



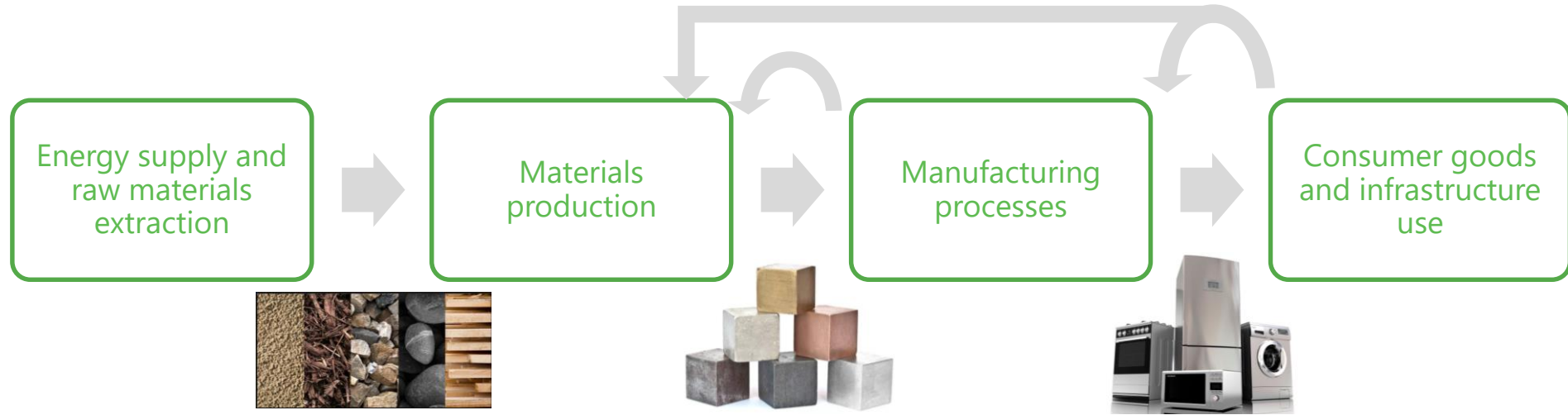
Exploring the materials and energy nexus

Araceli Fernandez

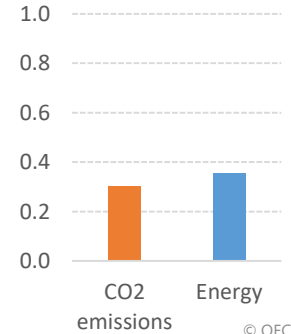
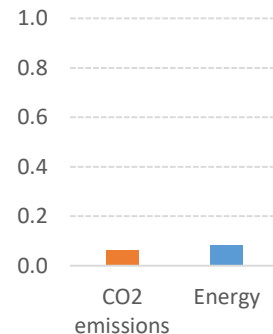
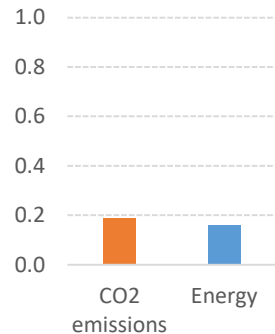
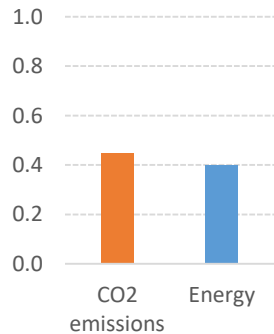
MinFuture project, 6 November 2018



Supply value chains connect natural resources with consumers through material and energy flows

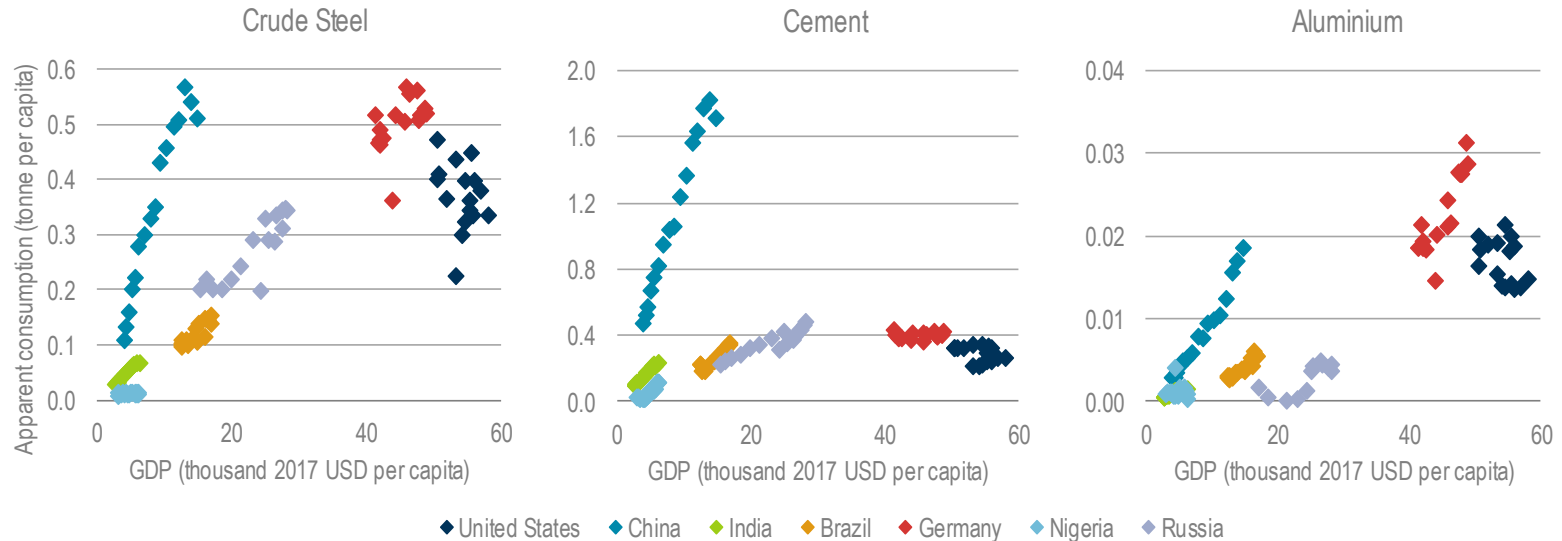


Global CO₂ and energy use shares, 2015



Projecting materials demand from socio-economic indicators... a difficult question!

Per capita material apparent consumption and per capita GDP for selected countries from 2000 to 2015

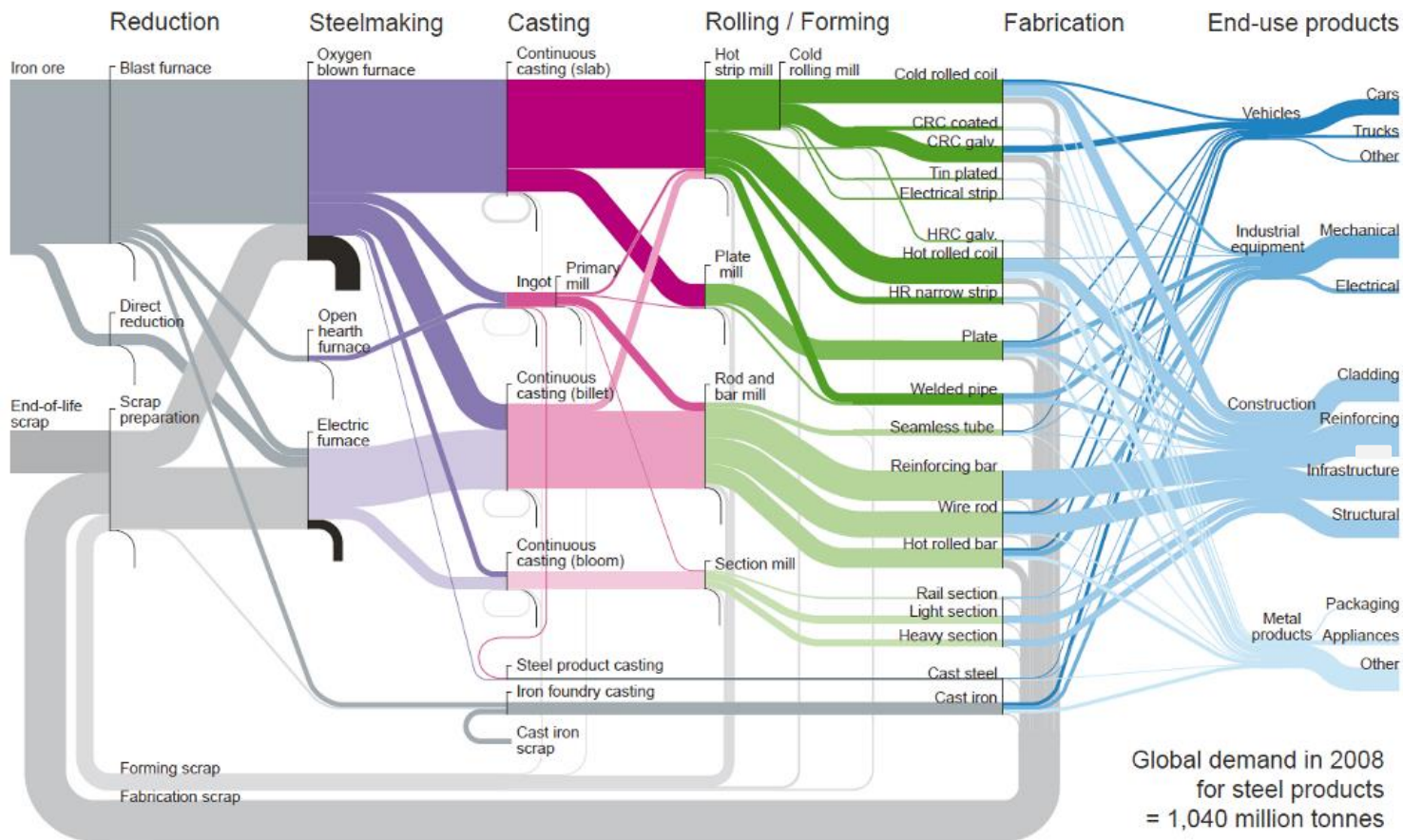


Note: Aluminium apparent consumption does not include secondary production, as historical secondary production statistics are limited. Cement consumption is approximated to production provided its local nature.

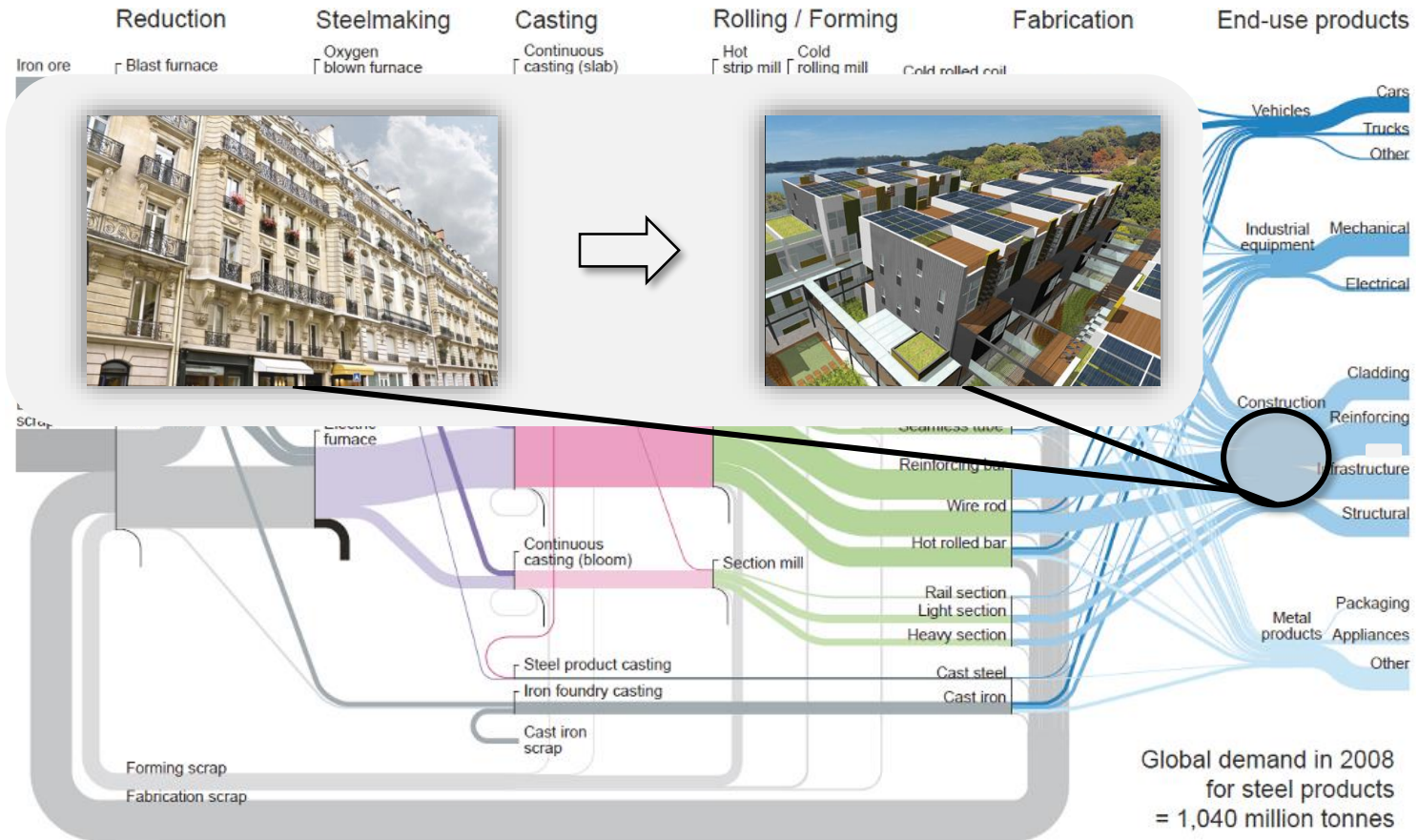
Sources: Forthcoming IEA report "Exploring different clean energy pathways" based on USGS, Worldsteel, IMF, UNDESA.

Generally greater economic development leads to higher levels of material demand per capita.

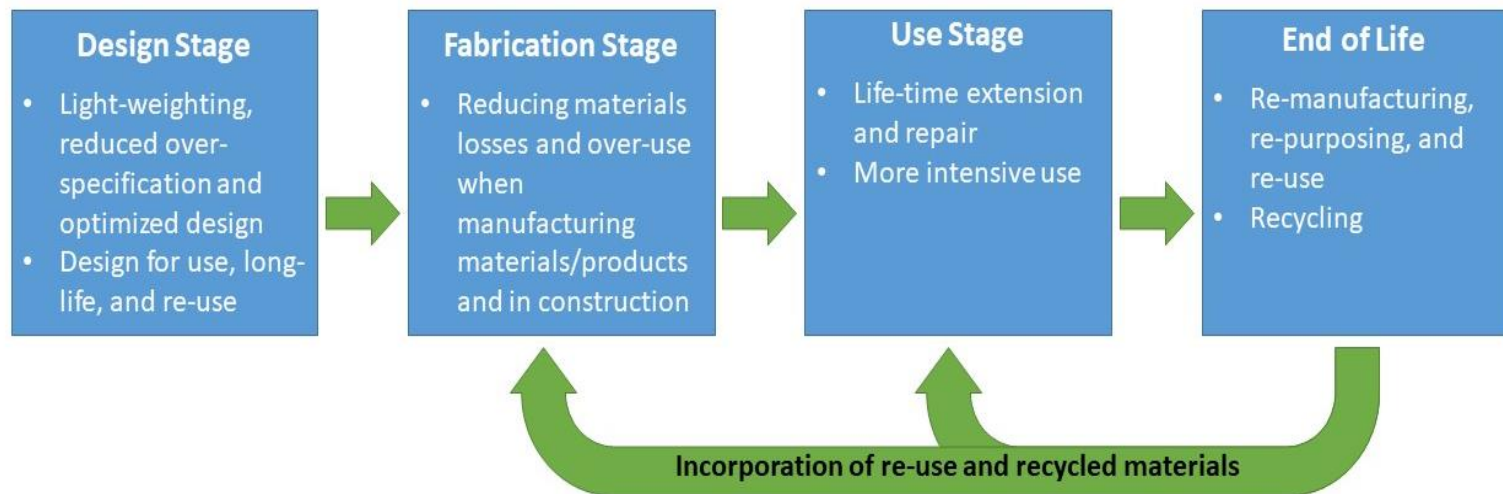
Understanding existing complex supply value chains is needed...



...but supply value chains are also continuously evolving



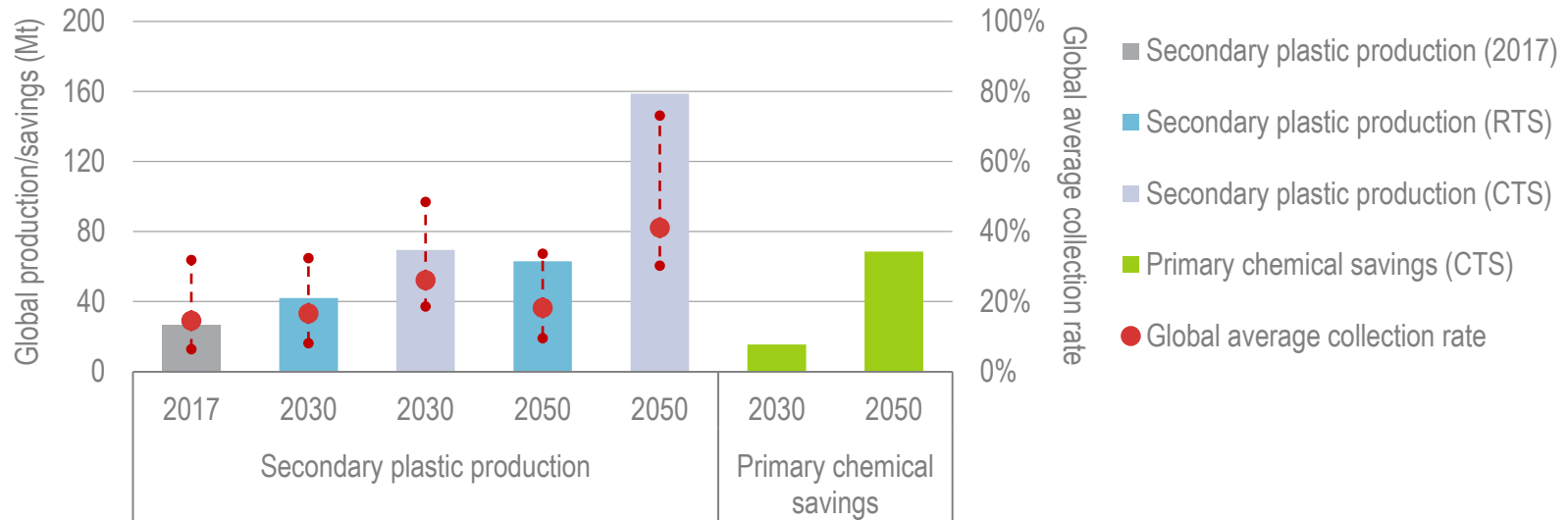
Examples of material efficiency strategies across value chains



Material efficiency strategies can enable sustainability gains along value chains by promoting a more effective use of materials and consequently resources.

Material efficiency opens opportunities for energy and CO₂ savings

Secondary plastic production, primary chemical production savings and plastic collection rates



Note: RTS = Reference Technology Scenario. CTS = Clean Technology Scenario.

Sources: Future of Petrochemicals, IEA 2018.

By 2050, the plastic collection rate for recycling nearly triples in the Clean Technology Scenario, resulting in almost 10% of cumulative CO₂ emissions reductions relative to the base scenario.

- Energy Technology Perspectives editions
- IEA Technology Roadmaps: Cement (2009-2013-2018), Chemicals (2013), Iron and steel (forthcoming)
- World Energy Outlook: material efficient scenario (2015)
- The Future of Petrochemicals (2018)
- Special report: “Exploring different clean energy pathways: The cases of CO₂ storage and materials efficiency” (forthcoming)
- ...

- Supply value chains connect natural resources with consumers through material and energy flows.
- They are complex and continuously evolving. Understanding the materials demand and clean energy transition nexus is key to make the most sustainable use of natural resources for societal development.
- Material efficiency can provide considerable opportunities for energy and CO₂ savings, and should be rolled out hand-in-hand with innovative technologies and product designs across value chains.
- Materials is an area of increasing priority for the IEA.



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