

Mission critical power plants

EPC - MEP & FP, HVAC capabilities

www.neptunus-power.com

Neptunus Power Plant Services Pvt. Ltd.

The Context



- Bigger and faster data centers
- Higher reliability expectations from mission critical utilities like the DG Backup Power Plant
- Key risk faced - delayed response from DG sets

The Neptunus Way



Our design philosophy: design that works

Created from an operator's perspective

- 23+ years in O&M leads to life-cycle considerations
 - Practical user considerations
 - Opex vs Capex considerations
 - Long term benefits

Data Center Project Case Study



- Greenfield data center facility at Navi Mumbai
- 16 Data Halls X 1080 KW
- Highly resilient and scalable facility with 32 MVA of Grid Power
- Mission critical backup power supply through DG sets
- Uptime Institute Tier III Certified
- Designed to an efficient PUE of 1.6 under adverse ambient conditions
- Global best practice operations and maintenance

Scope of Neptunus' Work



- Complete **Design Engineering** of
 - 21 nos x 2 MWe, 11 kV Diesel engines based backup power plant
 - 5 x 125 kL HSD tank yard and fuel management system
 - Acoustic solution for entire DG room
 - Stand alone chimney exhaust, ventilation
 - Load bank to ensure that engines can be regularly tested
- **Specification, tendering & negotiations** for procurement
- **Supervision of Erection and Commissioning** of the above facilities

Power Plant Composition

Engine Room #1

11 units of
open skid configuration
prime duty radiator cooled
2.5 MVA, 11 kV DG sets

Engine Room #2

10 units of
open skid configuration
prime duty radiator cooled
2.5 MVA, 11 kV DG sets

HSD Tank Yard

125 kL X 5 units of
underground tanks for
fuel storage alongwith
the fuel management
system

Inherent Design Challenges



- Ventilation system: only one side of room had access for inlet and exhaust air, which is covered by the building facade for aesthetic purposes.
- Acoustics: The conference room and board meeting room of the main office block is situated adjacent to the engine rooms

Value Creation #1

Objective

Approach

**Value
Creation**

Optimize the procurement of critical capex item

Client trusted Neptunus for procurement of DG engine sets due to our 23+ years of experience in engines and seeing no conflict of interest in favor of a particular brand

Helped the client over entire procurement cycle from designing the tender specs with BoQ, to the techno-commercial evaluation and finally the recommendation.

Single handedly managed negotiations

Saved ~INR 6.5 cr from target price for first 7 DGs saving in high side package (DG & accessories)

Saved ~INR 9 cr in low side package after technical discussion without compromising tender specifications and quality.

Value Creation #2



Ease of operation & maintenance over the operating life-cycle of the plant

The PMC & architects insisted tighter placement of generators

Neptunus took a practical consideration & stayed firm on recommended distance in view of operator friendly design

Convinced the client, PMC & architects by giving them detailed operational objections

Lowering the operating risk

Foreseeing operations and maintenance needs in future

Example - if the radiator had to be removed, it would need that minimum distance

Value Creation #3



Piping design optimization

Designed the fuel pipeline by focussing on its operational ease and economy by routing pipelines which were easy to use and maintain.

Addressed the queries of PMC related to higher space occupancy by giving them detailed operational objections.

Lowering safety hazard of fuel leakage and risk of downtime

Fire safety features for individual DG day tank: fusible link which melts in the event of fire and transfer entire diesel to storage.

Isolation of fuel supply lines for individual DGs

Value Creation #4

Objective

Approach

**Value
Creation**

Comply with the critical occupational health & safety requirement

The inherent project design challenge required limiting the “noise” levels due to engine operations within 45 dba max in the adjacent conference & board rooms

Neptunus strongly recommended double brick wall partition and convinced the client & architects on the technical & operational superiority of this solution

Lowering the compliance risk and enhancing safety and productivity of people

During the engine operations, lower noise levels would ensure comfort and productivity

Value Creation #5

Objective

Approach

**Value
Creation**

**Efficient fuel
management**

Tank yard design is compliant to the CCOE norms.

Incorporated a 'fuel polishing system' at the fuel intake point to minimize the impact of fuel contamination

Optimized the space available and made provision for uploading fuel from two tankers simultaneously in an emergency condition.

**Enhancing the operational
efficiency**

Addressed issue of fuel contamination in underground storage tank.

Will improve efficiency of engine and lower operational cost by avoiding frequent cleaning of sedimentation in the tank

Value Creation #6

Objective

Approach

**Value
Creation**

**Overcoming
inherent
design
limitations
w.r.t.
Ventilation
system**

Challenge faced - only one side of room have access for inlet and exhaust air.

Designed the ventilation system with inlet fresh air from 2nd floor level and exhaust hot air from ground level.

Maintained 22 meters gap between two different air cycle with ventilation analysis and simulation with CFD analysis.

Structural design optimization

Avoided mixing hot and cold air (short cycling) of ventilation w.r.t. 11 nos. DG set in one room.

Noise attenuation with adding noise silencer in exhaust air duct.

Avoided ceiling suspended mounting of 22 ventilation fans. Designed a specialized steel mezzanine structure for this which also supports DG cable tray & silencers

About Neptunus



- **23+ years** in the business of delivering reliable solutions
- More than **2000 assignments** completed
- A strong & committed team of **~100 people**
- Serving customers in **25 countries** across Europe, Asia & Africa
- HQ & workshop in India & warehouse in Middle East

Our Solutions



#1 EPC & Turnkey Solutions



#2 Operations & Maintenance



Capabilities to deliver integrated solutions,
ready for **Industry 4.0** using
IIoT and Cloud-based Remote Monitoring

#1 Turnkey Solutions



Diesel, Gas, Biogas
as well as **dual-fuel**
powered engines

- **Greenfield** Projects
- **Brownfield** Projects
 - Refurbishment, Rebuilding,
 - Repowering,
 - Shifting of existing units

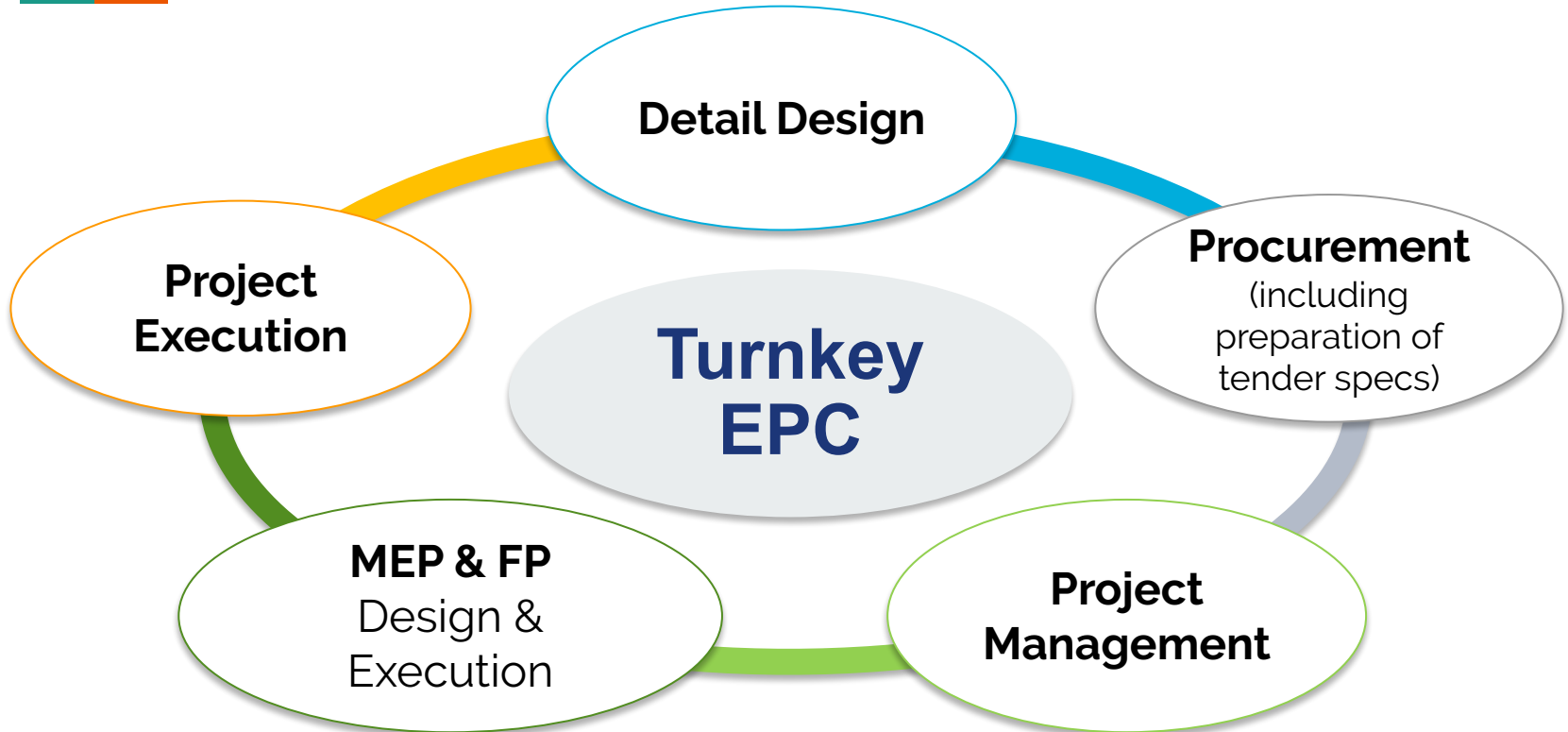
**Detailed
Design &
EPC of
back-up/
captive
power
plants**

A light gray diamond-shaped graphic with a black outline, containing the text "Detailed Design & EPC of back-up/captive power plants" in a bold, black, sans-serif font.

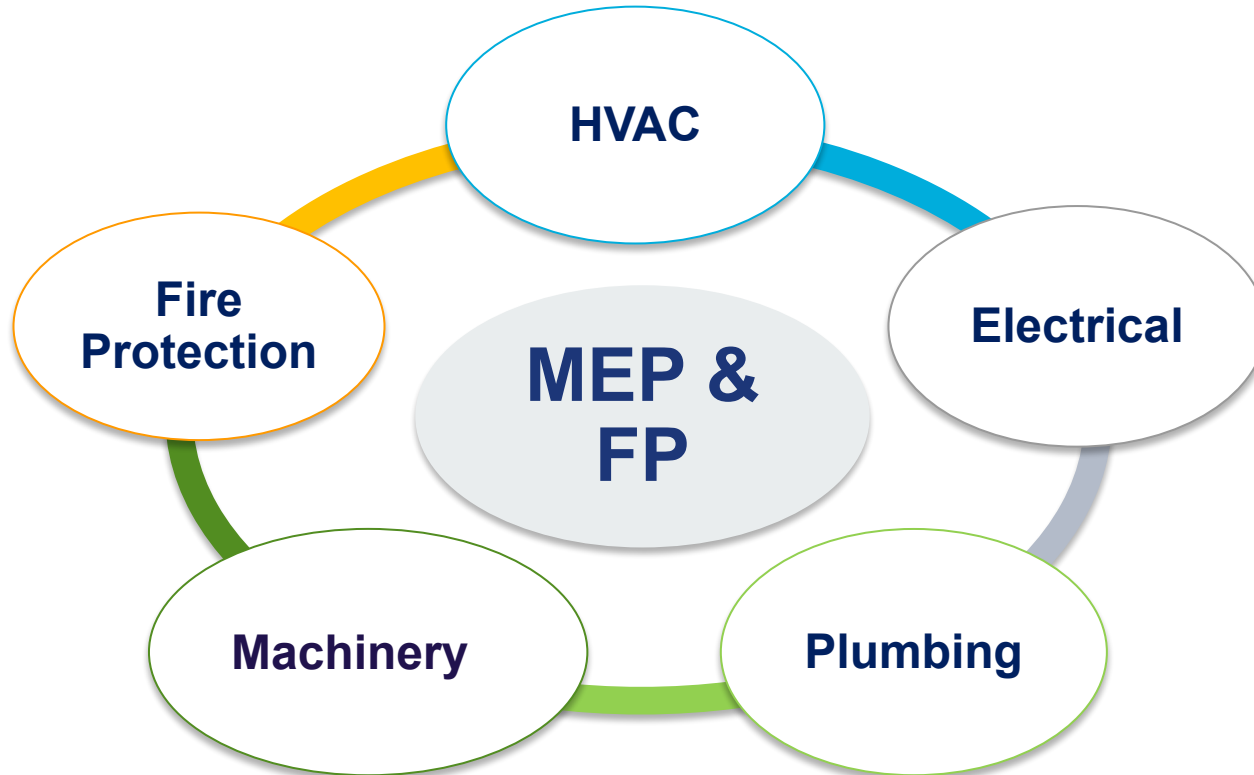
- Waste to Power
- Biogas based Power
- Cogen Plant
- Trigen Plant

- Data Centers
- Engine Test Cells
- Industrial CPPs
- Oil Rigs & platform supply vessels

EPC



MEP+FP



#2 Operations & Maintenance



Condition based maintenance

- Condition Monitoring & predictive analysis with Torsional Vibration measurement.
- Earliest warning systems anywhere in industry.
- **Equivalent to detecting cancer at Stage 0.**
- **Applications:** Engine, Motor, Pump, Bearing, Gearbox etc.

Oil monitoring & management

- On-line monitoring of oil quality
- Advance Filtration Solutions
- **No need to change lube Oil!**

Engine life-cycle management

- Authorised distributors & service partner for diesel engines of Niigata Japan and EMD USA (a Caterpillar company)
- Extensive experience in repair & service of all leading makes of engines like CAT, Cummins etc.

Remote monitoring of all critical plant assets!

List of Completed Projects



- **Tier III data center, Mumbai - Design and PMC Services of 41 MW Power backup plant**
 - DG set and accessories
 - Room Ventilation system
 - DG room Acoustic treatment
 - Chimney exhaust system
 - Fuel tank yard and fuel management system
- **Existing Data Centre, Pune**
 - Brownfield project - Redesign of underground fuel storage & management system

List of Completed Projects



- **Kenya Navy : Engines Test Cell Project, Mombassa, Kenya**
 - Set up a 4100 kW dyno based test cell for testing of multiple naval engines.
 - Greenfield project with a challenging concept since there was no reference / benchmark available for any such facility. We understand that this is the only of its kind project set-up for any navy establishment
- **NATCO, Yemen**
 - Brownfield project - conversion of gas based engine power plant to diesel engine power
- **MCCPTA, Haldia, West Bengal**
 - Greenfield project - 4 x 6 MW HFO based power Plant for Captive generation, using Niigata 750 rpm engines
 - EPC project: Engine room ventilation system, Room acoustical solution, HFO management system, Chimney stack, control panels

List of Completed Projects



- PMC services to set up new **Data Center, Mumbai**
- **ONGC**, Heera Platform, Bombay High
- **MCCPTA**, Haldia, West Bengal
- **Pioneer Distilleries**, Nanded
- **Riddhi Siddhi Glycols**, Gokak
- **Maize Products**, Ahmedabad
- **Surat Municipal Corporation**
- **Spectrum Dyes**, Surat
- **Somany Tiles**, Ghaziabad
- **Jaipur Municipal Corporation**
- Over 15 installations of diesel/gas powered Captive Power Plants

Value System



Teamwork



Safety



Integrity



Excellence



Accountability



**Stakeholder
Delight**

Certifications & Awards



- ISO 9001:2015 certified by LRQA
- Rated BBB long term and A2 short term by ICRA and Crisil
- Featured, "Leading SMEs of India 2017" by Dun & Bradstreet and RBL Bank
- Awarded the India SME 100 Award by the Government of India by the Ministry of MSME and Axis Bank in 2016

Global Partners



Triple R
Stakeholder
Delight



You can count on us for delivering reliable solutions!

For more details, contact **Neptunus Power Plant Services Pvt. Ltd.**

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