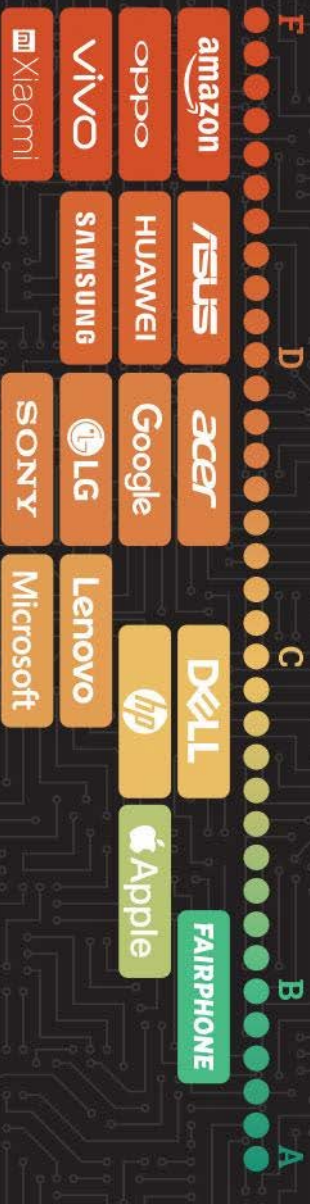


Electronics & the Right to Repair

Gary Cook
Greenpeace
gary.cook@greenpeace.org

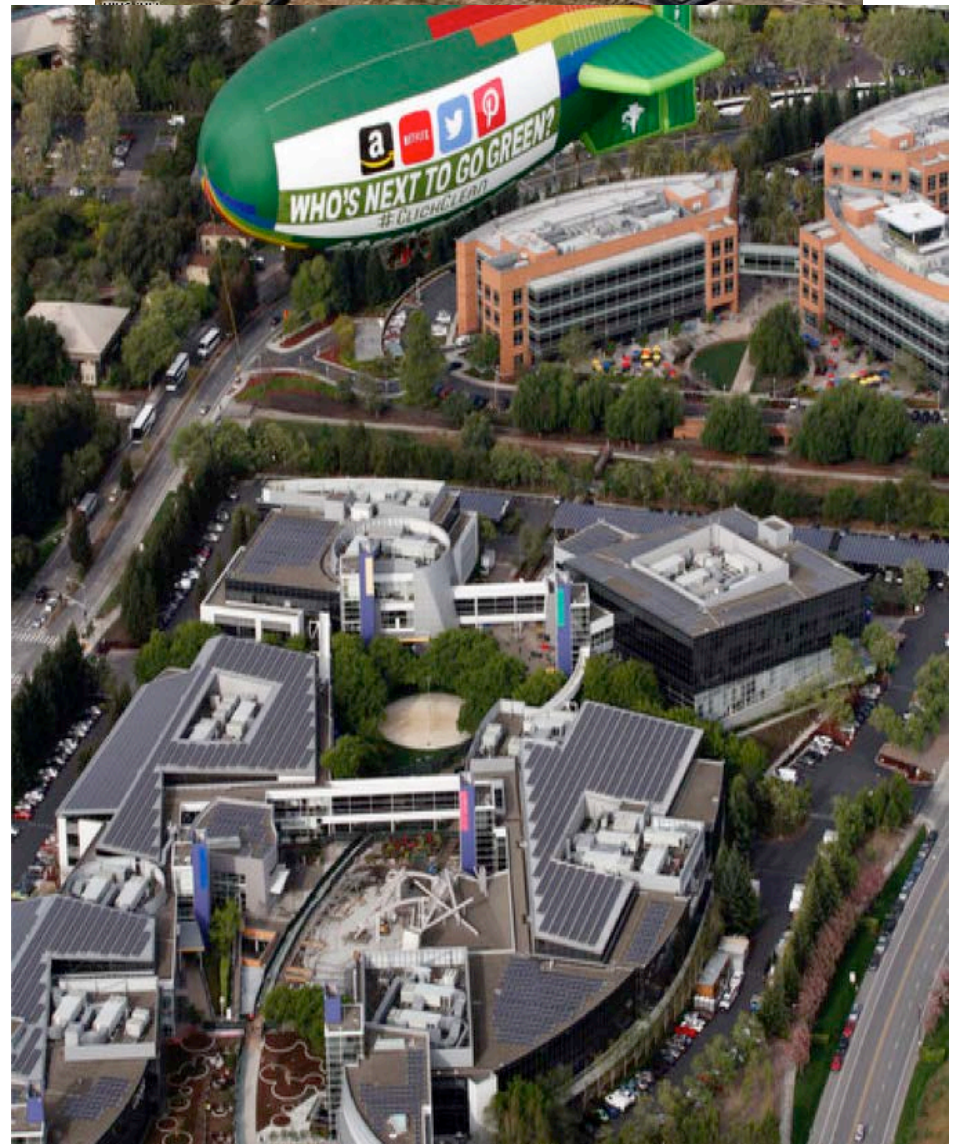
GUIDE TO GREENER ELECTRONICS 2017





Greenpeace Today

- 3 Million members
- Offices in 40 + countries
- Fully Independent-no corporate or government funding
- Global campaigning (10+ years on IT)

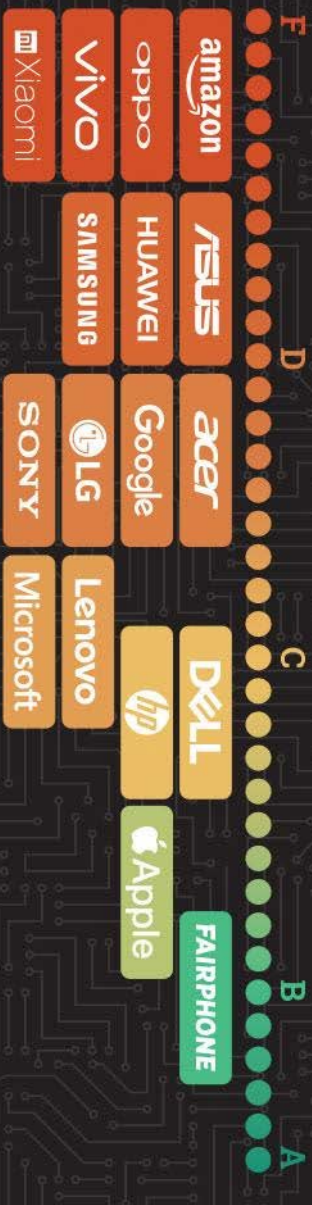


Rethink-IT

Challenge to the IT Sector

- * Recycled Materials
- * Renewable Energy
- * Repairable Devices
- * Remove Hazardous Chemicals

GUIDE TO GREENER ELECTRONICS 2017



Period Table of Electronics

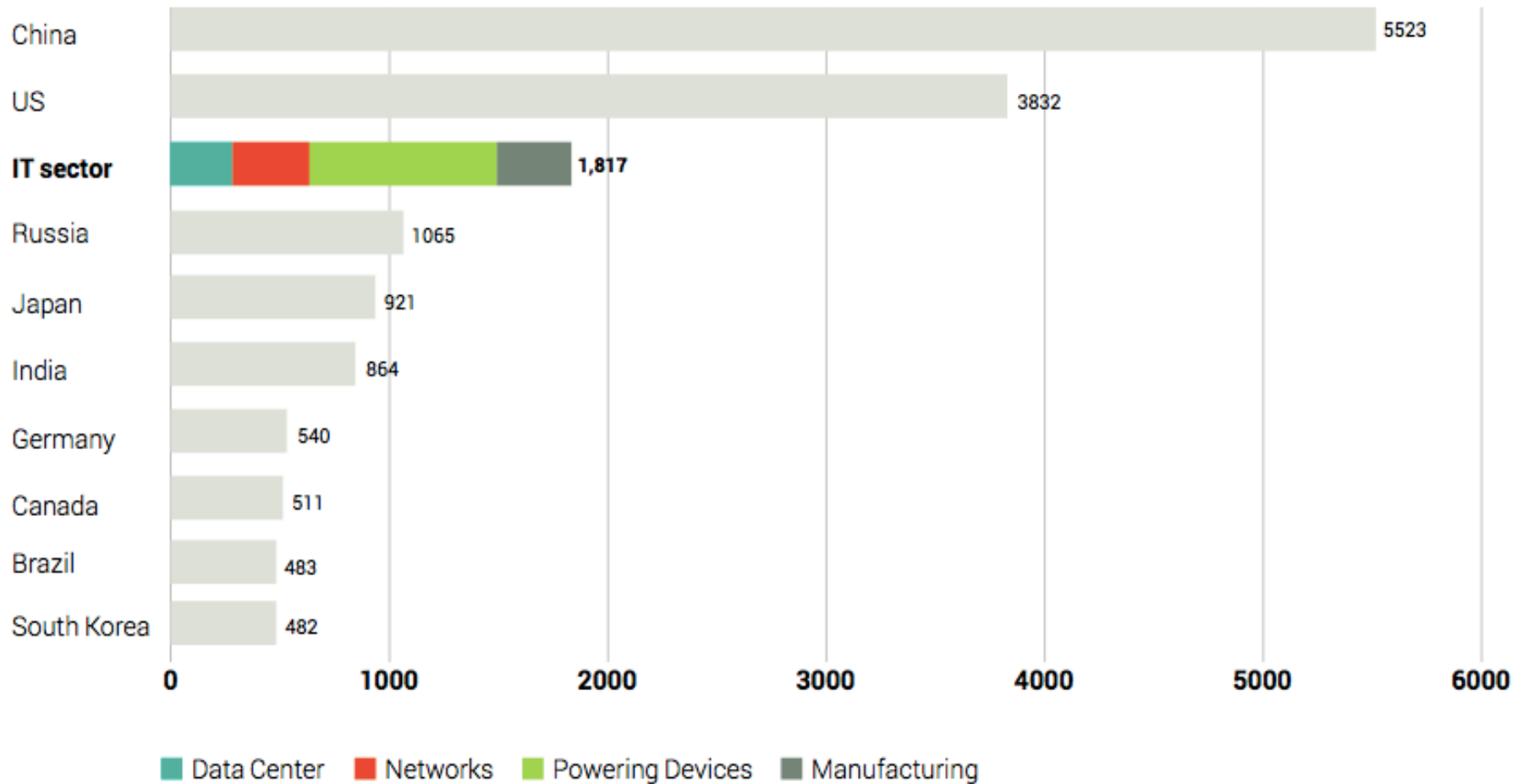
1 H Hydrogen 1.008																	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.065	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.972	35 Br Bromine 79.904	36 Kr Krypton 84.798
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.905	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.294
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71 Lanthanide Series	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine 209	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinide Series	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [265]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [268]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Nh Nihonium unknown	114 Fl Flerovium [289]	115 Mc Moscovium unknown	116 Lv Livermorium [293]	117 Ts Tennessine unknown	118 Og Oganesson unknown
		57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.967	
		89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 267.086	101 Md Mendelevium 268.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]	

KEY:

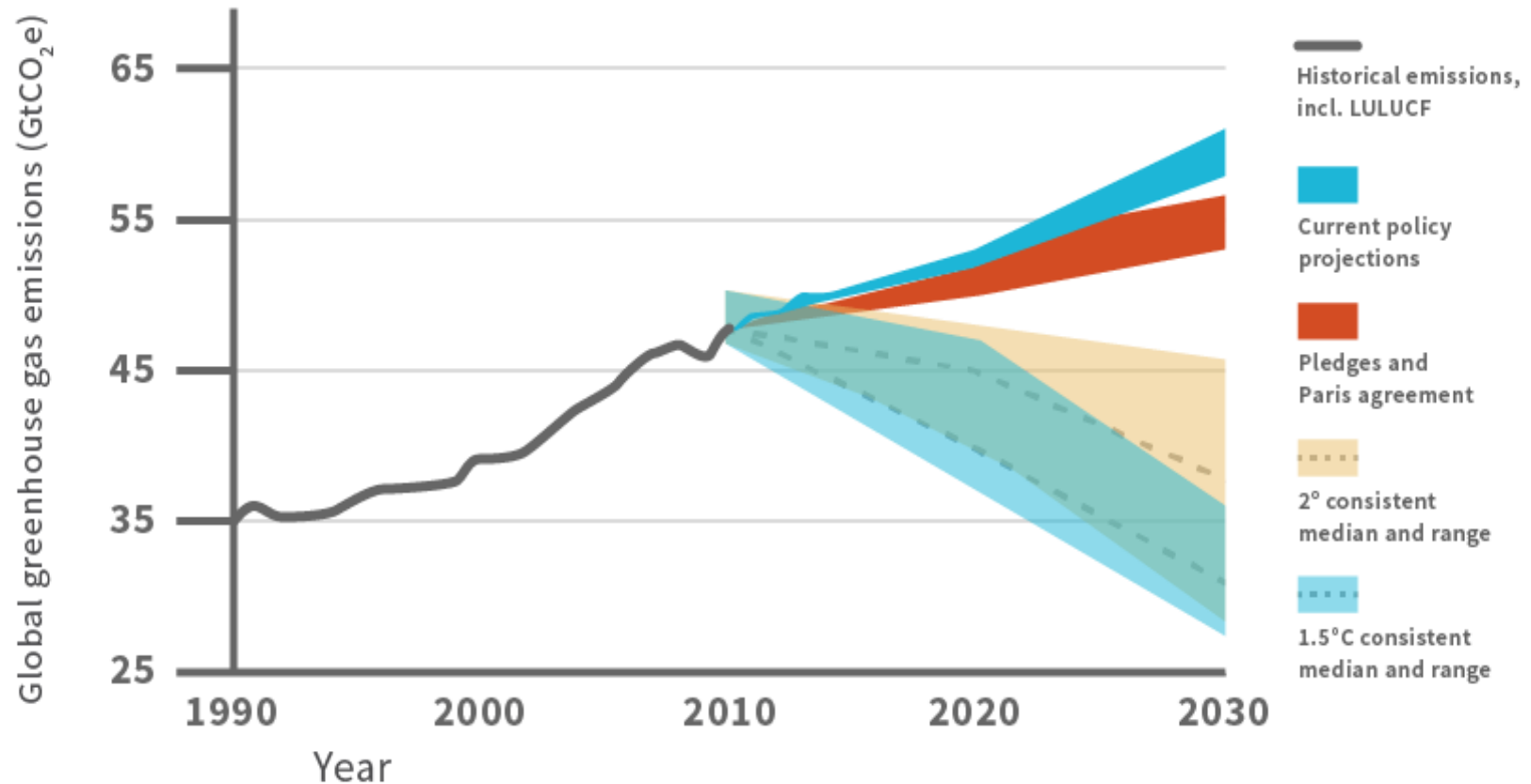
- Select substances of concern
- Rare earth element
- Conflict mineral
- Commonly used in advanced electronics



Global Electricity Demand of IT Sector

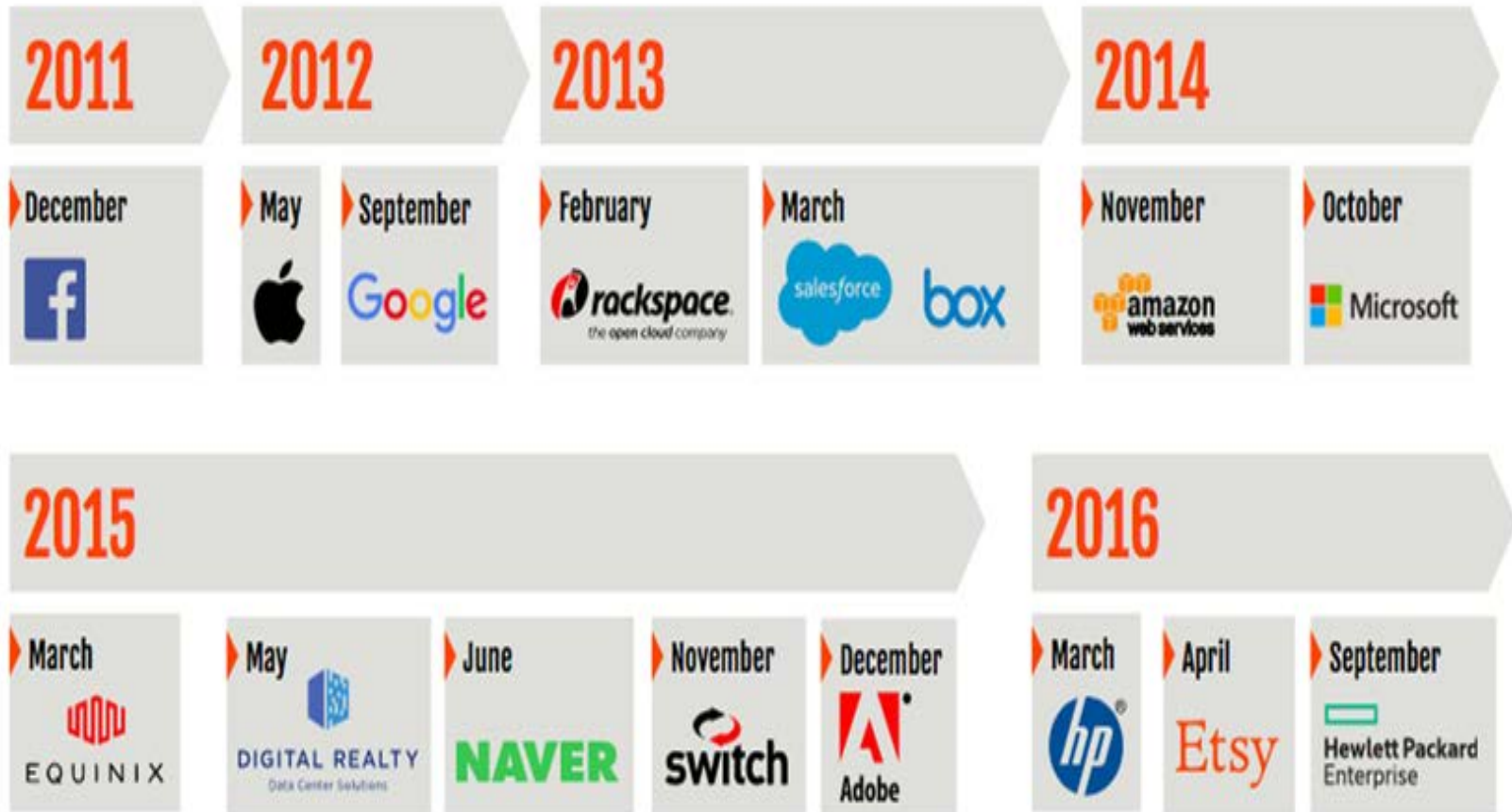


Emission Gaps to Meeting 1.5° Goal



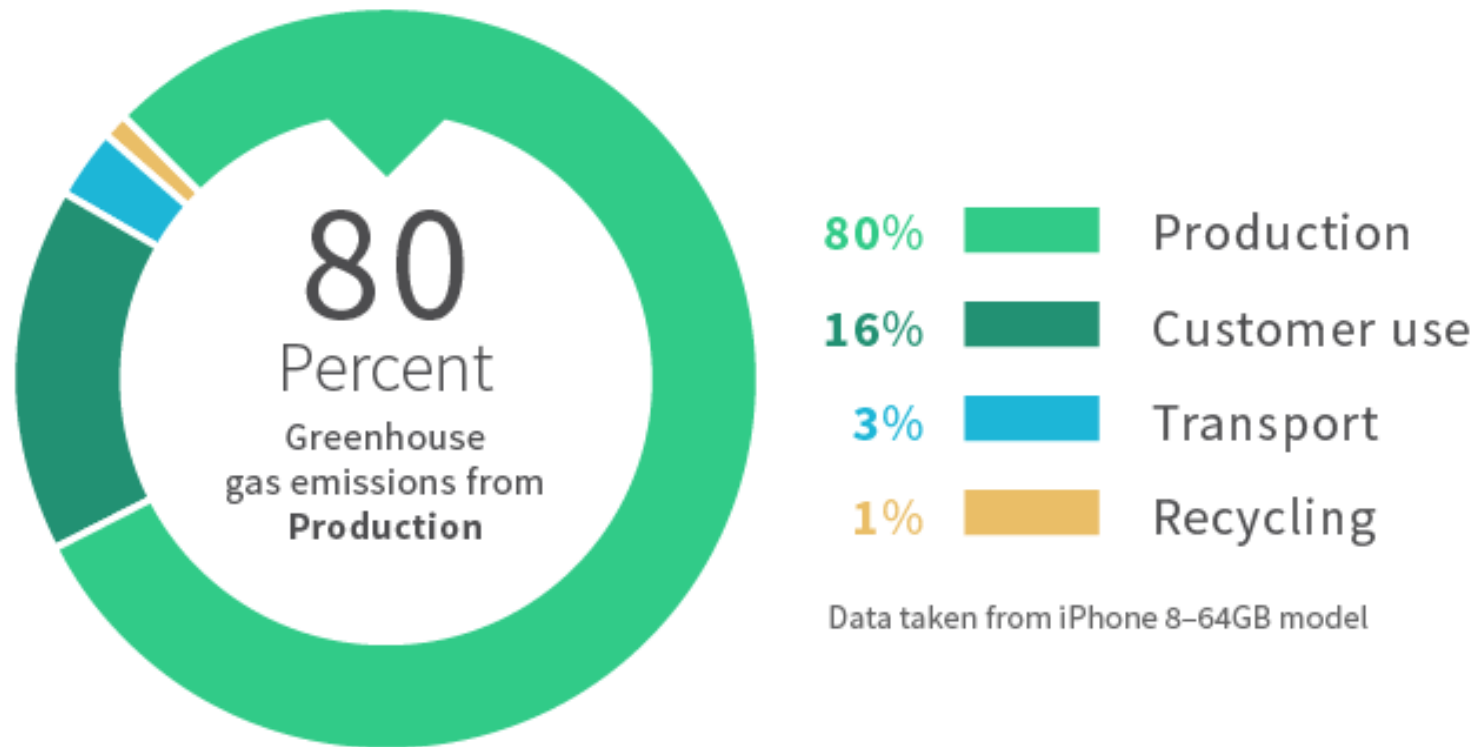
Emission reduction commitments set under Paris Agreement remain well below what climate scientists say is needed to avoid dangerous and irreversible climate change. Greater corporate action is needed. *Source: Climate Action Tracker*

100% Renewable Energy Commitments

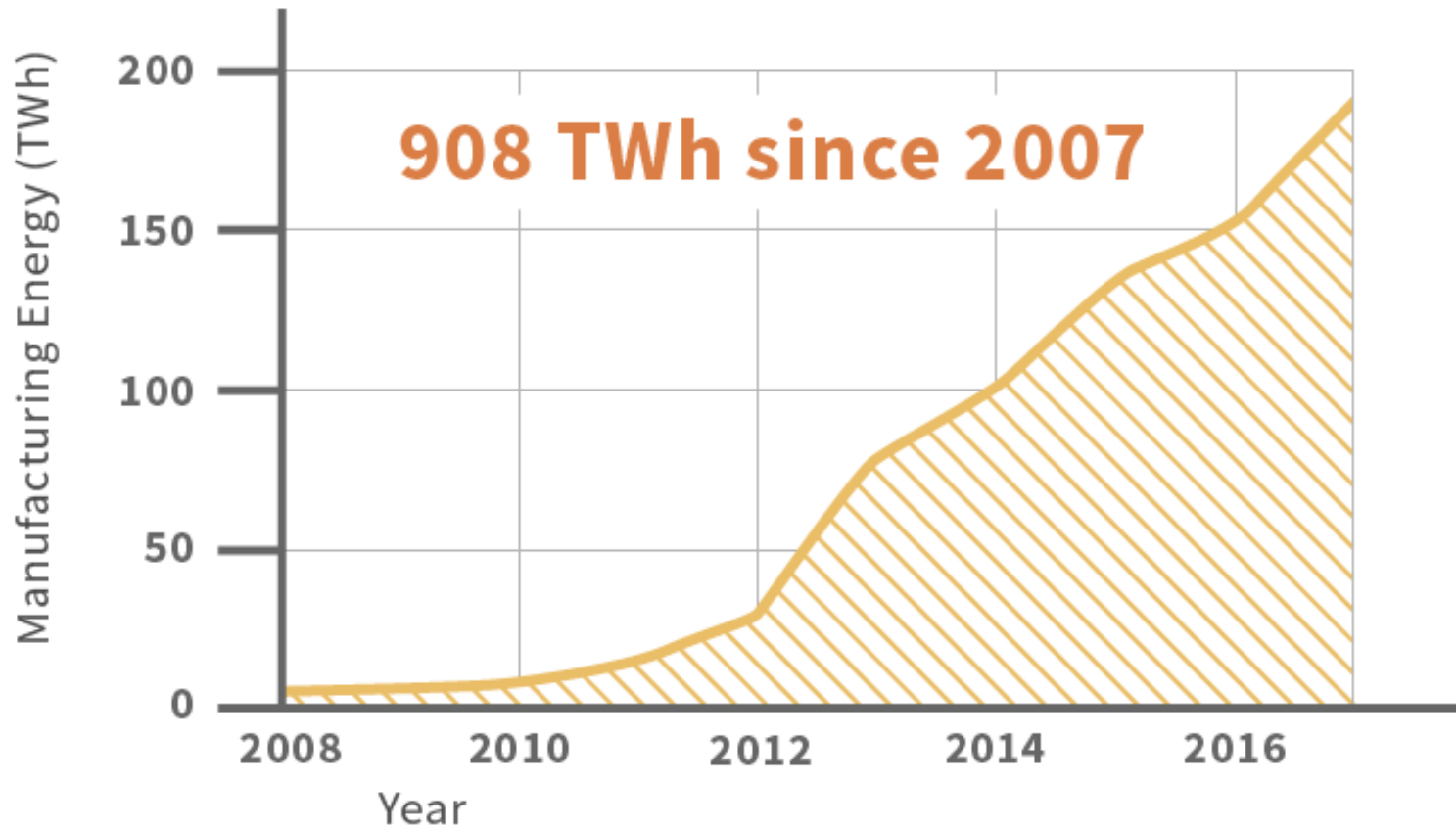


20+ IT Companies w/100% RE Commitment

Greenhouse Gas Emissions of a Smartphone



Smartphone Manufacturing Energy Footprint



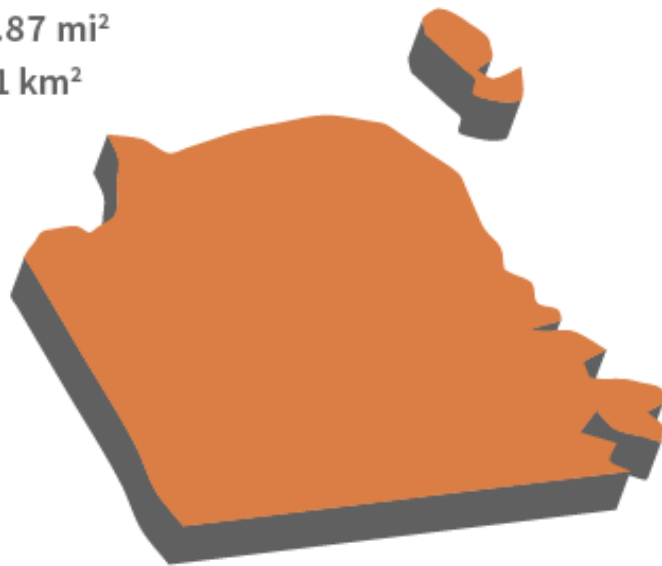
Since 2007, 908 TWh, close to the annual electricity consumption of Japan, has been used to manufacture smartphones alone.

Annual E-Waste Generation

San Francisco

46.87 mi²

121 km²



Each year, enough e-waste is produced globally to cover all of San Francisco.

Electronics Recycling

Only 16% collected for recycling

Loss in energy & materials with standard methods

Lack of transparency on handling

Innovations on Secondary Materials:

- Closed Loop Plastic (Dell)
- Tin (Apple)
- Tungsten (Fairphone)
- Materiality Assessments (Apple & FP)
- Apple Closed Loop Commitment

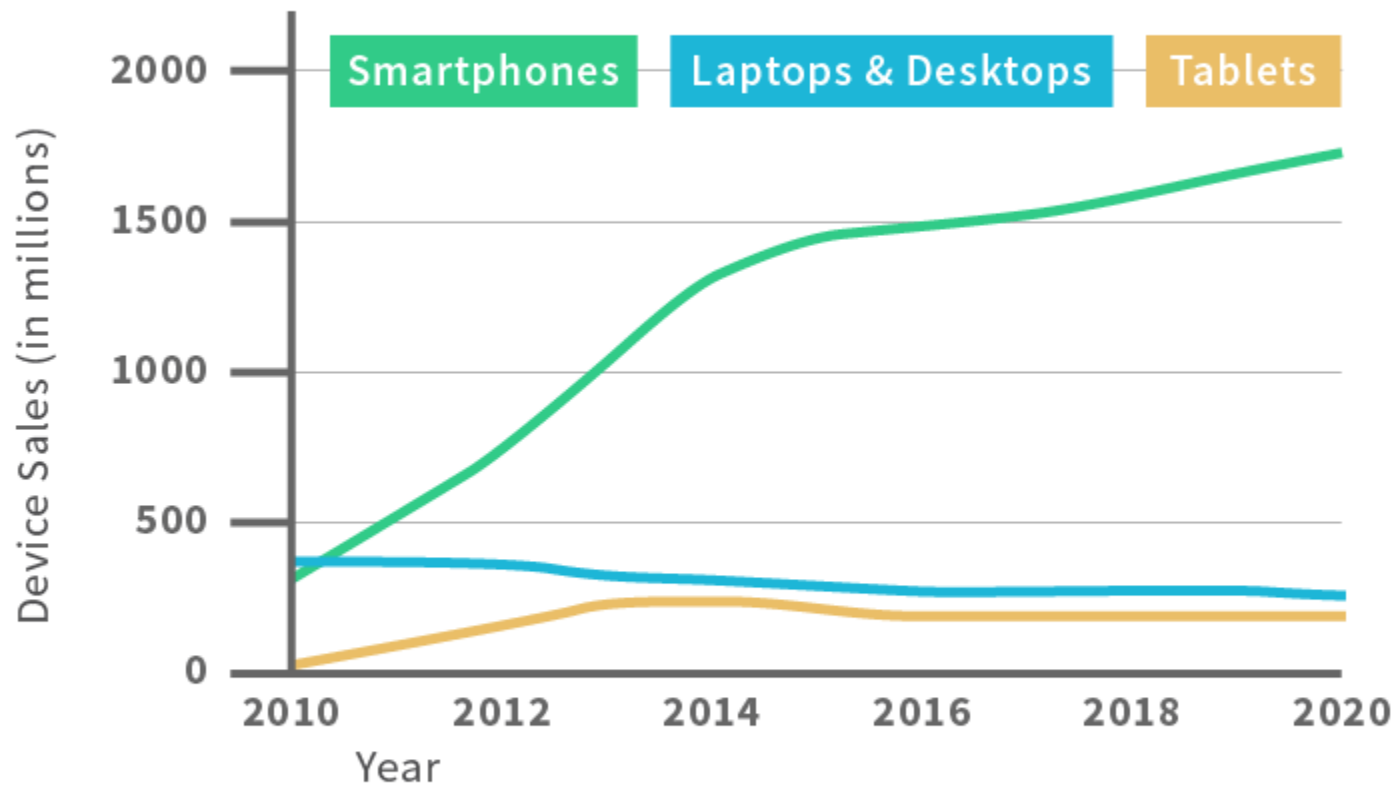


Importance of Repairable Electronics

- Slowing resource consumption
- Lower Emissions
- Less Waste
- Bigger Mindset shift on Products



Consumer Electronics Sales Since 2010



More than 1.5 billion smartphones are expected to be produced every year from 2017.

Reparability & Longer Product Life

- ✓ Battery Replaceability
- ✓ Display Replaceability
- ✓ Modular Design
- ✓ No Special Tools
- ✓ Spare Parts Available
- ✓ Repair & Disassembly Info

www.rethink-it.org



“Smart” ~~Design?~~

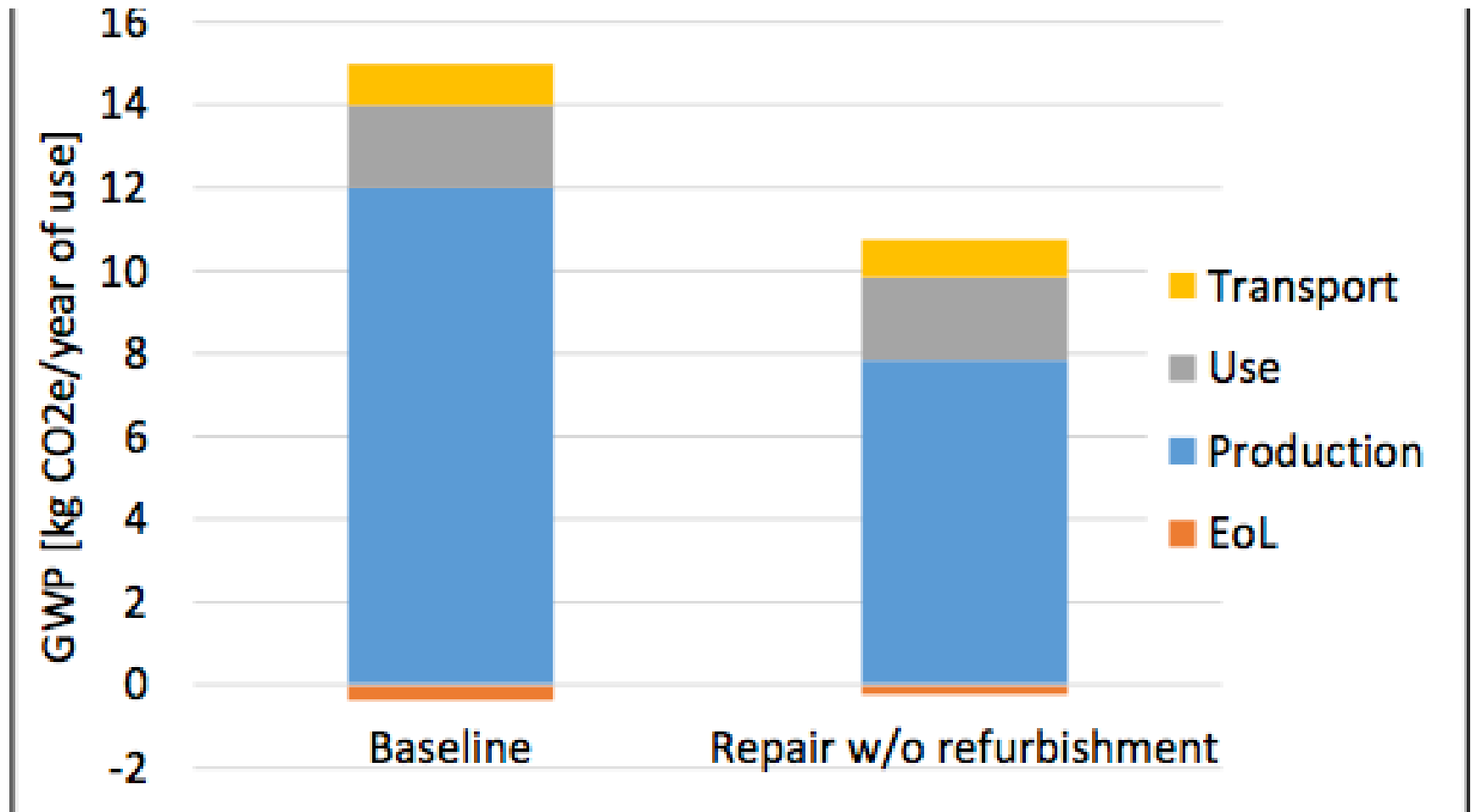
- No Longer Upgradeable
- Non Replaceable Battery
- More Difficult to Repair
(Adhesives, Specialty Tools)
- Lack of Spare Parts &
Repair Documentation



Fairphone – Smarter Phone



Emissions Reductions with Repair



Guide to Greener Electronics

- 17 Global Electronics Manufacturers
(Smartphones, Tables, PCs)
- Evaluated on
 - Renewable Energy
 - Resource Consumption
 - Hazardous Chemicals
- Measurements:
 - Transparency
 - Commitment;
 - Performance;
 - Advocacy



www.greenpeace.org/greenerguide