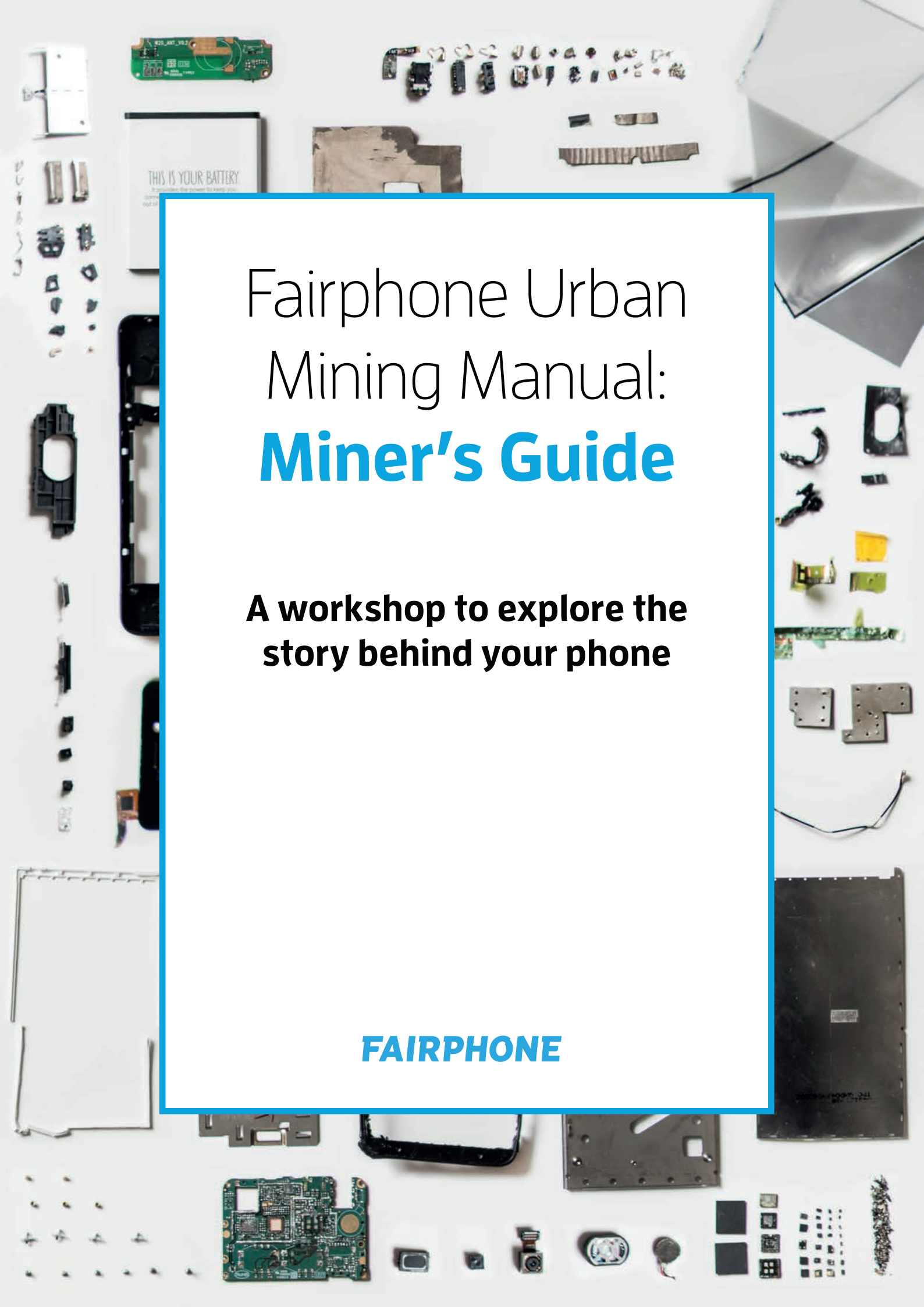


Fairphone Urban Mining Manual: **Miner's Guide**

A workshop to explore the story behind your phone

FAIRPHONE

Workshop at Lowlands festival, Flevoland, Aug 2011

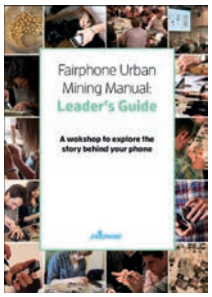
Workshop in Fairphone's Pop-Up Space, London, Sep 2013

Workshop with Epoch Foundation from Taiwan, Amsterdam, Nov 2014

What is going to happen?

Cut this page out

Average workshop time: 1-2 hours



For further reading, or to organize your own Urban Mining workshop please read the **Urban Mining Manual: Leader's Guide** available at Fairphone.com.

It includes
- Workshop planning and leading advice
- Quiz anwers
- Further reading on relevant topics
- Urban Mining glossary

Why the contents of your phone matter

Bags of tin before tagging, DR Congo

Making mining tools, Rwanda

What does your phone have to do with this?
Have you got all your tools? and your old phone? Let's explore this story together, starting with a quiz!

Warm up quiz

1. What is the difference between a mineral and a metal?

- [ ] a) There is no difference
- [ ] b) A metal is the rock from which the mineral is extracted
- [ ] c) A metal is an element, generally extracted from a mineral

2. Which metal is used in the largest quantity in a mobile phone?

- [ ] a) Copper
- [ ] b) Tin
- [ ] c) Tantalum

3. Do all the components in your phone come from the same country?

- [ ] a) Yes, they all come from China
- [ ] b) No, they are from different countries in Europe
- [ ] c) No, the minerals, metals and components in your phone are part of a complex and global supply chain

4. Why should you remove the battery before taking apart the phone?

- [ ] a) The battery can electrocute you
- [ ] b) To reach the other components
- [ ] c) The battery contains hazardous substances that can be harmful if you open or puncture it

5. What can be the capacitor's function?

- [ ] a) Store energy
- [ ] b) Power the phone
- [ ] c) Increase memory capacity

6. What should you do with your old phone if it still works?

- [ ] a) Take it to pieces
- [ ] b) Give it to someone who can use it or donate to the Fairphone Recycling Program
- [ ] c) Keep it hidden in a drawer in your bedroom where no one will ever see it

7. What is a conflict mineral?

- [ ] a) A mineral mined in a conflict area where the profits are used to fund the conflict
- [ ] b) Any mineral mined in a conflict area
- [ ] c) A mineral not related to war or conflict

8. In a Fairphone, where can you find conflict-free minerals from the DR Congo?

- [ ] a) Solder
- [ ] b) Electroplating
- [ ] c) Vibration motor

9. Where can you find tin inside your phone?

- [ ] a) Tin foil
- [ ] b) Soldering paste
- [ ] c) There is no tin in my phone

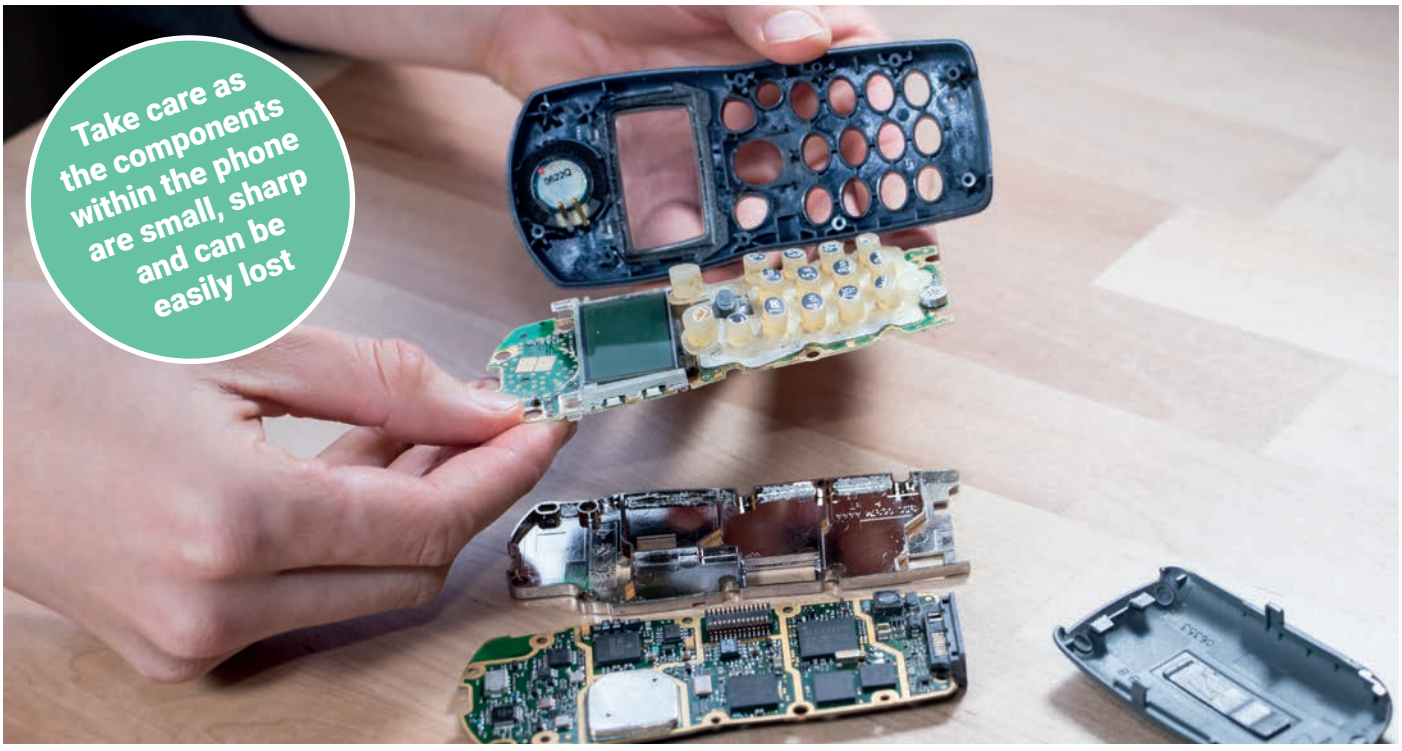
10. Is it possible to recycle your phone?

- [ ] a) No, the pieces cannot be recycled
- [ ] b) Yes, every piece is recyclable
- [ ] c) Yes and no, some parts are recyclable and some parts are not

Score

/10

Take your phone apart!



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Let's urban mine!

What phone are you going to take apart?
The specific model is usually written on or inside the phone.

Phone model:

How old is your phone:

Place all the components you have in this space and see how many of them you can identify.

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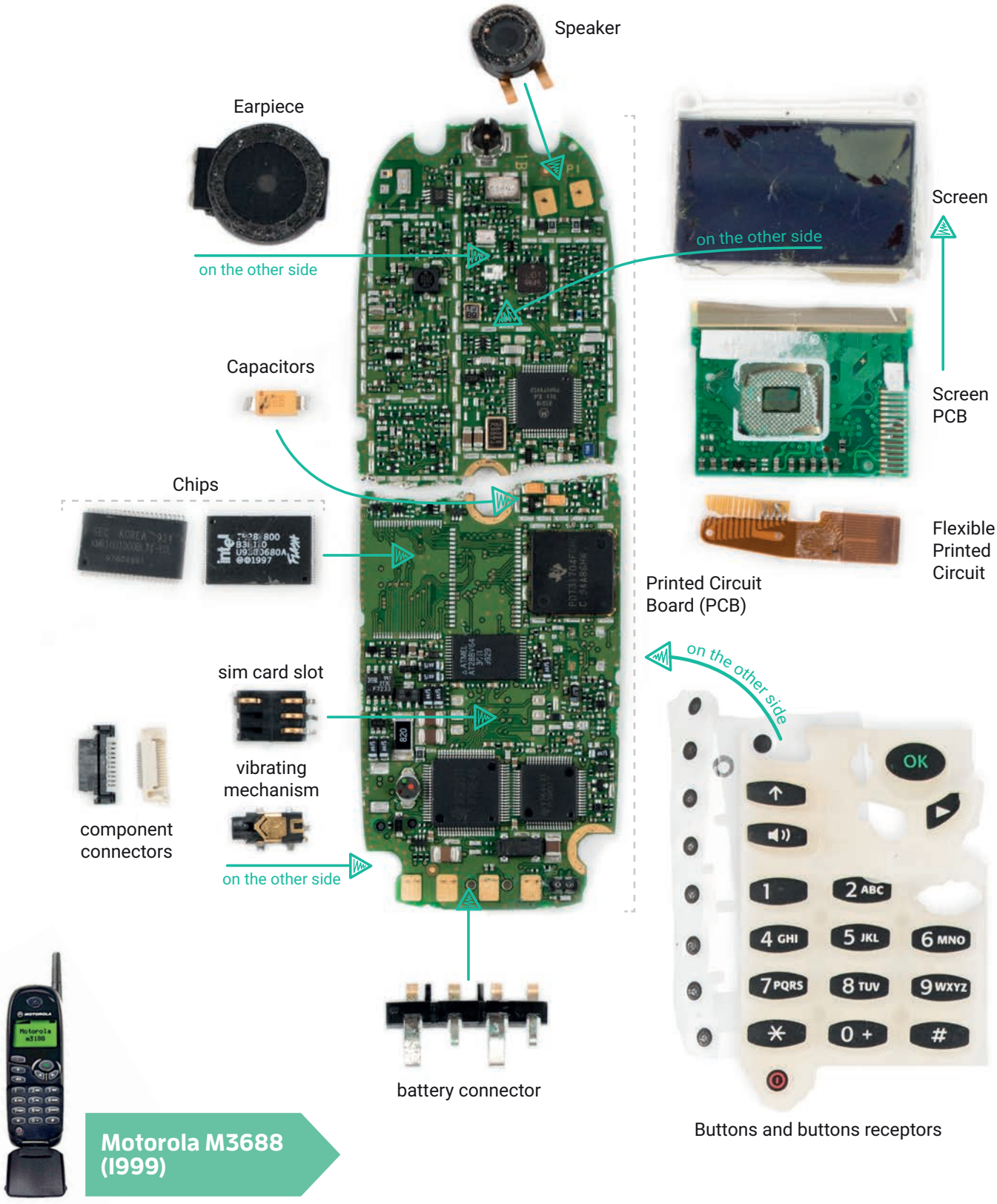
If you've chosen to save paper by printing the manual on both sides, then this is the back of the "Let's urban mine" page.

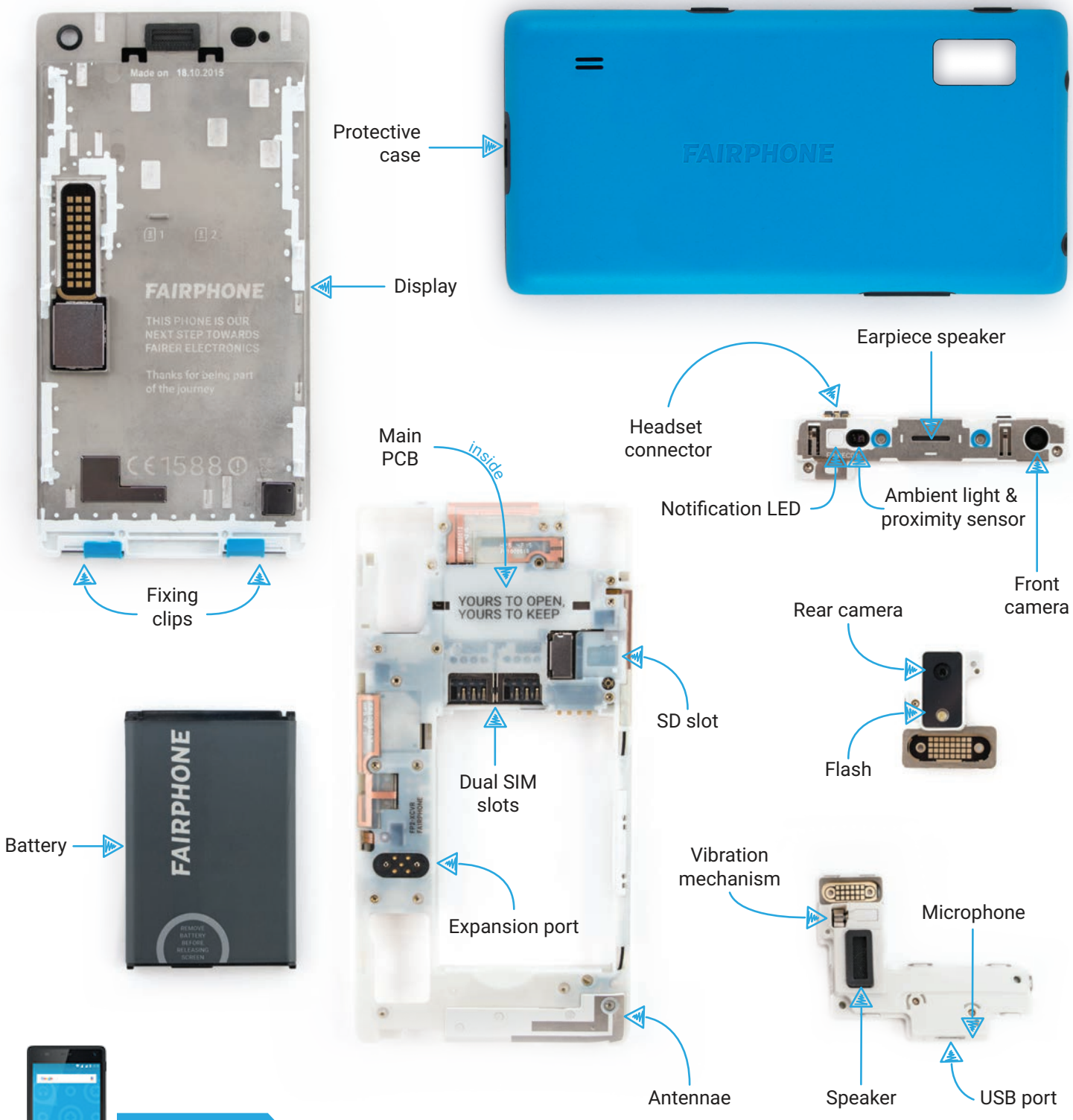
Components we might find

Mobile phones come in all shapes and sizes. You're probably looking at a traditional mobile phone similar to this Motorola from 1999. The components may or may not look like those in the image below, but let's take a look!

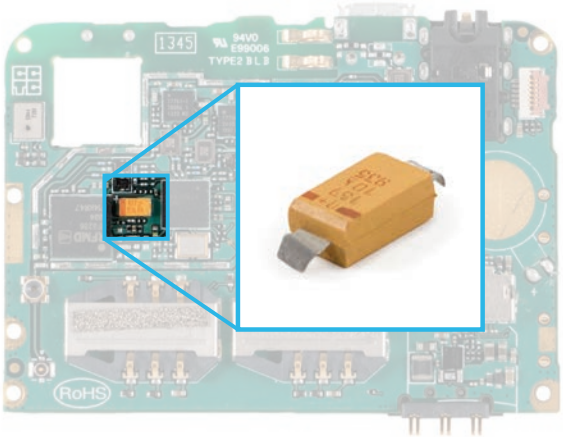


Fairphone 2

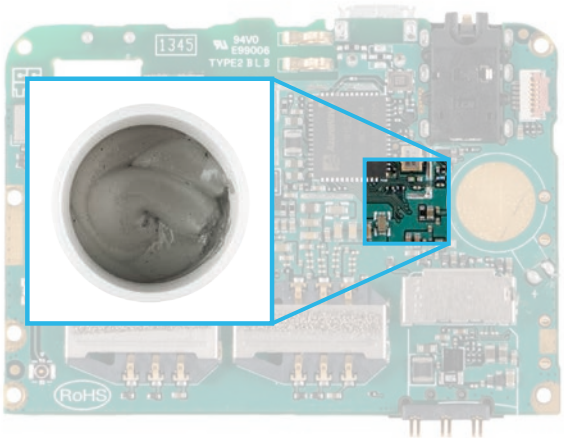
The Fairphone 2 is a modular phone designed to be easy-to-repair. You can fix a broken screen in under a minute and spare parts are available allowing you to repair the components yourself, all you need is a screwdriver! Fairphone 2 invites you to open up the device and take a look inside.



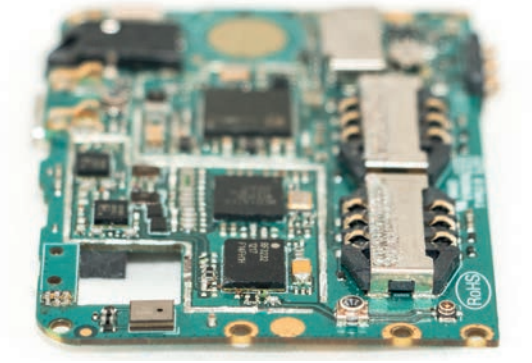
It's what's inside that counts



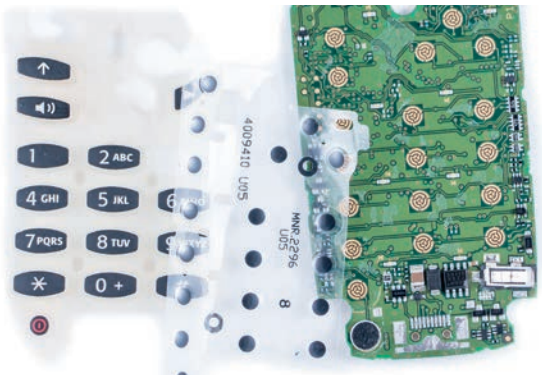
Capacitors are difficult to spot as they are very small. Some capacitors are made with **tantalum** and they are used to store electrical energy.



The tiny silver blobs connecting components to the PCB are soldering joints, and they are made with **tin**.



The most important thing to find is the PCB. They are coated in a polymer mask ink and are usually green, but not always. The PCB contains a large amount of **copper**.



Underneath the **silicon** buttons there are **carbon** connectors. A sheet of **carbon** connectors are pushed onto those **copper** circles on the PCB.

These covers protect the chips underneath. They often contain a mixture of **tin, iron, nickel, silver, zinc** and **aluminium** and are very easily recycled. Take them off to see the chips underneath!

Chips almost always contain **silicon**. Pins, containing **copper**, come out on each side. Inside these chips are smaller, thinner layers which are connected with **gold** wires.

There are over 30 metals in a phone.
We are going to look at two of them **(tin and tantalum)** in detail on the next few pages.

Digging deeper

Semi-industrial tungsten mine site, Rwanda

Refining tin to tin powder, DR Congo

Artisanal mining. Digging for copper, DR Congo

Digging deeper

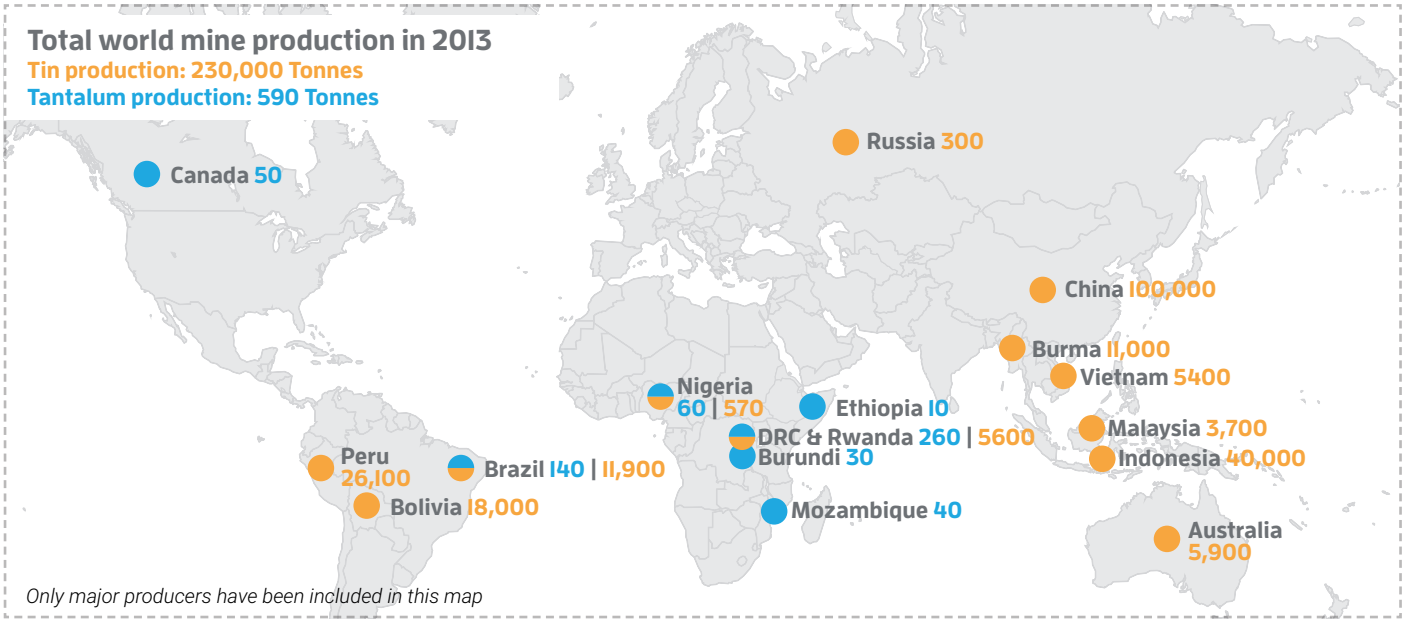
Now you've opened your phone, it's time to unravel some of its hidden stories. Around 30 minerals are found in a phone. They are mined all over the world, so how do they end up in our phone? Many steps take place between the mine site and the final product. So let's begin to uncover the supply chain by discovering more about how a phone is made. We're going to take a closer look at tin and tantalum to reveal some of the social and environmental issues connected to these minerals.

Mineral / Ore The raw, mined substance	Metal The substance that's extracted	Material The refined product	Component(s) The part inside your phone
 Cassiterite	Tin	Tin powder	Soldering paste 
 Columbite-tantalite	Tantalum	Tantalum powder	Tantalum capacitor 

FUN FACT! Tin foil is actually **not made of tin!** Originally, tin sheet packaged and preserved different foods, but today we use cheaper and more durable aluminium to wrap our sandwiches.

FUN FACT! The word **'coltan'** originated in Africa as a nickname to describe columbite-tantalite. Today the word is used worldwide.

How much tin and tantalum is produced? and where?



Source: U.S. Geological Survey (2014) Mineral Commodity Summaries http://minerals.usgs.gov/minerals/pubs/commodity/tin/mcs-2014-tin.pdf and http://minerals.usgs.gov/minerals/pubs/commodity/niobium/mcs-2014-tanta.pdf

Beyond electronics:

Where else is tin used?

- [ ] Dyes
- [ ] Tin foil
- [ ] Mirrors
- [ ] Cans
- [ ] Vehicles
- [ ] Roofing in houses

Where else is tantalum used?

- [ ] Door locks
- [ ] Turbines
- [ ] Textiles
- [ ] Prosthetics
- [ ] Missiles
- [ ] Medical implants

Digging deeper

How do minerals relate to conflict in the DR Congo?

What kind of negative side effects can be caused by mining in this country?

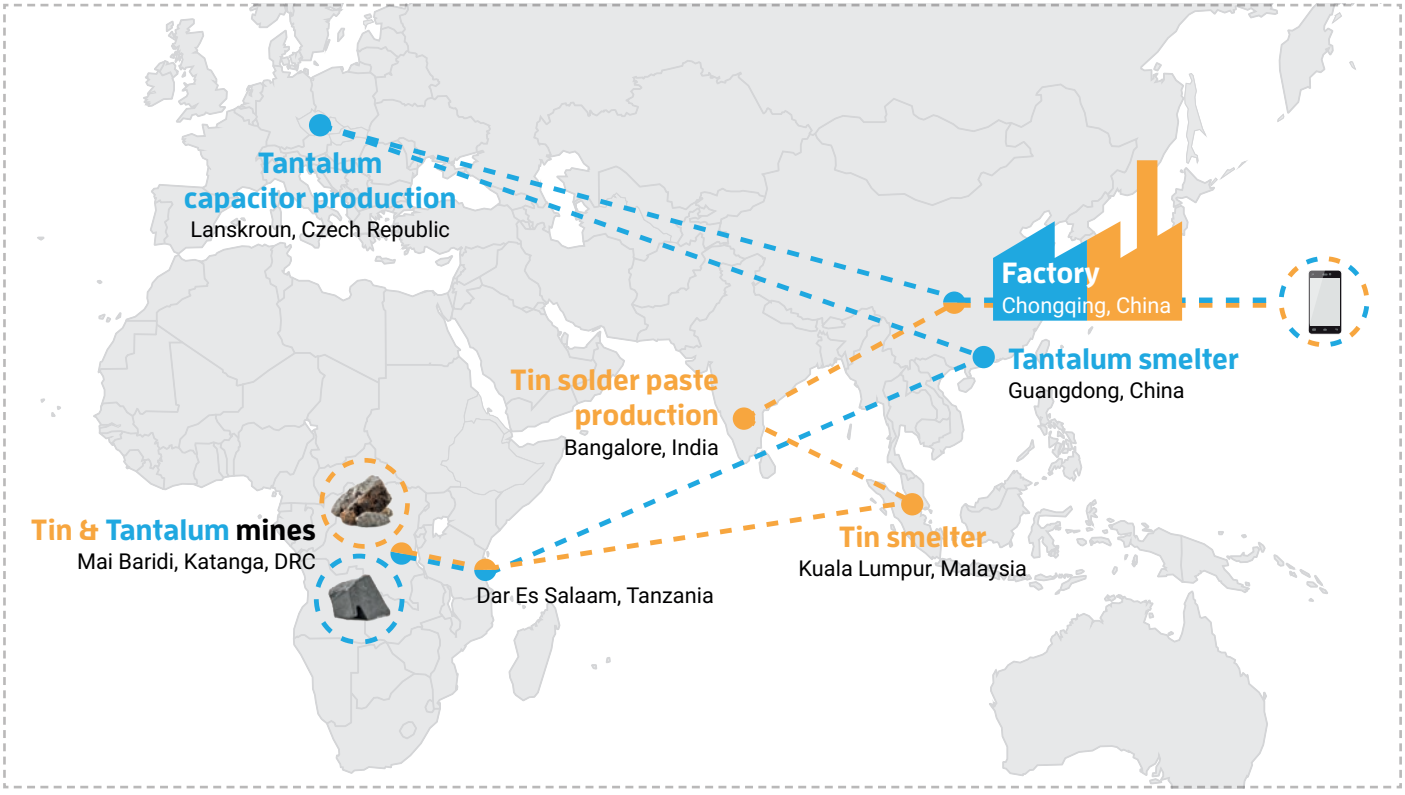
What actions can be taken to transform negative effects into positive effects and by whom?

What action can YOU take?

You've got the world in your pocket!

The map below tracks the journey of tin and tantalum (only two minerals out of over 30) used in the first edition Fairphone. Follow the minerals on their international route from the mine site to the factory.

Fairphone sources tin and tantalum from conflict-free mines in the DRC



Recycling the parts

By urban mining the metals in your old mobile phones you are helping to reduce e-waste. Make sure you recycle these parts to help conserve natural resources, and prevent these materials - which can be toxic - from ending up in our water, landfills and air.

Bring the parts of the phone to a designated recycling point

My local recyling point is:

FACT! In Europe, only about 7% of used phones ever reach recovery facilities.
What will you do with your old phones?

You can use the list of recycling and collection points on the Fairphone website.

Discarded phones collected by Fairphone & Closing the Loop for recycling, Ghana

Components collected in an urban mining workshop, Netherlands

Next steps: take action!

Take a photo and share it with the Fairphone community

Facebook/fairphone

Twitter @fairphone

Instagram @ WeAreFairphone

Flickr @Fairphone

#UrbanMining

#WeAreFairphone

Use your phone for as long as possible.

Become an informed shopper, choose wisely.

Collect unused mobile phones from your community, school, family and friends.

Organize your own Urban Mining workshop?