

IUWA

Report on the Field Research of Midong Chemical Industrial Park

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Midong Chemical Industrial Park (Industrial Park) was established in September 2005, and is a large-scale Chemical Industrial Park at Region-level. It is an important base to invest and develop, and enjoys the same preferential policies as other two state-level economic and technological development zones in Urumqi. Industrial park located in Midong district of northern Urumqi, and is 18km far from the Urumqi center (Figure 1).

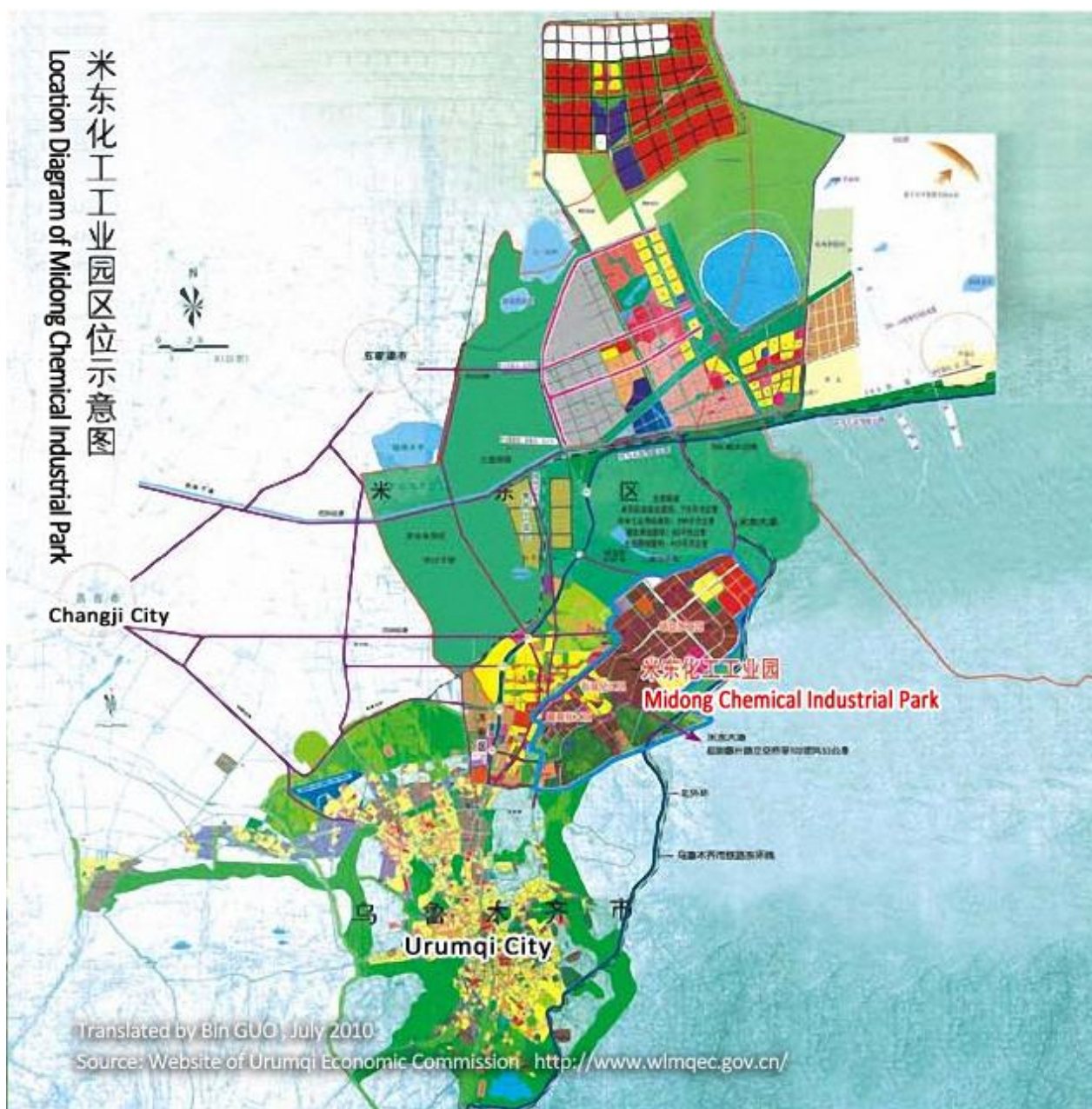


Figure 1: Location Diagram of Midong Chemical Industrial Park

The total planned area of Industrial Park is 108 square kilometers, including the Chlor-alkali Chemical Industrial Zone of 25 square kilometers, Petrochemical Zone of 33 square kilometers and Comprehensive Processing Zone of 50 square kilometers (Figure 2).

米东化工工业园用地示意图 Land use planning diagram of Midong Chemical Industrial Park
总用地面积：108 平方公里 The total area: 108 sq.km

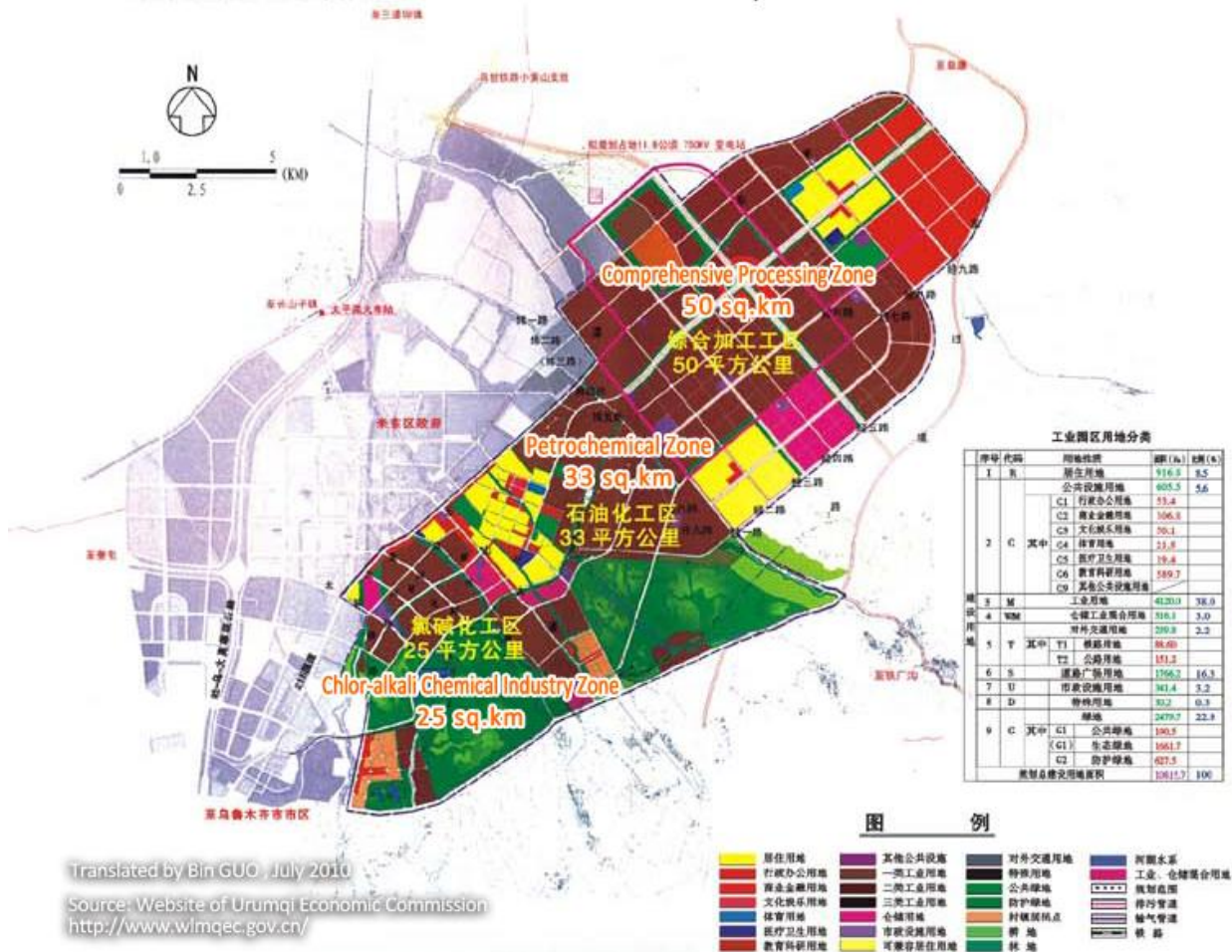


Figure 2: Land use planning diagram of Midong Chemical Industrial Park

In September 2007, “Midong Chemical Industrial Park pilot implementation plan about circular economy development” of Industrial Park was formally examined and approved by the Economic and Trade Commission of Xinjiang Autonomous Region, and Industrial Park was named as the first batch of pilot units of circular economy. By May 2010, nearly 300 enterprises have settled in Midong Chemical Industrial Park, and about 20 thousand employees work in the enterprises within Industrial Park. In 2009, the industrial output value of Industrial Park is about 33 billion Yuan, accounting for 91.6% of total industrial output value of Midong district [1].

In order to understand the development of circular economy in Midong Chemical Industrial Park, researchers of circular economy group of “RECAST URUMQI” project have done a thorough research preparation. Base on the data collection, literature review, information summary and team discussion, they developed two valuable questionnaires about circular economy in Midong Chemical Industrial Park. They are “Circular economy questionnaire about Midong Chemical Industrial Park” (Table 1) and “Circular economy questionnaire about industrial companies within Midong Chemical Industrial Park” (Table 2)

Circular Economy Questionnaire about Midong Chemical Industrial Park	
Number	Questions
1	Introduction about Midong Chemical Industrial Park
2	Which is the competent authority of Midong Chemical Industrial Park (About environment management and resource utilization)?
3	What titles about circular economy have Midong Chemical Industrial Park received?
4	Documents and information about investment in Midong Chemical Industrial Park?
5	What are the requirements of enterprises about environment protection before them settled in the Midong Chemical Industrial Park?
6	"Midong Chemical Industrial Park pilot implementation plan about circular economy development"
7	Organizations and duties of the administrative committee Midong Chemical Industrial Park
8	Which bureau of the administrative committee is in charge of the environment management?
9	Environmental monitoring and management systems and environmental emergency plans of Midong Chemical Industrial Park
10	Which enterprises settled in Midong Chemical Industrial Park are the world's top 500 enterprises?
11	Which enterprises settled in Midong Chemical Industrial Park are the China's top 200 or 500 enterprises?
12	Which enterprises are the "Scale Enterprises" in Midong Chemical Industrial Park? ("Scale Enterprises" means state-owned and large non-state owned industrial enterprises)
13	The list of main industrial companies in Midong Chemical Industrial Park
14	What Circular Economy Industrial Chains have formed in Midong Chemical Industrial Park?
15	Which enterprises in Midong Chemical Industrial Park use their selves' by-products and waste as raw material?
16	Which enterprises in Midong Chemical Industrial Park use other companies' by-products and waste as raw material?
17	Which enterprises in Midong Chemical Industrial Park are resource recovery enterprises?
18	What incentives and priority policies are used by the Administrative Committee to promote resource(waste) recycling and utilization
19	Which waste discharge enterprises in Midong Chemical Industrial Park are monitored and controlled by State?
20	Which waste discharge enterprises in Midong Chemical Industrial Park are monitored and controlled by Xinjiang?
21	Which waste discharge enterprises in Midong Chemical Industrial Park are monitored and controlled by Urumqi?
22	What measures are used by Midong Chemical Industrial Park to Control waste discharge enterprises?
23	Whether Midong Chemical Industrial Park plans to apply the National eco-industry Demonstration Park?
24	Comprehensive utilization rate of industrial solid waste in Midong Chemical Industrial Park
25	Hazardous waste treatment and disposal rate in Midong Chemical Industrial Park
26	Waste water and Solid waste collecting system in Midong Chemical Industrial Park
27	Centralized wastewater treatment facilities and solid waste disposal facilities in Midong

	Chemical Industrial Park
28	Network and information platform construction in Midong Chemical Industrial Park
29	Environmental report written by the Administrative Committee
30	What kind of marketing activities are done by the Administrative Committee to win new companies to settle down?
31	Is the Midong Chemical Industrial Park member of any kind of national or international networks with topic eco-industrial park?
32	Are there ISO 14001 certificated companies in the park?
33	"Master Plan of Midong Chemical Industrial Park"
34	"Environmental Impact Assessment Plan of Midong Chemical Industrial Park"

Table 1: Circular Economy Questionnaire about Midong Chemical Industrial Park

Circular Economy Questionnaire about Industrial Companies within Midong Chemical Industrial Park	
Number	Questions
1	Introduction of the circular economy project of the company?
2	Construction data of the circular economy project
3	On stream time of the circular economy project
4	Which kinds of energy can be saved by this project, and how much they worth?
5	Which kinds of resources (raw materials) can be saved by this project, and how much they worth?
6	Which kinds of wastes can be reduced by the project, and how many?
7	Which are the main raw materials of the company for production?
8	Which companies do the raw materials come from? Which companies are inside the Midong Industrial Park and which are outside?
9	How many raw materials are needed per year?
10	Which materials are other companies' wastes or by-product?
11	Which companies do you think produce the wastes you can use for production?
12	How much wastes or by-products are produced by upstream enterprises of your company?
13	How many by-products and wastes from other companies can be consumed by your company?
14	Which other companies use the same wastes as their materials like your company? Are they inside the Industrial Park? How far are they for here?
15	How much do you pay for using other companies' wastes?
16	What are the main products of your company? And what is the output of each product?
17	What are the prices of your company's products?
18	Which kinds of energy does your company need for production? Coal, water, electricity or steam? And how many?
19	Where does the energy come from? How much is the cost per year?
20	Which kinds of preferential policies are given by the state or local government? Tax for example.
21	Which kinds of waste are produced by your company? (waste water, solid waste and waste gas)
22	How many wastes are produced by your company?
23	Which kinds of hazardous wastes are produced by your company?
24	How many hazardous wastes are produced by your company?
25	How does your company dispose the industrial wastes and hazardous wastes?

26	Which downstream companies do you think can use your company's wastes as their materials for production?
27	How many wastes do you think they need for production?
28	If you company can reuse the wastes by yourself, what is the method?
29	If the wastes are disposed by other companies, which companies are they?
30	If you sell your wastes to other companies, which companies are they? What about the price?
31	If your store the wastes, where do you store them?
32	What kinds of charges do you need to pay for disposal the industrial wastes and hazardous wastes? And which departments should you give the money to?
33	Do your company certified by ISO 14001?
34	Have your company done the cleaner production audit?
35	Which office in your company is in charge of environmental management?
36	How many staffs in this office are in charge of environmental management?
37	What is the industrial output value of your company?
38	What is the wastes comprehensive utilization output value of your company?
39	What is the original value of your company's environmental protection facilities?
40	Is your company the key waste discharge company?
41	Which government agency counts the pollution charge of your company?
42	How much is the pollution charge of your company?

Table 2: Circular Economy Questionnaire about Industrial Companies within Midong Chemical Industrial Park

For getting further information about circular economy development in Midong Chemical Industrial Park, researchers of circular economy group carry out a detailed field research on Industrial Park and industrial companies in Midong Urumqi from May to June 2010. On the symposium with Midong Chemical Industrial Park Administration, researchers got the knowledge that there are 12 pilot circular economy projects in Industrial Park, involving 7 circular economy industrial companies (Table 3).

Number	Name of the project	Responsible Company
1	Waste water comprehensive treatment project	Xinjiang Huatai Heavy Chemical Industry Company
2	Using carbide slag produce cement clinker project (first phase and second phase)	Xinjiang Midong Tianshan Cement Company
3	Refinery alkaline residue treating project	PetroChina Urumqi Petrochemical Company
4	Sulfur recovery facility project	PetroChina Urumqi Petrochemical Company
5	Add flue gas desulfurization facility on coal-fired boiler project	PetroChina Urumqi Petrochemical Company
6	New sewage stripping unit project	PetroChina Urumqi Petrochemical Company
7	Advanced wastewater treatment system upgrading project	PetroChina Urumqi Petrochemical Company
8	Hydrazine hydrate production project	Xinjiang Xinren Chemical Industry Company
9	Environmental protection building material production project (first phase and second phase)	Xinjiang Fuyang New-type Environmental Protection and Energy Saving Building Material Company
10	Cogeneration by burning coal gangue project	Shenhua Shendong Electric Power Xinjiang

		Midong Thermal Power Plant
11	Shenhua coal washery project	Shenhua Xinjiang Energy Company
12	Shenhua coal mine four in one project	Shenhua Xinjiang Energy Company

Table 3: List of Midong Chemical Industrial Park Circular Economy Project

In order to learn more details about the development and implementation of the 12 circular economy pilot projects and collect information for the material flows model, researchers respectively interviewed the related 8 key industrial companies and 5 authorities. The 8 key industrial companies include the 7 circular economy industrial companies and a resource recovery company near by Industrial Park.

Number	Name	Property
1	PetroChina Urumqi Petrochemical Company	Industrial Company
2	Xinjiang Huatai Heavy Chemical Industry Company	Industrial Company
3	Shenhua Xinjiang Energy Company	Industrial Company
4	Xinjiang Xinren Chemical Industry Company	Industrial Company
5	Xinjiang Midong Tianshan Cement Company	Industrial Company
6	Shenhua Shendong Electric Power Xinjiang Midong Thermal Power Plant	Industrial Company
7	Xinjiang Fuyang New-type Environmental Protection and Energy Saving Building Materials Company	Industrial Company
8	Xinjiang Midong Material Supply and Marketing Company	Industrial Company
9	Midong Chemical Industrial Park Administration	Government Agency
10	Midong Environmental Protection Bureau	Government Agency
11	Midong Environment and Sanitation Station	Government Agency
12	Midong household waste landfill	Government Agency
13	Xinjiang Academy of Environmental Protection Science	Government Agency

Table 4: List of Interviewed Industrial Companies and Authorities

Through the serious investigation, researchers in details understand the progress of circular economy projects and the material flows among the industrial companies in Industrial Park. Base on the summary of primary investigated data and information from local government websites and related media reports about Midong Chemical Industrial Park, researchers developed the main material flows diagram of Midong Chemical Industrial Park (Figure 3).

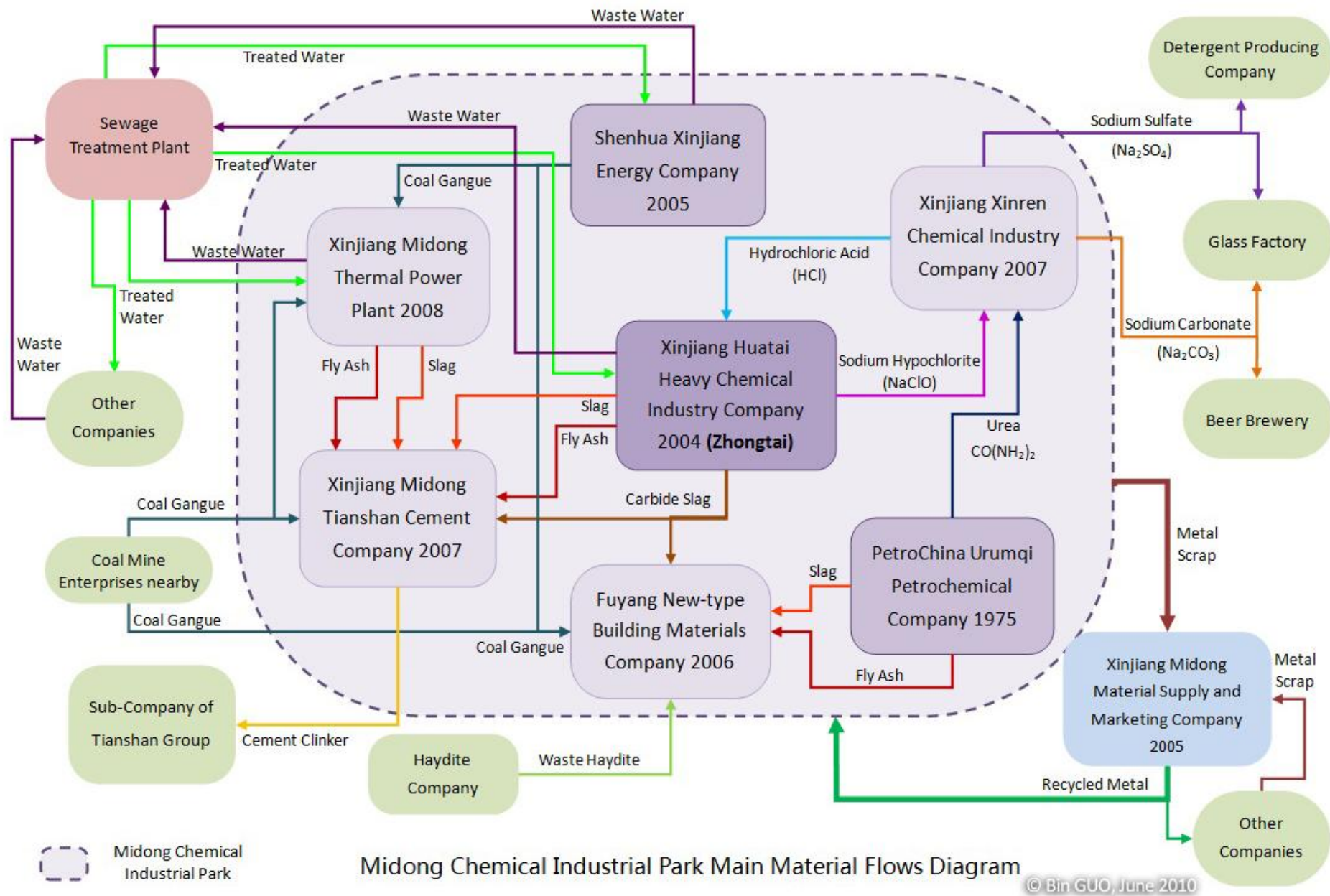


Figure 3: Midong Chemical Industrial Park Main Material Flows Diagram

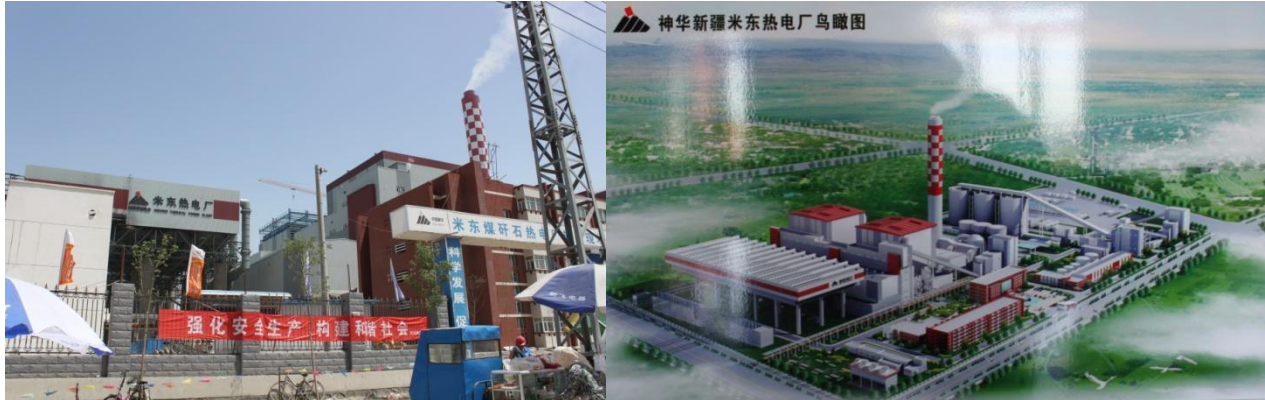
The company in the center of the material flows diagram named Xinjiang Huatai Heavy Chemical Industry Company (Huatai Company). It is a subsidiary of Zhongtai Chemical Corporation, was established in January 2004. Its main products are PVC resin and ion-exchange membrane caustic soda. Huatai Company has the annual production capacity of 300 thousand tons of PVC resin and 240 thousand tons of ion-exchange membrane caustic soda. And now it is constructing the second phase project with total investment of 4.2 Billion Yuan, including 360 thousand tons of PVC resin, 300 thousand tons of ion-exchange membrane caustic soda and 2X135 thousand kilowatts cogeneration. Huatai Company's main solid wastes are carbide slag, fly ash and slag. The current annual output of carbide slag is about 600 thousand tons. After the second phase project goes into operation in the latter half of 2010, the annual output of carbide slag is expected to be 1300 thousand tons.



In order to dispose the large amount of carbide slag produced by Huatai Company, Huatai Company and Xinjiang Tianshan Cement Corporation (Tianshan Corporation) established Xinjiang Midong Tianshan Cement Company (Midong Cement) in a joint venture in 2007. A 1600 ton/d using carbide slag producing cement clinker production line has been set up, and it is the first cement clinker production line which is 100% using carbide slag instead of limestone. This production line can produce 400 thousand tons of cement clinker annually, at the same time saving 600 thousand tons of limestone. Since this production line put into operation in March 2008, it has disposed 700 thousand tons of carbide slag produced by Huatai Company, effectively help Huatai Company to deal with the solid waste. In August 2009, Midong Cement invests 0.55 Billion Yuan to build another two using carbide slag producing cement clinker production line with 2000 ton/d production capacity. After the two production lines put into production, Midong Cement can consume 1500 thousand tons of carbide slag, and all the carbide coming from Huatai can be disposed.



Shenhua Xinjiang Energy Company (Shenhua Xinjiang) which is in the upper-middle of the material flows diagram is a subsidiary of Shenhua Group Corporation Limited (Shenhua Group), was established in August 2005. The company mainly engaged in producing and marketing of coal, electricity, heat production and supply and so on. The company has seven pairs of production coal mine, and its annual production capacity of coal (mainly long flame coal and weakly caking coal) has reached 15 million tons. The company's main solid waste is coal gangue the output of which is about 1.4 million tons ^[2].



To dealing with the large amount of coal gangue produced by Shenhua Xinjiang and other coal mines nearby, another subsidiary of Shenhua Group called Shenhua Shendong Electric Power Company established a new thermal power plant, in August 2008, named Shenhua Shendong Electric Power Xinjiang Midong Thermal Power Plant (Midong Thermal Power Plant) which takes coal gangue as their raw material to generate electricity and heat. The planned capacity of Midong Thermal Power Plant is 2X300MW. The commissioning of Midong Thermal Power Plant has already started in May 2010. In the second half of 2010, the whole plant will go into operation. After that, 2 million tons of coal gangue can be disposed, it means all the coal gangue produced by Shenhua Xinjiang and other nearby coal mines can be comprehensive utilized. The main solid wastes of Midong Thermal Power Plant are fly ash and slag the output of which is about 1.89 million tons per year ^[2]. Nevertheless, part of the solid waste will be sent to Midong Cement as their material to recycle. In addition, Midong Thermal Power Plant uses treated water of Qidaowan sewage treatment plant as their cooling water, and effectively conserves the consumption of water resources.

The oldest company of Industrial Park which was founded in 1975 is called PetroChina Urumqi Petrochemical Company (Urumqi Petrochemical), consists of ten units, such as, Refinery, Fertilizer Plant Chemical Fiber Plant, Thermal Power Plant, Water Treatment Plant and etc. Now Urumqi Petrochemical has the annual capacity of processing 6 million tons of crude oil, producing 1.1 million tons of urea and 150 thousand tons chemical fiber and etc. It has more than 60 species of petrochemical products of ten categories. This company is responsible for five circular economy pilot projects, and is the most one in the Industrial Park. The alkaline residue acidification and processing facility of Refinery can deal with 1.5 tons of waste per hour. The added flue gas desulfurization facility on coal-fired boiler of Fertilizer Plant can reduce sulfur dioxide emissions by more than 98%, which means 2500 to 3500 tons of sulfur dioxide emissions are reduced annually. The 10,000 t/a sulfur recovery facility of Refinery can re-process the acid gas containing 80% hydrogen sulfide which produced in the refining production process. It can

produce first-grade solid sulfur and food-grade sulfur in line with national standards, while purifies the exhaust gas. The main solid wastes of Thermal Power Plant of Urumqi Petrochemical are fly ash and slag 280 thousand tons and 70 thousand tons of which were produced in 2009 respectively. And Urumqi Petrochemical has already stored 4 to 5 million tons of fly ash since 1993.



Xinjiang Fuyang New-type Environmental Protection and Energy Saving Building Material Company (Fuyang Brick) is a circular economy company using solid waste like fly ash, slag, carbide slag, coal gangue and etc. to produce bricks. The company was established in May 2006, has 8 brick production line which can produce more than 0.5 Billion bricks per year. The first phase of the project has already put into operation. In 2009, Fuyang Brick disposed 190 thousand tons of fly ash and slag which was produced by Urumqi Petrochemical. In the second phase of the project, they add new equipments to support using more solid waste when producing bricks. After the upgrade of the project, 97% of the production material will be composed of solid waste. It is expected to dispose 1 million tons of solid waste when the second phase put into operation in August 2010.



Xinjiang Xinren Chemical Industry Company (Xinren Chemical) which was established in January 2007 is a private enterprise for producing hydrazine hydrate. The total planned annual production capacity is 20 thousand tons, and now it can produce 6 thousand tons of hydrazine hydrate per year. The main production material of Xinren Chemical is sodium hypochlorite which is one of the by-products of Huatai Company. The daily consumption of sodium hypochlorite is about 120 tons (14% liquid). Xinren Chemical processes soda which is generated during the production, and sells it as one of its by-products to the glass factory and beer brewery around

the Industrial Park. In order to dispose the salt residue and caustic residue, Xinren Company set up a new upgrade project in 2009. With this new project they can produce hydrochloric acid and sodium sulfate out of the residue. They produce 30 tons of hydrochloric acid per day and sells it to Huatai Company, and 20 to 25 tons of sodium sulfate and sells it to the detergent producing company and glass factory around the Industrial Park. Almost all the waste produced by the production processing can be recycled.

Among the 7 circular economy companies of Industrial Park, Urumqi Petrochemical and the holding company of Midong Cement have already been certified by ISO 14001, and the leaders of other 5 companies all have concerns with ISO 14001. It indicates that the circular economy companies in Midong Chemical Industrial Park have higher awareness of environment management and circular economy.

References:

[1] 6 new projects begin to construct in Urumqi Midong Chemical Industrial Park.

http://www.tianshannet.com/news/content/2010-04/22/content_4926800.htm, 2010-08-02

[2] Environmental Impact Report of Shenhua Xinjiang Midong (2X300MW) Coal Gangue Thermal Power Plant Project. <http://www.xjepb.gov.cn/Announce.asp?ChannelID=1&ID=629>, 2010-08-03