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AFRY Insights

Bioindustry

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Topics

Water stewardship
Pulp price volatility
Mining, minerals and metals
EU Taxonomy - Green transition

Editorial

Dear reader,

The path to net zero is broad, complicated and long. And, while we're irrefutably on that path, in many cases we haven't taken the plunge yet. Like the diver on the front cover of this edition, we've changed our clothes and have been climbing higher and higher, in preparation to take the deep dive. Yet we're still contemplating. When are we going to run and jump?

In this edition of AFRY Insights magazine, my brilliant colleagues discuss and explore various complexities and obstacles that must be navigated on the path to net zero – also in dialogue with our clients, who appear in various articles to provide further perspectives, as they do in our daily work together, when we address business challenges and find ways forward.

Topics vary from the navigation of complex sets of regulations that have the EU Green Deal at their centre and are mandatory to drive change forward, to the evolving role of the forest amidst the reality of climate-change adaptation.

Join us as we share the latest insights into consumer behaviours, thanks to our renewed survey, and as we lay out the roles of the EU Taxonomy and CSRD, to name just two, in the strategies that will bring us forward across industries.

In this age of generative AI, we challenged ourselves to come up with original thought leadership straight from the minds of our experts, to provide our customers and community with new perspectives and food for thought.

While it seems impossible to declare anything "AI free" these days, we hope you enjoy reading this fresh set of insights and join the discussion as we move together towards "Making future".

We look forward to continuing the discussions with you!

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Make or break

Is packaging's reuse option finally materialising?

The environmental impacts of packaging and packaging waste are mounting problems the world must solve on the path towards net zero. The US Environmental Protection Agency estimates that packaging materials make up close to 30% of municipal solid waste generated in the US. Pictures of plastic bags taking over beaches and of sealife being suffocated by beverage rings and straws have made reduction of single-use plastic packaging the first step of action for many consumers, companies and legislators alike.

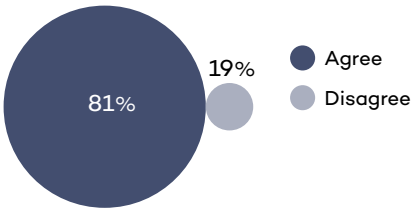
However, what is the best way to substitute single-use plastics? What is the right path towards net zero for packaging? And how does the European debate on reuse fit into this picture?

We at AFRY surveyed 1,000 consumers in Germany and the US to gain insight into what consumers think about packaging and its sustainability as well as what they are willing to do to support circular economy goals. We especially wanted to understand consumers' perceptions of reusable packaging and recyclable packaging, as both formats have been presented as pathways towards net zero.

From linear to circular

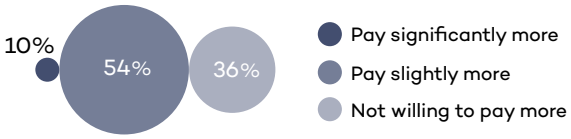
It is clear that consumers' awareness and preference for more sustainable packaging has grown. In our survey, 81% of the respondents indicated that the sustainability of the packaging materials used is of primary concern to them.

Sustainability of the packaging materials I buy is of primary concern



Furthermore, consumers are also willing to pay more for sustainability. 54% of the respondents were willing to pay "slightly more" for sustainable packaging, while 10% of consumers are even more committed to put their wallets where their values are and are willing to pay "significantly more" to limit the burden of their consumption habits on the environment and society.

Willingness to pay more if the goods bought are packaged in a more sustainable way



Consumers, packaged goods companies and legislators are all, in their own ways, taking steps to move packaging away from a linear model of production, use and disposal to a model of circular economy. Sustainable performance of packaging has four pillars:

1. reduce packaging waste and pollution by packaging and process redesign,

2. ensure the packaging protects and enables consumption of the goods by, e.g. reducing food waste or damaged goods,

3. reuse and/or recycle packaging materials, and

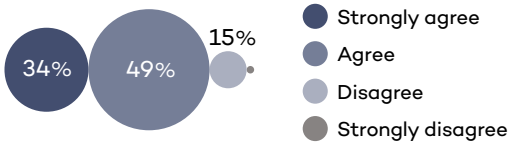
4. introduce an end-of-life plan, e.g. through Extended Producer Responsibility schemes.

Draining the plastic ocean

Consumers are backing the goal of curbing the world's plastic addiction. In our survey, 83% of people stated that they are doing their best to limit the use of single-use plastics. Accordingly, introducing new packaging formats, which either use less or no plastics, has been a valid option for brand owners towards achieving net zero targets.

Outright bans of single-use plastics, in applications such as food service or carryout bags, have been emerging across the world.

Do their best to limit single-use plastic packaging



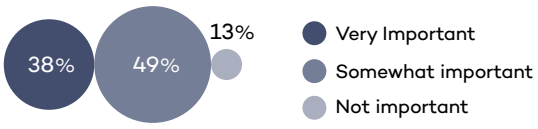
The European Union has its Single-Use Plastics Directive (SUPD), which bans materials such as plastics straws, plates and EPS (expanded polystyrene) containers altogether. To reach zero plastic waste by 2030, Canada banned, as of the end of 2022, the manufacture and import of six single-use plastic categories, including bags and takeout containers. In the US, there is no movement in federal, nationwide, single-use plastic regulation. Rather, individual States are moving ahead on their own, California being the most progressive with its Plastic Pollution Prevention and Packaging Producer Responsibility Acts.

Packaging recycling is mainstream

Recycling: The reprocessing of discarded waste materials for reuse, which involves collection, sorting, processing, and conversion into raw materials, which can be used in the production of new products – Oxford English Dictionary

Consumers have learned to expect that the containers, boxes, pouches, sleeves, bottles, jars and other forms of packaging that they use can be recycled. For 87% of the consumers we surveyed, it is very or somewhat important that packaging is recyclable.

Importance that products are packaged and delivered in packaging that is recyclable



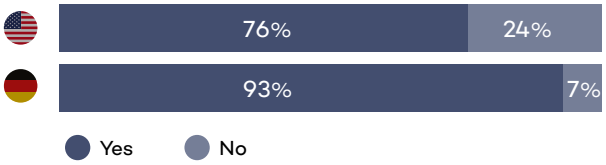
People actually recycle. Especially in Europe, recycling is a part of life and expected behaviour.

In Germany, 93% of the respondents indicated that they diligently sort different wastes in separate bins at home, or return to retailer or a community recycling center. The figure was much lower in the US, where only 76% of respondents actively and regularly recycle.

To our surprise, we did not find Millennials recycling more than Gen X and Baby Boomers. That indicates that people in the US across all age groups seem to be aware of the benefits and how to recycle. Although, Baby Boomers are

more likely to have better access and resources to recycle in their suburban homes than recent college graduates living in big cities.

Do you recycle?

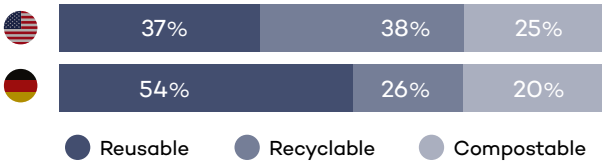


Return to reuse economy
Reusable: It can be used again - Oxford English Dictionary

Reusable packaging has (re)emerged and has been promoted as another way towards the same goal. Therefore, reusable packaging has been increasingly included, and even favored, as a mechanism for legislative frameworks guiding jurisdictions towards net zero.

In our survey, we asked 1,000 German and US consumers which packaging format they think is the most sustainable way of packaging products: recyclable, reusable or compostable packaging?

The most sustainable way of packaging



Considering the public debate in Europe around reusable, versus lack thereof in the US, it is not surprising that the results differ by region.

In Germany, reusable packaging was perceived as the most sustainable packaging format by the majority (54%) of the respondents. In the US, the most sustainable packaging format was a close tie between recyclable (38%) and reusable (37%) packaging. This reflects ythat – aside from many reusable packaging pilots by consumer products companies, with Starbucks' reusable coffee cups being one of the most visible ones – reusable consumer packaging is still rather limited and not a headline topic of conversation in most US States.

Reusable is getting first traction in Europe now
Reuse is now one of the cornerstones in a draft proposal of the overarching EU legislation called the Packaging and Packaging Waste Regulation (PPWR). The PPWR has the power to change the feasibility of reusable packaging significantly.

The European goal of 50% reusable e-commerce packaging by 2040 may sound distant, but players are already moving ahead in creating new reusable packaging concepts. Logistics companies and European national mail systems are partnering with packaging start-ups to find the most workable packaging solutions and are already testing those in practice. Retailers welcome the developments and are increasingly participating in the decarbonisation of supply chains.

One of the key misunderstandings that many still have about reusable packaging is that returnable packaging equals reusable. This is clearly not the case, given how the PPWR is formulated right now. It will not be sufficient to be able to tear packaging open and then seal it again to ship back the shoes that didn't fit.

In order to comply with the formulation of the draft PPWR, packaging is required to not be destroyed during opening and closing. Basically, the packaging needs to be clearly designed for reuse. It needs to be standardised for cleaning and repair – and for as many rotations as possible. Loop systems (comparable to those for pallets or returnable fruit boxes) are still to be established. And finally – but not to be forgotten – it will take some time until consumers are fully educated on how the new packaging concepts work.

The bottom line is that the PPWR draft is challenging old thinking patterns that tell us that recollecting packaging for reuse is not viable as it is too costly, consumers are too scattered, and the overall supply chain is too complicated and slow to change. Instead, the packaging and logistics sectors are already piloting new reusable packaging solutions, experimenting with deposits and pricing formulas to see what works.

Against all odds, reusable packaging has started to make inroads. The key question has changed from "Are reusable packaging systems possible?" to "Where are reusable packaging systems a viable solution towards net zero packaging?"

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Are you ready?

The Corporate Sustainability Reporting Directive (CSRD) is coming – and will transform business

This is the most significant change in financial reporting since the introduction of International Financial Reporting Standards (IFRS), driving organisational change and strategic development to boost the green transition.

Over time, more than 50,000 companies will be impacted and starting on 1 January 2024, companies with activities in Europe must begin reporting their environmental, social and governance (ESG) practices. This will be done according to the CSRD and the 12 European Sustainability Reporting Standards (ESRS), which have been designed to guide the information that should be included in Management- and Annual Reports.

The CSRD will impact large, listed companies that are already subject to the NFRD (Non-Financial Reporting Directive) and have more than 500 employees from the beginning of 2024.

When your company meets the following criteria, the reporting obligation starts in 2025:

- EUR 40 million turnover
- EUR 20 million balance sheet

Moreover, SMEs will enter the obligation in 2026, while companies with subsidiaries or over 150 M€ in revenue in the EU will follow suit in 2028.

The first set of CSRD standards includes double materiality and quality of information, the former focusing on identifying potential impacts on people and the environment.

The first sustainability reports are due in 2025 and must be available in a digital format. Each organisation is to submit their report to the European Single Access Point (ESAP) database.

Ensure that your organisation is prepared in time and start your journey towards sustainability reporting and broad transformation already now.

Contact AFRY Management Consulting

AFRY has an integrated approach, combining business strategy, broad sustainability expertise, deep technical engineering and design capabilities with a human touch. We will guide you each step of the way with a uniquely customised approach tailored to your needs.

Smoother curves in pulp price rally

Why is market volatility increasing? What does China as an end consumer have to do with it? And how can the effects be mitigated?

Price volatility has picked up

Since the start of the decade, the pulp market has travelled a winding road from boom to bust. The market has suffered from unexpected events – from demand fluctuations and logistical bottlenecks, driven by the global pandemic, to surging energy prices due to geopolitics, rising wood costs and unforeseen production outages.

Market pulp as a global commodity has always been subject to cyclical fluctuations and price volatility. However, there are clear signs that overall volatility is growing and that the predictability of the changes is weakening. A significant factor fuelling long-term volatility is China's expanding presence as an end-use market, currently accounting for over 40% of global demand. Moreover, market dynamics in this region diverge significantly from those in the Western world.

Market behaviour in China is more speculative, with shorter contract periods, recurring negotiations and aggressive inventory management, with less focus on working capital. Furthermore, volatility is strengthened by the larger scale of pulp suppliers, which has made them more resilient to market changes and more flexible to take market downtime or geographically reallocate volumes based on demand fluctuations.

Positive or negative?

There are advantages and disadvantages when it comes to price volatility. As Anita Skjong, Chief Commercial Officer of NOREXECO states, volatility is a sign of a functional and efficient market, because it reflects changes in market fundamentals. The question is how the industry adapts to these changes. João Pereira, Managing Director of Altri Sales, underpins that volatility ensures the industry stays sharp and keeps chasing opportunities. Being on the pulse of the market has become more critical than ever within an increasingly volatile price environment.

However, there is also a flip side of the coin: strong volatility means less predictability of earnings and margins, raising the financial risk for any company in the pulp market – essentially hitting market capitalisation. Brian Dillion, Director at tissue and hygiene company Essity, sees volatility as a value-destroying factor, especially now, as the magnitude of these changes has grown increasingly extreme. The tissue and hygiene business is typically more stable by nature, however amid the current volatility, the commodity-driven nature of the pulp market is also commoditising some segments of the tissue market more than ever before. "We have to find mechanisms to mitigate the volatility", Brian Dillon underlines.

How to mitigate the impacts?

Both Anita Skjong and João Pereira agree that there is no reason to expect pulp price volatility to fade. Currently, prevailing pricing mechanisms with recurring negotiations are enhancing short-sightedness and feeding overall volatility, with both buyers and sellers chasing the last dollar. Additionally, pulp suppliers have become more resilient and capable of moving the market. Furthermore, as João Pereira outlines, different pulp grades and products have become more interchangeable, especially driven by the increased share of tissue end use that is tightening competition in the market.

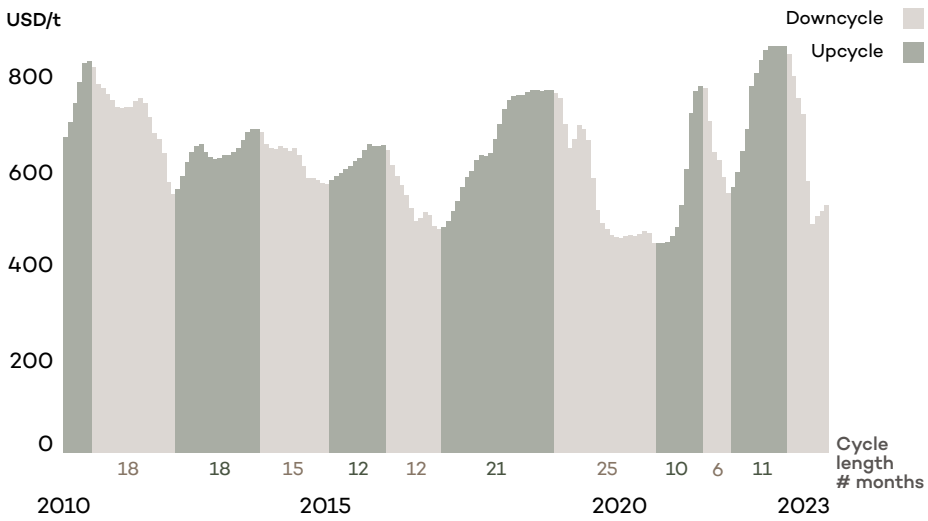
In an environment of strong and even strengthening volatility, it becomes more critical to stay close to the market pulse and focus on sharp market intelligence – in order to anticipate the cyclical turning points. Even though volatility has largely been perceived to be "business as usual", there are ways to mitigate its implications.

Seeking alternative pricing models is one of the potential measures to mitigate the implications of price volatility. In consumer markets such as tissue, time becomes an important factor – passing price increases down the value chain invariably comes with a delay. It is why Brian Dillon from Essity sees potential in, for example, time-lagged pricing mechanisms, which could provide a way to smoothen price volatility along the value chain. Implementation of such mechanisms would require longer contract periods, and long-term commitment from both buyer and seller.

Hedging provides another alternative or complementary solution for price volatility mitigation. In many other commodities, such as energy, metals and agriproducts, hedging is already a widely used financial instrument for price-risk mitigation. In turbulent times, according to Anita Skjong, market pulp futures have also gained increasing traction with pulp buyers – especially with those who have already been exposed to hedging, for example in natural gas and electricity. However, international futures markets in pulp are still building liquidity, requiring higher traded volumes and in practice a higher participation of pulp suppliers in the market. With more liquidity, pulp hedging would provide attractive opportunities for both buyers and sellers, for example by stabilising or improving earnings and margins – but also by enhancing customer service.

Pulp price volatility is here to stay, and it remains one of the key business fundamentals and critical success factors to mitigate related risks. In this regard, seeking new solutions, building trust and long-term commitment play a central role. Large buyers and sellers are in a position to drive change, upon which many others will follow.

Monthly nominal price data, market BHKP net prices in China, USD/t



Where there's a will

Carbon markets are designed to be one tool in achieving net zero ambitions. In this article, the focus lies specifically on the voluntary carbon markets (VCM) where buyers are typically large corporate organisations, and within the VCM, the focus lies on land-based greenhouse gas (GHG) removal.

A carbon credit, traded on the VCMs, is a token which represents either the removal or avoidance of greenhouse gases (GHG) from the atmosphere. Companies related to forestry that are generating GHG removals can measure their changes in carbon stocks and, assuming that those carbon stocks are greater than a baseline scenario, sell a corresponding amount of carbon credits to VCM participants. These credits are then purchased by other companies within voluntary markets, who wish to "offset" their own emissions.

Ambitious intentions beset with criticism

In many cases, GHG removals are generated by projects in developing countries, whereas the credits are purchased by companies in developed countries. In theory, corporate demand for carbon credits can implicitly benefit the host country in meeting national GHG targets in the land use, land-use change and forestry (LULUCF) sector. Therefore, credits have a dual purpose of channeling funds into forest and biodiversity conservation as well as climate-change mitigation by emission reduction.

Ruth Malone
Victoria Poljatschenko

Despite the ambitious intentions of carbon credits, the idea has been beset with criticism. The criticism falls into three main areas:

First, there are concerns that carbon credits offer a "get out of jail free card" for those companies that have large carbon emissions. Rather than reducing emissions related to the product, the company instead purchases carbon credits and uses this to "cancel out" the carbon dioxide that has already been emitted. The difficulty with this approach is that capturing one tonne of carbon dioxide now is not equal to one tonne of carbon dioxide that has already been emitted, at least not when it comes to measuring the impact on the climate. There is also concern that all this creates a distorted message, that we can tackle the climate crisis without making any changes to our existing way of life, as we can simply offset instead.

Second, concerns relating to methodological issues, leading to overstating of carbon removals, have been prominent in the press. Case studies conducted in the global South show that the poor estimation of baseline GHG emissions is the key cause of error when it comes to quantifying additional GHG removals.

A third area of concern relates to the potential of projects to have an adverse impact on local communities or exacerbate existing environmental issues. Projects that generate carbon credits are expected not to significantly impair any aspects of sustainability. In many areas, forests support local livelihoods and ways of living. International carbon standards require that projects driven by foreign demand must not jeopardise the need to meet local needs. Despite clear instructions and even careful project planning, it has been demonstrated that the reality in many cases does not meet the required conditions.

Improving practices
As carbon markets have developed, steps have been taken to mitigate these risks and address concerns. For example, the development of carbon accounting methodologies, and ongoing refinement will help to some extent.

Additionally, coalitions such as the Integrity Council for the Voluntary Carbon Market have been formed to define consensus-based standards and ensure integrity in the market. International frameworks, such as those from the Science Based Targets initiative (SBTi) and the Voluntary Carbon Market Initiative (VCMI) similarly seek to ensure that climate target setting follows a meaningful climate mitigation hierarchy: avoid, reduce, offset, neutralise.

Voluntary action for improving the integrity of carbon offsetting has also been taken by market participants that are showing thought leadership. Good practices are demonstrated by Microsoft, representing the demand side, and Nasdaq on the supply side. The former seeks to offset its entire carbon footprint including historical emissions, the latter aims to enable net zero for client companies via its Puro.earth marketplace which focuses on high-quality carbon removal technologies.

AFRY view
Whilst carbon markets were developed primarily to provide incentives for net zero, they also come with sizeable potential co-benefits to other aspects of sustainability, such as conservation, improvements in biodiversity and social benefits, provided that these forestry projects are executed in the right way. The importance of these should not be overlooked as the market strives to address its difficulties; there is more to be gained and there are bigger reasons to address the issues than carbon emissions alone.

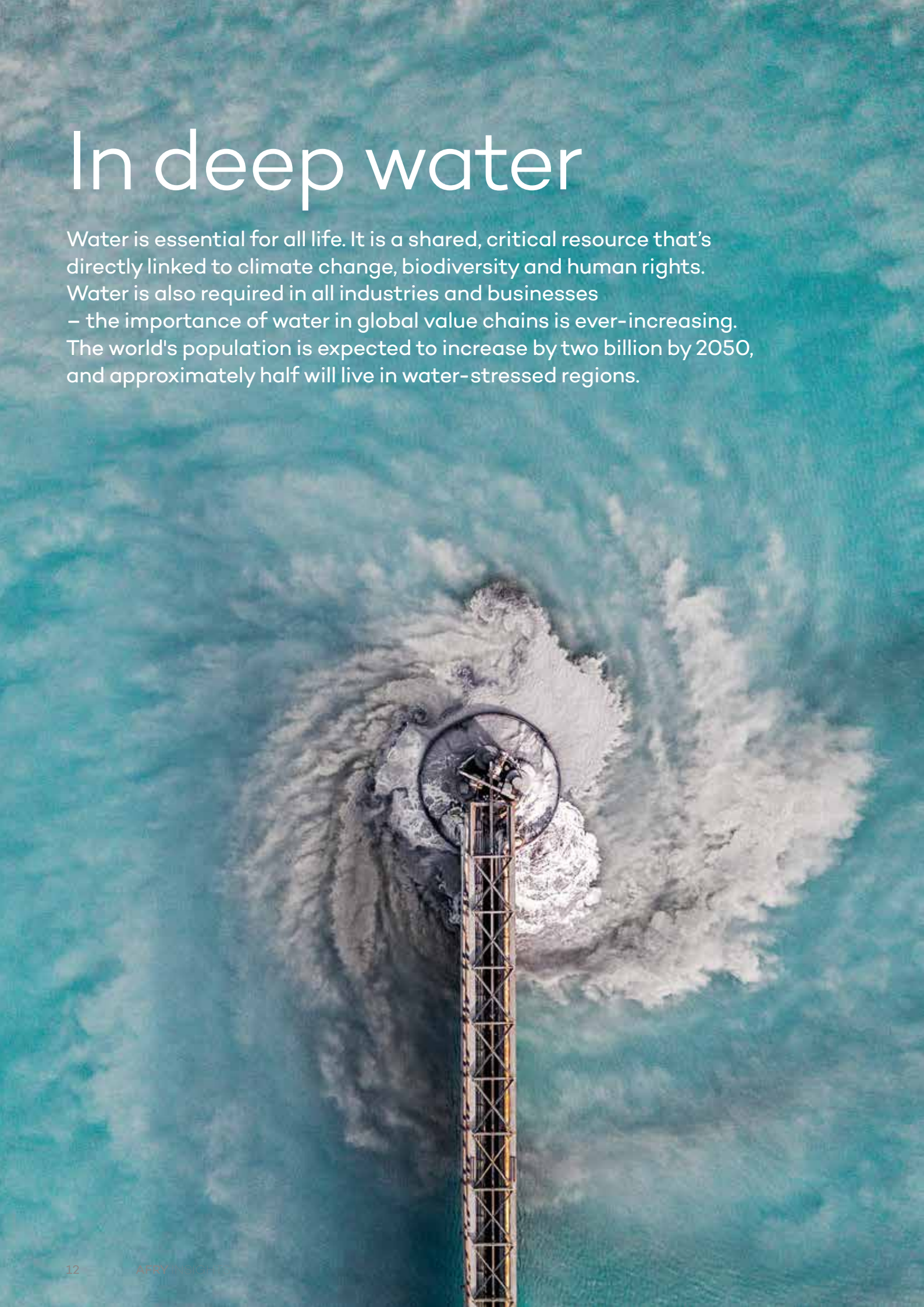
The market must not, however, lose sight of the key principle of "do no harm" ensuring that carbon sequestration is achieved with co-benefits, and not at their expense. This philosophy is already reflected to some extent in some companies' GHG reporting as they shift to a more holistic form of sustainability report. In this context, forests have a lot to offer as they deliver economic, social and environmental benefits.

Ongoing improvements in quality standards and governance have the potential to regulate the market effectively – and this is where the focus should remain, with the public continuing to hold the market to account. At the same time, however, care must be taken to ensure that the level of regulation does not create barriers to entry and discourage afforestation projects.

Organisations that are strong with their due diligence of carbon projects can confidently purchase credits, with transparency as to the value being delivered. All stakeholders have an additional role to play in educating people about carbon markets and the benefits that can be derived thereof.

In deep water

Water is essential for all life. It is a shared, critical resource that's directly linked to climate change, biodiversity and human rights. Water is also required in all industries and businesses – the importance of water in global value chains is ever-increasing. The world's population is expected to increase by two billion by 2050, and approximately half will live in water-stressed regions.



Minna Pirilä
Tanja Virtanen-Leppä

Water consumption in the global North continues to increase, and the UN predicts a 40% global gap in water supply by 2030 if current consumption and production patterns continue. Strategic water stewardship is seen as a prerequisite to maintaining water security in the future. Regulatory compliance and operational water efficiency management is not a viable water strategy anymore. Both are necessities when building approaches to water, however, it is the big picture, including the societal impacts of water in value chains, that needs to be addressed.

Water stewardship
Water stewardship is a framework and set of water-related practices that help businesses manage risks, cut costs and build trust while promoting long-term water security for all. According to the Alliance for Water Stewardship (AWS), water stewardship is socially and culturally equitable, environmentally sustainable and economically beneficial use of water, achieved through a stakeholder inclusive process that includes both site- and catchment-based actions. Water stewardship is sustainable water management on watershed level under consideration of related stakeholders as well as consideration of local factors influencing water related risks.

Moving beyond traditional water management to a more strategic level brings a variety of benefits, while staying on an operational level may lead to financial and reputational risk.

Beyond water management
Taking a strategic approach brings a variety of benefits for companies, including a positive impact on company reputation through trust and collaboration within and between sectors, investors, local communities and governments. Water stewardship is an essential part of the social acceptability of any company's operations. It also helps to identify and implement better water use practices and decreases environmental impact. Losing sight of water issues may lead to diverse challenges and risks, including physical, regulatory, technological, and reputational as well as financial. In fact, 69% of listed equities reporting via the Carbon Disclosure Project (CDP) are exposed to water related risks that could generate a substantive change in their business. The potential value at risk has been estimated to be as high as USD 225 billion. Reputational risks might affect financial performance as well.

Actions in assessing
As stated by the World Economic Forum, water is an impact multiplier for sustainability and is inextricably linked to climate change and degradation of ecosystems. All too often, water has been an underrated resource, and its benefits to ecosystems and society underestimated. The financial sector increasingly recognises the need to understand water-related impacts and dependencies. Current projections of water stress suggest potential long-term growth rate declines due to water scarcity. Increasing water stress is intensified by the net zero transition, which will amplify both risks and opportunities for investors. This requires business owners' preparedness to respond to investors enquiries as to water strategies and performance.

Different pathways
It is natural that corporates evolve from basic to more advanced water stewardship practices. On a high level, the corporate water stewardship journey is about understanding how essential water is to your business and identifying the water basins you impact and depend on. Based on this prioritisation, companies then create water stewardship plans and targets for their own operations, supply chain and the whole value chain, implement the plans and act collectively. Finally, actions are assessed and verified, and progress is communicated.

"I have followed and taken part in the development of global water stewardship approaches for over ten years", stated Suvi Sojamo, Leading Researcher at The Finnish Environmental Institute (SYKE). "Complexity of water issues and the plethora of tools and initiatives available can be confusing", which is one of the reasons why AFRY Insights interviewed her about recommended actions.

"SYKE has collaborated with research institutes, ministries, NGOs and businesses in establishing the Finnish Water Stewardship Commitment, an action framework helping companies to become the most responsible water stewards in the world by 2030. Each of its five steps is accompanied with best practice tools and guidelines.

1. Identifying water risks and opportunities with a mapping exercise covering their global operations and value chains
2. Assessing the material water risks, opportunities and impacts
3. Integrating water into their strategy by defining key priorities, objectives, targets and actions
4. Collaborating with stakeholders to develop sustainable water use and governance
5. Monitoring and reporting on water stewardship progress in a transparent manner

When businesses get their water use and impacts right, building on a robust evidence base and open collaboration with stakeholders, they can become real change agents in a broader sustainability transformation."

Financial opportunity
The CDP report Riding the Wave, published just before the UN 2023 Water Conference in March, illustrates financial opportunities that exist for companies that integrate water into their business strategies. Water stewardship is no longer just a question of risk management but of real value ready to be captured. Water has become a topical issue in boardrooms, with major companies investing in new products and services to address the water challenge and seize market share in a world in which we will have to do more with less.

Key to green transition

Realising sustainable transformation

EUR 700 billion of additional annual investments are estimated to be needed to deliver upon the objectives of the European Green Deal. The bulk of these investments will have to come from private funding.

The EU Taxonomy alignment will facilitate access to financing and is also likely to have an impact on company valuation. The EU Taxonomy classifies what is green, and alignment with it is a way for companies to future-proof themselves.

Sustainable finance, according to the EU Taxonomy, includes what is nowadays already deemed eco-friendly, and it is referred to as green finance. Transitional financing enables the transition to comply with EU objectives and becoming green in the future. The latter is expected to exist only in the short and medium term, with green finance taking over in the long term.

Marie Ahlgren

Enabled by improved transparency, financial institutions and banks are starting to rank the "greenness" of their investments based on the corporations' Taxonomy disclosures.

What is the EU Taxonomy
The EU Taxonomy provides a common language, guiding companies in what they need to achieve, to reach six environmental objectives.

Taxonomy eligibility refers to whether an activity is covered by the EU Taxonomy. About 150 economic activities have currently been identified in this field.

Taxonomy alignment refers to whether an activity meets the EU Taxonomy Technical Screening Criteria, i.e., making a substantial contribution to at least one of six environmental objectives while simultaneously doing no significant harm to the other five. Alignment also requires complying with the minimum safeguarding criteria, e.g. OECD Guidelines on Multinational Enterprises and the UN Guiding Principles on Business and Human Rights.

EU is taking the lead – with a tight time schedule
Taxonomy classification is pivotal in most new and future EU initiatives, policies, and regulations.
The disclosure of the EU Taxonomy will be mandatory for 50,000 companies, along with the new CSRD/ESRS reporting requirements for corporations and the SFDR for financial market participants and financial advisors. As a consequence, demand for taxonomy-aligned products and services will increase in most value chains, including design, development, production and distribution.

The EU has a tight time schedule: in 2023, it became mandatory for large, listed corporations to disclose EU Taxonomy eligibility and alignment for two climate objectives. In June 2023, the EU published additional economic activities covering all six objectives, to be reported on already in 2024 for the fiscal year 2023.

The enormous investments required to address the climate and nature crises are driving the global development of taxonomies, similar to the EU Taxonomy. The EU is taking the lead – and the EU Taxonomy is a forerunner providing the framework for other taxonomies.

The taxonomy landscape is quickly evolving in Asia. However, contrary to the EU, the region has a fragmented market without an overarching regulatory body to implement ESG legislation. Taxonomies already exist or are under development in Singapore, Malaysia, China and India, while the Association of Southeast Asian Nations (ASEAN) has established the ASEAN Taxonomy for Sustainable Finance.

The US Environmental Protection Agency (EPA) is looking into the EU Taxonomy and is discussing ways to develop one of its own.

The Canadian Taxonomy Technical Experts Group (TTEG) has developed a recommended framework architecture to guide Canadian green- and transition finance taxonomy development.

Practical pathway to alignment
A company on the path towards Taxonomy alignment faces several challenges:

1. Articulating sustainability objectives and actions to close the gaps as part of its business strategy
2. Complying with higher environmental and social standards
3. Investments in data collection and processing

Preparing for EU Taxonomy alignment as early as possible is crucial, as it provides a common base for all new EU Green Deal regulations and standards.

Becoming Taxonomy-aligned is a transition process, which is why it is recommended to engage an EU Taxonomy expert to ensure its swift advancement and efficient execution. The expert can support in defining the roadmap for eligibility and alignment assessment, provide the tools for closing the alignment gaps and assist in reporting requirements.

A close and strategic cooperation between different corporate functions is important. Starting with objective- and target-setting, identifying key stakeholders, and establishing a project team including finance, operations and sustainability management.

SIX ENVIRONMENTAL OBJECTIVES

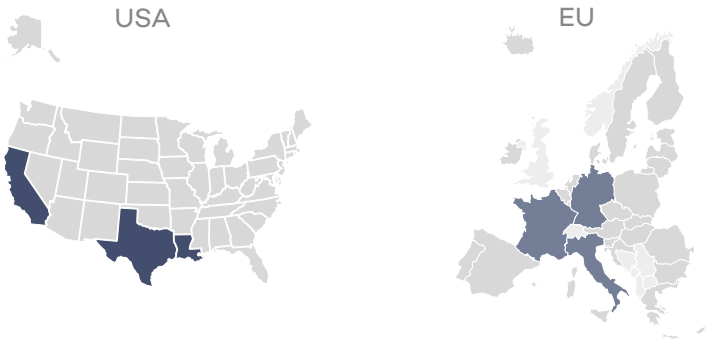
- Climate-change mitigation
- Climate-change adaptation
- Sustainable use and protection of water and marine resources
- Transition to a circular economy
- Pollution prevention and control
- Protection and restoration of biodiversity and ecosystems

Navigating climate policy on both sides of the Atlantic

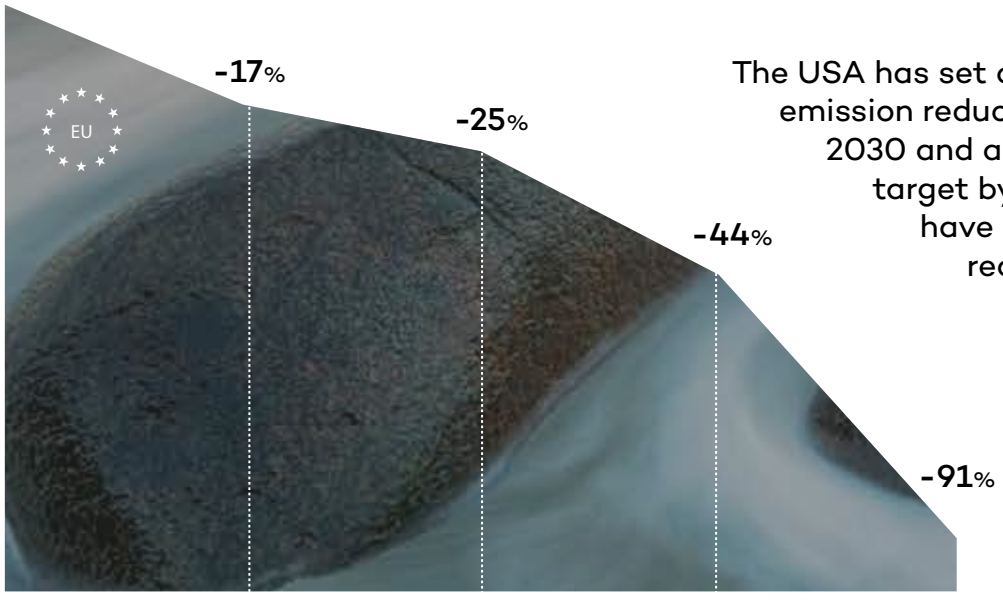
Over the last five years, both the European Union (EU) and the United States of America (USA) have introduced various regulations and policy initiatives to combat climate change with primary focus on reducing greenhouse gas (GHG) emissions. Solving the problem is a complex effort, which is mirrored in the intricacy of the regulations. The EU and USA have taken differing approaches in regulatory framework to achieve net zero by 2050.

The ever-increasing number of regulations direct the market through obligations and targets. Thus, for industries, it is essential to understand how to navigate regulatory requirements while generating profitable business. At AFRY, we have discovered that embarking on a path to lower GHG emissions frequently leads to operational efficiencies and substantial cost savings. The pivotal factors in achieving these begin with the development of a well-structured roadmap and a comprehensive GHG mitigation strategy.

Top regional industrial greenhouse gas emitters in 2021



EU trajectory for industrial GHG reductions in a 1.5° scenario

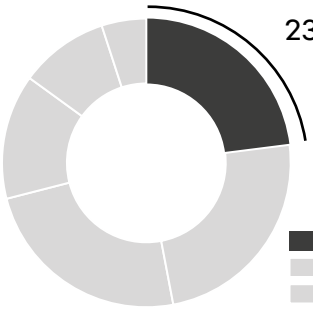


The USA has set an overall 50% emission reduction target by 2030 and a net zero economy target by 2050, but does not have a comparable emission reduction path for industry.

Net zero emission economy by 2050

*Source: EU; Eurostat, USA; Department of Energy, Pulp and Paper; Environmental Protection Agency

EU and USA emissions by sector



- Industry
- Transport 24%
- Energy 24 %
- Commercial and residential 14%
- Agricultural 10%
- Other 5%

Industry emissions million tonnes of CO_2 equivalent 2021*

1,360 USA

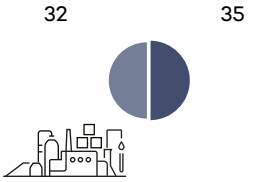
799 EU

to Zero

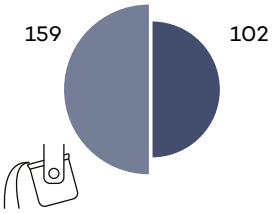
As point source emitters of carbon dioxide, all heavy industry sectors can benefit from carbon capture utilisation and storage (CCUS) to reduce their carbon emissions. Additional benefits can come through the use of renewable and low-carbon power sources.

million tonnes of CO_2 equivalent 2021*

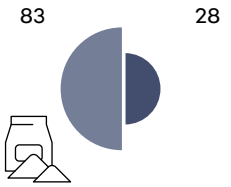
EU USA



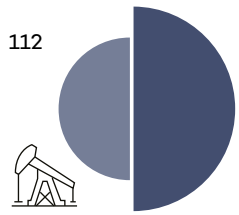
Pulp and paper
Electrification and substitution of remaining fossil fuels with low-carbon alternatives can completely decarbonise the pulp industry. Utilising pulp industry by-products can also help other industry sectors to reduce emissions.

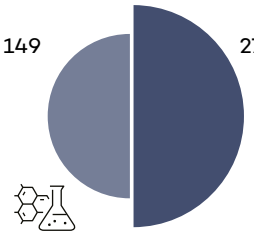


Iron and steel
Direct iron reduction with hydrogen and biomass in the form of pyrolysis oil and biochar are extensively studied for decarbonising the steel industry.



Cement
The emissions of the cement industry can be lowered via the use of alternative low-carbon energy sources such as renewable fuels and electricity, novel low-carbon materials and, especially, carbon capture.





Refining and Chemicals
The petroleum and chemicals industries can decarbonise by electrifying production or utilising biomaterials and recycled materials. Bio-based fuels and chemicals, low-carbon hydrogen, synthetic fuels and recycled feedstocks are the main pathways to decarbonisation.

Relevant regulations to path net zero

EU
- **Net zero industry act**
- **ETS**
- **CBAM**

The EU has a clear path to achieve emission reductions, but the financial incentives to push the industry are disorganised and lacking compared to the USA.

USA
- **IRA funding,** USD 470 billion
- **IRA tax credit,** value USD 1,000 billion during 10 years
  Announced clean energy projects under IRA USD 132 billion
- **Executive order (EO) 14081,** USD 1.2 billion

IRA funding and tax credits **EO**

TOTAL USD 1,471 billion

AFRY
ÅF PÖYRY

Alexander Koukoulas
Johannes Lottonen

Regulation complexity

The increasing amount of global regulations is shaping an intricate web of interconnected crossroads where each step matters. While the EU climate change policy focuses on minimising emissions by setting reduction targets, the USA relies mostly on financial incentives.

The United States (USA) and the European Union (EU) are each other's largest overall trade and investment partners with over USD 1.3 trillion in trade from goods and services and over USD 5.0 trillion in direct investments. Recently, the relationship has been strained by several factors, including mixed signals regarding US commitment to combating climate change and the new regulations that effectively support domestic industries through restrictive trade policies. Some expect this tit-for-tat exchange to continue, so it is critical to monitor developments between the two regions as the economic impact could be quite severe.

With respect to climate-change policy, the EU's regulatory approach focuses heavily on minimising GHG emissions by setting emission reduction targets. The US relies mostly on financial incentives to promote renewable energy projects with the Renewable Fuel Standard being an outlier.

The EU's approach clearly shows the emission reduction path required to meet the 2030 goal, but the financial incentives to push industry and other economic sectors to GHG reductions are disorganised. Conversely, the US approach lacks a clear pathway and instead emphasises the end result of achieving at least a 50% reduction in GHG emissions by 2030. However, it has been analysed that the Inflation Reduction Act (IRA) itself will will cut GHG emissions by 33% to 40% by 2030, while the rest would be achieved through transportation and industry emission standards and through mainstreaming low-carbon technology, both supported by the IRA.

Both approaches show weaknesses. In the absence of clear emission reduction targets, the US must confidently ensure that tax breaks and other financial incentives steer the industry towards emission cuts, especially in cases where more polluting options would be cheaper. Additionally, in 2022, the US Supreme Court restricted the Environmental Protection Agency's power to regulate carbon-dioxide emissions (West Virginia v. EPA). Although the IRA largely addresses this issue, there is a possibility of similar challenges emerging in the future.

On the EU side, the Net Zero Industry Act and the relaxation of the EU's state-aid rules provide some clarity regarding the financial incentives – a policy shift from the more traditional, stricter Single Market antitrust rules in the EU.

The EU's motivation behind this policy shift is the fear of losing financial investments to the US, as these incentives are tied to production in the US. However, this does not imply that the EU lacks financial incentives altogether. For example, the EU Innovation Fund, Projects of Common Interest funding, funding under the RePowerEU plan and different Member State funding programs all provide financial support and incentives.

The world today is a significantly different place than it was in the 2000s. The promises of expanded globalisation and free trade have been supplanted by protectionist policies that have the potential to undermine the global world order ushered in after the end of the Second World War. This is most apparent in the industrial sector, where trade barriers and tariffs are increasingly impacting global markets.

From the perspective of climate change, the focus of the regulations has evolved from operational standards and requirements to a larger market-driving force that creates and directs markets to reduce GHG emissions.

Yet, global markets for carbon dioxide are still untested, which is shown all too painfully in recent scandals involving the markets for carbon offsetting. This is why business leaders must be vigilant in understanding regulations and their impacts. Ignorance is not bliss and being uninformed can lead to severe penalties for non-compliance. On the other hand, generous and unprecedented incentives laid out in recent policies could ease the economic pain and provide financial incentives that can accelerate the transition.

One plus one is more than two

Global risks such as the failure to mitigate climate change and the failure of climate-change adaption are systemic and cannot be dealt with using traditional risk analysis methods due to their complexity and deep interconnectedness. This calls for a different approach: one which takes multiple individual perspectives into consideration to build a broader, shared and cooperative knowledge base.
It calls for organisational resilience.

Aila Vapaaoksa
Łucja Wanicka

Setting the scene

Every year, the World Economic Forum publishes an insight report where it evaluates both short-term and long-term risks. The report examines global events and conditions that can negatively impact global GDP, population, or natural resources. In the most recent January 2023 publication, five environmental risks topped the severity list of global, long-term risks:

#	Global long-term risks	Risk category
1.	Failure to mitigate climate change	Environmental
2.	Failure of climate-change adaptation	Environmental
3.	Natural disasters and extreme weather events	Environmental
4.	Biodiversity loss and ecosystem collapse	Environmental
5.	Large-scale involuntary migration	Societal
6.	Natural resource crises	Environmental
7.	Erosion of social cohesion and societal polarisation	Societal
8.	Widespread cybercrime and cybersecurity	Technological
9.	Geoeconomic confrontation	Geopolitical
10.	Large-scale environmental damage incidents	Environmental

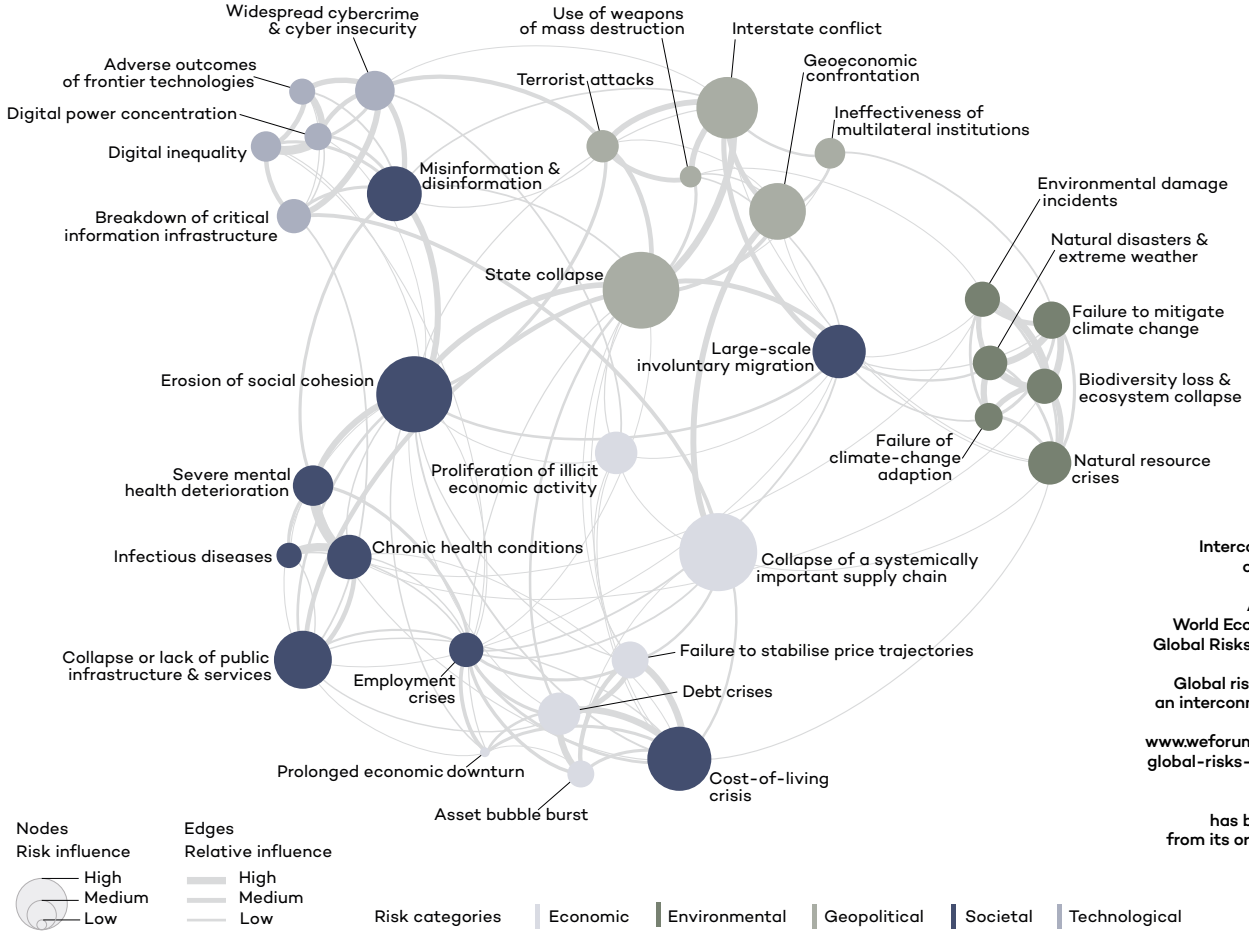
Global risks are complex and deeply interconnected systemic risks because the overall impact of one risk exceeds the sum of each individual risk. This means that it is not just understanding the individual risks themselves that matters, it is also understanding the holistic view and how, for instance, socioeconomic risks relate to the supply and demand of natural resources.

Since systemic risks are so interconnected, they cannot be dealt with by using traditional risk-analysis methods as they were not designed to deal with such uncertainties and unknowns. Systemic risks call for a different way to be dealt with – one such way could be systemic resilience.

Developing resilience to manage risks

How can organisations build resilience and deal with systemic risks? We posed this question to Mikael Seppälä, co-founder of Systems Change Finland and Project Manager at Laurea University of Applied Sciences, who currently researches systemic innovation management and ecosystems. His interests are also focused on developing practical solutions to complexity and systems thinking.

To start off with, Mikael Seppälä views systemic resilience as a concept related to how organisations adapt to shocks and disorder in their business environment and is based on the idea that organisations and individuals are part of a larger, broader network. Systemic resilience is then built when organisations and individuals interact with each other, and exchange information to strengthen network connections. Seppälä refers to a study conducted by two US army researchers – Igor Linkov and Benjamin Trump – wherein systemic resilience was defined as the ability of organisations and individuals to recover and adapt after a risk materialises.



Interconnectedness of global risks.

Adapted from World Economic Forum, Global Risks Report 2023, Figure C: Global risks landscape: an interconnections map, page 10, www.weforum.org/reports/global-risks-report-2023/.

The graphic has been modified from its original format.

In this study, the researchers also formulated a framework to evaluate the readiness of resilience and to reveal development areas and innovations needed within organisations. Clearly, there are several definitions and viewpoints to what systemic resilience is, but we may all agree that it is a continuous process and one which requires flexibility.

For a global organisation with thousands of employees, offices in multiple countries and numerous business areas operating in a world full of global risks across industries with sustainability at the core of its strategy, Seppälä advised the following two points to improve resilience. This company could well be AFRY.

The first is obvious – one needs to understand their business environment and how networks can be utilised in risk situations. This cannot be done in a closed system where actions can be planned, and risks managed beforehand because this approach would lead at best, to a slow recovery in disruptive situations. It must therefore be done in an open system, where uncertainty is present, and where one can increase flexibility through interactions within one's network.

This means that situation analysis and cooperation are core to the process, Seppälä stresses. Social capital, interaction and shared situation analysis are valuable capital and while physical and digital tools are important, developing social practices is decisive.

In effect, a shift needs to take place from placing emphasis on individual expertise and knowledge to a broader, shared and cooperative knowledge base. However, for this to happen, trust, openness and interaction between employees and team members are essential.

Mikael Seppälä also says that the role of information and what one does with it becomes more important. Information storage is not enough and while tacit knowledge, something specialists gather on their professional career path, is still important, it is information synthesis and insights that becomes crucial, he emphasises. In effect, resilience is about sense-making where different viewpoints are combined to create a shared, common understanding. One plus one is more than two.

Resilience in practice
After the discussion with Mikael Seppälä, we reflected on our AFRY cross-continental teams as well as official (and occasionally unofficial) cross-divisional groups such as the Textile Tactics team which was set up in 2021. Initiatives like these give us reassurance that we are on track to be resilient and prepared for disruptions within our business, potentially even giving us a strategic advantage and the ability to capitalise on opportunities when our competitors are least prepared. The next step would be then to broaden our networks and include external parties and even clients. Join us "Making Future".

Textile Tactics,
a global virtual team, was set up in February 2021 to build an internal AFRY network of subject matter experts in the field of textiles and the textile-related industry. The aim of this network was to share knowledge and expertise, to collaborate and strengthen AFRY's engineering and management consulting competences and offering in this growing field. As of June 2023, the Textile Tactics team was composed of 35 members, representing four business areas and perspectives from Finland, Sweden, Germany, Spain, Italy, Thailand as well as China.

Critical mass

Mining, quarrying, refining and processing minerals and metals is one of the most sizeable industries that pillars nearly half of the global economy. It supplies us with essential means and solutions to continue shaping the world around us, for buildings, infrastructure, vehicles, machinery and electronics. The catch is that these benefits are linked to environmental harm and climate change.

Terrain disruptions, pollution and contamination have formed a negative image of the mining, minerals and metals industry. The overall land area stressed by mining and quarrying is estimated to have reached 800,000 km^2 globally, which is comparable to the size of Germany, Austria and Italy combined. Metal production and related mining processes are estimated to account for up to 10% of global GHG emissions.

Although most of our high-tech products are heavily dependent on the mining, minerals and metals industry, the industry itself is quite traditional, very energy intensive and has, in fact, been underfinanced for decades. However, there are some fundamental changes happening right now that are calling for a sustainability turnaround.

This sustainability turnaround is a must, it is unavoidable, and it is driven by the consumer interest in green and ethical products along with transparent and responsible performance.

This quest for sustainability provides bespoke growth opportunities – a high and rapid increase of demand for metals and minerals, and new investment requirements to engineer and build the future. How will the sustainability turnaround reshape the industry?

Energy transition

The increase in pressure for increased sustainability in the natural resources industry has made mining and metals companies target emissions reductions across their entire value chains. At the production stage, metals producers are seeking to decarbonise both through process improvements, such as energy efficiency investments, and via use of alternative energy or feedstock sources, including greater use of scrap and renewable energy supplies (RES). RES in particular offers an attractive opportunity to decarbonise, and at the same time addresses emerging needs around security of supply, becoming especially attractive to those who have been using expensive off-grid power at mines generated from diesel and other fossil fuels, and for those facing higher electricity and fuel costs.

More fundamental changes are also necessary in the decarbonisation of commodities production. For example, in the steel industry a shift from blast furnaces using coke to green hydrogen-based direct iron reduction (DRI), could mean a paradigm change. Ironmaking, e.g. DRI could become decoupled from steelmaking, and competitive DRI producers will be those with access to low-cost renewable energy sources and high-quality iron ore. In the aluminium industry, new materials need to be developed, while inert anode technology for electrolysis in the smelting process should cut emissions. However, reductions in indirect emissions from power generation offer the largest emissions abatement in aluminium smelting.

For some mining and metals companies, fundamental shifts to new production methods or feedstocks pose too high a risk, or too large capital expenditure and operational costs. Alternatively, the time to implement solutions is too long to meet company or policy targets, and, therefore, transition solutions are required. Carbon capture, utilisation and storage (CCUS) is one technology that is being investigated for some metal producers, especially, those where the CO_2 concentrations are higher and, therefore, more suitable for capture, for example, in steel. CCUS enables them to maintain use of fossil fuel-based production routes, whilst also reducing emissions.

Mining companies are also seeking to reduce emissions in transport applications used for production and transport of materials. A number of mining companies are developing hydrogen fuelled or electrified mining trucks. As the emphasis grows on reducing scope 3 emissions, including emissions from the transport of raw materials and end products, attention is switching to the fuels used to power commodities transport. For example, mining companies including Anglo American, Rio Tinto, BHP and FMG, are considering various shipping decarbonisation options, ranging from vessels fueled by ammonia, biofuels and in the shorter term LNG.

Circularity

Mineral-based materials in clean energy technologies, such as wind turbines, devices needed in smart technology, and electric vehicles, are essential for the green transition. The availability of many of these valuable raw materials necessary to numerous industrial sectors is already reaching a critical point of supply. Additionally, in materials processing there are also sustainability concerns, such as the availability of clean water.

The growing need of mineral resources results in an increase in greenfield exploration and alternative mining methods, such as deep sea mining .

Increasing demand calls for a transition in thinking to reduce, reuse and recycle natural resources in a sustainable and efficient way.

In other words, how to get by with less via adoption of carbon neutral circular economy solutions in many sectors, including the mining and metals industry.

The material development and product-design phases are the most important decision-making phases to enable a transition towards a circular economy. The goal should be to design “everlasting” products, where recycled materials, parts and components are in use, and are easier to repair and maintain. In addition, it is important to minimise environmental impacts in the use phase and keep products in use as long as possible. Therefore, new maintenance and repair services that extend product life cycles are needed.

Josie Armstrong
Ilya Gasparishvili
Nani Pajunen

From a material recycling perspective, the biggest challenges are non-comprehensive take-back systems, the low value of recycled materials, lack of cost-efficient recycling technologies and costs of recycling. For the transition towards a circular economy society, more efficient use of materials that tackles all of the above challenges will be critical.

In the future, the sustainable use of natural resources means that whenever we use raw materials, we ensure at the beginning of the life cycle that they remain in use after their first use. Tools, such as material and product passports, have been created to support this transition.

The core of the green transition is to integrate carbon neutral circular economy solutions and actions in business strategies and plans.

Circular economy provides a win-win situation from both an economic and an environmental point of view.

Bio is part of the solution

Various bio-based materials and methods in ore processing, wastewater treatment, production of metals and some applications like batteries provide another possible route to a more sustainable industry.

Bio-based (bacteria, microalgae, fungi, proteins, etc.) laboratory-developed solutions used in the exploitation of rare earth elements, magnesium and platinum group metals are ready for industrial use. These biomining processes are proven to reach high recovery yields (≥90%) and selectivity (>95%) and be environmentally safe and cost-efficient. Sometimes they even allow elements inaccessible by conventional mining methods to be extracted.

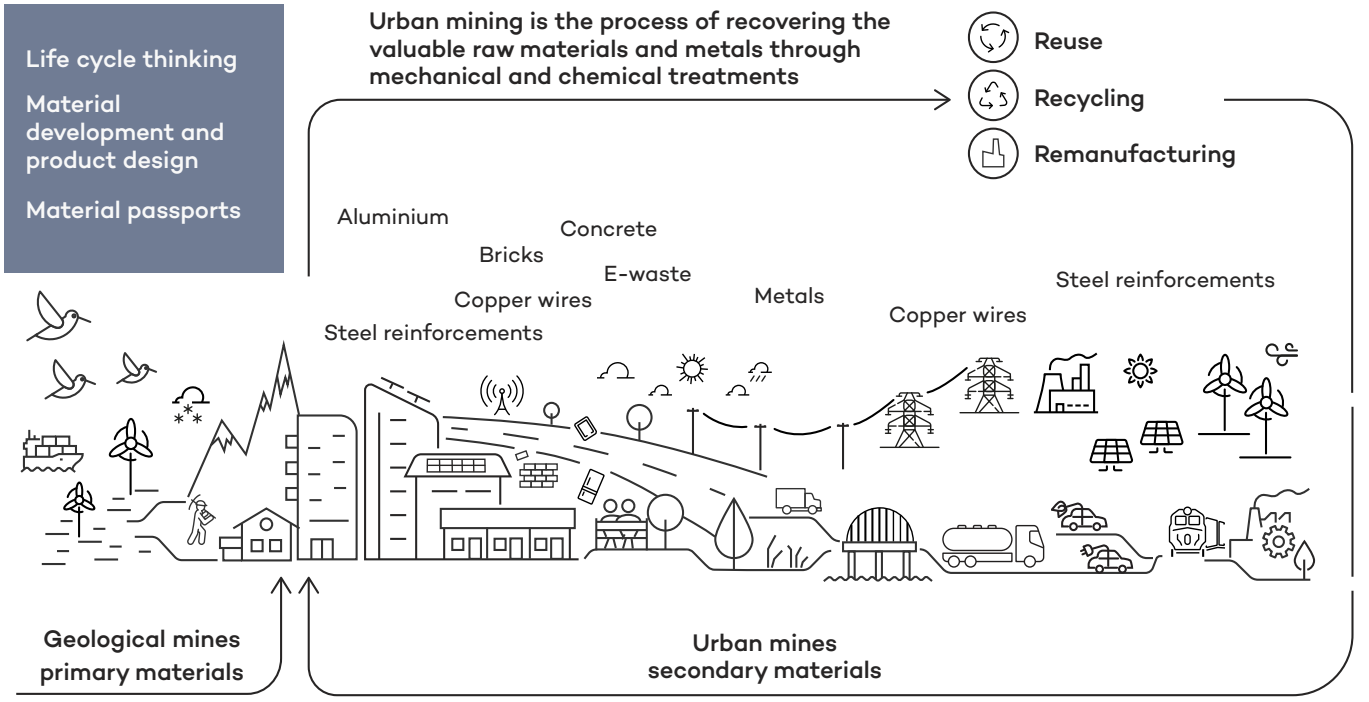
As the energy transition gains pace, there are bio-based solutions that could help traditional metallurgical methods to achieve a better environmental performance.

Biocoal could be used in the iron ore sintering process, it could also partially substitute coking coal in coking blends and pulverised coal injections into blast furnaces. Biocoal may also be used as charge carbon and biochar as a foaming agent in electric arc furnaces. A combination of these solutions could reduce up to 25% of fossil-based CO_2 emissions.

A myriad of approaches is required

Scientists and engineers are working on various bio-based techniques for further applications, e.g. batteries manufacturing. There are, for example, multiple applications for lignin: lignin-based anodes for lithium-ion and sodium-ion batteries, lignin-based organic expanders for lead batteries, lignin-based bio-solvents to replace toxic dipolar aprotic solvents, such as NMP, lignin-based vanillin as electrolyte in redox-flow batteries and many more.

There are some constraints and limitations associated with each of the above routes and particular solutions, but a careful selection of initiatives could lift environmental performance of companies along the mining and metals value chains, thus leading to a fundamental sustainability transition in the whole industry.



Overcoming uncertainties

"If there's one thing that's certain in business, it's uncertainty." Stephen Covey

In this world of constant economic and financial crisis, leaders must respond quickly to the rapidly changing environment and be prepared to steer their organisations through all the uncertainties ahead. Managing uncertainty is an ongoing process that requires adaptability, vigilance and continuous improvement, mastering it is an essential tool for survival. To thrive amidst all the uncertainty, an organisation should focus on resilience and agility.

But what characterises a resilient organisation after all? A resilient organisation is aware of its key stakeholders and the environment in which it operates. It has a deep understanding of its key vulnerabilities and the impact these vulnerabilities can have on its operations and financial results. Think of teams that are facing knowledge constraints in new projects or a high dependency on raw material shipments from overseas. Another quality of resilience is the ability to adapt to changing situations with new and innovative solutions, and doing so fast. An organisation with increased resilience is able to quickly identify and respond to any situation that has potentially negative consequences, finding ways to minimise detrimental consequences. They do not have to be perfect or overengineered, just an appropriate and fast response without delay. Fine-tuning and adjustments are of secondary priority. Resilience enables companies to see fruitful business opportunities in even the most challenging circumstances, enabling them to move forward even in times of adversity.

The importance of management structures to succeed

In times of uncertainty, management structures and processes must adapt to the challenges that arise and enable accelerated response cycles. Historically well-established management processes are not designed for this job. We are used to negotiating budgets and setting targets on an annual basis and leaders work towards achieving them with more or less regular feedback rounds that usually do not impact the budgeting. However, in times of uncertainty, iterative and fast-paced improvement processes are required. Instead of long processes, a quick diagnosis should be carried out in the respective business areas, taking current circumstances into account and adapting the operating model to address the issues. Understanding the need for urgency and necessary fast reactions trumps sophisticated and lengthy business planning, while we have to keep the drive for perfect solutions at bay.

The role of communication

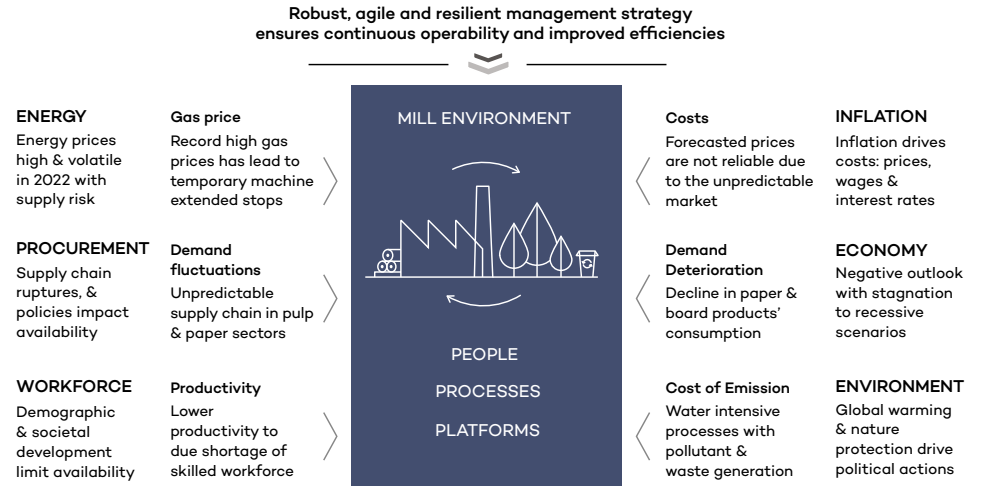
Crises come in varying degrees of intensity, but, however great their magnitude, what they all have in common is that communication is crucial to maintaining employees' trust and confidence in the organisation. Communication plays a key role in ensuring that employees feel informed, supported and engaged. It helps manage expectations, dispel rumors, build trust and create a positive working environment that enables employees to adapt and thrive.

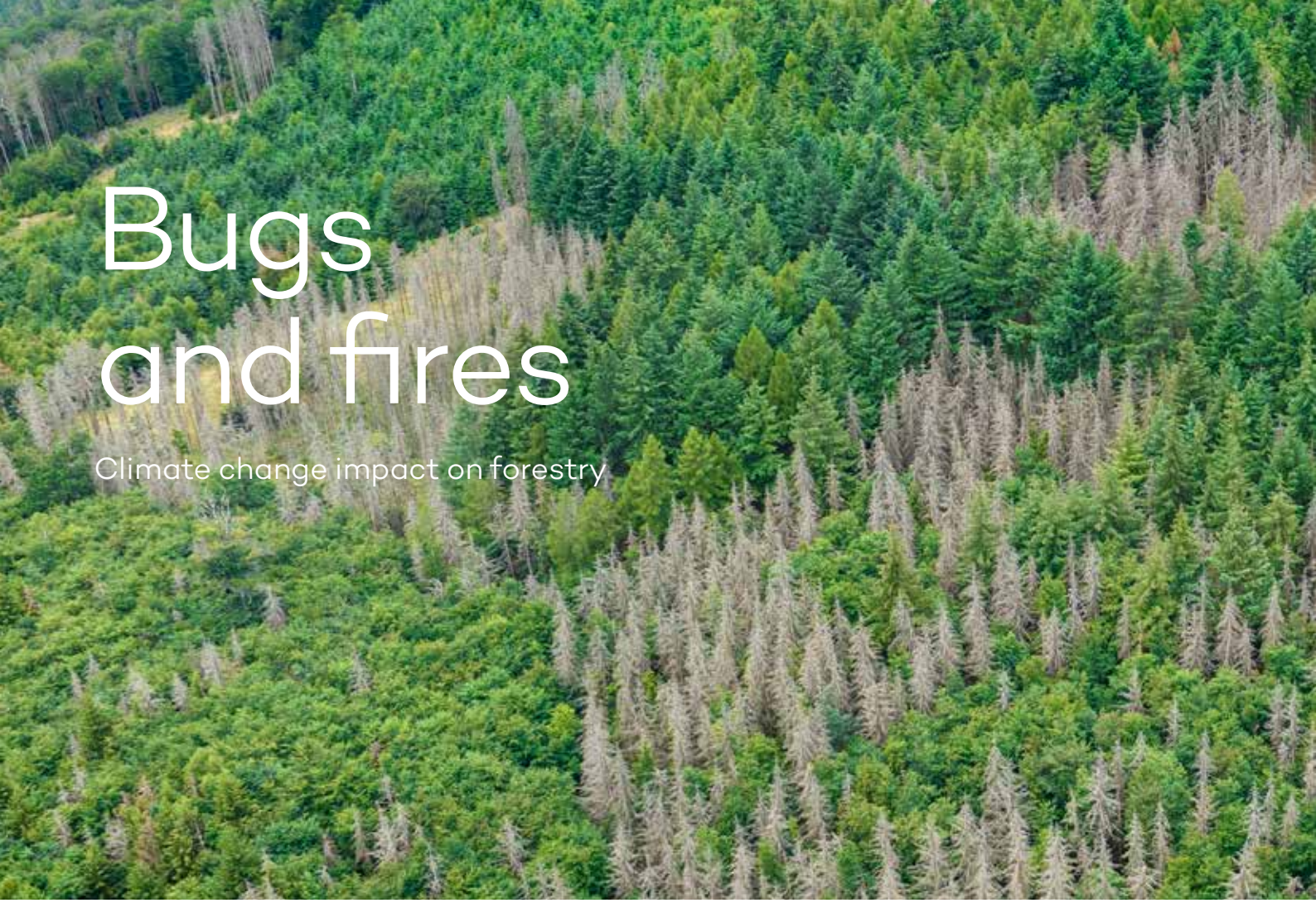
Focus on factors the organisation can control

While companies have very little leverage on volatile energy markets and disrupted supply chains, there are a number of areas that offer almost full control and they are fundamental for creating a clear vision for a successful future. A good starting point is to create a flexible, lean organisation with a minimum of bureaucracy and decision-making driven by data rather than by mere assumptions.

Transparency throughout the production and SG&A processes, supported by digital tools providing real-time insights and analyses lead to significant performance improvements and foster agility. System automation helps increase shop-floor transparency with the information being made available on the levels where value is created, whether it is production, improving energy efficiency, supply chain or maintenance. Direct accountability for reactive decisions will follow, by empowered and engaged employees, and pave the way for forward-looking proactive measures and improved performance.

While we commonly experience double-digit performance gains in our projects with EBITDA impacts up to 12%, well-guided information system support is the "turbo mode" to achieving them. Rigor in quality control processes will help reduce reworking and material waste as a cost-reduction element, but also as a pillar for environmental sustainability. And, of course, practice makes perfect – a culture that is used to regularly evaluating performance against a set of iterative targets as better odds at defying the diverse uncertainties. By implementing a combination of these strategies, organisations can significantly improve performance, increase profitability and reduce their environmental footprint. At the same time as being a lever for reduced environmental footprint, raw-material consumption and energy, efficiency helps organisations remain resilient through uncertain times.





Bugs and fires

Climate change impact on forestry

As we embark on the route to net zero, forests and forestry science have been at the centre of the discussion. Whether we are discussing reducing deforestation of nativeforests, growing forest areas through afforestation and reforestation projects or increasing the usage of wood-based products in substitution of more carbon-intensive materials, mentions of forests are everywhere.

The relationship between forests and climate change is a two-way street. On one hand, forests act as CO_2 storage, removing carbon from the atmosphere that would otherwise contribute to global warming. On the other hand, climate change is impacting the distribution, health and growth of forests around the globe. Forests' importance goes beyond their climate contribution as they also provide other ecosystem services related to biodiversity, soil and water, and generate renewable resources that are key for our transition to net zero. Thus, understanding the potential impact of climate change on them is crucial.

According to the IPCC, in the Special Report on Climate Change and Land (2019), changes in the climate will have positive and negative impacts on forests depending on their location and characteristics. The effects of the climate on forests can be divided into two categories. One category relates to basic climatic variables such as temperature, precipitation and carbon concentration, among others. The second category relates to how these and other variables interact, producing extreme events such as prolonged droughts, floods, storms, fires et cetera.

Such changes in conditions do not only impact forests directly but also decrease forests' resilience to pests and diseases and ease the spread of invasive species. For instance, prolonged droughts and fires followed by major pest outbreaks are becoming more and more common, as seen in Europe (spruce beetle), Canada (pine beetle) and Brazil (eucalyptus bronze bug). The IPCC forecasts outbreaks of pests and diseases with a much shorter recurrence period.

If we examine the World Climate Bank's data on the impact of precipitation and temperature variation based on a temperature increase of 2.6°C by 2100 ('Middle-of-the-road' scenario) we see positive and negative impacts. Southern Europe, especially Spain, Portugal and Italy, are likely to be negatively impacted by a decrease in rainfalls and an increase in temperatures. At the same time, the Nordics are likely to benefit, with an increase in rainfall and a prolonged growing season. It is important to highlight that these impacts should not be considered on their own, as isolated events, but together with several other factors.

Changes like the ones highlighted here are happening everywhere. AFRY has been advising several clients on how to assess, quantify and mitigate risks. Such assessments can focus either on natural forests and their impact on biodiversity, rural communities and resilience or on commercial forests and their impact on wood sourcing, costs and competitiveness. The table shown highlights the key aspects and questions for each situation.

Jack Lonsdale
Guilherme Simon

AFRY has recently been working with Stora Enso in understanding climate risks in its forest operations. Johan Carlsson, SVP Group Strategy & Business Intelligence at Stora Enso, had the following to say about this recent assessment:

Why is Stora Enso interested in assessing climate risks?
Stora Enso is one of the largest private forest owners in the world and one of the biggest consumers of wood and biomass globally.
As such, it is very important for us to gain the best possible understanding of the impact that global warming is likely to have on our forest assets, wood markets and wood supply going forward.

To be able to quantify the potential impact of different climate-change scenarios in both the short and long term helps us to assess risks, develop adaptation plans and make informed strategic choices.

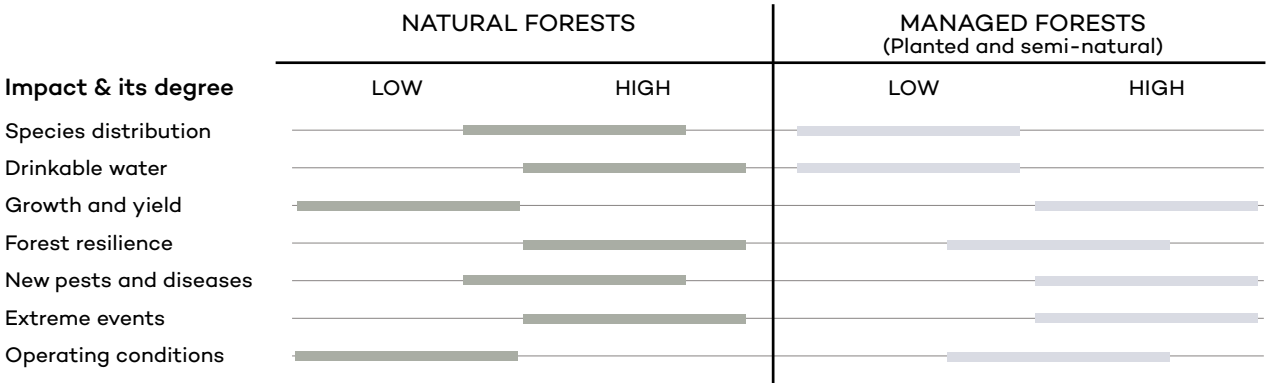
What are the most important insights in this area for Stora Enso?
Forest asset productivity and wood supply are likely to be negatively impacted in all scenarios of future climate change. However, there will be big differences in the drivers and the impact between assets, markets and locations, even when they are in relatively close geographical proximity to each other. Hence, it is important for us to understand the relative resilience of our assets and how the competitiveness of our operations is likely to develop over time. The insights also help us prioritise mitigation actions and develop adequate adaptation plans.

In addition to the impact on forest productivity, climate change will also change the forestry operation conditions in many geographies. According to IPCC, air temperature and relative humidity are expected to reduce physical work capacity in Latin America, West and Central Africa, India and Southeast Asia, restricting operational activities like planting and manual harvesting. In the northern hemisphere, in places like Canada and the Nordics, where frozen conditions are relied upon for harvest operations, a reduction in the harvesting season is likely to happen.

All these changes will impact not only forests but also agricultural value chains and the food production, increasing the competition for land. In this framework, forests are likely to suffer even more, and we need to address several important topics, for example:

- The impact on natural forests needs to be assessed with clear mitigation measures to preserve biodiversity and carbon storage and improve the livelihoods of indigenous and other rural communities.
- Semi-natural and plantation forests with the primary target of wood production will most likely explore new geographic frontiers. In this transition to new areas, ensuring the sustainability of projects regarding local communities, biodiversity and water balance is essential.
- Industries reliant on virgin wood supply need to understand what is changing, including the impact on different wood supply basins and then lead the transition through R&D considering costs and yield as well as the resilience of forests and operations.

Forests are among our most important solutions in solving climate change, and we need to ensure their growth and health in the long term while promoting sustainable usage of their resources. Governments, private companies, NGOs and the scientific community need to work together to address this complex topic. In this way, we can address climate change through and with forests.



Key questions

- What are the impacts on biodiversity and ecosystem resilience?
- Can forest species adapt?
- Are natural forests reducing or increasing carbon stock?
- What are the impacts on the livelihoods of communities?

- What are the impacts on growth and wood supply?
- What are the relative impacts on different companies and regions?
- How should industrial and forest assets adapt?
- What are the sustainability impacts?


ONE WAY
RUBICON

Silja Papinaho
Michael Riffel

Big Apple to Forbidden City

In today's interconnected world, organisations understand the importance of embracing diversity and cultural exchange in the workplace. AFRY stands at the forefront of this movement with its office transfer programme, allowing employees to relocate to different offices for a few months at a time. This programme not only helps employees expand their professional skills but also encourages them to explore new countries, work in diverse environments, and learn about different cultures. In this article, AFRY's consultants Silja Papinaho and Michael Riffel reflect on their time and experiences in this programme.

From the snowy landscapes of Helsinki to the towering skyscrapers of New York
The bustling streets of Manhattan, the towering skyscrapers, and the fast-paced lifestyle create an atmosphere like no other. Silja, a consultant in AFRY Management Consulting's Packaging and Tissue team, transferred from Finland to New York in the beginning of 2023.

"I chose my destination based on the opportunities I believed it could offer. I wanted to experience a different working culture and expand my skills and market know-how outside of Europe. North America met these criteria and seemed like a natural choice for me. I had travelled to New York before, and I knew that the city's hustle and bustle would be a great environment for me.

Before leaving, I was mentally prepared for the stereotypical American consulting firm culture, which, according to my prejudices, included extreme 15-hour working days in addition to working on weekends, but also a thriving social professional scene. Fortunately, only the latter was true. The working hours were reasonable, I was involved in extremely interesting projects and the local colleagues were so welcoming, helpful, and amazing in general that it was hard to leave all that behind when it was time to return.

AFRY's set of values is well present at the New York office as well as in Vantaa. The colleagues I have had the honour of working with are talented, bright-minded, and brave people who share the mindset of making an impact and striving for a better tomorrow. I was delighted to see colleagues from many different cultures and backgrounds working in the North American team and pleased to see that the bioindustry sector had also attracted so many female experts."

From scenic Bavaria to the heart of China and back
Beijing is a city where tradition and thousands of years old history meet a thriving, modern culture.

Michael, Senior Consultant in the Wood Products Team, had the privilege of staying for five months in China, right after the Zero-Covid policy was lifted.

"Since my team regularly receives client requests involving the Chinese surfacing and wood-based panels market, the office exchange offered a brilliant opportunity to understand the market better with my feet on the ground. Data available from statistics are limited and often contradictory, so it is necessary to talk to people locally in order to understand how to interpret them properly.

Having already spent more than one year in China in total previously, I knew roughly what to expect. However, the cities in China are changing so fast that even eight years after the last time I visited Beijing, some parts were new to me (as back then). When talking with friends or colleagues, the picture of a heavily polluted sky and city were still in their mind, but now the exact opposite was the case. Beijing presented a blue sky and many parks and recreation areas.

Probably one of the only aspects that had not changed was the supportive and open-minded attitude of the Chinese. This was plainly visible among the colleagues in Beijing, but also in Shanghai and Jinan. From day one, I was integrated into the team and welcomed, no matter whether it was in the energy or the bioindustry business unit.

With my colleagues, I went to visit multiple conferences and industry events. Since my Chinese skills are limited, they helped me translate, and, together, we managed to get valuable insights into the market dynamics."

Uniting and strengthening AFRY's working cultures
AFRY's Nordic roots have instilled a collaborative and inclusive work culture that transcends national borders and resonates with AFRY employees worldwide despite geographical and cultural distance. While the working environments in New York and China may differ, the underlying thread of AFRY's working culture, built on collaboration, integrity and excellence, remains consistent.

Through this programme, AFRY not only creates opportunities for personal and professional growth but also fosters a cohesive global community that thrives on diversity, shared values, and a collective pursuit of innovation and success. The programme enables mutual exchange of expertise and innovative concepts between the transferee and the transfer office, thereby enhancing the overall value derived for all.

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