

SHAPING THE CIRCULAR ECONOMY - TEXTILE REDESIGN



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The Narrative



More than any time in history mankind faces a crossroads. One path leads to despair and utter hopelessness, the other to total extinction. Let us pray that we have the wisdom to choose correctly.

- Woody Allen

Agenda

- ▶ **RESYNTEX**
- ▶ **Circular Economy**
 - ▶ What got us here?
 - ▶ Limits of Linear Economy
 - ▶ Kuznets Curve and Kondratieff Green Cycle
 - ▶ Idea of Circular Economy
 - ▶ Required Breakthroughs
 - ▶ Main Drivers
 - ▶ Value of Design
 - ▶ Business Models
 - ▶ Case Studies
 - ▶ Conclusions

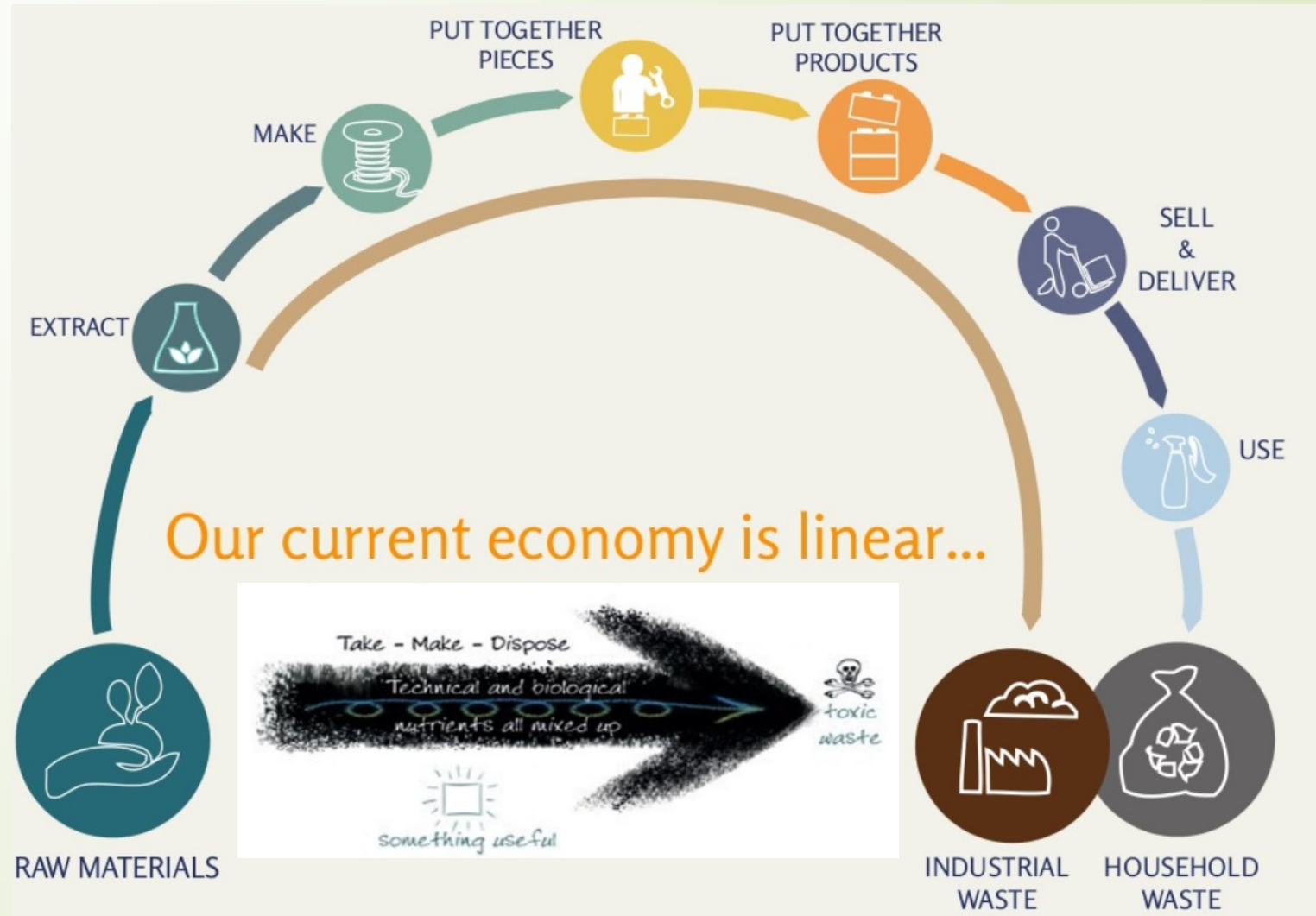


RESYNTEX: The EU H2020 Project



- RESYNTEX is an innovation/research project which aims to create a new circular economy concept for the textile and chemical industries.
- Using industrial symbiosis, it aims to produce secondary raw materials from unwearable textile waste.

Current Linear Economy



Ratio of Household to Industrial Waste

For each tone of common waste,
50 to 70 tones of industrial waste are
used, transported or trashed*

Source : Blue Economy, Gunter Pauli



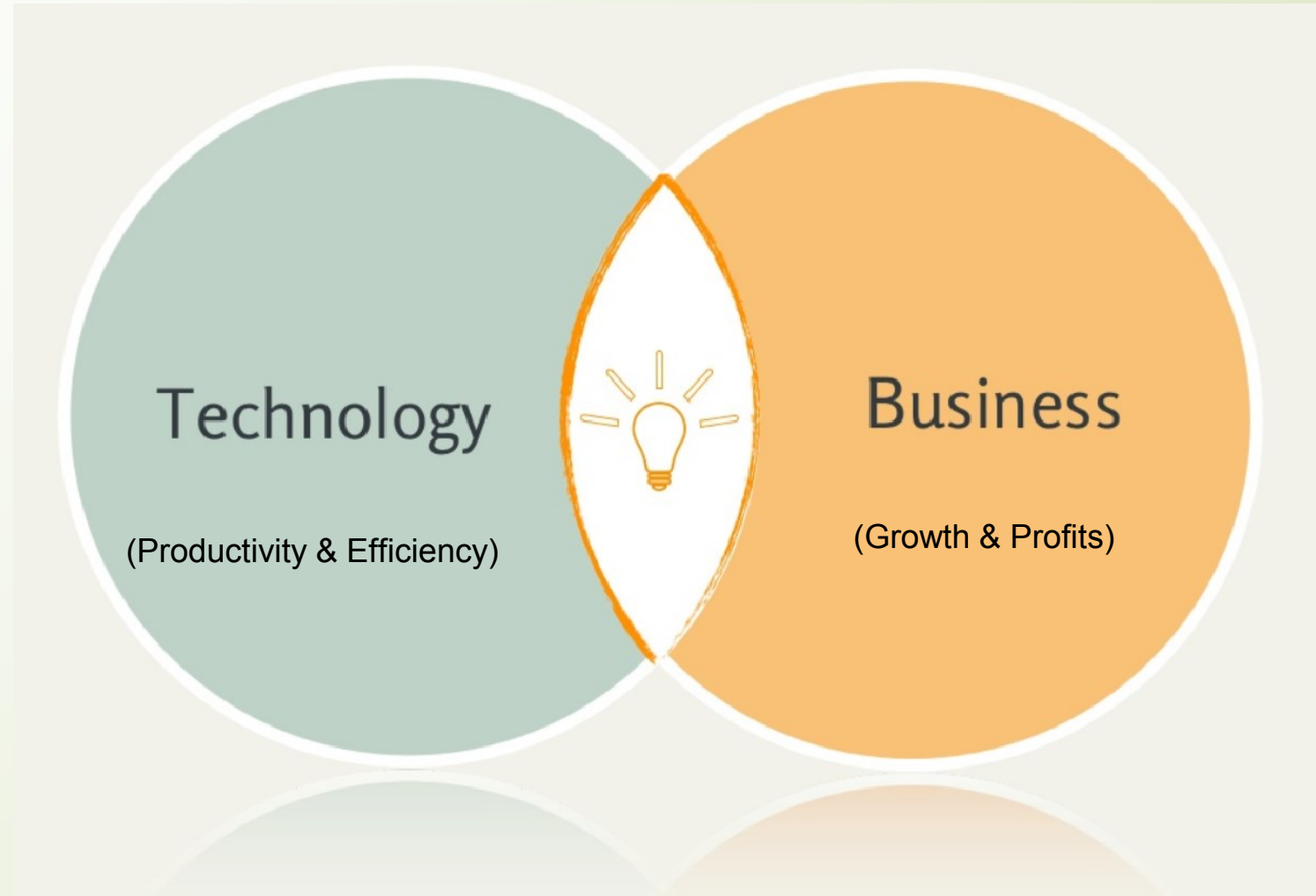
Bagger 288 - Mine Extractor in Germany

The limits of the linear “take-make-dispose” economy reaching its limits

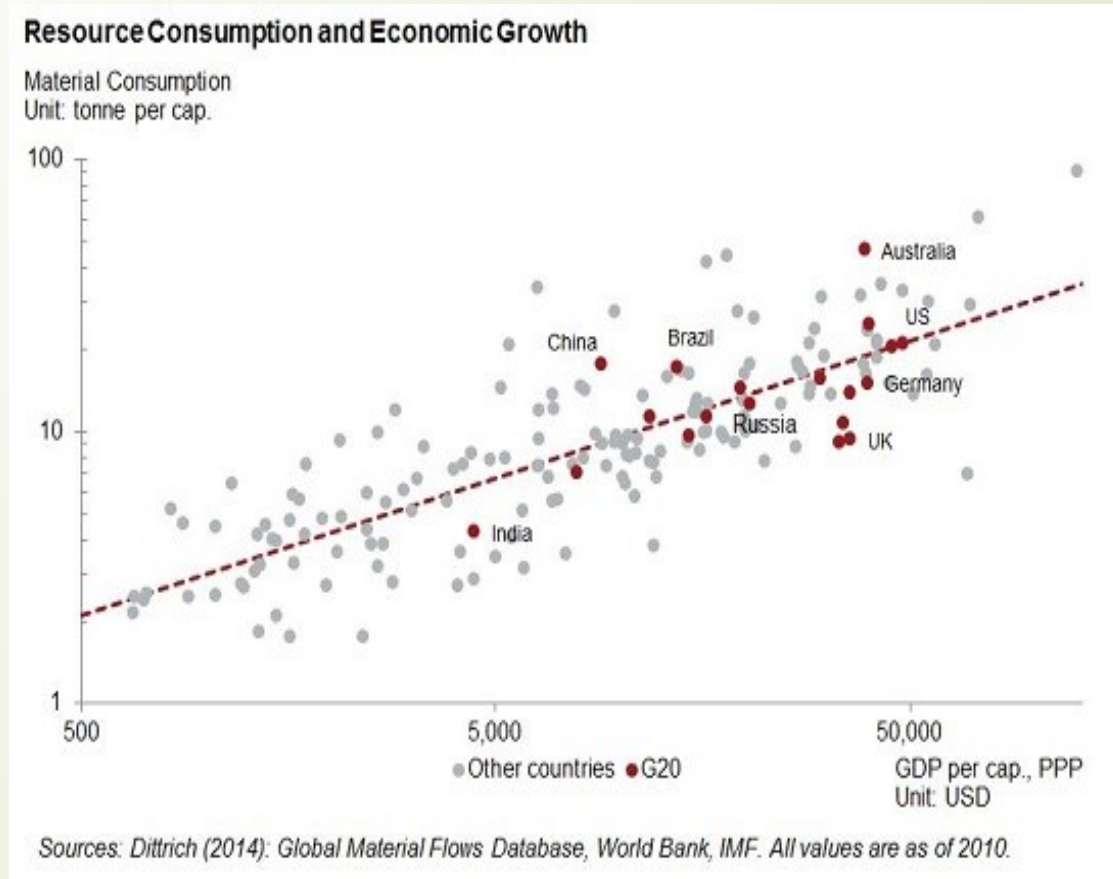
- One way production model, a major force since the Industrial Revolution ▶
- Relies on unlimited supply of cheap, easily accessible materials and energy
- No plans for reuse or active generation of natural systems ▶
- 2025: Growing world population (1.1 bn) and growing middle class (3 bn)
 - 24% higher food consumption
 - 47% more packaging
 - 41% more end-of-life materials (waste)
- Resource related challenges to businesses and economies also growing and will hamper companies and undermine economies.
- Pressure on natural resources intensifying
- Low and poor recycling => Unable to keep up stock of quality materials
- Higher price volatility => higher business investment uncertainty
- Commodity prices increased 150% during 2002-2010 (metals, food, and non-food from agriculture) ▶
- Resource dependency– Raw high grade materials declining
- Climate change, world overshoot and sustainability ▶



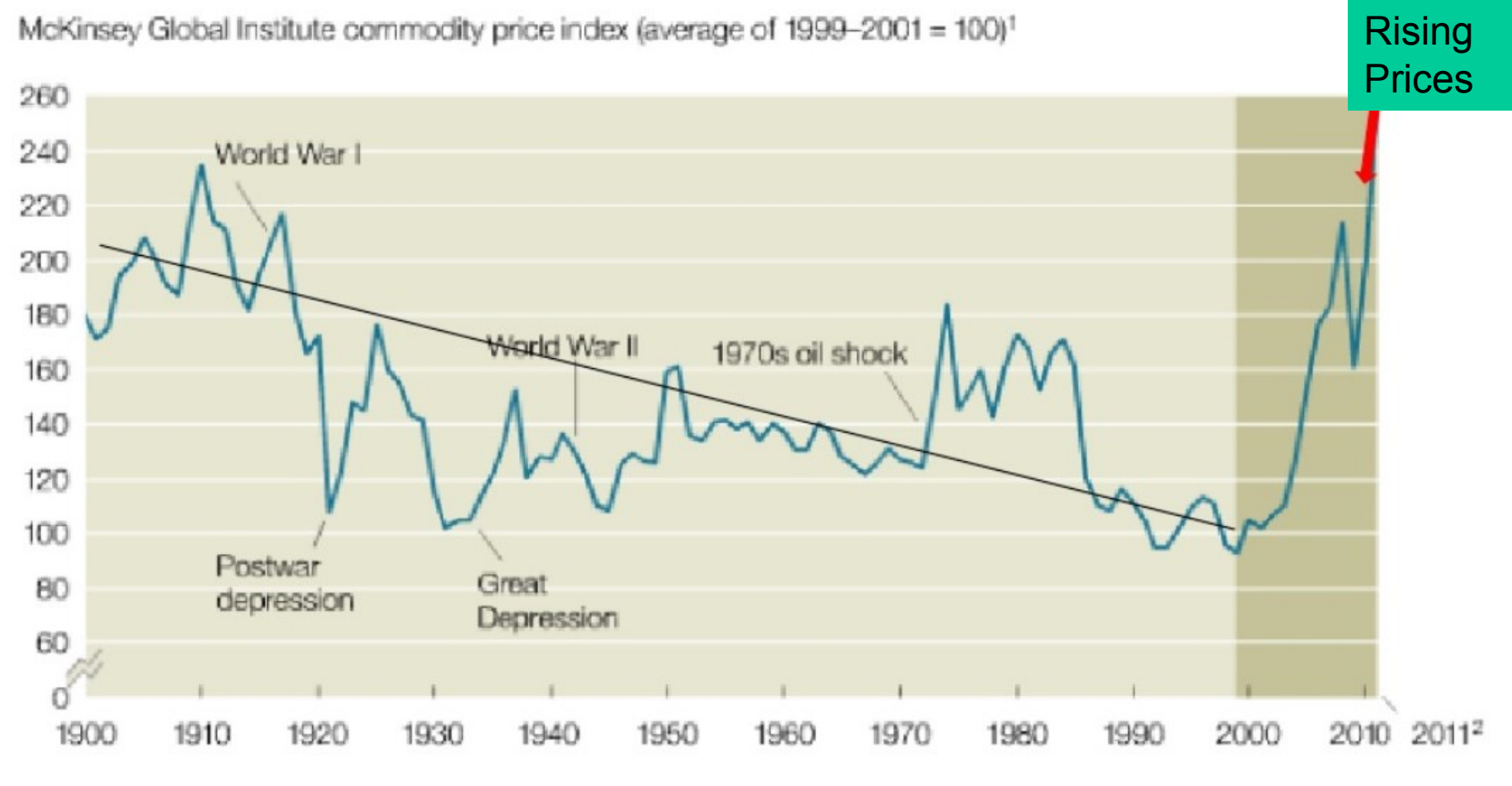
Focus on Two Parameters



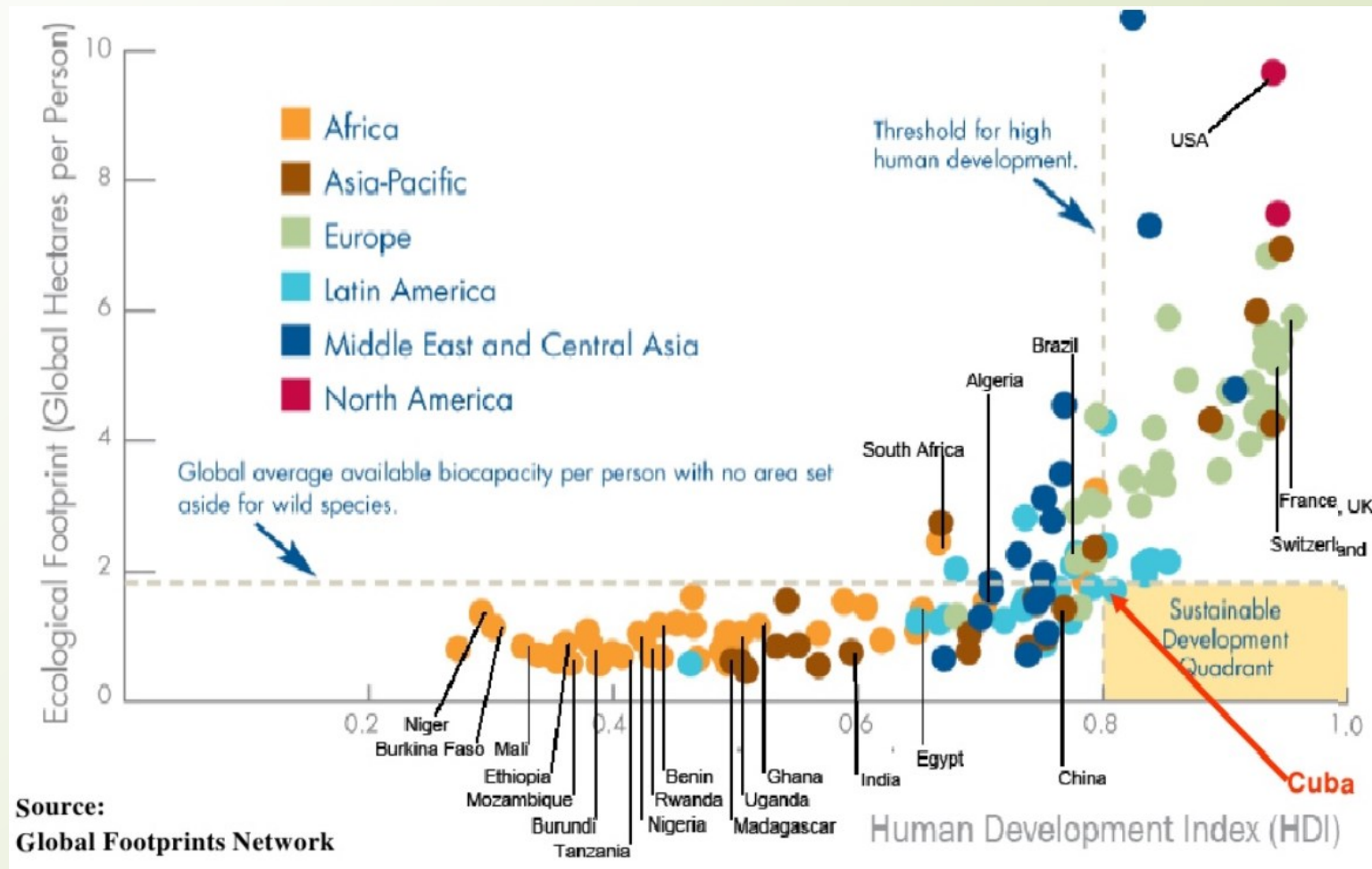
Resource Consumption & Economic Growth



Rising Resource Prices



Only One Country in Sustainability Rectangle!



American Life-style for the World – Need five Planet Earths

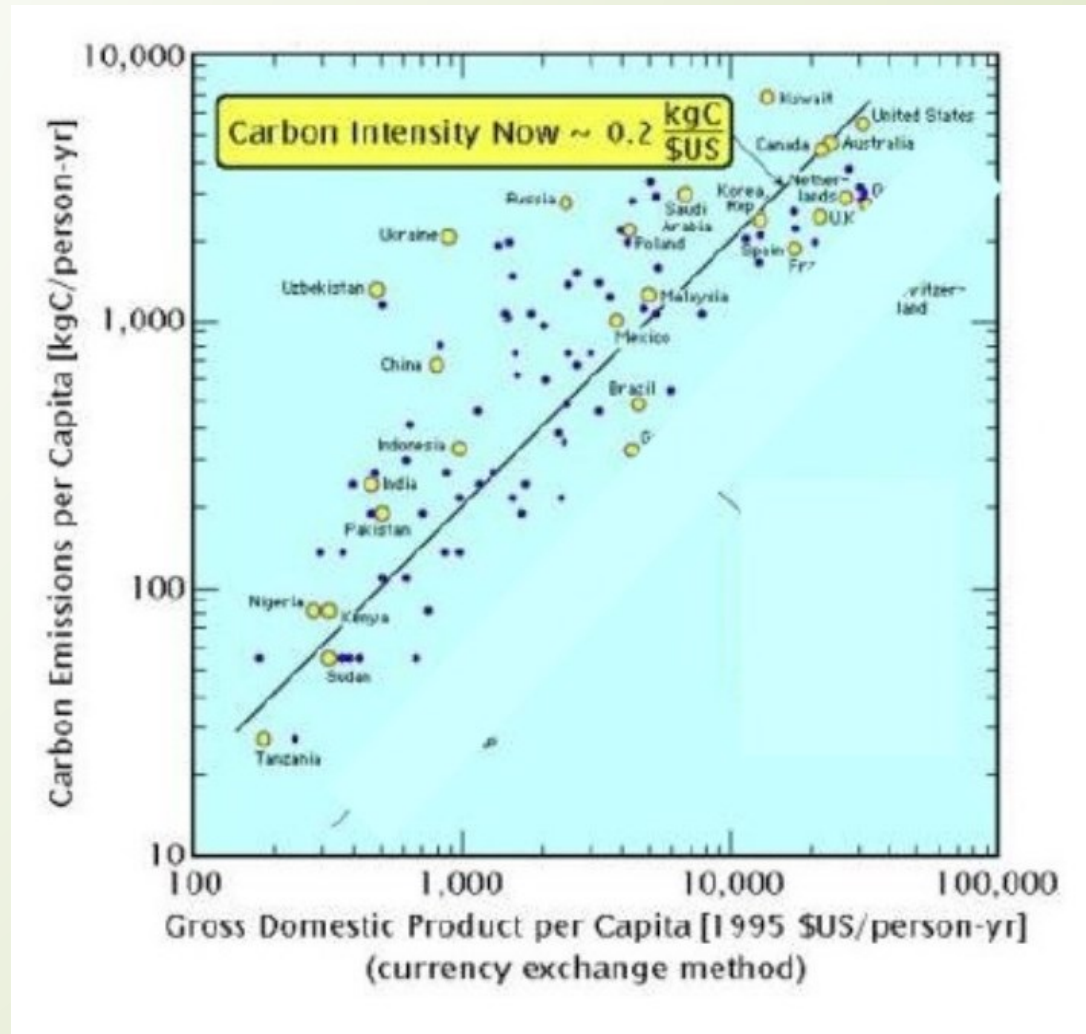


Being Green Today (Do less harm)

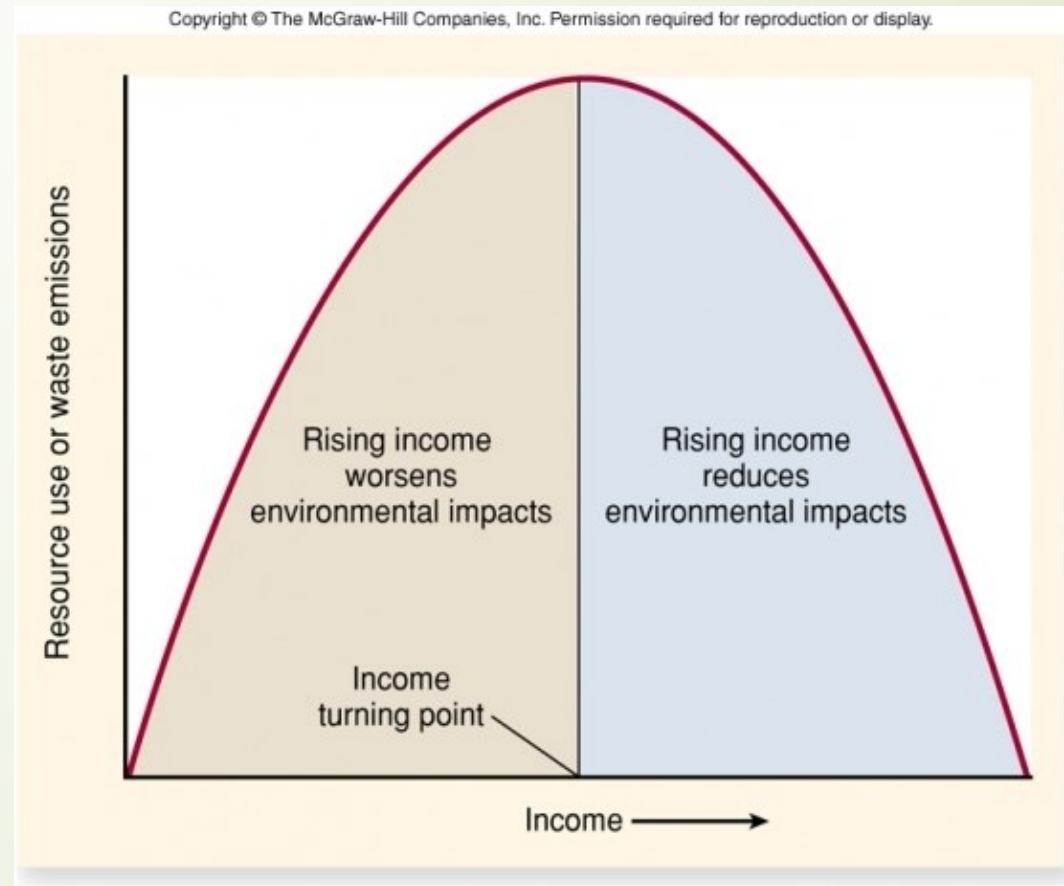
- ▶ We know the “drill” for Green Economy
- ▶ Reduces negative impacts (Recycle, Recover, Reduce)
 - ▶ Decrease pollution
 - ▶ Uses less resources
- ▶ Does not positively impact the current focus on growth, which generates more waste, greenhouse gases, lost resources, and adversely impact human health
- ▶ Green is Good but Green is not Good Enough!



GDP Increases with CO₂ Intensity

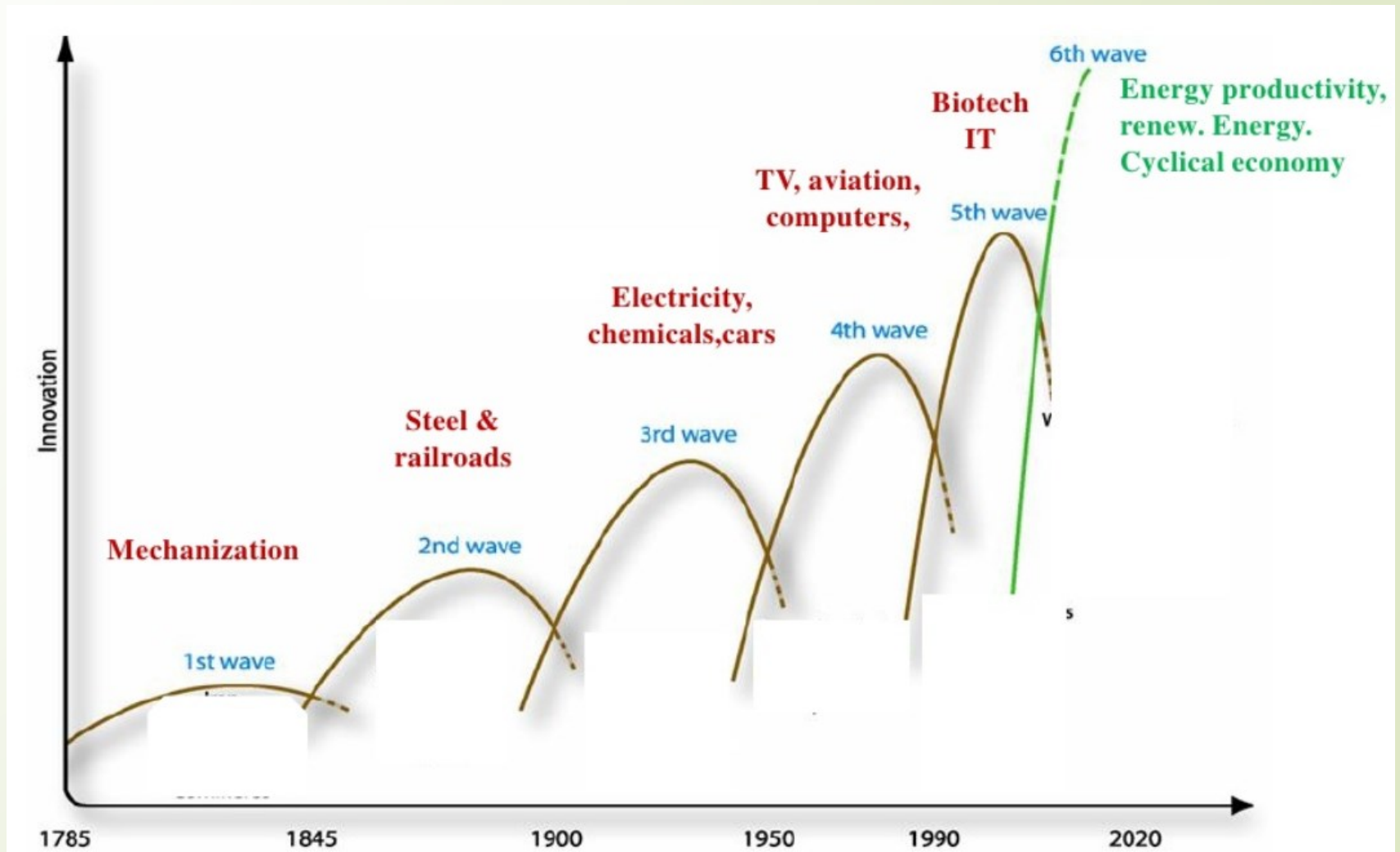


Environmental Kuznets Curve



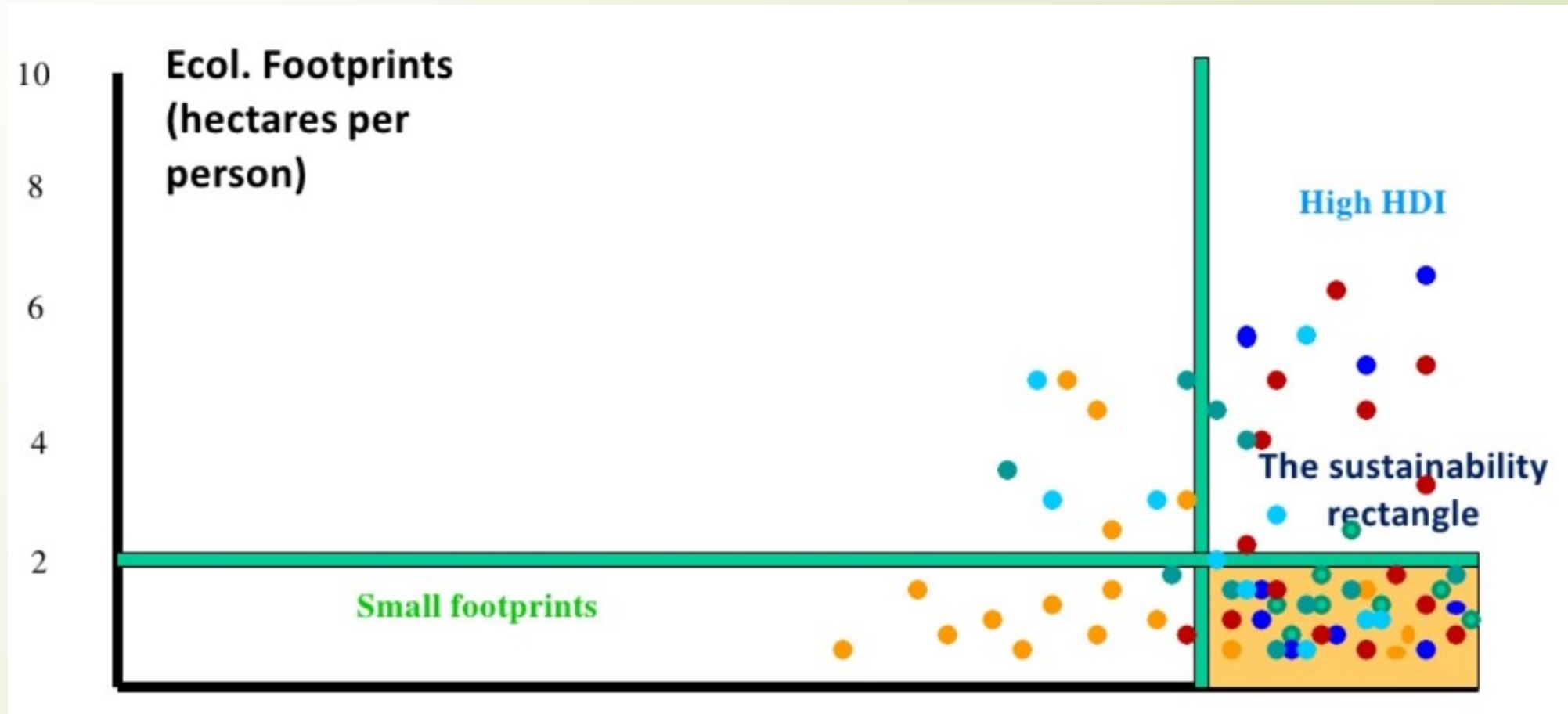
Kuznets Curve: Hypothesis that as an economy develops, market forces first increase and then decrease economic inequality

Need a Green Kondratieff Cycle







Kondratieff Cycle: Based on innovation theory, these waves arise from the bunching of basic innovations that launch technological revolutions that in turn create leading industrial or commercial sectors

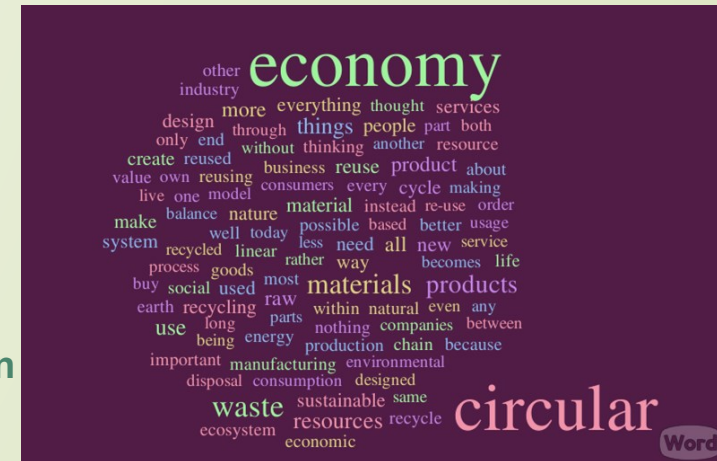
Resource Productivity Increase 5X – Most Countries Achieve Sustainability



Circular Economy

(Do More Good)

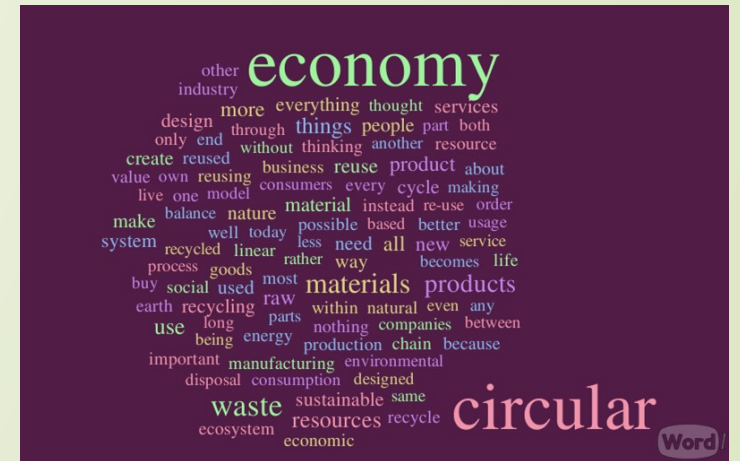
- ▶ Everything within the economy has value 
- ▶ Circularity view of materials, energy, ecosystems, value, health and society 
- ▶ Distinguish between consumable and durable components: 
 - ▶ Technical (durable materials, technical nutrients designed to circulate as long as possible at high quality without entering the biosphere)
 - ▶ Biological (consumable, biological nutrients designed to reenter the biosphere safely)
- ▶ Smarter, restorative and regenerative by design
 - ▶ Create, use and dispose of products that designs out waste
 - ▶ Eliminate toxic chemicals – reuse components without risk of contamination
- ▶ Design is key 
- ▶ Aim to keep products, components and materials at highest utility and value at all times
- ▶ Find ways to reuse materials across the value chain



Circular Economy (Continued)

(Do More Good)

- ▶ Create positive arbitrage opportunities by preserving embedded capital – financial, materials, energy, labor, social and natural
- ▶ Fuel the system with renewable energy
- ▶ Build resiliency thru diversity, modularity - a source of creativity and resiliency in a system
- ▶ Prices to reflect true cost of product
- ▶ Think in systems – One action will impact the whole
- ▶ Think in cascade – Extract additional value thru utility in other applications/sectors
- ▶ Production of goods operates like systems in nature - waste and demise of a system becomes the food and source of growth for something new
- ▶ Decoupling global economic development from finite resource consumption – an economy like an ecosystem where nothing is lost and all is transforming



Macro-Economic Business Case

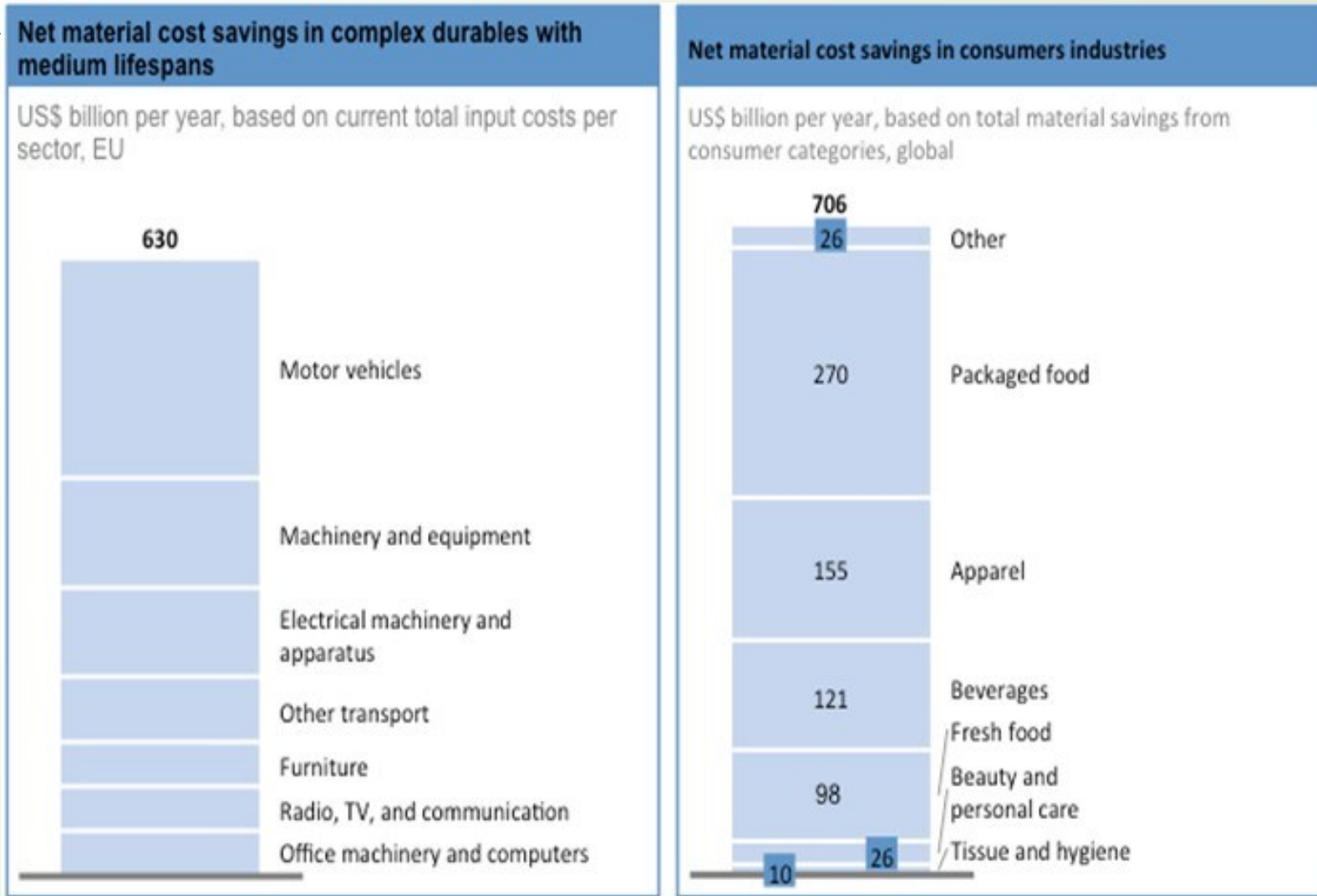


*"Today's goods are tomorrow's
resources at yesterday's prices."*

- Walter Stahel



Circular Economy – Material Cost Savings Value



Circularity Vision



MATERIALS
All materials are infinitely recycled



ENERGY
All energy is derived from sustainable sources



ECOSYSTEM
Human activities support ecosystems and the rebuilding of natural capital



VALUE
Resources are used to generate value (financial and other forms)



HEALTH
Human activities support human health & happiness

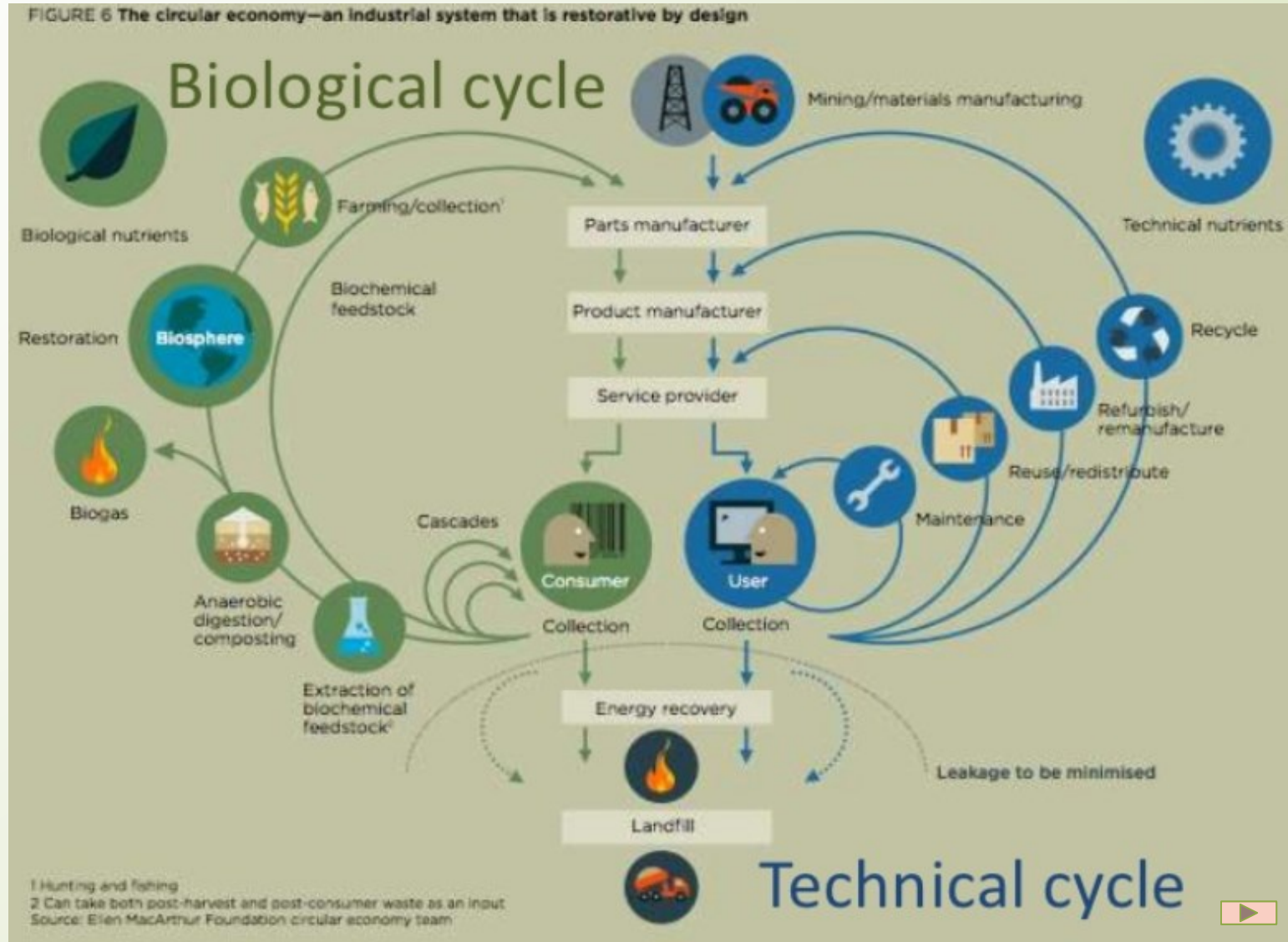


SOCIETY
Human activities support a healthy & cohesive society & culture

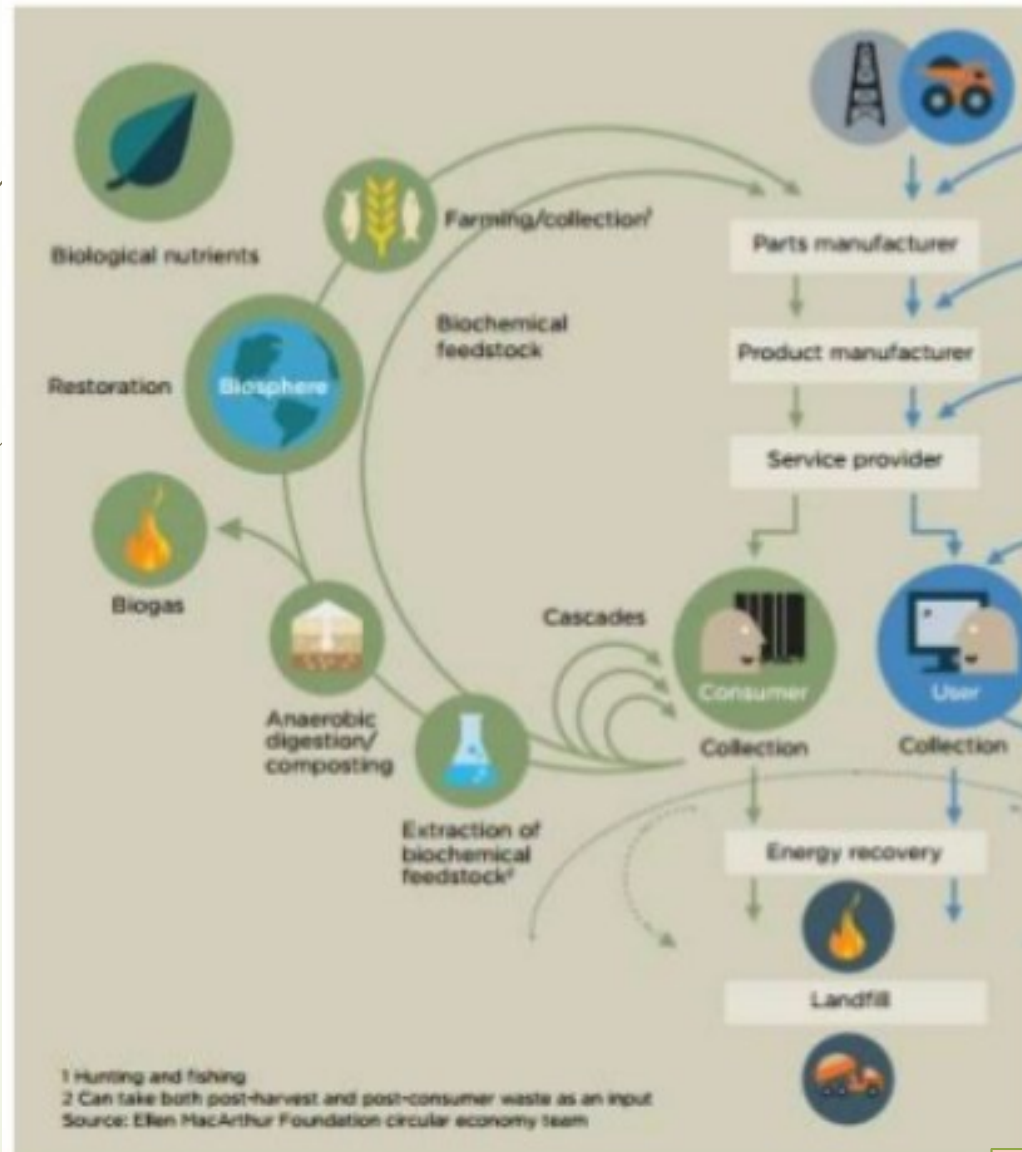


Circular Economy

Industrial System Restorative by Design



Biological Cycle

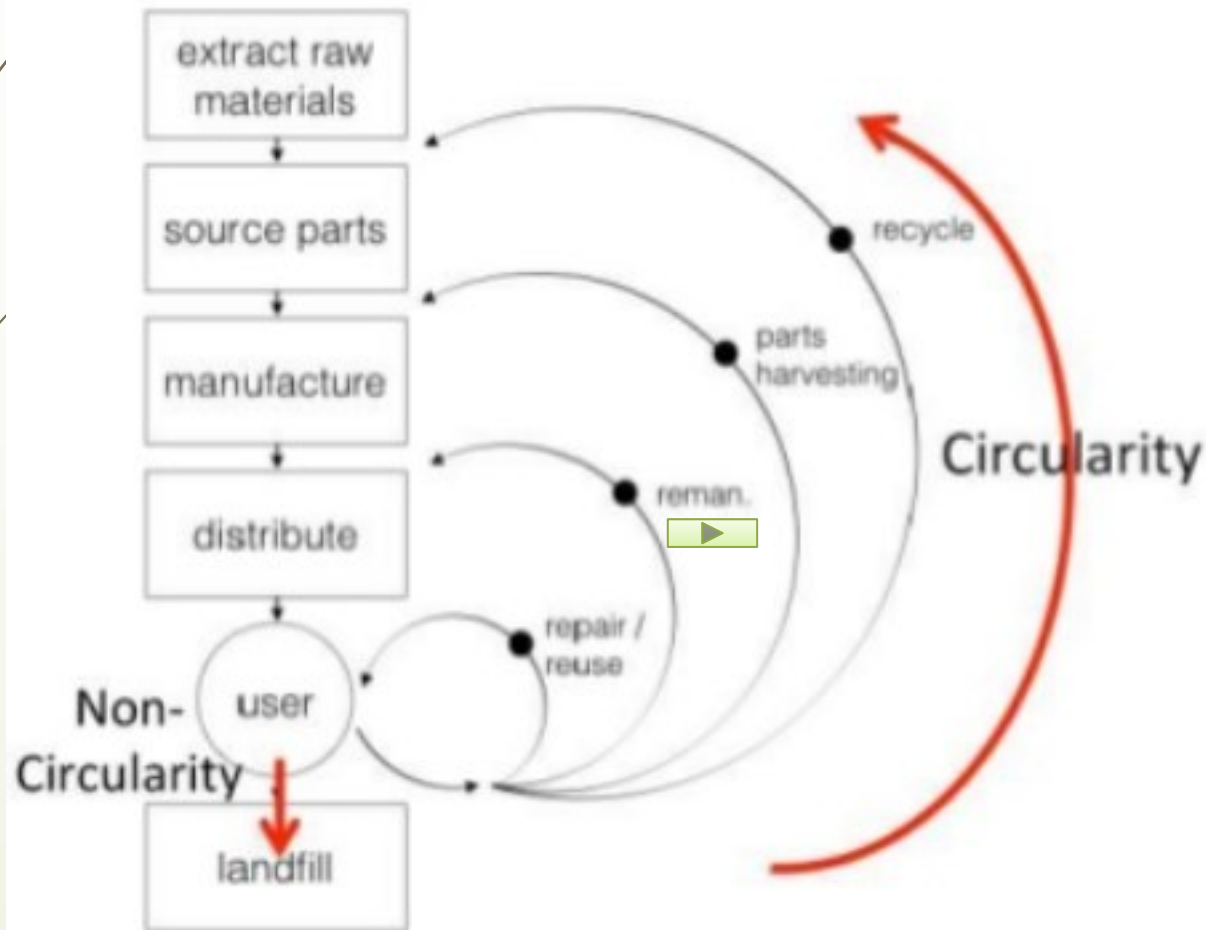


- Biological materials of our products can increase agricultural value.
- They can also be reused several times in different products (cascades), before safely returning them to biosphere.

Example of cascading:

1. Cotton clothing first reused as a second-hand clothing.
2. Then it is reused in furniture industry as fibre-fill.
3. Fibre-fill can then be reused in construction industry as insulation in stone wool.

Technical Cycle: Recapturing Value & Resource Efficiency



- 1st circle: we try to repair/reuse the product.
- 2nd circle: we try to remanufacture and regenerate the product instead of throwing it away.
- 3rd circle: if repair/reuse or remanufacturing were not possible, we disassemble the reusable parts in order to use them again in the manufacturing of new products.
- The last option would be to recycle the separate parts/components so that they can be used again instead of raw materials.

Remanufacturing

What?



Why?

- € Create new ranges of products and services
- Internalise revenues
- Improve productivity
- ★ Better quality proposed
- ♥ Loyal customers
- Job creation
- Reduce environmental impact
- Be better prepared for future legislation






Value of Design

«Design is not just what it looks like and feels like.

*Design
is how it works.»*

Steve Jobs



Design Principles

Design and Materials

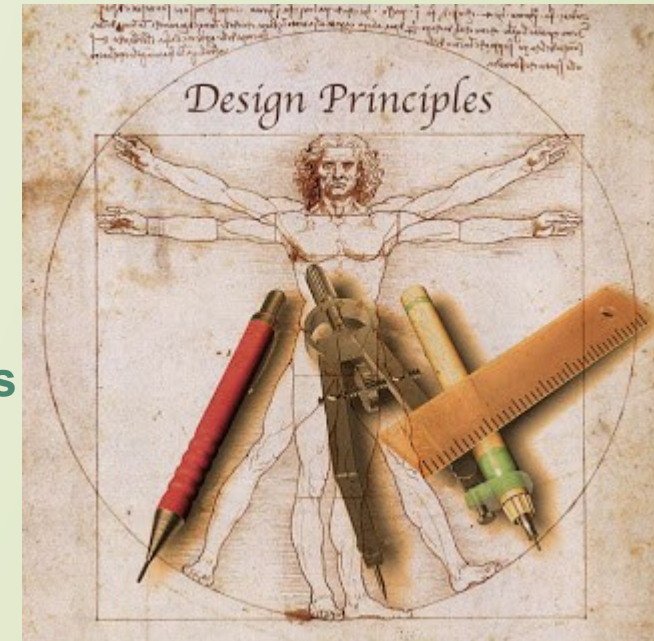
- Avoid heavy metals as cadmium, lead, and dangerous substances (Restriction of Hazardous Substances)
- Use recycled materials (metals, etc.)
- Encourage Recyclability and Recoverability
- Reduce weight (de-materialization)

Design, Durability, and Repair

- Create Modular design, standard component, easy to repair and to upgrade
- Engineer easy to dismantle and reassemble with common tools
- Design Upgradability and Adaptability Options
- Provide Standardization and Compatibility
- Have ease of Maintenance and Repair

Design for End-of-Life

- Avoid substances that make recycling expensive / problematic
- Capability of product take-back & organize waste streams to avoid down-cycling
- Reuse of components



Drivers for a Circular Economy

- **Positive Business case on Macro-Economic Level**
- **Resource Dependency (Shortages & Volatility)**
- **Climate Change and World Overshoot**
- **Innovation Potential & Job Creation**



Key Drivers

- Looming Resource Shortages
- Skyrocketing Commodity and Energy Costs
- **Better Technology:** Core competence and technologies along reverse cycles and cascades
- Urbanization
- Government Pressures
- New Consumer Notions of Value and Materialism
- Access Over Ownership
- Positive Business case on Macroeconomic Level
- Innovation Potential



RFID tags for easier identification and recycling



3D printing for fabrics and spare parts; smart materials

Key Drivers

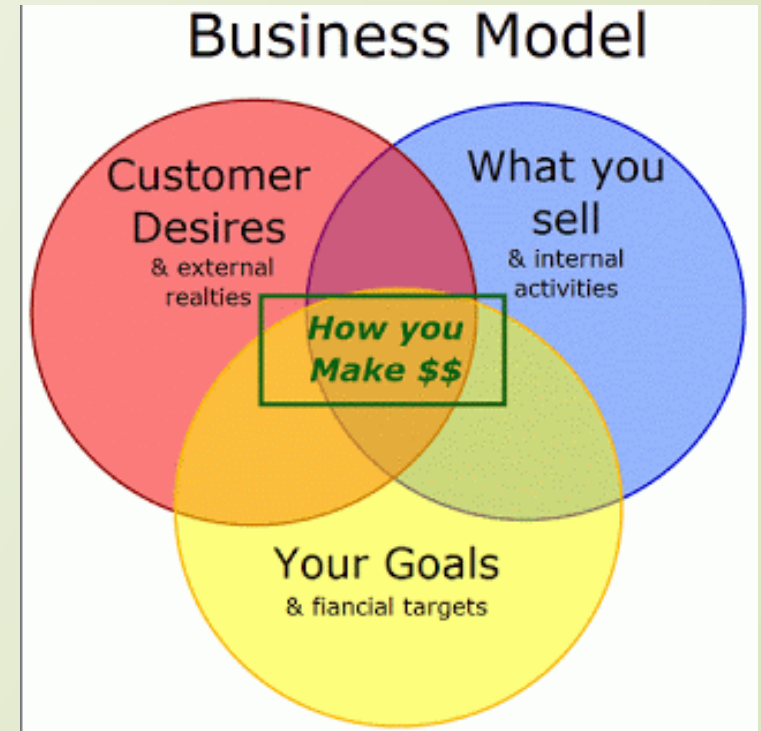
- Looming Resource Shortages
- Skyrocketing Commodity and Energy Costs
- Better Technology
- **Urbanization:** More and more people living in urban areas make sharing, repairing and recycling easier
- Government Pressures
- New Consumer Notions of Value and Materialism
- Access Over Ownership
- Positive Business case on Macroeconomic Level
- Innovation Potential



Business Models

Innovative business models: From ownership to performance and access based service systems

- From product to service
- From Consumer to User
- Leasing, Rental, and Borrowing
- Experience Economy
- Performance Contracts
- Intelligent Demand
- Extended Guarantee (spare parts)
- Service Agreement (durability)



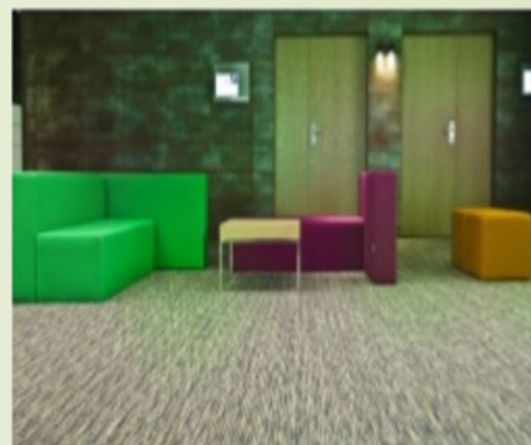
Case Studies

Strategy

- Selling Temporary Ownership
- Facilitating Secondhand Sales

How

- Carpet leasing program of eco-based carpets (Desso-Dutch Company)
- Leasing of Jeans - Fashion focused prevents price volatility (Mud Jeans-Dutch Company)
- Multi-sell brand store on eBay (Patagonia)
- “Swhopping” store credit for dropping off old clothing



Breakthroughs Required

- ▶ **Radically changed practices**
 - ▶ Extending producer responsibility to complete life – cycle to create more eco-responsive design
 - ▶ Develop sharing economy to get more service from fewer products
- ▶ **Need for more efficient and new technologies e.g. recycling**
- ▶ **Innovation in Design – less components, products designed to be easily disassembled, regenerated and recycled.**
- ▶ **Collaboration between public and private sectors**
- ▶ **For long lasting products and innovations in business approach – buying service instead of buying the product.**



Services

- World's largest taxi company owns no taxis (Uber)
- Largest accommodation provider owns no real estate (Airbnb)
- World's most valuable retailer has no inventory (Alibaba)
- World's largest movie house owns no cinemas (Netflix)
- Largest software vendors don't write the apps (Apple & Google)



Our wide range of services offerings

Broader Value Spinoffs / Enhancement of Circular Economy

- **Learnings from consumer friendly textile waste collection strategies for other sectors**
- **Contribution of emerging technologies**
- **Implication of rebound effects**
- **New business models for value extraction**
- **Symbiotic relationships between sectors to redefine more efficient value chain**
- **Potential for Greater Utility and Decoupling**
- **Impact on Profitability, GDP and Employment**
- **Impact in Environment and Economic Resiliency**



Challenges



1. Design

Products & services designed in circular way



2. High Value-Reuse

High value reuse is the new normal and processes are optimized



3. Chain Transition

Creating circular value chains. From design to end of life.





4. Spreading the Word

Government, corporates and industry recognizes need for transition to circular models.

Conclusion: Scaling the Circular Economy

- **Product design – designing out waste, materials to be used, and ability to upgrade**
- **New business models – service based solutions**
- **Reverse cycles – “closed loop” recycling, reuse and refurbishment**
- **Breakthrough innovation – disrupting global supply chains and manufacturing**





**After the final no there comes a yes
And on that yes the future world depends.**

- Wallace Stevens



WE ARE GUESTS



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