

# Free Soil

## World map of high-tech waste

Working in many ways as media-based artists, we found it relevant to question the impact on the environment of the tools we use and of our practice. This led us to question the local and global impact of the high-tech industry, an industry that is often considered clean but in fact uses a vast amount of natural resources, electricity and produces gigantic amounts of toxic electronic waste.

In 2006 we did a bio diesel bus tour of Silicon Valley to investigate these issues on the ground (see figure below). One of the first things we learned was that Silicon Valley has the most soil pollution in the US due to the high-tech industry. Our research has since broadened to look into the wider geographic implications – where do the minerals used in personal computers come from, and what happens after the equipment is discarded? One of the results is the world map of the high-tech industry shown on the centre-spread.

Departing in Silicon Valley, the studies became global and related to issues of environmental justice, labour rights and a rapidly changing landscape above, as well as underground.

## Free Soil

Free Soil is an international hybrid collaboration of artists, activists, researchers and gardeners who take a participatory role in the transformation of our environment. Free Soil fosters discourse, develops projects and gives support for critical art practices that reflect and change the urban and natural environment. We believe art can be a catalyst for social awareness and positive change. Read more at [www.free-soil.org](http://www.free-soil.org)

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# WORLD MAP

of the high-tech industry in relation to mining, e-waste and environmental justice



A water powered aluminium work is being planned in Greece cover an area of 150 football fields. It will need 3 power plants and a dam for the workers.

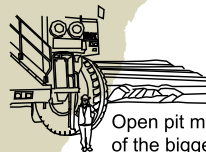


Silicon Valley, was where the micro processor and the computer was invented. The high-tech industry that followed has radically reshaped the environment and urban areas. Now most production has relocated and only research and development is left. Free Soil investigated these changes through bus tours in the area.

USA exports up to 80% of it's electronic waste to 3rd world countries where it is the fastest growing part of the waste stream. There are 500 million obsolete computers in the U.S. alone.



Mining strikes in Peru (the 2nd largest producer of copper) for better conditions and pay, seriously affected the world output of copper in 2008.



Open pit mining marks some of the biggest man made changes to the landscape. In the Amazon forest giant machinery carry 240 tons of iron ore at a time.



Lagos, Nigeria is the largest dump ground for electronic waste in the world.

## Top ingredients in a PC

- Plastic
- Iron
- Aluminium
- Copper
- Lead
- Zinc
- Tin
- Nickel
- Barium
- Manganese

## TIN

52% of the worlds annual tin production is used for soldering electronic equipment.

### Tin mining:

China	136,000 tons
Indonesia	66,000
Congo	15,000

## ALUMINIUM, BAUXITE

14% of a computer is made up of aluminium. Producing and mining aluminium is extremely energy intensive.

### Bauxite mining:

Australia	62 million tons
Brazil	25
India	23

## COPPER

40% of all copper produced is used in electrical or electronic equipment.

### Copper mining:

Chile	5.5 million tons
Peru	1.2
USA	1.1

## LEAD

There is 1.5-4% of lead in a television or computer monitor. Lead is a toxin to both humans and the environment. It accumulates in the soil, high and chronic exposure on micro organisms and plants and animals.

### Lead mining:

China	1,300,000 tons
Australia	600,000
USA	400,000

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Miners represent approximately 1% of the global workforce, or about 30 million workers. Worldwide, mining is one of the most dangerous occupations relative to other industries; with 15,000 fatal accidents annually, mine workers are subject to 8% of all work-related fatalities.



Despite European regulations prohibiting the trade, in waste thousands of tonnes of electronic waste is exported to China and Nigeria  
is dumped or recycled in ways dangerous to people and environments

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Tin mining in The Democratic Republic of Congo is controlled by renegade militia. Mined by the poorest, controlled and taxed by the local militia, then sold for use in PCs.

There are more than 1000 chemicals used during electronics production and many are hazardous to human health, including lead, mercury and cadmium. Manufacturing workers and the communities surrounding high-tech facilities are exposed to these toxics and develop higher rates of cancer, reproductive problems and illness. In the 80s most manufacturing was moved from Silicon Valley to Asia where environmental standards and workers protection are lower.



Woman cooking circuit boards to melt and reuse solder from wasted computers in Taizhou, China 2007. In Guiyu, China around 100,000 workers are estimated to work with recycling of computer waste under hazardous conditions.



Australia is the world's biggest producer of bauxite used for making aluminium. The refining process is energy intensive making it feasible to ship over large distances to regions where energy can be had the cheapest.



December 2008; 4000 seabirds died and children had elevated levels of lead in their blood in the city and Port of Esperance, Western Australia. It was caused by mismanagement in the world's only pure primary lead mine.

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### ZINC

Mining zinc produces large amounts of sulphur dioxide and cadmium vapour. Smelter slag and other residues of process also contain significant amounts of heavy metals.

#### Zinc mining:

China	2.6 million tons
Australia	1.3
Peru	1.1

### MERCURY

Found in flat screens, scanner lights and switches. Even small amounts are very damaging to plants people and the environment. It accumulates in humans and can cause brain damage.

#### Mercury mining:

China	800,000 tons
Kyrgyzstan	400,000

### CADMIUM

Cadmium is used in batteries and printed wiring boards. Cadmium is an environmental hazard, and poisonous to people.

#### Cadmium mining:

China	3,800 tons
Korea	2,846
Japan	1,939

### Sources:

svtc.org  
mindat.org  
British Geological Survey  
(2007 figures)

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60,000 tons  
41,000  
33,000