

# On-site power solutions

A guide for large energy users









# Foreword

Across Europe there is a clear and consistent trend for large scale commercial and industrial users of electricity adopting on-site power solutions. This is the result of a range of factors, including:

- renewable on-site generation being one of the most clear-cut ways to help “green” a site’s electricity supply and help the commercial/industrial user achieve their climate change targets;
- on-site power solutions having the ability to provide resilience of electricity supply during times of system outage or constraint;
- avoidance of the network and policy charges typically associated with electricity taken from the grid; and
- the commercial opportunities from leveraging flexible on-site power solutions to reduce consumption from the grid and/or to export electricity onto the grid.

However, while such opportunities mean that on-site power solutions are often an attractive option, on-site projects will generally come with a complex array of legal options and considerations. These range from:

- the fundamental point that such projects inherently involve participation in a typically heavily-regulated arena (and often the backdrop of a set of regulations rapidly evolving to keep pace with the sector), to
- a range of project/agreement structures and parties (without a “cookie cutter” approach) involved in project ownership, operation and electricity sale and purchase, with significant co-dependence between such parties, to
- a government policy context that (while at face value often pro-green) is often increasingly concerned about grid and policy charges being avoided through these types of project and wishes to see all market participants paying a perceived fair share of such costs.

In this guide we provide an overview of these challenges and opportunities in Europe, with a view to assisting you in reviewing, upfront, the key issues often associated with on-site power solutions of this nature.



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# An introduction to on-site power solutions

For the purposes of this guide, “on-site power solutions” refers to physical infrastructure that provides sites where electricity is consumed with reduced reliance on electricity from the grid. Typically this physical infrastructure will take the form of on-site electricity **generation** – often renewable like solar and wind but also frequently using fuelled approaches such as gas and diesel generation – and, more recently, **storage** of electricity (either in combination with on-site generation or deployed solely for storing electricity taken from the grid).

## Overview of the market

### Market size

Across Europe there is now a consistent and established trend for greater use of on-site power solutions. Given the comparatively unregulated nature and scale of on-site power solutions, definitive statistics can be hard to come-by. However, while the technologies and drivers vary, published figures for electricity markets including the UK<sup>1</sup>, France, Austria, Germany, Spain, Portugal and Poland consistently show significant growth in the sector.

By way of some examples, in the UK in 2020<sup>2</sup> circa 8% of electricity supplied was derived from on-site generation. In France and Spain in recent years a very significant proportion of new solar PV installations have been installed for on-site consumption. In Germany we see electricity generation plants in the manufacturing and mining sectors making up a circa 14% share of electricity generation in the country, and in Poland 6.4% of annual electricity production (that was exported to the grid) in 2020 came from so-called industrial power plants, which mostly comprises on-site generation.

### Technologies

The type of technology used for on-site power solutions tend to be a product of the specific aims and opportunities of each project.

For example, where “greening” of power supply is the main driver, solar PV, wind turbine and fuelled low-carbon generation (such as biomass/waste) are common technologies. Conversely, although renewable technologies can offer resilient and reliable generation, where guaranteed/flexible supply at particular times or on a baseload basis is the overriding objective, gas fuelled generation and battery storage can be attractive.

On-site power solutions that produce both power and heat on a combined basis (Combined Heat and Power or “CHP”) – which come in renewable and non-renewable forms – can also be used to improve efficiency at sites, and are seen from time to time in public building, business park and office developments. However, these bring with them the need to find customers for the relevant heat and to develop the relevant pipes and infrastructure to transport such heat.

Small-scale diesel generation is also a relatively common feature at industrial and commercial sites, particularly for short-term back-up generation for times of grid outage. Given the need to reduce carbon emissions we anticipate that such units may well look at cleaner fuels, such as low-carbon hydrogen, in future.

A key constraining factor on the scale and type of technology practicable for any given on-site project tends to be the physical scope and nature of the land available for the potential project together with the land rights and planning/consenting position. These constraining factors will often mean, for example, that a wind farm of significant scale is not practicable and instead immediately point to technologies with a smaller physical footprint.

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<sup>1</sup> In this guide, where we refer to the UK strictly speaking we refer to the electricity market in England, Scotland and Wales (Great Britain) as opposed to also including the separate Northern Ireland electricity market.

<sup>2</sup> The year for which the UK Government’s most recently published “[Digest of UK Energy Statistics \(DUKES\)](#)” is available.







# Market players

A number of different project structures - and therefore participants - are typically involved in on-site power solution projects.

**On-Site Consumer:** The starting point for on-site projects tends to be an energy consumer (or group of nearby consumers – “collective self-consumption” is, for example, a particular feature in the French on-site sector) with a significant level of demand, such as industrial processing facilities, large commercial developments or the transport sector (including, increasingly, electric vehicle charging).

As discussed below, to the extent the relevant consumer(s) will not own the relevant generation/storage facilities, power purchase arrangements need to be put in place for the sale/purchase of the electricity being consumed on-site and recognition given to the extent of the relevant owner’s reliance on the ability to export electricity onto the grid in various scenarios.

**Generating/storage facility:** As noted above, it is common for on-site power solutions to be owned and/or operated by a third party rather than directly by the relevant consuming organisation. This can allow for the commercial, regulatory and technical risks associated with running such on-site power solutions to be to some extent “outsourced” to specialist organisations.

Alternatively, various models exist for the ownership/operation/usage to be split to apportion practical and regulatory responsibilities or to provide for structures (such as the “energy as a service” model popular in Poland) that reduce regulatory obligations and requirements.

Ownership or operation by group companies of the relevant consumer(s) is also sometimes used in order to ring-fence the activities associated with the generation/storage of electricity. While often necessary/desirable, separate ownership/operation of the on-site power solution can bring complexities in terms of the contractual interfaces, regulatory obligations, and inter-dependencies.

In some jurisdictions, a regulatory framework exists which allows special forms of legal entities for the joint production, consumption and/or sale of energy. For example, in Austria a renewable-energy community can be established by private companies, public organisations, and private individuals. These legal entities can own the generation and distribution facilities, hold the regulatory licences, receive subsidies and enjoy advantages like simplified grid connection. In such models, consumers share the commercial risks and are free to sell their share once their need for energy changes irrespective of its current members, such joint vehicles can contract service providers to fulfil the regulatory requirements.

**Private wire distribution of electricity:** As well as production of electricity, on-site projects will generally involve the “distribution” (i.e. conveyance on a low/medium voltage line) of electricity. Generally, such distribution will be carried out by one or both of the entities that are producing the electricity and/or consuming it (although a structure involving the creation of separate “gridco” entities is also possible). However, as explored in more detail below, it is important to identify who is distributing, as distribution is in itself a regulated activity. From a commercial perspective, how/whether the entity providing distribution services will charge for such services (for example as a separate “use of system” cost akin to a regulated network company or built into other charges) requires interrogation.

**Supply of electricity:** in addition to production and distribution, on-site projects with multiple parties generally involve the supply of electricity to the ultimate end-consumer. Clearly the commercial arrangements associated with this (including pricing, any obligation to apply particular levies/taxes to supply, any commitment on volume levels, the transfer of any “green benefits” associated with renewable generated electricity) need detailed thought. In addition, such supply may represent a regulated activity (in itself, and separately from generation/storage and distribution) and as a result careful analysis needs to be undertaken regarding those entities who could be deemed to be “supplying” (including following the “chain” of supply through to the ultimate consumer, if ownership of the electricity passes through different hands).



## Spotlight on Austria

By 2030, 100% of the electricity produced in Austria (> 100 TWh) will come from renewable sources. This will require an additional 11 TWh of PV plants to be installed in the next eight years with c.4TWh expected to be provided by on-site projects. In large cities approximately 10% of all roof top space of buildings for private accommodation can be used, the rest must be on commercial and government buildings like shopping malls, logistic buildings or sporting facilities, garages, or public administration, hospitals, schools, etc. In Vienna for example there are approximately 68,000 multi-family dwellings, 10% of which must still be equipped with PV plants.

In Austria, an important incentive for large consumers to invest in an on-site power solution project has been the prospect of safeguarding a stable price for electricity compared to the volatile market price. Another factor is the ability to use existing space and facilities to create additional value. Avoiding network charges is another motivation.

The public sector is also investing in on-site consumption facilities for schools, hospitals and large administrative buildings, and supports residential projects, mainly for PV projects.

Austrian consumers with very large and stable needs like industrial plants or railway operators often use small hydropower plants as a common self-consumption solution. But it is still not common for

other large consumers, such as data centres or telecom network operators, to invest in on-site power solution projects. Residential projects, public buildings and shopping malls typically use existing space, which makes roof-top-PV their preferred solution, and in rural areas biomass is popular in times of rising prices for oil, gas and electricity.

A new Renewable Energy Expansion Act entered into force in 2021 introducing new subsidy schemes for electricity generation from renewable sources like roof-top-PV. It also introduced so-called “energy communities” as a main pillar of Austria’s attempt to achieve the European climate targets. In a nutshell, energy communities are non-profit-orientated legal entities intended to decentralise the generation, distribution, and consumption of renewable energy. Renewable energy generation facilities in an energy community can be owned by the energy community itself, its members or by third parties. This means that “contracting” or “leasing” models are now explicitly permissible. Energy communities are established as independent legal entities, such as private associations, limited liability companies, stock corporations etc.

Distribution system operators shall only be provided with the information (and changes thereto) necessary for metering and billing. The new law also lists issues that must be included in the energy community’s foundation documents.



**Licensed grid operator:** The premises on which on-site generation takes place will generally still require a connection to the grid, to:

- import electricity where the on-site assets are not sufficient to meet demand and/or to charge battery storage assets; and
- export surplus electricity from the on-site generation, where the project includes this as part of the commercial arrangements.

Such connections will usually be to the relevant regional licensed distribution network (or, in comparatively rare cases of very high-consuming sites, to a high-voltage transmission network). This interface with the relevant licensed network operator often requires scrutiny in on-site power projects for three main reasons:

- the relevant connection agreement is almost always held by a single entity, yet on-site projects frequently lead to more than one party relying on use of the relevant connection;
- generally, the introduction of on-site power solutions will lead to a material difference to the site’s use of the grid connection, at the very least requiring review of the existing connection agreement and at times agreeing a variation/consent with the network company; and
- ensuring a robust ongoing right of connection to the grid will generally be crucial for the consuming entity (i.e. to give a fallback position where the on-site generation is not delivering either temporarily or on a long term basis) and frequently also crucial to the commercials of the on-site power solution itself, in terms of giving a route to market where electricity is not being consumed on-site.



**Licensed electricity supplier:** as introduced above, where an on-site power solution is being used:

- in tandem with electricity being imported from the grid; and/or
- with surplus electricity being exported onto the grid; arrangements for the relevant sale/purchase of electricity from/to the grid will need to be entered into with a licensed supplier.

A number of different structures (of varying complexity) can be used for this. Consideration also needs to be given to existing electricity supply agreements in place in respect of the site. Generally, the interface with a licensed supplier in respect of electricity generated at the site will be limited to the electricity not intended for on-site consumption, as the moment units of electricity are apportioned (even notionally) to sale to a licensed supplier on the grid, they risk attracting the levies and

network charges that the use of on-site generation is often designed to avoid. Thus, it is usually a prerequisite that any electricity consumed on-site is not taking place on a licensed supply basis – although as noted above it is important to review at the outset whether the envisaged scenario/structure is permitted on an unlicensed basis in the relevant jurisdiction



# Key market drivers and business models

## Drivers behind the growth of on-site power solutions

The rationale and incentives for the use of on-site power solutions vary between different large consumers across Europe. Broadly speaking some combination of the following drivers are normally relevant:

- A desire to clearly demonstrate “green” electricity consumption through the use of renewable generation technologies such as wind and solar PV.
- Commercial benefits, including the ability to:
  - sell surplus electricity generated on-site via export to the grid;
  - avoid network charges and other levies added to the cost of electricity imported from the grid;
  - where there is flexibility at the site on the timing of use of electricity from the grid, achieve cost savings (e.g. by reducing consumption from the grid at times of high demand) and access revenue streams associated with flexible generation/ demand reduction;
  - achieve independence from fluctuating market prices of energy; and/or
  - make commercial use of otherwise unproductive space.
- An increase in the likelihood of obtaining planning permission for new developments by demonstrating net-zero ambitions, which can sometimes be achieved by committing to the use of e.g. on-site “energy centres” - often combined heat and power (**CHP**) for example.
- Increased resilience of electricity supply during times of system outage/constraint.

## Key Business Models

On-site generation is a significant and growing sub-sector of the wider electricity sector.

In recent years there has been a concerted (and continuing) focus on how most efficiently to maintain reliable and cost effective electricity systems alongside a move to a more decentralised energy system. This has manifested itself in a widening range of revenue streams available for those who can provide electricity to the grid or reduce demand from the grid during times of need – with these revenue streams increasingly being accessible by a widening range of types and scales of providers.

As a result, new opportunities continue to emerge for those with sites suitable for on-site power solutions, and for third parties wishing to develop such projects.

Examples of these third-party businesses include:

- Companies with portfolios of small scale generation/ storage in different places (variously described, among other things, as “virtual power stations”, “distributed energy platforms” and “energy portfolios”) offering turn-key solutions for suitable sites;
- Companies with systems and expertise suitable for remotely operating and aggregating on-site generation/storage such that they can better access the revenue streams available through carefully managing or “optimising” the use of such assets on an aggregated basis. Depending on the extent to which a large consumer can be flexible with when they consume from the relevant asset, this can be a suitable and attractive product/service;
- Companies that own/operate large scale “private wire” (i.e. unlicensed) electricity distribution networks (often with connected generation/storage assets) with multiple consuming sites connected. Often such large-scale private wire networks are owned and/or operated by group companies of licensed network owners (given the expertise required to run large private wire networks is similar to that required for a licensed network). However, as these networks operate in an unlicensed context, the commercial terms of connection to such networks (or the flexibility of approach they can offer) can be attractive;

## Spotlight on Spain

The Government Cabinet approved the National Strategy for Self-Consumption on 21 December 2021. This document set out guidelines for the promotion of renewable self-consumption, putting the consumer at the centre of developments in the energy sector, and enabling that sector to be used as a major tool in the fight against energy poverty.

This strategy includes mechanisms to increase the sharing of energy resources, such as energy communities, and will help to implement applications in areas such as industry and the services sector. In this sense, self-consumption not only constitutes a direct source of employment and activity generation - linked to its installation - but also has a triggering effect on the whole Spanish value-chain, which can benefit from the energy cost savings and modernisation drive linked to the growth of self-consumption.



- For sites with very large demand, many of the same developers who build independent power projects (such as onshore wind farms and ground-mounted solar PV) for connection to the grid can also build medium-scale generation close to or on the same site as the relevant consumer, for the purpose of providing all or a significant portion of the relevant output to that consumer. Particularly in the absence of widespread renewable subsidy for new projects, a long-term power purchase arrangement with a consumer with good covenant strength can offer an approach with value to both the developer and the large consumer;
- In **Spain**, companies that own/operate small scale domestic on-site generation provide mechanisms where customers have access to solar energy by making monthly payments without a large upfront investment. These options could take the form of an operating lease, financial lease or forward sale payable in instalments;
- A similar model, so-called energy as a service, is used in **Poland**. Companies owning small scale on-site generation (often developers or contractors of renewable energy sources or CHP installations) can allow the consumers to use the generation assets in exchange for regular payments (e.g. rent or lease fees). The agreement can include sale of the asset to the consumer at the end of the term. Since there is no actual sale of electricity (the consumer is self-consuming the power), the energy as a service is not subject to energy regulatory obligations and requirements, such as the generation, distribution licence requirements or obligation to redeem the energy certificates or pay the electricity surcharges and levies.







# On-site power solution risks

The heavily regulated nature of the electricity sector, the changing nature of this regulation, and the high degree of interdependency created between different parties can mean that the legal challenges associated with on-site power solutions can be underestimated.

In our experience, review of the following areas early on when assessing a project is key, and can save unwelcome surprises later.

## **Connection to the grid and “stranded asset” risk:**

for on-site generation/storage at any scale, the need to supplement on-site generation with electricity imported from the grid, charge battery storage and (in many cases) to export electricity to the grid – and ensuring robust physical and legal avenues for so doing are available - should be carefully considered at the outset.

As well as envisaging a situation where on-site generation/storage and consumption are happening as expected, as part of the risk analysis it is important to carefully contemplate what might happen over the lifetime of the relevant on-site generation/storage. For example:

- What happens if the on-site power solution does not function as expected?
- What happens if future consumption at the site reduces or increases from current levels/expectations?
- Where there is segregation of ownership/operation of the on-site power solution from the consumer, how will each party be able to react if the other does not comply with their contractual obligations or, in extremis, goes insolvent or abandons the contract?

Generally, given the essential nature of electricity supply for the sorts of large-scale sites interested in on-site power solutions, the answer to such questions is that having a grid connection in place from the outset is essential - or at the very least optimal. Often the generator will also require a grid connection for the export of electricity, given concerns about route to market and/or asset stranding where the on-site

consumer doesn't commit to taking all electricity or in the event of a default by the on-site consumer.

Assuming there is an existing grid connection agreement for the site, this conclusion leads to two further key questions:

- To what extent do the terms of this agreement allow for the proposed new on-site power solution to be connected and the relevant required export and import levels, and what are the risks under those terms in respect of future changes to the position?
- Which entity holds the benefit of the grid connection agreement (usually a site owner/occupier and usually a single entity) and will there be a need (i) to transfer this to a different party, and/or (ii) enter into separate “grid sharing” arrangements (contractual or by way of a jointly-owned “gridco” counterparty) such that more than one entity at the site can have some degree of legally robust reliance on the grid connection agreement despite it only being in one entity's name? The need for “grid sharing” arises, for example, in the UK because the Distribution Network Operators who offer connections to their distribution systems will generally require a single counterparty and will not offer any step-in rights to third parties (i.e. a right for specified third parties to take over the connection agreement in certain default scenarios). Accordingly, if the grid connection agreement can only be held in the name of the site owner/occupier or the on-site generator (but not both) a solution is required to cover the risk of the grid connection agreement being terminated by the DNO for insolvency or breach by the relevant counterparty. In contrast, in jurisdictions where grid connection runs with the land such arrangements are not required.

If the terms of an existing grid connection are not suitable (or require modification of their terms), there will need to be dialogue with the relevant network company and the necessary changes agreed. The earlier this can be commenced (or at least the process, timescales and costs discussed) the better, as this can be a lengthy process and if the outcome is that a physical upgrade to the existing connection is required, then significant cost and lead times will be associated with the relevant construction works.





## Spotlight on Portugal

In Portugal, on-site power solutions are a relevant aspect in the context of the energy transition. The National Energy and Climate Plan 2021-2030 (PNEC 2030) sets a of 9 GW of photovoltaic energy by 2030, with 7 GW of centralised production and 2 GW of decentralised production. This would require Portugal to quadruple the current installed capacity of decentralised production (which is around 0.5 GW).

The recent new decree-law that establishes the organisation and functioning of the National Electricity System (Decree-Law no. 15/2022, of January 14) incorporated the self-consumption regime, individual and collective, as well as energy communities, improving and clarifying some aspects of the previous legislation. It is important to note that the legal concept of self-consumption is not restricted to solar primary source projects, but encompasses any production that has renewable energy as its primary source.

According to the Portuguese legal framework, the

use of internal networks that do not involve the use of the public grid to conduct electricity between the self-consumption and the consumption facility is not subject to any grid tariff. In addition, the charges for the costs of general economic interest that are part of the grid tariffs corresponding to self-consumed electricity conducted by the public grid may be, in whole or in part, deducted from the grid tariffs by order of the member of the Government responsible for the energy sector.

We have seen a significant increase in the number of companies implementing energy as a service business model, which means that they carry out energy services without the clients having to invest their own funds into the projects. The capital invested is then repaid with the achieved cost savings which allows the client's capital to be focused on its core business. Portuguese legal framework encompasses this type of mechanism very well, for example, allowing the ownership of the self-consumption unit to belong to a third party (the investor).

It is also often overlooked that in some jurisdictions connection agreements provide rights for network companies (known as “use it or lose it” rights) to remove consistently unused capacity (export and import). In **Croatia**, for example, the national transportation grid is undersized so grid connection agreements have tight deadlines for building the grid connection. If the deadline is missed, the grid connection must be applied for again. In **Austria**, on the other hand, renewable energy communities enjoy a simplified access to the grid and a reduced fee. In the context of significant scale generation/storage projects, with large capital expenditure requirements, and often non-recourse debt finance involved, these risks that exist in principle in most connection arrangements can take on heightened importance and therefore need to be scrutinised.

If there is no existing site grid connection but one will be required, then the regulated process for the application for and construction of a new grid connection will need to be completed. Depending on the connection works (and consequential wider grid reinforcement works) required, the costs and lead times of new connections can vary dramatically and can make or break the viability of introducing new on-site power solutions.

If a decision is taken to proceed without a grid connection being in place, then it should be appreciated that the timescales and costs associated with any future procurement of a connection to the grid down the line (for example following a termination of the on-site generation arrangements) will generally be uncertain.

**Electricity sector regulation:** It can be easily overlooked that there can be multiple regulated electricity sector activities being undertaken by on-site generation/storage projects. In the case of projects in the **UK**, for example, often each of the following separate regulated activities will be taking place (i) electricity generation/(storage), (ii) the distribution of electricity, and (iii) the supply of electricity. While structures can involve obtaining licence(s) (particularly for the generation/storage activity), the assumption often made is that all activities will be conducted on a “licence exempt” basis. This both reduces the regulatory burden and is often part and parcel of avoiding various costs associated with buying electricity imported from the grid.

The usual way to achieve this in the **UK** is to meet the requirements of the “class exemptions” regime legislated for under the Electricity Act 1989<sup>3</sup> (with case-specific exemptions in principle also possible, but

only commonly seen for generation). However, generally there is no process for obtaining “sign-off” from Ofgem or government of being within such a class exemption. Therefore, careful review of the structure and the relevant wording in the exemptions regime needs to be undertaken so that the relevant organisations can satisfy themselves (and relevant funders) of this. The UK Government is in the process of reviewing the “class exemptions” regime to ensure that it remains fit for purpose in light of the growth of distributed generation and renewables.<sup>4</sup> This review is also linked to the UK Government’s review of network charging to ensure that all market participants pay a fair share of policy and network costs.

In addition to this fundamental analysis of which electricity sector licence/regulatory exemptions are being relied upon, it is also prudent to scrutinise the contractual assurances between the parties in respect of remaining within the relevant regulatory requirements, including qualifying for the relevant exemptions. For the **UK**, the analysis is often most complex here in respect of electricity supply, where the party acquiring electricity can (through the way in which they use that electricity, in particular via resale rather than self-consumption) cause the party supplying them electricity to cease to be within their supply licence exemption.

In **Poland**, self-consumption does not require an electricity generation licence, as it does not constitute a commercial activity. If, however, the surplus electricity is sold to any third party (whether through the public grid or otherwise, including on-site), an electricity generation licence is generally required, unless the project falls under capacity exemptions (such as a renewable energy source below 0.5MW).

There is no separate supply licence in Poland. However, where there is separation of ownership/operation of the on-site power solution and ownership of the wires from the consumer, the contractual set-up may be established as a power purchase agreement and the conveyance of electricity as distribution. This is because under Polish law, construction of private wires requires consent from the energy regulatory authority, which is very rarely given. If the wires are not treated as private, they will be treated as distribution grid, which consequently triggers the obligation to obtain a distribution licence.

In addition, for large scale projects the potential relevance of the transparency obligations imposed by EU (and for the UK retained EU law) regulation on wholesale energy market integrity and transparency (known as REMIT) should be analysed.

3 See the Electricity (Class Exemptions from the Requirement for a Licence) Order 2001 (as amended) (the “**Class Exemptions Order**”).

4 <https://www.gov.uk/government/consultations/exemptions-from-the-requirement-for-an-electricity-licence-call-for-evidence>





## Spotlight on the UK

The regulatory position in the **UK** does not tend to mandate particular forms of technology for on-site generation. The key regulatory constraints instead tend relate to fulfilling the necessary criteria for licence exempt/unlicensed generation, conveyance over wires ("distribution") and supply of electricity – given generally there are practical and commercial advantages (often imperatives) to avoiding the need for licences. Accessing these avenues to unlicensed/licence exempt generation/distribution/supply is broadly speaking about size and context rather than technology type.

We expect significant incentives for on-site generation in the UK to remain in place for the foreseeable future. However, the approach to network charges is undergoing reform, with on-site generation in particular likely to be a net "loser" in terms of the financial impact of these changes as proposed. At a high level, this outcome is driven by a policy view that the rise of self-generation (domestic and larger-scale) risks, under the current approach, concentrating network costs on the smaller volumes of electricity being taken off the grid by a smaller group of consumers. Therefore moves have been implemented to levy more network charges on a fixed basis and to reduce some of the reduction in

connection charging benefits of investing on-site generation associated with export to the grid from (among others) most forms of on-site generation.

Further, the funding of renewable subsidies via levies on electricity supplied on a licensed basis is under political scrutiny, in the context of the impact this has on electricity prices (for example some of these costs may be applied to gas supply). Given that, like with network charges, the avoidance of these levies is often a feature of on-site power solutions, the impact such changes will have on the economics of such projects will warrant ongoing scrutiny.

Green subsidies available for new small and medium-scale renewable generation in the UK have significantly diminished. While volumes of existing on-site generation continue to benefit from long term subsidy that was locked-in from the point of commissioning, for new projects the absence of these long-term and relatively simple subsidies can render the income streams/commercials more complicated. The absence of green subsidies has resulted in significant reliance on the long-term power purchase arrangements with large corporates with bankable covenant strengths.

**Ongoing access to the relevant private wires:** for on-site power solution projects, wires are generally needed to convey electricity from the project to the point of consumption and, assuming there is a grid connection, to also convey electricity to the point of export to the grid. Unless the project asset, the electricity consumer and the wires are all owned by the same entity, the relevant parties who do not control these wires therefore need to bear in mind the extent to which they can be assured of ongoing access.

In a **UK** context these wires will very often be owned and operated on an unlicensed “private wire” basis.

In contrast, in **Poland** there is no distinction between private wires and public grid. There is only a direct line concept, which refers to a line connecting one power producer with one consumer (only two parties are involved). However, the construction of a direct line has to be approved by the Polish regulator and in practice such approval may only be granted, where there is no possibility for the customer to be connected to the transmission/distribution grid. In any other case, the electricity networks/wires can generally be considered as distribution/transmission grid and their operation requires a relevant licence.

In jurisdictions such as the UK where a private wire approach is often used, given the absence of the protections afforded when dealing with licensed network, appropriate remedies where the party with control of the wires simply fails to comply with its obligations (including in extremis in an abandonment or insolvency scenario) should be thought through. While of course financial remedies for breach will likely be an aspect of contractual arrangements, in practice in such a default scenario the non-defaulting party (be they consumer or generator) is likely to need the ability to continue to use these wires urgently and to be assured the wires will continue to be appropriately maintained and operated. In some scenarios, rights of “step-in” can therefore be provided for, whereby the relevant wires are “taken-over” by the non-defaulting party. However, to do this in a robust manner requires proper review and treatment of the necessary land rights, the position on insolvency, and in practice whether the relevant party has the practical desire/capability to take over the private wires in this way. For large scale private wire networks with numerous separate connected consumers, the feasibility of step-in can prove even more problematic. In such situations, an insolvency remote gridco structure might provide a solution by better insulating the relevant assets from the wider business risks associated with the generator or onsite offtaker.

Finally, for both those controlling private wire networks and those using private wire networks controlled by a third party, it is worth being aware that the often overlooked EU “third party access” regime applies in respect of unlicensed distribution networks. By way of example, as implemented in the **UK**, the practical impact of this is that end consumers can require private wire networks to allow third party suppliers access to supply them over the relevant private wire network (with the relevant private wire network operator’s charges for granting such access also being regulated).

**Network charges and green levies to support government subsidies:** the avoidance of both network charges and green levies tends to be a key incentive for the use of on-site generation in certain jurisdictions. This generally makes it important that electricity which is generated and consumed on-site does not pass through a licensed supplier and is not metered as passing onto the licensed network (often the two things would go hand in hand) as these respectively would lead to the need for the licensed supplier to apply levies and network charges to the electricity supplied.

However, the regulatory position on this has changed and/or is changing in a number of jurisdictions as governments seek to control the ability to bypass network charges and thereby concentrate them on those consumers who are drawing electricity from the grid.

For example, the **German** legislature has already introduced a number of changes in recent years to limit the avoidance of levies and charges by on-site power solution projects. Regulatory changes regarding incentives for on-site generation in Germany focused in the past on limiting the definition of distribution lines exempted from network charges and levies, and instead the possibilities for avoiding or reducing renewable energy surcharge and benefiting from energy tax exemptions rather than network charges. Similarly, in the UK changes are being implemented which reduce the avoided network charges and “embedded benefits” associated with shifting consumption on-site. In addition, at the time of writing it has been suggested that UK government is contemplating reducing the extent to which green subsidies are recovered through levies on electricity supplied via the grid - a knock-on impact of such an approach could well be a reduced differential between the cost of on-site generated electricity versus electricity supplied via the grid.



## Spotlight on Germany

In **Germany**, the focus of self-consumption projects (other than classic rooftop solar plants in the private sector) used to be self-consumption models at industrial facilities with high levels of electricity consumption and/or CHP requirements. Also important were contracting models for the provision of heat, electricity and often also cooling from plants operated on site by a professional contracting company.

An important incentive behind these models has often been to avoid network levies and other charges levied by grid operators; energy tax savings, and the avoidance of the renewable energy surcharge. However, opportunities for both energy tax-saving and avoidance of the renewable energy surcharge have been significantly reduced over the last ten years due to legislative changes and jurisprudence. This has led to a shift in incentives and the drivers behind self-consumption models

There is currently more focus on self-consumption models using renewable energies for a “green” footprint and in order to benefit from renewable energy surcharge reductions. Another driver is the push for local behind-the-meter projects for electricity and heat supply in new housing developments, blocks of houses or even entire city districts. As the government plans to abolish the renewable energy surcharge as of 1 January 2023 other drivers will gain further in importance.



**Power purchase:** to the extent that the structure dictates that the person consuming the electricity is different from the person generating it, terms need to be agreed for purchase of electricity by the consuming entity. Depending on who has access to export on to the grid, and the licensing analysis discussed above, commonly this may involve either:

- the consumer at the site purchasing all electricity generated and selling or “spilling” the amount they do not need onto the grid; or alternatively
- the third party on-site generator selling a portion of electricity to the consumer and itself spilling the untaken portion onto the grid via sale to an offtaker.

The terms of the purchase of electricity which is consumed on-site vary enormously depending on the commercials of the relevant structure, but where the purchasing consumer is able to offer a long-term fixed or “floor” price on electricity on all or the bulk of the

output this can represent a particularly “bankable” and attractive proposition to a third party generator (particularly as renewable subsidies for new projects cease to be widely available) and increase the possibility of attracting project finance debt to the project.

The terms of such purchase (generally under a Power Purchase Agreement (“PPA”)) tend to be bespoke in nature and require significant development and negotiation across a wide range of areas, including in respect of:

- *The credit-worthiness of the purchasing organisation* (and any parent company guarantee/credit support they may provide). As renewable subsidy diminishes in many jurisdictions, long-term PPAs with purchasers with large scale energy needs and a good covenant strength are increasingly used to underpin bankable projects. Appropriate creditworthiness on the part of the purchasing organisation is of course, however, fundamental to this equation.

- *Demand changes* – Given power purchase in an on-site generation context will tend to be associated with commercial/industrial activities with their own set of potentially changing circumstances, the “what if” question of what happens under power purchase arrangements where such commercial activities/industrial activities at the site need to change (or even cease altogether) needs answering. This may for example lead to discussions over term, break clauses and the extent to which the power purchase arrangements can (or indeed must) be transferred to any purchaser of the relevant site/business. Similarly, the position at the end of life of the relevant arrangements or generation assets needs practical thought, given it is generally necessary to assume the site will need to be able to continue to operate (and be supplied with electricity) when such point in time is reached.
- *Development and commissioning* – Where PPAs or other relevant power purchase terms are entered into prior to the relevant generation being developed (as is often the case), the relevant conditions precedent, milestones and associated deadlines that apply ahead of commissioning of the generation facility will need scrutiny. These will generally include areas over which the generating entity has control (such as build and financing) to other areas where the purchasing entity may well have control (such as land rights and grid connection), and therefore which party takes responsibility for the relevant condition/milestone being fulfilled (and the consequences where milestones are not fulfilled) requires interrogation and documentation.
- *Network access* – As discussed above, responsibility for the wires and apparatus connecting the consumer to the power solution and (where relevant) connecting both to the point of connection to the grid is an important area. Further, and perhaps counterintuitively, a structure that preserves ongoing access to the grid even where the power purchase arrangements are terminated will often be of relevance, in order to provide the relevant on-site project with an ongoing route to market.
- *Change in law* – Changes to the agreement arising from change in law and the process for such changes being agreed/determined will require inclusion for PPAs spanning any significant length of time.
- *Price* – Pricing of electricity supplied under the power purchase arrangements – and any interface with the cost of electricity procured from the grid - will of course be a key term, including in respect of the risk of levels of generation/consumption being different to that forecast and the associated imbalance risk that may arise from this and the impact of “negative pricing” (where there is a cost associated with exporting electricity onto the grid). The approach will tend to vary depending on the nature and commercial drivers for the relevant project. Similarly, the position on transfer and the value of any renewable benefits/green attributes associated with electricity being purchased needs to be addressed.
- *Corporate Policies* – Large corporate power purchasers may also seek to include requirements for the relevant generator to comply with such corporate’s general corporate policies (e.g. anti-bribery etc) in much the same way as any other supplier of goods or services to the corporate will be expected to comply. However, the on-site generator will need to review such obligations very carefully especially in terms of whether it confers any hair-trigger termination rights. The position of the on-site generator is likely to differ from that of many general suppliers of goods and services. In particular, the sunk capital costs to be put at risk by the generator in building new generation – and the risk/consequences to the generator losing the PPA and having to operate via selling electricity to the grid or worse still being left with a stranded asset with no route to market for its electrical output at all.

**Revenue stacking:** “revenue stacking”, whereby on-site assets export and/or store electricity in a way that best takes advantage of the revenues available for generation/demand reduction during times of system need, is also increasing in popularity. It is sometimes achieved through active trading of electricity<sup>5</sup> and sale to an electricity supplier under a single power purchase agreement. However, this approach requires sophisticated operational oversight (often by intermediaries with wider portfolios of generation/storage) and does not yet tend to offer long term certainty on levels of revenue. It is therefore difficult to structure as the basis of a bankable proposition, at least for the purposes of a single asset project financing.

**Planning permission:** on-site power solutions are generally located on sites which are already used in an industrial/commercial context. However, this does not mean that the planning permission that exists in respect of the relevant site will allow for the proposed facility; a fact which we see can be overlooked given the “brownfield” nature of the site. Therefore, early due

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<sup>5</sup> In the UK, for example, a recent modification of the GB Balancing and Settlement Code (Mod P375) will allow on-site/behind the (boundary) meter assets to participate in the GB Balancing Mechanism through individual asset level metering systems that can be used in the GB electricity settlement process. Mod P375 is being billed as a “fundamental building block for future energy flexibility” given the increase in assets that sit behind the grid boundary point metering systems.



diligence of whether new planning permission, or an amendment to the existing planning permission, will be required for the envisaged generation/storage is advisable. In certain jurisdictions such as the UK, there are generation capacity thresholds (in the UK being 50 MW) that may require a different consent to be obtained and therefore this should be reviewed for larger installations.

**Land rights:** the land rights to be granted (and the ability/right of the relevant consumer, who may for example themselves be a leaseholder) must be analysed carefully in the context of the type and scale of on-site power solution project being contemplated. Where land rights are being provided by one party to another (for example by the relevant consumer to a third party generator) then the duration of these land rights (for example the term of any lease) will need to be long enough to cover the envisaged duration of the power arrangements. The permitted use under any lease will need to capture the full extent of the activities to be carried out and the rights granted under any easement will need to be drafted to cover the proposed construction, operation and on-going maintenance of the cables to be installed. In respect of the relevant private wire networks and points of connection concerned, then appropriate access rights require proper review and any mechanisms for “step-in” to provide access to private wire networks where the intended controlling party is failing to maintain/provide access needs to take account of the relevant land rights required.

The manner in which land rights must be established, and whether they can be transferred without the consent of the landowner or used as a security for project financing differs significantly from jurisdiction to jurisdiction. For example, in **Austrian** projects, several different kinds of land rights are available. What is more difficult is separating the ownership in the land from the ownership in the generation facilities if they are not mounted on the ground but on a building like for a roof-top PV plant.

**Debt Financing:** on-site generation projects can lend themselves to a wide range of debt financing products, including project finance and asset finance. This could be on a single asset or portfolio/warehouse basis. Funders, principally commercial banks but also other sources of debt such as institutional investors, have increasing risk appetite to finance portfolios of small and medium scale on-site generation projects both within a single jurisdiction and even internationally across a number of different jurisdictions, in particular across a range of European markets.

Many on-site power solution projects do not meet all of the many criteria typically required by senior lenders to enable a classic project financing. For example, such projects may not be completely ringfenced from other activities of the sponsors or site owner, lack long-term offtake or route to market arrangements which substantially remove electricity pricing risk or have significant stranded asset risk. For this reason many developers consider proceeding with construction of projects without project finance, and then seek to finance them on a portfolio basis once the projects are operational.

**Finance Lease, Sale and Leaseback, and Operating Leases:** the structures used for on-site power solutions projects may also use these approaches as a financing tool. However, the IFRS accounting treatment of these approaches and the legal treatment of sale and leaseback arrangements should be carefully considered at the outset.

**Other aid/support received in respect of the relevant site:** finally, it is worth noting that it is not unusual for the sorts of large industrial sites often suited to on-site generation/storage projects to also benefit from unrelated forms of support. For particularly large/nationally significant sites, State aid may have been applied to support the site and, by way of example, certain categories of business categorised as “electricity intensive industries” (“**EIIs**”) qualify for relief from the usual levies on grid supplied electricity used to fund renewable energy schemes. Where such support has been/is being received, analysis on whether the reduced costs flowing from on-site generation in any way contaminates the conditions/eligibility for such support is prudent.

For example, the **French** Government also subsidises self-consumption projects through tenders decided by the Minister for Energy and managed by the energy regulator. These can be divided into two groups:

- Small solar installations on buildings (<100 kWp) with self-consumption. These projects can benefit from a 20-year contract, with an investment premium paid for five years coupled with a feed-in tariff for the surplus injected into the grid.
- Renewable electricity installations with a capacity between 100 kWp and 1 MWp, regardless of the technology used. These projects can benefit from calls for tenders in the form of a premium for the electricity produced (whether it is self-consumed or injected into the public grid) or a contract for difference. This support is currently structured to incentivise self-consumption.<sup>6</sup>

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<sup>6</sup> <https://www.cre.fr/Documents/Appels-d-offres/appele-d-offres-portant-sur-la-realisation-et-l-exploitation-d-installations-de-production-d-electricite-a-partir-d-energies-renouvelables-en-auto>



## Spotlight on Poland

In Poland the self-consumption and other on-site models were traditionally used mostly by very large industrial consumers, who were seeking supplementary sources of power (and heat), but also reduction of costs. However, due to increasing electricity prices (both due to wholesale price increase and introduction of new levies and surcharges, such as the capacity market surcharge of EUR 17 per MWh) and growing interest in “green” footprint, this has changed. A significant increase of interest in the on-site generation models have been observed in recent years within the wide range of consumers.

The key incentive behind the on-site generation is the ability to avoid or reduce network charges, electricity levies and surcharges, as well as obligations to redeem energy certificates. For example, typical self-consumption model is not subject to any of those charges and obligations. Other on-site models involving sale of power also

allow to avoid network charges, but certain levies and energy certificates obligations may still apply. There is a strong tendency on the market to pursue alternative solutions such as the energy as a service model, where the generation asset is leased to the consumer, who can benefit from on-site electricity production without network charges, levies and other regulatory burdens and also without a large upfront investment.

The on-site generation in Poland seems to be thriving without a dedicated regulatory incentives or subsidies. It is driven by the consumers’ focus to reduce and stabilise the electricity costs. However, the Polish government also sees the benefits flowing from the development of on-site generation and distributed generation as a whole. The Polish Energy Policy recognises industrial electricity and local generation as key factors in pursuing the emission-free energy system.

Public bodies sometimes take part in their own self-consumption projects. For example, the city of Rennes created a company to sell the solar electricity produced on the roofs of its buildings, and seven sites equipped with photovoltaic panels and schools generated 120,000 kWh of electricity in 2018.<sup>7</sup>

In **Austria** renewable energy generation is usually subsidised by tenders for market premiums. However self-consumption projects can obtain aid in the form of investment subsidies. Such subsidies are always notified aid schemes under EU state aid rules and are available for PV, wind and renewable gas (including hydrogen). No such aids are granted for hydro power or biomass.

However, as soil sealing is a major problem in Austria, self-consumption plants for photovoltaic can only be subsidised if they are mounted on existing buildings, already paved surface, landfills or railway tracks. In all other cases investors must make sure that the land used falls into a special zoning category for PV use.

In **Poland**, renewable energy and CHP generation is also subsidised (by feed-in tariffs, CfD tariffs and feed-in premiums), but this mostly refers to electricity exported to the grid. However, small CHP installations (i.e. below 1 MW) can obtain a subsidy (feed-in premium) for all generated electricity, regardless of whether it is exported to the grid, or self-consumed.

<sup>7</sup> <https://metropole.rennes.fr/photovoltaïque-rennes-mise-sur-l'autoconsommation-et-l'investissement-privé-et-associatif>





## Spotlight on France

As shown by the multi-year programme for energy (PPE) of June 2020<sup>8</sup>, the development of individual self-consumption in France is now a reality after accelerating growth in recent years. The French Government has set a target of 200,000 self-consumption photovoltaic sites by 2023, including 50 collective self-consumption operations<sup>9</sup>.

Individual self-consumption allows for a producer to consume a part or all of the electricity produced by its own facility, as production and consumption both happen on the same location (article L315-1 of the Energy Code). Third party investment is authorised thanks to Alinea 3 of Article L.315-1 of the French Energy Code which provides that the plant of the self-producer may be owned or managed by a third party. The third party may be entrusted with the installation and management, including maintenance, of the generating facility, provided that it remains subject to the instructions of the self-producer. The third party itself is not considered to be a self-producer.

Self-consumption is collective when the electricity supply involves one or more producers and one or more consumers gathered within a legal entity and when electricity extraction and injection points are

in the same building, including residential buildings. The extraction and injection points can also be located on the low-voltage network if they meet specific criteria's regarding geographical proximity (article L315-2 of the energy code).<sup>10</sup>

The network access tariff, also called the "TURPE" is paid by all electricity consumers for the use of the public electricity network and includes a fixed part, based on the subscribed power and a variable part, based on the electricity consumed. As individual self-consumption without any injection does not imply electricity transit through the public network, individuals do not pay the network access tariff for the kWh self-consumed. On the other hand, for individual self-consumption with injection or for collective self-consumption, the producer must pay the TURPE. Individual self-consumption also benefits from preferential tax treatment regarding the excise duty on electricity. The TICFE is the national tax on final electricity consumption. It must be paid by all electricity consumers. An operator whose production does not exceed certain thresholds and who consumes it in its entirety should not have to pay the excise duty on electricity according to Articles L.312-13 and Article L.312-17 of the CIBS.

8 <https://www.ecologie.gouv.fr/sites/default/files/20200422%20Programmation%20pluriannuelle%20de%20l%27e%CC%81nergie.pdf>

9 <https://www.ecologie.gouv.fr/sites/default/files/20200422%20Programmation%20pluriannuelle%20de%20l%27e%CC%81nergie.pdf>

10 [https://www.legifrance.gouv.fr/codes/article\\_lc/LEGIARTI000043213495](https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000043213495)







# Heads of terms issues checklist

We would distil the key issues into the following “check list” of energy specific legal areas that in our experience often benefit from review at Heads of Terms stage.

-  **Grid connection:** Maintaining the ability to draw upon electricity from the grid when required, notwithstanding the introduction of an on-site power solution, is generally essential. Are any consents/ amendments needed under the site grid connection agreements with the relevant network company to allow for the introduction of new equipment at the site and the changing nature of usage of electricity from the grid (and the potential for export of electricity to the grid)? Does this extend to the need for physical works on the point of connection? In either case, what will the likely timescale and cost be, and could the necessary changes be denied by the relevant network company?
-  **Arrangements with existing electricity supplier:** How does the envisaged on-site power solution interface with the existing agreements in place with the existing electricity supply arrangements for the site e.g. due to export of generation and the desire to monetise this? Does the new on-site power solution assume/necessitate a change in these arrangements?
-  **Regulated activities:** what electricity sector regulated activities (such as electricity generation, electricity conveyance, and electricity supply) will be performed as part of the proposed on-site power solution and by which parties? Will such parties hold the relevant licences or licence exemptions? What is the commercial impact of performing the relevant activity on a licensed versus licence exempt basis and therefore to what extent does this dictate the necessary approach? Which parties are taking responsibility/risk for ongoing compliance with such regulatory requirements and what is the risk of and position on a change in law in this regard?
-  **Property Rights:** How is the site owned (e.g. freehold or leasehold, security etc)? The consents or restrictions this presents should be scrutinised early on.
-  **Commercial arrangements:** Assuming there are different parties involved in the project (such as a third party owner/operator of the relevant equipment) what benefits/income streams will each be receiving and who will be taking the risk/upsides of external opportunities and changing circumstances. This covers a wide range of areas, for example:
  -  **Volume commitments:** will the on-site consumer be committing to a take and/or pay for all output from the on-site facility or a particular volume of electricity and will any form of security be required in respect of this. What happens if usage/demand at the site changes? What happens on a change in control or ownership of the consumer site? Similarly, will the generator be committing to delivering certain volumes and what will the consequence be if they fall short?
  -  **Renewable subsidy:** Generally renewable subsidy (such as feed-in tariffs or subsidised green certificates) associated with small-scale renewable generation is on the decrease, but if any such subsidy will be applicable who will receive such subsidy in the project structure? Will there be a sharing of the benefit of this subsidy? And if the proposal involves adding/amending existing renewable generation, will this change risk losing any subsidy previously secured in respect of the pre-existing facility?

✓ **Flexibility/Capacity Services:** In contrast to such subsidy, the potential for income streams (such as from “Capacity Markets” and contracts with network companies) for flexible generation/response is on the increase. Is the intention that these may be put in place in respect of the relevant on-site power solution and, if so, who will directly be party to such benefits and obligations? Will these benefits and obligations be factored into the wider deal?

✓ **Exclusivity:** what degree and type of exclusivity will be expected/required in respect of offtake of power from the relevant on-site power solution? How does this approach dovetail with regulation, for example in respect of “third party access” to on-site networks? For third party owners/operators of on-site power solutions the degree of exclusivity from the on-site power consumer is frequently a fundamental issue for project economics and bankability.

✓ **Changing regulation/commercials associated with electricity supply from the grid:** the use of on-site power solutions to avoid network charges and policy costs is coming under increasing political scrutiny across a range of jurisdictions and the way in which such charges are applied is evolving in light of this. Wholesale electricity/commodity prices can also of course be turbulent. Who is taking the potential risk and upside of such changes (either foreseeable or unforeseeable)?

✓ **Private wire network responsibilities/charges:** on-site power solutions such as these not only require the underlying generation or storage asset, they also require the relevant electricity line(s), apparatus and equipment to convey electricity within the site. There will be a cost associated with running this, regulation will often apply to the way it is operated, and it will of course be fundamental for consumption of the electricity on-site and (if relevant) to getting the electricity to the point of connection to the grid for export. Who will be responsible for the build and ongoing operation of the network and will they directly charge for such activities?

✓ **Planning:** Given the scale and technology type of project envisaged, what planning/consenting will be required. Who is taking the responsibility and risk for procuring this and what happens if it is not obtained?

✓ **REMIT:** Will this bite? For large scale projects, the potential relevance of the transparency obligations imposed in respect of wholesale markets by regulation on wholesale energy market integrity and transparency (known as REMIT) should not be overlooked.

✓ **Remedies if things go wrong and asset stranding risk:** On-site power solutions by their nature often involve a particularly close reliance between different parties. On the one hand, a third party providing on-site generation/storage will often not only be relying on the relevant on-site consumer to consume (and/or pay for) a certain amount of electricity but in practice will also be reliant on grid connection arrangements held by the site owner for its ability to physically export (and thereby sell) unused electricity onto the grid. Conversely, the relevant consumer not only be expecting a certain level of supply from the on-site power solution, but will also (i) be physically connecting important infrastructure, (ii) will need to carefully assess the extent to which particular actions by a third party on-site power solution operator could jeopardise the sites all-important grid connection, and (iii) in practice will very often be requiring such third parties to ensure energy sector regulatory compliance to some degree or another. Therefore, there is often a benefit to considering early warning breach triggers and step-in rights (with associated property rights), as well as financial compensation and rights to terminate as part of the structure.





# What next?

The statistics show a consistent increase in on-site generation/storage over recent years and there is no indication that this trend will cease.

While in some jurisdictions a reduction in the net value in respect of network charges derived from on-site generation is being implemented, there has been increasing recognition of the value to large demand consumers of secure flexible energy consumption/ demand reduction (at all scales) in an efficient electricity system. This is increasing routes to market for the provision of such services via relatively small scale on-site generation and storage.

With the rise of the net-zero agenda, the reduction in the availability of renewable subsidies for many new projects is not reducing the number of planned on-site projects. This appears to be a combined product of: (i) large-scale consumers remaining determined to “green” their energy procurement as part of the drive to net-zero; (ii) a reduction in cost of renewable technologies (and battery storage) meaning subsidy is less fundamental to the necessary income streams; and (iii) the availability on some projects of power purchase agreements with a strong corporate counterparty giving certainty on long term revenues.

Having said that, the increased prevalence of “corporate”, “virtual” or “sleeved” power purchase agreements, whereby electricity from a remotely located generation facility is acquired for a particular site or wider organisation, may represent a threat to private wire-based projects.

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