

*Telefonica*



ITU Green standards week

Innovating today for  
a sustainable tomorrow

*Designing Products for End-Of-Life*

Markus Terho, Head of Sustainability, Nokia



NOKIA SUSTAINABILITY STRATEGY

**DELIVER GREAT  
MOBILE PRODUCTS  
THAT....**

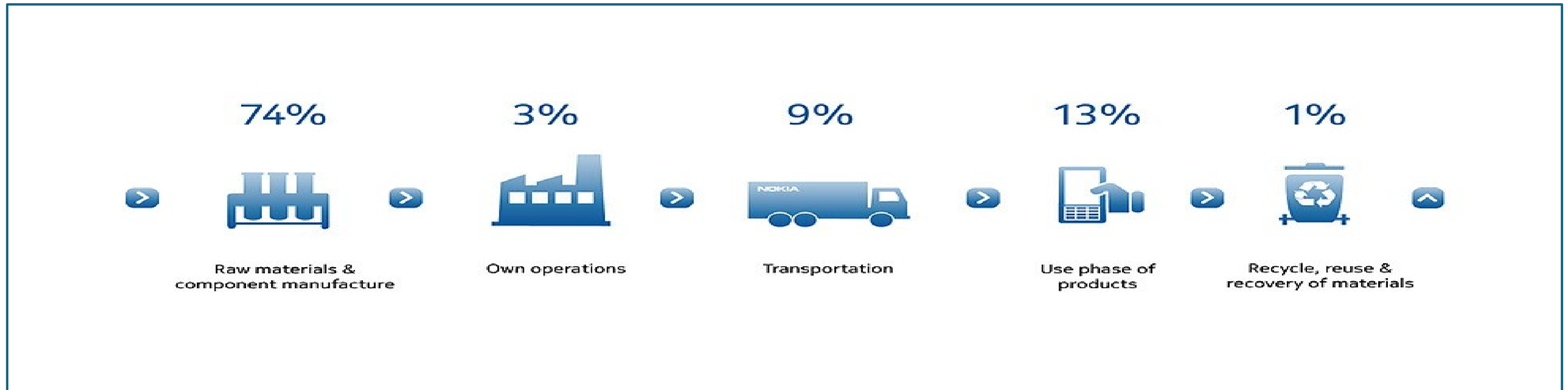
**NOKIA**

...enable people to improve their lives

...are made with best  
environmental and social  
practices

# We consider the environment during the entire life cycle of all our products

## - Life Cycle Thinking -



We create every device with the environment in mind

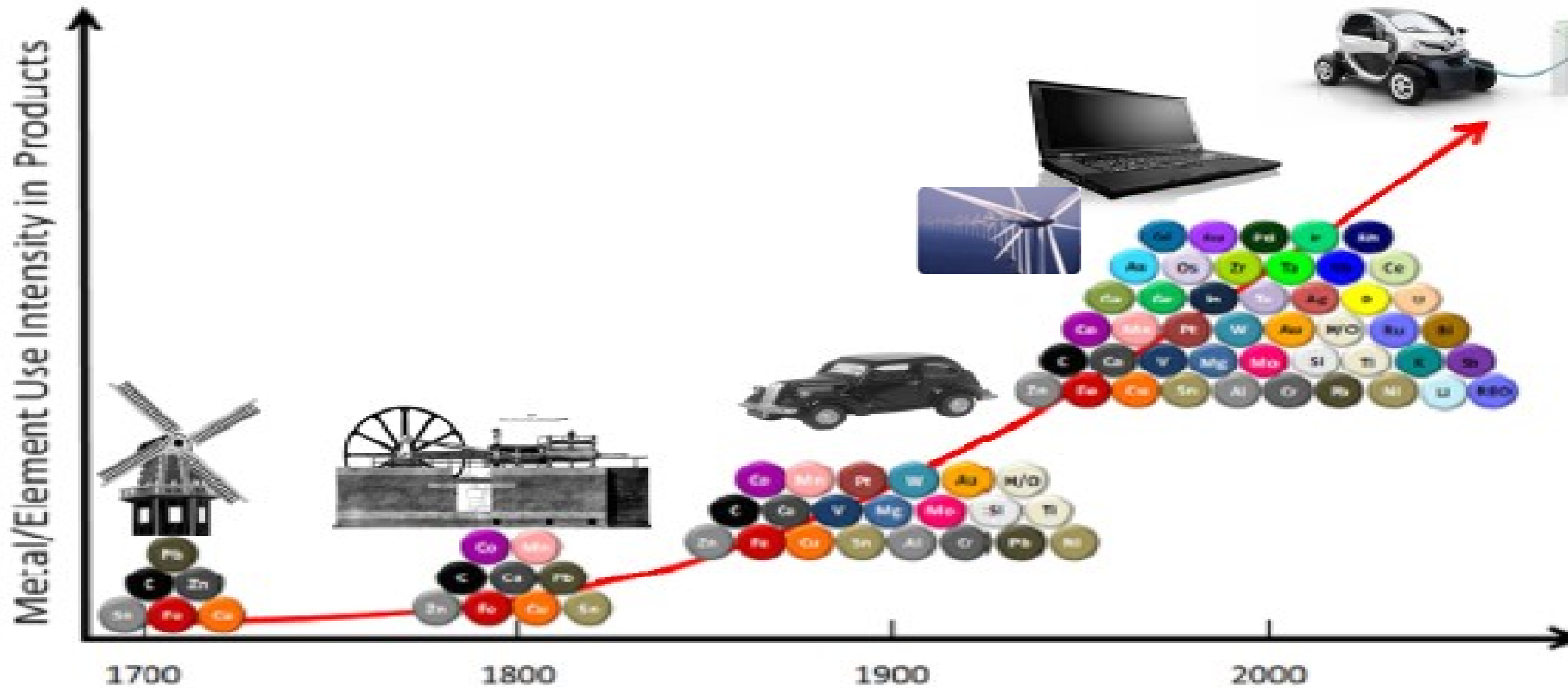


# Dematerialization

- Converging several devices into one single small device
- Mobile technologies are also continuously helping to dematerialize the economy by replacing physical products with services



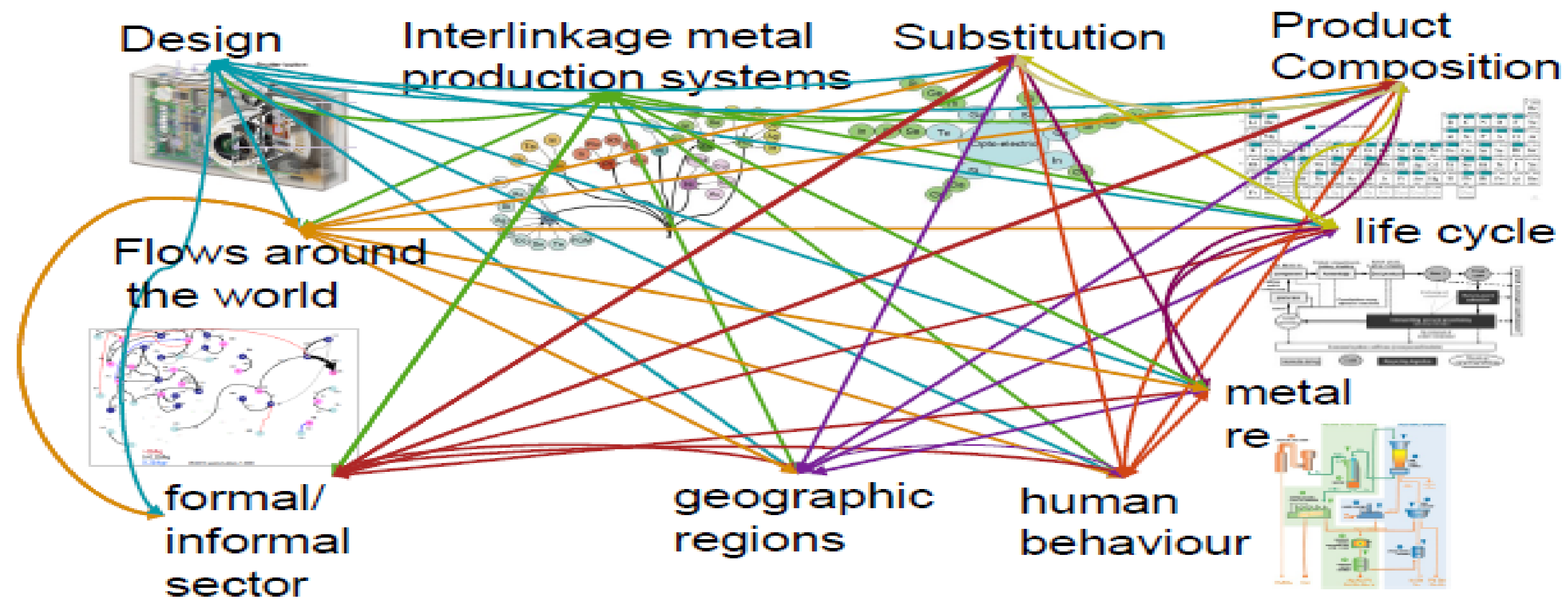
# Products become increasingly complex...



Based on: Achzet et al., Materials critical to the energy industry, Augsburg, 2011

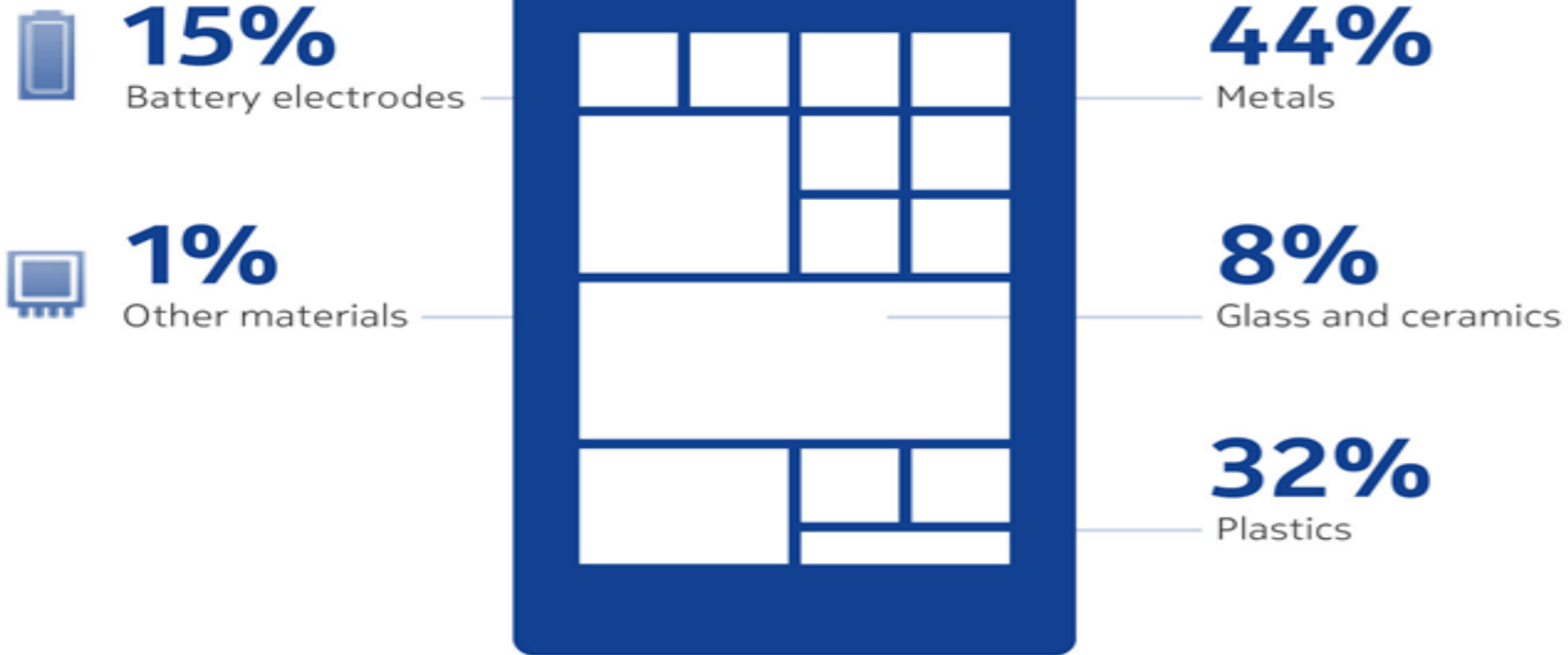


# Everything is connected...and complex

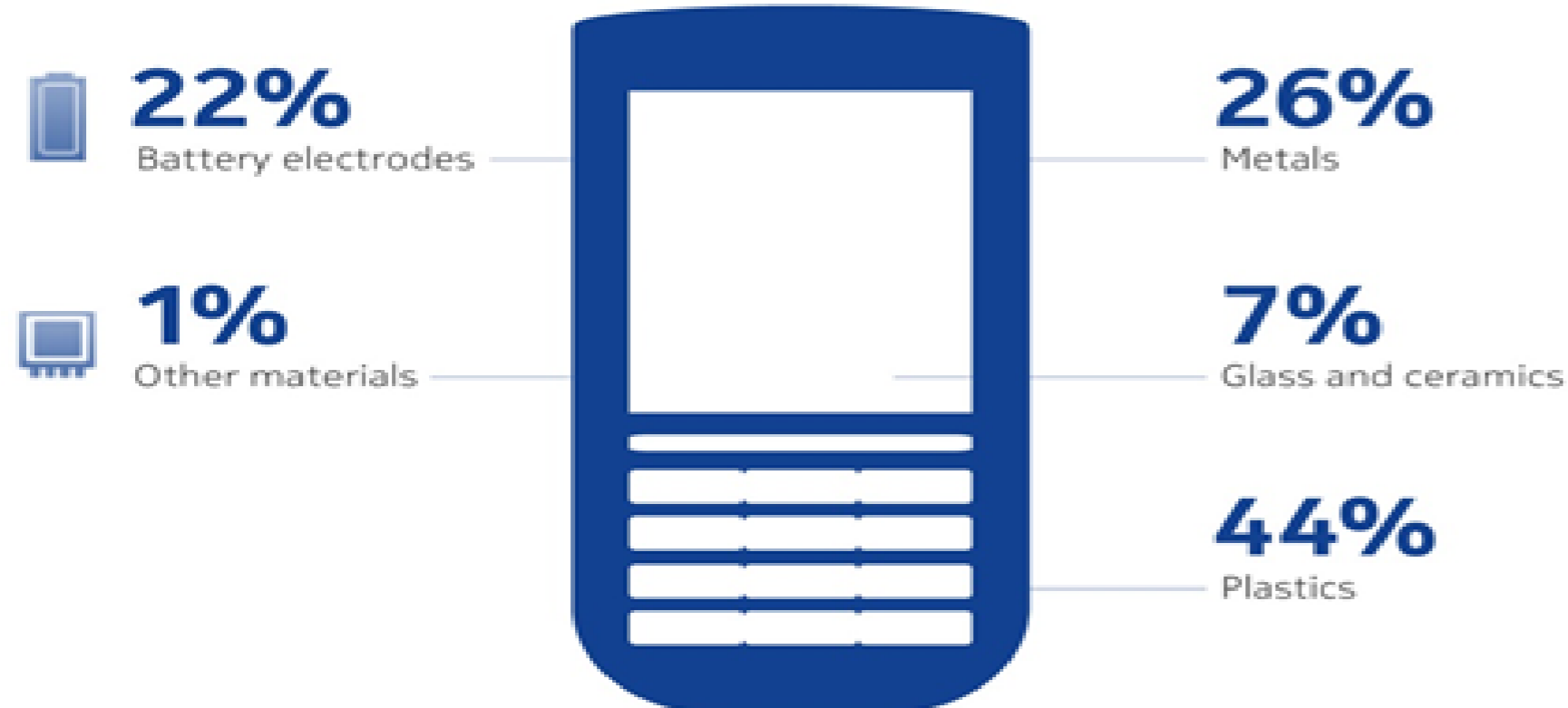


# INGREDIENTS OF A NOKIA PHONE

## Lumia



## Asha



We are the first mobile manufacturer to manage full list of substances used in our phones.

Some of our products include bio plastics, bio paints, recycled metals and recycled plastics.

Our products do not include PVC, brominated flame retardants (BFR) nor chlorinated and brominated compounds.

Every Nokia product comes with an Eco profile, which tells you about its materials, energy efficiency, packaging, environmental impact and recycling.

# Elements typically used in a mobile devices

hydrogen 1 <b>H</b> 1.0079																		helium 2 <b>He</b> 4.0026																			
lithium 3 <b>Li</b> 6.941		beryllium 4 <b>Be</b> 9.0122																		boron 5 <b>B</b> 10.811		carbon 6 <b>C</b> 12.011		nitrogen 7 <b>N</b> 14.007		oxygen 8 <b>O</b> 15.999		fluorine 9 <b>F</b> 18.998		neon 10 <b>Ne</b> 20.180							
sodium 11 <b>Na</b> 22.990		magnesium 12 <b>Mg</b> 24.305																		aluminum 13 <b>Al</b> 26.982		silicon 14 <b>Si</b> 28.086		phosphorus 15 <b>P</b> 30.974		sulfur 16 <b>S</b> 32.065		chlorine 17 <b>Cl</b> 35.453		argon 18 <b>Ar</b> 39.948							
potassium 19 <b>K</b> 39.098		calcium 20 <b>Ca</b> 40.078		scandium 21 <b>Sc</b> 44.956		titanium 22 <b>Ti</b> 47.867		vanadium 23 <b>V</b> 50.942		chromium 24 <b>Cr</b> 51.996		manganese 25 <b>Mn</b> 54.938		iron 26 <b>Fe</b> 55.845		cobalt 27 <b>Co</b> 58.933		nickel 28 <b>Ni</b> 58.693		copper 29 <b>Cu</b> 63.546		zinc 30 <b>Zn</b> 65.39		gallium 31 <b>Ga</b> 69.723		germanium 32 <b>Ge</b> 72.61		arsenic 33 <b>As</b> 74.922		selenium 34 <b>Se</b> 78.96		bromine 35 <b>Br</b> 79.904		krypton 36 <b>Kr</b> 83.80			
rubidium 37 <b>Rb</b> 85.468		strontium 38 <b>Sr</b> 87.62		yttrium 39 <b>Y</b> 88.906		zirconium 40 <b>Zr</b> 91.224		niobium 41 <b>Nb</b> 92.906		molybdenum 42 <b>Mo</b> 95.94		technetium 43 <b>Tc</b> [98]		ruthenium 44 <b>Ru</b> 101.07		rhodium 45 <b>Rh</b> 102.91		palladium 46 <b>Pd</b> 106.42		silver 47 <b>Ag</b> 107.87		cadmium 48 <b>Cd</b> 112.41		indium 49 <b>In</b> 114.82		tin 50 <b>Sn</b> 118.71		antimony 51 <b>Sb</b> 121.76		tellurium 52 <b>Te</b> 127.60		iodine 53 <b>I</b> 126.90		xenon 54 <b>Xe</b> 131.29			
caesium 55 <b>Cs</b> 132.91		barium 56 <b>Ba</b> 137.33		57-70 *		lutetium 71 <b>Lu</b> 174.97		hafnium 72 <b>Hf</b> 178.49		tantalum 73 <b>Ta</b> 180.95		tungsten 74 <b>W</b> 183.84		rhenium 75 <b>Re</b> 186.21		osmium 76 <b>Os</b> 190.23		iridium 77 <b>Ir</b> 192.22		platinum 78 <b>Pt</b> 195.08		gold 79 <b>Au</b> 196.97		mercury 80 <b>Hg</b> 200.59		thallium 81 <b>Tl</b> 204.38		lead 82 <b>Pb</b> 207.2		bismuth 83 <b>Bi</b> 208.98		polonium 84 <b>Po</b> [209]		astatine 85 <b>At</b> [210]		radon 86 <b>Rn</b> [222]	
francium 87 <b>Fr</b> [223]		radium 88 <b>Ra</b> [226]		89-102 **		lawrencium 103 <b>Lr</b> [262]		rutherfordium 104 <b>Rf</b> [261]		dubnium 105 <b>Db</b> [262]		seaborgium 106 <b>Sg</b> [266]		bohrium 107 <b>Bh</b> [264]		hassium 108 <b>Hs</b> [269]		meitnerium 109 <b>Mt</b> [268]		ununnillium 110 <b>Uun</b> [271]		unununium 111 <b>Uuu</b> [272]		ununbium 112 <b>Uub</b> [277]		ununquadium 114 <b>Uuq</b> [289]											
*lanthanoids		lanthanum 57 <b>La</b> 138.91		cerium 58 <b>Ce</b> 140.12		praseodymium 59 <b>Pr</b> 140.91		neodymium 60 <b>Nd</b> 144.24		promethium 61 <b>Pm</b> [145]		samarium 62 <b>Sm</b> 150.36		europium 63 <b>Eu</b> 151.96		gadolinium 64 <b>Gd</b> 157.25		terbium 65 <b>Tb</b> 158.93		dysprosium 66 <b>Dy</b> 162.50		holmium 67 <b>Ho</b> 164.93		erbium 68 <b>Er</b> 167.26		thulium 69 <b>Tm</b> 168.93		ytterbium 70 <b>Yb</b> 173.04									
**actinoids		actinium 89 <b>Ac</b> [227]		thorium 90 <b>Th</b> 232.04		protactinium 91 <b>Pa</b> 231.04		uranium 92 <b>U</b> 238.03		neptunium 93 <b>Np</b> [237]		plutonium 94 <b>Pu</b> [244]		americium 95 <b>Am</b> [243]		curium 96 <b>Cm</b> [247]		berkelium 97 <b>Bk</b> [247]		californium 98 <b>Cf</b> [251]		einsteinium 99 <b>Es</b> [252]		fermium 100 <b>Fm</b> [257]		mendelevium 101 <b>Md</b> [258]		nobelium 102 <b>No</b> [259]									

This periodic table does not take into account in what quantities and concentrations the elements have been used (only the smallest impurities are excluded). Neither does it take into account the form the element in question has been used in.



# Mobile phone take-back and recycling

## phases

### Consumer Facing

#### Collection /Take back

1. Nokia own collection
2. Partnerships (operator, NGO etc)
3. Producer associations



### E-waste recycling company

#### Sorting/ Pretreatment

1. Manual
2. Mechanical

Recycling companies separate materials and sell them as secondary raw material to downstream



### Downstream companies

#### Material recycling

1. Aluminum smelter
2. Ferrous smelter
3. Integrated Cu smelter
4. Plastic compounding
5. Cobalt chemistries





# THE MATERIALS IN YOUR OLD PHONE CAN BE RECOVERED AND USED to make new products or generate energy



You can drop off your old phone at any local electronics recycling point. Nokia has also own recycling points around the world.



**Mobiles E-waste problem? Resource?**



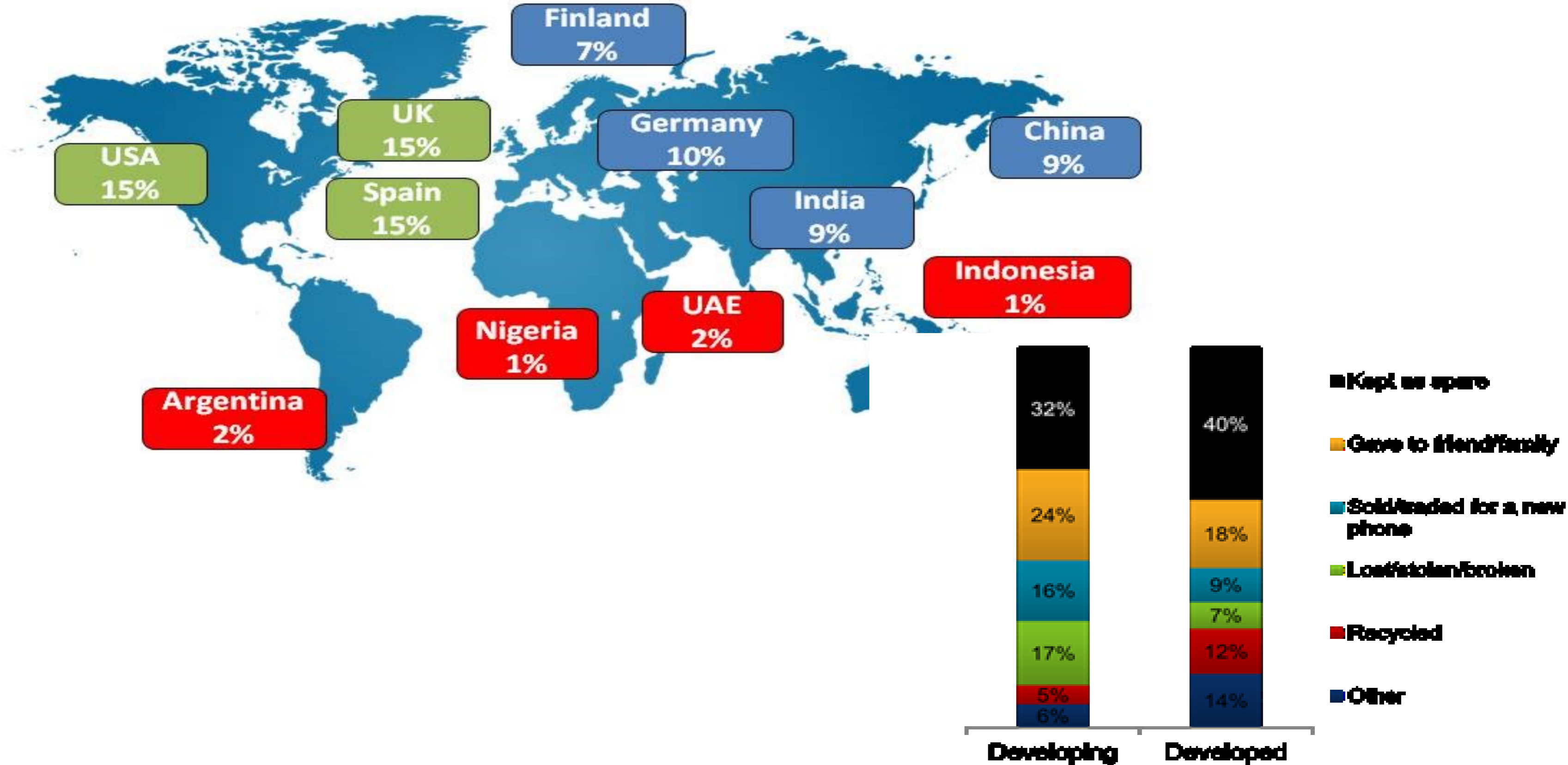




E-waste ... efficient Collection  
of the End-of-Life e-waste is key!



# Recycling behaviour-mobile phones





# RECYCLING IS THE WAY FORWARD

RECOVER THE MATERIALS IN OLD PHONES to make new products or generate energy.

## Nokia to collect fake handsets for recycling

Posted by MARGARET WAHITO on September 19, 2012



NAIROBI, Kenya, Sept 19 – Nokia has partnered with local mobile service providers and retail outlets to collect and dispose of counterfeit phones ahead of the planned switch-off of these devices by the Communications Commission of Kenya (CCK).

The handset manufacturer has partnered with Safaricom, Airtel, Nakumatt, Naivas, Phonelink, and

## Ditch your old phone for recycling and save a turtle

Recycle your old mobile devices at any Nokia Care Centre in the UAE, Oman, and Qatar and get a chance to 'adopt' one of 200 endangered Hawksbill turtle

By Janice Ponce de Leon, Staff Reporter

Published: 15:53 November 23, 2011



## Nokia's Recyclimpics Adds Some Fun To Recycling

6 Jul 2011 / 2:34pm / By Daniel Goh

Malaysia – Nokia recently held a three-day Nokia Recyclimpics event at the east court of M... continued effort of its 'Recycle a Phone & Adopt a Tree' program.



# Conclusions

- Designing for Recycling is a broad topic for Product Design
  - Functionality, technology, materials
  - Technically products are challenging, they contain almost every element from the periodic table
- Circular Economy need across-industries dialogue and a global view
  - Product use patterns and WEEE/EPR
    - People do not know that you can recycle electronics -> collection amounts are low
  - recyclers need to introduce advanced recycling technology to get all possible materials from mobile phone in an environmentally sound manner
- Better Solution:
  - All stakeholders work together (government, manufacturer, retailer, operator, recycler, consumer)



*Thank you*

