Achieving a resource efficient economy in Europe in 2050: Modelling results

A Presentation to the Ellen MacArthur Foundation's Disruptive Innovation Festival by

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Background

The model and the scenarios

Background

► The GINFORS model

⇨ GINFORS = global dynamic EE-MRIO

⇨ Coverage and degree of detail of current version 3:

- 38 countries + region „Rest of World"

- 59 product groups, 35 industries, 27 energy carriers, 7 raw materials, 13 crop groups, 4 water abstraction sectors

- National sector accounts with more than 100 posting items

⇨ Theoretical foundation: Neo-Keynesian

⇨ Empirical foundation:

- WIOD as main database

- Behavioural parameters derived by econometric analysis

► In POLFREE linked with LPJmL

⇨ Global bio-physical model by PIK, that projects crop growth

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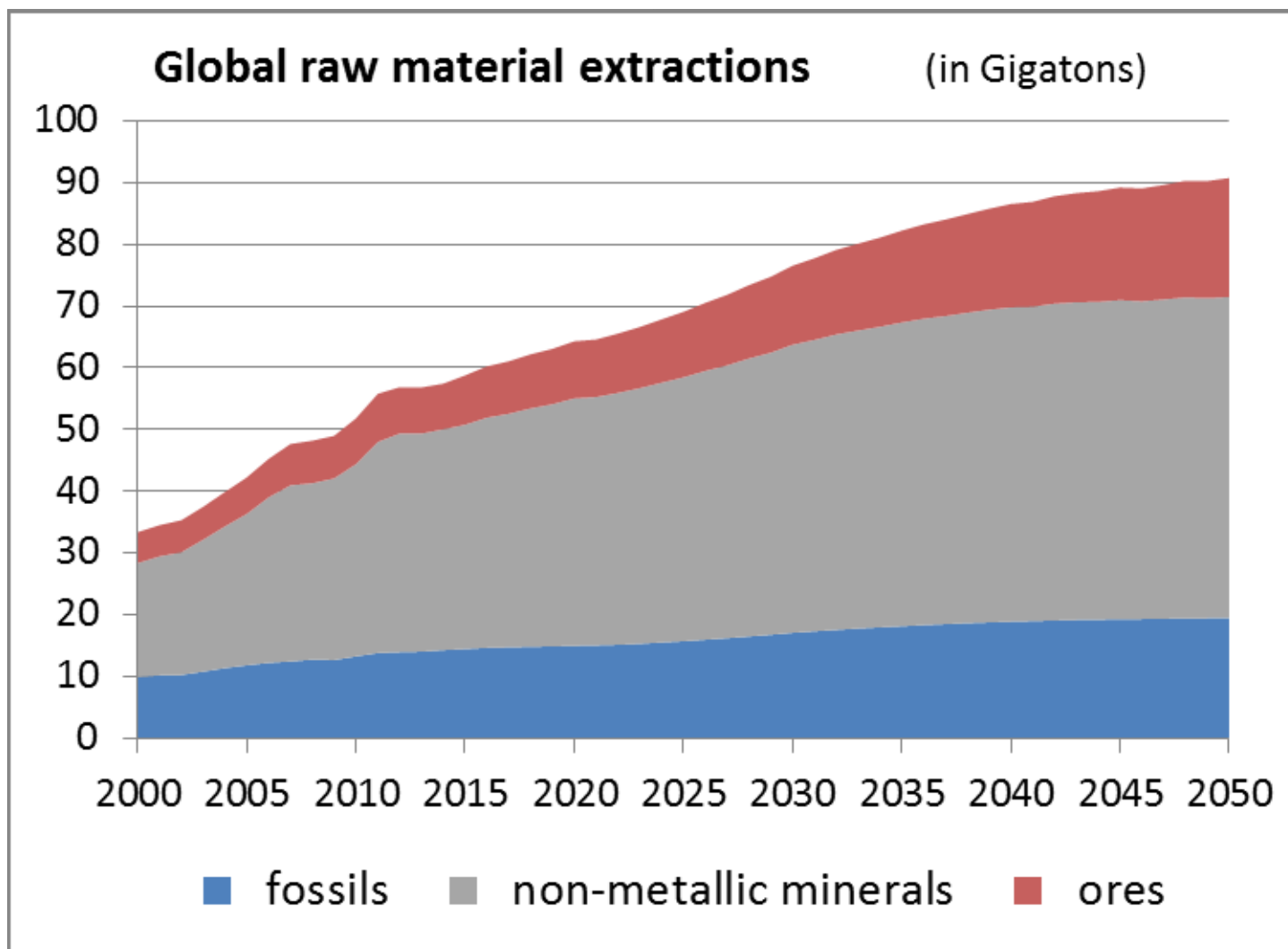RESOURCE EFFICIENT ECONOMY

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Background

The Scenarios (up to 2050)

► A **Reference Scenario** that shows a plausible pathway, if technology and behaviour continues to change like in the past and (environmental) policy does not change.

► Three transition scenarios **Global Cooperation, EU Goes Ahead** and **Civil Society Leads** that ask for policy measures and behavioural changes that are needed for a simultaneous achievement of key environmental targets for the EU

⇨ GHG emissions reduced by > 80% (compared to 1990)

⇨ RMC per capita reduced to less than 5 tons

⇨ Crop land footprint per capita reduced by > 30%

⇨ Water exploitation indices below 20%

Key findings

The development up to 2050 in the Reference scenario

Key findings

Global raw material extractions (in Gigatons)

Legend: fossils, non-metallic minerals, ores

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Key findings

► What else?

⇨ Global CO2-emissions climb up to 45 Gigatons, which means that the world is on a RCP6.0 pathway

⇨ Global agricultural land increases by more than 3.9 mio. km^2 (nearly half the size of Brazil) within the next 35 years

- Ongoing deforestration and biodiversity losses

⇨ Further increase of global water abstraction (+5%)

- Ongoing/increasing pressure on freshwater resources

⇨ Global crop demand for food, feed and processing purposes increases faster than crop production

- Accelerating crop prices with negative impacts on poverty and food security

⇨ and from a EU27 perspective: despite demographic change ongoing unemployment problems

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Key findings

The policy impacts in the transition scenarios

Key findings   Policy impacts in the transition scenarios

- Modelling of policy measures and behavioural changes in POLFREE based on research by the Wuppertal Institute

  – In each of the three transition scenarios a set of 20 to 30 single policy measures / behavioural changes is considered

Key findings Policy impacts in the transition scenarios

1. **Set the prices right**
   - Examples: ETR / ETS; fade out of EHS
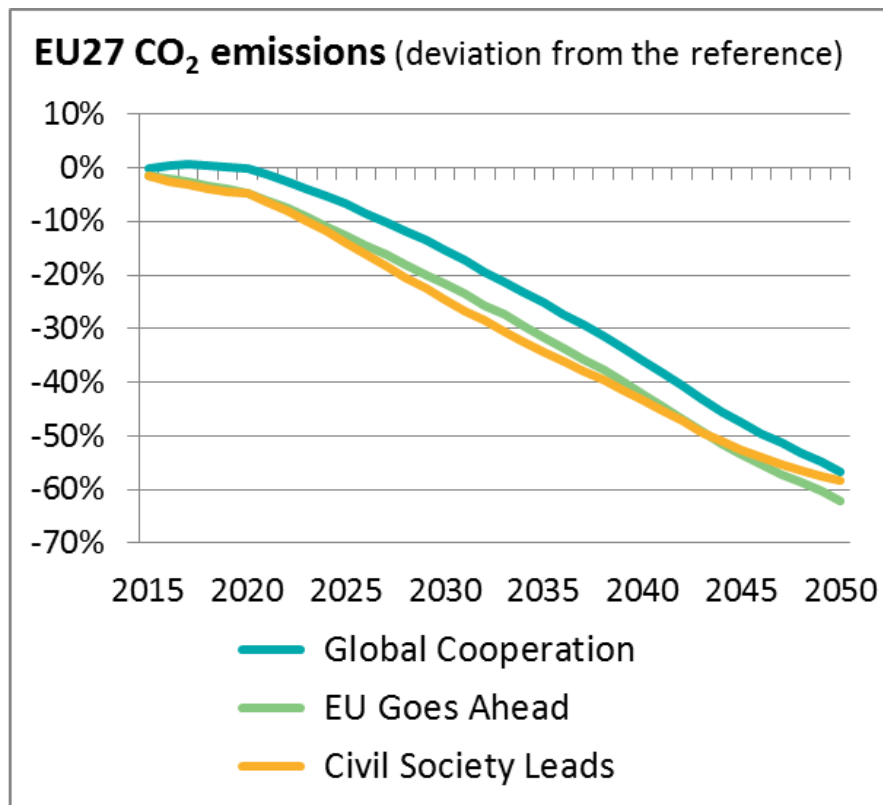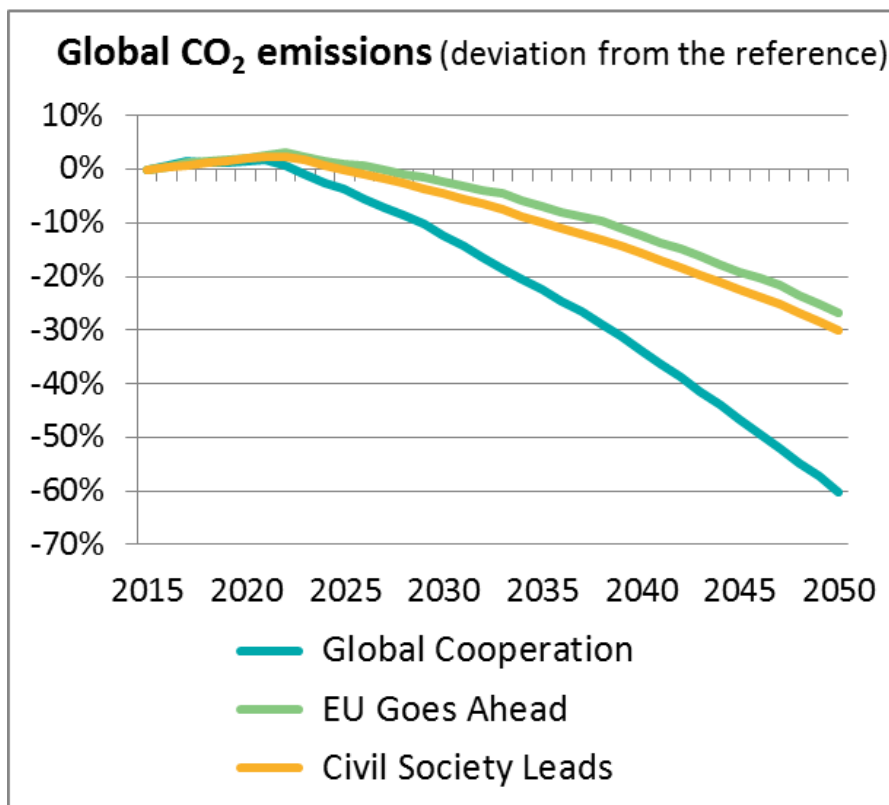
2. **Regulation**
   - Examples: Binding targets for e.g. Renewables, Recycling; Land and Water

3. **Information and incentives**
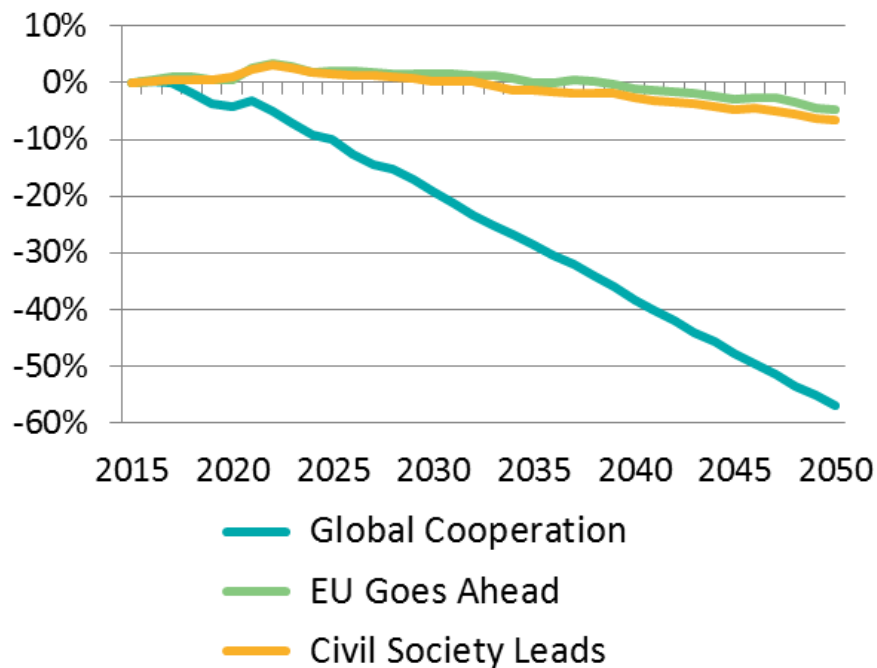   - Examples: Public innovation fund; food waste; insulation
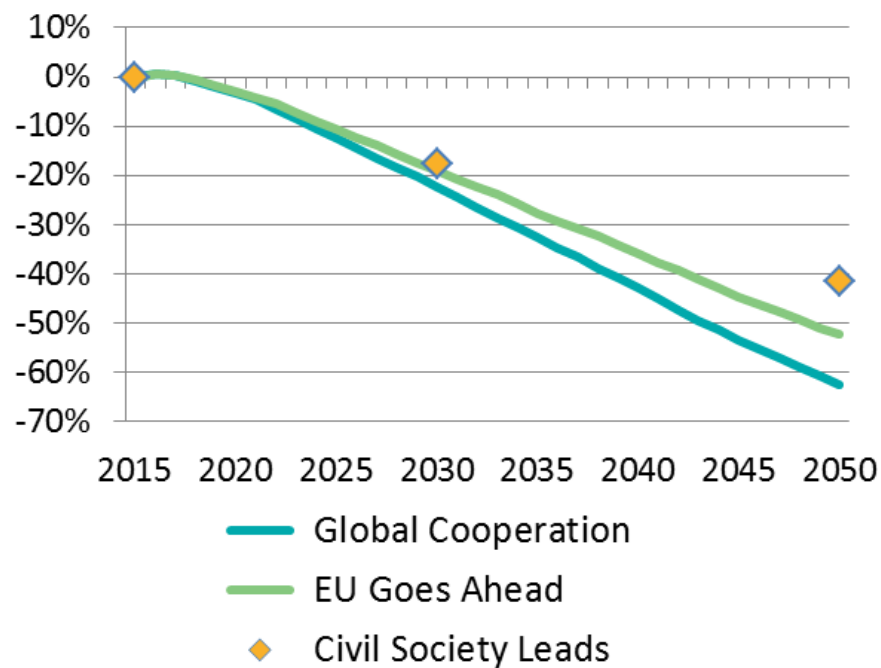
4. **Behavioural changes of consumers / citizens**

► Carbon

Global CO₂ emissions (deviation from the reference)

- Global Cooperation
- EU Goes Ahead
- Civil Society Leads

EU27 CO₂ emissions (deviation from the reference)

- Global Cooperation
- EU Goes Ahead
- Civil Society Leads

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► Abiotic raw materials

Global abiotic raw material extractions
(deviation from the reference)

Legend:
— Global Cooperation
— EU Goes Ahead
— Civil Society Leads

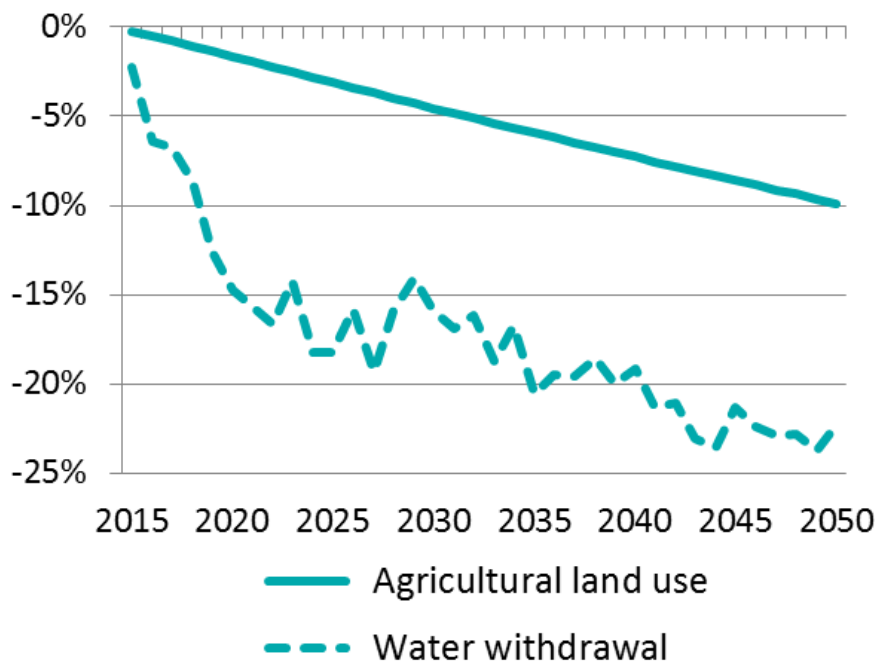**EU27 abiotic resource use [RMC]**
(deviation from the reference)

Legend:
— Global Cooperation
— EU Goes Ahead
◆ Civil Society Leads

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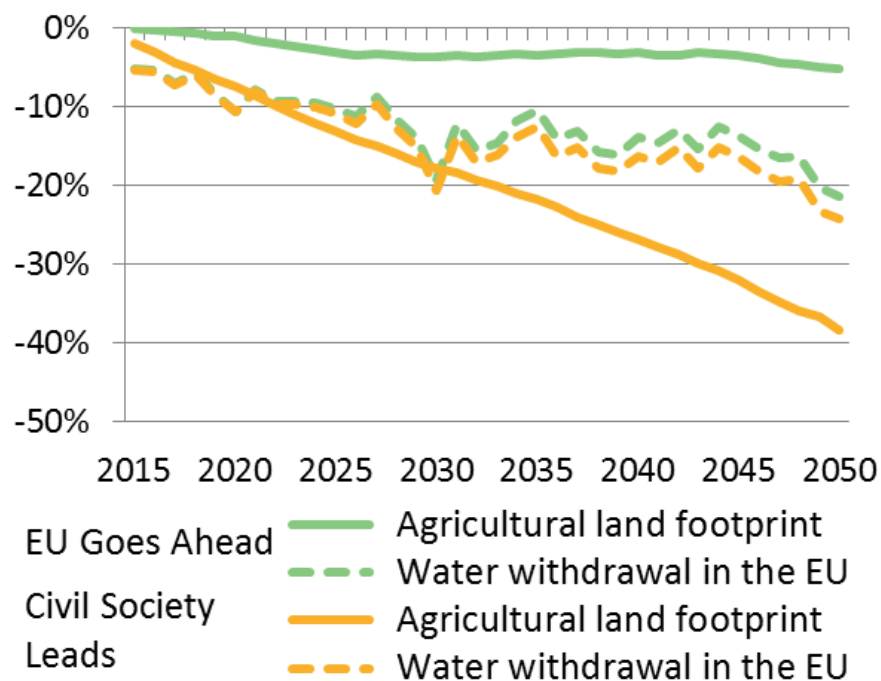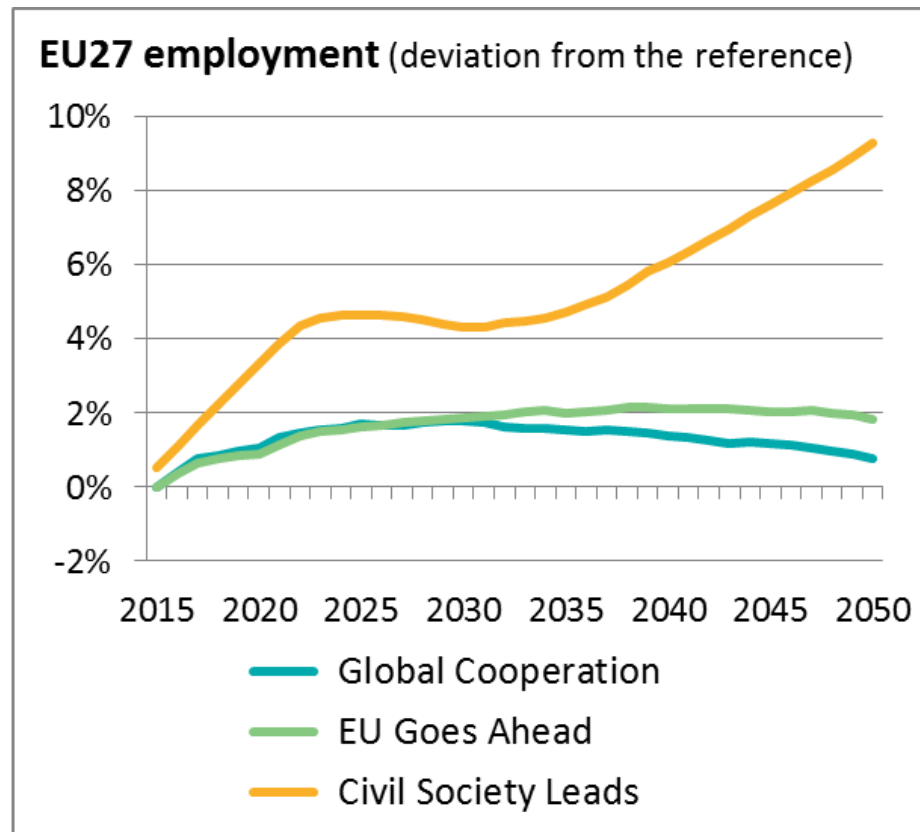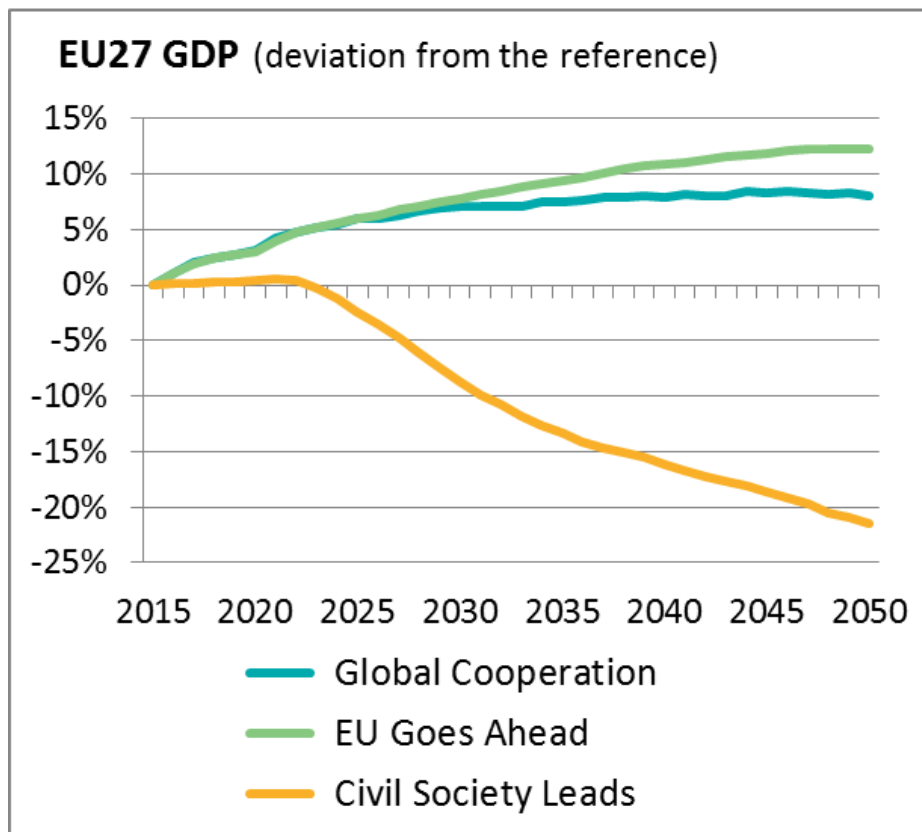POLICY OPTIONS FOR A
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► Land & Water

Global land and water use in the scenario *Global Cooperation* (deviation from the reference)

EU27 land and water use in the transtition scenarios (deviation from the reference)

Agricultural land use

Water withdrawal

EU Goes Ahead
- Agricultural land footprint
- Water withdrawal in the EU

Civil Society Leads
- Agricultural land footprint
- Water withdrawal in the EU

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Key findings **Policy impacts in the transition scenarios**

► Impact on jobs and growth in the EU

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► Achievement of environmental targets is possible,

► but only with a clear and comprehensive policy intervention that improves resource efficiency in industry as well as bringing about reductions in resource use by citizens

► Continuing economic growth, and positive impacts of employment, are possible with reduce resource use