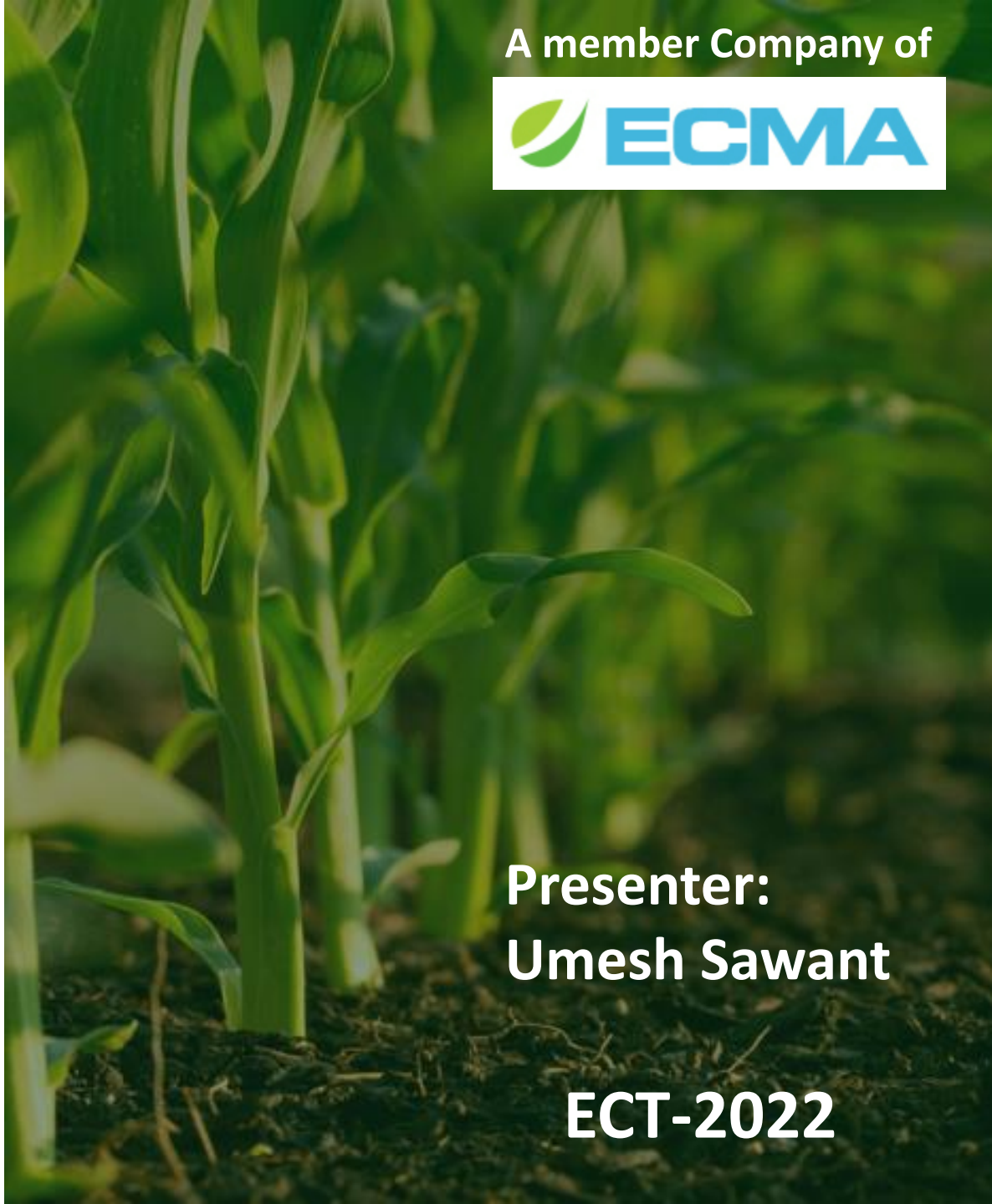
Pi GREEN INNOVATIONS PVT. LTD.

Unconventional After Treatment Solutions for PM Reduction from Diesel Engines



A member Company of ECMA

Presenter:
Umesh Sawant

ECT-2022

Company Introduction

Story of ordinary Indians doing extraordinary things

VISION

A Pollution-free tomorrow

MISSION

Relentlessly Innovate solutions for a sustainable environment

Pune based cleantech start up with passion for cleaner environment through innovation

Recognized through many awards and backed by passionate investors

2016
-First Prototype developed

2018
- Seed capital by Irfan Pathan
-Aaccelerated product development
- Won Smogthon, Poland

2019
- WWF Climate Solver Award
- Won UNDP Air Pollution Solution Challenge

2020
- DG retrofit exhibiting >70% PM reduction with ISO 8178 D2 5 mode test
- Commercial sales begin

2021
- Patents granted in Singapore, China and EU
- Successful DG retrofit emissions demonstration
- OEM collaboration begins

2022
- Patents granted in the USA
- Pi Green Wins the India Clean Air Challenge
- **Certifies RECD product**

SMOGATHON
GLOBAL COMPETITION FOR SMOG-FIGHTING INNO

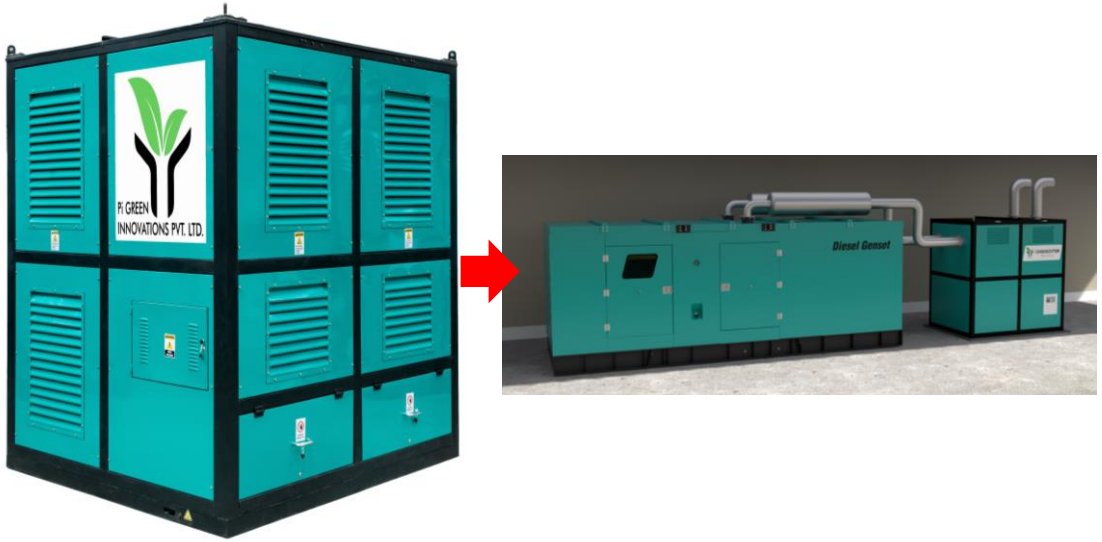
WWF CLIMATE SOLVER

icac
INDIA CLEAN AIR CHALLENGE

Winner of the #AirPollutionSolution challenge by UNDP

Product Offerings and Possibilities

Diesel Exhaust PM Reduction:



- Filter-less technology. Separates PM in agglomerated form
- Minimal and consistent back pressure on engine
- Energy efficient solution. No regeneration required
- Robust for PM challenges and optimized for duty cycles
- Can be installed remote from DG set
- Soot recyclable in paint, rubber & polymer products

Other Clean Air Solutions:

- Ambient air cleaning products
- Industrial boilers of smaller capacity (up to 5 TPH)
- Industrial incinerators and crematoriums
- Jaggery units
- Smoking Rooms
- Exhaust purification aid – crushers, chimneys, aerosols etc

Patented technology with patents granted in India, US, EU, China, Singapore

Solutions can be deployed for on-highway and off-road equipment. Pilots on city bus and pick up truck

Problem Statement

> US$ 150 Billion

Economic cost of air pollution to the Indian economy *

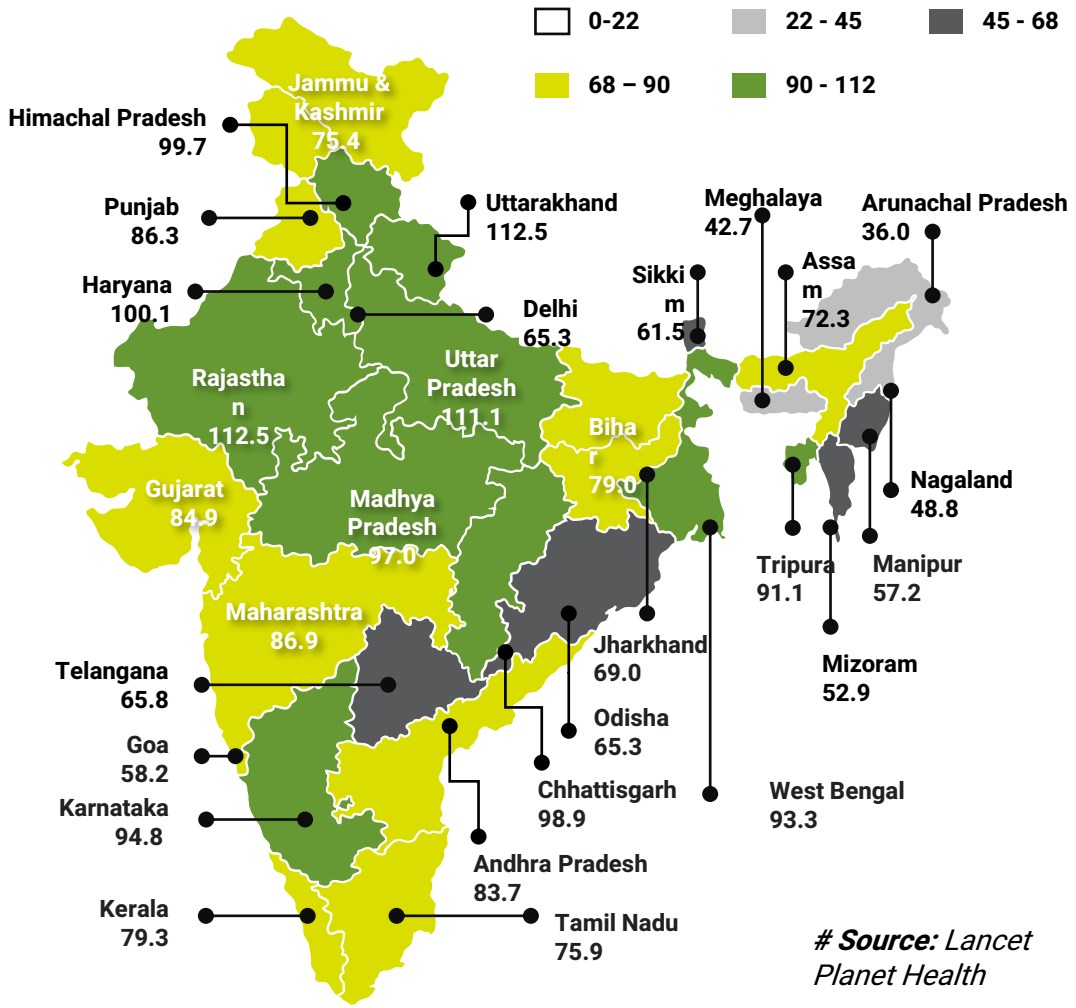
5.9% of GDP

Level of Morbidity & Mortality has costed the Indian economy *

97%

population exposed to particulate matter in excess of WHO specified air quality levels *

 # Deaths per 100,000 due to Air Pollution in 2017



 # Source: *Lancet Planet Health*

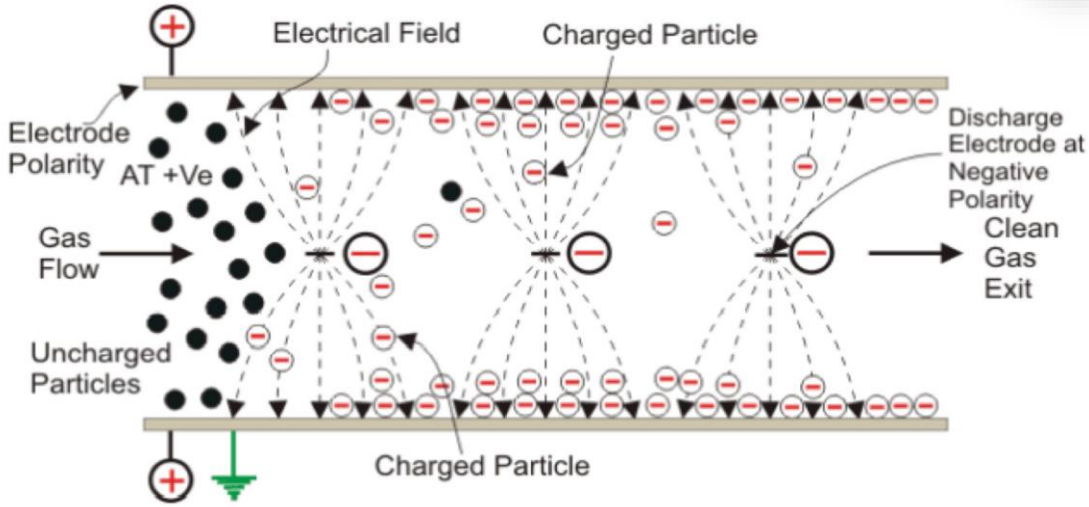
**** Source:*** *Finding Solutions to Air Pollution in India: The Role of Policy, Finance, and Communities - ORF Special Report No. 120, September 2020, Observer Research Foundation.*

Challenges

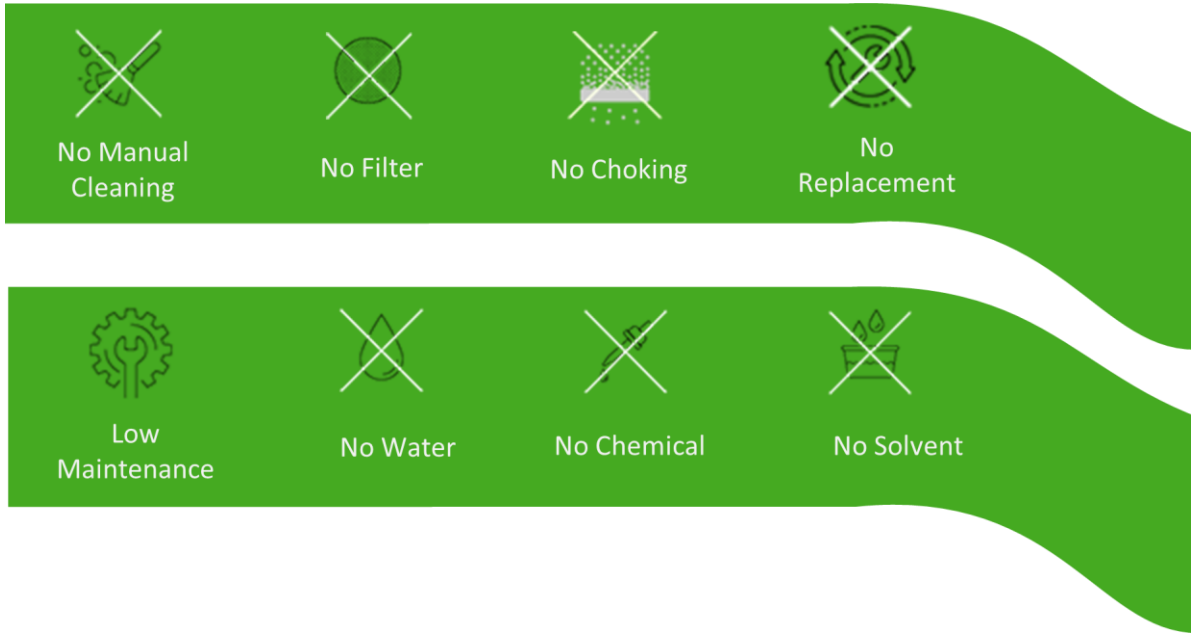
- Progressive and stringent emission norms rolled out in India will help clean air in near future. However older engines in use will continue to make negative impact in absence of scrappage policy, something that has economic impact
- Emissions retrofitment is a strong alternative addressing above issue immediately
- Many efforts Worldwide has seen limited success with this approach
- NGT has directed DG based PM reduction by 70% as one of first initiative that has seen regulation written for such product certification

How We Do It

1. Utilizes fundamentals of Electrostatic precipitation (ESP)
2. Uses patented agglomerated soot scraping mechanism for continuous and automated cleaning
3. Technology is optimized for diesel soot particles, something ESPs are not used popularly
4. Requires minimal electrical power to generate Corona effect
5. Challenging product to develop due to variable flow and temperatures in diesel engine duty cycles



Single Stage ESP Model



Opportunities

Opportunities exists through tighter regulations to reduce particulate matter pollution in India and make our future more sustainable

- **DG retrofits**
- **HFO fired DG sets and industrial engines**
- **Automotive retrofits**
- **Coal, husk, wood fired industrial boilers**
- **Incinerators of various types**