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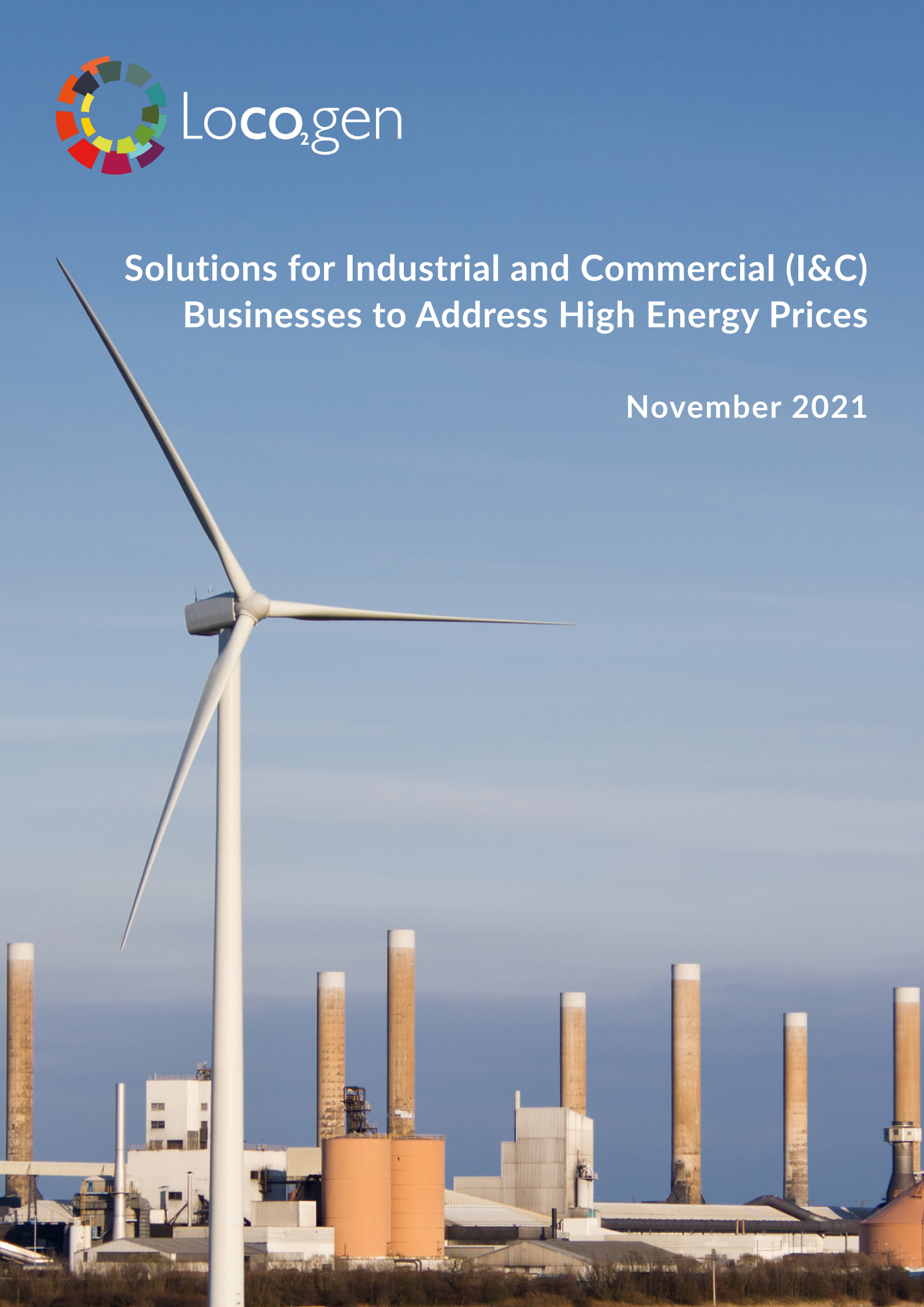
Solutions for Industrial and Commercial (I&C) Businesses to Address High Energy Prices

November 2021



Executive Summary

Over the last 12 months energy prices have risen sharply reaching a level, in recent months, that has been widely termed an 'energy crisis'. Businesses in the Industrial and Commercial (I&C) sector not only need to address the short term implications but also be prepared for sustained future turbulence in the UK energy market over the longer term. The constrained state of the current national grid together with its need to support massively increased capacity over the next 20 years to achieve net zero targets mean electricity prices are likely to face continued upward pressure. This issue is worthy of board-level monitoring as part of the standard risk review process of most businesses.

There are several strategies to mitigate this risk. Businesses can minimise their energy demand through a broad range of energy conservation measures. They can adopt longer-term supply contracts where pricing is based on long-term trends thereby offering greater protection from shorter-term price volatility. Most businesses should actively consider increasing their long-term energy security and surety of costs through options for self-generation, either physically or virtually. They can also develop competitive advantage by becoming more flexible in terms of their energy demand to create new revenue streams as a prosumer.

The opportunity for I&C businesses to invest into renewable energy technology is a 'win-win'. It will not only improve their long-term financial performance and resilience but also strengthen their environmental credentials, making a major contribution to their net zero ambitions. As energy markets become more unpredictable, government climate obligations become more onerous, decarbonisation obligations become more stringent due to business supply chain requirements, and consumer attitudes become more favourable towards planet-friendly products, the arguments for investment into business-level energy security gain ever stronger traction.

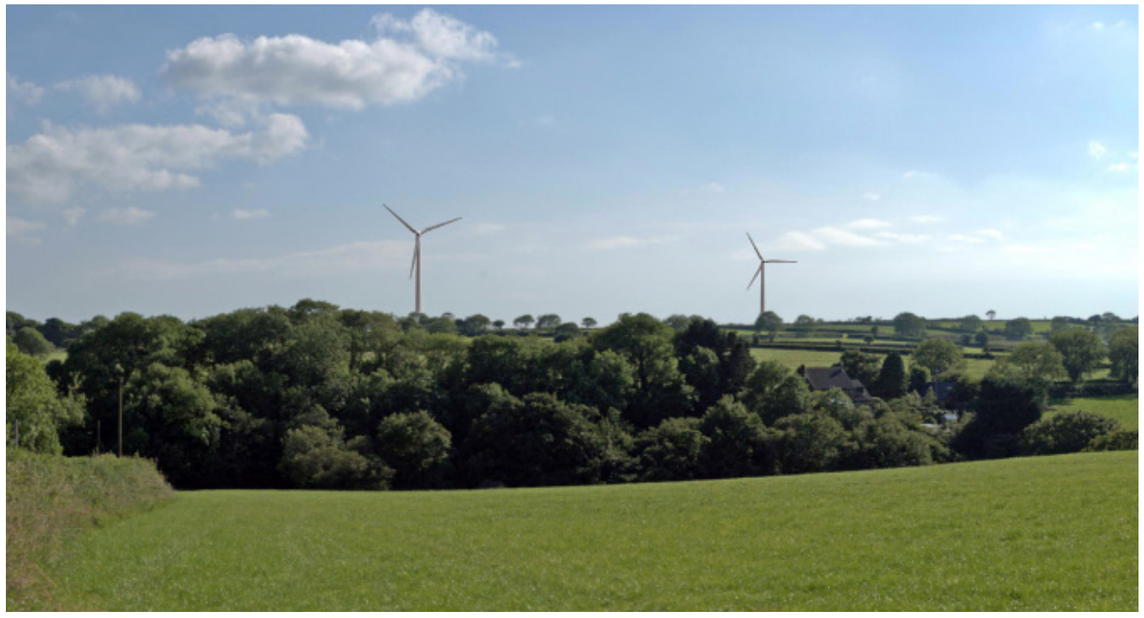


Image: Twin turbines installed with private wire connection to Princes Gate Spring Water headquarters

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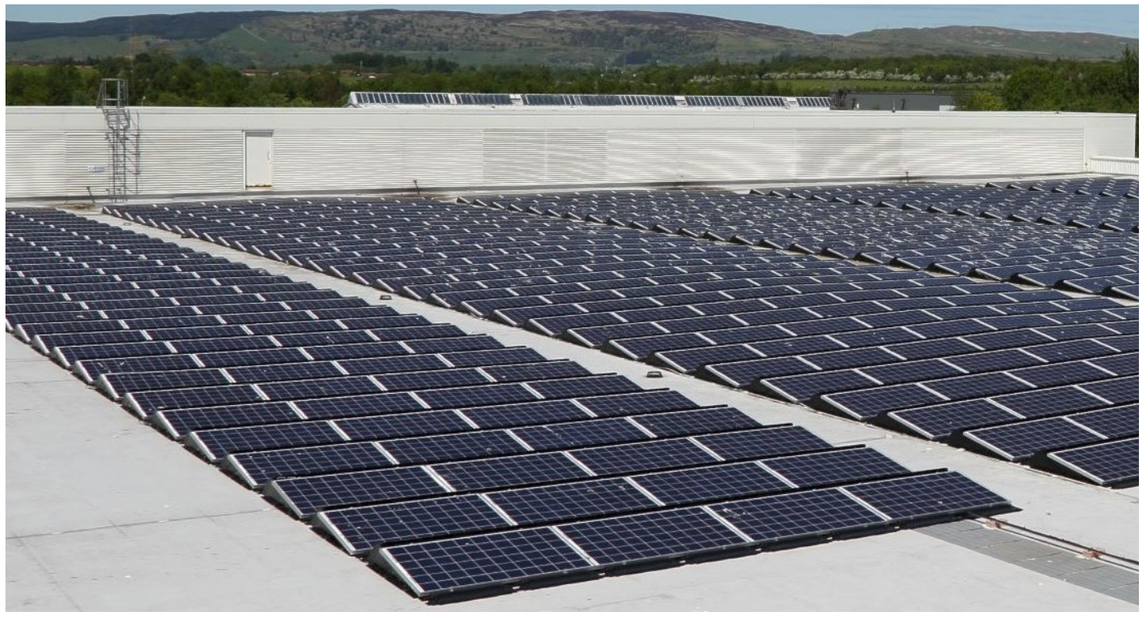
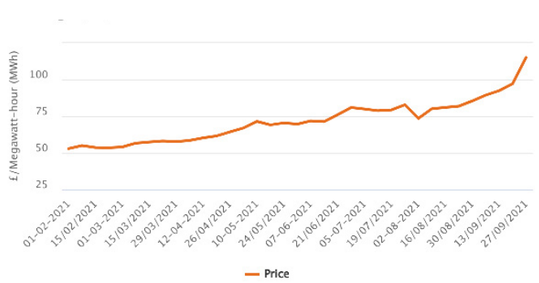


Image: Rooftop solar installed at M&Co (Mackays Stores)

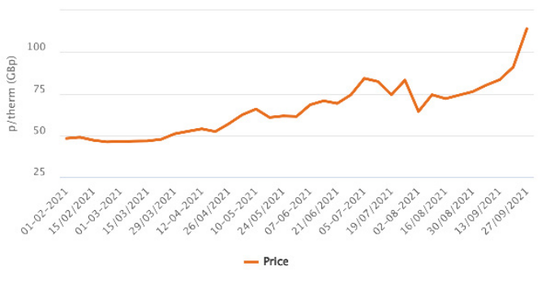
Many businesses in the Industrial and Commercial (I&C) sector are facing uncomfortable times when it comes to reviewing their current and future energy costs. Sharp rises in retail gas and electricity prices over recent weeks have triggered what has been termed 'an energy crisis' with increases already, in some cases, being passed through to customer bills. This is having a major detrimental impact on operating costs, particularly for those businesses with high energy loads. Indeed, some manufacturers have resorted to drastic action by pausing or limiting their production while others have reverted back to using diesel driven assets instead of their electrically driven alternatives.

The causes of this recent energy price spike have been attributed to a complex set of natural and man-made factors that are well documented in an International Energy Agency (IEA) report. A recent BloombergNEF blog post highlights the specific problems facing global gas supplies.

The Ofgem graphs below emphasize the significant surges in retail electricity and gas prices over recent weeks for UK customers. Prices in recent days have exceeded 200p/Therm for gas and £200/MWh for electricity.



UK Electricity Prices (Forward Delivery Contracts) – weekly average Feb – Oct 2021 Source: Ofgem



UK Natural Gas Prices (Forward Delivery Contracts) – weekly average Feb – Oct 2021 Source: Ofgem

How have energy prices been changing over recent years?

UK wholesale and retail energy prices over the last decade have seen a gradual upward trend albeit with some fluctuations. The price of electricity in the UK remains closely correlated to the price of gas, given our heavy dependency on gas to generate a significant proportion of our electricity. However, as we shift this dependency towards renewable sources for our electricity generation this correlation will weaken. Wholesale price variations generally have a direct impact on retail prices although there is often a lag factor as energy suppliers typically purchase energy to meet consumer demand in advance using gas and electricity forward contracts; in essence the current tariff levels offered to the consumer depend to a large degree on the price the supplier paid at the time they bought the energy to meet their demand.

Suppliers are currently being forced to buy energy at excessively inflated prices and naturally this cost is going to be passed on to consumers. With a government price cap on tariff rates for households, some energy suppliers may look to their business customers to address some of the shortfall. Many energy suppliers are under increasing pressure as wholesale exposure and cashflow impact can be so high that some have suspended offering their products to the market. The situation can lead to prices for new contracts jumping by significant amounts at the point of refresh to ensure retail prices 'catch up' with the current market.

While many businesses may currently be shielded from these fluctuations through longer-term energy pricing fixing contracts, others on more flexible arrangements are facing substantially higher bills together with the likelihood that prices won't fall significantly over the next 6-12 months.

Where are energy prices going in the future?

It is impossible to accurately predict patterns in energy prices. These will be impacted by a complex set of factors including weather conditions, in particular low wind or low temperature events. Demand for gas in the short to medium term is likely to stay strong, pushing up prices as international economies recover from the pandemic. Industry experts like IEA indicate energy prices are likely to continue to rise until the Spring of 2022 at which point they may flatten out and even decline although they are unlikely to return to levels seen pre-April 2021.

In view of the predicted significant growth in demand for electricity within the UK, together with the massive investment required over the next two decades to decarbonise and decentralise our national power grid, some analysts believe that retail energy prices will continue to remain significantly higher than the average over the last decade. It is almost inevitable that the costs of grid reinforcement works required to support more capacity will be passed on to consumers. Likewise, the situation for heat is similar as we seek to drastically cut our reliance on natural gas and move towards alternative low carbon heating solutions.

For businesses that could generate their own heat and/or electricity on-site or within the local area, energy self-sufficiency is the optimal route for cutting their costs significantly and ensuring they have full control over their energy costs long-term.

It is therefore likely that the future picture for energy prices is one of rising volatility as a result of a growing reliance on renewable generation and the impacts of government decarbonisation policies.

What should businesses do about their energy supply contracts?

For those businesses thinking about switching to an alternative energy deal at a lower tariff, the advice from most brokers, energy analysts and energy suppliers is to stay put, especially if they are on a longer-term fixed price tariff. Current market fluctuations mean that finding a better deal is highly unlikely.

However, as we move towards April 2022, there are some businesses with contracts coming to an untimely end. The advice here is not to wait until March to start discussions. It is adviseable to make contact with your broker or adviser now to review potential options. BIU, the energy and utility consultants, provide independent advice to businesses about their contract supply options. Their advice, detailed in their recent blog post, suggests I&C businesses should look at 3-year energy supply contracts to take advantage of potentially cheaper rates in years 2 and 3 or, potentially, consider a 5-10 year Corporate Power Purchase Agreement (see below for more detail). An alternative strategy is for businesses to 'buy time' by remaining on a variable rate until summer 2022 in the hope the market moves in their favour over that period.

Business owners should also consider their contract refresh cycle as an opportunity to switch to a green energy supplier to meet their ambitions and obligations towards 'Net Zero'. The UK I&C sector is a major contributor to UK emissions. While the carbon intensity of all grid-supplied electricity is continuing to drop as more renewable generation comes on-stream, switching your business energy supply to a green supply tariff is one of the simplest and most effective ways to strengthen your environmental credentials. There are now numerous business tariff options on the market to source green electricity and greener gas (where methane is blended with biomethane or green hydrogen).

What other options should I&C businesses consider?

In addition to negotiating the most effective energy supply arrangement, there are several other options that I&C businesses, particularly bulk energy users, should consider. These would enable them to reduce their long-term energy overheads, take greater control over energy bills and enhance their green credentials.

In summary there are four main options:

1. Reduce energy demand
2. Utilise Corporate Power Purchase Agreements
3. Increase energy security
4. Become a flexible prosumer

1. Reduce energy demand

Businesses should explore all obvious 'low regret' options to save energy. They should start with a more detailed understanding of their energy demands across all their assets. With limited investment it may be possible to cut their energy bills considerably through installation of more energy efficient technologies (such as LED lighting) and/or behaviour change of staff. The first step towards understanding energy conservation options is through undertaking an energy performance survey, based on industry standard approaches, to include building assets, industrial processes and staff behaviour.

2. Utilise Corporate Power Purchase Agreements (CPPA)

Corporate Power Purchase Agreements (CPPAs) are long-term contractual relationships (usually 10+ years) between a power generator and a power consumer or 'offtaker'. Through making this direct connection, they offer advantages to both parties. Generators can secure stable, long-term prices for their power, while offtakers are able to benefit from long-term price stability and power at discounted rates. They rely on the national grid to link a generator to an offtaker and are therefore termed an **'in front of the meter solution'**.

CPPAs usually involve purchase of renewable electricity, so they offer a highly effective means of strengthening green credentials and addressing 'net zero' ambitions. They are the preferred route for energy procurement for many corporate businesses looking to strengthen their sustainability commitments rather than simply moving to green supply tariffs. They particularly suit businesses that:

- Have a reliable and high baseload electricity requirement
- Are looking for long term certainty over energy costs
- Have limited potential for on-site or local power generation
- Wish to promote their commitment to sustainability/green principles as a key part of their brand promotion and net zero strategy
- Have a longer-term outlook

CPPAs do not require an offtaker business to be in close geographic proximity to a generator. However, there may be good reasons why a business committed to its local area would prefer to have a closer geographic association with a generator in the local area. If businesses want to consider a CPPA route with a local generator they could approach the owner of a suitable generating asset directly, for example a wind turbine or a solar farm. If they are less concerned about the location of the generating asset then they have more choice over their options and could, feasibly, contract with a generator anywhere in the UK. Businesses do not need to offtake 100% of their power demand from a generator and can 'top up' their supply through a more conventional power supply deal alongside their CPPA.

CPPAs in more detail

There are two kinds of CPPA contract:

- **Physical (or Sleeved) PPAs** are contracts between a business offtaker and a specific renewable energy generator for the delivery of a defined amount of electricity. Power is supplied (or 'sleeved') into the grid by the generator and the same amount of power is then exported out of the grid at the offtaker site. The arrangement is often facilitated by a third-party intermediary such as an energy supplier or aggregator that sets up a 'sleeving service' - a back-to-back supply arrangement between the generator and the offtaker. The offtaker price is usually fixed for the term of the PPA.

- **Virtual (or Synthetic) PPAs** are contracts that are similar in structure to Physical PPAs but with some key differences. Generators sell their power to the wholesale market, not to a specific offtaker. The business offtaker purchases the power through the wholesale market. The contract defines a pricing security mechanism, usually through a 'financial swap'. The offtaker benefits from long-term price stability and strengthening their green credentials but they tend to take the risk that their agreed fixed price remains lower than the variable market price. Virtual PPAs offer greater flexibility in terms of number and location of suppliers compared with Physical PPAs but their structure is more complex.

It is common for the owner of the generation asset and the business offtaker to be different organisations. However, if businesses want to simplify the contractual arrangement and maximise their cost savings, they should look to owning their own power generating asset. In effect this means the generator and consumer become one and the same party. To progress this approach, the business could either develop their own scheme or acquire an existing operational asset. In the former case they could appoint a renewable energy specialist to find and progress a suitably sized scheme based on current and projected power demand of the business. In the latter case the business could find and purchase an operating asset that, ideally, could supply most of their predicted power needs. If the location of the generator and consumer is within national grid territory this contractual connection should be possible.

Given the range of CPPA options, the differing business drivers, and variability around risk appetites, it is advisable to use a specialist energy adviser to structure a bespoke CPPA deal. This should ensure the risks are shared fairly between the offtaker and the generator.

In the future there are likely to be additional 'virtual options' as local energy markets mature. In some countries Peer-to-Peer (P2P) online trading platforms for electricity have been established where generators and consumers of power are brought together virtually to meet each other's needs. This arrangement can offer commercial benefits to both parties and there are UK trials currently being undertaken through Ofgem to explore this (see for example Electron's TraDER project and UrbanChain).

3. Increase energy security

For businesses that could generate their own heat and/or electricity on-site or within the local area, energy self-sufficiency is the optimal route for cutting their costs significantly and ensuring they have full control over their energy costs long-term.

There are two main options to consider: 'on-site solutions' and 'local solutions'. Both are considered to be **'behind-the-meter solutions'** because they do not require the use of the national electricity grid and can therefore avoid use-of-system and other charges that get added to a standard business energy bill.

- **On-site solutions**

These are schemes where renewable energy generation and, potentially, storage technology for electricity and/or heat is installed on-site. For those businesses with large sites the distance between the renewable asset and the main point of demand can be significant and bridged through the use of a 'private wire' or, in the case of heat, a 'private pipe'.

In general, all renewable electricity generation assets (wind turbines, hydro power or solar PV) require an area of open space. As such they tend to suit businesses that have access to areas of open space relatively close to the main point of demand. How much space is needed depends on the scale of the solution – smaller schemes can still be lucrative in limited spaces. In terms of generating renewable heat, this can be feasible within confined spaces and again there are a range of options. As prices fall, technologies for storing power and heat become more viable and these should also be considered. Often the most effective solutions involve a hybrid mix of generation and storage technologies to enable businesses to closely balance their local supply and demand.

It is best to engage an independent consultancy that specialises in a wide range of renewable technologies to advise on all options that may be available.

While there may be a perception that renewable energy solutions are only available to businesses located in relatively isolated, rural situations, this is not the case. There are many examples of viable projects located in a more urban context, such as industrial estates. While solar PV solutions can be ground-mounted, they can also be installed on roofs and even on walls or integrated into window glass. Low carbon heat solutions can source their renewable heat from the sub-surface, making them highly space efficient. Given the significant advantages of self-generation, we would encourage all I&C businesses to undertake an initial screening assessment of their site/premises to understand whether they have opportunities for increasing their energy self-reliance.

For those businesses that do not envisage

developing their own energy generation assets, it may still be possible to get these benefits without the CapEx and OpEx costs. Developers are interested in owning assets and may consider developing a suitable on-site solution in return for a contractual arrangement to sell the energy to a local business.

- **Local solutions using a private wire**

If a business does not have access to open space on-site, maybe it has access to suitable space nearby? Or perhaps there is an option for the business to acquire rights to suitable land relatively close to its site? If this is the case the option opens up to develop a renewable power asset linked by a 'private wire' to the point of demand. In simple terms a private wire is an electric cable connecting a generator with a consumer together with associated metering and other electrical equipment. In most cases the power consumer will not utilise all the power from the generator so there is also a grid connection with the local Distribution Network Operator (DNO) to support the sale of excess power.

This 'private wire' behind-the-meter arrangement is common for many businesses and offers them greater flexibility over the location of their generation and storage assets. For those businesses located in extensive grounds or campuses, this arrangement is ideal as there is greater scope to optimise the performance of the asset through careful siting depending on local conditions and constraints.

There are examples of relatively long-distance private wire scenarios where electricity generation occurs many kilometres from the point of demand. Likewise, there are examples of heat being generated several kilometres from its point of use and transported through a well-insulated, underground 'private pipe' (or 'heat network') in the form of hot water.

The advantages to the business of a private wire or private pipe arrangement are similar to those with on-site energy assets although there may be additional overheads for the routing infrastructure and in negotiating contractual arrangements should the route cross land owned by third parties.

As above, if a business is reluctant to develop its own renewable energy project they could look to partner with a renewable energy developer that is interested in installing a scheme in their locality to supply them with power or heat through a private wire or private pipe. This arrangement usually requires a long-term contractual PPA agreement for purchasing the energy.

4. Become a flexible prosumer

For those businesses that can accept some degree of flexibility around their energy supply there are an increasing number of ways to turn this into a commercial advantage. There are technologies like battery storage, thermal storage and Demand Side Response (DSR) that can turn consumers into 'prosumers'. This enables them to buy electricity at times of lower demand and sell at periods of high demand for premium rates thereby creating new revenue streams. Some businesses will already have some degree of flexibility to 'price time shift' perhaps by using backup power supplies. This capacity can be enhanced through installation of on-site power and heat generation and storage technology. There is a wide range of power and heat storage technologies on the market and care is needed to design an optimal solution that integrates effectively with other infrastructure and business processes.

Energy suppliers are now offering customers in the I&C sector an array of more flexible Demand Side Response (DSR) contracts that include relatively sophisticated tools to help them transform into prosumers. They can then generate new revenue by becoming a more flexible energy consumer, reducing their consumption of grid-based power at times when overall demand is high and increasing consumption when grid demand is low. Storage devices can be charged up at times when the grid is under least strain and prices are lowest so that power can be sold back at premium rates when grid demand peaks. This flexibility is an ideal response to power suppliers and national grid operators that rely increasingly on renewable power generators enabling businesses to be rewarded for not 'over-stressing' the grid without disrupting their processes.

About Locogen

Locogen provides independent advice and a range of professional services to UK I&C businesses to help them develop their energy security and create new revenue streams. It also provides Asset Management services for owners of renewable assets to maximise their benefits.

Locogen I&C case studies include:

- Princes Gate Spring Water: A 'private wire' wind solution to offset on-site electricity usage at their HQ.
- JJ Food Service: Roof-mounted solar PV solutions to boost environmental performance and generate a new revenue stream
- M&Co (Mackays Stores): Roof-mounted solar PV solutions to boost performance and generate an additional revenue stream
- Prestige Leisure: Roof-mounted solar PV solution to offset their substantial electricity costs and further boost their environmental credentials.

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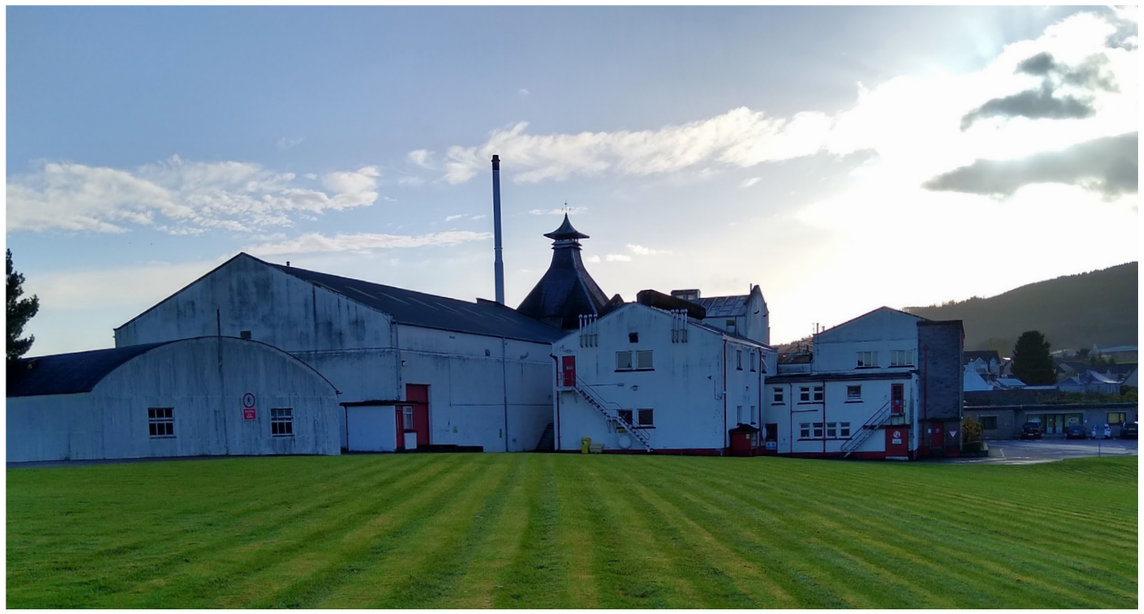

Image: Investigating renewable energy options at a Scottish distillery