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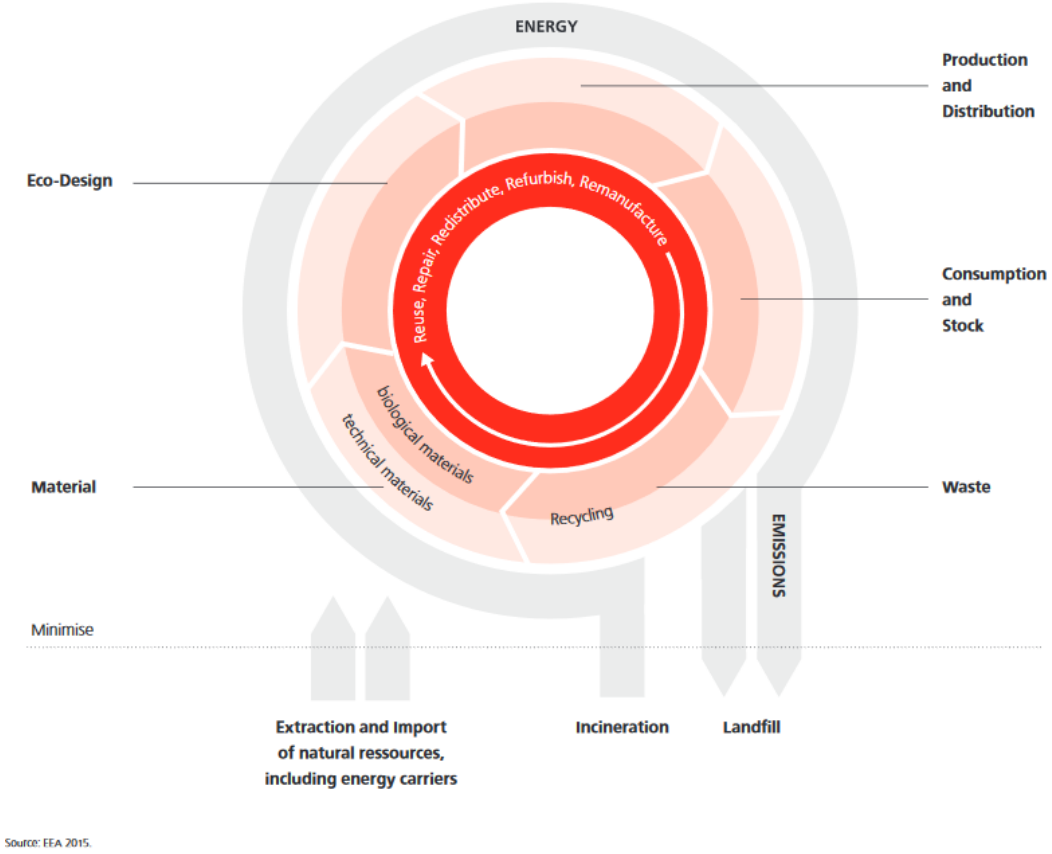
LCS - RNet 11th Annual Meeting

October 17th 2019, Rome

Material efficiency and circularity as key lever for climate mitigation and sustainability

Dr. Henning Wilts
Wuppertal Institute for Climate, Environment, Energy

The Circular Economy concept



Source: EEA 2015.

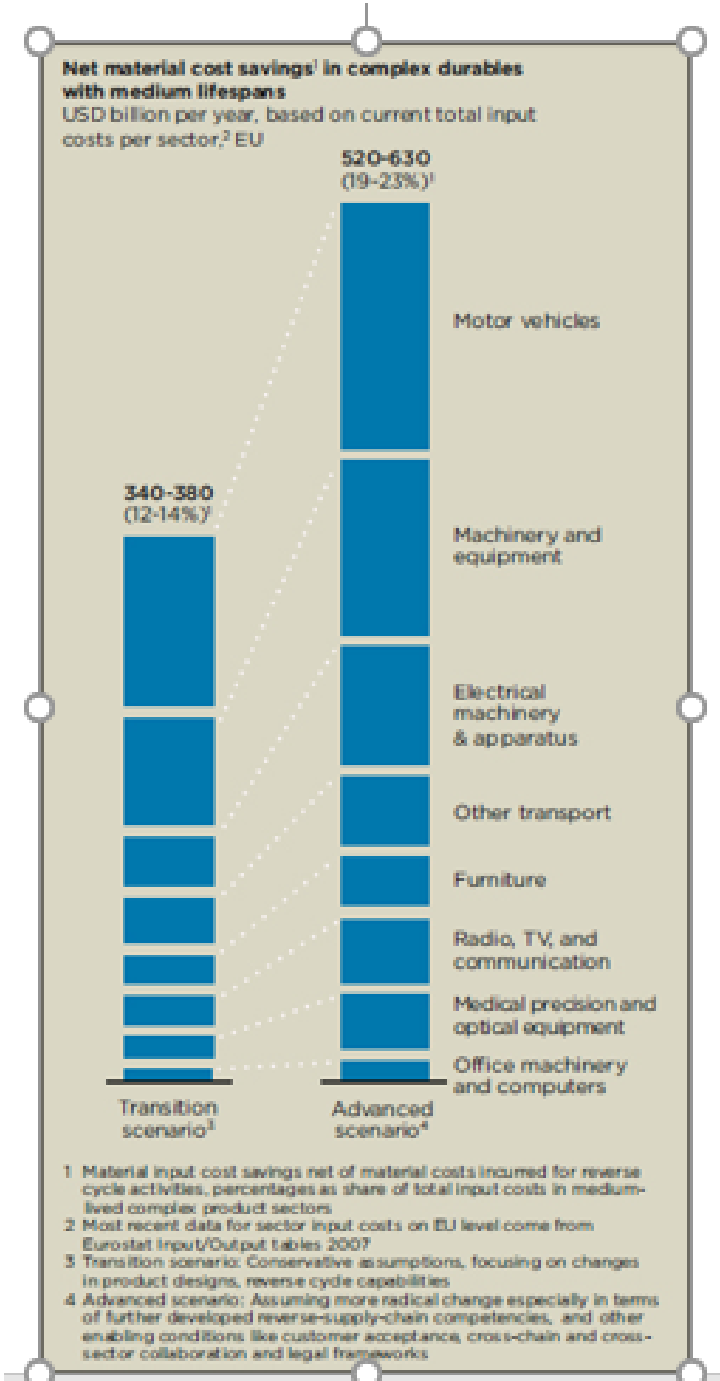
Sources: EEA 2017; European Commission 2018

Europe on its way towards a Circular Economy: the potential benefits

High expectations:

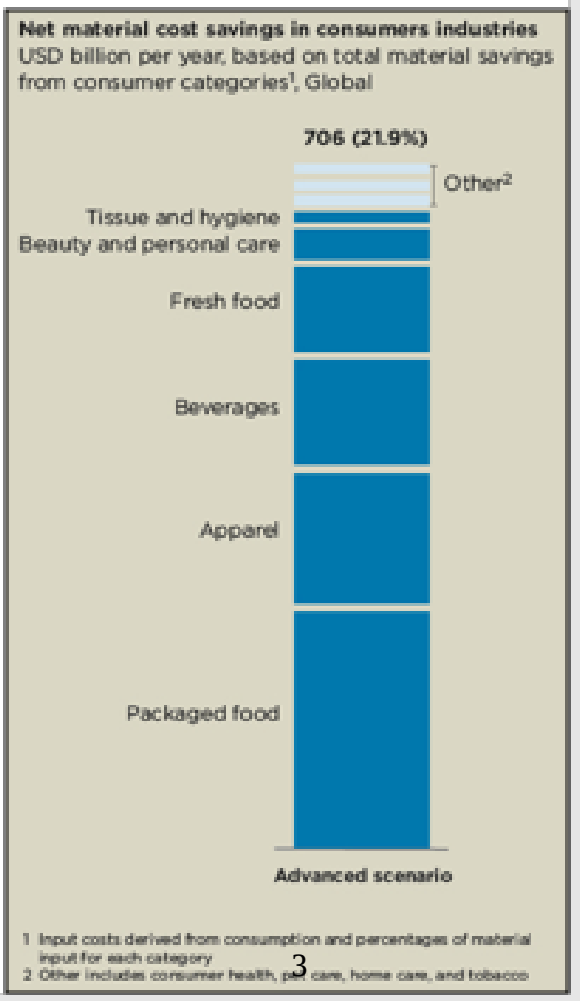
Significant impact on innovation, capital productivity and reduced reliance on raw material imports

Estimated annual net material cost saving potentials of up to USD 706 billion (EMF)



Adoption of circular setup in relevant medium-lived complex product sectors
Source: EMF 2012

Adoption of circular setup in relevant fast-moving consumer goods sectors
Source: EMF 2013



Outlook: CE Action Plan 2.0

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Circular Economy as responsibility of VP Timmermans

- „Green New Deal“ as one of six strategic priorities of the new European Commission
- Second week of November: Outline of the strategic agenda 2024 including a draft Circular Economy Action Plan 2.0

CE as win-win strategy?

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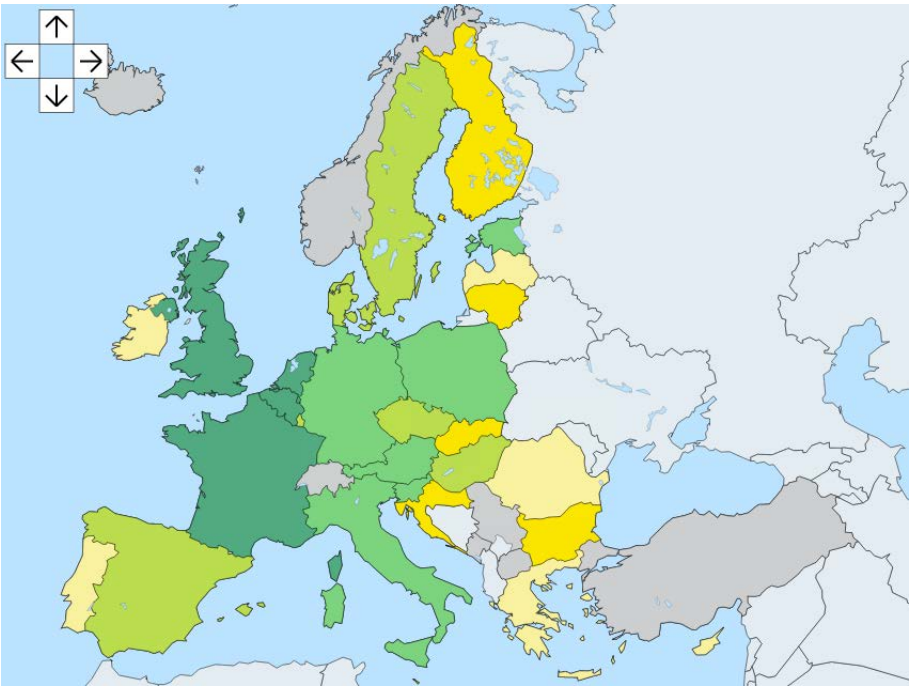
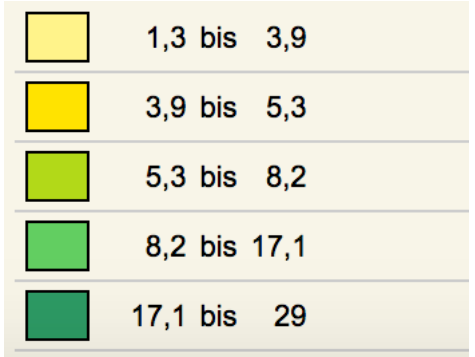
Discourse on **Circular Economy** is often dominated by either

- normative assumptions about the world should look like, e.g. “circular” or “plastic free” or
- assumptions about potential economic, social and environmental benefits; e.g. EMF 2016

➢If circular economy is such a win-win opportunity, why are still so dominantly linear?



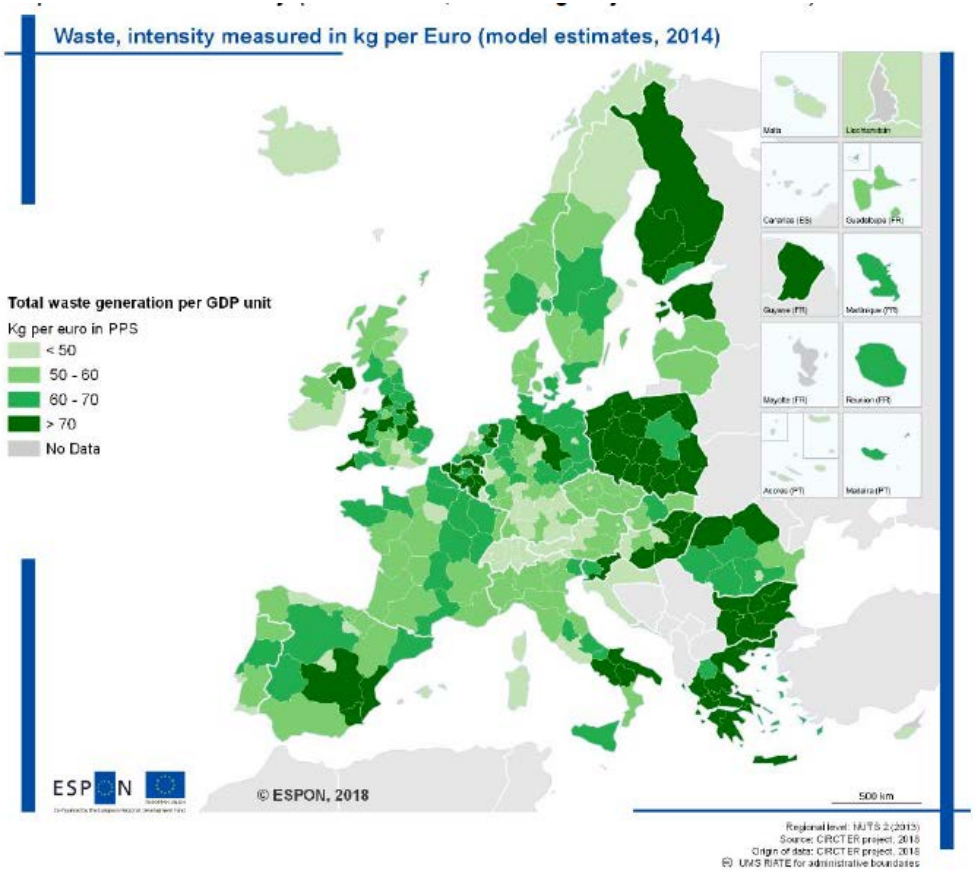
Cyclical material use rate in %, 2016 (Eurostat)



Key gap: Theoretical foundation

We´re lacking a consistent theoretical approach that would allow us to understand status quo and dynamics

- the extremely different value chain integration e.g. for plastics or metals; (➔ production) and
- the surprisingly low uptake of recycled raw materials (➔ matching supply and demand)
- of the often significant differences in waste generation, e.g. per capita or per unit of GDP between member states, regions and cities (➔ consumption);



Transaction cost perspective on the circular economy

Guiding research hypothesis: Our economy would be (much more) circular

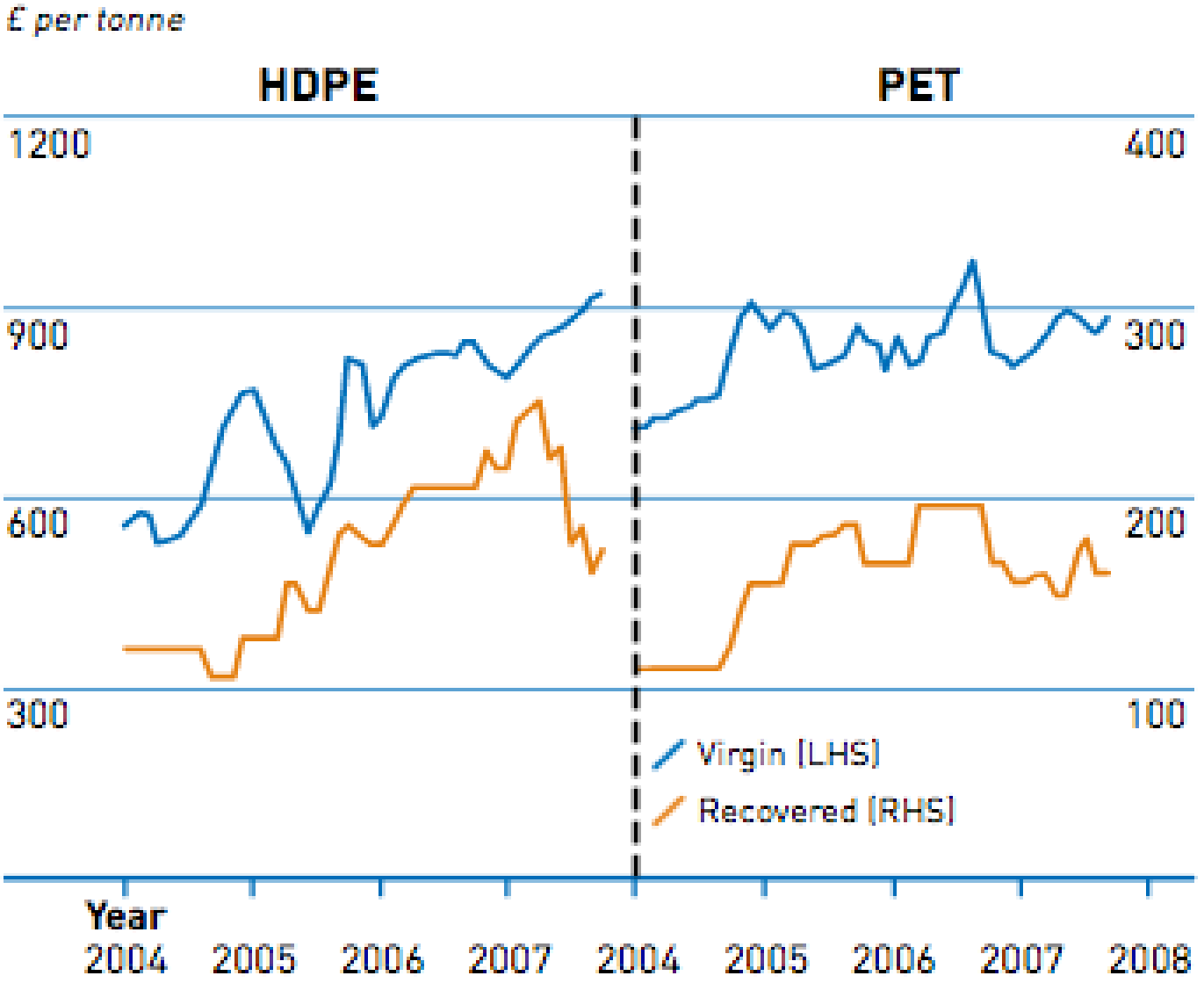
- If all actors would be fully informed about the costs of wasted resources as well as supply and demand for secondary raw materials;
- If this knowledge would be accessible for everyone, everywhere at zero costs

Theoretical starting points in New Institutional Economics (NIE)

- Simon: Bounded rationality of market participants
- Coase: Transaction costs of using market mechanism
- North/ Williamson: Make or by, market or hierarchy

- **How do transaction costs influence transition processes towards circular economy?**

Transaction costs for closing material loops



Sources: www.pieweb.com, MPR and Bank of England.

Transaction costs for prevention

Quelle: http://www.foes.de/pdf/2017-01-FOES-Studie-Stoffliche-Nutzung-Rohbenzin.pdf

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Macro-economic and rebound effects

- Only few studies systematically assess indirect economic effects of food waste prevention policies (Wilts 2018)
- Reduced food demand from companies and households would lead to reduced economic activity and potential job losses in the agricultural sector
- Rebound effects are often neglected:
  - Financial savings resulting from throwing away less food may be spend on other consumption activities
  - Uncertain overall environmental outcomes (47%-73% on average, even negative if the savings are used e.g. for additional long-distance travel)

➢ **Need for macro-economic modelling tools for an assessment of food waste and losses**

How do consumers spend the money they save from food waste prevention?

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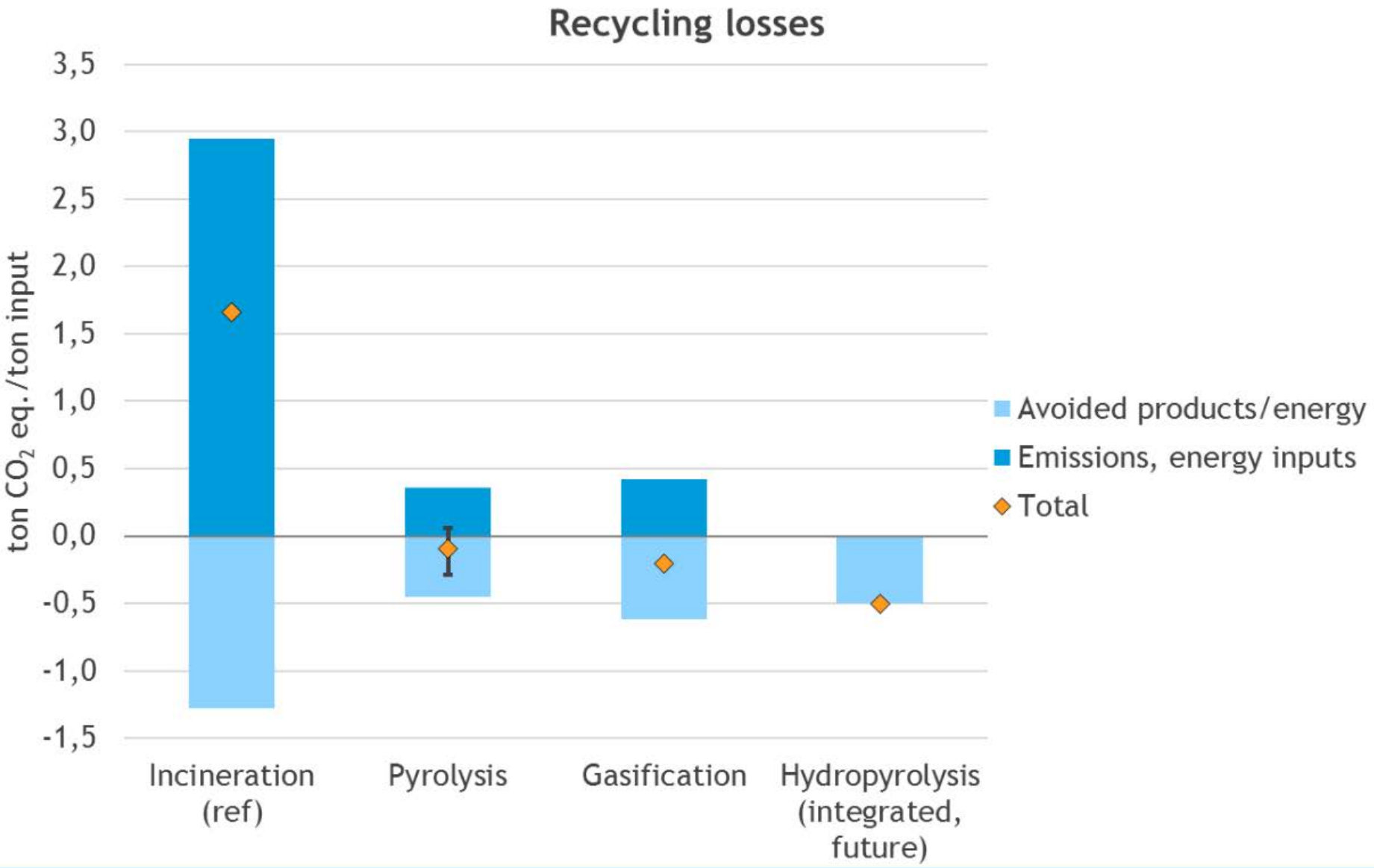
Income Group		Monetary Savings	Potential Savings	Impact of Re-Spending	Actual Savings	Rebound Effect
No.	Net Income/ Month	€/ Year	kg CO_2 eq/ Year	kg CO_2 eq/ Year	kg CO_2 eq/ Year	
1	< 900	279,2	86,6	65,7	21,0	76 %
2	900–1300	337,5	104,7	72,8	31,9	70 %
3	1300–1500	387,7	120,3	78,8	41,5	66 %
4	1500–2000	444,0	137,7	86,3	51,5	63 %
5	2000–2600	530,3	164,5	101,1	63,5	61 %
6	2600–3600	638,8	198,2	115,0	83,2	58 %
7	3600–5000	767,4	238,1	129,6	108,4	54 %
8	5000–18000	936,1	290,4	136,2	154,3	47 %

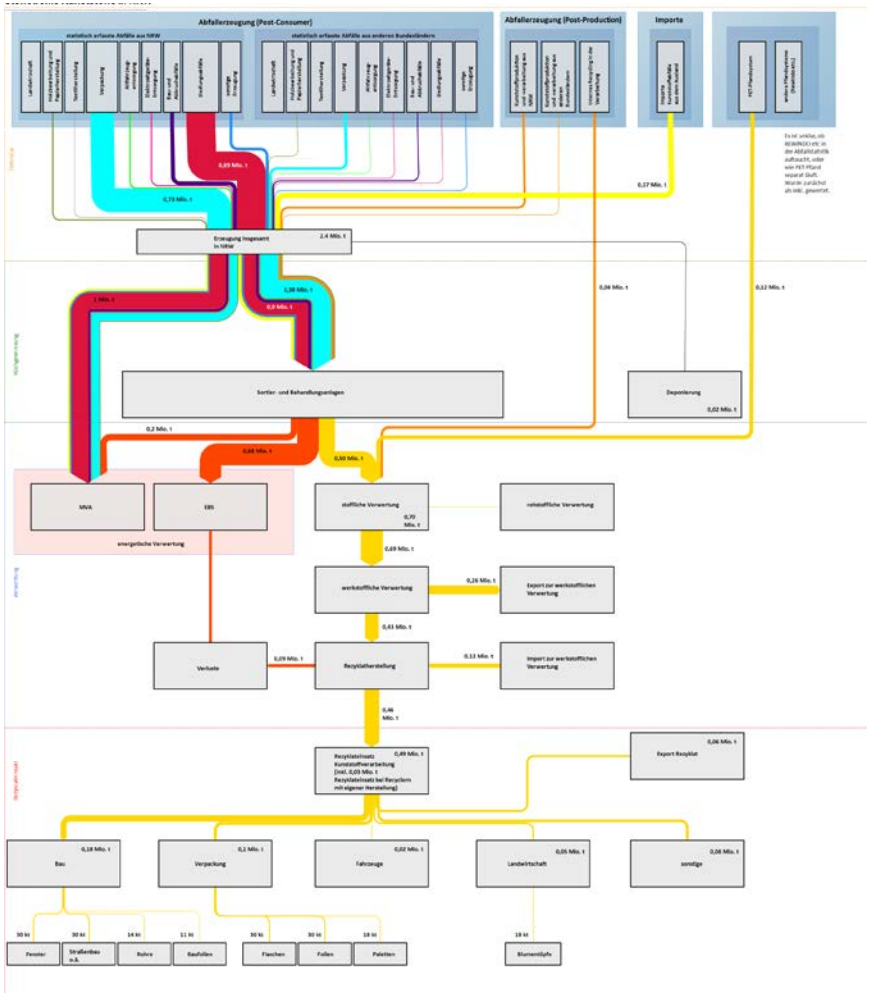
Source: Hagedorn/ Wilts 2019

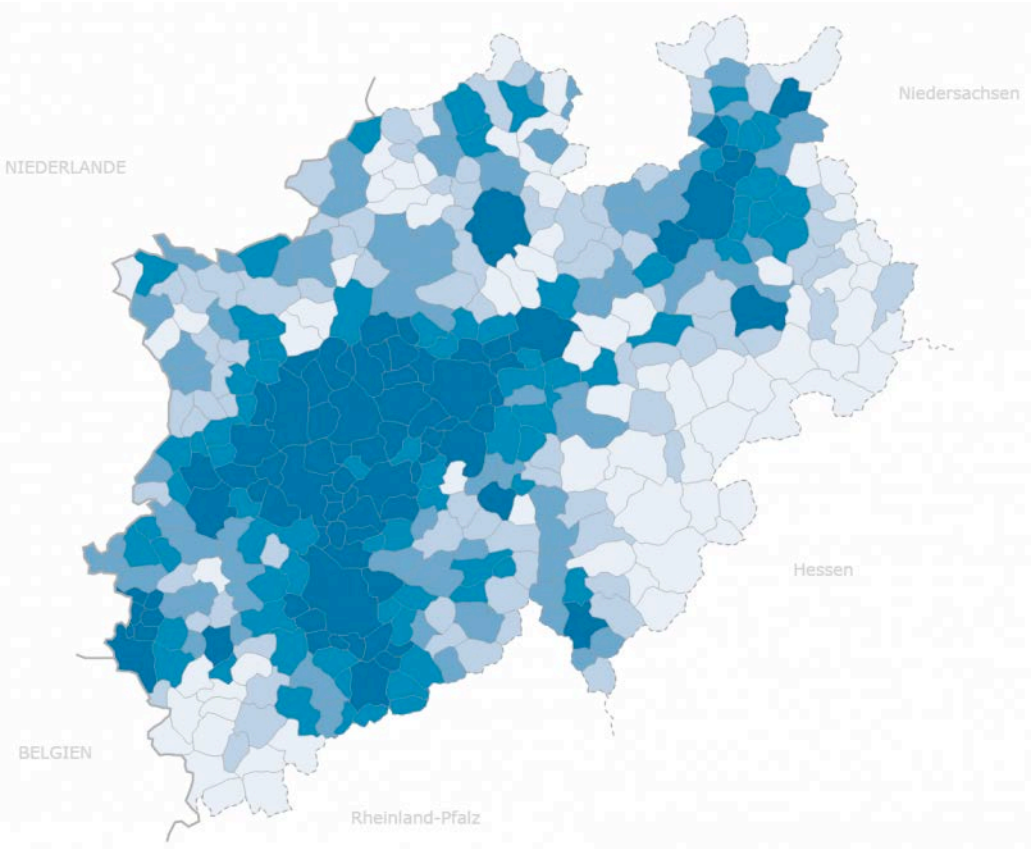
Up-coming discussion: Chemical recycling



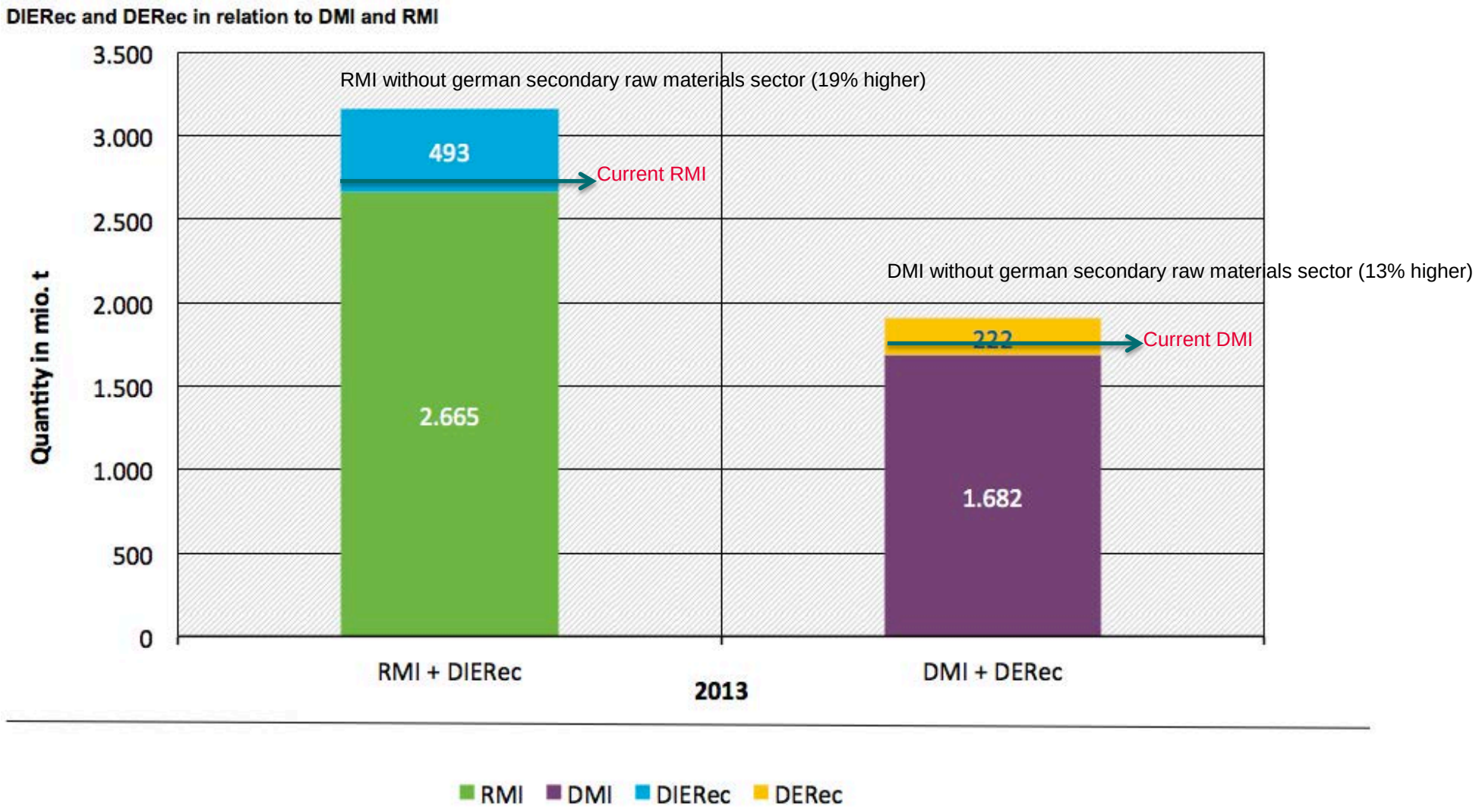
Source: Bergsma 2019

Systemic perspective urgently needed!





Reduction of the theoretical raw material requirement through secondary raw materials sector (UBA)



Source: Steger et al 2018

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Thank you for your attention!

Further information
at our website
www.wupperinst.org

Increasing circularity of plastics...

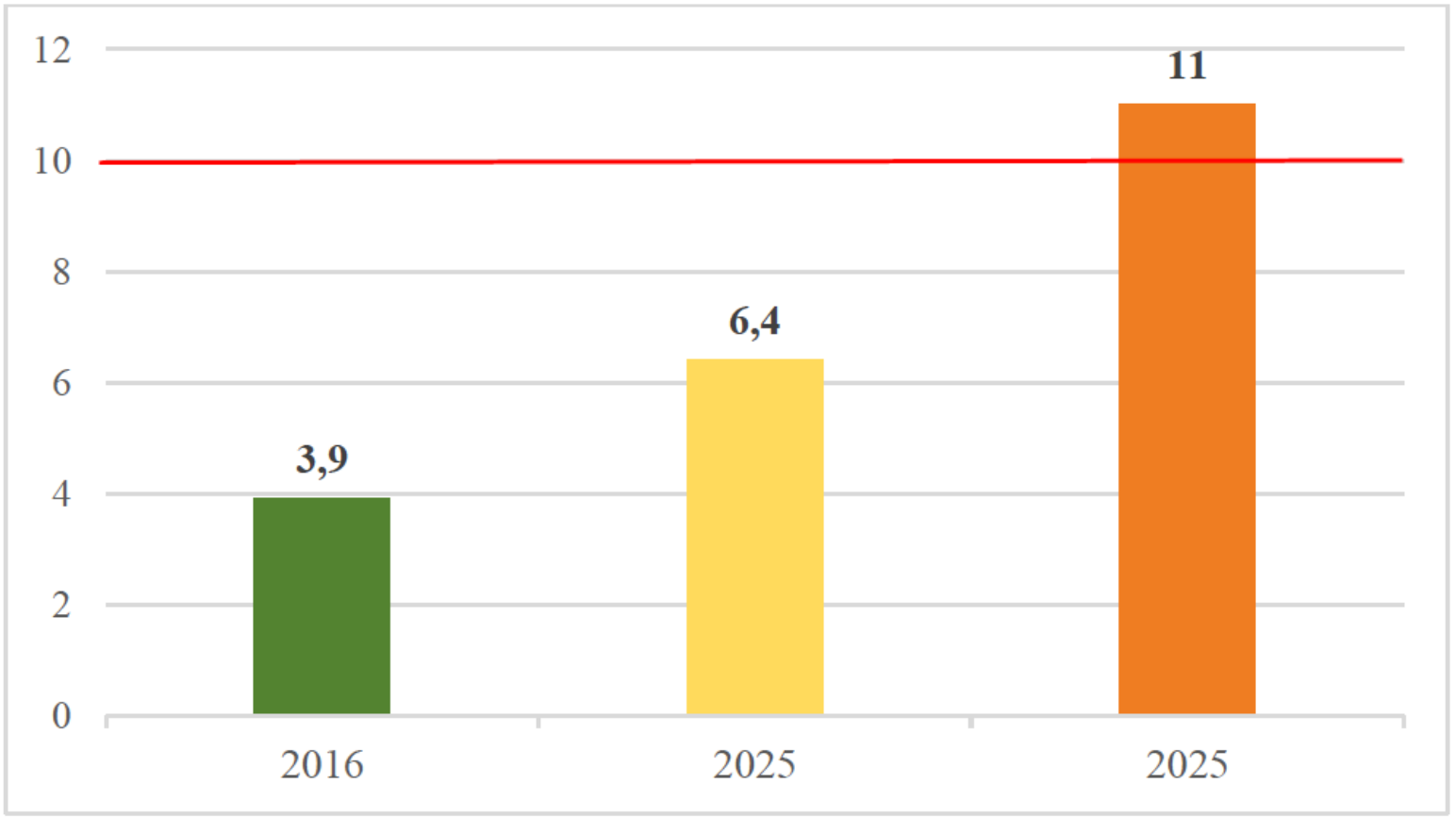

Figure 7: demand for recycled plastics in 2016 (in green) vs. pledges from the demand side (in yellow) and pledges from the supply side (in orange), in million tonnes

Source: European Commission 2019