

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

**A workshop to explore the
story behind your phone**



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?



Page 1 - Why the contents of your phone matter

Page 2 - Warm up quiz

Page 3 - Take your phone apart



Page 4 - Let's urban mine!

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Page 5 - Components we might find

Page 6 - Fairphone components

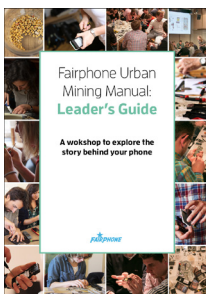
Page 7 - It's what's inside that counts

Page 8-10 - Digging deeper

Page 11 - Recycling the parts

Page 12 - Next steps: take action!

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 answers
- 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 mineral 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

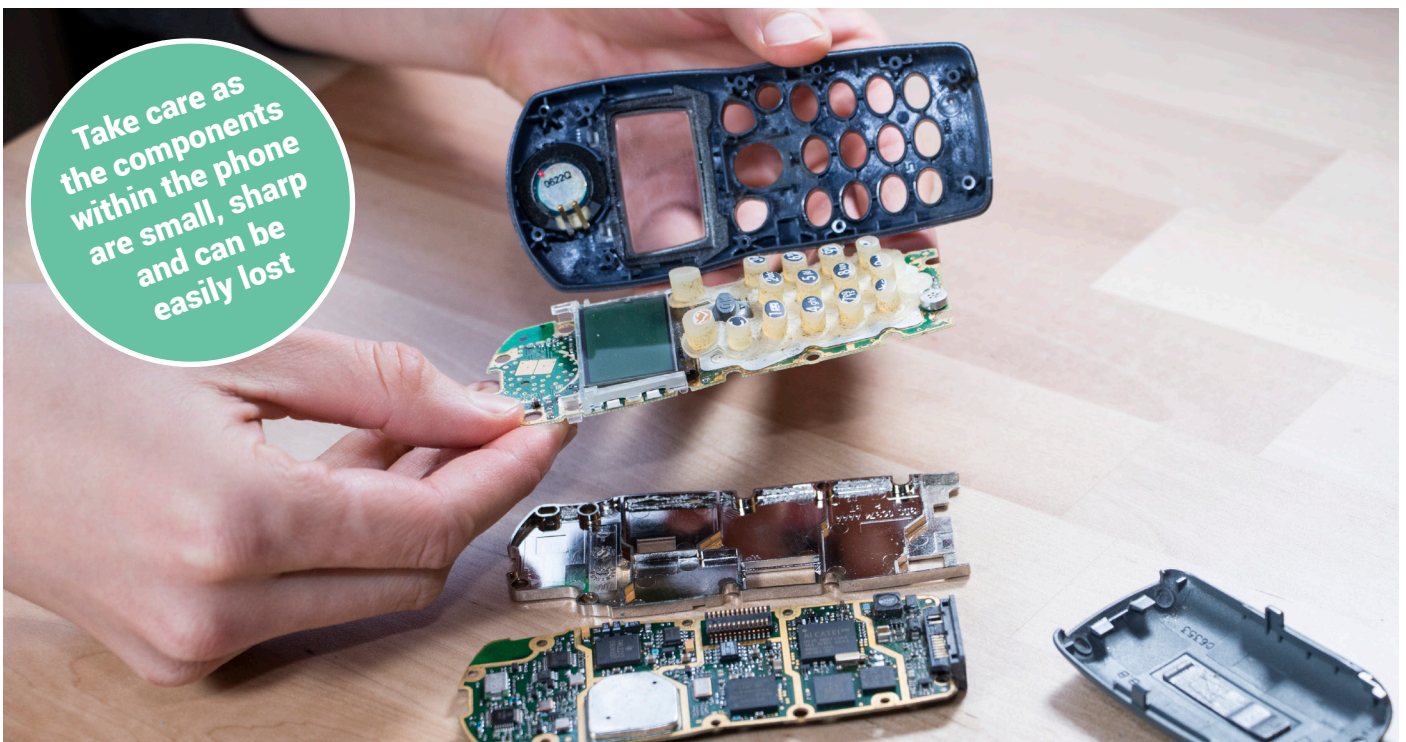
Score

/10

Take your phone apart!



Please remove the battery safely. Do not open or puncture the battery! It contains hazardous materials that can severely damage your health.



Take care as the components within the phone are small, sharp and can be easily lost

The materials contained in this manual are provided for general guidance purposes only and Fairphone has made every effort to ensure information provided is correct in all details in order to prevent any risk. Fairphone does not assume and hereby, disclaim any liability for any loss, damage or disruption caused by errors or omissions whether such errors or omissions result from negligence, accident, or any other cause. The activities in the workshop may pose some risk and therefore, Fairphone advise urban miners to take full responsibility for their safety. Especially when taking out phone components, urban miners are advised to not take risks beyond their comfort level.



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:

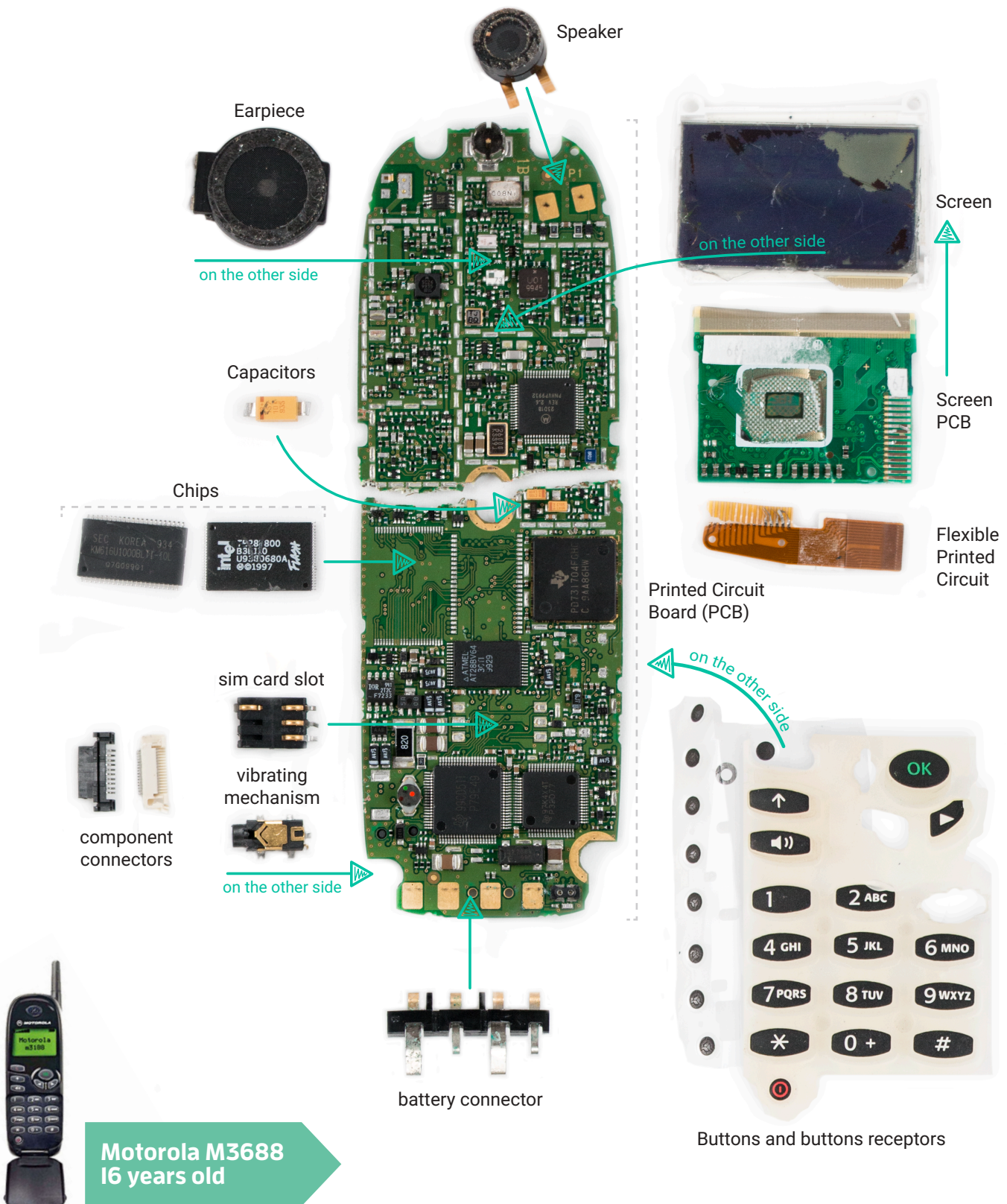
Place all the components you have in this space and see how many of them you can identify.

This page is blank.

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

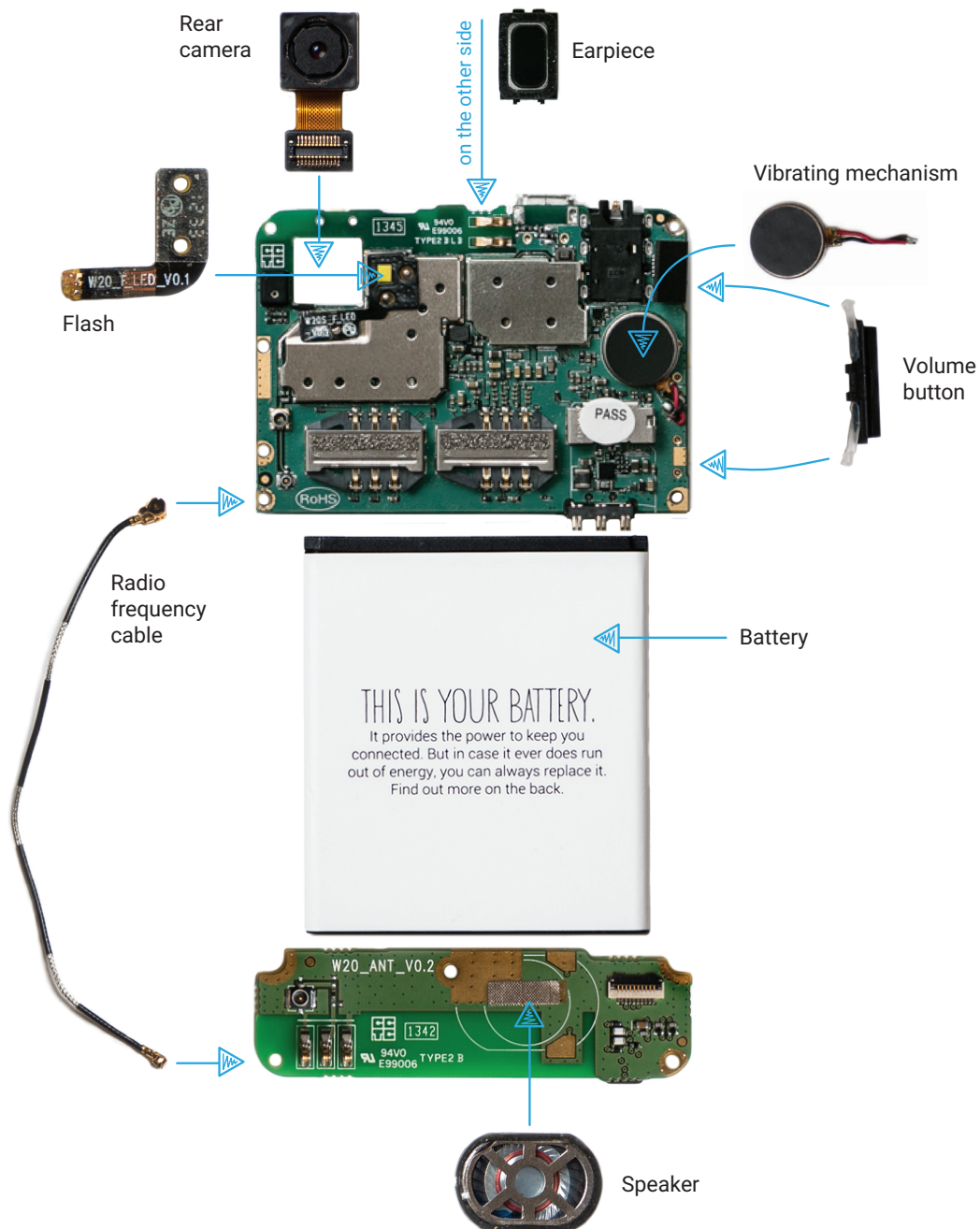
Components we might find

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 components

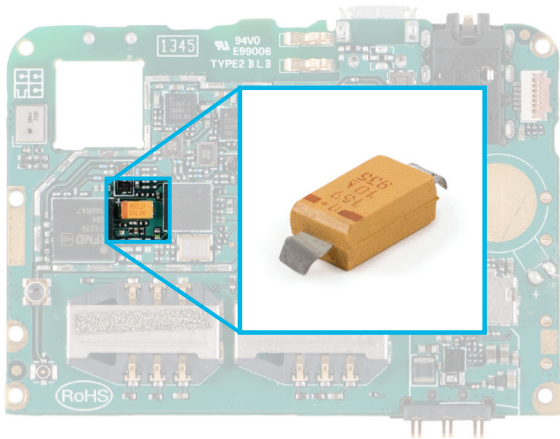
Over time, components have become smaller while screens have grown in size. We've replaced buttons with touch screens, added cameras and ditched those antennas! There are over 500 components in a smartphone. Below, a first edition Fairphone is labelled with some of its replaceable components. Take a good look, and see if you can recognize any components in your own phone.



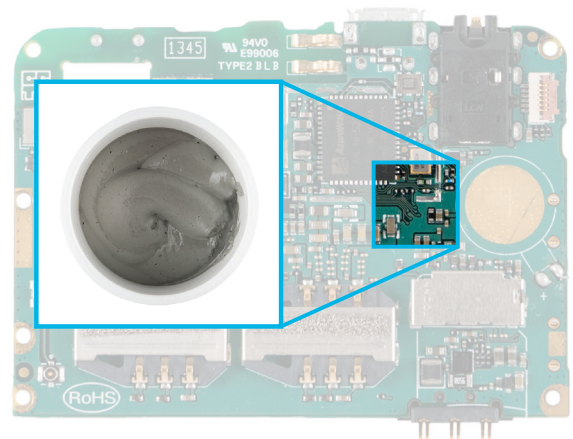
**First Edition Fairphone
1 year old**

**Which components have you found?
What are they made of?**

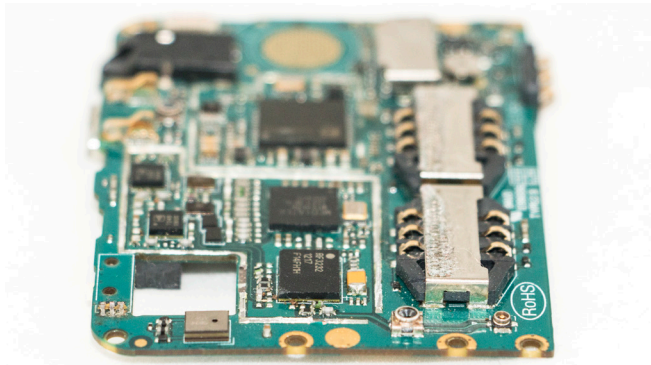
It's what's inside that counts



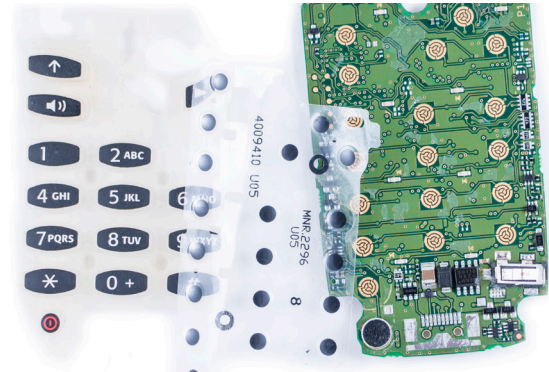
Capacitors are difficult to spot as they are very small. Some capacitors are made with **tantalum** and they are used to store electrical energy.



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



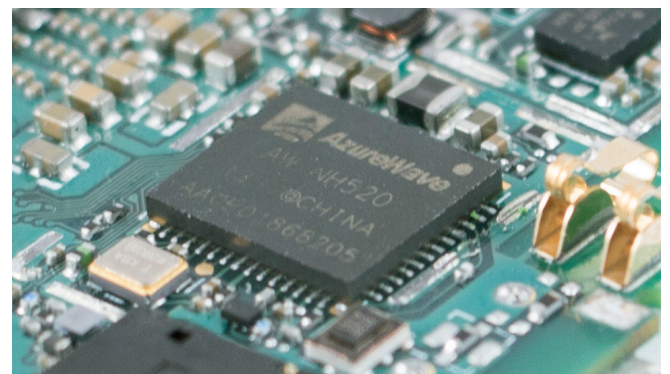
The most important thing to find is the PCB. They are coated in a polymer mask ink and are usually green, but not always. The PCB contains a large amount of **copper**.



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 minerals 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



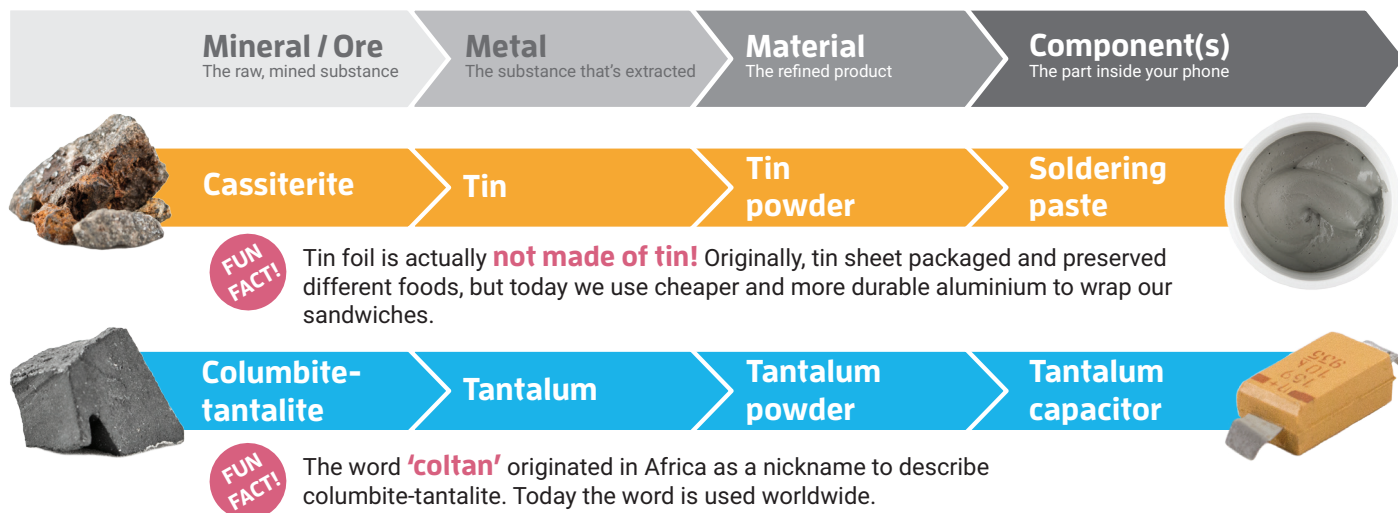
Refining tin to tin powder, DR Congo



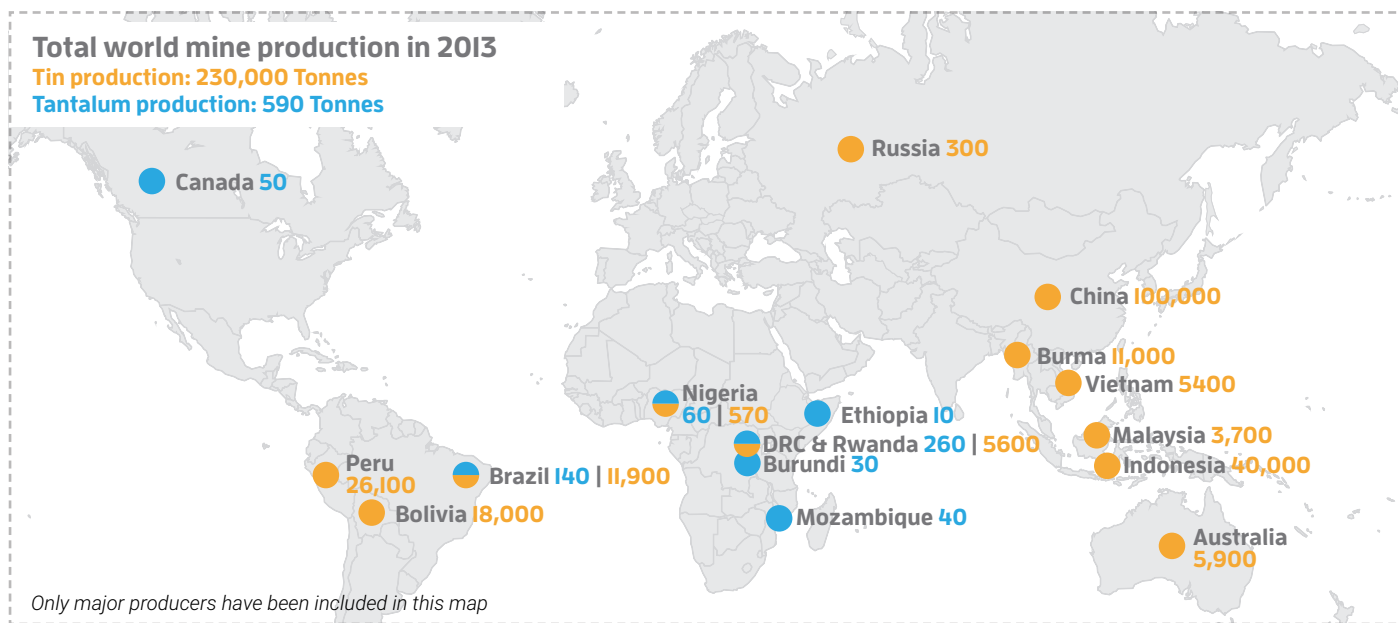
Artisanal mining. Digging for copper, DR Congo

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.



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?

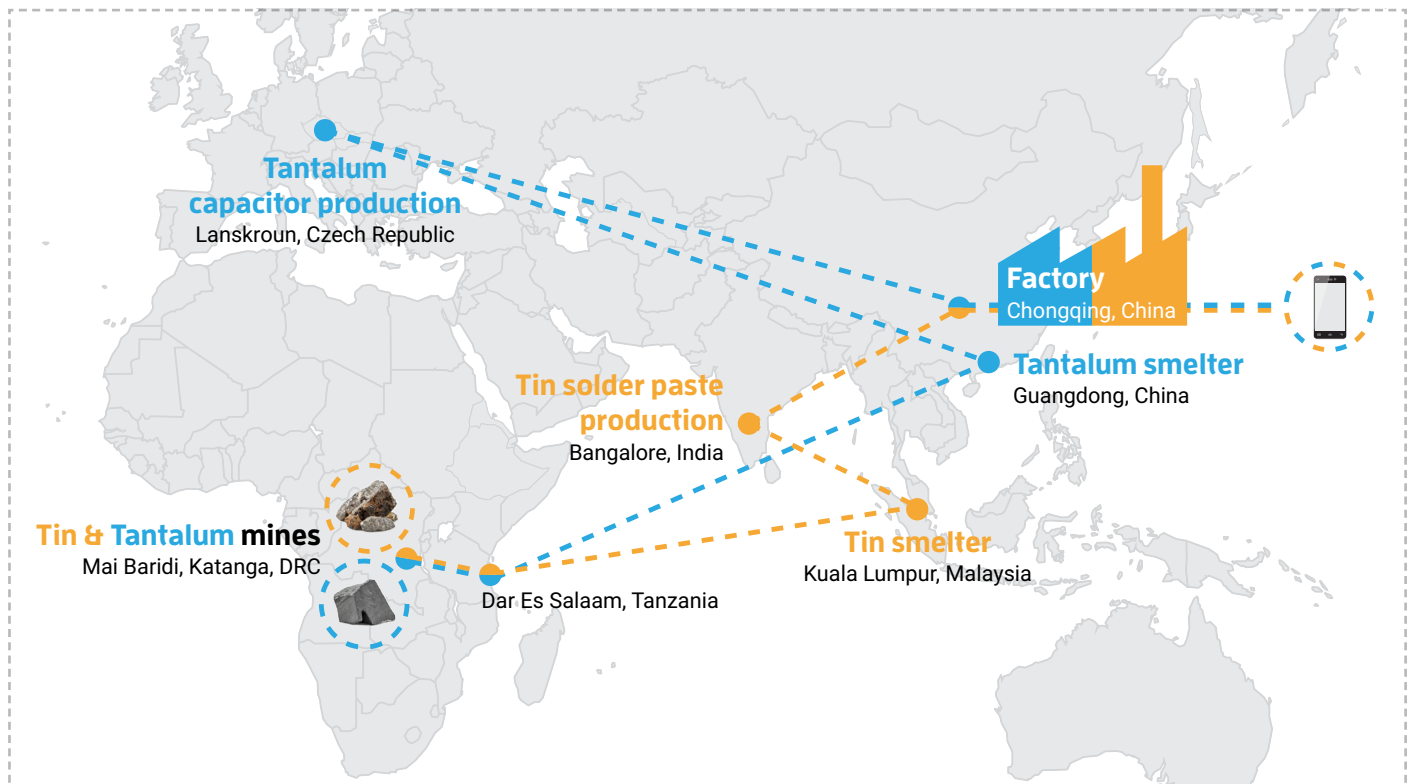
What actions can be taken to transform negative effects into positive effects and by whom?

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 recycling point is:



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](#)



Daria Koreniushkina
@dariakore

Just dismantled 15 years old Motorola at #UrbanMining workshop & learnt where phones come from! Cool! #WeAreFairphone



[#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?

