



# **TRANSITION TO A NEW ECONOMIC MODEL: CHALLENGES AND OPPORTUNITIES**

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Co-Chair UNEP International Resource Panel (IRP)  
EEA Webinar  
October 28<sup>th</sup> 2015**

**WORLD**

**IN WHICH WE**

**LIVE**

# 20<sup>th</sup> CENTURY

## THE GREAT ACCELERATION



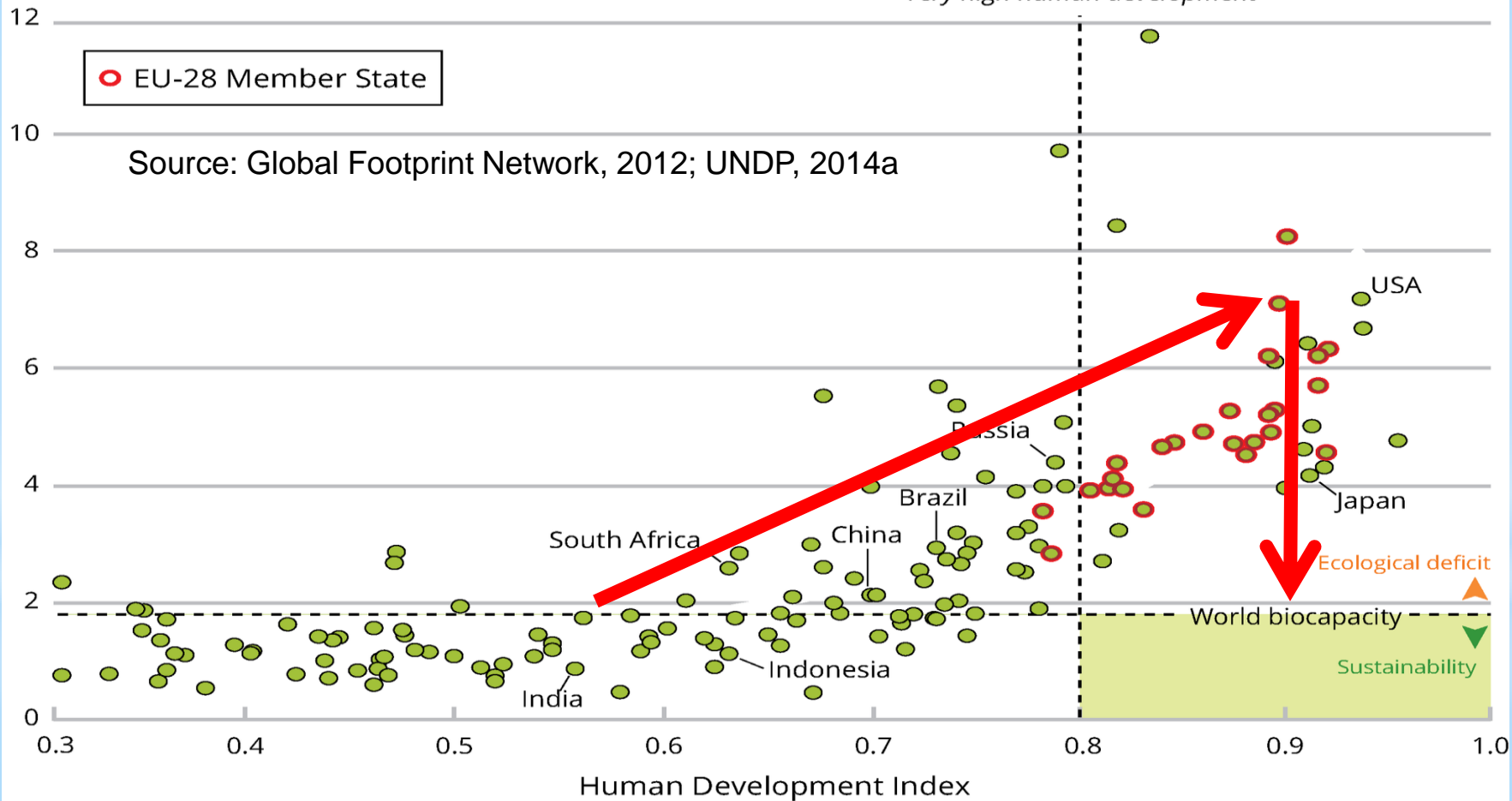
- **GROWTH OF POPULATION BY A FACTOR 3.7**
- **ANNUAL EXTRACTION OF CONSTRUCTION MATERIALS GREW BY A FACTOR OF 34, ORES AND MINERALS BY A FACTOR OF 27, FOSSIL FUELS BY A FACTOR OF 12, BIOMASS BY A FACTOR OF 3.6**
- **TOTAL MATERIAL EXTRACTION GREW BY A FACTOR OF 8**
- **GHG EMISSIONS GREW BY A FACTOR OF 13**

**MAIN  
PROBLEM  
(IN ONE SLIDE)**

# DEVELOPMENT TRAJECTORY ...

Ecological footprint  
(hectares per person per year)

'Very high human development'



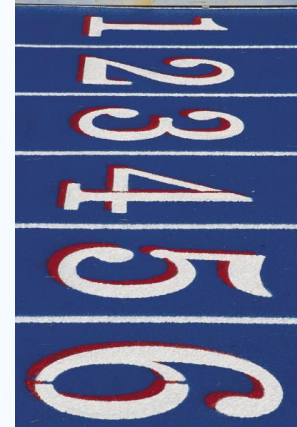
**\* SUSTAINABLE, LOW-CARBON, CIRCULAR,  
GREEN, RESOURCE EFFICIENT, DECOUPLING  
OR ...**



- WHAT WE ACTUALLY TALK ABOUT**
- SUSTAINABILITY – ECONOMIC, SOCIAL,  
ENVIRONMENTAL ...**
- ECONOMY IS IN DENIAL OF PHYSICAL LAWS**

# \* **FACTS WE TRY TO IGNORE ...**

- **POPULATION GROWTH (2050 – 9.7 BIL)**
- **PER CAPITA CONSUMPTION GROWTH**



- **LIMITED RESOURCES - FRESH WATER, OCEANS, LAND AND SOIL, CLEAN AIR, RAW MATERIALS, BIODIVERSITY, ECOSYSTEMS, FUEL ...**
- **TODAY 60% OF ECOSYSTEMS DEGRADED OR USED UNSUSTAINABLY**

# **ECONOMIC ARGUMENTS FOR CHANGE (EU)**

- **RESOURCE INTENSIVE MODEL OF PRODUCTION  
AND LOCK-INS**



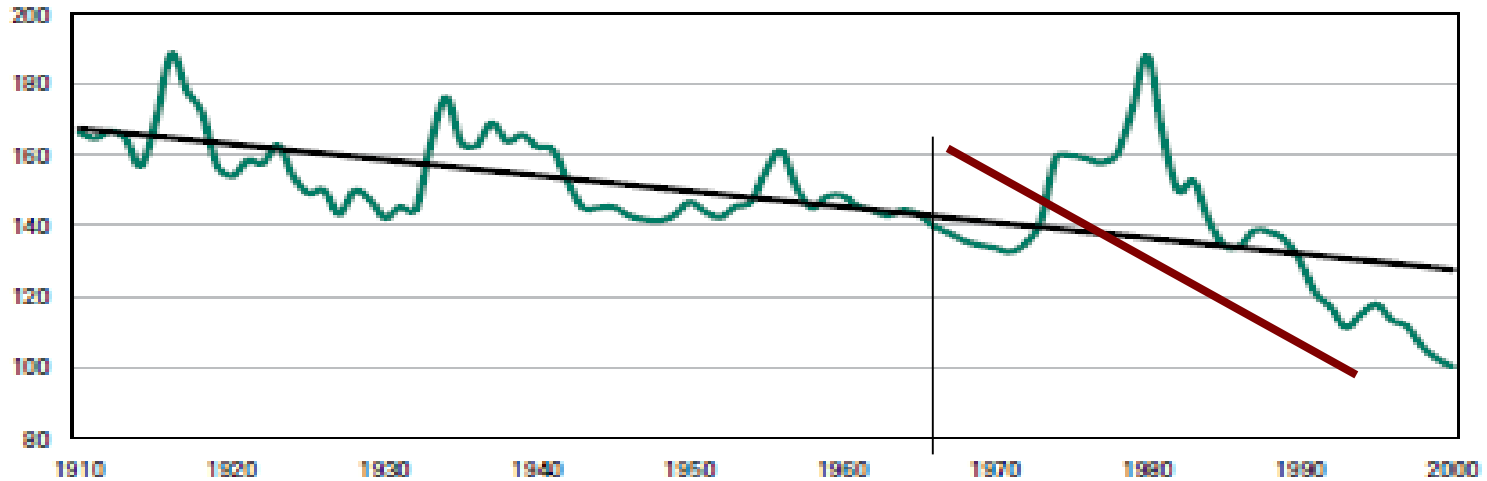
# **ECONOMIC ARGUMENTS FOR CHANGE (EU)**

- **RESOURCE INTENSIVE MODEL OF PRODUCTION AND LOCK-INS**
- **CHANGE OF RESOURCE PRICE TRENDS AND INCREASED PRICE VOLATILITY**

# A HUNDRED YEARS OF DECLINE OF RESOURCE PRICES

Figure 2.4. Composite resource price index (at constant prices, 1900–2000)

Indexed  
2000=100



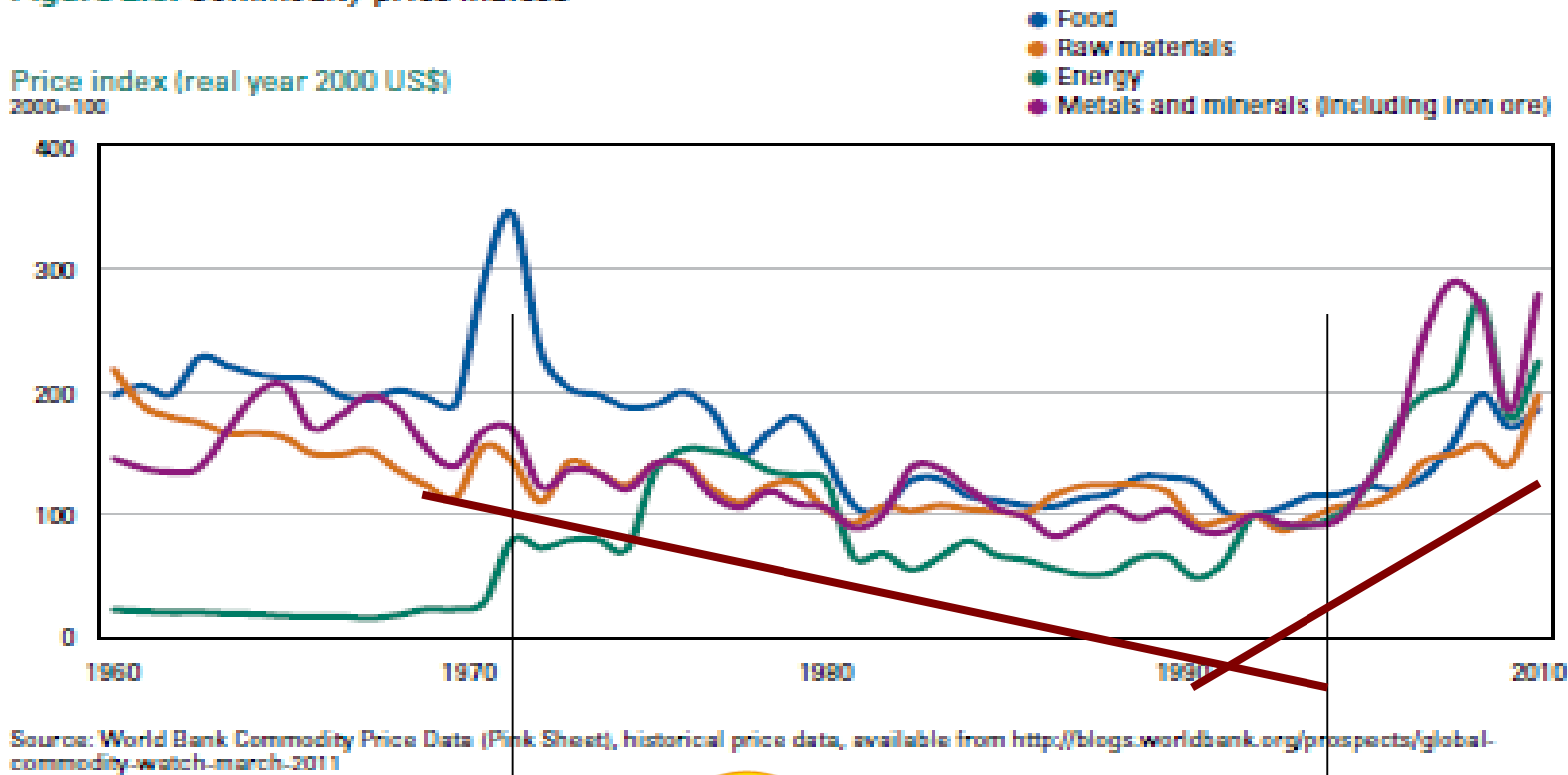
Source: Wagner et al., 2002



International  
Resource  
Panel

# RESOURCE PRICES ON THE RISE DESPITE RECENT TRENDS

Figure 2.5. Commodity price indices



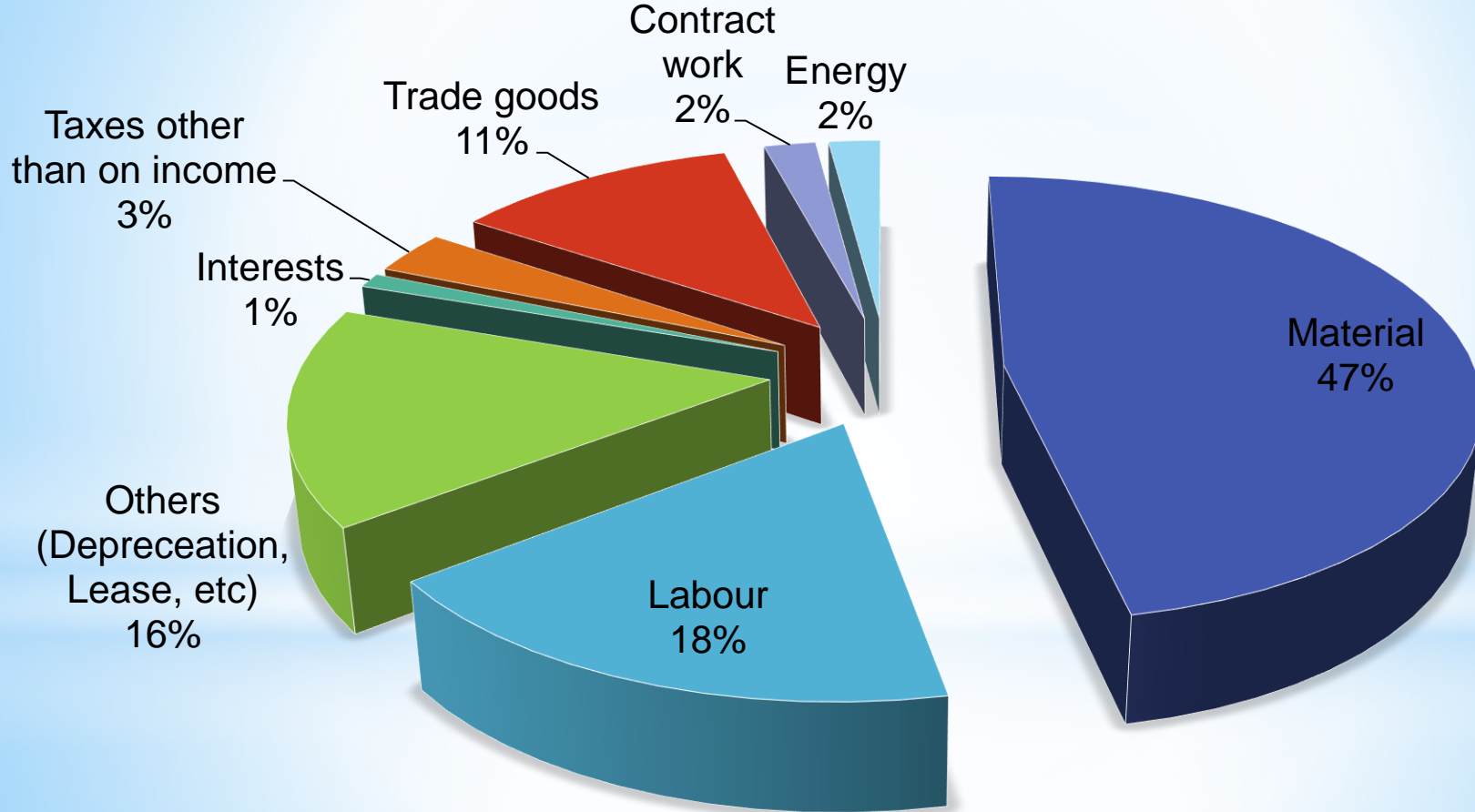
International  
Resource  
Panel

# **ECONOMIC ARGUMENTS FOR CHANGE (EU)**

- **RESOURCE INTENSIVE MODEL OF PRODUCTION AND LOCK-INS**
- **CHANGE OF RESOURCE PRICE TRENDS AND INCREASED PRICE VOLATILITY**
- **COST STRUCTURE OF MANUFACTURING SECTOR**

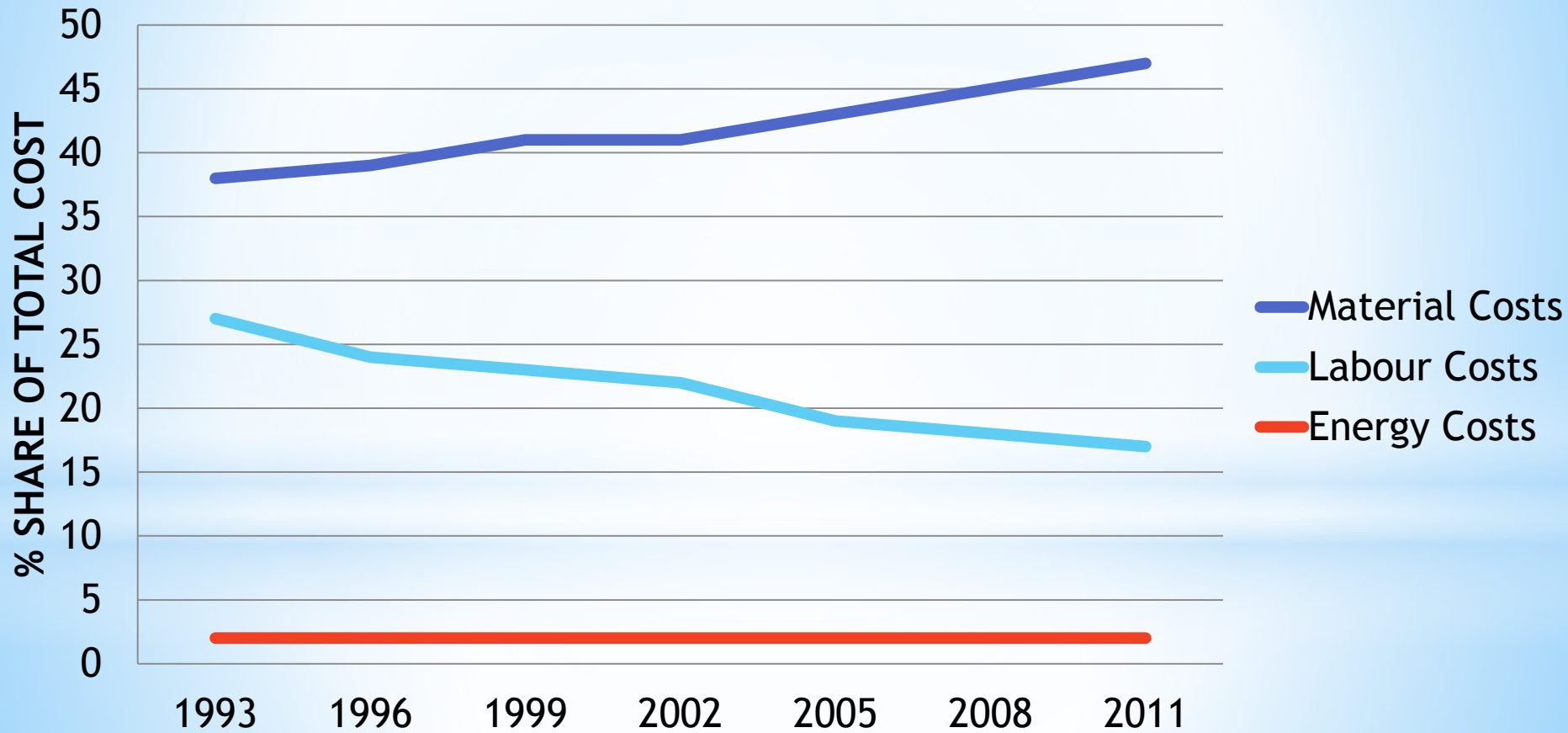
# COST STRUCTURE IN THE MANUFACTURING INDUSTRY 2011

## VDI GERMAN AGENCY FOR MATERIAL EFFICIENCY



# SHARE OF COSTS IN THE MANUFACTURING SECTOR 1993-2011

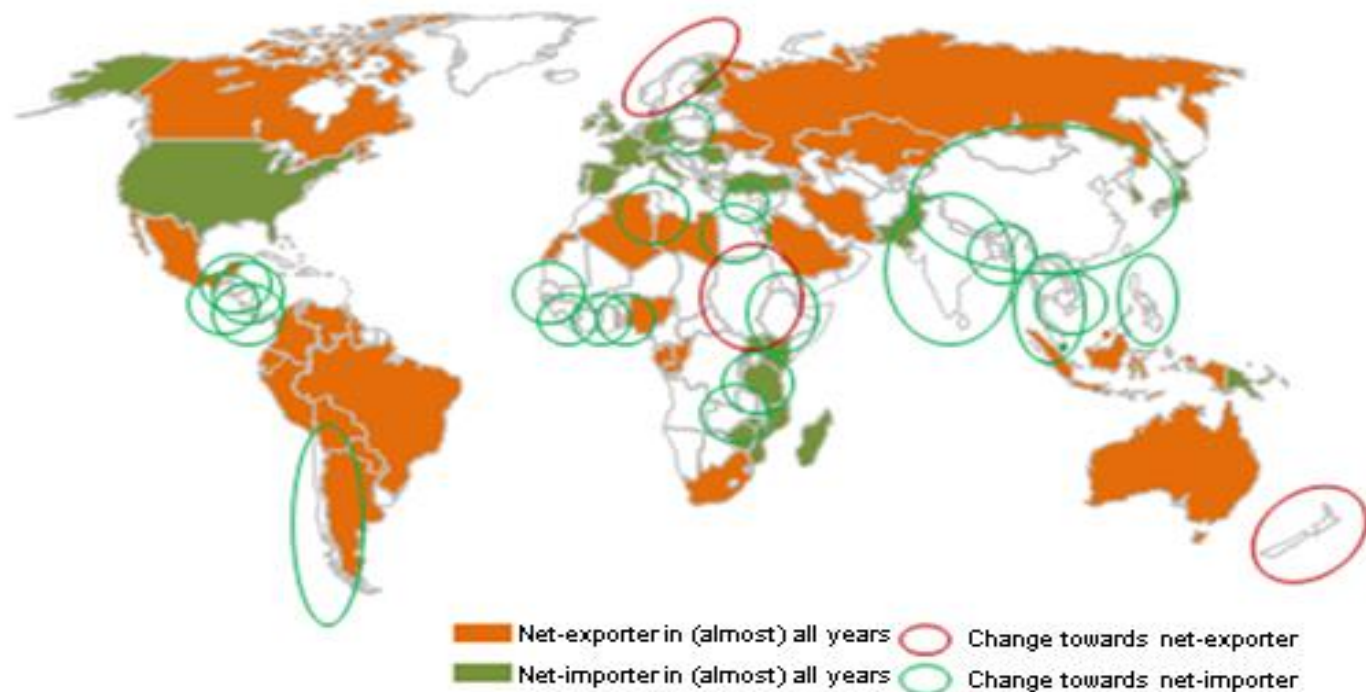
## VDI GERMAN AGENCY FOR MATERIAL EFFICIENCY



# ECONOMIC ARGUMENTS FOR CHANGE (EU)

- RESOURCE INTENSIVE MODEL OF PRODUCTION AND LOCK-INS
- CHANGE OF RESOURCE PRICE TRENDS AND INCREASED PRICE VOLATILITY
- COST STRUCTURE OF MANUFACTURING SECTOR
- **IMPORT DEPENDENCY**

Figure 4: Persistence and changes in net importing and net exporting countries, 1962–2010





**FOR 54 SCARCE AND ECONOMICALLY  
IMPORTANT RAW MATERIALS, EUROPE  
IN ITS ENTIRETY DEPENDS 90% ON  
RAW MATERIALS IMPORTED FROM  
OUTSIDE EUROPE**

**(EUROPEAN COMMISSION, 2014)**



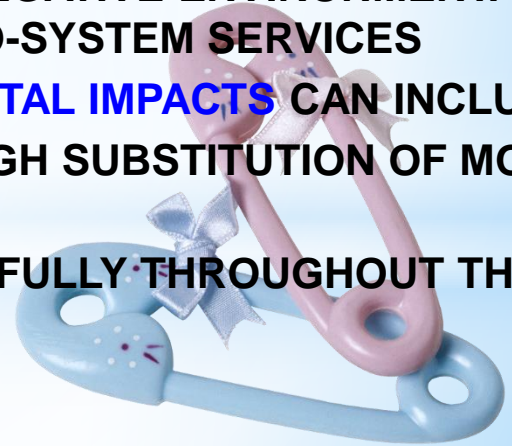
**DECOUPLING**

**GROWTH**

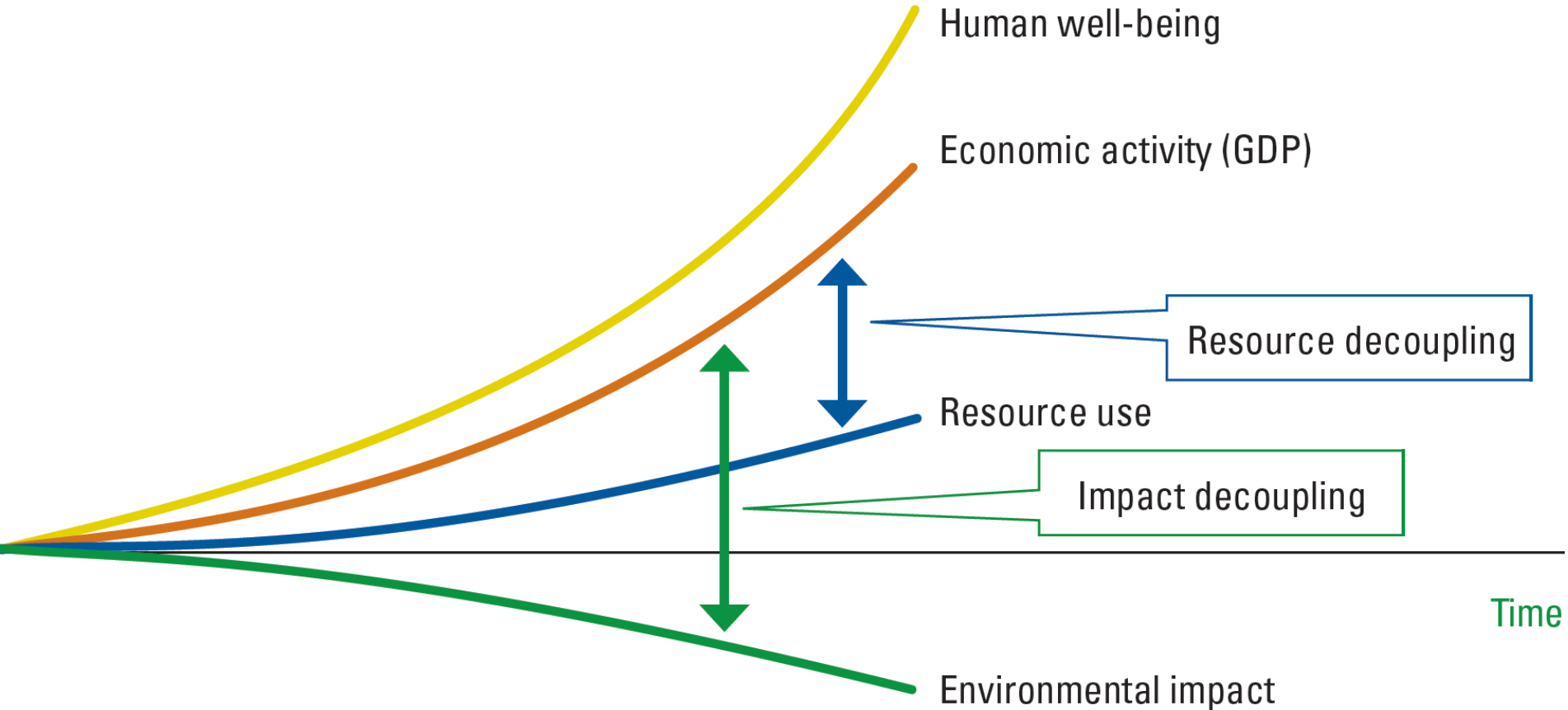
**FROM RESOURCE USE  
AND ENVIRONMENTAL IMPACTS**

# TWO ASPECTS OF DECOUPLING

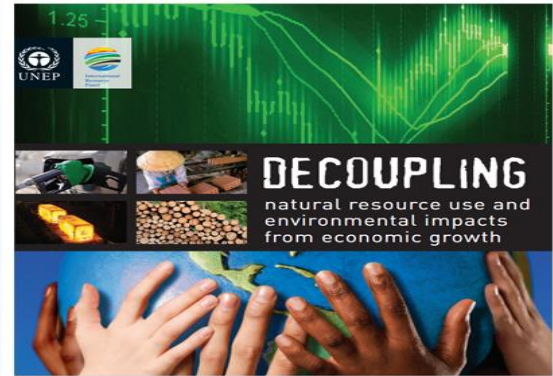
- **RESOURCE DECOUPLING** HAPPENS WHEN RESOURCE PRODUCTIVITY IS IMPROVED AT A RATE THAT IS FASTER THAN THE ECONOMIC GROWTH RATE (INCREASED ECONOMIC VALUE AND A GREATER LEVEL OF WELL-BEING CAN BE CREATED BY USING THE SAME AMOUNT OF, OR LESS, RESOURCES)
- **IMPACT DECOUPLING** REFERS TO ACHIEVING MORE WELL-BEING AND (IF NECESSARY) ECONOMIC GROWTH WITH FEWER NEGATIVE ENVIRONMENTAL IMPACTS, OR INDEED, EVEN RESTORATION OF ECO-SYSTEM SERVICES
- **STRATEGIES TO MITIGATE HARMFUL ENVIRONMENTAL IMPACTS** CAN INCLUDE:
  - ✓ CHANGING THE MIX OF RESOURCES USED THROUGH SUBSTITUTION OF MORE HARMFUL RESOURCES BY LESS HARMFUL ONES
  - ✓ USING RESOURCES MORE EFFICIENTLY AND CAREFULLY THROUGHOUT THEIR LIFE CYCLE
  - ✓ REDUCING RESOURCE USE



# TWO ASPECTS TO DECOUPLING GROWTH IN RESOURCE USE AND ENVIRONMENTAL IMPACTS



# DECOUPLING 1



DECOUPLING REPORTS SHOW THAT ONLY **RELATIVE DECOUPLING** IS HAPPENING.  
BUT THE GLOBAL RESOURCE AND CLIMATE DILEMMA REQUESTS **ABSOLUTE DECOUPLING**.

# DECOUPLING 2



# **CIRCULAR**

## **ECONOMY**



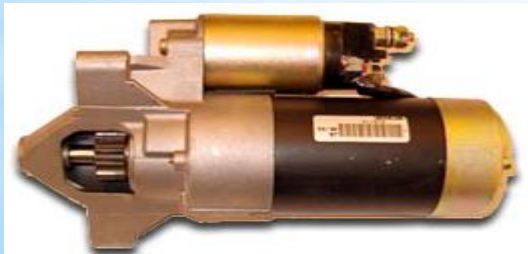


# REMANUFACTURING AND THE CIRCULAR ECONOMY

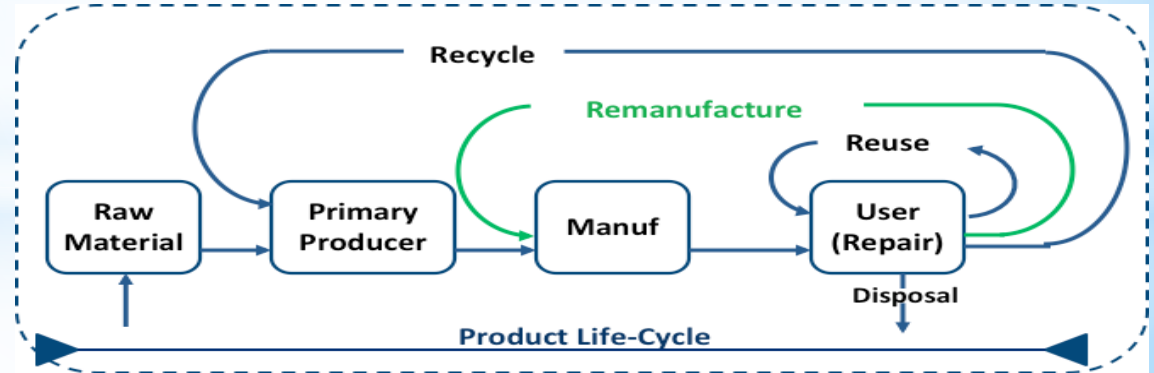
BEFORE  
REMANUFACTURING



AFTER  
REMANUFACTURING



Remanufacturing is a comprehensive and **rigorous industrial process** by which a previously sold, worn, or non-functional product or component is returned to a “**like-new**” or “**better-than-new**” condition.





# \* BENEFITS OF REMANUFACTURING

## CASE STUDY: CYLINDER HEAD

- **GHG EMISSIONS:**
- **WATER USE:**
- **ENERGY USE:**
- **MATERIAL USE:**
- **LANDFILL SPACE:**



**50% LESS**

**90% LESS**

**80% LESS**

**99% LESS**

**99% LESS**

# MOBILE PHONE ... OUR POCKET PARTNER

- WEDDING RING: 10 TONNES OF GOLD ORE  
10 KILOS OF MOBILE PHONES
- LESS THAN 10% RECYCLED
- IN EU MORE THAN 100 MIO EACH YEAR IN THE DRAWERS

2.4 TONNES OF GOLD  
25 TONNES OF SILVER  
1 TONNE OF PALLADIUM  
900 TONNES OF COPPER

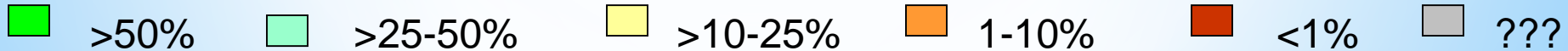


# END OF LIFE RECYCLING RATE (GLOBAL) FOR 62 METALS

## UNEP EVALUATION JANUARY, 2010

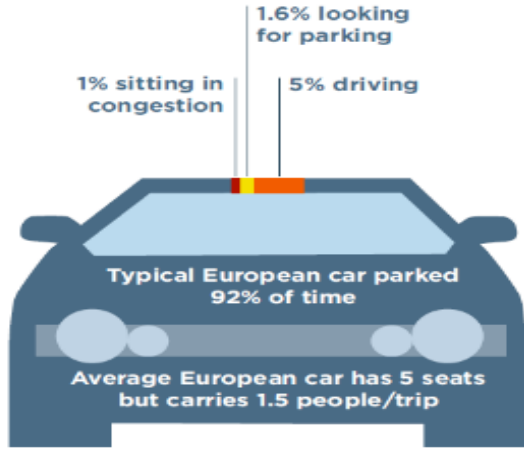
1 <u>H</u>																	2 <u>He</u>
3 <u>Li</u>	4 <u>Be</u>											5 <u>B</u>	6 <u>C</u>	7 <u>N</u>	8 <u>O</u>	9 <u>F</u>	10 <u>Ne</u>
11 <u>Na</u>	12 <u>Mg</u>											13 <u>Al</u>	14 <u>Si</u>	15 <u>P</u>	16 <u>S</u>	17 <u>Cl</u>	18 <u>Ar</u>
19 <u>K</u>	20 <u>Ca</u>	21 <u>Sc</u>	22 <u>Ti</u>	23 <u>V</u>	24 <u>Cr</u>	25 <u>Mn</u>	26 <u>Fe</u>	27 <u>Co</u>	28 <u>Ni</u>	29 <u>Cu</u>	30 <u>Zn</u>	31 <u>Ga</u>	32 <u>Ge</u>	33 <u>As</u>	34 <u>Se</u>	35 <u>Br</u>	36 <u>Kr</u>
37 <u>Rb</u>	38 <u>Sr</u>	39 <u>Y</u>	40 <u>Zr</u>	41 <u>Nb</u>	42 <u>Mo</u>	43 <u>Tc</u>	44 <u>Ru</u>	45 <u>Rh</u>	46 <u>Pd</u>	47 <u>Ag</u>	48 <u>Cd</u>	49 <u>In</u>	50 <u>Sn</u>	51 <u>Sb</u>	52 <u>Te</u>	53 <u>I</u>	54 <u>Xe</u>
55 <u>Cs</u>	56 <u>Ba</u>	*	72 <u>Hf</u>	73 <u>Ta</u>	74 <u>W</u>	75 <u>Re</u>	76 <u>Os</u>	77 <u>Ir</u>	78 <u>Pt</u>	79 <u>Au</u>	80 <u>Hg</u>	81 <u>Tl</u>	82 <u>Pb</u>	83 <u>Bi</u>	84 <u>Po</u>	85 <u>At</u>	86 <u>Rn</u>
87 <u>Fr</u>	88 <u>Ra</u>	**	104 <u>Rf</u>	105 <u>Db</u>	106 <u>Sg</u>	107 <u>Bh</u>	108 <u>Hs</u>	109 <u>Mt</u>	110 <u>Ds</u>	111 <u>Rg</u>	112 <u>Uub</u>	113 <u>Uut</u>	114 <u>Uuq</u>	115 <u>Uup</u>	116 <u>Uuh</u>	(117) <u>(Uus)</u>	118 <u>Uuo</u>

* <u>Lanthanides</u>	57 <u>La</u>	58 <u>Ce</u>	59 <u>Pr</u>	60 <u>Nd</u>	61 <u>Pm</u>	62 <u>Sm</u>	63 <u>Eu</u>	64 <u>Gd</u>	65 <u>Tb</u>	66 <u>Dy</u>	67 <u>Ho</u>	68 <u>Er</u>	69 <u>Tm</u>	70 <u>Yb</u>	71 <u>Lu</u>
** <u>Actinides</u>	89 <u>Ac</u>	90 <u>Th</u>	91 <u>Pa</u>	92 <u>U</u>	93 <u>Np</u>	94 <u>Pu</u>	95 <u>Am</u>	96 <u>Cm</u>	97 <u>Bk</u>	98 <u>Cf</u>	99 <u>Es</u>	100 <u>Fm</u>	101 <u>Md</u>	102 <u>No</u>	103 <u>Lr</u>

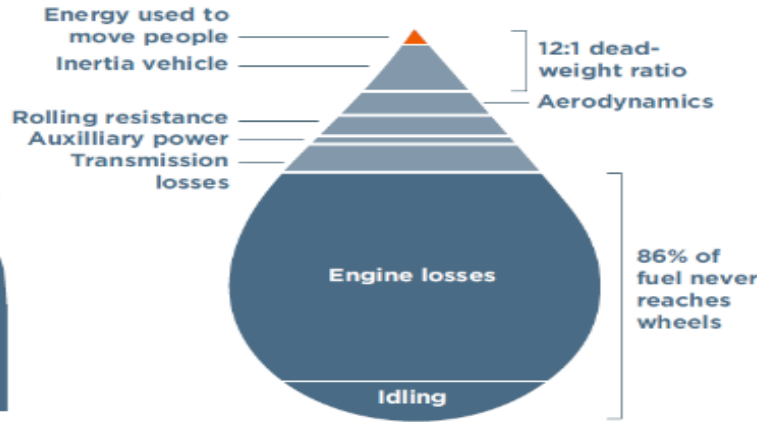


# STRUCTURAL WASTE IN THE MOBILITY SYSTEM

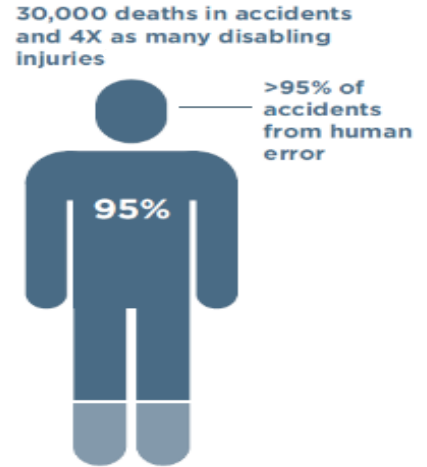
## CAR UTILISATION



## TANK-TO-WHEEL ENERGY FLOW - PETROL



## DEATHS AND INJURIES/ YEAR ON ROAD



LAND UTILISATION:

**5%**

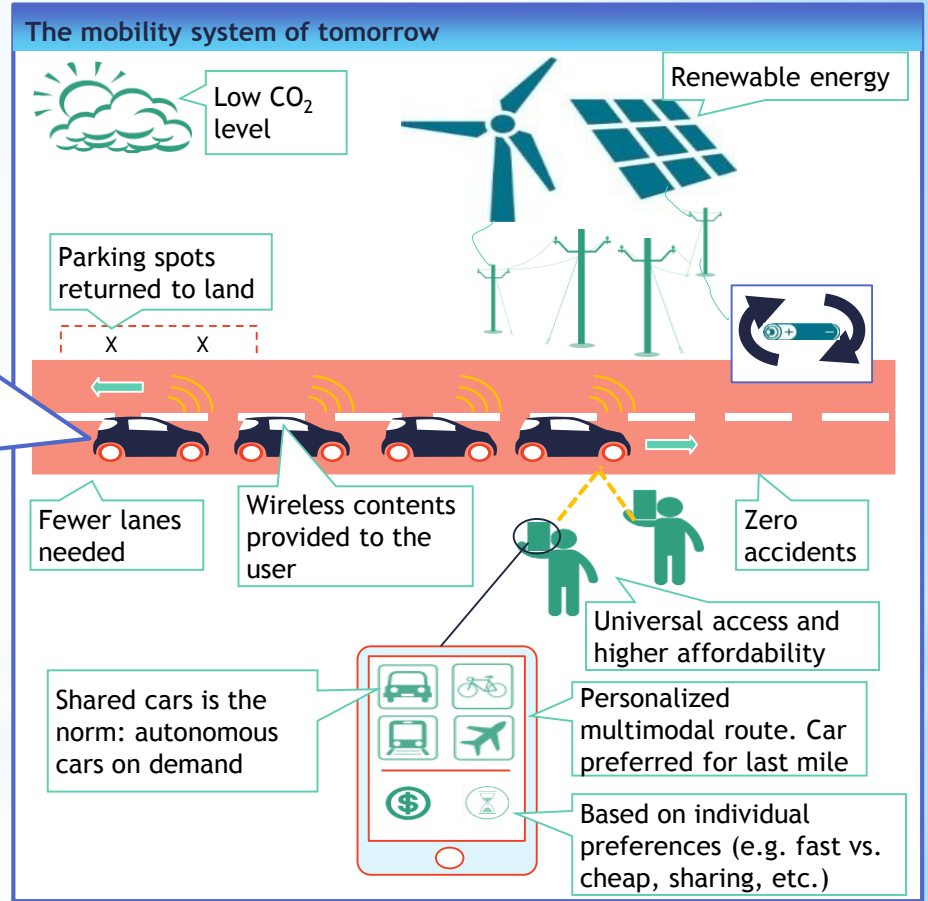
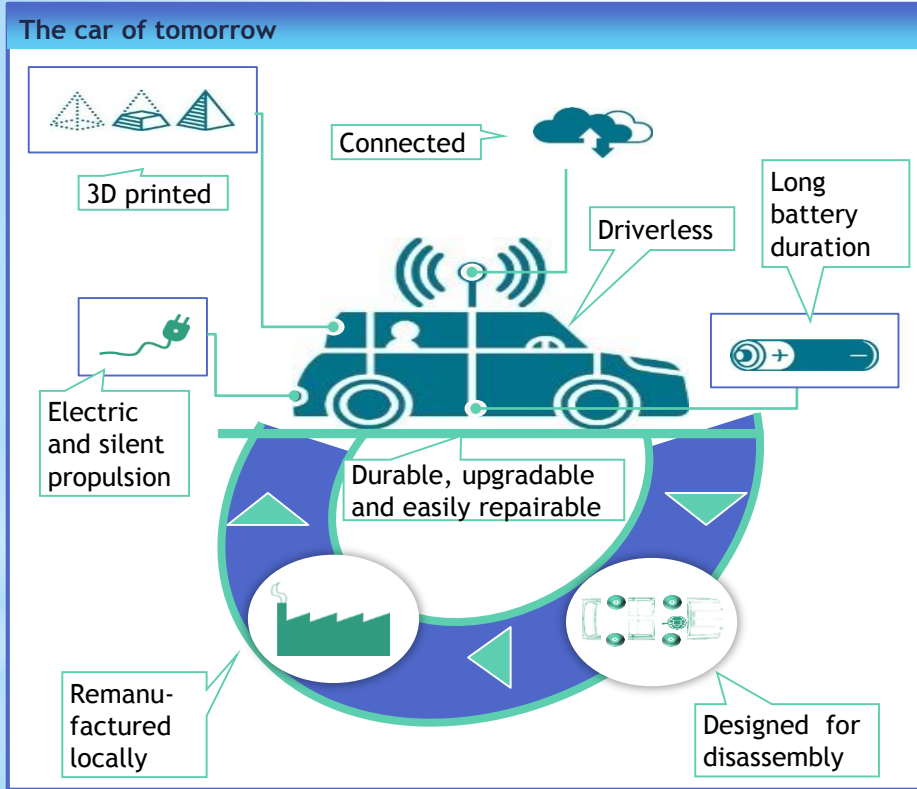
Road reaches peak throughput only 5% of time and only 10% covered with cars then

**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

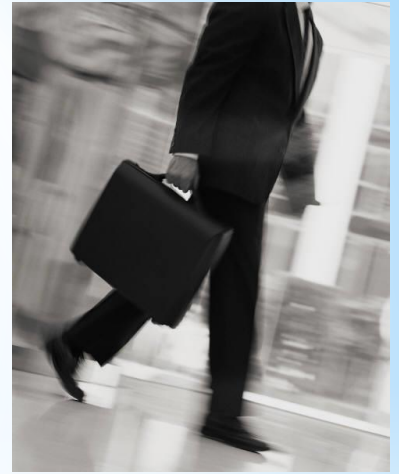
## Illustrative vision



# **MARKET ROLE**

## **AND BUSINESS OPPORTUNITIES**

# **MARKETS CANNOT ENSURE EFFICIENCY IN THE ALLOCATION AND USE OF RESOURCES ...**



- **IF PRICES DO NOT REFLECT THE TRUE VALUE AND COSTS OF RESOURCES,**
- **IF REWARDS TO CAPITAL ARE DISPROPORTIONATE TO OTHER INPUTS,**
- **IF MANAGERS ON ANNUAL CONTRACTS ARE INDUCED TO MAKE SHORT TERM INVESTMENT DECISIONS OVERLY INFLUENCED BY BONUSES BASED ON SHORT TERM SHARE PRICE,**
- **IF ...**

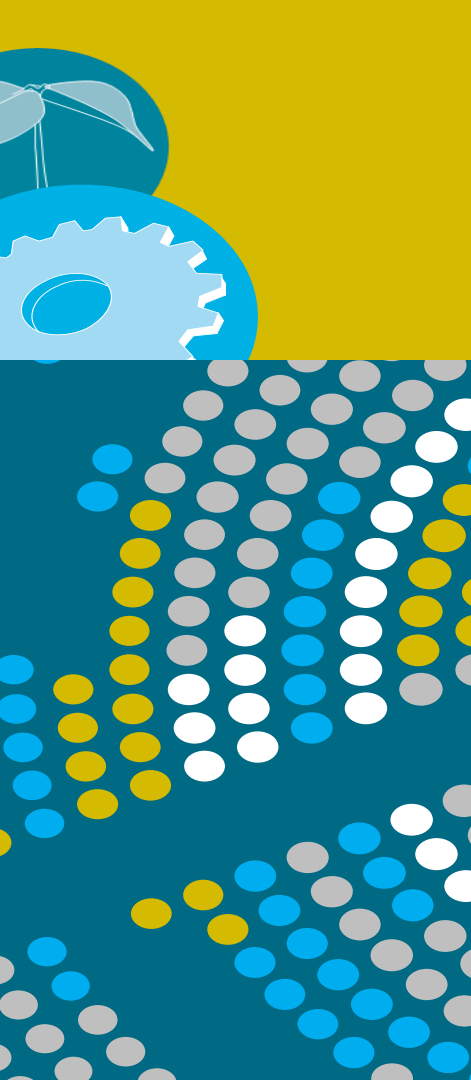


# MARKETS AND REGULATION

- **INNOVATION (INCENTIVES)**
- **PRODUCTS (DESIGN)**
- **CONSUMERS (BEHAVIOUR)**
- **BUSINESS MODELS**
  
- **YES ECO INDUSTRIES ARE IMPORTANT, BUT THE WHOLE ECONOMY HAS TO CHANGE**







# GROWTH WITHIN: A CIRCULAR ECONOMY VISION FOR A COMPETITIVE EUROPE



ELLEN MACARTHUR FOUNDATION



Stiftungsfonds für Umweltökonomie  
und Nachhaltigkeit GmbH

McKinsey&Company

# THE RESOLVE FRAMEWORK


## Examples

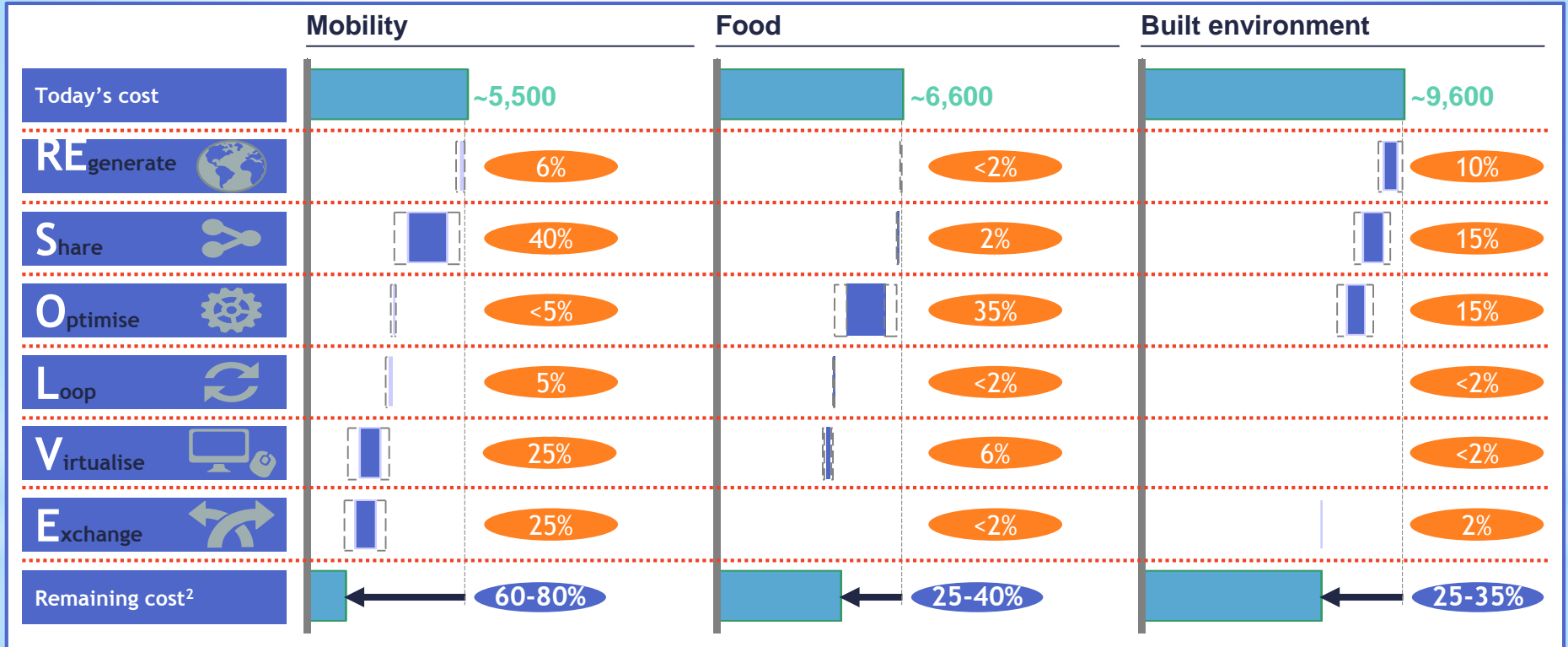
<b>RE</b> GENERATE 	<ul style="list-style-type: none"> <li>RECLAIM, RETAIN, AND RESTORE HEALTH OF ECOSYSTEMS</li> <li>RETURN RECOVERED RESOURCES</li> </ul>	
<b>S</b> HARE 	<ul style="list-style-type: none"> <li>SHARE ASSETS</li> <li>REUSE/SECONDHAND</li> <li>PROLONG LIFE</li> </ul>	
<b>O</b> PTIMISE 	<ul style="list-style-type: none"> <li>INCREASE PERFORMANCE/EFFICIENCY OF PRODUCT, VALUE CHAIN, CONSUMER</li> <li>LEVERAGE BIG DATA, INTERNET OF THINGS, ETC TO MAKE PRODUCT OR VALUE CHAIN MORE INTELLIGENT</li> </ul>	
<b>L</b> OOP 	<ul style="list-style-type: none"> <li>REMANUFACTURE</li> <li>RECYCLE MATERIALS</li> <li>REPURPOSE RENEWABLE MATERIALS TO OTHER USES</li> <li>EXTRACT BIOCHEMICALS FROM ORGANIC WASTE</li> </ul>	
<b>V</b> IRTUALISE 	<ul style="list-style-type: none"> <li>DIRECT DEMATERIALIZATION, E.G., BOOKS, CDS, DVDS, TRAVEL, OFFICE SPACE</li> <li>INDIRECT DEMATERIALIZATION, E.G., ONLINE SHOPPING, AUTONOMOUS VEHICLES</li> </ul>	
<b>E</b> XPLORE 	<ul style="list-style-type: none"> <li>ADVANCED MATERIALS</li> <li>DIFFERENT TECHNOLOGIES</li> <li>DIFFERENT PRODUCT/SERVICE</li> <li>RENEWABLE ENERGY</li> </ul>	

SOURCE: S. HECK AND M. ROGERS, "RESOURCE REVOLUTION: HOW TO CAPTURE THE BIGGEST BUSINESS OPPORTUNITY IN A CENTURY", 2014 ; COMPANY INTERVIEWS; WEB SEARCH; SUN, ELLEN MACARTHUR FOUNDATION AND MCKINSEY & COMPANY TEAM ANALYSES

# COST REDUCTION POTENTIAL INHERENT IN BROAD CIRCULAR ECONOMY LEVERS<sup>1</sup>

Total annual cash-out costs per household; EU average 2012, Euro, Improvement potential for the year 2050

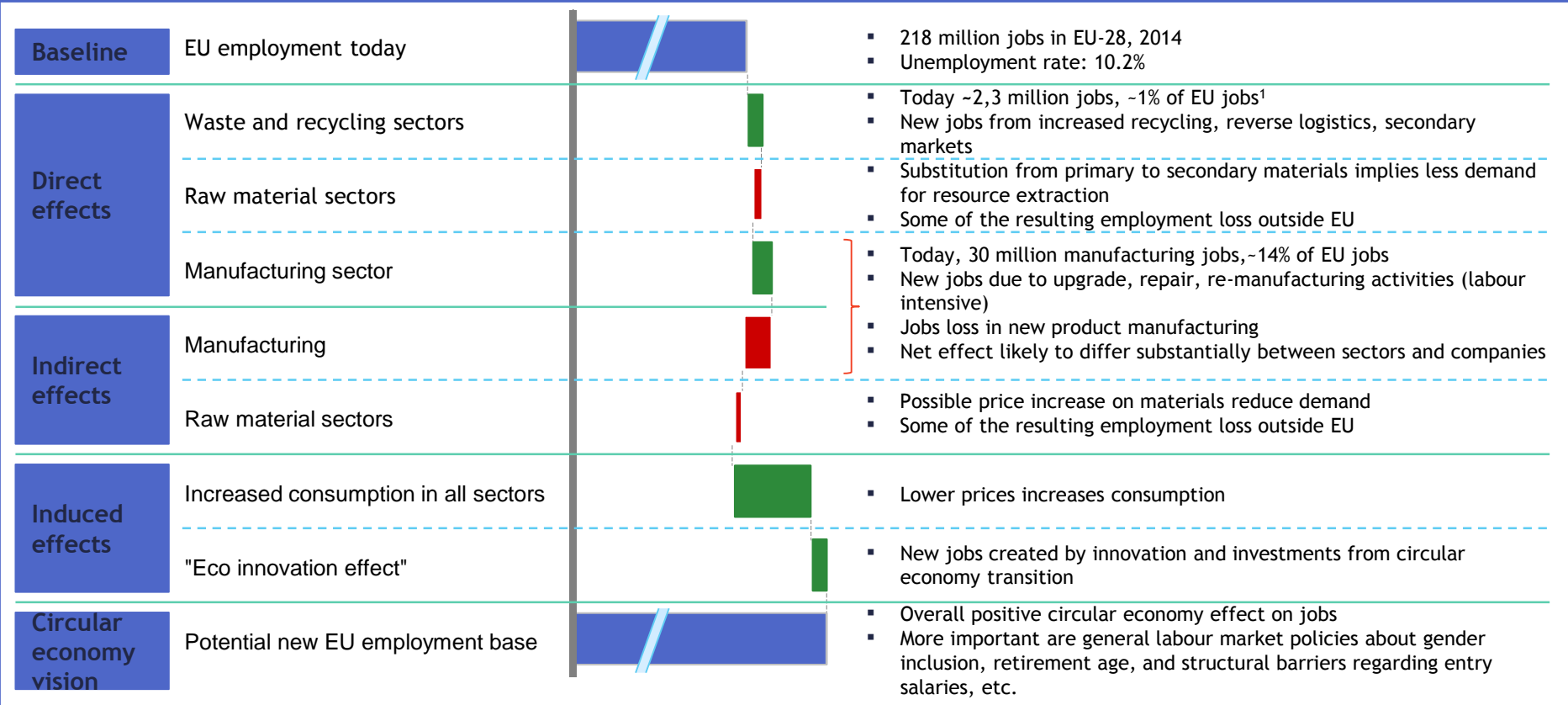
 Total savings, %



<sup>1</sup> Note that this is not a forecast of how costs will develop. It is an assessment of how costs could develop if Europe aggressively went after this agenda, and if all improvements were captured as cost savings.

SOURCE: SUN, ELLEN MACARTHUR FOUNDATION AND MCKINSEY & COMPANY TEAM ANALYSES REPORT

# QUALITATIVE EMPLOYMENT EFFECTS OF A CIRCULAR ECONOMY TRANSITION



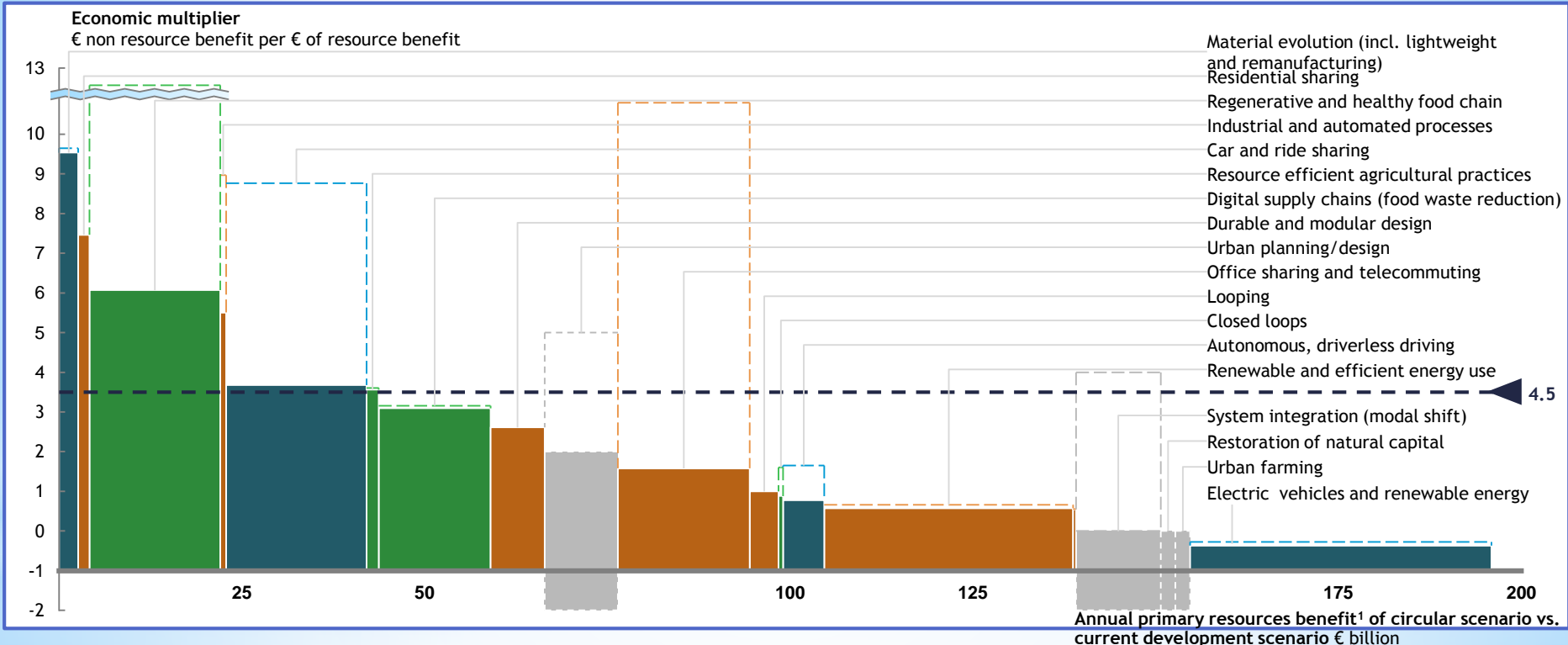
<sup>1</sup> Includes jobs from waste management, wastewater management and recycled materials - Based on 2008 data.  
 SOURCE: Eurostat; Ecorys, *Study on the competitiveness of the EU eco-industry - Within the Framework Contract of Sectoral Competitiveness Studies ENTR/06/054 - Final Report Part 1*, 2009; European Environment Agency, *Earnings, jobs and innovation: the role of recycling in a green economy*, 2011; EU Commission, *Memo: Advancing Manufacturing paves way for future of industry in Europe*, 19 March 2014.

# THE RESOURCE BENEFIT CURVE

## MOBILITY, FOOD AND BUILT ENVIRONMENT, EU27

Cash-out<sup>2</sup> (excl. externalities)      Incl. externalities<sup>3</sup>

■ Mobility      ■ Mobility      ■ Illustrative<sup>4</sup>  
■ Food      ■ Food  
■ Built environment      ■ Built environment



1 Primary resources include virgin automotive and construction material, virgin synthetic fertiliser (€535/tonne), pesticides, agriculture land and water use (€0.20/m<sup>3</sup>), fuel (€1.64/litre gasoline, €1.45/litre diesel, €0.91/litre of heating oil, €68/tonne of coal, €0.067/kWh of natural gas), land for residential and office buildings and non-renewable electricity (€0.20/kWh) 3 Other cash-out costs include all household and government expenditures on mobility, food, residential housing and office space, excluding the primary resource costs 4 Externalities include CO2 (€29/tonne), traffic congestion, non-cash health impacts of accidents, pollution and noise, land opportunity costs, opportunity costs related to obesity, adverse health effects due to indoor environment and transport time (related to urban planning). Other externalities such as eutrophication, biodiversity loss, deforestation are not quantified in this analysis, but are likely to be significant as well.

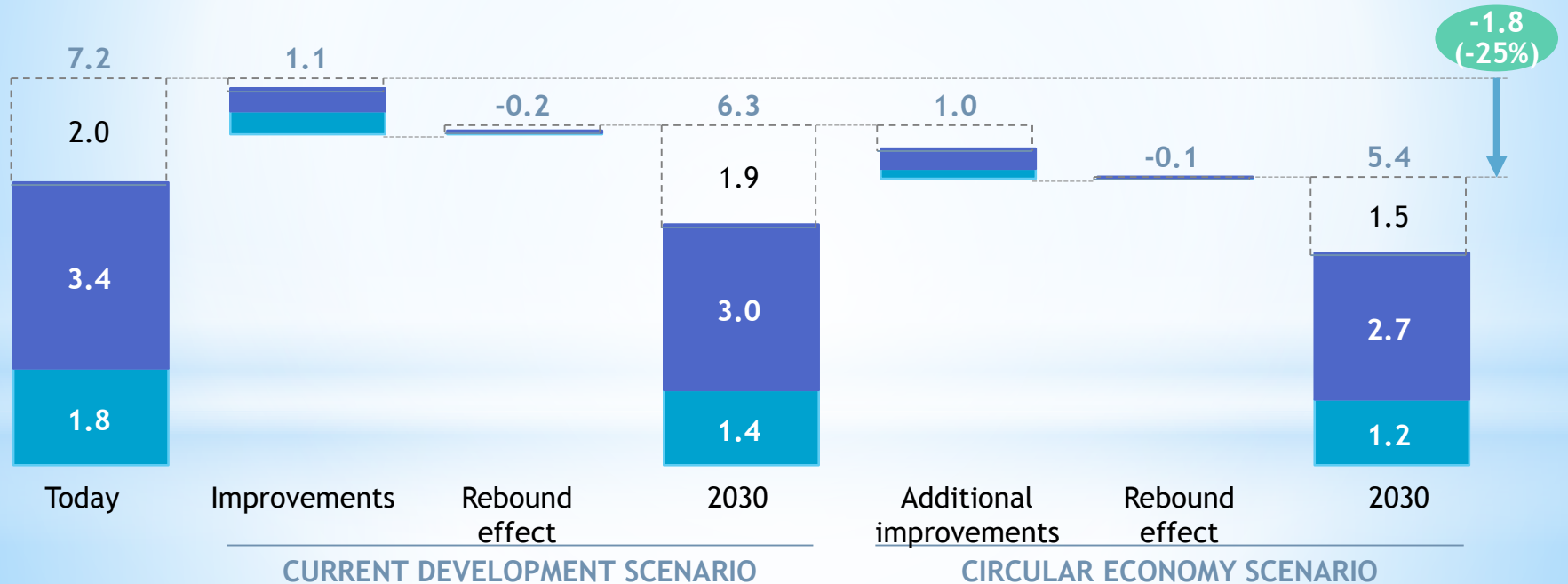
4 Some levers show ranges because the impact and/or implementation cost are hard to quantify or because the impact differs a lot from one case to another

# THE CIRCULAR ECONOMY OPPORTUNITY - 2030 SCENARIOS

Mobility, food and built environment, EU27, societal perspective 2030

Annual primary resource costs, other cash-out costs and negative externalities  
EU-27, 1000 billion EUR

- Primary resource costs
- Other cash-out costs
- Externalities



# COMPARISON OF POTENTIAL DEVELOPMENT PATHS: IMPACT ON THE ECONOMY

EU-27, indexed (2012 = 100)

■ Current development scenario  
■ Circular economy scenario

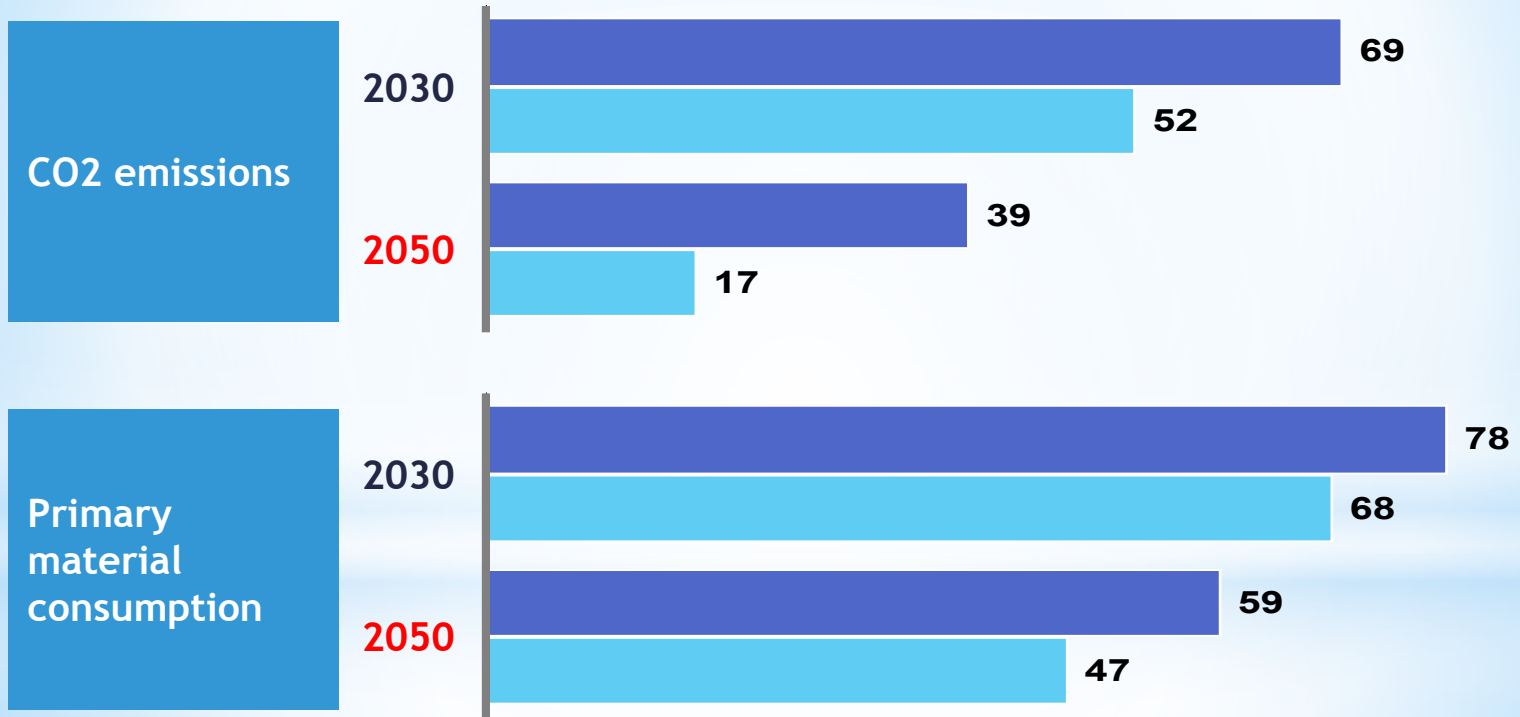


SOURCE: Economic modelling expertise provided by Professor Christoph Böhlinger, University of Oldenburg, and Professor Thomas F. Rutherford, University of Wisconsin; Company and expert interviews; Web search; Eurostat household expenditure data; ACEA, The Automobile Industry Pocket Guide, 2015; Todd Alexander Litman, Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications, Victoria Transport Policy Institute, 2009; Udo Jürgen Becker et al., The True Costs of Automobiles: External Costs of Cars: Overview on existing estimates in EU-27, TU Dresden, 2012; ICCT, European Vehicle Market Statistics Pocketbook, 2013; ICE database of CO2 embedded in material; Frances Moore and Delavane Diaz, Temperature Impacts on Economic Growth Warrant Stringent Mitigation Policy, Nature Climate Change, 2015; MGI, Overcoming obesity: An initial economic analysis, 2014; FAO, Global food losses and food waste – Extent, Causes and Prevention, 2011; EEA, Towards efficient use of water resources in Europe, 2012; EU Commission, Official Journal of the EU, Commission Agriculture and Rural Development, 2012 budget, 2012; FAOSTAT; Kimo van Dijk, Present and future phosphorus use in Europe: food system scenario analyses, Wageningen University, 2014; Josef Schmidhuber, The EU Diet – Evolution, Evaluation and Impacts of the CAP, FAO, 2008; Gregor Zupančič and Viktor Grlič, Anaerobic Treatment and Biogas Production from Organic Waste, 2012; Joint Research Centre (JRC) of the European Commission et al., Precision agriculture: an opportunity for EU farmers – potential support with the CAP 2014-2020, 2014; Laure Itard et al., Building Renovation and Modernisation in Europe: State of the art review, TU Delft, 2008; BPIE, Europe's buildings under the microscope: A country-by-country review of the energy performance of buildings, 2011; Per-Erik Josephson and Lasse Saukkoripi, Waste in construction projects: call for a new approach, Chalmers University of Technology, 2007; Mark Hogan, The Real Costs of Building Housing, SPUR, 2014; Cushman & Wakefield Research Publication, Office space across the world, 2013; Ellen MacArthur Foundation, Delivering the circular economy toolkit for policymakers, 2015.

# COMPARISON OF POTENTIAL DEVELOPMENT PATHS: IMPACT ON THE ENVIRONMENT

EU-27, indexed (2012 = 100)

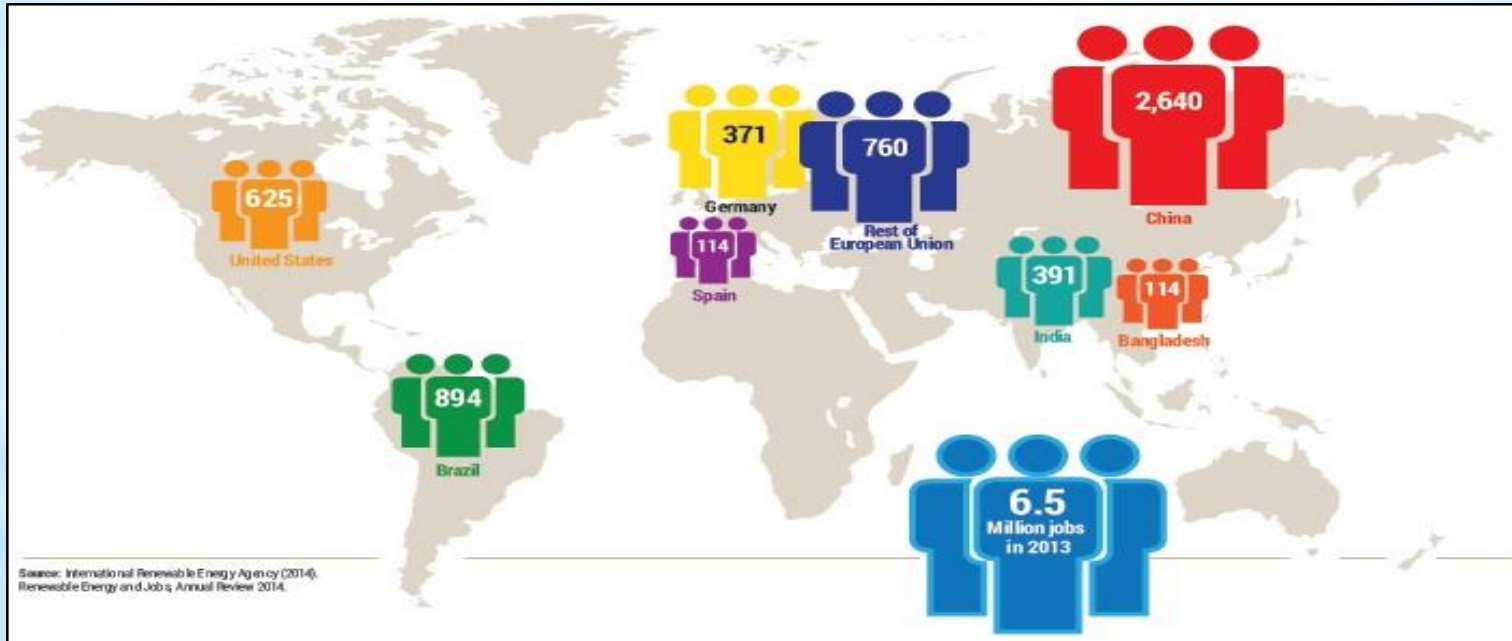
■ Current development scenario  
■ Circular economy scenario





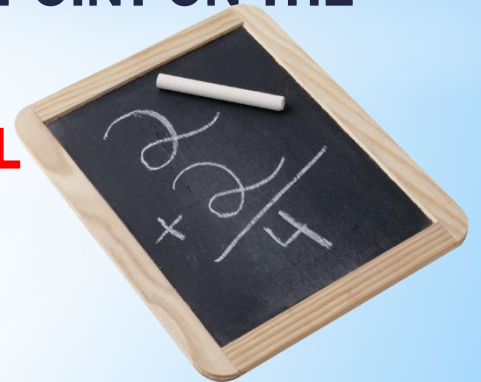
# THE CENTRALITY OF JOBS

The renewable energy sector created 6.5 million jobs as of 2013

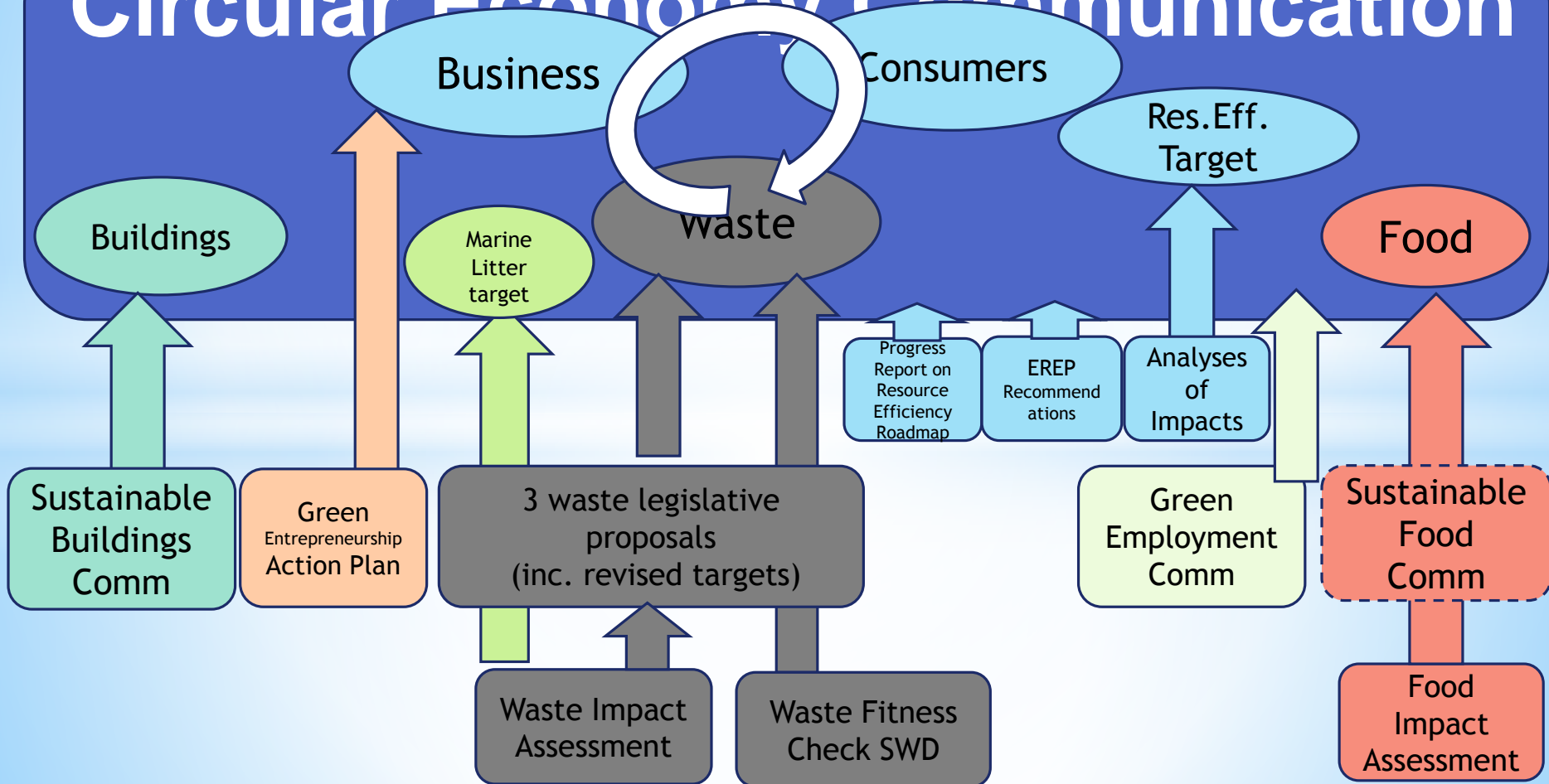


**EU  
APPROACH  
BARROSO(2) COMMISSION**

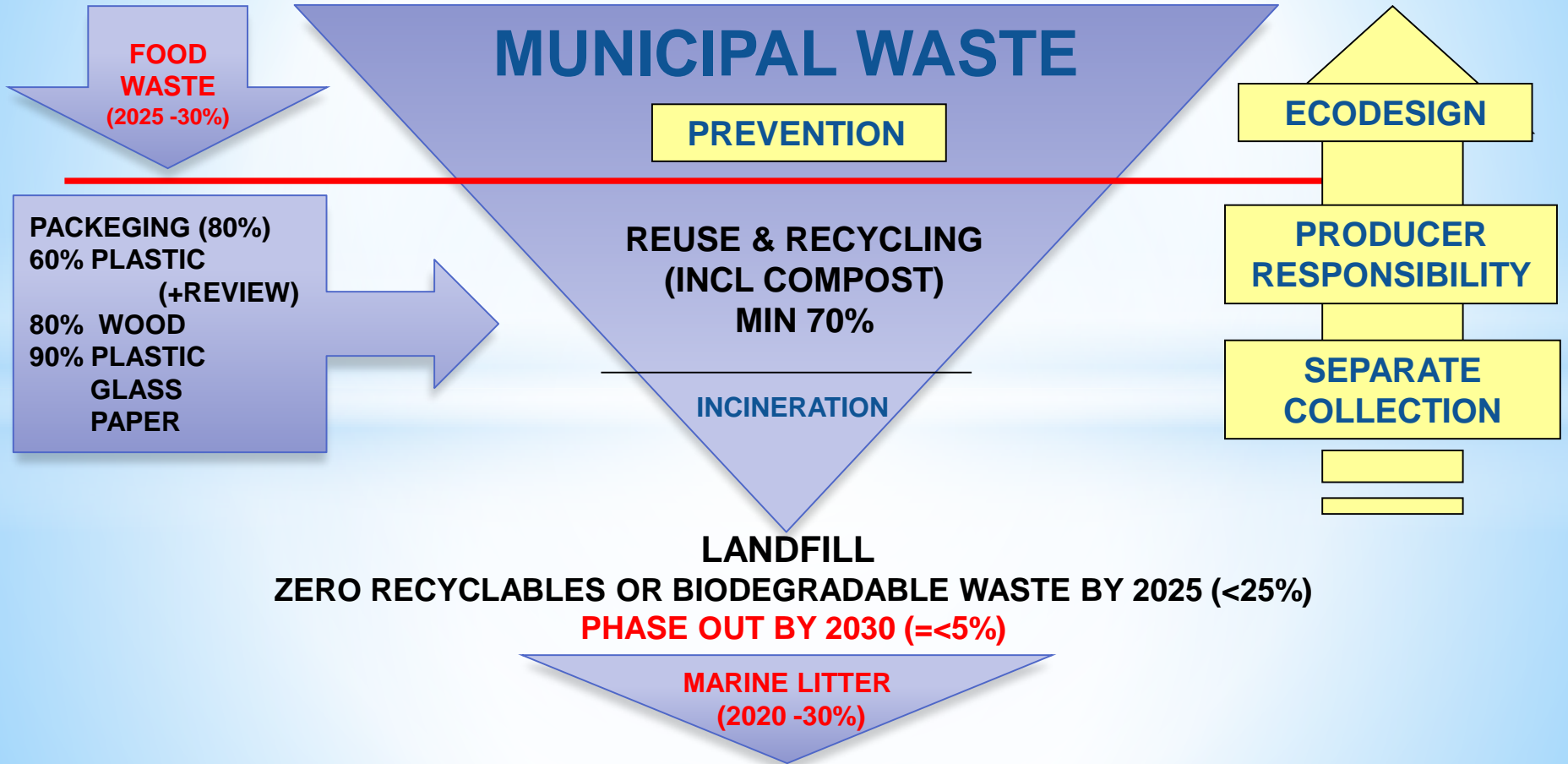
- **GETING ALL STAKEHOLDERS ON BOARD: RESOURCE EFFICIENCY ROUNDTABLE**
- **PROGRAMME FOR CHANGE: RESORCE EFFICIENCY ROADMAP**
- **INTEGRATION WITH OTHER POLICIES : CIRCULAR ECONOMY PACKAGE**
- **INTEGRATION INTO ECONOMIC GOVERNENCE MODEL: PREPARING INPUTS FOR THE SEMESTER PROCES – SUSTAINABLE ECONOMIC POLICY, REORGANISATION OF DG ENVI, REGULAR POINT ON THE ENVI COUNCIL AGENDA**
- **ACTIVELY CONTRIBUTING INPUTS FOR THE GLOBAL TRANSFORMATIONAL AGENDA**



# Circular Economy Communication



# 2030 CIRCULAR ECONOMY TARGETS



**HEADLINE TARGET  
GDP/RAW MATERIAL  
CONSUMPTION**

**DASHBOARD**

**INDICATOR  
LAND**

**INDICATOR  
WATER**

**INDICATOR  
GHG**

**INDICATOR  
MATERIALS**

**ANNUAL RESOURCE EFFICIENCY SCOREBOARD  
(EUROSTAT, SINCE 2013)**

# **INTERNATIONAL**

## **DEVELOPMENTS**

# ENCOURAGING NEWS



- **SDGs AND POST 2015 AGENDA – SYSTEMIC TRANSFORMATION – NEW GLOBAL AGREEMENT BASED ON “NEW NORMAL” POVERTY ERADICATION AND SUSTAINABILITY (NEW YORK 2015)**
  - **RIO+20: AGREEMENT ON SDG’s PROCESS**
  - **FROM MDG’s TO SDG’s AND POST-2015 AGENDA**
  - **ADOPTED: SEPTEMBER 25<sup>TH</sup> 2015**
  - **17 GOALS AND 169 TARGETS + INDICATORS**
- **CLIMATE/ENERGY (PARIS 2015)**



# THE GLOBAL GOALS

For Sustainable Development



**IRP**

**INTERNATIONAL  
RESOURCE PANEL**

# INTERNATIONAL POLICY NEEDS A SCIENCE BASE

The international resource panel was created in 2007 as a science-policy interface in responding to economic growth, escalating use of natural resources and deteriorating environment and climate change.



Climate Change

IPCC

Biodiversity Loss

IPBES

Hazardous Substances

Assessments under the Basel Convention

Ozone Depletion

Montreal Protocol's Scientific Assessments

Resource Efficiency

International Resource Panel

# **IRP, IPCC, IPBES AND SCIENCE – POLICY INTERFACE**

- **INTERNATIONAL BY NATURE AND BY DEFINITION**
- **TRANS-DISCIPLINARY**
- **POLICY RELEVANT BUT NOT POLICY PRESCRIPTIVE**
- **GO FOR A BALANCE OF EVIDENCE APPROACH**



**CREATE A CRITICAL MASS OF SCIENTIFIC KNOWLEDGE -  
ADVISE THAT POLICY MAKERS CAN NOT IGNORE**

# \* FROM INDIVIDUAL RESOURCES TO SYSTEMS THINKING

## INDIVIDUAL RESOURCES



Land and Soils



Water



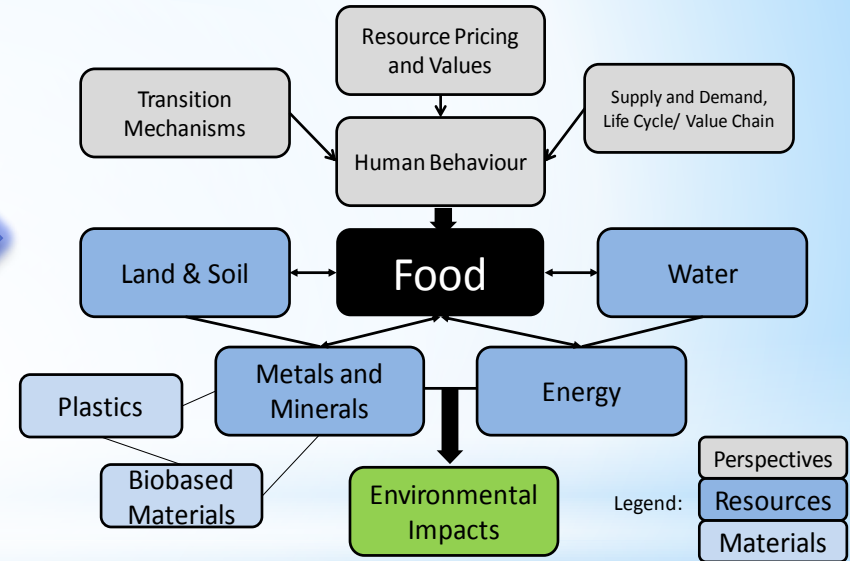
Environmental Impacts



Metals



## SYSTEMS THINKING



# \* 14 ASSESSMENTS PUBLISHED 2007-2015

1. Assessing Biofuels (2009)
2. Priority Products and Materials (2010)
3. Decoupling Natural Resource Use and Env. Impacts from Eco. Growth (2011)
4. Metal Stocks in Society (2011)
5. Recycling Rates of Metals (2011)
6. Measuring Water Use in a Green Economy (2012)
7. Metal Recycling: Opportunities, Limits, Infrastructure (2013)
8. Env. Risks and Challenges of Anthropogenic Metal Flows and Cycles (2013)
9. City-Level Decoupling and the Governance of Infrastructure Transitions (2013)
10. Assessing Global Land Use: Balancing Consumption with Sust. Supply (2014)
11. Building Natural Capital: How REDD+ Can Support a Green Economy (2014)
12. Decoupling Technologies, Opportunities and Policy Options (2014)
13. Rapid Assessment on SDGs (2015)
14. International Trade in Resources – a Biophysical Assessment (2015)



# ON-GOING RESEARCH AND UPCOMING REPORTS



	2014	2015	2016	2017 (next strategic exer.)	2018
1. Water	→				
2. Land and Soils II	→				
3. Food Systems	→				
4. GHG II	→				
5. Material Flow Analysis	→				
6. Integrated Scenarios		→			
7. Cities II		→			
8. Marine Resources		→			
9. Circular Economy, Innovation & Reman.		→			
10. Land Restoration, Ecosystem Resilience		→			
11. Governance of Resources and Poverty Reduction		→			
12. Rapid Ass. on Res. Eff. Potentials/Prosp.		→			





\* **TO CONCLUDE ...**



# 21<sup>st</sup> CENTURY



**FROM FRAGILITY TO SUSTAINABILITY**  
**INCREASED RESPONSIBILITY**  
**LEARN FROM NATURE**



**CHANGE**

**CHANGE**

**UNAVOIDABLE**

**UNAVOIDABLE**

IS

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



# \* SOME OBSTACLES FOR CHANGE ...

**HUMAN BEHAVIOUR** - WHY WE ACT AT HOME IN A DIFFERENT WAY THAN WE DO IN OUR PUBLIC LIFE?

**LACK OF LONG TERM CONSISTENCY** – HOW TO STRENGTHEN LONG TERM STRATEGIC THINKING AND POLICY MAKING AND REPLACE PREVAILING SHORT TERM LOGIC?

**FOCUS ON FINANCIAL SIDE OF ECONOMY** - BUDGETARY DEFFICIT VERSUS THE STRUCTURE, COMPARISON COMPANY - COUNTRY

**PROTECTING STATUS QUO** - HOW TO BREAK LOCK-INS AND THE LOGIC OF DEFENDING THE LOWEST COMMON DENOMINATOR APPROACH?

**GOVERNANCE AND LACK OF IMPLEMENTATION:** HOW TO TRANSLATE COMMITMENTS FROM POLITICAL STATEMENTS TO A DAILY REALITY ?

**SILOS MENTALITY** - HOW TO MAKE PEOPLE UNDERSTAND THAT COOPERATION IS THE BEST WAY FOR ALL OF THEM TO WIN?

**ENVIRONMENTAL PROTECTION  
IS NOT AN OBSTACLE TO  
ECONOMIC GROWTH**

**\* IT IS JUST THE OPPOSITE**

**PROTECTING ENVIRONMENT AND HUMAN HEALTH** WILL NOT BE  
POSSIBLE WITHOUT FUNDAMENTALLY CHANGING OUR ECONOMIC  
BEHAVIOUR - WITHOUT GOING INTO THE ROOTS OF ECONOMIC THEORY

**ECONOMIC DEVELOPMENT** WILL NOT BE POSSIBLE WITHOUT  
RESPECTING THE LIMITS OF THE PLANET

ECOLOGY  
ECONOMY  
**OIKOS (HOME)**



**ENVIRONMENT  
ECONOMY**







\***THANK YOU**

[www.unep.org/resourcepanel](http://www.unep.org/resourcepanel)