

The
Communication and Outreach
Perspective

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“REALITY IS ALWAYS MORE COMPLEX”

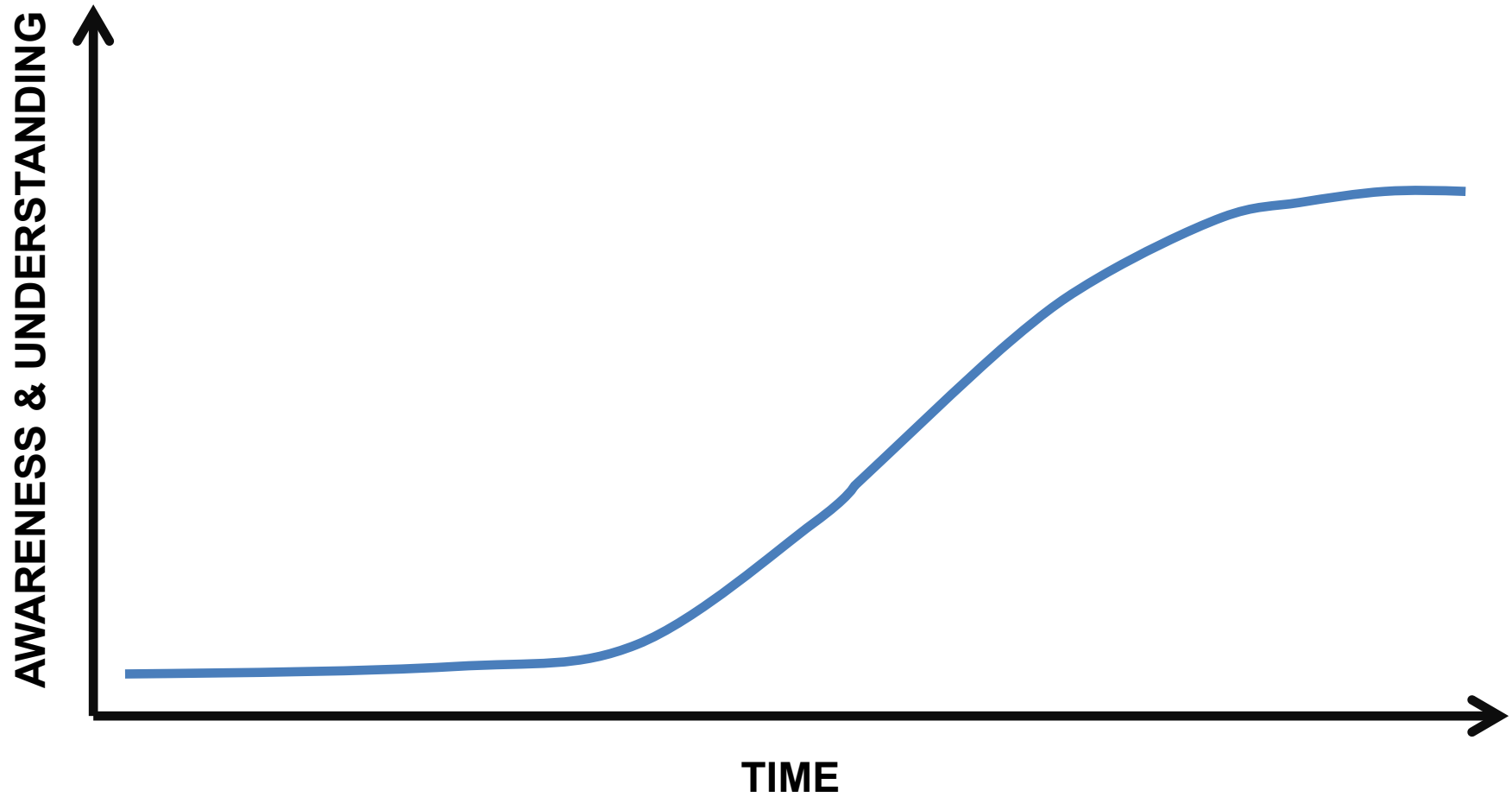
**COMPLEXITY ALWAYS TAKES MORE TIME TO EXPLAIN
THAN THE ATTENTION SPAN OF THE LISTENER**

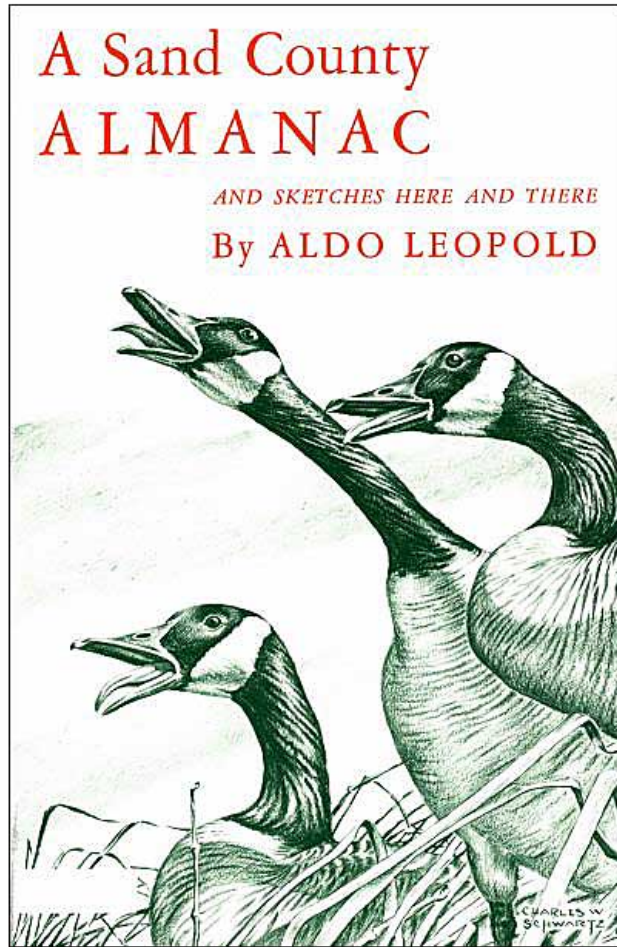
Q: What words do we use when we communicate with the general public and policy makers about mineral and material supply (or any complex issue for that matter?)

A: Probably NOT the same ones we use among ourselves...

...unless we can raise their awareness and understanding of what these words really mean.

SOCIETAL LEARNING CURVE

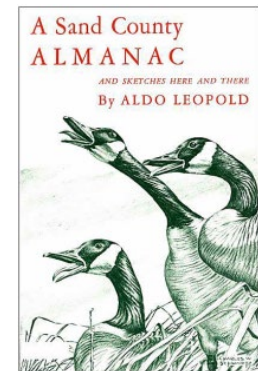




Aldo Leopold is credited with awakening modern society's **environmental awareness**

There are two “**spiritual dangers** in not owning a farm. One is the danger of supposing that breakfast comes from the grocery, and the other that heat comes from the furnace.”

Aldo Leopold, *A Sand County Almanac*



“There is in fact, a **third** spiritual danger in not owning a farm; it is supposing that the axe used to fell the tree, and the brick used to build the furnace, simply come from the local hardware store.”

D. Anderson, *The Mineral Footprint™ Initiative*¹

¹Upcoming Article in *Mining Engineering* Magazine, published by the Society for Mining, Metallurgy and Exploration (SME)

COULD WE USE WORDS THE PUBLIC IS ALREADY FAMILIAR WITH TO:

- 1. RAISE SOCIETY'S AWARENESS, APPRECIATION and UNDERSTANDING of MATERIALS?**
- 2. AND PUT THE IDEA OF "LIMITS" INTO PERSPECTIVE?**

ENVIRONMENTAL FOOTPRINTS

**ecological
footprint**

acres

**carbon
footprint**

tons CO₂

**water
footprint**
gallons

**MAINSTREAM
MEASURES OF HOW
OUR CHOICES
IMPACT
LAND, AIR & WATER**

MATERIAL FOOTPRINTS

ecological footprint

wood, paper, clothing ...

mineral footprint

metals, non-fuel minerals

chemical footprint

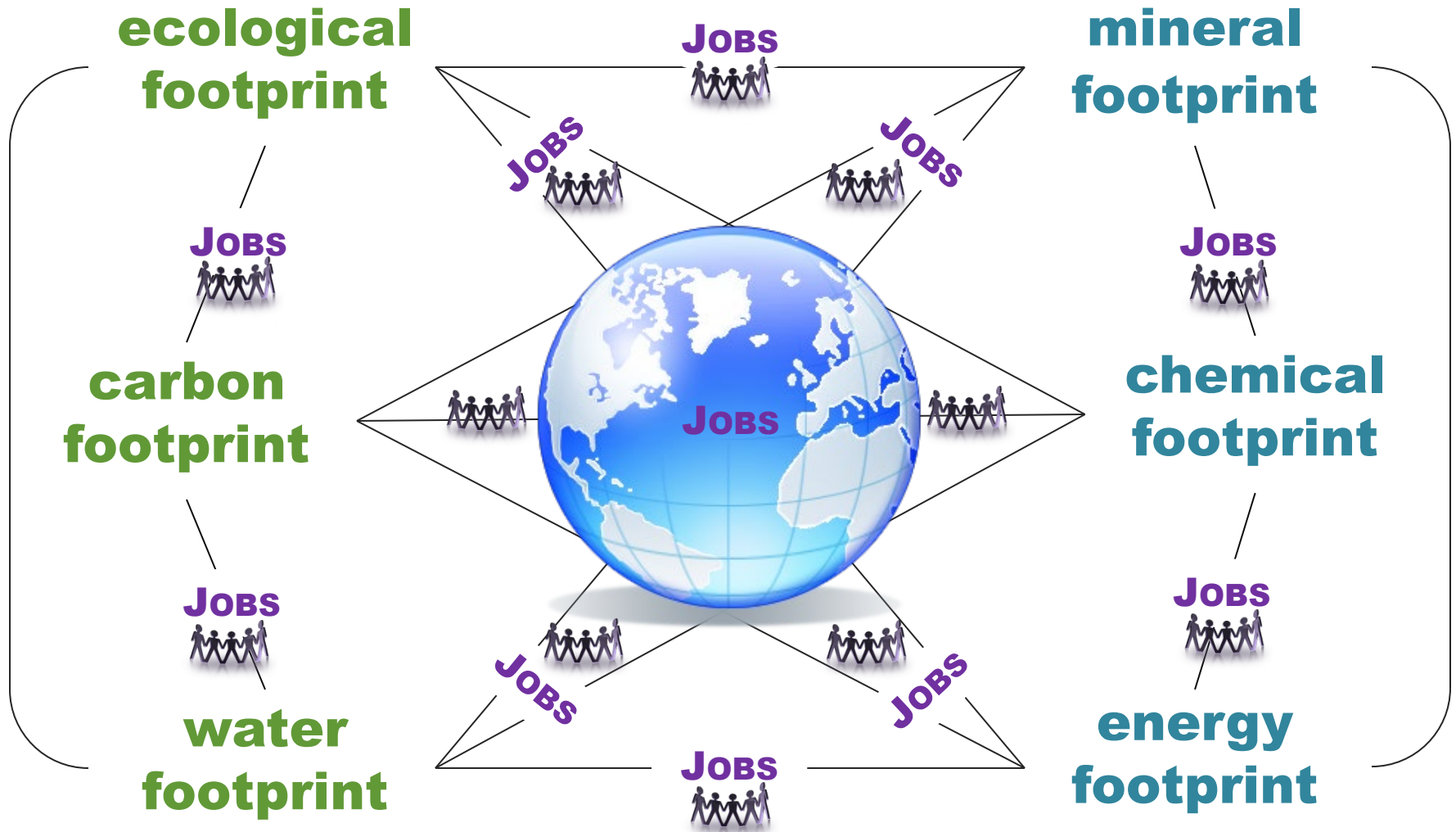
biopolymers, petrochemicals ...

energy footprint

renewables, fossil fuels, fuel minerals

**MATERIALS REQUIRE
A **COMPLEX**
COMBINATION OF
ANIMAL, PLANT,
MINERAL AND
ENERGY INPUTS**

SOCIOECONOMIC FOOTPRINTS



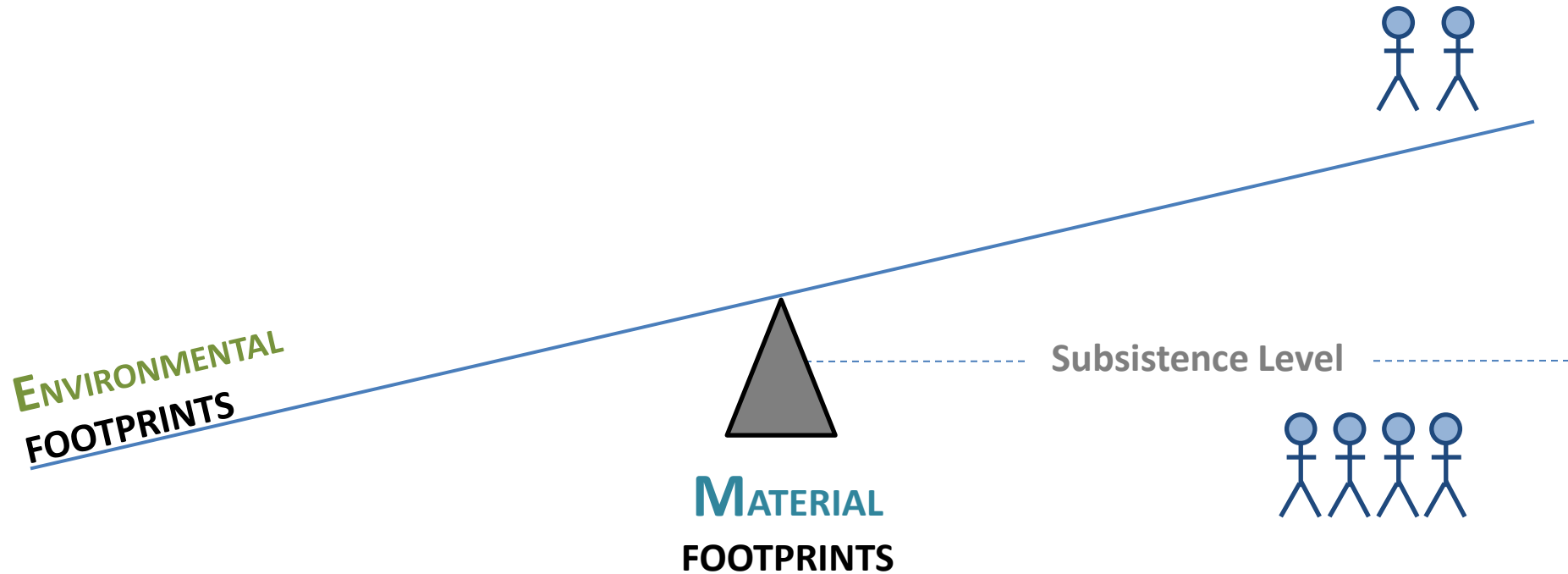
EACH FOOTPRINT IS LINKED TO JOBS IN A GLOBAL ECONOMY

Assuming the last slide is roughly the “WHOLE PICTURE” . . .



- ✓ What lens are we using when we look at it?
- ✓ Are we really making the best decisions if we aren't looking at all of these 'footprints' at the same time?
- ✓ How does each footprint interact or overlap with the others?
- ✓ How do our choices **reinforce**, **distort** or **sever** the relationships?

The World Today...



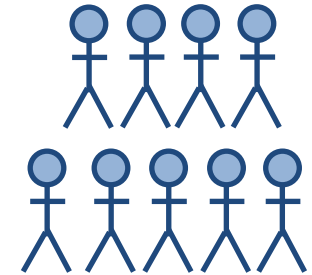
How do we bring this system into **balance**?



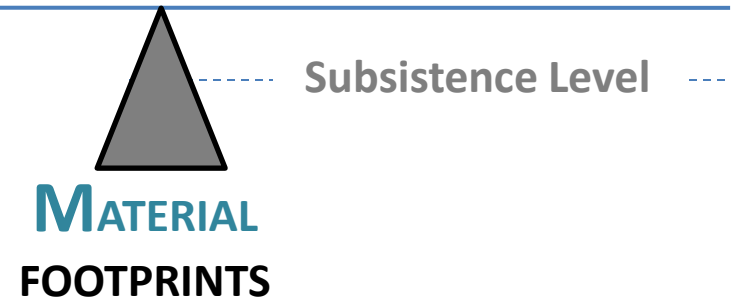
We **leverage** the materials we use...



The World Tomorrow?



ENVIRONMENTAL
FOOTPRINTS



Materials* will act as the **fulcrum** for sustainability

*produced in a socially and environmentally responsible manner....



But there are many competing uses for minerals and materials so how do we find the optimal solution?



We can't move the fulcrum without socially and environmentally acceptable engineering advancements.

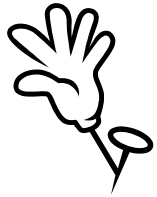
We can't bring the engineering advancements and technologies to market without reliable information about the complete mineral and material cycle.



*There is societal
“confusion” about mineral supply* and
recyclability that needs to be corrected if we
are going to make informed decisions about
the materials we will use*

* i.e. – reserves vs. resources





5 Dimensions of Mineral Availability

***WHAT** Questions Must We Ask?*

1

Geologic
Availability



✓ Does the mineral resource exist?

2

Technical
Availability



✓ Can we extract and process it?

3

**Environmental
& Social**
Availability



✓ Can we produce it in environmentally and socially responsible and acceptable ways?

4

Political
Availability



✓ How do governments influence availability through their policy and actions?

5

Economic
Availability



✓ Can we produce it at a cost users are willing and able to pay?

HUMAN FOOTPRINT






CELL PHONE

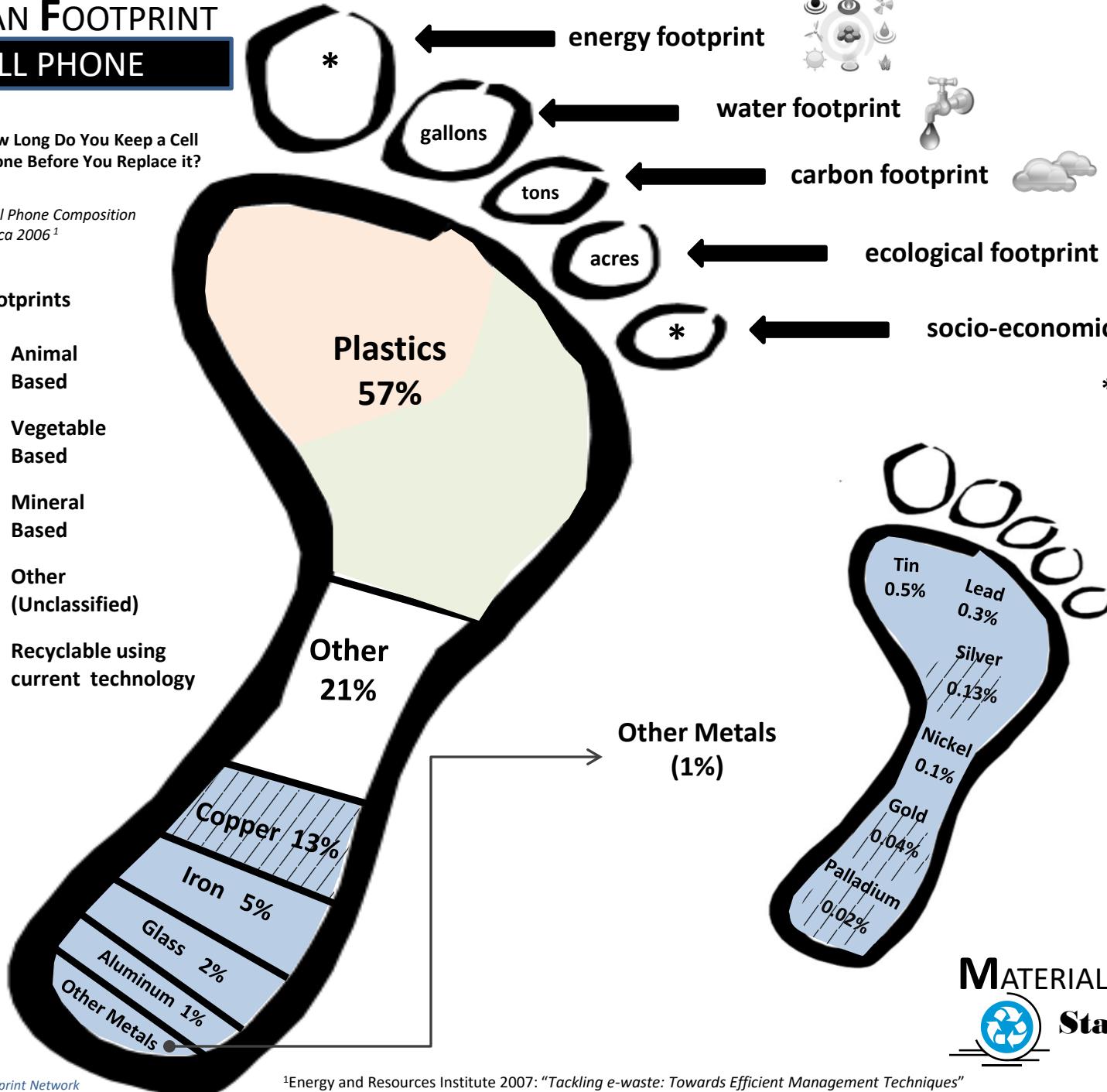


How Long Do You Keep a Cell Phone Before You Replace it?

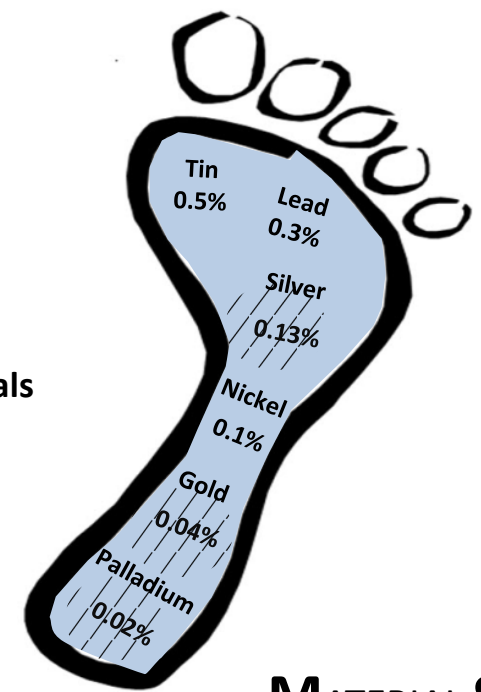
Cell Phone Composition
Circa 2006¹

Material Footprints

-  Animal Based
-  Vegetable Based
-  Mineral Based
-  Other (Unclassified)
-  Recyclable using current technology



People
Planet
Profit



MATERIAL STEWARDSHIP
Starts with You
www.e-stewards.org

Do we really know how close we are to “the limit” when it comes to minerals?

We need a way to communicate to our leadership the relative certainty we have in the data we collect at any given point in time. Furthermore, we need the proper expertise to interpret the data that will inform societal decisions to achieve an optimum, and sustainable supply mix.



NRC report

“Full information on the mineral life cycle, and the **critical mineral cycle** particularly, requires information on recycling and scrap generation and inventories of old scrap; in-use stocks; reserves and resources; downstream uses; subeconomic resources; material flows; and international information in each of these areas. Federal mineral information collection presently does not include these factors.”

2008 National Research Council Report,
Minerals, Critical Minerals and the U.S. Economy