



THE ROLE OF CIRCULAR ECONOMY IN RESOURCE STORY AND THE CITIES

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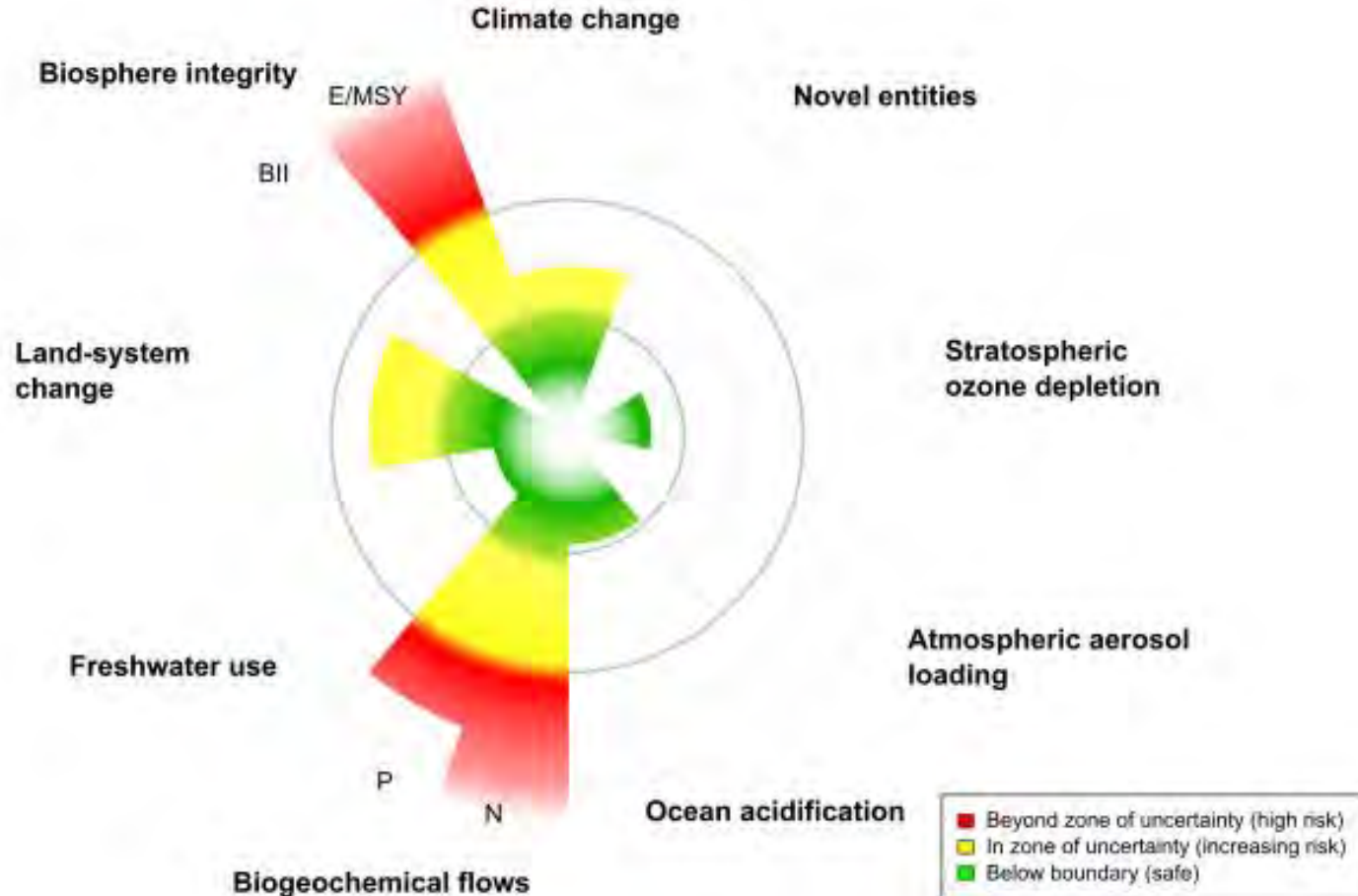
Partner SYSTEMIQ

STRUCTURE

- *THE WORLD WE LIVE IN AND CHALLENGES WE ARE FACING*
- *SUSTAINABLE DEVELOPMENT GOALS - THE ROLE OF SCP*
- *ECONOMIC MODEL DRIVING OUR LIVES*
- *RESOURCE MANAGEMENT - RECENT IRP REPORTS*
- *THE ROLE OF THE CIRCULAR ECONOMY*
- *CITIES, SDGs AND THE CIRCULAR ECONOMY*
- *LEADERSHIP, GOVERNANCE AND THE ROLE OF EU*
- *TO CONCLUDE ...*

*THE WORLD WE
LIVE IN
AND CHALLENGES WE ARE
FACING*

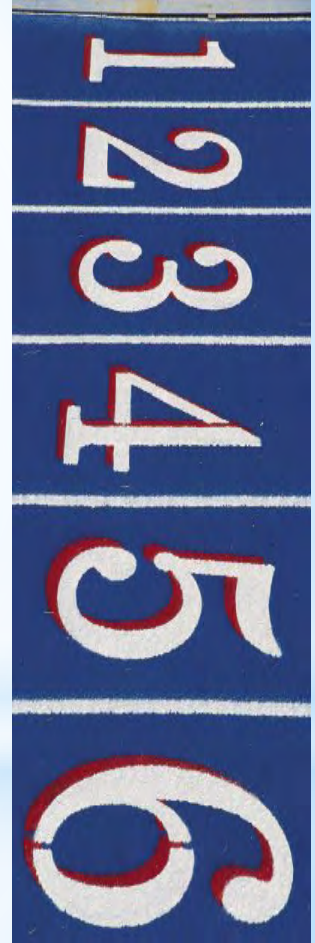
“PLANETARY BOUNDARIES”



Source: Steffen et al. 2015

THE TASTE OF 21ST CENTURY *POPULATION*

- *Population* growth (2050 - 9.7 billion)
- *Per capita consumption* growth (up to 3 billion consumers moving from low to middle class consumption till 2030)



THE TASTE OF 21ST CENTURY

POVERTY AND SOCIAL INEQUALITY

- Oxfam Report: 62 people own the same as half of the world and the richest 1% is more *wealthy* than the rest of the world)
- Nearly 800 million people are *hungry*, over 2 **billion suffer from micronutrient deficiencies ...** while over 2 billion people are *obese*
- We *throw away* one third of the *food* we produce



THE TASTE OF 21ST CENTURY ENVIRONMENT

- There is increasing evidence of the *climate change* threat
- 60% of *ecosystems* already degraded or used unsustainably
- More than 85 % of the world's *fisheries* are at, or beyond, their biological limits
- 33% of *soils* is moderately to highly degraded due to erosion, nutrient depletion, acidification, salinization, compaction and chemical pollution
- 467 000 premature *deaths* yearly in EU *due to air pollution* (7 millions globally)
- A million of *plastic* bottles are bought every minute. In 2015 9% of plastic was recycled, 12% incinerated, 79% accumulated in landfills or the environment

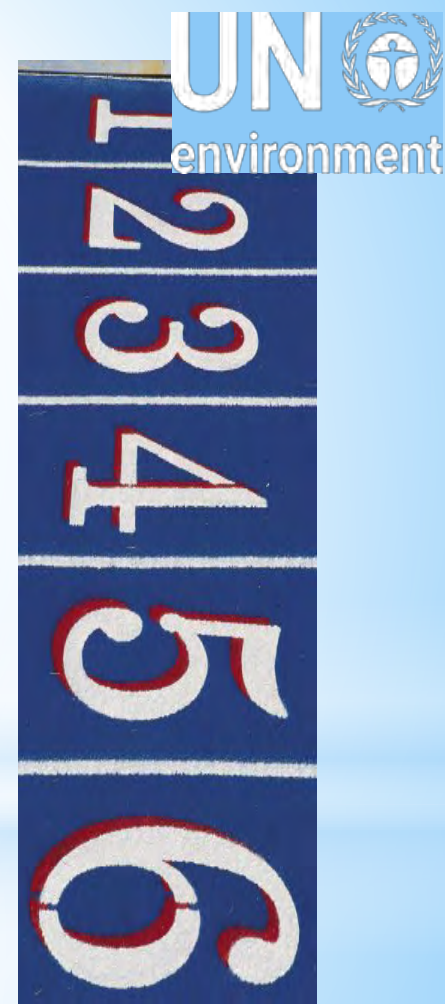




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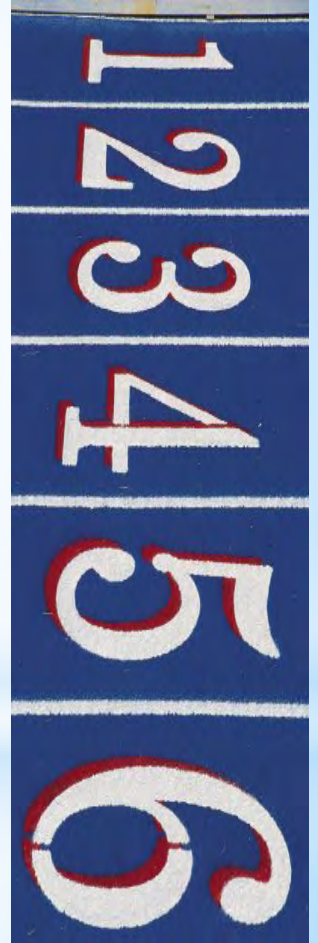
THE TASTE OF 21ST CENTURY URBANISATION

- Globally, an area of the size of the UK has been *converted to buildings* since 1990 (OECD GG Indicators 2017)
- *More than 50% of urban fabric* expected to exist by 2050 still needs to be constructed
- In the three years period (2011-2013), *China* has used more *cement* than the *USA* during the entire 20th century



THE TASTE OF 21ST CENTURY *ROBOTISATION*

- Nearly *half* of all the work we do, will be able to be *automated* by the year 2055
(McKinsey Global Institute)



THE TASTE OF 21ST CENTURY GLOBALISATION

- For the first time in a human history we face the emergence of a single, tightly coupled *human social-ecological system of planetary scope*. We are more *interconnected* and *interdependent* than ever.
- Our individual and collective *responsibility* has enormously increased.



SYNCHRONOUS FAILURE: THE EMERGING CAUSAL ARCHITECTURE OF GLOBAL CRISIS

Ecology and Society 28/08/2015

[Thomas Homer-Dixon](#), [Brian Walker](#), [Reinette Biggs](#), [Anne-Sophie Crépin](#), [Carl Folke](#), [Eric F. Lambin](#), [Garry D. Peterson](#), [Johan Rockström](#), [Marten Scheffer](#), [Will Steffen](#), [Max Troell](#)

In a world where external reserves of resources are limited and second chances are thus increasingly rare, humankind must develop the ability to proactively navigate away from this new kind of crisis - globally extensive and inter-systemic - that could otherwise irreversibly degrade the biophysical and economic basis for human prosperity.

*SUSTAINABLE
DEVELOPMENT GOALS
AND
THE ROLE OF SCP*

THE GLOBAL GOALS

For Sustainable Development





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*Trade-offs among various SDGs are unavoidable.
Sustainable Consumption and Production is the most
efficient strategy to avoid trade-offs and create
synergies to resolve the development and
environmental challenges articulated in the SDGs.*



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SDGs DIRECTLY DEPENDENT ON NATURAL RESOURCES



ECONOMIC MODEL

DRIVING OUR LIVES

Price Signals:

Financial Capital Overvalued

Human Capital Undervalued

Natural Capital not Valued



Market

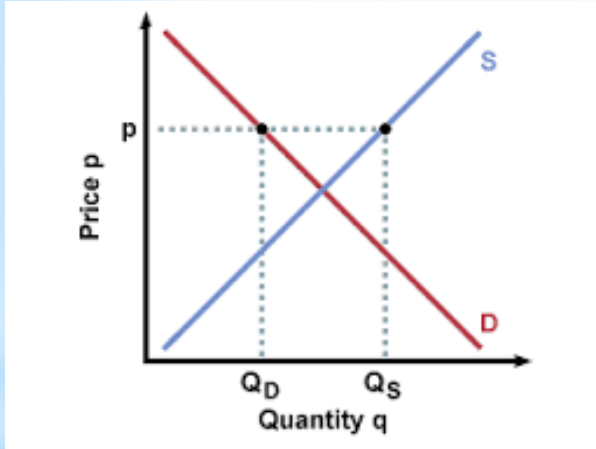
Producers/Consumers

Rational Behaviour



Economic model

Inbuilt Economic, Social, Environmental Imbalances

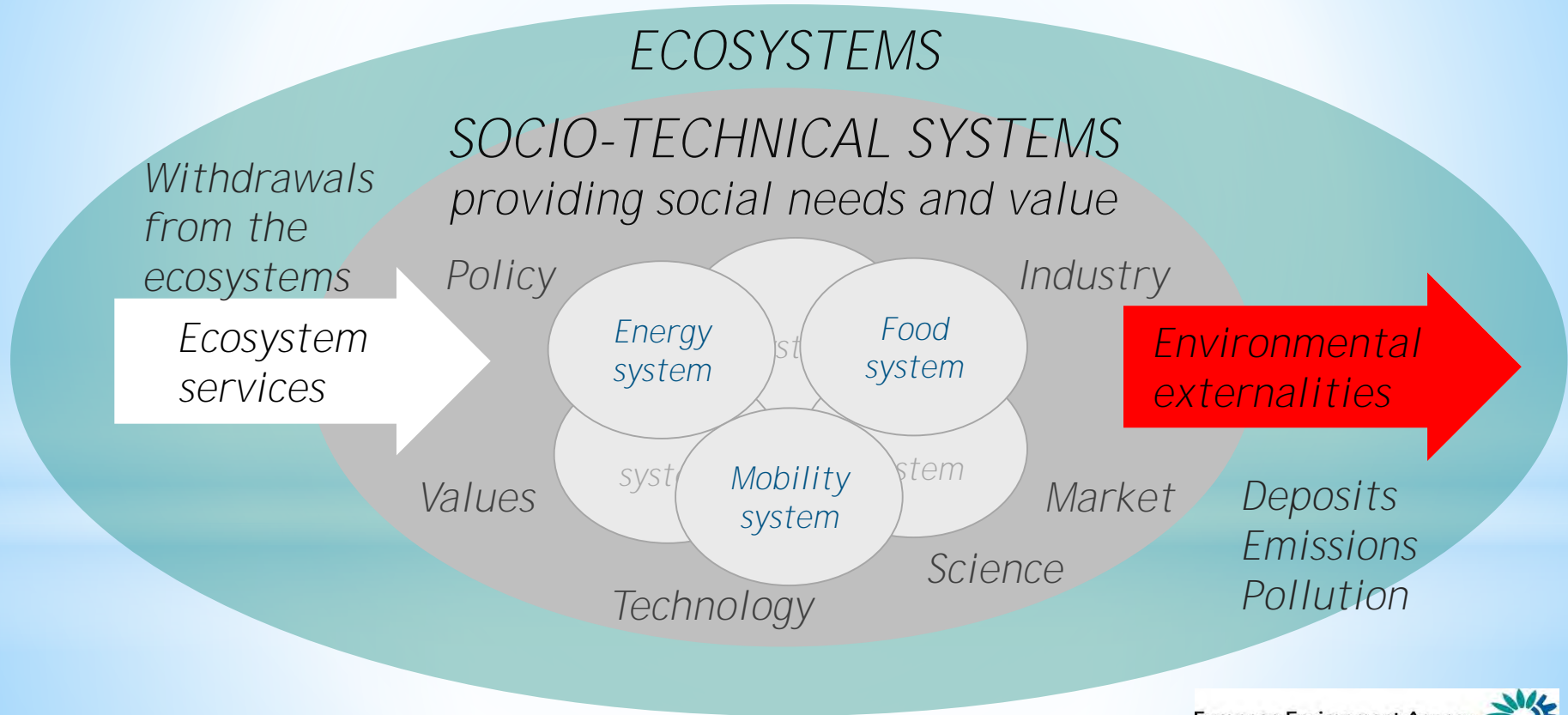


ECOSYSTEMS
ECONOMY

SOCIO-TECHNICAL SYSTEMS
providing social needs and value

LIVING WELL WITHIN ECOLOGICAL LIMITS

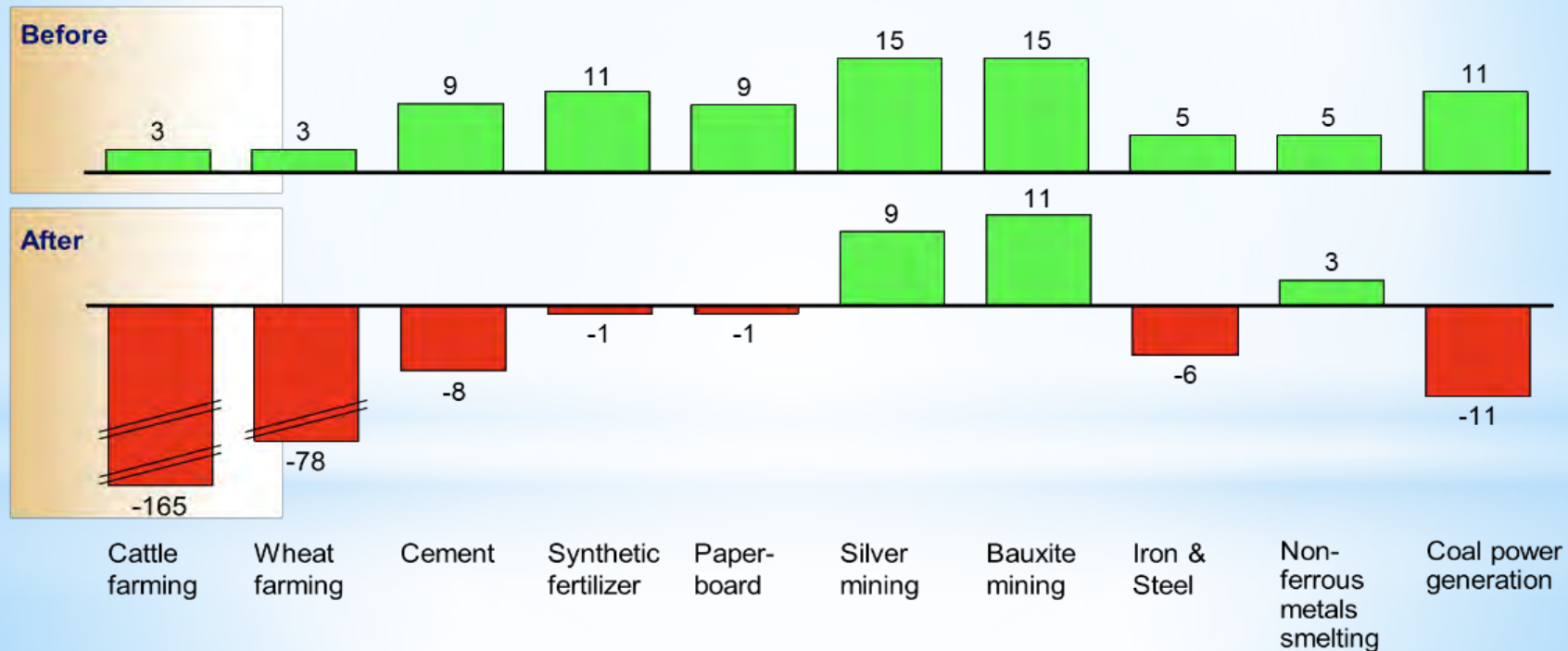
ECONOMIC SYSTEM FUNCTION OF ECOSYSTEM



EXTERNALITIES - COSTS THAT EXIST, BUT WE DENY THEM

Negative profit margins in most of the world's raw material industries if natural capital costs are included

Profit margin (EBIT) before and after natural capital costs, based on top-2 companies in each Morgan Stanley Composite Index category, Percent, 2012

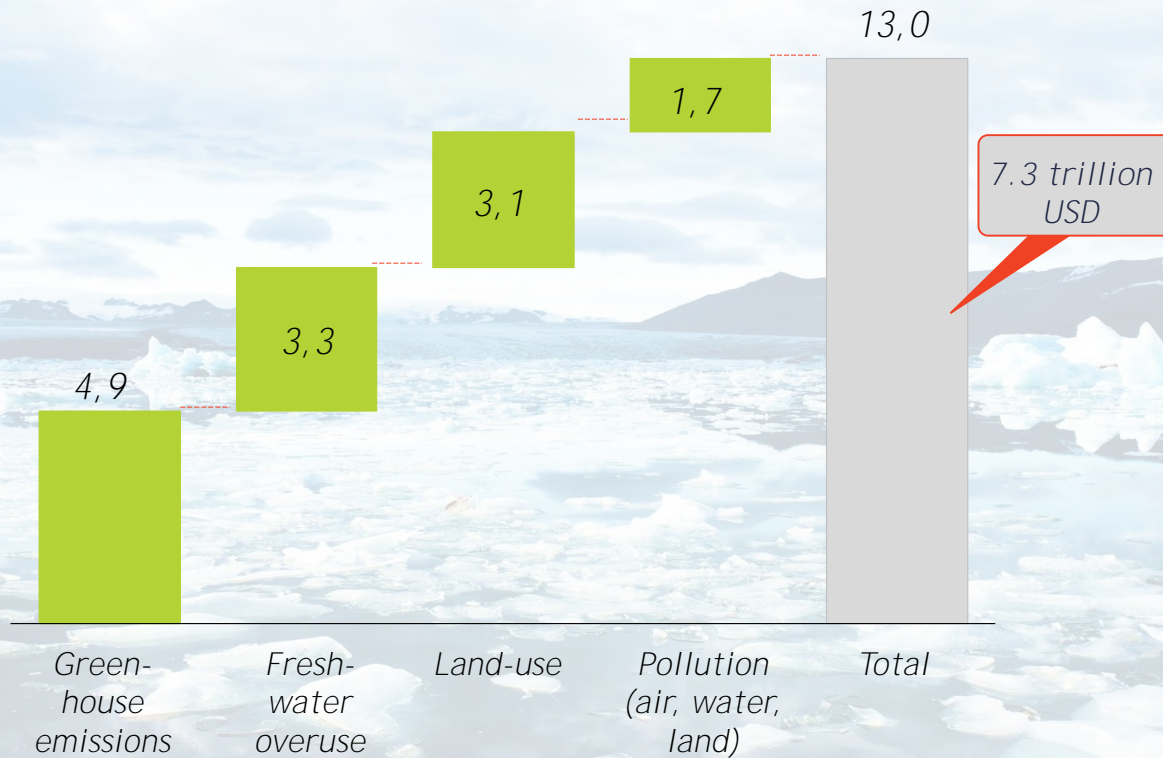


COSTS SOCIALISED



PROFITS PRIVATISED

UNPRICED ENVIRONMENTAL DAMAGE COSTS PERCENT OF GLOBAL GDP, 2009



MEASURES OF SOCIETAL DEVELOPMENT THAT INCLUDE NATURAL CAPITAL DEPLETION GROW MUCH SLOWER THAN GDP

Progress per capita³, globally, 1990-2010, real terms

Considerations

			<i>Capital</i>		
			<i>Economic</i>	<i>Social</i>	<i>Natural</i>
Gross Domestic Product		2,0	✓		
Human Development Index		0,8	✓	✓	
Genuine Progress Indicator ¹	-0,1		✓	✓	✓
Inclusive Wealth Index ²	-0,2		✓	✓	✓

1 1990-2005, as later data not available globally,

2 IWI exists in two versions, one unadjusted, and one where adjustments are made for environmental damage, oil capital gains, and total factor productivity. The adjusted version is shown here,

3 Global population growth was 1.6 percent per year during the period

SOURCE: UNEP (2014a), Kubiszewski et al. (2013)

- “Good” growth - “Bad” growth -
How much of the “growth” in the
past actually qualifies for growth?
- GDP growth rates - GDP levels
- Flows, stocks and increased debt
- Remember: 7% growth - doubling of
everything in 10 years!





*It is not helping if
you are walking
faster,*

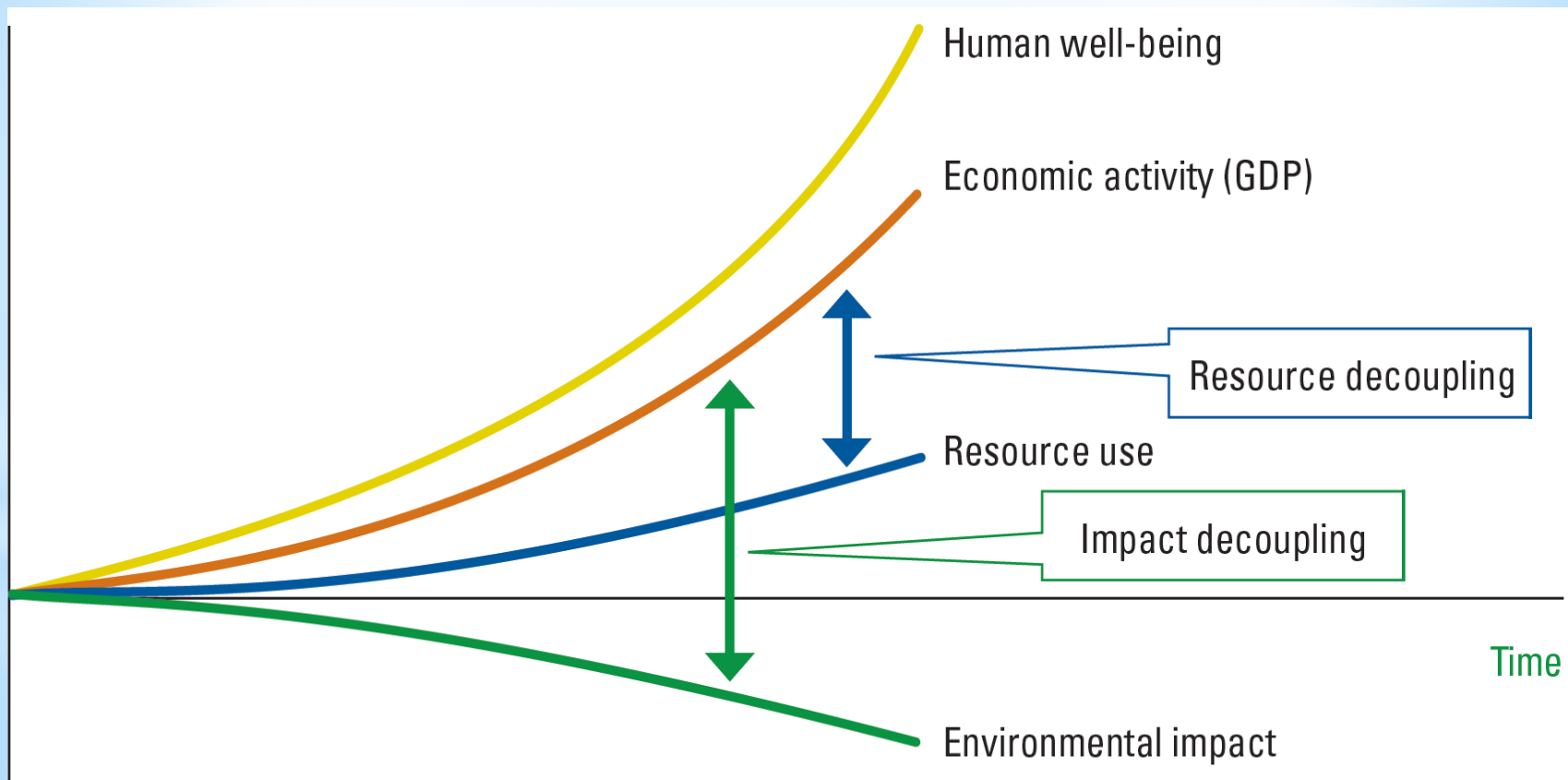
*if you are walking in
the wrong direction!*

*RESOURCE
MANAGEMENT
RECENT IRP REPORTS*



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DECOUPLING IS THE IMPERATIVE OF MODERN ENVIRONMENTAL AND ECONOMIC POLICY

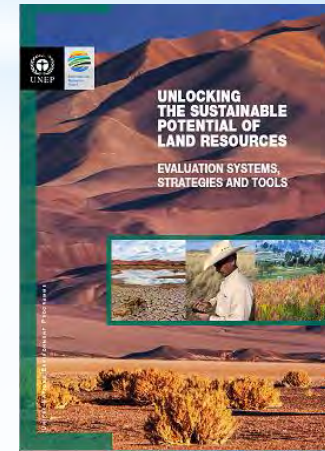
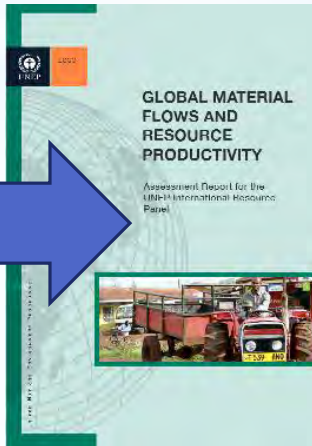
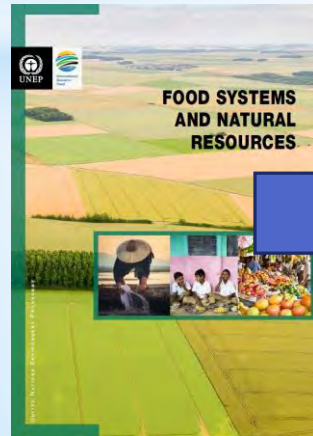
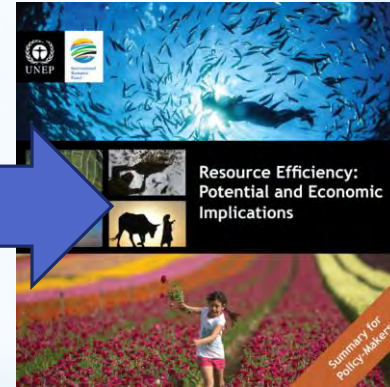
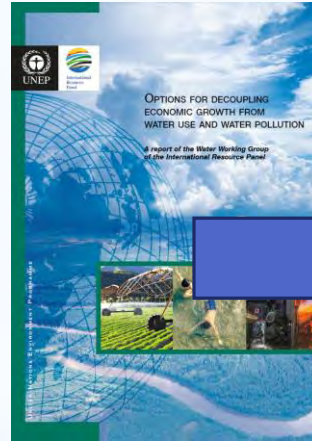
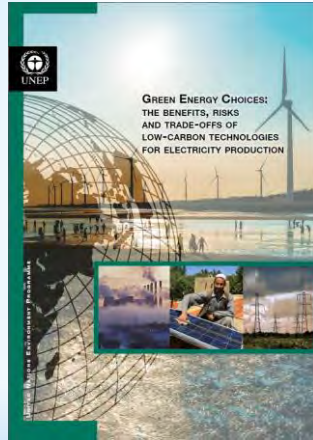




*In the mid-term, except in specific cases,
resource shortage will not be the core
limiting factor of our (economic)
development ...*

*... but the environmental and health
consequences caused by this excessive and
irresponsible use of resources will be!*

IN THE RECENT MONTHS ...



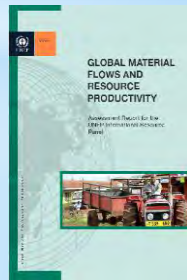


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GLOBAL MATERIAL FLOWS AND RESOURCE PRODUCTIVITY (1970-2010)



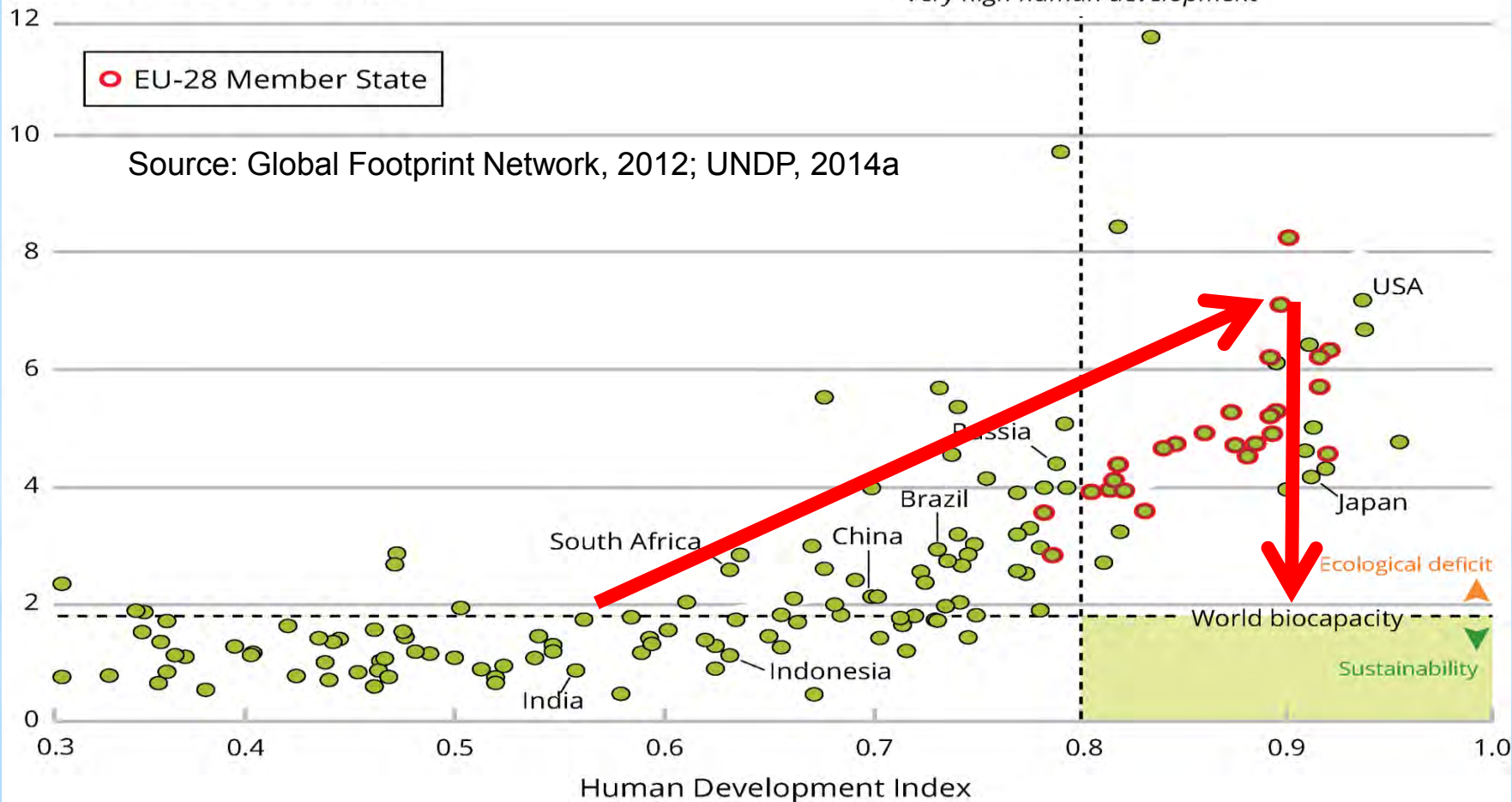
- *Consumption* has been stronger driver of growth in material use than population growth
- The *richest countries* consume on average *10 times more* materials than the poorest
- *Since 2000 material efficiency has declined* - global economy needs more materials per unit of GDP. Production has shifted from material efficient countries to countries that have lower material efficiency
- The level of well-being achieved in wealthy industrial countries *cannot be generalised globally based on the same system of production and consumption*



DEVELOPMENT TRAJECTORY ...

Ecological footprint
(hectares per person per year)

'Very high human development'





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CONCLUSIONS FROM THE RE REPORT: RATIONALE FOR INCREASING RESOURCE EFFICIENCY

1. *Assure availability of resources in future*
2. *Volatility of resource and commodity prices*
3. *National resource security*
4. *Negative environmental impacts of resource extraction and use*
5. *Considerable opportunities for resource efficiency to be increased with negative net costs, i.e. with overall economic benefits.*



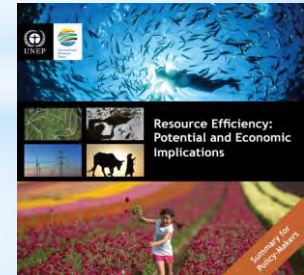


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CONCLUSIONS FROM THE RE REPORT: REALISING THE POTENTIAL



- With concerted action, there is *significant potential for increasing resource efficiency*.
- *Markets will not achieve* higher rates of resource efficiency *by themselves*. Public policy and political will be needed.
- There are *significant barriers* to the increases in resource efficiency required, *but they can be removed*.
- Improving resource efficiency is *indispensable for meeting climate change targets* cost effectively.



CLIMATE

CARBON MANAGEMENT

LAND

WATER

GHG

MATERIALS

DECOUPLING

RESOURCES

LOW CARBON RESOURCE EFFICIENT ECONOMY

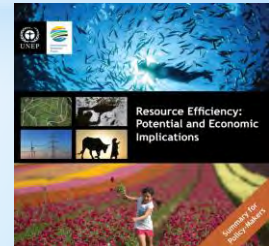


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DISCONNECT BETWEEN RESOURCE EFFICIENCY AND ECONOMIC EFFICIENCY

*There is a need to rebalance the cost of labour, and the costs of resources and pollution by **pricing externalities**, using **taxation** and **other incentives** for actors to favour paying for labour to save materials, rather than for materials to save labour*



THE ROLE OF THE
CIRCULAR ECONOMY

PRINCIPLE

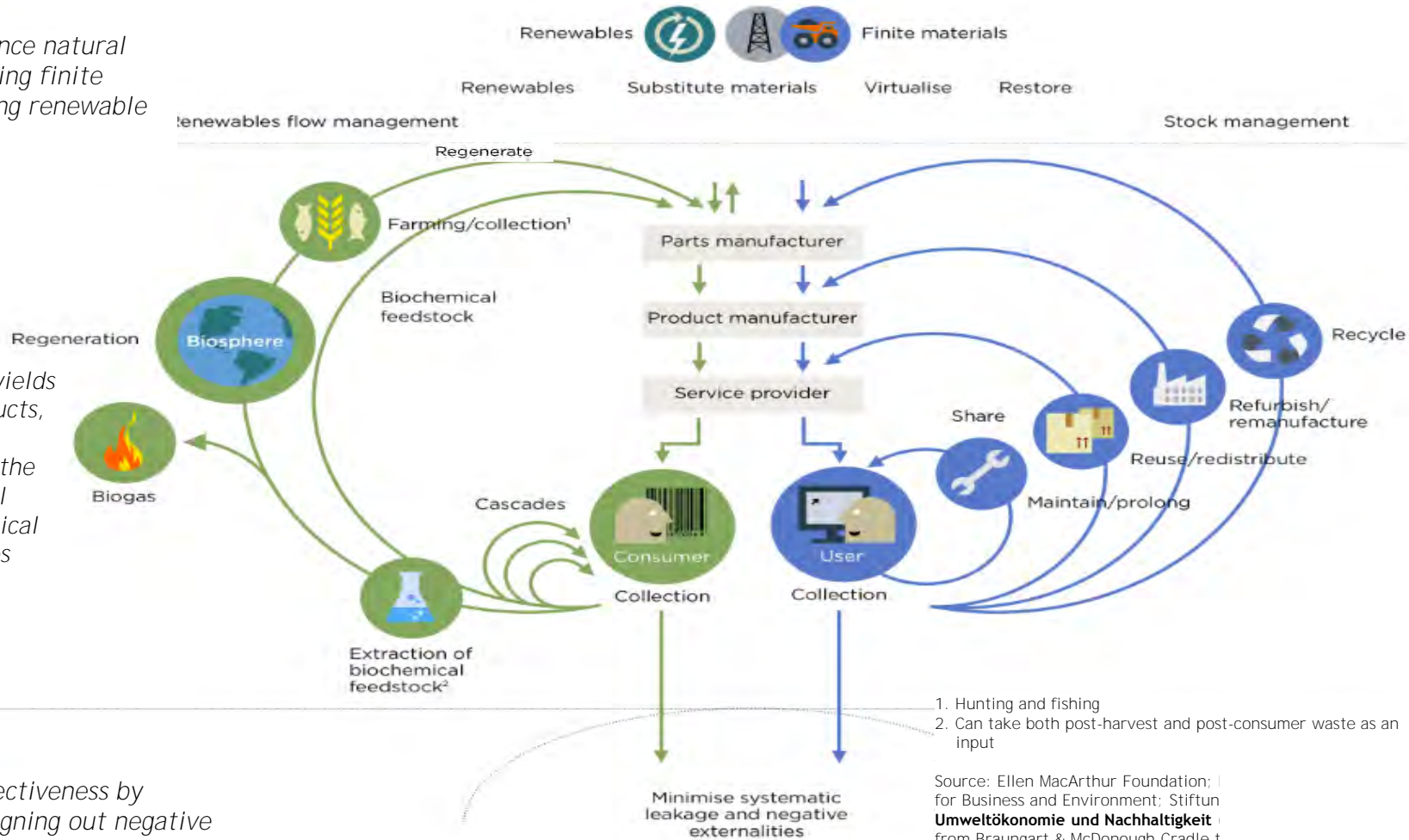
1
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows

PRINCIPLE

2
Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles

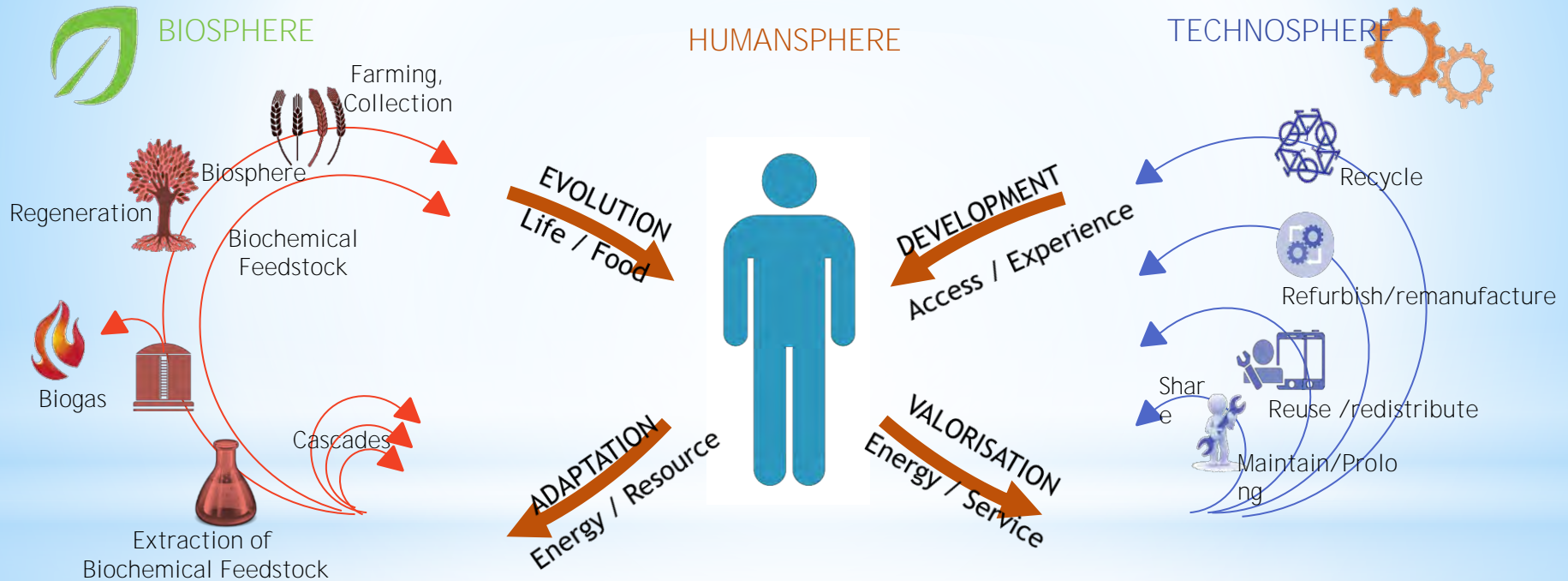
PRINCIPLE

3
Foster system effectiveness by revealing and designing out negative externalities



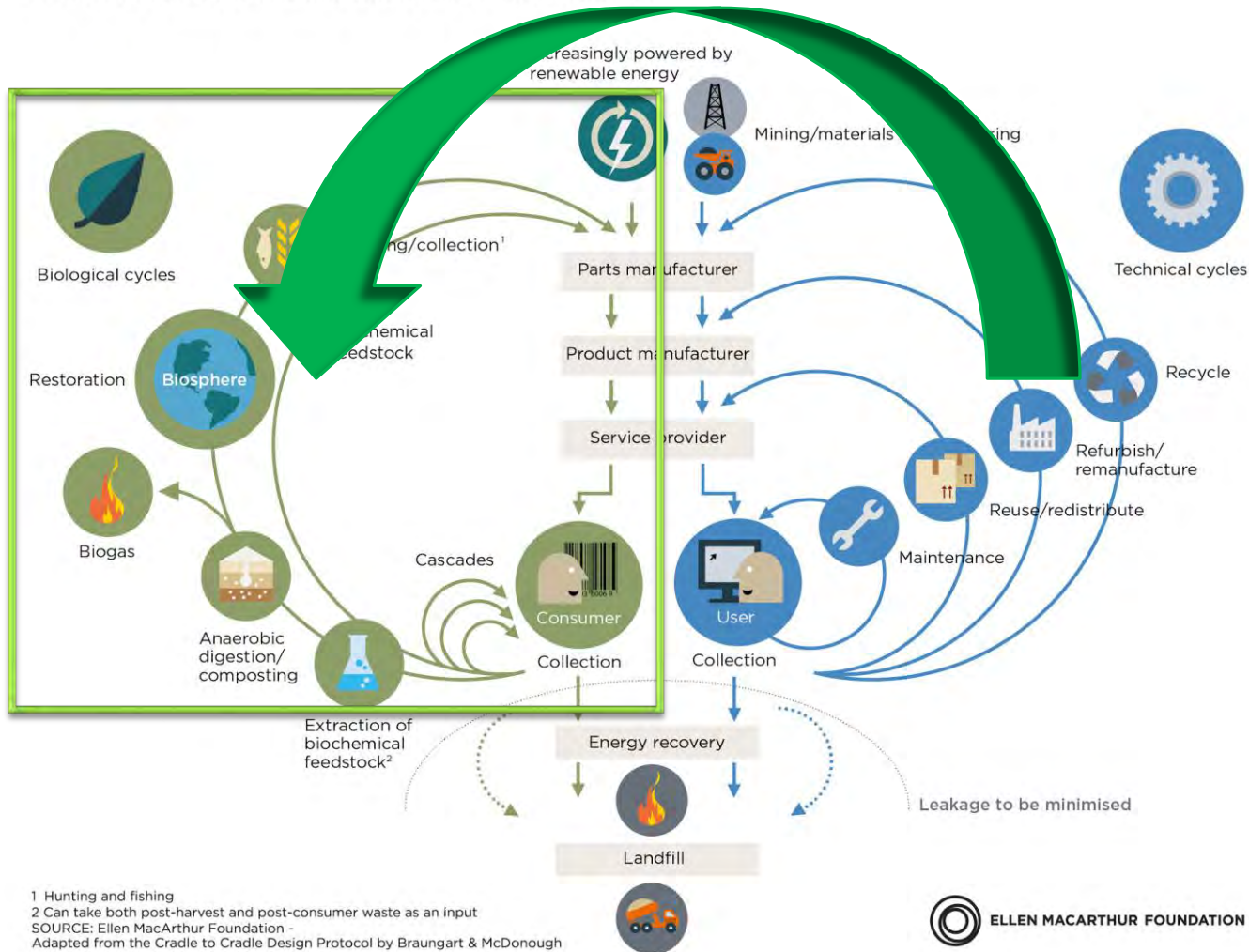
ADAPTED “BUTTERFLY DIAGRAM”

INTEGRATING HUMAN FLOWS



The Golden Rule of priorities:

Natural Capital → Human Capital → Remanufactured Capital



BIOECONOMY AND CIRCULAR ECONOMY



ELLEN MACARTHUR FOUNDATION

CITIES

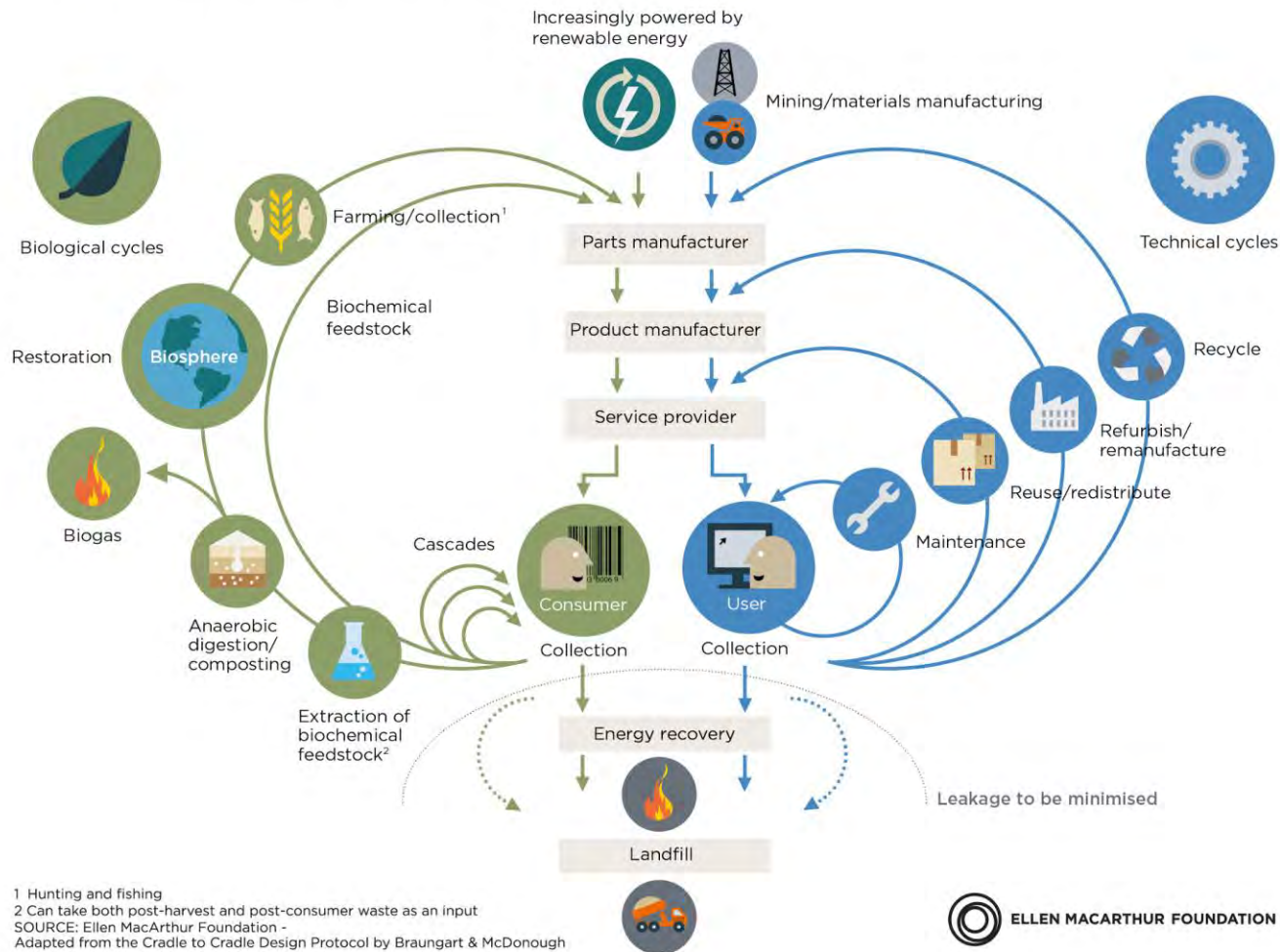
*SDGs AND CIRCULAR
ECONOMY*

THE GLOBAL GOALS

For Sustainable Development



CIRCULAR ECONOMY - an industrial system that is restorative by design



¹ Hunting and fishing

² Can take both post-harvest and post-consumer waste as an input

SOURCE: Ellen MacArthur Foundation -

Adapted from the Cradle to Cradle Design Protocol by Braungart & McDonough



ELLEN MACARTHUR FOUNDATION



- *SHARING MODELS*
- *MOBILITY SYSTEMS*
- *WASTE RECYCLING*
- *SUSTAINABLE BUILDINGS*
- *ENERGY EFFICIENCY*

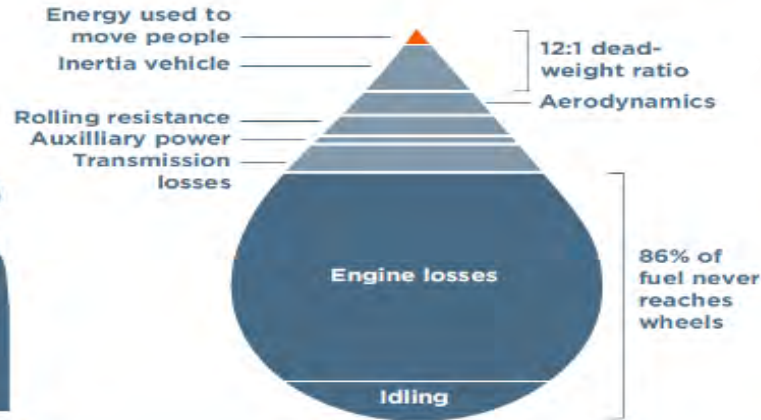


STRUCTURAL WASTE IN THE MOBILITY SYSTEM

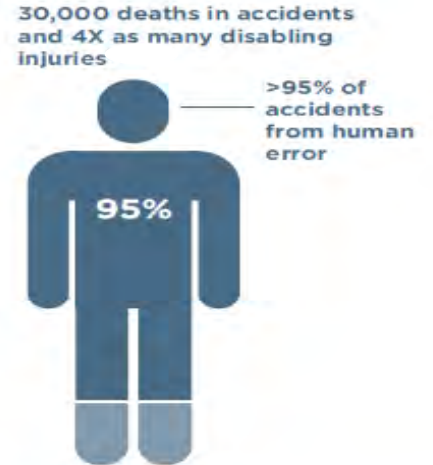
CAR UTILISATION



TANK-TO-WHEEL ENERGY FLOW - PETROL



DEATHS AND INJURIES/ YEAR ON ROAD



LAND UTILISATION:

5%

Road reaches peak throughput only 5% of time and only 10% covered with cars then

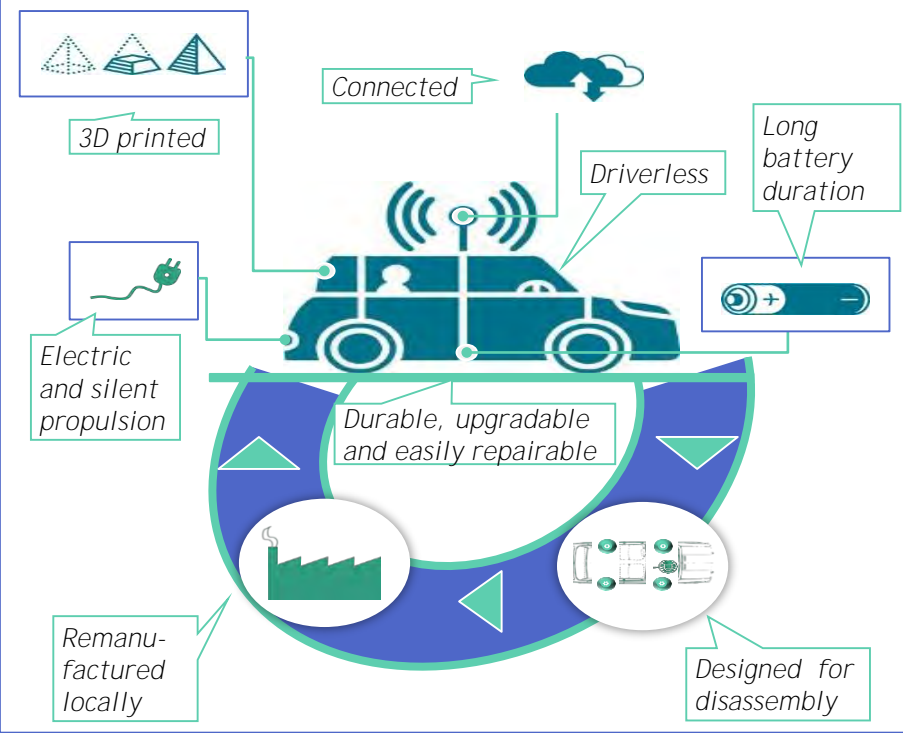
50%

50% of most city land dedicated to streets and roads, parking, service stations, driveways, signals, and traffic signs

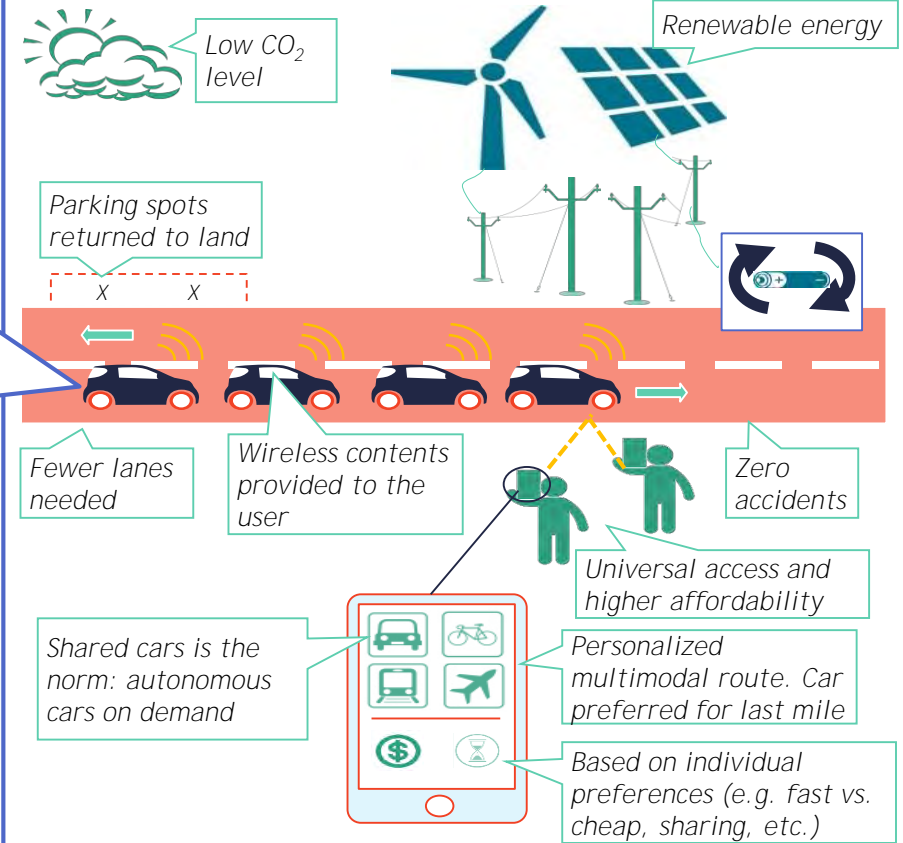
A FUTURE END-STATE COULD LOOK VERY DIFFERENT FROM TODAY'S MOBILITY SITUATION

Illustrative vision

The car of tomorrow



The mobility system of tomorrow



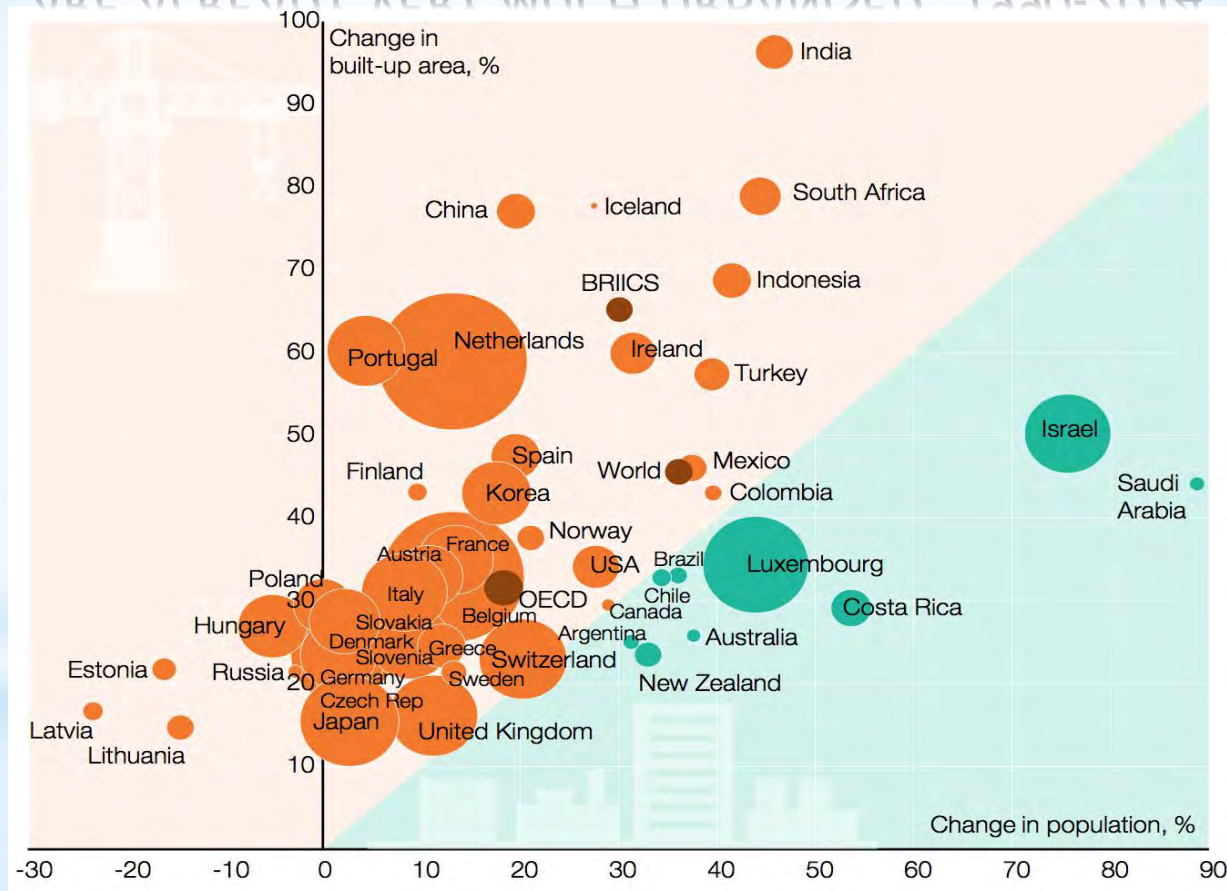
BUILDINGS COVER 30% MORE LAND in 2014 THAN IN 1990

Built-up area in thousand km² in a selection of countries, in 2014 and new constructions since 1990



Source: OECD, Green Growth Indicators 2017

BUILT-UP AREA PER CAPITA IS INCREASING, INCLUDING IN COUNTRIES THAT ARE ALREADY VERY MUCH URBANISED, 1990-2014



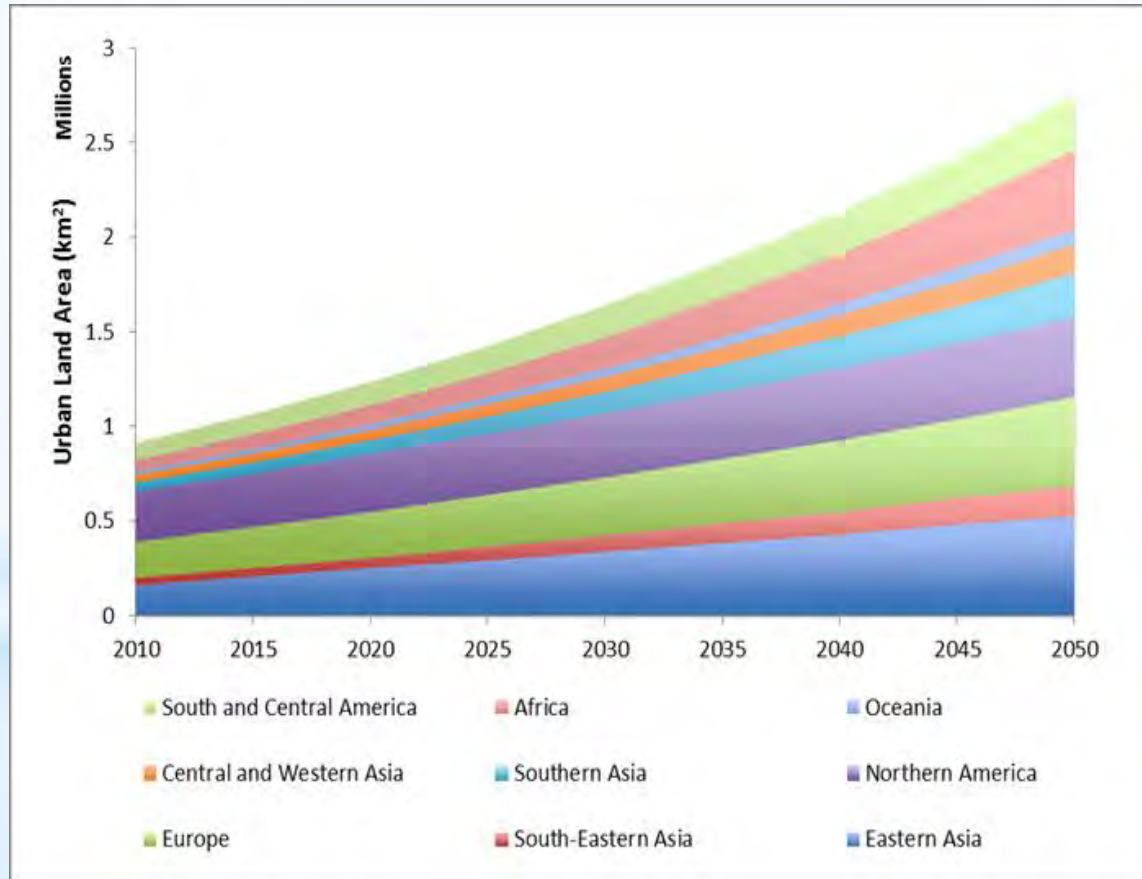
Source: OECD, Green Growth Indicators 2017

WORLD URBANIZATION PROSPECTS 2014 REPORT

- 3.8 billion people *lived in urban areas* in 2015 (54% of the global population). By 2050 this is expected to rise to 6.3 billion (66% of the global population)
- If inequalities remain unchanged, *one third* will be living in *slums* by 2050
- 37% of the growth is expected to come from *China, India and Nigeria*
- There has been a historic de-densification trend of 2 per cent per year. This threatens to increase *global urban land use* from just below 1 million km² to over 2.5 million km² in 2050, putting agricultural land and food supplies at risk



URBAN LAND AREA



“NEW URBAN AGENDA”

QUITO 2016

*Roadmap for sustainable urbanization with its
three transformative commitments*

- *leave no one behind*
 - *sustainable and inclusive economies*
 - *environmental sustainability*
- *and references to resource efficiency, alongside low-emission and resilience, of housing, infrastructure and basic services.*

“THE WEIGHT OF THE CITIES” - RESOURCE REQUIREMENTS OF FUTURE URBANISATION 2050

Preliminary results

*Urbanization is expected to be more or less
completed in 50 years.*

*We have a once-in-a-lifetime opportunity to
shift the expected urbanization onto a more
environmentally sustainable and socially just
path.*

“THE WEIGHT OF THE CITIES”

Report consists of four main parts:

- 1. The most comprehensive assessment of the resource requirements of future urbanization*
- 2. An assessment of the possibilities available to cities to shift on to a more sustainable resource use path.*
- 3. The governance strategy required to shift urbanisation on to a sustainable trajectory*
- 4. Conclusions and recommendations*

“THE WEIGHT OF THE CITIES”

Some basic facts about resource use

- Cities use billions of tons of *raw materials*, from sand, gravel, and iron ore to *biotic resources* such as wood and food.
- Without new strategy, *global urban material consumption* will grow from 40 billion tons in 2010 to about 90 billion tons by 2050. This would exceed by far what the planet can provide in a sustainable manner.
- For sustainable use of global resources by 2050, the *average material intensity of consumption per capita* needs to be reduced from the forecasted 8-17 to 6-8 tons/capita/year.

“THE WEIGHT OF THE CITIES”

Four systemically inter-related interventions

- *spatial restructuring* of the urban morphology to achieve *strategic intensification* (well-articulated network of high density nodes and within nodes the fostering of a richer mix of housing, jobs and amenities at neighbourhood level)
- *human-scale sustainable design* (conditions for liveable, functionally and socially-mixed neighbourhoods, ‘**soft**’ mobility (pedestrianizing, cycling) at the city/neighbourhood scales, and ‘**passive**’ heating, cooling and lighting at building level)
- *resource efficiency* (of all urban components, such as vehicles, infrastructures, buildings, factories etc.)
- *sustainable behaviours* (the separation of waste at source for recycling, the use of public transport, walking or cycling, the use of public spaces, etc.)

“THE WEIGHT OF THE CITIES”

Actual improvements in energy (and resource productivity)

1. *Higher densities and compact urban forms* can reduce GHG (greenhouse gas) emissions by a factor of 2 or more
2. *Human-scale functionally mixed neighborhoods* could reduce energy consumption by a factor of 2 or more
3. *Energy-efficient buildings* could reduce energy demand by a factor of 2 or more
4. *Efficient systems* could achieve a further 20 per cent energy saving
5. *Behavioural changes* could reduce energy demand by a factor of 2

**THE CASCADING MULTIPLICATIVE IMPACT OF THESE MEASURES
CAN IMPROVE ENERGY USE BY A FACTOR OF 10**

“THE WEIGHT OF THE CITIES”

Key principles of integrated urban planning

1. *Compact, articulated and polycentric strategic intensification* (as opposed to only increasing average density)
2. *Agglomeration in nodes* (as opposed to agglomeration in a single area)
3. *Flexibility and alignment with market demand*
4. *Small perimeter blocks with active edges* (efficient and well-connected street networks comprise a variety of moderate street widths and between 80 and 100 street intersections per km². The street network should occupy at least 30% of the developed land area and comprise at least 18 km of street length per km²).

“THE WEIGHT OF THE CITIES”

Key principles of integrated urban planning

5. *Connectivity through scales* (inter-city connections, intra-metropolitan connectivity, and local-level) and a vibrant public realm
6. *Mixed-use neighborhoods* (at least 40 per cent of floor space should be allocated for economic use in any neighborhood, and single function blocks should cover less than 10 per cent of any neighborhood).
7. *Fine grain diversified plot patterns*
8. *Green public spaces, natural systems and a bioclimatic urban fabric*

“THE WEIGHT OF THE CITIES”

Some general conclusions and orientations

- *Urban transition* will not happen without appropriate urban governance arrangements
- *Urban experimentation* is happening everywhere - the concept of urban experimentation may be emerging as a new mode of urban governance
- *Far-sighted city governments* are needed and they need to become global leaders

European Green Capital 2016



LEADERSHIP GOVERNANCE

AND THE ROLE OF EUROPEAN UNION

THE DAWN OF THE SYSTEM LEADERSHIP

Peter Senge, Hal Hamilton, John Kania

Stanford Social Innovation Review, Winter 2015

- We face a host of *systemic challenges beyond the reach of existing institutions and their hierarchical authority structures*. Problems like climate change, destruction of ecosystems, growing scarcity of water, youth unemployment, embedded poverty and inequity require unprecedented collaboration among different organisations, sectors and even countries.
- We are at the *beginning of the beginning* how to catalyse and guide systemic change at a scale commensurate with the scale of problems we face, and all of us see but dimly.

THE DAWN OF THE SYSTEM LEADERSHIP

Peter Senge, Hal Hamilton, John Kania

Stanford Social Innovation Review, Winter 2015

Three core capabilities that system leaders develop in order to foster collective leadership

- *Helping people see the larger system and build a shared understanding of complex problems.*
- *Fostering reflection and more generative conversations*
- *Shifting the collective focus from reactive problem solving to co-creating the future*

GOVERNANCE





TO CONCLUDE ...

SUSTAINABLE, LOW-CARBON, CIRCULAR, GREEN,
RESOURCE EFFICIENT, ENERGY EFFICIENT,
DECOUPLING, 3Rs, ECOLOGICAL CIVILISATION,
C2C, BIOECONOMY, ECO-**ECONOMY**, **BLUE** ...

- *What we actually talk about*



*WE HAVE TO FIX A BROKEN
COMPASS
(PAVAN SUKHDEV)*

*NEW ECONOMIC MODEL BASED
ON SUSTAINABLE CONSUMPTION
AND PRODUCTION,
INTEGRATING ALL PILLARS OF
SUSTAINABILITY IS*

*NECESSARY AND
UNAVOIDABLE*



MAIN POINTS TO REMEMBER

- For the first time in a human history we face emergence of a single, tightly coupled *human social-ecological system of planetary scope*.
- It is about *system change*. Without *leadership* and improved *global governance* SDGs are only a wishful thinking.
- Transition to a *new economic model* integrating all pillars of sustainability should be in the centre of our attention. Trade-offs among various SDGs are unavoidable. *SCP* is the most efficient strategy to avoid them and create synergies. *Circular economy* is very good concept to operationalise it in practice.
- We should refocus our efforts from addressing *state and impacts* (migration, security ...) to addressing the *pressures and drivers* leading to them (economic, social, environmental ... imbalances).

MAIN POINTS TO REMEMBER

- *Implementing SDGs should be priority of any government* defined in the strategic documents, supported by indicators, monitoring, reporting, linked to the core economic policy decisions.
- All (economic) policies should be systematically adjusted. Synergies among *climate change, bio-economy and resource management* (circular economy) should be exploited.
- *All levels* (global, European, national, local, city) and *all stakeholders* (public & private actors, financial sector, civil society, academia...) should actively participate in the system change. *Active dialogue with potential losers* is necessary to make transition fair and possible.
- Majority of people are living in *urban areas*. It is expected that in the future this % will increase. *There is no sustainable future without sustainable cities.*

MAIN POINTS TO REMEMBER

- EU is the best *global governance pilot*, an enormous wealth of good and bad examples in practice, but there is *a need for a clear vision and leadership*.
- Change will not appear by waiting for the leadership of others, *be the leaders* on your level of governance and authority ... in politics, in business, academia, local, city level ...
- If we are to *avoid globally extensive and inter-systemic crisis and frequent conflicts* **than let's get serious about implementing** what we have agreed in SDGs. Changes are *unavoidable* and humans are supposed to be intelligent. It is high time to prove it.

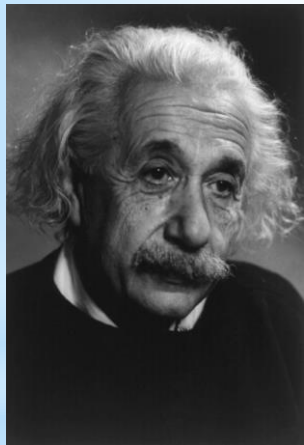
Any global transition is a major new opportunity for the innovation, new development opportunities, new jobs

*And alternative ...
I would rather not think and talk about it!*

About our time ...

Insanity - doing the same things over and over again and expecting different results

ALBERT EINSTEIN



When asked why it is that mankind has stretched so far as to discover the structure of the atom, but we have not been able to devise the political means to keep the atom from destroying us he replied:

“That is simple, my friend. It is because politics is more difficult than physics”

Try not to become a man of success, but rather try to become a *man of value*.

*The past cannot be changed.
The future is yet in our power.
But ... do not forget.
Future has already arrived and
it is called **present**.*



International
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THANK YOU

For more information

Contact IRP Secretariat at resourcepanel@un.org

Visit our website at <http://resourcepanel.org/>