



Article by  
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China Inroads supports innovative European high-tech companies with a firm foothold in the Chinese market. Whether you need support in accelerating your existing cooperation with your Chinese partner, or wish to enter the Chinese market, China Inroads is your local strategic partner in developing a successful business venture.



## → CHINA'S FOOD WASTE PROBLEM

It is no news that China, in recent years, has been developing rapidly and still knows high economic growth. Due to this growth, consumption has increased sharply in the last decades, including the consumption of food. Because of this high increase in consumption, food waste has become a big challenge for the Chinese government. China Inroads has been active in several waste processing projects over the past years, and therefore would like to give some insight in the problem of food waste in China. What are the causes of food wastage in China? How can this be prevented? And how is China using technology to deal with the food waste problem?

### Prevention is key

Across the globe, nearly 30% of food is wasted throughout the agrifood supply chain. In China, over EUR 28.4 billion worth of food is thrown away annually nationwide. It is estimated that China produces at least 60 million tons of food waste every year, and due to the economic growth and increased consumption this number is increasing with 10% every year.

### 'You need 20 times as much energy to produce food as what you get out of it'

However, the awareness on food waste is also increasing. Toine Timmermans is the coordinator of Refresh, an EU research project taking action against food waste. This research project contributes to the UN's Sustainable Development Goal 12.3 which is to halve food waste per capita at the retail and consumer level, reduce food losses along production and supply chains, reduce waste management costs, and maximize the value from unavoidable food waste and packaging materials. Businesses, research institutes, governmental organizations and other stakeholders from 12 European countries and China work together to tackle this problem. In China, the partners are the All-China Environment Federation (ACEF) and the Institute of Geographic Sciences and Natural Resources Research (IGSNRR). According to Toine Timmermans, it is first of all important to prevent the wastage of food. A lot of profit is to be gained from this. You need 20 times as much energy to produce food as what you get out of it. Wasting food is therefore both uneconomical and unsustainable.



How to prevent the wastage of food? First of all, it is important to look at where the wastage of food occurs. Toine Timmermans argues that, when comparing China and Europe, wastage of food occurs in different parts of the chain. On the one hand, at the consumer level less wastage of food occurs in China because it is common to eat by-products, for example offal. Only 5% of the food is wasted at the consumer level, compared to 12-15% in EU countries. On the other hand, food and culture are highly intertwined in China. In restaurants and at big banquets it is of importance to show hospitality and abundance. At restaurants around 11-17% of the food is wasted, which is quite high compared to Europe. Furthermore, a lot of waste takes place in the production stage, at the farms. Products are often not stored and preserved correctly, and therefore need to be thrown away. For example, in The Netherlands apples can be consumed up until a year after they have been harvested. In China, apples have to be consumed within a month after harvesting. Good storage, logistics and preservation are crucial to prevent wastage of food. Toine Timmermans sees that in China there is a need for solutions to these problems, which leads to business opportunities for European companies offering technologies to optimize these processes. Many Dutch companies are active in this field, as they are leading in the agrifood sector. The above shows that there are different causes of food waste, therefore multiple solutions are necessary. Both behavioral changes and the right technologies are needed.

### **Food waste projects are booming**

Although more and more attention is being paid to prevention, existing food waste still needs to be processed. Therefore, the Chinese government is taking action regarding food waste management. During the last five years, the government has invested about EUR 1.5 billion on food waste projects in China. About 118 food waste treatment plants in 100 cities have been built or are under construction. The total processing capacity of food waste is about 21,500 tons/day, much below the goal of 30,000 tons/day set by the Chinese government. Therefore, more and more food waste treatment plants are planned to be built in various cities. As these numbers show, the Chinese government places great importance on the food waste industry. Therefore, this industry, with a market size of EUR 5.4 billion, shows great potential for both Chinese and foreign companies.

### **Food waste can be a valuable resource**

Food waste accounts for roughly 37-62% percent of municipal waste. This food waste first of all needs to be separated from the rest of the waste. Therefore, good separating technology is essential for the entire process. Currently, this technology is lacking in China. Therefore, most of the food waste ends up in a landfill or is burned. This has negative consequences for the environment. First of all, leachate of the food waste gets into the sewage system which pollutes the ground water. Second, landfills cause land salinization due to the composition of the food waste. Furthermore, the smell of organic food waste and the burning of this waste pollutes the air. Nowadays, food waste is one of the top concerns when it comes to environmental pollution in China. In fact, food waste has the potential to be a valuable resource, for example as a source of energy or fertilizer. The Chinese government and companies are starting to see the added value of food waste.



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### **Here we highlight three ways of resource utilization for food waste: feeding, aerobic composting and anaerobic digestion.**

The feeding of food waste to animals used to be a common approach in China. In the past this has led to food security problems, such as mad cow disease (BSE) caused by i.e. meats and bones in this food waste.

Nowadays, due to strict governmental policies regarding food security and health care, feeding is less common in China.

The second way of food waste treatment is aerobic composting. Aerobic treatment is the use of free or dissolved oxygen by aerobes in the degradation of organic waste. The aerobes can process the organics from the food waste into humus through fermentation. This humus can be used as soil fertilizer, thereby playing an important role in land improvement. The Chinese city Hefei in Anhui province is one of the cities that uses aerobic technology for the treatment of food waste. However, aerobic treatment has several downsides. First of all, the entire process includes solid and liquid separation, secondary fermentation, microbial fermentation and dehydration, which makes it rather complex and time consuming. Furthermore, this process needs a relatively large area of land and uses large amounts of energy, indirectly causing air pollution. Furthermore, aerobic composting can also lead to land salinization due to the composition of the waste.



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The third way of processing food waste is widely used in China: anaerobic digestion. Anaerobic digestion is an effective and environmental friendly biological process which can treat a wide variety of organic waste. It is a collection of processes by which microorganisms break down biodegradable material in the absence of oxygen. This way, the organics from food waste are processed into biogas. However, it should be noted that the Chinese food waste is different from European food waste. Zhaopeng Cheng CEO of Shanghai Wenyuan Environment Technology argues that these differences have important consequences. Shanghai Wenyuan Environment Technology company is a private engineering company which is active in microbial and anaerobic technologies for the processing of food and agricultural waste. According to Zhaopeng Cheng, Chinese food waste contains large amounts of debris, water and oil which influences the microbial activity, effectivity of the biogas generation and machine usage. Therefore, good pre-treatment (i.e. separation technology) is essential. This is something European companies should be aware of when applying their European anaerobic digestion technology in China.

### **It is all about local circumstances**

Looking at the current technologies of food waste treatment used in China, there is no conclusion as to which is method is best. That being said, about 90% of new built food waste plants in China currently prefer anaerobic digestion to feeding and aerobic composting because it is less harmful to the environment. Because of the high biogas yields, companies are developing dry anaerobic technology and combined wet and dry anaerobic technology instead of using wet anaerobic technology.

## **‘Sometimes a combination of technologies is necessary’**

There are several examples of Chinese cities who have successfully implemented anaerobic digestion plants. In Chongqing, 1000 tons of food waste per day can be processed into biogas, biodiesel and compressed natural gas (CNG) by using anaerobic digestion and cogeneration. Xining processes up to 120 tons/day of food waste using anaerobic digestion. Suzhou can process 380 tons of food waste per day into biogas and biodiesel, using anaerobic digestion. In Changzhou, continuously-stirred anaerobic digestion is used to



process 200 tons/day of food waste. These cities adjusted the technology for food waste treatment to meet the local conditions. Mr. Cheng argues that companies need to combine various solutions (aerobic composting, wet and dry anaerobic digestion) due to the different food composition in different regions, especially between Northern and Southern China.

### **Are you struggling to find the right partner?**

For Chinese parties it is difficult to find the right channels to get appropriate technological support from European companies. From our experience, Chinese companies are often not interested in buying a turn-key plant. Instead, they are looking for a model where local resources and suppliers can keep the costs affordable. Thus, an appropriate cooperation mode is essential for both Chinese and European companies to create a win-win situation. Furthermore, it is important to keep in mind that the technological needs in China differ because of the different composition of the waste. For example, Chinese food waste contains a lot of oil, salt and water while Northern European food waste mostly consists of milk products, bread, vegetables, sauces and fats. Finally, it is difficult for European companies to understand the real needs of Chinese companies and to understand the Chinese business culture. China Inroads helps to tackle these issues.

## **How can China Inroads help you bridge this gap?**

China Inroads supports innovative European high-tech companies with the realization of a sustainable cooperation in China with relevant, reliable partners and distributors.

We support machinery manufacturers that provide technological custom-made solutions in fields such as food processing, energy- and environmental technology and waste processing.

Would you like to enter the Chinese market or intensify your current cooperation? In that case, China Inroads – with its extensive local network and relevant expertise – is a valuable partner to help you take that step.

From our offices in Utrecht, Shanghai and Beijing, China Inroads offers the following services:

- Relevant market research
- Market entry strategy
- High-quality partner search
- Workshop business culture
- Local representation
- Recruitment of local personnel

You are welcome to visit us for a consultation at one of our offices. We are of course glad to visit your company as well.