

Sino-Italian Demonstration Project for BAT/BEP Implementation & UP-POPs Reduction in China

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Outline

- 1. *Background***
- 2. Implementation**
- 3. Project Outputs**
- 4. Conclusion**

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Financial Support

- **Sino-Italian Cooperation Program (UNIDO):**
Strategies to Reduce Unintentional Production of POPs in China: BAT, BEP and Incremental Costs for Selected Sectors of Industry
- **GEF, World Bank, UNIDO:**
Building the Capacity of the People's Republic of China to implement the Stockholm Convention on POPs and develop a National Implementation Plan



Objectives

- ① **To demonstrate methodologies to promote the implementation of BAT & BEP for reducing UP-POPs in 6 enterprises representative of key industry sectors**
- ② **To estimate the incremental costs of implementing BAT and BEP options at enterprise and sector level**

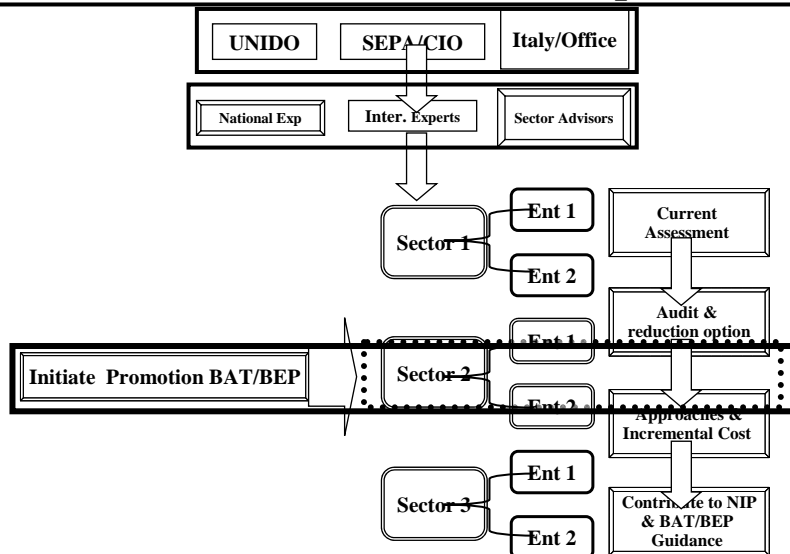


Activities

- ③ Sensitize national planners, ministries and associations, to Convention requirements and build enterprise participation
- ④ Baseline & monitoring capability (enterprise level)
- ⑤ Process & operational audit (enterprise level)
- ⑥ Best options, cost modeling & Incremental costs (Sector and national level)



Activities Relationship



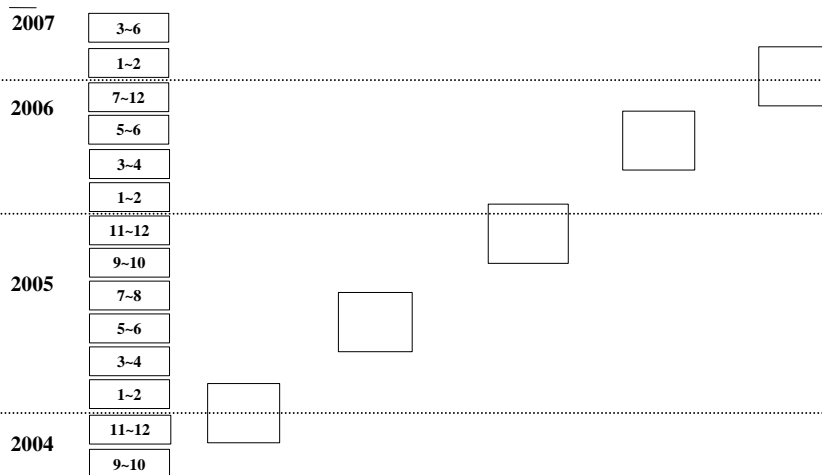
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Timetable



Selection Training

Survey Capacity

Evaluation Optimize

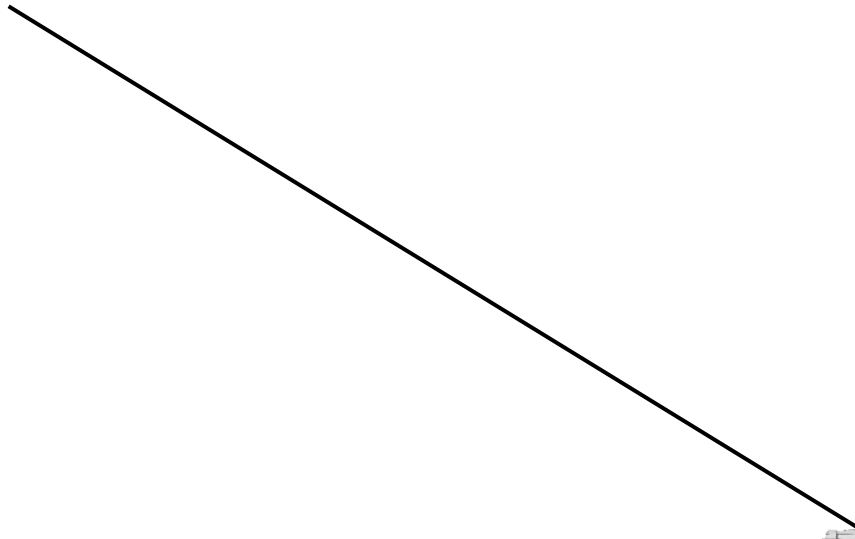
Incremental C Best Option

Monitoring Summary

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Initial Stage



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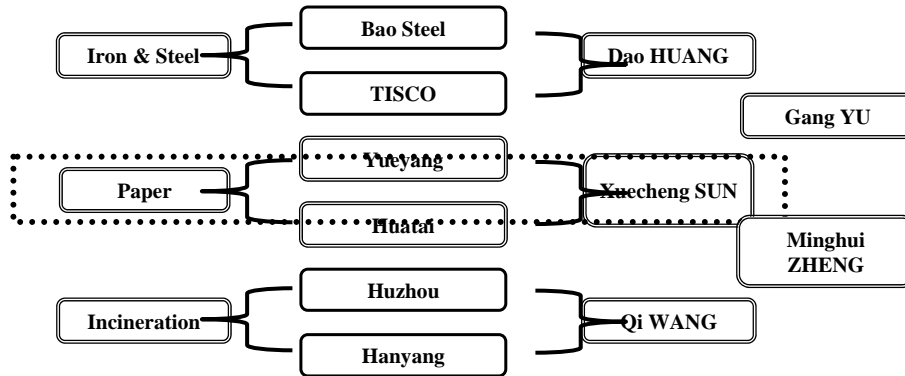
Selection Principles

- ① **Benefit for global environment improvement**
- ② **Importance of the industries in the national economic & social development**
- ③ **Quantity of the UP-POPs emission**
- ④ **Environment protection background**
- ⑤ **Interest and support for selecting as a demonstration sector or enterprises**

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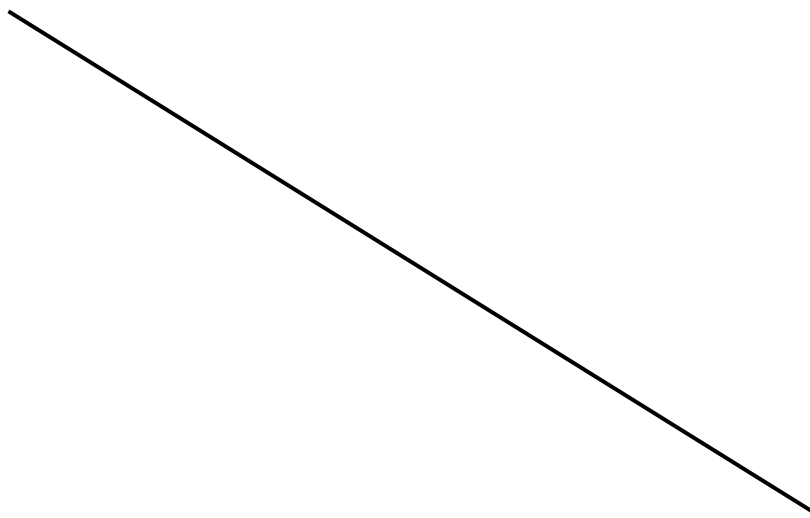
Selected Sectors, Enterprises & Experts



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Capacity-Building



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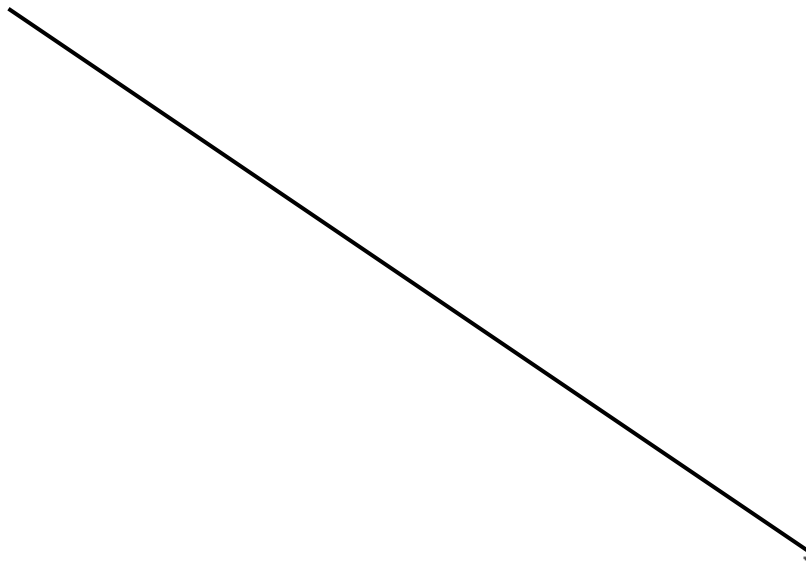


Objectives in Stages

- ① To identify & confirm stakeholders
- ② To propagandize & agree on concepts of demonstration projects
- ③ To establish cooperative relationship between stakeholders
- ④ To confirm monitoring capacity & pathways for survey
- ⑤ To adjust & improve draft plans of the project



Evaluation & Optimization



	Surveys for sampling methods	1st Sampling	Dioxin emission reduction scheme	2nd Sampling
Bao Steel	2005.6	2005.8.9-10	Sintering machine: use the homogenous ore free of recycled solid materials/stop using the pellets in mixed materials/stop using the sinter refines in auxiliary materials EF: use cleaner steel scrapes	2005.12.19-21
TISCO	2005.6.2-4	2005.12.8-10	Sintering machine: adjust the proportion of ore powder, add dust, reduce Si and Mg EF: reduce the ratio of steel scrapes, add a small amount of steeling mud balls	2006.6.19-23

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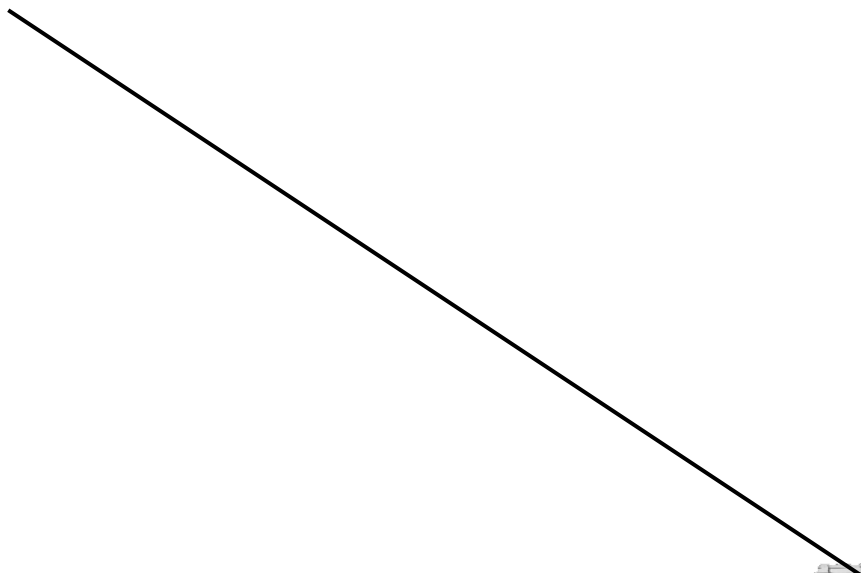


	Surveys for sampling methods	1st Sampling	Dioxin emission reduction scheme	2nd Sampling
Yueyang	2005.6.4-7	2005.8-9	Bleaching line: transform Cl ₂ bleaching into oxygen bleaching combined with two-stage ClO ₂ bleaching	2005.11
Huatai	2005.6-8	2005.8	Pre-bleach with bio-enzyme before Cl ₂ bleaching to reduce Cl ₂ consumption, add H ₂ O ₂ to enhance alkaline treatment process	2005.12
Huzhou	2005.6.4	2005.9.8-15	Raw materials/combustion/ post-combustion/ end-of-pipe control	2006.1.20
Hanyang	2005.6-7	2005.9	Add quencher/operation condition control/post-combustion control/end-of-pipe control	2005.12

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Incremental Costs & Options



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Dioxin reduction scheme for sectors (1)

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	Suggestion on dioxin emission reduction
Pulp and paper industry	<ol style="list-style-type: none"> 1. More effective pulp-washing method 2. Exclusion of pulps made from wood or reef contaminated by polychlorinated chemicals. 3. Applying chlorine dioxide/ECF rather than chlorine for bleaching 4. Adapting extended delignification for less lignin residual released into bleaching workshop 5. Treatment with oxygen for further removal of lignin residued after cooking 6. pre-bleach with bio-enzyme for less consumption on chlorine 7. Bleaching with hydrogen peroxide, ozone, and so on 8. Proper disposal of control sludge 9. Reasonable application of alkaline recycling burning technology for wood and reef pulp 10. Effective disposal of sludge from waste paper deinking process

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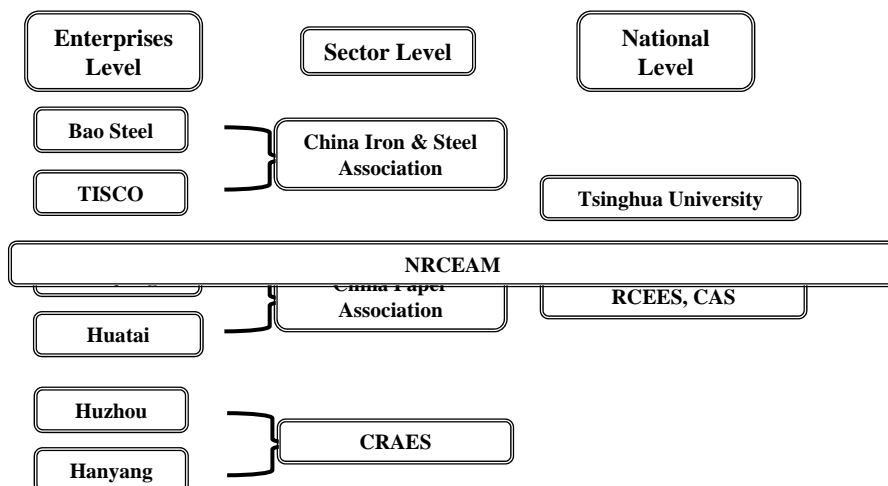
Project Outputs

- ① Established expert group and decision support system for BAT/BEP
- ② Obtained production technology & dioxin emission of typical enterprises
- ③ Developed BAT/BEP implementation methods for key enterprises
- ④ Analyzed incremental cost referred to monitoring data
- ⑤ Wrote reports for BAT/BEP implementation in 3 industry sectors (6 enterprises)

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Decision Support System



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Technologies & Dioxin Emission (1)

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	Technology	Dioxin Emission	
		Before BAT/BEP	After BAT/BEP
Yueyang	Delignification with oxygen and bleaching with non elemental chlorine (D ₀ -E ₀ -D ₁) instead of CEH	Reduction on per ton of dry pulp is 3.12mg TEQ	
Huatai	Prepare materials with dry/wet method, cook continuously, and CEH three-stage bleach	Emission mgTEQ/year (C/E/H three stages)	
		10.8/7.9/12.7	128.2/31/—
Huzhou	Rotary fluidized multiple stage incineration system	Emission level (mgTEQ/year)	
		1926	53
Hanyang	Vertical rotary pyrolysis/gasification incinerator	Sampling point at stack (mgTEQ/year)	
		672	198
		Fly ash/ slag (mgTEQ/year)	
		1820/160	2200/960

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	Shanghai Bao Steel	TISCO
BAT/BEP Implementation	<p>For sintering machine: use the homogenous ore free of recycled solid materials/stop using the pellets in mixed materials/stop using the sinter refines in auxiliary materials</p> <p>For electric furnace: use cleaner steel scrapes</p>	<p>For sintering machine: adjust the proportion of ore powder, add dust, reduce Si and Mg</p> <p>For electric furnace: reduce the ratio of steel scrapes, add a small amount of steeling mud balls</p>



BAT/BEP Implementation in Enterprises (2)

	Yueyang	Huatai	Huzhou	Hanyang
BAT/BEP Implementation	Change craft of preparation in dry method, intermittent cooking, and CEH three-stage bleach into the craft of preparation in dry/wet method, continuous cooking and delignification with oxygen and non elemental chlorine bleaching	Applying the craft of preparation in dry/wet method, continuous cooking, and CEH three-stage bleaching; moreover, pre-bleach with bio-enzyme, and add hydrogen peroxide to enhance alkaline treatment process	Materials control: reduce size of materials; combustion control: continuous operation; post-combustion control: temperature in quencher, ammonia additives, control of bag filter; end-of-pipe control: add AC adsorption & SCR to reduce dioxin	Extend continuous use of system, reduce the time of start & stop; clean pipes in residue heat boiler timely; additives to reduce HCl, set up an AC adsorption unit before dedust equipment.



Summary of Reports

Reports of Enterprises:

- BAT&BEP Implementing Trial Plan of Baosteel- Research Institute of Baosteel (technique center) (2007.02.16)
- Taiyuan Iron & Steel (Group) Co. Ltd BAT&BEP Demonstration item implementation project report- Energy & Environmental Protection Department of TISCO (2007.01)
- Taigelin Paper Group Demonstration Project Case Study for Reduction of Persistent Organic Pollutants Dioxin emission – Technique Center of Taigelin Co. Ltd (2007.04.10)
- Demonstration Project of BAT/BEP implementation in the Enterprise- Shandong Huatai Co. Ltd (2007.06)
- Case Study of Demonstration Project for Dioxin Emission Reduction in Medical Wastes Incineration – Institute of Thermal Power Engineering of Zhejiang Uni./ Huzhou Shijiqing Solid Waste Treatment Center(2006.11.05)
- Case Study of Demonstration Activities in the Enterprise – Jinan Hanyang Solid Waste Treatment Co. Ltd (2007.10)

Reports of Sectors:

- UP-POPs Reduction in Iron & Steel Industry of China – China Iron & Steel Association (2007.06.01)
- Sino-Italian Strategy for UP-POPs Reduction – China Paper Association (2007.04)
- Final Report on Strategy for UP-POPs Reduction & BAT/BEP Implementation in Medical Waste Incineration – China Research Academy of Environmental Science (2007.03)

General Report:

- Reports on Strategy for UP-POPs Reduction in China – Tsinghua University (2007.11)

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Conclusion

- ① **Implement BAT/BEP demonstration in 3 key sectors and 6 enterprises: Reduction of UP-POPs in iron & steel enterprises is susceptible to ratio of raw materials; effective reduction in incineration enterprises can be achieved by improving operation conditions and adding end-of-pipe adsorption unit; pulp & paper enterprises reduced chlorine dosage, however the reduction effects are fluctuated associated with different technologies employed.**



Conclusion

- ② **Incremental cost:**
 - **Iron & Steel enterprises:** as raw materials and technological parameters adjust is needed, incremental cost is relatively high;
 - **Incineration enterprises:** by adding end-of-pipe adsorption unit, reduction can be achieved with relatively low cost;
 - **Pulp & Paper enterprises:** since quality & price can be improved after implementation of reduction technologies, relatively good economic benefit can be obtained on a consolidated basis.



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Thank You 

