



New Environmental Norms on Particulate Matter for Thermal Power Generation

Challenges...TPPs(Units) shall meet the limits with in two years from the date of notification...07-12-2015



- Units installed **before 31st December 2003--100mg/Nm³**
- Units installed after **1st Jan 2003,upto 31st Dec,2016--50mg/Nm³**
- Units **to be installed from 1st Jan,2017--30mg/Nm³**
- **Norms till 07-12-2015—100mg/Nm³**

Technology....BHEL capability



- **Electrostatic precipitator (ESP)**
- **Fabric Filter**
- **Hybrid ESP (ESP + Fabric Filter combination)**
- **ESP with Ammonia Flue Gas Injection System**

BHEL capacity...



- *Successfully executed green field ESPs meeting 30mg/Nm³ emission level.*
- **Have vast experience and expertise in design, manufacture, supply, erection & commissioning of retrofit job orders(>150ESPs) since 1993, in various TPPs meeting the guaranteed emission norms as per customer specification.**
- Executed fabric filter orders successfully.
- Can offer Hybrid ESP (ESP + Fabric filter combination) to meet the stringent emission norms.
- Commissioned AFGCS along with ESP, achieving significant emission reduction.

BHEL's ESP Reference



APPLICATION	NO. OF PROJECTS	NO. OF ESPs
UTILITY BOILERS - PF Fired - 15 to 660 MW	447	1134
INDUSTRIAL BOILERS – CPP, VU40, Stoker, etc	104	134
AFBC BOILERS – 25 to 165 TPH	57	57
CFBC BOILERS – 30 to 250 MW	18	33
CHEMICAL RECOVERY BOILERS – 75 to 900 TPD	46	70
OIL FIRED BOILERS -125 MW	3	3
BIOMASS – Upto 20 MW	50	50
CEMENT	16	16
STEEL	11	13
GLASS FURNACE	2	2
LIME KILN – 170 TPD - Paper plant	1	1
REFRACTORY - Magnetite	1	1
TOTAL	746	1514

Retrofit ESPs Supplied by BHEL



Sl. No.	UNIT RATING	No. OF UNITS
1.	200 MW & Above	8
2.	100 MW to 120 MW	45
3.	LESS THAN 100 MW	48
4.	INDUSTRIAL BOILERS	31
5.	CEMENT & MAGNESITE	14
6.	IRON & STEEL	3
7.	CHEMICAL RECOVERY	3
	TOTAL	152

BHEL's proven methodology....



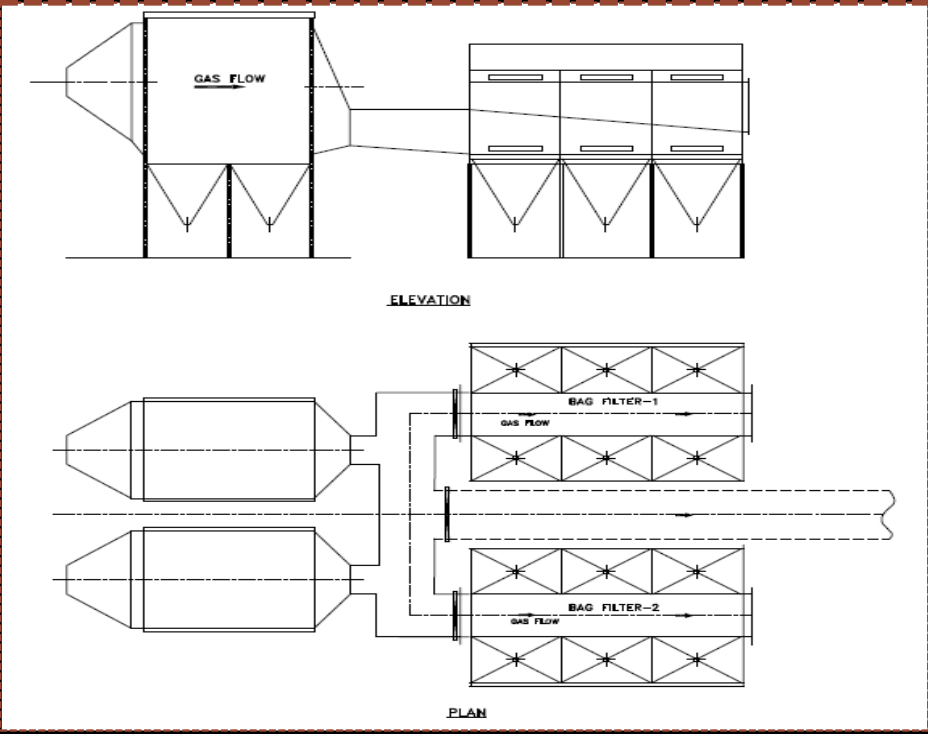
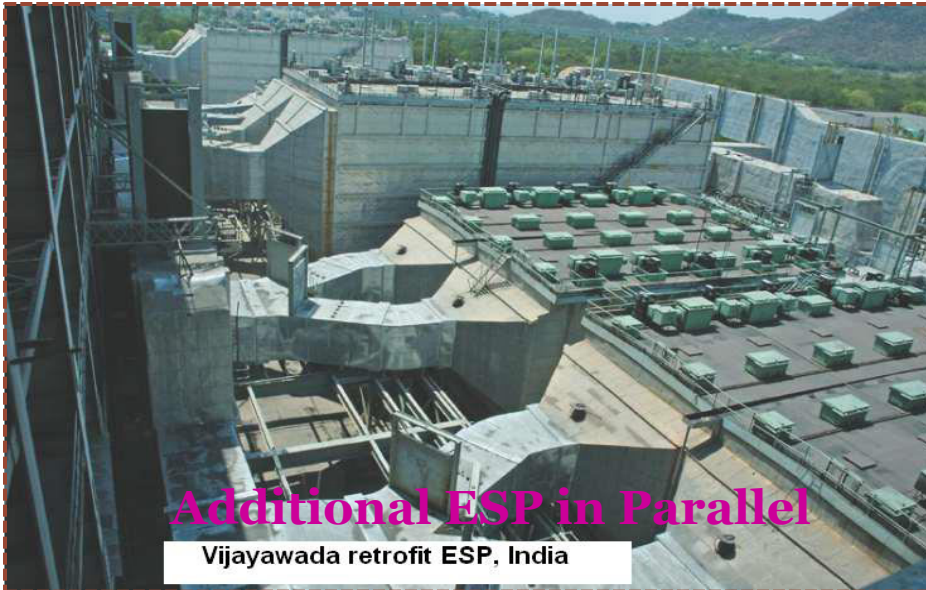
Retrofitting methodology includes:

- ✓ Additional ESP in series or Parallel.
- ✓ Addition of ESP fields either or both at leading/trailing ends of existing ESPs.
- ✓ Increasing the existing height of ESP to enhance collection area.
- ✓ Replacement of ESP internals within the existing ESP chamber enhancing collection area.
- ✓ Envisaging state of the art controllers for sustained ESP performance.
- ✓ Envisaging AFGCS apart from the ESP retrofitting.
- ✓ Hybrid ESP (Combination of ESP and Fabric Filter)

BHEL capacity/Capability/Experience...Retrofit of ESPs



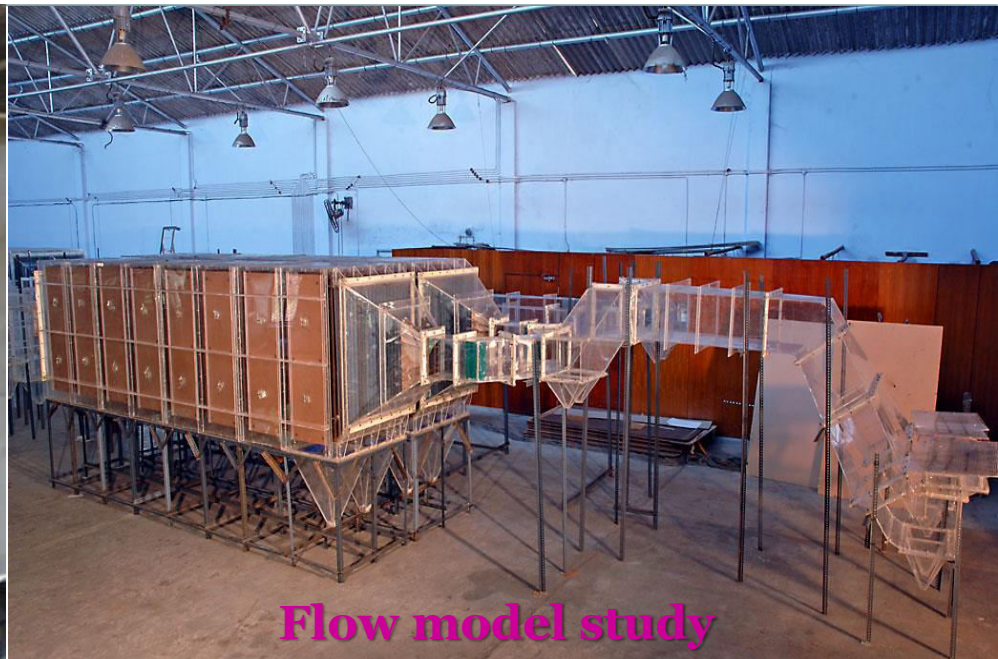
- Dedicated team for conducting performance evaluation test(PET) and layout study.
- Highly potential design, manufacture, erection & commissioning team.
- CFD modeling for the additional ESP Passes ensuring uniform flow distribution and use of existing ID fans.
- Flow model study lab for uniform flow distribution.
- State of art ESP controllers to achieve desired performance in existing ESP fields also and to reduce the overall emission to the design level.



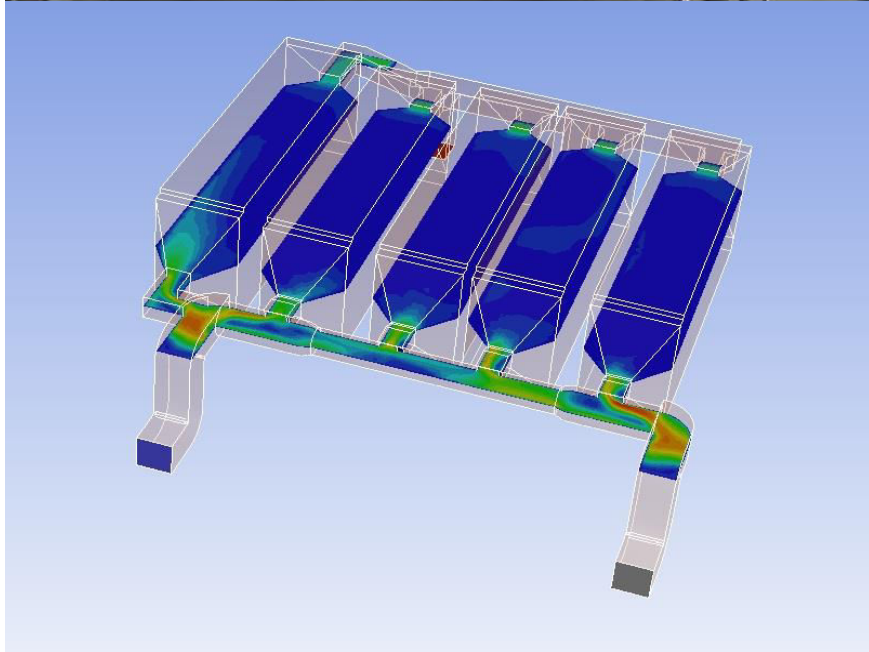
Hybrid ESP (Combination of ESP+Fabric filter)



Ammonia injection system



Flow model study



CFD modeling of retrofit layout



State of the art micro controllers



BHEL is committed and assures to provide best suited technical solutions meeting the emerging challenges for better environment and cost effective with the most efficient use of available resources in terms of Space, Land, time schedule and capital etc.



Thank You