

A different approach

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Where did it all start for me...





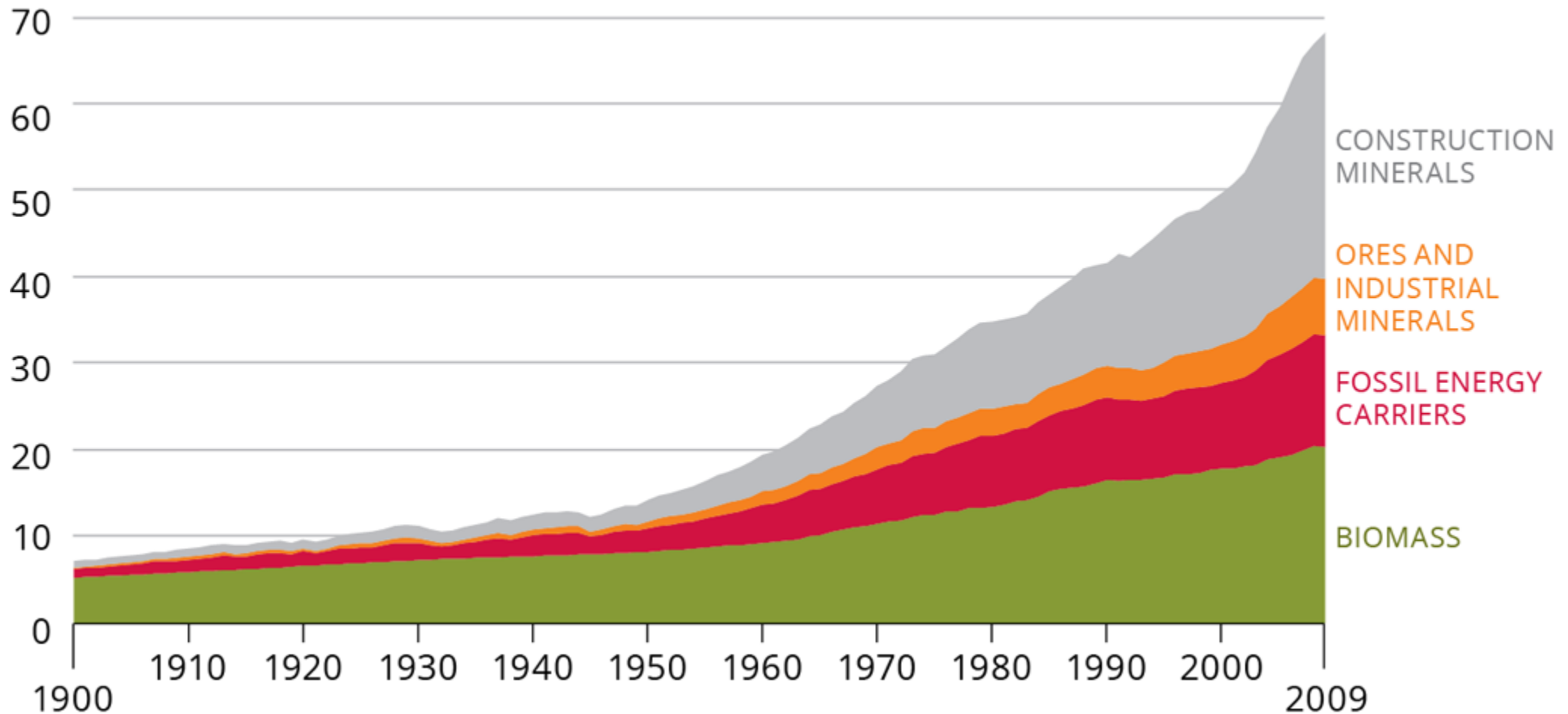
What is our economy based on?

- Our economy is based on trade, production, and consumption. We produce goods and services while consuming others. Money is simply an instrument to facilitate this trade. <https://answers.yahoo.com/question/index?qid=20080918113609AAwaRCr>
- An economy (Greek οἶκος-household and νέμωμαι - manage) or economic system consists of the production, distribution or trade, and consumption of limited goods and services by different agents in a given geographical location. The economic agents can be individuals, businesses, organizations, or governments. Transactions occur when two parties agree to the value or price of the transacted good or service, commonly expressed in a certain currency.

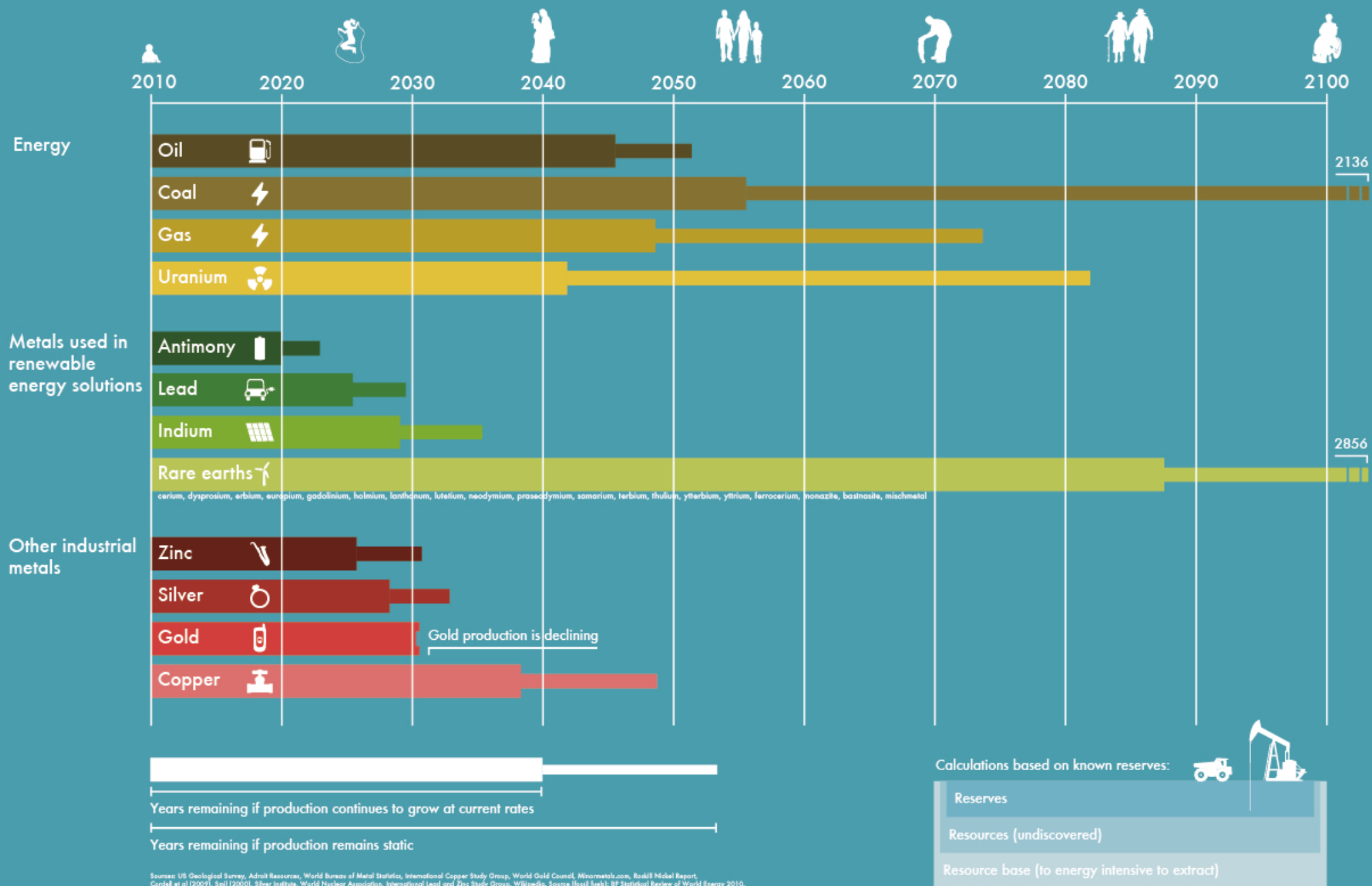
<https://en.wikipedia.org/?title=Economy>

Why is it important?

Billion tonnes



Source: <http://www.eea.europa.eu/soer-2015/global/competition>



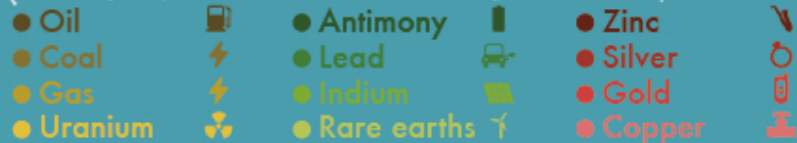
<http://www.visualcapitalist.com/forecast-when-well-run-out-of-each-metal/>

PLAN
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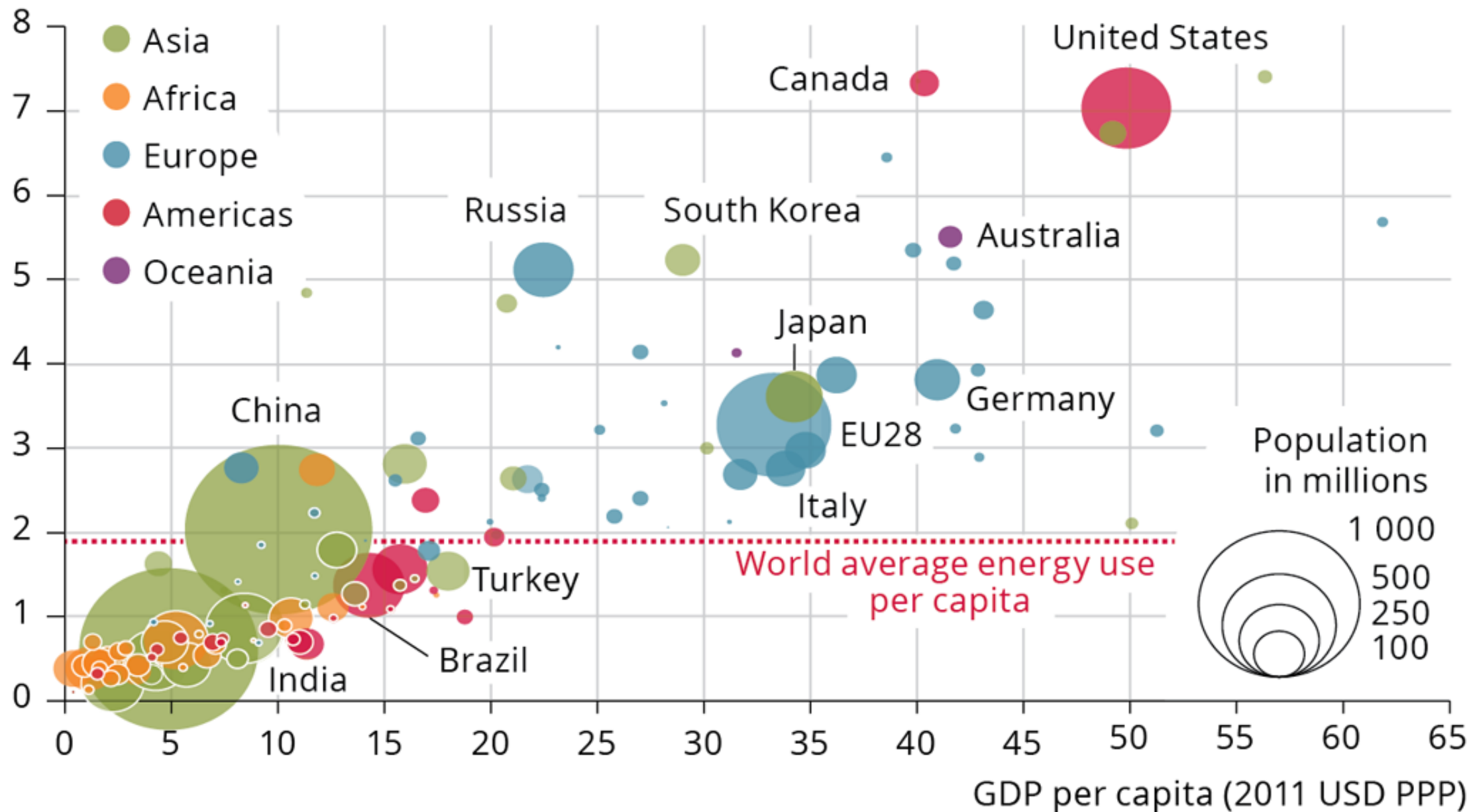


Share of total world reserves expressed as a percentage.

Sources: US Geological Survey, World Nuclear Association, BP Statistical Review of World Energy 2010.



Energy use in tonnes of oil equivalent per capita



'Linear economy'

Take - Make - Dump

Technical and biological
nutrients all mixed up



toxic
waste



something useful

'Circular economy'

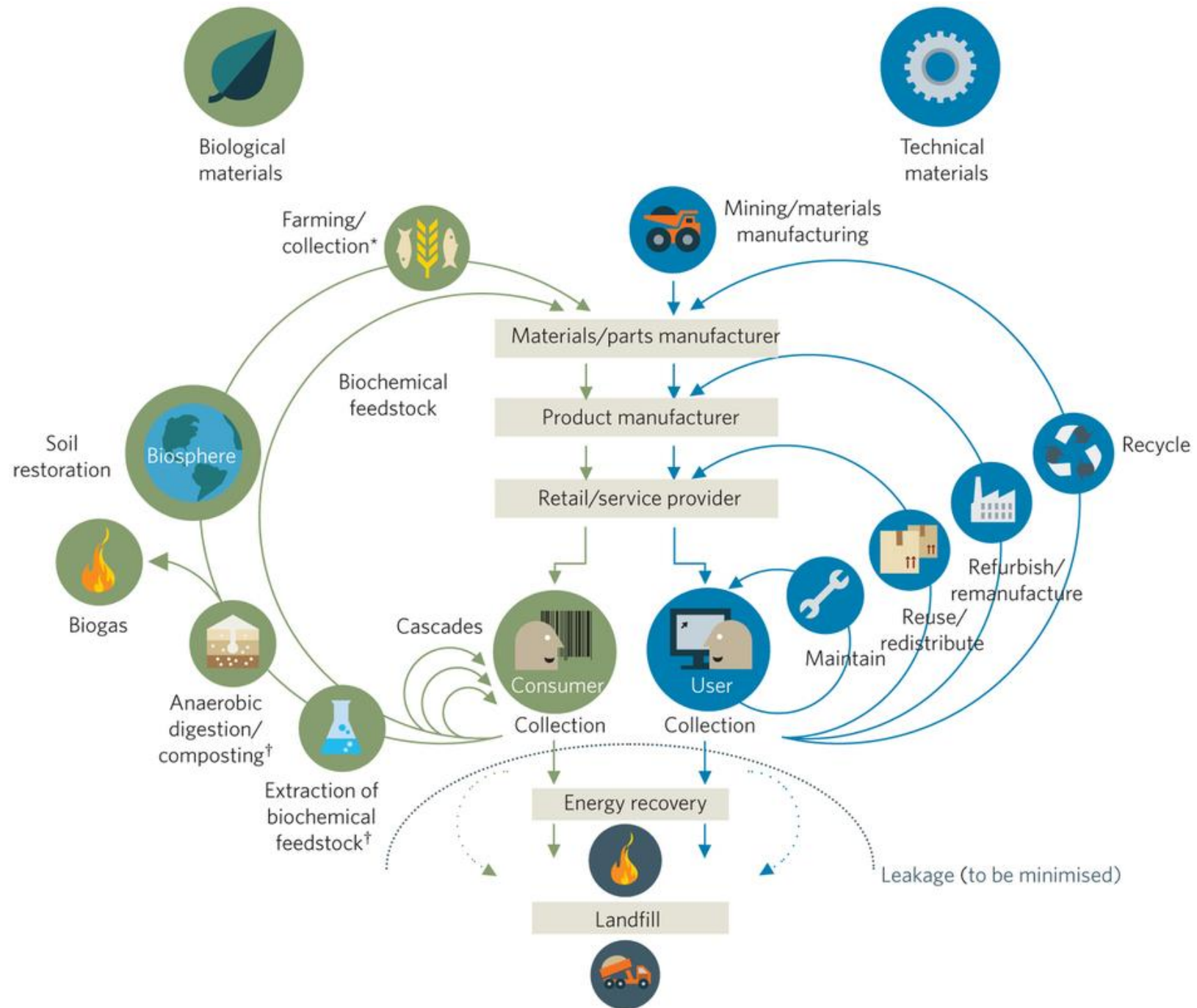
Technical nutrients

Biological nutrients



Living systems

after W. McDonough and M. Braungart



So how do we achieve a move to a circular economy...?

- In diverse ways...
- One way being Industrial Symbiosis

What is Industrial Symbiosis?

- “...the establishment of close working agreements between normally unrelated companies that lead to resource efficiency. Working agreements include, among other, the direct reuse of one company's waste stream as another's raw material, the innovative reprocessing of problematic by-products, and the sharing of underutilised power, water and/or steam

(Jensen, et al, 2011, as cited in Resources, Conservation and Recycling 55(7): 703-712).

What is Industrial Symbiosis?

- In Europe -
- the definition has started to consider new concepts including eco-innovation and long term culture change.
- Lombardi and Laybourn, 2012,
 - “Industrial symbiosis engages diverse organisations in a network to foster eco-innovation and long-term culture change. Creating and sharing knowledge through the network yields mutually profitable transactions for novel sourcing of required inputs, value-added destinations for non-product outputs, and improved business and technical processes”

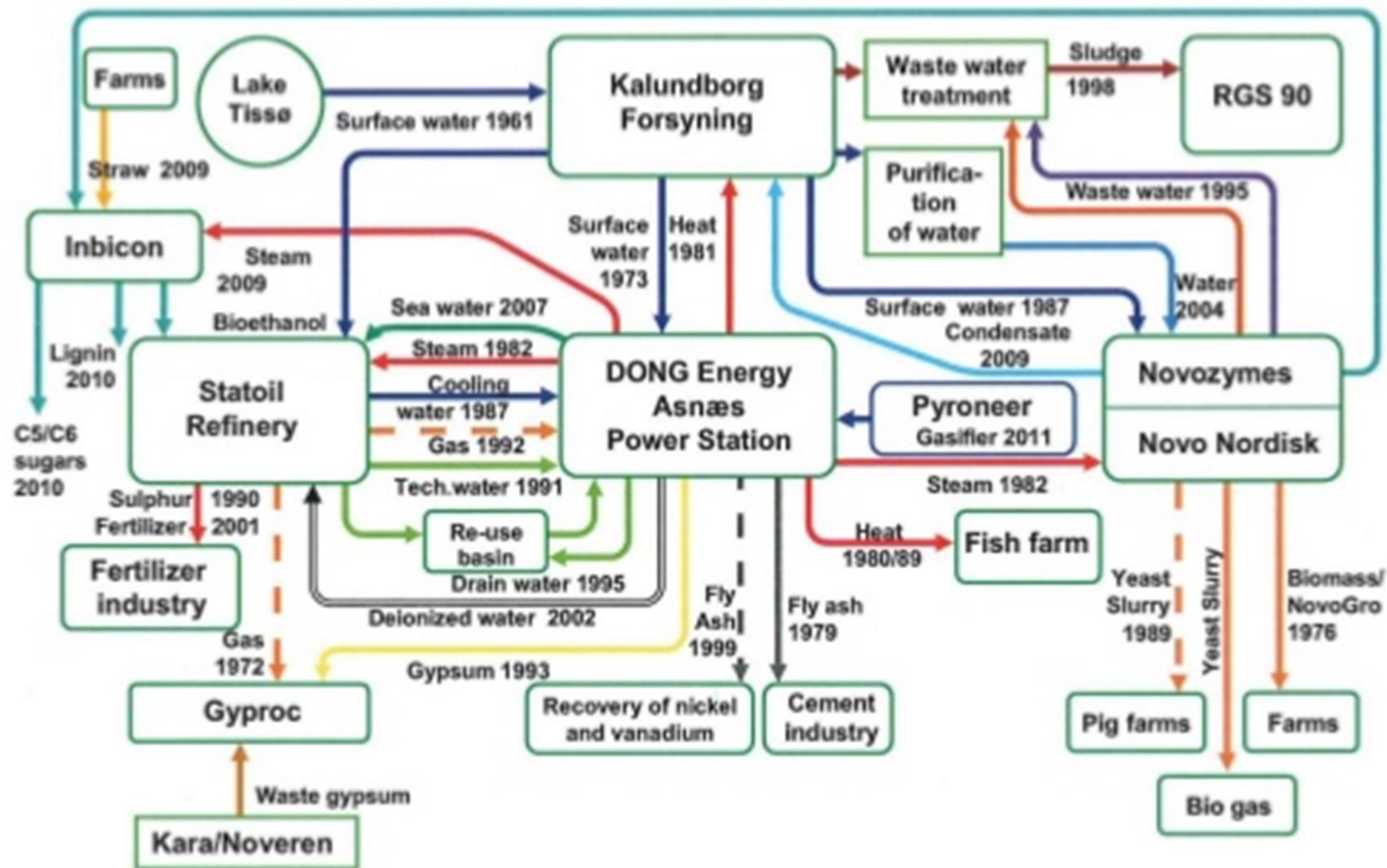
(as cited in Journal of Industrial Ecology 16(1): 28-37).

History of Kalundborg

- 1960's to present
 - World's first working industrial symbiosis – eco-industrial park
 - Developed organically since the 1960's
 - Based on commercial agreements
 - Has private and public partners
 - 50 different symbiotic relationships

Kalundborg Symbiosis





Savings compared to 'non-symbiosis-situation' (2008)

- Groundwater – 2 million m³/year
- Surface water – 1 million m³/year
- Natural gypsum – 100 thousand tons/year
- Oil – 20 thousand tons/year
- Reduced CO₂ emissions around 275 000 tons

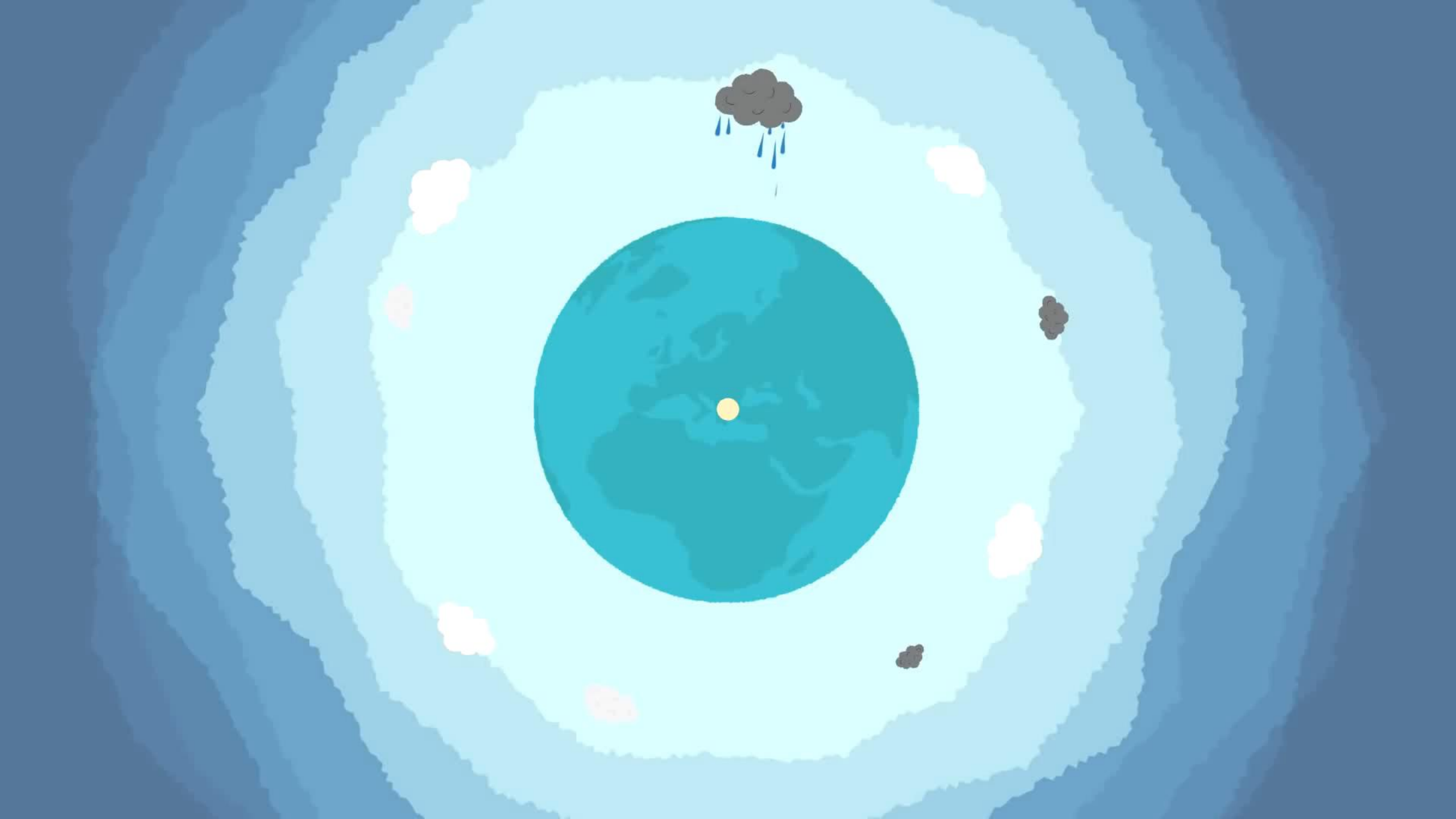
SA?

- Regional Facilitated Programmes
 - Western Cape IS (WISP)
 - KZN
 - Gauteng
- National IS Strategy - planned

Aspect	Pilot Year (August 2013-March 2014)	To Date (March 2015)	Estimated Five Year Impact (Assuming No More Synergies Completed)
Waste diversion	59.3 tonnes	394 tonnes	1,408 tonnes
Additional revenue	R2.93 million	R3.64 million	R7.15 million
Cost savings	R2.65 million	R3.9 million	R11.26 million
Private Investment	R100 000	R100 000	R100 000
Fossil GHG savings	1,177 tonnes CO ₂ e	2,100 tonnes CO ₂ e	7.000 tonnes CO ₂ e
Job creation	11 temporary 4 new permanent	11 temporary 10 new permanent	11 temporary 10 new permanent

Silver bullet...? Thoughts to take away...

- IS is NOT the silver bullet
- It is a way to enlighten and find innovative solutions to current waste challenges in order to move in the direction of the **CIRCULAR ECONOMY**



Additional sources of information:

- <http://www.ellenmacarthurfoundation.org/about>
- <http://www.mbdc.com/cradle-to-cradle/c2c-framework/>

Thank you...

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