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Study Tour on Integrated Solid Waste Management and other Urban Development Issues

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Schedule and cost

- 4 days: 6-9 May 2014;
- 4 cities in the Yangzi River Delta area, the PRC;
- 10 presentations and 10 site visits covering various topics
- KSSC support: total cost \$47,000 for 16 ADB staff

Content

- waste-to-energy, and landfill management;
- integrated urban planning;
- sludge management for wastewater treatment facilities
- new technology in water supply management
- industrial park development and management; and
- various PPP financing models

Highlights 1: Waste to energy (W-T-E);

- ADB PSOD financed Everbright W-T-E projects;
- Incineration plants using BOT model,
Changzhou city with capacity of 800 ton/day
Suzhou city with capacity of 3, 550 ton/day
- Electricity generation
- Everbright own technology of incineration

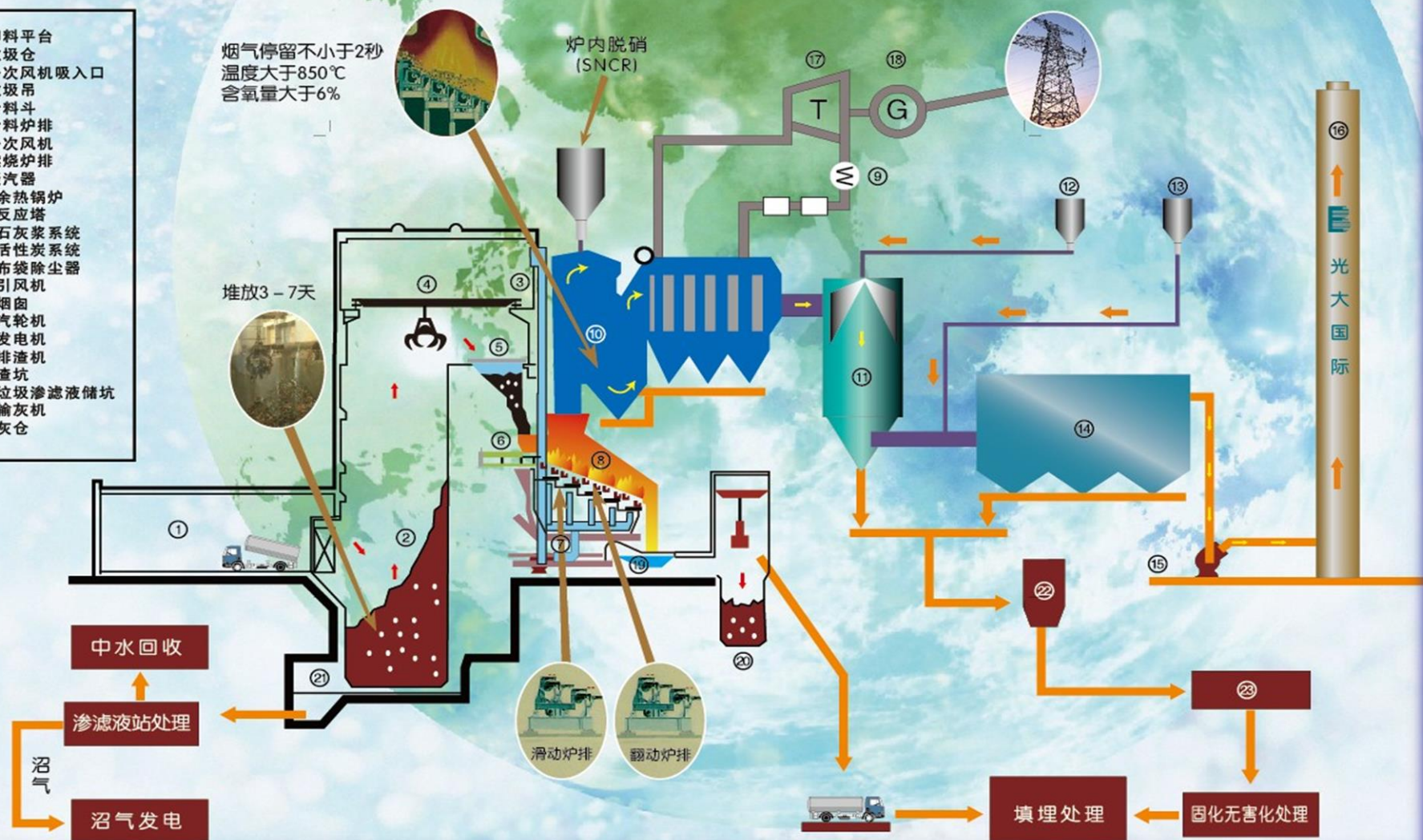
垃圾焚烧发电流程图

- 1、卸料平台
- 2、垃圾仓
- 3、一次风机吸入口
- 4、垃圾吊
- 5、给料斗
- 6、给料炉排
- 7、一次风机
- 8、燃烧炉排
- 9、凝汽器
- 10、余热锅炉
- 11、反应塔
- 12、石灰浆系统
- 13、活性炭系统
- 14、布袋除尘器
- 15、引风机
- 16、烟囱
- 17、汽轮机
- 18、发电机
- 19、排渣机
- 20、渣坑
- 21、垃圾渗滤液储坑
- 22、输灰机
- 23、灰仓

烟气停留不小于2秒
温度大于850℃
含氧量大于6%

炉内脱硝
(SNCR)

堆放3-7天



Operation performance

- Significant reduction of waste volume, and
- Generated renewable energy
- Proper treatment of
 1. Flue Gas Treatment
 2. Leachate Treatment
 3. Solid residues
 4. Fly ash



Highlights 1: Waste to energy (W-T-E);

2014年5月7日 星期三 天气: 多云转晴 安全天数: 486

项 目	单 位	A 值	B 值	C 值	D 值	日 累 计	月 累 计
垃圾进厂量	T	552.52	553.61	/	551.43	1657.56	14566.14
垃圾焚烧量	T	480.60	481.60	/	481.0	1448.30	13237.70
垃圾发电量	MWh	218.00	219.80	/	219.00	656.80	6064.00
焚烧上网电量	MWh	189.30	190.10	/	190.40	569.80	5250.30
沼气上网电量	MWh	/	/	/	/	/	/
热水销售量	T	/	/	/	/	/	/
总 进 水 量	T	21	20	/	23	64	772
原水取水量	T	/	/	/	/	/	/
柴 油	T	0.00	0.00	/	0.00	0.00	0.00
焚烧厂用电率	%	11.77	11.23	/	11.36	11.46	11.62
补 水 率	%	2.00	1.73	/	2.05	1.91	2.49
吨垃圾发电量	KWh/T	453.60	456.40	/	455.21	453.50	458.09
吨垃圾上网电量	KWh/T	393.88	394.73	/	395.76	393.43	396.62
DUST(80/10)	mg/m ³	3.64	4.27	/	3.11	3.67	3.45
HCL(75/10)	mg/m ³	2.97	3.13	/	3.97	3.36	3.90
SO ₂ (260/50)	mg/m ³	20.44	20.82	/	18.94	20.00	20.34
NOx(400/200)	mg/m ³	135.08	134.81	/	134.60	134.76	134.14

2 机运行, 沼气 3 机运行。



W-T-E: PPP based sustainability

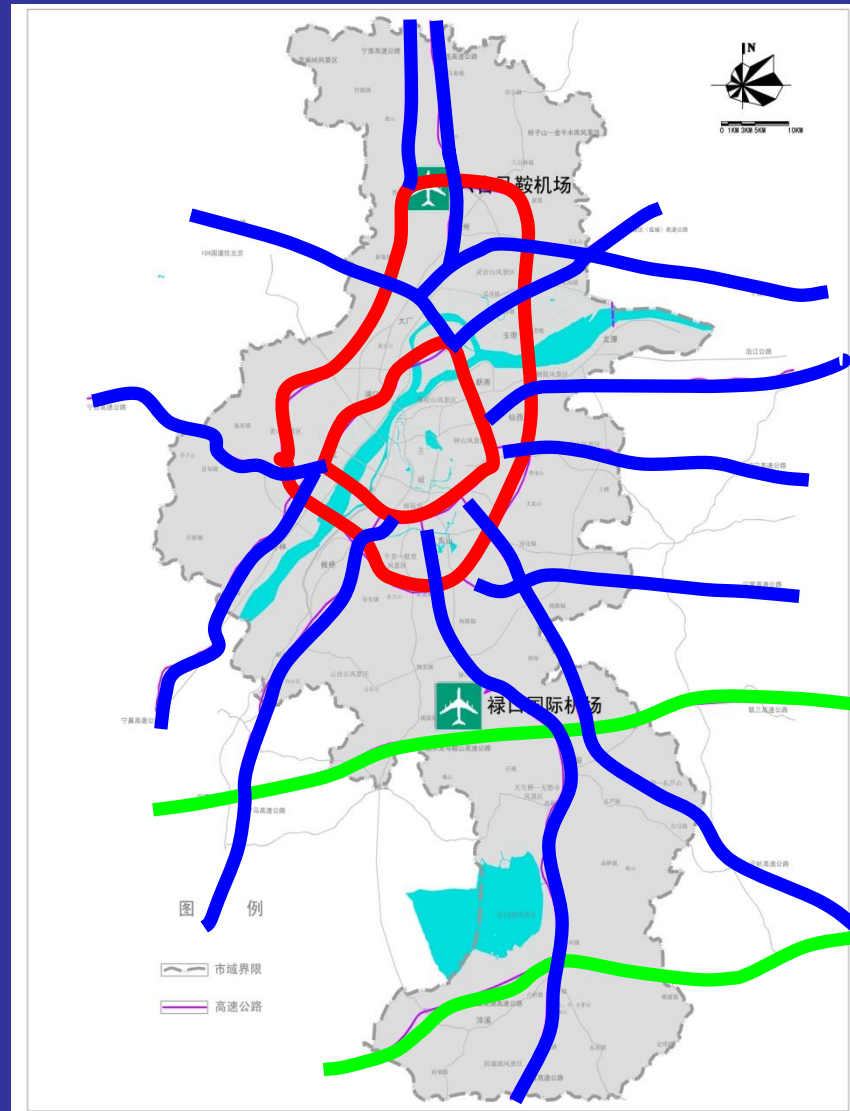
- government's policy to provide financial incentive for electricity generated through renewable energy (\$0.11/KWH vs \$0.07/KWH)
- Adapted incineration technology
- Tipping fee at \$10-\$15/ton by municipal government, and
- the restrict control of emission standard and operation environment by the local government and the operators.

Highlight 2: integrated urban planning

Presentations for Nanjing city, Jiangsu Province and Shanghai city;

- short term, middle-term and long-term issues within a national or regional economic development framework.
- develop through a city cluster approach and to ensure integration of urban transport development and general urban development among the economic growth centres within the metropolitan region.

Planning of Intra-city Expressways Network in Nanjing



Planning Policies for Urban Spatial Development in Shanghai

Shanghai Master Plan (1999)



Highlight 3: Sewage sludge drying

Comprising a wastewater treatment plant, a sludge drying facility, and a thermal power plant. Challenges:

- wastewater treatment process could not be completed without appropriate treatment of sludge,
- the state of art sludge drying technology is very expensive (\$100/ ton with water content of 80%), and
- Sludge remain a growing challenge

Sewage sludge drying: Synergism and recycling



苏州工业园区

Suzhou Industrial Park

Auxiliary Building
Materials

Cement plant



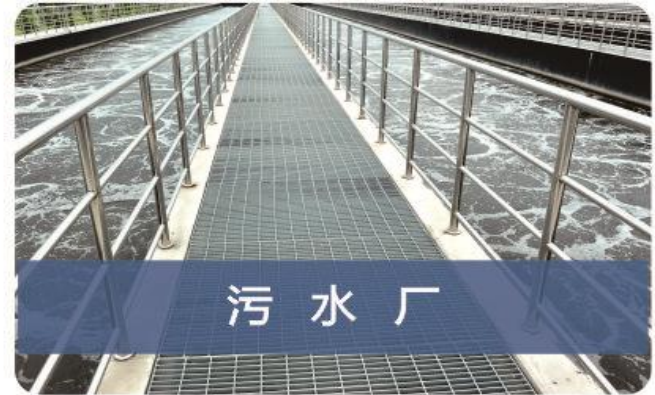
水泥厂

Sewage

Sewage

Waste
heat
steam

Ash



污水厂

WWTP

Watery
Sludge
Reclaimed
water



污泥干化厂

Sludge drying plant

Dried
sludge
Steam
condensed
water



热电厂

Thermal power
plant

Highlight 4: Shanghai Pudong Veolia Water Supply

- Joint-venture company through PPP model for water supply service in Shanghai Pudong District
- Basic information:
 - Service Area: 672km²
 - 5 water plants, 9 pumping stations
 - Network : 4,624 km (diameter 75mm–1,800 mm)
 - Population served: 3.6million
 - 1,240,907 water meters in 5 agencies
 - Average daily capacity: 1.60 million m³/day
 - 1,038 employees
- Top ranking of performance.

Highlight 5: Suzhou Singapore Industry Park

- a leading industry park in PRC
- Three stages of knowledge sharing and transfer from Singapore to the PRC in over past 20 years



Highlight 6: various PPP financing models

- BOT models on W-T-E;
- Various joint ventures on water supply, sewage sludge and industry park;
- Enabling Environment

Highlight 7: others

- Suzhou Venus Industry Park;
- Communication between Suzhou and Shanghai;
- Yangzhi Delta Economic Zone
- Tongji urban knowledge hub

Conclusion

- Good practice sharing
- Importance of the enabling environment
- Regularize the study tour
- Involvement of the clients, EAs and IAs

Thank You!

**All related presentations are available
upon request.**