



Investment Planning: The Complete Solution

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Agenda

- The Need for Investment Planning
- Investment Planning Using Linear Programming
- Site Selection & Constructability
- OSBL Facilities
- Plot Plan Development
- Project Implementation Plan
- Capital and Operating Cost Estimating
- Summary



The Need for Investment Planning

- Investment planning considers not only the process unit configuration but also utilities, offsites, infrastructure, constructability, execution and logistics to provide the complete project picture
- Heavy crude processing & residue upgrading schemes provide investment opportunities
- Investment planning supports these big decisions
 - Considers project viability now and into future
 - Minimises overall project cost & capital expenditure
 - Shortens schedule and reduces the risk of costly design changes

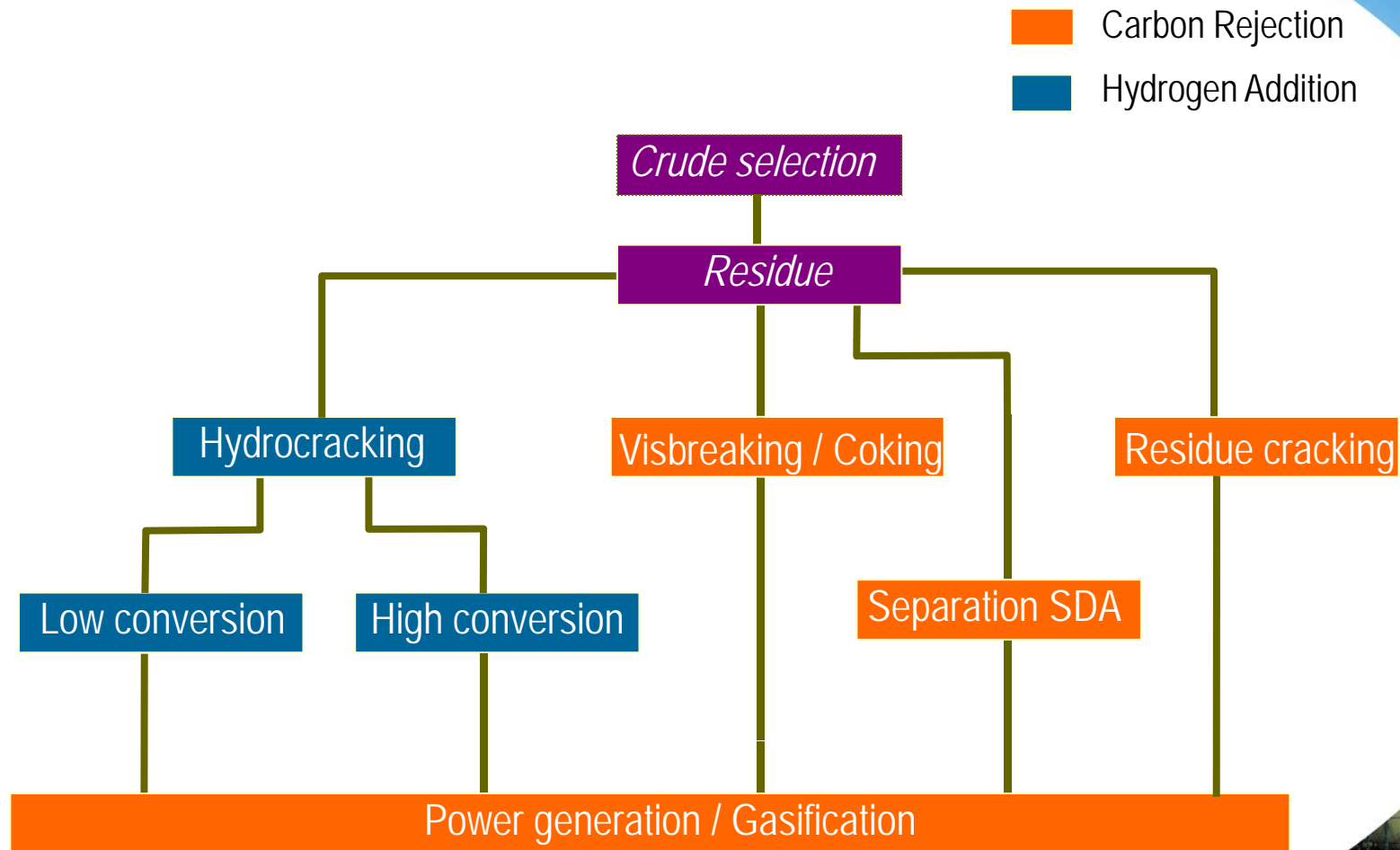


The Need for Investment Planning

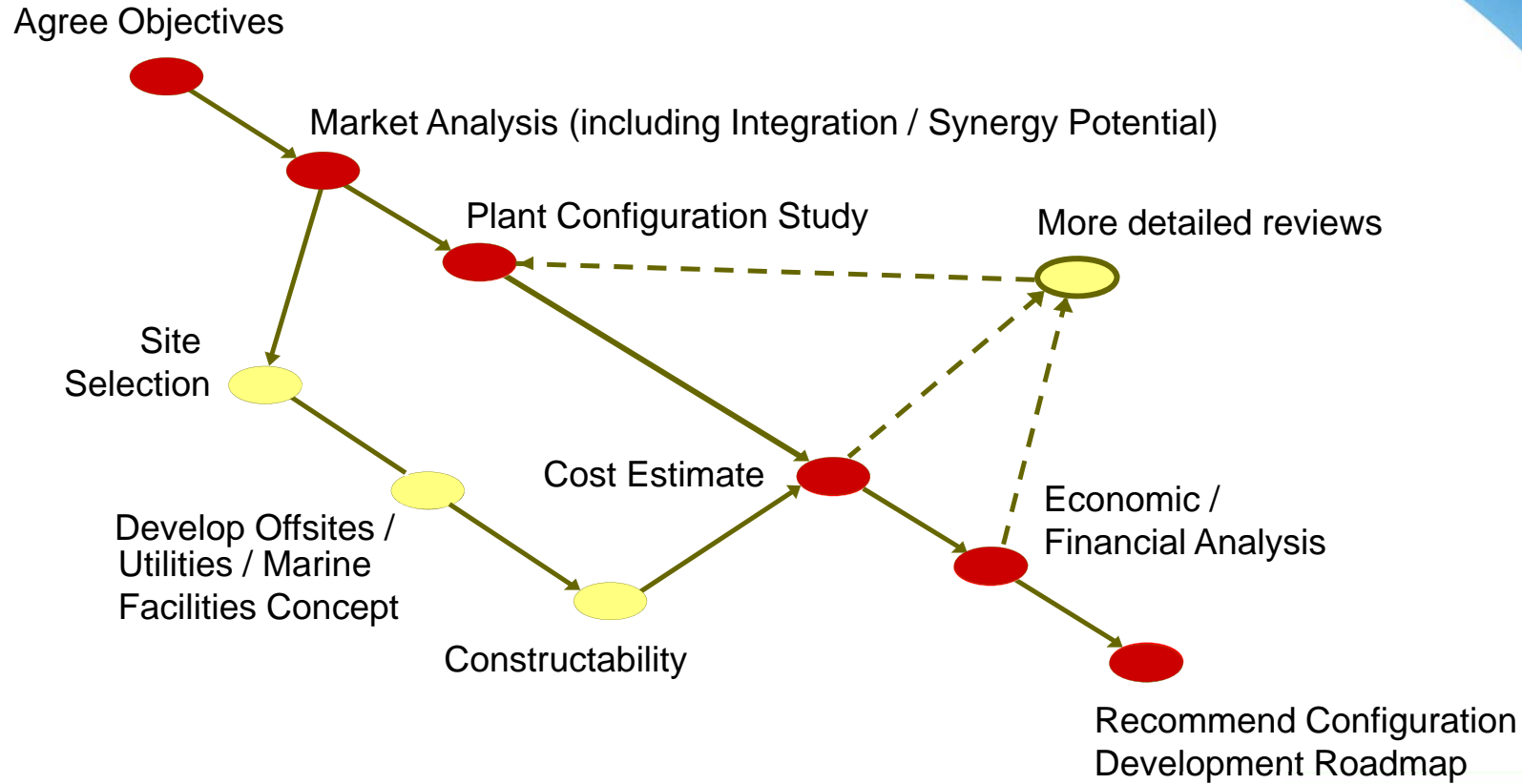
- Investment planning looks at:
 - What are the optimum feedstocks and are these available?
 - What products are in demand and should be produced?
 - What capacity should the plant be?
 - Where should the plant be?
 - What process / technologies should be used?
 - Is capital cost reasonable and are the economics acceptable (IRR, NPV etc)?
 - Are logistics feasible?
 - Feedstock supply
 - Product distribution
 - Construction access



Residue Upgrading - An Example of Available Options

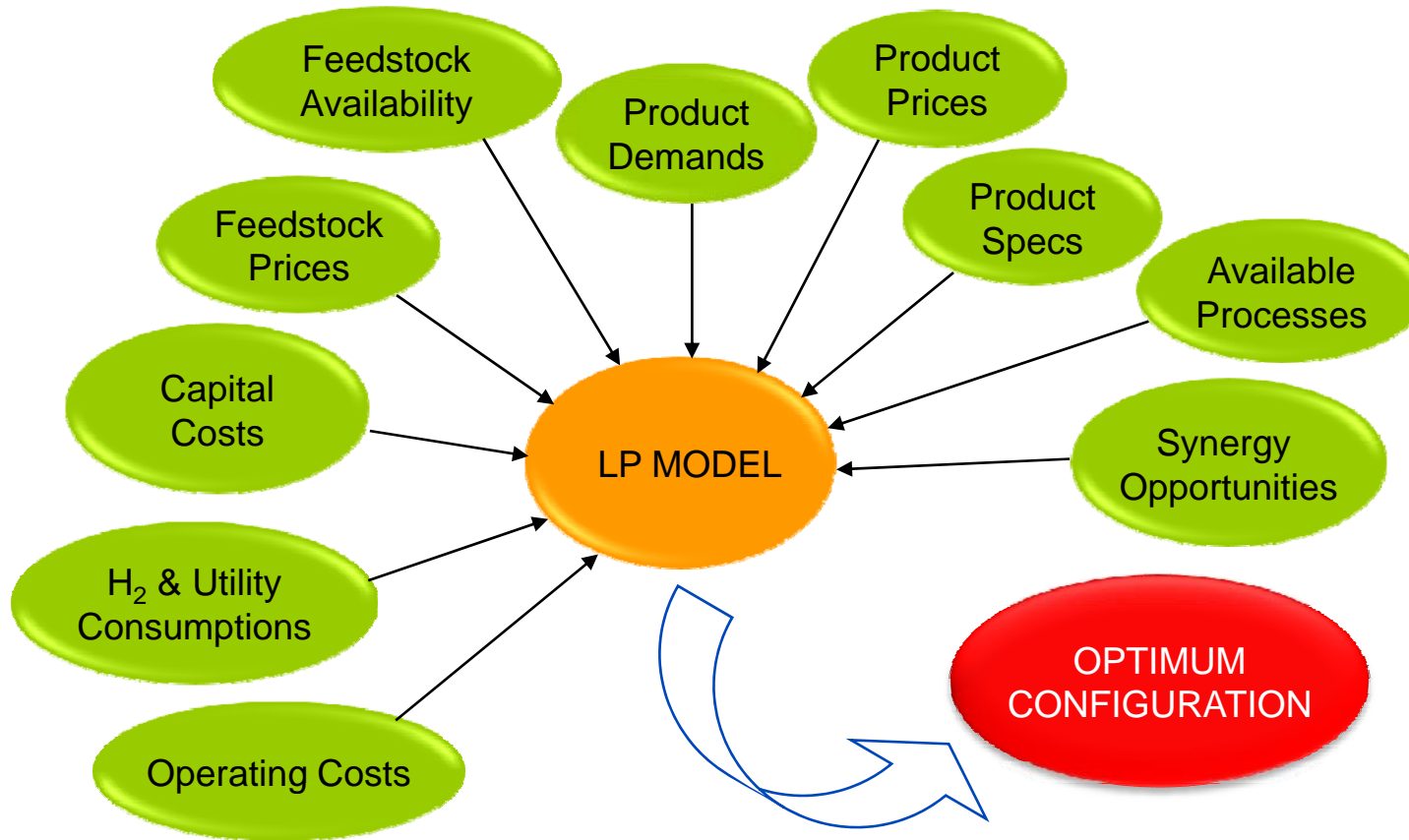


The Foster Wheeler Approach



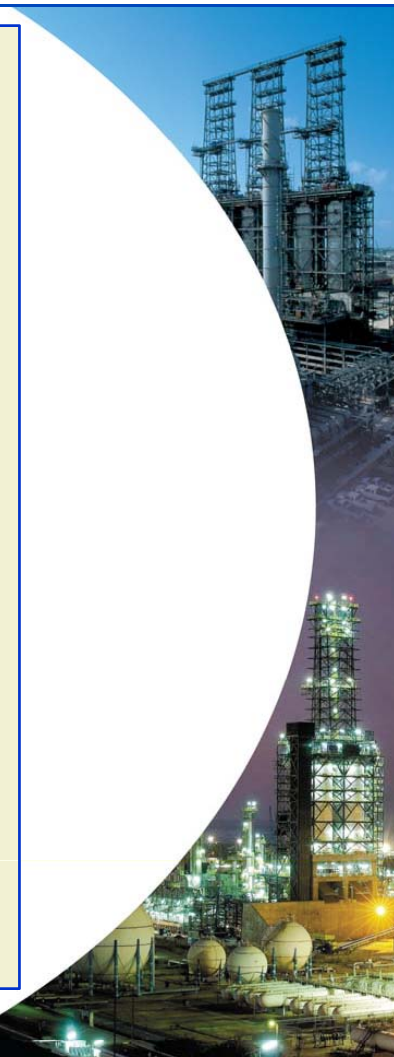
'Real project execution experience that adds value to your business'

Investment Planning Using Linear Programming



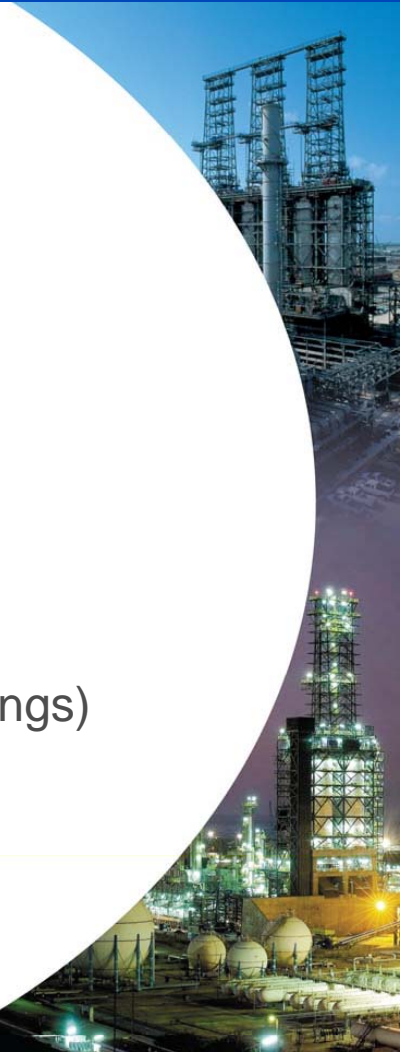
Site Selection & Constructability Matrix

<p>H S E</p>	<h3>Site</h3> <ul style="list-style-type: none"> Land Availability Ground Conditions Structures & Obstructions Protection Against Severe Weather Earthquake Zonal rating 	<h3>Port</h3> <ul style="list-style-type: none"> Existing Port? Dredging Requirements Jetty Location Existing Facilities Suitability of Surrounding Waterways
	<h3>Infrastructure</h3> <ul style="list-style-type: none"> Local Road Network National Road Network Heavy Haul Routes Rail Network Regional & National Airports 	<h3>Local Area</h3> <ul style="list-style-type: none"> Local Towns Fabricators / Industry Construction Resources Landfill Materials Local Labour Schools / Emergency Services Prevalent Health Hazards



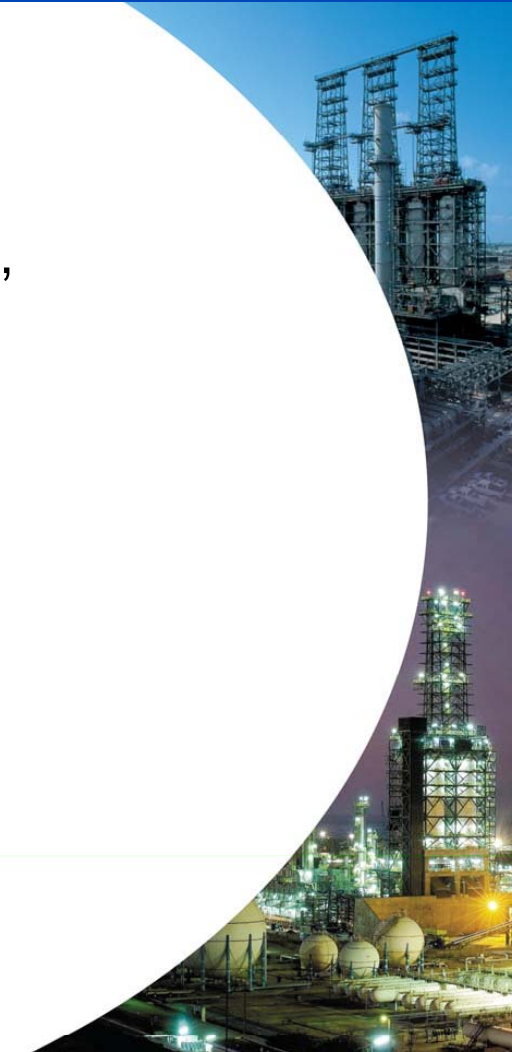
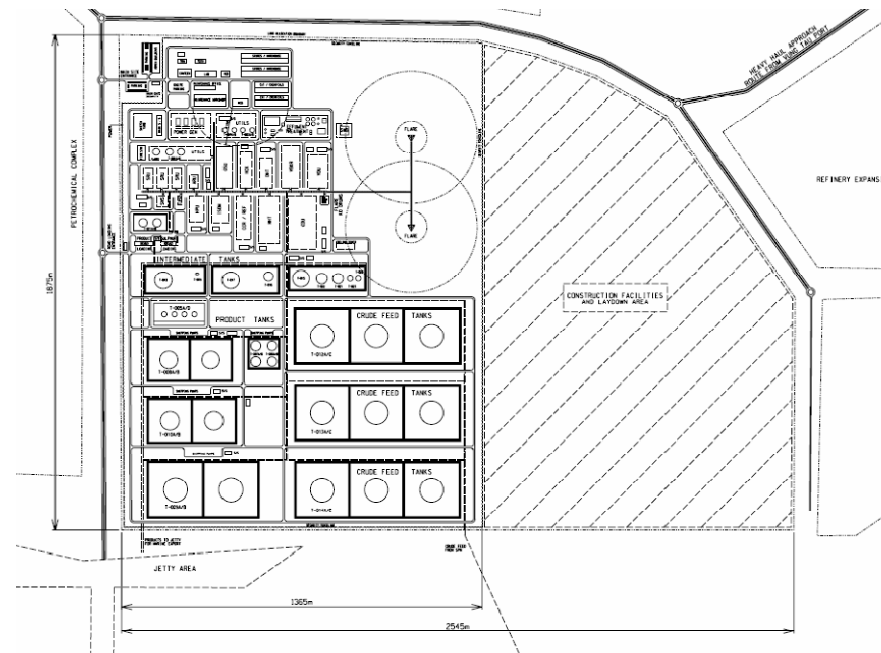
OSBL Facilities

- Develop philosophy and high level equipment list for:
 - Utilities systems
 - Tankage (including intermediate tankage driven by the shutdown philosophy)
 - Marine facilities – philosophy based on SBM and/or Jetty, ship sizes and assumed berth occupancy
 - General site infrastructure (e.g. buildings and hard-standings)



Plot Plan Development

- Development of overall plot layout to facilitate development of the estimate
- Layout of process units, utilities & offsites (tankage, flare, main pipe racks)

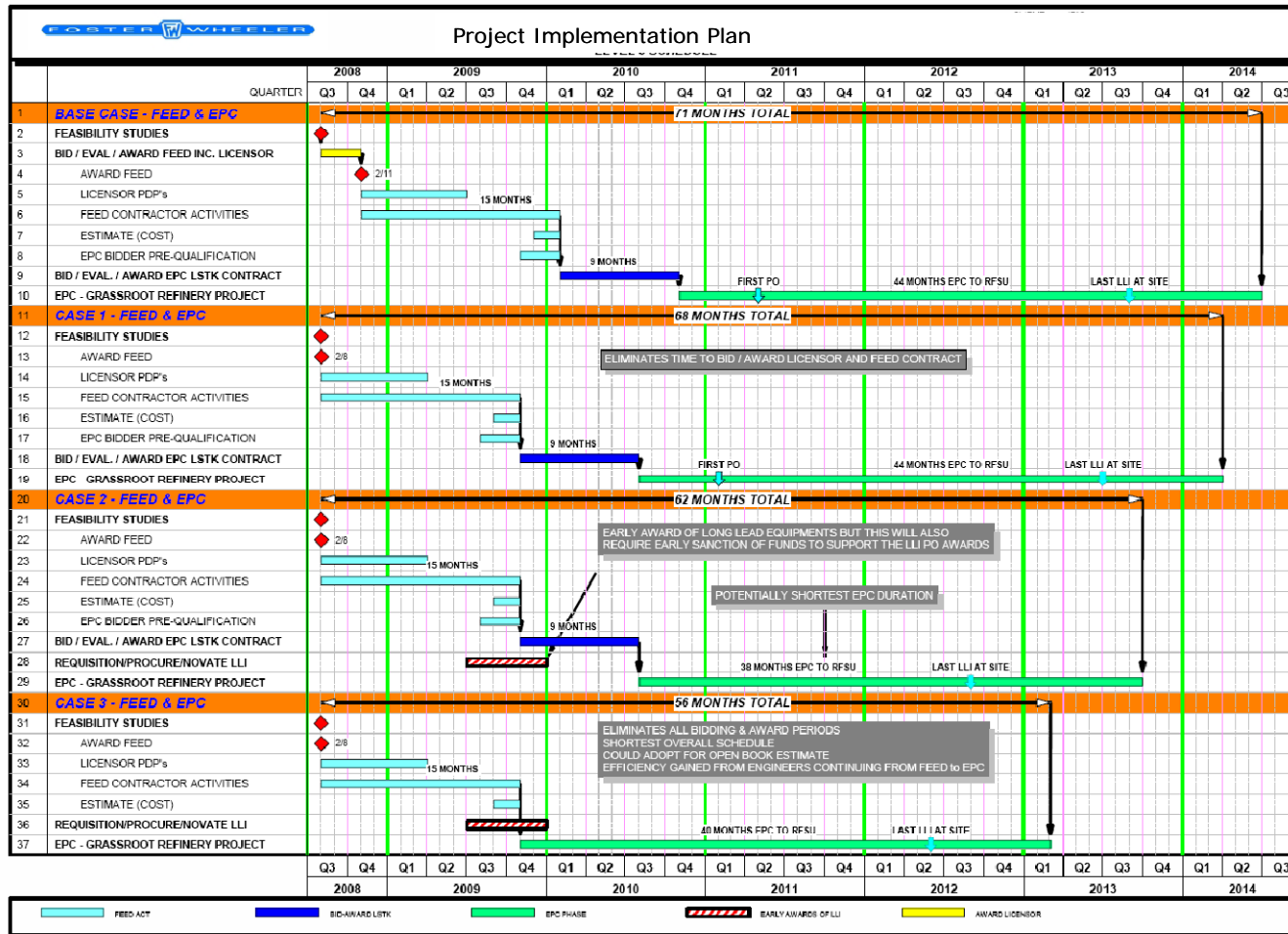


Project Implementation Plan

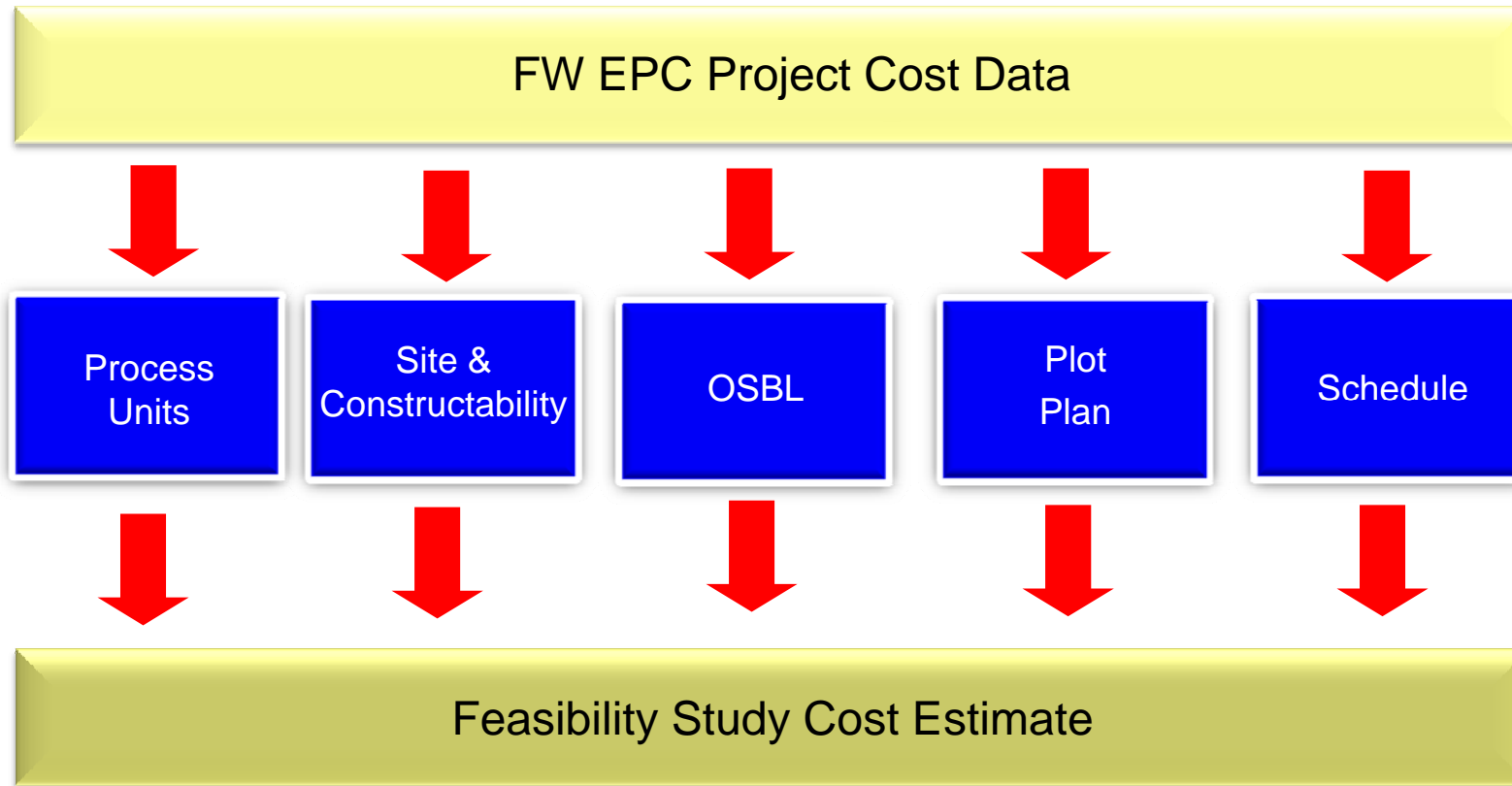
- High level schedule for project development through to ready for start-up (RFSU)
- Typically consider the following options
 - Separate bidding phases for FEED and EPC
 - Rollover of feasibility study to FEED
 - Rollover of FEED to EPC
 - Novation and early procurement of long lead items
- Enables the client to see early during the project the available routes to meet any time constraints imposed on the project, and options for early revenue generation



Project Implementation Plan – An example



Capital Cost Estimating



Operating Cost Estimates

- Operating cost allowances developed based on FW in-house data and include the following:
 - Maintenance
 - Insurance
 - Operating Labour
 - Catalyst and Chemicals costs
 - Effluent disposal costs
 - Working Capital



Summary – The Questions Answered

- Project Feasibility (Go / No-go):
 - Is Capital cost acceptable?
 - Are Economics acceptable (IRR, NPV etc)?
 - Is sufficient land available?
 - Will suitable feedstock always be available?
 - Is there sustained demand for products?
 - Are logistics feasible?
 - Feedstock supply
 - Product distribution
 - Construction access



Summary

- Investment planning is essential to optimise the project and confirm feasibility on a robust basis ahead of any significant expenditure
- A shortlist of technically feasible options should be generated with economic evaluation of the most promising
- Investment planning can be iterative, but it's better to get the conceptual design right before risking substantial recycle of effort
- Investment planning should focus on all issues affecting project cost and development – not just the configuration of process units

Foster Wheeler brings real, practical EPC experience to conceptual investment planning

