Marsh

Decarbonizing for a competitive future:

Balancing sustainability and success in meeting energy demand

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Historically, the motivations for energy, power, and heavy industry companies to reduce energy consumption, enhance energy efficiency, and lower greenhouse gas (GHG) emissions have been primarily financial. For example, when energy costs were relatively low, opportunities for improvement were limited. This led to process industries concentrating on maximizing production and profitability, often resulting in increased energy consumption.

Globally, the situation continues to change significantly. Rising energy costs, the impacts of climate change, and pressure from consumers and governments have made decarbonization a top priority. However, an increasingly integrated and consolidated decarbonization landscape has implications for risk management and insurance. As organizations outline their decarbonization targets, they must consider the associated risks and opportunities.

Quantifying decarbonization risk and opportunity

Broadly, decarbonization can be achieved through several key stages:

1. **Conduct energy analysis.** Understand how, where, and how much energy is consumed.
2. **Reduce energy use.** End processes that do not add value to the business.
3. **Improve energy efficiency.** Ensure that energy is used efficiently.
4. **Utilize renewable energy.** Electrify processes where possible using wind and solar sources.
5. **Opt for low-emission energy.** Use hydrogen or natural gas where electrification is not possible.
6. **Use carbon offsets.** Offset or capture any residual emissions.

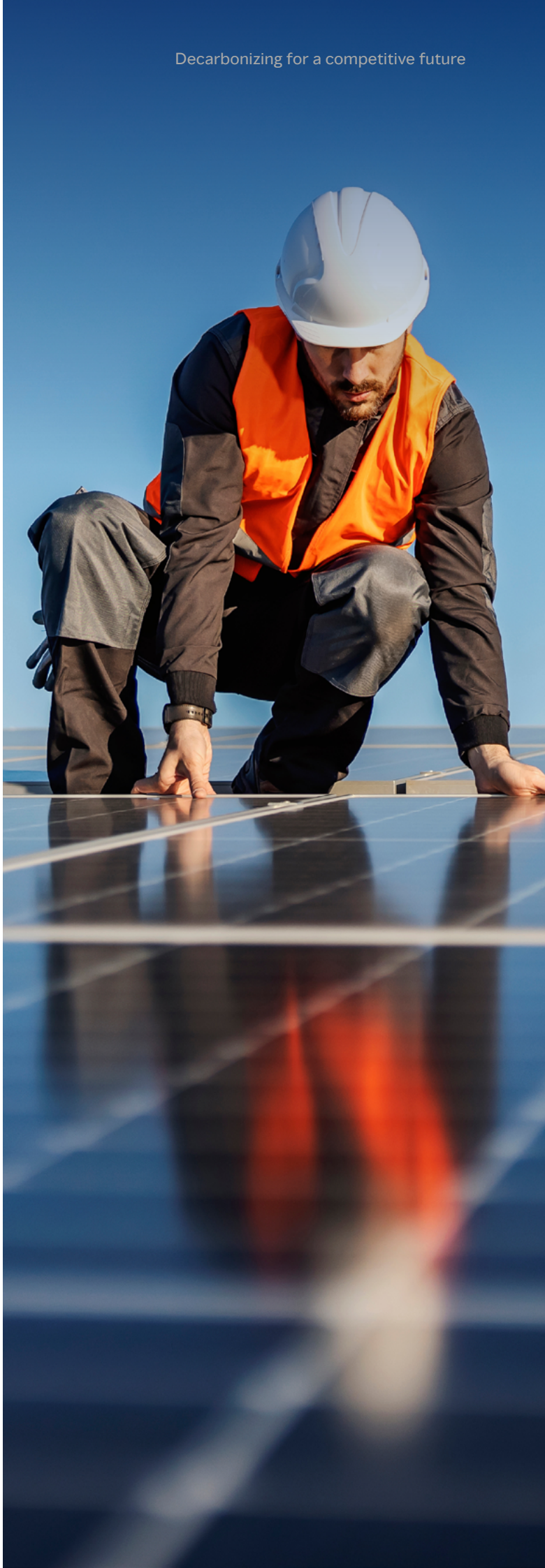
Over the past decade, the first three stages of decarbonization have been the most widely implemented. The energy, power, and heavy process industries now face the challenge of completing stages four to six while maintaining profitability and managing interdependencies across their supply chains.

Strategies such as carbon capture, utilization, and storage (CCUS), renewable energy integration, and the electrification of existing processes are gaining momentum and will reshape traditional business models. However, these strategies may also introduce new or elevate existing risks, such as business interruption if business operations are halted due to property damage.

Adding to this complexity, carbon credit systems, such as the European Union Emissions Trading Scheme (EU ETS), could impact insurance claims related to property and business interruption due to the complexities surrounding the valuation and utilization of carbon credits.

CCUS: Decarbonizing hydrocarbons

As efforts to decarbonize progress, CCUS is emerging as a key technology for reducing emissions in hydrocarbon-intensive industries. By capturing CO_2 at its source and either storing it underground or repurposing it in industrial processes, CCUS enables refineries, petrochemicals, and heavy industry manufacturing facilities to significantly reduce their carbon emissions.



Emissions trading schemes:

Potential impacts on insurance claims

Emissions trading schemes (ETS) create a marketplace for GHG emissions, including CO_2, nitrogen dioxide, methane, and perfluorinated compounds (PFCs). Facilities that emit these gases must balance their carbon dioxide equivalent emissions with "allowances," where one allowance permits the emission of one metric ton of CO_2 equivalent (tCO_2e). These allowances are allocated to organizations based on benchmarks and production history or purchased on carbon trading markets.

The objective of an emissions scheme is to improve energy efficiency and reduce emissions by assigning a cost to GHG emissions. By limiting the supply of allowances over time, the cost can increase, providing a financial incentive to decarbonize.

Under the EU ETS, allowances are called EU Allowances (EUAs). For much of the previous decade, the cost of an EUA was less than €20 per tCO_2e. However, since then, the average price of an EUA has risen above €60 per tCO_2e, peaking at €100 per tCO_2e in February 2023. This price increase has significantly affected business interruption exposures.

If business operations are halted due to property damage, the facility's CO_2e emissions may temporarily decrease during the equipment reinstatement period. However, this business interruption can lead to significant financial consequences.

Examples include:

1. **Lost revenue from excess allowances.** Efficient operations often generate surplus EUAs that can be sold for profit, but a disruption can impact this revenue stream.
2. **Dynamic allocation mechanisms.** Prolonged reductions in production can result in lower allocations in subsequent years under the EU ETS Phase 4 methodology, which uses auctioning and allocation to distribute allowances. This can increase the financial impact of a single loss.
3. **Complex business interruption claims.** Traditional business interruption coverage in property insurance policies may not fully contemplate the impacts of emissions trading, particularly the delayed impacts of reduced allocations and the fluctuating price of EUAs.
4. **Low property damage, high business interruption.** An insurable event that does not affect production throughput can still result in significant financial losses related to carbon credits. For example, damage to equipment essential for energy efficiency, emissions abatement, or CCUS operations may allow production to continue at normal levels but with higher emissions.
5. **Increased costs of compliance with new carbon emission regulations.** This may involve (re)optimizing process plant equipment and adjusting raw material acquisition to control emission variables within mandated limits.

Implications of carbon credit systems on business interruption

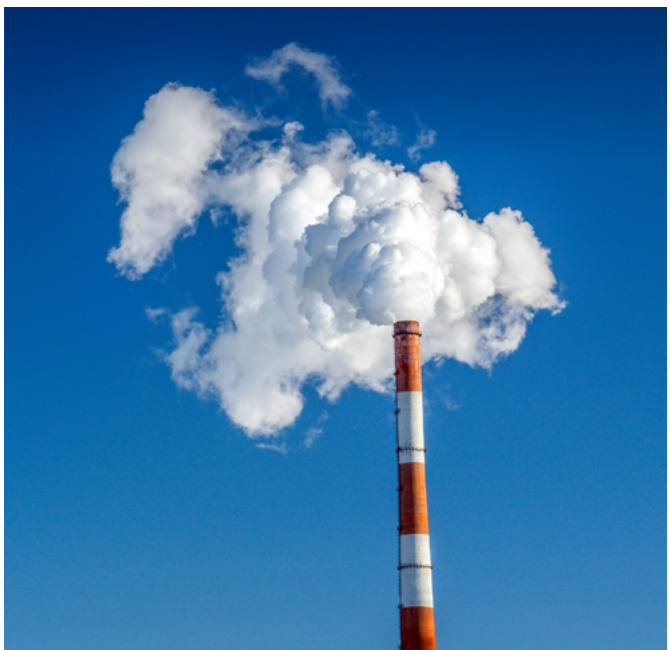
The EU ETS highlights some of the complexities of carbon credit systems in relation to business interruption exposure. Under this cap-and-trade system, companies must monitor, report, and balance their EUAs annually to match their emissions. In the event of property damage, emissions reductions may temporarily lower EUA requirements, creating perceived savings. However, potential impacts include:

1. **Delayed allocation reductions.** If production rates drop significantly due to property damage, EUA allocations may decrease in subsequent years, creating long-tail financial impacts.
2. **Disputes over savings and losses.** Insurers may view reduced EUA purchases as savings, which could result in lower claim payments. Meanwhile, facilities may incur higher EUA costs to resume operations.

To address these complexities, tailored business interruption coverage to address emissions trading exposures is recommended.

Coverage features, where available, that may seek to address these exposures include:

- Tailored coverage extensions to address short-term and delayed impacts under emissions trading frameworks.
- Policies designed to align with the EU ETS's reconciliation timelines, offering additional limits for impacts lasting up to two years after operations resume.
- Additional sub-limits to cover unique exposures related to emissions trading.
- Simplified claims processes that compensate insureds for emissions-related impacts based on agreed pre-defined values.



Integration of renewable energy in process plants

Renewable energy sources, such as solar and wind, continue to propel environmental sustainability efforts by providing industrial power in place of traditional energy sources. In addition, renewable electricity is increasingly used in power-to-X technologies, such as power-to-hydrogen. These integrations reduce the carbon intensity of operations and diversify energy inputs, aligning with global sustainability goals.

Renewable energy integration is essential for decarbonization, but it also introduces risks and complexities, including:

1. **Geographic and climatic dependencies.** Certain renewable energy assets can be more vulnerable to weather-related risks than traditional energy infrastructure. For example, a solar farm supplying energy to a petrochemical plant may experience downtime during extreme weather events such as hailstorms or windstorms.
2. **Accumulation risks.** Process plants and renewable energy sources are increasingly co-located in industrial hubs to optimize resources. This consolidation heightens exposure to localized catastrophic natural events, which in turn may increase both business interruption and contingent business interruption risks. In addition, the introduction of new technologies to process plants, such as large-scale battery energy storage systems (BESS) and high-pressure gas storage required for power-to-gas technologies, adds new operational risks to manage.
3. **Supply chain disruptions.** Renewable energy interruptions can cascade across the supply chain, particularly if a critical supplier's operations are disrupted, leading to more widespread contingent business interruption claims. Some heavy industries, such as aluminum smelting, require a high level of reliable power to sustain operations and avoid maximum loss scenarios. Similarly, chemical process industries require dependable alternative power supplies to prevent damage during utility outages.

Electrification of existing process plants

Electrification entails replacing traditional energy systems, such as gas-fired boilers and heaters, with electric alternatives. By using renewable electricity, electrification can significantly reduce Scope 1 emissions.

As process industry facilities increasingly rely on electricity, risk management processes must adapt to address emerging exposures, including:

1. **Grid dependency.** Electrified operations depend on stable and resilient electrical grids. Power outages, bird strikes, cyberattacks on grid infrastructure, or supply shortages can disrupt operations.
2. **High-cost downtime.** Electrification often requires significant capital infrastructure investments. Damage to key components, such as high-voltage transformers or electrical substations, can lead to prolonged downtime and substantial repair costs.
3. **Heater design.** Electrifying process plants typically requires large-scale electric heaters to replace traditional gas-fired systems. These heaters must be carefully sized and designed to meet specific thermal demands. Sizing can be challenging due to variable process conditions, the lack of standardized designs for high-capacity electric heaters, and the need to integrate them into existing infrastructure.

Integration, consolidation, and risk accumulation

Process industries are increasingly consolidating their operations to achieve economies of scale and integrate decarbonization technologies. While this consolidation enhances efficiency, it can also amplify exposure to business interruption and contingent business interruption risks, such as:

1. **High-value asset concentration.** Co-locating CCUS facilities, renewable energy assets, and electrified process plants may create single points of failure. A fire, flood, or cyberattack in an industrial hub could disrupt multiple interconnected operations simultaneously.

2. **Supply chain vulnerabilities.** Consolidation increases interdependencies across supply chains. A disruption at a CCUS facility may affect downstream users of captured CO_2, such as enhanced oil recovery projects or chemical or food and beverage manufacturers, leading to more extensive contingent business interruption claims.

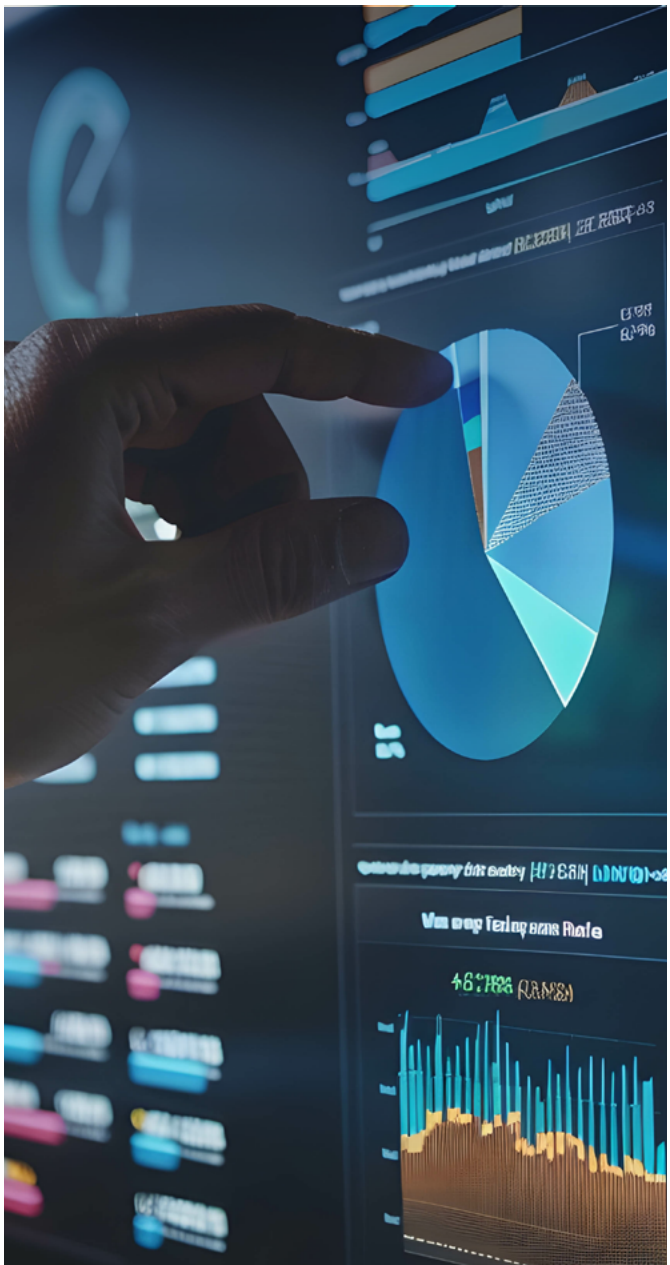
Proactive risk management strategies are essential to address these heightened risks. Mapping business interruption dependencies across facilities, suppliers, and critical infrastructure is important for identifying single points of failure and implementing redundancies. Regulatory frameworks can also incentivize investments in resilience, such as distributed systems and diversified energy sources.

Tailored coverage solutions, including enhanced business interruption and contingent business interruption coverages, can provide financial protection against complex risks. Organizations should consider seeking policies that include coverage for emissions trading exposures, supply chain interdependencies, and extended recovery periods. Additionally, adopting advanced risk modeling tools and engaging in cross-industry collaboration can help stakeholders anticipate and mitigate cascading risks, promoting operational continuity and financial stability in an increasingly interconnected industrial ecosystem.

Developing robust risk management strategies

Decarbonization is a strategic imperative for ensuring long-term competitiveness in the process industries. Strategies such as CCUS, ETS, renewable energy integration, and electrification can help companies achieve sustainability goals while meeting global energy demands. However, these innovations introduce new risks, particularly within an integrated and consolidated industry landscape.

To navigate this evolving risk environment, industry leaders and insurers must collaborate on tailored risk management solutions that address the complexities of carbon credit systems, business interruption claims, and contingent business interruption exposures. By embracing innovation and fostering resilience, the energy and power process industries can lead the transition to a sustainable future while safeguarding their operational and financial stability.



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