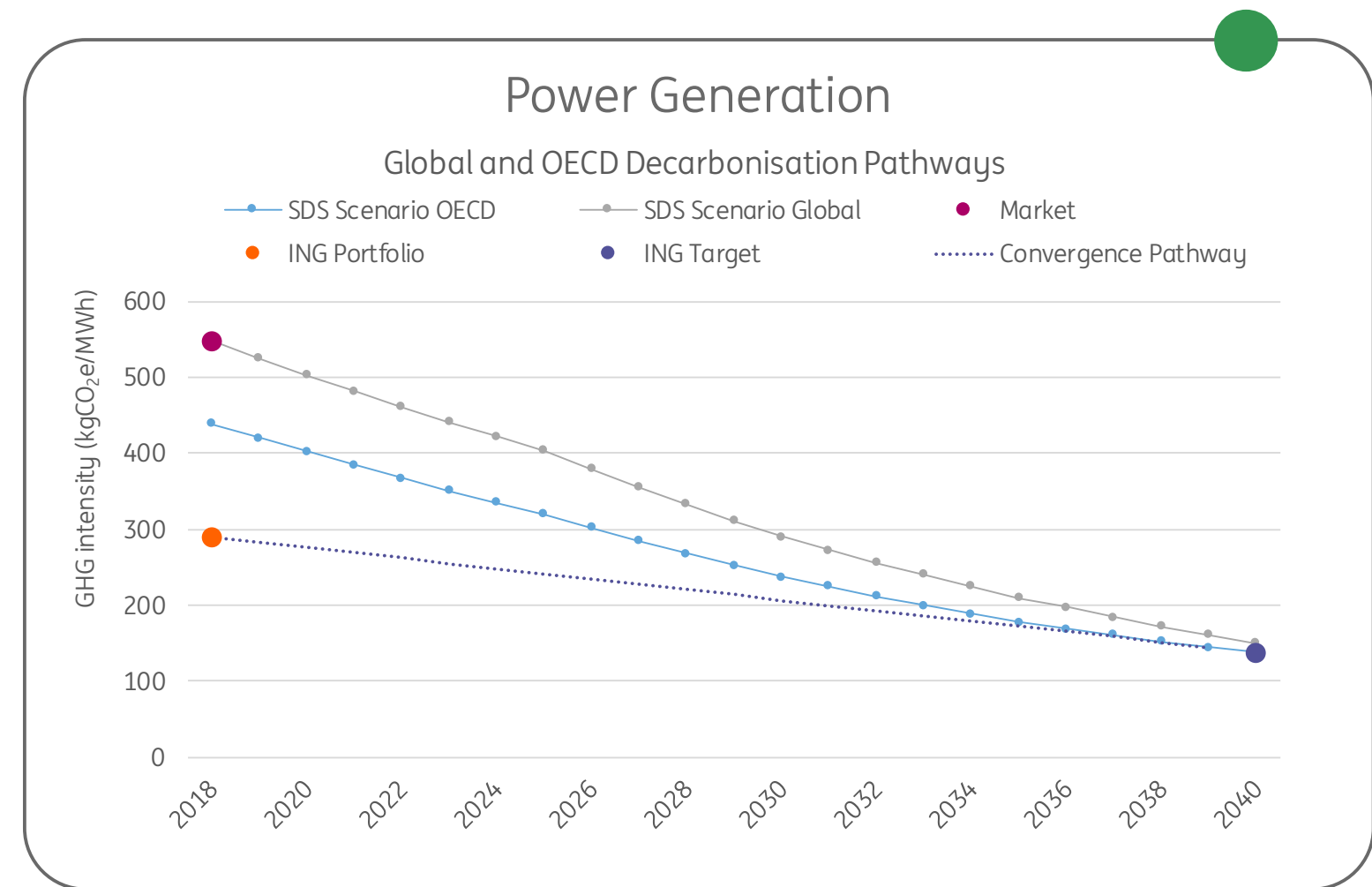
Our performance

Our power generation portfolio within the scope of Terra (€7.6 billion) is concentrated in OECD countries (approx. 90% of total outstandings), and to a lesser extent in non-OECD regions (approx. 10%).

¹¹ <https://www.iea.org/tcep/power/>

The below chart shows ING’s power generation portfolio compared to the global market and the SDS scenario pathways. In contrast to the other sectors, we display the global SDS pathway and the OECD SDS pathway. That’s because, while ING’s business scope is global, the majority of the portfolio currently falls within OECD. ING has applied the OECD SDS pathway, which is slightly more ambitious than the global SDS pathway, to determine our 2040 ambition (our convergence target). However, as our portfolio may shift its concentration over time, it is relevant to show it in relation to both scenarios.

Figure 1 Power generation decarbonisation pathway



[> Power generation](#)

In light of this, ING's power generation portfolio is currently outperforming the market and both scenarios. This is largely because a significant share of the portfolio is financing renewable projects and because of ING's strict stance on thermal coal.¹² Since 2015, ING has introduced restrictive policies for financing coal-fired power plants. In 2017, our coal policy was strengthened by the goal to reduce exposure to coal-fired power and thermal coal mining to close to zero by the end of 2025.

Our initiatives

Through continuing our significant lending activities in renewable power generation, we will support our clients' and the sector's energy transition in line with the carbon-intensity milestones that mark the energy transition pathway set out by the IEA's Sustainable Development Scenario (SDS). The SDS requires a carbon intensity of 137 kgCO₂e/MWh in 2040, applying the emissions factors of 2°ii.

Our renewables and power financing business is a key part of this target and the team therefore aims to contribute by continuing to support the renewable energy business. We expect that the insights gained from the PACTA tooling will provide a useful framework for strategic discussions with our clients.



In power generation it's important to look at both sides of the spectrum – what we say no to, like coal-fired power, and especially what we say yes to, in terms of renewables. Accelerated growth in the sector's project financing means that now more than half is directed towards renewable energy including wind, solar, water and geothermal power. These are the reasons the portfolio is outperforming.”

– Michiel de Haan, Global Head – Energy

¹² ING's coal policy applies to both thermal coal mining and coal-fired power generation.

Sector outlook and challenges

Despite our efforts, a number of macro-economic factors may slow or impede some clients' transitions and the further growth of renewables at the pace needed to achieve the Paris goals. We see the following factors presenting a number of challenges that could impede ING's overall ability to meet the SDS scenario target over its horizon:

- Addressable market: 70% of today's global investment in energy supply is undertaken or supported by governments. Ignoring all other limiting factors (such as country suitability, and credit risk and return considerations) this greatly restricts the financing opportunity available for funding by banks.¹³
- There is also an increasing trend towards the use of other non-bank sources of funding for smaller projects (leasing, equity or crowd funding), although still driving forward the energy transition, which could negatively affect ING's ability to achieve its ambition under the Terra approach.
- Currently, a significant portion of our power generation portfolio is project finance for industrial-scale power generating capacity where nearly all assets are captured in the external database, with the exception of rooftop solar.¹⁴ However, as generating capacity becomes increasingly more decentralised (e.g. rooftop solar), we may struggle to capture the full scope of ING's activities in external data. Currently, manual matching of these assets is possible, but as this scope increases, this may require the approach to be revised in the future.

¹³ IEA World Energy Outlook 2018.

¹⁴ Rooftop solar assets are typically not captured in the external database as they tend to fall below the capacity threshold of 1 MWh.

Next steps

- ING will continue to work with clients to support their ambitions and strategies to transition in line with the Paris goals.
- We will engage with peers and other stakeholders to continuously improve and refine our strategies to measure, steer and report on progress in the power sector.
- We will continue to transparently report on our progress against our 2040 target.

Automotive

- Our performance
- Our initiatives
- Global outlook and challenges
- Next steps



Automotive

Automotive

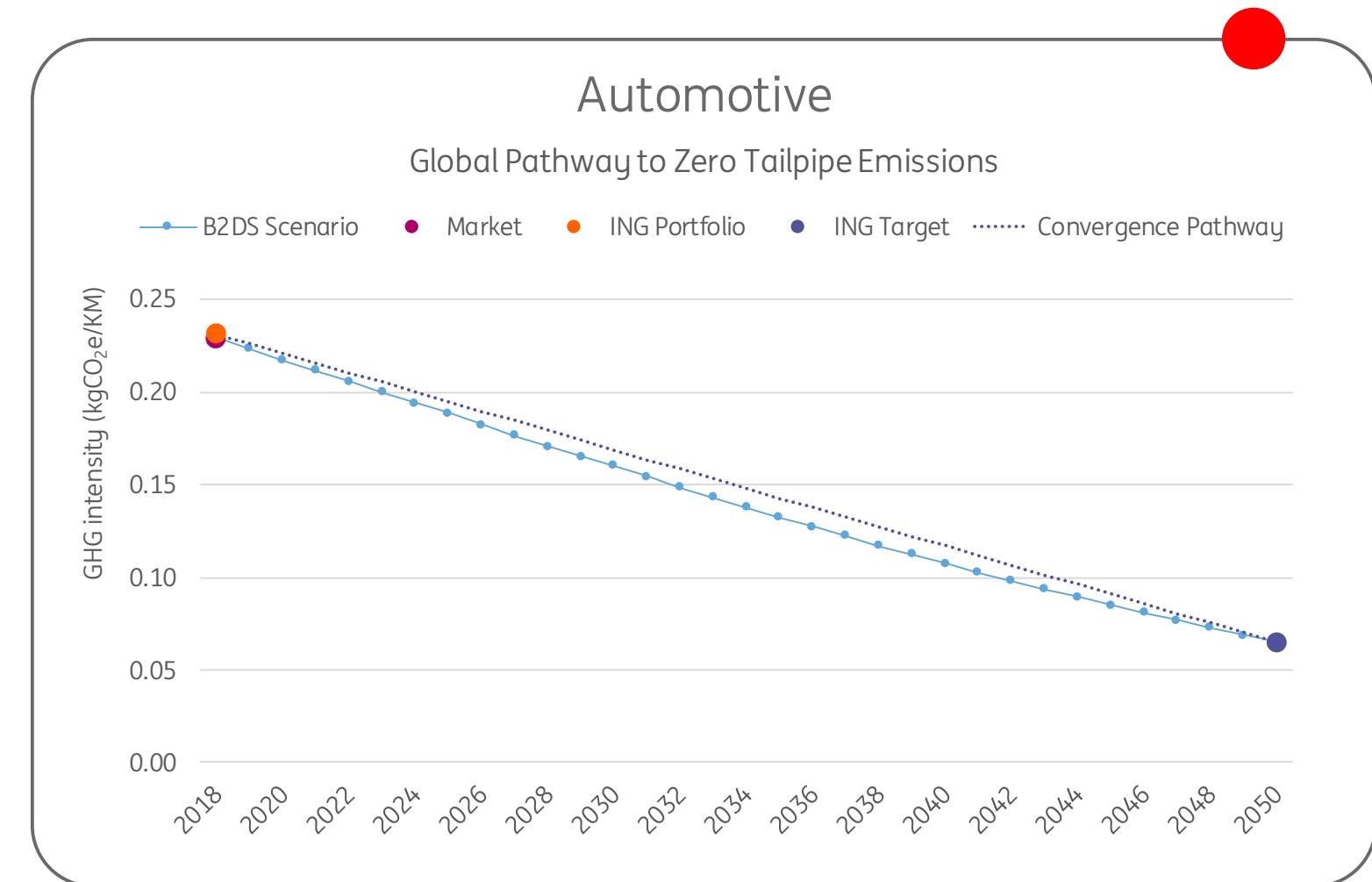
Outstandings in scope

€2.6 billion

In recent years, CO₂ emissions-related regulation has increasingly pressured ‘original equipment manufacturers’ (OEMs) towards electrification. The tightening of emissions standards, the introduction of low-emission zones among other initiatives have been accompanied by support from consumers concerned about air quality and climate change. At the same time, innovations and technological advancements in the sector are accelerating the shift to zero-emissions vehicles. Despite these movements towards more sustainable technologies, road transport still accounts for approximately 18.5% of global CO₂ emissions.¹⁵

The analysis of the automotive sector portfolio focuses on car and light-duty truck producers, known as OEMs, as they are the primary influencers of emissions intensity.¹⁶ There are approximately 20 OEMs worldwide who generally have a global reach in terms of manufacturing and sales. Our portfolio includes most of these OEMs.

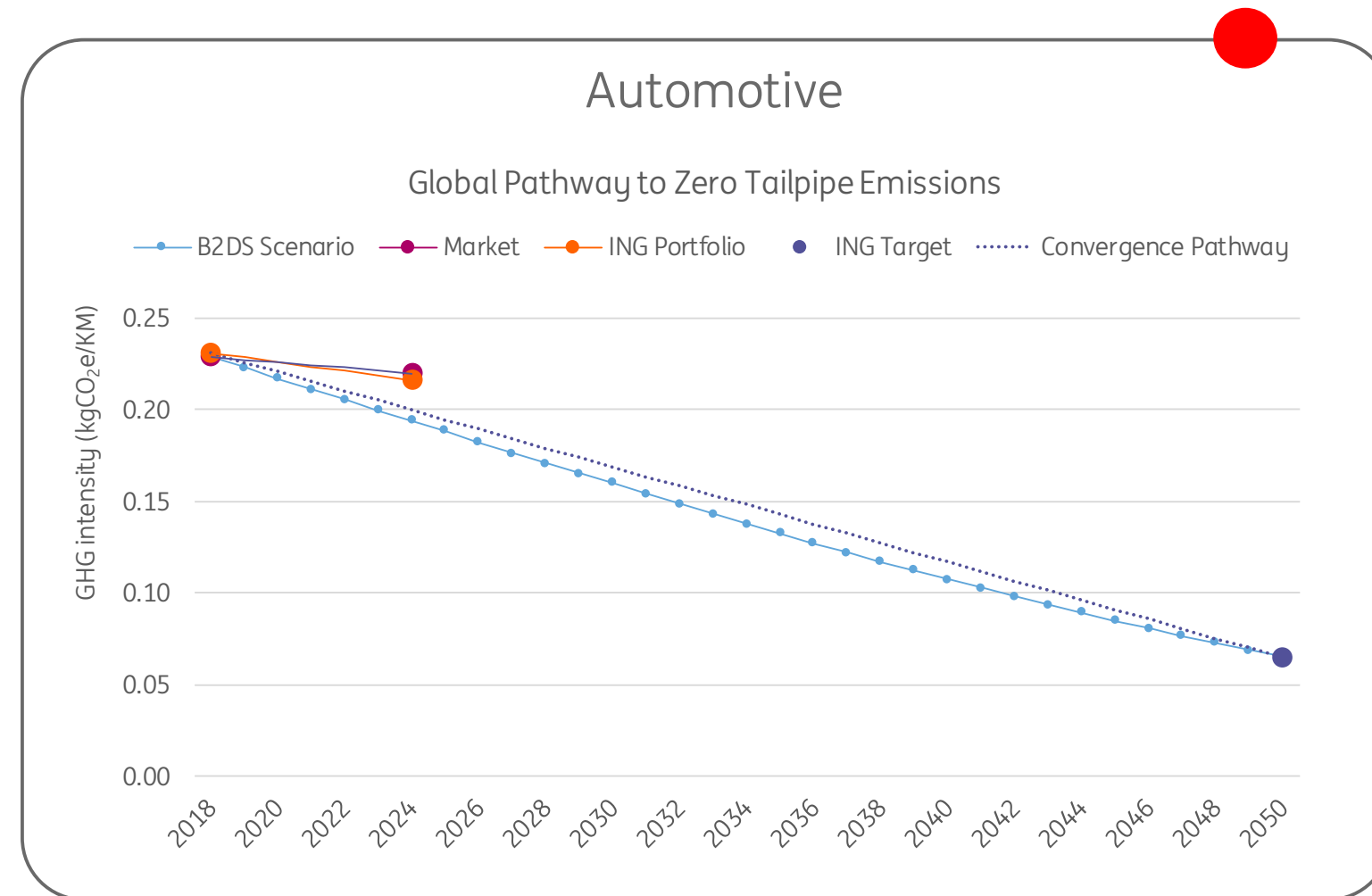
Figure 2 Automotive sector decarbonisation pathway



15 IEA: <http://data.iea.org/payment/products/115-co2-emissions-from-fuel-combustion-2018-edition-coming-soon.aspx>

16 ING's automotive sector portfolio in scope represents the global light duty vehicle as well as light trucks production. It does not include heavy duty vehicles such as semi-trucks, busses, etc.

Figure 3 Automotive decarbonisation pathway with five-year forward-looking



Our performance

The current production capacity within our automotive portfolio reflects 95% internal combustion engines (ICE) with the remainder made up of hybrid and battery-electric vehicles (BEV). To simplify the illustration of the alignment of our automotive portfolio, vehicle propulsion types (ICE, hybrid and BEV)¹⁷ are converted to GHG emissions intensities using emissions factors provided by 2°ii. The sector has a clear technology roadmap described by the IEA B2DS scenario, which we have also converted to GHG emissions intensities.¹⁸

ING's target to converge with the B2DS scenario in 2050 is 0.065 kgCO₂e/KM – a 72% reduction from 2018. Based on the five-year forecast of ING's current clients (see Figure 2 above), we expect our portfolio to perform better than the market in 2021.^{19,20} The results also show that the B2DS benchmark is not likely to be matched in the medium term. Given that the current forward-looking data is linearly extrapolated, the benchmark might be achieved well before 2050, as soon as the production forecast reflects the exponential market adoption of low/zero tailpipe emissions vehicles. Overall, the automotive sector is expected to transition more slowly than the scenario prescribes in the coming five years, with signs of a rapid transition longer term.

17 Fuel cell production is currently too small but may be revisited over time as and when it scales up.

18 See [Technical annex](#) for conversion approach.

19 The distribution of the portfolio across borrowers is assumed to be constant through time i.e. does not take into account new loans or amortisations.

20 Using the forward-looking data of the PACTA tool, ING is able to project the CAPEX plans of existing clients in order to determine whether or not they are making investments in line with climate scenarios. This analysis is currently only displayed for automotive as some technical/methodological issues still need to be worked out for the other sectors.

> Automotive

Our initiatives

ING's automotive team has been involved in many of the bank's sustainability initiatives, including the successful placement of sustainable finance products. In 2018, a sustainability strategy was drafted for the automotive portfolio, including three essential pillars:

- Aligning our client base in accordance with our goal to steer our portfolio towards the below two-degree goals.
- Encouraging sustainable products and aiming to create new products/services that support our clients' transition path while adding value.
- Establishing ING's thought leadership for sustainability in the automotive sector.

Global outlook and challenges

We are seeing the energy transition pick up in the global automotive sector.

Manufacturers and suppliers are shifting their R&D and production towards electrified drivetrains – especially BEVs. Additionally, developments of other sustainable drivetrain and mobility options are being put forward. These include sharing platforms to increase the utilisation of cars, the exploration of micro-mobility solutions (e.g. electric scooters, bikes, etc.), and the research into hydrogen and synthetic fuels as alternative energy carriers for cars and trucks. Most players in the industry are engaged in one, several or even all of these R&D fields.



Our recent green financing initiatives illustrate how ING is supporting the transition of our automotive clients. This way we can achieve our climate ambitions.”

– Gerlach Jacobs, head of Global & Local Transport & Logistics

[> Automotive](#)

Current global emission regulations require OEMs to increase fuel efficiency and to electrify their product portfolio. In Europe for example, most OEMs require electrification to close the gap of their CO₂ targets up to 2021. In addition to the CO₂ regulation, many other factors influence the outcome and pace of BEV adoption. These include the BEV model availability, the oil price, the cost of traction batteries, and the ramp-up of BEV infrastructure. The industry is already reacting to the regulatory environment. Ambitious electrification goals and substantial investments are being put forward by OEMs. The shift towards electrification is having an impact on the entire automotive value chain to varying degrees.

The B2DS scenario also assumes simultaneous progress in multiple sectors, including the energy sector, which, according to the B2DS scenario, will achieve carbon neutrality by 2060. However, the full decarbonisation of the automotive sector is contingent on the deployment of renewables in the energy sector's role in the transition, which currently relies on fossil fuels to generate most electricity. Focusing solely on the automotive sector, the B2DS decarbonisation pathway for automotive depicts a pathway towards zero tailpipe emissions.

Next steps

ING maintains a close working relationship with our automotive clients, valuing open, engaging discussions about sustainability and their own transitions.

- Utilising the client-level alignment dashboards, we will continue to discuss our clients' strategies towards zero tailpipe emissions in line with global goals.
- Our interim target is to achieve market outperformance in the near term, with the aim of seeing quicker convergence towards the B2DS target in the longer term.

Commercial real estate

- Our performance
- Our initiatives
- Global outlook and challenges
- Next steps



Commercial real estate

Commercial real estate

REF NL – Outstandings

€13.5 billion

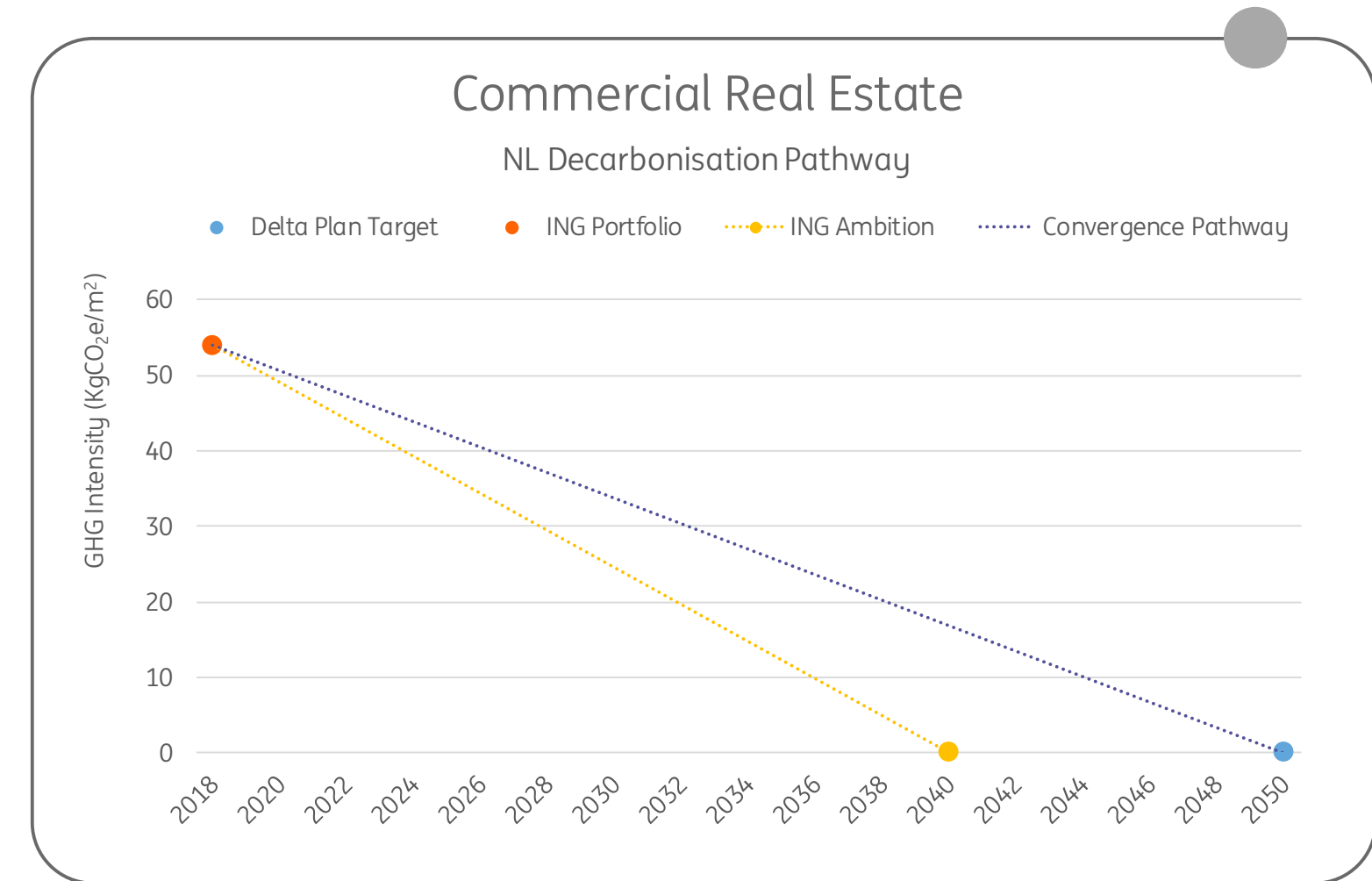
The built environment, which includes commercial and residential buildings, consumes roughly 36-40% of global energy and is responsible for 40% of total direct and indirect CO₂ emissions.^{21,22}

While the transition in the sector is dependent upon macro-economic factors, such as the shifting of the electricity grid away from fossil fuels towards renewable energy, improvements in the energy efficiency of existing buildings will need to increase rapidly.

In addition, new buildings will need to be extremely efficient, if not energy neutral, beyond 2025.

Because existing building stock is the most important factor for meeting the Paris objectives, it is where we focus our efforts; to support clients in improving existing buildings. We are focusing on the Netherlands at this point as approximately 45% of our commercial real estate portfolio is currently in the Netherlands, where data is most accessible – making this the best market to start with.²³

Figure 4 NL Real Estate Finance decarbonisation pathway



21 https://www.worldgbc.org/sites/default/files/UNEP%20188_GABC_en%20%28web%29.pdf

22 <https://www.iea.org/topics/energyefficiency/buildings/>

23 The commercial real estate sector represents commercial buildings such as schools, offices, parking lots etc. within the Netherlands only.

Our performance

The results below show the average CO₂e emissions intensity (KgCO₂/m²) in 2018 and the decarbonisation pathway for ING's 'commercial real estate NL' portfolio (hereafter, 'REF NL') to meet both its internal ambition and the Dutch climate target for buildings of achieving zero emissions by 2040 and 2050, respectively.^{24,25} The Dutch climate target for buildings was established by the Dutch Green Buildings Council's [Delta Plan Paris Proof Programme](#).

With limited CO₂e intensity data available for the current Dutch commercial real estate market, it is not possible to compare the REF NL lending portfolio with the market directly. However, in relation to these emissions, 70% of the offices financed by REF NL are certified green buildings²⁶, compared to a market average of 37%.²⁷ Based on this, REF NL is currently outperforming the market. However, the absence of complete market data means that a market scenario pathway cannot be determined. For this reason we cannot apply the red - green system to commercial real estate, and therefore the red - green indicator is grey.

Our initiatives

REF NL has implemented various sustainability initiatives since 2015. As an active partner within the Delta Plan Paris Proof Programme, REF NL has set goals aligned with or exceeding the three main ambitions of the Delta Plan. REF NL's goals are:

- By 2023, 100% green energy label lending portfolio.²⁸
- By 2030, 50% completion of the kWh/m² Paris Proof goals per sector.
- By 2040, achieve the Paris Proof objectives (ten years earlier than the Delta Plan target).

Based on the objectives of the Delta Plan, which take into account the estimated renewable energy that will be available in 2050, we have analysed the majority of the REF NL lending portfolio and developed an internal benchmark based on energy performance certificates converted to average kWh/m² and then to CO₂/m²: for all building types we have set a corresponding average annual kWh/m² (kilowatt hours per square metre) decline necessary to become Paris Proof by 2040.²⁹

To achieve this, REF NL already started to support clients in their sustainable transition in 2015. At the start, 15% of the REF NL lending portfolio consisted of certified green buildings. By providing an analytical insight, financing and advice, REF NL has managed to increase the number of green certified buildings to 60% to date.

However, in order to track the actual climate impact, it is essential to measure actual energy consumption. Therefore, ING in the Netherlands has introduced the [ING Energy Robot](#), which is available to all clients free of charge. The robot identifies, estimates, and reports energy saving options. Eliminating 10% to 15% of energy waste in buildings, the Energy Robot will help our client instantly to achieve 40% completion of the 2030 Paris Proof goals. Therefore, the Energy Robot is another way to help us track and manage our portfolio towards carbon reduction in line with our ambitions.

²⁴ Terra converted the average annual kWh/m² target set by the Delta Plan into CO₂ intensity metric (KgCO₂/m²).

²⁵ The results are based on approximately 60% coverage of the ING Real Estate Finance (REF) NL lending portfolio.

²⁶ 'Green Buildings' are defined as having an EPC label of C or better according to Dutch regulatory standards.

²⁷ https://www.vastgoedmarkt.nl/beleggingen/nieuws/2019/04/tweederde-kantoren-niet-duurzaam-hoe-zit-dat-101143178?vakmedianet-approve-cookies=1&_ga=2.36503712.1682649150.1565352282-566262857.1564135827

²⁸ 'Green Buildings' are defined as having an EPC label of C or better according to Dutch regulatory standards.

²⁹ Terra converted the average annual kWh/m² target set by the Delta Plan into CO₂ intensity metric (KgCO₂/m²).

Global outlook and challenges

Looking at the global sector outlook, the average building energy intensity per square metre only improved by 1.3% last year, while total floor area grew by 3% globally. Progress is promising in some countries, such as the Netherlands, but overall, buildings are still not on track to meet the B2DS objectives by 2025.³⁰ Thanks to clear policies in the Netherlands, e.g. the mandatory upgrade of existing commercial properties to a C-label or better by 2023, rapid improvement of the existing building stock is underway. For these same improvements to be seen elsewhere, national governments will also need to implement energy efficiency requirements and support local businesses to transition.

Next steps

As data coverage, insights and accuracy improve over time, we will:

- Fine-tune our methodology;
- Replicate and expand beyond the Netherlands; and
- Adjust the requirements necessary to complete our objectives and steer our clients towards becoming Paris Proof.



Actions speak louder than words. We have concrete goals and are taking actions to achieve them, like with the ING Energy robot. It helps our clients make changes to improve their energy efficiency and reduce CO₂ emissions. That makes ING REF unique compared to other banks.”

– Peter Göbel, Head of Real Estate Finance – NL

³⁰ <https://www.iea.org/etp/tracking2017/>

Residential real estate

- Our performance
- Our initiatives
- Sector outlook and challenges
- Next steps



Residential real estate

Residential real estate

Residential real estate NL, DE – Outstandings

€176.5 billion³¹

Almost half our loan book consists of mortgages within the residential real estate sector, and residential buildings contribute nearly 20% of global energy-related CO₂ emissions.³² We're working with customers to improve the energy consumption of the houses we finance as a way of achieving our Paris alignment goals. Our long-term vision is to have an energy-positive mortgage portfolio by 2050. This means that the houses in our portfolio will collectively generate more energy than they consume.³³

A first step is to increase the energy labels of homes in our portfolios that are now D-G to a C label or better. This can be through supporting customers' efficiency measures such as insulation (roof, floor, windows), which also make houses more comfortable, prepares them for the future and reduces monthly energy bills.

We are focusing on the Netherlands, Belgium and Germany first because together they account for 73% of our mortgage portfolio. In this report we include results on the Netherlands and Germany, as data for Belgium is still being developed.

Our performance

ING's Dutch and German mortgage portfolio includes combined outstandings of roughly €177 billion (60% of total mortgage outstandings) and more than one million financed homes. Other countries will be included at a later stage.

In line with the recommendations of the [Partnership for Carbon Accounting Financials \(PCAF\)](#), we used energy labels as a proxy for actual energy performance of the properties because of limited data availability.

Data on energy labels is publicly available in the Netherlands, for instance via the website of the Netherlands Enterprise Agency (RVO). This data was matched with our portfolio by postcode and house number, while adding additional information about floor area per property.³⁴

This energy label data is not publicly available in Germany because there is no central register. We have therefore developed our own means of determining energy labels based on other available data, such as building year, modernisation and subsidised loans via [KfW](#).

³¹ This figure excludes our Westland-Utrecht portfolio in the Netherlands.

³² https://www.worldgbc.org/sites/default/files/UNEP%20188_GABC_en%20%28web%29.pdf

³³ This ambition takes into account the increased market demand for renewables through clients' purchase of renewable electricity.

³⁴ It is important to mention that approximately 80% of the energy labels in the Netherlands are still preliminary labels, assigned by the Dutch government in 2015 based on best-available information. Some homes may have been improved, since, and would actually receive a better 'final' label if requested.

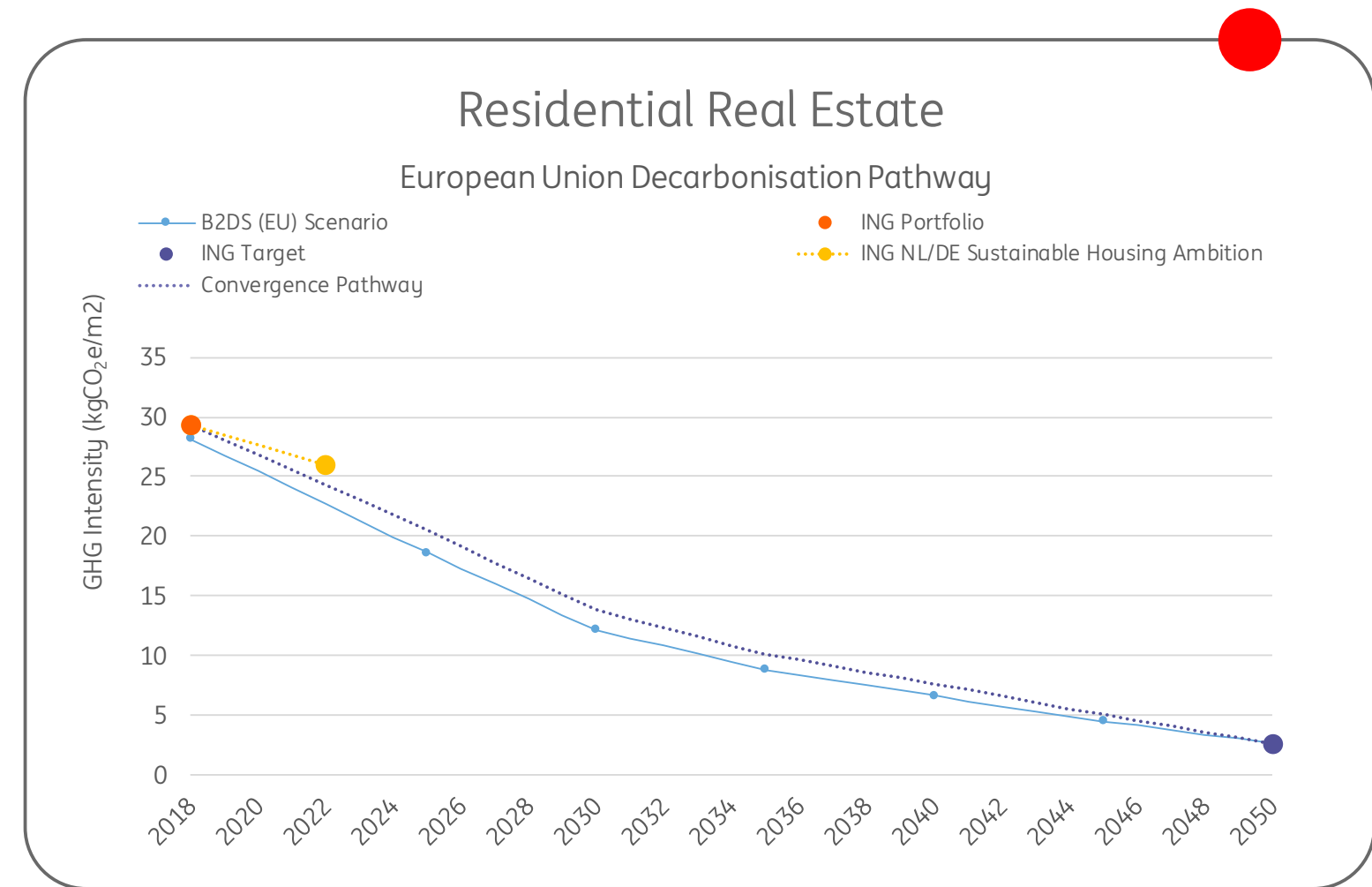
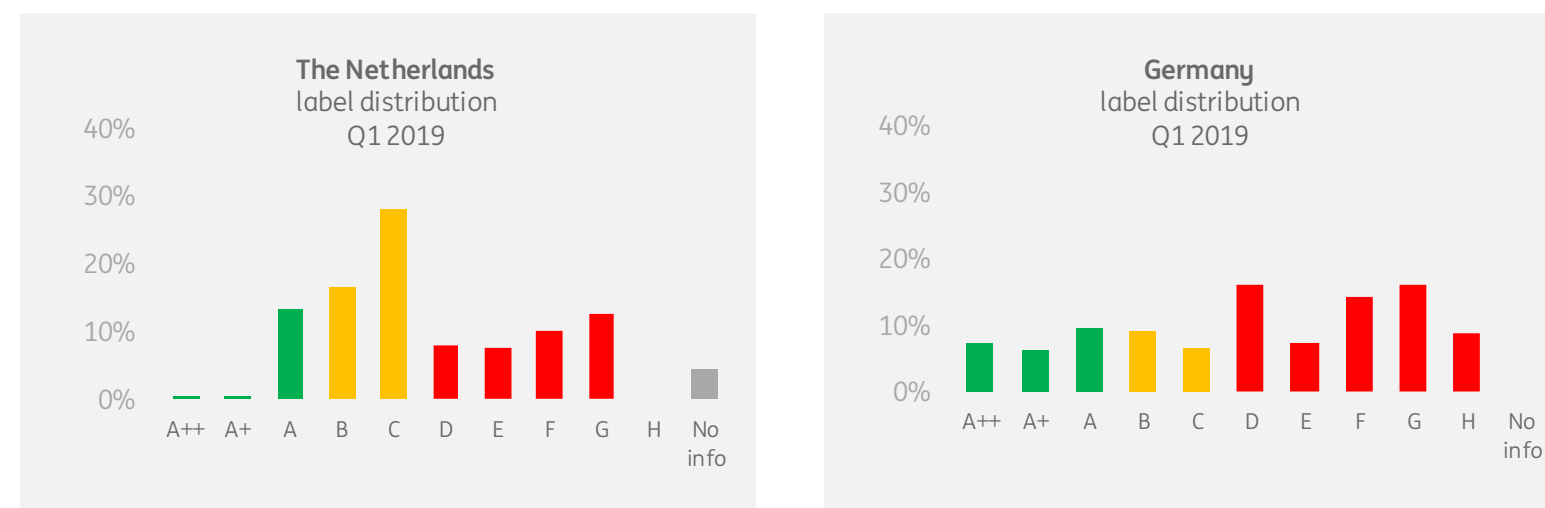
> Residential real estate

Figure 5 shows the distribution of energy labels within ING’s residential real estate portfolios for both countries.³⁵ Navigant, one of the method developers that adapted the SBTi SDA approach for residential real estate, provided us with additional data to convert the energy labels into CO₂ intensity.³⁶ These emissions factors are based on average gas and electricity consumption per energy label for each of the two countries.

Finally, we also calculated the effect of upgrading 50% of the D-G labels to a minimum of C on our 2022 Sustainable Housing ambition, which is also shown in figure 6.

Figure 6 Residential real estate: Netherlands and Germany combined decarbonisation pathway

Figure 5 Label distributions for ING portfolios – Netherlands & Germany



IEA data on the European Union decarbonisation pathway, as well as current floor area and projected growth rates for Europe, allowed us to plot the B2DS trajectory for the EU until 2050. By applying the SBTi SDA approach developed for residential real estate (see technical annex for details) we were able to calculate the combined NL/DE convergence target to align with the B2DS scenario by 2050 (Figure 6).

35 Note that energy levels are evaluated differently per country. For example, the Netherlands doesn't have label 'H' as Germany does.

36 Note: The German energy label includes all energy sources for space and water heating (including electricity), which covers approx. 84% of total energy use by residential buildings in Germany. However, electricity use for non-heating purposes (i.e. lighting, appliances, cooking, etc.) is not covered by the energy label, which accounts for approx. 15% of total energy use by residential buildings in Germany. Other non-heating energy use (e.g. gas for cooking) is also excluded.

> Residential real estate

Similar to commercial real estate, we do not currently have access to the combined Dutch and German residential market averages. However, we do have access to the EU B2DS scenario data for 2018 through 2050. For this reason, we were able to compare our current performance against the scenario data. We are currently slightly above the scenario intensity, putting us off track and warranting a red RAG status.

In addition, although we recognise that our 2022 ambition is not enough to align our portfolio with the convergence pathway in the short term, we feel this is the right ambition for now. Benefits for green retrofitting for customers will grow in the mid-to-long term as the energy transition and sustainable innovations accelerate, governmental policies become clearer and data becomes more accurate (for example via the increase of definitive energy labels in the Netherlands). With this we could expect to align with our convergence pathway in the mid-to-long-term.

Our initiatives

We are working to raise awareness of the topic with our customers and to offer products and services to make it easier and more accessible for them to act. And now, homeowners are starting to take action.

Last year, ING Netherlands introduced a green consumer loan with a reduced interest rate targeted at all ING mortgage customers. Not only is the rate on this green loan reduced, but it is also available to finance small amounts, as most 'no regret' measures do not require a big budget. In addition, homebuyers who would like to invest large amounts (e.g. in making renovations all at once or in a newly bought house) are able to include the amount needed in their mortgage.



Our focus is on the homeowners who have a lot to gain by upgrading the energy efficiency of their homes, and therefore their energy label. We offer them tools and services from third parties to help them, but for many people, it's ultimately a financial decision. That's where we have a role to play."

– Vincent van den Boogert,
CEO ING Netherlands

[> Residential real estate](#)

Since 2005, the [KfW mortgage](#) in Germany has provided loans to four million properties to increase their energy efficiency. ING has been offering kfW mortgages for many years. And as the topic is of growing interest, we are positive that more homeowners will start with the so-called ‘no-regret’ measures such as insulation. This will take them quite easily to our ambition level of energy label C or better.

Sector outlook challenges

[Research shows](#) that people need more than just a financial solution to overcome barriers and start acting. To make an impact, we need to make homeowners aware and willing to act even without having to change their mortgage. This is a tough challenge and one that we cannot overcome alone.

What many homeowners are waiting for is clarity from the government about future policies. They also expect measures to become cheaper either via government subsidies or from advanced technology and/or scaling. Policies on restricting certain energy labels or supporting certain measurements (such as subsidies for insulation) potentially have a huge impact on the pace and rate of making houses more energy efficient. Although we have little influence, we do engage with policy-makers on this topic to see how we can contribute.

The final challenge is about data availability and quality. The current percentage of preliminary energy labels in the Netherlands is very high (80%), though on average, the preliminary labels are more conservative than reality. Obtaining better insight into this data – either through access to real energy consumption or slowly by receiving more definitive energy labels, will have an impact. This is relevant for our portfolio both now and in the future, because if homeowners don’t register their updated energy label, even if ING has financed their improvement, we will not be able to reflect this progress in our analysis.

Next steps

- The lack of data availability is one of the leading challenges impeding the inclusion of other markets for target-setting. To solve this, we’re working together with peers to engage with national and local governments to improve accessibility and quality.
- As this data comes online for other countries, ING will work to incorporate this into our residential real estate CAD.

Cement

- Our performance
- Our initiatives
- Global outlook and challenges
- Next steps



Cement

Cement

Outstandings in scope €821 million

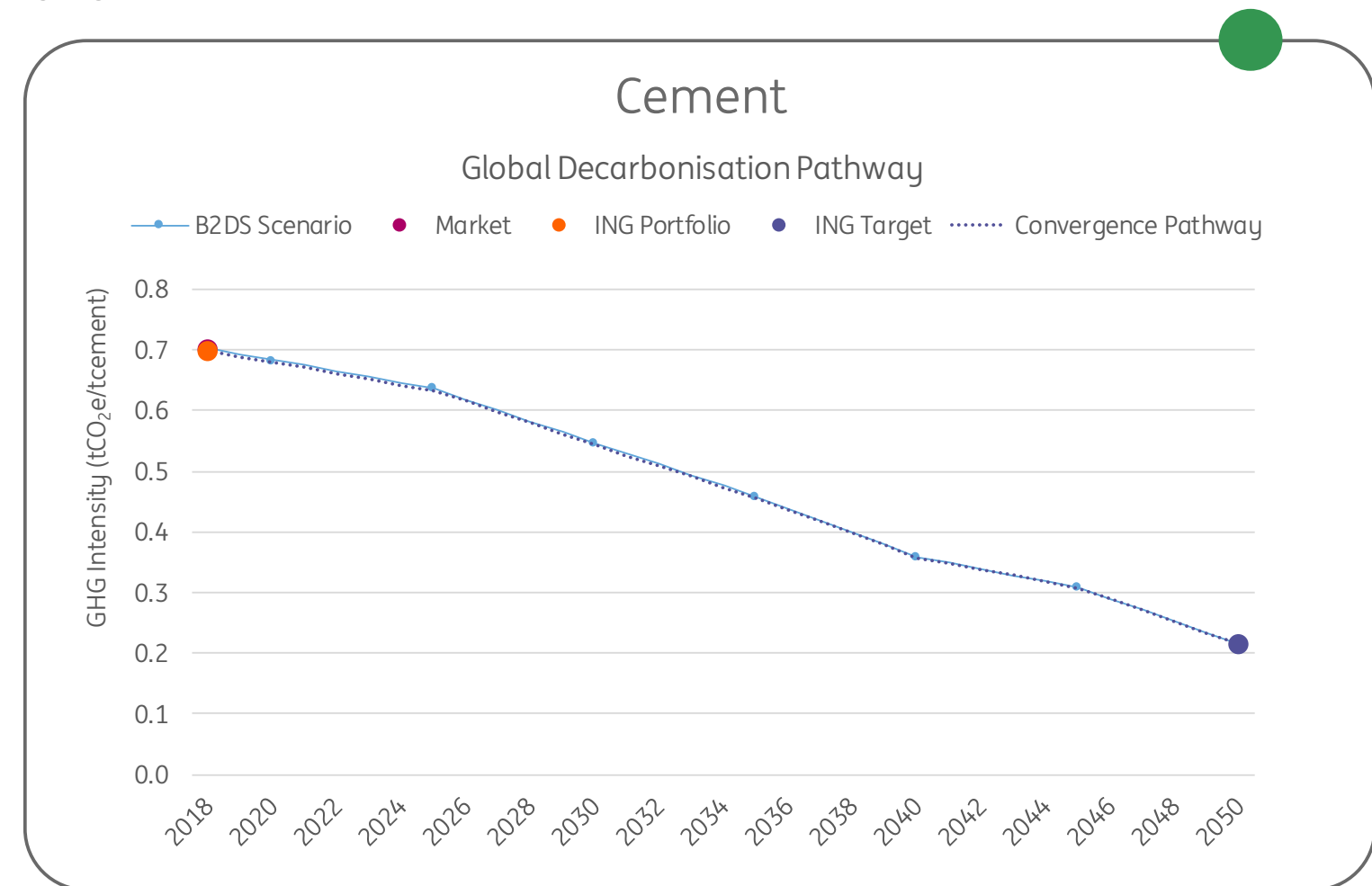
Currently, cement is the most commonly used man-made material on the planet (mainly via manufactured concrete) and the second-most consumed element in existence, only behind water. Cement is a material that is rarely used independently. It usually acts as a binder, mixed together with fine aggregates to make mortar for masonry or combined with sand and gravel to make concrete. According to the IEA 2018 Cement Technology Roadmap developed with the Cement Sustainability Initiative (CSI), the cement sector accounts for 7% of global energy use, making it the third-largest industrial energy consumer and the second-largest total direct industrial CO₂ emitter with a share of 27% (2.2 gigatonnes of CO₂ per year) in 2014.³⁷

The multi-step production process is very energy-intensive and CO₂ emission-intensive as it involves the decomposition and calcination limestone (sintered with other materials), creating clinker (in high-temperature kilns where the majority of emissions occur), which at that end is ground with other components. Around 60-70% of the total emissions in the process are created when the limestone is converted to calcium oxide, with and the remaining 30-40% coming from the combustion of fossil fuels.³⁸

Our performance

ING's cement clients' aggregate CO₂e intensity is slightly below that of the market and therefore the scenario starting point. While this is a narrow margin, it is largely because some of our larger clients outperform the market average. In order to reach the 2050 target of the B2DS scenario, the CO₂e intensity of ING's portfolio will need to decrease by roughly 69%.

Figure 7 Cement decarbonisation pathway



37 IEA & Cement Sustainability Initiative (2018) Technology Roadmap – Low-Carbon Transition in the Cement Industry, p. 5.

38 IEA & CSI (2018) Technology Roadmap – Low-Carbon Transition in the Cement Industry, p. 12.

Our initiatives

ING is committed to working with our clients to achieve their sustainability ambitions, including our cement sector clients. We therefore apply the client-level insights provided by the PACTA tooling to create the climate alignment dashboard for each client, which provides a better understanding of their strategies going forward.

Using these dashboards, we can identify opportunities to help clients achieve efficiency gains in their production processes through our financing solutions. ING is therefore extending our various sustainability products to our cement clients, such as our sustainability improvement loans.

Global outlook and challenges

The global cement sector faces the tough challenge of reducing CO₂ emissions while keeping up with the expected increased total demand in the coming years, especially in Asia. According to the IEA, the demand for concrete, and therefore cement, is likely to surge by 12-23% by 2050 compared to 2014 levels. Various factors such as increased global population, urbanisation and infrastructure development are driving the predicted increase in global cement production. Moreover, there is no substitute material currently obtainable that could meet the quantities required for buildings and infrastructure. The raw materials used in the production process are easily available in most parts of the world, which, combined with high transportation costs, make the sector very regionally sensitive around the globe.³⁹

According to the CEMBUREAU 2017 activity report, the leader is China with 52% of global production, followed by India (6.2%), the EU (5.3%) and the USA (1.9%).⁴⁰ China's cement production is expected to decline in the long term. However, this trend will be offset by the anticipated increases in regions that are developing their infrastructure such as India, other developing Asian countries and Africa.⁴¹

Despite the growing demand in the industry in recent decades, CO₂ emissions have been reduced by 18.4% per tonne since 1990.⁴² However, a further 24% reduction of cement manufacturing emissions is required by 2050 compared to 2018 levels to meet the ambition of the 2DS scenario. IEA & CSI propose several key levers for supporting the sustainable transition – “improving energy efficiency, switching to alternative fuels (fuels that are less carbon-intensive), reducing the clinker to cement ratio and integrating carbon capture into cement production [...]”⁴³ Even more ambitious, the B2DS scenario, which ING uses as a CO₂ intensity climate benchmark, would require a further increase of about 45% in the cumulative CO₂ emission reductions compared to the 2DS scenario.

39 IEA & CSI (2018) Technology Roadmap – Low-Carbon Transition in the Cement Industry, p. 8.

40 Global Cement and Concrete Association (GCCA), citing the CEMBUREAU 2017 activity report.

41 IEA Cement Tracking Clean Energy Process, <https://www.iea.org/tcep/industry/cement/>

42 GCCA, citing 2016 GNR data.

43 IEA & CSI (2018) Technology Roadmap – Low-Carbon Transition in the Cement Industry, p. 5.

Next steps

- ING will reach out to clients in the cement sector in order to discuss these results, sector challenges and ING's solutions for financing their needs.
- We will continue to engage with clients and work with peers in our sector to further improve and test effective strategies, products and approaches for facilitating progress in this sector.

4 Updates on remaining sectors



Steel

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Fossil fuels

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Steel

- Global outlook
- Challenges
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Steel



Steel is an essential part of the fabric of modern life. It is used in the production of much of what surrounds our everyday lives, such as vehicles, white goods (such as refrigerators, air conditioners and stoves) and buildings. In Europe, it is an integral part of manufacturing industries. However, due to its prominent use and nature of current production methods, the steel sector is responsible for ~7% of global emissions. While emissions per tonne of steel have fallen over the past 50 years, production of one tonne of steel will, on average, emit ~1.8 tonnes of CO₂.

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Steel is produced in two ways:

- Blast Furnace: Reducing iron ore using coking coal in a blast furnace (BF) to pig iron with subsequent conversion to crude steel in a basic oxygen furnace (together the 'BF route').
- Electric Arc Furnace: Smelting scrap or direct reduced iron (DRI)⁴⁴ using electricity and gas in an electric arc furnace (EAF).

On average, a BF emits ~2-2.2t of CO₂ per tonne of steel, while an EAF emits ~0.8t of CO₂ p/t. Currently about 70% of the world's annual production of 1,700 million tonnes of steel is made using the BF route. Increased utilisation of EAFs is constrained by (i) availability of scrap; (ii) availability of cheap reliable electricity (i.e. natural gas); and (iii) quality limitations of output material due to impurities inherent in scrap materials.⁴⁵

⁴⁴ DRI is Direct Reduced Iron (also called sponge iron), which is produced by the reduction of iron ore pellets by gas. It is expected that going forward using DRI in EAFs will be used more and more as CO₂ reduction becomes a priority for steel producers.

⁴⁵ Scrap refers to recycled steel, for instance from cars. This scrap will inevitably contain traces of other metals which can be difficult and/or expensive to remove. As such, steel produced with only scrap cannot reach the quality required for the production of automobiles, for instance. Please also note that the BF also used scrap to reduce carbon content and contain temperature during the process, however this is typically no more than 20% of the load.

Global outlook

Within the steel sector, China is immensely important as it is responsible for both the production and the consumption of 50% of global steel. The Chinese government is increasing its focus on reducing pollution and CO₂ emissions, and a lot of older (more polluting) steel mills have been closed in favour of newer (and therefore less polluting) mills. Any meaningful reduction in CO₂ output of the steel sector will therefore have to involve China. At the moment though, it's mainly EU based mills that are actively researching and piloting new technologies. As it is generally challenging to obtain CO₂ emission data on steel mills, a good first step would be greater public disclosure.

There are roughly three routes for reducing CO₂ output of the steel industry:

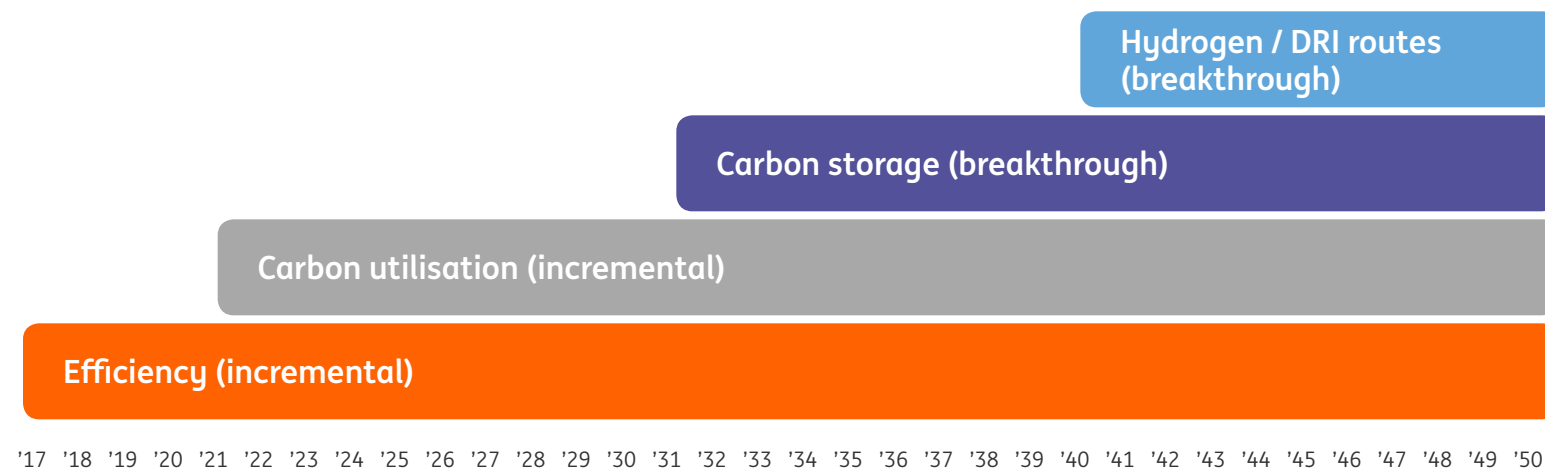
1. Increase energy efficiency of BFs;
2. Capturing and storing / or using CO₂ output; and
3. Replacing carbon as a reducing agent.

The most efficient BFs currently emit around 1.8-1.9t of CO₂ per tonne of steel, while the achievable lower limit of CO₂ emissions of the BF process is estimated to be around 1.5t CO₂. Therefore it is expected that a further reduction of around 15-20% of CO₂ emissions might be feasible through incremental improvements. We expect these small improvement steps to be ongoing over the next 25 to 30 years (potentially made economical by carbon pricing).

The second transition route envisions either carbon utilisation (i.e. conversion of carbon to chemicals) or a combination of storage and utilisation. While carbon utilisation is considered an incremental step, the large-scale storage of CO₂ would be a breakthrough technology. Please note that some innovative steelmaking techniques, such as Hisarna, also have as a primary benefit that the CO₂ emitted is of a higher purity and therefore easier to capture and store. Disadvantages of capture and storage include the costs as well as the limited percentage of CO₂ that can effectively be captured from an industrial site (no more than 90%).

Finally, the ultimate goal would be to replace carbon (i.e. coking coal or natural gas) as a reducing agent. Effectively this is likely to lead to a shift to the EAF route, using hydrogen as a reduction agent to produce DRI as raw material for conversion in a renewable energy powered EAF. In Europe, certain companies are already working on this type of solution. Benefits of this route are that hydrogen-based steelmaking is already being used on an industrial scale and the process is quite similar to the current gas-based process.

Figure 8 Transition timelines per strategy and technology



[> Steel](#)

Considering long investment cycles in the capital intensive steel industry, we expect to see the slow implementation and roll-out of the various solutions over the next 30 years. It seems likely that carbon capturing and storage will be the first focus from many steel companies and will attract research and investments during the 2020s, while hydrogen-based solutions will be invested in and rolled out in the 2030s. Besides the fact that design and testing will take time, significant investments in the electricity grid will be required to supply the electricity required. Moreover, in order to be truly green, this electricity (including the electricity to make the hydrogen) should also be produced by renewables.

Challenges

Steel is a globally traded commodity, however, due to its weight, trading generally has a more regional character. The EU has clearly stated its strong ambitions with regards to CO₂ reduction, and if it imposes higher carbon costs on steel production while maintaining free trade with regions whose climate ambitions are smaller, there is a real risk of 'carbon leakage' across borders.

The EU-based steel industry is already at somewhat of a disadvantage due to higher energy costs (versus for instance the CIS, US and China) and (to a lesser extent) higher labour costs. In an industry where significant fluctuations in margins are a reality, this higher cost base theoretically limits investment capacity. While a more stringent climate policy will necessitate significant investments, it could also exacerbate the disadvantages and thereby limit the capacity for those investments. Introducing trade measures (such as a carbon border adjustment) could alleviate such pressures.

While it is clear that commercial banks will have a role to play in the energy transition for steel, the above also clearly illustrates the challenges involved in financing the transition, especially in the early stages of technology development. Several public financing initiatives have been taken by the EU (such as the innovation fund) and the European Investment Bank, however there are also examples of sponsored projects never taking off due to uncertain market conditions.

Next steps

Over the past months, a dedicated steel team has been formed within ING to focus on the sector. Given the scale of the challenge, ING considers the energy transition to be one of the major strategic issues facing the steel industry at the moment. To make further progress, ING will take the following next steps:

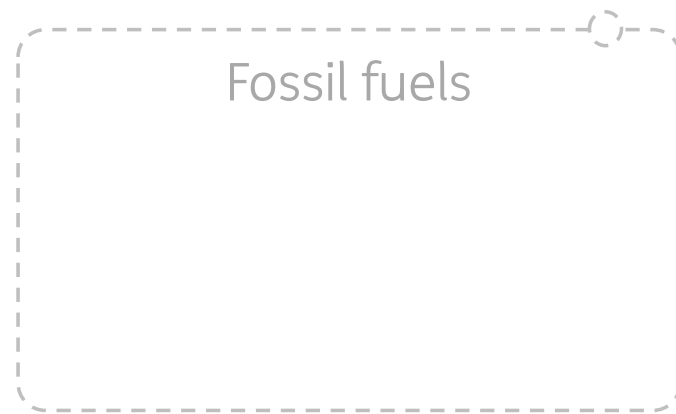
- Intensify outreach to industry bodies to get a stronger understanding of the challenges and potential solutions.
- Continue to work with our partner 2ⁱⁱ and peer banks on the methodology for the steel sector.
- Continue to engage with our clients on what steps they are taking and how ING as a bank can assist.
- We aim to publish our climate alignment results for steel in 2020.

Fossil fuels

- Global outlook
- Initiatives
- Challenges
- Next steps



Fossil fuels



The fossil fuels sector comprises the coal, oil and gas sectors. Oil, gas and coal are used globally in a wide variety of ways, including energy generation (mainly electricity, heating and transportation), and the production of plastics, steel, medicines, construction materials, fertilisers, and many other products. As such, the sector is vital to the functioning of the global economy, and its products are used on a daily basis by nearly all of the global population.

Historically, the fossil fuels sector has been responsible for the vast majority of global primary energy supply. Today 87% of global energy supply comes from fossil fuels and the burning of fossil fuels⁴⁶ to create energy generates 89% of global CO₂ emissions.⁴⁷

The fossil fuels sector can be split into two main categories: companies active in (i) the extraction of fossil fuels from the subsurface ('upstream'), and (ii) the trading, transportation and processing of fossil fuels ('midstream and downstream'). The SDS scenario focusses on fossil fuel demand and production levels over time. Given this focus on production volumes, we consider the upstream activities of the sector to be relevant for the future assessment of alignment with the scenario.

Global outlook

The Sustainable Development Scenario

The International Energy Agency (IEA) Sustainable Development Scenario (SDS) depicts an energy transition between now and 2040 with a starting point that takes into account a number of desired outcomes aligned with the below 2°C goal, as well the energy-related elements of the UN Sustainable Development Goals. The SDS then works back from there to define the most environmentally, socially and economically efficient transition pathways that each energy-related sector will need to follow in order to achieve these goals. For the fossil fuels sector, this will mean a number of changes:⁴⁸

- After a peak in the first decade, oil demand will have reduced by nearly 40% by 2040, driven largely by the foreseen uptake in electric vehicles, the increased fuel efficiency of internal combustion engines, and the reduced use of oil in electricity generation.

⁴⁶ International Energy Agency World Energy Outlook (WEO), 2018.

⁴⁷ PBL Netherlands Environmental Assessment Agency, Trends in Global CO₂ and total GHG Emissions, 2018.

⁴⁸ Bullet points reference: International Energy Agency World Energy Outlook (WEO), 2018.

> Fossil fuels

- Demand for gas will increase in the short to medium term as it plays the role of a ‘transition fuel’ alongside renewable sources to meet the increased demand for electricity.
- Demand for coal is projected to drop to less than half today’s level due to the energy transition in the power generation sector, driven by gas and renewables becoming more cost-competitive.
- Demand for oil and gas will continue beyond 2040. Oil will continue to be used for certain forms of transport (e.g. aviation) and other uses (e.g. petrochemicals). Natural gas will continue to be required (i) to maintain flexibility and reliability in the energy system in view of the intermittent nature of renewable power supply, and (ii) to create high temperatures required in industrial processes for which there is currently no alternative.

Initiatives

Historically, ING has been a bank with strong expertise in the energy sector and as such has an established market position in the fossil fuels sector. In recent years, following the Paris Agreement and the strengthening of ING’s commitment to sustainability and action against climate change, new policies and lending criteria have been put in place for the fossil fuels sector:

- For coal mining, ING’s coal policy was significantly strengthened in 2017 by a commitment to reduce our thermal coal-related lending exposure to close to zero by 2025 in a gradual and responsible manner. This includes all thermal coal mining and related infrastructure as well as thermal coal-fired power generation.
- For upstream oil and gas, the credit assessment includes a strong focus on production costs. By focusing on low-cost production, we work together with our clients to ensure that their businesses are resilient to ‘stranded assets’ risk.

Challenges

- GHG emission reduction needs to be driven by a shift in demand and, in particular, by electrification of transport and the built environment. It cannot be obtained by focusing on limiting fossil fuel supplies only.
- A material amount of fossil fuels that are extracted are non-combustion fossil fuels. These are used for the production of materials and goods such as plastics, medicines and construction materials.
- The current developments and market expectations are not aligned with the SDS scenario, as the demand for fossil fuels continues to grow. This creates further uncertainty for the actions that may be taken to achieve the below 2°C goal (e.g. significant policy intervention).

Next steps

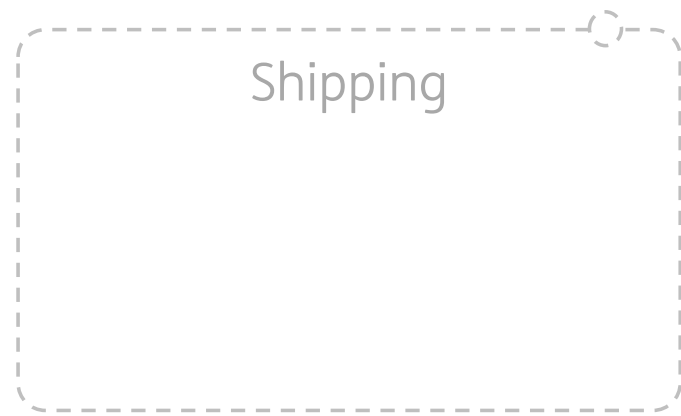
- We are working closely with 2°ii, the other Katowice Commitment banks and consulting NGOs and think tanks, such as the Carbon Tracker Initiative, to develop a methodology to measure Paris Agreement alignment.
- We will strive to include results for this sector in our next disclosure, currently planned for 2020.

Shipping

- Initiatives
- Terra and the Poseidon Principles
- Global outlook and challenges
- Next steps



Shipping



Shipping is one of the key sectors in scope of our Terra approach, as the international shipping sector accounts for 2-3% of global emissions. Without global mitigation efforts this could grow by as much as 250% by 2050.⁴⁹ Despite the sector’s significance, shipping, together with aviation, are two of the sectors left out of the Paris Agreement in 2015. However, in April 2018, the International Maritime Organization (IMO) and its member states adopted a resolution outlining the Initial IMO Strategy on GHG emissions reductions from ships.⁵⁰

This strategy sets the ambition to “peak [greenhouse gas (GHG)] emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008 while pursuing efforts towards phasing them out on a pathway of CO₂ emissions reduction consistent with the Paris Agreement temperature goals.” ING is committed to supporting our clients in the shipping sector to achieve this international ambition.

Initiatives

ING has undertaken a variety of shipping sustainability initiatives in recent years:

- We cooperate closely with Rightship, a benchmark provider of how vessels perform (theoretically) in terms of CO₂e emissions. Rightship is a reference point when we enter into new transactions.
- Together with 10 other international banks, ING is a signatory of the Poseidon Principles. They aim to contribute to the IMO’s ambition to reduce GHG emissions by at least 50% by 2050. These principles established a framework to assess and disclose whether financial institutions’ lending portfolios are in line with these adopted climate goals.⁵¹ ING will measure carbon intensity and assess the climate alignment of the shipping portfolio annually, using the methodology established by the Principles (see below for details).⁵²
- In 2018, ING set up a €300 million green financing framework with the European Investment Bank (EIB) for projects that make the shipping industry more sustainable.
- ING is a founding member of the Responsible Ship Recycling Standards (RSRS). The RSRS is a joint initiative with eight other financial institutions to encourage our clients to scrap their vessels in an environmentally and socially responsible manner.

49 <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/GHG-Emissions.aspx>

50 http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Documents/Resolution%20MEPC.304%2872%29_E.pdf

51 www.poseidonprinciples.org

52 Factual is expected to start in 2021.

> Shipping

Terra and the Poseidon Principles

The Poseidon Principles are a framework for assessing and disclosing the climate alignment of ship finance portfolios and have been developed by several stakeholders in the shipping industry (including banks, ship owners and research institutes). They were launched in June 2019. The signatories represent a combined loan portfolio of \$100 billion.

The principles fit with our Terra approach. The first principle requires banks to measure carbon intensity (tonnes of CO₂e per tonne-nautical mile) of their shipping portfolio annually, and to assess the climate alignment (carbon intensity relative to established decarbonisation pathways) of the portfolio using the methodology established by the Principles. This methodology (developed by the Rocky Mountains Institute) will be integrated into the PACTA tool.

While the IMO ambitions driving the Principles are groundbreaking for the sector, we recognise that further efforts will be needed to align fully with the Paris goals. Nonetheless, we consider the Principles to be a very positive step in the right direction, taking into account:

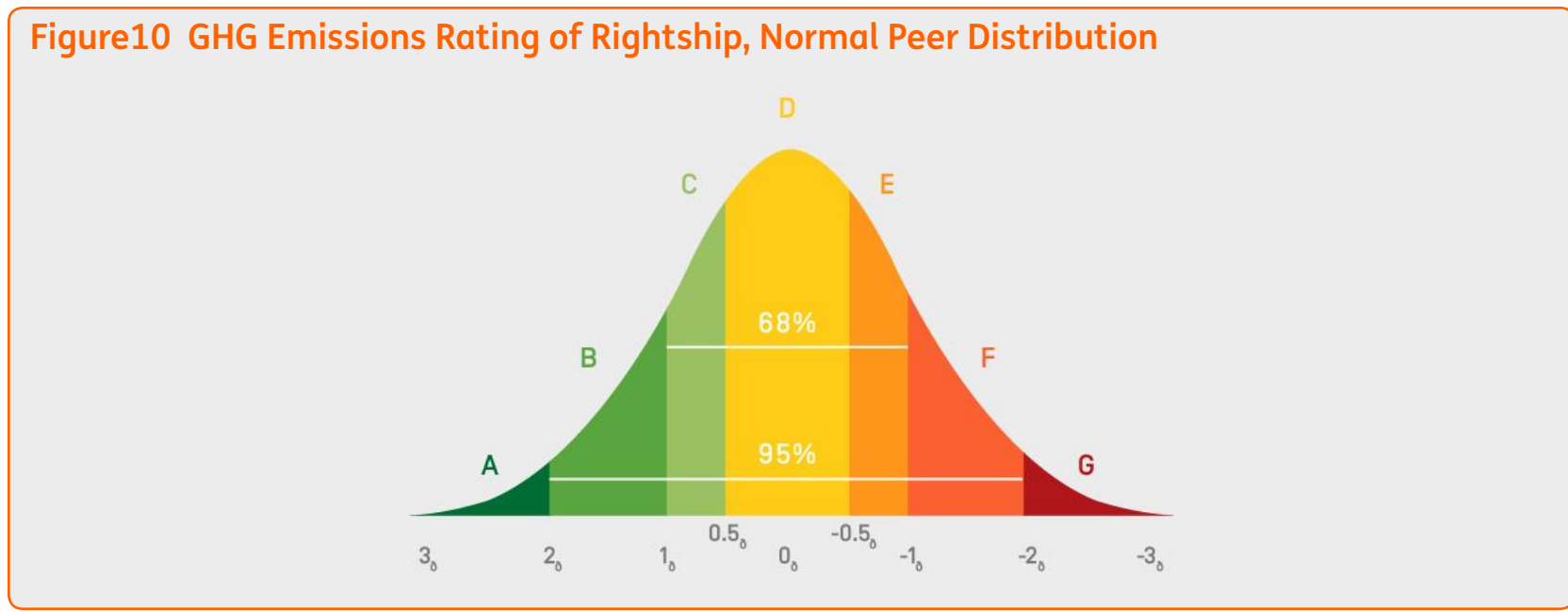
- That this is the only global initiative to reduce CO₂e emissions supported by many stakeholders in an industry that is not covered by the Paris Agreement;
- That the principles are ambitious, but do not lose connection with macro-economic constraints and our clients' ability to meet global goals; and

- That they facilitate the disclosure of CO₂e emissions data from our clients, which provides the required transparency to measure alignment over time with the stated goals of the principles.

Global outlook and challenges

The achievability of the IMO 50% reduction ambition will still depend on technological development and substantial changes in the industry.

In the short term, developments relating to vessel/engine design, route optimisation and slow steaming (ships operating at slow speed and therefore reducing their fuel consumption), are expected to contribute to lower CO₂e emissions. However, there is currently no mechanism or policy framework to incentivise or require such actions. This may need to be introduced by ship owners or policymakers in order to achieve the reductions needed.



Source: Rightship

> Shipping

In the long term, more radical technology shifts are required to achieve the reduction required. One of the options lies in the use of different types of fuel, such as LNG, hydrogen, lithium-ion batteries, and renewable energy sources such as wind power. Aside from the costs aspect, each of these technologies presents challenges of its own, with one of the concerns being the availability of these cleaner fuels. However, supply will be uncertain unless there is demand. Since vessels obtain their fuel at various locations around the world, if we want vessels to burn more environmentally friendly fuel, all bunker locations should collaborate to accommodate the supply of fuel. Therefore a mass move within the sector towards cleaner fuels is considered necessary to create the demand needed and to incentivise the establishment of a cleaner fuel global bunker structure.

The introduction of IMO 2020⁵³ and the current expansion in LNG-powered vessels may reduce sulphur content in vessels, but is not expected to lead to a substantial enough reduction in CO₂e emissions to meet the relevant targets. It has been argued that even if the entire fleet were to switch to LNG, the difference compared to business as usual (in terms of CO₂e) would be limited to a 15% reduction.⁵⁴ This is not sufficient to meet the IMO ambitions; therefore LNG is considered to be a partial solution only. Even for the mid-term there are challenges for an LNG fuel switch as substantial (governmental) investments are required to accommodate LNG infrastructure.

⁵³ In 2016, the IMO agreed to limit the sulphur content in all marine fuels to 0.5% beginning in 2020 – with the exception of fuel burned in Sulphur Emission Control Area regions, which are already at lower sulphur limits. This is expected to affect demand for fuel oil for ship bunkers as shippers look for alternatives, such as adding on-board exhaust scrubbers or switching to liquefied natural gas (LNG), as the global refining system is not yet equipped to make meet the new volume of residual fuel oil at 0.5% sulphur once the regulation goes into effect.

⁵⁴ <https://www.ship-technology.com/features/reducing-carbon-emissions-shipping-sector-prepared/>

While battery and hydrogen cell technologies do exist, their current capabilities are not sufficient to become a complete solution for CO₂e reduction. Most of the ships built from 2030 would need to be capable of zero emissions straight away in order to meet the 2050 targets. Large-scale research and development is therefore required now to ensure that vessels are compliant by the 2030s.

Next steps

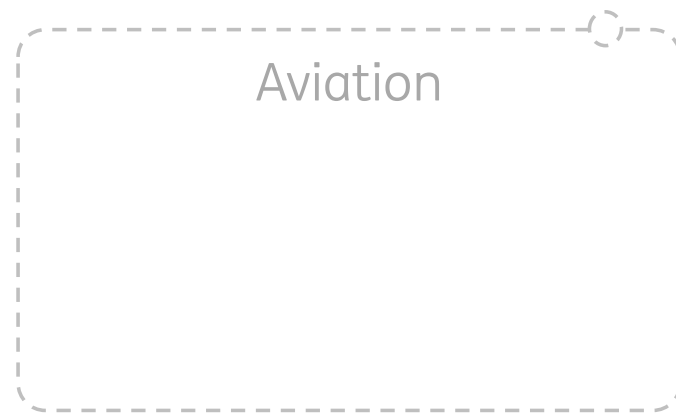
- The principles will report for the first time on 2019. Data should be delivered in 3Q 2020 and factual reporting by the signatories, including ING, is expected in 2021.
- Until then, we will continue to use Rightship to assess the expected efficiency of the vessels in our portfolio (for each ship type) in terms of CO₂e emissions based on their design, translated into a label. Rightship does not provide a trajectory, nor has it set sustainability-linked ambitions. Labels range from A to G (more sustainable to less sustainable). The Rightship methodology is based on a normal distribution and therefore labels A–C can be considered to be the 32% most efficient vessels in term of CO₂e emissions. We aim to have 35% of our vessels labelled A–C at all times.

Aviation

- Initiatives
- Global outlook and challenges
- Next steps



Aviation



The aviation industry makes up about 2% of global CO₂ emissions.⁵⁵ If aviation were a country, it would be one of the top 10 emitters. One flight from London to New York and back generates the same level of emissions as a person heating his or her home for a year.⁵⁶ The aviation industry has seen continuous growth in recent decades as increasingly more people fly. By 2020, CO₂ emissions will be 70% above 2005 levels and global output is set to increase by 300% through 2050 without concerted mitigation efforts. This is because the 'propensity to fly' (flights per capita per year) is expected to dramatically increase in emerging markets, with China and India currently still at <0.1 flights per capita per year vs >2.5 in Europe and the US.⁵⁷

Despite the aviation sector's significance, like shipping, it was left out of the Paris Agreement in 2015. However, the International Air Transport Association (IATA), which represents 82% of air traffic globally, has set a target to reduce net aviation CO₂ emissions by 50% by 2050, relative to 2005 levels.⁵⁸ This will be pursued through improved technology and sustainable fuels, more efficient aircraft operations, infrastructure improvements, and market measures to reduce emissions and to increase emissions offsetting.

Initiatives

At ING, we recognise the threat that increased emissions pose to societies around the world and to the preservation of the planet. We are committed to working with our clients to help them achieve their climate ambitions and a greater degree of efficiency. We therefore work closely with the large aircraft manufacturers to map aircraft emissions efficiency by aircraft type. As such, ING has generated an internal list of 'outperforming aircraft' – the asset types that beat their competitors and predecessors in terms of emissions (the latest generation of aircraft is generally 20% more efficient than its predecessor).⁵⁹

⁵⁵ <https://www.carbonbrief.org/aviation-consume-quarter-carbon-budget>

⁵⁶ <https://www.bloomberg.com/news/articles/2019-07-18/airlines-clash-over-co2-as-industry-vilified-in-climate-debate>

⁵⁷ [Ibid](#)

⁵⁸ <https://www.iata.org/policy/environment/Pages/climate-change.aspx>

⁵⁹ When identifying outperforming aircraft, we take note of regulatory and industry standards, such as the [green bond principles](#).

[> Aviation](#)

Today, these types represent approximately 5% of the global commercial aircraft fleet. These aircraft, however, make up approximately 33% of ING's aviation portfolio. **It is our goal to increase this to 50% by 2022 year-end.**

Global outlook and challenges

The Aviation industry is expected to continue its growth on the back of continued passenger and freight demand. In this context, the industry faces increasing environmental pressure.

The sector has seen significant improvements in CO₂ emissions per passenger kilometer largely as a result of better aircraft utilisation, fleet renewal and the rise of low-cost airlines – which has increased the average number of passengers per flight, lowering energy use per passenger. Low-cost carriers generally present lower CO₂ intensity at around 60g CO₂ per passenger kilometre compared with network carriers which are at around 90g CO₂ per passenger kilometre as more floor space is used by business – and first class seats.⁶⁰ Further improvements are envisaged in aircraft design, fuels and logistics and there is ample room for further efficiency gains.⁶¹

Beyond efficiency improvements, policy developments have started to come into force. One of those is CORSIA (the Carbon Offsetting and Reduction Scheme for International Aviation), which addresses CO₂ emissions from international aviation and obliges airlines to track, report and offset their emissions.⁶²

Finally, in terms of financing, the industry is moving away from secured aircraft financing and towards more unsecured financing, where the purpose of the funds is less clearly and more broadly defined. This makes it harder for ING to link our funds directly to a specific aircraft, and hence financiers will need to find other ways to prove the sustainable nature of their exposure.

Next steps

- ING will continue to work with our partner, 2°ii to finalise the sector analysis using external databases such as FlightGlobal, to understand and measure the CO₂ intensity of our portfolio and work with clients to reduce this over time.
- We aim to publish the climate alignment results for aviation in 2020.

⁶⁰ <https://www.bloomberg.com/news/articles/2019-07-18/airlines-clash-over-co2-as-industry-vilified-in-climate-debate>

⁶¹ <https://www.iea.org/tcep/transport/aviation/>

⁶² <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>

5 Next steps

We've come a long way in these last years. And it will continue to be a work in progress as the various methodologies are refined, data sources are improved, and we receive and take into account feedback on our approach. Nonetheless, we are convinced that we have created a solid base that allows us to determine meaningful actions for the sectors in scope and to steer towards the set targets.

With this report, it is ING's aim to not only provide a transparent update on our commitments, but also to use this first step to start a necessary dialogue with the banking sector, clients and our stakeholders. We believe that by not waiting for a 'perfect' solution, but rather putting our progress out there, we can contribute a tangible example of what portfolio climate alignment could look like and what the challenges are. We welcome clients, peers, academics, policy makers, regulators, and civil society to think with us, help us improve and join the movement of moving from commitment to action.

Below we list a number of topics that we acknowledge as being next steps and points of further development. We look forward to [hearing your thoughts](#) on the work we've done so far, the topics below and how you see the way forward.

Methodology refinement

We recognise that methodology development is still underway, even within the context of the initiatives ING is active in, namely the Science Based Targets Initiative and the PACTA pilot, among others. For this reason, our approach may need to further adapt to new insights as they develop. We will need to continuously assess whether current methodologies and scenarios are the most appropriate or accurate. In short, this is a new and evolving field and all involved will need to be agile and adapt to new developments. Though we've explained our approach so far, we are committed to these processes of refinement and development. If needed, we will ensure that any changes to the methodology or data that materially impact our reporting are transparently communicated, and that any restatements are indicated and explained in future reports.

Bank standardisation

One of the desired outcomes is that a viable standard will emerge for banks globally in terms of measuring climate alignment of their loan books; a standard that allows for comparison and aggregation of data across the sector. To achieve this, uniformity must be achieved on many levels, starting with physical, asset-level client data. Further, comparison will depend on other methodological choices like attribution and scope. We see great possibilities for standardisation within the bounds of the target-setting methodologies ING has applied. However, as the previous bullet mentions, this will need to be a collaborative and iterative process, one we are in the early stages of. ING is working closely with peers and partners to overcome some of the barriers of standardisation.

However, ING also sees the pragmatic necessity for each bank to consider approaches in the context of its own portfolio composition. Due to the fact that different banks will have very different sector focuses, this may result in the need for a varied set of methodologies and approaches to be applied. As such, we see the conclusion emerging that the most like-for-like comparison scope across banks might be sector-specific alignment, for example, by comparing power generation portfolio results among banks active in that sector. For that reason, ING encourages stakeholders to look at each bank individually given their specific portfolios and to consider comparing performance on a sector level.

Scope expansion

We have made a deliberate choice to initially focus on the sectors that contribute a significant carbon footprint globally. However, during the last year we were asked regularly what will happen when we have completed our work on these carbon intensive sectors. The methodologies currently being developed and applied are limited to a specific scope of sectors. Expansion will require more data, new scenarios to be developed and more iterative testing phases.

To that effect, we are discussing with peers and partners which sectors should be in the next wave. For example, the agriculture and land use sector has long been identified as a major contributor to GHG emissions but due to the lack of data and climate scenarios specifically tailored for this sector, alternative approaches need to be developed. We are keen to continue these types of exploratory discussions and in the meantime are also committed to finalising the work in the remaining four sectors in scope of Terra in the coming period.

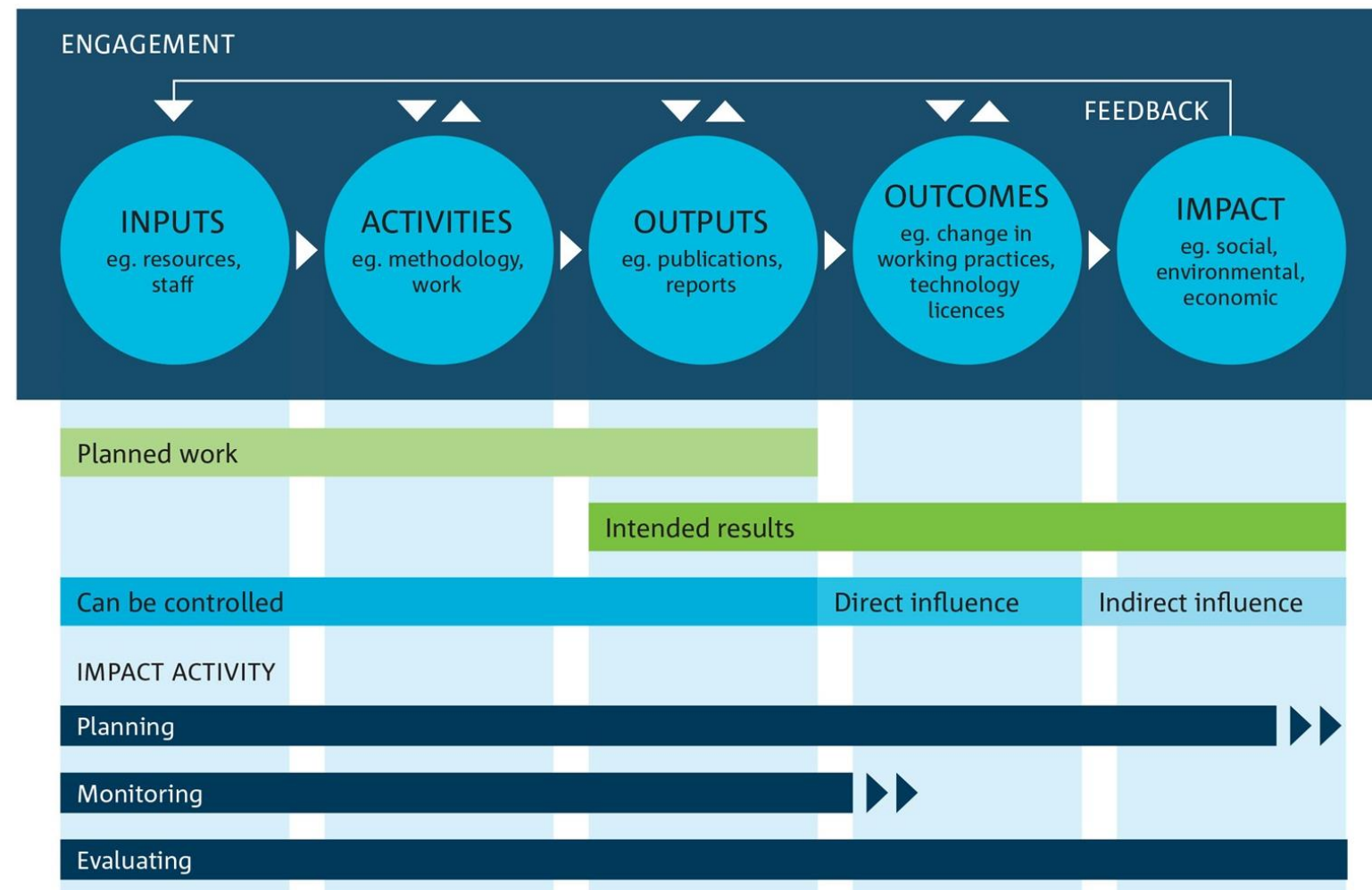
Outcomes vs. Impact

As described in the introduction of this report, there is a difference between the outcomes of portfolio climate alignment and the impact of absolute GHG emissions reduction in the real economy. Challenges such as carbon leakage present limitations to how much a bank can control in terms of climate impact, especially when applying capital allocation choices as a tool for steering.

As mentioned previously, this is why ING values an inclusive approach where clients are supported in their transition. But even this approach presents challenges with regards to measuring and attributing actual impact to ING's actions. Should ING take robust measures to support and engage a client to transition, the client's actions may have been a response to pressure from multiple stakeholders or their own internal decision-making. It would therefore be difficult for ING to claim that impact as a result of our efforts alone. This is because our influence is often indirect.

To illustrate this, we use the impact framework developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) displayed in figure 11.

Figure 11 CSIRO's Impact Framework



Impact Framework derived from the work of the W.K. Kellogg Foundation

Source: <https://www.csiro.au>

Applying the impact framework to ING's efforts to steer towards the goals of Paris:

- ING's **inputs** would be our goal to steer our portfolio towards the well-below 2 degree goal of the Paris Agreement. Further inputs would be the teams, programmes, and tools put in place to achieve this (for example as described throughout this report).
- Our **activities** would flow out of our Terra approach tools and capabilities, through client engagement and deployment of policies and products.
- The **output** would be a shift in our portfolios over time, monitored internally via sector reports.
- The **outcome** of this portfolio shift is that the CO₂ intensity of our sector portfolios should improve over time, reported via the CAD.
- The desired **impact** would be that CO₂ emissions on the ground are reduced.

As the CSIRO impact framework visualises, as we move through this process, the nature of the results shift from the things we can directly control to those we can only influence both directly and indirectly. Of course, a positive impact is the desired result, but it remains difficult to account for and attribute. ING is committed to working with our sector, stakeholders and partners to better understand how to evaluate this in the future, and in the meantime, we will continue in this process of engagement, working towards the best possible results.

In closing, we hope you've found this report insightful and inspiring in the face of the climate crisis our world faces. Though we are committed to doing our part, there's only so much an individual bank can do. That's why there is an urgent need for action by all, including open, multi-stakeholder collaboration with civil society organisations, clear national climate road maps and strong regulation.

With that, it is our hope that the work we have reported on in this progress update will lead ING and our sector closer to Paris Alignment with the help of strong government policies, technological development and the ingenuity and passion of our clients. Everyone has a part to play. Thank you for caring about how we're playing ours.

6 Governance annex

Climate Change Governance

In order to have board-level oversight of strategic climate-related risk and opportunity management, which includes our ambitions and strategies related to Terra, ING established the Climate Change Committee (CCC) in 2018. This executive committee is chaired by ING's CRO and co-chaired by the board member responsible for Wholesale Banking. It is further comprised of a number board members and senior managers from the Wholesale and Retail business. The Committee is advised by an internal Climate Expert Group (CEG) made up of experts from various front office, sustainability, risk and other departments

More specifically, the CCC is responsible for:

- Mandating appropriate processes by which ING identifies climate-related financial risks and opportunities.
- Mandating appropriate processes by which ING effectively manages climate-related financial risks and opportunities.
- Guiding policies, strategy, performance objectives and monitoring pertaining to climate-related financial risks and opportunities.
- Monitoring and overseeing progress against relevant goals and targets.
- Guiding external communication and transparency requirements.

The CCC meets six times per year (every other month). The agenda is prepared by the CEG (which meets monthly) and consists of minutes of the last meeting, proposals for decision, proposals for information and progress on action list. Terra is a fixed agenda item in all CEG and CCC meetings.

Terra is further supported on a day-to-day basis by the Global Head of Sustainability who oversees the strategy, monitoring and reporting on Terra and the Head of Sustainable Finance who oversees opportunity identification and client engagement related to Terra in Wholesale Banking. The Terra team works closely with the sector teams and business units on methodology development, implementation, monitoring and reporting.

The Terra team works closely with our colleagues in the risk domain to align and support risk disclosures where possible. To further strengthen the alignment between our risk and opportunity management, both are governed by the CCC.

Reporting process

ING aims to publish a review of our Terra progress on an annual basis. The next review will include additional sectors as the methodologies are finalised as well as an update on our progress for the sector results presented in this review. In line with this reporting cycle, ING will communicate any changes to our measurement and target-setting approaches with appropriate restatements if and where necessary.

7 Technical annex

Conceptual building blocks for target-setting

In order to set climate alignment targets, two key building blocks are needed. First, granular client-level insights and measurements are vital for decision-making and client engagement. Second, a normative benchmark is required to guide decision-making towards an intended outcome (e.g. climate scenario or target).

Therefore, there are two types of methodologies associated with the above mentioned building blocks: i) a measurement methodology that identifies and allocates client-level data to a financial portfolio and ii) a methodology that applies a scenario or target to that portfolio in order to set targets.

The table below presents the measurement and target-setting methodologies applied per sector in order to create the climate alignment dashboard (CAD). The table also displays the climate scenario applied for each sector as well as the measurement methodology's primary output and the metric used in each sector's convergence chart.

Table 2 Overview of applied approaches and output types

Sector	Measurement Methodology	Target-setting Methodology	Scenario	Primary output	Reporting metric
Power	PACTA	PACTA	IEA SDS 2018	Technology mix	kgCO ₂ e/MWh
Automotive	PACTA	PACTA	IEA B2DS 2017	Technology mix	kgCO ₂ e/Km
Real Estate Finance (NL)	DeltaPlan	Paris Proof Method	Planbureau voor de leefomgeving (PBL), derivative of the Paris Agreement	EPC Distribution/ estimated consumption data	kgCO ₂ e/m ²
Residential real estate (NL & DE)	PCAF	SDA (SBTi)	IEA B2DS 2017	EPC Distribution/ estimated consumption data	kgCO ₂ e/m ²
Cement	PACTA	SDA (SBTi)	IEA B2DS 2017	CO ₂ intensity per unit of production	tCO ₂ e/tcement

Structure and scope of the technical annex

This annex will focus on the two main methodologies from which we derive our targets: PACTA and the SBTi SDA. The target-setting methodology descriptions will also discuss the measurement methodologies applied. The Paris Proof Method is applied for commercial real estate and is described on the Dutch Green Buildings Council website: <https://www.dgbc.nl>.

As noted in the introduction, there is more to the PACTA methodology than is currently applied for setting our convergence targets and reporting. The additional client and portfolio analysis (based on forward-looking data) is designed for client engagement and internal steering for the applicable sectors. This is briefly described below, however, will not be the focus of this annex. The focus will be primarily on the aspects of each methodology applied for the CAD.

In summary, the first section will describe how the PACTA methodology is applied to generate the CAD. We then describe how PACTA is further applied for internal steering. After this, we describe the SBTi SDA approach and how it is applied to residential real estate. We then present the data sources the scoping methods used. Finally, we discuss a number of general observations.

PACTA – 2° Investing Initiative (2°ii)

2° Investing Initiative

The 2° Investing Initiative is the leading global think tank on developing climate and long-term risk metrics and related policy options in financial markets. 2°ii coordinates the world's largest research projects on climate metrics in financial markets, with over 40 research partners in the public, private and philanthropic sector, and millions of euros re-granted to research partners to date. It's backed by bodies including the European Commission and various European governments, and supported by academics, expert groups and civil society.

PACTA

The Paris Alignment Capital Transition Assessment (PACTA) was originally developed for equity and bond portfolios building upon research conducted by 2°ii within the EU Horizon 2020 Sustainable Energy Investing Metrics project. This tool has been [launched online](#) for equity and bond portfolios to determine whether or not portfolios are in line with below-2 degree scenarios. This tool has since been applied by over 780 investors on over 34,500 portfolios. In 2017, ING started working with 2°ii to convert this approach to corporate lending for banks. In 2019, 2°ii launched a PACTA lending pilot together with 25 of the largest banks globally, representing more than \$10 trillion in assets. PACTA employs a sector-based approach focusing on the economic activity resulting from owned assets of companies in the most carbon-intensive sectors. The approach targets shifts in investment of companies from high-carbon to low-carbon technologies.

Five Steps to arriving at the CAD for PACTA sectors

Of the sectors currently presented in the CAD, ING applies the PACTA approach to power generation, automotive and cement. For the cement sector, however, the application of PACTA is performed using the SDA method as described under section 'Sectoral Decarbonisation Approach (SDA) for Cement' below. Using PACTA, we determine the technology mix of our current portfolio which we then convert to CO₂e intensity per unit of production or activity. For each sector in scope, we then plot our portfolio's current CO₂e intensity against the current market CO₂e intensity and the technology mix roadmap (also converted to CO₂e) described by external climate scenarios. This process can be summarised in the five steps below:

1. **Matching:** each borrower in scope is matched to external physical asset-level databases (ALD) in order to identify the type of assets owned by our clients and their production capacity (see below for further details).
2. **Attribution:** this information is then attributed to our portfolio based on the 'portfolio-weight approach' (see below for further details).
3. **Aggregation:** the attributed client-level data is then summed up to arrive at the portfolio technology mix per sector.
4. **Benchmarking:** this is then benchmarked against the market and the shift prescribed by the climate scenario.
5. **Conversion:** the technology mix and the scenario are both converted to CO₂e intensity using emission factors. The converted scenario end point then determine ING's target which we aim to converge on by the target date (see below for further details on power generation and automotive conversion methods).⁶³

Data matching

The purpose of the matching process is to link internal loan data to external asset-level data bases, linking owned assets to our clients. Once the data is linked, it is ready for analysis by reference to climate scenarios and technology roadmaps or decarbonisation pathways. This process is currently conducted by an automated text-string matching algorithm. If matches cannot be made automatically, they will be reviewed and matched by an analyst. The minimum match percentage for all sectors is 90%. The matched portfolio is then validated by the sector teams.⁶⁴

Attribution: Portfolio Weight Approach

The resulting technology mixes of our clients are portfolio-weighted (i.e. weighted by the proportion of each loan in the total loans provided to the sector) for portfolio attribution to reflect the capital allocation choices we have made across clients and technologies. Please note that technology mixes for the sector as a whole (i.e. the market) are not weighted due to the fact that the total loan universe within a sector is unknown. As such, they cannot be compared on a like-for-like basis with the portfolio technology mix. However, as this portfolio weight attribution rule demonstrates our allocation choices, it can therefore be seen in the context of the composition of the market.

Power generation conversion from technology mix to GHG intensity

SDS scenarios for both OECD and Non-OECD regions are provided in MW per year per technology. These are converted into MWh, using the WEO 2017 generation factors. The final conversion is the one into kg CO₂e/MWh, using 2ⁱⁱ 2018 CO₂e emission factors for each technology.

ING's portfolio is split into OECD and Non-OECD regions (approx. 90% vs. 10%). For both regions the technology mix is converted into CO₂e/MWh, using aforementioned conversion factors. The same is done for the technology mix of the market.

⁶³ Note that this conversion allows us to communicate the PACTA results concisely – but is not a part of the PACTA methodology as such.

⁶⁴ While ING's minimum threshold for matching is 90%, the actual match results for the automotive and cement scopes was 100% while power achieved a 94% match rate.

Automotive conversion from technology mix to GHG intensity

The ETP 2017 B2DS scenario is provided in percentage of annual change per technology (ICE vs. hybrid vs. EV). Using the current global technology mix (in number of produced cars by technology) the scenario for each year is converted into kg CO₂e/km, using the 2^oii 2018 CO₂e emission factors per technology. For both ING's portfolio and the market the current technology mix is converted using the same emission factors.

PACTA application for internal steering

The PACTA methodology currently provides client-level, forward-looking analysis for the power generation and automotive sectors. From this, ING has developed client-level CADs that make use of the full range of PACTA analysis at client level. This includes the volume analysis (or production capacity build-out projection) of each technology and how this compares to what it should be to align with climate scenarios, as well as the forward-looking technology mix of the client based on the CAPEX plans of each client and how these compare to the climate scenario requirements.⁶⁵ We are then able to provide clients with these insights and how they compare to peers and the market within this context. Such insights are extremely useful for client engagement and steering. The tech mix and volume analyses are further elaborated upon below.

Analysis of technology mixes

The technology mixes of our current portfolio are compared with the target (i.e. climate-aligned) portfolio mix set by climate scenarios. The elements of a technology mix are the respective shares of the main different technologies (energy sources) available. For power generation the technology mix is expressed as installed capacity (in MW) across oil, gas, coal, hydropower, nuclear energy and renewable energies. For

the automotive sector the mix is expressed as production capacity (number of vehicles) across the three main propulsion technologies (ICE, hybrid and EV).

While in the context of the CADs, we view climate alignment on the basis of technology mix converted to CO₂e intensity at a point in time, internally, through client-level CADs, we compare our current technology mix with our future portfolio in five years (using forward-looking production data). To determine our target portfolio technology mix, PACTA applies the *'fair share approach'*; it determines the current market share of each actor and subsequently determines the required (climate-aligned) rate of change for each technology assuming that each actor maintains its market share and regardless of each actor's initial alignment with a climate scenario (so that both laggards and outperformers are expected to achieve the same required rate of change). Whereas this approach is inherently simple, our experience in working through the sector-specific outputs is that there are drawbacks to this approach which will need to be further discussed in the context of the PACTA pilot.

Volume analysis

This analysis determines the rate of projected change of production (capacity) volumes over a five-year horizon which we then compare with the climate-aligned (target) rate of change of production (capacity) volumes as set by climate scenarios. For every

⁶⁵ For internal steering, the power generation and automotive portfolio (with other sectors being added over time) are estimated for two points in time: present-day, and in five years (using forward-looking production data). Five years is the furthest horizon for which CAPEX forecasts were considered most meaningful. Acknowledging that the furthest meaningful horizon varies across sectors, this five-year horizon is adopted as best common denominator. Additionally, bank loan portfolios refinancing rates are on average not far off from the five-year horizon (in some sectors advancing to seven/eight years) providing an opportunity to re-balance the portfolio even if the underlying asset has an economic life of 20-30 years.

sector for which production (capacity) forecasts are known the individual production (capacity) volumes of our clients are portfolio-weighted and aggregated. The reason for performing the volume analysis is that the technology-mix metric is relative and would therefore not provide an insight into volume changes of individual technologies (e.g. fossil fuel volumes could increase in absolute terms but if low-carbon technology increases even faster, the relative share of fossil fuels would decrease). Volume analysis also allows us to form a view on the level of ambition in terms of our capital allocations between technologies that is required to steer towards the climate-aligned volume for each technology. The volume analysis is not visible in the current CAD but is utilised internally in client and sector dashboards for steering.

Science Based Targets Initiative's SDA

Science Based Targets Initiative

The Science Based Targets Initiative (SBTi), a collaboration between CDP, the UN Global Compact, the World Resources Institute (WRI) and the World Wide Fund for Nature (WWF), has developed a number of frameworks for companies to set so-called science-based targets. The ambition of SBTi is to facilitate companies in reducing GHG emissions in line with limiting global warming to 1.5°C-2°C by establishing methods for setting appropriate targets.

Sectoral Decarbonisation Approach (SDA)

ING applies the SDA for cement, as indicated by the PACTA approach, as well as for our residential real estate portfolio. While cement has been defined by SBTi for some

time,⁶⁶ the SDA for residential real estate has recently been developed within the SBTi Financial Institutions (SBTi-FI) Expert Advisory group.

Sectoral Decarbonisation Approach (SDA) for Cement

The SDA is used in the framework of the PACTA analysis of the cement sector. The SDA allows us to derive a sector-specific 2050 emissions reduction target and a corresponding forward-looking decarbonization pathway for the ING Cement portfolio in line with the IEA B2DS scenario.

The SDA prescribes that the portfolio's decarbonization pathway be plotted as a function of (i) its starting point, (ii) the 2050 sector-wide B2DS-aligned emission intensity target and (iii) projected changes in market share. ING currently assumes the latter to be constant.

Next to that, the scenario is plotted as a B2DS-compatible scenario trendline by calculating a B2DS-compatible carbon intensity rate of change (derived from the B2DS scenario values) and applying them to the average emission intensity of the relevant data universe (i.e. the corporate economy). This conversion is necessary because the B2DS scenario values include cement facilities outside the corporate economy which is the scope of ING's cement portfolio. The analysis includes both scope one and scope two emissions.

⁶⁶ <https://sciencebasedtargets.org/wp-content/uploads/2015/05/Sectoral-Decarbonisation-Approach-Report.pdf>

SBTi-FI

As there is currently no methodology for Financials to set science-based targets, SBTi has launched the Financial Institutions sector work (the SBTi-FI sector group). Together with 42 other financial institutions worldwide, ING has joined the SBTi-FI Expert Advisory Group to road test the practicality and credibility of its framework. The pilot runs until September and feedback from road testers will inform method revisions and the final framework. ING has been one of the banks to road test the various methods in scope, including PACTA for corporate lending developed by 2°ii and the SDA for mortgages translated/developed by Navigant. It should therefore be noted that this work is still in progress and the outcomes could influence future disclosures of ING’s portfolio for all sectors in scope as we align with the SBTi-FI work.

Sectoral Decarbonisation Approach (SDA) for residential real estate (mortgages)

As part of this framework, SBTi, together with its technical partner Navigant, translated the SDA to be applied to mortgages. In the SDA, emissions reduction targets are assessed based on sectoral emissions reduction pathways, using the absolute emissions and activity data projection from International Energy Agency’s (IEA) Energy Technology Perspectives (ETP). Although the SDA does not include emissions reduction pathways for the residential buildings, it can be extended to this sector as the IEA models this data as well.

Currently, only scope one (direct emissions from onsite fuel combustion) and scope two (indirect emissions from purchased energy) are included. The data availability of scope three emissions (building material and construction) is still under development. This may be included at a later stage.

In the absence of actual energy consumption or emissions data of the households we finance, the PCAF approach prescribes the use of energy labels as a proxy. Navigant, one of the method developers, provided us with additional data to convert the energy labels into CO₂ intensity. These emission factors are based on average gas and electricity consumption per energy label for each of the two countries.

Next to an estimation of scope one and two emissions, setting a science-based target for mortgage portfolios also requires floor area data of current properties and the portfolio growth rate which we have access to in ING’s internal systems.

IEA data on the European Union decarbonisation pathway, as well as current floor area and projected growth rates for Europe, allowed us to plot the B2DS trajectory for the EU until 2050. Applying the SBTi SDA approach developed for mortgages, we were able to calculate ING’s *convergence target* in order to align with the B2DS scenario by 2050 using the below formula:

$$\begin{aligned}
 & \textit{Portfolio intensity target}_{mortgage} \\
 = & (PI_{b,i} - SI_{2050,i}) \times \frac{(SI_{t,i} - SI_{2050,i})}{(SI_{b,i} - SI_{2050,i})} \times \frac{(PA_{b,i} / SA_{b,i})}{(PA_{t,i} / SA_{t,i})} + SI_{2050,i}
 \end{aligned}$$

Where **SI** and **PI** are the sectoral and portfolio emissions per floor area, **SA** and **PA** the sectoral and portfolio total floor area, **i** the subsector for residential buildings, **b** the base year, and **t** the target year.

Data sources and scoping

Table 3 Data source by type and sector

Sector	ING Portfolio	Scenario/Target	Market	Client level external data	Emissions Factors	Conversion factors
Power	ING (Vortex 2018YE)	SDS IEA 2018 – data treated and provided by 2°ii	Global Data – corporate economy: treated and provided by 2°ii	Global Data – corporate economy: treated and provided by 2°ii	2°ii	2°ii
Automotive	ING (Vortex 2018YE)	B2DS IEA 2017 – data treated and provided by 2°ii	Ward's & AutoForecast Solutions – corporate economy: treated and provided by 2°ii	Ward's & AutoForecast Solutions – corporate economy: treated and provided by 2°ii	2°ii	2°ii
Commercial Real Estate Finance (NL)	CFP Green Buildings*	Dutch Green Building Council/DeltaPlan	NA	Energy Performance of Buildings Directive (EPDB)	CFP Green Buildings	NA
Residential real estate (NL & DE)	DM_MRT (Datamart Mortgages 2018YE)	B2DS IEA 2017 – data provided by Navigant	NA	RVO (Dutch Government Agency)/ Calcasa	Navigant	NA
Cement	ING (Vortex 2018YE)	B2DS IEA 2017 – data treated and provided by 2°ii	Global Cement Directory – corporate economy: treated and provided by 2°ii	Global Cement Directory – corporate economy: treated and provided by 2°ii	2°ii	NA

* ING REF NL clients onboard their property data themselves via the CFP portal.

NA – Not applicable.

Regionality

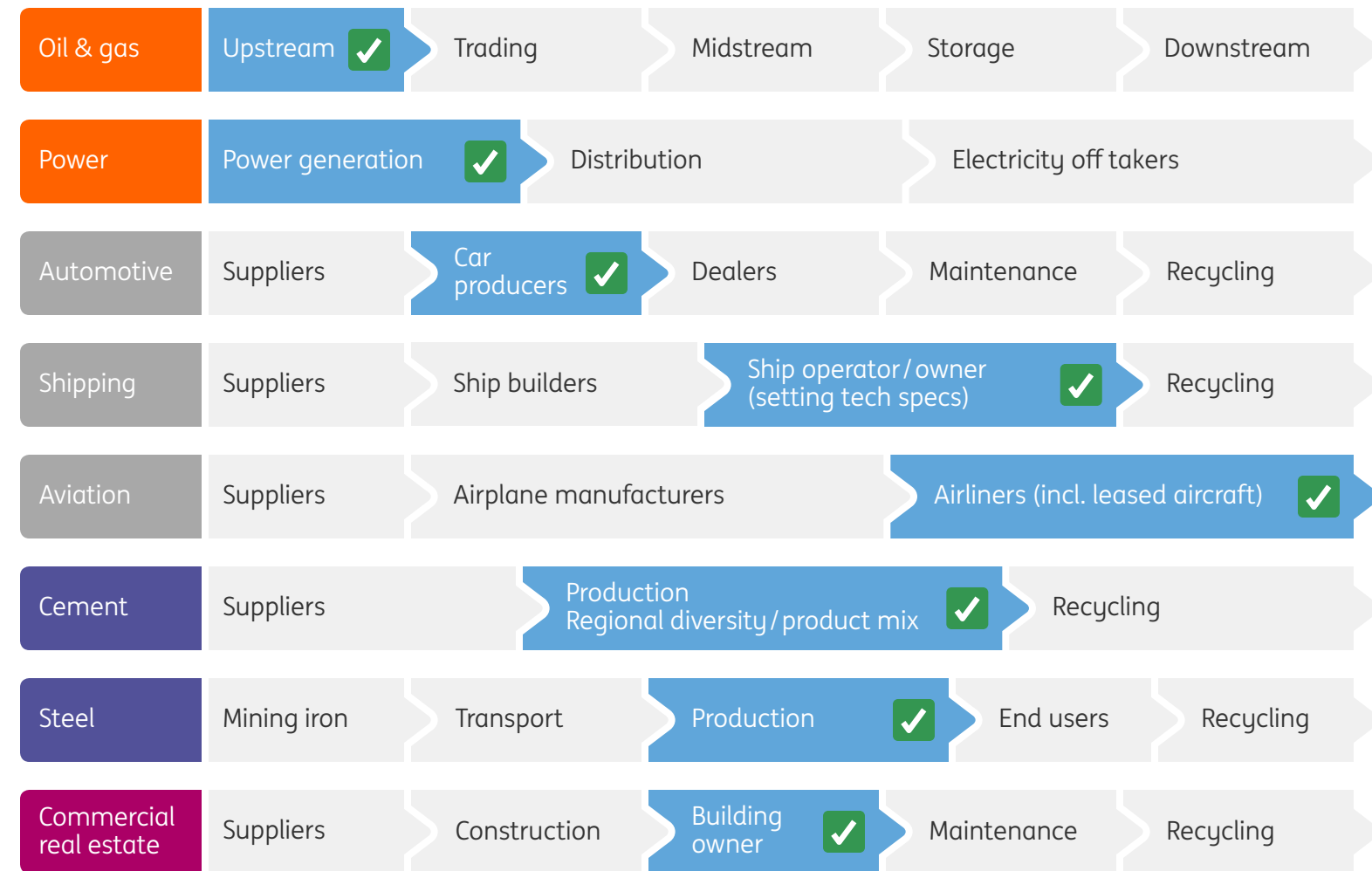
Climate scenarios and targets may be applied at global or regional level (if available) depending on the sector. Automotive for example is a global business whereas technologies used for Power generation vary considerably by region (OECD, EU, non-OECD; as defined by IEA) with each having regional targets and thus clients will be analysed within these boundaries.

Portfolio scoping

The data scoping process is aimed at capturing the relevant loan portfolio for analysis by identifying (i) the relevant drivers of emissions in the value chain within each sector in scope (see Figure 12 below) and (ii) the financial product types that most accurately represent balance sheet allocations within our loan portfolio.

Figure 12 Portfolio scoping

Wholesale



Retail



Glossary

The definitions below are described in the context of Terra.

Asset-level data: economic activity data acquired from external industry databases. The databases provide information about climate assets such as coal power plants. The most relevant data points of these databases for the methodology presented in this paper is production capacity (e.g. power production capacity in Megawatts or oil production in barrels per day) as well as the owner and the location of the asset.

Beyond 2° Degree Scenario (B2DS): looks at how far known clean energy technologies could go if pushed to their practical limits. The scenario outlines carbon neutrality by 2060 and an emissions trajectory with a median temperature rise in 2100 of around 1.75°C. Source: <https://webstore.iea.org/energy-technology-perspectives-2017>

Carbon leakage: refers to the situation in which carbon emissions (intensity) reported for a financial portfolio are reduced due to reallocation of capital rather than actual emissions reduction in the real economy.

Climate scenario: represents a possible pathway toward a climate target (end point), – this could be a GHG intensity or a temperature – they do not aim to forecast or project the future. A climate scenario is created by first setting a target (its end

point) – e.g. a probability of at least 50% to limit global warming to 2°C above pre-industrial levels by 2100 – and then works back to the current state of the market to determine what would be needed to deliver these goals.

Climate target: in the context of Terra, climate targets represent a desired GHG intensity at an established future date. For example, the DeltaPlan has established a target GHG intensity of zero in 2050. It does not set out a scenario from the present day until the target is met, i.e. a pathway representing what would be needed to achieve the target.

Clinker: dark grey nodular material made by heating ground limestone and clay at a temperature of about 1400 °C - 1500 °C. The nodules are ground up to a fine powder to produce cement, with a small amount of gypsum added to control the setting properties.

Corporate economy: businesses, excluding the private economy and small scale assets such as private households.

Decarbonisation pathway: trajectory between ING's portfolio today and the target for a specific sector. The pathway does not necessarily have to beat the scenario every step of way, it must, however, eventually lead to each sector's respective target.

Emissions Intensity: level of GHG emissions per unit of economic output, for example kilograms of carbon dioxide released per kilometre travelled.

Emission factors: representative value that attempts to attribute the quantity of CO₂e released to the atmosphere to a given economic activity (e.g. ICE cars produced).

Market: for power, automotive and cement, the market referred to in this report is designated based on the global corporate economy by sector, retail players are out of scope (see definition 'corporate economy').

Science-based methodology: follows a systematic methodology based on evidence aligned with limiting global temperature rise this century to well below 2°C above pre-industrial levels and with pursuing efforts to limit the temperature increase even further to 1.5 degrees Celsius.

Sustainable Development Scenario (SDS): outlines an integrated approach to achieving internationally agreed objectives on climate change, air quality and universal access to modern energy and an emissions trajectory with a median temperature rise in 2100 of around 1.7°C to 1.8°C. Source: <https://www.iea.org/weo/weomodel/sds/>

Zero-tailpipe-emission: Tailpipe emissions refer to the emissions produced exclusively during the operation of vehicles. Tailpipe emissions do not take into account the emissions produced when the car itself is manufactured, or when creating the electricity to power it. 'Zero tailpipe emissions' therefore refer to vehicles like battery electric vehicles.

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(8) changes affecting interest rate levels, (9) inflation and deflation in our principal markets, (10) changes affecting currency exchange rates, (11) changes in investor and customer behaviour, (12) changes in general competitive factors, (13) changes in or discontinuation of 'benchmark' indices, (14) changes in laws and regulations and the interpretation and application thereof, (15) changes in compliance obligations including, but not limited to, those posed by the implementation of DAC6, (16) geopolitical risks, political instabilities and policies and actions of governmental and regulatory authorities, (17) changes in standards and interpretations under International Financial Reporting Standards (IFRS) and the application thereof, (18) conclusions with regard to purchase accounting assumptions and methodologies, and other changes in accounting assumptions and methodologies including changes in valuation of issued securities and credit market exposure, (19) changes in ownership that could affect the future availability to us of net operating loss, net capital and built-in loss carry forwards, (20) changes in credit ratings, (21) the outcome of current and future legal and regulatory proceedings, (22) operational risks, such as system disruptions or failures, breaches of security, cyber-attacks, human error, changes in operational practices or inadequate controls including in respect of third parties with which we do business, (23) risks and challenges related to cybercrime including the effects of cyber-attacks and changes in legislation and regulation related to cybersecurity and data privacy, (24) the inability to protect our intellectual property and infringement claims by third parties, (25) the inability to retain key personnel, (26) business, operational, regulatory, reputation and other risks in connection with climate change, (27) ING's ability to achieve its strategy, including projected operational synergies and cost-saving programmes and (28) the other risks and uncertainties detailed in this annual report of ING Groep N.V. (including the Risk Factors contained therein) and ING's more recent disclosures, including press releases,

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