

The value of a green transition

UBS Asset Management

A model for including decarbonization in company valuation

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We would like to thank Per-Anders Enkvist, Anders Åhlén and Gustav Hedengren at [Material Economics](#) for their contributions to this paper. All MACCs and qualitative comments around abatements are based on their insights.

Lacking a bit of oomph in your climate efforts? Here is a [Spotify playlist](#) to get you going. 'Where words fail, music speaks' – Hans Christian Andersen

Can sustainable investing help drive the low-carbon transition?

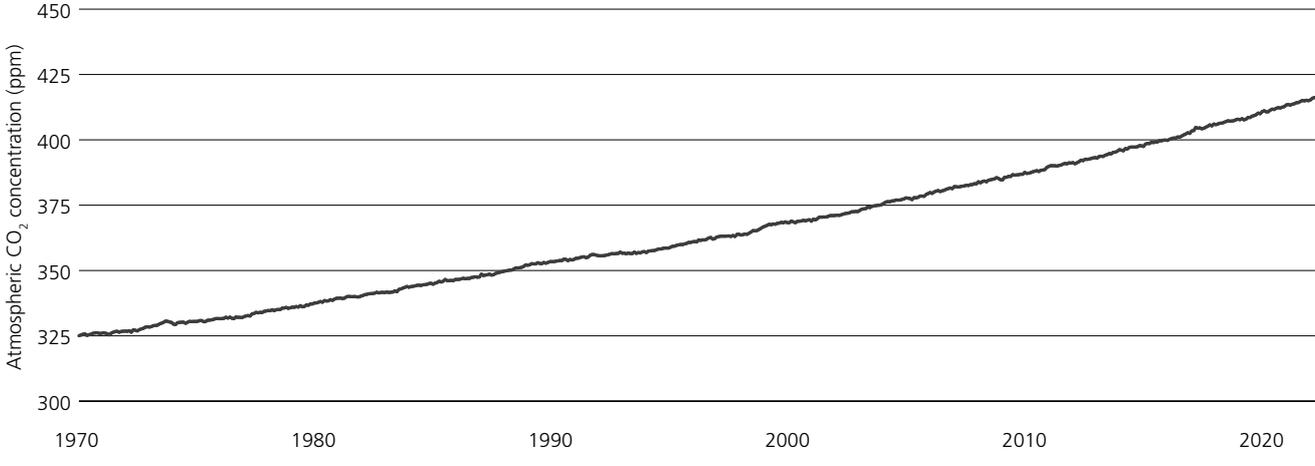
The world is faced with an existential crisis, manifested by undeniable shifts in our planet’s climate system. Driven by this crisis, the financial community is rethinking its purpose. Greenhouse gas emissions are largely corporate, so what part do we play as asset owners?

At UBS, we are actively seeking to reimagine investing—this is explicitly part of our Purpose Statement.¹ We want our investments to deliver financial returns, but also to deliver solutions to the climate crisis. Therefore, we are looking beyond superficially ‘greening’ portfolios to greening the assets in them.

The key is to engage some of the biggest polluters—legacy sectors that traditionally emit the most carbon, but that are vital to society. They must find efficient ways to reduce their emissions, typically at their own expense, a process referred to as a ‘green transition.’ At UBS, we want to support these transitions while meeting investment goals.

As a planet, we are still moving fast in the wrong direction

Figure 1: Atmospheric CO₂-concentration measured at Mauna Loa, aka The Keeling Curve
Almost 30% increase over the last 50 year and no sign of slowing down.



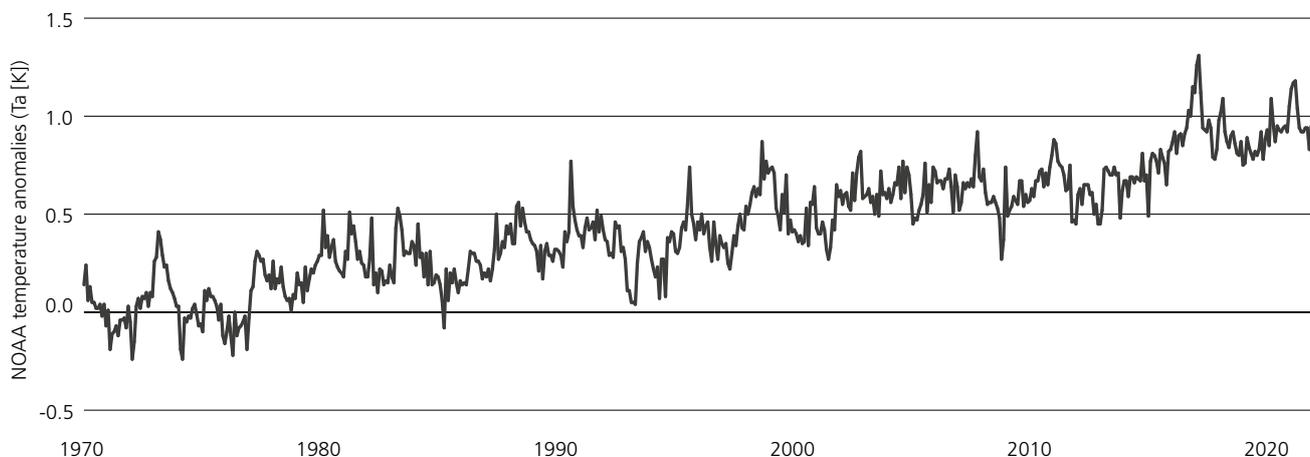
Source: gml.noaa.gov/ccgg/trends/data.html
Data as of 30 April 2021

¹ www.ubs.com/global/en/our-firm/our-purpose.html

In this white paper, we present a new valuation framework that embeds the cost of emissions and a systematic approach to emission abatements developed in collaboration with Material Economics. The purpose is to quantify valuation impacts of green transitions, and engagement with companies on specific steps for emission reductions. A science-based framework, demonstrating the economic cost vs. benefit of reducing emissions, should help companies to become more confident and ambitious in their climate efforts.

We believe investing in companies that aggressively transition is a commercial opportunity, well-aligned with our fiduciary duty to deliver returns and manage risk. From an investor point of view, tackling transitions requires the full package: world-class investment capabilities, impactful company engagement and a will to go above and beyond. The framework presented in this paper provides the foundation for UBS's efforts in supporting mission critical green transitions.

Figure 2: NOAA global surface temperature.
The earth has already reached around 1°C warming.



Source: www.ncdc.noaa.gov/monitoring-references/faq/anomalies.php#anomalies
Data as of 30 April 2021

Carbon emissions permits are becoming widespread—and expensive

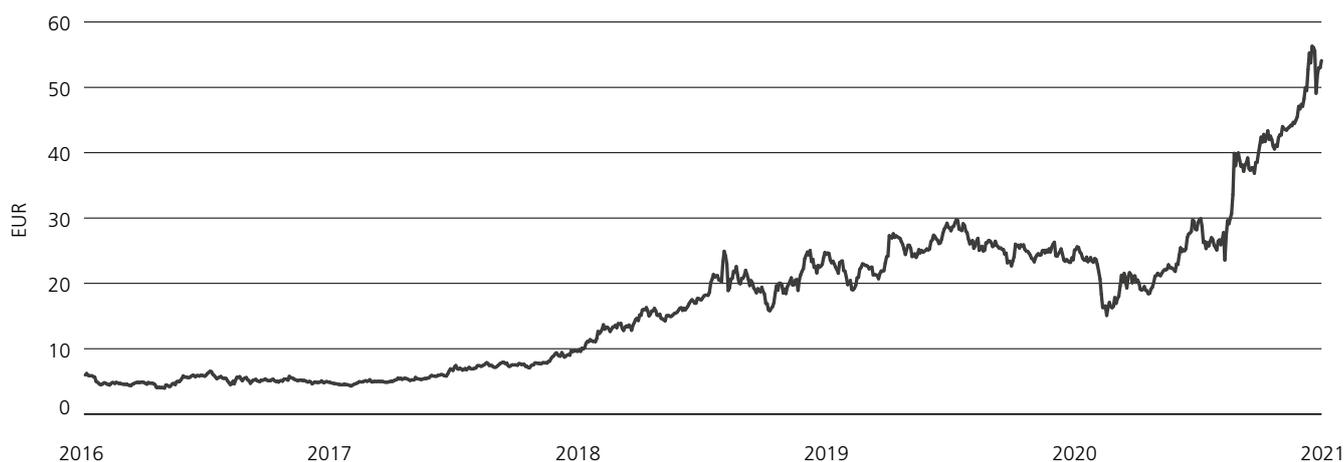
Pricing negative externalities is a critical incentive tool in addressing the climate crisis. A total of 64 carbon pricing instruments are currently operational around the world, covering over 20% of global emissions and generating USD 53 billion in revenue.² EU's emissions trading system (EU ETS) is the oldest and most established scheme for emission permits. One permit gives the holder the right to emit one metric ton of greenhouse gas and all scope 1 emissions must be covered.

Phase four of the EU ETS runs from 2021 to 2030, the longest period so far. In December 2020, the European commission announced an updated 2030 emission reduction target of 55%.³ To achieve this monumental target, the EU ETS is likely to only become more important.

Today, far from all sectors carry the full cost of emissions. The European Union maintains a 'carbon leakage list' with 63 sectors, among them steel and cement. Seen as at risk of relocating if held responsible for the full cost, these sectors get emission permits for free, so-called free allowances. As a rule of thumb, 100% of emissions are covered but the reality is more complicated.

A benchmark based on the most emission-efficient companies within each sector is used to allocate free allowances. The European Commission is to reassess the benchmarks for technology progress in 2025, and then again before launching phase five post-2030. These assessment points represent a material risk to emission-laggards, as they may end up with insufficient free allocations to cover their emissions.

Figure 3: The emission permits market is getting richer
In May 2021, the EU ETS traded above EUR 50 for the first time.



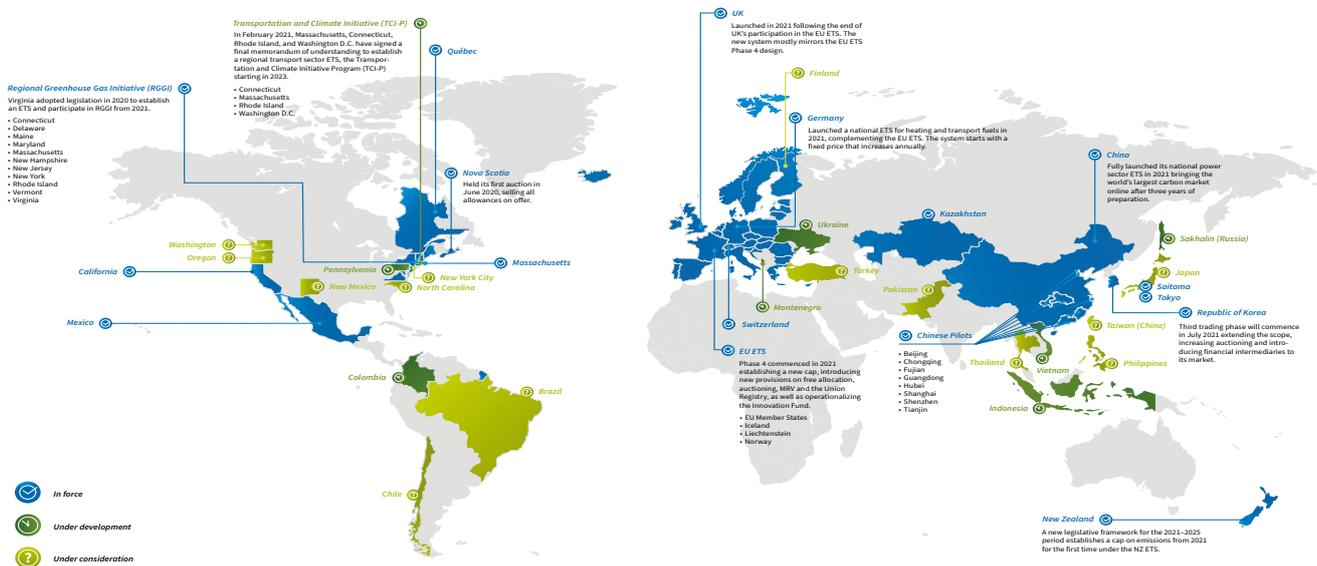
Source: Bloomberg, EECXSYR1 TNRG Index. Data as of 15 June 2021.

² www.worldbank.org/en/news/press-release/2021/05/25/carbon-prices-now-apply-to-over-a-fifth-of-global-greenhouse-gases

³ www.eea.europa.eu/data-and-maps/indicators/greenhouse-gas-emission-trends-7/assessment

The global ETS map is still fragmented and constantly evolving as more regions put a price on companies' externalities

Figure 4: The state of play of cap-and-trade in 2021



The ICAP ETS world map above depicts emissions trading systems currently in force, under development or under consideration. Source: International Carbon Action Partnership (ICAP)©

To level the playing field with regions not applying an ETS, and eventually withdraw the free allowances, the EU is working on a carbon border adjustment mechanism (CBAM).

This paper will focus on the EU ETS. The global ETS map is still fragmented and constantly evolving as more regions put a price on companies' externalities.⁴ Companies in regions without an ETS can be modelled with a theoretical cost, usually referred to as a 'shadow price'.

⁴ icapcarbonaction.com/en/ets-map

Green transitions create quantitative and qualitative financial drivers

The discounted cash flow (DCF) model has been around for hundreds of years and still rules the world of active investing.

By adding three extra line items to the financial statements, the valuation impact of a green transition can be assessed.

Our framework allows us to model the offsetting effects of investing in mitigation, which is a drag on near-term free cash flows, against the long-term financial benefit of lower emission costs. Also, when companies reduce their emissions, they can profit from selling unneeded emissions permits.

There are some additional factors that we believe will produce value gains:

- Sales growth: there is a higher demand for green products
- EBITDA margin: ability to charge a premium for green products
- Discount rate: lower risk premium demanded by investors

Estimating the impact of these is difficult and we deliberately leave them out of our analysis, which means that our valuation impacts are on the conservative side.

We believe the additional factors will be material – a market for green aluminum is in the making and we see a clear valuation premium for green utilities. Arguably, this is the real investment case for businesses with GDP-type growth and tight margins, but they need to go green to unlock them. We expect a significant first-mover advantage and that green premiums diminish as green becomes the new norm. Laggards will likely be exposed to unforeseen risks, perhaps leading to climate driven consolidation over coming years.

In our framework, a green transition budget determines the ambition level, how much of the green transition can be achieved in any given year. First, any green OPEX from previous investments must be covered, what is left is put to work on new transition levers in form of green CAPEX. For illustrative purposes, this is how these drivers enter the financial statements:

Laggards will be exposed to unforeseen risks, perhaps leading to climate driven consolidation over coming years.

Figure 5: Illustrative financial statements with emission cost and green investments

	2021	2022	2023	2024	2025
Sales	100	120	140	160	180
COGs	50	60	70	80	90
Total SG&A	25	30	35	40	45
EBITDA	25	30	35	40	45
<i>EBITDA, % Margin</i>	25%	25%	25%	25%	25%
Emission Cost	-5.0	-2.5	-0.5	2.0	4.5
Green OPEX	-1.0	0.0	0.5	1.0	1.5
EBITDA (Adjusted)	31	33	35	37	39
<i>EBITDA (Adjusted), % Margin</i>	31%	27%	25%	23%	22%

Illustrative example of a scaled back income statement. EBITDA Margin is a key driver in the DCF and for that reason the emission adjustments are entered below. Note that emission cost and green OPEX can go both positive (cost) and negative (income). Data as of 15 June 2021.

	2021	2022	2023	2024	2025
PP&E CAPEX	3.0	3.6	4.2	4.8	5.4
<i>PP&E CAPEX, % Sales</i>	3%	3%	3%	3%	3%
Green CAPEX	1.0	1.4	2.3	2.2	2.1
Total CAPEX	4.0	5.0	6.5	7.0	7.5

Illustrative example of the CAPEX calculation. The green transition budget is first used to support green OPEX from previous investments and what's left is used as CAPEX towards new projects. Green CAPEX is added to regular PP&E CAPEX and capitalized on the balance sheet. Data as of 15 June 2021.

Marginal Abatement Cost Curves help calculate the value of transition

The Marginal Abatement Cost Curve (MACC) is at the heart of the framework and enables us to assess the valuation impact of mitigation efforts. We follow an approach developed by Per-Anders Enkvist during his time at McKinsey & Company (1999 to 2015). Per-Anders Enkvist has since left to found the practice Material Economics. This part of the framework is developed in collaboration with Per-Anders and his team at Material Economics.

MACCs are sector relevant collections of green actions, referred to as levers, their associated emission abatement potential and costs.

We have commissioned an updated set of MACCs specifically developed for our valuation framework. Figure 6 shows one of the eight green levers that can be taken by the cement sector to reduce emissions. Assumptions made in our MACCs are:

- Abatement costs and potentials are based on global sector averages.
- All levers are expected to be commercialized no later than 2030.
- All CAPEX and OPEX is stated as incremental to business as usual (BAU).

The last assumption above removes any need for adjusting the baseline forecast – abatement costs can be layered on top.

Figure 6: Sample MACC assessment for an abatement in the cement sector

MACC	Cement
Lever	Clinker substitution by slag
Abatement Potential	14%
Upfront Cost (CAPEX)	EUR 161 per ton CO ₂ abated
Ongoing Cost (OPEX)	EUR 2 per ton CO ₂ abated
Technical Asset Life	20 years
Abatement Cost	EUR 19 per ton CO ₂ abated

Source: Material Economics. Example of one lever from the cement MACC. Data as of 15 June 2021.

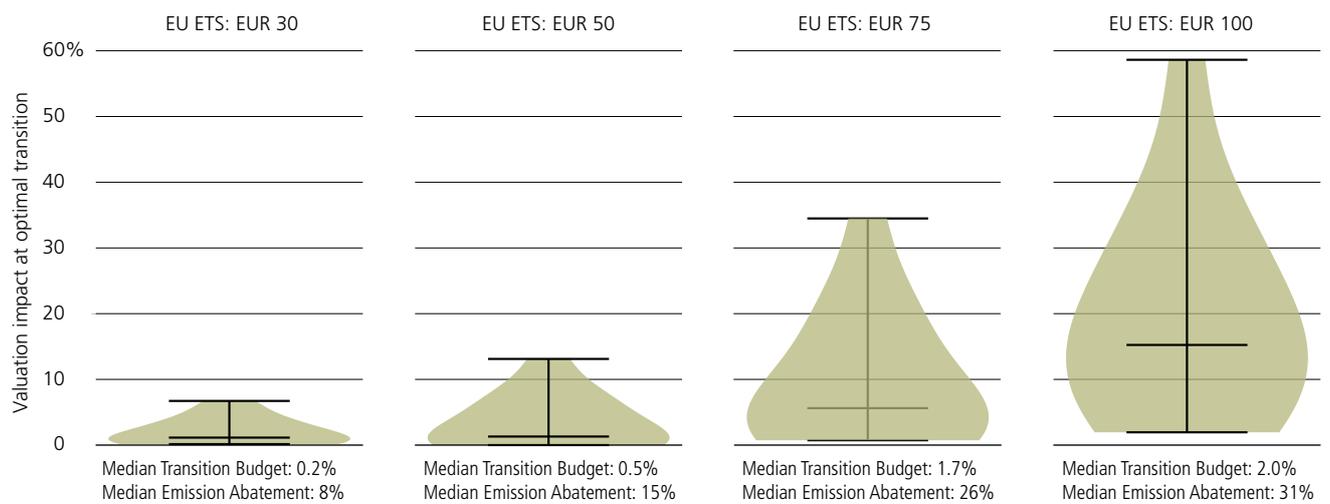
Green transitions in heavy industry are essential

Heavy industry products (aluminum, cement, chemicals and steel) are commoditized but essential to our society. Without any commercial substitutes in sight, an end to our cement or steel dependence is, today, unthinkable. To produce these products sustainably is critical to reach our climate targets.

The good news is that substantial abatements are not only possible, but value accretive. We believe this is one of the most misunderstood opportunities in today's markets, both from an investor and climate point of view.

For most of these sectors, our MACCs suggest abatement potential, at reasonable cost, of around 30% by 2030. In Europe, these sectors are on EU's carbon leakage list. When abatements are achieved, free allowances no longer needed can be sold and turned into profits. This is how the EU ETS is intended to incentivize green actions. We believe that not realizing these abatements is economically suboptimal and leaves companies exposed to unnecessary risk. Pushing forward with aggressive green transformation programs is in the interest of companies, investors and the climate.

Figure 7: Valuations and abatements grow as the EU ETS price rises



This chart is based on 14 European cement and steel companies. The 'violins', Barbapapa-lookalike charts, show how valuation impacts are distributed under different EU ETS price expectations for 2030. We have combined steel and cement companies, they are in many ways similar but cement tends to have a higher impact. If we assume the EU ETS will reach EUR 75 by 2030, the median company should invest an additional 1.7% of annual revenue in green transition levers allowing them to abate 26%. Source: UBS QED. Data as of 15 June 2021.

Figure 7 shows valuation impact distributions, from optimal green transitions, under different EU ETS price scenarios. Transitions may come at a significant cost, but when abatements are realized companies can resell any emission permit no longer needed. We believe the income more than compensates for the transition costs; this holds true in all our EU ETS scenarios. The valuation impact increases if the EU ETS continues to rise. For companies on EU's carbon leakage list, falling behind the competition on abatements presents

a significant risk. Laggards may end up with lower free allocations when benchmarks are reassessed.

It is important to note that these valuation impacts are completely driven by EU ETS dynamics, green CAPEX and OPEX. We expect 'going green' to unlock higher sales growth and margin expansion, and therefore for investors to re-rate these companies.

CASE STUDY

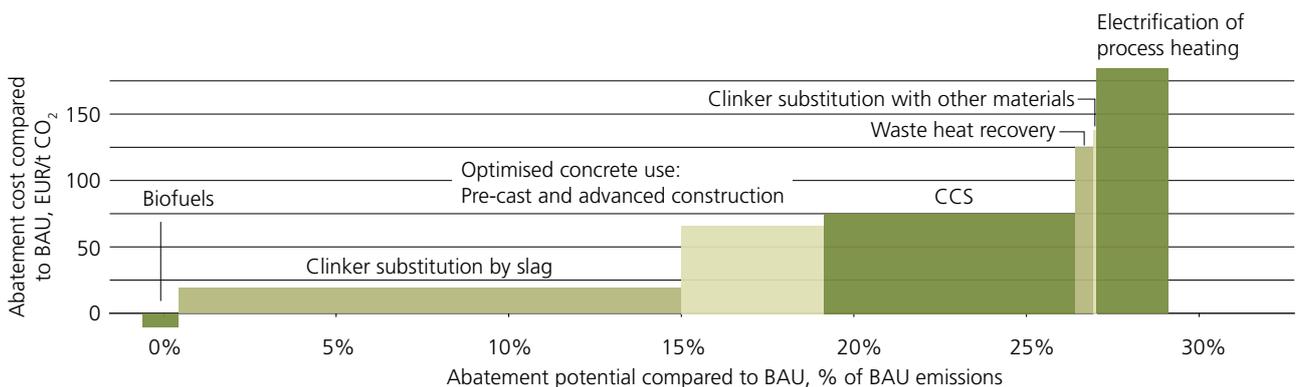
HeidelbergCement

It's hard to imagine a world without concrete, one of the most widely used materials. But the chemical and thermal processes involved in the production of cement, the key input, are a major contributor to climate change. Cement is the glue that represents around 15% of concrete by weight, but 95% of the emissions. According to Chatham House, an independent policy institute, the cement industry accounts for around 8% of global carbon dioxide emissions.⁵

German HeidelbergCement, one of the world's largest manufacturers of building materials and a top player in cement, has taken such a leadership position. In June 2021, the company announced plans to upgrade its Cementa Slite facility (Sweden) to become the world's first carbon-neutral cement plant. This will be achieved by capturing the plant's total emissions, up to 1.8 tonnes of CO₂ annually from 2030 onwards.⁶

Some major players in the cement industry are developing plans to substantially reduce their carbon emissions. We believe the leaders in this effort will realize substantial benefits, for investors and the climate.

Figure 8: MACC – Cement

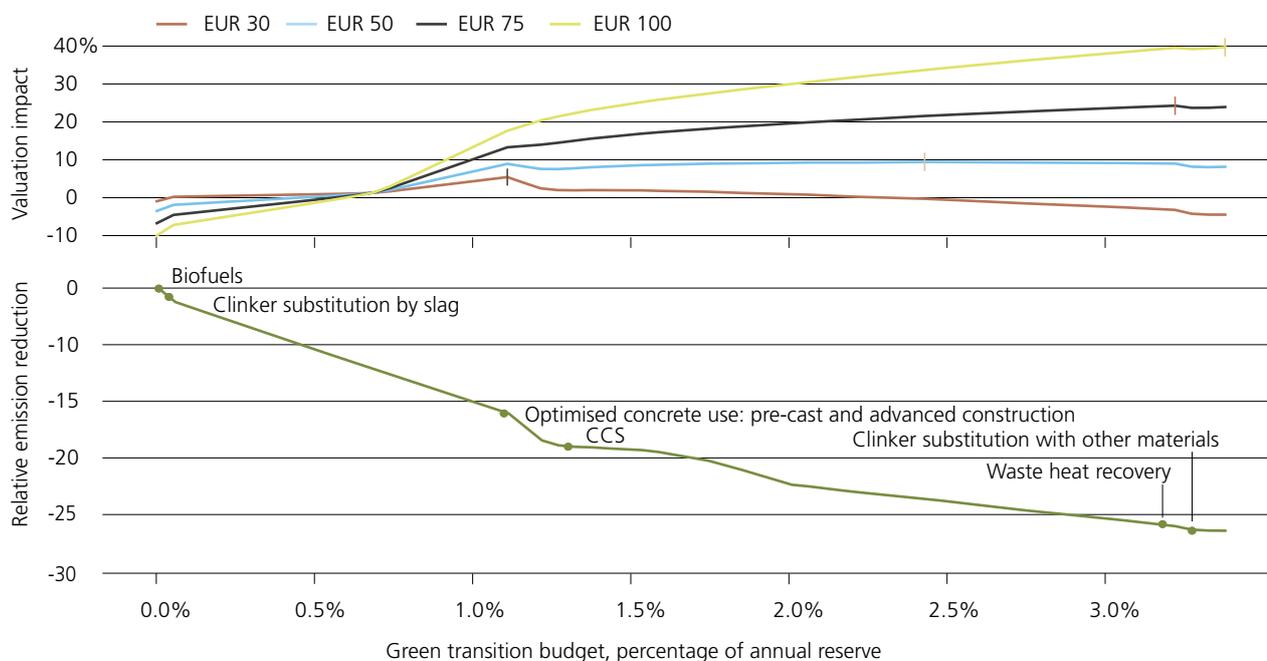


Source: Material Economics. Data as of 15 June 2021.

⁵ "Making Concrete Change: Innovation in Low-carbon Cement and Concrete." Chatham House, June 2018.

⁶ "HeidelbergCement to build the world's first carbon-neutral cement plant," HeidelbergCement, 2 June 2021.

Figure 9: Abatements driving value: HeidelbergCement



The top chart shows valuation impacts for increasing levels of green transition budgets. We assume that a flat price of EUR 30 and no green transition are priced in today (the red line starts at 0% valuation impact). The vertical markers show the optimal green transition budget given the EU ETS price. The bottom chart shows the abatements achieved with a given budget and where investments in different levers are initiated. Source UBS QED. Data as of 15 June 2021.

Cement manufacturers will have to incorporate a range of abatement technologies to achieve carbon neutrality. Cement is typically manufactured by heating a mixture of clay, sand and finely ground limestone, in a kiln reaching temperatures of over 1500°C. Emissions are split between fuel combustion to generate heat, and 'process emissions' from superheating the raw materials which then releases CO₂. Both are addressed by the cement MACC (see figure 8). The most material lever is to substitute clinker, the primary material, with slag, a by-product from blast furnaces. Carbon capture and storage (CCS) will also play an important role given that cement's process emissions cannot be fully abated, and instead must be captured and stored.

Valuation impacts in figure 9, produced with our systematic framework, are for illustration purposes only. They provide a reliable starting point, but assumptions should be fine-tuned when analyzing individual companies. Our results suggest that so long as emissions are covered by free allowances, the valuation downside risk is limited. A material upside potential can be realized through aggressive emission abatements that allow HeidelbergCement to resell their emission permit surplus. If we assume the EU ETS will reach EUR 75 by 2030, HeidelbergCement should abate 27% of their total emissions by 2030, leading to 25% valuation upside. But it will require significant investments at over 3% of annual revenue.

We believe there is more to come on HeidelbergCement's long journey towards net zero.

The important role of engagement

The primary purpose of engagement on climate issues is to bend the curve, to induce the public companies to change their business practices and business models. Emission-intensive companies must significantly reduce emissions to avoid destruction of the world we live in. But while the world at large is free to engage anything and everything, asset managers must abide by their fiduciary duty, which is to produce returns and to mitigate risk. Thus, everything that we do with respect to climate engagement has to connect to our primary investment function. Our decarbonization framework links environmental and financial analysis.

Investing in emission-intensive companies may be controversial. It is naturally easier to be associated with solutions, low-carbon sectors, alternative power and other investment themes that have a positive image. But we believe the development of sophisticated abatement techniques, such as

CCS provide an opportunity for some high emissions sectors to be transformed into a much cleaner form. Many of these technologies are available today, but investment is crucial for them to be implemented. Cement manufacturing is just one example. Steel production is another, and agriculture is a third. For many of these companies, shifting from fossil-fuel derived power to hydroelectric, solar or wind power will change the emission profile completely. At UBS, we want to get involved and drive positive change.

How can we make the distinction between companies that can be saved and those that cannot? We need to assess the value of a green transition. Our framework provides important insights for us as investors into companies that are not low-carbon today but can be in the future by decarbonizing in the most optimal way.

At UBS, we want to get involved and drive positive change.

Conclusion

Although sustainable investors may reflexively exclude sectors that are heavy contributors to greenhouse gas emissions, by engaging them, we believe that investors can play a more meaningful role in solving the climate crisis.

In addition to supporting companies that provide climate solutions as their core business, we see that it is critical to enable green transitions in emission-intense sectors. By engaging, investors may influence these transition companies in the right direction. Today, engagements tend to be values-based and non-technical in nature. Supported by a comprehensive quantitative framework illustrating the value of green transitions, engagements become more credible and impactful.

This paper has presented a valuation framework incorporating decarbonisation as a key value driver. We have shown that significant abatements are economical given an ETS, in our case illustrated through a case study based on the EU ETS. In Europe, we believe that sectors receiving free allowances have limited downside risk for now, but more importantly an upside potential that is widely misunderstood. Demand for greener products may drive volume and green price premiums may drive profitability, both leading to further upside. Solving the climate crisis through green transitions is a great commercial opportunity. By illustrating this to companies, we can enable more forceful actions earlier.

Recent steps by leading cement and steel companies suggest that heavy industry may no longer be 'hard-to-abate.' Success by these early adopters could put pressure on peers to act. We expect the net zero race to accelerate and become the key performance differentiator in emission-intense sectors. We believe that our decarbonization framework is an important step in encouraging the transition in industries that are too important to discard.

We believe this is sound investing, with our clients and the climate as the ultimate beneficiaries.

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