Introduction to Power Purchase Agreements
This guide explains the basics of Power Purchase Agreements (PPA) and how Crown Commercial Service (CCS) can assist with their procurement.

We aim to cover the main topics to ensure public sector buyers understand what they need to consider when looking to procure a PPA.
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What is a PPA?
Put simply, a PPA is a contract between two parties, one which generates electricity (the generator) and one which is looking to purchase electricity (the buyer). The PPA defines all of the commercial terms for the sale of electricity between the two parties, including when the project will begin commercial operation, schedule for delivery of electricity, penalties for under delivery, payment terms, and termination. (A similar arrangement is also available for “green” gas and is known as a Gas Purchase Agreement (GPA) but for the purpose of this document we will focus on electricity).

There are a number of different contractual models by which a PPA can be delivered, and it is important to understand what choices of PPA delivery models there are, the differences between them and their associated opportunities, benefits and risks.

This understanding will help guide public sector organisations when deciding the approach that best suits their needs and requirements when looking to secure a PPA agreement. CCS is able to support full end to end PPA services through its energy agreements RM3824 Heat Networks and Electricity Generations Assets (HELGA) and RM6011 Supply of Energy.

Types of PPA
Indirect Wire via Grid
Indirect wire or Corporate PPAs are becoming a popular way for organisations to contract for renewable electricity.

These involve a contractual arrangement where a buyer chooses to buy a specified amount of electricity, for a specified term, from a specified asset which belongs to a Generator. The electricity is then supplied through the normal electricity Transmission and Distribution systems and paid for through a standard electricity Supplier contract. This type of PPA could be with an existing or additional new-to-earth asset (see glossary for description):

- **Existing/Operational assets** will likely give lower prices (as set up and installation costs may already be covered) and be available for immediate delivery on more flexible/shorter contract terms. They may however be considered to be less ‘green’ as they are not adding any “new” green capacity to the network.

- **New-to-earth/new build assets** give what is referred to as “additionality”, as they provide new generating capacity. They are therefore considered as more ‘green’ than existing asset PPA’s. In most cases they will be more expensive and generally require longer contracting as the generator needs to incorporate the new generator facility set up and installation costs.
In general, these PPAs will involve two agreements, one between the buyer and PPA generator and one between the buyer and electricity supplier to allow:

- A price to be agreed between the PPA generator and buyer for electricity and Renewable certificates for the Term of the PPA
- A service charge (also known as a sleeving charge) to be agreed with the electricity supplier, who provides the electricity, for the services involved in calculating and invoicing the cost of the electricity provided on behalf of the PPA generator. The CCS Supply of Energy framework is pre enabled to allow this process both for Electricity (and Gas)
- Portability, to allow the buyer to retain PPA provisions if they change electricity supplier during the lifetime of the PPA

The impact of entering into a PPA will need to be discussed with the electricity supplier in advance to ensure that the volume can be included within the current purchasing strategy.

**Direct Wire**

A Direct Wire Connection or Private Wire PPA involves a direct physical connection between the generator and the buyer/consumer, whether on-site (e.g. roof-mounted solar power) or with a physical connection.

This means electricity can be supplied without needing to use the Transmission and Distribution systems and can be supplied 'behind the meter', avoiding the variable non commodity costs for Transmission and Distribution. This can make the overall total costs of Direct Wire significantly cheaper than Indirect wire PPA's.

An off-site Direct Wire PPA would be similar to an Indirect PPA, in that a contract with the generator would be required for the supply of electricity for a specified price and term. However provision would need to be made to take account of the physical aspects of the installation, including but not limited to:

- installation and maintenance of a physical connection into the site
- generator downtime and in-year performance guarantees
- long-term generation and performance guarantees

With a Direct Wire PPA there is no need for a separate agreement with an electricity supplier (unless to help facilitate the agreement). However if by entering into the PPA, there is a significant effect on the electricity consumption of the site, it may impact on the standard supply contract you already have with a supplier. It is always worth including the electricity supplier at regular intervals of the project to ensure they are aware of impending volume changes and ensure there are no penalty charges.
Virtual
Also known as Synthetic or Financial PPAs, a Virtual PPA is another way to allow access to low-carbon electricity through a financial arrangement only. This form of PPA is not common within the UK but is more widely used in the US.

These types of PPA’s can be interpreted as financial instruments and as such are unlikely to be acceptable for use by public sector organisations.

PPA model summary

<table>
<thead>
<tr>
<th></th>
<th>Indirect via Grid</th>
<th>Direct Wire</th>
<th>Virtual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>Rapid deployment for existing assets</td>
<td>1-2-year lead time for new assets</td>
<td>Financial deployment for existing assets</td>
</tr>
<tr>
<td></td>
<td>Circa 2 year lead time for new assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Term</td>
<td>Medium to Long</td>
<td>Long</td>
<td>Medium to Long</td>
</tr>
<tr>
<td>Availability</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Choice</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Competition</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Sustainability -reporting</td>
<td>Not zero carbon in BEIS rules</td>
<td>Zero carbon in BEIS rules</td>
<td>Not zero carbon in BEIS rules</td>
</tr>
<tr>
<td>Contracting</td>
<td>3-way contract buyer/generator/supplier</td>
<td>2-way contract buyer/generator</td>
<td>Financial contract</td>
</tr>
<tr>
<td></td>
<td>n.b can be a 3 way contract if required.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Export**

Buyers who generate their own electricity, whether from a renewable asset like a solar installation, or from a more traditional source such as a Combined Heat and Power (CHP) gas powered generator, might be interested in a PPA electricity export agreement.

This is an agreement to sell on site generated electricity back to the grid. An Export PPA is usually made with an electricity supplier.

The CCS Supply of Energy framework, provides this facility for public sector organisations.

**Opportunities**

Direct Wire PPAs are more difficult to implement than Indirect Wire PPAs as they require a generation facility to be available on or near a buyer’s site. It is common for a Direct Wire generator to approach potential buyers with a proposed project in order to secure commitment.

If approached directly by a generator, and no competition is conducted, the project will not comply with public procurement regulations. These regulations aim to ensure free and fair competition for any contract for any public sector body. Public sector organisations should always consult their commercial team or seek advice from CCS before proceeding in order to remove the risk of challenge.
PPA as part of an Energy Strategy

Before undertaking a PPA, an organisation should first consider how it will fit into their wider energy and carbon strategies.

The typical organisational approach to reducing carbon emissions works in three stages:

1. Understand current electricity consumption and predict future demand (measure)
2. Reduce electricity consumption through demand management and energy efficiency (manage)
3. Where able, self-generation and were not, source the remaining electricity requirement from the most effective sources, which could include PPAs, green tariffs or conventional grid supply (switch)

Even with extensive energy efficiency, most organisations will still be an underlying demand for electricity. PPAs provide a way to procure this electricity from green sources as an alternative to self-generation, traditional supply markets, supplier-offered green tariffs or carbon offsetting.

Areas for consideration

Entering into a PPA can appear complex, especially when approaching it for the first time.

It is however important to take time to understand some of the technical aspects which would need to be addressed during the process of entering into a PPA. By looking at each in turn, the PPA journey is simpler to navigate. These aspects would cover areas such as:

- **Technology** - what type of generation technology are you looking to secure your electricity from e.g. solar or wind? This will have an impact on price, volume (shape), and term (length of contract)
- **Additionally (newly built projects)** - are you looking to enter into a PPA from an exciting or newly built generator? This will affect Sustainability credentials, price, delivery time and contract term
- **Price** - at what level should you fix your long term PPA price for electricity? This will need to be reviewed, to help assess the potential value for money of a project, with a focus particularly around long-term market forecasts and indexation

CCS has agreements available such as HELGA where buyers can access specialist suppliers to develop energy strategies and incorporate the use of PPA’s. These specialist can provide guidance on the technical aspects to ensure that consideration is given to the specific needs and requirements when selecting a PPA model and approach.
PPA Benefits
This section focuses on the primary benefits of PPAs.

The benefits of a PPA fall into the following categories: Sustainability and Price and Risk Management.

Sustainability
Increasingly public sector organisations are looking to reduce their carbon footprint. This is driven by government policy and environmental targets. As a result organisations are looking to both reduce their energy demand and were possible find low-carbon sources of energy.

PPAs are becoming part of these considerations as they offer a way to directly link a buyer with a low-carbon generator, which offers a great way to address carbon impact and contribute to carbon reduction targets.

The sustainability credentials of a PPA are linked to a number of factors namely: the proximity between a buyer and low-carbon generation, and the certificates which accompany the generated electricity.

Additionality
An important aspect of the sustainability of a PPA is whether it is increasing the amount of renewable generation in the UK – so-called Additionality.

Currently there is no official measure of Additionality, but PPAs which help build new renewable generation (new-to-earth) are perceived as ‘greener’ than existing assets, as they directly contribute to the increase in the total renewable generation on the grid.

‘New-to-earth’ assets will need to be designed and built, and for that reason the price of the electricity generated will need to ensure that the generator’s installation costs are recovered – in general, PPAs for new-to-earth assets will be more expensive than for existing assets.

Each organisation and its stakeholders will need to decide if the perceived sustainability benefits of Additionality are worth the increased cost.
Carbon reporting & green energy

It is important to understand how REGO-supported ‘green energy’ is included within public sector carbon emissions reports. This will have a significant influence on which model and approach to PPA’s is most appropriate. Depending on the type of organisation different standards apply for the reporting of carbon:

- The Greening Government Commitments (GGC) for central government and the voluntary wider public sector Emissions Reduction Pledge (ERP) use strict interpretations which do not count energy from off-site renewable generation as zero carbon.
- Other voluntary standards, including DEFRA’s guidance and the international Greenhouse Gas (GHG) Protocol, allow reporting of ‘green’ energy and carbon offsets as part of an additional Market-based report, which is intended to encourage organisations to invest in green energy or carbon offsets.

Wider public sector bodies can currently choose to follow one of the voluntary standards in which REGOs can be counted as zero-carbon, and this would make all PPAs a viable option to decarbonise the organisation’s electricity supply.

PPA Sustainability summary

<table>
<thead>
<tr>
<th>Type of PPA</th>
<th>Green for GGC/ERP Reporting</th>
<th>Green for DEFRA/GHG Reporting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Tariff</td>
<td>No</td>
<td>Yes</td>
<td>No link between generator and buyer, no guarantee on origin of ‘green’ certificates</td>
</tr>
<tr>
<td>Purchased REGOs from names asset</td>
<td>No</td>
<td>Yes</td>
<td>Link between generator and buyer</td>
</tr>
<tr>
<td>Virtual PPA</td>
<td>No</td>
<td>Yes</td>
<td>Contractual link between generator and buyer</td>
</tr>
<tr>
<td>Indirect Wire PPA – existing assets</td>
<td>No</td>
<td>Yes</td>
<td>Contractual and electricity supply link between generator and buyer</td>
</tr>
<tr>
<td>Indirect PPA – new-to-earth assets</td>
<td>No</td>
<td>Yes</td>
<td>Contractual and electricity supply link between generator and buyer with new generation being funded</td>
</tr>
<tr>
<td>Direct Wire PPA</td>
<td>Yes</td>
<td>Yes</td>
<td>Contractual and direct electricity link between generator and buyer with new generation being funded</td>
</tr>
</tbody>
</table>

1 REGO-backed energy is not counted as zero-carbon by these standards as it is already counted within the calculation of the UK electricity grid mix. This avoids double-counting the renewable energy within two sets of government reporting.
Price and Risk Management

As a PPA is likely to be a long-term contract, the price offered and associated risk offered will be a key consideration to any potential buyer. The price obtained will be influenced by a number of factors: Commodity, Volume, Technology and Term and alongside each of these are associated risks.

Commodity Price

It is hard to predict with any degree of certainly the outturn of the commodities market, however buyer are keen to understand if the commodity price offered by a PPA generator will be competitive and offer value against the traditional wholesale market.

Some factors that may influence the price include:

- The business case for each project will be different, depending on Volume, Technology and Term
- PPAs for new-to-earth assets will likely be more expensive than for existing assets
- In-Direct PPAs will need to include shape and balancing costs in addition to the commodity cost of electricity
- Direct Wire PPAs eliminate the need to pay Transmission and Distribution costs, significantly reducing the total delivered price of electricity
- Direct Wire PPAs may include additional costs such as maintenance or lease of generating equipment and supporting infrastructure
- Future price increases across the lifetime of the contract. Important factors to consider are internal priorities, Indexation and how the prices compare to the current market forecasts

Volume

The volume of electricity required can have an impact on the price of a PPA:

- Smaller volume PPA's may have relatively high transaction costs as contracts will need to be negotiated / competed and legal costs incurred regardless of the size of contract. The risk associated could be larger generators may choose not to participate for smaller volumes
- Larger volume single PPA's may only be able to be satisfied by larger developers so will reduce the number of suppliers able to compete meaning this may reduce the number of SMEs bidding
- Assets have a ‘natural’ volume attached to them, for example a 10MW wind turbine would generate around 30GWh of electricity every year. Organisations whose volumes fit the natural volume of an asset would mean a generator needs only one contract to cover their asset which could be beneficial. NB. generators may choose to keep some volume out of contract to manage the variability inherent in renewable generation
**Technology**

Technology will have an impact on pricing, with different technologies having differing maturities, generation profiles and intermittency.

- **Underlying technology:** some technologies may be more expensive but still desirable due to other reasons, particularly if they provide Baseload power
- **Maturity:** technologies become more cost effective as they mature
- **Generation profiles:** solar power only generates during the day, meaning any overnight electricity demand will need to be delivered from the grid and purchased via the wholesale market
- **Intermittency:** solar and wind power vary in generation depending on the weather, meaning total generation has to be managed to provide a reliable output

<table>
<thead>
<tr>
<th>Technology</th>
<th>Maturity</th>
<th>Seasonality</th>
<th>Intermittency</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onshore wind</td>
<td>Mature</td>
<td>Slight winter bias</td>
<td>Intermittent but predictable on day +1 level</td>
<td></td>
</tr>
<tr>
<td>Offshore wind</td>
<td>Reasonably mature</td>
<td>Slight winter bias</td>
<td>Intermittent but predictable on day +1 level</td>
<td>Price improving as deep water tech develops</td>
</tr>
<tr>
<td>Solar Photovoltaic</td>
<td>Mature</td>
<td>Summer bias</td>
<td>Daytime only, intermittent</td>
<td></td>
</tr>
<tr>
<td>Anaerobic digestion</td>
<td>Mature</td>
<td>None</td>
<td>None</td>
<td>Can provide Baseload</td>
</tr>
<tr>
<td>Combined Heat and Power (natural gas)</td>
<td>Mature</td>
<td>None</td>
<td>None</td>
<td>Not zero carbon</td>
</tr>
<tr>
<td>Combined Heat and Power (biogas/ hydrogen)</td>
<td>Immature</td>
<td>None</td>
<td>None</td>
<td>Zero carbon</td>
</tr>
<tr>
<td>Wave &amp; tidal</td>
<td>Very Immature</td>
<td>Slight winter bias</td>
<td>Predictable</td>
<td></td>
</tr>
</tbody>
</table>

**Term**

The ideal term, contractual length or as it is sometimes referred to “tenor” of a PPA, is dependent on several factors, including the technology selected and whether it is a new-to-earth/new build or existing/operational asset. In general, longer-term deals face more uncertainty about future value, so there is likely to be a risk premium built into the price.
**New to Earth/New Build Assets**

For a new-to-earth asset the PPA for the generator provides them with a guaranteed regular financial income allowing them a bankable capital flow to invest in the new asset. The generator will therefore be looking for a return on the investment which is higher than the credit charge secured to finance any upfront borrowing or the opportunity costs of investing any capital elsewhere.

These types of PPAs are usually for a longer period of time typically 10 - 15 years (however may be longer depending on the type of technology used and PPA type). This secures the generator profitability and pay back over the period of the project’s life, and also gives a buyer a chance for long-term price fixing.

**Existing/Operational Assets**

For existing or operational assets, where the original build and set up investment has already been made, and in some cases paid back, shorter term PPAs between 5 – 7 years may be available. This strikes a balance between the 3-year horizon of the traditional electricity market and the longer term PPAs.

Finding the ideal term for a PPA deal is a matter of balancing the different considerations in a way that best fits an organisation objectives and attitude to risk.

**Sleeving contract**

Indirect Wire via Grid PPA arrangement will require a Sleeving contract with an electricity supplier as well as the PPA provider. Sleeving is the industry term used to describe the process whereby the electricity supplier acts as an agent on behalf of the buyer to manage the offtake from the generator’s asset, and provides provision for the electricity to be included in the wider supply contract. This service will usually incur a fee from the supplier and therefore require a contract to be put in place.

The CCS Supply of Energy Framework, is already enabled to allow organisations to arrange a Sleeving contract with the electricity (or gas) supplier.

Electricity suppliers can and may also be required to perform balancing and shaping services alongside the sleeving, independently from the generator.

It is important to consider portability during the contracting phase, for example: it is not intended that entering into a 15-year PPA also locks an organisation into a 15-year electricity supply deal. Provision should be made to move or ‘port’ the PPA balancing and shaping arrangements and associated charges to a new electricity supplier.

**Future Commodity price**

One of the most important aspects of the future long term PPA commodity pricing is establishing how or if it will be charged over the length of the contract. There are several different models which could be applied, from a fixed price for the entire period to a variable model based on an index link with the wholesale market. Which approach used will be dependent on organisation’s risk appetite versus the need for price certainly and stability.
Procuring a PPA

All public sector organisations need to ensure that they are compliant with EU procurement rules and this is especially so when the contract term is long and values are high. Ensuring best practice governance of the procurement procedure is critical both to deliver a successful procurement and to ensure that there is no risk of challenge.

In order to ensure the provision of appropriate specialist support and to deliver a PPA there is usually the need for three independent procurement exercises:

- **Consultancy:** Procurement of specialist PPA consultant to lead market engagement, market testing, cost/price analysis and the development and drafting of tender documentation including the specification, KPI’s and evaluation criteria
- **Legal:** Procurement of specialist legal expertise to lead in the review, development and drafting of the appropriate PPA terms and conditions to be included as part of the tender documentation
- **PPA Procurement:** Management of the tendering process leading to successful delivery of the PPA

**Consultancy**

Given the nature of PPA’s it is recommended that buyers source an experienced PPA consultant to support with the early stages of the procurement documentation development.

The role of the consultant would primarily be to undertake the required market testing, cost/price analysis and development and drafting of the specification and evaluation criteria taking into account the specific requirements of a buyer’s organisation.

The consultant support should provide a buyer with a bespoke suite of PPA tender to use to maximise good quality procurement outcomes.

**Legal**

Given the nature of the project, the potential value and length of a PPA it is recommended that buyers source experienced PPA legal support to ensure that all corresponding contractual terms are robust and that risk is managed at the appropriate level.

The role of legal support would primarily be to review, develop and draft appropriate PPA contractual Terms and Conditions for all parties, taking into account the specific needs and risk requirements of a buyer’s organisation.

The Legal support should provide a buyer with a bespoke suite of Terms and Conditions to use to ensure the contractual effectiveness of any future PPA agreements.
PPA Procurement
Given the nature of the project, the potential value and length, it is recommended that buyers source PPA providers using a compliant but flexible tendering route.

The role of the PPA procurement will be to maximise market participation via a competitive tendering process, providing buyer with a fully market tested PPA provider. On completion, buyer will be in a position to appoint a provider and enter into a PPA contract that supports its long term objectives in relation to sourcing sustainable carbon neutral power.

CCS provides public sector organisations with a comprehensive OJEU compliant route for procuring a PPA through its HELGA agreement, covering both Direct Wire Connections and Indirect Wire via Grid PPAs.

HELGA also provides access for buyers to source specialist Consultancy support, to assist with overarching Energy Strategy and pre procurement business case development, PPA market research and price analytics, PPA specification through to supplier evaluation criteria. Legal support can also be accessed via CCS agreements to help with the creation or review of terms and conditions if required.

CCS agreements are simple and flexible to use and designed to allow you to tailor the scope of work required to meet your organisation’s individual needs.

Below is a typical example of a PPA procurement timeline when using the HELGA agreement:
Glossary

Additionality - the concept of adding more renewable generation onto the grid. Linked to new-to-earth assets/new build.

Buyer - a user of energy/electricity. Also called an Offtaker/consumer.

Carbon footprint - a term for the carbon emissions from an organisation or individual. A carbon footprint will likely also include non-carbon greenhouse gases, such as methane or refrigerants, which also contribute to climate change.

Existing asset - an asset which has already been built and generates additional from a PPA, not directly contributing to an increase in the total amount of renewable generation. Also referred to as an Operational asset.

Gas Purchase Agreement - an agreement which allows a Gas generator to export to the grid.

Generator - a generator of electricity (or gas). Also covers Developers, who will develop a project which could then potentially be run by another party. Also known as a generator.

Greenhouse Gas Protocol (or GHG Protocol) - an international standard for reporting on emissions of greenhouse gases such as carbon dioxide.

Greenhouse gases (GHG) - gases which have been identified as contributing to climate change. The main definition of GHGs comes from the Kyoto Protocol, and includes carbon dioxide and methane as the main sources of warming.

New-to-earth asset - an asset which has not yet been built which will be encouraged to be built by the guaranteed income from a PPA, hence increasing the total amount of renewable generation. Also referred to as a New build.

REGOs - Renewable Energy Guarantee of Origin certificates, certificates which show that electricity (or gas) has been generated from a low-carbon source.

Sleeving - Sleeving is the industry term used to describe the process whereby the electricity supplier acts as an agent on behalf of the buyer to manage the offtake from the generator’s asset, and provides provision for the electricity to be included in the wider supply contract. This service will usually incur a fee from the supplier.

Supplier – a traditional supplier of electricity (or gas).

Term - the length of the agreement to supply electricity from the generator to the buyer. Also referred to as Tenor.

Transmission and Distribution - Transmission and Distribution refers to the different stages of carrying electricity over poles and wires from generators to a home or a business. The primary distinction between the two is the voltage level at which electricity moves in each stage.
Disclaimer: The details contained within this guide are for reference purposes only. Before entering into any form of contractual arrangement an organisation should satisfy themselves that they have understood all associated risks and challenges. Specialist support should be sought as part of the PPA process.

Contact details
If you need general advice about the services that CCS offers please contact our customer service helpdesk:

0345 410 2222
info@crowncommercial.gov.uk
www.crowncommercial.gov.uk

@gov_procurement
Crown Commercial Service