



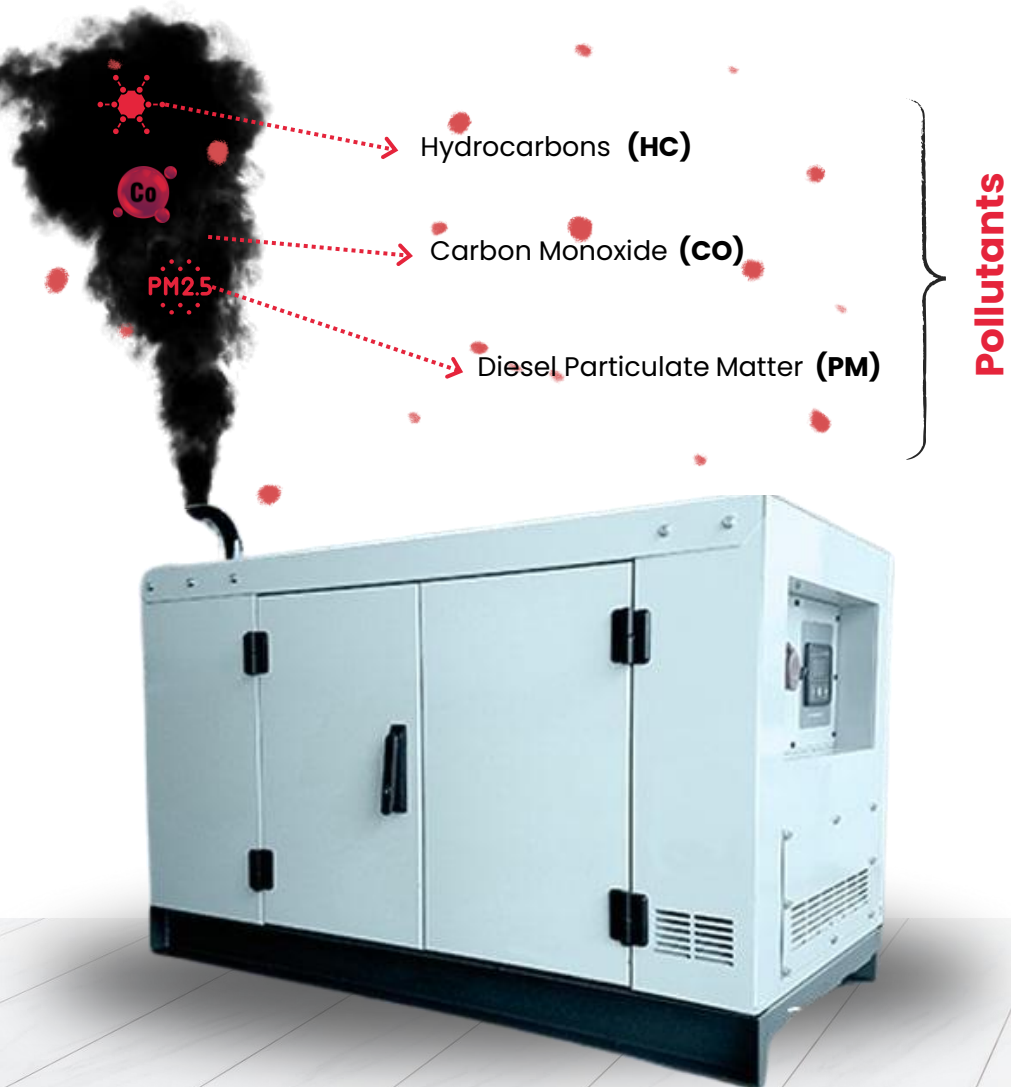
CHAKR INNOVATION

Materializing a cleaner Reality

www.chakr.in

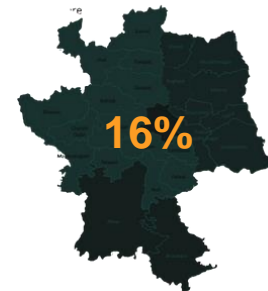
Diesel Generators

Major Contributors upto **18%** of Urban Air Pollution in Indian Cities



Global Warming potential for PM is **460** times that of CO₂

Impact of Diesel Generators on PM2.5 Levels



Delhi NCR



Bangalore



Chennai



Government Measures

Expanding Access to Cleaner Energy Resources

GOOD NEWS!

The Ministry of Environment, Forest and Climate Change, Government of India, launched the National Clean Air Programme (NCAP) on 31st December 2018.

Following this, the National Green Tribunal mandated using a Retrofit Emission Control Device (RECD) to reduce air pollution from diesel generators.

Sl. No.	Component/Activities	Level for Funding	Level For Implementation	Agencies	Timeline (Year)
1.8.9	For the DG sets already operational, ensure usage of either of the two options: (i) Use of retrofitted emission-control equipment with a minimum specified PM-capturing efficiency of at least 70%, type approved by one of the five CPCB-recognized labs. (ii) Shifting to gas-based generators by employing new gas-based generators or retrofitting the existing DG sets for partial gas usage.	State	City/State	SPCB, CPCB	2022

20. We note that the air pollution caused by DG Sets needs to be part of the action plans which may, if necessary, require retrofitting of emission-control devices on generators already in use. CPCB may consider this aspect. The NCAP itself provides following action points:

1. Introduction of gaseous fuels and enforcement of new and stringent SO₂- NO_x /PM_{2.5} standards for industries using solid fuels.
2. Stricter enforcement of standards in large industries through continuous monitoring.
3. Full enforcement of zig-zag brick technology in brick kilns.
4. Elimination of DG set usage by provision of 24x7 electricity.
5. Control by innovative end of pipe control technologies.
6. Evolve standards and norms for in-use DG sets below 800 KW category.
7. For DG Sets already operational, ensure usage of either of the two options: (a) use of retrofitted emission control equipment having a minimum specified PM capturing efficiency of at least 70%, type approved by one of the 5 CPCB recognized labs; or (b) shifting to gas-based generators by employing new gas-based generators or retrofitting the existing DG sets for partial gas usage
8. Utilize the Gujarat case study for a compelling case for other states to adopt third-party audits for polluting industries for enhancing implementation(States)."

Thus, DG Sets should also be covered by the action plans for all the States/UTs.




Chakr Shield


Retrofit Emission Control Device (RECD)

 **Powerup
Without
Polluting
Down**



 **4000+**
Successful Installations across India

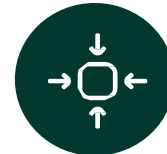
 **1000+**
Happy Customers across India

 **2**
State of the art Manufacturing
Plant at Pune & Gurugram

 **40000 tonnes**
Of CO₂ equivalents has been
reduced till now



Low Maintenance



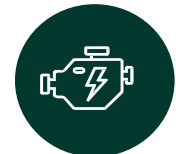
Modular & Compact



Long Product Life



No by Product



No Adverse Impact on
Engine



Chakr Shield

Working Principle, An Innovative Technology for Cleaner Air

Stage 1

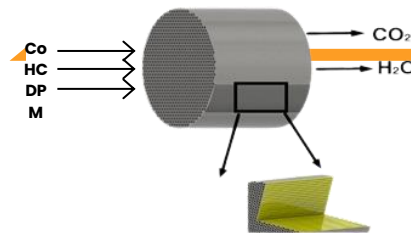
Uniformity Generator

The design has been developed using extensive Computational Fuel Dynamics. Achieves high uniformity index while minimizing pressure drop.

Stage 2

Oxidation

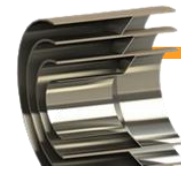
A substrate with proprietary catalytic material accelerates reactions, converting them into Cleaner air.



Stage 3

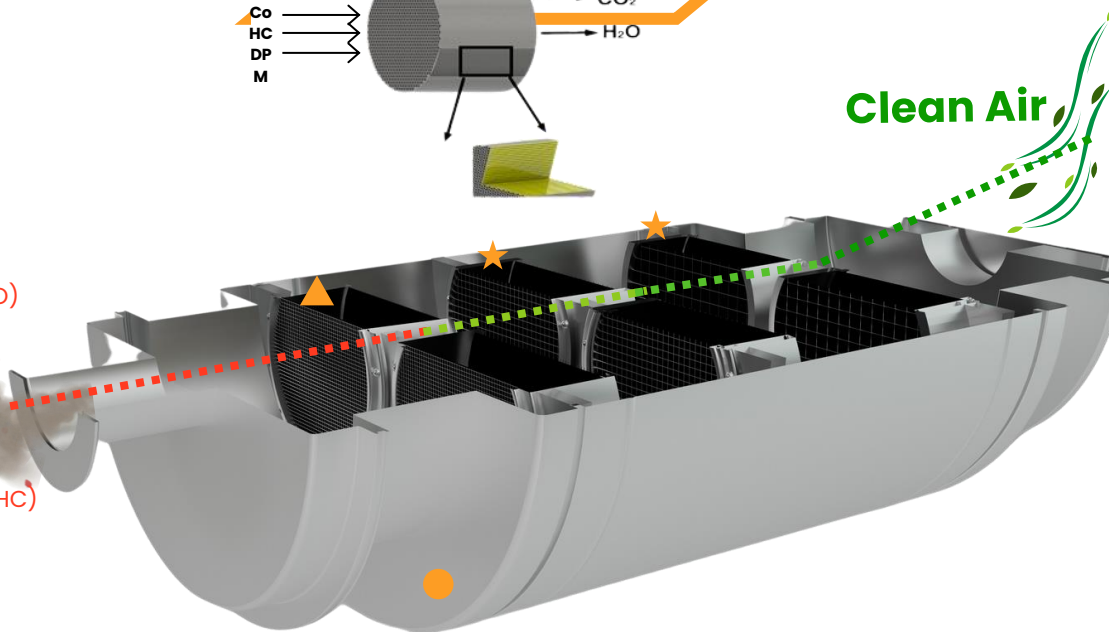
Particulate Regenerative Trap

The substrate-based PRT traps over 90% of PM, passively regenerating via an anisotropic catalyst.



Clean Air

Carbon Monoxide (CO)
Particulate Matter (PM)
Hydrocarbon(HC)



Chakr Shield: Reduction in Emissions



Salient Features

Transforming Emission Control with Superior Features



Energy Free Operations

Revolutionary power-free technology



Clean and Green

No secondary Pollution



Low Maintenance

No moving parts for long-lasting performance



Design

Modular & Customizable, Adaptive for any site



Noise Decibel

<75 DB equivalent performance as a muffler



No Consumables

No consumables for continuous & reliable operation



Adaptable

Integrated engineered design compatible with a wide range of DG Sets



No Engine Stress

Maintains back pressure within permissible limits



Durable & Robust

Consistent performance for a long-lasting solution



Smart Tech

IOT diagnostics with predictive maintenance



Chakr Shield

Transforming Emissions On-Site



Our Type Approval Certificates

[illegible]

62.5-125kVA

[Click to Check 62.5-125kVA Certificate](#)

[illegible]

140-320kVA

[Click to Check 140-320kVA Certificate](#)

[illegible]

320-500kVA

[Click to Check 320-500kVA Certificate](#)

[illegible]

525-1000kVA

[Click to Check 525-1000kVA Certificate](#)



Technological Advantages

Setting the Standard in Emission Control Technology

Technology		PM Reduction Efficiency	Capital Cost	Operational Cost	Impact on Engine	Ease Of Maintenance	Back Pressure
1	Chakr Shield	>70	Low	Negligible	Medium	Preventive Maintenance	Medium
2	Diesel Oxidation Catalyst	15%	Moderate	Negligible	Medium	Preventive Maintenance	Medium
3	Diesel Particulate Filter (DPF)	>70%	High	Moderate	High	High (Ash Cleaning Suit Removal)	High
4	Wet Scrubber	15%	High	High (Wash fluid & Chemical Replenishment)	Low	Complex & Frequent Service	Low
5	Electrostatic Precipitator Technology	80-90%	Moderate	Very High Due To Extreme Voltages	Low	Complex & Frequent Service	Low

*Chakr Shield is the most lucrative and sustainable RECD Technology for Diesel Generator



Chakr Shield- PRT Technology

PRT/DPF/ES

Factors	Chakr Shield- (PRT Technology)	Diesel Particulate Filter (DPF)	Electrostatic Precipitator (ESP)
1 Reduction of particulate matter (PM)	>70%	>70%	>70%
2 Design for Indian DG Market	Reduction of HC & CO	Reduction of HC & CO	No
3 Regeneration	Lower Exhaust Temperatures due to proprietary catalyst	Higher Exhaust Temperatures	No Continuous Regeneration Available
4 Exhaust Back Pressure	Low	High	Low
5 Thermal Rundown	No Risk due to PRT design Patented Technology	Very High Risk	NA
6 Face Blocking	No Risk due to filter cell level design	Very High Risk	NA
7 Caking of Pores (Combine these two)	No Risk due to design of PRTs Filter Channel Distribution	Very High Risk	NA
8 Exhaust Back Pressure Vs Regeneration	Well within OEM limit at all operating conditions	Risk of Exponential increase in back pressure due to poor regeneration	Within OEM Limit



Chakr Shield- PRT Technology

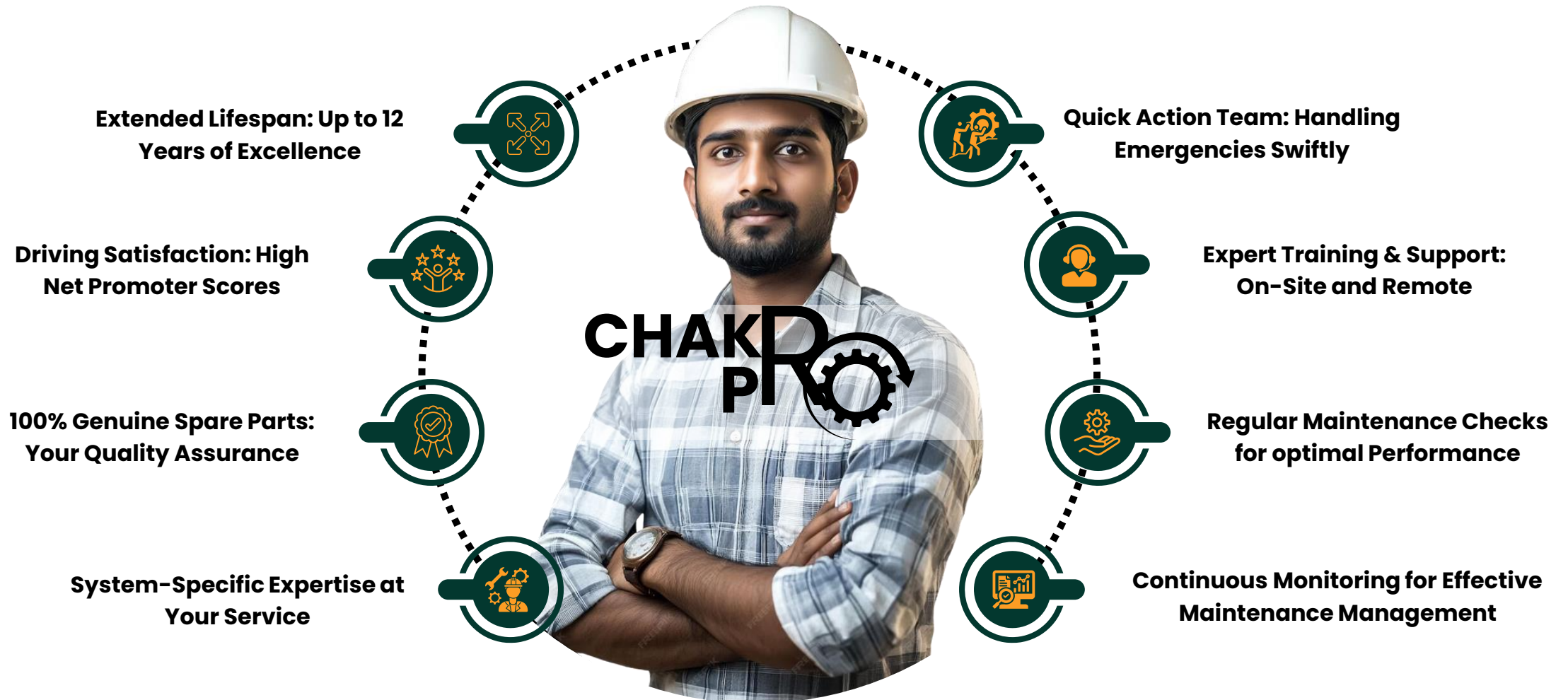
PRT/DPF/ESP

Factors	Chakr Shield- (PRT Technology)	Diesel Particulate Filter (DPF)	Electrostatic Precipitator (ESP)
9 Product Life	~40,000 hours	~ 10,000 hours	~ 5,000 hours
10 Noise Level Limit	Within 75db without silencer due to specially designed noise attenuation CFD driven contours	No Feature Available	No Feature Available
1 Power Required	None	None	Very High Voltage (>1000kVA)
1 Safety Risk	None	Potential of Thermal Rundown	High Voltage Shock
1 Space Required	x	x – 1.5x	10x
14 Design for Indian DG Market	Specially design and patented technology fit for Indian market	Old Technology not fit for Indian DG sets	Fit for Boilers



Beyond Installation

Pan India After-Sales Support- To Maximize your Investments



For assistance, Contact Customer Service at **1800-203-8001**



Connect Us

Your Path to Cleaner Air Starts Here...



Corporate Office

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Sector 19 Gurugram, Haryana 122016

Manufacturing Plants

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Haryana – 122004

Pune: Survey no 236-237, Rajiv Gandhi Infotech Park, Phase-I,
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