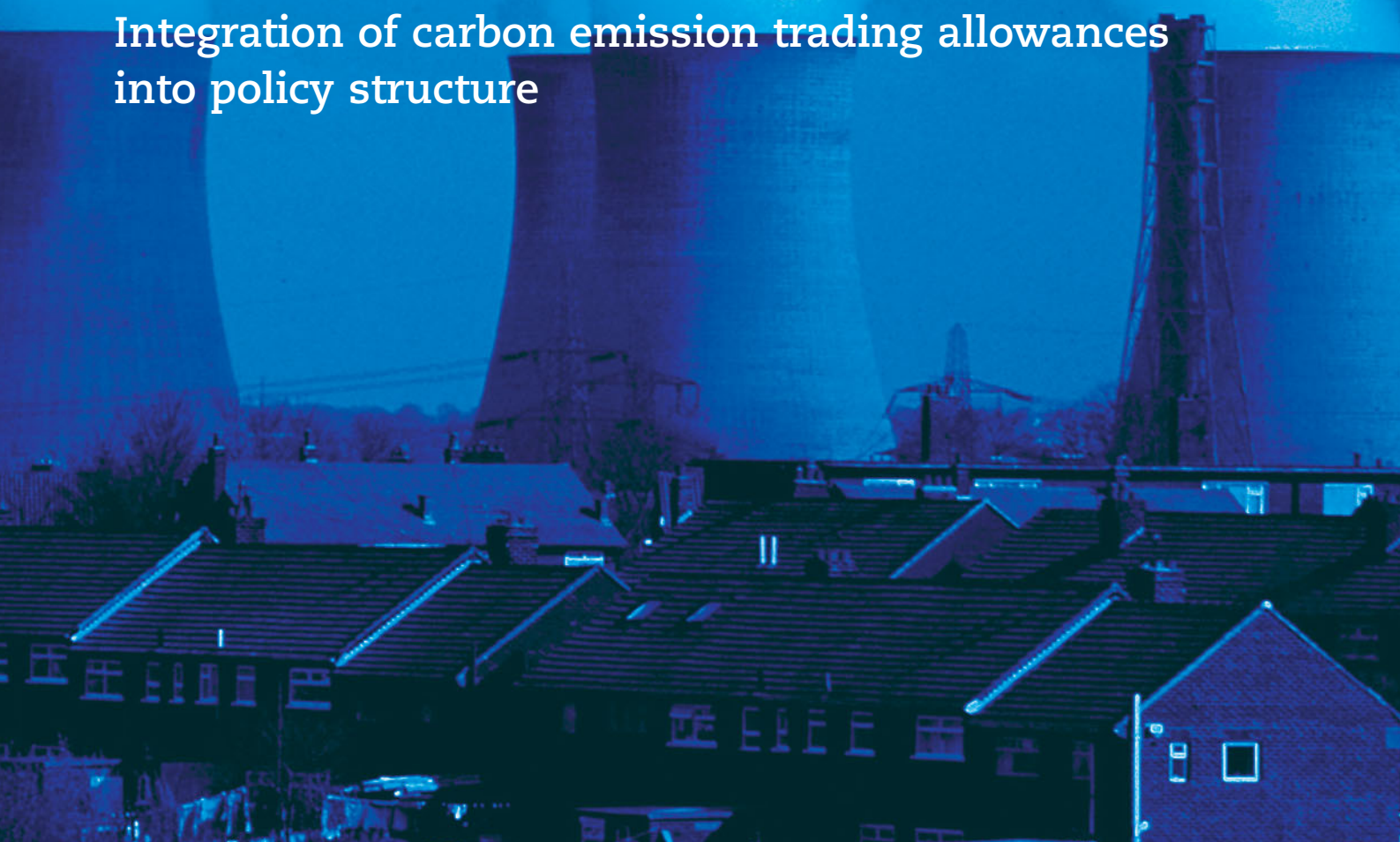
MARSH

Remodelling business interruption insurance in the power sector

Integration of carbon emission trading allowances into policy structure



Key points

- A significant new risk area has been created by the volatility of carbon allowance price under the EU emission trading scheme.
- The impact of plant outages on carbon emissions can result in revenue gains or losses dependant upon corporate response strategy.
- Business interruption insurance could be used to protect profit at risk from emissions trading in the event of plant failure and/or reflect its asset potential with lower sum insured values to reduce policy premium.
- Risk managers that can successfully demonstrate to underwriters the size and vulnerability of their company's exposure to carbon risk are better placed to potentially access an effective risk management solution to hedge this new exposure.

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Key elements of the EU emission trading scheme

The European Union Emission Trading Scheme (ETS) commenced in January 2005 and aims to constrain greenhouse gas emissions from the EU 25, the most important of which is carbon dioxide (CO2), in line with greenhouse gas reduction commitments under the Kyoto protocol.

The scheme operates via a cap and trade mechanism and in its first phase (2005-2007) covers around 12,000 installations from energy and energy intensive sectors including power generation, steel and cement manufacture, oil refineries, as well as any companies with significant onsite thermal generation capacity. Phase 2 of the scheme coincides with the first Kyoto commitment period, 2008-2012, and will probably include other sectors such as aviation and chemicals and possibly additional gases as well.

CO2 emission targets are imposed at a country level via an aggregate emission cap set out in each country's National Allocation Plan. Eligible installations are then allocated a specific number of permits or allowances (one allowance unit entitles the holder the right to emit one tonne of CO2 per year) based largely on their historic emission levels. In the schemes first phase this will amount to at least 95% of emissions, dropping to 90% in the second phase in 2008.

As part of compliance with their annual permits to emit companies must submit an independently validated report detailing their emissions each year and surrender allowances equivalent to their emission levels. This is important as financial penalties of €40 in phase 1 and €100 in phase 2 are applied for every tonne over their threshold a company exceeds plus they have to make good the deficit in the following year.

Firms have several options in how they balance emissions with their allowance allocation. They can buy surplus allowances direct from other scheme participants or via exchanges and brokers, invest in emission reduction technology or generate allowances via Kyoto project mechanisms such as the Clean Development Mechanism (CDM) and Joint Implementation (JI). These allow developed countries to acquire carbon credits by investing in emissions-reducing projects in developing and other emission capped industrialised nations respectively.

Companies that have an excess of credits liberated from such reduction activities or generous country allocation can sell them to earn revenue or alternatively bank them for future use or transfer them to other installations in the group as necessary. All allowance exchanges are tracked and monitored on a national and European level by electronic registry systems to prevent abuse and double counting.

Effect of carbon trading on risk profile

The price of carbon emission allowance units under the EU ETS has risen dramatically since the schemes launch in January 2005, moving from a price of around €7/unit at commencement to almost €30/unit in July.

This volatility can have considerable impacts on corporate profitability (in addition to balance sheet effects) at firms who are heavy carbon emitters if emission levels surpass the allowances allocated to the company under the scheme, requiring extra allowances to be purchased in the open market for compliance. Conversely, this volatility also means that companies holding a surplus of allowances due to emission reduction efforts and/or generous country allocation can create a substantial new revenue stream with prudent trading.

The significance of carbon allowance price on operating profit coupled with its behaviour as both potential asset and liability means that companies should evaluate whether to factor this new risk area into their business interruption insurance in the event of a plant outage as a result of an insured loss.

An outage will usually result in an increase or decrease in carbon emission levels depending on the company's response to the outage. Response strategy will be influenced by many factors such as contractual supply obligations, forecast length of outage, availability of spare capacity within the group and prevailing market conditions i.e. power and fuel prices. Trading position and third party agreements such as swaps and replacement power provisions will additionally shape the response.

For example, supply deficits can be met by switching generation to alternative plant with spare capacity within the group or purchasing replacement power from competitors, but these alternative supply sources may be more or less efficient per MWh from an emissions perspective and this will have direct or indirect ramifications on cost. Contingent fuel supply problems, or failure of plant to burn a specific fuel mix will also impact emission volume. Coal produces approximately twice as much carbon as gas so fuel switching could have dramatic effects on emission levels. Similarly, failure of abatement technology due to machinery breakdown in fuel pre-treatment (coal) or (planned) carbon capture equipment may also cause large emission spikes if the plant continues operation regardless.

Subject to the net effect on emissions the outage response provokes, companies may find themselves with either a contingent deficit of allowances that will need to be made up via the open market, or an allowance surplus that can be transferred internally, used as part payment to replacement power providers, banked or sold.

The projected net effects on emission levels in the event of an outage will therefore need to be quantified in monetary terms and incorporated into the overall cost calculations made when determining the economic feasibility of responses to the outage, as above an allowance threshold price the added cost or value of carbon could prove to be the critical factor in governing how the company reacts.

The example in the table overleaf illustrates how the status of carbon as both a potential asset and a potential liability, coupled with allowance price volatility can influence response strategy in a hypothetical scenario. The scenario assumes that sufficient spare capacity is available in a group's generational portfolio to make up contractual supply deficits if one plant suffers an outage event.

Impacts of carbon allowance price on operating profit in the event of a plant outage.

Station - CO2 Price 1	A Coal	B Gas	A Coal	B Gas	A Coal	B Gas
Size (MW)	800	800	800	800	800	800
LF (%)	50	50	0	100	100	0
Power Market Price (€/MWh)	**50**	**50**	**50**	**50**	**50**	**50**
Gen Cost (€/MWh):	**40**	**44.5**	**40**	**44.5**	**40**	**44.5**
■ Fuel	25	35	25	35	25	35
■ Carbon (@10€/allowance)	10	5	10	5 (surplus 5)	10 (deficit 5)	5
■ Transmission	3	3	3	3	3	3
■ Other	2	1.5	2	1.5	2	1.5
Operating Profit (€/MWh)	10	5.5	10	5.5 (Total 11)	10 (Total 20)	5.5
Total Operating Profit (€/MWh)	**15.5**			**16 (11 + 5)**	**15 (20 - 5)**	

Station - CO2 Price 2	A Coal	B Gas	A Coal	B Gas	A Coal	B Gas
Size (MW)	800	800	800	800	800	800
LF (%)	50	50	0	100	100	0
Power Market Price (€/MWh):	**55**	**55**	**55**	**55**	**55**	**55**
Gen Cost (€/MWh)	**50**	**49.5**	**50**	**49.5**	**50**	**49.5**
■ Fuel	25	35	25	35	25	35
■ Carbon (@20€/allowance)	20	10	20	10 (surplus 10)	20 (deficit 10)	10
■ Transmission	3	3	3	3	3	3
■ Other	2	1.5	2	1.5	2	1.5
Operating Profit (€/MWh)	5	5.5	5	5.5 (Total 11)	5 (Total 10)	5.5
Total Operating Profit (€/MWh)	**10.5**			**21 (11 + 10)**	**0 (10 - 10)**	

A power generation company operates two installations A and B of equal size and station load factor. Station A is coal fired, Station B is a modern CCGT plant. The coal fired plant produces twice as much carbon emissions per MWh as the gas requiring a greater number of allowances to mitigate and is less efficient in terms of net heating value efficiency, but these extra costs of generation are offset by the lower price of coal. Transmission charges are the same at both plants.

In this simplified model, at carbon allowance price 1 the lower price of the coal results in higher operational profit at plant A. In the event of an outage at A the supply deficit can be made up by increasing generation load factor at B. This will lead to a slight increase in total operating profit (total profit) as although plant B operates at a lower margin this drop is compensated by the surplus carbon allowances that are left over after transfer of those needed to mitigate the increased emission levels at B.

Conversely, an outage at plant B will lead to a slight decrease in total profit as although A enjoys higher margins at this fuel price there will be a deficit of allowances (that need to be acquired) as those transferred from B will not be enough to cover the extra emissions due to power replacement from A.

At the higher carbon allowance price 2, power price per MWh is raised equivalent to a 50% pass through of costs to the customer due to the allowance increase, but the total profit is obviously still lower to reflect this added cost of generation. Under these circumstances an outage at plant A will yield a large increase in total profit, reflecting the much greater value of the allowances liberated due to lower carbon emissions arising from replacement power production at plant B. In contrast, meeting supply deficit demands with plant A due to an outage at B will lead to a significant loss of total profit as the extra allowances needed to balance emissions will reduce margins to zero.

This scenario is a simplified example of just one choice companies may have in the event of an outage. Most power generators do not have large excesses of spare capacity sitting idle as this is inefficient and expensive. In addition, transmission charging can vary greatly depending on the geographical location of installed capacity, which may also adversely influence logistics costs for extra fuel delivery, assuming this is available and at a viable price. This aside, many firms do reserve some spare capacity or specific plant for rapid response services to system imbalances and other peak power price opportunities, and could deploy this partially or fully to meet contractual demands in the event of an outage if economically viable vs. competitor or open market sourcing.

If supply replacement from alternative internal capacity is not an option, such as is the case for many Independent Power Producers (IPPs), generators should consider how the unused carbon allowances allocated to the plant suffering the outage are used in financing replacement power from external suppliers. In simple terms the choice will either be to transfer the allowances as part payment to the replacement provider, sell them to earn revenue and offset this cost directly, or do not factor this asset into the replacement transaction and keep them for future use/sale. The decision will largely depend on the trading strategy employed and future projections in allowance pricing, as well as replacement power agreements and the treatment of allowances by replacement providers.

Implications for business interruption insurance

The decision whether to include carbon in BI gross profit[1] indemnity coverage therefore needs to be placed in the context of the company's planned response strategy to an outage at each major installation and how this will affect the operating profit (net profit) sum insured at individual plant and portfolio level, increased and additional increased cost of working limits.

Carbon allowances could directly reduce the actual indemnity limits needed at an installation if the intended response does not involve transfer of allowances, as the allowances allocated to that installation can be sold to offset the loss.

[1] Please note that the term 'gross profit' when used outside the insurance industry usually refers to the sale price of a product minus its cost of production. In this instance gross profit refers to the operating profit and fixed cost values that together provide the basis for calculating the sum insured in business interruption insurance.

If however alternative supply is needed due to contractual demands, this may result in either extra allowances being required or a surplus created. If extra allowances are needed as a result of plant inefficiency or higher emission fuel being used, then this added cost could be provided within increased cost of working cover over and above those allowances transferred from the installation affected by the outage. If production is moved to higher efficiency plant then the allowances saved can be sold to offset any other increased cost of working expense e.g. logistics or more costly fuel, or the cost of paying a competitor to make up any deficit in supply.

Further, if allowance prices rise above economically justified measures to reduce the consequential loss of the interruption, then additional increased cost of working cover could be agreed for these expenses under a separate sum insured.

Finally, how operating profit is indemnified under the policy will also need clarification. In the example described in the table, an interruption event at plant A at carbon price 1 will result in a small increase in total profit. However, policy treatment may or may not deem this a loss of €10/MWh if loss adjustment is made on a single plant basis and not taken in the context of the overall effect on portfolio total profit. To avoid any dispute this should be agreed upfront in contract negotiation.

Insurers recognise these potential effects on indemnity and loss adjustment but there are still many questions from an underwriting standpoint that need to be addressed:

- When should sale/purchase of allowances be transacted i.e. during/after outage or prior to compliance surrender date?
- What is the correct sub-limit and sum insured for increased and additional increased cost of working cover?
- Should title of allowances be transferred to the insurer? Some reinsurers have intimated that they may be willing to engage in such carbon trading transactions.
- When will valid payment to the insured be made? i.e. the BI policy claim may not be resolved until after required allowance surrender date so working capital could be impacted
- What is the total consequential loss?

Successfully underwriting BI with provisions for carbon costs built in will consequently require insurers to understand the planned business continuity response strategy to outages at all major plant within the group's portfolio as well as the size of the potential carbon assets or liabilities at stake under this strategy.

Once this is quantified agreement will need to be reached on how the coverage is structured in terms of adjusted levels of indemnity, aggregate caps and sub limits, timing of purchase or sale of extra carbon allowances as required i.e. during outage or at surrender, who will be responsible for transacting the trades and whether title be transferred.

Underwriters are unlikely to take on any allowance price risk as hedging this area naturally falls within the remit and expertise of a company's power trading desk. However, this can partially be mitigated indirectly by insurance via the capping of liability in the limits of increased or additional increased cost of working cover for extra allowance purchase, this being at the discretion of the client to agree a suitable level based on pricing terms.

Similarly, the client and insurer should decide how sums insured and losses are offset when an allowance surplus arises from an outage. Is it desirable to lower the sum insured to reflect the carbon asset and thus pay a lower policy premium, or exclude carbon from the coverage and continue with current provisions? The answer will likely depend on carbon trading and hedging positions held by the firm compared with the premium saving (if available) on offer, the pricing volatility again being effectively capped by the agreed sum insured. In this respect risk managers will need to liaise with their trading departments to determine the economic validity of including this risk in coverage.

In summary the significance of carbon cost warrants investigation into insurance risk management strategy. Plant outages can result in both contingent revenue gains and losses, and this can potentially be transferred and mitigated by integration into BI insurance. Risk managers should review existing BI provisions with respect to their company's exposure to carbon costs in the context of group trading strategy and business continuity response to an outage. Finally, this is a new and important risk area so it is important that risk managers and finance directors work with their broker and insurer to understand and review the parameters upon which BI coverage is based in view of evolving carbon exposures and restructure policy terms and conditions as required.

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