Master Class on
“Contract types in the project development and implementation with special emphasis on EPC contracts”

The Integrated Mineral Resources Initiative in Mongolia

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In Ulaanbaatar, Mongolia

Lecturer:
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Linde AG, Engineering Division, Dresden
You are warmly welcome!

- Presentation of the Participants
- Brief Introduction to the Seminar
- Your expectations …
Introduction: From the idea up to the implementation of the Project – The Project cycle

1. What is the Client’s intention and how are Suppliers organized?
2. Risk allocation / distribution and types of Contract
3. Structure and contents of an EPC-Contract
What is the benefit of Contract Management?
First Message coming from Contract Management

„you can make more money with a pencil than with your tools“
What is the benefit of Contract Management?
Second Message coming from Contract Management

- A Contract which has been deposited in a safe and has never been used might eventually be a good Contract.

- It is better to understand and live the Contract which both Parties have agreed upon and which is accepted by the Parties.

- Therefore we say:
  - The Contract is to be read!
  - The Contract is to be understood!
  - The Scope is to be fulfilled according to the Contract!
What is the benefit of Contract Management? Third Message coming from Contract Management

Cost increase/delay

Reaction
by Change & Claim Management
- Fast processing of information
- Comprehensive SWOT-Analysis
- Development and implementation of a comprehensive CCM-Strategy

Pro-Action
by Contract Management
- Provision of the Contract Know-how
- Knowledge transfer
- Increase the perception for Claims
- Correct contractual correspondence
- Permanent risk analysis

Prevention
by Contract Elaboration
- Detailed evaluation of documents and offers
- Contractual risk analysis
- Details to be defined in the Contract/order of precedence
- Fulfillment of the principles

Potential for Risk Reduction
Introduction: From the Idea up to Start-Up of the Plant

a. Feasibility Study
b. The ITB / RFQ – Process
C. Front End Loading taking a FEED Study as an example (incl. cost estimate +/- < 30%)
d. The Investment Decision
e. Engineering phase
f. Construction Phase
g. Taking into Operation
h. Ramp Up
1. **What is Client´s intention and how are Suppliers organized?**

**The Client wants…**

1. to realize a complete Project with one or more Plants,
2. Plant shall perform as contractually agreed, be maintainable at low cost, exist for many years (have a long lifetime), may be operated in an easy and cheap way, be of the newest state of the art, achieve the highest output and require lowest input,
3. to receive the Project and the Plant(s) in time and quality,
4. the budget not being exceeded,
5. an experienced and competent partner, who understands the EPC-business and who is well acquainted with the technological and process related challenges,
6. one single point of contact and responsibility,
7. an EPC-Contractor, who has the financial power, to implement and handle such a cost intensive investment,
8. more pre-requisites? Financing? Off-taking?
How do Suppliers organize themselves? Types of Cooperation - Overview

„The selection of the appropriate cooperation concept is decisive for the commercial success“

**General Contractor**
- EPC-Contractor realizes the Plant in its own responsibility and engages therefor vendors and sub-contractors

**Open Consortium**
- Sharing of risks and chances with Partner

**Alliance**
- undefined; not recommended to be used

**Joint Venture**
- implementation by founding a SPV/SPC

**Silent Consortium**
- Consortium Partner does not appear officially; Consortium Leader acts like General Contractor

**Partnership**
- undefined; not recommended to be used
The Contractor as General Contractor

- Contractor’s Services as fixed price alternative: reimbursable

- Engineering
- Procurement services

- Equipment Alternative 1
- Equipment Alternative 2
- Equipment Alternative 3

- Civil & Construction Alternative 1
- Civil & Construction Alternative 2
- Civil & Construction Alternative 3

- Best alternative

- Quotations of potential vendors, suppliers or sub-contractors

- Profit & Overhead
- Risk Mark-up
- Engineering Development allowance

- Delivery time
- Performance
- Quality
- Price
- Development
- etc.

- € / %

- FEE / MARK-UP

- time & certainty

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General Contractors

- General contractors usually build the entire plant as a turnkey project at a fixed/lump sum price. The fixed price is determined at a relatively early stage. Fees and mark-ups are relatively high due to the early specification of pricing.

- As the general contractor, the plant builder plans and designs (generally independently), delivers, builds and assembles (usually with the help of third parties) and commissions the overall plant (generally also independently).

- The risk is always transferred to the employer when the plant is accepted.

- The general contractor bears the sole risk for the construction of the plant (for their own and third party work).

- The general contractor incorporates the planning, implementation and price risks in their pricing.

- Payment is made according to a specified schedule (milestones).

- Individual costs are generally not revealed. **Exception: For reimbursable or cost + fee**
Project Realization by several Contractors or Consortium

Client may order certain stages of the Project from different contractors. Examples:

- Study
  - Basic Eng.
  - Detail Eng.
- Procurement
  - Transport
- Civil Construction
- Installation
- Commissioning & Start-Up

→ Clear definition of the hand-over from one Contractor to the other is important.
→ Also consortium contracts with partners require clear split of work.

Any kind of contract has to define clearly the contracting philosophy (which phases are performed by whom) and what phases are to be performed for the contract price.
Realization of the Project by Consortia with horizontal split (by phases)

- **Construction-Partner:** Consortia are mostly eligible for EPC-Contracts. Construction is being performed by the Consortium Partner being responsible for Civil and Construction. In case Client is responsible for the Construction no partner is being needed.

- **Technology-Partner:** in most cases only as Licensor (Process owner; Know-how Provider)

1. normal relationship:  
   - Client
   - EP-Contractor
   - C-Contractor

2. Consortia:
   a) structure
      - Client
      - EP-Contractor
      - Consortium
        - Partner
        - On-Shore Scope + Construction
        - Off-Shore Scope

   b) **Consequence**
      - **risky because:**
        - internal liabilities in the Consortium Basis Total Contract Price of Consortium!
        - Total liability towards Client

      - Contractor is also liable for Civil and Construction; therefore sufficient supervision should be calculated (as for sub-contractors for Construction)
      - Split of Contract Price and scope should be balanced
      - Partner should be interested in the overall success.
Methods of scope definition

1. **Split into different project portions** (“who does what?”):

Possible methods of scope splits between parties (also in consortium or JV):

- by project phases → “horizontal split”
- geographically / by area → battery limits → “vertical split”
- by units → “vertical split”

**Diagram:**

- **Horizontal split**
- **Vertical split**

<table>
<thead>
<tr>
<th>Unit 1</th>
<th>Unit 2</th>
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</thead>
<tbody>
<tr>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
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<tr>
<td>Procurement</td>
<td></td>
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<tr>
<td>Partner</td>
<td></td>
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<tr>
<td>Construction</td>
<td></td>
</tr>
<tr>
<td>Commissioning</td>
<td></td>
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</tbody>
</table>
2. Risk allocation / distribution and Types of Contract

a. General thoughts on distribution of risks
b. reimbursable
c. Open book / cost plus fee
d. Convertible Contract
e. The TKLS-Contract
High complexity and risk →

Necessary to define:

A) **the Scope of Work**

B) **Other Project Responsibilities** (DOR)

C) division of Project **Risk**

In practise, this definition may be difficult and requires long and exhausting discussions.
A: Definition of the Scope of Work

Clear definition of the scope of work is of MAJOR IMPORTANCE for Client and Contractor!

Reasons:
- Due to complexity of projects both parties must be certain of their rights and obligations
- **Client** does not want to pay more than necessary, **Contractor** does not want to deliver more than what his price is for.
- During project execution **Client** will try to get as much as possible for the Contract Price, **Contractor** will try to get more money for the Scope of Work which he performs (opposing interests).
Helpful Questions:

What does the Contractor provide and deliver?
- what engineering, what equipment, what material, site security, fencing, utilities … ?

What is the project for?
- e.g. “build road” → for cars or trucks? …

What special rules and regulations does the Client want to apply?
- Technical specifications of the equipment (ASME, DIN …)
- Other specifications (→ buses + safety belts)

What does the Customer provide?
- Lay down area, support during transport, personnel during start-up …
# Types of Contract by Project Phases

Client may order **certain stages** of the project.

<table>
<thead>
<tr>
<th>Scope</th>
<th>Contract type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contractor</strong> provides only engineering, Client buys equipment and organizes construction himself</td>
<td>Engineering Contract</td>
</tr>
<tr>
<td><strong>Contractor</strong> provides engineering and equipment, Client builds plant himself (w/ other company)</td>
<td>E + P Contract</td>
</tr>
<tr>
<td><strong>Contractor</strong> provides engineering, buys and delivers equipment and builds the plant</td>
<td>E + P + C Contract</td>
</tr>
<tr>
<td><strong>Contractor</strong> provides engineering, delivers equipment + manages the construction company</td>
<td>E + P + CM Contract</td>
</tr>
</tbody>
</table>
**Value of the Project Phases related to the Total Contract Price**

<table>
<thead>
<tr>
<th>Study</th>
<th>Basic Eng.</th>
<th>Detail Eng.</th>
<th>Procurement</th>
<th>Transport</th>
<th>Civil Construction</th>
<th>Installation</th>
<th>Commissioning &amp; Start-Up</th>
</tr>
</thead>
</table>

Engineering (E)  
- 15% of project cost

Procurement (P)  
- 50% of project cost

Construction (C)  
- 35% of project cost

**FEED** = Front End Engineering Design  
**EPC** = Engineering + Procurement + Construction  
**EPCM** = Engineering Procurement Construction Management  
**TKLS** = turnkey lump sum (full responsibility at fixed price)
Types of Contract by Types of Prices

**Lump Sum Price**
- one **fixed price** for the defined scope

**Reimbursable / Cost plus Fee**
- Engineering/Services: Payment according to **fixed rates**
  - hourly rates for engineering services
  - unit rates for third party services
- Other cost: Payment at cost plus **fixed mark-ups (fee)**
  - on all actual cost (except own engineering)

**Convertible**
- Start as **Reimbursable/Cost plus Fee** (Phase 1)
- **Open Book phase**: Customer can see and check price estimates at any time during Phase 1; prices are discussed
- **Conversion** into Lump Sum after certain time (Phase 2)
„Open books“ and „Cost plus Fee“

There is a difference in the meanings of „open books“ and „cost plus fee“:

**open books**: means only, that Client sees the binding offers and/or the cost of vendors and sub-contractors; the books are opened; actually no statement referred to payment!

**cost plus fee**: Client pays all cost and a mark-up („fee“); „cost plus fee“ requires the transparency of the prices, i.e. „open books“.
### Overview on the Types of Contract by Types of Prices with Pros and Cons

<table>
<thead>
<tr>
<th></th>
<th>Pros for Project</th>
<th>Cons for Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lump sum</strong></td>
<td>• Lumpsum fixed price</td>
<td>• Contractor calculates high fees (risk allowances) for risks of fixed price</td>
</tr>
<tr>
<td></td>
<td>• Contractor is free and flexible to select vendors and sub-contractors</td>
<td></td>
</tr>
<tr>
<td><strong>Reimbursable/Cost plus Fee</strong></td>
<td>• Client has the right to select vendors and sub-contractors and to participate in negotiations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Risks can be discussed and fixed individually</td>
<td>• Price risk on Client’s account</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Discussion on selection of third parties may take long time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• High workload for Client’s team</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Final date (PAC) normally not guaranteed by Contractor</td>
</tr>
<tr>
<td><strong>Convertible</strong></td>
<td>• Open book phase opens discussion on price, milestones and risks</td>
<td>• By disclosing the price calculations Contractor reveals his calculation (mostly secret)</td>
</tr>
<tr>
<td></td>
<td>• Risks are being taken later by Contractor</td>
<td>• Prices stay open for a while</td>
</tr>
<tr>
<td></td>
<td>• Complete scope can be ordered immediately</td>
<td>• Detailed and long lasting discussions on Price</td>
</tr>
</tbody>
</table>

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**Explanation: Target Price with Bonus/Malus**

- **Price overrun:** By overrunning the target price and in case Contractor is responsible therefor Contractor shall pay a malus in the amount of xx % of the additional costs up to a maximum amount of xx.

- **Price under run:** By under running the target price Contractor shall receive a bonus in the amount of xx % of the saved costs up to a maximum amount of xx. 

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**Target Price for Lot „XY“**

- **Real Costs:** Malus in case Contractor is responsible

- **Real Costs:** Bonus for Contractor

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**EURO / USD**
3. Structure and Contents of an EPC-Contract

1. Commercial Rationales and Risk Distribution
2. Standard Contracts like FIDIC or Customized Contracts?
3. The EPC Contract in Detail – Structure and the most important stipulations
4. Disputes Resolution in International in EPC-Contracts
# Identification of Possible Purchasing Risks and Measures

<table>
<thead>
<tr>
<th>Risk</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market risks</td>
<td>Early warning system, strategic market observation</td>
</tr>
<tr>
<td>Price and term risks</td>
<td>Fixed price agreements, price adjustment clauses</td>
</tr>
<tr>
<td>Contractual risks</td>
<td>Comprehensive contract and claim management</td>
</tr>
<tr>
<td>Award risks</td>
<td>Evaluation model</td>
</tr>
<tr>
<td>Quality risks</td>
<td>Supplier audits, contractual penalties, warranty agreements</td>
</tr>
<tr>
<td>Time risks</td>
<td>Contractual penalties</td>
</tr>
<tr>
<td>Process and information risks</td>
<td>Definition of the responsibilities of team members, the processes and the information flow</td>
</tr>
</tbody>
</table>
# Contractual Risk and Cost Allocation

## Owner Risk Distribution Contractor

### Construction Management
- Contractor acts merely as managing interface, while contracts are directly concluded between Owner and specialist companies.
- Often used in multi lot projects

### Traditional
- Design done by Owner
- e.g. FIDIC Red Book

### Design & Build
- Detail design is done by Contractor while the outline design is delivered from Owner and/or his engineer.
- e.g. FIDIC Yellow Book

### EPC
- Design done by Contractor, input from Owner purely functionall (e.g. output in MW or heatrate)
- e.g. FIDIC Silver Book

## Costs

- **Low Cost**
- **Costs**
- **High Costs**
Application of Standardized Contracts

A quite extensive variety …
Typical Standard Contracts used in the international EPC-Contracting

**FIDIC**: Federation Internationale des Ingenieurs Conseils

**NEC**: New Engineering Contract (Institution of Civil Engineers)

**JCT**: Joint Contracts Tribunal

**ECE**: United Nations Economic Commission for Europe (UN/ECE)

**Orgalime**: European Engineering Industries Association representing the interest of Mechanical, Electrical, Electronic, Metalworking & Metal Articles Industries

Etc…
Standard Contracts - Advantages and Disadvantages

Advantages:

- Proven and internationally accepted
- Many legal systems do not have the necessary sets of standards
- Faster negotiation
- Greater expertise on the global market

Disadvantages:

- Always require adaptation to individual cases, which can be more complex than producing new contracts.
- Can give a false feeling of security, depending on the amendment.
- Contractually intended risk distribution and client strategy do not match.
- Closed systems which can quickly become inconsistent in the event of amendments.
Federation Internationale des Ingenieurs Conseils (FIDIC)

Founded in 1913, headquarters in Geneva

Global association of consulting engineers, currently represents 75 countries

Articles: Honorary code for consulting engineers, establishment and promotion of professionals

In this context: Development and issuing contract conditions

Widespread in Eastern Europe and for projects from the world bank, IMF, EU, EBRD etc.
FIDIC Contracts: Special Features

• FIDIC contractual basis is used globally, but there is no obligation to use a specific contractual basis - as a result, there are a wide range of versions.

• The FIDIC contractual conditions are based on English law – they are incompletely formulated for special cases and must be extended with corresponding clauses.

• In FIDIC contractual law, the engineer has a special role consisting of independent arbitrator functions which initially appear strange to professional planners.

• There are permanently rooted dispute settlement systems such as the Dispute Adjudication Board (DAB) or courts of arbitration.

• The deadline regulations for certain processes (installment payments, reporting concerns, acceptances etc.) are organized differently than in German law.

• Mandatory national law always has precedence!
Overview of the FIDIC Books

**Red book** (Contract for Construction)
For detailed descriptions of services with unit prices, invoicing based on quantity survey

**Yellow book** (Contract for Plant and Design & Build)
Most widespread for functional descriptions of services with lump-sum prices

**Silver book** (Contract for EPC Turnkey Projects – Engineering, Procurement, Construction Projects)
Similar to the Yellow Book, but the Contractor takes on more extensive risks and assumes planning responsibility; turnkey construction as required for a full-service company.

**Golden book** (Contract for Design, Build and Operate Projects)
For BOT/operator models

**Green book** (short form of contract)
For tendering small construction contracts for less than 500,000 USD

**White book** (Consultant Model Service Agreement)
For tendering architectural and engineering services
Structure of the FIDIC-Books

FIDIC-Contracts

Construction Contract

- Pure Construction (without planning)
  - Planning by Owner
    - < 500.00 US$
  - Planning by Contractor
    - Lump sum Price

- Construction incl. Planning
  - With Engineer
  - Without Engineer

Consultant-Contract
The Conditions of Contract for Construction ("New Red Book") are tailored for construction and engineering services, in which planning and design are prescribed by the employer.

The Conditions of Contract for Plant and Design-Build ("New Yellow Book") and the Conditions of Contract for EPC/Turnkey Projects ("Silver Book") can be considered if planning and construction are fundamentally up to the contractor (functional description of services).

The Silver Book is intended for EPC and BOT structures for industrial plants and other models of privately financed public infrastructure facilities where the lender and Employer demand certainty of a fixed end price and completion date. The Contractor has the full responsibility for planning, purchasing and implementing the project based on the lump-sum price.

The Short Form of Contract ("Green Book") permits different contract forms, but is primarily intended for low-value or technically simple projects, or standardized work, e.g. with a maximum duration of roughly half a year and a maximum financial upper limit of 0.5 million dollars.

The distribution of risks between the client and contractor differs according to the book used. The Red Book assumes a largely balanced risk distribution. The Yellow Book shifts the risk towards the contractor, and the Silver Book transfers most of the risks to the contractor. The increased risk acceptance in a contract in accordance with the Silver Book is generally counterbalanced by increased remuneration.
General information:

- The FIDIC books are incomplete and require supplements.

- Risk distribution/basic principles of good faith are largely ineffective.

- Also, all terms which appear important to a contractual party, should be defined

- Legal consequences (e.g. damages) should also be expressly governed

- In particular, references to local technical standards, which can result in significant costs in the event of failure to incorporate them in planning and costing, are especially important.
General Structure of an EPC-Contract

Part A0
ITB / RFQ Documents

Part A1
Commercial Contract with Annexes

Part A2
Maintenance Contract for the time of the Defects Liability Period

Part B
Functional Scope Description ("Employer’ Requirements")
Components of the EPC-Contract

EPC-Contracts have a number of elements:

✓ Legal components with respect to Design and Engineering Services

✓ Legal components with respect to Civil and Construction

✓ Manufacturing and delivery

✓ Performance guarantees

✓ Services of all kind

✓ BOO, BOT, Operation & Maintenance
EPC Contract – Responsibilities of Contractor

- Fulfillment of the Contract (scope, schedule, quality)
- permits
- documentation
EPC Contract – Responsibilities of Owner

- site access
- permits
- provision of services and materials
- provision of manpower
- payments
- acceptance
Scope Description as the central element of the EPC Contract

Scope description (“Scope of Works“) is in first instance independent of the applicable law,
it always consists of the following parts:

- Performances, achievements
- detailed description of services and deliveries
- standard description of services and deliveries
The construction project should be described in **detailed** or within a **functional description** (range of services and deliveries) or a **mixed form** of both.

**Functional Description**

The Employer "only" formulates the results, the requirements (functions)

The Contractor performs part of the planning work.

**Advantage:** The Contractor bears the risk of the planning being incomplete.

**Disadvantage:** The Employer has less of an influence on the execution details.

**Description of services and deliveries with specifications**

Here, the Employer not only describes the results of the construction work, but also the method and the execution details.

**Advantage:** The Employer determines the execution details.

**Disadvantage:** The Employer bears the risk of supplements
Additional Note: Standards/Technical Rules

Clauses on the "best practice technical rules" are often used. However, as a result of the different international interpretations, they are not clear, e.g.

- "with due diligence and care"
- "state of the art"
- "good industrial standard"
- "reasonable standard of skill and diligence"

These often entail significant potential for disputes due to imprecise definitions and differing legal interpretations!

**Practical tip:** Define the required technical standard precisely. Pay particular attention to the different national standards; you must ensure that you clarify in the contract whether your own technical rules or those valid in the country of the Contractor are applicable, to avoid price and quality risks!
Possible Sources of Error

In practice, most errors are made at the simplest level:

- Project decision takes a long time, but then:
- Rapid, careless planning
- Selection of cheap construction companies and/or plant engineers, some of whom perform in a completely unsatisfactory manner with a rather bad and insufficient quality and with significant delays deteriorating the success of the Project.
- Legal no-go's are ignored.
- The Contractor's equity/liability capital is not audited sufficiently (e.g.: Special Purpose Vehicle)
Incomplete Scope Description

Risk of incompleteness (principle: the planner is liable!)

- Classic function sharing: Contractor performs construction work, Employer/client performs planning work.
  - Employer bears risk of incomplete planning
  - Correction possible via Contractor's audit obligation

- Function sharing for functional service description: construction work and most of the planning work by the Contractor
  - Risk of Contractor optimizing planning for their own purposes, i.e. minimal design to reach functional requirements, with minimal reserves.
  - Partial correction possible via Employer's right to audit
Contractors' obligations in detail

- Comply with Contract, Law, Authority Approvals
- Acquire and maintain Authority Approvals (part to be provided by Owner)
- Provide utilities (or Owner ?)
- Prepare Project Documentation
- Supply and replace Spare Parts
- Provide training to Empl. personnel
- Apply a Quality Management System
- Fulfill Safety requirements
- Fulfill Environmental requirements
- Submit and comply with Project Management Plan
- Handle all import/export formalities
- File all documentation on Projekt
- Take care of CE marking
- Submit required (bank) securities
- Pay taxes imposed on the Works and services
- Provide all IP Rights for operat. + maint. of Plant
- Elaborate + update Project Schedule
- Design the plant + prepare Project Documentation
- Transport Mat. & Pers. to / from Site
- Perform all required inspections + tests
- Commission + test the Plant
- Correct all Defects prior PAC and during DLP
- Take out required insurances

Contractor shall:
- Design the plant + prepare Project Documentation
- Elaborate + update Project Schedule
- Correct all Defects prior PAC and during DLP
- Take out required insurances
Owners' obligations in detail

- Payment of the Contract Price
- Provide access to the site
- Acquisition of permits
- Allocation of personnel
- obligations of Owner
- Provision of feed and utilities
- Issuance of the Provisional Acceptance
- Issuance of the Final Acceptance
- Acceptance of the documentation
Guarantees in EPC Contracts - Fundamentals

As guarantees from the Contractor are always incorporated in the contract price, you should always review whether and to which extent guarantees are required and whether or not the Employer's own risk management can reach the same level of security. The key to this, in addition to the own personnel resources, the availability of the corresponding expertise.

As the agreement of guarantees shifts the risks towards the Contractor, the latter will request more extensive control rights (e.g. 24/7 online monitoring of the plant) and insist on operating the plant in accordance with the manufacturer's requirements. If these requirements are infringed in standard operation, there is a risk that guarantees could be lost.

Practical tip: As part of the preliminary considerations for contract formulation, it is essential to establish which guarantee values are absolute guarantee values and which guarantee values are subject to contractual penalties.
EPC Contract in Detail – Absolute and Minimum Guarantees

System representation based on performance

• The guarantee range which definitely must be reached represents the minimum performance guarantee values to be reached in accordance with the Employer's requirements. If they are not reached within a contractually-agreed period, the Employer is entitled to withdraw from the contract.

• If the plant reaches the minimum values but not the contractually required performance guarantee value, the Employer must take over the plant, but is entitled to claim contractual penalties.
Performance Guarantees

Absolute Performance Guarantees

- Must be fulfilled => No LD! No PAC!
- No limitation of Contractor's liability!
- No other forms of relief!

Performance Guarantees

Employer or Contractor may choose:

- To demand at its own discretion to make changes and modifications to the Plant, so that the Performance Guarantees are met;
- To demand to pay Performance LD for the PG which have not been achieved, provided they are above the MPG (Contractor can „buy off“ the obligation to achieve these guarantees by paying the LD)

Minimum Performance Guarantees

Same effect as Absolute Performance Guarantees!

Availability Guarantee

- Contractors accept availability guarantees only for selected Projects (e.g. Power Plants in combination with O&M-Contracts)
- Contractor must then pay Availability LD, if guarantee is not met
The completion guarantee (subject to achievement of MC and/or PAC) is a central element of the EPC contract, as the regularly very high investment volume and the associated financing mean that profitability depends to a great extent on timely completion.

In the event of a delay (generally per day or per week), a contractual penalty or lump-sum damages are payable. The amount of the penalty or damages shall be based ideally on the return from the EPC project.

**Practical tip:** In order to avoid disputes on when the project reaches completion, the take over processes must be defined precisely in the contract.
Issuance of the Acceptance as central obligation of Owner

Minimum Criteria for issuing of PAC

- End of commissioning
- Successful completion of Trial Operation
- Successful Performance Test (achievement of at least the minimum performance values for output and efficiency)

Consequences upon failure to reach PAC

- End of commissioning
  - Make good
  - Rejection
Guarantees - Availability Guarantee

Definition of the availability guarantee

\[
\text{Verfügbarkeit} = \frac{\text{Gesamtzeit} - \text{Gesamtausfallzeit}}{\text{Gesamtzeit}}
\]

Total time

Total downtime

In this context, planned and unplanned downtime must be distinguished. As only the downtime within an agreed period is calculated to assess the availability, planned downtime (e.g. to perform maintenance work) is outside the agreed period.

The availability of a power plant is generally slightly lower in the first year, as it can be assumed that systems must first be run in, and some rework may be required.
Guarantees – guaranteed performance rate, efficiency

- Performance test at acceptance
- Performance test at the end of the DLP
- "new"
- End of defects liability period DLP
- $P_1$
- $P_2$
- Time, equivalent time
Guarantees - Other Types of Guarantees

Electrical net output
Practical tip: It is essential to define where this value is measured!

Thermal net output

Emission values
For emission guarantees, a distinction must be made between absolute emission values required to maintain the operating permit and other values defined by the Employer.
It only makes sense to agree contractual penalties for the latter.

Reaction time guarantees
In order to maximise availability, an agreement should be reached on the maximum reaction time for the Contractor to reach the installation site in case of downtime.
EPC Contract in Detail - Contractual Penalties

- In EP & EPC-Contracts, contractual penalties are typically agreed for delays and performance deficits. In addition to their damage limitation function, contractual penalties also have a pressure function, which can reach different levels of severity according to the design (e.g. staggered increasing contractual penalties). From the point of view of the Contractor, contractual penalties have a liability limitation function.

- In assessing the level of contractual penalty, ensure that the Contractor cannot buy their way out too fast and that the pressure function loses its effect when cap limits are reached.

- In EP & EPC-Contracts, contractual penalties are frequently viewed as liability limits, as the principle of "full and final satisfaction" is frequently applied in international EPC business. That means that the Contractor will generally attempt to restrict its liability completely to the contractual penalties.

Depending on the plant type and risk, the Employer will certainly try to agree liability above and beyond this!
EPC Contract in Detail - Payment Terms

As an important part of the EPC contract, the payment schedule governs when each part of the contractual total is payable to the Contractor. From the point of view of the Employer, individual payments should be linked to the completion of individual construction phases and reflect the value growth of the property. They should not place the Client at a disadvantage.

**Practical tip: If the Contractor proposes payments according to percentage construction progress without delimiting the construction phases, this should not be accepted, as otherwise disputes on the payments to be made are inevitable!**

- The following aspects should be considered during contract formulation and negotiation:
  The amount of the advance payment should be considered in total price (discount!) and be covered by bank guarantees.
  Construction sections which are obviously not completed or defective and thus not taken over must not establish any claims for payments.

**Payment of the final rate must be linked to acceptance of the complete documentation. It is often the only and final source of pressure.**
Example of a milestone payment-scheme

<table>
<thead>
<tr>
<th>Instal-ment</th>
<th>%</th>
<th>EUR</th>
<th>Invoice not earlier than months after Commencement Date</th>
<th>Initiating event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td></td>
<td></td>
<td>After Commencement Date and submission of the Contract Performance Security</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td></td>
<td></td>
<td>Start of civil Works</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td></td>
<td></td>
<td>Successful balancing of gas turbine 1 and 2 rotors</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td></td>
<td></td>
<td>Delivery of the gas turbines to the Site</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td></td>
<td></td>
<td>Steam turbine and condenser on foundations / first shipment of special equipment</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td></td>
<td></td>
<td>First ignition of gas turbine 1 and 2</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td></td>
<td></td>
<td>Issuance of PAC</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td></td>
<td></td>
<td>Complete documentation and elimination of all items of the Punch List</td>
</tr>
</tbody>
</table>
Proposals of bidders in comparison to ITB
EPC Contract in Detail - Project Schedule

- The project schedule is the central control instrument for project management and project controlling, whose significance should not be underestimated under any circumstances!

- Accordingly, the EPC contract must absolutely contain detailed provisions on the software to be used by the Contractor, the resulting reporting and any online access rights of the Employer!
EPC Contract in Detail – Changes to the Scope of Service

• It is virtually impossible to draft major infrastructure projects so transparently that all consequences of defaults, contractual infringements and requested changes can be contractually governed.
• Distinction between undisputed changes (Change Order) and disputed changes (Claim).

Reasons for changes

• Delayed reaction to changes
• Changes requested by the Employer
• Insufficient communication between the parties
• Poorly trained personnel
• Imprecise contracts and contract documents
• Inappropriate risk sharing in the contract
EPC Contract in Detail – Termination Fundamentals

• Termination of the EPC contract should always be viewed as an **ultima ratio and last resort.**

• Depending on the legal system to which the contract is subject, termination has an effect which cannot easily be reversed.

• In certain cases, unjustified termination by one party (which does not in fact terminate the contractual relationship) can result in a justified termination by the other party with corresponding consequences (especially in terms of damages)!

• In almost all scenarios, termination of a major project results in damages for both parties!
## Termination by the Employer

### Possible causes of fault by the Contractor 1/2

<table>
<thead>
<tr>
<th>Type of fault</th>
<th>Effect of termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>The value retention of the collateral provided decreased, i.e. the rating of</td>
<td>The Contractor must</td>
</tr>
<tr>
<td>the bank which issues the surety has deteriorated.</td>
<td>• cease work immediately, unless the Employer demands the continuation of individual</td>
</tr>
<tr>
<td>The Contractor or its parent company</td>
<td>• deliver all works completed on termination;</td>
</tr>
<tr>
<td>becomes insolvent.</td>
<td>• transfer all existing rights to the Employer to the extent possible;</td>
</tr>
<tr>
<td>The Contractor attempts to transfer the contract to third parties;</td>
<td>• hand over to the Employer all documentation produced by the time of termination;</td>
</tr>
<tr>
<td>The Contractor is involved in illegal activities, especially corruption;</td>
<td></td>
</tr>
<tr>
<td>Preliminary acceptance is not granted, and the cap limit of the lump-sum</td>
<td></td>
</tr>
<tr>
<td>damages is reached;</td>
<td></td>
</tr>
</tbody>
</table>


## Termination by the Employer

### Possible causes of fault by the Contractor 2/2

<table>
<thead>
<tr>
<th>Type of fault</th>
<th>Effect of termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ If the plant does not reach the minimum guaranteed values, or it is predicted that it will not reach them;</td>
<td>▪ The Contractor must reveal its original calculation.</td>
</tr>
<tr>
<td>▪ The plant does not pass the test run (reliability test/endurance test);</td>
<td>▪ If the remedy is performed by a third company, the Contractor must support this.</td>
</tr>
<tr>
<td>▪ Unjustified interruption of work by the Contractor;</td>
<td>▪ The Contractor must bear additional costs of the Employer;</td>
</tr>
<tr>
<td>▪ It becomes clear that the Contractor cannot deliver on time or in the quality agreed contractually;</td>
<td>▪ The Employer is entitled to lock the Contractor out of the construction and continue to use its tools</td>
</tr>
<tr>
<td>▪ <em>(P)</em> The Contractor commits a major infringement of the contract;</td>
<td></td>
</tr>
</tbody>
</table>
Termination by the Employer

Free termination (for discretion)

For free termination, which is an exclusive right of the Employer, no special termination reasons are required. The Employer can terminate the contract in this way at any time. In terms of legal consequences, it is similar to termination of the contract by the Contractor and largely shifts the risk and cost load to the Employer.

Free termination is generally invoked if the capital liberated by termination, less the lost costs, can be used more effectively elsewhere, or the project is not to be pursued for other reasons.

Note: The associated costs are generally very high, up to total loss of the funds planned for project implementation.

Possible legal consequences of the free termination

As free termination results from the risk or decision-making scope of the Employer, the Contractor must always be freed from resulting damages.

Accordingly, the Employer shall pay:

- the contract price for all work already performed;
- inevitable costs for additional work;
- inevitable costs incurred by the Contractor in relation to the termination;
- ... and potential lost profit!
### Termination by the Contractor

#### Possible causes of fault by the Employer

<table>
<thead>
<tr>
<th>Type of fault</th>
<th>Effect of termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Employer refuses to make payments to which the Contractor has a legally valid claim without legal grounds.</td>
<td>The Employer is obliged to pay:</td>
</tr>
<tr>
<td>2. The value retention of the collateral provided decreased, i.e. the rating of the bank which issues the surety has deteriorated.</td>
<td>• the contract price for all work already executed;</td>
</tr>
<tr>
<td>3. The Employer or its parent company becomes insolvent;</td>
<td>• the lost profit;</td>
</tr>
<tr>
<td>4. (P) The Employer commits a major infringement of the contract;</td>
<td>• inevitable costs incurred by the Contractor in relation to the termination;</td>
</tr>
</tbody>
</table>

The Contractor can lock the Employer out of the construction site after termination.
Termination Rights for both Parties - Force Majeure

Force majeure in the EPC contract

Definitions:
Force majeure refers to inevitable events such as natural catastrophes of all kinds, especially storms, earthquakes, floods, volcano eruptions, as well as fires, traffic accidents, hostage-taking, war, unrest, civil war, revolution, terrorism, sabotage, strikes where they affect third parties, atomic/reactor accidents or industrial machine damages or production interruptions. Force majeure generally requires a completely unexpected occurrence of one of these events. Thus, if the occurrence of an event can be expected, for example with floods which occur repeatedly in the same regions, this shall not be deemed force majeure.

Triggers of termination due to force majeure

Where the contract cannot be fulfilled for a period longer than defined by the parties due to force majeure, each of the parties is entitled to terminate the contract.

Effect of termination

In general, the Employer is only obliged to pay the contract price for all work already performed.
Project Success via Motivation – Incentives

Definition:
- are motivating factors, either financial or non-financial, material or immaterial, which encourage a party to choose a specific alternative.

- As part of large-scale infrastructure projects, incentives are usually designed such that the Contractor is offered financial benefits - above and beyond the agreed contract price - if it not only meets the agreed targets (schedule, performance data), but achieves even better results (e.g. 60% efficiency instead of 58.5% or completion/commissioning of the overall plant ahead of schedule).

- In particular in conjunction with the penalty provisions (malus provisions), i.e. provisions which result in disadvantages for the Contractor if it does not reach goals, incentives/bonus provisions can make success of the project far more likely!

Examples of bonus provisions
- Bonus for earlier completion
- Bonus for better performance data
- Payment for risk reduction
- Sharing saved costs

Examples of penalty (malus) provisions
- Contractual penalties
- Lump-sum damages
- Withholding payment
- Exclusion from other projects
Example of an EPC Security Concept
Contractor‘s Defect Liability

Prior to PAC (Execution Period)
- Right to demand due fulfilment of all Contractor‘s Obligations in any respect
- Withhold Payments
- Set-off Payments
- Engage others
- Reject the Plant
- Demand Perf. LD’s
- Demand Delay LD’s
- Termination

From PAC to FAC (Defect Liability Period)
- Right to demand remedy of Defects
- Withhold Payments
- Set-off Payments
- Engage others
- Demand Delay LD’s
- Termination

After FAC
- No Rights, except for prolonged DLP and Latent Defects
- None

Owner‘s Rights
- Owner‘s recourses to enforce
Reduction of Communicative Uncertainties

Clear definition of the terms and processes used (translation errors, ambiguity, different legal situations etc.)

Definition of the binding contract language if the contract is to be translated into multiple languages

Where possible, clarify before drawing up the contract, otherwise directly after concluding the contract (and before first disputes!!!) Driving clarification

Develop and coordinate workflow/structural diagrams and responsibilities/contacts

Clear documentation

→ Open communication!
## Choice of Law - Fundamental Considerations

<table>
<thead>
<tr>
<th>Practical considerations</th>
<th>Legal considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing experience in purchasing?</td>
<td>Buyer or seller-friendly?</td>
</tr>
<tr>
<td>Organisation of contract management</td>
<td>Stability of the legal system</td>
</tr>
<tr>
<td></td>
<td>Enforceability?</td>
</tr>
<tr>
<td></td>
<td>Legal knowledge of the court (of arbitration)?</td>
</tr>
</tbody>
</table>
## Commonly Mentioned Advantages and Disadvantages of Arbitration

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final decision</td>
<td>No binding effect</td>
</tr>
<tr>
<td>Easy to enforce</td>
<td>No integration of third parties</td>
</tr>
<tr>
<td>Competent panel of arbitrators</td>
<td>Few means of legal redress</td>
</tr>
<tr>
<td>Neutral panel of arbitrators</td>
<td>Interference by state courts</td>
</tr>
<tr>
<td>Generally faster</td>
<td>Poss. ex aequo et bono decisions</td>
</tr>
<tr>
<td>Generally less expensive</td>
<td></td>
</tr>
<tr>
<td>Not public/confidential</td>
<td></td>
</tr>
<tr>
<td>Procedural flexibility</td>
<td></td>
</tr>
</tbody>
</table>
Place of Jurisdiction or Venue of the Arbitration Proceedings

Considerations which must always be made
- Travel expenses/accessibility
- Availability of legal council
- Legal fees
- Procedure logistics
- Business strategy

Venue of the arbitration proceedings
- Neutral arbitration venue
- National arbitration legislation
- Support from state courts?
- Local arbitration institutions?

Place of jurisdiction
- Acceptable forum?
- Non-EU: Enforcement agreement?
- Reliability of the legal system
- Foreign law for the court?
Assertability of Contractual Claims I

- Negotiation, negotiation, negotiation...
- Consideration of cultural aspects (e.g. loss of face)
- Incorporation of common mediation mechanisms
- Legal action always ultima ratio!

Consider:
- Subject of dispute vs. strategic company goals
- Balance costs/benefits (e.g. cost of case in the USA)
- Note possible legal options
- Recommendation: If you take on a lawsuit, do it right...
 Assertability of Contractual Claims II - Enforcement

Arbitration

→ 1958 Convention on the Recognition and Enforcement of Foreign Arbitral Awards
→ More than 160 member states
→ There is no equivalent of state jurisdiction
→ Extremely limited options of preventing enforcement (limit of ordre public)

Cases before state courts

→ Enforcement in the EU: In particular: Brussels regime
→ Enforcement outside the EU: Bilateral agreements
→ Outside the EU generally significant difficulties involved!
# Appendices to an EPC-Contract

<table>
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<th>Appendix [1] (Employer’s Requirements)</th>
<th>Appendix [12] (List of Sub-Providers)</th>
</tr>
</thead>
<tbody>
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<td>Appendix [14] (Construction Site Requirements)</td>
</tr>
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<td>14.1 Utilities Supplied by Employer</td>
</tr>
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<td>3.2 Payment Schedule</td>
<td>14.2 Construction Site offices</td>
</tr>
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<td>15.1 Requirements on Project Management Plan</td>
</tr>
<tr>
<td>Appendix [6] (Commissioning Requirements)</td>
<td>15.2 Project Organization / Organogram</td>
</tr>
<tr>
<td>Appendix [7] (Project Documentation)</td>
<td>15.3 Contractor’s Key Personnel</td>
</tr>
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<td>7.1 Document Requirements</td>
<td>Appendix [16] (Insurance Requirements)</td>
</tr>
<tr>
<td>7.2 Layout and Content of Handover Documentation</td>
<td>Appendix [17] (Variations)</td>
</tr>
<tr>
<td>7.3 Labeling and Coding of Documents</td>
<td>Appendix [18] (Performance Guarantees)</td>
</tr>
<tr>
<td>7.4 Information Requirements List</td>
<td>Appendix [19] (Bill of Articles and Conditions)</td>
</tr>
<tr>
<td>Appendix [8] (Permits &amp; Approvals)</td>
<td>Appendix [20] (Forms &amp; Templates for Securities)</td>
</tr>
<tr>
<td>8.1 Existing Permits &amp; Permit Applications</td>
<td>20.1 Advance Payment Security</td>
</tr>
<tr>
<td>8.2 List of Permits to be Provided by Contractor</td>
<td>20.2 Performance Security</td>
</tr>
<tr>
<td>Appendix [9] (Training Requirements)</td>
<td>20.3 Parent Company Guaranttee</td>
</tr>
<tr>
<td>Appendix [10] (Maintenance Requirements)</td>
<td>20.4 Defect Liability Period Security</td>
</tr>
</tbody>
</table>
Questions and/or suggestions?

Thank you very much for your attention!