SOLAR DUE DILIGENCE

Instructor: Peter Cockcroft

20 – 22 March 2017

Jakarta

COURSE BENEFITS
• This 3-day course is essential for all players in the international solar power “game”, and you will walk away with a well-defined checklist as well as comprehensive course notes.
• Not only will you learn how to assess solar projects, whether are residential or commercial, off-grid or grid-connected, but also identify and review some of the more common mistakes that developers and contractors through articulated case studies and class exercises.

KEY LEARNING OBJECTIVES
• Understand the process of developing international solar projects from concept to operations
• Understand the risks – including country risk, operational risk, offtaker and currency risk, financial and investor risks
• Walk away with a checklist that they can use for their own projects
• Be able to assess the viability of solar investment projects

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AGENDA AT-A-GLANCE

Day 1
• Understand why proper due diligence is important to all the stakeholders in international solar power development
• Review the phases of solar projects and the skills needed for each step
• We will run a risk identification workshop based on real-world example of a ground-mounted 10MW power plant
• Learn how to use the ISO 31000 standard for risk management
• Understand the process of the sun’s influence on earth
• Learn how to measure the Sun’s irradiance in your area

Day 2
• Understand the different types of photovoltaic panels and how they work
• The difference with thermal solar projects
• Tracking the sun – is this necessary?
• Difference between rooftop and ground-mounted
• Inverters – do we need them, and how do they work?
• Transformers, mounting and other essential technical elements
• The essentials of site selection
• The importance of EPC contracts. A review of the major elements of EPC contracts will be held and a checklist distributed
• We will walk through the plant construction process and identify potential pitfalls
• Case studies of over 20 different actual construction problems will be presented and discussed
• The importance of a good O & M contractor is emphasised with a summary terms of an O&M presented
• The advantages of off-grid versus grid-connected projects will be reviewed

Day 3
• Legal due diligence will be reviewed, from determining the validity of the appropriate laws and regulations through the various agreements including those pertaining to construction, grid connection, access, operating and maintenance.
• The PPA is the most important agreement for financing a solar PV project, and needs to be combined with all other related agreements - the loan agreement, grid connection agreement, and EPC contract - should be aligned with the PPA
• We will examine how policy provisions are designed and what specific support mechanisms for international solar PV projects are available to bridge the gap between the costs of conventional power sources and solar PV.
• Financing structures from both equity and debt will be analysed.
• Equity from one or more investors, injected directly or via the project developer into a special purpose vehicle (SPV or “project company”).
• Non- or limited-recourse debt from one or more lenders, secured against the assets owned by the SPV.
• Project Economics of a real world ground-based PV will be reviewed, including yield forecast, revenue, capital costs, operating costs, and economic hurdles and metrics
• A class project economics exercise in Excel will be conducted
• A comprehensive list of checklists will be presented during the final session

WHO SHOULD ATTEND?
• Regulators
• Power Utilities and Users
• Renewable Energy Project Developers
• EPC Contractors
• Transmission/Distribution System Operators
• Energy Technology Vendors
• Commercial Services Suppliers (Legal, Insurance, Environmental, etc.)
• Investors, including Commercial and Development banks, Venture Capital and Private Equity
• Policymakers, Policy Advisors
• NGOS
• Local Community Representatives
• Market Analysts & Consultants

Program Overview

SECTION 1: OVERVIEW
Why Due Diligence?
• Regulators,
• Offtakers
• Bankers,
• Developers
• Contractors
• Manufacturers
• Local Communities

Project Development Phases
• Project Development Overview
• Stage 1 - Concept Development And Site Identification
• Stage 2 - Prefeasibility Study
• Stage 3 - Feasibility Study
• Stage 4 - Permitting, Contracts And Financing
• Stage 5 - Engineering, Procurement, Construction And
• Stage 6 - Commercial Operation

Risk Identification and Assessment
• Stakeholder identification and Engagement

SECTION 2: TECHNICAL DUE DILIGENCE
The Solar Energy Yield Prediction
• Solar Resource Overview
• Quantifying Solar Resource
• Solar Resource Assessment
• Irradiation on Module Plane
• Performance Modelling
• Energy Yield Prediction Results
• Uncertainty In The Energy Yield Prediction

Solar PV Technology
• Solar PV Technology Overview
• Overview Of Ground Mounted PV Power Plant
• Solar PV Modules
• Mounting And Tracking Systems
• Inverters
• Quantifying Plant Performance

SECTION 3: OPERATIONAL DUE DILIGENCE
Site Selection
• Site Selection Overview
• Site Selection Criteria
• Site Selection Constraints
Plant Design
- Plant Design Overview
- Layout and Shading
- Technology Selection
- Electrical Design
- Site Buildings
- Site Security
- Plant Monitoring
- Optimising System Design
- Design Documentation Requirements

Rooftop PV Systems
- System sizes
- System types
- Energy yield
- System tilt and azimuth
- Plant design
- Construction
- Commissioning
- Operation and maintenance
- Economics and project structure

Construction
- Construction Overview
- Construction Management
- Interface Management
- Programme And Scheduling
- Quality Management
- Environmental And Social Management
- Health And Safety Management
- Specific Solar PV Construction Issues
- Construction Supervision
- Common Construction Mistakes

Operation and Maintenance
- Operation and Maintenance (O&M)
- Overview
- O&M Contracts
- Scheduled/Preventative Maintenance
- Unscheduled Maintenance
- Spare Parts
- Performance Monitoring, Evaluation and Optimisation
- O&M Contracts For Solar PV Plants
- O&M Contract Heads of Terms

SECTION 4: COMMERCIAL DUE DILIGENCE

EPC Contracts
- EPC Contracts Overview
- Basic Features of An EPC Contract
- Scope of Work
- Price and Payment Structure
- Completion and Handover Of The Plant
- Provisional Acceptance
- EPC Contract Heads Of Terms

Identifying and Quantifying “soft” issues
- Stakeholders
- Country Risk
- Currency Risk
• Disruptions (such as terrorism and security risks)

SECTION 5: LEGAL DUE DILIGENCE

Policies and Support Mechanisms for Solar PV
  • Feed-in Tariffs (FiTs)
  • Reverse Auctions and Tenders
  • Market-based Instruments
  • Tax Incentives
  • Soft Loans
  • Capital Grants
  • Solar PV Support Mechanisms
  • Further Guidance to Developers On Regulatory Support Frameworks

Power Purchase Agreements
  • Power Purchase Agreement Overview
  • Main Power Purchase Agreement Terms

Solar technology documentation
  • Independent engineering reports
  • List of project equipment and equipment warranties

Other Legal Agreements
  • SLAs (Site Lease Agreements)
  • ESAs (Energy Service Agreements)
  • EPC (Engineering, Procurement & Construction)
  • PRG (Performance Ratio Guarantees)
  • Warranties

Solar technology documentation
  • Independent engineering reports
  • List of project equipment and equipment warranties

SECTION 6: FINANCE AND ECONOMICS

Financing Solar PV Power Projects
  • Forms of Financing (Equity and Debt)
  • Description of corporate structures
  • Project Financing
  • Templates
  • Re-Financing

Project finance documentation
  • Debt service coverage ratio
  • Off-taker credit
  • Optional Production Insurance Wrappers

Project Economics of Solar Projects
  • Project Costs and Revenues Overview
  • Solar PV Project Capital And Operational Costs
  • Solar PV Project Revenues
  • Financial Modelling

COURSE FACULTY

Peter Cockcroft

Peter Cockcroft has almost forty years in the international energy sector, and has been in charge of successful projects in Australia, Indonesia, Thailand, the Philippines, Vietnam, India, Pakistan, France and West Africa (most of these in excess of US$100 million). He is recognized as being a world authority on energy risk identification and assessment, and has lectured on this topic in over twenty countries. He can certainly “walk the talk” as not only has he been in charge of a
135MW IPP, but has also held executive positions for international organizations such as BHP and Shell, state owned companies in Indonesia and Korea, as well as being advisor to various Governments. He also presents a “sister”, more detailed, course on solar project economics.

ENROLLMENT
In order to allow sufficient time for arranging travel plans, early enrollment is recommended. Registration will be closed on 16 February 2017. Late enrollment may result in course cancellation.

CANCELLATION, SUBSTITUTION & REFUND
The tuition fee will be refunded (less US$ 100 registration fee) only if notification of cancellation is received at least 10 days prior to the commencement.

Non payment of tuition fee does not constitute automatic cancellation of participation. Substitution may be made at any time for those enrolled.

CERTIFICATE
A certificate of participation will be awarded to each person completing the course.

TUITION FEE
Tuition fee at Rp. 21,600,000 + 10% VAT per delegate (the tuition fee will be adjusted based on the prevailing rate) is due and payable upon confirmation of enrollment. The fee is excluded accommodation. Payment should be settled at the latest on 16 February 2017. Any bank charges in connection with payment in Rupiah must be added to tuition fee payment. Tuition fee includes admittance to the course, course materials, daily refreshments and full lunch.

Payment can be transferred to PT. Geoservices
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