شركة نفط البحرين ش.م.ب (مقفلة)
THE BAHRAIN PETROLEUM COMPANY B.S.C. (CLOSED)

11th PMI-Arabian Gulf Chapter Conference
Gulf Mega Investments & Opportunities

Gulf Hotel, Manama – Kingdom of Bahrain
February 13-15, 2007

The Challenges of EPCM-LS Contracting Strategy as Applied to Bapco Low Sulphur Diesel Production (LSDP) Project

Presented by
Essa G. Al-Ansari

14th February 2007

Items of Presentation

- Purpose of the presentation
- Introduction
- LSDP Contracting Strategy Development
- Evaluation of contracting strategy options
  - Understanding of project execution activities
  - Understanding of characteristics of contracting strategies
  - Risk & Benefit Evaluation.
- Implications of the selected strategy on the prime Contractor.
- Mitigating Steps
- Conclusion

Purpose of the Presentation

- Demonstrate the application of risk/benefit analysis in determining the most appropriate contracting strategy as applied to the Bapco LSDP Project conditions.

- Implications of the selected contracting strategy on the prime Contractors and Mitigating Steps.

Introduction

- The Bahrain Petroleum Company (Bapco)
- Strategic Investment Program (SIP)
- Low Sulphur Diesel Production (LSDP) Project:
  - 40 MBPD full conversion/ 60 MBPD (67%) hydrocracker
  - 100 MMSCFD Hydrogen Plant
  - Sulphur recovery facilities
  - Revamp of No.2 HDU into a 70,000 bpd diesel hydrotreater- 10 ppm sulphur.
  - Supporting Offsite & Utilities

LSDP Contracting Strategy Development

- EPC-LSTK competitive bidding priced as whole and per package.
- EPC-LSTK commercial bid analysis favoured multiple contractors.
- Bapco local suppliers and subcontractors concerns.
- Abort EPC-LSTK strategy.
- Adopt EPCM strategy within the project original approved budget.

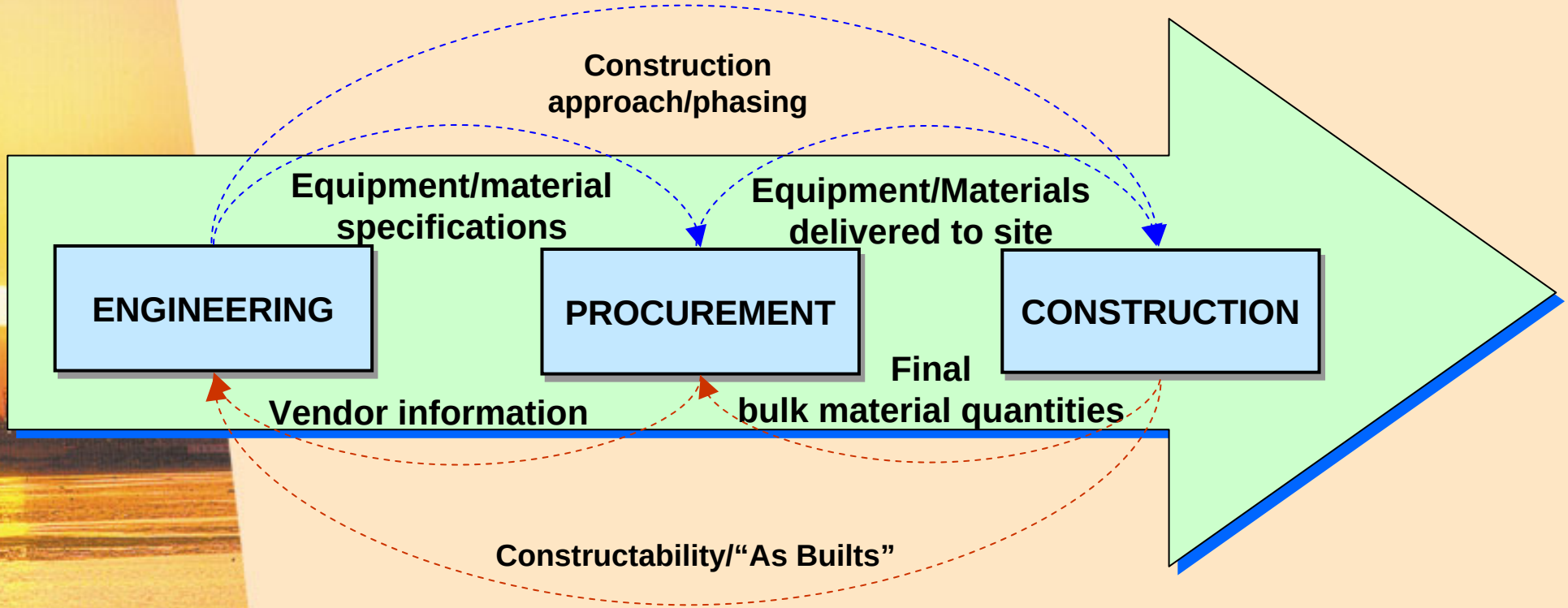
Evaluation of contracting strategy options.

Key evaluation steps

- Understanding project phases and their integrated activities.
- Understanding the characteristics of various Contracting Strategies.
- Apply risk/benefit analysis to identify the most appropriate EPCM form for Bapco LSDP Project.
- Implications of the selected strategy on the prime Contractor.
- Mitigating Steps

Projects in the hydrocarbon sector comprise three highly integrated activities: Engineering, Procurement and Construction

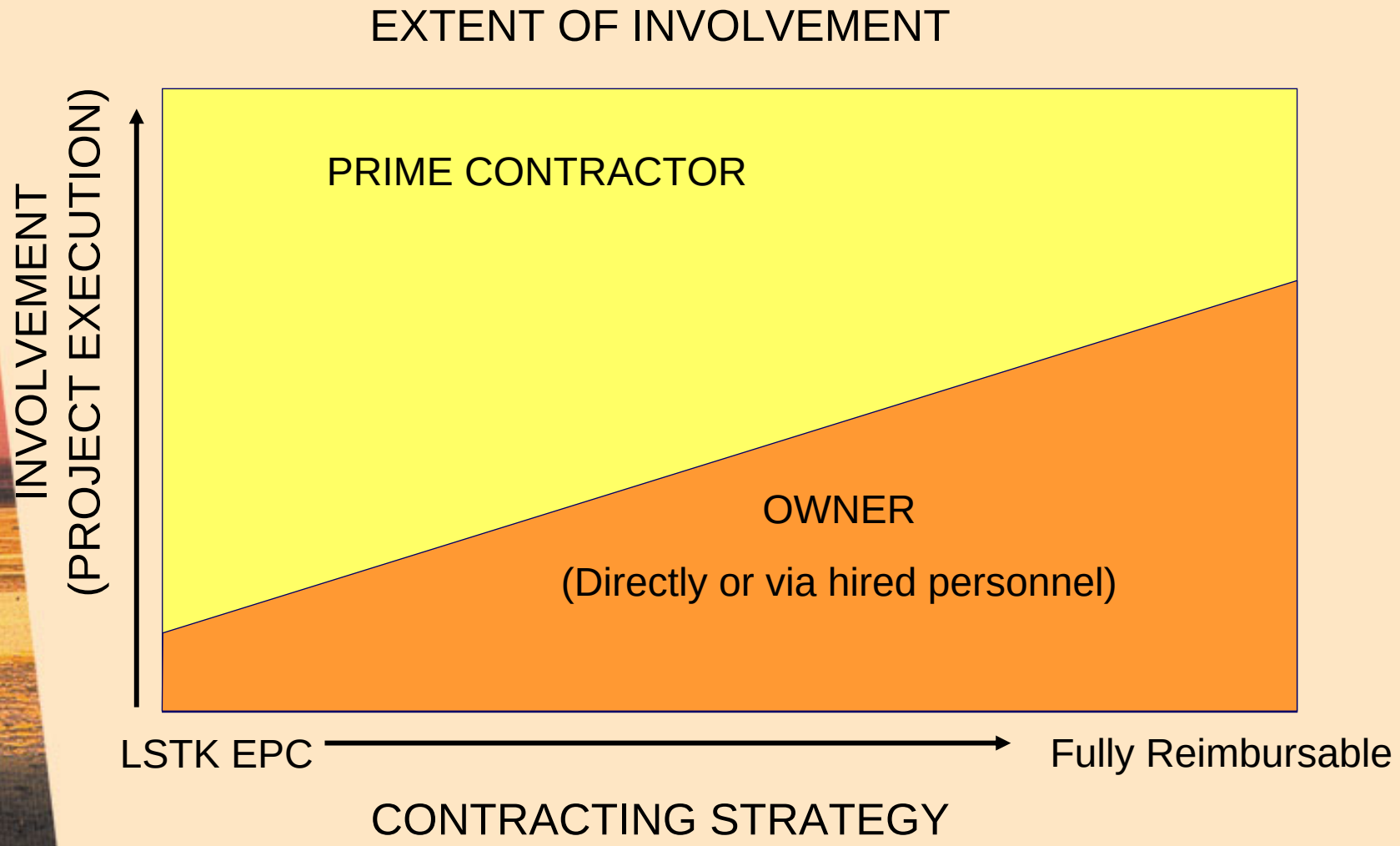
Successful project implementation requires integration of E,P and C activities



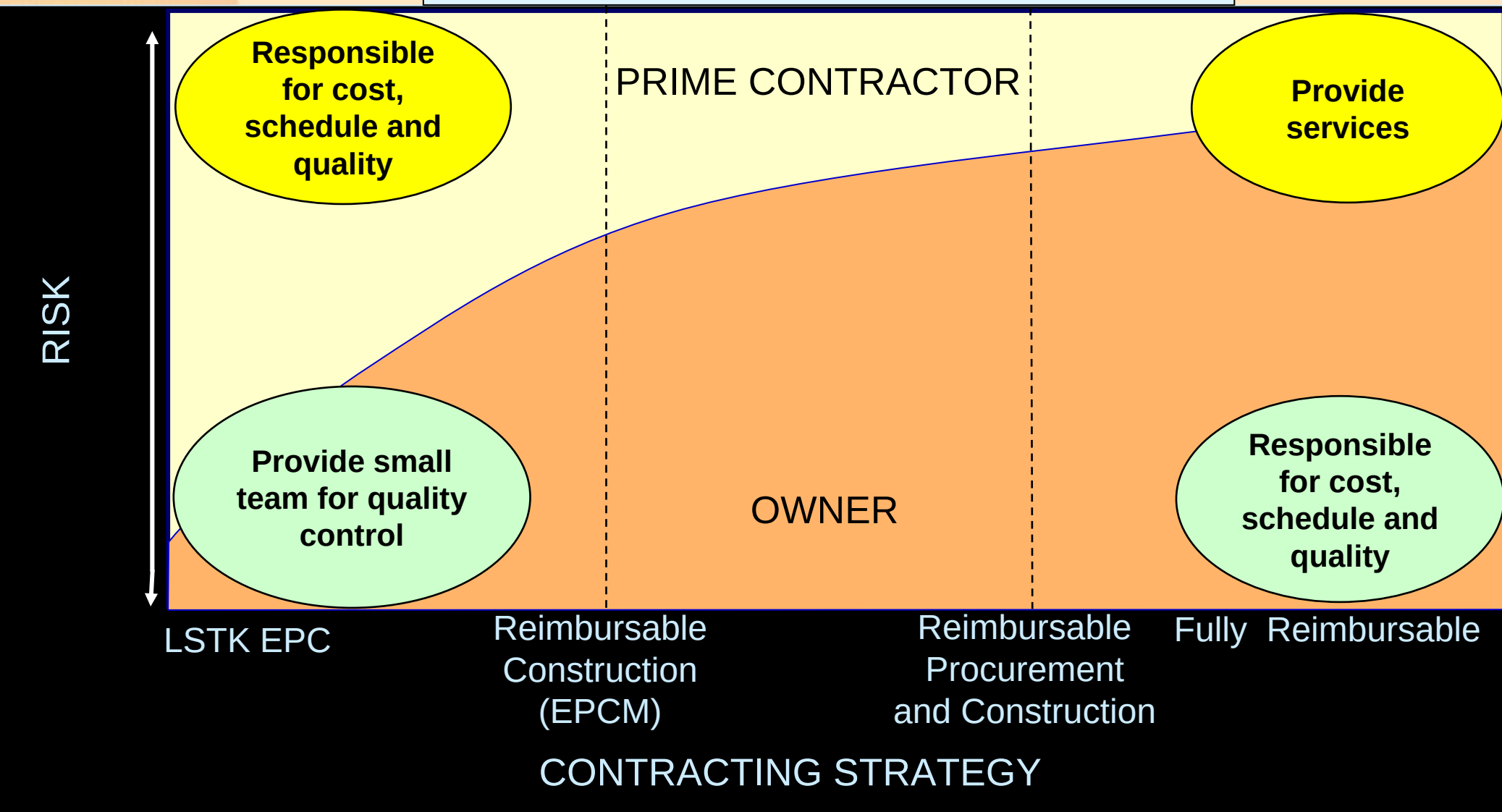
% of Total Cost	E	P	C
	10 - 20	50 - 55	40 - 45

PROJECT IMPLEMENTATION ROUTE

The level of involvement for project implementation can be between two extremes of “largely with the Contractor” or “largely with the Owner”.



LSTK EPC contracts offer increased Owner definition, in terms of cost and schedule, and represents the vast majority of traditional industry practice.



Evaluation of EPCM strategy types… Cont'd

Risk & Benefit Evaluation

Bapco has key focus areas, in terms of risks and benefits that influence the selection of the most appropriate LSDP strategy.

BENEFITS *(Bapco)*

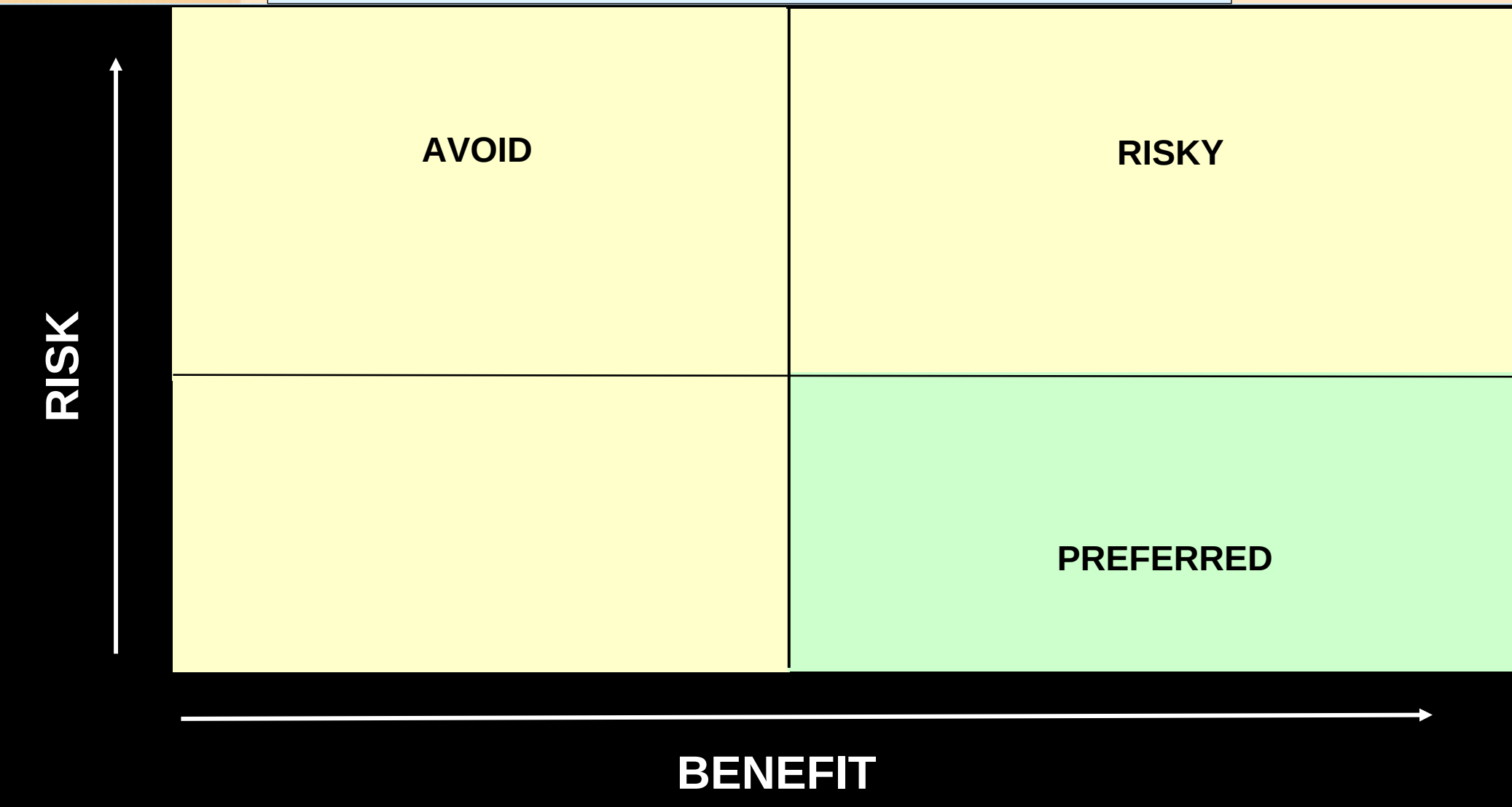
- Quality/safety
- Price (in terms of value)
- Financing requirements
- Schedule
- Ability to influence Contractor selection

RISKS *(Bapco)*

- Poor quality/safety control
- Conflicts
- Insufficient Owner capabilities
- Approval process cycle time impacting performance
- Poor initial price definition
- Poor initial schedule definition
- Risk of high levels of refinery “changes”

A risk/benefit matrix was developed to evaluate potential strategies.

CONTRACTING STRATEGY EVALUATION
(Risk/Benefit Matrix)



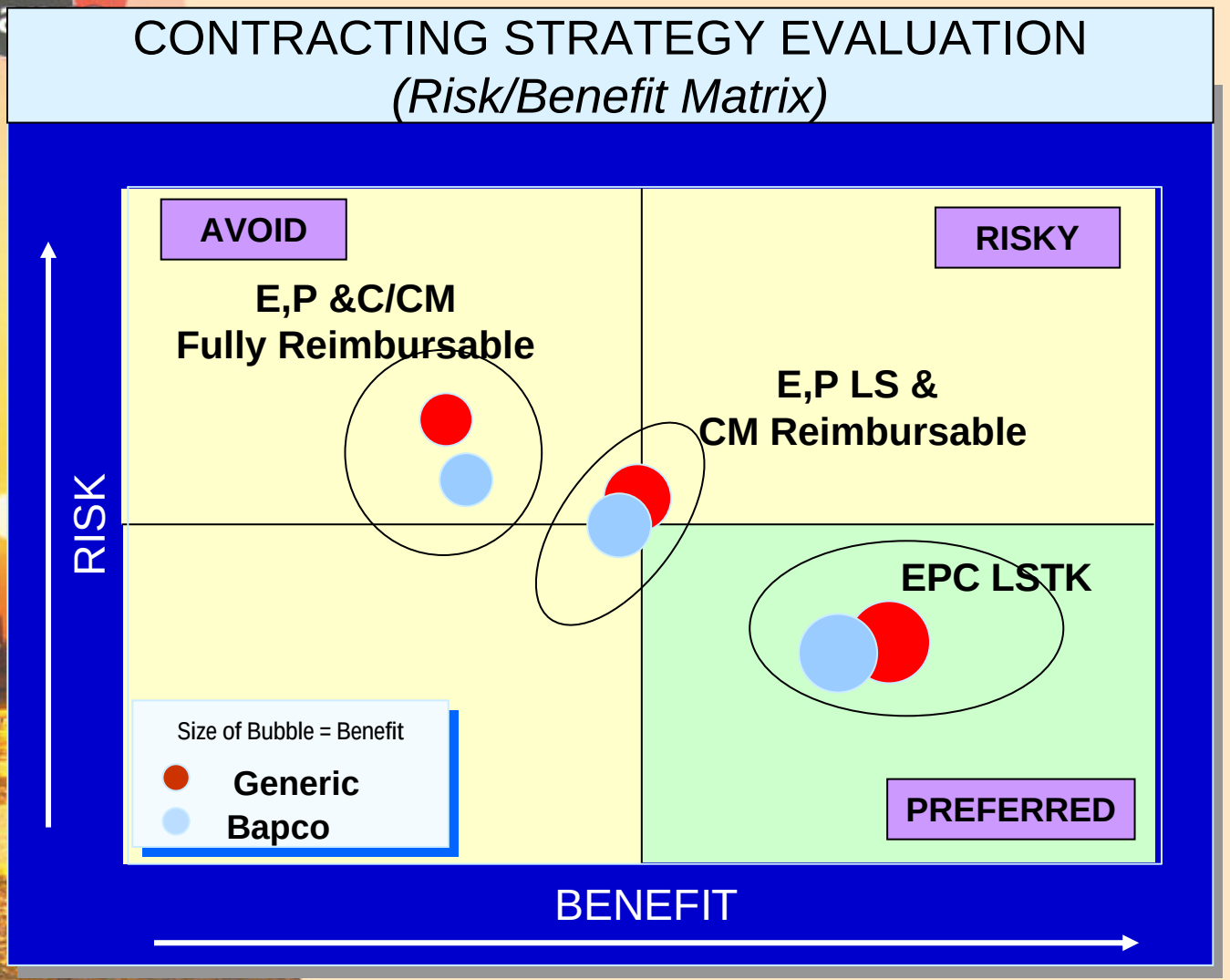
Contracting Strategy – Risk/Benefit Matrix Elements

RISK	Weightings		Contracting Strategy (Scores 1=Low, 10=High)			
	Bapco	Generic Refiner	LSTK	EPCM-LS	EPCM	FR
Poor price definition	10	25	3	5	7	10
Poor schedule definition	10	25	3	4	6	10
Conflicts	20	10	2	5	5	1
Poor overall quality/safety control	25	20	7	5	6	1
Owner capability being insufficient	15	10	1	2	3	9
Risk of high levels of refinery “changes”	5	5	1	2	3	7
Approval process cycle time impacting performance	15	5	1	3	4	10
Totals	100	100				
Overall Risk Profile						
Bapco Score			3.1	4.0	5.0	5.7
Generic Score			3.3	4.1	5.4	6.6

Contracting Strategy – Risk/Benefit Matrix Elements

BENEFIT	Weightings		Contracting Strategy (Scores 1=Low, 10=High)			
	Bapco	Generic Refiner	LSTK	EPCM-LS	EPCM	FR
Price	22	25	9	7	6	1
Schedule	20	25	9	8	6	3
Ability to influence Contractor	15	10	2	2	3	4
Compatibility of approach with financing	18	18	10	7	3	2
Appropriate Overall quality/safety control	25	22	4	5	5	6
Totals	100	100				
Overall Benefit Profile						
Bapco Score			6.9	6.0	4.8	3.3
Generic Score			7.4	6.3	4.9	3.1

An LSTK approach is preferred for both LSDP and a "generic" refiner, as it typically offers the lowest risk and highest benefits.

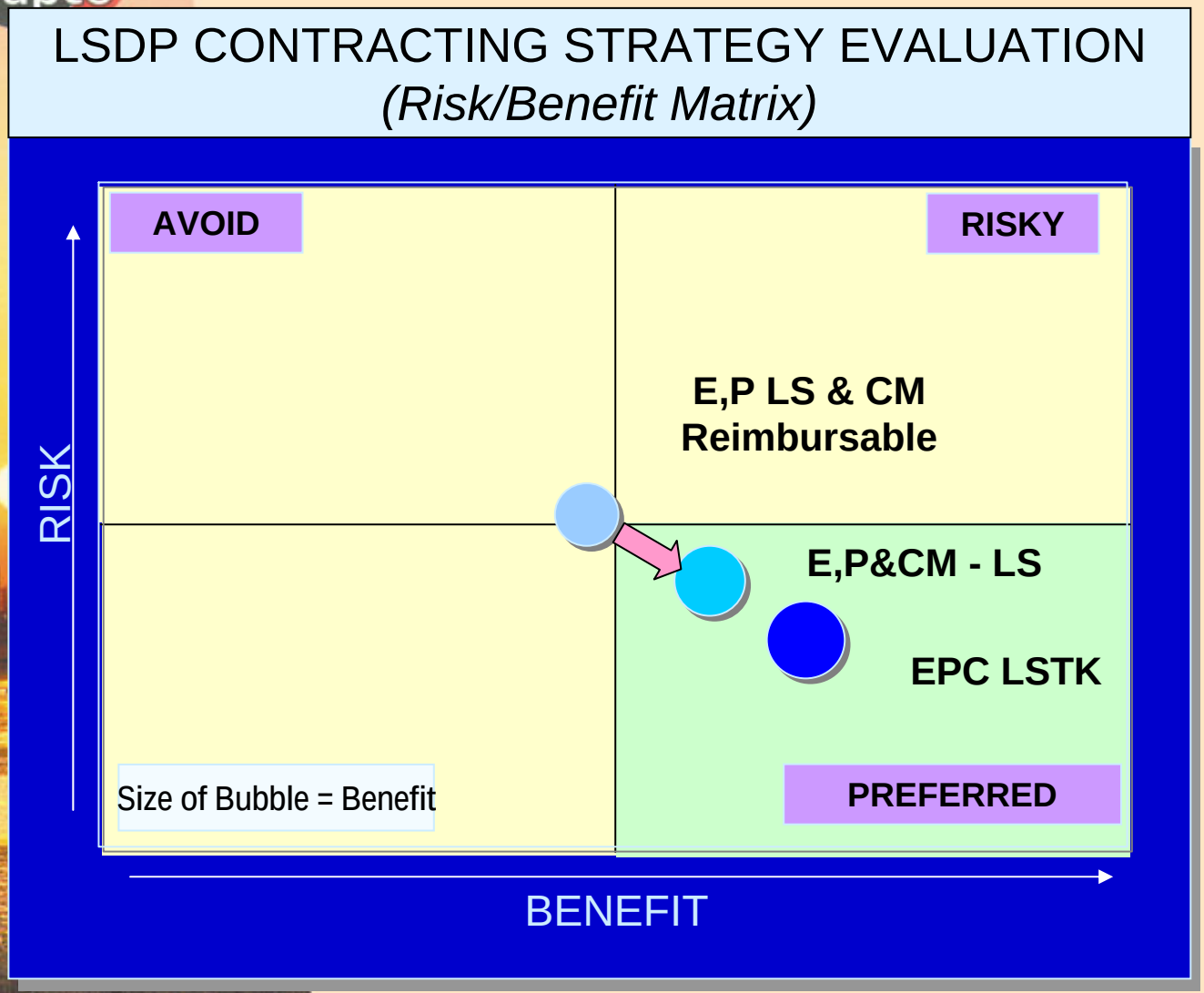


Compared to a generic refiner, Bapco has a stronger focus on:

- quality, rather than cost and schedule, so it may not capture the full benefits of a LSTK approach
- conflict avoidance and quality/safety control, so it could achieve a greater (relative) benefit from an EPCM approach

Fully Reimbursable approaches are to be avoided due to increased risk

The position of the EPCM approach can be improved by adopting risk mitigants

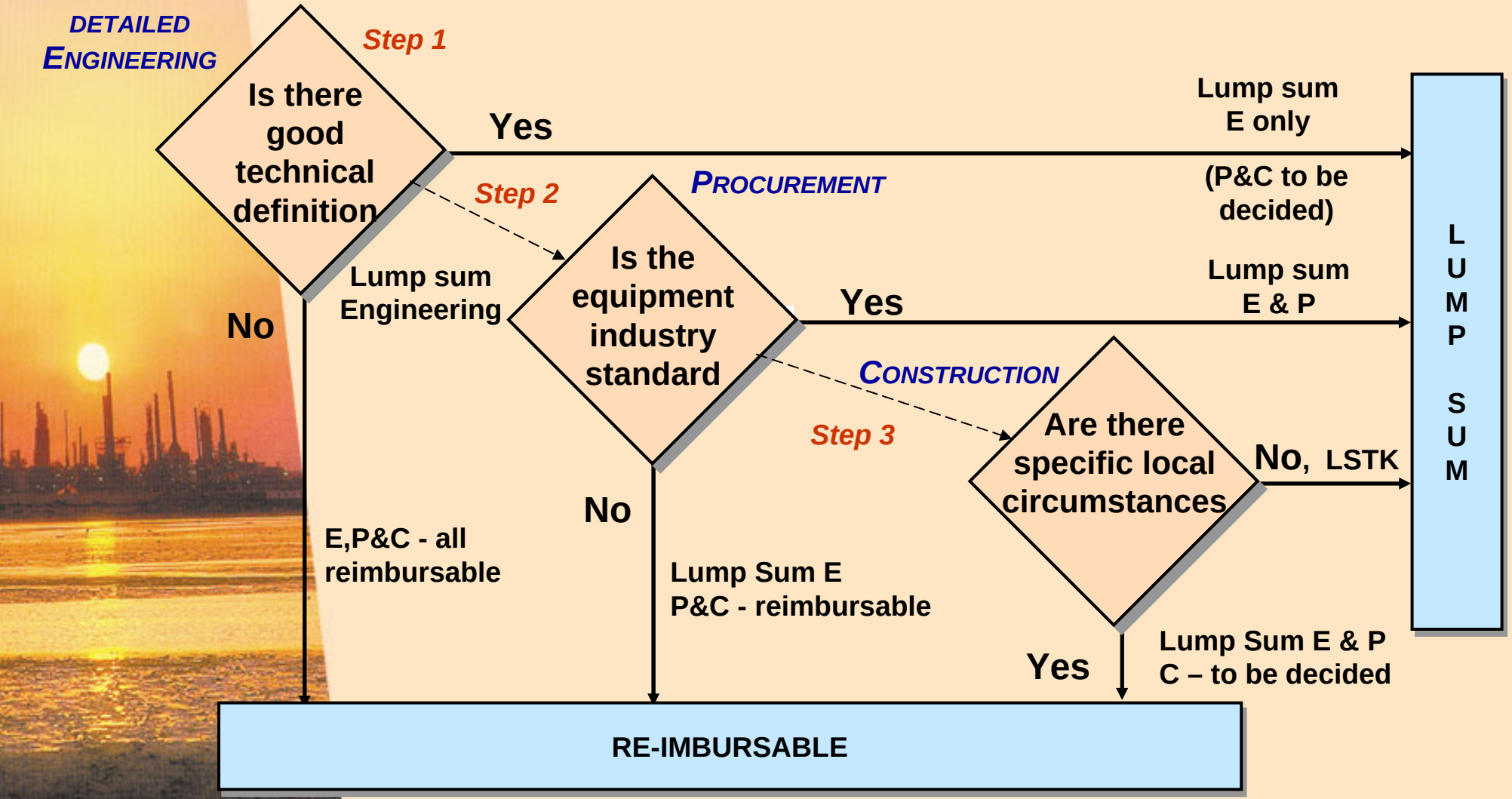


The risk mitigants are:

- **Adopt Lump Sum approach (EPCM-LS)**
- **Appoint Contractor with Single point responsibility (including schedule LDs)**
- **Reduce number of site subcontract packages**
- **Include high complexity items in Lump Sum (control room, supply /erect structural steel)**
- **Define strategy in tender documents, including Construction subcontractor list.**

EPCM-LS is the preferred EPCM approach

General contracting strategy can be guided by a “decision-tree”



Implications of EPCM-LS Strategy on the EPCM-LS Contractor

- EPCM Contractor is to unconditionally accept and supervise the Construction Contractors selected by BAPCO. EPCM Contractor will also accept all terms and conditions applied to the Construction Contractors.

- EPCM Contractor takes full responsibility for workmanship and performance of the Construction Contractors.

- EPCM Contractor will be responsible for the communication and coordination between Construction Contractors.

Implications of EPCM-LS Strategy on the EPCM-LS Contractor…Cont'd

- Additional cost incurred by Construction Contractors due to EPCM Contractor 's fault is to be paid by EPCM Contractor.

- EPCM Contractor accepts the schedule liability and therefore, the EPCM Contractor pays Liquidated Damages for completion delay

- EPCM Contractor holds BAPCO harmless against claims by Construction Contractors.

- EPCM Contractor takes the full liability for the safety of construction site operation.

Mitigating Steps

- Mutually agreed list of prequalified Construction Contractors to be competitively bid and selected by Bapco and Assigned to the EPCM contractor to manage.
- Executing a Tri-Partite Agreement between Bapco, EPCM Contractor and each of the Assigned Subcontractors transferring Bapco's rights to manage the Assigned Subcontractors to the EPCM Contractor.
- Payments for work done by the Assigned Subcontractors shall be made directly by Bapco.

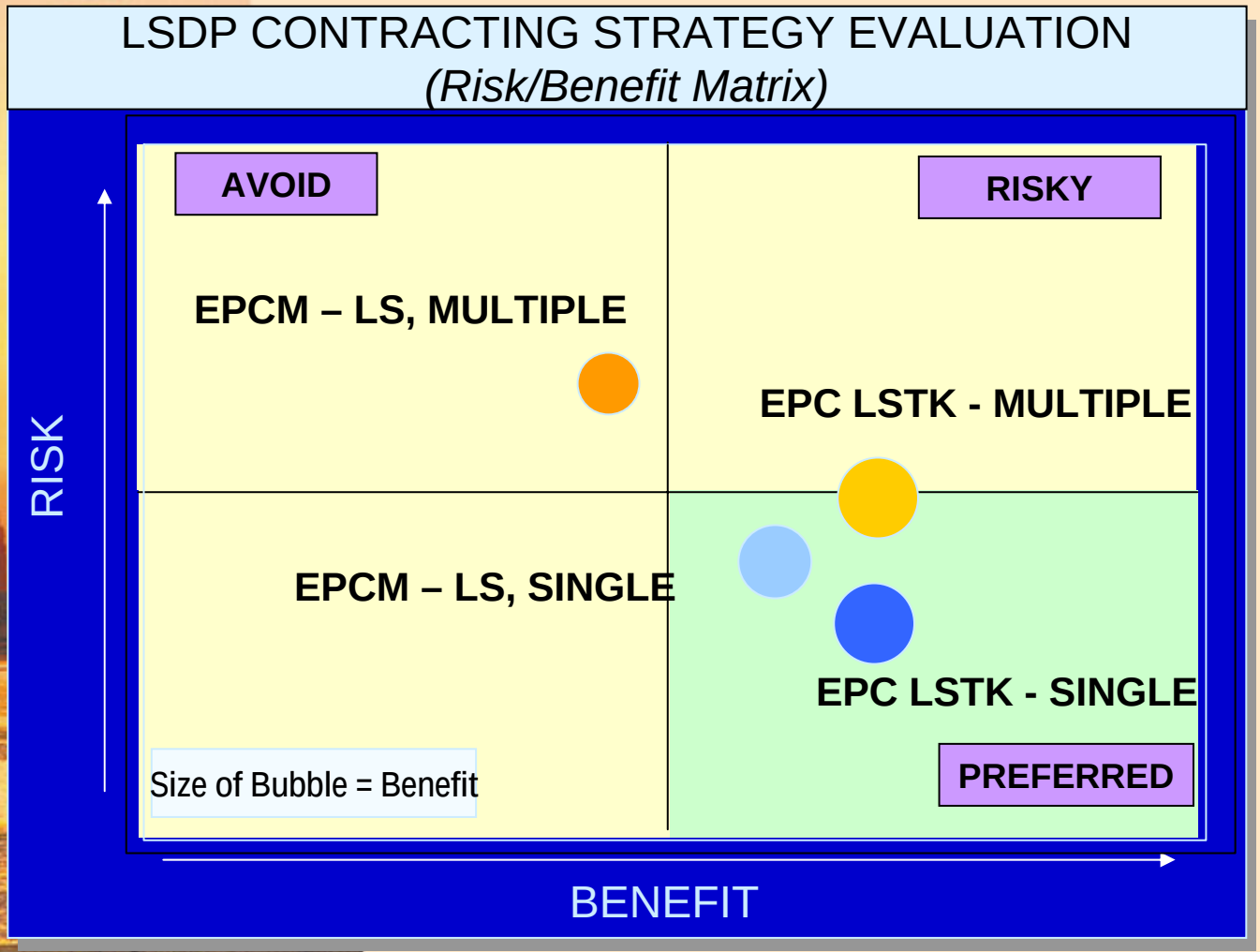
Conclusion

In terms of the LSDP Project, the evaluation concluded:

- EPC - LSTK STRATEGY AS “FIRST CHOICE”
- UNDER AN “EPCM” APPROACH, ADOPT “EPCM-LS” TO SATISFY BAPCO’S CONDITIONS
- USE SINGLE PRIME CONTRACTOR

Thank You

Multiple prime contractors would make the Project “risky”



The increased risk are from:

- Increased interfaces
- Greater risk of conflict
- Higher risk of Bapco approval cycle impacting overall schedule

The reduced benefits are:

- Likely schedule increase
- Lower compatibility with financing
- Need for larger Owner team to ensure appropriate coordination across the Project

Evaluation recommends use of “Single Point Contractor” for LSDP