

Engineering: What is it? In Eastern Europe



Tebodin
always
close

Moscow, 2011

AEB Round Table: AEB Machine Building & Engineering Committee

Major Types of Construction

- **Residential Housing Construction**
- **Institutional Buildings**
- **Commercial Building Construction**
- **Specialized Industrial Construction**
- **Infrastructure**
- **Heavy Construction**

<i>Consultancy</i>	<i>Design and Engineering</i>
<ul style="list-style-type: none"> <input type="checkbox"/> Red-flag Due Diligence <input type="checkbox"/> Technical Due Diligence (TDD) <input type="checkbox"/> Opportunity/ Pre-feasibility/ Feasibility Study <input type="checkbox"/> Business/ Investment Planning <input type="checkbox"/> Valuation of Tangible & Intangible Assets/ Business <input type="checkbox"/> Environmental, Social Responsibility, Health and Safety Consultancy (EDD/ ESA, E&SA, EIA, ESAP) <input type="checkbox"/> Market Study and Analysis <input type="checkbox"/> Project Partner/ Financing Search <input type="checkbox"/> Lender's/Project Monitoring <input type="checkbox"/> (Alternative) Cost/ Budget Estimation <input type="checkbox"/> Energy & Resource Efficiency Consultancy <input type="checkbox"/> Procurement & Tenderers Evaluation 	<ul style="list-style-type: none"> <input type="checkbox"/> General Designer Services <input type="checkbox"/> Conceptual Design <input type="checkbox"/> Engineering Studies <input type="checkbox"/> Terms of Reference <input type="checkbox"/> Design Adaptation <input type="checkbox"/> LEED/ BREEAM <input type="checkbox"/> Basic Design <input type="checkbox"/> Detail Design <input type="checkbox"/> Specifications and Cost Estimation <input type="checkbox"/> Permitting Assistance <input type="checkbox"/> Tender Drawings and Preparation <input type="checkbox"/> Author Supervision <input type="checkbox"/> Technical Supervision
<p style="text-align: center;"><i>Project / Program Management (PM) Construction Management (CM)/ General Contractor Procurement</i></p>	

Interface – Management & Engineering consultancy

<p><i>Management Consultancy</i> <i>(The European Federation of Management Consultancies Associations - FEACO)</i></p>	<p><i>Engineering Consultancy</i> <i>(European Federation of Engineering Consultancy Associations - EFCA)</i></p>
<ul style="list-style-type: none"> <input type="checkbox"/> Corporate strategy & organization development <input type="checkbox"/> Financial & administrative systems <input type="checkbox"/> Human resources <input type="checkbox"/> Production & services management <input type="checkbox"/> Marketing & corporate communication <input type="checkbox"/> IT & systems <input type="checkbox"/> Economic & Environmental studies 	<ul style="list-style-type: none"> <input type="checkbox"/> Advise on projects funding <input type="checkbox"/> Project & construction management <input type="checkbox"/> Feasibility studies on projects <input type="checkbox"/> Conceives (basic) design <input type="checkbox"/> Detail design <input type="checkbox"/> Procurement of contractors & suppliers <input type="checkbox"/> Construction supervision & installation

Engineering supports clients through the whole

Investment Project Cycle

- ✓ Pre-investment phase
- ✓ Investment phase
- ✓ Post-investment phase

→ **Pre-investment assistance**

- Partner search
- Feasibility Study
- Market study
- Business planning
- Technical DD
- Environmental DD
- BAT assessment
- Valuation of PP&E

→ **Investment assistance**

- (Sustainable) Engineering
- Procurement
- Construction management
- Project management

→ **Post-investment assistance**

- Strategy development
- Technical evaluation
- Environmental issues
- EMS
- Energy Consultancy/Audits

Matrix of main services through EPCM Project Cycle (I)

Tebodin Function	Project Cycle Phases				
	Due Diligence	Concept Design	Basic Design	Tender/Detail Drawings	Construction
Consultant	Visual site assessment Utility consumption / connection assessment Study of site / design documentation ESA phase I & II Asbestos survey Preliminary EIA DD report preparation	Assessment and adaptation of Client's concept Budget estimate Study of utility connections and associated costs	Independent expertise of 3-rd party's BD Lender Monitoring (Inception) Analysis of Clients budget est. Analysis of site, permitting and design documentation Study of contractors docs. Preparation of bankable report for loan obtaining	Independent expertise of 3-rd party's Detail Design Lender monitoring (Inception phase)	Analysis of executed works Analysis of budget consumption Analysis of project progress upon spent budget Estimation to complete Construction supervision Construction management Lender Monitoring (monthly reports)
Engineering		Development of Conceptual Design: (MP, A&S, M&E solutions) Budget estimate Study of utility connections and associated costs	Development of Basic Design: MP, A&S, M&E solutions, Utility connection solutions Special reports: Fire safety, EIA, Labor safety, Energy saving, Construction organization	Option I: Tender drawings: MP, excavations and foundation, A&S, MEI parts, for all buildings and external utilities Option II: Detail drawings: MP, excavations, foundations, architectural and external utilities. Tender drawings: structural and MEI Option III: Adaptation of 3-rd party's drawings Implementation of design changes upon Client's demand (based on additional agreement)	Implementation of design changes upon Client's demand (based on additional agreement)
Project Management	Planning and control of DD scope execution	Planning and control of CD scope execution	Lead on design input data collection Advise on permitting strategy Planning, time/progress management Interface control/management Lead permitting process Obtain building permit Bi-weekly or monthly reporting		See below Construction Manager's scope

Matrix of main services through EPCM Project Cycle (II)

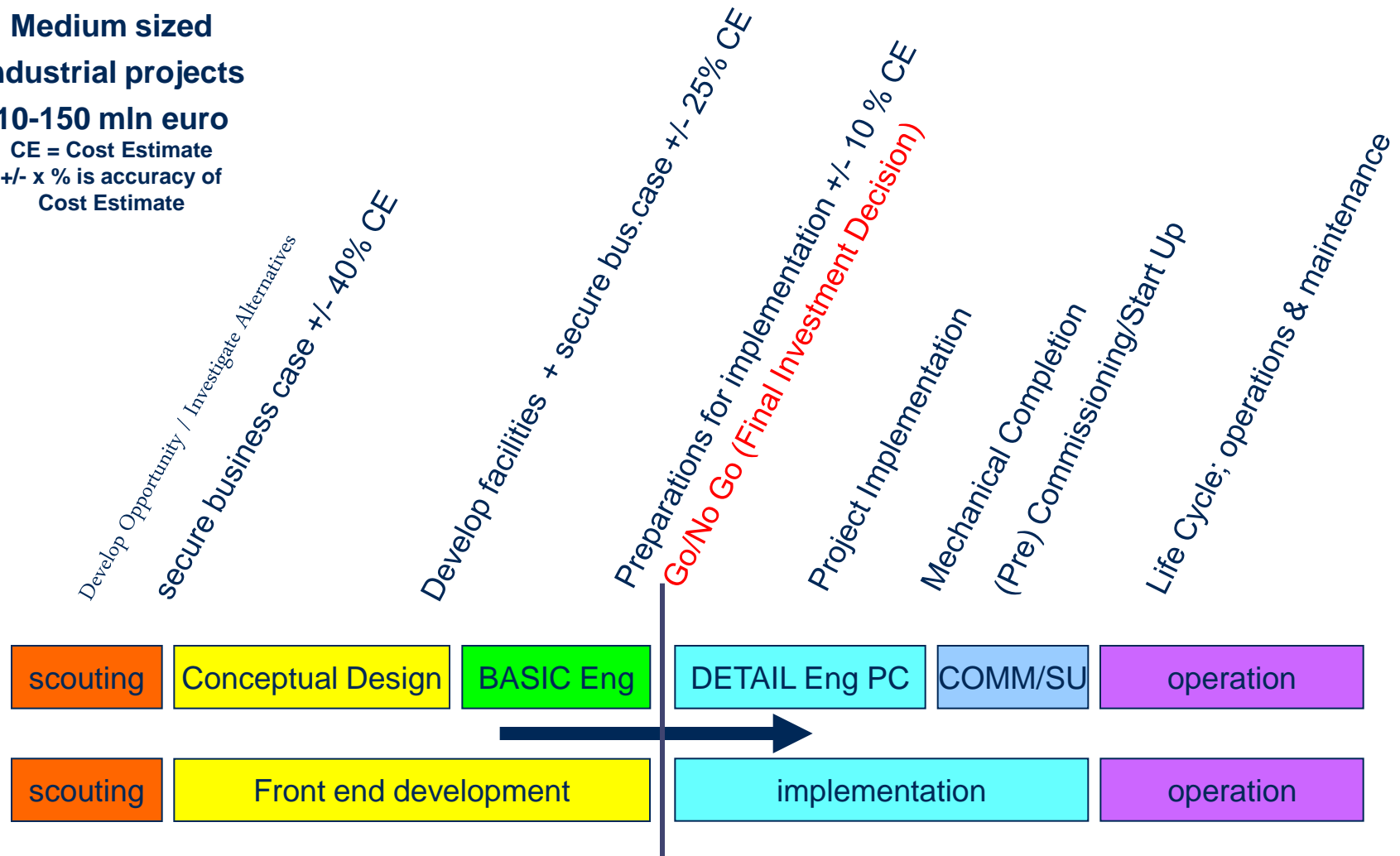
Tebodin Function	Project Cycle Phases				
	Due Diligence	Concept Design	Basic Design	Tender/Detail Drawings	Construction
Author Supervision					<u>Is never part of the engineering scope and fee!</u> Execution of Author supervision (min scope – one visit per week by two engineers) Author supervision log maintenance Bi-weekly or monthly reporting
Construction Supervision					<u>Is never part of author supervision scope and fee!</u> Permanent presence on site for: Quality and quantity control, HSE control Interface control
Construction Management				Participation in Bids evaluation session and selection of General contractor	Lead construction process on site Planning, time/progress management Interface control/management Budget control
Procurement			Tender of General designer and specialized design contractors Forming of bidder's list Tender packages preparation and distribution Answering questions Technical and financial evaluations of bids		Tender of General contractor and nominated subcontractors/suppliers Forming of bidder's list Tender packages preparation and distribution Answering questions Technical and financial evaluation of bids Bids evaluation report

Project phasing (medium / industrial)

Medium sized
industrial projects

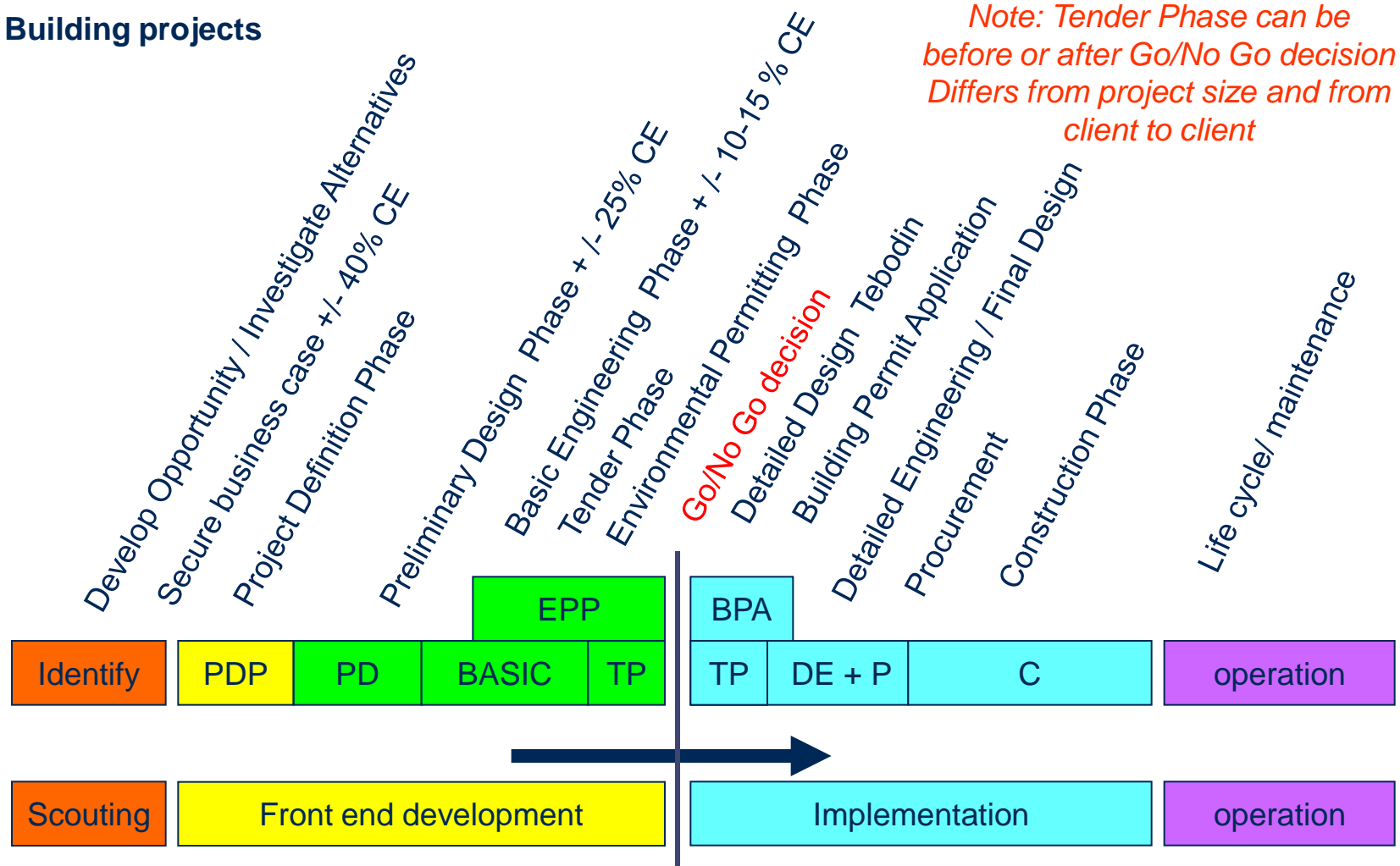
10-150 mln euro

CE = Cost Estimate
+/- x % is accuracy of
Cost Estimate

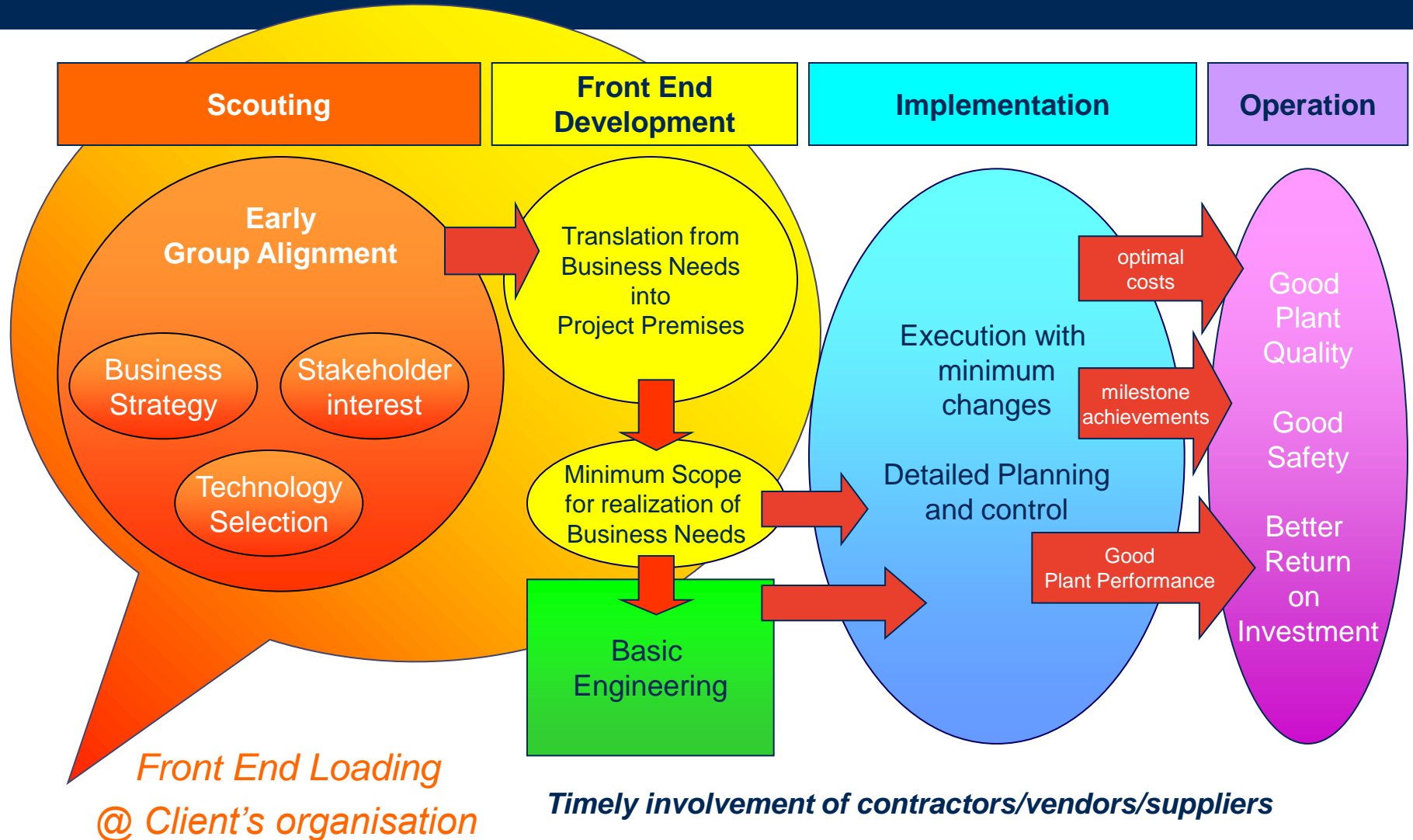


Project phasing (Buildings)

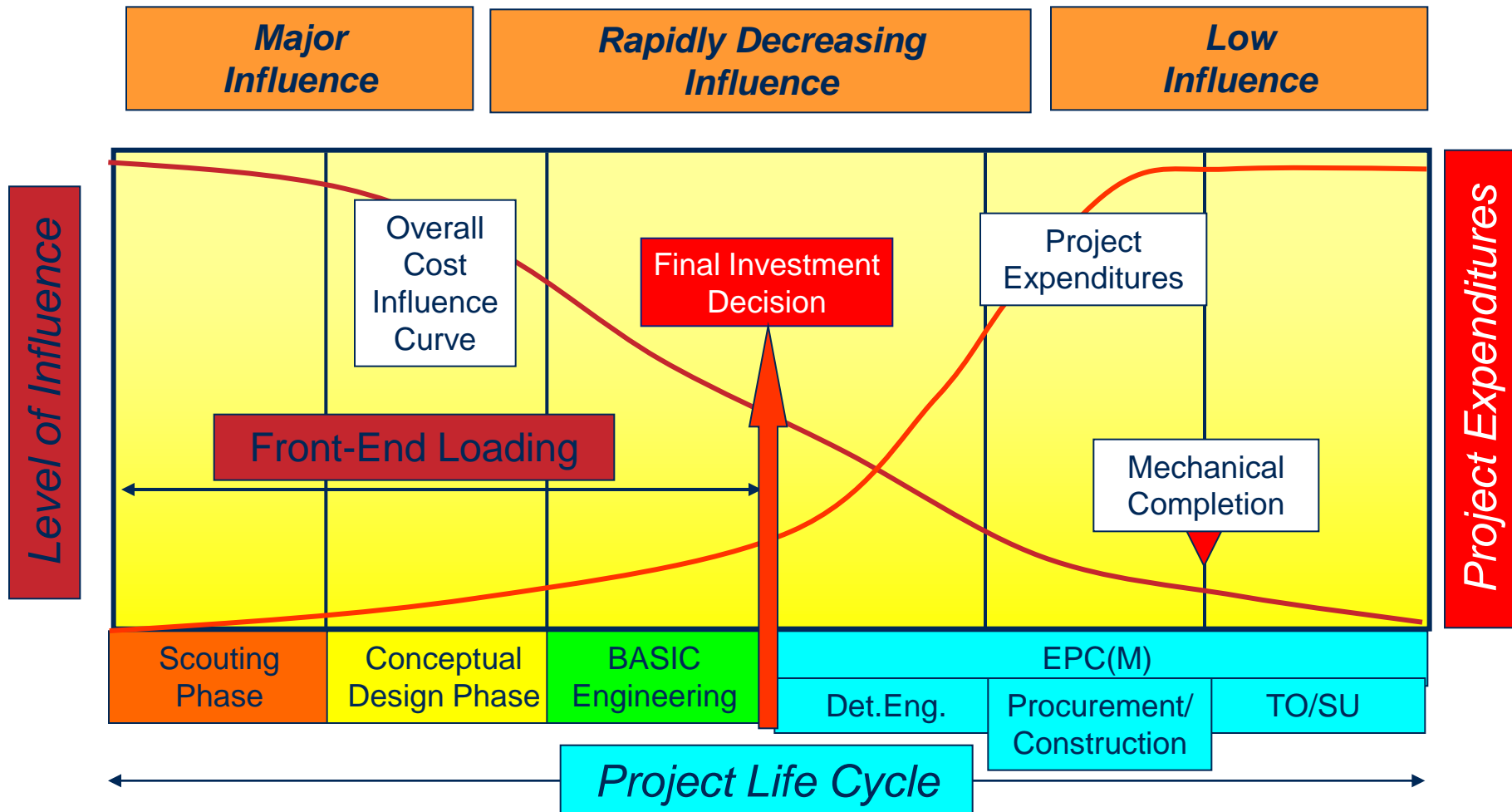
Building projects



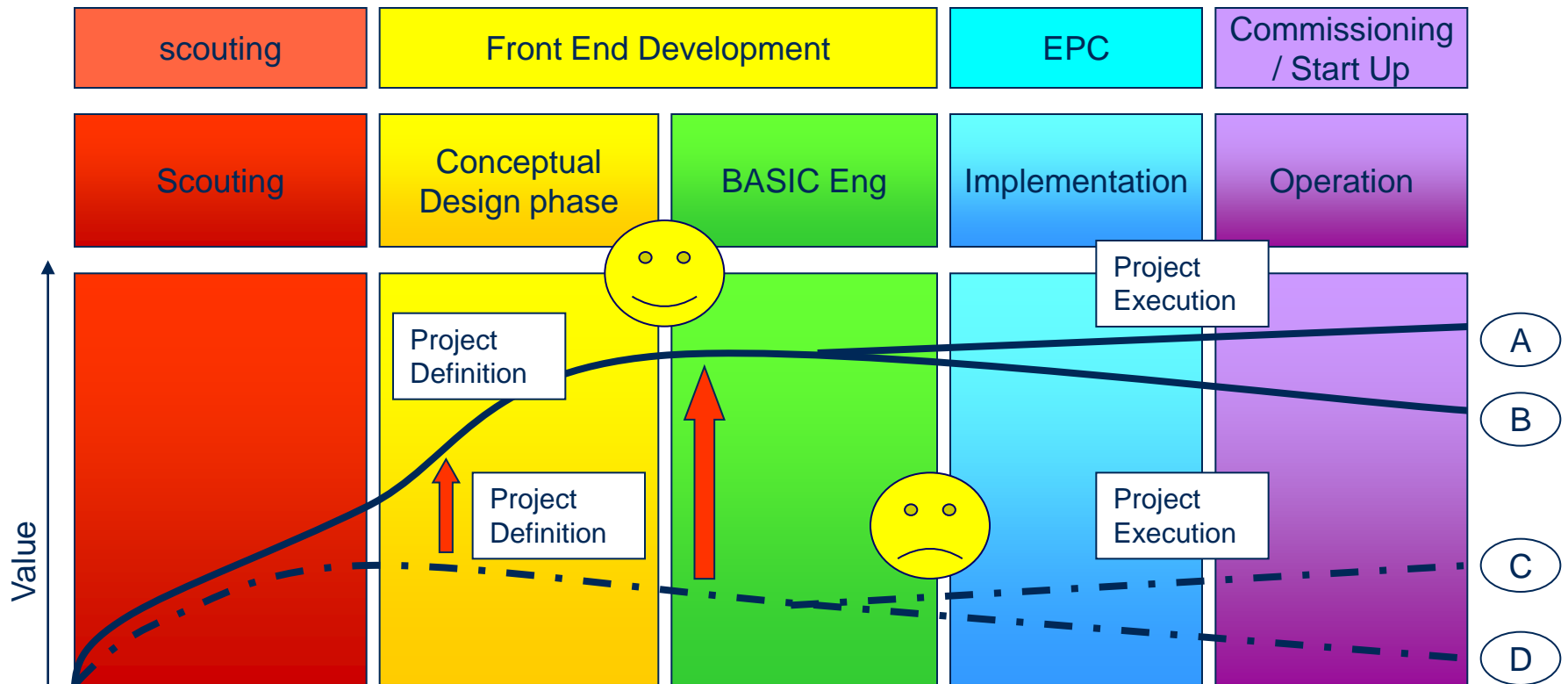
Front End Loading/Project phasing



Opportunity to influence costs



Project phasing / influencing value



(A) Good project definition and -execution

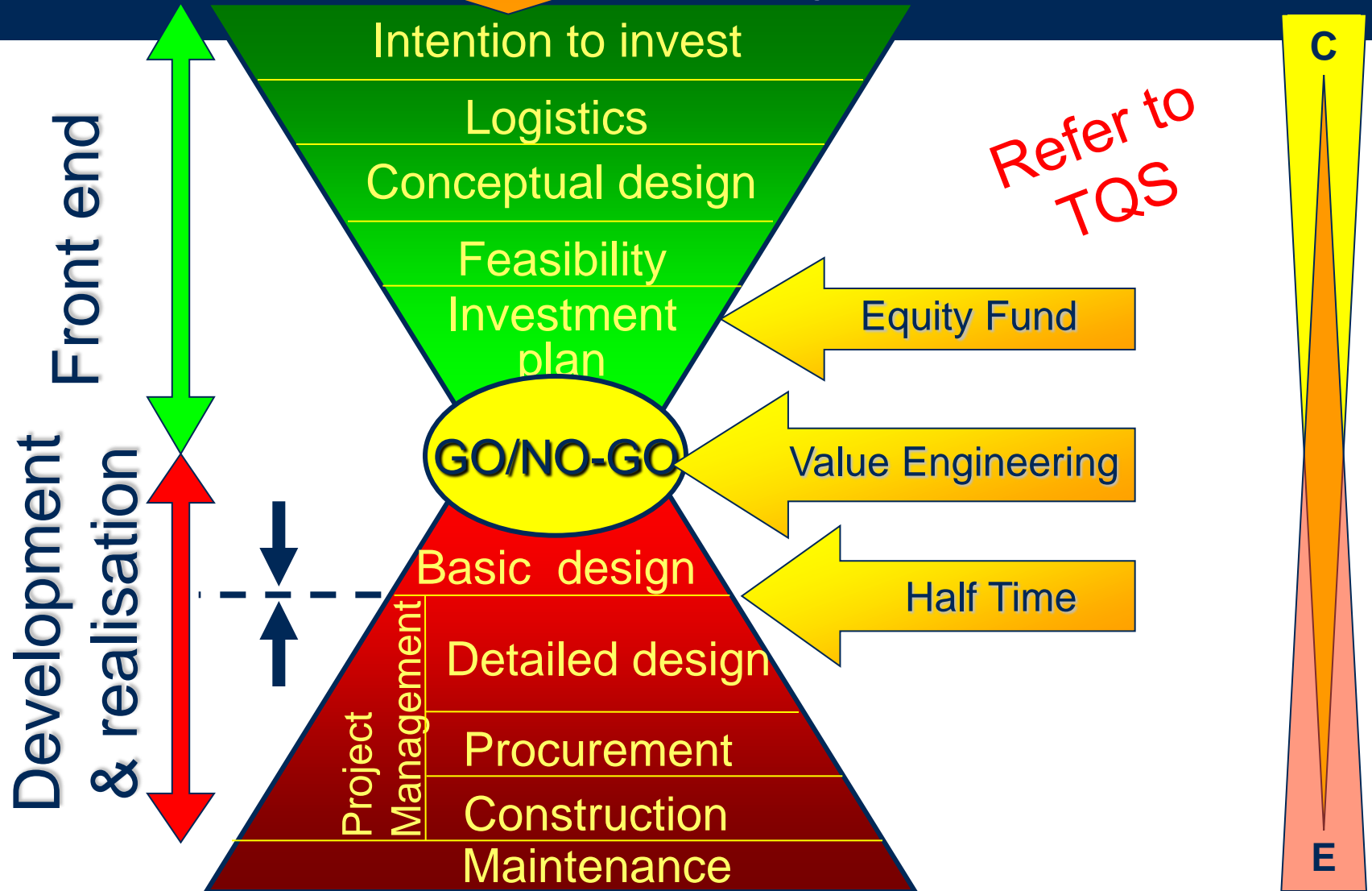
(B) Good project definition and poor -execution

(C) Poor project definition and good -execution

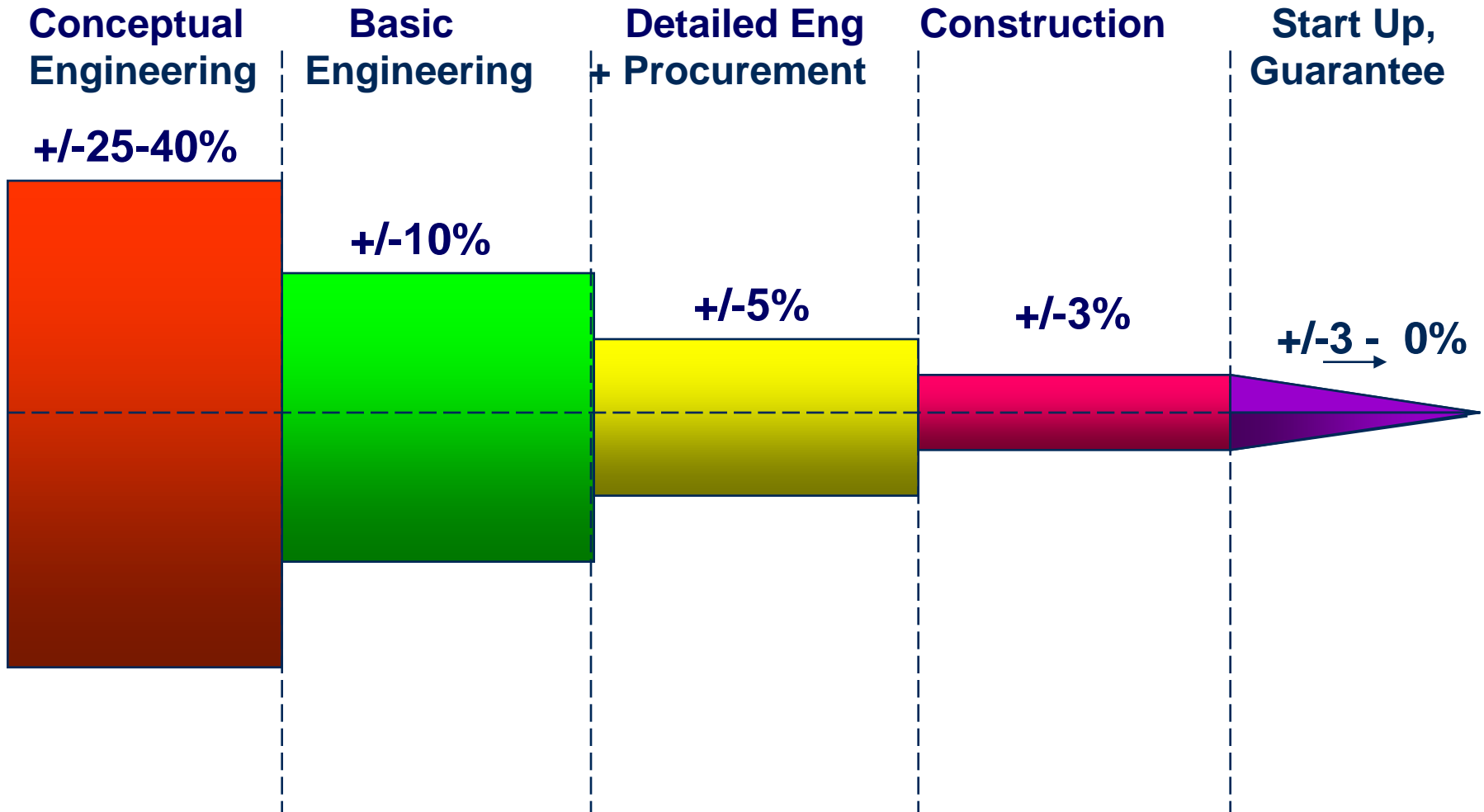
(D) Poor project definition and poor -execution

Strategy

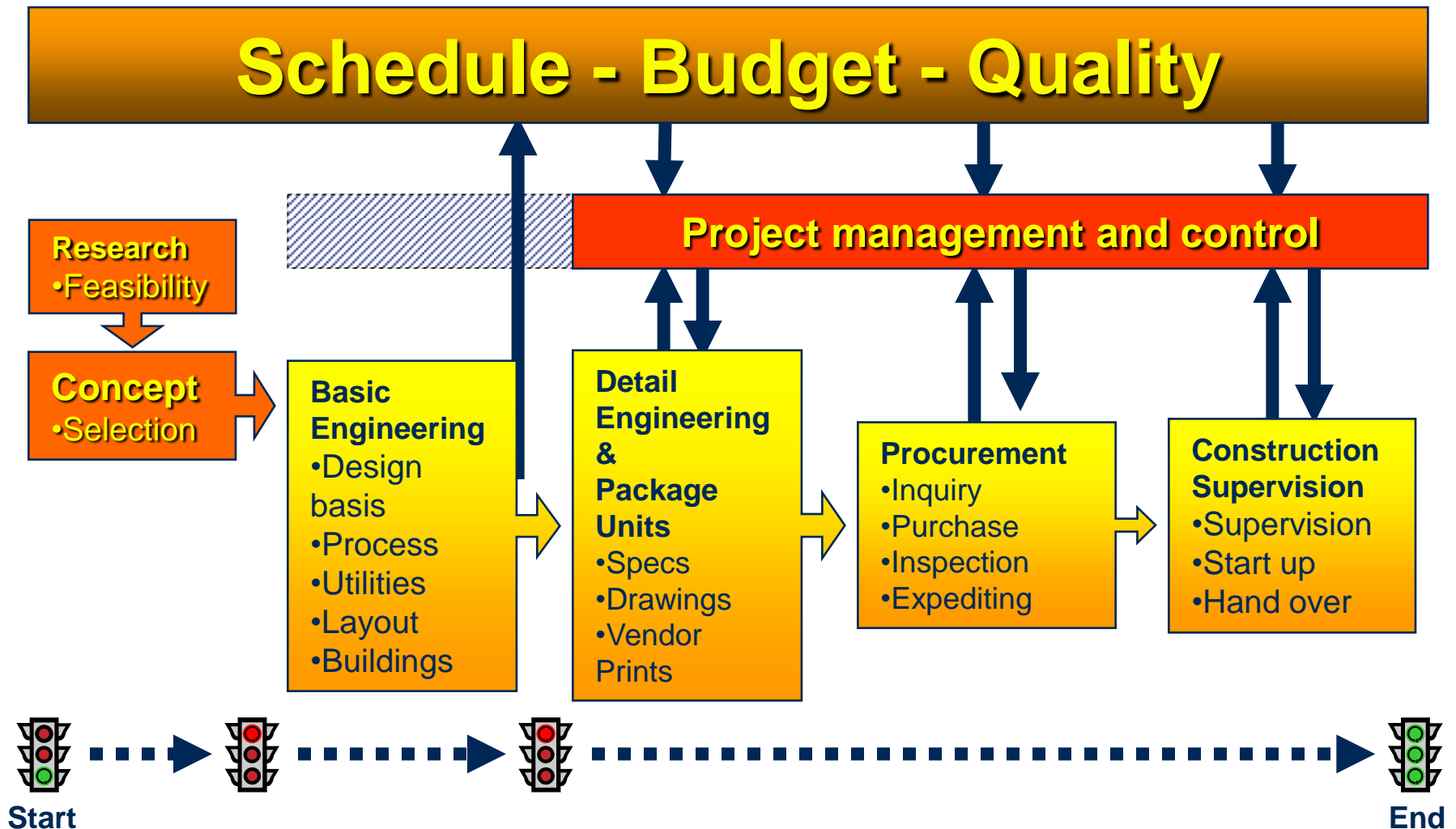
Project Characteristics



Project phases Cost Estimate Accuracy

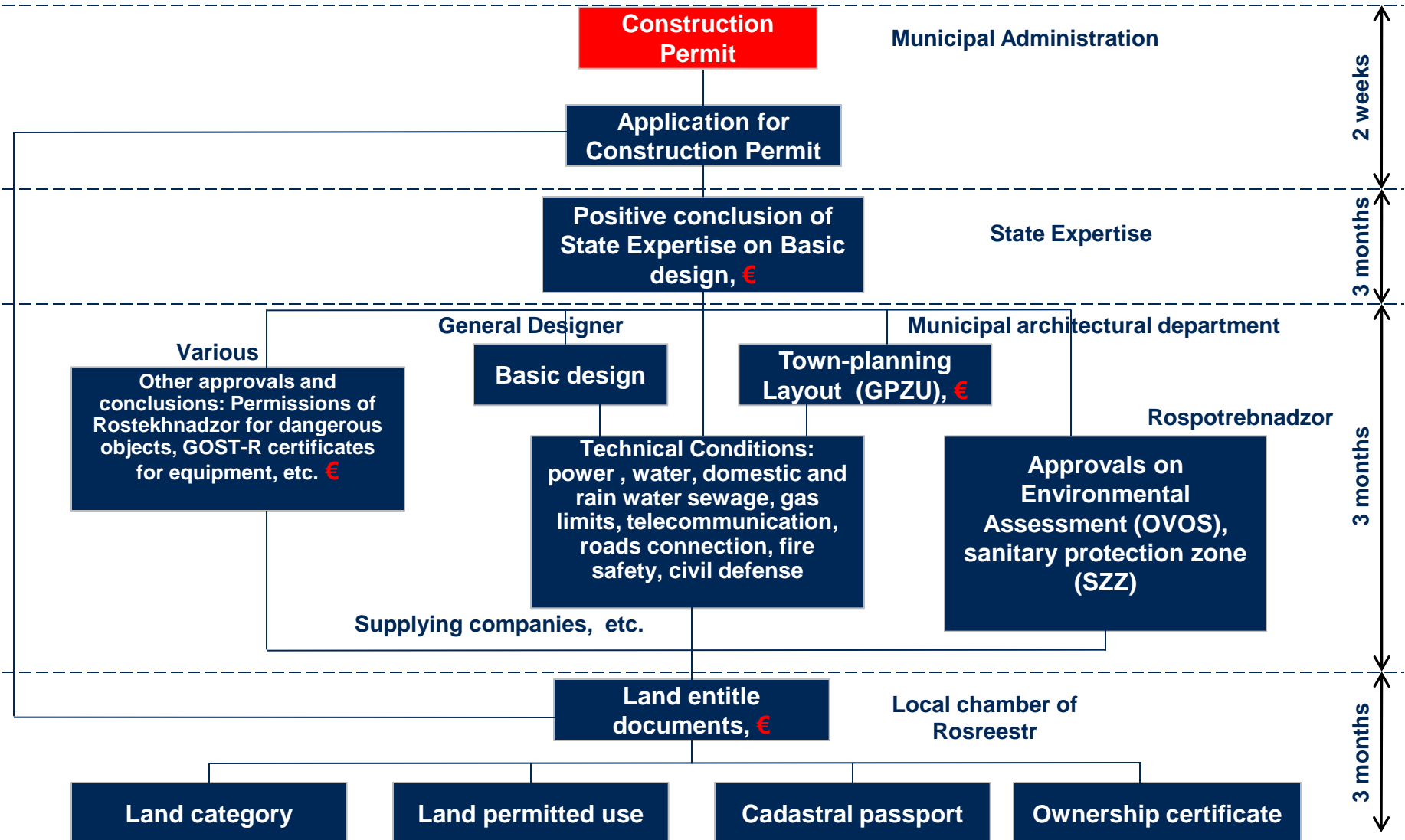


Project Phases Flowchart

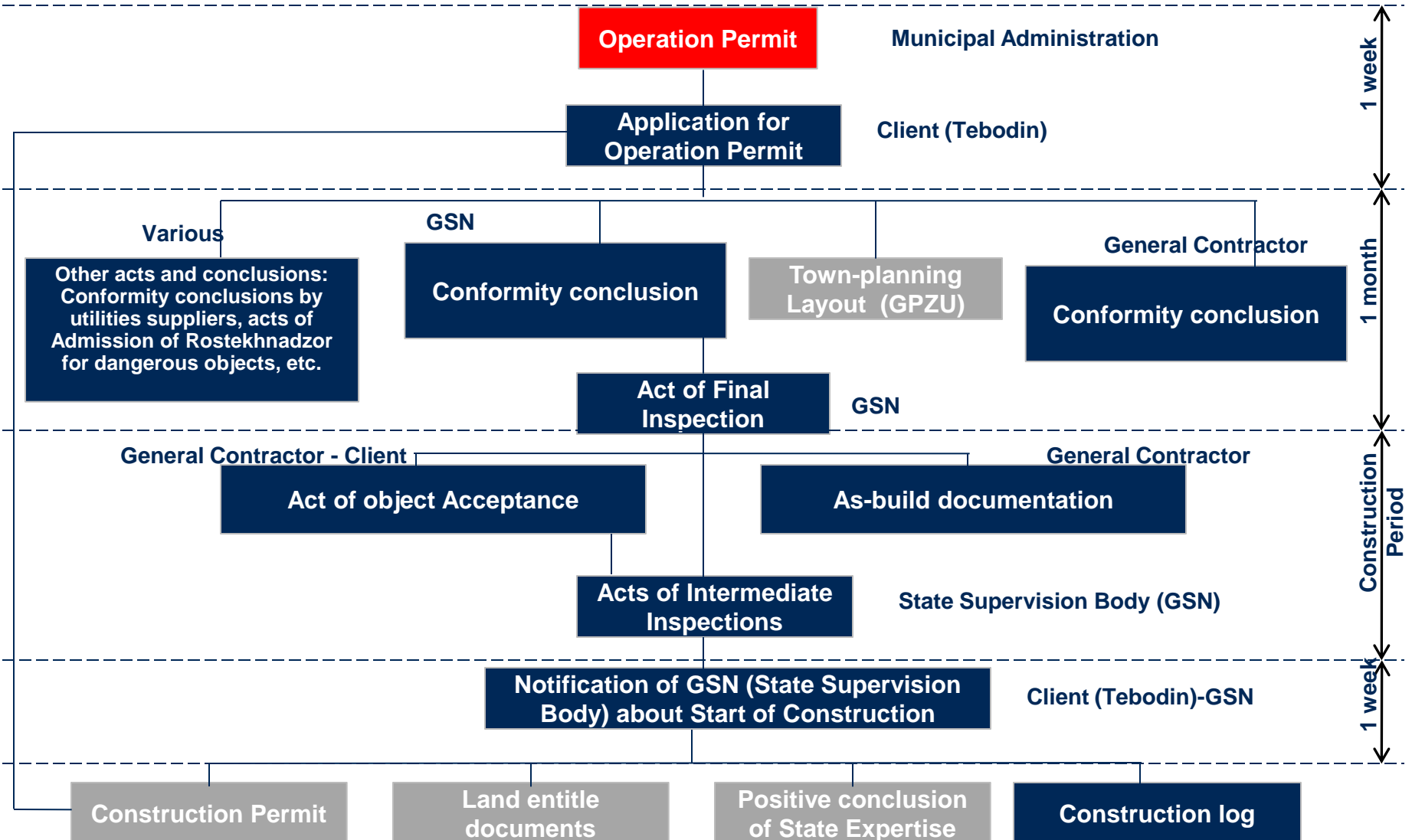


Project Plan and Permitting

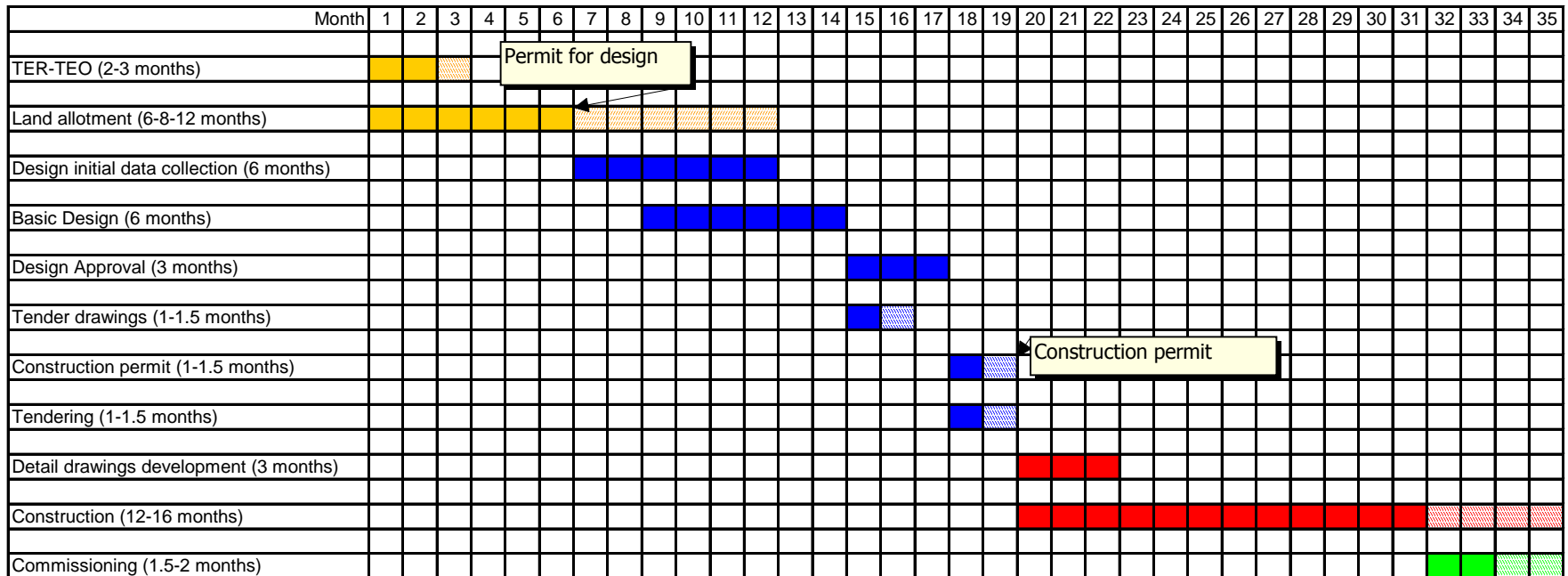
Construction Permit. Permitting hierarchy. Authorities. Timing



Operation Permit. Permitting hierarchy. Authorities. Timing



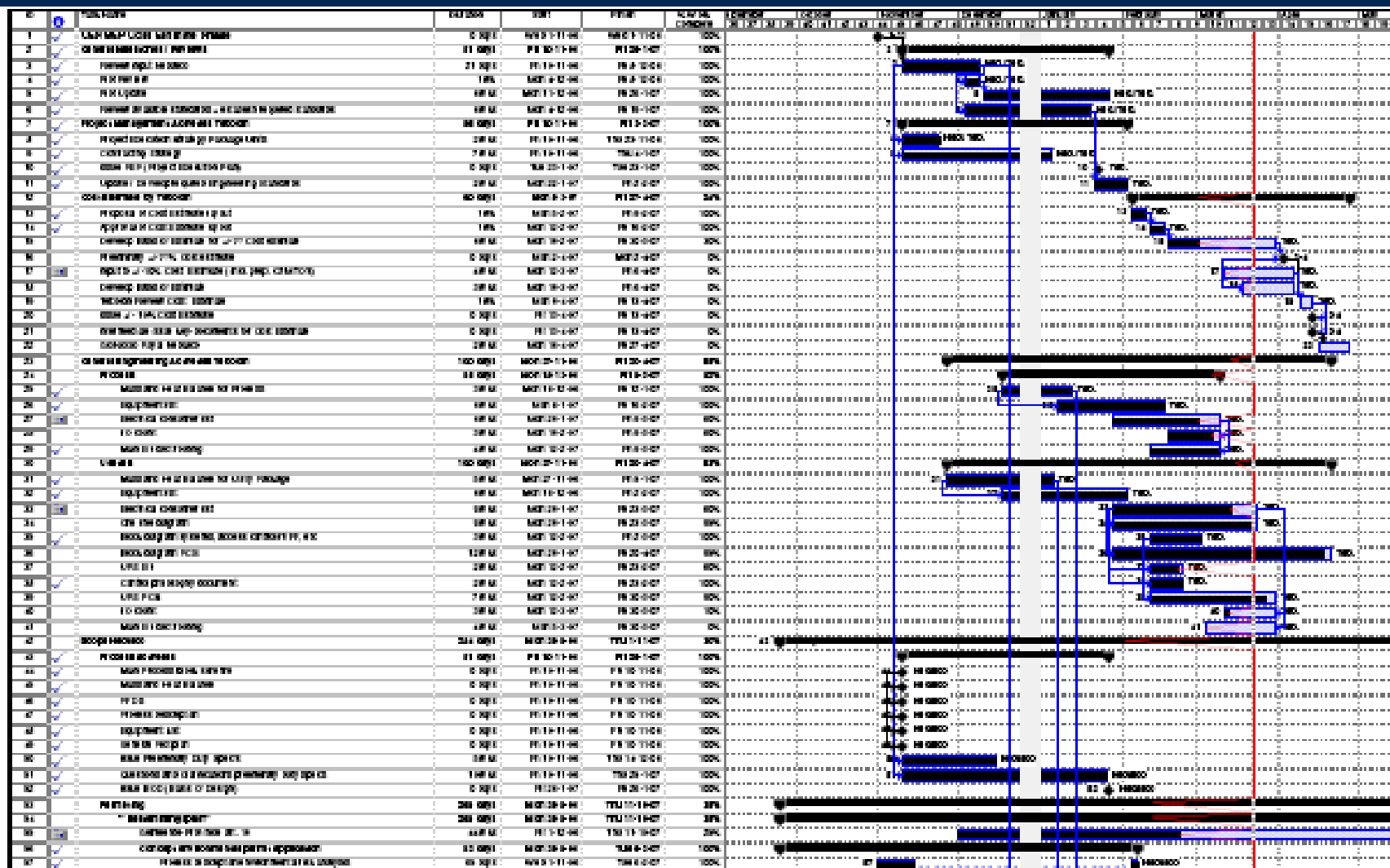
Tentative planning for logistics object



Total project duration ~ 33 months



Example Project Schedule



Standard PDM's:

- ✓ **Cost Plus a Fee (Fixed/Variable)**
- ✓ **Cost Plus a Fee with a Guaranteed Maximum Price (GMP)**
- ✓ **Lump Sum Turn Key (LSTK)**
- ✓ **Design-and-Build**
- ✓ **Design-Bid-Build**
- ✓ **Build-Operate-Transfer (BOT)**
- ✓ **EPCM/PMC**

Project Organisation

