Study on the Operation Mechanism and Application of Water Pollution trading in China

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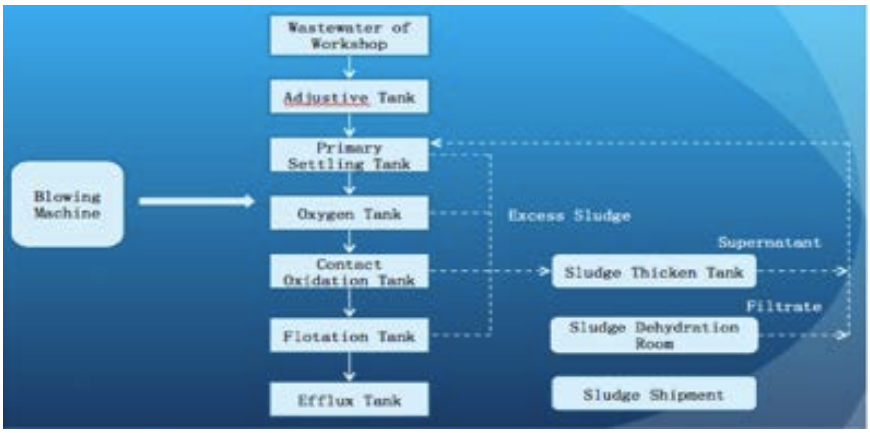
In the past summer holiday, I went to Shaoxing, China to doing the fieldwork, aims to know the current environment situation and on going environmental policies, regarding to my current research topic is "Study on the effectiveness by practicing cap-and-trade scheme for water pollution in China- Case study at Shaoxing". My research target is based upon the actual development level of China's dyeing and finishing industry, to introduce an enhancement proposal on cap-and-trade scheme for wastewater and finding the right approach to implement relevant environmental regulation.

1. Fieldwork Area and Studying Industry Type Introduction-Shaoxing

The existing industrial wastewater treatment program in China is still far from the programs in developed countries, both in standard and technology. Current wastewater treatment system in Shaoxing industrial park is collect the wastewater which was pretreated by individual factories and then released into the Shaoxing Full Centralized Wastewater Treatment Station. However, when China raised the bar for wastewater treatment, the requirement for CWT became even higher, such as the tightening COD limit from 500 to 200, and factories without proper treatment system cannot easily meet such strict regulation.

Below is the product process as well as the wastewater treatment system:



Textile wastewaters are characterized by extreme fluctuations in many parameters such as chemical oxygen demand (COD), biochemical oxygen demand (BOD), pH, color and salinity. The composition of the wastewater will depend on the different organic-based compounds, chemicals and dyes used in the dry and wet-processing steps. Recalcitrant organic, colored, toxicant, surfactant and chlorinated compounds and salts are the main pollutants in textile effluents.

Industrialization of the textile industry and use of a large variety of chemical treatments and dyes has resulted in a public health threat created by pollution. 17 -20% of industrial freshwater pollution is caused by textile dyeing and treatment.

2. Introduction of Cap and Trade Scheme for water

Below picture was taken at Paojiang industry of Shaoxing city during my fieldwork period.

Under a cap-and-trade system, water polluters would have the option to reduce pollution in their own operations, or to purchase pollution-control credits from another source at a lower cost than undertaking the pollution control themselves. Industries, farmers or cities could also conceivably buy and sell credits for water use.

On the other hand, the cap-and-trade scheme for water appears to have a very low activity in China. My research will focus on identifying the existing schemes in the world and find an approach for promoting the cap-and-trade development in China. I believe a suitable policy in China will need to have a level of flexibility in order to provide benefits the environment without inhibiting economic growth.

3. Current Situation of Cap-and-trade for Water in China

CAP： Under a cap and trade system, a government authority first sets a cap, deciding how much pollution in total will be allowed. According to the 《Shaoxing compensated emission use rights and trading pilot implementation measures》, the cap had been taken effect 1st,February, 2012. The emission here mentioned is chemical oxygen demand (COD), sulfur dioxide (SO2), nitrogen oxides (NOx), ammonia (NH3-N) four major pollutions.

Trade:
- Transferor: Zhejiang Shaoxing Xinxin Textile Co., Ltd.
- Transferee: Shaoxing Ming Yu Dyeing Co., Ltd.
- Trading Contents: 1200 tons / day of sewage industrial emissions of COD(chemical oxygen demand) and NH3-N (ammonia).
- Trading Amount: RMB one thousand two hundred million.
- Trade Time: September 19, 2014

4. Date Collection

Below is the Dyeing and Finishing Factory Location Map, which Draw by Arc GIS:

Also, I have got some date which be listed below from the local government including the all factories' name located at Paojiang industry park and the monthly water consumption of each Dyeing and Finishing factory.

	A	B	C	D	E	F	G	H	I	J	K
1	ID	Latitude	Longitude	Category	Name	Note		3月抄见量（m3）	4月抄见量（m3）	3月 吨/日	4月 吨/日
2	1	30.056636	120.605130	Dyeing and Finishing	浙江新建纺织有限公司（印染）			69138	69515	2230	2317
3	2	30.057749	120.600119	Dyeing and Finishing	绍兴鼎记印染有限公司			66047	68724	2131	2291
4	3	30.098514	120.635386	Dyeing and Finishing	浙江立盛织染有限公司			92526	81962	2985	2732
5	4	30.049673	120.597649	Dyeing and Finishing	绍兴瑞富毛纺织有限公司			3617	4139	117	138
6	5	30.087029	120.639535	Dyeing and Finishing	绍兴大发布业有限公司			36315	37285	1171	1243
7	6	30.076522	120.617471	Dyeing and Finishing	绍兴海神印染制衣有限公司			83875	85121	2706	2837
8	7	30.118512	120.635975	Dyeing and Finishing	绍兴市大昌祥印染有限公司			67842	62634	2188	2088
9	8	30.086751	120.625077	Dyeing and Finishing	绍兴市立新印染有限公司（1）			61490	93571	1984	3119
10	9	30.103031	120.600867	Dyeing and Finishing	绍兴飞亚印染有限公司			119429	115059	3853	3835
11	10	30.095187	120.638989	Dyeing and Finishing	绍兴忠兴印染有限公司(万天)			88551	41438	2856	1381
12	11	30.088720	120.604139	Dyeing and Finishing	浙江庆茂纺织印染有限公司			173187	224029	5587	7468
13	12	29.986434	120.586374	Dyeing and Finishing	绍兴市金丰印染有限公司			22663	34118	731	1137
14	13	30.116263	120.637247	Dyeing and Finishing	绍兴丝绸印染有限责任公司			22438	27994	724	933
15	14	30.082089	120.654113	Dyeing and Finishing	汤姆斯（绍兴）织染服饰有限公司			30870	32124	996	1071
16	15	30.079870	120.624170	Dyeing and Finishing	绍兴市城中诚服饰有限公司			13874	20944	448	698
17	16	30.093464	120.657055	Dyeing and Finishing	浙江瑞芬特纺织服饰有限公司			5875	7038	190	235
18	17	30.025478	120.577518	Dyeing and Finishing	绍兴市跃进印染有限公司			84743	93531	2734	3118
19	18	30.087485	120.601729	Dyeing and Finishing	浙江龙翔针织科技有限公司			45179	71145	1457	2372
20	19	30.018158	120.574711	Dyeing and Finishing	绍兴市洗毛有限公司			17089	17863	551	595
21	20	30.061872	120.634483	Dyeing and Finishing	绍兴鑫亿布业有限公司（红黄蓝）			17460	22451	563	748
22	21	30.014816	120.563332	Dyeing and Finishing	绍兴市北海印染有限公司			39451	46079	1273	1536
23	22	30.058793	120.723469	Dyeing and Finishing	绍兴玫雄丝绸领带有限公司			930	4356	30	145
24	23	30.005075	120.588257	Dyeing and Finishing	绍兴伊诺印染有限公司			26771	56752	864	1892
25	24	30.058718	120.723672	Dyeing and Finishing	绍兴县龙洋纺织印染有限公司			32520	47906	1049	1597

Shaoxing City's dyeing, chemical, paper mill, electroplating, leather tanning, and lead battery manufacturing began in the 1970s. These industries started in small scale, after 40 years of development and expansion the government policies began to suffer from lack of execution compliance from these companies.

Fabric and Dyeing has always been a strongly supported industry in Shaoxing, with the biggest companies in the industrial park being Dyeing Plants, complete with research and development and integrated supply chain. In 2012 the production capacity was 2.02 billion meters, ranked first in the entire country. There are 426 companies located in the area, using the city's natural water network for water supply and waste disposal.

	Number of dyeing factory	Amount of dyeing factory (%)	Production of dyeing and printing cloth (hundred million)	Production of dyeing and printing cloth (%)
China	8786	100	566.02	100
Shaoxing	426	4.85	201.51	35.6

In 2012, the city's release result on COD waste disposal was 86,602 tons, in-city pollution 57,353 tons (66% of total), ammonia pollution 10,122 tons, with in-city pollution 5841 tons (57% of total).

In 2012, the oxygen gas consumption and ammonia disposal in the Shaoxing city was 11% and 9% of the entire province.

COD emission intensity per unit of gross production is 23.6 tons / billion yuan. Ranking 7th in the province, above the provincial average by 4%, but still far lower than national average by 46%. This means that Shaoxing city produces far less COD in national average but not the best in the province.
Ammonia emission intensity per unit of gross production is 2.8 tons / billion yuan. Ranking 8th in the province is 87.5 of the provincial average, 51.9% of national average.

Through 20 days fieldwork at Shaoxing, I collected more information on environment issue of Paojiang industrial park and it will help me for the further study on the policy related project at this area.

5. Research Approach and Methodology

Firstly, to gather and organize the existing related data, followed by qualitative comparison analysis by cross referencing case data. The current plan is to focus on how Dyeing and Finishing Factory production impacts regional GDP, environment, and society benefits, and specifically study the following points:

1) The history of industrial park and wastewater treatment technology
2) Currently used treatment method, process, and technology
3) The industry type, geographical location of the factories, and the type of wastewater treated
4) The current economic and environmental benefits
6) Regional policies and changes that was used to support the new waste water treatment technology
7) More of the social environmental science related subjects of developed countries.
(i) The effect of economic development, abatement costs, and democracy on pollution patterns
(ii) The debate on the effect of growing trade on environmental degradation
(iii) Regulatory issues
(iv) The link between environmental factors and conflict
(v) The formation and effectiveness of international regimes.

Secondly, combining the seven study focus above, the same factors will be studied via research and fieldwork for Paojiang, and a comparison study in both qualitative policy study and quantitative treatment study will be made to identify current wastewater treatment effectiveness, to be presented in graph data.

Lastly, to conduct policy analysis and combine the feasibility study results to deliver final proposal as applicable with the comparison in environment policies of China and reference developed country.

6. Anticipate Result

After analysis the risk as well as the benefits, finally find out that practicing a cap-and-trade scheme for water pollution in China is a big trend and more preferable than taxation or punishing system, because by practicing cap and trade scheme for water could push forward technology improvement of production process as well as the full wastewater treatment system of factories.

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