

FEDO PROFILE



FACT Engineering & Design Organisation
A Division of
The Fertilizers And Chemicals Travancore Ltd.
(A Government of India Enterprise)
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ISO 9001 : 2015 Certified

1.0. OUR BACKGROUND

1.1 FACT Engineering & Design Organization (FEDO), is a premier Engineering consultancy Organization of India, engaged in design, engineering and implementation of projects in process, oil & gas and allied industries. We form part of a multi-divisional company, the Fertilizers And Chemicals Travancore Ltd (FACT), a Schedule-'A' category Government of India Enterprise, under the administrative control of the Department of Fertilizers in the Ministry of Chemicals & Fertilizers.

1.2 FEDO's symbiotic relationship with FACT endows us with certain unique strengths that most other Indian consultants do not possess. These include access to FACT's rich database on building and managing of plants, based on different generations of process technology, availability of experienced personnel, and support of sister divisions like;

- | | |
|--|--|
| ➤ FACT-UC-Udyogamandal Complex-Fertiliser & Petrochemical Division | ➤ FACT-Training Centre & Management Development Centre |
| ➤ FACT-CD-Cochin Division-Fertiliser Division | ➤ FRBL-FACT-RCF Building Product Ltd-A Joint Venture between M/s FACT and M/s.RCF Mumbai. Engaging in manufacture of Load Bearing Gypsum Panel |
| ➤ FEW-FACT Engineering Works-Fabrication Division | |
| ➤ R&D Centre | |

1.3 The financial backing of FACT, with an annual turnover in excess of ₹17450 million (US \$275 million) adds to our credibility with clients, while awarding high value LSTK (Lumpsum Turnkey) contracts to FEDO.

1.4 In May 1995, FEDO became the first project engineering Consultant in India to be awarded the prestigious international quality certification ISO 9001 (1994 revision) for our quality systems and procedures. Presently, it has been upgraded to the ISO 9001:2008 version, and getting ready for revision to ISO 9001:2015, due in 2017.

2.0. SERVICES OFFERED

2.1 In the fifty eight years of its existence, FEDO has served an impressive array of clients in diverse fields of operation. Indian blue chip companies operating in the petroleum, refining and fertilizer sectors have utilized our services for their prestigious projects during this period. FEDO's operations have been extended in big way to Infrastructure sector also, catering its services to major Educational Institutions like NIT-Nagaland, NIT-Calicut, CUSAT (Cochin University of Science and Technology), Kendriya Vidyalaya Sangathan etc.

2.2 Besides taking up projects on a concept-to-commissioning basis, FEDO also undertakes pure consultancy jobs for owners who are capable of managing the fine intricacies of project implementation - Technology sourcing, Procurement and Construction - themselves.

2.3 Our Project Management Consultancy (PMC) Services package comprises;

2.3.1 Pre-Project activities like;

- Preparation of Techno-Economic Feasibility Reports (TEFR) with Internal Rate of Return (IRR), Sensitivity Analysis etc
- Assisting Clients in getting EIA clearance
- Carry out Quantitative Risk Analysis
- Detailed Project Report (DPR)
- HAZOP Studies
- Selection and Transfer of Technologies
- Assisting Client in liaising with statutory bodies and project funding agencies.

2.3.2 Supply of know-how and Basic Engineering Design Packages (BEDP) for processes developed in-house and preparation of Basic Engineering Package for commercial sized plants based on pilot plant data;

2.3.3 Providing Detailed Engineering and Services that also include;

- Procurement Assistance
- Commissioning Assistance during project execution stage
- Construction Supervision
- Inspection, including Third Party Inspection (TPI) and Expediting Services

2.3.4 Project Management Services comprising of;

- Planning
- Trouble-shooting and maintenance services for running plants
- Cost Control and associated MIS
- Undertaking revamp and retrofit of ailing plants
- Electrical System/Power System Analysis using ETAP Software

2.3.5 Studies and Audits;

- Conducting Safety Audit
- Energy Audit
- Environmental Audits
- HAZOP and HAZAN studies
- Disaster Management Plan / studies (DMP)
- Lightning Protection Adequacy studies
- Health Study
- Weak Area Analysis of Process Plant
- SIL Review

2.3.6 Fire & Safety Engineering;

- Adequacy study of existing Fire Protection Systems
- Fire Fighting facilities and Safety systems

3.0. FIELDS OF OPERATION

3.1 Over the years, FEDO has actively participated in the industrialisation process by helping both private promoters and Government agencies in setting up viable units. Our clients include:

3.1.1 Oil , Gas& Refining Sector;

- Oil & Natural Gas Corporation Ltd (ONGC)
- Indian Oil Corporation Ltd (IOCL)
- Bharat Petroleum Corporation Ltd (BPCL)
- Chennai Petroleum Corporation Ltd (CPCL)
- Gas Authority of India Ltd (GAIL)
- Hindustan Petroleum Corporation Ltd (HPCL)
- IBP Co Ltd

- Mangalore Refineries and Petro-Chemicals Ltd (MRPL)
- BPCL-Kochi Refineries (BPCL-KR)

3.1.2 Fertiliser Sector;

- KrishakBharati Co-operative Ltd (KRIBHCO)
- Madras Fertilizers Ltd (MFL)
- Hindustan Fertilisers Corporation Ltd (HFCL)
- Tuticorin Alkali Chemicals & Fertilisers Ltd
- Pyrites, Phosphates & Chemicals Ltd (PPCL)
- Indo Gulf Fertilisers & Chemicals Corporation Ltd (IGFCC)
- Gujarat State Fertilizer Corporation (GSFC)
- Mangalore Chemicals & Fertilizers Ltd (MCF)
- Indian Farmers' Fertiliser Cooperative Ltd (IFFCO)
- Fertiliser Corporation of India Ltd (FCIL)
- Southern Petrochemical Industries Corporation Ltd (SPIC)
- Paradeep Phosphates Ltd (PPL)
- Oswal Chemicals & Fertilizers Ltd
- Gujarat Narmada Valley Fertilizer Corporation Ltd (GNFC)

3.1.3 Process Industries;

- Hindustan Organic Chemicals Ltd (HOCL)
- Hindustan Copper Ltd (HCL)
- Travancore Titanium Products Ltd (TTPL)
- Hindustan Lever Ltd (HLL)
- Indo German Carbons Ltd (IGCL)
- Kerala Minerals and Metals Ltd (KMML)
- Oil Palm India Ltd (OPIL)
- Hindustan Zinc Ltd (HZL)
- Kerala Chemicals & Proteins Ltd (KCPL)
- Binani Zinc Ltd (BZL)
- Hindustan Insecticides Ltd (HIL)
- Tata Projects Ltd (TPL)
- Travancore Cochin Chemicals Ltd (TCC)

3.1.4 Infrastructure Sector;

- Kerala Infrastructural Development Corporation (KINFRA)
- Kerala State Industrial Development Corporation (KSIDC)
- Bharat Petroleum Corporation Ltd (BPCL)
- National Institute of Technology -NIT-Nagaland
- KINFRA Export Promotion Industrial Parks (KEPIP)
- Roads & Bridges Development Corporation of Kerala Ltd. (RBDCK)
- Cochin University of Science and Technology (CUSAT)
- Kendriya Vidyalaya Sangathan (KVS)
- Kerala Minerals and Metals Ltd (KMML)

3.2 For these clients, we have executed projects in fields like:

Fertilisers

- Ammonium Chloride
- Ammonium Sulphate
- Mono and Di Ammonium Phosphate
- Urea
- Complex Fertilisers etc

Petrochemicals

- Caprolactam
- Phenol
- Methanol
- Mono-Chloro Benzene etc

Intermediates

- Acids (organic and inorganic)
- Ammonia
- Hydrogen etc

Industrial chemicals

- Ammonium Chloride
- Ossein and Di Calcium Phosphate
- Gelatin
- Sodium Bi Carbonate etc

Refining & Distribution

- Unit revamps
- Tank farms
- Oil depots
- LPG bottling plants
- Floating roof tankage – Crude and Product tankages
- Natural gas distribution system etc

Pesticides

- DDT
- Dicofol
- Benzene Hexa Chloride
- Bio-pesticides
- Mancozeb. etc

Infrastructure

- National Highways
- Industrial parks
- Textile Park
- Video Park
- IT Park
- Industrial Infrastructure Development Centres (IIDCs)
- Crude Receipt Facilities, etc.

Antibiotics

- Streptomycin
- Penicillin etc

Environmental Physico-Chemical and Biological Engineering

- Effluent Treatment Plants (ETP)
- Gas Scrubbing System
- Stacks etc

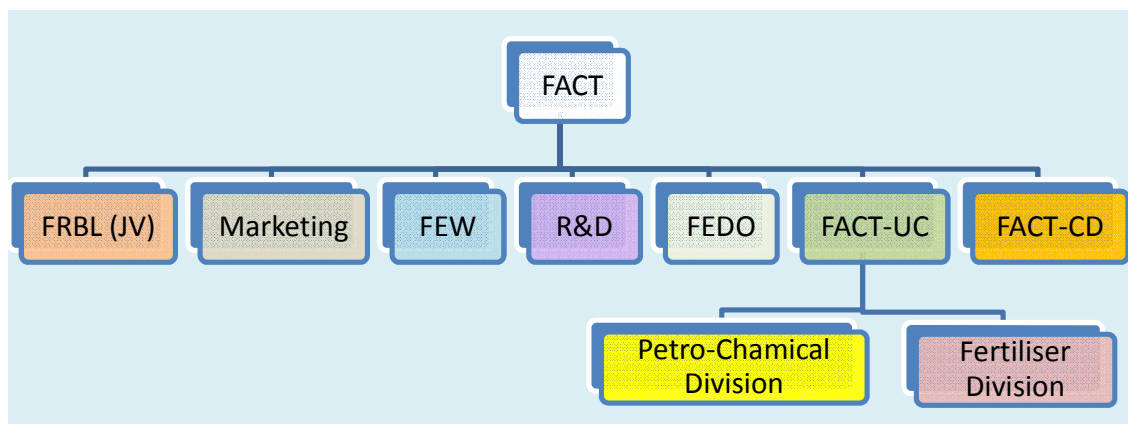
Offsite Facilities

- Utility System
- Raw Material/Product Storage and Handling System
- Fire Fighting Facilities
- EHV Power Receiving Stations
- Captive Power Generation Plant
- Non-Plant Buildings and Industrial/Residential Townships etc

4.0. SYSTEM STRENGTHS

4.1 Organisational Structure of Parent company M/s. FACT Ltd.

Our parent company, FACT Ltd. is a multi-divisional company. Besides FEDO, it has various Divisions as below;



Fertiliser Manufacturing Divisions	<ul style="list-style-type: none"> ➤ FACT-UC (located at Udyogamandal) producing FactumFos, Ammonium Sulphate ➤ FACT-CD (located at Ambalamedu) producing DAP, Complex fertilisers etc;
Petrochemical Division	➤ FACT-UC (located at Udyogamandal) producing Cyclohexanone and Caprolactam
Fabricating Division	➤ FACT Engineering Works (FEW) –located at Palluruthy
Marketing Division	➤ A central Marketing Division for fertilisers and chemicals, headquartered at Udyogamandal.
Building Product Manufacturing	➤ FACT-RCF Building Products (FRBL), a joint venture between M/s.FACT and RCF Mumbai located at Ambalamedu, engaged in fabrication of GFRG (Glass Fibre Reinforced Gypsum) Panel, a readymade wall panel used for mass scale building construction, reducing the construction cost and time of buildings.

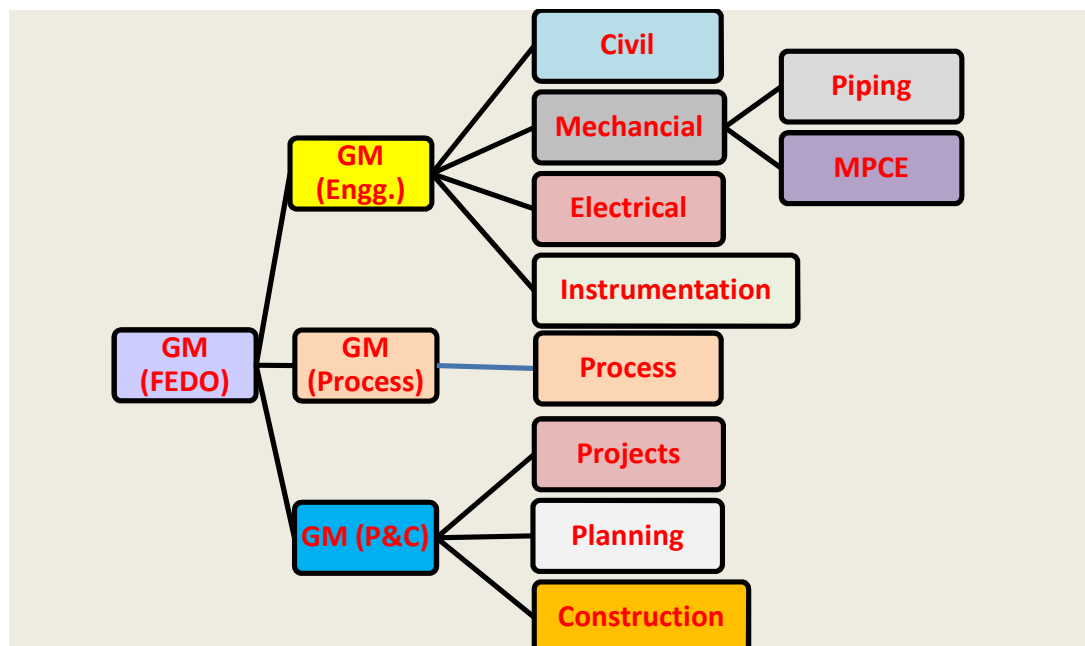
Uduogamandal, Ambalamedu and Palluruthy are industrial locales just outside the city limits of Kochi, in south India, connected by Rail, Air and Water to other principle cities/international locations.

4.2 DIRECTOR BOARD

FACT is managed by a Board of Directors. The Chairman of the Board is also the Managing Director. The Board comprises of Finance Director, Technical Director and Marketing Director. There are also several part-time Directors on the Board, who are nominees of the Central and State Governments.

4.3 FEDO

FEDO, like other Divisions of FACT, is headed by a General Manager/Chief Operating Officer. The operations are streamlined by the coordinated work of various Groups, viz. Process Engineering, Engineering group comprises of Civil, Electrical, Mechanical, Instrumentation, Projects, Construction, , Commercial Departments. The various Departments in each Group are headed by Deputy GeneralManagers. FEDO's Finance, Material, and HR functions are taken care of by FACT's integrated Finance, Material and HR departments.



4.4 Human Resources

- 4.4.1 FACT has employee strength of around 1800 spread across its various Divisions. FEDO is a professional-dominated division with majority staff with technical qualifications, many with post-graduate qualifications in engineering and management subjects, distributed across the various specialized disciplines.
- 4.4.2 FACT lends its personnel from the production and fabricating Divisions to FEDO, whenever FEDO has to take up operations & maintenance assignments or when plant commissioning / site fabrication expertise is required.
- 4.4.3 FEDO designs are tempered with the plant experience gathered by our personnel during the periodic job rotations. Our designers also gain invaluable insights into the latest international developments in the practice of design, engineering, project and construction management through their association with various process licensors and engineering contractors in different projects, participation in technical seminars, training programmes etc. Our Material Procurement group is also acquainted with international competitive bidding procedures and procurement practices through their involvement in projects funded by bi-lateral and multi-lateral funding agencies like the World Bank, Overseas Economic Cooperation Fund etc.

4.5 Computer facilities

- 4.5.1 FACT was one of the first Indian companies to computerize its operations, way back in 1965. This head start is maintained even today with computers finding applications in integrated maintenance and materials management systems, vendor information systems, HRD database, plant optimization projects, product distribution monitoring etc besides routine accounting and MIS functions. A vast array of hardware, ranging from mainframe and super minis to PCs, Plotters, Printers, Scanners are used for this purpose and distributed on a network, FACTNET, which provides connectivity and resource sharing.
- 4.5.2 Advanced engineering and design software is utilized to develop optimum designs for plant and machinery.
- 4.5.3 Major packages procured include:

SOFTWARE	APPLICATION
Engineering Software	
Autocad 2019	Drafting
Process Engineering	
Design – II	Process Simulation Software
Pipenet	Network Analysis of Water/Fire Hydrant Network System.
Aspen ONE Engineering Suite (Ver.10)	Aspen Plus & HYSYS Aspen Flare System Analyser Aspen Exchanger Design & Rating V10 – Thermal Design, Simulation & Rating of Heat Exchangers
Cameo Aloha	Dispersion Analysis
Delta P	Pressure Drop Calculation (In House software)
R Orifice	Orifice Sizing (In house software)

SOFTWARE	APPLICATION
Orimet	Orifice Sizing (in house software)
SAPHED	Design of Heat exchangers for Sulphuric Acid Plant (in-house software).
SAPHER	Rating of Heat exchangers for Sulphuric Acid Plant (in-house software).
Conv.	Process Simulation of Sulphuric Acid Plant (SO ₂ Converter) (in-house software)
Piping Engineering	
Caesar II	Stress Analysis of Piping
PipeNet(Transient)	Surge Analysis
CADWORX	3 D Modelling
Process & Combustion Equipment Engineering	
“TANK” Design Software 2017	Design of Storage Tanks as per API 650, 11Ed. Verification of In-service Storage Tanks as per API 653.
P V Elite 2018	Design of Pressure Vessels as per ASME Sec. VIII Div.1, 2007 Design of Pressure Vessels as per ASME Sec. VIII Div.2, 2007. Design of Pressure Vessels as per British Standard PD 5500 Design of Pressure Vessels as per EN 13445. Component Analysis to the above codes.
Aspen - EDR	Mechanical Design of Shell & Tube Heat Exchangers as per TEMA – Latest Edition.
PipeNet-2018	Sprinkler Systems
Civil Engineering	
STAAD Pro V8i	Structural Analysis using 3D Models and Design.
ETABS	Structural Analysis using 3D Models and Design
Autocad	Building design suite
Staad foundation advanced	Foundation Design
Staad RCDC	Reinforcement Design
Projects Management	
PRIMAVERA P6	Project scheduling & monitoring
MS PROJECT 2007	Project scheduling & monitoring
Electrical Engineering	
ETAP Software Version 18.1.1	Power System Analysis
Instrumentation Engineering	
SMART PLANT INSTRUMENTATION	Instrumentation Engineering and Design Software.

4.5.4 Besides running advanced design and engineering software, computers are also used for communications. Internet connectivity and e-mail communication facility make decision taking and implementation faster and more client-friendly.

4.6 Geographical Network

4.6.1 FEDO carries out most of the engineering and procurement activities from the home office at Udyogamandal, near the city of Kochi in the Kerala State.

4.6.2 FEDO/FACT has an office in Mumbai, mainly for liaison work related to various projects. Depending on vendor distribution pattern, expediting centres is opened for short duration at other locations as required.

4.6.3 FEDO/FACT has an office also at New Delhi for business development and liaison with Government, financing agencies and clients located in that area.

4.6.4 FACT Marketing offices in places like Chennai, Hyderabad, Bangalore and Trivandrum act as communication links for FEDO.

4.7 Technological Capabilities

4.7.1 FEDO has own process know-how for the production of Hydrogen (low capacity plants), Sulphuric acid and Effluent Treatment Plants for fertilizer, petroleum and petrochemical plants.

4.7.2 FEDO concludes tie-ups with globally reputed technology licensors for sourcing know-how for projects in other areas, on a case to case basis.

4.7.3 We also provide detailed engineering and allied services for technologies identified and sourced by clients themselves for their projects. In this way, we have worked in association with reputed international firms like MW Kellogg, Haldor Topsoe, Stamicarbon, Chiyoda, Toyo Engineering, United Oil Products, BASF etc.

4.8 Recognitions

4.8.1 FEDO has been awarded ISO 9001 quality certification for our systems and procedure for activities connected with project execution such as engineering, procurement, construction etc. The certification was given in May 1995 by Det Norske Veritas Quality Assurance Ltd, the UK based accredited quality auditors. In May 1998, a re-certification audit was conducted by Det Norske Veritas (M/s.DNV) Quality Assurance Ltd, Netherlands and the certification was extended for a further period of three years. A second re-certification audit was conducted in July 2001 by Det Norske Veritas Quality Assurance Ltd, Netherlands, and the certification extended for another three years. FEDO has been awarded ISO 9001:2015 in 2018.

4.8.2 FEDO has been recognized by the Electrical Inspectorate of the Government of Kerala for undertaking the statutory Electrical Energy Audit of Industrial undertakings.

4.8.3 FEDO personnel have served on important policy-making bodies like the Bureau of Indian Standards etc.



5.0. PROJECT MANAGEMENT STYLE

- 5.1. General Manager (Process) at senior level heads the core department 'Process Engineering' in the Organisation responsible for the Plant Process Design and simulation.
- 5.2. Deputy General Manager (Engineering) at senior level heads a multi-disciplinary Task Force comprising specialists from the following engineering streams, responsible for the respective areas of each project: Civil & Structural, Mechanical- Which consists of:-Piping, Machinery and Material Handling-, Vessels, Electrical, Instrumentation
- 5.3. Deputy General Manager (Projects & Construction) at senior level heads a multi-disciplinary Task Force comprising specialists from the following streams responsible for the Project Management and execution:
- Planning cost control and Management Information System.
 - Procurement, Purchase, Inspection & Expediting.
 - Vendor Coordination
 - Traffic & Stores Management
 - Site Management
- 5.4. The site organisation will be headed by a Resident Chief Construction Manager who will be assisted by specialists in erection / construction.
- 5.5. This Task Force will be totally responsible for the project from start to finish. It will ensure completion of the project on schedule, within defined costs and achievement of the guaranteed performance.
- 5.6. The Project Manager nominated for each Project will be Co-ordinating the entire process of project execution among different departments such as Engineering, Planning, Execution, Site management etc and acts as one point correspondence between Client and FEDO.

6.0. MAJOR PROJECTS HANDLED BY FEDO

- 6.1. Since inception FEDO has executed a number of projects, either using its own process know-how or know-how obtained from other process owners. A representative list would read like this:

Area/ Sector	No. of Projects
Petrochemical plants (Phenol, Caprolactam, Methanol & Mono Chloro Benzene)	4
Ammonia/Hydrogen plants based on steam reforming of hydrocarbons	13
Fertiliser salt plants (N, NP & NPK fertilisers like DAP, SSP, Urea, Ammonium Sulphate, Ammonium Chloride etc)	10
Pesticide Plants, (DDT, Endosulphan, Malathion, Gamma Benzene Hexa Chloride, Dicofol, Bio-pesticides and Mancozeb)	7
Antibiotics plants (Streptomycin, Penicillin, Ampicillin)	3
Non-ferrous metallurgical plants (for mercury & silver recovery)	3
Fine chemical plants (Ossein, Di Calcium Phosphate, Gelatin, Sodium bi	4

Area/ Sector		No. of Projects	
Carbonate).			
Single Point Mooring (SPM) Project for BPCL-KR		1	
Large diameter Floating roof Tankage projects		3	
Revamp / Extension of Electrical Systems		3	
Adequacy Study of Fire Water Network		2	
Cross-country oil product pipelines		8	
Cross country water pipelines		6	
Area/ Sector	No. Projects	Area/ Sector	No. Projects
Urea Plant revamp	1	Captive power plants	5
Sulphuric acid plants	19	LPG Bottling plants.	3
Phosphoric acid plants	5	Bulk Oil Terminals	5
Formic acid plants	2	Oil Depots	8
Nitric acid plants	2	Refinery related projects	12
Mini Cement plants	3	Natural Gas related projects	3
ETPs	7	Infrastructure projects	12

- 6.2 A number of Utility plants and off-site facilities including solid and liquid raw material storage and handling, power receiving and distribution, Rock Phosphate storage handling and grinding, sulphur storage and handling, raw water pumping, cooling towers, in-plant buildings, off-site buildings and peripheral facilities have also been executed by us as part of various projects.
- 6.3 FEDO has also been involved in Indian Space and Defense Research through the execution of a few vital projects.
- 6.4 FEDO has considerable experience in carrying out of Techno-Economic Feasibility (TEFR) studies, Detailed Project Reports (DPR), End-to-end surveys, Safety Audits and Energy Audits.

7.0. SPECIFIC PROJECT PROFILES

Though FEDO has successfully executed a number of turnkey projects, most of our projects have been executed on a consultancy basis. Our experience in rendering consultancy services for certain large Indian projects in the recent past is given in detail in the ensuing pages.

7.1. Ammonia Project of FACT

Client	FACT Ltd
Capacity	Ammonia : 297,000 TPA Addl.syn gas : 29,700 TPA
Location	Udyogamandal, Kerala
Process Licenser	Haldor Topsoe, Denmark
FEDO's scope	Detailed engineering Procurement and Construction
Zero date	May 1993
Commissioning date	March 1998
Project Cost	6,500 million
Feed stock	Naphtha
Process route	Naphtha de-sulphurisation, Steam/naphtha reforming, High & low temp shift conversion, CO ₂ removal (MDEA process), Methanation, Syn gas compression & Ammonia synthesis,

	Refrigeration & ammonia storage.		
Off sites	2 x 60 TPD steam generation plant, DM water plant, Nitrogen Plant, Cooling towers (Process plant & auxiliary) Instrument air system, 5000 MT ammonia storage system		
Planning drawings	120 Nos		
Engineering		Procurement	
P & I diagrams	56 Nos	Equipment details	100 Nos
Civil & Structural drawings	500 Nos	Static	160 Nos
Piping:		Site fabricated tanks	16 Nos
Key plans	120 Nos	No. of purchase orders(Major)	393 Nos
Isometrics	2260 Nos		
Electrical drawings	350 Nos		
Instrumentation drawings	500 Nos		
Construction		Equipment erection	
No. of pile (for ammonia Storage tank)	170 Nos	Heavy equipment (ODC)	1,400 MT
Structural steel/plates	3,600 MT	Light equipment	2,500 MT
Reinforcement	2,900 MT	<u>Piping fabrication</u>	130,000inch dia
RCC	18,000 M3	<u>Insulation</u>	20,000RM

7.2. Ammonia Plant Revamp Project of MFL

Client	Madras Fertilisers Ltd		
Objective	Enhance capacity from 750 TPD to 1050 TPD. Extend economic life of plant by fifteen years.		
Location	Manali, Chennai		
Process Licenser	HaldorTopsoe, Denmark.		
Date of completion	September 1997		
Project cost	₹3,500 million		
Feed stock	Naphtha		
Process route	Naphtha desulphurization, Steam/naphtha reforming, High & low temp shift conversion, CO2 removal (MDEA process), MethanationSyn gas compression, Ammonia synthesis, Refrigeration & ammonia storage		
Engineering			
P & I diagrams	69 Nos	Civil & Structural drgs	221 Nos
Piping:		Procurement/Equipment details	
Planning drawings	107 Nos	Rotating	55 Nos
Key plans	97 Nos	Static	84 Nos
Isometrics	1160 Nos	Major turnkey packages	10 Nos
Electrical drawings	165 Nos	Sub-contract packages	9 Nos
Instrument drawings	1075 Nos	Major purchase orders	230 Nos

7.3. Methanol Project of GNFC

Client	Gujarat Narmada Valley Fertiliser Company Ltd		
Project	100,000 TPA Methanolplant		
Location	Bharuch, Gujarat		
Project cost	₹820 Million		
Technology Licenser	Toyo Engineering Corporation Japan		
P & I Diagrams	20 Nos	Purchase Orders	300 Nos
Civil & Structural diagrams	110 Nos	RCC	5400 M3
Electrical &Instn. Diagrams	440 Nos	Structural steel	450 MT
Piping isometrics	1200 Nos	Equipment erection	900 MT

7.4. Caprolactam Project of FACT

Client	FACT Ltd.		
Project	50000 TPA Caprolactam& 225,000 TPA Ammonium Sulphate		
Location	Udyogamandal, Kerala		
Project cost	₹3,500 Million		
Technology Licenser	Stamicarbon, The Netherlands & Chiyoda, Japan.		
P & I Diagram	126 Nos.		
Civil & Structural diagrams	600 Nos	Equipment procurement	1,099 Nos
Electrical & instn. Diagrams	1,400 Nos	RCC	32,000 M3
Piping isometrics	4,500 Nos	Structural steel	3,600 MT
No of purchase orders	900 Nos	Equipment erection	3,800 MT

7.5. Phenol/Acetone complex of HOC

Client	Hindustan Organic Chemicals Ltd		
Project	40,000 TPA Phenol &24,000 TPA Acetone		
Location	Ambalamedu, Kerala		
Project cost	₹900 Million		
Technology Licenser	UOP Incorporated, USA		
Completed	1987	No of purchase orders	250 Nos
P & I Diagram	80 Nos	Equipment procurement	393 Nos
Civil & Structural diagrams	220 Nos	RCC	12,000 M3
Electrical &Instn Diagrams	269 Nos	Structural steel	680 MT
Piping isometrics	1,050Nos	Equipment erection	1,200 MT

7.6. Ammonia Project of KRIBHCO

Client	KrishakBharati Cooperative Ltd		
Project	2 x 1350 TPD Ammonia plants		
Location	Hazira, Gujarat		
Project cost	₹4,000 Million		
Technology Licensor	MW Kellogg, USA		
Completed	1985		
P & I Diagram	31 Nos		
Civil & structural diagrams	155 Nos	Equipment procurement	280 Nos
Elec. & Instn. diagrams	519 Nos	RCC	35,000 M3
Piping isometrics	2,400 Nos	Structural steel	2,450 MT
No of purchase orders	313 Nos	Equipment erection	5,000 MT

7.7. Revamp of Urea Plant of NFL, Nangal

Client	National Fertilisers Ltd., Nangal.
Project Description	Revamp of Urea Plant at Nangal.
Location	Nangal, Punjab.
Project cost	₹120 crores.(₹1200 million)
FEDO's fee	₹22.87 crores (₹228.7 million)
Technology Licensor	UREA CASALE, SWITZERLAND.
Zero Date	Aug 1999
Completion date	Feb. 2001.
Equipment	CO2 compressor, Ammonia Pump, Carbamate pump, Urea reactor, carbamate condenser, heat exchangers, conveyors, pumps, piping, pritting.
P&I Diagram	20 Nos
Civil & Structural diagram	150 Nos.
Elect.& Instn diagrams	150 Nos.
Piping Isometric	Approx: 150 Nos.
No. of purchase order	Approx: 80 Nos.
Structural steel	Tower equipments
Equipment erection	150 Ton

7.8. Transducer Positioning System for NPOL

Client	Naval Physical & Oceanographic Laboratory (NPOL), Ministry of Defence, Govt. of India.
Project description	Installation of facility for under water testing & Calibration of ultrasonic transducer on LSTK basis . Capable of testing 5 Tonne transducers accuracy #10mm in all three directions.

	Movement controlled through PLC system.
Location	Thrikkakara, Kochi.
Project Cost	₹364.98 lakhs.(₹36.5 million)
FEDO's fee	₹364.98 lakhs(₹36.5 million)
Technology Licensor	Nil
Zero Date	28-10-2002.
Completion date	31-3-2004.
General arrangement drgs	10
Elec. &Instn. Diagrams	10
No. of purchase orders	10
Equipment	2 Platforms for Transducer Positioning systems PLC, Azimuthu Positioner (5 Nos.), Under water lumineries, low noise cable Laser vibrometer

7.9. Consultancy Services for Cochin Airport-Seaport Highway

Client	Roads & Bridges Development of Kerala Ltd.
Project description	Consultancy services for Kochi Airport-Seaport Highway.
Location	Kochi
FEDO's scope of services	Detailed engineering, construction supervision and Project Management for four-lane highway from Kochi International Airport, Nedumbassery to NH-49 Bye-pass, connecting to Cochin Seaport
Total Length of Road	31 Km.
Total Estimated cost	:₹240 crore, excluding cost of land acquisition.
<p>Work description -</p> <p>The total work was divided into three phases, as follows:</p> <p>Phase-I—Strengthening & widening the existing two lane 13 Km road from HMT junction, Kalamassery to Karingachira, Construction of 2 lane road from HMT Junction, Kalamassery to Kochi International Airport, Nedumbassery (16 Km) & from Karingachira to NH 49 Bye-pass (2 Km).This includes a bridge of about 400m span across the River Periyar, and a 50m bridge over Thuruthu, as well as a Rail Over Bridge (ROB) at Neduvannur.</p> <p>Phase- II-Four Laning of the whole stretch, of approximately 31Km length. This involves bridges across River Periyar, Thruthu and Chitrapuzha, ROBs will be required at Neduvannur, Irimpanam and Tripunithura.</p>	

Details of Services provided:

- a) Reconnaissance survey and Alignment Finalisation
- b) Topographical Survey
- c) Soil Investigation
- d) Detailed Engineering and estimation

- e) Tendering, prequalification of bidders, techno-commercial recommendation and Contract Finalisation.
- f) Construction Management including construction supervision & quality assurance and control.
- g) Project Management including Planning and monitoring.

Topographical survey: Executed through sub-contractors M/s. Bhageeratha Engineering, Kochi and M/s. Geo Foundations, Kochi. The survey was conducted using Total Station and Global Positioning System.

Soil Investigation - Executed through sub-contractors M/s. Geo Foundations, Kochi.

Value of Contract (Total Project cost excluding land cost)

Phase I : ₹124 crore.

Phase II : ₹120 crore (estimated)

7.10. Crude Oil Receipt Facilities Project of M/s. BPCL, Kochi Refinery

Better known as the Single Point Mooring Project (SPM) for unloading of VLCCs off the coast of Kochi, the first of its kind in Asia, FEDO was the PMC for setting up the on-shore tank farm, pumping facilities, cross-country crude and product pipelines, fire installations and associated facilities for this prestigious project. The project cost for the on-shore part was to the tune of ₹300 crore, while FEDO received a fee of ₹3.72 crore for successfully rendering its consultancy services. The tank farm was commissioned in December 2007.

7.11. PMC Services for Crude Oil Pipeline Project of M/s. BPCL, Kochi Refinery including Study of Adequacy of Existing Electrical System.

The job involves Review of Design Basis, Preparation of Major Packages, Process Design Services, Detailed Engineering Services, Construction Supervision and Quality Assurance, HAZOP study, Project Management, Commissioning assistance, Performance Guarantee run.

FEDO's fee was ₹3.98 crore. The job was completed in 2012.

7.12. Health Assessment & RLA Study for Ammonia/Urea Plants

The client was M/s. KRIBHCO, Surat and FEDO's fee was ₹2.21 crore. The study was completed and final report submitted by FEDO in March 2010 well ahead of the scheduled date of submission.

7.13. Detailed Health Study of Ammonia/Urea Plants

The client was National Fertilisers Limited and the work was for its plants located at Panipat, Bathinda & Nangal. FEDO's fee was ₹1.08 crore. The final report was submitted in November 2008.

7.14. Feasibility Study for Installation of New Back Pressure Turbine

The client was M/s. BPCL, Kochi Refinery and FEDO's fee was ₹44.75 lakh. The final report was submitted by FEDO in September 2011.

7.15. PMC Services for Electrical Distribution System Revamp-Phase III

The client was M/s. BPCL, Kochi Refinery and FEDO's fee was ₹45.25 lakh. The work was completed in August 2011.

7.16. Revamp of 900TPD Ammonia Plant for Feed Stock Flexibility for M/s.FACT Ltd., Udyogamandal

The scope of services includes Preparation of DPR, Project Management and engineering services upto commissioning and test run. The work was completed in March 2013.

- Conversion of fuel and feed from Naphtha to fuel and feed mode of LNG and Naptha
- Revamp of plant to increase the energy levels and increase the capacity increase possible.
- Preparation of TPS for the Captive Power Plant for the above facility

7.17. PMC Services for Implementation of Crude and Product Tankages for Paradip Refinery Project at Paradip, Orissa (India) on Built-Own-Operate-Transfer (BOOT) Basis for M/s Indian Oil Corporation, New Delhi

The initial phase of the project including consultancy services for preparation of PQ docs, floating of bid, PQ of bidders, preparation of tender docs, tendering, evaluation up to appointment of the BOOT contractor was entrusted to FEDO for a fee of ₹1.78 crore. This is a mega tankage project of M/s. IOCL, Refinery Division being set up in conjunction with the Greenfield refinery coming up at Paradeep, Odisha state. The work under FEDO's scope was completed in August 2010.

After completion of the initial phase of the project up to appointment of the BOOT contractor the implementation was also entrusted to FEDO by M/s IOCL for a fee of ₹15.0028 crore. The work under FEDO's scope of Consultancy Services for Project Management, Review of Detailed Engineering, Construction Management & Supervision, and Procurement Services of the tankage project was completed in July 2013. It was part of a major refinery expansion for enhancement of capacity by Indian Oil Corporation and was dedicated to nation in January 2016.

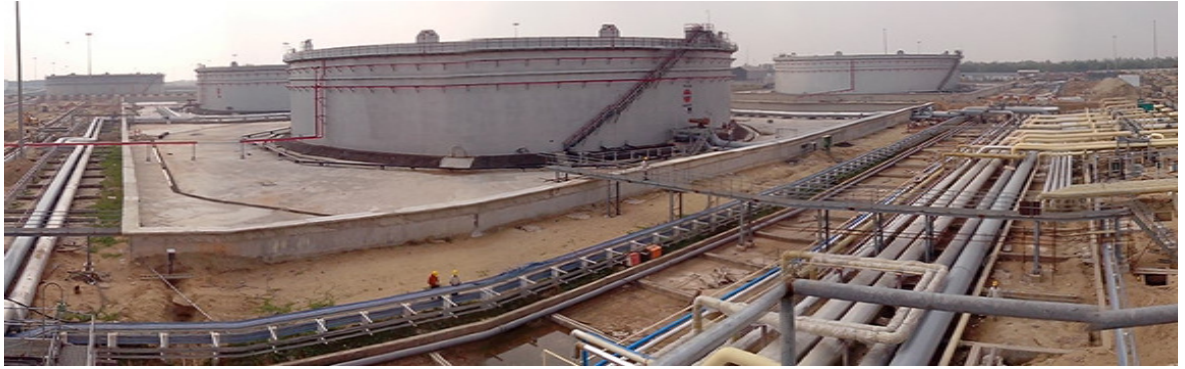
The major packages in this project were:-

Crude Oil Tanks- Floating Roof	11 Nos
PRODUCT TANKAGES	
Motor Spirit (Floating roof)	5 Nos
Dual Purpose Kerosene (Internal Floating roof)	4 Nos
Intermediate	1 No.
SKO	1 No.
Sulphur	3 Nos.
HSD	7 Nos.
Naphtha (Floating roof)	4 Nos
LPG Bullets	9 Nos.
Propylene Bullets	6 Nos.

OTHER EQUIPMENTS AND FACILITIES	
Pumps	84 Nos
Flare	1 No.
Pig Launcher/ Receiver	9 Nos
Compressor	1 No.
Tilted Plate Interceptor	1 No.
Pump Houses	11 Nos.
Control Rooms including blast proof control room	3 Nos.
Metering Houses	3 Nos.
Sub-stations	2 Nos.
Custody Transfer Metering Skids (9 Nos for Pipeline/ Marketing Transfer, 2 No For Truck Loading of LPG and Propylene (17 & 11 stream))	11 Nos.
Auto-sampler for Crude Oil	1 No.
Crude Oil Blending system (5 Stream)	1 No.
LPG Blending system (9 Stream)	1 No.
Motor Operated Valves	560 Nos.
Shutdown Valves	148 Nos.
Control Valves	66 Nos.

Some of the photos of the project site are given below:





8.0. MAJOR PROJECTS IN HAND

Our current major Indian assignments include:

Client	Description of the Job
Ministry of Chemicals & Fertilisers	Technical Audit of SSP Manufacturing units
IOCL, Mumbai	Consultancy Services for Project Management and Facilities for Setting up LPG Import Facility at Kochi
NIT, Nagaland	Construction and Expansion of Infrastructure Facilities of National Institute of Technology, Nagaland
ONGC, Hazira	PMC for Laying New Fire Water Network at Hazira Plant
Kendriya Vidyalaya Sangathan , New Delhi	Empanelment of FEDO as Construction Agency of KVS for Construction of School Building, Staff Quarters, Boundary Wall, etc. for Kendriya Vidyalaya, Kaduthuruthy (Kottayam), Haveri (Karnataka) and Harda (Madhya Pradesh)
HPCL , Indore	EPMC Service for LPG Augmentation Projects at HPCL-Indore
BPCL, Krishnapatnam	Design Consultancy for Mechanical works for Krishnapatnam Coastal Installation , Andhra Pradesh
HCL, Ghatsilla	Preparation TFER and PMC Services for Retrofitting of Amine based SO ₂ Absorption Route in Existing Sulphuric Acid Plant
FACT	Construction of Additional Ammonia Storage and Handling Systems

Client	Description of the Job
	Additional Phosphoric Acid and Sulphuric Acid Tanks New Ammonia Barge New NP Plant of 1650MTPD at Ambalamedu etc
M/s BPCL	Design Consultancy for Mechanical works for Krishnapatnam Coastal Installation , Andhra Pradesh
M/s CPCL	PMC Services for provision of RLNG as additional fuel in boilers 4 & 5 and HRSG-4 at CPCL Manali
BPCL-KR	PMC services for setting up facilities for Residential Township for BPCL - KR at Ernakulam (Photograph Below)

9.0. RECENTLY FINISHED/ NEARING COMPLETION- MAJOR PROJECTS

Client	Description of the Job
ONGC, Hazira	PMC for Laying New Fire Water Network at Hazira Plant
HPCL , Indore	EPMC Service for LPG Augmentation Projects at HPCL-Indore
BPCL, Krishnapatnam	Design Consultancy for Mechanical works for Krishnapatnam Coastal Installation , Andhra Pradesh
KMML, Chavara, Kollam	Preparation of DPR for the capacity expansion of TiO2 pigment production from 40000TPA TO 60000TPA
BPCL	Consultancy for generating a scheme for DHDS area effluent rerouting to ETP-V / ETP - III
TPL	Pre- bid Engineering support to M/s TPL in connection with bidding for setting up of 50000 MTPY Caprolactum Plant for M/s GSFC, Vadodara
BPCL-KR Kochi	PMC for providing additional pile supports for the existing crude oil line and related structures
HPCL	Engineering Consultancy Services For Revamp Of Elathur (Kozhikode) IRD
BPCL-KR	PMC services for setting up facilities for Residential Township for BPCL - KR at Ernakulam (Photograph Below)
BPCL-KR	PMC for crude tank construction at STF
IOCL-TNSO	PMC services for Terminal Automation System, CCTV Surveillance System including inspection services at various terminals under Tamilnadu State Office
CUSAT, Kochi	Supply & installation of Electrics for Electrical power distribution
IOCL	Consultancy services for implementation of Crude & Product Tankages on BOOT basis for Paradip Refinery Project



10.0. OVERSEAS PROJECTS

FEDO has been active in the Exports Sector also. Some of the jobs are listed here:

- 10.1. Providing **Engineering Services** for SahiRawl Water disposal project of Petroleum Development Oman, sub-contracted from the EPC contractor, Al-Hassan Trading & Contracting Co, Muscat, Oman.
- 10.2. Providing **Maintenance Services** for Rotating Equipment of Petrochemical Industries Company, Kuwait, contracted through Abdul Aziz Yousuf Al-Essa, Kuwait.
- 10.3. Providing **Technical Assistance** for Procurement of Rotating Equipment to ABB Global Engineering, Qatar.
- 10.4. Providing **Inspection Services** to Kuwait Oil Company, Kuwait sub-contracted from the maintenance contractor, El Dabhous, Kuwait.
- 10.5. Providing **Engineering Services** for Ahmadi and Sabhan Oil Depot Projects in Kuwait for Kuwait National Petroleum Company, sub-contracted from the EPC contractor, Abdul Aziz Yousef Al-Essa, Kuwait.
- 10.6. Providing **Detailed Engineering Services** for the 2.5 km long Inter Refinery Transfer Pipeline connecting the Shauiba and Mina Ahmadi Refineries of Kuwait National Petroleum Company, sub-contracted from the EPC contractor, Abdul Aziz Yousef Al Essa, Kuwait. Overall project management consultancy for this project was provided by Flour International, USA.
- 10.7. Providing **Plant Operation Services** for DM Water plant contracted through Abdul Aziz Yousef Al Essa, Kuwait.

- 10.8. Providing **Engineering Services** for the Revamp of Steam System (involving utility boilers and associated piping) of Kuwait National Petroleum Company, Kuwait, sub-contracted from the EPC contractor, Abdul Aziz Yousef Al Essa, Kuwait. Overall Project Management Consultancy was provided by Stork Ketels, The Netherlands.
- 10.9. Developing **Detailed Process Design** for Gas Separators (for separating associated gas and free water from crude oil) for the Gathering Station of Kuwait Oil Company, Kuwait sub-contracted from the equipment supplier, KREMENCO, Kuwait.
- 10.10. Providing **Design and Engineering Services** for the Acid Washing System in the Salt & Chlorine plant of Petrochemical Industries Company, Kuwait, sub-contracted from the EPC contractor, Abdul Aziz Yousuf Al-Essa, Kuwait.
- 10.11. Providing **Design and Engineering Services** for the ‘Replacement of Water and Gas Networks at Ahmadi’ for Kuwait Oil Company (KSC) together with Jaseem Qubazard Engineering Consultants under the subcontract of United Gulf Construction Company (UGCC), Kuwait.
- 10.12. **Design & Engineering** of Tanks for M/s Al Bucheeri Engg. Services, UAE

11.0. ADDRESSES & KEY PERSONNEL

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