



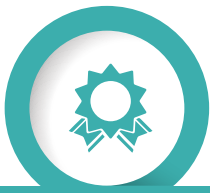
Confederation of Indian Industry

Waste Heat Recovery

Cement Industry

The adoption of Waste Heat Recovery (WHR) system in Indian cement plants offers several benefits:

- ✓ Mitigates Greenhouse gas (GHG) emissions
- ✓ Helps in achieving PAT cycle targets set by Bureau of Energy Efficiency
- ✓ Help India achieve energy security in long term



India
2nd

Largest Cement producer in the world



677 kCal/kg clinker
44 kWh/Tonne clinker

Best Performers



210

Large Cement Plants have installed capacity of **350 million** tonnes



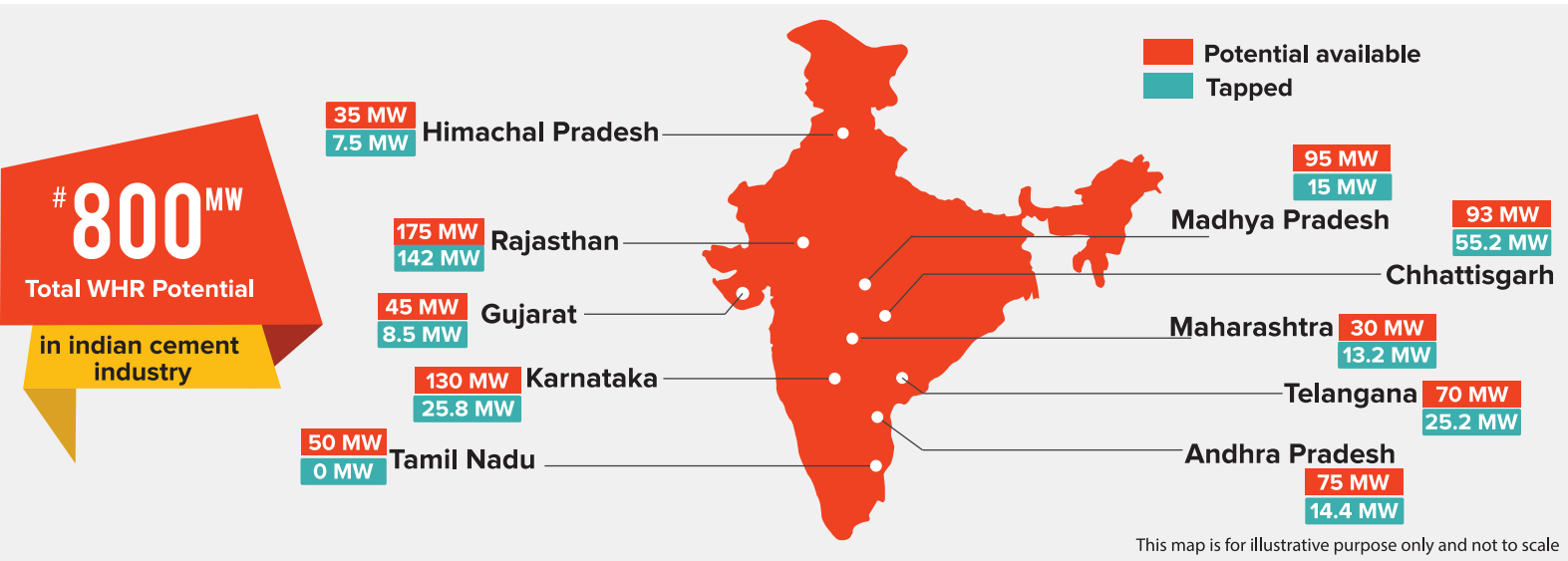
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Cement Plants in India have WHR Installed



*307^{MW}

Installed WHR Capacity in India



Did you know

Tapping further available potential of 500 MW results in

12% - 15%
Power Consumption of cement plant can be through WHR

Fuel Saving of **2 million tonnes** of coal

CO₂ emission reduction potential **4 million tonnes** CO₂ eq.

50%+ of PAT Cycle 2 target can be achieved

Monetary Benefit **₹ 1400 crore** (\$ 220 million)

Additional investment opportunity for installation of WHR **₹ 5500 crore** (\$ 880 million)

*As on May 2017 | # CII Data



Performance Assessment of 12+ Waste Heat Recovery Systems in India

Pressure drop across WHRB	90 mmWC
Optimum velocity required inside WHRB	6 m/s
Water consumption	5.8 lit/kWh
Dust concentration	100 gm/Nm ³
WHR Plant load factor	82%
Auxiliary power consumption	8.5%
Difference between design & actual power generation	24%
Overall cycle efficiency	16%
Variation in design & actual gas parameters at boiler inlet	13%
Investment required for Installation of WHR	11 Rs Crore/ MW
WHR power generation cost	0.9 Rs./kWh
WHR installation time	1.5 years



Challenges

Higher dust Concentration and its sticky & abressive nature

High Capital Investment

Quality & Availability of Hot Gas

Lack of Knowledge in Operating WHR



How to tap the additional 500 MW potential ?

- Innovative Financing Models
- Policy Support
- Preferential tariff for WHR power generation
- Improvement of Technology through Research & Development



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