Power Purchase Agreement (PPA) for Renewable Energy Power Plants

Learn how to assess and negotiate power purchase agreements for buyers and sellers within different technology settings and regulatory frameworks across the globe.

21st – 23rd November 2018 | Kuala Lumpur, Malaysia
Due to their relatively high capital costs, investors in renewable energy power plants require long-term certainty about the plant’s ability to sell the power it generates. This is usually achieved through a long-term power purchase agreement. More than 95% of new built power plants are in fact financed on the back of a power purchase agreement.

Buyers may want to minimize their exposure to volatility and price rises in the electricity market or specifically energy from certified renewable energy power plants. This has given rise to the so-called “corporate PPA”.

There will be a massive focus on using a PPA to finance a new power plant and how to make a PPA “bankable”, managing risks, especially market risk and credit risk through a power purchase agreement and negotiating and re-negotiating a PPA from buyer’s and seller’s viewpoints.

This workshop provides insights into analysis, application and negotiation of power purchase agreements and the contractual context. The trainer will provide a wider view of the topic, but also to provide delegates with a toolbox of how to approach negotiations or risk management.

This 3 days PPA course isn’t really limited to renewable energy power plants. During the workshop the trainer will point out how in the PPA differences in technologies are reflected. For instance, solar photovoltaic and wind are intermittent resources and therefore will operate on a self-dispatch basis, whereas hydro and thermal sources are dispatchable, i.e. can deliver energy on demand. That of course must be reflected in the PPA. What’s special about renewable energy sources is that they often, but depending on jurisdiction, have a second revenue stream attached to them in the form of sale of renewable energy certificates or carbon credits. The rights to those revenue streams are determined in a power purchase agreement.

**LEARNING OUTCOMES:**

- Analyze the typical structure of the PPA document and the provisions in a power purchase agreement.
- Understand the underlying economic terms and how to find them in a power purchase agreement. How are tariffs in a PPA expressed and how are those prices determined in both regulated and de-regulated markets?
- Learn about the risks that a power purchase agreement can address.
- Discover what it takes to make a power purchase agreement “bankable” – i.e. what provisions must a PPA have in order for lenders to provide debt to the project?
- Comprehend the differences between “thermal” and “renewable” PPAs
- Conduct a PPA negotiation and understand non-negotiable and negotiable elements.
- Put power purchase agreements in context of the wider contractual framework and applications in various markets across geographies.

**PRACTICAL INVOLVEMENT:**

Having the ability to implement directly once you are back at your workplace is crucial for every participant. During the 3 days training, practical involvement and activity will be shared. Participant will be involved in activities as per below:

- **“Negotiating the PPA”**
  The trainer will split up the class into three groups, one representing the offtaker (buyer), one the seller and one the lenders. Everyone will read the same power purchase agreement. This is a real-life document that has some issues. Hence, the three groups are asked to work out what they would like to get out of a re-negotiation of the contract. I.e. what would it take for the lenders to make this PPA into a “bankable” agreement?

- Negotiate a corporate power purchase agreement - “buyers” and “sellers”.

**This program is intended for:**

This course is primarily designed for PPA disciplines [Seller] mainly from renewable plant (Solar, Wind, Hydro, Geothermal, Biogas and Biomass), Transmission and distribution companies [buyers], Investment Bank, Financial institution [Lenders] and finally the regulators.

- Project managers
- Risk and investment analysts
- Project finance analysts
- Project engineers
- Decision makers in energy departments and regulators
- Power plant developers / owners
- Utilities and grid operators
- Accountants and lawyers
- Private companies that want to buy “green” energy at fixed or predictable prices (thru financial PPAs)
- Lenders and investor / financial analysis
- Regulators (Involved in accepting a tariff that is agreed in a PPA and involved in developing a standard PPA for the market.)
- Sellers (generators), buyers (corporate buyers as well as utilities or licensed suppliers) and also financiers.
- Buyers of PPAs who want to understand more on carbon and green credits and carbon tax to make sure their supply comes from green sources.
DAY 1

Introduction: Basic objectives and components of a PPA
- What are the objectives of participants in a renewable energy power purchase agreement?
- Basic structure and components of a PPA

Power industry, markets, participants and types of PPAs
Physical infrastructure
- Off-grid applications
- Grid-connected: generators and buyers connected via transmission and distribution network. The role of the grid operator: balancing energy, maintaining a stable grid.

Characteristics of power plant technologies: capacity factor, firm capacity, load-following capacity, intermittency of underlying resource and dispatch type for the technologies in the energy mix: nuclear, coal, gas, oil, diesel, wind, solar, hydro and geothermal.

Market Infrastructure
- Monopoly Generator / Supplier
- Independent Power Producers (IPPs)
- Single Buyer
- Power market and power exchanges
- Vertical integration

Types of PPAs:
- Direct PPA
- PPA with wheeling agreement (“sleeved PPA”)
- Synthetic PPA
- Solar Rooftop PPA
- Variations: availability contract, contract for difference, hedges, tolling, contract with self-consumption

Environmental attributes: carbon credits, renewable energy certificates

Storage: technologies and applications, impact on network, regulatory classification and business models.

Price and Volume
- Volume: take-or-pay, take-and-pay, contracted volume, capacity cap
- Differentiation between delivered and deemed energy in renewable energy plants, assessment of energy or capacity not delivered, but expected.
- Tariffs for delivered energy, deemed energy and non-delivered energy.
- Reduction in chargeable volume due to allowed grid unavailability, facility unavailability or grid operator instructions.
- Term of PPA
- Tariff elements: base tariff, currency, index – choice of index
- Pricing regimes available dependent on market:
  - Feed-in tariff scheme
  - Regulatory asset price model (RAB)
  - Power and capacity / availability auctions – auction types
  - Bilateral negotiation
DAY 2

Risk assessment
- Risks for sellers and buyers (also if buyer is grid operator) that can be addressed or controlled in a PPA. Discussion of what these risks are and how and to what extent a PPA can help manage those risks:
  - Market risk – volume and price risk: both from seller’s and buyer’s point of view
  - Force majeure events affecting buyer or seller
  - Currency exchange risk
  - Change in law
  - Buyer default – credit risk
  - Seller default
  - Supplier default
  - Construction completion risk (cost and time overruns)
  - Risk of underperformance of the plant
- Legal risk inherent with PPA
- The cost of fixing a tariff: The buyer’s market risk in opting for a fixed tariff versus remaining on a floating tariff.

Using a PPA to finance a renewable energy power plant with debt and equity
- Cost model of a renewable energy power plant: capital requirements over the plant life, operational expenditure (fixed and variable costs including costs for ancillary grid operator services).
- Calculating the future project cash flows based on provisions in the PPA.
- Investment decisions: financial and non-financial criteria
- Lending decisions: debt service cover ratio and debt sizing
- Bankability criteria
- Re-financing: Reasons for re-financing and financial benefits
- Separate financing agreements linked to the PPA:
  - Direct agreement between participants of PPA and financie
  - Loan documentation and security package referenced by PPA

Environmental Attributes
- Renewable energy power plants may qualify for carbon credits, renewable energy certificates or other environmental attributes whilst buyers may want to avail themselves of those attributes in order to comply with regulation or save money.
- Carbon Pricing: carbon pricing instruments: trading systems vs carbon tax
- Carbon pricing initiatives: international, national and internal – summary of pricing initiatives worldwide.
- Renewable energy certificates: Renewable Energy Guarantee of Origin (EU) or Renewable Energy Certificates (US) supporting renewable energy power plants specifically.

Negotiating a PPA
1. Setting objectives for the negotiation
2. Consideration of non-negotiable terms
3. Negotiable items for both buyer and seller that are not directly linked to tariff.
4. Negotiation of tariff and role of the regulator
5. Re-negotiation of executed PPAs

Workshop:
- Assess a real-life power purchase agreement from the view of a lender, offtaker or generator.
- What provisions in the agreement are missing, what provisions are insufficient and what provisions are particularly favourable for each party?
- How can a better agreement be negotiated?
DAY 3

Other PPA clauses including dispute resolution, insurance requirements and technical issues.
Dispute Resolution
  o Definition of dispute
  o How can disputes be resolved without having to rely on courts? Discussion of multi-tiered dispute resolution procedure leading ultimately to arbitration.
Termination
  o Conditions under which early termination can be triggered.
  o Calculation of termination compensation

VI. Other Components

Technical Description
  • Relevant components
  • Facility and interconnection
  • Meters: installation, testing, recalibrating

Testing & Commissioning
  • Procedures for testing and commissioning
  • Selling commissioning energy

Operation
  Technical information provided in the PPA appendices / schedules

Conditions precedent
  Insurance: Stipulation of insurance requirements in PPA

Related agreements
  • Contractual framework: the “PPA eco system” and discussion of selection of related contracts:
    o Equipment, Procurements and Construction (EPC) contract
    o Operations & Management agreement
    o Project implementation agreement / policy support agreement with government
    o re-organisation agreement
    o land lease agreement
  • How the agreements hang together and which points need to be considered in making sure the contract framework is consistent.
  • Overview of PPA markets
    o European Union (in particular UK)
    o North America
    o Africa & Middle East
    o Asia Pacific: types of PPAs on offer. (Particularly Vietnam, Taiwan, Thailand and Cambodia.)
Joachim’s expertise

- Over 20 years’ international, commercial experience in capital markets, power and oil & gas. Passionate about renewable energy technologies and their application in emerging markets.
- Founder & Managing Director - Green Rhino Energy Ltd, London
- Engineer and entrepreneur in the renewable energy sector, bridging technology and finance.
- Featured on 21st Century Business TV shown on CNBC Business and Fox Business
- Managed global projects in credit trading and market risk management at HSBC in London, Hong Kong and New York.
- Both consultant and developer in utility-scale solar and wind power, solar greenhouses and waste to energy plants with a focus on Africa, including South Africa, Zimbabwe, Ghana, Sierra Leone, Egypt, and Namibia.

Joachim brings project ideas to fruition by bridging complementary areas of renewable energy technologies, project finance and experience in project development. Joachim has been involved as both consultant and developer in utility-scale solar and wind power, solar greenhouses and waste to energy plants with a focus on Africa, including South Africa, Zimbabwe, Ghana, Sierra Leone, Egypt, and Namibia.

Joachim has been part of a team winning project competitions held at “Making Solar Bankable” in Amsterdam and “Africa Energy Forum” in London 2016 for the development of a solar portfolio in Sierra Leone. Joachim was featured on 21st Century Business TV shown on CNBC Business and Fox Business. He has been guest speaker at conferences, e.g. “Utility scale PV” in Milan 2011 and Envirotech Summit 2013 in London.

Prior to founding Green Rhino Energy in 2008, Joachim managed global projects in credit trading and market risk management at HSBC in London, Hong Kong and New York and consulted for BP International on its strategic credit risk management platform. Joachim has a Masters in Electrical Engineering from the University of Stuttgart. As an engineer he conducted research into off-grid hybrid renewable energy systems with solar photovoltaics, wind turbines, batteries and diesel engine at the Centre for Renewable Energy in Loughborough, where he was awarded an MPhil. He gained an MBA with distinction from London Business School.

Green Rhino Energy Ltd, London [Founder & Managing Director]
Set up Green Rhino Energy, an independent consultancy with exclusive renewable energy sector specialization, in particular solar, wind and waste-to-energy. Entered into joint ventures in Ghana, Zimbabwe and South Africa to develop projects in partnership with local companies.

Engagements included:

- Leading the development of a 50-150MW solar pv power plant in Zimbabwe in joint venture with local partner. Project has been granted a licence and executed power purchase agreement. Instrumental in siting, engineering, procurement process and negotiations.
- Since 2014: Advising developer in Sierra Leone on PPA, technical and financial issues to implement the construction and integration of a 5MW solar farm into a mini-grid. Won FMO’s “Solar Sharktank Project Competition” in Amsterdam in 2016 and a co-development facility from Access Power in June 2016. Leading the EPC negotiations and technical due diligence.
- Collaborated in fund raising for 72MW solar farm in Cameroon, securing equity participation of international co-developer, and further participation from FMO and ADB.
- Advising on a mini-grid municipal project in Cameroon, a hybrid off-grid solution combining solar photovoltaic modules, a battery and a diesel generator. Completed study of load profile and sizing of components, feeding into financial model and power purchase agreement.
- Consulting multi-million dollar company on business models and associated power purchase and power system lease agreements of building a large solar rooftop portfolio in three countries in Africa.
- Assisted multi-national client on the development and financing for wind and solar photovoltaic projects in Egypt; created detailed energy yield estimation, plant concept and financial model, and advised on tariff considerations.
- Conducted an environmental study for the development of 3 wind farms in Costa Rica. This included a visual impact study [calculated zones of visual impact, created photo montages and videos] and a shadow-flicker analysis, calculating the number of minutes particular windows will suffer from flickers caused by wind turbine blades cutting through the sun light.
- Consulted university spin-off on the commercialisation of a tidal stream turbine technology, created a business plan. Won funding and support from Harbour Master for pilot.
- Devised a project finance tool for a development bank in Honduras, enabling it to assess risks to financial viability of renewable energy projects across multiple technologies, including hydro, biomass, wind, solar photovoltaic, waste-to-energy.
- Consulted investor on 75MW solar PV project in preparation for a bid in round 4 of South Africa’s REIPP program with technical due diligence, yield estimation and financial model.
- Since 2014: Developed 4- and 5-day classroom training courses on “Renewable energy finance & modelling” and “Yield Estimation with PVSyst and Technical Issues in Solar PV” and “Power purchase agreements”; delivered courses in London, Dubai and Johannesburg.

Directories

- Technical Director at Africa Growth Energy Solutions (AGES),
- Director rat Afro South Renewables (South Africa), Gold Coast Energy (Ghana), De Green Rhino Energy (Zimbabwe)
Power Purchase Agreement for Renewable Energy Power Plants (3 Days)

Registration Form

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<th>Power Purchase Agreement for Renewable Energy Power Plants</th>
<th>2 or more Participants</th>
<th>Per Participants</th>
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<td>Full 3 Days</td>
<td>SGD 2595 ( )</td>
<td>SGD 2995 ( )</td>
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REGISTER 3 AND SENT THE 4th FREE
- Please note that all registrations must be made at the same time to qualify.
- The above investment fee are inclusive of course material, tea breaks and lunch.

I would like to organize this training on-site and save at least 30% on the total course Fees! Please call +603 7727 3952 for more about our in-house training or email iht raining@petro1.com.my (Terms & Conditions apply)

Delegate Details

1. Name: ____________________________ Mr □ Mrs □ Ms □ Dr □
   Job Title: __________________________
   Email: ____________________________
   Contact No: ________________________
   Department: ________________________

2. Name: ____________________________ Mr □ Mrs □ Ms □ Dr □
   Job Title: __________________________
   Email: ____________________________
   Contact No: ________________________
   Department: ________________________

3. Name: ____________________________ Mr □ Mrs □ Ms □ Dr □
   Job Title: __________________________
   Email: ____________________________
   Contact No: ________________________
   Department: ________________________

Head of Department: __________________________

Invoice Details

Invoice Attention to: __________________________
Company: __________________________
Industry: __________________________
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Postcode: __________ Country: __________
Telephone: __________________________ Fax: __________________________
Email: __________________________
Authorized Signature: __________________________

Credit card Payment

Please Debit my credit card:
- VISA □ MASTERCARD □

Card Number: _______ - _______ - _______ - _______
Security Code: _______ Expiry Date: _______

Named printed on card: __________________________

Payment Method

By Direct Transfer: Please quote invoice numbers on remittance advice.

ACCOUNT NAME: PETRO1 SDN BHD
BANK: United Overseas Bank (Malaysia) BHD
ACCOUNT NO: 202 - 900 - 319 - 1 (SGD)
SWIFT CODE: UOVBMYKL

All bank charges to be borne by payers. Please ensure that PETRO1 SDN BHD received the full invoice amount.

** Credit card payment will include a charges 2.8% **

Payment Policy: Upon receipt of a completed registration form, it confirms that the organization is registering for the seat(s) of the participant(s) to attend the conference or training workshop. Payment is required with registration and must be received prior to the event to guarantee the seat. Payment has to be received 7 working days prior to the event date to confirm registration.

Venue: All of our training courses are held in 4 - 5 star venues. The course fee does not include accommodation or travel cost. It's recommended to book the hotel room early as there are only limited room available at the discounted corporate rate.

DATA PROTECTION

The information you provide will be safeguarded by Petro1 that may be used to keep you informed of relevant products and services. We take it seriously when it come s to protection of our client data.

Cancellation & Substitutions: Upon receipt of a completed registration form, it confirms that the organization is registering for the seat(s) of the participant(s) to attend the conference or training workshop. Should you be unable to attend, substitutes are always welcome at no additional cost. Please inform us as early as possible. Payment is non-refundable if cancellation occurs 7 working days prior to event commencement. However a substitute is welcome at no additional charges. If cancellation occurs 5 working days prior to the registration date and there is no substitute, the organizer reserves the right to charge 50% of the total investment from your organization.

PETRO1 SDN BHD is not responsible for any loss or damage as a result of a substitution, alteration or cancellation/postponement of an event. PETRO1 SDN BHD shall assume no liability whatever in the event this training course is cancelled, rescheduled or postponed due to a fortuitous event, Act of God, war, fire, labor strike, extreme weather or other emergency.

Walk in Registration: Walk-in participants with payment will only be admitted on the basis of seat availability at the event and with immediate full payment.

Program Change policy: The organizer reserves the right to make any amendments and/or changes to the workshop, venue, facilitator replacements and/or modules if warranted by circumstances beyond its control.