On the path to "net zero" by 2050
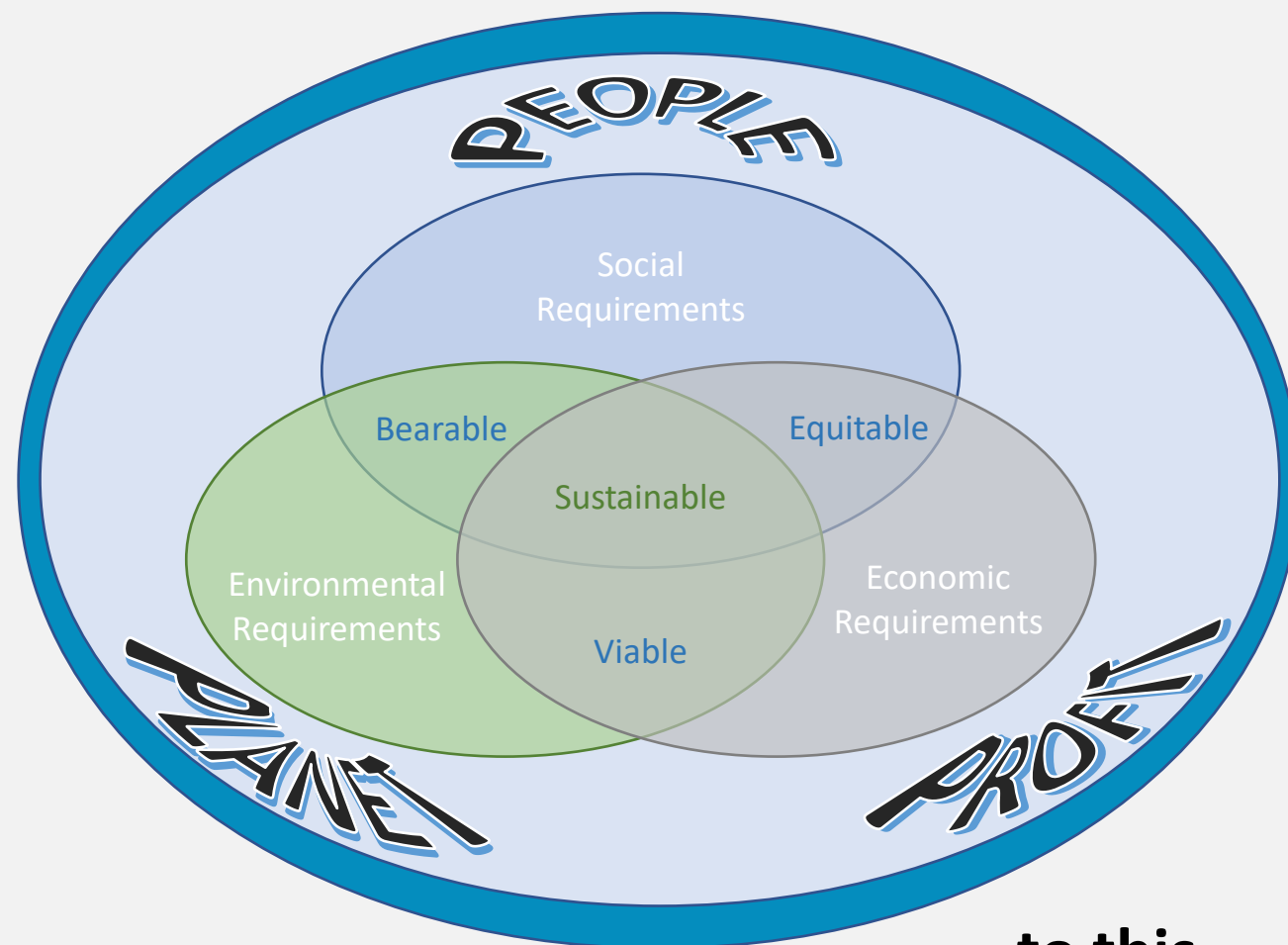
Jean-Marc Jefferson
Business Advisor – N2S

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Technology Lifecycle Management

"Passionate about Sustainable IT"

From this.....

.....to this.

We already do this.....

.....and are broadly aligned on the importance of these

So we can also do this.....

Environmental Impact   Jan 1, 2019 - Dec 31, 2019   **n2s**

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

1,060.66
tonnes of equipment processed

That's the weight of
84
double decker buses!

13 CLIMATE ACTION

11,709
tonnes of CO2 were avoided by re-using equipment

That's equivalent to taking
5,380
average cars off the road for a year

6 CLEAN WATER AND SANITATION

23,418,408
litres of water were avoided by re-using equipment

That's daily drinking water for
146.4%
of the population of London!

17% equipment re-used   **0%** equipment going to landfill

hello@n2s.co.uk   www.n2s.co.uk
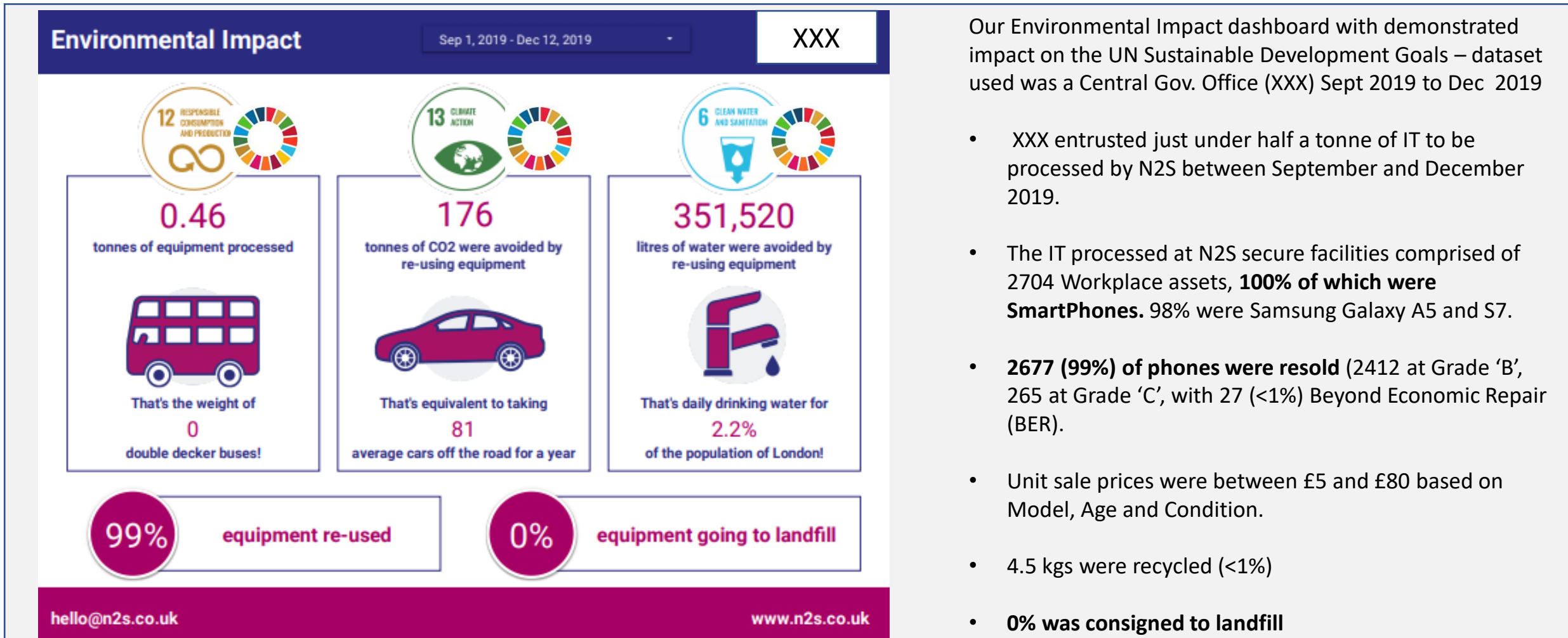
Our standard Environmental Impact dashboard can be created at a per client and per project level and is based on four key principles:

- Base data around weight and volumes of technology used in our Resale and WEEE waste databases.

- Standard algorithms applied to the base data to provide meaningful metrics that demonstrate environmental impact (savings and sustainability).

- Relevance to the UN Sustainable Development Goals. https://www.un.org/sustainabledevelopment/

- Conversion of data into meaningful information which can be visualised.

Example Environmental Impact Dashboard from Central Gov. Office

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Our Environmental Impact dashboard with demonstrated impact on the UN Sustainable Development Goals – dataset used was a Central Gov. Office (XXX) Sept 2019 to Dec 2019

- XXX entrusted just under half a tonne of IT to be processed by N2S between September and December 2019.

- The IT processed at N2S secure facilities comprised of 2704 Workplace assets, **100% of which were SmartPhones.** 98% were Samsung Galaxy A5 and S7.

- **2677 (99%) of phones were resold** (2412 at Grade 'B', 265 at Grade 'C', with 27 (<1%) Beyond Economic Repair (BER).

- Unit sale prices were between £5 and £80 based on Model, Age and Condition.

- 4.5 kgs were recycled (<1%)

- **0% was consigned to landfill**

There's gold in them there Dells…

Embodied carbon: 60-80 % in manufacturing. Recycling is great but reuse is better.
All figures below are based on embodied carbon not full eco-costs

	A	B	C	D
Asset Type	Average Weight	H2O	Fossil Fuels	Embodied CO2
	kg	litres	kg	kg
Desktop Computer	12	1500	240.0	744
Server Blade	12	1200	192.0	588
TV (large)	20	1900	304.0	920
TV (connected)	10	900	144.0	441
Laptop	2	1050	168.0	514
Monitor	7	620	100.0	303
Tablet	0.75	260	41.6	124.5
Mobile	0.17	109	17.4	54
PCB	0.275	520	83.2	260
Chip	0.002	8	1.3	4
Algorithm (B/Alg1=C,C*Alg2=D)			6.25	3.1
Algorithm (B/Alg3=D)				2.01
Aggregates	6.4	806.7	129.2	395.3

Source: JM Jefferson.

		new	secondary	saving
Resource Type	Average Weight	Embodied CO2	Embodied CO2	Embodied CO2
Common Metals	kg	kg	kg	kg
stainless steel	1	7.65	1.55	6.10
aluminium	1	7.27	2.53	4.74
copper	1	3.6	2.24	1.36
Precious Metal				
gold	1	17,903.00	397.44	17,505.56
platinum	1	13,891.60	610.27	13,281.33
palladium	1	9,335.64	172.82	9,162.82
silver	1	123.70	7.13	116.57
titanium	1	27.37	4.46	22.91
Rare Earth Metal				
scandium	1	8.51	n/a	n/a
cerium	1	25.13	n/a	n/a
erbium	1	94.70	n/a	n/a
terbium	1	576.90	n/a	n/a

Source: Delft University of Technology - Materials Dept - http://idematapp.com/about/

Bio-leaching - a better alternative to mining

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1 Table 1. Comparison of the main processes for recovering metals from printed circuit boards (PCBs).

Types	Thermal Processes	Non-Thermal Processes
Characteristics	- Non-metallic materials recovered - High investment... installation... pollution control... - Efficiency not proven for ...astes [a]	- Health risks for the milling operators, because of the possibility of inhaling fiberglass particles and heavy metals - Strong irritating odor generated by ...lic resin during the milling - ...ge investment in equip... for waste-water treatme... - High water utiliza... ...te-water generation, ...idues - Noise p... ...grinding equipme... - Generation of solid waste
Environmental impacts	...eneration of gaseous pollutan... ...uding dioxins and lead fumes	

[a] Adapted from Xiang et al. (2007) [7] and Lee et al. (2004) [8].
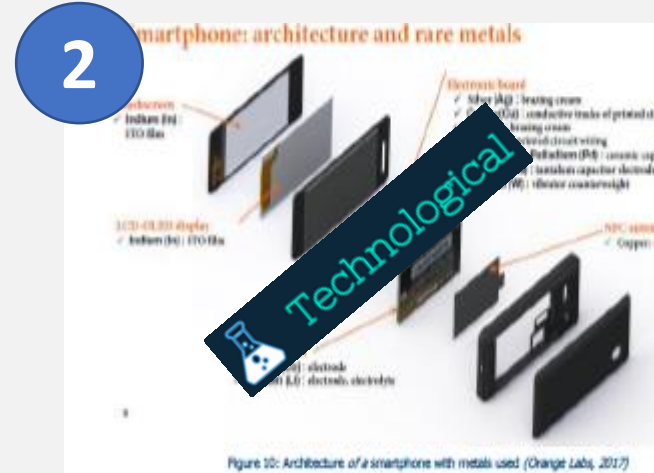
Materials **2014**, *7*, 4555-4566; doi:10.3390/ma7064555

Environmental *Social* *Legal*

2 smartphone: architecture and rare metals

Figure 10: Architecture of a smartphone with metals used (Orange Labs, 2017)

Figure 13: Countries producing the largest amounts of critical raw materials [Source: (European Commission, 2017)]

Technological *Political*

3

1. All components are mechanically removed for processing

2. The board is shredded to enable bacteria to access the inner materials

3. The shredded board is placed into bacteria which turn the copper to solution

4. The copper solution is electro plated

Cu 29 Copper

5. The plated copper is now available for re-use

4 *Economic*

5 Bio-Refinery in a box.. ... a pot ...some ingredients ...a recipe

Source: N2S, Coventry University and Innovate UK

Some thoughts that don't cost much…

Keep your IT assets longer. And think of the optimal hierarchy of outcomes when you no longer need them:
(Repurpose or re-deploy (internally) - Donate (employee, charity) - Resell (realise RV) - Recycle (ethically) - 0% to landfill)

Ask your return journey partner to resell your unwanted IT hardware assets rather than recycle them and share the residual values equitably:
(That's the most sustainable way)

Demand proof of outcomes from your return journey partners:
(Certificates of Destruction, WEEE, Environmental Impact Data)

Ask your suppliers for the manufacturing CO2e footprint of the technology they are selling you:
(and make it a part of your buying criteria)

Enable your employees to bring their personal unwanted electronics to the office for disposal:
(they'll thank you for the opportunity and so would we)

About me

Jean-Marc Jefferson
Business Advisor – N2S

BIOGRAPHY

I have over 30 years' experience in leading business units, sales and marketing teams, and service operations.

My background is in infrastructure, communications and systems integrators - IBM, Dimension Data, Orange Business Services and Accenture.

I am passionate about Sustainable IT.

Outside of business, I chair the Maritime Archaeology Sea Trust (UK Registered Charity # 1140497).

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N2S enables organisations to acquire, use and dispose of IT hardware easily, securely, sustainably and responsibly. We call it 'Managing the Circular Journey'

N2S is a professional and project services company specialising in optimising forward and reverse supply chain services for businesses and government sectors. Built upon maximising the value of IT assets combined with sustainable IT objectives N2S offer a full suite of services designed to provide optimal and secure acquisition, utilisation and disposal outcomes for clients, manufacturers and reuse markets. These include large scale installation services, full life subscription models, decommissioning, de-installations, sanitisation and data destruction, remarketing and WEEE disposal.

N2S is a member of Defra's eSustainability Alliance (DeSA), is NCSC Certified to CAS-S and holds a WEEE licence.

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N2S – "Passionate about Sustainable IT"

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Mission

"…to provide a collaborative framework for our clients, our partners and our suppliers whereby all contribute to an enhanced value for returned assets that balance the priorities of people, planet and profit…sustainably…"

Desired Outcome

"…a positive outcome in extending the life of unwanted IT assets, of disposing of unusable assets responsibly and ethically, of making a positive contribution to the UN Sustainable Development Goals all whilst tirelessly exploring better ways of reusing and processing materials through innovations such as bio-leaching…"

¹ Graphic adapted from The Green Grid
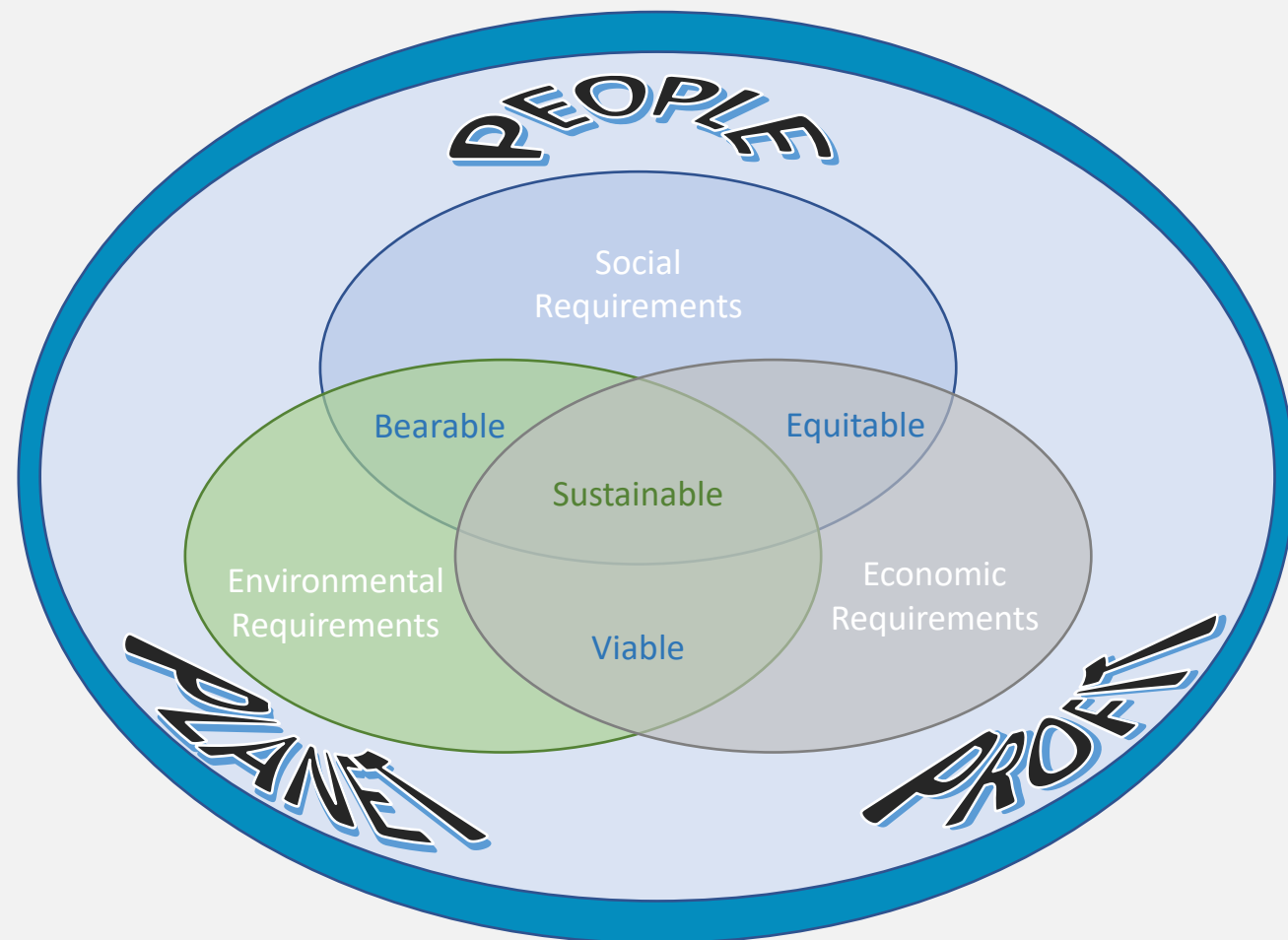
Sample Case Study

Secure IT Asset Disposition

- Audited workflow (OnSight tool)
- De-installation, re-cabling & on-site destruction of data-bearing devices
- Secure transportation and storage
- Re-use, recycle and CSR reporting

Headline Statistics

- 8 Head offices, 552 branches
- ~18,000 known workplace assets to process
- 9 month project, 10 staff (on-time, in budget)
- 190 tonnes (22,471 assets) of IT collected
- 130 tonnes (9,088 assets) of IT re-used
- 60 tonnes recycled (including 10t of cable)
- 11,238 HDD destroyed
- 5,849 out-of-scope assets processed
- 0% to landfill

Circular IT Economy

13+ million litres of water* avoided by extending asset life through re-use cycles rather than new IT purchase

That's enough drinking water for the population of Birmingham for 5 years

2+ million kilos of fossil fuel use avoided through technology re-use and avoiding the release of over 6 million kg of CO_2 into the atmosphere**

That's enough to enable the entire population of Dumfries to fly to London and back in a year

*An average IT appliance consumes 1500l water and 250kg of fossil fuels in manufacture.
**Burning 1kg of fossil fuel releases around 3 kg of CO_2 into the atmosphere

Secure Sustainable ITAD - Proof Points

Reasons why clients might be encouraged to adopt a secure, sustainable IT asset disposition approach to their unwanted IT Hardware Assets:

➤ **Protect reputation** against illegal and sharp practice on data protection and IT waste dumping

➤ **Comply with and uphold regulations (for Data Protection and Waste)** and maintain and publish auditable, measurable outcomes for unwanted IT hardware assets

➤ **Support Corporate and Social Responsibility (CSR) Agenda** and underpin existing initiatives with credible, measurable and meaningful data for processing of unwanted IT hardware assets

➤ **Support the UN Sustainable Development Goals and the UK Gov Climate Change Act** to promote positive environmental impact (H_2O and CO_2 footprint) based on increased reuse over recycle outcomes

➤ **External and Internal Marketing** to demonstrate thought leadership ahead of increasing regulatory requirement to attract and retain clients and staff

➤ **Support the Circular IT Economy** and monetise unwanted assets, extend residual values and offset future IT investments that create more jobs in the workplace