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Department of **Mines, Industry Regulation and Safety**
Energy Policy WA

Hybrid Power Purchase Agreement Guide

Mine onsite renewable energy in Western Australia

September 2022

Working together for a **brighter** energy future.

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How to use the accompanying template

The hybrid PPA template which accompanies this Guide is designed primarily for remote, off-grid mine sites. It contains basic provisions for inclusion (highlighted) if there is a grid connection but these will need to be reviewed based on any arrangements with the relevant network service provider and retailer for the connection point. The hybrid PPA template does not include provisions for participation in the Western Australian Wholesale Electricity Market.

Important Notices

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Gold Field's Agnew gold mine has a Power Purchase Agreement with EDL for supply of power from 18 MW of wind, 4 MW_p of tracking solar, 13 MW / 4 MWh battery and 21 MW of gas/diesel generation. Source: EDL.

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Glossary

Term	Definition
Customer	The owner of the mine site and buyer of the electricity under the Power Purchase Agreement (PPA).
(Cth)	Legislation of the Australian government
equipment	The plant and equipment owned by the IPP and used for the generation of the electricity to be sold under the PPA, including all metering and cabling.
hybrid PPA template	The separate document that this Guide refers to and is available from Energy Policy WA's website.
Independent Power Producer (IPP)	The owner of the equipment and seller of the electricity under the Power Purchase Agreement.
PPS Act	<i>Personal Properties Security Act 2009</i> (Cth), discussed in section 4.
RET Act	<i>Renewable Energy (Electricity) Act 2000</i> (Cth).
WHS Law	<i>Work Health and Safety Act 2020</i> (WA) including regulations made under that Act, specifically the <i>Work Health and Safety (Mines) Regulations 2022</i> (WA).

Abbreviations

Term	Definition
ACCU	Australian Carbon Credit Unit
ARENA	Australian Renewable Energy Agency
capex	capital expenditure
IPP	Independent Power Producer
kWh	kilowatt hour, unit of energy
LGC	Large-scale Generation Certificate (a Renewable Energy Certificate issued by the Clean Energy Regulator under the RET Act)
MW	megawatt, unit of power
MW _p	megawatt peak, photovoltaic DC power output under standard test conditions
MWh	Megawatt hour, unit of energy
PPA	Power Purchase Agreement
REF	Renewable Energy Fraction, also referred to by some as annual energy contribution
RPF	Renewable Power Fraction, also referred to by some as instantaneous power penetration

Overview and scope

1. Approach to a hybrid power purchase agreement

1.1 Scope

This Guide is targeting power purchase agreements (PPAs) for mine onsite renewable energy generation in Western Australia. It is designed to help you get the maximum benefit from the Western Australian Government's **hybrid PPA template**.

The hybrid PPA template has been prepared for remote, isolated power systems. It also contains optional clauses for co-located generation for grid-connected sites, where the generation is "behind-the-meter". It does not cover "contract-for-difference", "virtual" or "corporate" PPAs, which use grid-connected generation not co-located with the onsite loads.

The hybrid PPA template permits the Customer and the IPP to bring together generation from carbon energy sources with generation from renewable energy sources.

This Guide presents a high level overview of the main legal and commercial issues you will need to deal with in a hybrid PPA, and outlines some of the possible variations you may consider to the hybrid PPA template, to better fit your project.

The Guide does not attempt to be a comprehensive or detailed manual on all permutations and issues related to PPAs. It assumes a basic understanding of energy contracting and of some of the technical and economic considerations associated with a hybrid power solution for a mine site and therefore does not describe these considerations in any detail. For more information on some of these initial considerations, ARENA's handbook *Hybrid power generation for Australian off-grid mines* (June 2018) is a useful guide.¹

The hybrid PPA template is intended as a starting point for negotiating the terms of a PPA for your project and as mentioned above has been prepared with a limited scope. You should seek professional advice to customise the hybrid PPA template to the needs of your project.

There are two main variants of the hybrid PPA template – one for remote ("islanded") systems, and one for grid-connected systems. The variations for the grid-connected systems are shown highlighted in the hybrid PPA template. These variations do not cover renewable generation systems designed to export to the grid, if generation exceeds the onsite load, additional technical and contractual considerations are required for grid exports and participating in the Western Australian Wholesale Electricity Market.

The hybrid PPA template is deliberately brief and simple for ease of use in smaller scale projects. It can be scaled up to make it more complex if appropriate for a particular project. This Guide discusses some of the ways in which that might be done.

1.2 Possible commercial models for hybrid generation

When a Customer and a technology provider (whether an IPP or otherwise) come together to build and operate a hybrid power solution for a mine site, they can adopt one of several commercial models. These include:

¹ arena.gov.au/knowledge-bank/hybrid-power-generation-for-australian-off-grid-mines/

- a conventional PPA; in which the IPP supplies, build, owns and operates the hybrid power solution on the mine site and sells the electricity generated to the Customer;
- a design, construct, operate and maintain model in which the technology provider builds the hybrid power station for the Customer to own. Following construction, the provider operates it on a services contract basis;
- an equipment leasing model, in which the technology provider makes plant available for the Customer or another contractor to operate and maintain.

Each of the business models, and others, can involve a range of pricing options. Section 6.1 expands on some of the pricing options. At the heart of the commercial relationship:

- the technology provider wishes to recoup its investment in building the equipment, its costs of operating and maintaining it, with a suitable margin; and
- the Customer wishes to secure energy for a medium to long period, usually the life of its mine, but may not wish to own the assets and have their funding cost on its balance sheet.

How to balance these requirements will be a matter for negotiation in each case, but the options include the Customer paying a simple standing monthly charge, paying a mix of fixed and variable charges, or paying only a variable per kWh charge. The hybrid PPA template adopts the conventional PPA model with a pricing option which uses both fixed and variable charges.

In choosing your business model, there will be a number of risk factors to take into account such as uncertainties regarding the remaining mine life, regulatory changes (particularly in relation to the energy sector and decarbonisation), early termination, force majeure impacts etc. Consider how each risk factor impacts your chosen business model and ensure risk is allocated in a manageable way.

1.3 Risk analysis is crucial

This Guide touches on some of the commercial and legal issues involved in designing your PPA. However, although beyond the scope of this Guide, engineering and operational issues will be critical in both the design of the power solution and its operation. These issues inform the commercial and legal issues and solutions.

It is therefore critical to undertake a risk analysis at the outset to understand key risks associated with construction, regulatory environment, delays, performance requirements etc so that you can ensure the PPA adequately allocates and mitigates these risks for your project from a commercial and legal standpoint. The generic risk allocation reflected in the hybrid PPA template agreement may not be appropriate for your project.

1.4 Characteristics of renewable generation

You should consider the characteristics of renewable generation in the context of the power needs of an operational mine site. Renewable generation is both intermittent (i.e. wind speed below the cut-in wind speed of wind turbines and no sun at night) and variable (i.e. wind turbine generation varies with wind speed and solar photovoltaic generation varies with a range of factors including cloud cover).

The costs of operating renewable generation assets are relatively low (compared to traditional fossil fuel generation assets) but in the context of a mine site, the reliability and security of supply will be of far greater importance than the operating costs of acquiring the power. Typically, at present, a hybrid power solution involving some carbon generation is used, as opposed to a pure renewable power solution utilising energy storage.

1.5 Particular risks of renewable and hybrid generation

A hybrid power solution requires the parties to agree to the maximum ratio of instantaneous renewable power delivered to the fluctuating load. This ratio is known as the renewable power fraction (**RPF**). The RPF continually varies as the load and generation mix vary, so it is the maximum RPF allowed that is the key system design criteria. Detailed load analysis and renewable resource monitoring is required to undertake the modelling to optimise the system design. While estimates of solar and wind resources exist for Western Australia, onsite resource monitoring is recommended, particularly for wind.

The renewable energy fraction (**REF**) describes the portion of total energy serviced by the renewable generation over a defined amount of time, typically a year.

The RPF and REF need to be modelled for each specific project taking into account any constraints posed by legacy infrastructure and integrating the generation solution with existing, or upgraded, control systems and generation fleet. ARENA's handbook sets out a number of hybrid integration considerations.²

The hybrid PPA template allows for performance requirements to be included; it can be tailored to include both a maximum RPF and a minimum, annual REF. The hybrid PPA template also has a section to specify the contract maximum quantity. This is similar to the traditional 'contract maximum demand' often used in PPAs but it refers to the maximum generation to be made available as opposed to the maximum demand from the Customer's load. In setting the contract maximum quantity, it should be noted that a shortfall in the renewable generation annual forecast is not the same thing as to whether the equipment is performing efficiently. The renewable generation performance requirements should take into account the forecast renewable resource as well as potential annual variations. The hybrid PPA template seeks to mitigate the risk of the intermittency and variability in the renewable resource by excluding the IPP's liability for renewable generation supply shortfalls due to such intermittency and variability.

If this is not appropriate for your project, an alternative risk allocation will be needed, taking into account the quality of the renewable resource data available. It may be possible to obtain insurance products to mitigate the risk further.

1.6 Renewable energy and carbon mechanisms

The scheme for Large-scale Generation Certificates (**LGCs**) under the RET Act is administered by the Clean Energy Regulator, and is currently valid to 31 December 2030. Under the scheme, liable entities are required to surrender certificates to acquit their LGC surrender liability. Liable entities can also voluntarily surrender LGCs.

Given one of the key drivers for installing a hybrid power solution is likely to be decarbonisation, you will need to consider who should get the benefit of LGCs and any other 'green' benefits. The hybrid PPA template provides for the Customer to have the benefit of these.³ The value of the LGCs can be factored into the pricing mechanism for the renewable electricity.

Australian Carbon Credit Units (**ACCUs**) are issued by the Clean Energy Regulator for greenhouse gas abatement activities. Each ACCU represents one tonne of carbon dioxide equivalent stored or avoided by a project. Eligible offset projects must meet a number of ongoing requirements to qualify for ACCUs (see section 6.5).

² Refer to section 3 of ARENA's handbook.

³ Note an IPP could be the liable entity as a notional wholesaler under the RET Act where the grid that it delivers electricity to the Customer through has a capacity of 100 MW or more. The scope of the parties' obligations under the RET Act need to be considered on a case-by-case basis.

An independent review into ACCUs was announced by the Australian Government on 1 July 2022. The law in this area is likely to change in the coming years. It is not possible to factor in how reforms may evolve. A generic change in law clause is included in the hybrid PPA template but this may not address all changes. To a certain extent this is a risk which the parties may not be able to fully address now in a long term PPA but you should consider the potential impact of possible replacement schemes or simply expiry of the current schemes with no replacement.

1.7 Tenure

Where the footprint of the renewable energy project falls beyond the boundaries of the relevant mining lease, alternative tenure is required. Situating these projects on land which is otherwise open for mining or where there are other competing land uses may cause some tension.

Tenure is therefore a key consideration. Solar arrays can have a material footprint, and once installed will place significant limitations on other uses of that land. Wind farms typically require a much greater total land area per MW than solar, for wind turbine spacing not the actual land required for footings and access. However, wind farms can co-exist with other land uses between the individual wind turbines.

Traditional forms of mining tenure under the *Mining Act 1978 (WA)* are not always appropriate or indeed available. Access for construction of wind turbines also needs to be considered (i.e. the access roads need to be able to accommodate heavy tonnage and the transportation of the blade lengths).

Reform of tenure solutions is currently being undertaken by the Western Australian Government in the form of the *Land and Public Works Legislation Amendment Bill 2022* as it is recognised that traditional tenure solutions (for example, general purpose leases or miscellaneous licences under the *Mining Act 1978 (WA)*) are not always fit for purpose for renewable projects.⁴

1.8 Key issues in any construction project

As with any construction project, a hybrid power project will carry construction risk. Delays to the date for commercial operations could significantly impact operations at the mine site. Any changes in scope by way of variations could impact the financial modelling for the supply charges (e.g. if the capital expenditure increases or decreases).

Defining exactly the works the IPP is responsible for, works the Customer is responsible for and who is responsible for the interconnection works is crucial. The hybrid PPA template includes basic provisions for the installation phase. Alternatively, you could choose to use more traditional construction contracts (e.g. engineering, procurement and construction (EPC) contract or design and construct (D&C) contract) but for a small scale project you may find them overly complex. The hybrid PPA template aims to bridge this gap, but necessarily provides less 'machinery' to deal with these issues when they arise.

1.9 Grid connection

The hybrid PPA template is primarily designed for an off-grid mine site. If the project will be grid connected, then there are a number of additional issues to consider (see section 7). The basic provisions that will be needed if grid connected are highlighted in the hybrid PPA template. These provisions do not cater for participation in the Western Australian Wholesale Electricity Market, on the assumption the system will be designed and engineered to not export to the grid or that the Customer will wish to leave this to the grid-based retailer.

⁴ www.wa.gov.au/government/document-collections/land-and-public-works-legislation-amendment-bill-2022 and consultation.dplh.wa.gov.au/land-use-management/diversification-lease-draft/

1.10 Structure of the template PPA and this Guide

The hybrid PPA template is divided into discrete parts, grouping together the provisions dealing with:

- Interpretation
- Commencement and duration (see Section 2 of this Guide)
- Safety, environment and compliance (see Section 3 of this Guide)
- The site (see Section 4 of this Guide)
- The equipment (see Section 5 of this Guide)
- Power supply and purchase (see Section 6 of this Guide)
- Risk and liability (see Section 8 of this Guide)
- Default, disputes and termination (see Section 9 of this Guide)
- Other provisions (see Section 10 of this Guide)

Some of the issues involved with a grid connection are discussed in Section 7 of this Guide.



Northern Star's 5.26 MW solar array (east and west facing panels) at Carosue Dam mine.
Source: Nomadic Energy.

2. Commencement and duration

2.1 Commencement

The hybrid PPA template is designed to become binding immediately upon execution, subject to any conditions precedent included in clause 6. However, the **supply period** does not commence until all required equipment has been installed and commissioned. That is when commercial operation commences.

The installation provisions discussed in section 5 place the risk of this date being delayed on the IPP, reflecting the fact that the Customer will need to be assured of supply on the specified date.

The hybrid PPA template anticipates that any supply of electricity during commissioning does not form part of the supply charges. If an extended ramp up or commissioning phase is required, a specific provision that sets out obligations during this period should be included. It is not recommended to start the supply period until steady state commercial operations are achieved as this could have unintended consequences in how the contract operates. For example, the obligation on IPP to supply the contract maximum quantity would commence, as would the obligation on the Customer to pay the fixed charge, together with all other rights and obligations which are only intended to apply once steady state operations are achieved. For a complex project with multiple renewable energy sources you may need to commission in stages, in which case you could commence the supply period once the first stage has reached steady state operations but ramp up to the contract maximum quantity once all components are commissioned and operational.

If the Customer needs temporary supply during the construction phase, this could be included as additional terms in an Appendix or it may be better dealt with in a separate side agreement.

Similarly, within the spirit of keeping this hybrid PPA template simple and manageable, the cost and benefit of fuel consumed and energy generated during construction and commissioning is better dealt with by a simple side agreement, rather than trying to include it in the PPA.

2.2 Duration

The length of the supply period is set out in the key commercial terms in Appendix A. This can be a fixed date or a number of years after the supply period starts.

As the PPA is designed to recover the IPP's investment in the equipment over a period, if the agreement ends before the end of the set supply period there are provisions for buyout of the equipment to allow the IPP to recover that capital investment (see section 9.1).

2.3 Extension of supply period

The hybrid PPA template contemplates a single supply period after which it expires. As noted above, the PPA is designed to recover IPP's investment in the equipment over the supply period. At the end of the supply period, the Customer has the option to purchase the equipment. If the capital investment in the equipment has been fully recovered throughout the supply period through the supply charges, the buyout amount should be zero or a nominal amount. The Customer can therefore take over ownership of the equipment and continue to operate and maintain it to end of mine life or the end of the equipment's useful life if earlier.

However, there are a number of scenarios under which the Customer may prefer to have an option to extend the supply period, including:

- If the initial supply period was relatively short due to an uncertain remaining mine life and the Customer subsequently requires a longer term.
- If the Customer does not want to take over the operation and maintenance of the equipment or prefers to outsource power operations to the IPP from a risk or efficiency perspective.
- If the Customer does not want to accept the responsibility for decommissioning and removal of the equipment at a later date.

The appropriate supply period and any potential options to extend will need to be considered on a case by case basis dependent on the circumstances of your particular project. If the original capex has been recovered during the initial term, then unless there is substantial renewal capex required, it would be reasonable for the tariff in any subsequent terms to be lower.

2.4 Conditions precedent

The hybrid PPA template includes a placeholder for any required conditions precedent. If including conditions precedent, the parties need to consider who has the benefit of each condition precedent, who (if anyone) can waive a condition precedent, and which party/parties should be permitted to terminate the agreement if a condition precedent is not satisfied.

Each party should spend time considering possible disruptions in approvals, financing or whatever else has been set as a condition precedent, to ensure that this clause does not produce adverse unintended outcomes, such as permitting a counterparty to make a strategic termination if market conditions have changed.

Long lead items

If the timetable is short, the parties may need a separate agreement to cover the purchase of long lead items before this agreement becomes unconditional. Once again, to keep this long-lived agreement simple, these transitional matters are usually best dealt with in a short separate agreement. However, the parties will need to agree what happens to that expenditure if this agreement terminates due to non-satisfaction of the conditions precedent. The Customer will also wish to ensure that capex is not counted twice in the tariff calculations.



Gold Field's Granny Smith mine has a 7.7 MW_p single-axis tracking, solar array combined with a 2 MW / 1 MWh battery to reduce fuel consumption from the 35 MW gas engine generation fleet. Source: Gold Fields.

3. Safety, environment and compliance

3.1 Site access and safety compliance

Under the hybrid PPA template, the IPP is given access to a site area on the relevant mining tenements where the equipment will be installed. The IPP is given control of the site and so is responsible for safety and security in respect of their site.

However, the Customer will still need to discharge its health and safety duties under the WHS Law with respect to the mine site and so the IPP is required to comply with directions of the Customer's site senior executive (formerly called the "registered manager") and to cooperate in relation to any notifications and investigations. Note that the site senior executive's power to give directions can extend to a suspension of activities, if warranted.

You will also need to consider other statutory positions required under the WHS Law, for example, electrical supervisor and high voltage operator, and identify who is responsible for carrying out those roles and associated duties on the site.

The clauses in the hybrid PPA template reflect a minimalist approach. Consider if more detailed requirements are preferred. A more detailed approach may include:

- specific reference to the Customer's site access policies and procedures, in which case you will likely want to deal with how those policies and procedures may change over time;
- requirements in relation to site inductions;
- requirements for the IPP to have an appropriate safety management plan and how this interacts with the Customer's policies, plans and requirements;
- requirements for safety audits.

Consider whether the PPA's allocation of responsibilities between IPP and Customer in respect of their site and the mine site is appropriate for your particular project.

3.2 Environment

The hybrid PPA template includes a generic obligation to comply with laws relating to the environment on the site. The approvals matrix at Appendix E should set out who is responsible for obtaining relevant approvals.

There is a separate provision dealing with responsibility for decommissioning and remediation (clause 32 of the hybrid PPA template).

Again, consider whether the hybrid PPA template's allocation of responsibilities between IPP and Customer in respect of environmental obligations is appropriate for your particular project.

4. The site

The hybrid PPA template includes, in Appendix F, a simple site licence for the site on which the equipment is to be installed.

Consider whether you want to include more detailed provisions in relation to issues such as:

- a requirement for Customer or IPP to accept the risk in relation to geotechnical conditions on the site;
- any existing contamination or pollution at the site which Customer needs to accept liability for;
- a detailed process for management of cultural heritage compliance.

Reflecting normal commercial practice, and the practicalities of the Customer's likely mining tenements, the tenure granted by the hybrid PPA template is a licence (right to enter and remain) only, not a lease (which would give the IPP actual title in the underlying tenement). The IPP will need to ensure its financiers are aware of this fact, and will need to take steps under the PPS Act to secure its interests in the equipment (see clause 34.1(b) of the hybrid PPA template).



Gold Field's Gruyere mine has a 13.6 MW_p single-axis tracking, solar array combined with a 4.4 MW / 4.4 MWh battery to reduce fuel consumption from the 57 MW gas/diesel engine generation fleet. Source: Gold Fields.

5. The equipment

In the hybrid PPA template, references to “**equipment**” are to the power facility to be provided by the IPP. This is to include all generation and storage plant and equipment and all cabling, wires, metering etc necessary to deliver electricity to the supply point.

The hybrid PPA template does not include detailed requirements around design and assumes that the design has been agreed prior to PPA negotiations, such that the hybrid PPA template is simply implementing that agreed design. The design is critical; the design and operating philosophy must be compatible with the power needs of the Customer’s mine site, and the capabilities of the selected equipment, if the Customer is to enjoy a reliable and secure power supply.

The hybrid PPA template anticipates the Customer will undertake some customer works on the load side to enable the Customer to take the electricity. The definitions of equipment, customer equipment, work and customer work will need to make clear the party that owns each part of the equipment or works and the responsibility for interconnection works.

You may want to consider including general arrangement drawings and a single line diagram to assist with clearly identifying ownership and responsibilities as contemplated by Appendix C.

5.1 IPP equipment

5.1.1 Installation

The hybrid PPA template requires the IPP to supply and install the equipment with key technical requirements included in Appendix B, for example installed capacity (in MW and MW_p for solar arrays), power generation (in MVA).

The hybrid PPA template requires the IPP to supply and install the equipment to meet an agreed date for commercial operation. Other than notification of timing for commissioning, there is no oversight by the Customer of the installation phase. The obligation is on the IPP to deliver on time to meet the requirements. Delay liquidated damages are payable if the date for commercial operation is not met, subject to any permitted extensions of time. All risk associated with the installation scope therefore sits with the IPP.

The hybrid PPA template does provide for an agreed works program which sets out key activities and dates.

Under this approach the types of provisions often found in construction contracts are not included. Standard construction contracts can be used if preferred for the construction/installation phase but it is often the case that many of the provisions in those contracts are overly complex for a project of the scale contemplated here.

If greater oversight and control is preferred during the installation phase, additional obligations to consider include:

- an independent engineer or a Customer representative to oversee construction/installation, commissioning and testing;
- provision of construction management plans for approval by the Customer;
- progress reporting throughout the construction/installation phase and associated process for delay events and extensions of time.

If the IPP is also to undertake design of the equipment, obligations in relation to the design should be included.

These obligations may include:

- a requirement to design the equipment to meet technical specifications/the performance requirements;
- a requirement to design the equipment in accordance with good industry practice, all laws and approvals;
- an obligation to provide the single line diagrams and other general arrangement drawings for the equipment, showing plant ratings, battery limits and connection points;
- lists of major plant items etc;
- a process for agreeing the design documents;
- provisions in relation to the reliance on any Customer provided information.

5.1.2 Operation and maintenance

Operations philosophy

During the commercial operations phase, the IPP remains the owner and operator of the equipment.

The primary obligations of the IPP in relation to operations and maintenance are to operate and maintain the equipment safely, in accordance with applicable laws and approvals, and to meet the performance requirements set out in the PPA. Some additional specific obligations have been included to give the Customer comfort that the value and utility in the equipment is preserved and for the IPP to report on the condition of the equipment given that the Customer has a purchase option exercisable at the end of the supply period.

The hybrid PPA template contains a high level statement on operations with respect to any installed battery. This obligation is to use surplus renewable energy to charge the battery and to use the battery for ancillary services. You may wish to include a more detailed operational philosophy associated with charging and discharging an installed battery if, for example, the parties require the battery to be charged during the day to provide clean energy at night when there is no solar generation.

You should also consider whether you want to include any requirements to identify improvements or modifications that will improve operational efficiency or productivity. Assessment of these types of enhancements requires the parties to understand anticipated impact on reliability, efficiency and cost and potentially to adjust for these in the commercial model and supply charges.

Maintenance scheduling

The hybrid PPA template anticipates that the parties will coordinate to agree a maintenance program each year which seeks to minimise the impact of planned outages on each party.

Under the hybrid PPA template's commercial model the fixed charge will continue to be payable throughout any planned outage. If a different commercial model is adopted, the impact of planned outages will need to be considered by the parties (see section 6).

5.2 Customer equipment and services

The Customer is to supply and maintain the load side connection equipment, including maintaining a system of electrical protection to prevent damage to the Customer equipment arising from faults in the IPP equipment.

Consider whether any other Customer services are required to facilitate the PPA. These may include supply of fuel for carbon energy sources and may also include other services such as flights or accommodation for remote sites.

6. Power supply and purchase

6.1 Supply charges

There are many different commercial models you can apply to supply charges. The hybrid PPA template supply charges are divided into a fixed charge, payable whether or not electricity is consumed and a variable charge (\$/kWh) payable by reference to consumption for each month of the supply period.

The fixed charge in the hybrid PPA template operates like a take or pay mechanism in that it is payable regardless of consumption. As this is behind the meter supply, any failure by the Customer to take the electricity (such as where the Customer equipment is disconnected) will automatically result in a cessation of generation as the intent is not to supply power to the grid (and for a remote hybrid PPA, there is no grid connection). The IPP therefore has no opportunity to sell the electricity elsewhere exposing the IPP to revenue risk if Customer consumption falls significantly below forecast levels. It is for this reason that a take or pay type mechanism is used.

Ultimately the model used is an allocation of risk between the parties and will be a matter for negotiation based on the particular circumstances relating to your specific project.

Other variations to the commercial model to be considered include:

- a) Removing the fixed charge and using only a variable charge (\$/kWh) but including a minimum monthly or annual consumption amount which if not taken by the Customer results in a shortfall amount becoming payable. This potentially allows for more flexibility as supply charges are more aligned with the Customer demand profile over a period. The shortfall amount ensures that the IPP is not exposed to the risk that Customer's demand falls below anticipated levels over the period leaving the IPP with a shortfall in revenue. If the minimum consumption is set over a year, it also allows for unders and overs to offset each other over the period before any shortfall amount becomes payable. However, this is a slightly more complex model and the end result over a period should not be significantly different to the model included in the hybrid PPA template.
- b) Removing the fixed charge and using only a variable charge (\$/kWh) with no minimum consumption amount. This offers maximum flexibility for the Customer but exposes the IPP to the, potentially unacceptable, risk that the PPA delivers significantly less revenue than forecast over the life of the supply period. To assist with reducing this risk, you could agree to different levels of variable charge over time. For example, the variable charge could be set at an amount which applies to all energy consumed up to an agreed threshold designed to recover the majority of the capital costs early in the life of the project. This threshold could take a number of years to reach. Once the threshold is reached the variable charge could then decrease.
- c) If the Customer requires the ability to be able to disconnect from the equipment without incurring the entirety of the fixed charge for the period of disconnection, consider breaking the fixed charge into components comprising a standby charge which is always payable (except perhaps when a disconnection is caused by IPP default) and the remaining fixed charge which is only payable whilst the equipment is connected to the Customer's equipment. To offset the risk of the fixed charge not being payable, the IPP may want a higher variable charge in this scenario.

6.2 Supply and supply interruptions

The hybrid PPA template requires the IPP to supply electricity up to a contract maximum quantity, with reasonable endeavours to supply above that quantity on a temporary basis, if reasonably requested by the Customer. The contract maximum quantity may be split into separate renewable electricity and carbon electricity amounts in Appendix B if this is required and is feasible.

There is a process for the Customer to provide demand forecasts up to the contract maximum quantity but this is non-binding. It is for planning purposes only and there is no minimum purchase obligation (see section 6.1 above in relation to alternative commercial models).

You should consider whether you want to include a performance guarantee mechanism where the IPP guarantees a particular quantity of electricity with a price adjustment if this guarantee is not met. Alternatively, you could include performance liquidated damages which become payable by the IPP for outages (except permitted outages). Note that as is customary in renewable energy contracts, the hybrid PPA template specifically excludes liability for the IPP where output is reduced due to the intermittency or variability of the renewable energy source.

The hybrid PPA template allows for other permitted interruptions in the supply of electricity. The Customer will want to ensure this list is relatively limited to incentivise IPP to ensure a secure and reliable power supply, particularly where the Customer is paying a fixed charge regardless of consumption. Conversely the IPP will want to ensure it is not liable for supply interruptions due to situations it cannot reasonably control or where power output may be uncertain. Both parties are incentivised to allow for permitted interruptions for maintenance to ensure the equipment is properly maintained and is able to generate to forecast quantities where possible.

6.3 Increasing the contract maximum quantity

You should also consider whether you want to include a mechanism for agreeing a future increase to the contract maximum quantity. If an increase is easily accommodated within the capacity limits of the existing equipment this is likely easily accepted. If such an increase would require new equipment to be installed or existing equipment to be upgraded which would incur additional capital expenditure and potentially altered operating costs, then additional changes are likely to be required. For example, you should consider the impact on the supply period, the supply charges and the buyout amount. If you have included a detailed operating philosophy, how is this impacted? Be careful including any binding mechanisms related to this at the outset when the implications may not be fully understood.

6.4 Renewable energy certificates (LGCs)

The hybrid PPA template provides for all renewable energy certificates (in this case, LGCs) created to be transferred to the Customer. An LGC is created for each megawatt hour of renewable energy generated. This is included on the assumption that the Customer requires this to achieve decarbonisation objectives. If the IPP retains the LGC and sells them separately, this would effectively amount to double counting as two different parties would be claiming the same environmental benefits from the same generated green power.

6.5 Emissions Reduction Fund

The hybrid PPA template contains a basic provision relating to the *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth). Credits under this scheme take the form of ACCUs. Hybrid power generation on a brownfields site may be eligible for ACCUs to the extent the project qualifies as an eligible offset project. You may want to consider whether this is relevant for your project. The hybrid PPA template provision provides for the Customer to be entitled to the benefit of any credits

associated with the equipment and the electricity supplied under the PPA and for the IPP to use reasonable endeavours to obtain any credits and transfer them to the Customer.

More information on this scheme is available from the Clean Energy Regulator⁵. Note that at the time of writing this Guide, the scheme is subject to an independent review announced by the Australian government on 1 July 2022⁶.

7. Additional issues in a grid-connected project

For a grid connected project, there will be a range of additional issues to consider. From an engineering perspective the equipment will need to comply with the relevant technical rules of the grid network operator at the connection point. These technical rules will also likely impact on the operating philosophy.

It may be that the IPP is the retailer at the connection point with the grid or there may be a separate retailer.

It is beyond the scope of the hybrid PPA template and this Guide to consider all the implications of being grid connected except to note that this will bring an additional compliance burden. This compliance burden can be less if the renewable generation system is designed and engineered to not be able to export to the grid. While there are potential additional revenue streams from exporting to the grid, these may be significantly less than offsetting onsite consumption, behind the meter per kWh. If connecting to the South West Interconnected System (SWIS) and participating in the Wholesale Electricity Market potential additional revenue streams can come from capacity credits and essential system services.

The hybrid PPA template contains some basic provisions on integrating a grid retail contract with the supply of electricity from the onsite generation. You will need to consider the specifics of the particular grid connection to identify whether there are additional fees and charges that need to be passed through or other issues to cater for.

⁵ www.cleanenergyregulator.gov.au/OSR/ANREU/types-of-emissions-units/australian-carbon-credit-units

⁶ minister.dcceew.gov.au/bowen/media-releases/independent-review-accus

8. Risk and liability

8.1 IPP and Customer liability

As noted above, IPP's liability for supply interruptions to renewable electricity caused by intermittency (no wind, no sun at night) or variability (variable wind speed, cloud cover) is specifically excluded. However, beyond these circumstances there may be liability for a failure to supply. The key allocations of risk in this respect are contained in other clauses in the hybrid PPA template, for example, supply interruptions.

If the performance requirements are modelled with good quality renewable resource data and the Customer requires the IPP to take on the risk of the intermittency and variability in the renewable energy source then this provision will need adjusting.

The liability clauses provide the caps and exclusions to that liability. The key aspects of the hybrid PPA template's liability clauses are as follows:

- Liability for indirect damage is excluded;
- IPP's liability is capped on a per occurrence basis and on an aggregate basis;
- There is a defined list of exclusions from the cap.

8.2 Force majeure

The hybrid PPA template contains a relatively standard force majeure provision. If IPP is affected by force majeure, then the supply period is extended accordingly. An alternative provision is included which provides that the supply period will not be extended.

The hybrid PPA template also allows for termination for extended force majeure.

The hybrid PPA template's force majeure mechanism only excuses performance where the party affected by force majeure is prevented from carrying out an obligation under the PPA as opposed to being simply delayed or hindered.

You should consider the risk allocation in the PPA when considering whether to extend the term for force majeure. For example, will a force majeure affecting one or both parties affect the IPP's ability to recover the capital costs expended if the term is not extended. The supply charging model chosen will impact this assessment.

In relation to the scope of a force majeure event, you should consider whether to specifically deal with any supply chain impacts or delays caused by COVID 19 related issues. As COVID 19 and its potential impacts are now a known risk, they may not be classified as force majeure and so may not qualify as a delay event during the installation phase.

8.3 Change in law/tax

A general change in law provision is included at clause 27. Given the pace of reforms in the energy sector you should consider whether known reforms should be excluded from this provision on the basis that the impact of those reforms should have been factored into the model and pricing at the time of contracting. It is recommended that this is only done where the actual legislation has been published (but has not yet commenced) or where the economic effects of a change are fully understood and determinable. Changes in policy and their effects can be wide ranging and it is unlikely to be appropriate for either party to take the risk on how any changes in policy will actually be implemented.

9. Default, disputes and termination

9.1 Buyout

One of the key considerations in PPAs is ensuring that the IPP has the opportunity to recover its capital investment in the equipment over time. The investment will be recovered over a number of years through the supply charges. If the agreement is terminated early then the IPP loses the opportunity to recover that investment.

For this reason buyout provisions are often included which provide:

- that Customer has the *option* to buyout the equipment if terminating the agreement early for IPP default;
- otherwise, if the Customer terminates early for any other reason, the Customer *must* pay the buyout amount.

The hybrid PPA template also provides for an option for the Customer to buyout the equipment if terminating for extended force majeure. As drafted this buyout right is available regardless of which party was impacted by force majeure. As no party is at fault and the relevant event giving rise to termination is beyond the control of the parties it gives the Customer the option but not the obligation to buyout the equipment. Similarly, it gives the IPP a potential opportunity to recover any lost investment but not the right to do so. Please consider whether this is the appropriate risk allocation position for your project.

The buyout amount is intended to be listed in Appendix A and will be a sliding scale, reducing over time as IPP recovers its investment through the supply charges. Often the buyout amount is calculated on day 1 as the capital expenditure incurred plus a reasonable assumed rate of return on that investment. The buyout amount should not simply accelerate anticipated variable supply charges over the remainder of the agreement or include operating costs as once the agreement terminates, no further operating costs are incurred and the inclusion of such amounts in the buyout payment could amount to an unenforceable penalty. The buyout amount should be viewed as a type of liquidated damages clause and so should reflect a reasonable pre-estimate of the loss incurred as a result of termination at the relevant point in time.

To avoid explicitly disclosing the IPP's margin or rate of return on its investment, the IPP may wish to agree a per annum liquidated sum with the Customer which is to be paid on top of the capex reimbursement.

Consider whether you need to include any specific rights or obligations in relation to handover on buyout. For example, do any approvals need to be assigned or re-applied for, do any contracts need assigning, are there records, manuals, spare parts that need to be handed over?

9.2 Step in right

The hybrid PPA template does not include a step in right for the Customer in the event of IPP default. If including a step in right you will need to identify when it can be exercised at each stage of the project. For example:

- During the installation phase – if there is a default which significantly delays the date for commercial operation, the Customer may want to step in to complete the works to minimise the impact on the operations of the mine.
- During the supply period – a default in supplying electricity as required by the PPA may have a significant impact on Customer operations and the Customer may want the ability to take over operation of the equipment.

- During the decommissioning phase – a default by IPP may potentially place Customer in breach of a condition of its mining tenure and so the Customer may want the ability to step in and remedy.

The objective of the step in right is to cure the condition that gave rise to the IPP default. Once cured, the Customer steps out again and the PPA continues as before. However, before including these rights consider whether it is practical in the context of your project and liability associated with exercise of the step in right. For example:

- Does the Customer have the relevantly qualified personnel and the benefit of any relevant approvals or licences to be able to step in?
- What happens if the Customer causes damage to IPP's equipment whilst exercising the step in right? Is Customer liable only where its actions are in breach of law or amount to gross negligence or wilful misconduct?
- Is IPP liable to pay Customer's costs of stepping in?

9.3 Dispute resolution process

The hybrid PPA template includes a fairly basic dispute resolution process which allows for a quick referral to proceedings if the parties cannot resolve the dispute by negotiation and unless the parties agree to expert determination.

Other potential options to consider include the requirement to mediate first. Also consider arbitration as an alternative to court proceedings. You should seek legal advice on the preferred dispute resolution process.



Granny Smith mine's solar array. Source: Gold Fields.

10. Other provisions

10.1 Good industry practice

The hybrid PPA template contains a definition of and various references to 'good industry practice'. The use of such terms is intended to provide a benchmark as to what is good industry practice but this is not always easy to understand or define and in the fast evolving renewable energy sector there is sometimes no established understanding of what this means in a particular context. Arguably there is no established 'industry practice' for using a combination of renewable energy and carbon energy to power a mine site in a remote location. The nature of each individual project may well be unique. Therefore these provisions should be treated with caution.

Sometimes parties attempt to be more prescriptive as to what the definition means (for example, having adequate supplies/spares for use under normal operating conditions, employing suitably experienced personnel, adequate maintenance and operating procedures etc). However, such prescriptiveness does not always assist when there is a lack of standards or where there is new and emerging technology.

You should therefore consider the appropriateness of this definition based on the facts of your particular project and either retain, amend or delete the definition (and associated references) as appropriate.

10.2 General

10.2.1 Security

The hybrid PPA template does not include requirements for either IPP or Customer to provide security. You should consider whether you require either party to provide security in the form of a parent company guarantee, bank guarantee or other form of security to guarantee that party's payment obligations under the PPA.

10.2.2 Representatives

The hybrid PPA template does not include a provision setting out identified contract representatives for each party. Such provisions are often included to give each party a nominated point of contact within the other party. Representatives generally have the authority to bind the relevant party in relation to actions taken under the agreement. You can include a provision for representatives if preferred. Companies generally have their own standard clause for this purpose.

10.2.3 Notices

The hybrid PPA template does not currently require all communications under the agreement to comply with the notices clause. This provides flexibility for day to day operational communications to be undertaken between the parties without complying with the formal requirements of the notices clause. Although this does introduce some legal risk that the communications at the operational level could inadvertently vary how the agreement is implemented, this risk is reduced by requiring all variations to be signed by the parties.

The risk could be further reduced by appointing a nominated representative for each party through which all communications are undertaken as noted in section 10.2.2. Consider if this is practical for your project based on your organisational contract management processes.

10.2.4 Subcontracting

The hybrid PPA template provides that IPP must not subcontract without Customer's consent (not to be unreasonably withheld). This is to allow Customer to approve any IPP subcontractors. If you want to allow subcontracting without consent, this clause will need adjusting.

11. Appendices to hybrid PPA template

11.1 Key commercial terms

Appendix A is designed to include all the key project specific contractual terms such as the supply period, the fees and charges and any buyout amounts.

11.2 Technical requirements

As well as detailing the works and customer works to be undertaken in the installation phase, **Appendix B** of the hybrid PPA template is designed to accommodate any key performance requirements relating to the design of the power system and the operating philosophy.

One aspect you should consider in both the design of the hybrid power system and the operating philosophy is the maximum renewable power fraction and the annual renewable energy fraction.

The following fractions are useful descriptors⁷:

- a) **Renewable power fraction (RPF)**: The amount of renewable power delivered to the loads compared to the total amount of power required by the load as defined by the following equation:

$$RPF = \frac{P_{REN}}{P_{tot}}$$

P_{RPF} : Renewable power fraction (kW_{AC}/kW_{AC})

P_{REN} : Renewable power delivered to load (kW_{AC})

P_{tot} : Total power delivered to load (kW_{AC})

The RPF varies continuously due to instantaneous variations in demand and generation mix. Thus it is the maximum RPF that is usually a key design criteria.

- b) **Renewable energy fraction (REF)**: The portion of total energy serviced by the renewable technology being discussed over a defined amount of time as defined by the following equation:

$$REF_t = \frac{E_{REN,t}}{E_{tot,t}}$$

REF_t : Renewable energy fraction (kWh/kWh)

$E_{REN,t}$: Renewable energy consumed over period, t (kWh)

$E_{tot,t}$: Total energy consumed over period, t (kWh)

The REF period is usually a year, in this case, it is the proportion of annual load that is met by renewable generation.

The maximum RPF and annual REF will be specific to your particular project and will require modelling. You can choose the extent to which you want to build the RPF and REF levels into the operating philosophy.

11.3 Site licence

The hybrid PPA template assumes that the IPP will be given control over a site area that is within the Customer's mine site (i.e. on the mining tenements).

⁷ Australian Renewable Energy Agency, *Hybrid power generation for Australian off-grid mines handbook* – June 2018 (page 25)

The site licence allows for a holding over period in which to undertake decommissioning works following the end of the supply period.

11.4 Installation of equipment and other works

Refer to section 5 in relation to the approach taken to installation in the hybrid PPA template.

Appendix G sets out the process for that installation. Note that the extension of time regime and the delay liquidated damages regime are tied to the date for commercial operation. This is consistent with IPP carrying the installation risk and simply being required to deliver the equipment ready for commercial operation by an agreed date. For planning purposes, the schedule does require that a date of preliminary completion is notified to Customer and Customer also has the right to information regarding and to witness commissioning tests.

If a delay in the target date for preliminary completion by itself will cause the Customer to incur loss, then the parties should consider expanding the delay liquidated damages provisions to also include a delay to that date. A different delay liquidated damages rate and cap may be required. Consider whether you also need additional conditions relating to timing for your project. For example, for a grid connected project the network operator may be responsible for undertaking connection works. Consider how this factors into the target date for preliminary completion and the date for commercial operations and consider including an extension of time allowance where the grid connection works are delayed and this is not due to the acts or omissions of either IPP or Customer.

The hybrid PPA template includes basic provisions to deal with variations and adjustments to the works and allows for direct reimbursement by Customer or an adjustment to the fixed charges under the PPA.

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