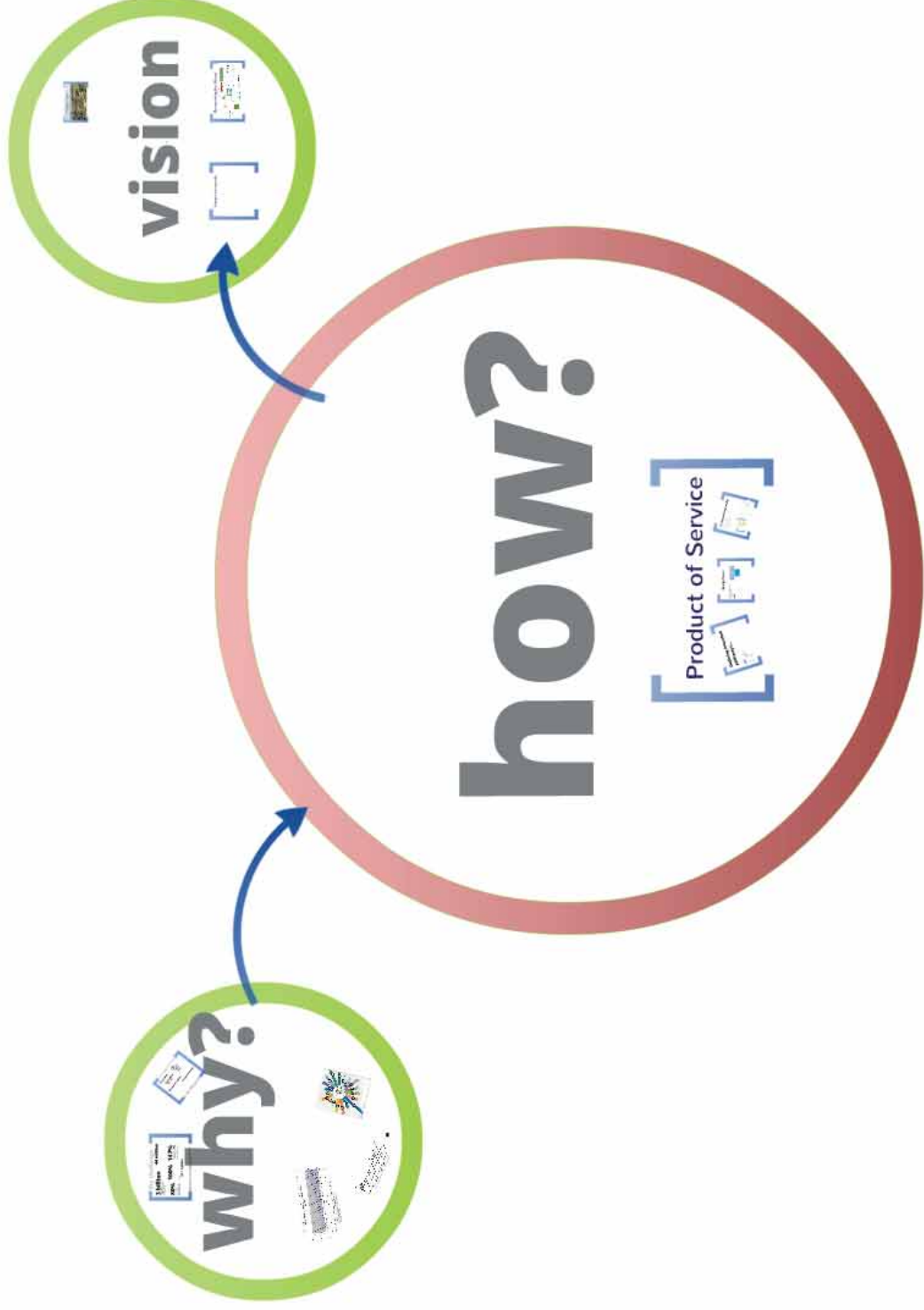
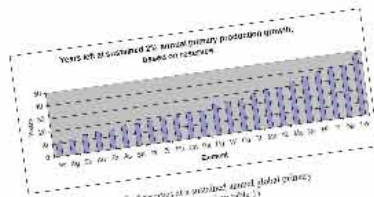


# Not costing the Earth... but regenerating its natural capital

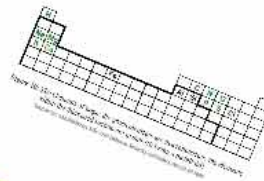


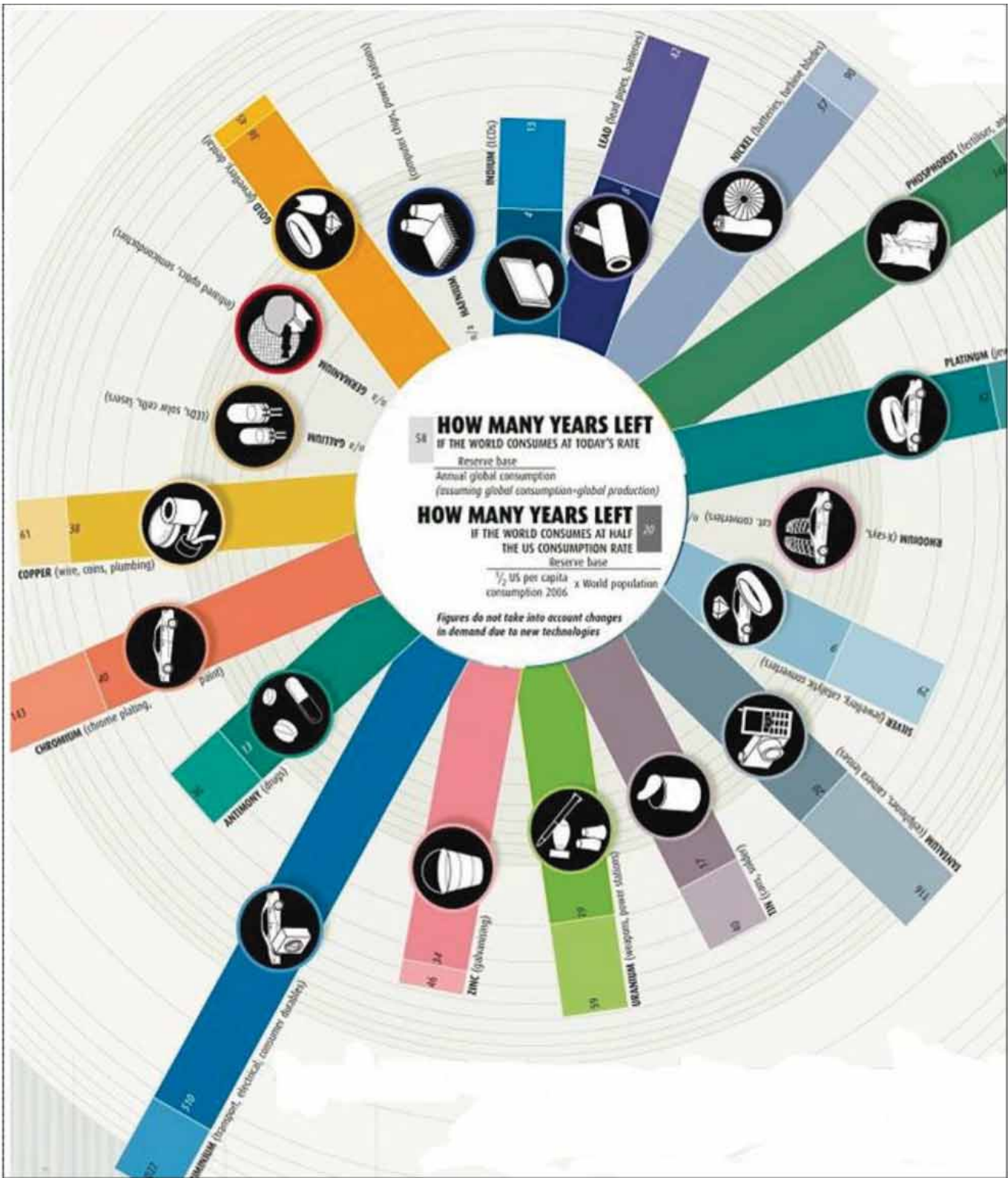
# why?



**Figure 2: Years left to sustain a 2% annual growth in global primary production based on 2% growth in 2% (based on 2000)**

Source: FAO, "World Resources 2000: The Use, Conservation, and Production of Ecosystems"





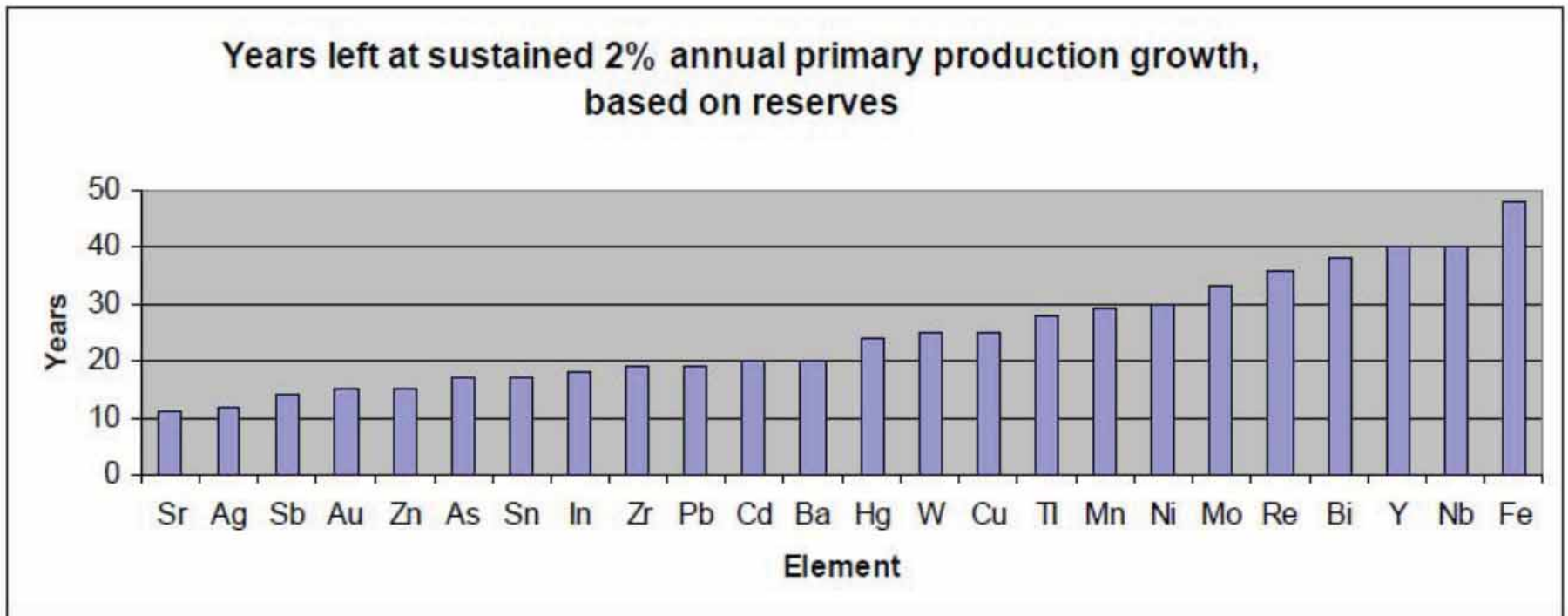


Figure 5: Years left of reserves at a sustained annual global primary production growth of 2% (based on table 1)

Source: Dr.A.M.Diederer, MSc TNO Defence, Security and Safety, March 10 2009



# the challenge

## 3 billion

more middle-class consumers expected to be in the global market by 2030

## 44 million

people driven into poverty by rising food prices in the second half of 2010 according to the World Bank

## 80%

rise in steel demand projected from 2010 to 2030

## 100%

increase in the average cost to bring a new oil well online over the past decade.

## 147%

increase in real commodity prices since the turn of the century

up to

## \$1.1 trillion

spent annually on resource subsidies

Source: 2011, McKinsey Global Institute, "Resource Revolution: Meeting the World's energy, materials, food and water needs".

# 147%

increase in real  
commodity prices since  
the turn of the century





- Incineration slag contains 13,000 tonnes of copper (average Germany)
- It is worth \$100 million per year (Price rate 2010)

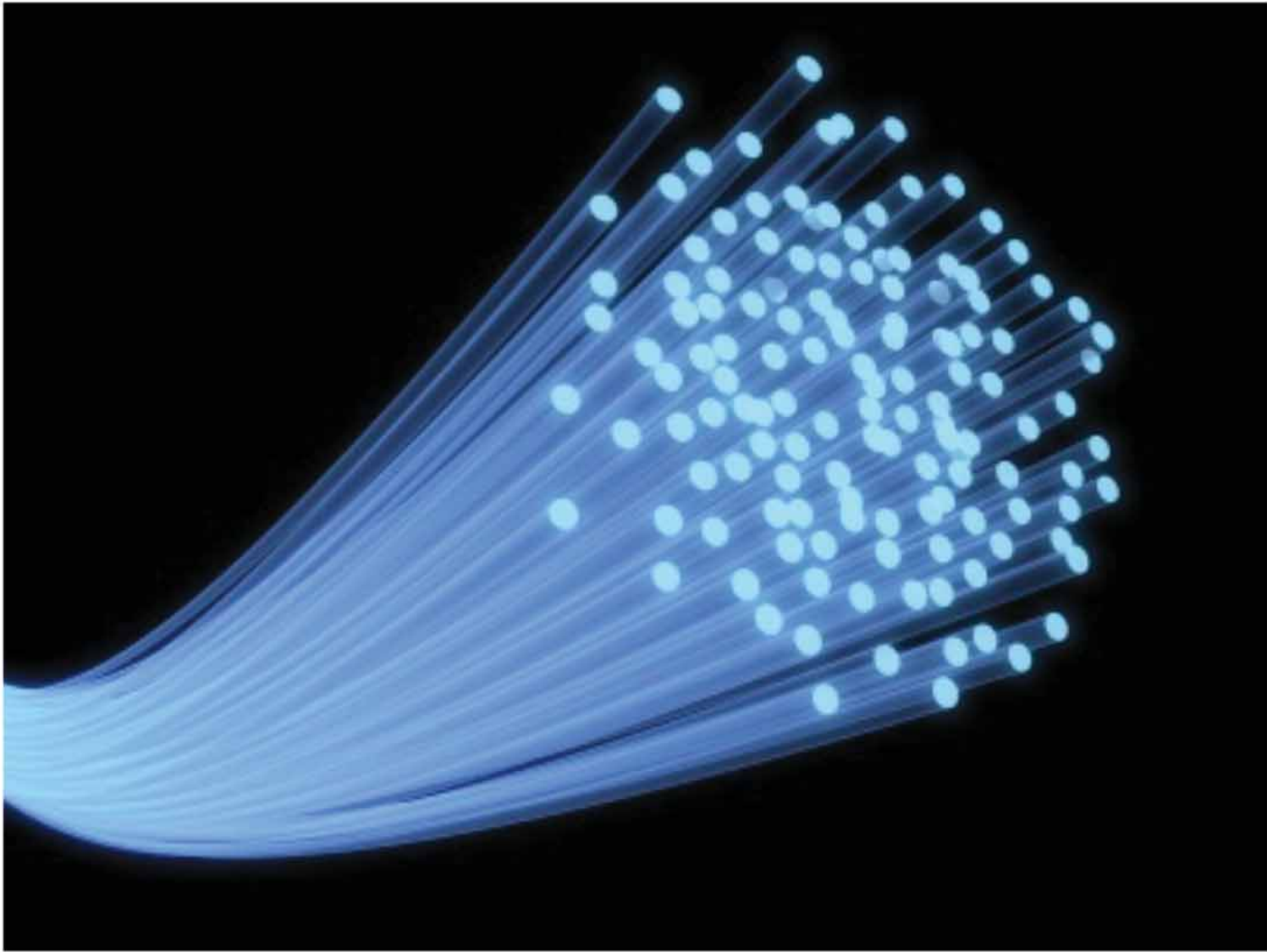
Source: 2011, M. Braungart, WAF Congress BCN

H																		
											C	N	O					
Na	Mg									Al	Si	P	S	Cl				
K	Ca					Fe												

Figure 10: The elements of hope; the green elements are macronutrients, the elements within the thickened section are metals (Si being a metalloid)

Source: Dr.A.M.Diederren, MSc TNO Defence, Security and Safety, March 10 2009





# Optic Fiber as an alternative to copper

Source: 2011 M. Braungart, WAF Congress BCN

# the opportunity

**\$2.9 trillion**

of savings in 2030 from capturing the resource productivity potential...

rising to

**\$3.7 trillion**

if carbon is priced at \$30 per tonne, subsidies on water, energy and agriculture are eliminated, and energy taxes are removed

**70%**

of productivity opportunities have an internal rate of return of more than 10% at current prices... rising to

**90%**

if adjusted for subsidies, carbon pricing, energy taxes, and a societal discount rate of 4%

**At least \$1 trillion**

more investment in the resource system needed each year to meet future resource demands

**15 opportunities**

deliver about 75% of total resource productivity benefits

Source: 2011, McKinsey Global Institute, "Resource Revolution: Meeting the World's energy, materials, food and water needs".

# 70%

of productivity opportunities  
have an internal rate of return of  
more than 10% at current prices...  
rising to

# 90%

if adjusted for subsidies,  
carbon pricing, energy  
taxes, and a societal  
discount rate of 4%



# how?

Product of Service



# Product of Service

**Defining intended pathways...**



**Design Tools**

Define a Positive List of Substances


Supply Chain Management

Material assessment

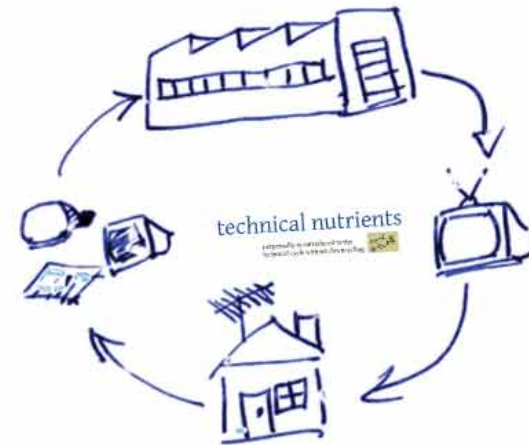
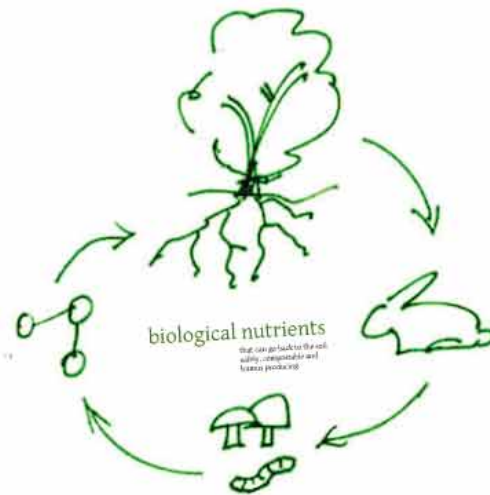


**A new business model**





# Defining intended pathways...





3 design principles:

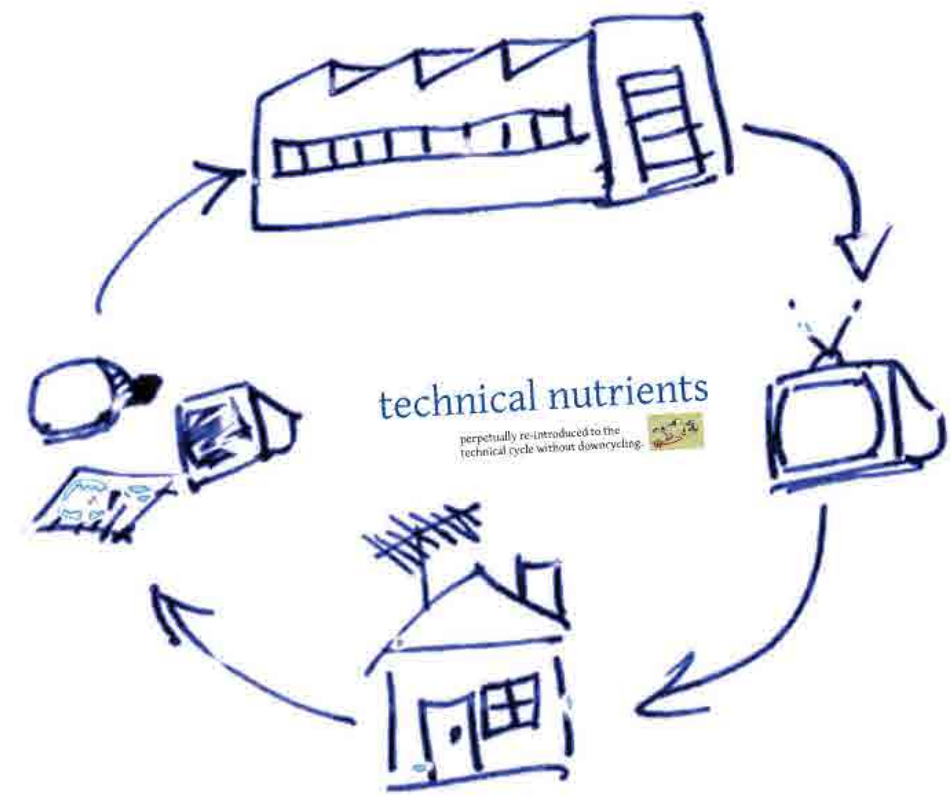
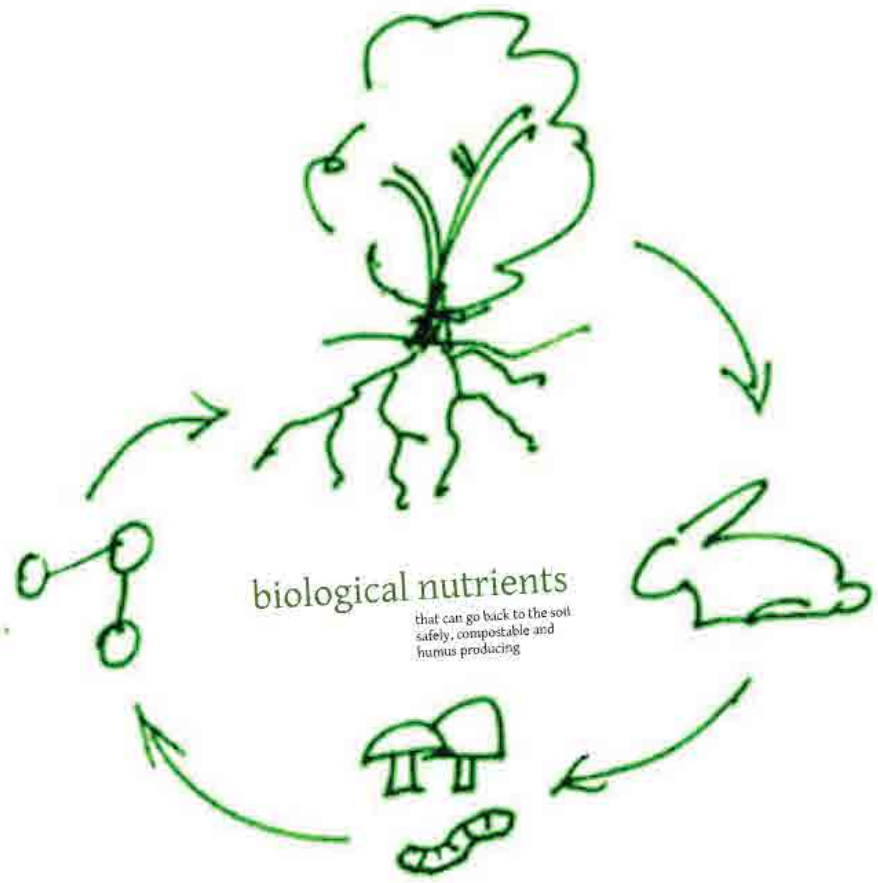
1. design with nutrients
2. design for the environment (disassemble)
3. design systems to recover and recycle nutrients

# cradle to cradle

3 design principles:

1. design with nutrients
2. design for the environment (disassemble)
3. design systems to recover and recycle nutrients


# Biological





# biological nutrients

that can go back to the soil  
safely, compostable and  
humus producing





## Back to Biosphere

Loss of top soil:  
4000-6000x  
more soil lost  
than generated



# Espai Tabacalera Tarragona





## **Dutch government declares to bring phosphorus flows back into cycles**

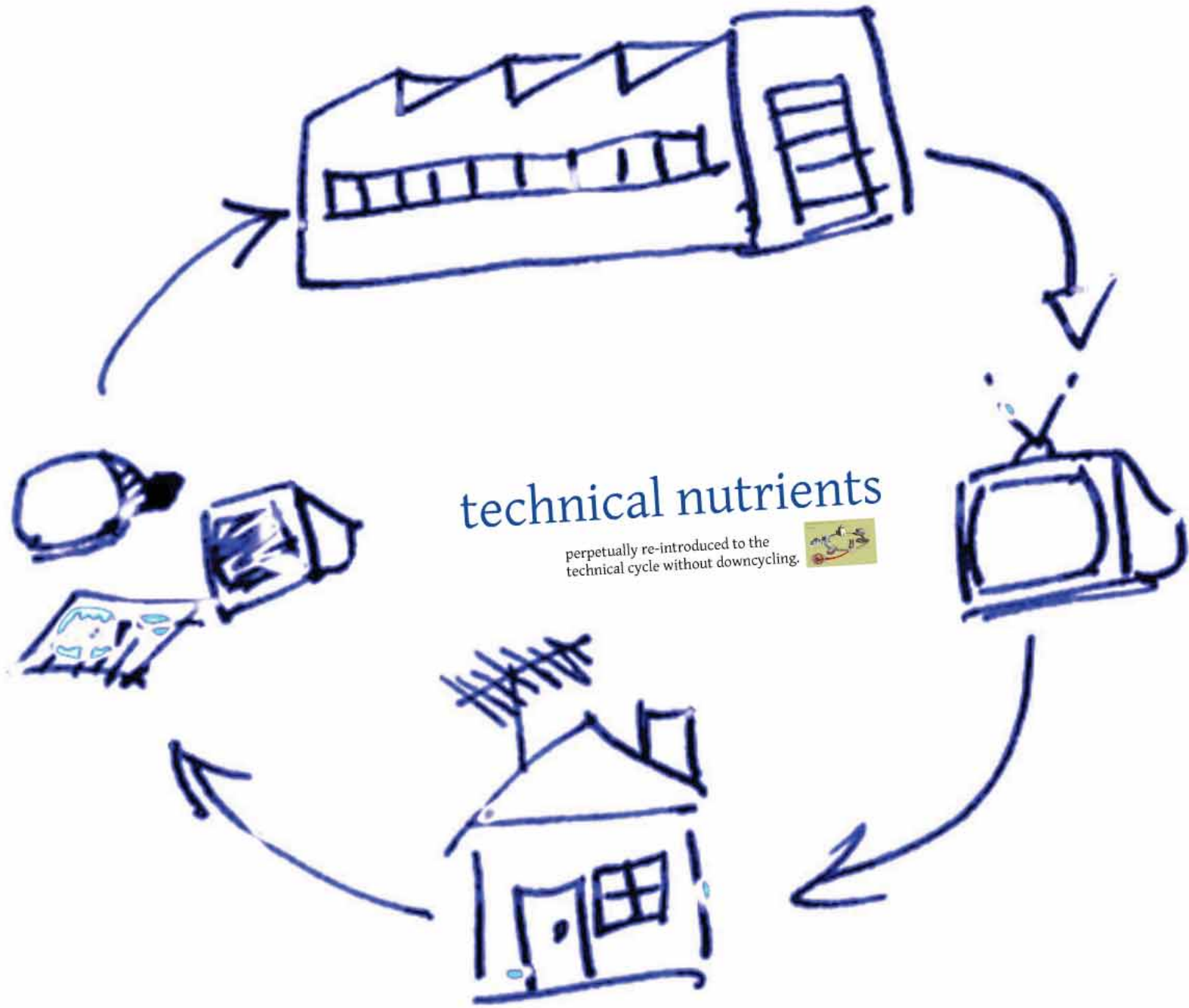
State Secretary Mr. Joop Atsma  
(Ministry of Infrastructure and the  
Environment):

"I am proud to be able to say that  
the Netherlands are the first  
country in the world to close  
phosphate cycles."

4th of October 2011

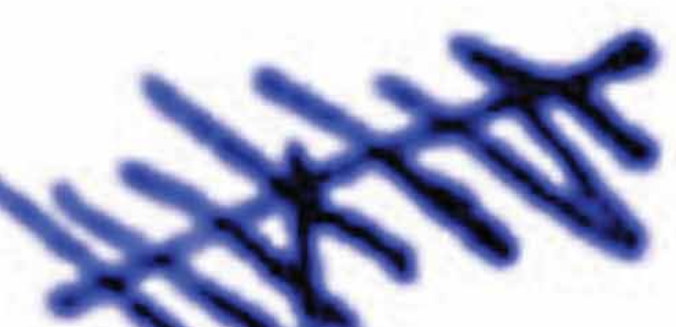


Ministry of Infrastructure and the  
Environment



# technical nutrients

perpetually re-introduced to the technical cycle without downcycling.





# SHAW GREEN EDGE INITIATIVE™ | 002 | Evergreen

Closed-loop cycle







# Cradle to Cradle<sup>CM</sup> Certification

Salud de los materiales

MESA

BIO

TEC

BIO/TEC

G

R

Y

O

G

INVENTARIO

Material

Comp. Químicos

Encimera  
Cerámica

2 Tapas Registrables

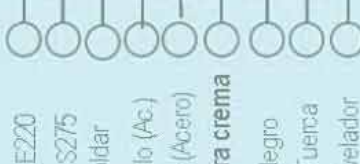
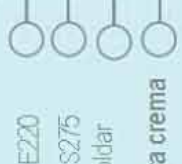
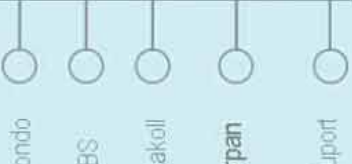
Rodapié

Estructura Central

Est. Sup.

Estruct. Posterior

Uniones y tuercas



21 CAS

10 CAS

10 CAS

16CAS

R

G

G

R

G

G

Y

Y

O

R

G

Y

O

Y

O

G

G

Y

TEC

TEC

BIO/TEC

TEC

TEC

BIO/TEC

TEC

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TEC

ANALISIS



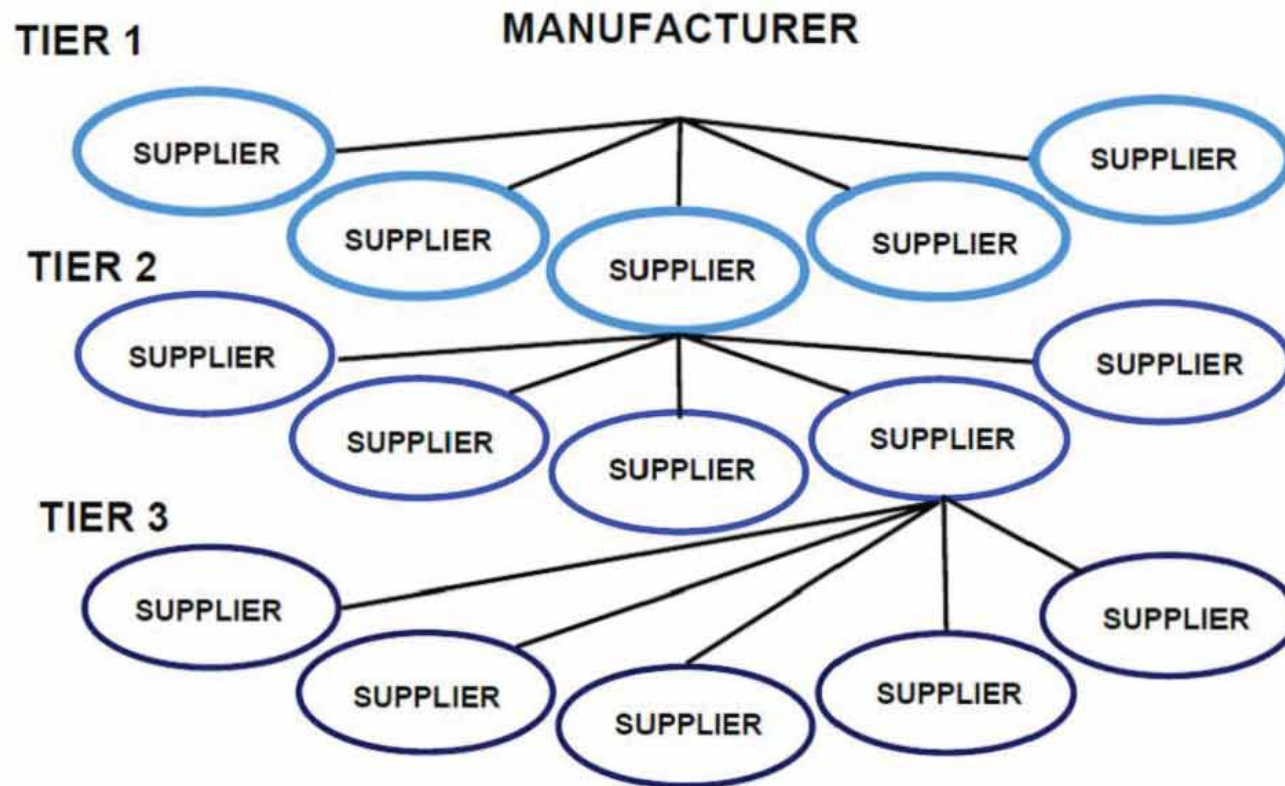




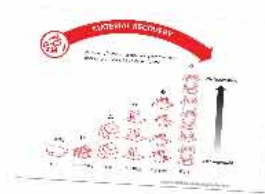
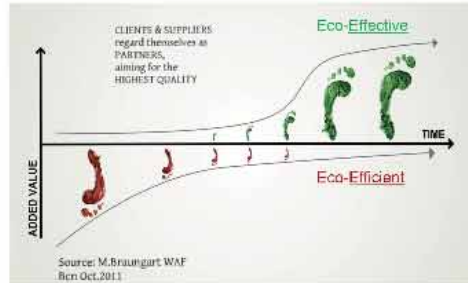
50 Recommended *Cradle to Cradle*® Cosmetic Ingredients

Chemical (INCI Name)	CAS	Function
Alginic acid	9005-32-7	thickener
Annatto	1393-63-1	plant-based pigment
Anthocyanin dye Red Radish	977010-58-4	natural dyestuff
Arabinogalactan	9036-66-2	thickener
Ascorbic acid	10504-35-5	antioxidant
Ascorbyl glucoside	129499-78-1	surfactant
Avocado oil	8024-32-6	emollient
Benzoic acid	65-85-0	preservative
Beta-Carotene	7235-40-7	antioxidant/dyestuff
C8-18-Alkylpolyglucoside	141464-42-8	surfactant
Calcium carbonate	471-34-1	filler/pigment
Calcium D-gluconate	18016-24-5	additive
Calcium distearate	1592-23-0	separation agent
Caprylic / capric triglyceride	65381-09-1	emollient
Caramel	8028-89-5	colorant
Cellulose gum	9004-32-4	thickener
Cetearyl glucoside	246159-33-1	emulsifier/surfactant
Cetearyl olivate	348616-34-2	emollient
Chitosan	9012-76-4	film forming agent
Citric acid	77-76-3	buffering agent
Coco-glucoside	110615-47-0	surfactant
Diisopropyl dimer dilinoleate	103213-20-3	emollient
Dimethicone (free of D4)	9006-65-9	emollient
Distearic acid, diester with glycerol	1323-83-7	antistatic agent
Docosanoic acid, ester with 1,2,3-propanetriol	77538-19-3	emollient
L-Glutamic acid N,N-diacetic acid, tetrasodium salt	51981-21-6	chelating agent
Hydrogenated castor oil	8001-78-3	skin care additive/surfactant
Hydrogenated coconut oil	84836-98-6	emollient
Hydrolyzed corn starch	8029-43-4	thickener
Iminodisuccinic acid, tetrasodium salt	144538-83-0	chelating agent
Iron (II) oxide (free of toxic heavy metals)	1309-37-1	pigment
Jojoba oil	61789-91-1	emollient
Magnesium myristate	4086-70-8	opacifier
Magnesium stearate	557-04-0	separation agent
Methyl paraben (not for leave-on applications)	99-76-3	preservative
Microcrystalline cellulose	9004-34-6	thickener
Potassium stearate	593-29-3	emulsifier
Sodium chloride	7647-14-5	thickener/preservative
Sodium citrate	6132-04-3	buffering agent
Sodium gluconate	527-07-1	chelating agent
Sodium lactate	72-17-3	skin care additive
Sorbic acid	110-44-1	preservative
Sorbitan monopalmitate	26266-57-9	surfactant
Sunflower seed oil	8001-21-6	emollient
Tocopherol	10191-41-0	antioxidant
Ultramarine blue	1345-00-2	pigment
Xanthan gum	11138-66-2	thickener
Zinc oxide	1314-13-2	pigment/UV protection

# Supply Chain Management



# A new business model



**PPU (Pay per Use) ...borrowing materials**

Biological Nutrients=Product of Consumption  
replacement & maintenance

Technical Nutrients:  
leasing/renting

We could reach a 20% savings on the initial investment



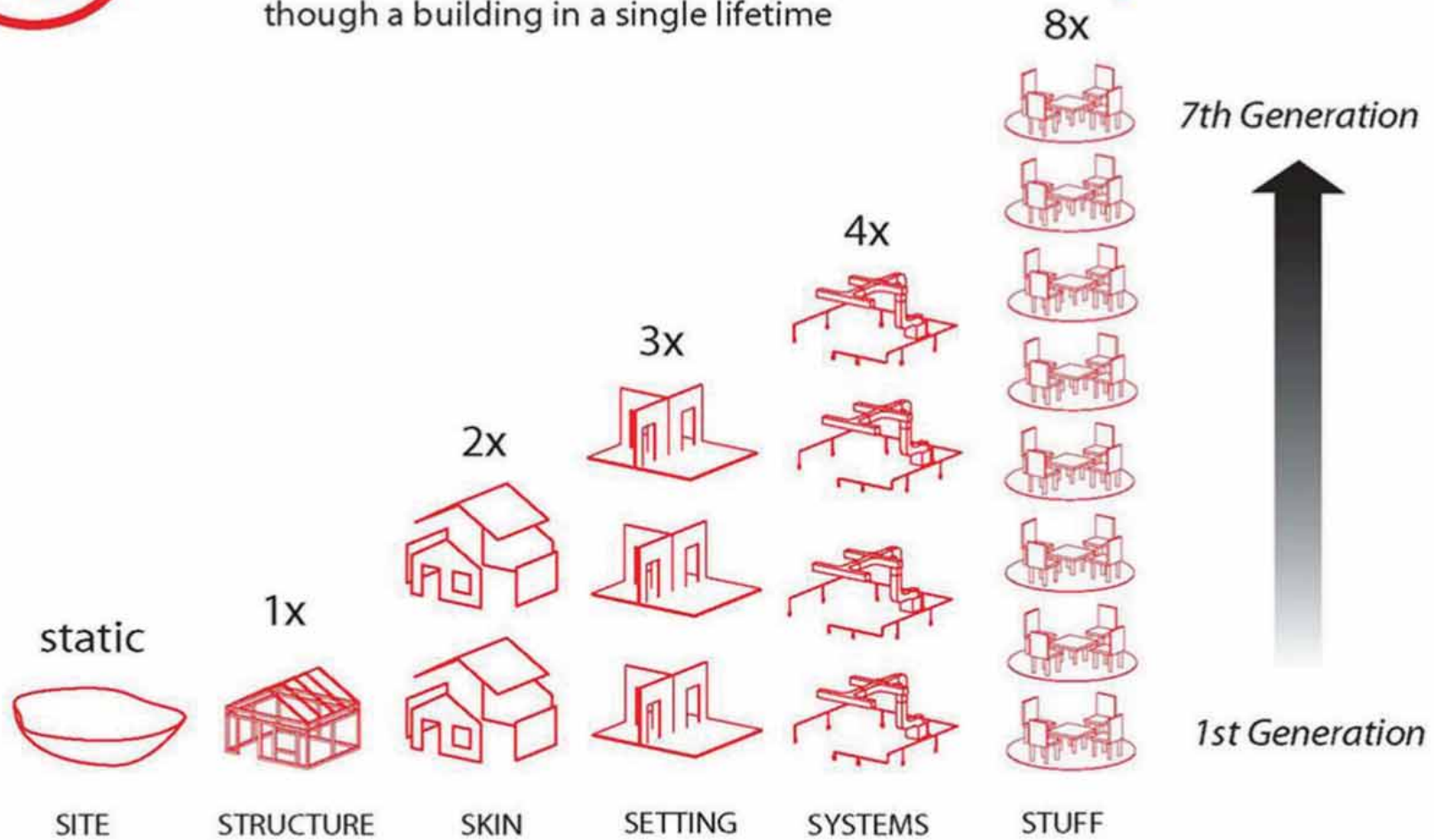


Source: M.Braungart WAF  
Bcn Oct.2011



# MATERIAL RECOVERY

Number of times material and systems cycle through a building in a single lifetime



Source: William McDonough & Partners



# PPU (Pay per Use) ...borrowing materials

Biological Nutrients=Product of Consumption

replacement & maintenance

packaging should be BN



# Consumption

## Technical Nutrients: leasing/renting

Possible for any product  
min. 15% leasing 5-15 years

We could reach a **20%** savings  
on the initial investment

### Leasing program

with ongoing data, at the end the supplier gets the product back and data is included in the new product.  
Pros: lower and less volatile price better quality products  
Cons: dependency on the supplier

### Renting program

with ongoing data, OBM included, the client decides at the end whether to return or not the product to the supplier. The client bears the cost of maintenance and a marginal cost to keep it in inventory.  
Pros: lower initial cost and good quality by the client  
Cons: no long-term guarantee from supplier

### Open Bank (no expiring date)

the client (user) owns the product and speculates with its value and demand. DDT is needed, otherwise the material value would be lost.  
Pros: broker power  
Cons: no initial cost reduction

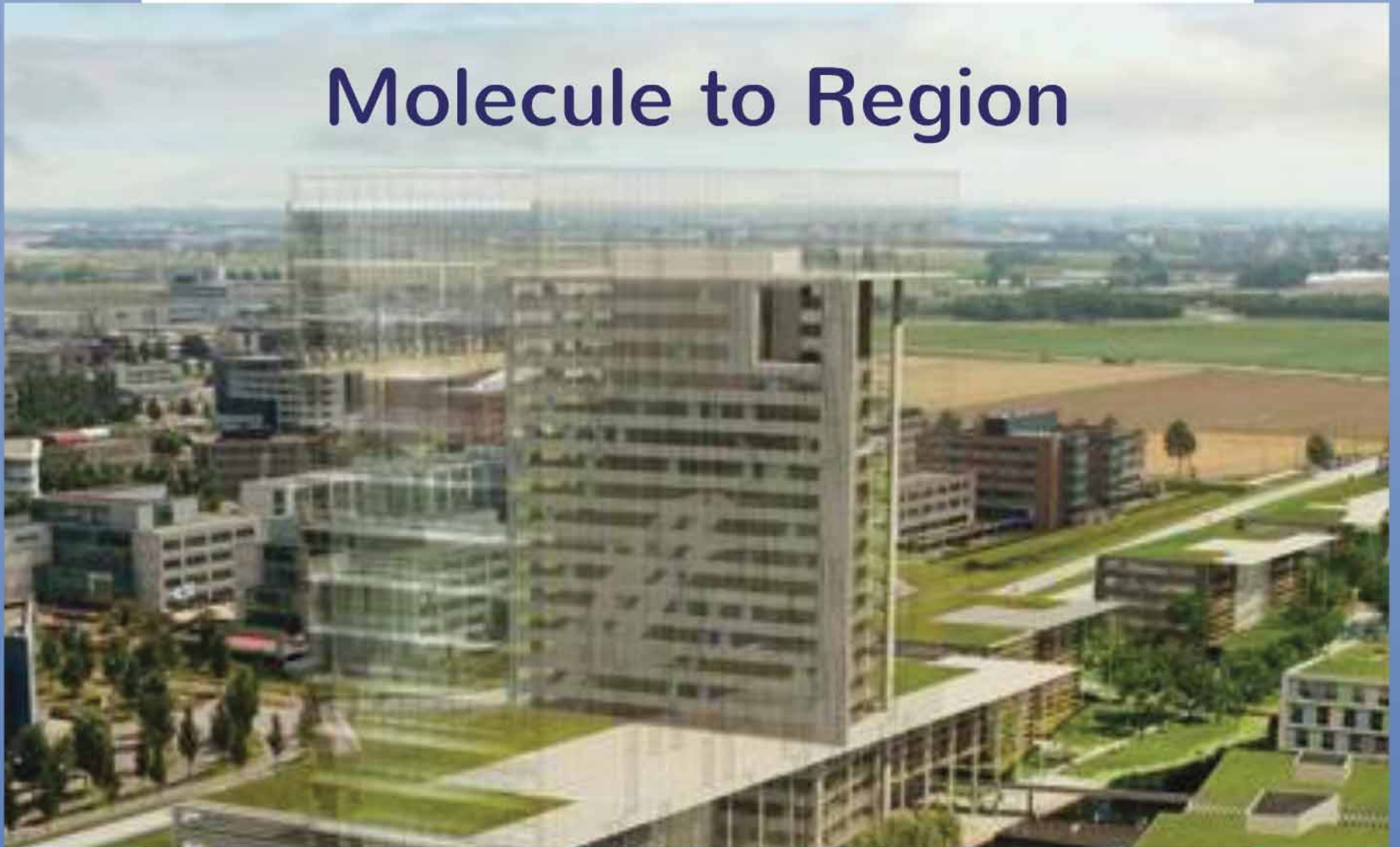
### Open Bank (expiring date)

the client (user) owns the product but specifies its expiring date, with the possibility of selling its market value in the future.  
Pros: broker accountability game  
Cons: supply availability if higher than expected.

# vision

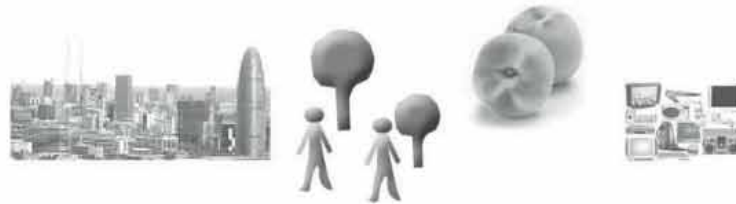


# Molecule to Region





# Impact on society



PRODUCTION SYSTEM  
ABUNDANCE  
RECOVERY SYSTEM



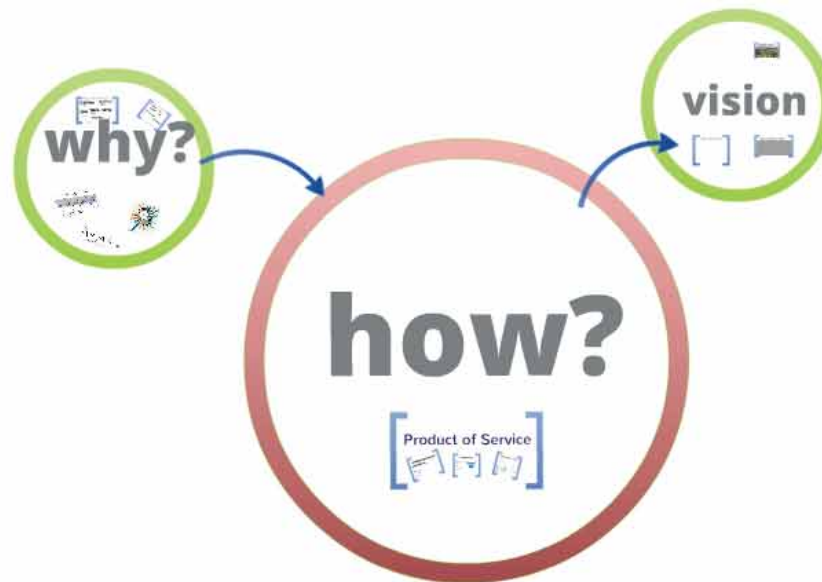


# Reinventing the Wheel



# Thank you for your attention!

**Not costing the Earth...  
but regenerating its natural capital**



Ignasi Cubiña, EcoIntelligentGrowth SL / EPEA Spain SL