



Spectra Dynamics Ltd.

... Excellence in Performance ...

Outline



- Company Background
- Strengths and Capabilities
- Some Projects & Customers
- Key Personal Outline
- Next Steps

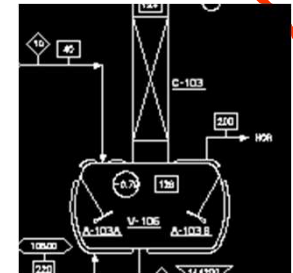
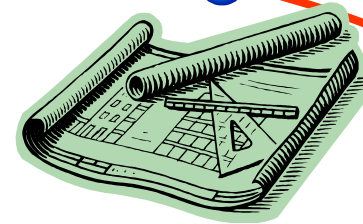
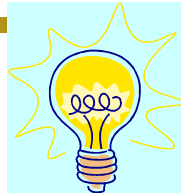
Spectra Dynamics Limited



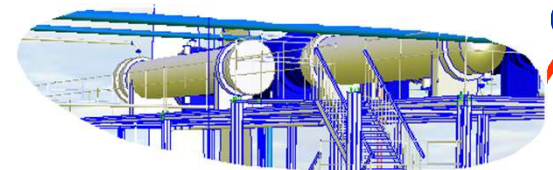
- Offices in Vadodara (HQ), Mumbai & Delhi
- Consulting Services
 - Conceptual Design
 - Front-end Engineering Design
 - Detailed Engineering
 - Safety Services
- Over 150 projects
- About 25 technical personnel
- www.specdynamics.com



Consulting Services



- Conceptual Design
- Front-End Engineering Design
- Detailed Engineering
- Safety Services



Conceptual Design



- **Commercial Technology Selection**
 - Identification of available technologies
 - Techno-commercial analysis
 - Viability for Indian conditions
 - Payback period & Sensitivity analysis
- **Client Technology Development**
 - Interact with client R&D department
 - Firming of the process scheme
- **Spectra Technology Solutions**
 - Ammonia Separation & Recovery
 - Solvent Separation & Re-circulation
 - LPG Recovery from Natural Gas

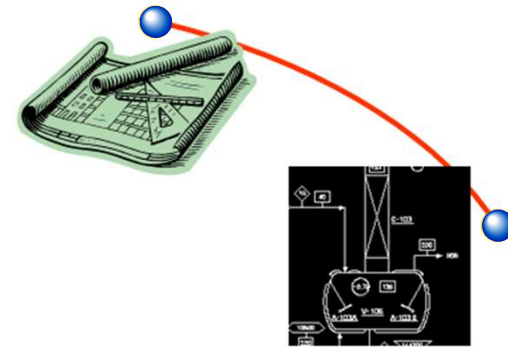
Get the right technology for your needs !

Front-End Engineering Design (FEED)



■ Complete FEED Package Development

- ❑ Process Simulation
- ❑ Optimized Heat & Mass Balance
- ❑ Process Flow Diagram (PFD)
- ❑ Equipment Specifications Sheets
- ❑ Piping & Instrumentation Diagram (P&ID)
- ❑ Conceptual Equipment Layout
- ❑ Instrument Specification
- ❑ Equipment and Line List



■ Specialization in

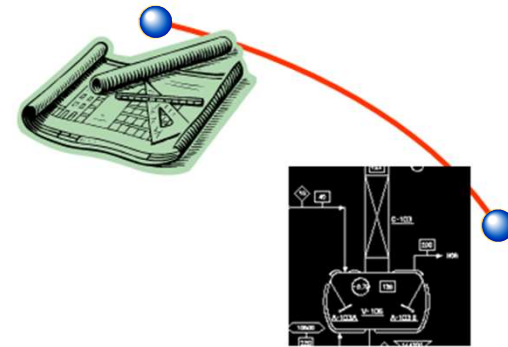
- ❑ Complex Distillation and Separation Systems
- ❑ Heat Exchanger Design / Rating

Front-End Engineering Design (FEED)



■ Feasibility Studies & Cost Estimation

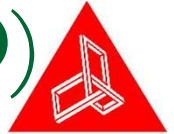
- Green field project feasibility
- Brown field project feasibility
 - Improved product purity
 - Change in feed type / feed composition



■ Scale up of Lab / Pilot Plant to Commercial Plant

- Commercial-scale plant design from
 - Pilot plant operations
 - Laboratory scale operation
- Reactor systems, mass and heat transfer equipment

Front-End Engineering Design (FEED)



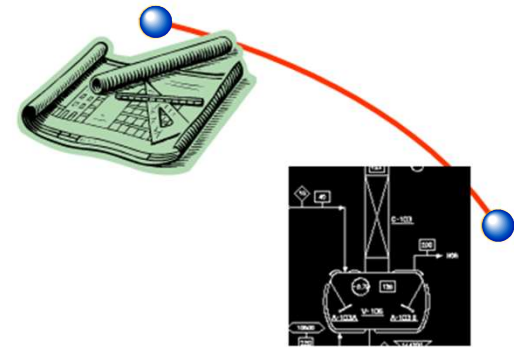
■ Conversion of Batch Process to Continuous Process

□ Unit Operations

- Reactors, filtration systems, distillation & extraction systems

□ Typical benefits

- Lower downtime & higher throughput
- Lesser Cost of Production
- Better operation and quality control

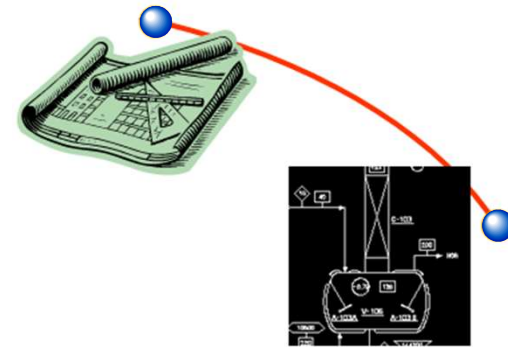


Front-End Engineering Design (FEED)



■ Process Simulation Studies

- ❑ Complete Plant Design
- ❑ Operations Decision Support
- ❑ Plant Troubleshooting



■ Heat Exchanger Design & Analysis

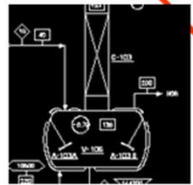
- ❑ Thermal Design
- ❑ Vibration Analysis
- ❑ Mechanical Design
- ❑ Exchanger Train / Network Design & Optimization

Front-End Engineering Design (FEED)



■ Relieving Systems and Flare Networks

- ❑ Design / Validation Studies
- ❑ Relief valve – load calculations, backpressure and orifice sizing
- ❑ Flare lines, headers, pots, flare stack



■ Plant Improvement / De-bottlenecking Studies

- ❑ Identification of Bottleneck / Improvement Areas
- ❑ Modifications for Bottleneck Elimination / Improvements
- ❑ Utility / Energy Optimization and Integration

Many modifications require minimal capital expenditures!

Front-End Engineering Design (FEED)



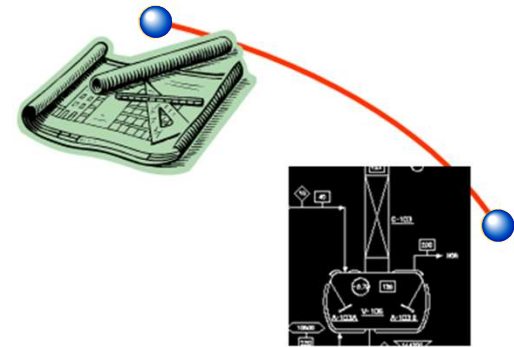
■ Equipment Engineering Services

□ Mechanical Design

- Preparation of mechanical data sheets
- Generation of fabrication drawings
- Review of Vendor drawings

□ Equipment Types

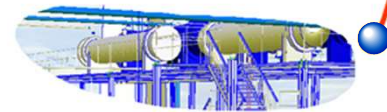
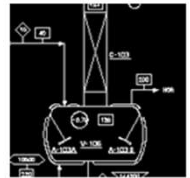
- Shell and tube heat exchangers
- Pressure Vessels
- Columns
- Air coolers
- Flat bottom storage Tanks
- Others



Detailed Engineering



- **Project Co-ordination & Management**
 - ❑ Coordination among engineering disciplines
 - ❑ Project progress monitoring & reporting
 - ❑ Coordination with Client
- **Technical Assistance for Procurement**
 - ❑ Detailed Equipment Specifications
 - ❑ Quotes from Vendors
 - ❑ Technical review of vendor documents
- **Piping Design**
 - ❑ Pipe Stress Analysis
 - ❑ Piping Material Specifications
 - ❑ Equipment & Piping Layout Plans, Isometrics
 - ❑ Bill of Materials



Detailed Engineering



■ Instrument Engineering

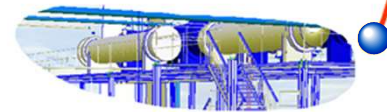
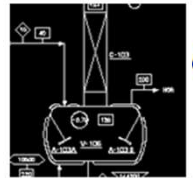
- ❑ Specs for Field Instruments
- ❑ Control Panel Specification
- ❑ Cable Layouts and Bill of Material

■ Electrical Engineering

- ❑ Single Line Diagrams
- ❑ Cable Sizing and Specs for MCC & PCC
- ❑ Cable, Lighting, Earthing Layouts and Bill of Materials

■ Civil / Structural Design & Engineering

- ❑ Buildings & Structures, Equipment Foundation & Pipe Racks
- ❑ Architectural Design
- ❑ Bill of Materials



Resource network of associates

Safety Services



- **Conducting / Leading Safety Studies**
 - HAZOP
 - HAZard & OPerability Study
 - HAZID
 - HAZard IDentification Study
 - Safety Layout Reviews
 - Review of Equipment Layout from Safety Perspective
 - Safety Audits
 - Studies for operating facilities

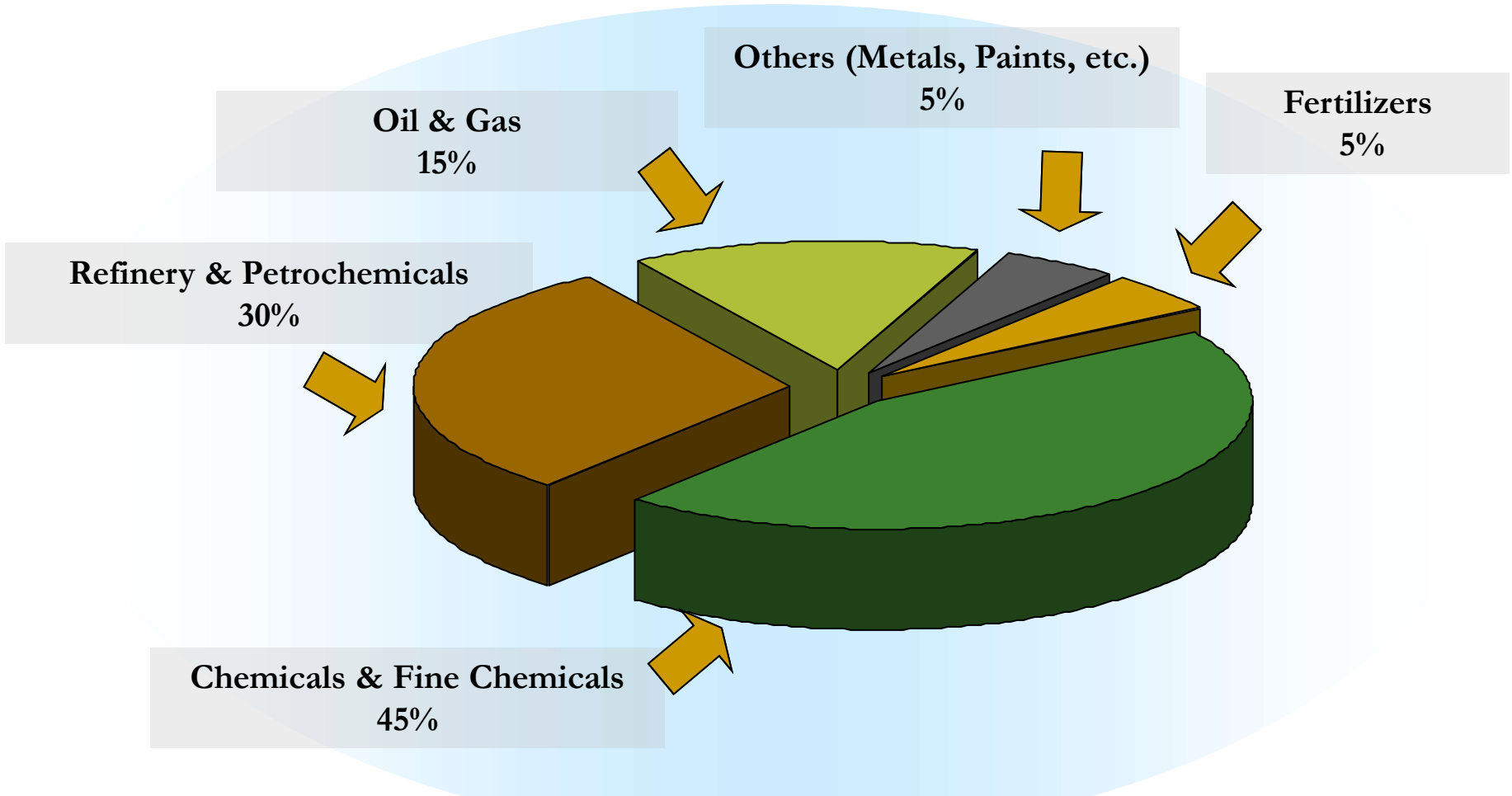
Strengths and Capabilities



■ Technical Strengths

- 25 technical personnel
- Expertise in
 - Complete FEED packages
 - Simulation and Heat Exchanger Design Software
 - HSE Services
- Detailed Engineering
 - Access to 200+ technical resources (Paramount Ltd)

Strengths and Capabilities



We cover a wide spectrum of market segments!

Strengths and Capabilities



■ Professional Work Quality

- Highly skilled dedicated staff
 - Average experience of about 15 years
 - Over 50% of the staff have an advanced degree
- Multiple levels of checks and reviews

■ Focused Management

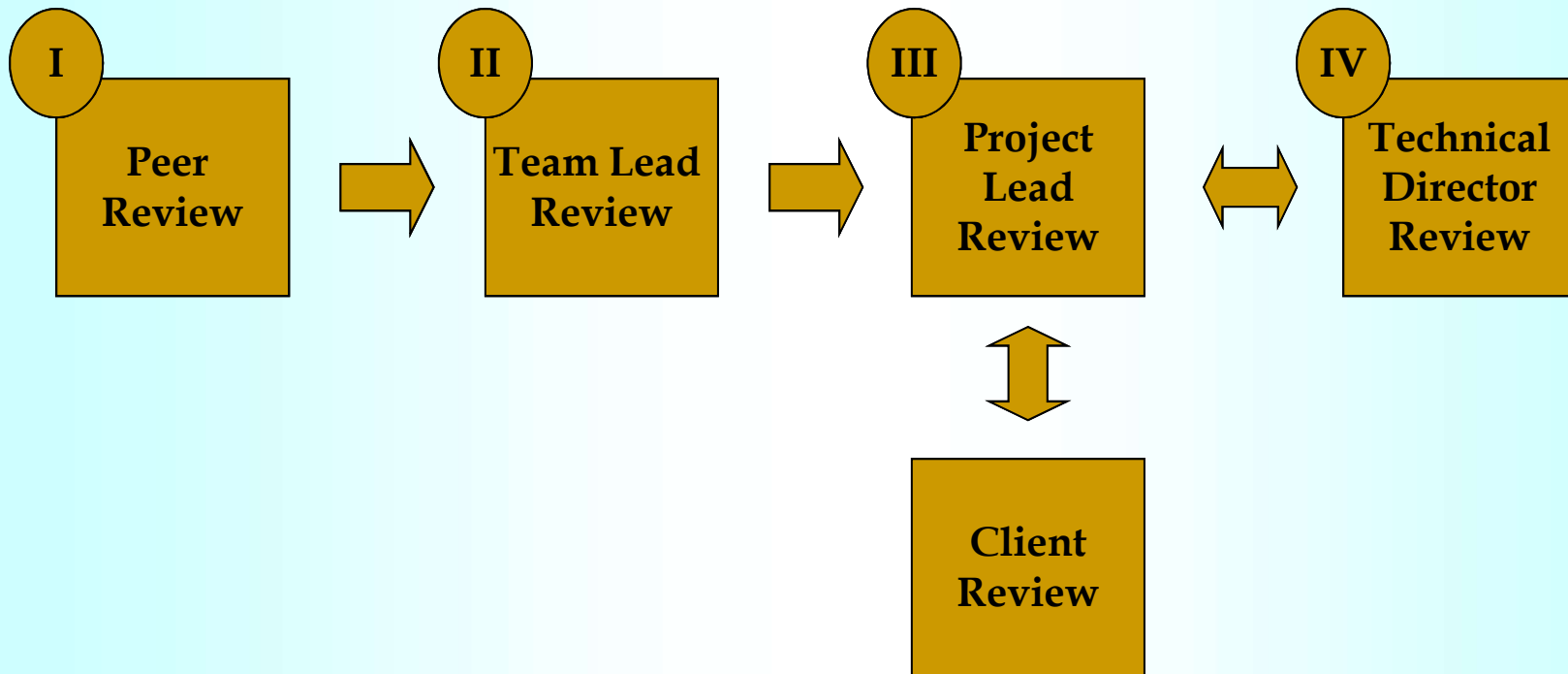
- A closely-held family corporation
 - Owners are all working managers
- Professionally managed organization

— Our knowledgeable and professional team minimizes the burden on your team! —

Strengths and Capabilities



Typical Project Review Process



Strengths and Capabilities



■ Domestic Experience

- ❑ Extensive local customer-base
 - Repeated projects from various customers
 - Several other major chemicals players in India
- ❑ Indian codes and standards, work culture

■ International experience

- ❑ Key people with plenty of international history
- ❑ International projects / domestic projects for multinationals
- ❑ API / ASME codes

Software Packages



■ Process Simulation

- ❑ PRO/II®: Premier Process Simulation Package
- ❑ VisualFlow®: Flare Network Simulation and Analysis
- ❑ INPLANT®: Plant Piping Systems Simulation and Optimization
- ❑ DATACON®: DCS Data reconciliation for H & M Balance

■ Heat Exchanger Design & Simulation

- ❑ HTRI®: Premier Heat Exchange Design & Analysis Package
- ❑ Hextran®: Heat Ex Network Design / Optimization

■ Mechanical Design

- ❑ PVElite®: Columns, pressure vessels, etc.

■ Life Cycle Asset Information Management

- ❑ Comos®: Integrate Engineering Documents & Data

— Industry-leading specialty software packages and their knowhow! —

Select List of Projects



- Over 150 projects completed since inception
- Conceptual Design
 - Anhydrous Alcohol Technology: Bayer, Baroda
 - Ammonia Recovery Technology: UPL, Ankleshwar
 - Condensate & LPG Recovery System: Canoro, Assam
- Front-End Engineering Design
 - Naphtha Stabilization Unit: IOCL, Barauni
 - Relief Valves & Flare System: Shell, Hazira
 - Lube Oil Re-refining Plant: Chemie Tech, Dubai
 - FCCU & DCU FEED Package P&ID Development: Essar, Jamnagar
 - Specialty Pigments Plant (4 nos.): Heubach Colour, Ankleshwar

Several repeat projects from many customers

Select List of Projects



■ Detail Engineering

- ❑ Moisture Control & Dehazing Facility, MAB Refinery, KNPC
- ❑ Gasoline Blending System: Yokogawa / IOCL, Gujarat
- ❑ Validation of Oil and Gas Separation Facility, HOEC

■ Safety Studies

- ❑ Pramoda Oil Field & North Balol Gas Collection System, HOEC, Chennai
- ❑ CDU / VDU / SGU, Essar Oil Limited, Jamnagar
- ❑ Propylene Technology, Udhe, Mumbai

■ Design, Engineering, Procurement, Construction Mgmt

- ❑ MPP Plant: India Malt (Lubrizol), Baroda

■ Heat Exchanger Design Projects

- ❑ Fabricators: TEMA India Limited & Grasim Industries Limited
- ❑ EPC / EPCM Companies: Punj Lloyd, EIL, Stone & Webster Rolta

Select List of Customers



List of International Customers



■ Europe

- ❑ Total (France)
- ❑ Linde (Germany)
- ❑ Bayer (Germany)
- ❑ Heubach (Germany)
- ❑ Transpek Silox (Belgium)

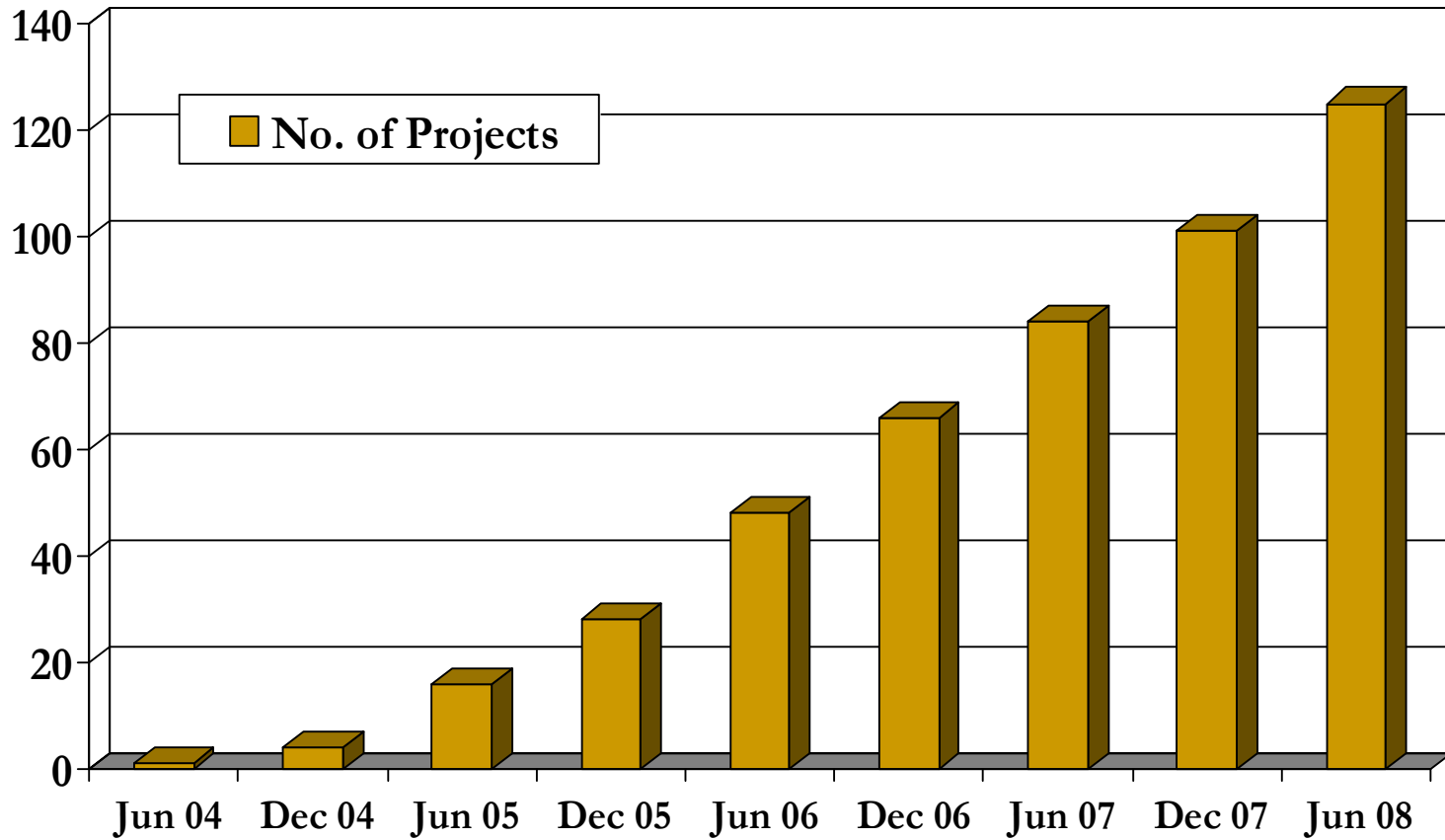
■ Middle -East

- ❑ KNPC
- ❑ Total (Yemen)

■ North America

- ❑ Shell (USA)
- ❑ Stone & Webster (USA)
- ❑ Inox/ Air Products (USA)
- ❑ Lubrizol (USA)
- ❑ TEMA India (USA)
- ❑ Rhine Engineering (USA)
- ❑ Wink Inc (USA)
- ❑ Tartan Engr (Canada)
- ❑ Equinox Engr (Canada)
- ❑ Sunoco (USA)

Project Growth



Next Steps

