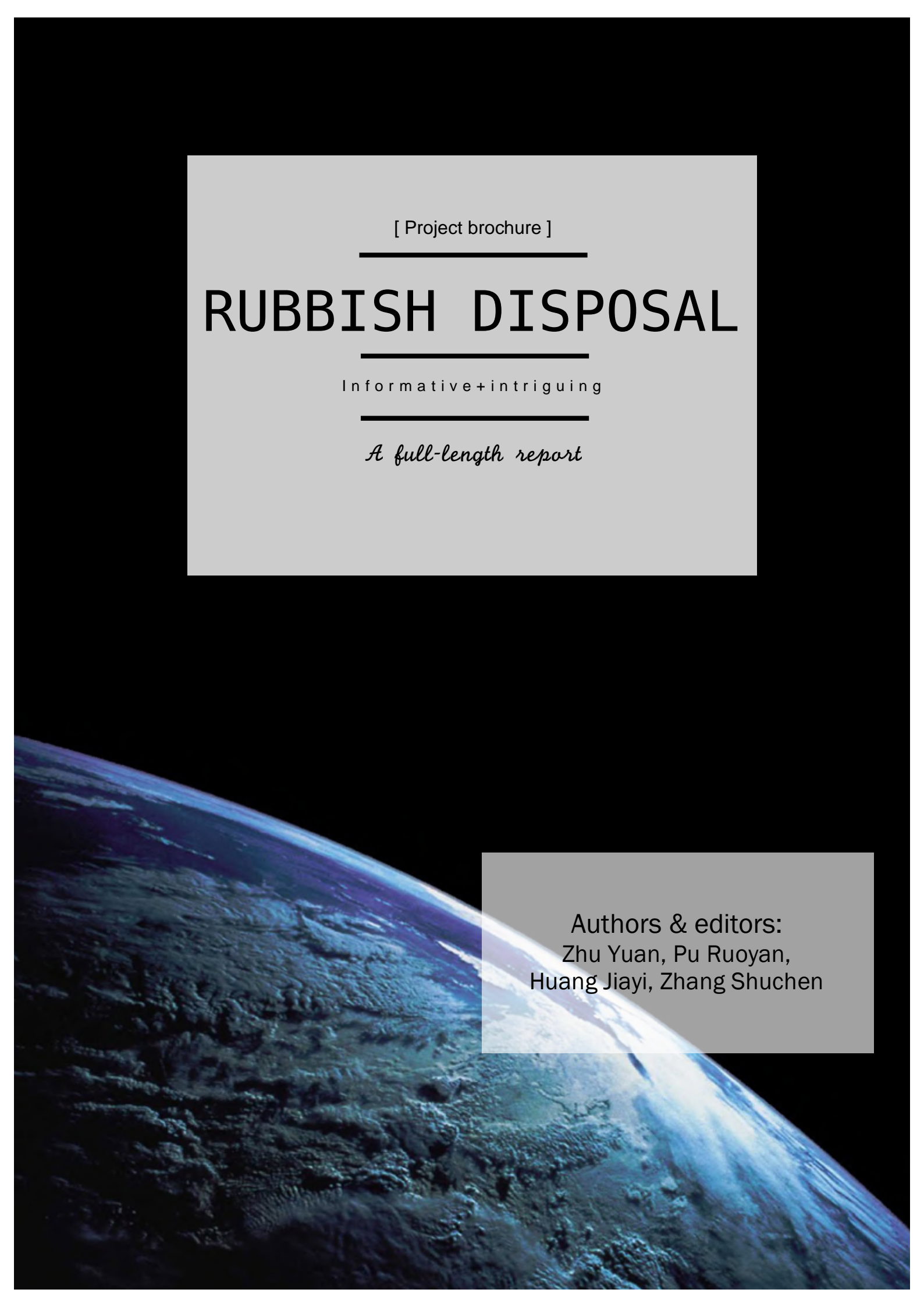


[Project brochure]

RUBBISH DISPOSAL

Informative+intriguing

A full-length report



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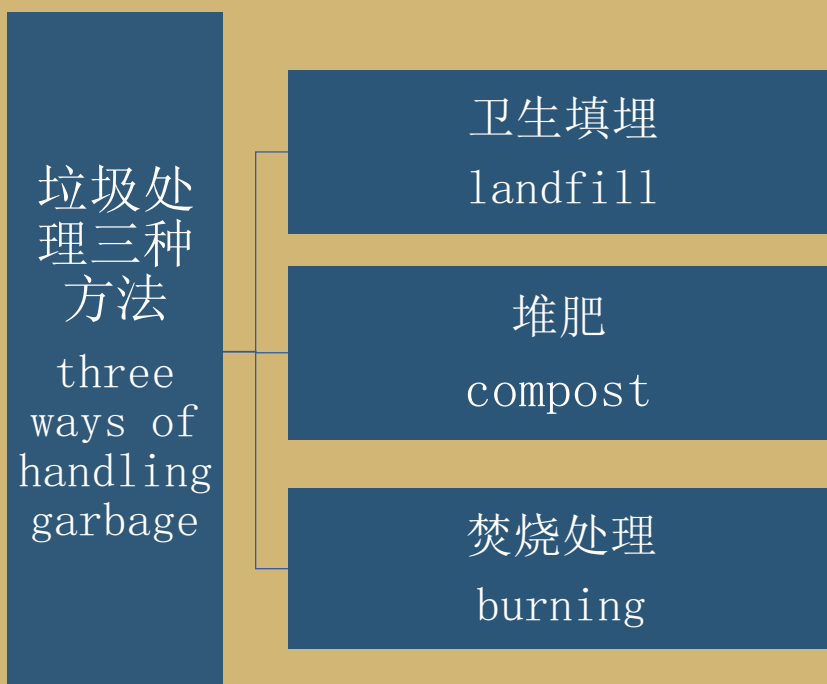
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WAYS OF RUBBISH DISPOSAL

目前垃圾处理主要有三种方法：卫生填埋、堆肥及焚烧处理。

There are currently three ways to handle garbage in China: landfill, compost, and burning.





◆
填埋技术
LANDFILL

◆ **THE LANDFILL** is very simple to operate and can deal with all kinds of garbage. However, Landfill requires a very large area of land and meanwhile severely pollutes the environment. For example, the toxic liquid in the garbage can contaminate underground water and soil; the bad smell of the garbage can pollute the surround air; methane produced by the fermentation of garbage can easily cause fire and explosion, and releasing methane to the air can increase greenhouse effect. Recently a lot of cities have already realized this problem and invented some advanced landfill technology, which to some extent solved the pollution problem. But the cost of this technology is high. The most essential problem is that landfill has very limited ability to handle garbage, and it takes a lot of land resources.

◆ 填埋技术的特点是操作简单，可以处理所有种类的垃圾。但占地面积大，同时存在严重的二次污染，例如垃圾渗出液会污染地下水及土壤，垃圾堆放产生的臭气严重影响场地周边的空气质量，另外，垃圾发酵产生的甲烷气体既是火灾及爆炸隐患，排放到大气中又会产生温室效应。近年来有的城市已经认识到这一问题，建立了一批具有较高水平的卫生填埋厂，较好地解决了二次污染问题，但建设投资大，运行费用高(包括规范的填埋、渗出液处理及甲烷收集利用等)。最关键的是填埋厂处理能力有限，服务期满后仍需投资建设新的填埋场，进一步占用土地资源。

焚烧技术

BURNING



对垃圾进行焚烧处理减容、减量及无害化程度都很高，焚烧过程产生的热量用来发电可以实现垃圾的能源化，是一种较好的垃圾处理方法。但对焚烧条件控制不当会存在烟气污染问题，且设备投资巨大。

Burning garbage is a very efficient way to dispose garbage, which reduces pollution. Generating electricity using the burning process is a kind of recycle of energy, which is a very good way to deal with garbage. However, if burning conditions are not properly controlled, the wasted gas may pollute the air. Besides, it cost a lot to build up a burning factory like this.



◆
堆肥技术
COMPOST

- ◆ **THE PROCESS** of compost is also simple, which is suitable to dispose garbage with high percentage of organic materials. This technique can reuse the resources in the garbage, which cost less than garbage burning. Composting technology started early in the western, and has currently reaching a very advance level. But it cost a lot to introduce this technology to china. Because of this, some companies in China has already started to study the compost technology and got some new discoveries.
- ◆ The percentage of disposable material in China's garbage is very high, which suggests that composting may be an effective way. But composting can not deal with materials that are not disposable, which may cause pollution to the environment. Therefore only relying on compost can not solve the problem.

- ◆ 堆肥技术的工艺也比较简单，适合于易腐有机质含量较高的垃圾处理，对垃圾中的部分组分进行资源利用，且处理相同质量的垃圾投资比单纯的焚烧处理大大降低。堆肥技术在欧美国家起步较早，目前已经达到工业化应用的水平。但引进国外技术投资巨大，不适合我国国情。针对这一情况，我国一些研究单位和企业已经开始了这方面的工作，并取得了一定的成绩。
- ◆ 我国垃圾的具体情况来看，生活垃圾中的易腐有机物含量较高，采用堆肥技术可以达到比较好的处理效果。但堆肥技术也存在明显的缺点不能处理不可腐烂的有机物和无机物，因此减容、减量及无害化程度低。因此仅仅依靠堆肥处理仍然不能彻底解决垃圾问题。

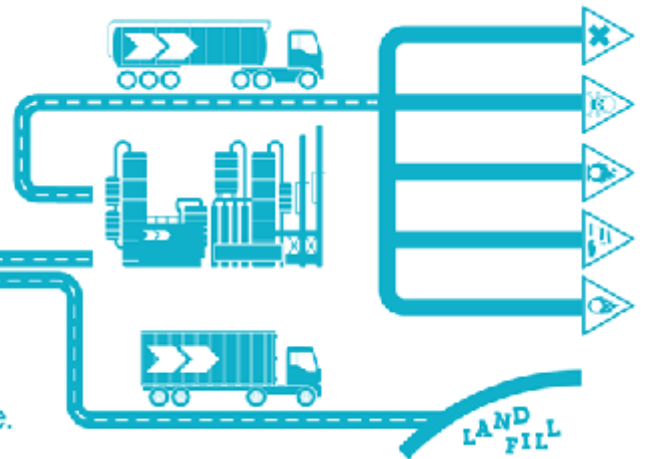


垃圾处理流程

waste processing



We process all your waste, including chemical and hazardous waste, in a **safe, secure and sustainable** way avoiding landfill where possible.



RUBBISH DISPOSAL PROCESS



通常情况下，一个环保节能的垃圾处理流程为：

第一步：生活垃圾通过垃圾车的运输先进入垃圾中转站，将垃圾根据金属，玻璃，可回收垃圾，有害垃圾，不可回收垃圾等进行分类。然后将垃圾压缩，去除水分，防止运输过程中跑冒滴漏的情况发生。

第二步：在垃圾被运到垃圾燃烧发电厂后，先将垃圾抓入炉膛，发酵一周左右，去除多余的水分后进入炉房焚烧。

第三步：在焚烧的过程中，垃圾燃烧产生的热量可以使水变成蒸汽，从而推动发电机来进行发电。

An environmental-friendly garbage disposal process is usually like this:

Firstly, household waste is transported by garbage truck to the transfer station. There, garbage is classified into different categories: metal, glass, recyclable garbage, toxic garbage, unrecyclable garbage and so on. Then the garbage is compressed and partly dehydrated to prevent waste water from seeping out in the process of transportation.

Secondly, when garbage arrives at garbage disposal factory, it goes through a one-week fermentation process to get rid of the extra water. Then the garbage goes to the burning process.

Thirdly, in the process of burning, the heat emitted can vaporize water and generate the turbine to produce electricity.

第四步：垃圾焚烧后会产生很多的烟气，其中包含了很多的有害气体，可能污染空气。但是烟气净化系统通过高温分解，半干式反应，活性炭吸附以及布袋除尘能够消灭这些有害气体中的二恶英等致癌物质，从而减少最后排放的烟气中的污染物。

第五步：燃烧垃圾和垃圾发酵后产生的废水和沼气也被净化和回收。渗滤液产生的沼气接入天然气管网送至千家万户生活使用。污水经过生物处理，调节处理，化学处理，以及膜处理将这些污水处理成清水。

第六步：垃圾燃烧后产生的炉渣可以用作铺路和建筑，同样也是资源的循环利用。

Fourthly, a lot of harmful gas can be produced in the burning process, which includes a lot of harmful chemicals which may pollute the environment. However, through high temperature decomposition, carbon absorption, and dust extraction process, the harmful chemicals can be filtered, and therefore reduce the pollution to the air.

Fifthly, the waste water and methane produced in the process of fermentation and burning can also be purified and recycled. The methane can be used for cooking. Through biological treatment, chemical treatment and filtration, the waste water can be purified.

Sixthly, the residue of garbage can also be used in pavement and as construction materials, which is also the recycle of resources.

当然，这是一个节能环保的垃圾流程。其他的垃圾处理工艺如垃圾填埋等，过程没有这么复杂和精良。仅仅将垃圾堆放和填埋不仅会污染空气和水源，并且不能进行资源的再利用。

Of course, this is an environmental-friendly garbage disposal process. Other processes like landfill will not only pollute the environment but also waste energy.



RUBBISH DISPOSAL MACHINES



大小规模垃圾处理机优劣势对比

Comparison of large and small scaled rubbish disposing machines



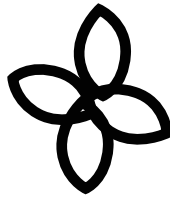
在我们的研究过程中,我们主要研究了两类垃圾处理厂,一类是大规模的,一类是小规模的。这两类垃圾场分别有各自的特点。在我们对垃圾处理厂的了解过程中,我们主要参观了以利百川垃圾处理公司为代表的小型垃圾处理厂,和以光大垃圾处理厂为代表的大型垃圾处理厂。

During our research, we mainly studied two kinds of garbage disposal machines, one is small scale garbage disposal machine and another is large scale garbage disposal machine. We visited LiBaiChuan Garbage disposal company, which produces typical small scale garbage disposal machines, and Guangda garbage disposal companies, which uses large scale garbage disposal machines.

DIFFERENCE

利百川公司的垃圾处理器是典型的小型垃圾处理器。一台垃圾处理器的占地面积基本小于五百平方米。其垃圾处理器的处理流程为：垃圾抓斗起重机、磁选机、破碎装置、输送装置，燃烧装置、残渣输送装置，和废气过滤装置等。

Guangda company uses typical large scale garbage disposal machine. A garbage disposal machine like this takes an area of about 57333 square meters. The structure of this kind of disposal machine includes: grab machine, garbage burning system, water purification system, electricity generation system, gas purification system. Guangda company not only dispose garbage, but also generate electricity through the burning process.



LiBaiChuan company uses typical small scale garbage disposal machine. One machine like this only takes an area of about 500 square meters. The main structure of small scale garbage disposal machine is: grab machine, transmission system, magnetic-selection system, crusher, residue-transmission system, burning system, and gas purification system.

光大大公司的垃圾处理器是典型的大型垃圾处理器。一台大型垃圾处理器占地约为86.42亩。这样一台大型的垃圾处理器的主要构造为：垃圾抓斗，垃圾燃烧系统，水处理系统，发电系统，烟气净化系统等。像光大公司这样的垃圾处理厂的目的不仅是处理垃圾，更是可以通过焚烧来发电。

大型垃圾处理厂的优点有：1，节能。大型垃圾处理厂不仅可以处理垃圾，而且可以通过发电来为千家万户提供能量，属于能源的再利用。2，环保。这种大型的垃圾处理器具有先进的污水处理系统和废气处理系统，防止一切对环境的污染。3，处理垃圾的数量多。因为大型垃圾场占地面积大，其每天处理的垃圾数量是很多的，几乎可以足够一个发展城市的需要。然而大型垃圾发电处理厂的缺点有：1，不易移动和组装。这种垃圾场不适合偏远地区，以及山区的垃圾处理。2，需要很多的技术人员。处理这么多垃圾需要许多技术人员，搭建工厂也需要专业人员的指导。

大型垃圾厂与小型垃圾厂的优缺点对比

The advantages and disadvantages of large-scale and small-scale rubbish disposal plants

The advantages of big scale garbage disposal system are: 1. it recycles energy. Big scale garbage disposal factories not only dispose garbage, but also provide energy for residents, which is a kind of energy-recycle. 2, it protects the environment. This kind of big scale garbage disposal machine has very advanced waste-water and gas purification system, which can prevent both air pollution and water pollution. 3. this kind of disposal factory can deal with a great amount of garbage each day. Due to the large size of the garbage disposal machine, it can burn a lot of garbage each day, which fit the garbage production of large cities. However, large disposal machines also have disadvantages: 1. it is too large to be transported. Therefore this kind of garbage disposal machine is not suitable to be used in far areas in China. 2. a lot of technicians are required to operate such a factory. Also, building such a machine needs a lot of engineers and professionals.

小型垃圾处理厂的优点有：1，可移动和组装。这种小型垃圾场可以很方便的在偏远地区，山区等地搭建，因为其占地面积较小。2，需要的技术人员比较少。这种小型的垃圾处理器不需要很多人来操作。但是小型垃圾场也有一些缺点如：1，对废气和残渣的处理不够。简单的废气过滤并不能达到很好的减排效果，有污染环境的可能。2，处理垃圾量很少。虽然可以足够处农村的垃圾，但是对于大量的城市垃圾肯定是不够的。

大型垃圾厂与小型垃圾厂的优缺点对比

The advantages and disadvantages of large-scale and small-scale rubbish disposal plants

There are several advantages of the small scale garbage disposal machine: 1.it is easy to be transported and assembled. The size of this kind of machine is small compared to Guangda garbage disposal machine, which make it easy to be used in mountain areas. 2. less technicians are required to operate the machine. But the small scale garbage disposal machine also has some disadvantages: 1. there is no enough precautions to deal with the wasted gas and water. Simple filtration of gas can not get rid of all the harmful particles in it, which may pollute the environment. 2. it can only dispose a small amount of garbage each day, which is not enough if the machine is used to burn large-city garbage.



RUBBISH CLASSIFICATION

垃圾分类以及呼吁的途径

Rubbish disposal and ways to appeal for public awareness



可腐有机物
disposable organic
material



可燃有机物
combustible
organic material



无机物
inorganic material

城市生活垃圾的主要成分可分为三大类：可腐有机物(以厨余为主)、可燃有机物(塑料、废纸、橡胶、皮革、竹木、布类等)、无机物(煤渣、砖瓦、地灰、玻璃、金属等)。

The city garbage in China can be divided in to three main categories: disposable organic material (kitchen garbage), combustible organic material (plastic, paper, rubber, leather, wood, and cloth), and inorganic material (coal, brick, dust, glass, and metal).



垃圾分类指的是按一定规定或标准将垃圾分类储存、分类投放和分类搬运，从而转变成公共资源的一系列活动的总称。通过我们项目中的问卷调查，我们发现公众对于垃圾分类这一方面的知识非常的匮乏，因此在这里我们将介绍垃圾分类及其好处。

垃圾分别分为可回收和不可回收两大类。可回收垃圾包括废纸，塑料，金属物，玻璃，布料等。这些垃圾通过综合处理回收利用，可以减少污染，节省资源。如每回收1吨废纸可造好纸850公斤，节省木材300公斤，比等量生产减少污染74%；每回收1吨塑料饮料瓶可获得0.7吨二级原料；每回收1吨废钢铁可炼好钢0.9吨，比用矿石冶炼节约成本47%，减少空气污染75%，减少97%的水污染和固体废物。

不可回收垃圾包括餐厨垃圾，餐厨垃圾袋，卫生纸，有毒有害垃圾，果壳和尘土等。这些垃圾如果仅仅随意堆放或者填埋，将对环境，空气，和居民都造成极大的危害。因此，分类这些垃圾不仅可以保护环境，还可以减少病菌的传播等问题。

Garbage classification means the classification treatment of garbage according to their categories. Through the questionnaire we made during our project, we found that the public knows little about garbage classification. Therefore, we will introduce the benefits of it.

Garbage can be divided as recoverable and unrecoverable.

Recoverable garbage includes waste paper, plastic, metals, glasses, cloth and so on. The recycle of this kind of garbage can reduce pollution and save resources. For example, a ton of waste paper can be used to produce 850 kg of new paper, which can save 300kg of wood and reduces pollution by 74%. Recycling a ton of plastic bottle can acquire 0.7 ton of raw material; recycling a ton of waste steel can produce 0.9 ton of good-quality steel, which costs 47% less money, reduces 75% air pollution, and decrease 97% of water pollution.

Unrecoverable garbage includes kitchen garbage, plastic bags for kitchen garbage, poisonous garbage, fruit peels, dust and so on. If recoverable garbage is accumulated randomly, it will cause great harm to air, water, and residents. Classifying this kind of garbage can not only protect the environment, but also prevent the spreading of bacteria.



然而，现在人们对于垃圾分类的了解和行动是非常不足的。在我们的问卷调查中，我们发现许多人都对垃圾分类有了解，但是在实际生活中很少，甚至从来没有执行过垃圾分类。同时，现在有些垃圾桶虽然放了垃圾分类的标志，但是由于民众对于垃圾分类的不了解，许多人仍然不知道垃圾应该如何分类。这是一个非常需要解决的问题。

解决问题的途径有如下几点：1，树立垃圾分类的观念。广泛开展垃圾分类的宣传、教育和倡导工作，使消费者树立垃圾分类的环保意识，阐明垃圾对社会生活造成的严重危害，宣传垃圾分类的重要意义，呼吁消费者积极参与垃圾分类。2，改造或增设垃圾分类回收的设施。增加分类垃圾桶的数量，垃圾桶上必须注明回收的类别和简要使用说明，指导消费者使用。3，改善垃圾储运形式。对一些体积大的垃圾，应该压缩后进行储运。尤应注意的是，要对环卫局的垃圾回收车进行分隔式的改造，分类装载垃圾。

Nowadays, the public's knowledge on garbage classification is very insufficient. Through our questionnaire, we found that although a lot of people heard about garbage classification, few had taken action to classify garbage. Meanwhile, although in some places classified garbage bins are set, still a lot of people do not know how to classify garbage. This is a very urgent problem.

There are several ways to solve this problem: 1. the concept of garbage classification should be set up in the public. More advertisements on garbage classification should be made. Consumers need to understand the harm that can be caused by accumulating garbage randomly, and keep in mind with the idea of protecting the environment. 2. more advanced garbage classification facilities should be set. More garbage-classification bins should be provided, and they should be clearly labeled for people to recognize. 3. the ways of storing and transporting garbage should be improved. Garbage with large volume should be compressed before being transported. The car for garbage recycle use should be divided into different parts to classify garbage.



SAVE THE PLANET,
STARTING FROM PUTTING RUBBISH INTO THE PLACES WHERE IT
BELONGS.