

1.

The figure shows that the process of reusing steel, which includes seven steps, collection, sorting, steel slugging, grinding, furnace, forming, flattening. In the first step, waste that is rich in metal is collected as PMC. Next, PMC is sorted by the means of conveying belt and magnetic material. After that, small pieces of metal are combined for several huge pieces of metal. Then the steel slugs are grinded to smaller pieces, and these smaller pieces are put into furnace to melt into liquid. After that, the steel liquid is flowed into forming models, in a long time it will become solid again and have its new shape. In the last stage, the raw products are flattened through a workshop and final products are produced. The final products are used to produce lots of industrial devices in different kinds of factories. Then industrial devices are used in thousands of families and finally are recycled again. In conclusion, this recycling process mainly has three aspects, first, collection is necessary. Second, reproduction is the main process. Third, final products are used by people.

3.

a. First criteria: Production ability.

The production ability is one of the most important aspects needed to be considered in detail, which includes the amount of production and water quality. For the former, MSF has the largest amount of production, which is 205000 m<sup>3</sup>/day, MED is secondary, 184500 m<sup>3</sup>/day, and RO is the last, 164000 m<sup>3</sup>/day. For the latter, MSF and MED both have very high water quality, but RO only has high water quality.

Second criteria: energy required.

There is also a necessary aspect that needs to be thought of, which is energy required, includes electricity power and heat power. For the former, MSF needs the most energy, which is 34 Mw, RO is nearly same as it, but for MED, it needs fairly smaller than that two. For the latter, RO has its evident advantage, which needs nothing for heat input, but the rest two designs both need a mass of heat input.

Third criteria: cost.

Cost is always the first things people tend to think about before something is constructed, it has two factors also, initial construction cost and water cost when operating. For the former, MED costs most, which is very expensive, and MSF is secondary, which is 180 million dollars, and RO costs least in sum. For the latter, water cost, includes cost of electricity and thermal energy. MSF is the most expensive for these cost, MED is a little smaller than that, and RO is still most cheap whether construction cost or water cost.

b. From the above-mentioned information, I think MSF should be constructed, which is the most ideal design by synthetically analysing

all details of the three designs. Firstly, MSF has the highest amount of water production and has the highest amount of water production and has a very high water quality, which is suitable and enough for tourists to swim and drink, the rest of two are not enough to solve the water shortages. Secondly, heat can be provided, so we don't consider it. For electricity, though MSF needs larger electricity, it will build a electricity generating power station there, so we don't worry about it. Thirdly, because the tourism industry of Seville is developed, the fund is enough for MSF to operate and construct.

c. The first design MSF can produce more water for people to live with, but it needs more electricity, which may be polluted because power generation will erupt lots of polluted gas and carbon dioxide, it may cause air pollution and global warming. MSF use heat from solar energy, which is sustainable, entirely use the energy from the sun for benefiting people. Though it costs money, it has more advantages than disadvantages.

d. There are two issues needed to be considered for desalination plant, one is environmental impact, the other is technology availability. For the former, the design may occupy a large area of land to construct the plant, which will destroy the habitat nearby by destroying trees and animal migration. For the latter, the technology need to be improved to produce better and more water in a short time and produce less pollution. If the two things can be solved. MSF is reliable and feasible.