

# Is the Circular Economy the heartbeat of a Decarbonised future ?

.....A lesson from ICT

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LET'S TALK.....NUMBERS



# PERIODIC TABLE OF ELEMENTS

1

H

Hydrogen

Nonmetal

3

Li

Lithium

Alkali Metal

4

Be

Beryllium

Alkaline Earth Metal

11

Na

Sodium

Alkali Metal

12

Mg

Magnesium

Alkaline Earth Metal

19

K

Potassium

Alkali Metal

20

Ca

Calcium

Alkaline Earth Metal

21

Sc

Scandium

Transition Metal

22

Ti

Titanium

Transition Metal

23

V

Vanadium

Transition Metal

24

Cr

Chromium

Transition Metal

25

Mn

Manganese

Transition Metal

26

Fe

Iron

Transition Metal

27

Co

Cobalt

Transition Metal

28

Ni

Nickel

Transition Metal

29

Cu

Copper

Transition Metal

30

Zn

Zinc

Transition Metal

31

Ga

Gallium

Post-Transition Metal

32

Ge

Germanium

Metalloid

33

As

Arsenic

Metalloid

34

Se

Selenium

Nonmetal

35

Br

Bromine

Halogen

36

Kr

Krypton

Noble Gas

37

Rb

Rubidium

Alkali Metal

38

Sr

Strontium

Alkaline Earth Metal

39

Y

Yttrium

Transition Metal

40

Zr

Zirconium

Transition Metal

41

Nb

Niobium

Transition Metal

42

Mo

Molybdenum

Transition Metal

43

Tc

Technetium

Transition Metal

44

Ru

Ruthenium

Transition Metal

45

Rh

Rhodium

Transition Metal

46

Pd

Palladium

Transition Metal

47

Ag

Silver

Transition Metal

48

Cd

Cadmium

Transition Metal

49

In

Indium

Post-Transition Metal

50

Sn

Tin

Post-Transition Metal

51

Sb

Antimony

Metalloid

52

Te

Tellurium

Metalloid

53

I

Iodine

Halogen

54

Xe

Xenon

Noble Gas

55

Cs

Cesium

Alkali Metal

56

Ba

Barium

Alkaline Earth Metal

72

Hf

Hafnium

Transition Metal

73

Ta

Tantalum

Transition Metal

74

W

Tungsten

Transition Metal

75

Re

Rhenium

Transition Metal

76

Os

Osmium

Transition Metal

77

Ir

Iridium

Transition Metal

78

Pt

Platinum

Transition Metal

79

Au

Gold

Transition Metal

80

Hg

Mercury

Transition Metal

81

Tl

Thallium

Post-Transition Metal

82

Pb

Lead

Post-Transition Metal

83

Bi

Bismuth

Post-Transition Metal

84

Po

Polonium

Metalloid

85

At

Astatine

Halogen

86

Rn

Radon

Noble Gas

87

Fr

Francium

Alkali Metal

88

Ra

Radium

Alkaline Earth Metal

104

Rf

Rutherfordium

Transition Metal

105

Db

Dubnium

Transition Metal

106

Sg

Seaborgium

Transition Metal

107

Bh

Bohrium

Transition Metal

108

Hs

Hassium

Transition Metal

109

Mt

Meitnerium

Transition Metal

110

Ds

Darmstadtium

Transition Metal

111

Rg

Roentgenium

Transition Metal

112

Cn

Copernicium

Transition Metal

113

Nh

Nihonium

Post-Transition Metal

114

Fl

Flerovium

Post-Transition Metal

115

Mc

Moscovium

Post-Transition Metal

116

Lv

Livermorium

Post-Transition Metal

117

Ts

Tennessine

Halogen

118

Og

Oganesson

Noble Gas

57

La

Lanthanum

Lanthanide

58

Ce

Cerium

Lanthanide

59

Pr

Praseodymium

Lanthanide

60

Nd

Neodymium

Lanthanide

61

Pm

Promethium

Lanthanide

62

Sm

Samarium

Lanthanide

63

Eu

Europium

Lanthanide

64

Gd

Gadolinium

Lanthanide

65

Tb

Terbium

Lanthanide

66

Dy

Dysprosium

Lanthanide

67

Ho

Holmium

Lanthanide

68

Er

Erbium

Lanthanide

69

Tm

Thulium

Lanthanide

70

Yb

Ytterbium

Lanthanide

71

Lu

Lutetium

Lanthanide

89

Ac

Actinium

Actinide

90

Th

Thorium

Actinide

91

Pa

Protactinium

Actinide

92

U

Uranium

Actinide

93

Np

Neptunium

Actinide

94

Pu

Plutonium

Actinide

95

Am

Americium

Actinide

96

Cm

Curium

Actinide

97

Bk

Berkelium

Actinide

98

Cf

Californium

Actinide

99

Es

Einsteinium

Actinide

100

Fm

Fermium

Actinide

101

Md

Mendelevium

Actinide

102

No

Nobelium

Actinide

103

Lr

Lawrencium

Actinide

1

H

Hydrogen

Nonmetal

Atomic Number

Symbol

Name

Chemical Group Block

Pub

C

hem

2

He

Helium

Noble Gas

1

**H**

Hydrogen

Nonmetal

Atomic Number

**Symbol**

Name

Chemical Group Block

**Pd**

40% Global Supply in Russia

3TG

Conflict Mineral (DRC)

Dy,  
W,  
Nd

Vibration in Electronics

Because IT shouldn't cost the Earth

# ELEMENTS OF A SMARTPHONE

ELEMENTS COLOUR KEY: ● ALKALI METAL ● ALKALINE EARTH METAL ● TRANSITION METAL ● GROUP 13 ● GROUP 14 ● GROUP 15 ● GROUP 16 ● HALOGEN ● LANTHANIDE

## SCREEN



Indium tin oxide is a mixture of indium oxide and tin oxide, used in a transparent film in the screen that conducts electricity. This allows the screen to function as a touch screen.



The glass used on the majority of smartphones is an aluminosilicate glass, composed of a mix of alumina ( $\text{Al}_2\text{O}_3$ ) and silica ( $\text{SiO}_2$ ). This glass also contains potassium ions, which help to strengthen it.



A variety of Rare Earth Element compounds are used in small quantities to produce the colours in the smartphone's screen. Some compounds are also used to reduce UV light penetration into the phone.

## BATTERY



The majority of phones use lithium ion batteries, which are composed of lithium cobalt oxide as a positive electrode and graphite (carbon) as the negative electrode. Some batteries use other metals, such as manganese, in place of cobalt. The battery's casing is made of aluminium.

## ELECTRONICS



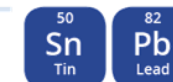
Copper is used for wiring in the phone, whilst copper, gold and silver are the major metals from which microelectrical components are fashioned. Tantalum is the major component of micro-capacitors.



Nickel is used in the microphone as well as for other electrical connections. Alloys including the elements praseodymium, gadolinium and neodymium are used in the magnets in the speaker and microphone. Neodymium, terbium and dysprosium are used in the vibration unit.



Pure silicon is used to manufacture the chip in the phone. It is oxidised to produce non-conducting regions, then other elements are added in order to allow the chip to conduct electricity.



Tin & lead are used to solder electronics in the phone. Newer lead-free solders use a mix of tin, copper and silver.

## CASING



Magnesium compounds are alloyed to make some phone cases, whilst many are made of plastics. Plastics will also include flame retardant compounds, some of which contain bromine, whilst nickel can be included to reduce electromagnetic interference.



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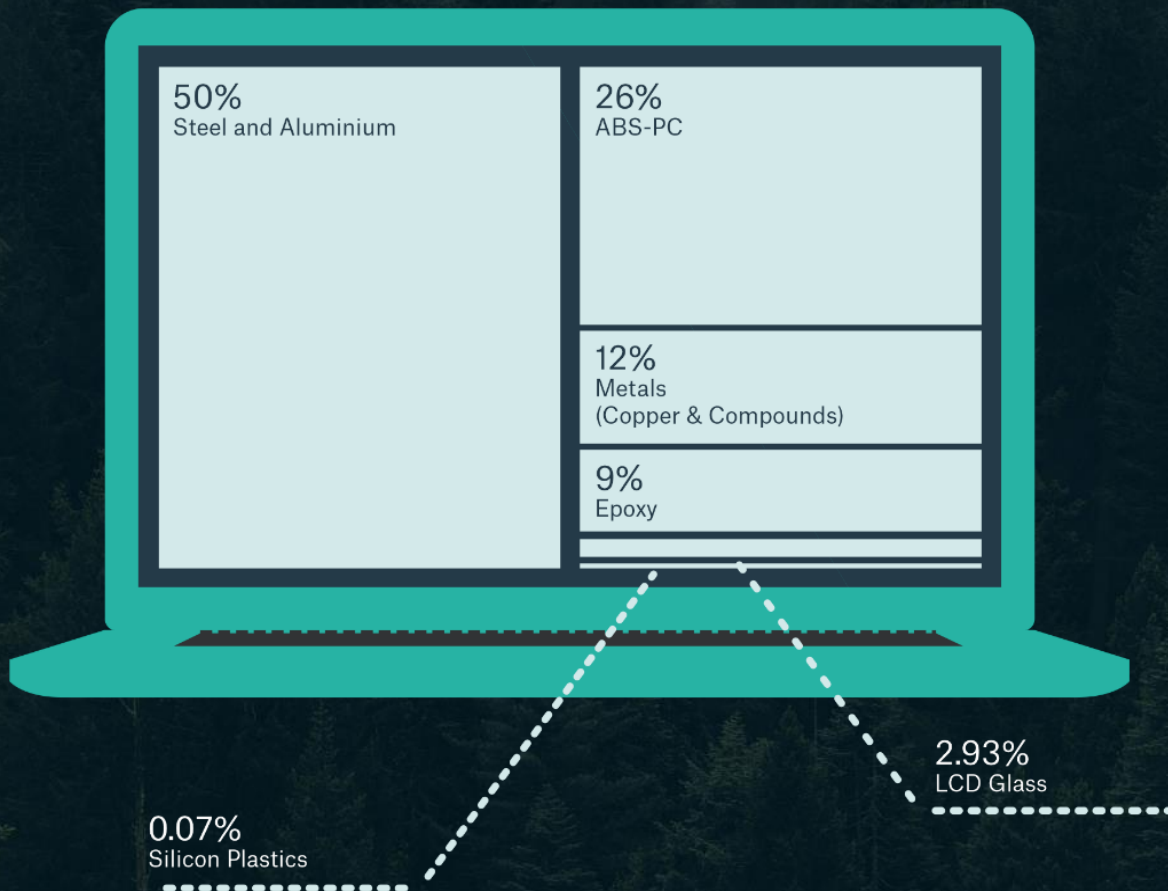


Because IT shouldn't cost the Earth



# WHAT MAKES A LAPTOP?

A breakdown of the materials, both critical and non-critical



## Minerals and materials used per laptop

Material	Usage (grams)	Status
Copper	270	Non-Critical
Cobalt	65	Non-Critical
Tin	9.33	Non-Critical
Neodymium	2.1	Non-Critical
Tantalum	1.7	Critical
Silver	0.44	Non-Critical
Praseodymium	0.27	Critical
Gold	0.1	Non-Critical
Dysprosium	0.06	Critical
Indium	0.04	Critical
Palladium	0.04	Critical
Platinum	0.004	Critical
Yttrium	0.0016	Critical
Gallium	0.0016	Critical
Gadolinium	0.00075	Critical
Cerium	0.0001	Critical
Europium	0.00003	Critical
Lanthanum	0	
Terbium	0	



Carbon  
Neutral  
Organisation

# THE CIRCULAR ECONOMY

The future depends on you



Source: Ellen MacArthur Foundation



# THE WORLD'S FIRST REMANUFACTURED LAPTOP BSI KITEMARK™



KM 747377  
BS 8887-220:2010  
BS 8887-211:2012

The awarding of the BSI Kitemark™ certifies that our Circular Remanufacturing Process produces products 'equal to or better than new' as required by the BS standard BS8887-220 and BS8887-211.



# 80% OF A LAPTOP'S ENVIRONMENTAL IMPACT IS FROM PRODUCTION



- 316kgs Co2eq is the average carbon footprint of a brand-new laptop
- 1,200kgs of precious earth resources are extracted and mined
- 190,000kgs of water is consumed during extraction and production
- Conflict minerals are used in production; cobalt, gold, tin, tantalum and tungsten
- Poor labour practices in supply chains from Africa to China

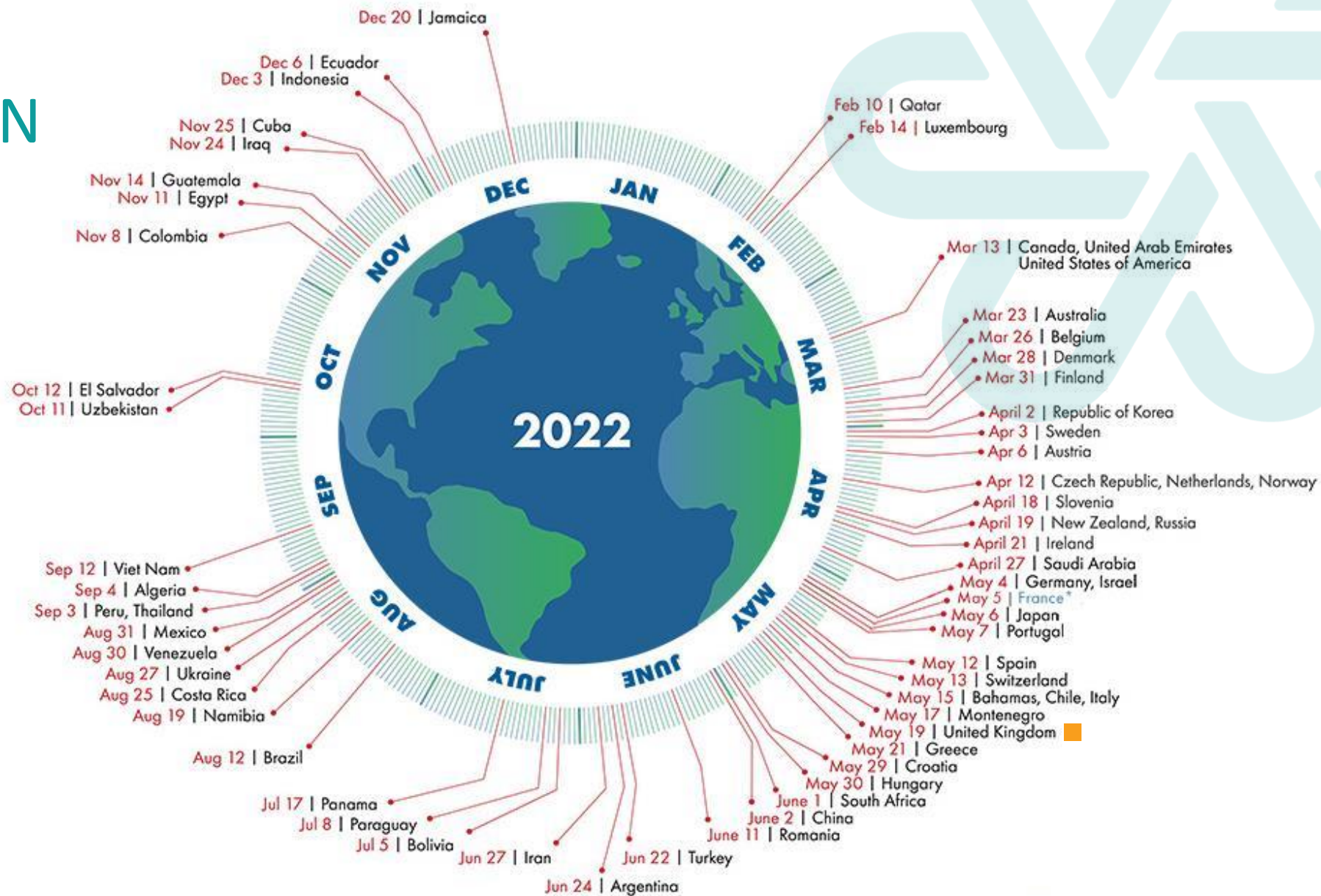
**Our linear consumption (take/make/use/dispose) of 250 Million new laptops a year causes.**

- Climate change
- Resource depletion
- 50Mt eWaste
- Social injustice

WE NEED A NEW WAY OF THINKING

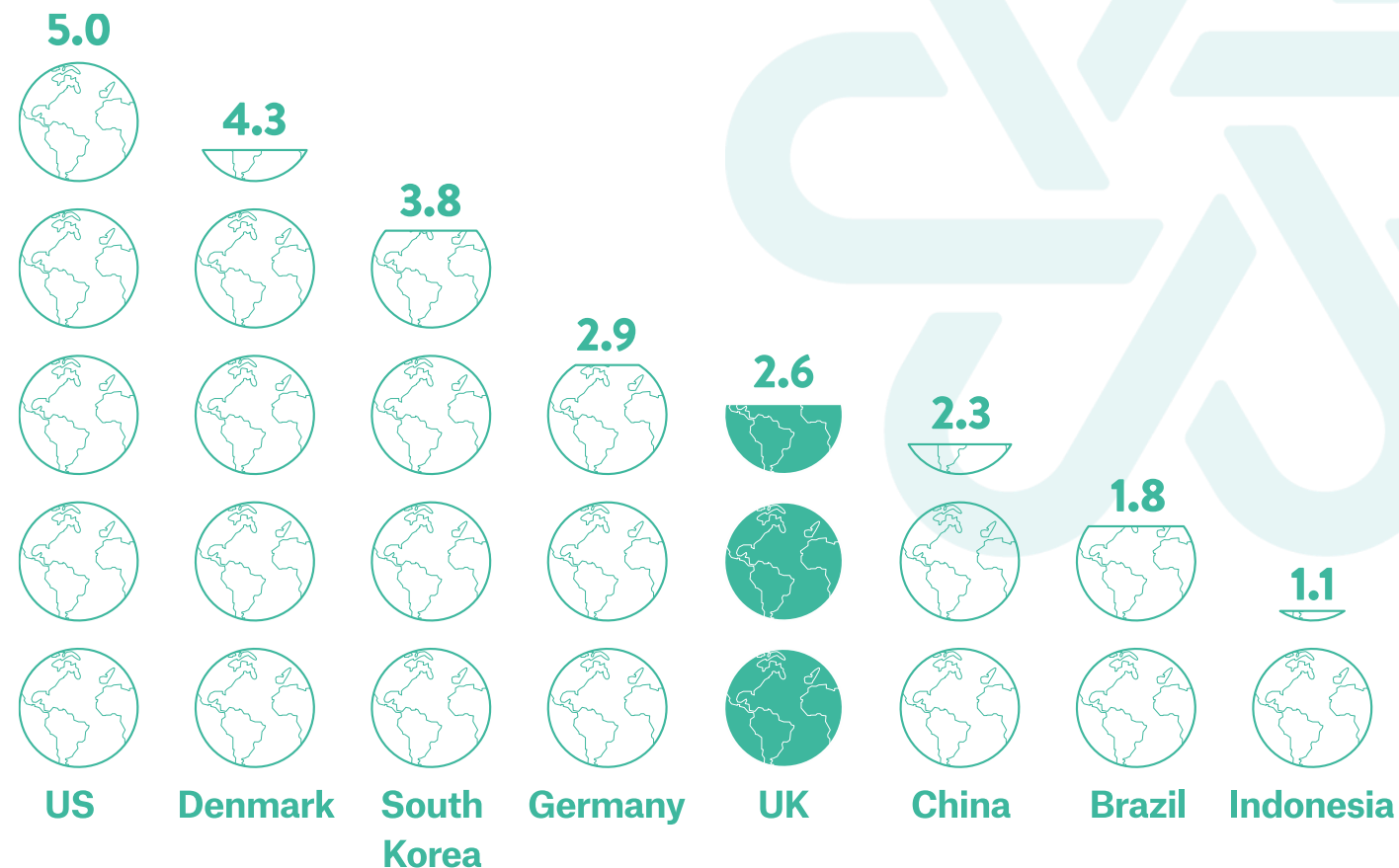


# OVER CONSUMPTION



# THE WORLD IS NOT ENOUGH

Number of earths and its resources  
needed if the world's population lived  
like the following countries



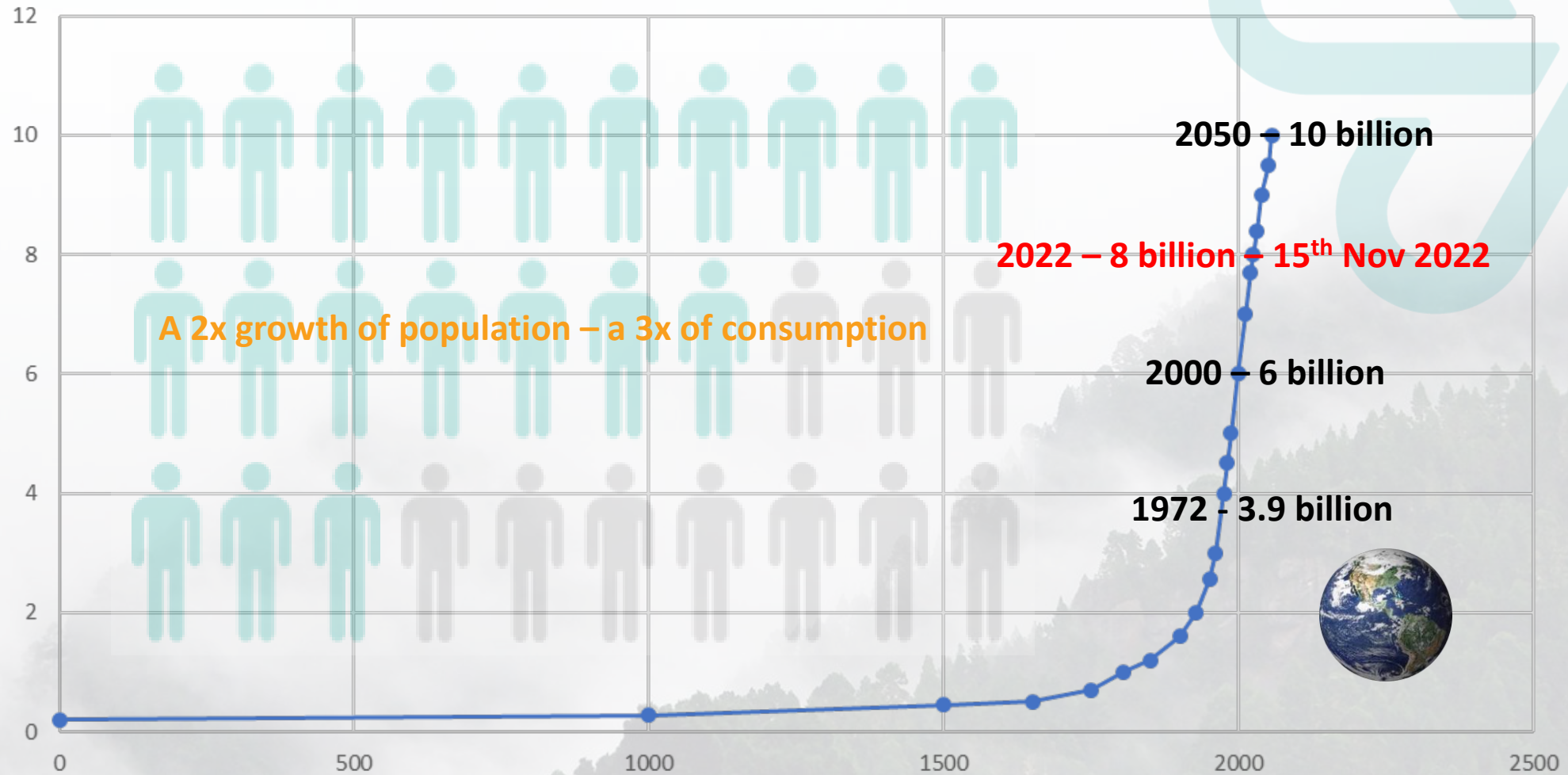
Selected countries. Calculated based on 2021 Earth Overshoot Days/2017 data  
Source: Global Footprint Network



**statista**

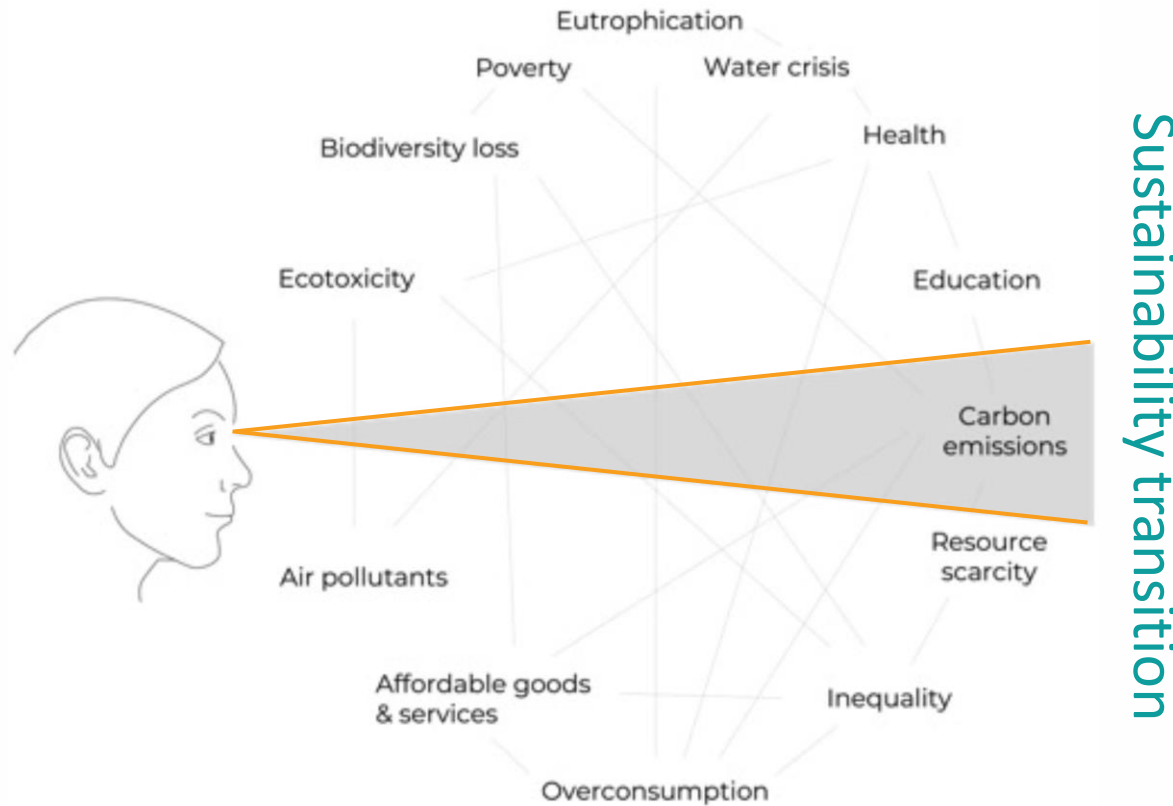


# GLOBAL POPULATION





# CARBON TUNNEL VISION



Graphic Jan Konietzko

A decarbonised future is not possible without the Circular Economy.

Remanufacturing is the heartbeat of the Circular Economy.

Therefore... a decarbonised future state relies on remanufacturing.

**But you cannot decouple other elements of a sustainable future from carbon. If we affect this, then we effect so much more.**

...Numbers





# SOCIAL MEDIA



cristiano



Follow

Message



3,392 posts

497M followers

523 following

Cristiano Ronaldo

Join my NFT journey on @Binance. Click the link below to get started.

[ter.li/CR7-On-Binance](https://ter.li/CR7-On-Binance)

## 1 Post

Energy 43MWh (43 million watt hours)

Equivalent of 19 Houses for a year

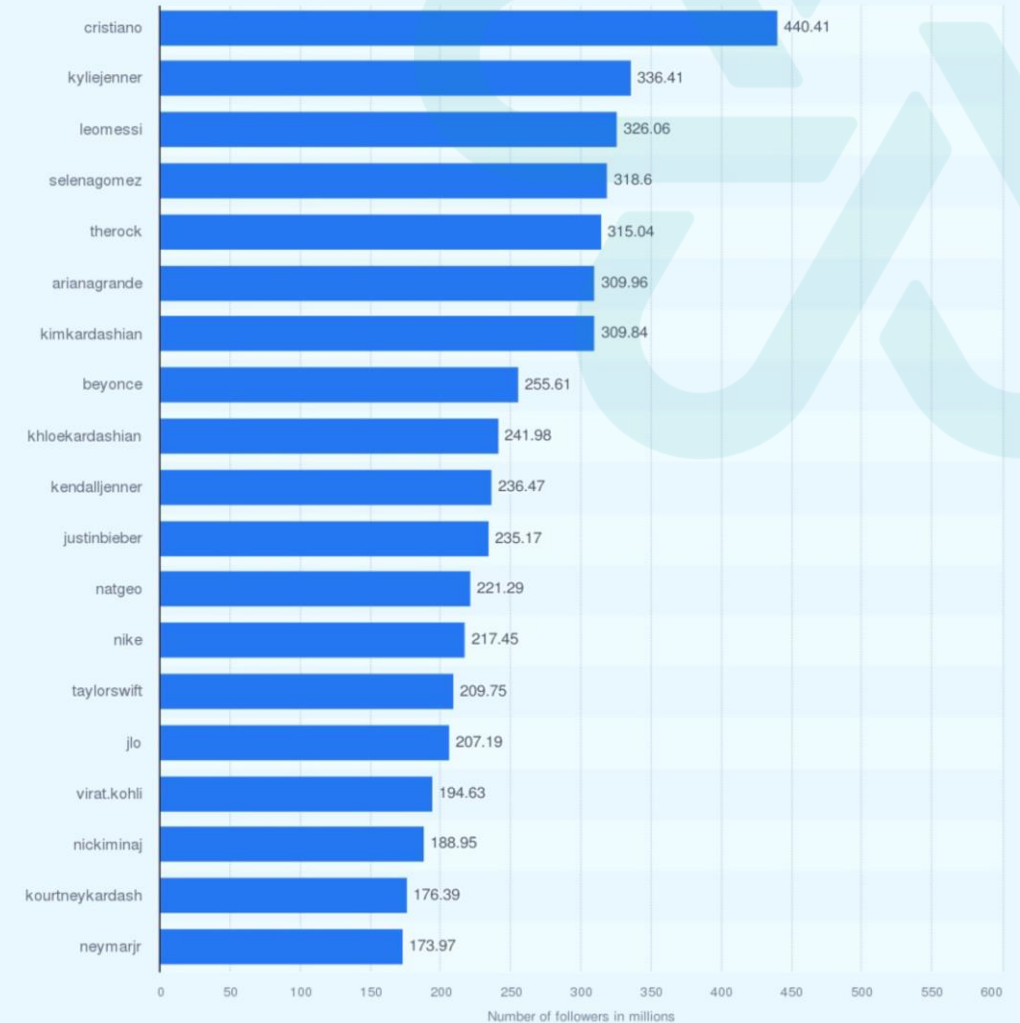
**Charge out rate of USD 1.6 million per post.**

**Posts 1.7 times a day (600 a year)**

Energy of 21 Million Watt Hours

Equivalent of 1,100 houses for a year

Instagram accounts with the most followers worldwide as of May 2022 (in millions)



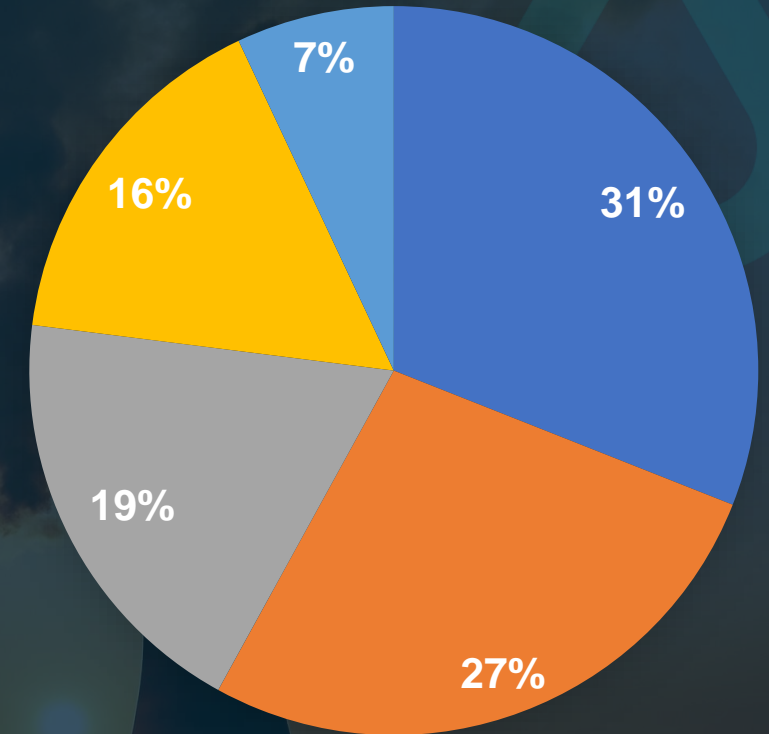
Source  
Social Blade  
© Statista 2022

Additional Information:  
Social Blade; May 2022; business / creator accounts

# WE ARE DUMPING 140 MILLION\* TONNES OF GHG INTO OUR ATMOSPHERE EVERY 24 HOURS!

## The CO<sup>2</sup> of Stuff

- Making Stuff (including cement, steel and plastic - and ICT)
- Powering stuff (electricity)
- Growing stuff (including plants and animals)
- Transporting stuff (including planes, trucks, cargo ships and cars)
- Temperature regulating stuff (meaning heating, cooling, and refridgeraton)

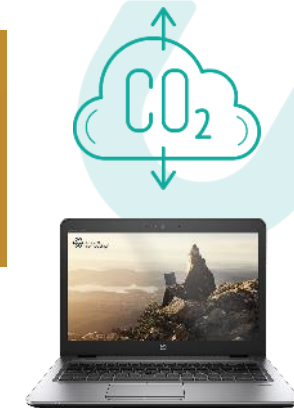


\*2021 Global output is 51 billion Tonnes annually

\*2021 Global output is 51 billion Tonnes annually



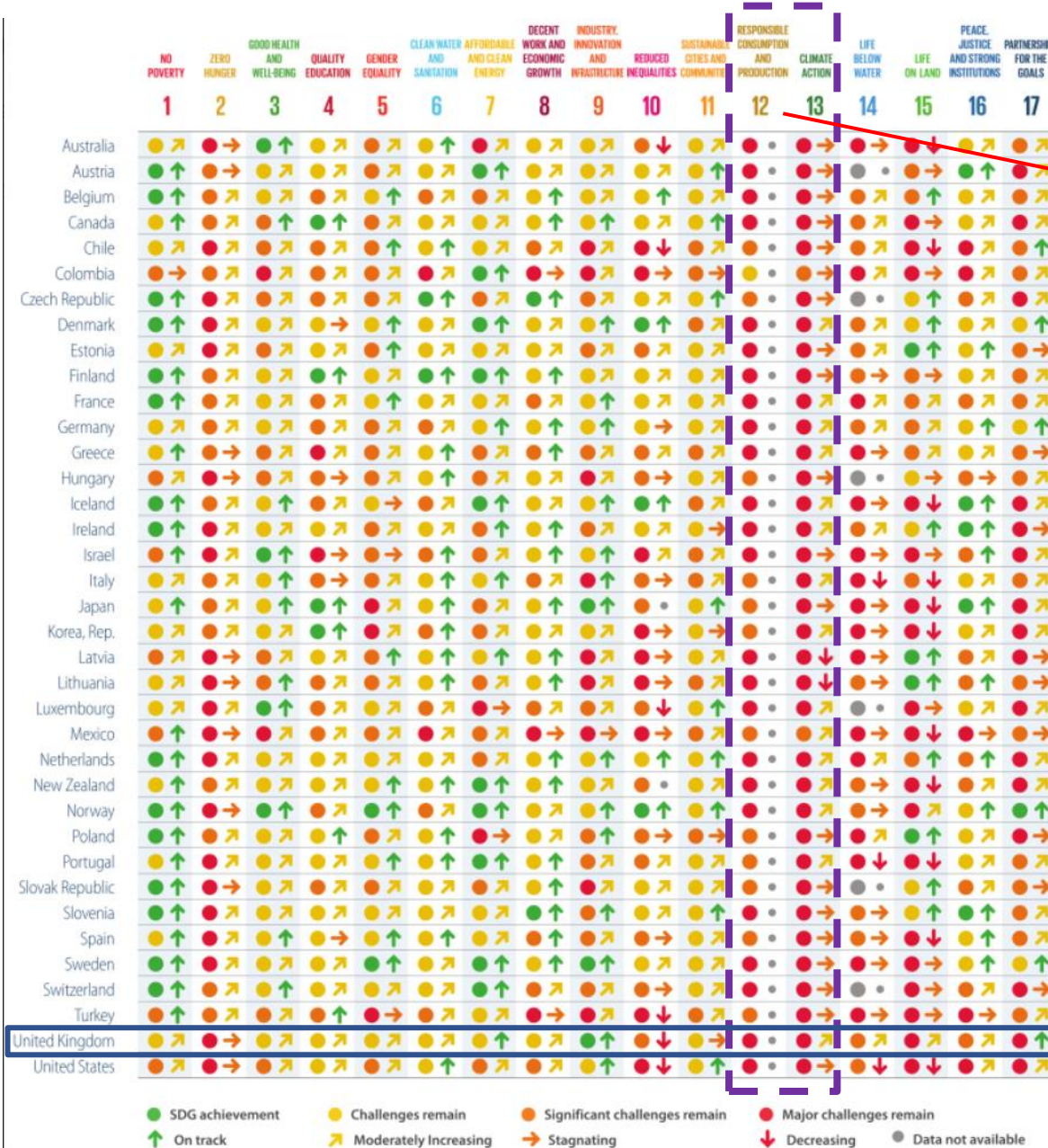
Don't turn away from **12** and **13**.  
 You cannot decouple them.  
 Taking hold of **12** will drive **13** down.  
 We have **mastered sustainable production**. It is down to the market to consume the product.



To make and ship a new laptop produces CO<sup>2</sup> (bad for climate).



<https://dashboards.sdgindex.org/chapters/part-2-the-sdg-index-and-dashboards>



# WHAT DEFINES SUSTAINABLE IT?



## ACQUISITION

Sustainable production  
...to deliver uncompromised...  
Sustainable consumption

## IN USE

Sustainable/renewable energy  
Smart plugs  
Intelligent users/use, etc

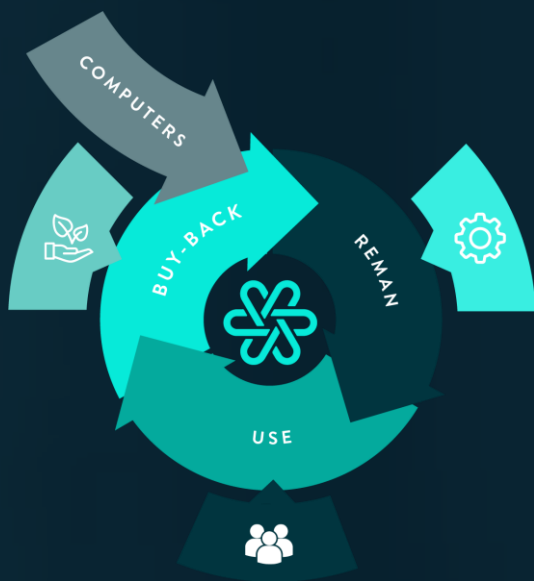
## RETIREMENT & VALUE RETENTION

Next generation resources,  
Sanitisation of your data  
Then entering a re-use model



# THE POSITIVE IMPACTS GAINED WITH CIRCULAR COMPUTING LAPTOPS

## 1. CIRCULAR ECONOMY



Resource efficient economy  
Climate positive environment  
Sustainable & ethical  
Regenerative & restorative

## 2. GET THE IT YOU NEED FOR LESS



Same as new quality  
Better value for money  
Available from stock or 4-8 weeks  
Meets performance needs  
Same as new warranty  
Premium user experience

## 3. SUSTAINABLE OUTCOMES



316kgs of CO<sub>2</sub>  
is avoided



5 Trees are  
planted



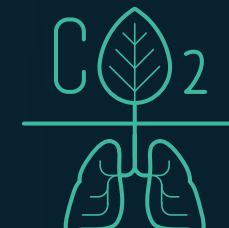
0% eWaste  
is produced



1,200 kgs of virgin  
earth resources  
are preserved.



190,000 litres of  
water is saved.



600Kgs of CO<sub>2</sub>eq  
captured from  
5 Trees.

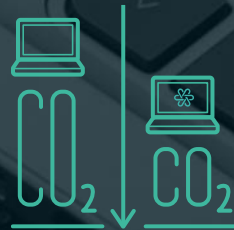
# OUR IMPACTS TO DATE

Creating a carbon neutral, Circular Economy enabled supply which we evidence as resilient and robust



## ECONOMIC SAVING

Circa £15-21 Million



## CO<sup>2</sup> PREVENTED

22,120 tonnes  
carbon reduction



## RESOURCES PRESERVED

84,000 tonnes



## WATER SAVED IN PRODUCTION

13 trillion litres



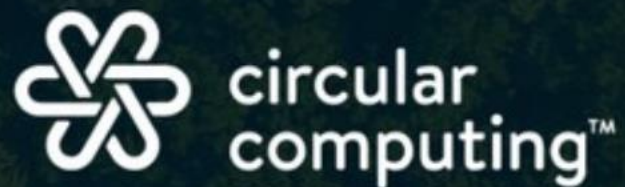
## REFORESTATION

350,000 trees

As of 0900 on 23-06-22 (70,000 units)

Because IT shouldn't cost the Earth





**Because IT shouldn't cost the Earth**

[www.circularcomputing.com](http://www.circularcomputing.com)  
[enquiries@circularcomputing.com](mailto:enquiries@circularcomputing.com)



Carbon  
Neutral  
Organisation



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