



PROJACS ACADEMY
by @egis



Economic Analysis, Financing and Power Contracts

التحليل الاقتصادي والتمويل وعقود الطاقة

12 - 16 June 2023

London / UK

Introduction

Economic Analysis, Financing and Power Contracts, is a training course that will work through analysis of different technologies including LCOE, pricing for energy projects, resource analysis and financing. The course will be hands-on where participants take turns sharing the screen and demonstrate how you can construct renewable analysis and evaluate materials that incorporate a variety of economic and financing issues. The course put emphasis on practical techniques with current data and covers batteries as well as corporate PPA's.

Objectives

- Incorporate power storage and battery analysis in analysis of power from an power storage perspective and from an ancillary service point of view
- Learn practical tools to analyse power including efficient tools to work with wind, hydro and solar data; creating flexible scenario and sensitivity analysis to evaluate resource risk, construction risk, O&M risk and debt structuring; developing techniques to resolve circular references related to funding debt and sculpting debt without copy and paste macros.
- Understand the implications of project finance features in the context of energy (sculpting, debt funding, debt size, DSCR, DSRA, debt tenor, re-financing) on costs and equity returns from renewable energy.
- Develop efficient ways to quickly compute the levelised electricity cost of different technologies using carrying charge factors and alternative financial models.
- Work through resource assessments and compute probability of achieving different levels of production (P90, P75 etc.) using hands-on exercises for different types of projects in order to effectively review consulting studies.
- Create flexible and transparent financial models of energy from A-Z that incorporate resource risk, financing structure, tax treatments, alternative pricing policies and other factors.
- Evaluate the economics of renewable energy (including ancillary services) in the context of merchant markets and review the structure of corporate PPA contracts.

Who Should Attend?

- Corporate Planning
- Economists
- Investment Analyst
- Corporate/Project Finance
- Business Development
- Infrastructure Advisory
- Heads of Businesses
- Banks and Finance Companies
- Government Ministries and Departments
- Power Equipment Manufacturers
- International Finance Institutions
- Renewable Energy Consultants

Course Outline

Day One

SOLAR AND VALUE DRIVERS, APPROPRIATE LCOE CALCULATION AND RECONCILIATION WITH FINANCIAL MODEL

- Overview of Renewable and Storage Value Drivers with Focus on Solar Energy
 - Value Drivers for Solar Energy
 - Calculation of LCOE from Value Drivers
 - Importance of Financing Cost and Target IRR
 - Carrying Charge Factor and PMT
 - Setting-up LCOE for Alternative Characteristics
- Drivers of Value in Solar Energy Projects
 - Resource Assessment, Yield and Capacity Factor from Satellite Data
 - Basic Concept of Performance Ratio
 - Evaluating Resources in Different Places and with Tracking
 - Module and Other Capital Costs
 - Operating and Maintenance Cost Categories and Benchmarking
- Reconciling LCOE with Operating Section of Project Finance Model
 - Setting up a Flexible Timeline
 - Modelling Operations with Degradation and Alternative Resource
 - Using Real and Nominal Prices
 - Computing Project Returns
 - Incorporating Debt
- Economic Analysis of Intermittant Power Versus Dispatchable Power
 - Understanding Short-Run versus Long-Run Costs
 - Incorporating Cost of Natural Gas in Cost Analysis
 - Comparing the Levelised Cost of Solar to the Variable Cost of Natural Gas
 - Comparing the Levelised Cost of Solar to Merchant Prices
 - Break-Even Cost of Storage in Comparing Solar to Dispatchable Sources

Day Two

WIND AND SOLAR AND ANALYSIS OF UNCERTAINTY

- Introduction to Resource Uncertainty and Financing
 - Concept of P50, P90, P99 etc. and Downside Cases for Financing
 - Case Study with Alternative Term Sheets

- Understanding the Fundamental Mathematics of P50, P90, P99 and NORMINV Function
- Application of P90 in Debt Sizing with Different Standard Deviation Assumptions in Simple Model
- Case Study: Details of Solar Resource Analysis
 - Interpreting PVSYST Output and Performance Ratio
 - Sizing of Inverter
 - Performance Ratio and Temperature with Hour-by-Hour Analysis
 - Uncertainty Estimates in PVSYST
 - Computing Uncertainty from Monthly Solar Variation
 - Addition of Uncertainty from Variance that is Independent
- Case Study: Wind Resource Analysis
 - Power Curve and why Hour-by-Hour Wind Profiles Are Necessary
 - Estimates of Energy Production from Power Curves
 - Uncertainty in Wind and Uncertainty in Energy
 - One-year versus 10-year or 20-year P50, P90, P99
 - Computing Resource Uncertainty from Estimates of Standard Deviation
- Understanding Renewable Term Sheet and Applying Concepts in Financial Model
 - Case Study on Banking Analysis
 - Detailed Term Sheet Review
 - Debt Sizing versus Estimates of IRR in Financial Models
 - Sculpting with Different Resource Estimates
 - Incorporating Debt to Capital Constraint versus DSCR Constraint

Day Three

PROJECT FINANCE, DEVELOPMENT FEES, RE-FINANCING AND ASSET SALE UPSIDES IN RENEWABLE ENERGY

- Measurement of Value and Risk using Project Finance
 - Debt Capacity and Changes in Risk for Different Projects
 - Problems with WACC in the Context of Renewable Energy with Changes in Risk
 - Changes in the Capital Structure with Project Financing
 - Debt Capacity for Hydro and Geothermal
- Debt Capacity and Project Finance Terms
 - Effects of Debt Service Coverage Constraint versus Debt to Capital Constraint in Sizing Debt
 - Debt Service Coverage Ratio Definition and Targets
 - Debt Tenor, Alternative Repayment Structure, Average Life
 - Credit Spreads and Target Credit Ratings in Project Finance

- Debt Service Reserve and Maintenance Reserve
- Covenants, Cash Flow Sweeps and Subordinated Debt
- Project Finance Valuation and Upside from Selling Assets in Renewable Energy
 - Project IRR to Screen Projects
 - Equity IRR to Structure Projects
 - Minimum Required Equity IRR for Different Renewable Projects
 - Earned IRR from Selling Assets when Risk Declines
 - Modelling Alternative Estimates of Value with Alternative Risk Profile Changes
 - Modelling Different Holding Periods and Optimising IRR
- Re-Financing for Renewable Projects
 - Types of projects where re-financing is important – off-shore wind, wave energy, merchant hydro projects and geothermal
 - Effects of re-financing on equity IRR and difficulty of defining the equity IRR with short-debt duration
 - Structuring project finance models and analysis to measure the effect of re-financing on equity returns
- Development Costs, Risks and Fees in Renewable Projects
 - Development Time Frame and Costs in Wind and Solar Projects
 - Exploration Costs and Time Frame in Geothermal Projects
 - Fees and Compensation for Development and Treatment of Development Fees when Computing
 - Equity IRR.
 - Probabilities of Proceeding Beyond Development
 - Compensation for Development Costs
- Modelling Exploration and Development Options – Geothermal Case
 - General Cost and Resource Parameters for Geothermal Projects
 - Review of Project Finance Model for Geothermal Project
 - Exploration and Development Cost, Probability Time Frame
 - Segregating Development Phases
 - Discount Rates for Different Stages

Day Four

BATTERY STORAGE ANALYSIS WITH RENEWABLE ENERGY

- Overview of Storage in Renewable Project Finance
 - Objective of Storage Analysis – Economic and Financial
 - Can Solar and Storage Compete with Other Technologies
 - Renewable Energy Intermittency and Unavailability
 - Battery Storage Duration and Cycles

- Use of Batteries for Ancillary Services
- Use of Batteries for Bulk Power Storage
- Other Uses of Batteries
- Battery Characteristics and Economic Analysis
 - Cost as a Function of both Storage Capacity and Charging/Discharging Capacity
 - Trend is Costs and Learning
 - Battery Life and Cycles
 - Operating and Maintenance
 - Battery Degradation and Effects on Cost
 - Round Trip Efficiency
 - Depth of Discharge
- Measuring the Cost and Benefits of Batteries
 - Application of levelised cost concepts to the carrying charges of batteries with different characteristics
 - Combining the discharge of batteries and renewable resource to compute the total energy produced
 - Incorporating round trip efficiency in the analysis of batteries and solar
 - Computing the total cost of batteries and storages
 - Comparing the total cost of storage and renewable to other strategies
 - Incorporating the cost of dispatchable technologies in the analysis for comparison
- Batteries and Storage in Project Finance Models
 - Background on Probability of Default and Loss Given Default
 - Definition and Calculation of DSCR
 - Use of DSCR in Base (P50 Cases) and Downside (P90, P95 Cases) in Determining Debt Capacity
 - Application of LLCR and PLCR
- Contract Structuring in Batteries and Renewable Project Finance
 - Importance of EPC Contract in Different Projects (Off-Shore Wind and Hydro)
 - Performance Contracts in Solar Projects
 - Power Curve and Availability Guarantees in Solar and Wind Projects
 - O&M Contracts and Warranties
 - Insurance
 - Counterparty Risk in Different Projects
 - Battery Contract Structures
 - Battery Capacity Contracts
 - Battery Lease Structures

Day Five

CORPORATE PPAS AND HYDROGEN

- Corporate PPAs and Merchant Pricing Overview
 - Background on Merchant Prices in Different Regions
 - Drivers of Merchant Prices and Implied Heat Rate
 - Alternative Corporate PPA Structures
 - Forward Prices and Corporate PPAs
 - Merchant Price Risk in Corporate PPAs
 - Evaluation of Value at the End of the Corporate PPA

- Hydrogen Overview – Grey, Blue and Green
 - Current and Future Uses of Hydrogen
 - SMR and Grey Hydrogen from Natural Gas
 - Electrolysis and Green Hydrogen
 - Efficiencies of Grey, Blue and Green Hydrogen
 - Energy Costs of Creating Hydrogen
 - Inclusion of Emission Cost in Energy Costs
 - Understanding of Fuel Cells

- Economic Analysis of Hydrogen
 - Challenge – Lifetime of Stack versus Lifetime of Other Equipment
 - Challenge – Degradation on Energy Used
 - Levelised Cost Comparison of SMR and Electrolyzer Including Compression
 - Modelling the Cost of Alternative Strategies Including Only Running Electrolyzer During Solar Production Periods

- Hydrogen Downstream Costs
 - Added Costs of Hydrogen – Compression, Storage, Transport, and Dispensing
 - Evaluation of the Costs of Each Item Using Different Drivers
 - Distribution Strategies and Revised Comparison of Electrolyzer with SMR Using Alternative Storage and Distribution Strategies
 - Methods of Summing Costs

- Total Cost of Ownership from Hydrogen Versus Battery and Internal Combustion
 - Case of Trucks and Buses – Accounting for Efficiency, Life and Use
 - Illustration of Battery Versus Internal Combustion
 - Case Study of Garbage Trucks to Compute Total Cost of Ownership.
 - Alternative Distribution Strategies and Total Cost of Ownership

Training Method

- Pre-assessment
- Live group instruction
- Use of real-world examples, case studies and exercises
- Interactive participation and discussion
- Power point presentation, LCD and flip chart
- Group activities and tests
- Each participant receives a 7” Tablet containing a copy of the presentation, slides and handouts
- Post-assessment

Program Support

This program is supported by interactive discussions, role-play, case studies and highlight the techniques available to the participants.

Schedule

The course agenda will be as follows:

- | | |
|---------------------|------------------|
| • Technical Session | 08.30-10.00 am |
| • Coffee Break | 10.00-10.15 am |
| • Technical Session | 10.15-12.15 noon |
| • Coffee Break | 12.15-12.45 pm |
| • Technical Session | 12.45-02.30 pm |
| • Course Ends | 02.30 pm |

Course Fees*

- **5,200 USD**
**VAT is Excluded If Applicable*

المقدمة

التحليل الاقتصادي والتمويل وعقود الطاقة ، هي دورة تدريبية ستعمل من خلال تحليل التقنيات المتجددة المختلفة بما في ذلك LCOE ، وتسعير مشاريع الطاقة ، وتحليل الموارد والتمويل. ستكون الدورة عملية حيث يتناوب المشاركون على مشاركة الشاشة وإظهار كيف يمكنك إنشاء تحليل متجدد وتقييم المواد التي تتضمن مجموعة متنوعة من القضايا الاقتصادية والتمويلية. تركز الدورة على التقنيات العملية مع البيانات الحالية وتغطي البطاريات وكذلك اتفاقيات شراء الطاقة الخاصة بالشركات.

الأهداف

- دمج تخزين الطاقة وتحليل البطارية في تحليل الطاقة من منظور تخزين الطاقة ومن وجهة نظر الخدمة الإضافية
- تعلم الأدوات العملية لتحليل الطاقة المتجددة بما في ذلك الأدوات الفعالة للعمل مع بيانات الرياح والمياه والطاقة الشمسية. إنشاء سيناريو مرن وتحليل الحساسية لتقييم مخاطر الموارد ومخاطر البناء ومخاطر التشغيل والصيانة وهيكل الديون.
- فهم الآثار المترتبة على ميزات تمويل المشروع في سياق الطاقة المتجددة (النحت، وتمويل الديون، وحجم الديون، DSCR، DSRA ، مدة الديون، إعادة التمويل) على التكاليف وعائدات الأسهم من الطاقة المتجددة.
- تطوير طرق فعالة لحساب تكلفة الكهرباء المستوية للتكنولوجيات المختلفة بسرعة باستخدام عوامل الشحن والنماذج المالية البديلة.
- العمل من خلال تقييمات الموارد وحساب احتمالية تحقيق مستويات مختلفة من الإنتاج (P90، P75 وما إلى ذلك) باستخدام التدريب العملي على التدريبات لأنواع مختلفة من المشاريع من أجل مراجعة الدراسات الاستشارية بشكل فعال.
- إنشاء نماذج مالية مرنة وشفافة للطاقة المتجددة من الألف إلى الياء تتضمن مخاطر الموارد وهيكل التمويل والمعاملات الضريبية وسياسات التسعير البديلة وعوامل أخرى.
- تقييم اقتصاديات الطاقة المتجددة (بما في ذلك الخدمات الإضافية) في سياق الأسواق التجارية ومراجعة هيكل عقود اتفاقية شراء الطاقة الخاصة بالشركات.

الحضور

- تخطيط الشركات
- الاقتصاديون
- محلل استثمار
- تمويل الشركات / المشاريع
- تطوير الاعمال
- استشارات البنية التحتية
- رؤساء الشركات
- البنوك وشركات التمويل
- الوزارات والدوائر الحكومية
- مصنعي معدات الطاقة
- مؤسسات التمويل الدولية
- مستشاري الطاقة المتجددة