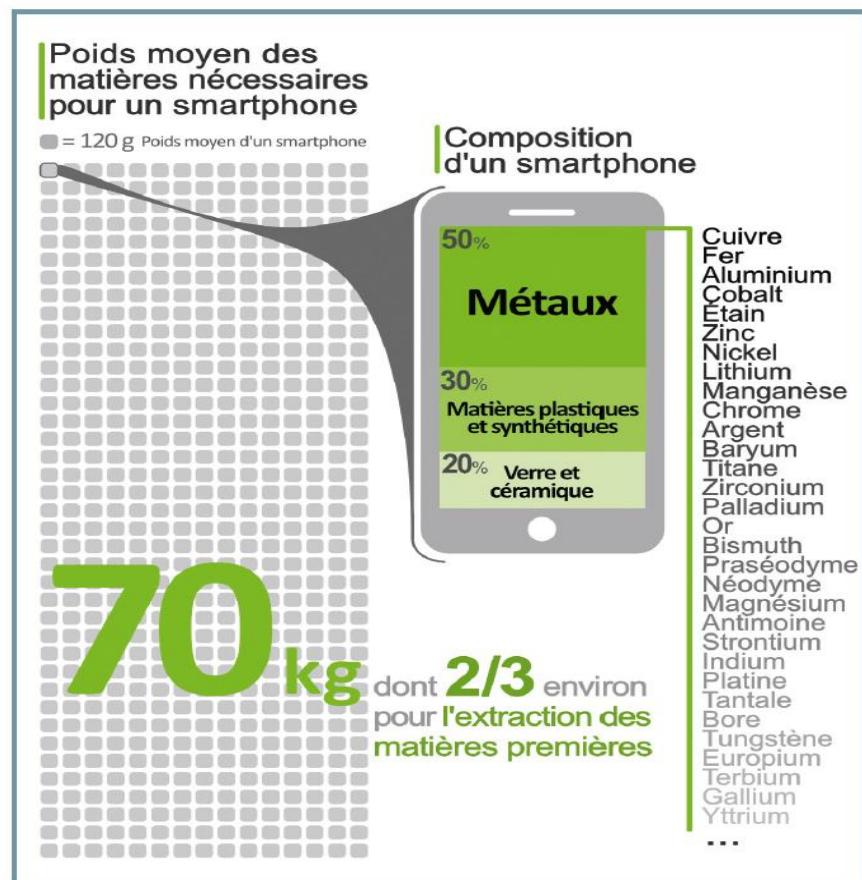


Smartphone

<https://www.insee.fr/fr/statistiques/4238589?sommaire=4238635>

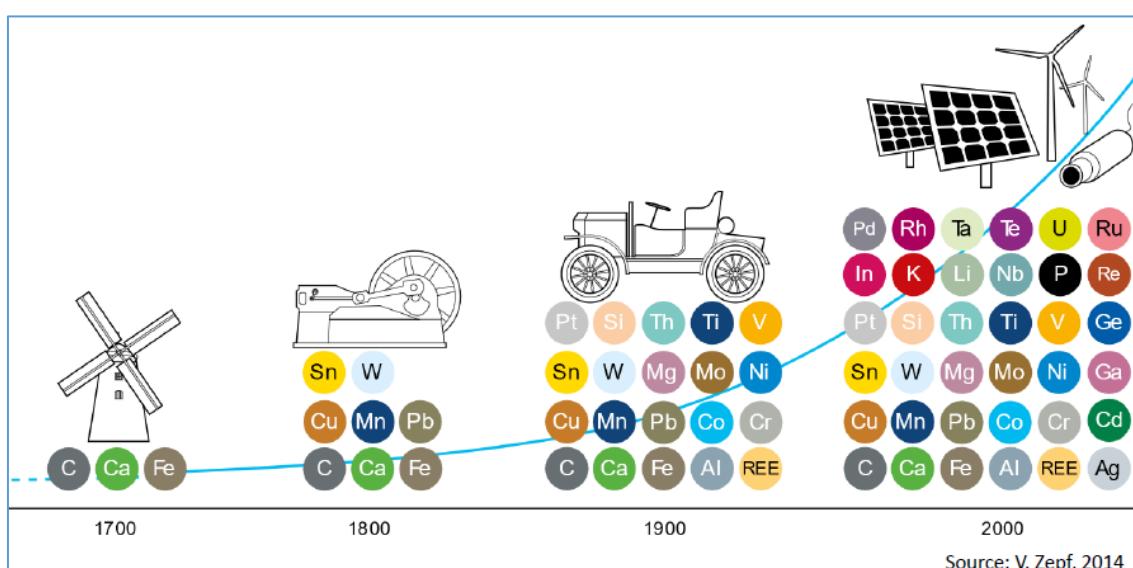
Commissariat général au développement durable - L'empreinte matières, un indicateur révélant notre consommation réelle de matières premières - Avril 2018



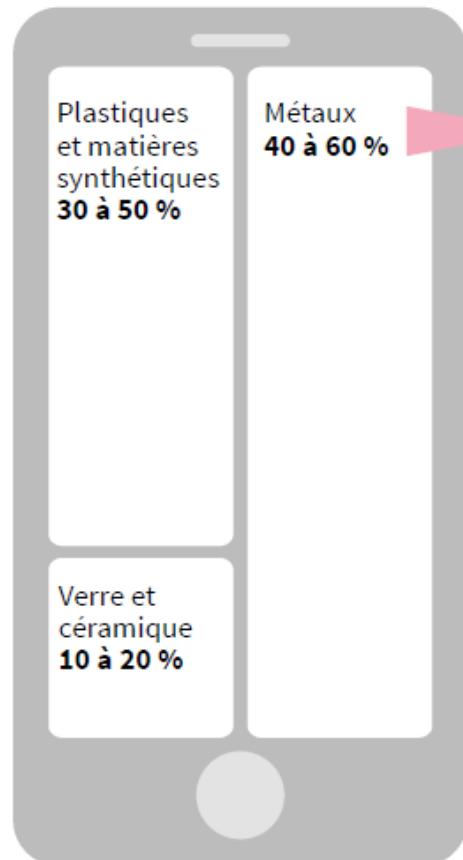
Sources : Aderme ; Sénat (rapport n° 850, 09/2016) ; Wuppertal Institut (2012), évaluation selon l'approche poids-matière de l'écologiste Friedrich Schmidt-Bleek
Infographie : Bertrand Gaillet

<https://ecoinfo.cnrs.fr/wp-content/uploads/2015/01/impacts-env-du-numerique-15-mars-2019.pdf>

Françoise Berthoud - *Les impacts environnementaux du numérique* - Ministère de la transition écologique et solidaire -Commissariat général au développement durable- Mars 2019



RÉPARTITION DU POIDS DES MATERIAUX DANS LA COMPOSITION D'UN SMARTPHONE



PROPORTION DES MÉTAUX

80 à 85 % de métaux ferreux et non ferreux : cuivre, aluminium, zinc, étain, chrome, nickel...

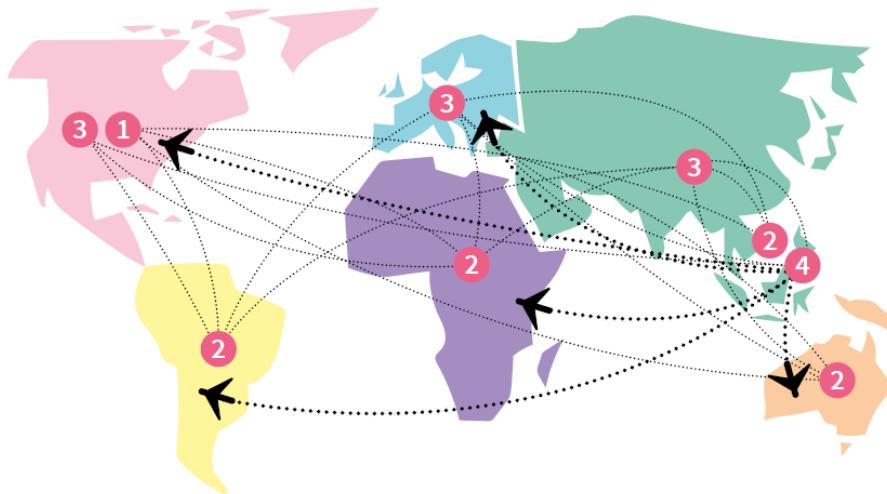
0,5 % de métaux précieux : or, argent, platine, palladium...

0,1 % de terres rares et métaux spéciaux : europium, yttrium, terbium, gallium, tungstène, indium, tantale...

15 à 20 % d'autres substances : magnésium, carbone, cobalt, lithium...

Source : Oeko-Institut, EcolInfo et Sénat

QUATRE TOURS DU MONDE POUR FABRIQUER UN SMARTPHONE



1. Conception le plus souvent aux États-Unis

2. Extraction et transformation des matières premières en Asie du Sud-Est, en Australie, en Afrique centrale et en Amérique du Sud

3. Fabrication des principaux composants en Asie, aux États-Unis et en Europe

4. Assemblage en Asie du Sud-Est

Distribution vers le reste du monde, souvent en avion.

Display

A mobile device's glass screen is very durable because glassmakers combine its main ingredient, silica (silicon dioxide or quartz) sand, with ceramic materials and then add potassium.



Layers of indium-tin-oxide are used to create transparent circuits in the display. Tin is also the ingredient in circuit board solder, and cassiterite is a primary source of tin.

Gallium provides light emitting diode (LED) backlighting. Bauxite is the primary source of this commodity.

Sphalerite is the source of indium (used in the screen's conductive coating) and germanium (used in displays and LEDs).



Banner image courtesy of
freevector-archive.com

Electronics and Circuitry

The content of copper in a mobile device far exceeds the amount of any other metal. Copper conducts electricity and heat and comes from the source mineral chalcopyrite.



Tetrahedrite is a primary source of silver. Silver-based inks on composite boards create electrical pathways through a device.



Silicon, very abundant in the Earth's crust, is produced from the source mineral quartz and is the basis of integrated circuits.



Arsenopyrite is a source of arsenic, which is used in radio frequency and power amplifiers.



Tantalum, from the source mineral tantalite, is added to capacitors to regulate voltage and improve the audio quality of a device.



Wolframite is a source of tungsten, which acts as a heat sink and provides the mass for mobile phone vibration.



Battery

Spodumene and subsurface brines are the sources of lithium used in cathodes of lithium-ion batteries.



Graphite is used for the anodes of lithium-ion batteries because of its electrical and thermal conductivity.



Speakers and Vibration

Bastnaesite is a source of rare-earth elements used to produce magnets in speakers, microphones, and vibration motors.

