# ParyaClean

AI based Robots for Sustainable Green Energy
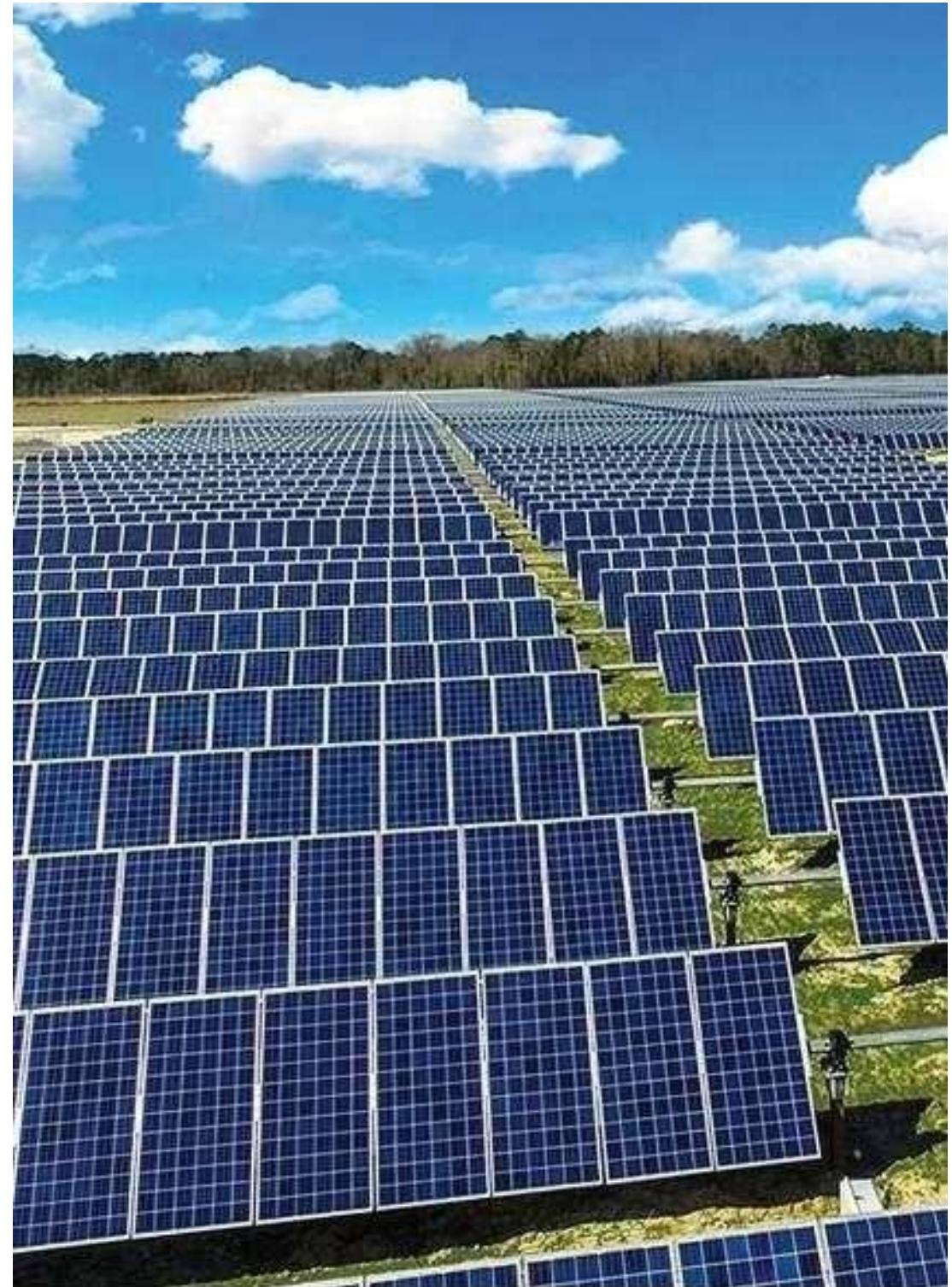
Business Landscape

The Indian renewable energy sector is the **fourth most attractive** renewable energy market in the world.

Installed renewable power generation capacity has gained pace over the past few years, posting a **CAGR of 15.92%** between FY16-22

The country is targeting about 450 Gigawatt (GW) of installed renewable energy capacity by 2030 – about **280 GW (over 60%)** is expected from solar.

Solar power installed capacity has increased by more than **18 times**, from 2.63 GW in March 2014 to 49.3 GW at the end of 2021. In 2022, till November, India has added 12 GW of solar power capacity.

Indian Landscape

Renewable Energy Hubs in India

- Rajasthan
- Gujarat
- Andhra Pradesh
- Karnataka
- Telangana
- Tamil Nadu

Global Landscape

Country	Total installation in GW*
China	393
United States	113
Japan	79
Germany	67
India	63
Australia	27
Italy	25
Brazil	24
Netherlands	23
South Korea	21
Spain	21
Vietnam	18
France	17
United Kingdom	14
Poland	11
Taiwan	10
Turkey	9
Mexico	9
Ukraine	8
Belgium	7
South Africa	6
Chile	6
Argentina	1

Solar Power plants are massive in size

Solar Panels requires CLEANING

Solar panels are installed in arid areas where the panels are vulnerable to dust accumulation on the solar panels, which leads to loss of efficiency and power loss which can be as high as 35%

Cleaning of Solar Panels

Regular cleaning of solar panels are done to improve the efficiency.

Traditional cleaning imposes threats like
- Millions of gallons of water wastage
- Damage of Panels due to Thermal Shoch
- Electrocution of operator
- Nanual intervention leads to non regulated cleaning
- Labour Intensive and inefficient

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Huge wastage
Df Water

Health & Safety
of Operators

4 Fundamental
Problems with
Traditional
Cleaning

Non Regulated
cleaning leads to
loss in efficiency

Risk Df Solar panels
getting damaged
overtime

Solution

AI based Dry Cleaninq Robots

- Requires no manual intervention

- Patented product design

- No water required for cleaninq

- Zaro operational cost

- Certified by international module manufacturers

- Operational on more than 1200 HW

Key Features

- **Patented Design**
- Integrated with **Artificial Intelligence**
- **Zero** operational cost
- **UL certified** product
- **Minimal maintenance** required
- **100%** Make in India product

Suitable for ALL types & size of Panels

2 Meter length robot

4 Meter length robot


6 Meter length robot

Suitability

Existing Solar Power Plant

Up-coming Solar Power Plant
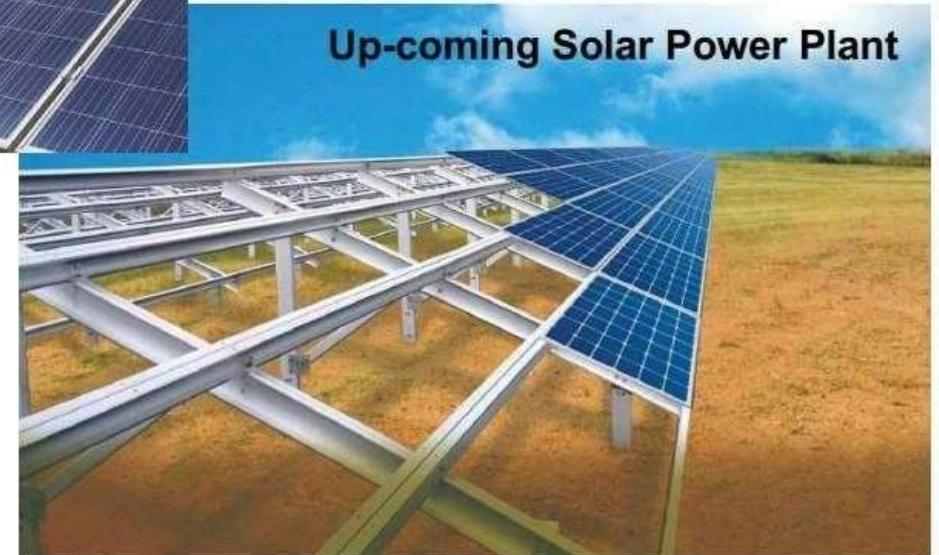
Suitability

Ground Mount Solar Power Plant

Rooftop Solar Power Plant

Cloud based communication

- Each robot can be controlled remotely through PC or mobile interface
- Warninqs are directly communicated to the user by each robot
- Each robot gives their runninq time, battery health, solar panel health etc. which is then summed up and displayed
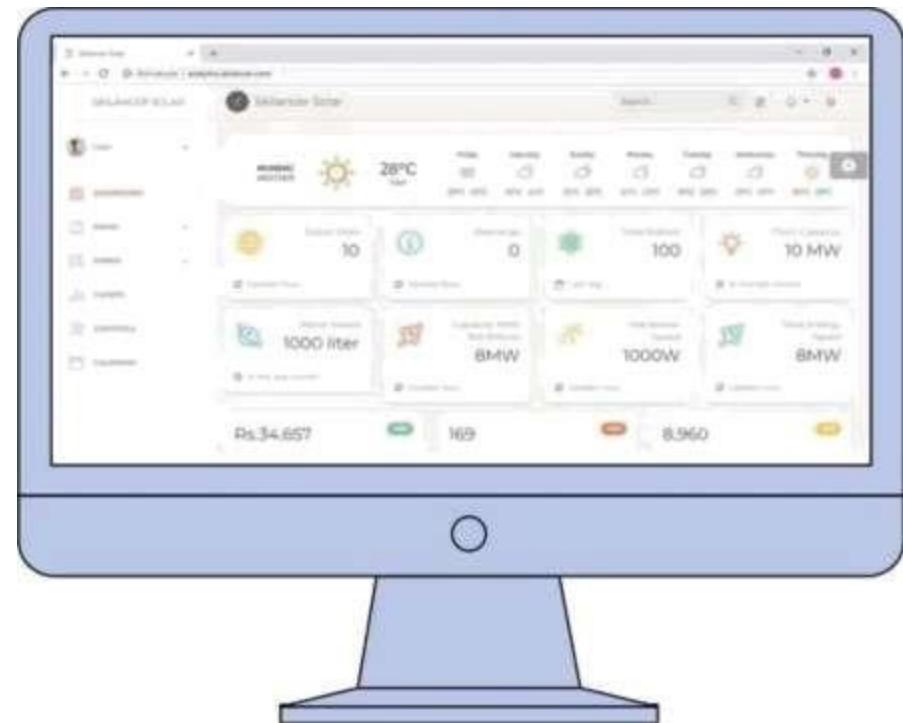
Comparison between Manual Water-Based Cleaning And ROV Duster(Autonomous Dry-Based Cleaning Robot)

Features	Manual Water-Based Cleaning	ROV Duster (Autonomous Dry-Based Cleaning Robot)
Cleaning Method	Water-based (requires significant water)	Dry-based (no water usage) Saved Galloons of water on a daily basis.
Automation Level	Manual, labour-intensive	Fully autonomous & programmable
Cleaning Frequency	Regular cleaning on daily basis not possible	Clean daily and on scheduled intervals
Dependancy	Water-based manual cleaning relies on labor and water, making it resource-intensive and less scalable	Dry autonomous cleaning uses robots or automation without water, offering efficient, frequent, and sustainable cleaning especially for large-scale solar installations and in adverse conditions
Water Consumption	High 1. Hundreds of litres are being used per cleaning cycle which could hike the cost	Zero 1. Totally dry based cleaning
Operational Cost (Long-Term)	High 1. Recurring labor cost (For ex. 1 labour cost 20000 per month: 20*12=240000 2. Water costs depending on size of plant	Low 1 one-time investment of 2.5 Lacs per unit with life span of at least 4 to 5 years 2. Annual maintenance 15% of Product Cost.
Impact	Negative impact due water wastage & thermal shock to Human Beings	Eco-friendly (no water wastage or runoff)
Remote Monitoring	No (requires physical supervision)	Yes (Scada Integragted)
Scalability	Difficult to scale due to manpower needs	Easily scalable across large solar farms
Cleaning Efficiency	Cannot be determined	Efficiency increases by at least 7.5 % in 15 days in monsoon season.

Thank You