POWER PLANT DESIGN & ENGINEERING
CONSULTANCY HOUSE

POWER PLANT DESIGN

OPERATION & MAINTENANCE SERVICES

ENVIRONMENTAL IMPACT ASSESSMENT

3D MODELLING OF POWER PLANTS

ISO 9001: 2008
Certificate No: P-BC1Q/I/1615

46 Years of proven track record
DESEIN - EXPERIENCE

Complete Engineering (Concept to Commissioning): >30,000 MW

<table>
<thead>
<tr>
<th>Services Rendered</th>
<th>No. of Projects</th>
<th>Cumulative MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feasibility Studies/DPR</td>
<td>201</td>
<td>1,11,280</td>
</tr>
<tr>
<td>Complete Engineering</td>
<td>130</td>
<td>30,646</td>
</tr>
<tr>
<td>Environmental Impact Assessment</td>
<td>77</td>
<td>53,880</td>
</tr>
<tr>
<td>Operation &amp; Maintenance</td>
<td>8</td>
<td>2,776</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gas based Simple/Combined Cycle Plants</th>
<th>No. of Plants</th>
<th>Cumulative MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>301-400 MW</td>
<td>2</td>
<td>704</td>
</tr>
<tr>
<td>201-300 MW</td>
<td>2</td>
<td>461</td>
</tr>
<tr>
<td>101-200 MW</td>
<td>5</td>
<td>607</td>
</tr>
<tr>
<td>&lt; 100 MW</td>
<td>13</td>
<td>831</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coal/Lignite Fired Plants</th>
<th>No. of Units</th>
<th>Cumulative MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 MW (Super Critical)</td>
<td>2</td>
<td>1,600</td>
</tr>
<tr>
<td>660 MW (Super Critical)</td>
<td>4</td>
<td>2,640</td>
</tr>
<tr>
<td>600 MW</td>
<td>7</td>
<td>4,200</td>
</tr>
<tr>
<td>500 MW</td>
<td>4</td>
<td>2,000</td>
</tr>
<tr>
<td>300 MW</td>
<td>3</td>
<td>900</td>
</tr>
<tr>
<td>250/210/195 MW</td>
<td>43</td>
<td>9,480</td>
</tr>
<tr>
<td>165/135/125/110 MW</td>
<td>39</td>
<td>4,835</td>
</tr>
<tr>
<td>&lt;100 MW</td>
<td>75</td>
<td>2,388</td>
</tr>
</tbody>
</table>

Total: 2,603

Total: 28,043

AN ENGINEERING TEAM WITH OVER 20 MILLION MAN-HOURS OF EXPERIENCE IN ENGINEERING, CONSTRUCTION AND OPERATION & MAINTENANCE OF POWER PLANTS IN INDIA AND ABROAD.

Over 560 power engineers in a multi-disciplinary team.

Over 40% of the engineers have over 15 years of experience in the power sector.

DESEIN - METHODOLOGY

Geographical Info System (GIS) Mapping is done to optimize land requirement, land use pattern, site selection and understand Environment Sensitivity.

DESEIN uses state-of-the-art software to optimise the Thermal Cycle.

Main Plant Building is analyzed and designed using latest softwares.

3D Models of the Plant are developed to check interference and to work out the schedule of quantities.

WHAT WE DO

DEVELOPMENT STUDIES
- Site Selection
- Techno-Commercial feasibility Studies
- Environmental Impact Assessment Studies
- Detailed Project Report
- Geo-Technical Investigation
- Review of PPA/PSA

BASIC ENGINEERING
- Plot Plan
- Design Basis Report
- Specification of Main Plant
- Specification of BOP
- Techno-Commercial Evaluation of Bids

DETAILED ENGINEERING
- P & IDs
- Layouts & GA Drawings
- Bill of Quantities
- Vendor Print Review
- Construction Drawings
- 3D Modelling
- As built drawings

PROJECT MANAGEMENT
- Planning and Scheduling
- Inspection
- Construction Supervision
- Erection Supervision
- Commissioning Supervision

OPERATION & MAINTENANCE

MECHANICAL SOFTWARE
- CAESAR II
- Steam Pro/Steam Master
- GT Pro/GT Master
- Solid Works
- AVIVA
- Plant Design System (Integraph, USA)
- Bentley’s AutoPLANT Design Software

CIVIL SOFTWARE
- ANSYS
- NISA
- STAAD PRO
- MATH CAD
- CIVIL 3D
- REVIT STRUCTURE

ELECTRICAL SOFTWARE
- ETAP
- AutoPLANT

PROJECT
- PRIMAVERA
- MS Project

DRAUGHTING & VECTORIZATION
- AUTOCAD Rel. 2011
- MICROSTATION-J
- I-VECTOR
DESEIN - A LEADER

DESEIN is India’s leading Engineering Power Plant Designer with a track record of 46 years.
Power Plant Design is driven by it’s expertise & experience of the Thermal Cycle. DESEIN Conceptualizes the complete life cycle of the project—Project feasibility, Detailed Engineering, Operation & Maintenance and Renovation & Maintenance.
DESEIN has worked on different fuels such as Gas, Coal, Lignite, Washery Rejects, Renewables and Waste heat recovery.
DESEIN works with CFBC, AFBC and Pulverised fuel boilers and Non-reheat and Reheat turbines.
DESEIN works with International Vendors located in USA, Europe, Japan, China etc.

MAJOR ONGOING PROJECTS

UTILITY PROJECTS
- 2 x 800 MW (Supercritical) Krishnapatnam Thermal Power Project, APPDCL
- 2 x 660 MW (Supercritical) Raghunathpur Thermal Power Station, DVC.
- 2 x 660 MW (Supercritical) Thermal Power Station, Chattisgarh, DB Power.
- 1X600 MW Ennore Thermal Power Station Annexe, TNEB.
- 330 MW Dholpur Combined Cycle Power Project, RRVUNL
- 100 MW Tripura Combined Cycle Power Project, NEEPCO

DEVELOPMENTAL & ENVIRONMENTAL IMPACT ASSESSMENT PROJECTS
- 4000 MW Orissa Ultra Mega Power Project Sundergarh
- 4000 MW Chattisgarh Ultra Mega Power Project Surguja
- 4000 MW Andhra (2nd) Ultra Mega Power Project Prakasam
- 3300 MW Dondalcha Thermal Power Project Dhule, Maharashtra (EIA ONLY)

DPR PROJECTS
- Madhya Pradesh Power Generating Co. Ltd. - Bansagar TPP-2x800 MW(Supercritical)
- Indian Railways- Adra TPP- 2X660 MW (Supercritical)

OPERATION & MAINTENANCE PROJECTS
- 2 X 20 MW Power Plant in UAE
- 1 x 27 MW & 1 x 21.5 MW Captive Power Plant for Dalmia Cement
- 1 X 24 MW & 1X 18 MW Bagasse-based Co-gen Power Plant for Godavari Sugar.
- 2 x 15 MW Captive Power Plant for Indorama Synthetics (India) Ltd.
- Monnet Power Co. Ltd.-Mahalibrahmini Ext at Orissa, 1x660 MW(Supercritical)

OTHER MAJOR POWER PROJECTS UNDER EXECUTION

OWNER'S ENGINEER
RAYALASEEMA IV (1x600 MW)
KVK NILACHAL (1x300 MW)
SATPURA (2x250 MW)
PARLI (1x250 MW)
LIGNITE BASED POWER PLANT OF JSW AT BARMER (8 x 135 MW)
BARAUNI (2x250 MW)
ACTION ISPAT CPP (2 x 43 MW)
BIRLA CORPORATION LTD. CHANDERIA & SATNA CPP (1x35 & 1x35 MW)

DEVELOPMENTAL & EIA
- GIDDERBAHA, PUNJAB (2640 MW)
- EIA KORADI, MAHARASHTRA (1980 MW)
- DPR SATTUPALLY (1x600 MW)
- BANJI-BUNDALI (2x250 MW)
- DHOLPUR CCPP STAGE-II (330 MW)

SOME COMPLETED POWER PROJECTS

OWNER'S ENGINEER
HISSAR (2x600 MW)
CHANDRAPUR (1x500 MW)
KAKATIYA-I (1x500 MW)
YAMUNA NAGAR (2x300 MW)
KOTHAGudem-V & VI (2x250 MW + 1x500 MW)
VIJAYAWADA-II, III & IV (2x210 MW + 2x210 MW + 1x500 MW)

RAYALASEEMA-I, II & III (2x210 MW + 2x210 MW + 1x500 MW)
RAICHUR III (2x210 MW)
ROPAR-II & III (2x210 MW + 2x210 MW)
PARLIB PARAS (1x250 MW + 1x250 MW)
PARICHHAI-I & II (2x110 MW + 2x110 MW)
PANIPAT-II & III (2x110 MW + 2x110 MW)
AKRIMOTA (LIGNITE BASED) (2X125 MW)
GIRAL (LIGNITE BASED) (1x125 MW + 1x125 MW)
2X800MW Supercritical, Sri Dammadom Sanjeeviah Thermal Power station of APPDCL.
DESEIN - Owner's Engineer

4000 MW Sasang UMPP- Sasang is the first UMPP project of the Govt. of India, which envisaged tariff based bidding.
DESEIN undertook the study on behalf of PFC for all pre-bid issues, environment, project location, water, land, fuel etc.

Rayalaseema Thermal Power Project comprises of Stage-I (2X210MW)
Stage-II (2X210MW)
Stage-III (1X210MW)
Stage-IV (1X600MW)
DESEIN - Owner's Engineer for all stages including detailed engineering for stages I, II & III and review engineering for Stage IV

One of the earliest Combined Cycle Power Plant - Vijeshwaram Gas Thermal Power Station Stage-1 (100 MW)
DESEIN - Owner's Engineer

SOME COMPLETED SIMPLE/COMBINED CYCLE POWER PLANTS

<table>
<thead>
<tr>
<th>OWNER’S ENGINEER</th>
<th>REVIEW ENGINEERING</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTRAN (374 MW)</td>
<td>JAZAN, SAUDI ARABIA (325 MW)</td>
</tr>
<tr>
<td>Jegurupadu (231 MW)</td>
<td>TIHAMA, SAUDI ARABIA (130 MW)</td>
</tr>
<tr>
<td>Samalkot (230 MW)</td>
<td>SHAROURAH, SAUDI ARABIA (51 MW)</td>
</tr>
<tr>
<td>Hazira (156 MW)</td>
<td></td>
</tr>
<tr>
<td>Utran (135 MW)</td>
<td></td>
</tr>
<tr>
<td>Rithala (108 MW)</td>
<td></td>
</tr>
<tr>
<td>Dhuvaram (107 MW)</td>
<td></td>
</tr>
<tr>
<td>Kuttalam (101 MW)</td>
<td></td>
</tr>
<tr>
<td>Vijeswaran (100 MW)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOME COMPLETED CAPTIVE POWER PLANTS

| COAL BASED            |               |
| JINDAL STEEL & POWER  | (2x20+4x15+1x70 MW) |
| GRASIM CEMENT         | (1x25 MW) |
| HINDUSTHAN NEWSPRINT  | (1x25 MW) |
| KANORIA CHEMICALS     | (1x25 MW) |
| SHRIRAM FERTILIZERS   | (1x30 MW) |
| NATIONAL FERTILIZERS  | (2x15 MW) |
| NAVA BHARAT FERRO ALLOYS | (1x50 MW) |

| MONNET (2x37.5 MW) |
| JAYPEE (1x27 MW)   |
| PT INDO BHARAT RAYON, INDONESIA (2x10 MW) |
| BAGASSE FIRED      |
| GODAVARISUGAR MILLS (1x24 + 1x20 MW) |
| BIOMASS BASED      |
| UNIVERSAL ENERGY (1x25 MW) |
| BIOMASS UNIVERSAL (1x15 MW) |
| LIGNITE BASED       |
| BIRLA COPPER (1x24.5+1x10.5 MW) |
| DIESEL BASED -      |
| INOX POWER (42 MW)  |
| GAS BASED           |
| HINDUSTHAN ZINC (80 MW) |

THE DESEIN ADVANTAGE

- An Engineering Team with 20 million man-hours of experience in engineering, construction and operation & maintenance of power plants in India & abroad.
- Developed Ultra Mega Projects at Sasan, Akaltara, Kothapeta, Tilaya, Sundergarh (All 4000 MW each) and at Talwandi Sabo (4x500 MW), Rajpura (2x660 MW): All Pre-bid issues- EIA, DPR, Site Survey etc.
- Major Public Sector Clients- APGENCO, BSEB, BHEL, CSPGL, DVC, GSEC, GMDC, HPGL, KPCL, MAHAGENCO, MPPGL, NLC, OPDC, OSEB, RRVU, TNEB, UPURVU, WBPDCL...
- Major Private Sector Clients- Birlas, Bhushan Steel, Dalmia Cement, Godavari Sugar Mills, GVK, Indorama, Jindals, Lanco, Monnet, Nav Bharat, Reliance, SV Power, Tatas, Vandana Vidyut, Visa Steel...
- Engineered a large number of Captive Power Plants based on coal, lignite, bio-mass, bagasse etc.
- Operation & Maintenance Services for 4X120 MW Homs Power Plant & associated Desalination Plants in Libya for 3 years- Currently providing similar services for 4 power plants.
- Worked with world’s leading manufacturers of Main Plant & Equipment - Ansaldo, Alstom, Dongfang, Siemens, Shanghai, BHEL...
- Worked with Global Players- Black & Veatch, CH2M Hill, J-Power, SNC Lavalin.
### CUSTOMER CONFIDENCE

<table>
<thead>
<tr>
<th>FIRST ORDER</th>
<th>REPEAT ORDER</th>
<th>FIRST ORDER</th>
<th>REPEAT ORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROPAR STAGE-II</td>
<td>STAGE-III</td>
<td>PANIPAT STAGE-II</td>
<td>STAGE-III</td>
</tr>
<tr>
<td>VIJAYAWADA STAGE-II</td>
<td>STAGE-II,III&amp;IV</td>
<td>KUTCH LIGNITE STAGE-I</td>
<td>STAGE-II,III&amp;IV</td>
</tr>
<tr>
<td>RAYALASEEMA STAGE-I</td>
<td>STAGE-II,III&amp;IV</td>
<td>GIRAL STAGE-I</td>
<td>STAGE-II</td>
</tr>
<tr>
<td>KOTA STAGE-I</td>
<td>STAGE-III</td>
<td>UTRAN STAGE-I</td>
<td>STAGE-II</td>
</tr>
<tr>
<td>PARLI &amp; PARAS STAGE-I</td>
<td>STAGE-II</td>
<td>PARICHHA STAGE-I</td>
<td>STAGE-II</td>
</tr>
</tbody>
</table>

### DESEIN - HANDS ACROSS THE GLOBE

- **2x20 MW Power Plant, UAE**
  - First Coal-based thermal plant in the middle-east.
  - Complete engineering & O&M by DESEIN

- **DESEIN**
  - Was responsible for the Owner’s Engineering of Yamunanagar Unit 1&II of HPGCL (2x300MW) which included Chinese equipment.
  - BTG by Shanghai Electric Corporation.
  - DESEIN was responsible for carrying out the PG test on behalf of HPGCL and successfully carried out the test with Indian Coal

- **CH2M HILL**
  - The world’s largest water company and DESEIN set up a Dedicated Resource Centre and provided 250,000 man-hours of engineering for water and waste water projects in Australia, Canada, Singapore, Thailand, UAE, US etc.

- **4X120 MW HOMS Power Station, Libya**
  - DESEIN executed the complete O&M of the HOMS power station in Libya for 3 years.

### OTHER INTERNATIONAL ASSIGNMENTS

- **Bangladesh**
  - Site Supervision for Installing a 120 tph boiler for Zia Fertiliser Corporation

- **Bhutan**
  - Sub-transmission & Distribution system study of Phuntsholing town

- **Indonesia**
  - Owner’s Engineer for 2x10 MW CPP of P.T. Indo Bharat Rayon

- **Nigeria**
  - Feasibility report for 105 MW CCPP at Ago-Oja, Ilorin Kwara State

- **Pakistan**
  - Feasibility Study for 1x60 MW Cogeneration Power Plant for Al-Abbas Sugar Mills

- **UAE**
  - O & M of 2x20 MW Coal Fired Power Plant
  - Feasibility Study of 2x300 MW Coal Fired Power Plant

- **Saudi Arabia**
  - Review Engineering & Project Management Services for Simple Cycle Power Plants at Jazan (325 MW), at Tihama (130 MW) and Sharourah (51 MW)
  - Generation Optimization Studies
  - Distribution system study for Jubail area
  - Preparation of unified O&M manuals for SCE Co.
  - Review of Basic Design for Saudi Consolidated Electric Co.

- **Thailand**
  - Pre-bid Engineering Services for SNC Lavalin for a 150 MW Combined Cycle Power Plant