Fossil-free circular industry – how could it evolve?

LCS-Rnet 9th Meeting, Warwick 12-13 September 2017
LARS J. NILSSON & MAX ÅHMAN

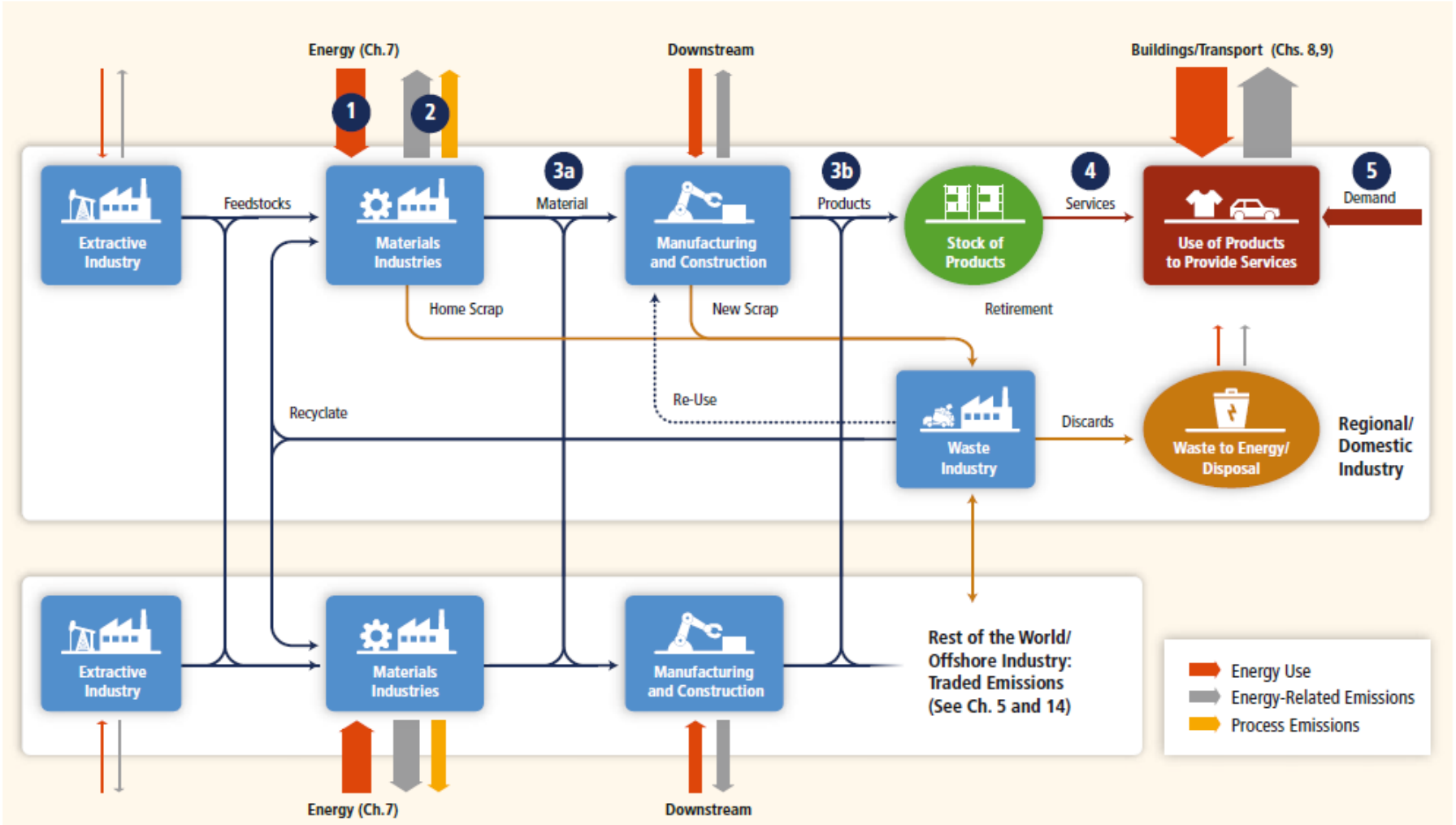
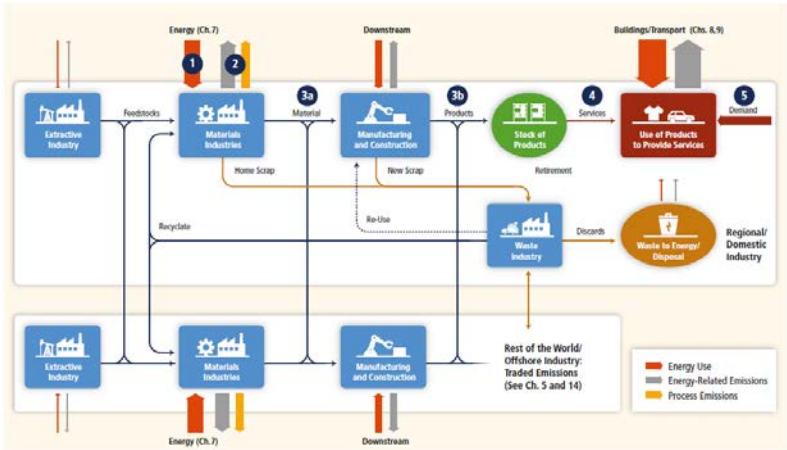


Figure 10.2 | A schematic illustration of industrial activity over the supply chain. Options for climate change mitigation in the industry sector are indicated by the circled numbers: (1) Energy efficiency (e.g., through furnace insulation, process coupling, or increased material recycling); (2) Emissions efficiency (e.g., from switching to non-fossil fuel electricity supply, or applying CCS to cement kilns); (3a) Material efficiency in manufacturing (e.g., through reducing yield losses in blanking and stamping sheet metal or re-using old structural steel without melting); (3b) Material efficiency in product design (e.g., through extended product life, light-weight design, or de-materialization); (4) Product-Service efficiency (e.g., through car sharing, or higher building occupancy); (5) Service demand reduction (e.g., switching from private to public transport).

Source: IPCC, AR5 WGIII, 2014

EU Circular Economy and Climate Mitigation Policy

- Ecodesign Directive (EE)
- Industrial Emissions Directive and BREF-documents
- Waste Directives
  - Packaging, vehicles, buildings, etc
- Plastics strategy
- R&D funding (H2020)
- Renewable Energy
- Energy Efficiency
- EU-ETS and Effort Sharing



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Adapted from Draft mapping by Circle Economy, in collaboration with Allen & Overy LLP for ECF and i24c

Emissions efficiency (i.e., #2 process emissions) from energy and feedstock

- Mitigation through emissions efficiency:
  - Carbon Capture and Storage
  - Biobased feedstock and fuels (biogas, charcoal, wood chips, etc.)
  - Electricity and hydrogen/CO_2/hydrocarbons for energy and feedstock

- Few, if any, co-benefits but more expensive (e.g., from 30 % for steel, 100 % for cement, to 300 % for plastics)

- Potentially large electricity user (e.g., +1500 TWh in EU)

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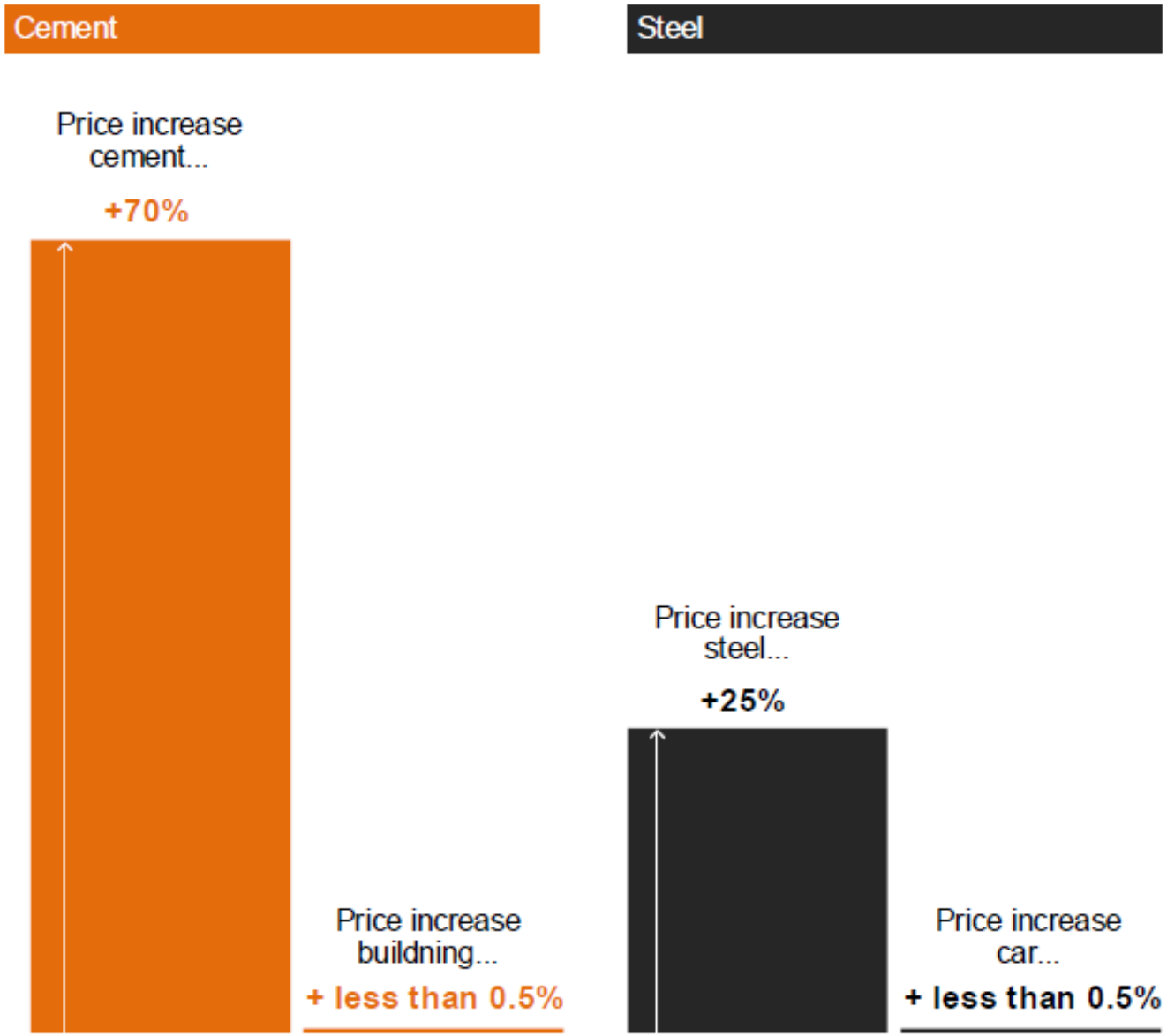
Investing in new low-CO_2 steel- and cement-making processes would require substantial increases in the selling prices of steel and cement, but the price increase facing a car buyer or a procurer of a building would be marginal...



Source: Johan Rootzén, Chalmers

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Power to plastics costs

Power-to-Methanol-to-Olefins (polyethylene/polypropylene)

- Fossil-based raw material price PE/PP 1400-1500 EUR/ton
- Plastic bottle price 10 cents of which material is 5 cents (typical weight for bottle is 35 grams)

- Power/CO2-to-plastics raw material PE/PP cost 4500 EUR/ton
- New bottle price 20 cents

Is it expensive?

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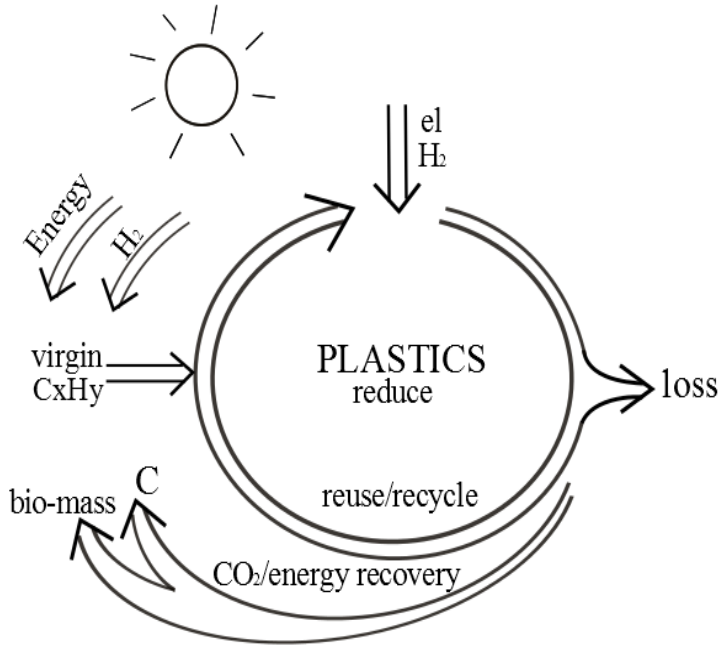
How is the plastics system governed?

Plastic Transitions?

- Fossil feedstock and limited biomass feedstock.
- No common vision, strategy or concerted governance.
- Focus on bags, packaging and recycling
- Who are the key actors? CocaCola, Tetra Pak or biotech start-ups?
- Forestry industry, petrochemicals industry, or others?
- A European Plastics Agency?



European Commission

ROADMAP			
TITLE OF THE INITIATIVE	Strategy on Plastics in a Circular Economy		
LEAD DG – RESPONSIBLE UNIT	DG ENV, B1 (coordinated with units B2, B3, C1 and C2) DG GROW, D2 (coordinated with units C1, D1 and D4)	DATE OF ROADMAP	26/01/2017

What is Industrial Policy?

- *”Anything that changes the structural composition of the economy*”

- **Progressive**: Innovation policy (with supply push and demand pull)
- **Protective**: Trade regulations, protected market access, tax-exemptions
- Ownership
- Procurement
- Infrastructure

Direct state action

- Tax-policies
- Exchange rates (e.g., China)

Economic policy

- Development cooperation, business delegations and export strategies, guarantees, councils

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What is Industrial Policy?

- Mercantilism, import substitution, infant industry argument
- Developmental state (e.g., Japan, South Korea)
- Industrialisation in Africa (import substitution, 1960s)
- The market liberal ”Washington Concensus” (contested)
- Re-industrialisation and ”green growth” as response to structural and climate crisis (D. Rodrik, K. Warwick, K. Aiginger, etc.)

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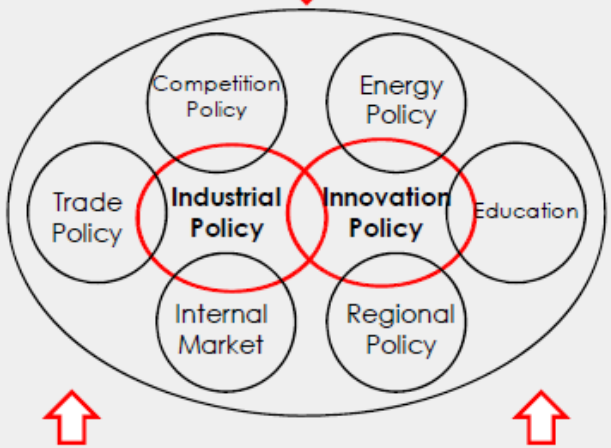
Industrial policy for a sustainable growth path
Policy Paper no 13, Karl Aiginger (WIFO), June 2014

The Systemic Industrial and Innovation Policy (SIIP) in a nutshell

Pulling forces
Vision of a new growth path (welfare beyond GDP)
Societal goals (health, climate, social cohesion)
Excellence in specific technologies (e.g. energy efficiency)



Pushing forces
Competition, openness and globalisation
Activated, trained and retrained labour force (flexicurity)
Competitive advantages (supported by policy)
Climate change, ageing

Create incentives for technical progress, education and research, public awareness, consumer preferences

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How can the fossil-free industry evolve?

- Bottom-up (niches) as well as top-down (EU policies)
- Technology push (c.f. NER300/ETS-IF) and market pull (?)
- Horisontal versus vertical (”pick winner”) industrial policy
- Soft versus hard policy

- Talk and attention. Materials matter more and more.
- Shared expectations and visions needed (also in f.x. NDCs)
- Are interests aligning? Voluntary approaches emerge?
- Tracing, labelling and transparency important
- Feed-in-tariffs or quota obligations
- Regulation and permits, high carbon prices?
- Carbon leakage

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Extra slides