

WE CAN  
DO SO  
MUCH  
TOGETHER

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## **Circular Economy in Europe: Examples with different economical backgrounds**

**Based on the evidence collected in the ESPON  
GREECO project**

***Dr Carlos Tapia, geographer***

***Circular Economy and Third Industrial Revolution:  
Spatial challenges for Luxembourg  
Luxembourg, 14th September 2017***

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# Index

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1. An overview of the GREECO project

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2. Some 'take-aways' from the GREECO project

---

3. Some examples of what regions and cities can do in support of a circular economy

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4. Final words

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# Section 1

# The GREECO project: an overview

## About the GREECO project

- GREECO stands for **Territorial Potentials for a Greener Economy**
- A project supported by the ESP  N Programme
- Implementation phase: September 2011 to November 2014
- Our team:



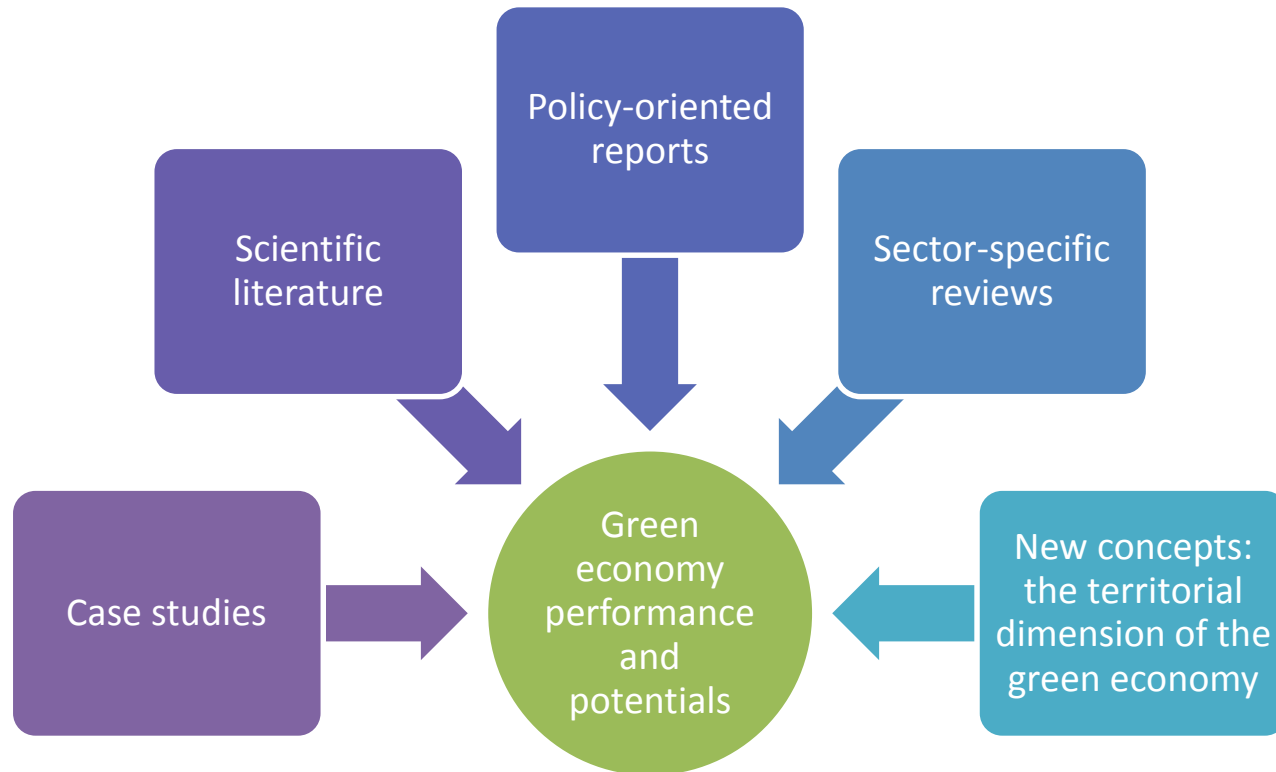
**NORDREGIO**  
Nordic Centre for Spatial Development



REGIONAL ENVIRONMENTAL CENTER

- More info at: <http://www.espon.eu/> (ESPON 2013 – Projects)

# The GREECO project: analytical approach

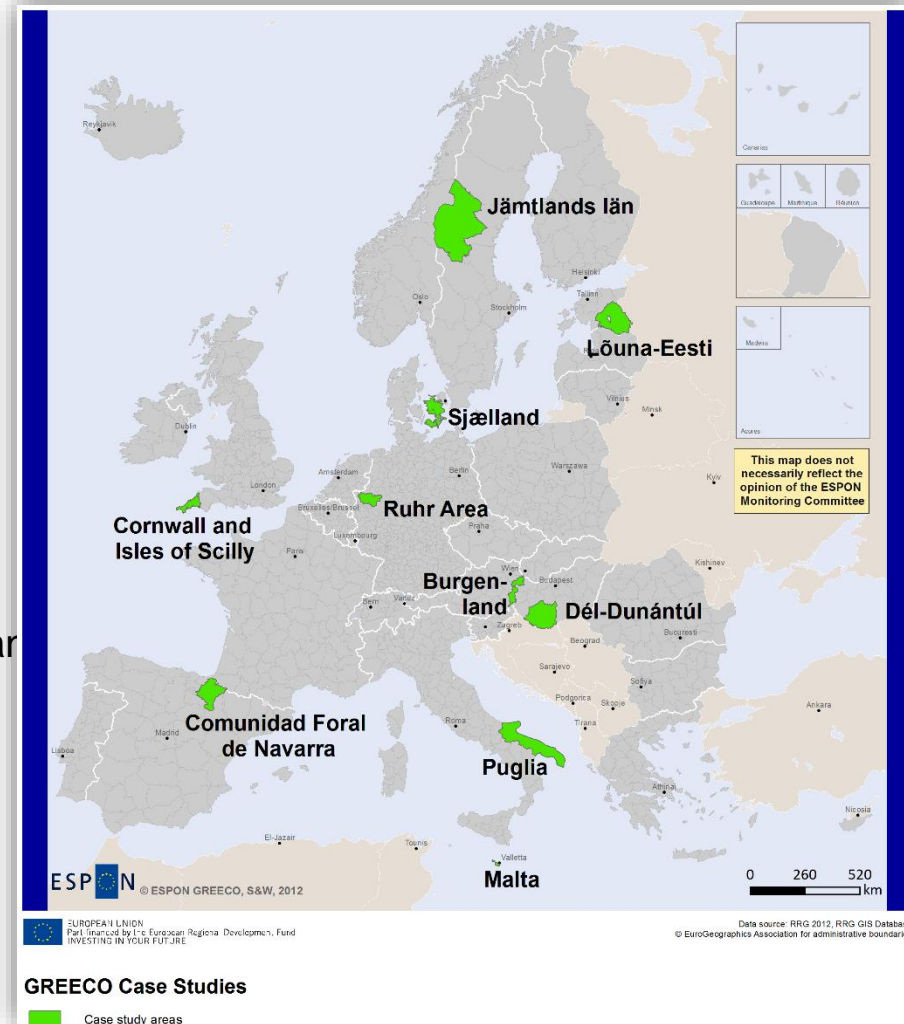


# Sectoral focus and case study areas in GREECO

## Sectoral assessments

- **Bio-economy** - Subsector **forestry and agriculture** by Nordregio (Sweden)
- **Bio-economy** - Subsector **fisheries and aquiculture** by Nordregio (Sweden)
- **Green building and construction** by Nordregio (Sweden)
- **Green research and eco-innovation** by TECNALIA Research & Innovation (Spain)
- **Manufacturing** by TECNALIA Research & Innovation (Spain)
- **Renewable energy** by Nordregio (Sweden)
- **Tourism** by Nordregio (Sweden)
- **Transport** by Spiekermann & Wegener - Urbar and Regional Research (S&W) (Germany)
- **Waste management** by Regional Environmental Center - REC (Hungary):
- **Water management** by Regional Environmental Center - REC (Hungary):

## Case study areas



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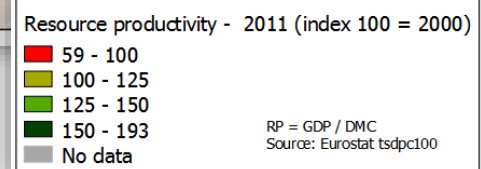
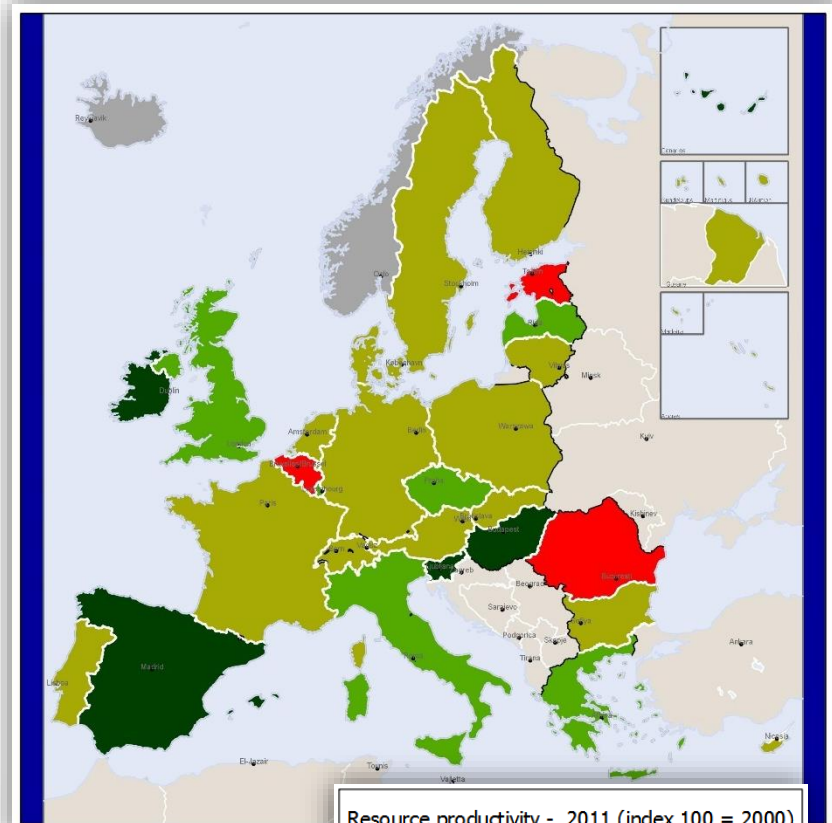
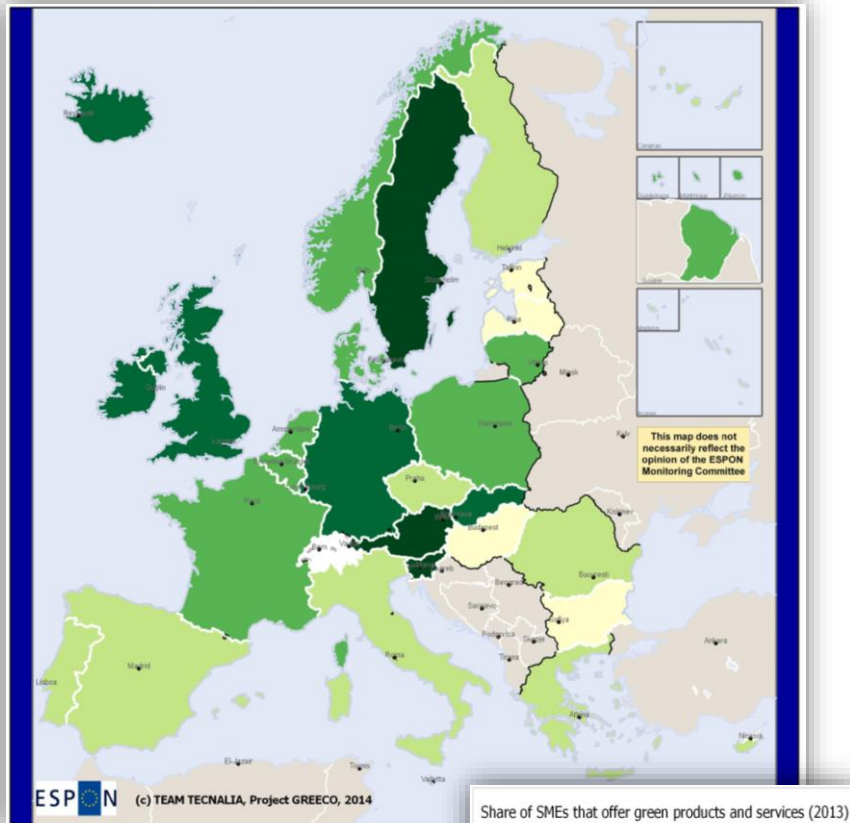
# Section 2

## Some 'take-aways' from the GREECO project

# Take-away 1: The EU economy is 'greening'...

'Green' activities are becoming increasingly important for the EU economy...

... And resource productivity is also increasing...

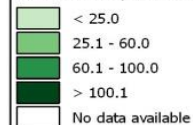




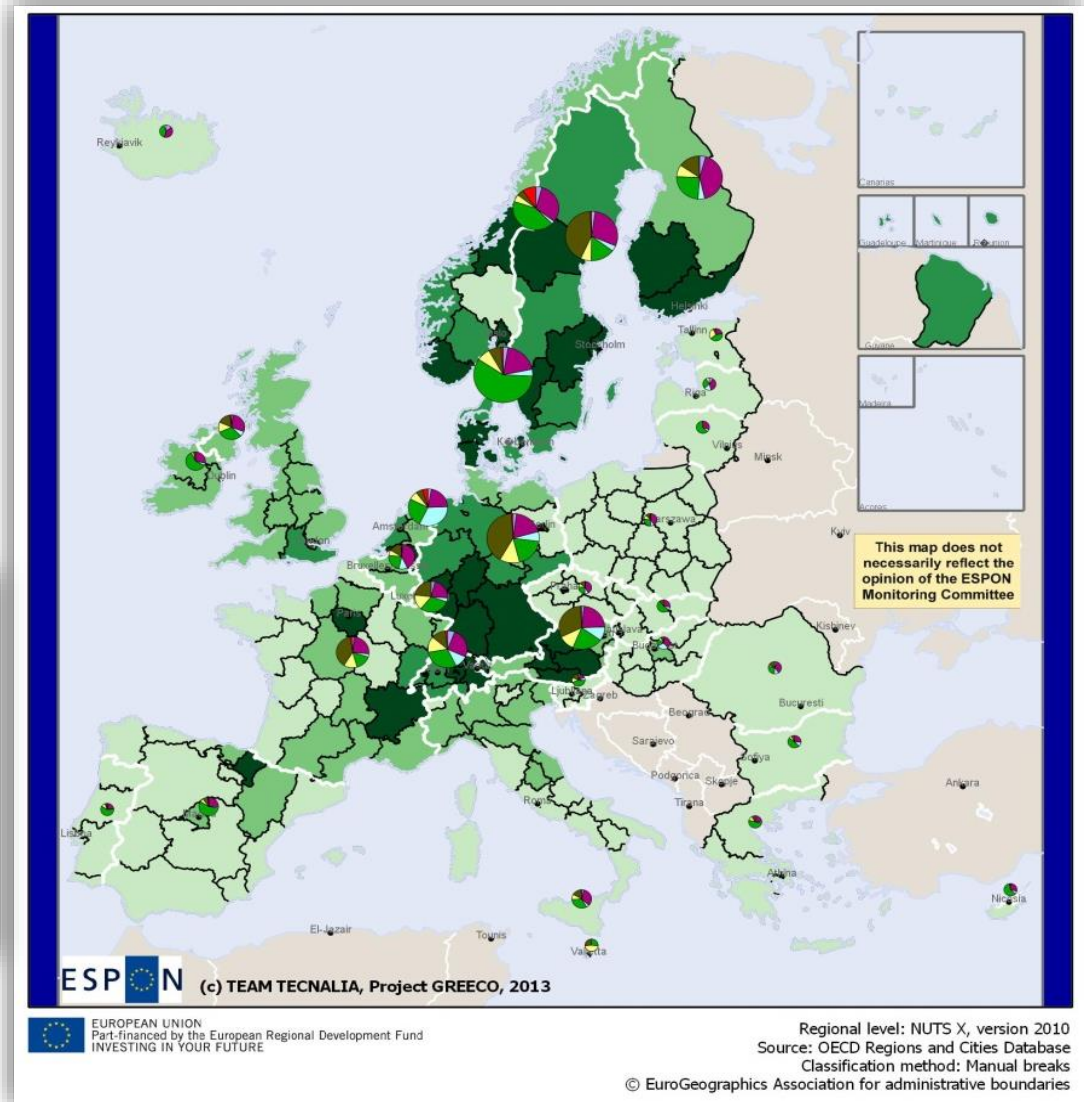
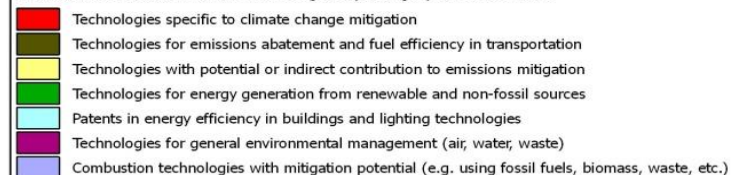
# Take-away 1: The EU economy is 'greening'...

... And much 'green innovation' is already taking place (with a high concentration in some areas)

Accumulated patents in environmental technologies per million inhabitants (2005-2010)

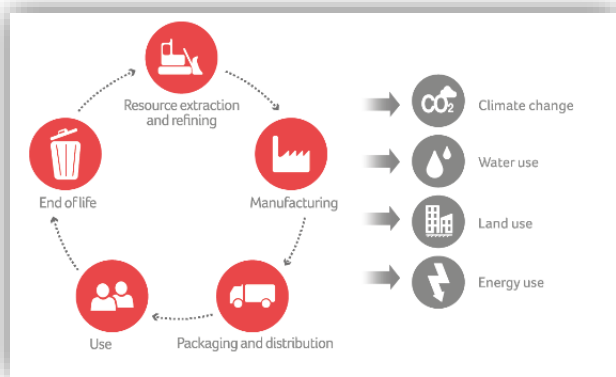


Breakdown of environmental technologies by category at NUTS0 level

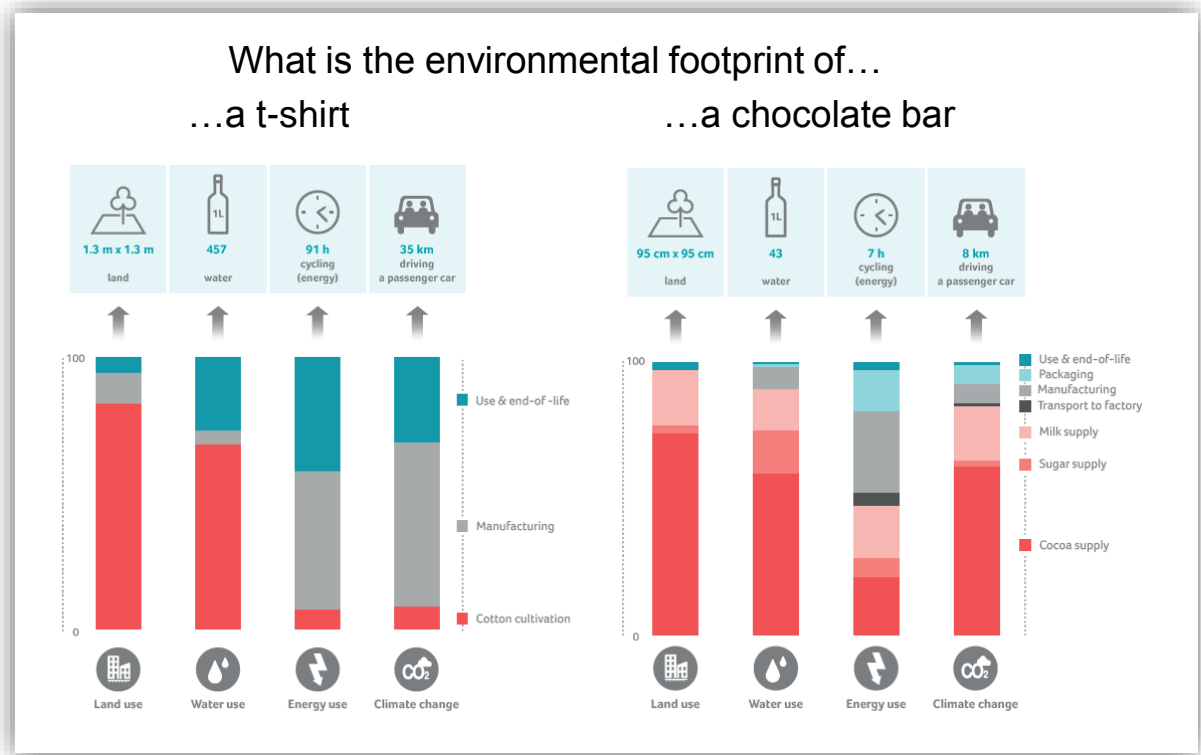


## Take-away 2: ...but there are some 'uncertainties'

**Deep sustainability implications:** the sustainability implications of new technologies (considering environmental, social and economic considerations) should be evaluated over the whole life cycle of products and services, 'from cradle to grave'.



Source: Ecoinvent



→ **Life Cycle Thinking** should be the key evaluation tool for assessing the sustainability implications of specific technologies.

## Take-away 2: ...but there are some 'uncertainties'

**Burden shifting:** e.g. 'sustainable' energy sources could be developed on the basis of landscape degradation

Figure 2.8-4. Ethanol Lifecycle GHG Results (NPV, r=2%, T=100 years)

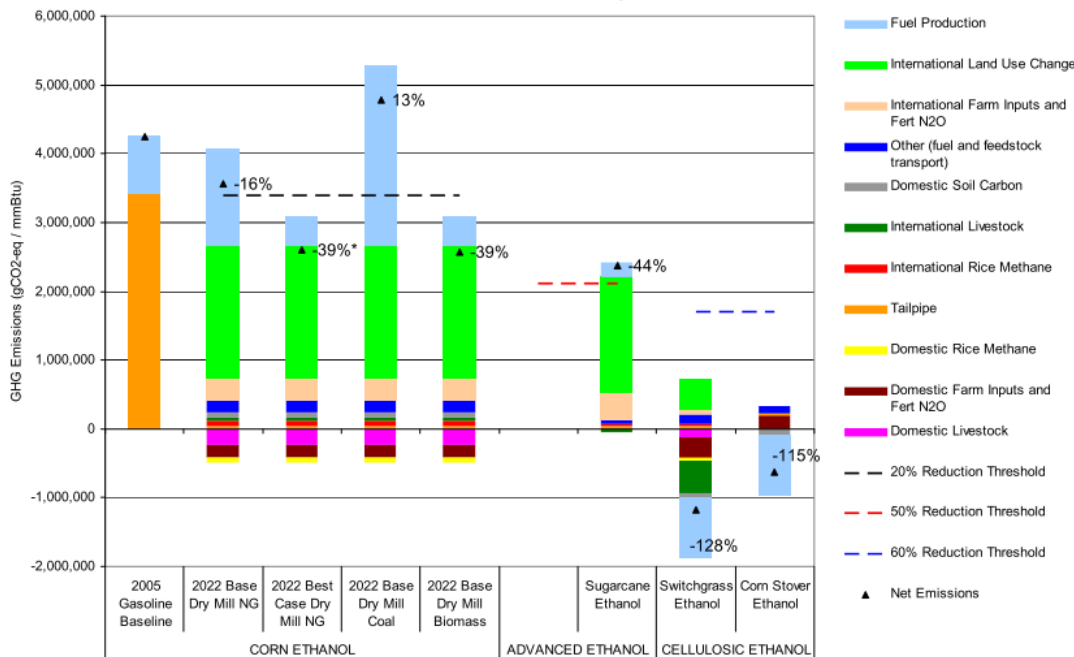
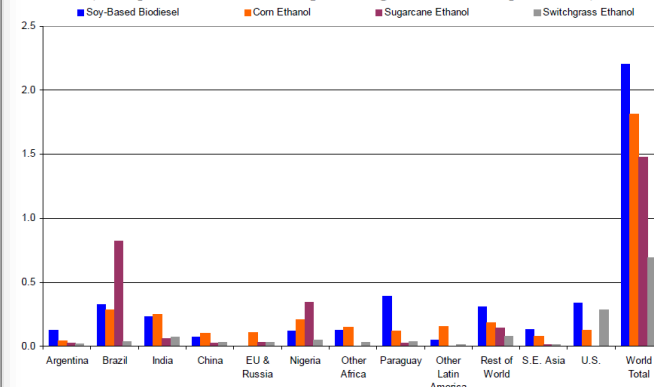


Figure 2.1-4. Regional Crop Expansion by Renewable Fuel, 2022 (acres per thousand ethanol equivalent gallons of biofuel production)

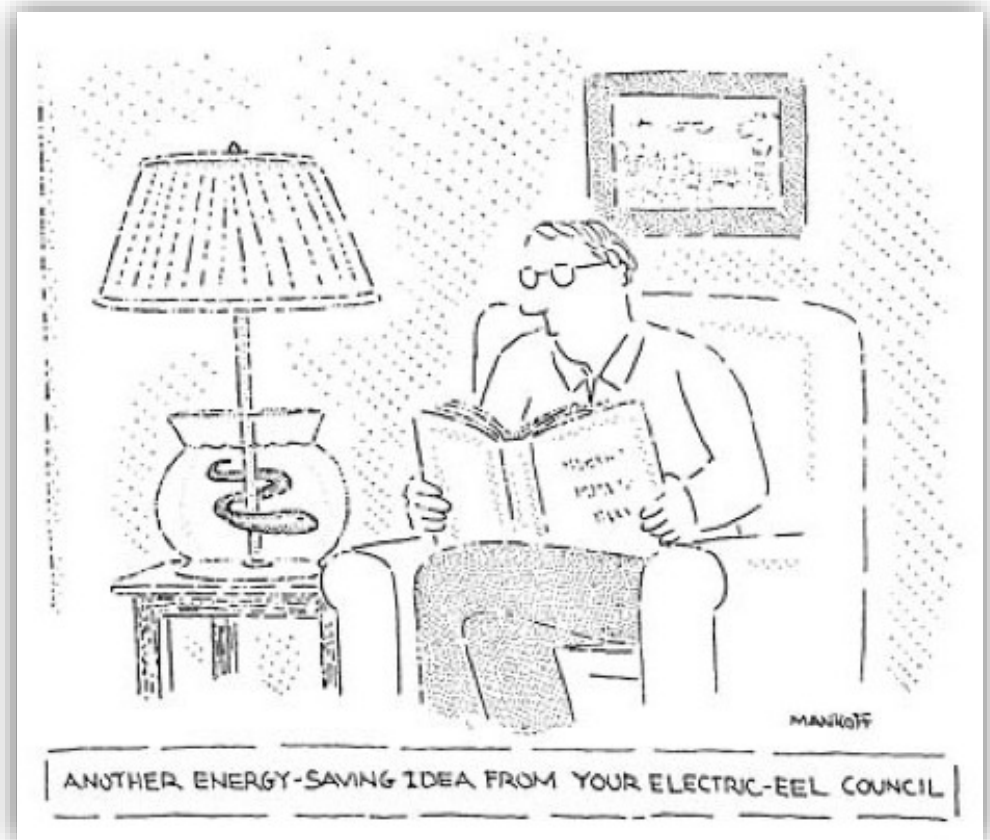


Source: US EPA, 2009. Draft Regulatory Impact Analysis: Changes to Renewable Fuel Standard Program.

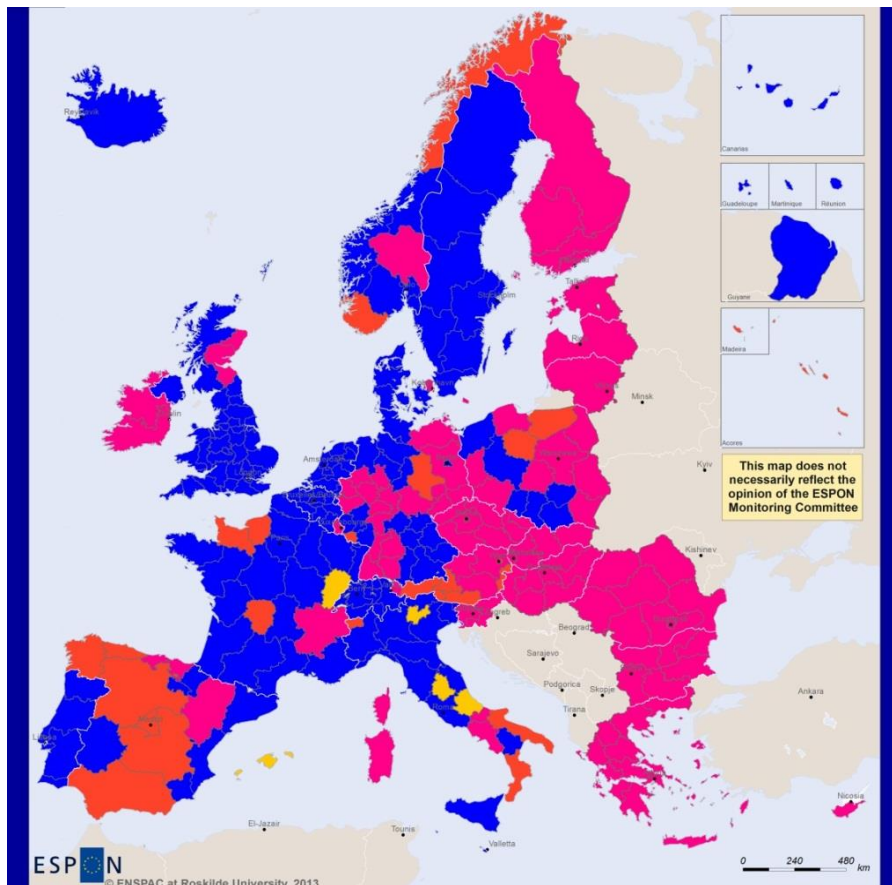
## Take-away 2: ...but there are some 'uncertainties'

**Rebound effects:** e.g., the savings on the fuel bill of more efficient cars could be spent on a larger combustion engine...

→ The progress in resource efficient innovations has to be accompanied by other measures to guide consumption towards a **responsible use of resources**



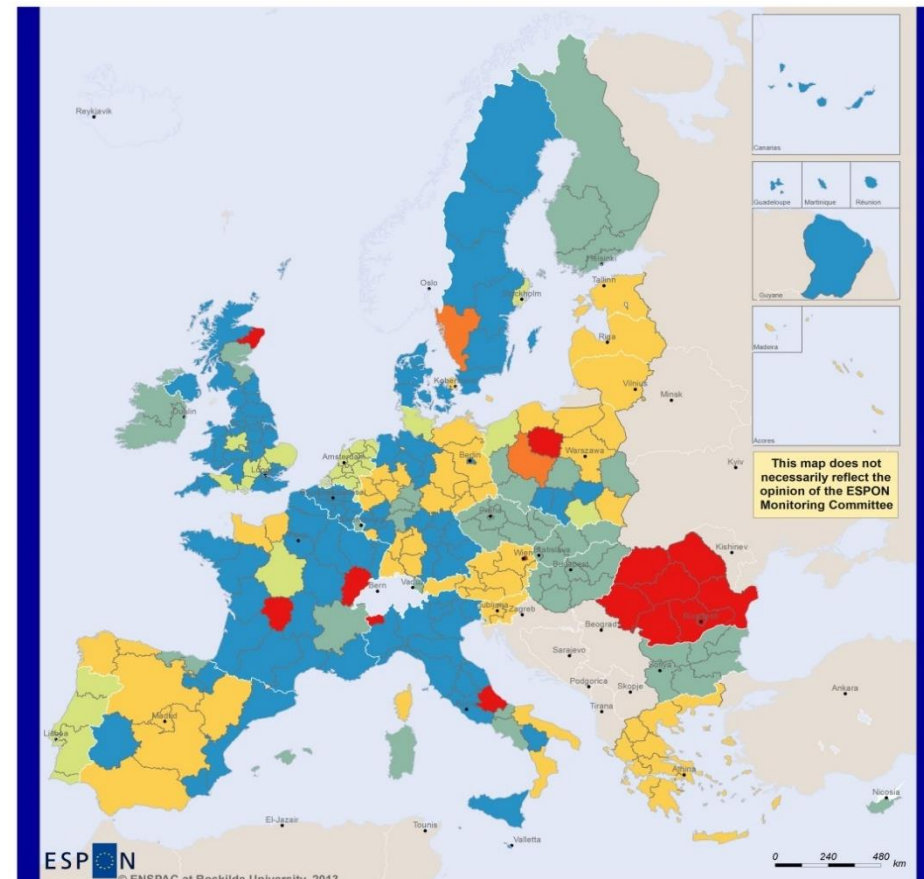
# Take-away 3: Absolute decoupling should be the goal!



$y < 0 < fec$ 
  $0 < y < fec$ 
  $y > fec > 0$ 
  $y > 0 > fec$

**Absolute relinking**      **Relative relinking**      **Relative delinking**      **Absolute delinking**

**Delinking typology of NUTS-2\* regions 2000-2008: correlation of final energy use growth (based on growth rates of GDP [y] in 2005 prices and final energy consumption [fec] 2000-08)**



EUROPEAN UNION  
 Part-financed by the European Regional Development Fund  
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Regional level: NUTS 02  
 Sources: EUROSTAT, national statistical institutes  
 Origin of data: Regional economic accounts, energy statistics  
 © EuroGeographics Association for administrative boundaries

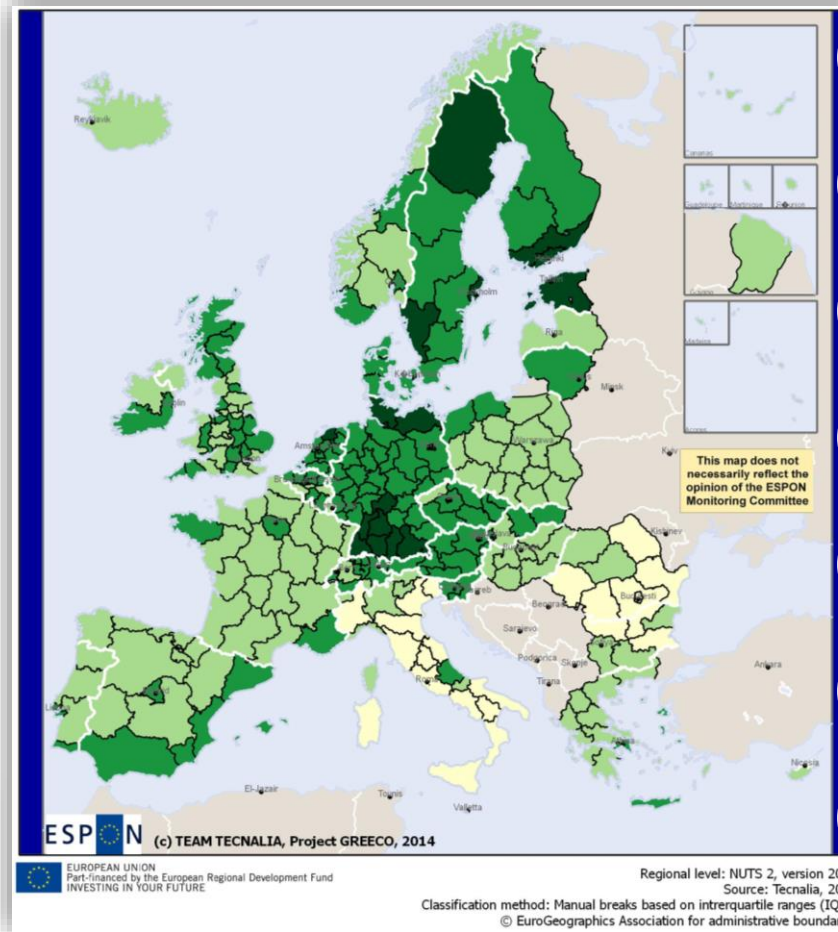
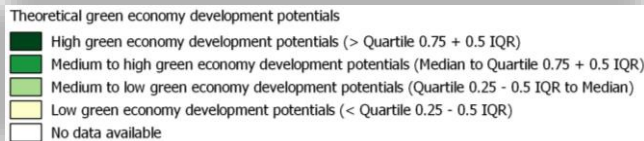
**Typology based on the labour/final energy intensity indicator change 2008- (l = growth rate of employment, fec=growth rate of final energy use) (Identical types of NUTS2 regions within NUTS1 or NUTS0 territories may indicate that data only exist at the higher level)**








$l < 0 < fec$ 
  $l < fec < 0$ 
  $0 < l < fec$ 
  $0 > l > fec$ 
  $l > fec > 0$ 
  $l > 0 > fec$

# Take-away 4: A territorial approach is needed

Not all regions have the same conditions to support a transition to a green/circular economy

## Regional typology of theoretical green economic potentials at NUTS-2 level (2013)



-  Good governance
- +
-  Financial support
- +
-  Territorial assets
- +
-  Access to technology
- +
-  Expected market demand
- +
-  knowledge and skills
- +
-  Voluntary actions

## Take away 5: Policy support is crucial...

...and **long-term transformative approaches** are those that yield better results.

	Green economy performance	Access to funding	Governance setting	Knowledge and skills	Expected market demand	Physical assets	Access to technology	Awareness
Green economy performance	1,000	-0,144	<b>0,612</b>	0,096	0,120	-0,165	<b>0,581</b>	0,109
Access to funding		1,000	-0,173	0,151	-0,024	-0,143	0,017	-0,076
Governance setting			1,000	0,189	0,071	0,034	<b>0,439</b>	-0,053
Knowledge and skills				1,000	0,047	-0,443	0,288	-0,162
Expected market demand					1,000	-0,202	-0,024	0,211
Physical assets						1,000	-0,281	0,051
Access to technology							1,000	-0,050
Awareness								1,000

Our linear model relating green economy performance and green economy factors shows that the **governance setting** and **access to technology** are the most influential factors.

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## Section 3

**Examples of what regions  
and cities can do in  
support of a circular  
economy**



# 1. Integrated planning

- Spatial planning
- Smart transport
- Circularity systems
- Ambitious targets

## Encourage regeneration & 'circularity' through spatial planning



The Bilbao Zorrozaurre Master Plan by Zaha Hadid

© www.zorrotzaurre.com

- Encourage space regeneration:** Practical measures beyond ambitious masterplans:
- **Tax land value rather than buildings** or other improvements to the property, so that owners have an incentive to develop the land to its most profitable use, thus encouraging development in the urban core. Source: OECD Green Cities (2013).
  - **Allocate land to the degree of 'circularity'**. Rebates on land prices can be given to projects that have a maximum score on circularity. Source: Circular Amsterdam (2016)

**Encourage mixed (but compatible) land uses.** Designers should aim are pedestrian-oriented places that place compatible land uses, public amenities, and utilities together at various scales and intensities.

## Sustainable spatial planning: a success story... hopefully

### HafenCity Hamburg

- 157 ha of former port and industrial land
- Will expand the area of Hamburg City by 40%
- Development timescale: 1997-2025/30
- **Fine-grained mix of uses**
- 1,800 residential units are completed by 2017
- 12,000 people already work in HafenCity
- More than 730 companies.



HafenCity masterplan (© HafenCity Hamburg GmbH)



HafenCity in 1997 (© HafenCity Hamburg GmbH)



HafenCity in 2017 (© HafenCity Hamburg GmbH)

# Design sustainable transport systems

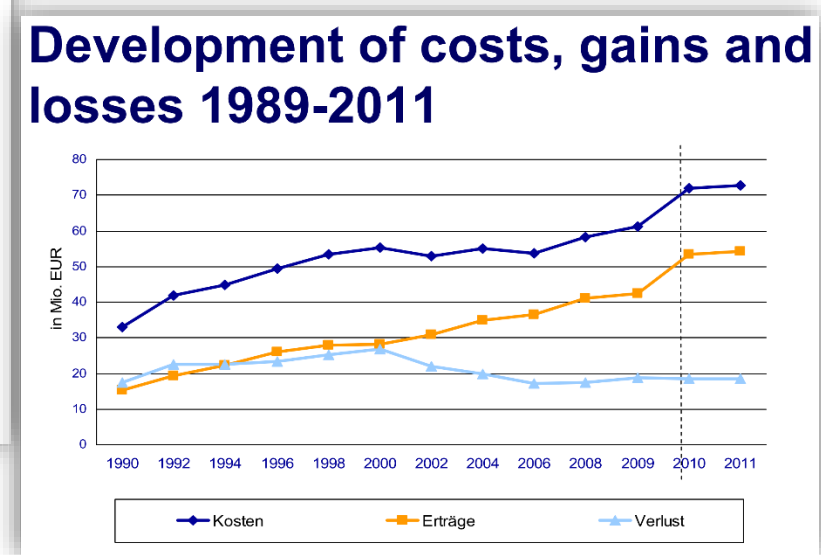
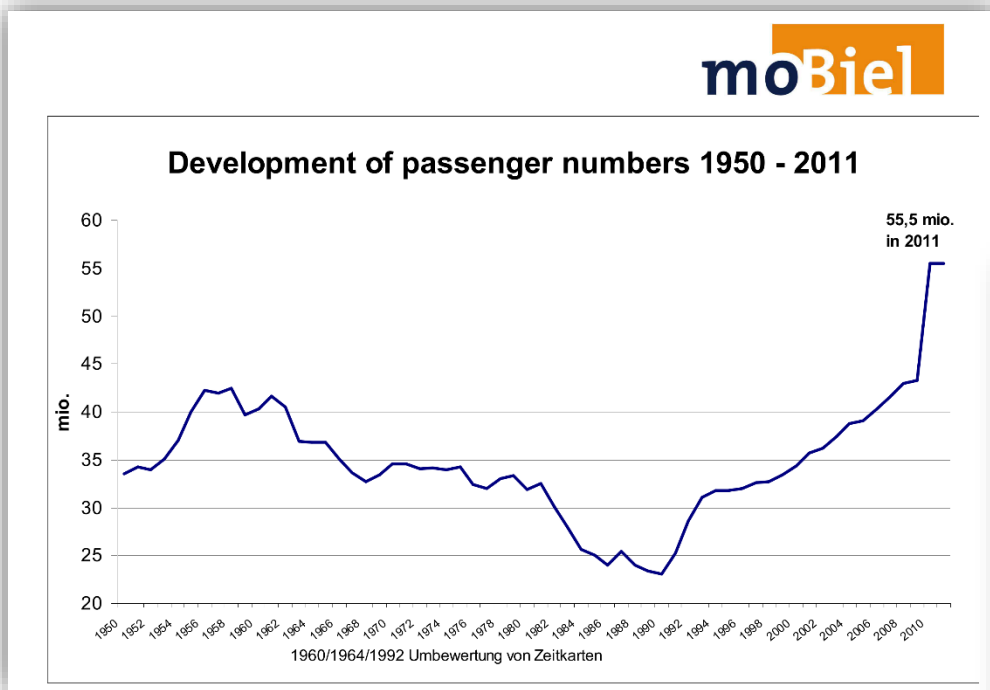
Enable, promote (and eventually enforce) **alternative forms of mobility** across cities and peri-urban regions of functional distances though:

- **Sustainable urban planning:** plan for urban designs that minimize car transport needs.
- **Support behavioural change:** Plan offer incentives for alternative transports and discourage car use.

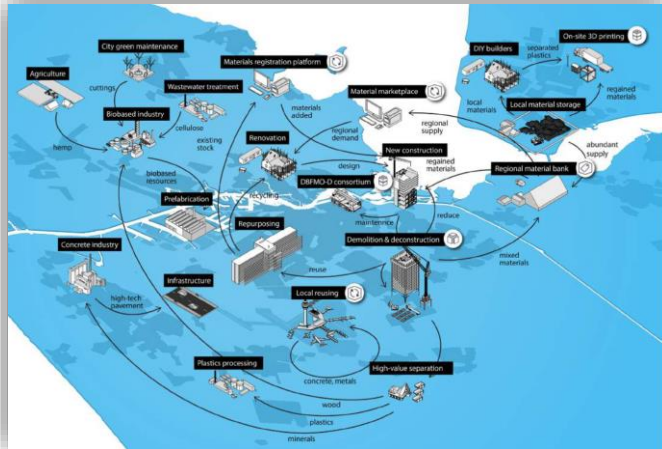


# Sustainable transport planning: a success story

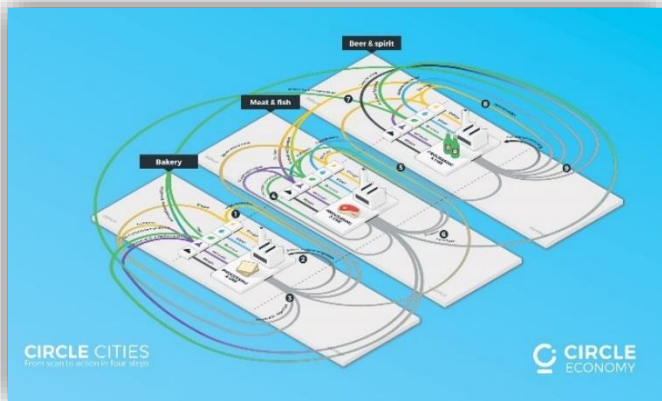
Bielefeld's public transport system was transformed through well-designed, long-term, structural interventions.



# Plan for 'circularity': support circular systems



The Circular Amsterdam strategy (2016)



The Glasgow Circle City Scan Approach (2017)

Within their physical planning powers, local and regional authorities should collaborate with national authorities in the following areas:

- **Materials:** in particular the use of Secondary Raw Materials in the construction sector, which consumes more than 50% of all extracted materials in Europe.
- **Water and waste:** Cities hold the keys to awareness raising and separate waste collection. Regions are better placed to organize functioning regional waste management systems. Both levels may be appropriate for establishing **industrial ecology systems** like industrial symbiosis platforms.
- **Energy:** An increased regional/local perspective will be crucial to incorporate renewable energy in energy systems, and it will also intensify the implementation of support schemes by regional/local authorities.

## Plan for ‘circularity’: a success story focusing on materials

### The Flanders Material Programme:

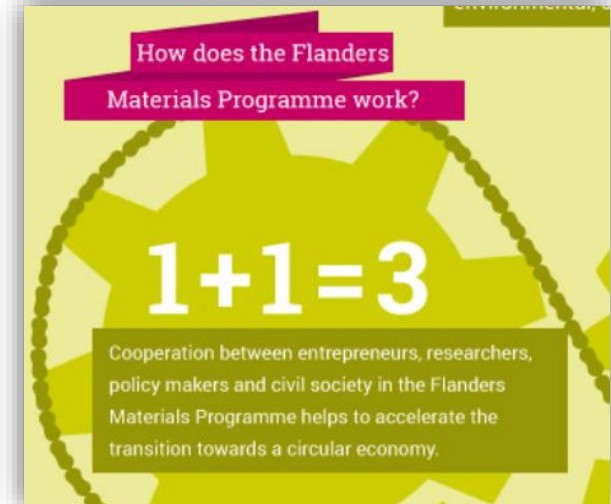
It's a **P**ublic-**P**riate **P**rogramme launched in 2012

Aims to:

- Close material cycles;
- reduce dependency on imported materials;
- reduce the impact on the environment;
- promote innovation, entrepreneurship, growth and employment;
- making our industry more competitive.

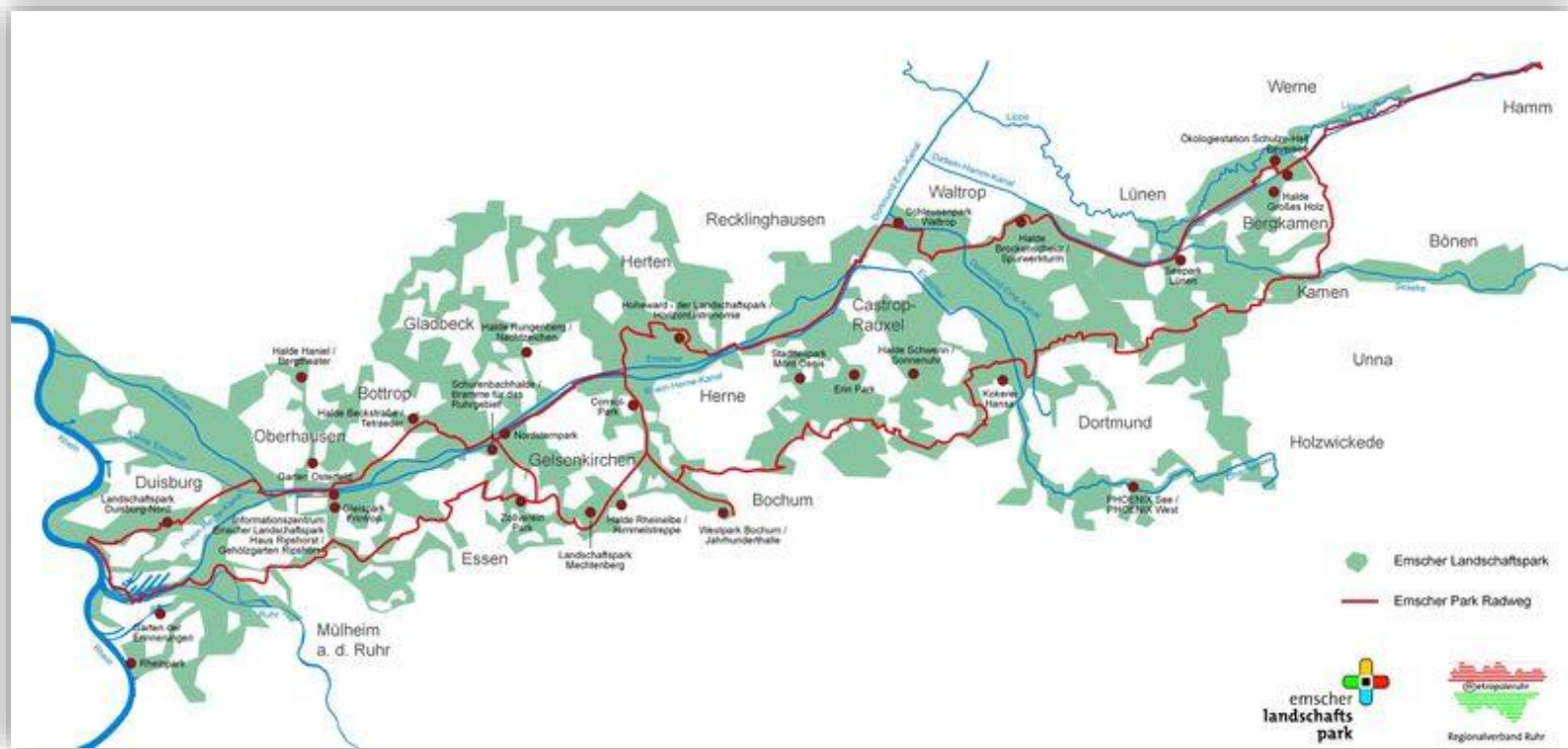
Through:

- sustainable design of products;
- more efficient production;
- more repair and reuse of products;
- waste prevention;
- state-of-the-art recycling.



## Plan for 'circularity': a success story focusing on water management

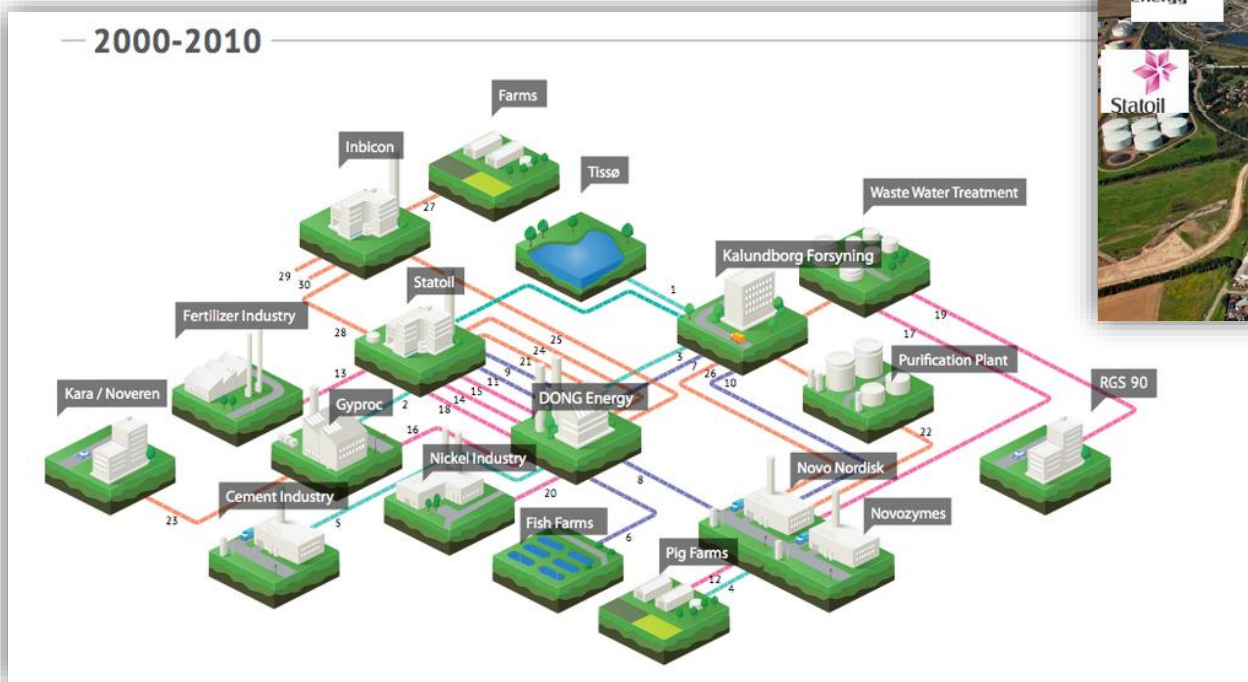
The **Emscher Master Plan** in the Ruhr area is a good example of integrated urban and regional planning for sustainable management of water resources





# Plan for 'circularity': a success story focusing on industrial systems

## Kalundborg's Industrial Symbiosis



Source: symbiosis.dk

### Resource savings:

- Ground water: 2,0 mill. m<sup>3</sup>/year
- Surface water: 1,0 mill. m<sup>3</sup>/year
- Natural gypsum: 200,000 tons/year
- Oil: 20,000 tons/year
- CO<sub>2</sub> emission (2008): app. 275.000 tons

# Set ambitious targets

Going beyond compliance can boost the circular economy...

For example, **London** has set targets for 70% commercial recycling/composting by 2020 and 95% of construction and demolition waste by 2020.

These goals are more ambitious than national and EU targets.



## 2. Market tools

- Certifications
- Procurement
- Financial support

# Certification

- Certification policy, both for products and processes, is a powerful market signalling tool.
- It may gradually transform a market, by increasing consumer choice and awareness.
- Certification develops a process that is workable for all industries on equal basis.
- Certification practices produce internal and significant effects to foster eco-innovation within companies.
- Certification gives companies a competitive advantage over rivals
- And of course contribute to ensure legal compliance and improve the long-term environmental performance.



# Certification: a success story

## Leadership in Energy and Environmental Design (LEED)

- LEED began development in 1993
- It is now the most widely used green building rating system in the world
- More than 90,000 projects using LEED
- >200 thousand square meters are LEED certified every day
- Certification is based on an assessment of the building's impact in the following five categories: **sustainable sites**, **water efficiency**, **energy** and **atmosphere**, **materials and resources**, and **indoor environmental quality**.
- LEED is currently being used in planning contexts to support 'sustainable zoning'. E.g. in the City of Vancouver



Source: [www.usgbc.org](http://www.usgbc.org), <http://vancouver.ca>

# Green Public Procurement

GPP can:

- Save consistent economic resources
- Bring-about substantial environmental benefits (e.g. CO2 abatement, less material consumption, etc.)
- Improve the quality of life, via higher quality standards of products/services, including health and safety aspects.
- Demonstrate the public sector's commitment to environmental protection.



Source: EC (2017)  
<http://ec.europa.eu/environment/gpp>

# Financial support tools

Public Administrations should align public spending with environmental goals though:

- Direct investment
- Subsidies
- Loans
- Tax breaks
- Public-Private Partnerships
- ...

Source: OECD (2013) - Green Growth in Cities

# Financial support tools: a success story

- The **City of Gothenburg** issued the very first Nordic **green bond** in September 2013.
- Developed by SEB together with The World Bank and other Swedish investors.
- Part of a potential SEK 2 billion green bond programme from Gothenburg to help fund environmental projects.



City of Gothenburg



## 3. Engagement

- Participation
- Training and education

# Participation

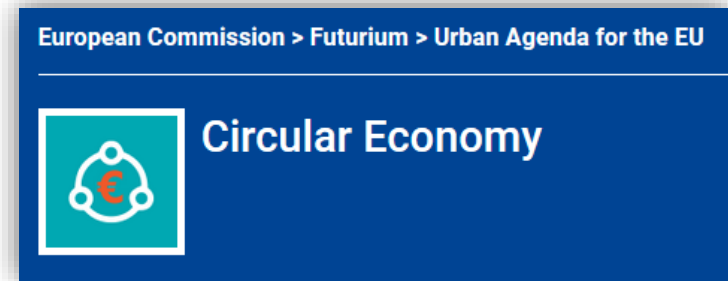
## Encourage participation:

“The circular economy requires close cooperation between sectors and chains. A lack of inter-sector networks and a conservative culture can be obstacles to quickly forming successful cooperations.”

Source: Circle Amsterdam (2016)

## And participate in active networks :

- **Partnership on Circular Economy** linked to the Urban Agenda,
- **Circular Cities Network** by the Ellen MacArthur Foundation, etc.
- ICLEI’s **Local Governments for Sustainability**
- **Association of Cities and Regions for a Circular Economy** by ACR+ ...



# Invest on training and education

Communication can help raise public awareness, change consumption habits and increase market penetration for green goods and services.

Ways to communicate:

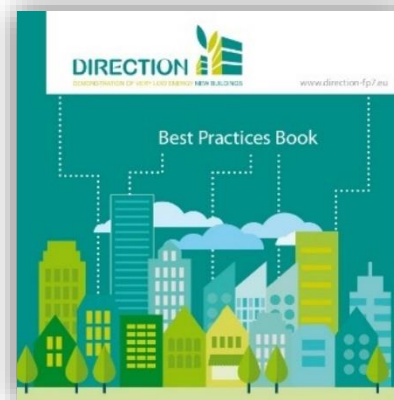
- Awareness campaigns
- Consumer education programmes
- Best-practice demonstration (sites, compiltations, etc.)



Source: FAO



Source: UNESCO



Source: EC

## Wrapping-up

- 1. Planning tools:** towards an **integrated planning** approach, particularly in relation to **transport, land-use, energy** and **service provision**.
- 2. Market tools:** send clear signals to the market via **public procurement**, the use of **eco-certifications** and **financial tools**.
- 3. Engagement tools:** **participate** in existing networks and invest on **awareness and training** to speed up transitions.

# Thank you for your attention!



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