POLFREE
POLICY OPTIONS FOR A RESOURCE EFFICIENT ECONOMY

Wuppertal Institute
for Climate, Environment
and Energy

What is the role of policy and what policy mixes are needed for a resource efficient economy in Europe?

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London, November 11, 2015

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Outline

- **Introductory remarks – what are the challenges and what is the role of policy?**
- Conceptional framework – approach to analysis & policy mix design
- Exemplary results: from waste disposal towards a resource-efficient circular economy
- Discussion of key trade-offs & conclusions

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Introductory remarks

- First phase of project, different angles: EU policy perspective, national policies perspective, business perspective, citizen-consumer perspective
- But no straightforward answer, because
- Most activities, practices and policies involve multiple resources consumed, manufactured and released back into ecosystems
- Human agency matters: green values are no good predictor of green behaviour; values tend to interplay with costs, preferences, social norms, convenience, infrastructural contexts, policies, etc.

- Three main challenges for resource efficiency policy: decoupling, planetary boundaries and the coordination of existing and innovative institutions/instruments/constellations

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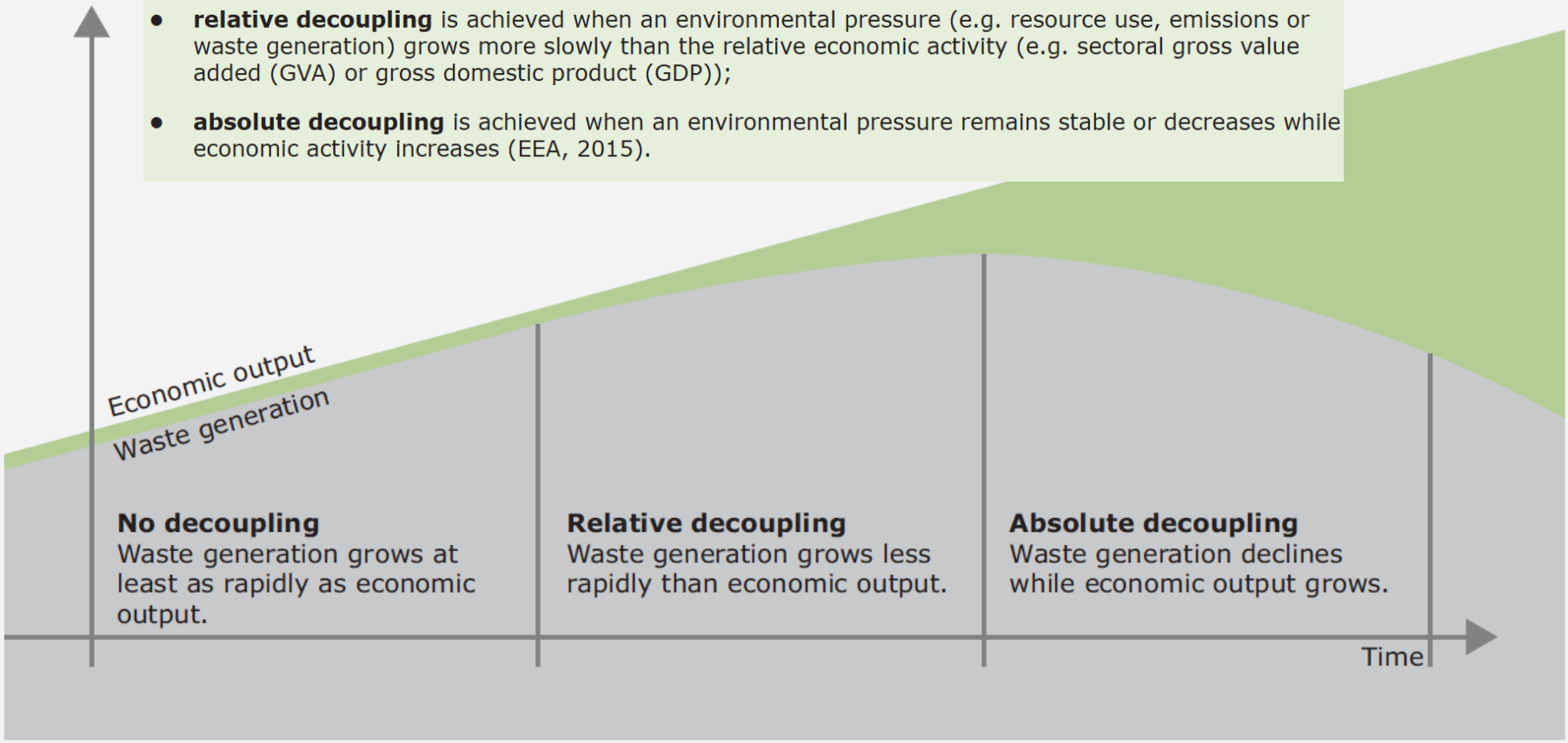
Decoupling

- **relative decoupling** is achieved when an environmental pressure (e.g. resource use, emissions or waste generation) grows more slowly than the relative economic activity (e.g. sectoral gross value added (GVA) or gross domestic product (GDP));
- **absolute decoupling** is achieved when an environmental pressure remains stable or decreases while economic activity increases (EEA, 2015).



SOURCE: EEA 2014

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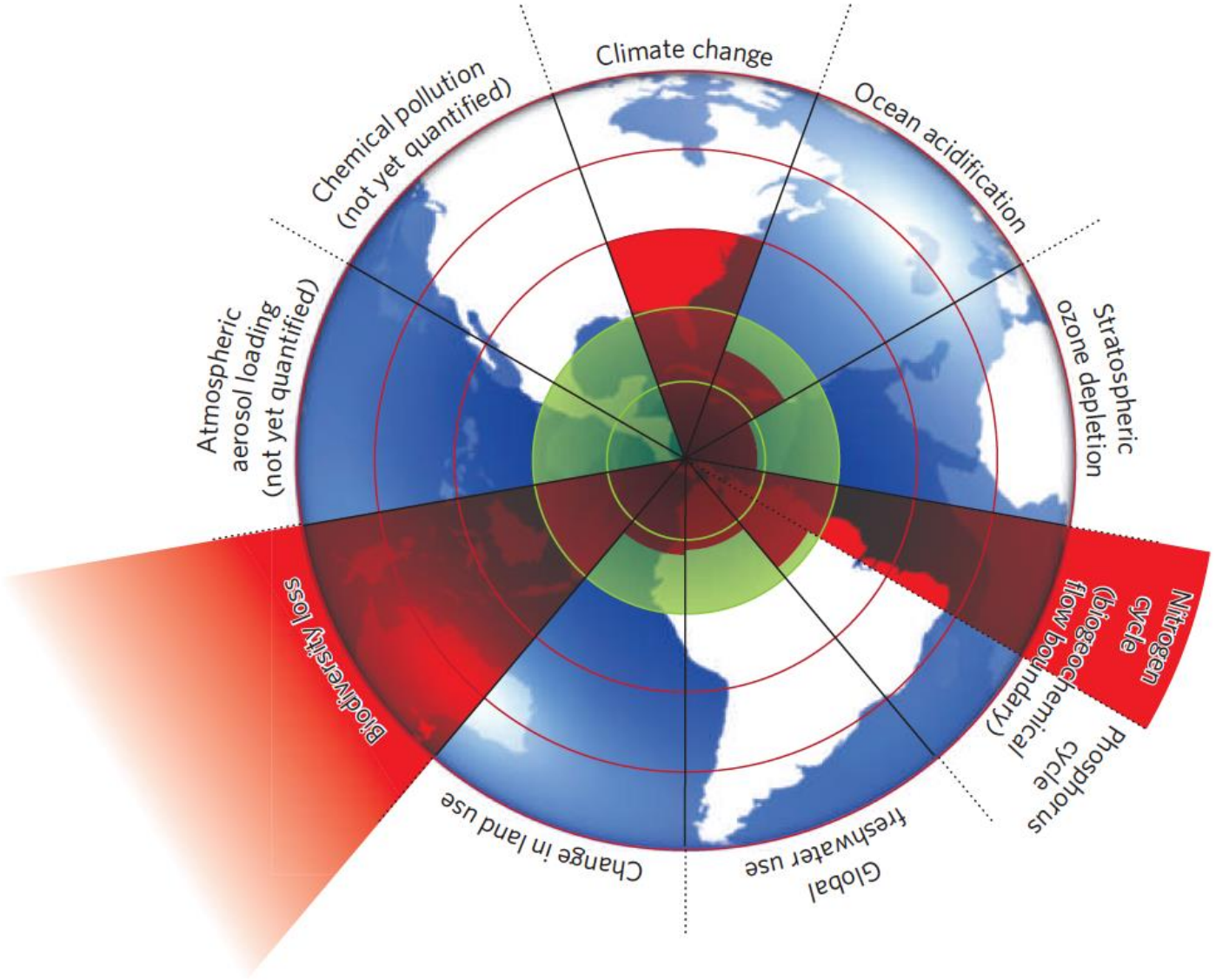
Keeping the planetary boundaries



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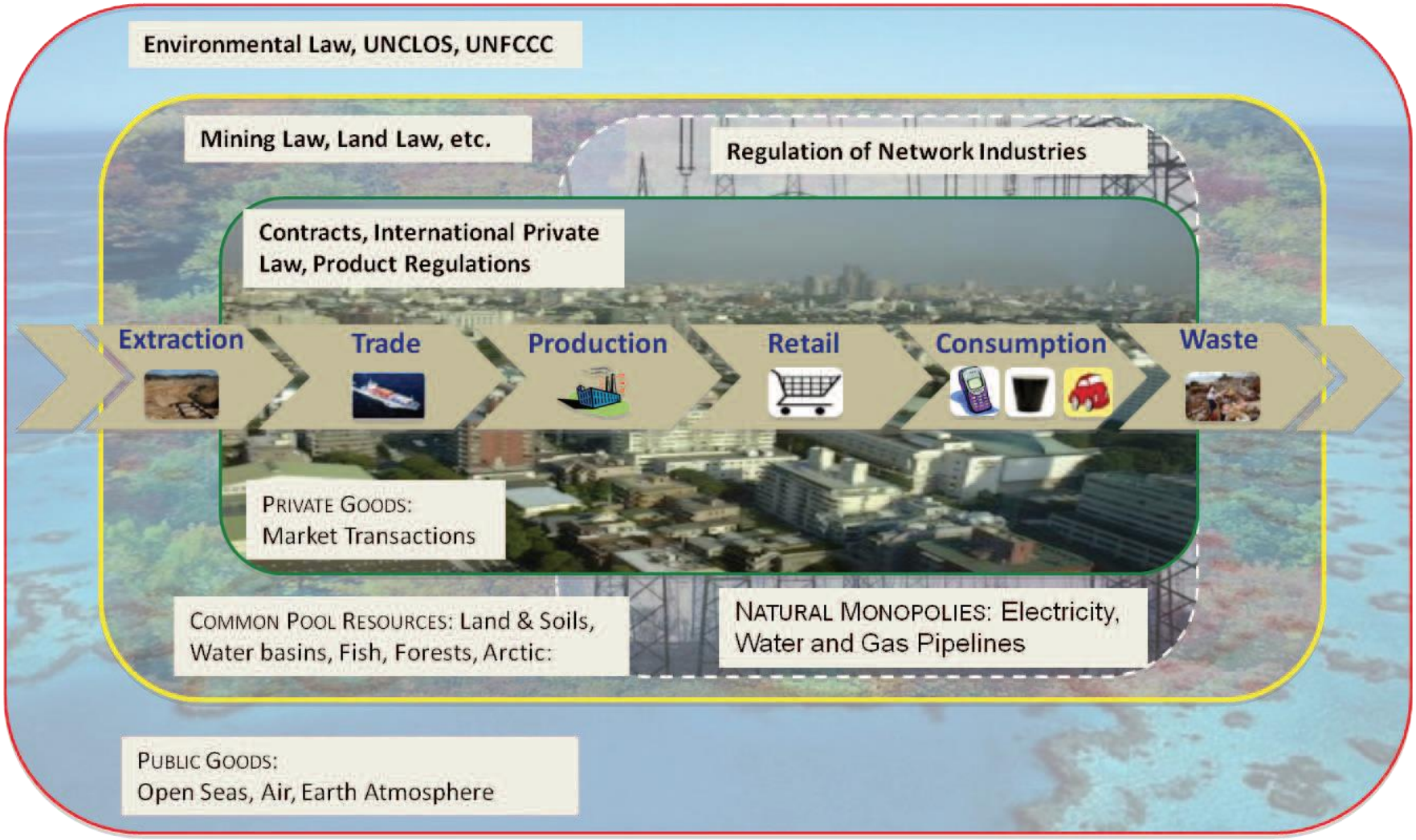
Institutions and actors of resource markets - polycentric and multi-level governance



Source: Transatlantic Academy 2012

What are the failures that call for resource efficiency policy?

- Negative externalities – price mechanism is fundamentally flawed by subsidies and support to resource-intensive consumption and production patterns
- Adaptation deficits – high price competition and increasingly shorter innovation cycles, delayed responses in process innovation in enterprises, radical eco-innovations are faced with sunk-cost risks
- Resources are treated as private goods on markets and collective goods dimension of resources only comes into play when the environmental and institutional system is taken into account
- Towards EOL, collection systems have to be managed collectively, but input of secondary resources as strategy to reduce primary resources is still very low
- Important interlinkages of resources with CO_2, water and energy issues are not sufficiently addressed
- Unclear competencies and regulation power – conflict of laws

- Policy mix design has to be a compound of methodologies such as MFA, LCA, EE-IOA and interdisziplinary institutional + policy analysis

Guiding research questions

1. Which types of policy mixes are likely to radically improve resource efficiency, optimize synergies and minimize trade-offs between instruments and policy fields?
2. What are important criteria for a successful implementation?

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Conceptional framework – approach to analysis & policy mix design

- Develop criteria for an ambitious resource efficiency policy
- Identify elements of a new policy mix leading to absolute decoupling of economic growth from unsustainable use of natural resources and environmental degradation by

  (a) transparent assessment criteria
  (b) screening of suitable options
  (c) selection of suitable instruments with key elements to be used in scenarios and modelling
  (d) (qualitative) ex ante analysis

- ➢ application oriented results
- ➢ theoretical results

General Criteria for a Policy Mix

Consistency

- „is characterized in its weak form by the *absence of contradictions* and in its strong form by the *existence of synergies within and between the elements of the policy mix*, (...)“
- interactions between different policies (i.e., instruments already in place and new ones), mutual benefits with existing policies
- negative interactions among instruments
- target conflicts with fundamental social policies

Coherence of processes

- Focus on the process dimension („referring to the processes of policy making and implementation, ensuring that they are not in contradiction with one another or may even reinforce one another”)
- Resource efficiency: policy integration and coordination

Credibility and stability

- Extent to which the policy mix is believable and reliable
- Influenced by a range of factors (commitment from political leadership, operationalization of targets by a consistent instrument mix and delegation of competencies)
- Stability of targets may influence credibility

Specific instruments' design features

Stringency	• How ambitious is the target in relation to a "baseline" trajectory? How well can target actors adapt to the external pressure?
Profitability	• „an instrument's effect on the return of an investment"
Predictability	• Expected probability of implementing a specific policy instrument, future development, overall direction, detailed rules and timing
Flexibility	• Can new technologies be tested when they become available?
Differentiation	• Distinguishing by properties of the target actors or the object of regulation
Depth	• Does the instrument address incentives in upstream or downstream sectors?

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Case Studies

List based on results of a policy mix workshop, stakeholder workshops and the POLFREE vision and pathways for resource efficiency

1) Mobility
2) Zero energy and material efficient buildings
3) Minimization of food waste losses alongside the value chain
4) Electricity production and distribution
5) Product Service Systems
6) Industrial symbiosis networks
7) Ecodesign Product Standards for a Circular Economy
8) Phasing out Environmentally Harmful Subsidies
9) Internalization of costs

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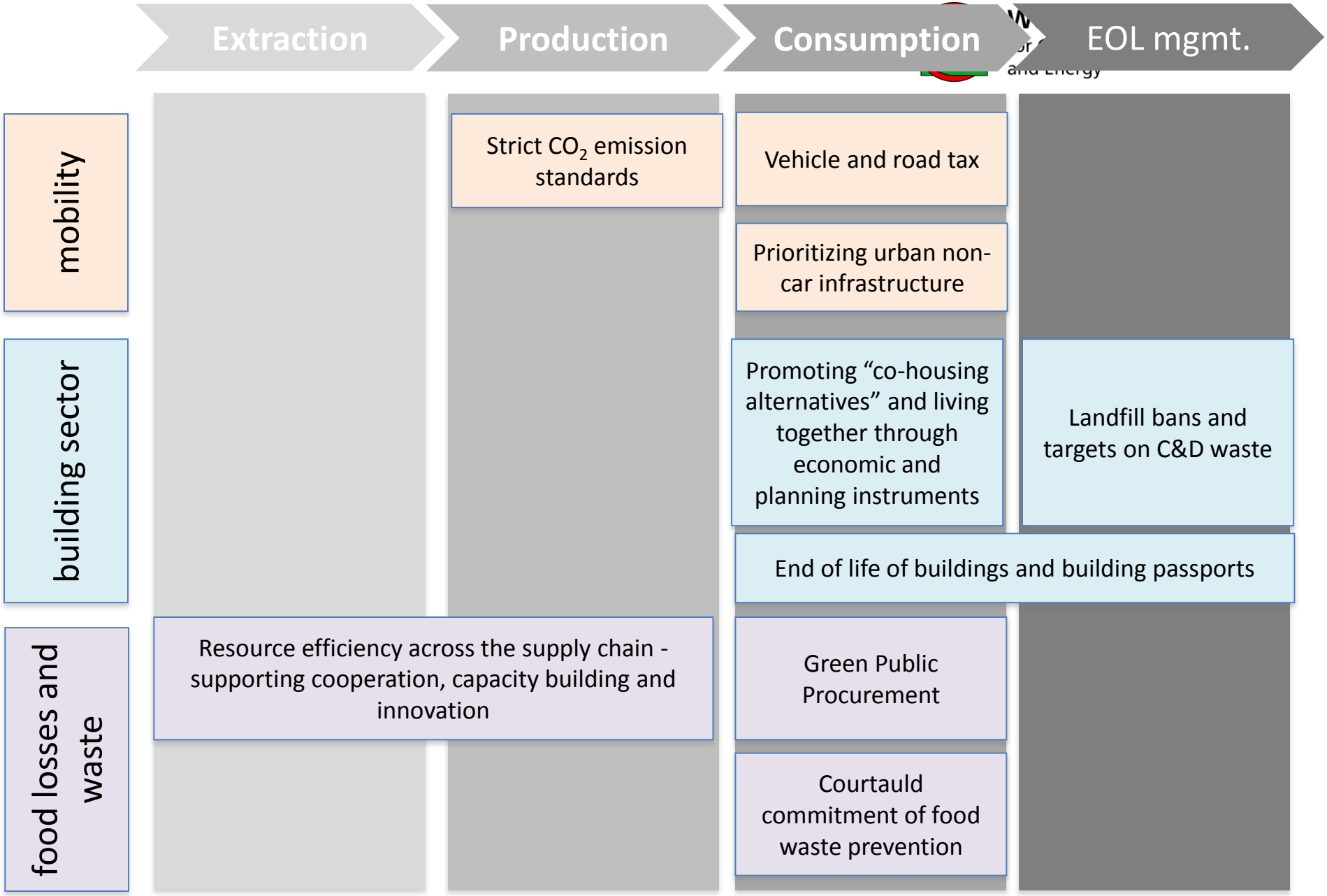
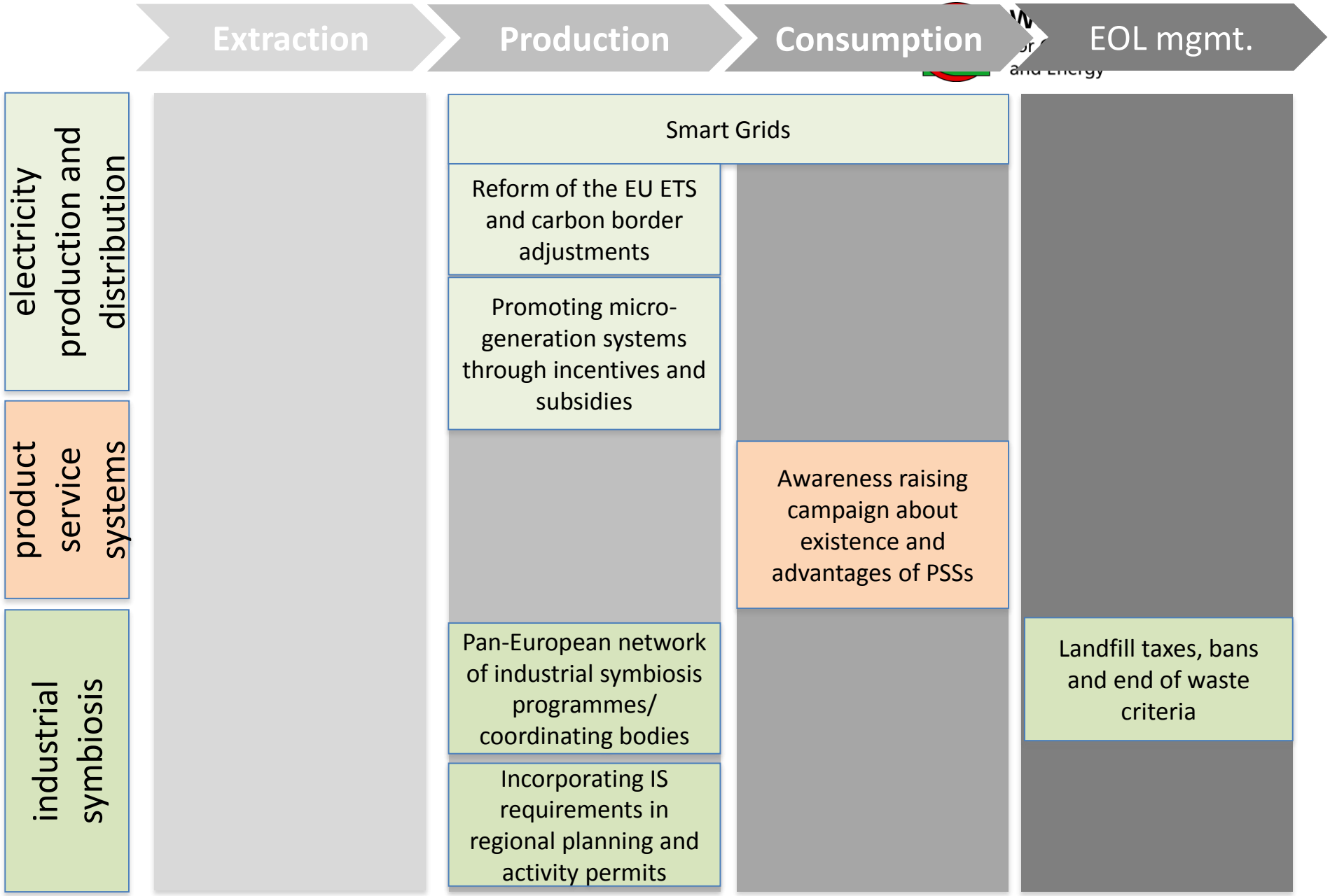
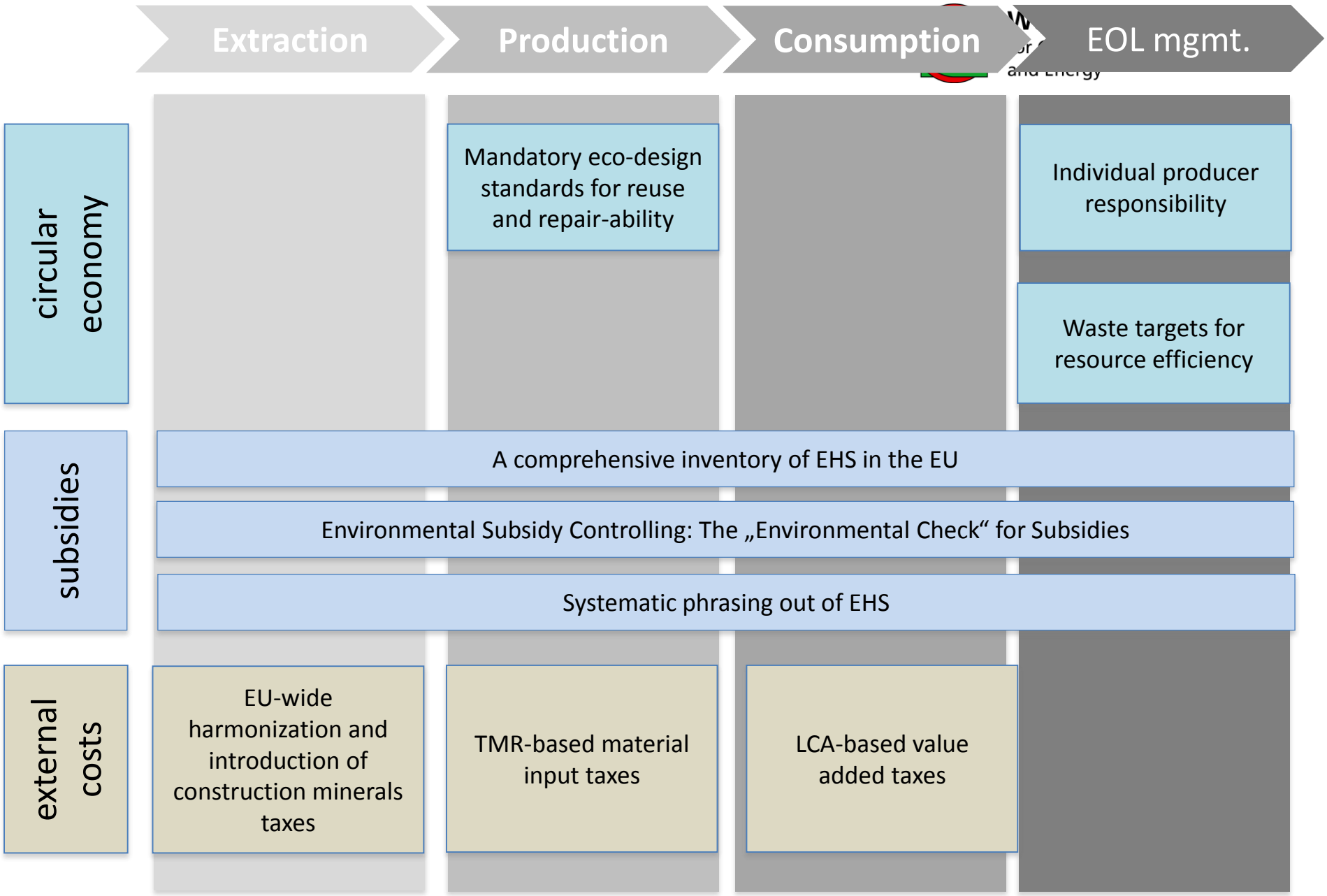

Extraction
Production
Consumption
EOL mgmt.
mobility
building sector
food losses and waste
Strict CO_2 emission standards
Vehicle and road tax
Prioritizing urban non-car infrastructure
Promoting "co-housing alternatives" and living together through economic and planning instruments
Landfill bans and targets on C&D waste
End of life of buildings and building passports
Resource efficiency across the supply chain - supporting cooperation, capacity building and innovation
Green Public Procurement
Courtauld commitment of food waste prevention


Extraction
Production
Consumption
EOL mgmt.
electricity production and distribution
product service systems
industrial symbiosis
Smart Grids
Reform of the EU ETS and carbon border adjustments
Promoting micro-generation systems through incentives and subsidies
Awareness raising campaign about existence and advantages of PSSs
Pan-European network of industrial symbiosis programmes/ coordinating bodies
Incorporating IS requirements in regional planning and activity permits
Landfill taxes, bans and end of waste criteria


Extraction
Production
Consumption
EOL mgmt.
circular economy
subsidies
external costs
Mandatory eco-design standards for reuse and repair-ability
Individual producer responsibility
Waste targets for resource efficiency
A comprehensive inventory of EHS in the EU
Environmental Subsidy Controlling: The „Environmental Check“ for Subsidies
Systematic phrasing out of EHS
EU-wide harmonization and introduction of construction minerals taxes
TMR-based material input taxes
LCA-based value added taxes

Common Structure for the Case Studies

- Context – Why is the topic relevant for a radical increase of RE? Vision and pathways? Ongoing projects? Literature?

- Instruments – Selection of three instruments:
  - 1) “win-win” instrument,
  - 2) instrument with hard market interventions,
  - 3) instrument focussing on the consumption side

  - What are effects? Experiences (national/ regional)? On which spatial level should it be implemented?

- Implementation – Relevant barriers? Winners, losers? Veto players? “Flanking instruments” to distribute expected welfare benefits?

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Assessment of policy instruments

Synopsis of the valuation of 9 policy fields and 25 instruments (3 in each policy field) with respect to 6 design features

5: high ambition/effort, 1: low ambition/effort

		Stringency	Profitability	Predictability	Flexibility	Differentiation	Depth
Phasing out environmental harmful subsidies	A comprehensive inventory of EHS in the EU	4	3	5	1	1	-
	Environmental Subsidy Controlling: The „Environmental Check“ for Subsidies	5	4	3	1	1	-
	Systematic phasing out of EHS	3	1	4	5	5	4
Internalisation of external costs	European-wide harmonization and introduction of construction minerals taxes (incl. border tax adjustment) _ Construction Minerals Directive	1	3	3	4	3	4
	TMR-based material input taxes	5	3	1	5	1	5
	LCA-based Value Added Taxes	4	1	1	5	1	5
From waste disposal towards a resource-efficient circular economy	Individual producer responsibility	1	3	5	5	1	5
	Mandatory eco-design standards for reuse and repair-ability	2	1	1	1	5	1
	Waste targets for resource efficiency	5	1	5	4	2	1

Distribution of responsibilities for selected resource efficiency instruments

	Leading role		Leading role
	Significant role		
	Supplementary role		

		Initiation Level					
		Sectoral	Global	EU	National	Regional	Local
Phasing out environmental harmful subsidies	A comprehensive inventory of EHS in the EU						
	Environmental Subsidy Controlling: The „Environmental Check" for Subsidies						
	Systematic phasing out of EHS						
Internalisation of external costs	European-wide harmonization and introduction of construction minerals taxes (incl. border tax adjustment) Construction Minerals Directive						
	TMR-based material input taxes						
	LCA-based Value Added Taxes						
Circular Economy	Individual producer responsibility						
	Mandatory eco-design standards for reuse and repair-ability						
	Waste targets for resource efficiency						

Synergies and trade-offs between selected resource efficiency instruments

	Phasing out environ-mental harmful subsidies	Internalisation of external costs	Resource efficient electricity production and distribution	Resource efficient mobility	Resource efficiency in the building sector	Minimization of food losses and waste	Resource efficiency by product service systems	From waste disposal towards a resource efficient circular economy	Resource efficiency by industrial symbiosis
Phasing out environmental harmful subsidies									
Internalisation of external costs									
Resource efficient electricity production and distribution									
Resource efficient mobility									
Resource efficiency in the building sector									
Minimization of food losses and waste									
Resource efficiency by product service systems									
From waste disposal towards a resource efficient circular economy									
Resource efficiency by industrial symbiosis									

Interim conclusions from the analysis of design features

Consistency
- Focus on contents

Coherency
- Focus on process dimension

•Fragmentation of responsibilities for initiating resource efficiency policies

•Many instruments highlight the importance of national and even sub-national approaches

•Innovative approaches to include sectoral actors on the global scale will be needed

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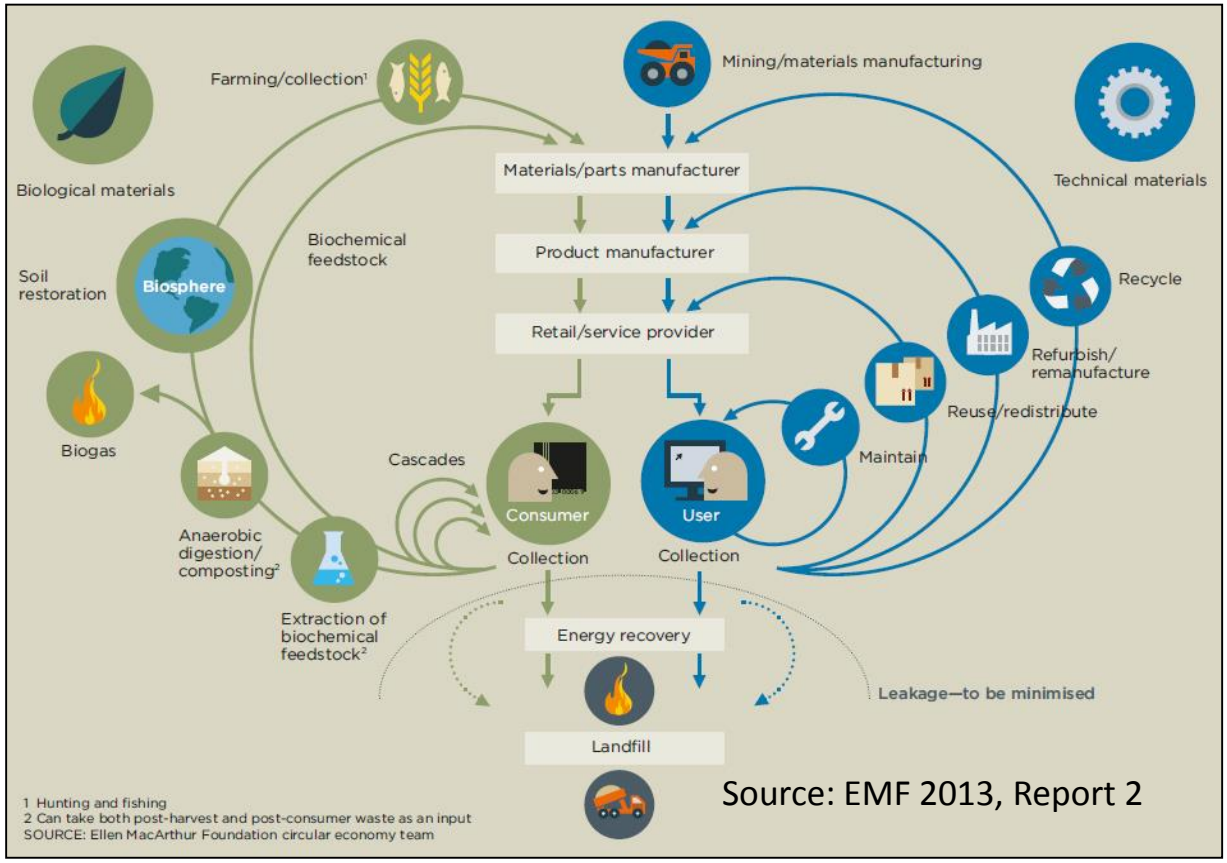
Towards a circular economy: Context

„Transition to a more circular economy requires changes throughout value chains, from product design to new business and market models, from new ways of turning waste into a resource to new modes of consumer behaviour.



Source: EMF 2013, Report 2

This implies full systemic change, and innovation not only in technologies, but also in organisation, society, finance methods and policies (European Commission 2014)“.

Towards a circular economy: Context

High expectations

- resilient growth, reduced dependency on resource markets
- significant impact on innovation, employment, and capital productivity
- annual net material cost saving potential up to USD 380 billion (€ 279 billion) in a *transition scenario;* up to USD 630 billion (€ 463 billion) in an *advanced scenario*

Reality

- total waste production in the EU (2011): 2.5 billion tonnes
  - 40% of MSW recycled, 37% landfilled, 23% incinerated (of which 500 million tons could have been otherwise recycled or reused)

➢ *"The Union thus misses out on significant opportunities to improve resource efficiency and create a more circular economy leading to economic growth and jobs which in turn would reduce greenhouse gas emissions and its dependency on imported raw materials." (EC 2014)*

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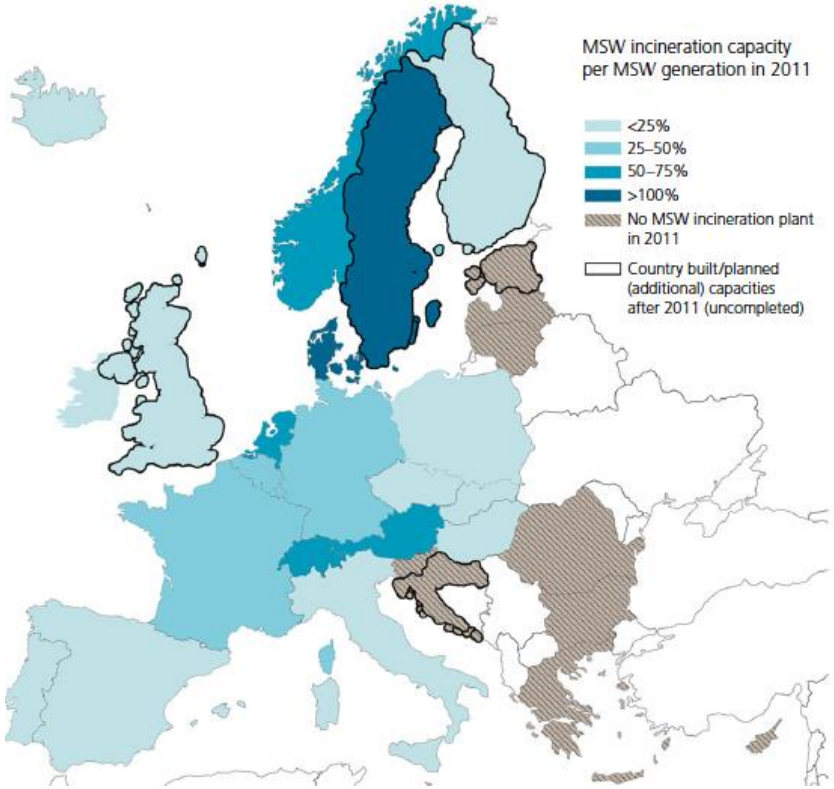
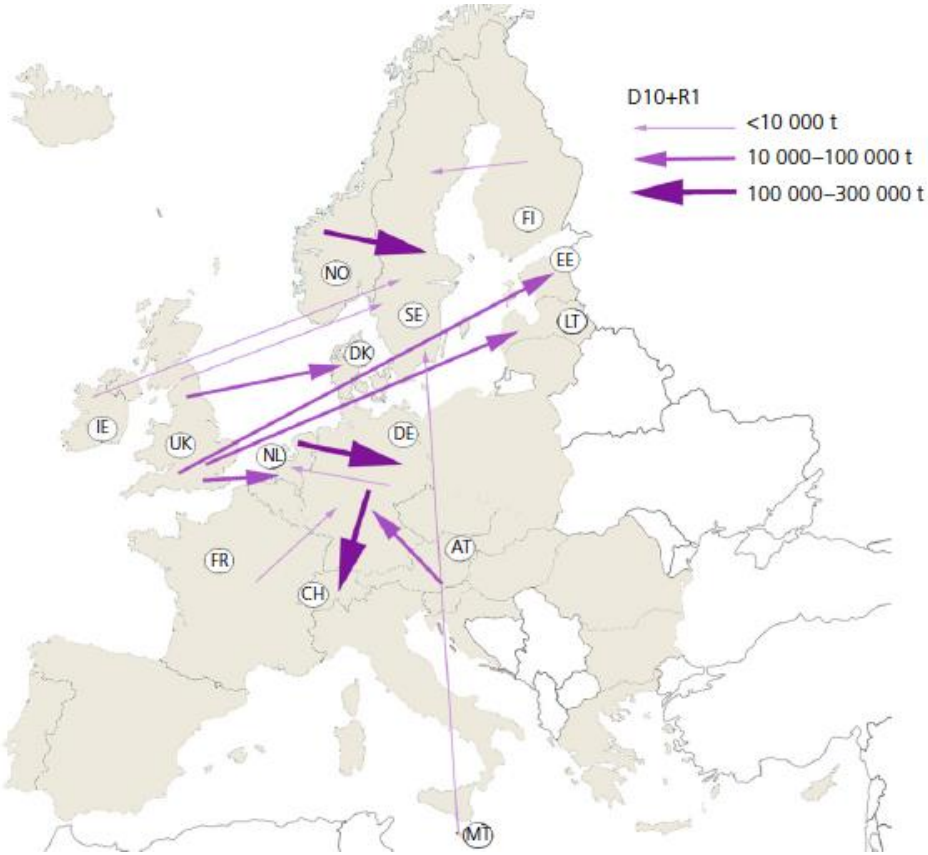
Transboundary shipment of waste and path dependencies





- Analysis of waste incineration capacities and waste trade flows
- Element of an extended assessment of waste prevention policies

Source: Wilts/von Gries 2015

Towards a circular economy: Context

Need for better policies

- Roadmap for a Resource Efficient Europe: „*By 2020, waste is managed as a resource. (…)" (EC 2011)*

Polfree Vision: In 2050 „*the EU continues to be largely dependent on imports of metals, but the scale of imports has been reduced […] Materials are managed so that they do not become waste. [...] High quality recycling is ensured."*

Clear need for innovative policy instruments

- higher priority for re-use and recycling
- combination of policies that take into account the full value chain (e.g., product design integrating a life-cycle approach, better cooperation along market actors, better collection processes, etc.)

Towards a circular economy: Instruments

(1)Setting incentives for a more resource efficient product design by ***individual producer responsibility***

(2)Specific mandatory ***eco-design*** *standards* that make reuse and repair of products economically viable

(1)Establishment of ***waste targets*** *that focus on the production of high quality secondary resources* – ***recycled content quota***

(1) Individual Producer Responsibility

Individual Producer Responsibility

•Responsibility of producers for the end-of-life phase of their own products

+Strong link between end-of-life management and producers

- ➢ initiates design change

•Individual financial responsibility / individual physical responsibility

•EPR applied in the European Packaging Directive, WEEE Directive, ELV Directive and Batteries Directive

Approaches and experiences of IPR

•Japanese Specified Home Appliances Recycling Law (SHARL): Recycling fee for the end-user at disposal

•Influencing factors affecting the form of individual implementation: product value, feasibility, producer's ambition to establish own downstream infrastructure, types of end-user, other producers

(2) Mandatory eco-design standards for reuse and repair-ability

- Relevant resource saving potentials (80% of environmental impacts determined in the design phase)
- Producers encouraged to take future repair and reuse into account
- Successfully used in the energy efficiency sector
- **Ecodesign Directive** (2009/125/EC): Mandatory ecodesign standards for energy-related products
  - "Implementing Measures": Mandatory obligations for industries for every product group, focused on energy efficiency during use phase
  - Assessment of Ecodesign Directive impacts on GHG emissions (2020):
- „ (*…)GHG emissions can be reduced by 211 to 265 Mio. t CO2eq compared to business as usual (BAU) development"* (Irrek et al. 2010)

  ➢ The directive has the potential to be a **powerful policy instrument for resource efficiency and the circular economy** such as it is for improving energy efficiency (Remmen and Dalhammar 2014)

(3) Mandatory recycled content target

- Classic approach: Mandatory recycling quotas
- Mandatory recycled content target for plastics as prerequisite for the recovery of secondary plastics
  - ➢ incentives to recycle a greater share of separated plastic wastes

- Problems:
  - access of manufacturers to secondary raw materials
  - traceability of material flows (e.g. by a proof of origin)
  - inclusion of non-European recyclers to the certification system
  - Plastics might be replaced by raw materials with probably higher resource requirements

(3) Mandatory recycled content target

- Construction sector favourable for introduction of a secondary recycling quota
- Electronic products → increasingly important field of application for plastics

- Minimum recycling quota of 30% in the construction sector appropriate
- Jap. Top-Runner approach: Best available quota as minimum threshold

- EU-wide approach needed; implementation through voluntary commitment
- Development of an appropriate certification system in joint effort between all relevant parties
- Employment of the instrument on a temporary basis; secondary plastics should have gained higher market shares after the initial phase of capital-intensive investments
- Actual market definition for a minimum quota challenging

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Discussion

If resource efficiency and the circular economy are win-win concepts, why don´t we see faster progress?

Key trade-offs within a policy mix for RE

1. The more ambitious an instrument (stringency), the lower the immediate profitability for the actors involved.
   → trade-off between those instruments that offer the highest potential increases for resource efficiency and those that could be easily implemented due to market incentives (political acceptance)
2. Instruments are often considered as more efficient and acceptable if the evolvement of tax rates, recycling rates etc. is clearly foreseeable, so that all actors can adapt especially their investment decisions to upcoming changes of prices etc.
   → trade-off between the predictability of an instrument and its flexibility / self-binding character of an instrument negatively influences the flexibility
3. Policy instruments benefit from a design that enables to take into account external circumstances like specific economic, cultural, social etc. regional aspects. At the same this specific focus makes it more challenging to include actors outside of this specific situation.
   → trade-off between the level of specificity of an instrument (differentiation) and its level of inclusion of up- and down stream actors (depth)

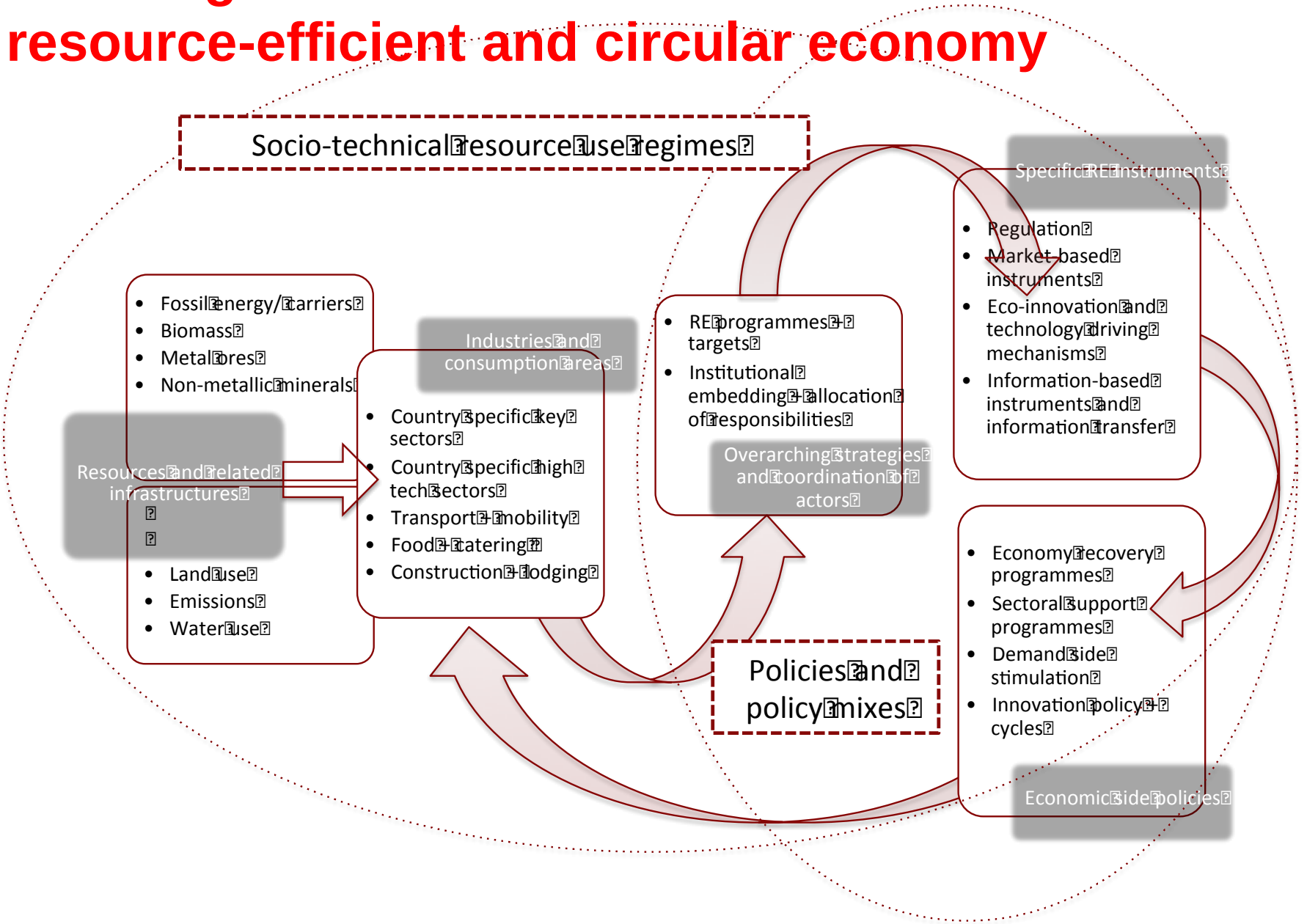
Key trade-offs …

Trade off between waste prevention approaches and policy fields like industrial symbiosis or circular economy
→ less waste generation leads to smaller benefits from recycling

Similar issues with regard to material efficient buildings
→ innovative materials or construction concepts make recycling processes of construction and demolition waste more challenging

Social conflicts
→internalisation of external costs or phasing out of environmental harmful subsidies increases prices

Challenges for a transformation towards a resource-efficient and circular economy



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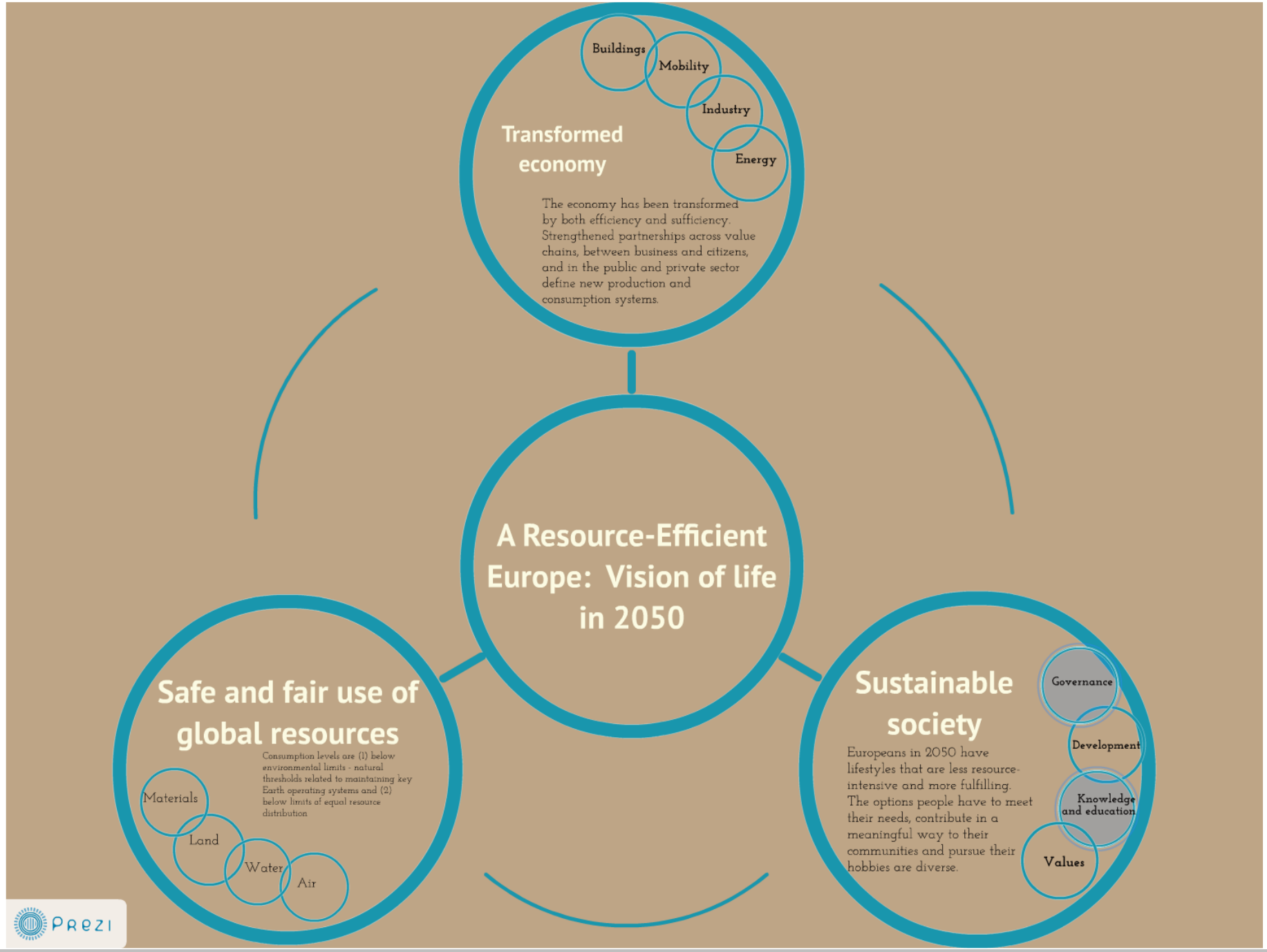

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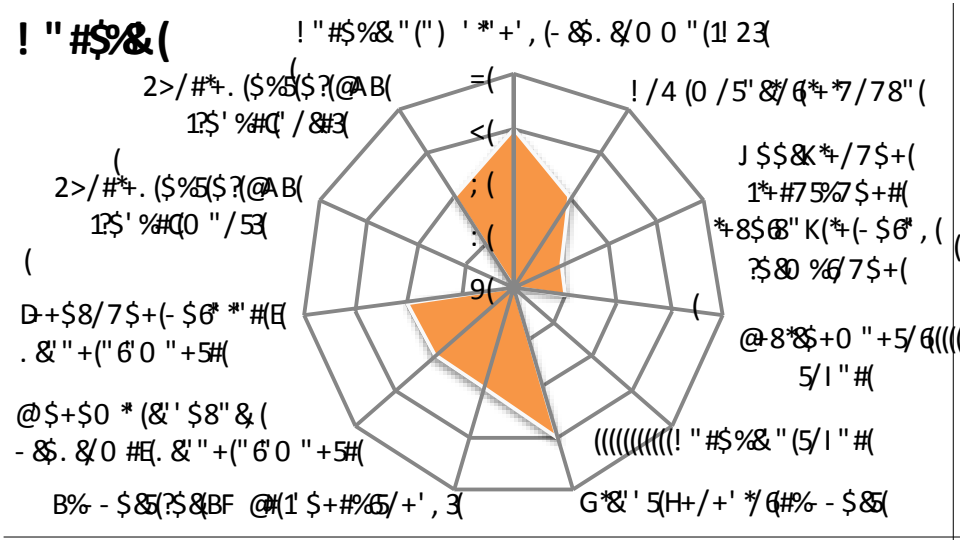
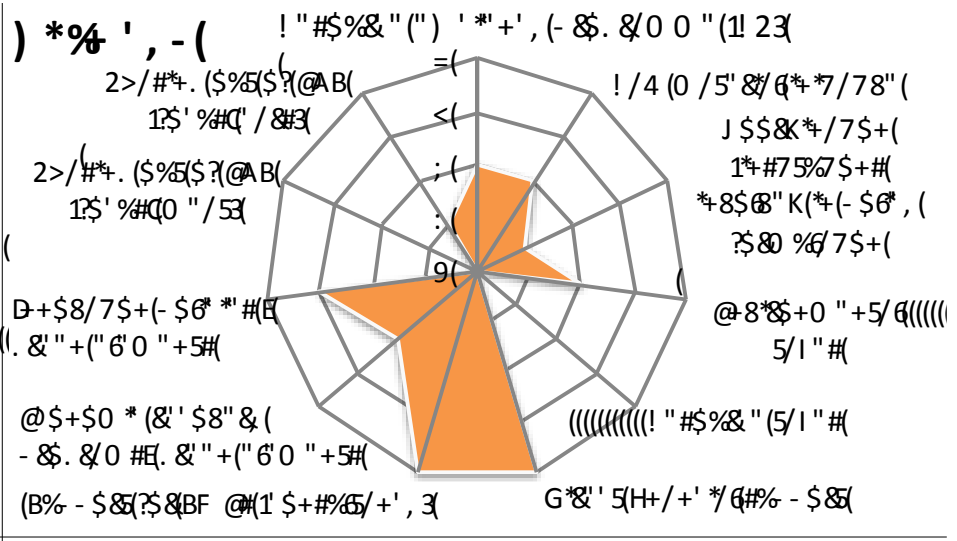
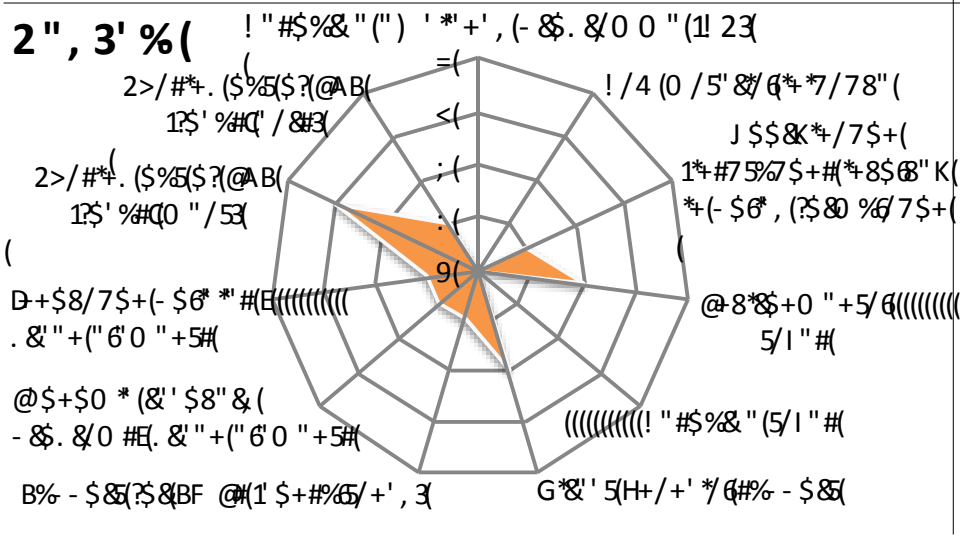
www.wupperinst.org

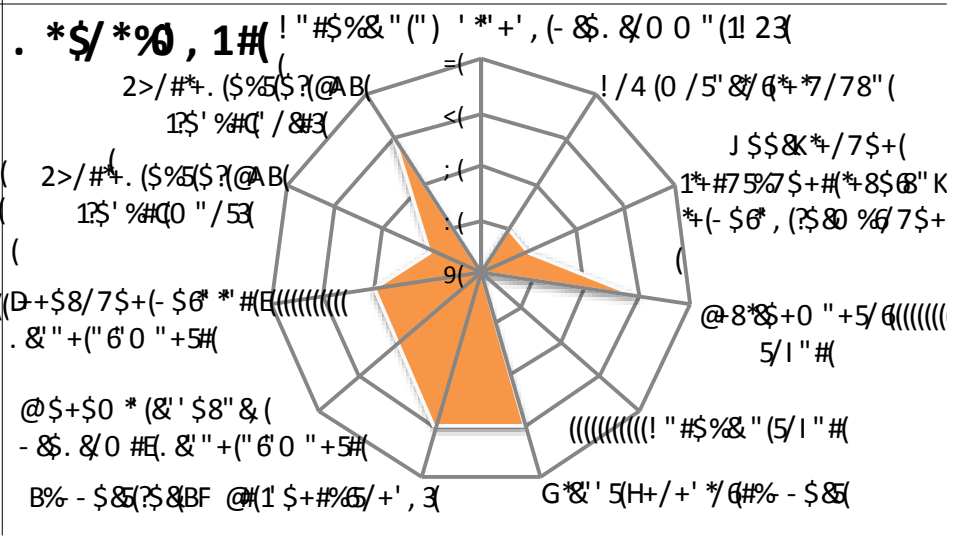
Back up

Resource policy: Configurations with respect to Roadmap requirements

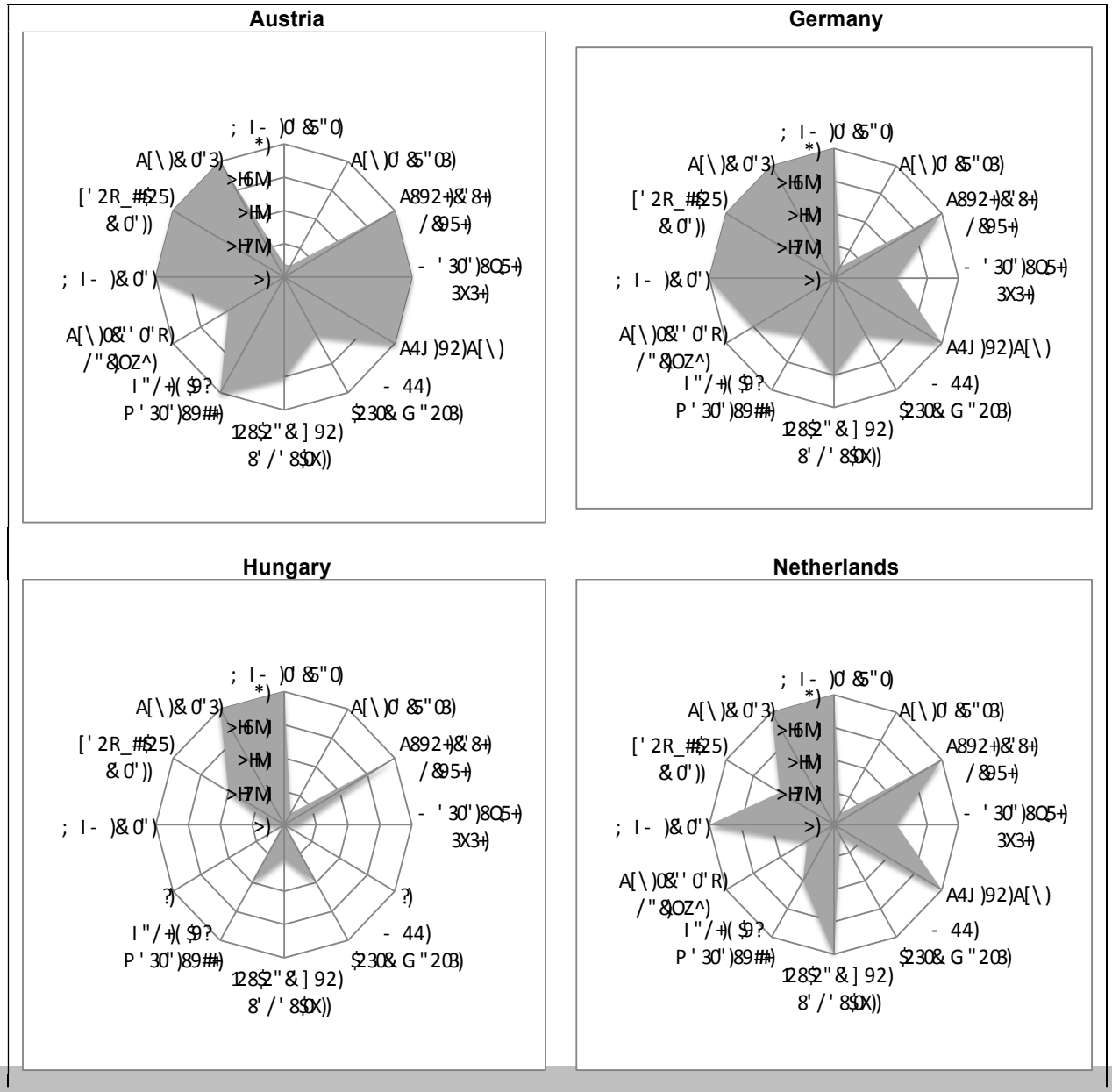








Waste policy: Configuration of waste policies



Resource targets

Resource efficiency / resource productivity of materials

Specified targets

- EU: Phosphate recycling 100% by 2020
- Sweden: Phosphate recycling 60% by 2015
- Japan: Waste limit 23 mt (minus 60%) by 2015

Quantitative time-bound objectives

- Austria: by factor 4 to 10 in 2008-2050
- China: increase of 15% by 2015
- Germany: abiotic by factor 2 in 2004-2020
- Hungary: minus 80% material intensity by 2020
- Italy: minus 75% by 2030, minus 90% by 2050 (no reporting planned)
- Netherlands: by factor 4 by 2030
- Japan: by 50% in 2000-2015

Quantitative objectives

- Sweden: max. 12 mt gravel per year
- UK: 25% construction minerals from responsible sources
- EU: construction minerals recycling 70%
- Belgium: c&d waste recycling 90%
- Japan: materials recovering 14-15% by 2015

General goals

all 35 regions, e.g.
- „dematerialisation“
- „sustainable materials management“
- „efficient use of natural resources“
- 3R – reduce, reuse, recycle

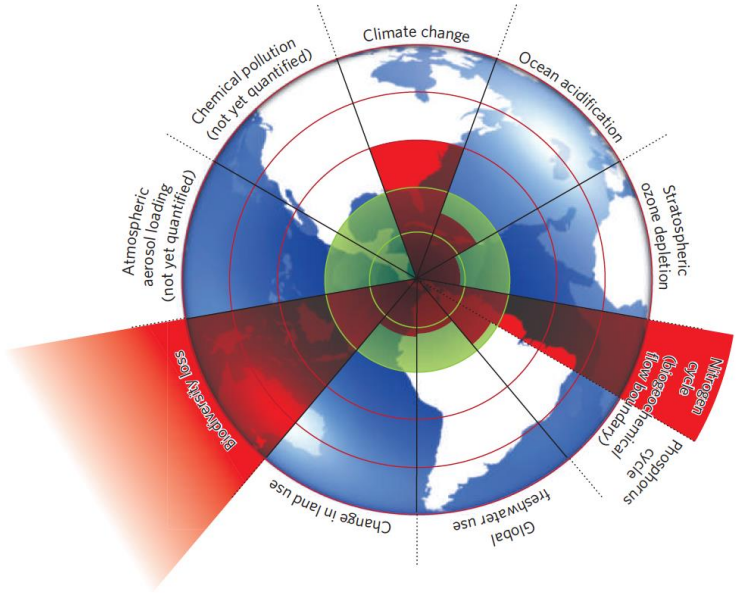
Broad sustainability considerations

- Finland: „sustainable growth through material efficiency“
- China: Doubling of Green investment

Welches Niveau an Primärmaterialverbrauch kann als nachhaltig angesehen werden?

Faktor 10 (1996/1997)

- Halbierung bis 2050 :
Reduktion des Verbrauchs
in den Industrieländern um 90%
- weitere Studien
in ähnlichen Größenordnungen
(BIO IS, SPREAD, SERI u.a.)



Globale Halbierung und Gleichverteilung

- Basisjahr 2000: weltweite Extraktion abiotischer Ressourcen von 100-110 Mrd. t, davon 32 Mrd. genutzt = 16-18 t/Kopf
- 9 Mrd. Menschen in 2050 = 5,6-6,1 t/cap

Total minerals, total biotic and raw materials flows
Potential target corridor: return to 2000 level or half of it