



Co-processing of wastes in cement kiln

**PCI-II Div.
CPCB**

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HAZARDOUS WASTE MANAGEMENT SCENARIO IN INDIA

Quantity of HW Generated : 7.9 Million Tonnes per Annum
in the country

Landfillable - 3.32 MTPA (42%)

Recyclable - 3.98 MTPA (50.4%)

Incinerable - 0.60 MTPA (7.6%)

Number of Common Secured Landfills : 30 (Approx. Capacity 34 MT)
(in 17 states/UTs)

Number of Common Incinerators : 25 (Cap.≈ 0.2 MTPA,
Capacity Deficit: 0.40 Million TPA)
(in 13 states/UTs)



Hazardous Waste Disposal Methods

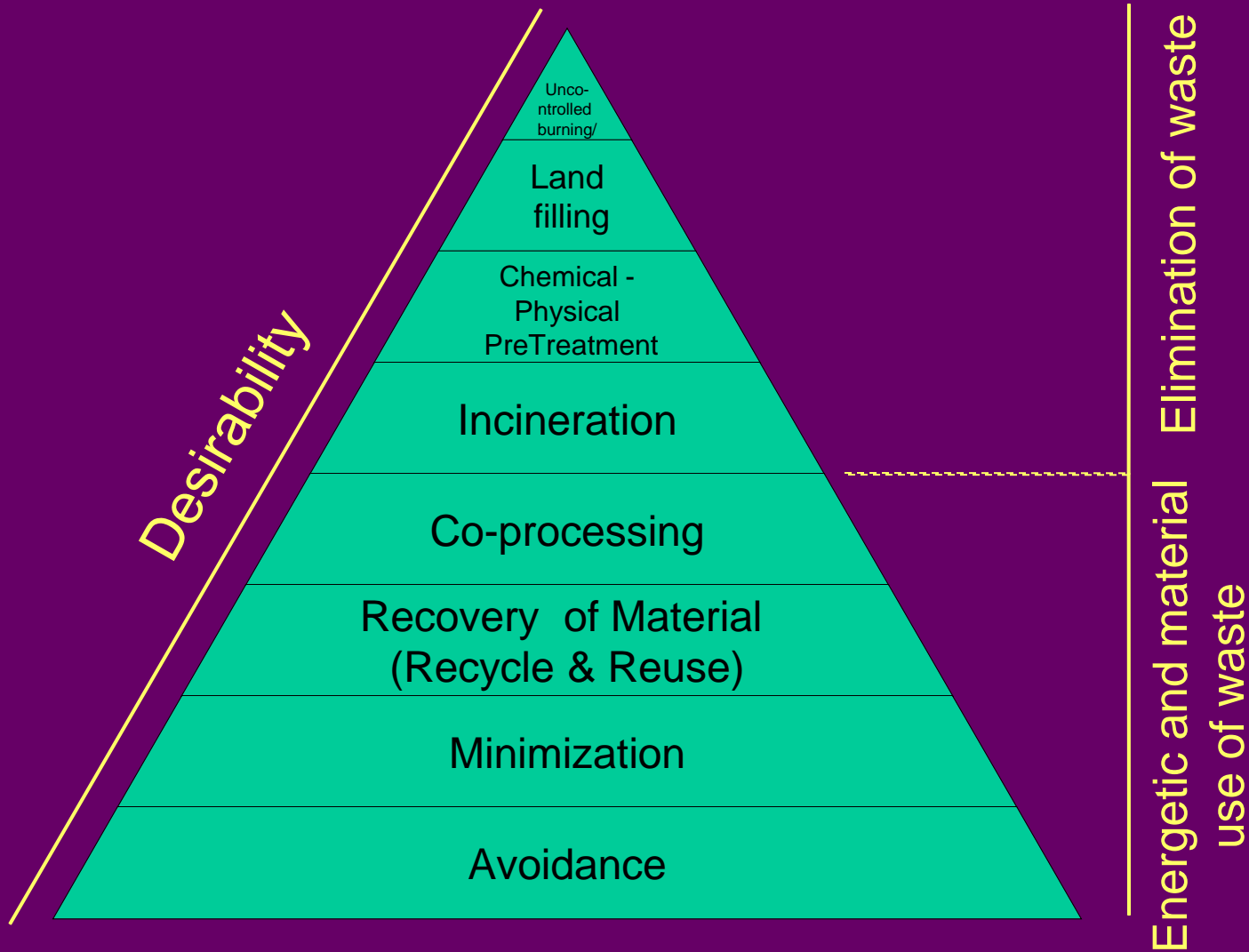
Conventional

- **Dedicated Hazardous Waste Incinerator**
- **Secured Land fill**

Alternative

- **Co-processing of compatible HW in Cement Kiln**

Waste Management Hierarchy



Co-Processing

- Co-processing in cement industry refers to the substitution of primary fuel and raw material by waste, recovering energy and material from waste.
- Waste materials used for co-processing are referred to as alternative fuels and raw materials (AFR)



Co-processing as an alternate will -

- Avoid land disposal or incineration of wastes
- Avoid future liability for wastes and associated problems
- Avoid investment on developing TSDF
- Gain Environmentally responsible image
- Be seen as a good steward of resources

and also yield benefits 

Benefits of Co-processing

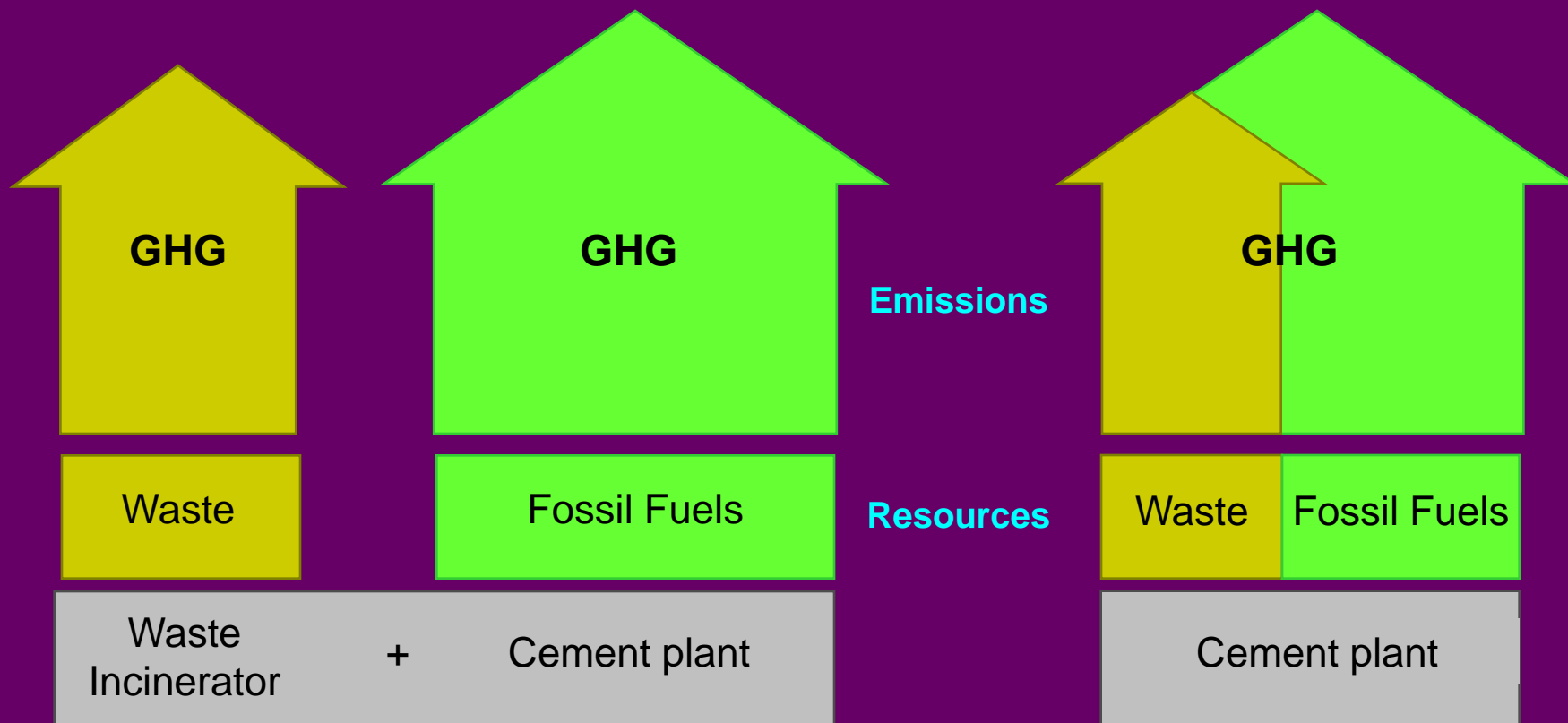
- **Reduction in Green House gases emission & related benefit of carbon trading**
- **Conversion of waste into energy / as a raw mix component**
- **Reduced burden on TSDF**
- **Conservation of fossil fuel resources**
- **Immobilization of toxic and heavy metals**
- **Reduction in energy costs**



Emissions from fossil fuel and waste as fuel

Waste incineration & cement manufacturing

Waste as fuel in cement manufacturing





Initiatives of CPCB

- **Introduced concept of Co-Processing of wastes in Indian Cement Industries in the year 2005**
- **Made a provision for utilization of hazardous wastes as a supplementary resource or for energy recovery, or after processing under Hazardous wastes (M,H & TM) Rules in 2008**
- **Developed Guidelines including monitoring protocol for Co- Processing of Wastes in Cement Industries in Feb. 2010**



- **Conducted about 70 trial runs for various category of wastes in cement industries**
- **Granted approval for about 40 Cement Plants for Co-processing**
- **Bilateral Programme on Co- Processing of Wastes with SINTEF, Government of Norway was initiated in Jan. 2011 to give International Exposure to the officials of CPCB, SPCBs & MoEF besides creating awareness in Indian Cement industries**

Calorific value of Few wastes for which trial run conducted

- Toluence Dilsocyanate Tar -7635 Kcal/kg
- Paint Sludge -6755 Kcal/kg
- Plastic waste -8200 Kcal/kg
- Solid Waste Mix -4174 Kcal/kg
- Liquid Waste Mix -3863 Kcal/kg
- Liquid Organic Solvent -9098 Kcal/kg



Potential for co-processing in Cement Sector in India

- **No. of large plants : 183**
- **Production: 270 Million Tons/Annum**
- **Coal consumption: 43 Million Tons/Annum**
- **Raw Material Consumption: 430 Million Tons/Annum**



Year wise Quantity of waste co-processed, coal and CO₂ saved

S. No.	Year	Quantity of Hazardous Waste Co-processed (Tons)	Quantity of Coal saved (Tons)	Quantity of CO2 saved (Tons)
2	2010-11	45,995	36,796	88,310
3	2011-12	73,037	58,430	1,40,231
4	2012-13	40,020	32,016	76,838
5	2013-14	99,460	79,568	1,90,963



Indo – Norway Project on Co-processing

- MoU for Institutional co-operation between CPCB and SINTEF on capacity building and technical support for the project “recovery of alternative fuels and raw materials and treatment of organic hazardous wastes through co-processing in resource and energy intensive industry in India” signed on 12.8.2010 and approved by MoEF, India on 14.12.2010.**
- The duration of the project was 4 years.**
- The Project has been completed successfully in Jan. 2015**



Objective of the Project

- The purpose of the project was technical support and guidance by SINTEF, Norway in implementing a safe and sound Co-processing practices.
- To increase treatment capacity for organic hazardous waste through co-processing.
- To organize two workshops each year for awareness of the stakeholders .
- To organize one international study tour for CPCB, SPCB and MoEF officials each year.
- To publish articles and reports on co-processing



Project Status

- **Seven workshops on Co-processing were organized jointly by SINTEF and CPCB at Bangalore, Bhopal, Vadodara, Jaipur, Bhubaneswar, Shillong and Delhi for the awareness of the stakeholder.**
- **About 30 officials of SPCBs, CPCB & MoEF have been given exposure / training on co-processing of waste in cement kiln abroad (Norway, Switzerland, Germany, Austria, Thailand, Vietnam).**
- **During last three years about 2.15 lakh tonnes of hazardous waste has been co-processed in cement kiln and thus saved 1.72 lakh tonnes coal and also reduced 4.12 lakh tonnes CO₂ emission.**



- **Demonstration on destruction of about 17 tonne of CFC (generated by M/s Navin Fluorine International Ltd., Gujarat) in Cement Kiln of M/s ACC Ltd., Kymore, MP, which resulted in saving of 1.3 lakh tonne CO₂.**
- **Various technical papers have been published in international journal / conference and few reports prepared.**
- **The overseas study tour for SPCB officials has been a great help for them to conduct the trial run in their state. So far about 70 trial runs conducted for co-processing of various wastes in cement kiln.**

Way Forward

- **Enhancement of quantity of waste being co-processed.**
- **Co-processing of MSW in cement kiln is a challenge.**
- **TSDF operators should come forward to provide facility to blend different kind of combustible hazardous waste to produce the homogeneous combustible hazardous waste with consistent quality commitment for use as fuel in Cement Kiln.**
- **Interstate movement of hazardous waste for co-processing**
- **Development of laboratory for emission monitoring by SPCBs**

Thank You