Understanding the materials implications of the 2°C scenario

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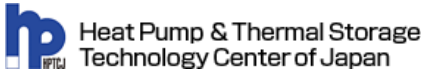
IEA's Buildings team: engagement and collaborations

Partners and initiatives



Taking tabs: we're not making enough progress on buildings

Buildings	↗

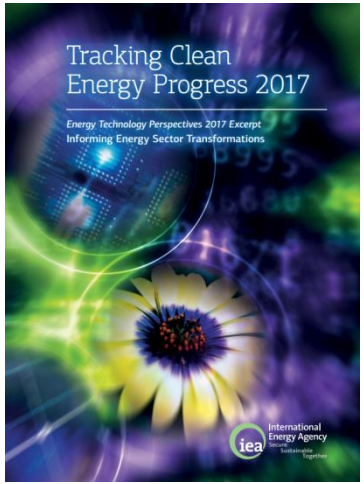
Recommendation for 2017: Countries can take immediate action to put forward commitments for low-carbon and energy-efficient buildings to implement their NDCs as a first step and a clear signal to scale up actions across the global buildings sector.

Building envelopes	~

Recommendation for 2017: Global cooperation should seek to ensure that all countries implement and enforce building energy codes and standards for both new and existing buildings, with improvement in enforcement and verification of codes and standards to overcome barriers to their implementation.

Lighting, appliances and equipment	↗

Recommendation for 2017: Countries should seize on momentum under the recent Kigali Agreement to rapidly move global markets for cooling equipment to much higher energy performances.

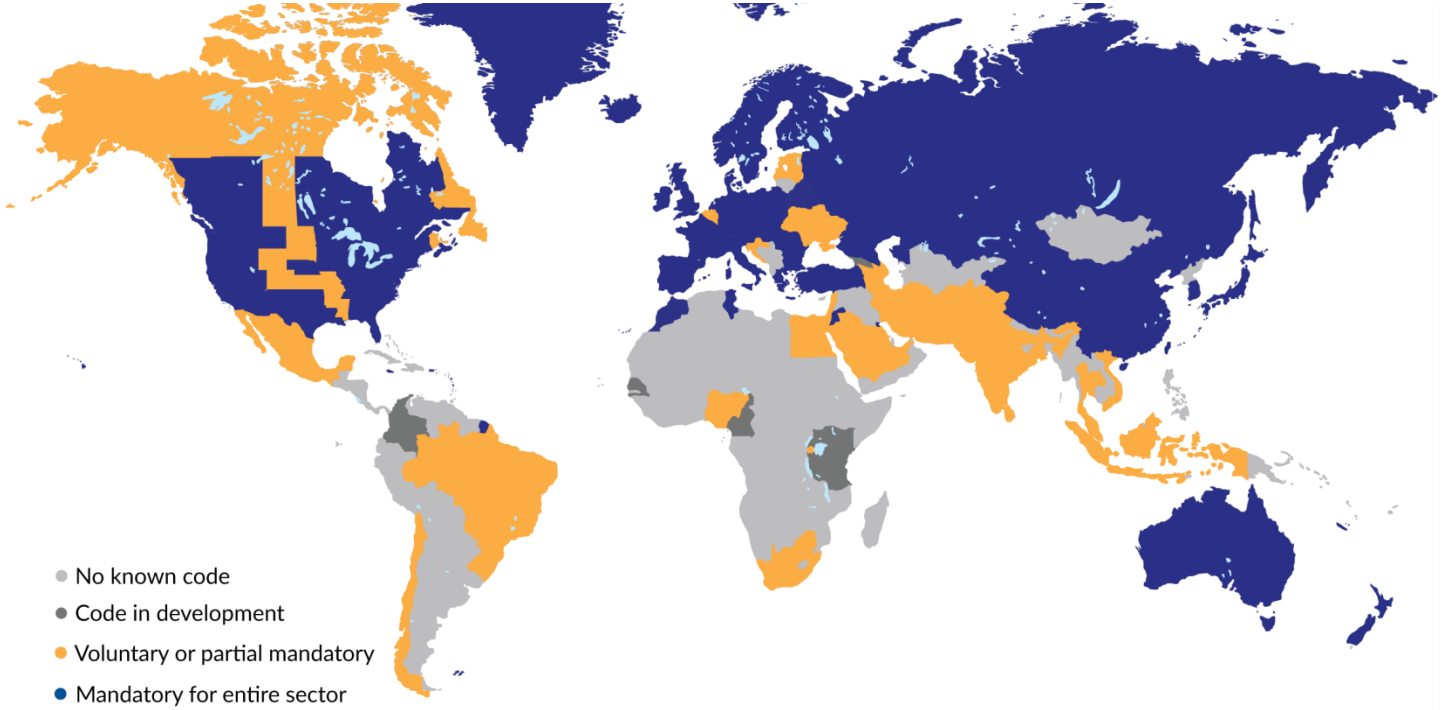


Despite some positive developments in the last two years, more assertive action is still needed to put the global buildings sector on track.

Source: IEA *Tracking Clean Energy Progress 2017*

Global buildings policy coverage is weak

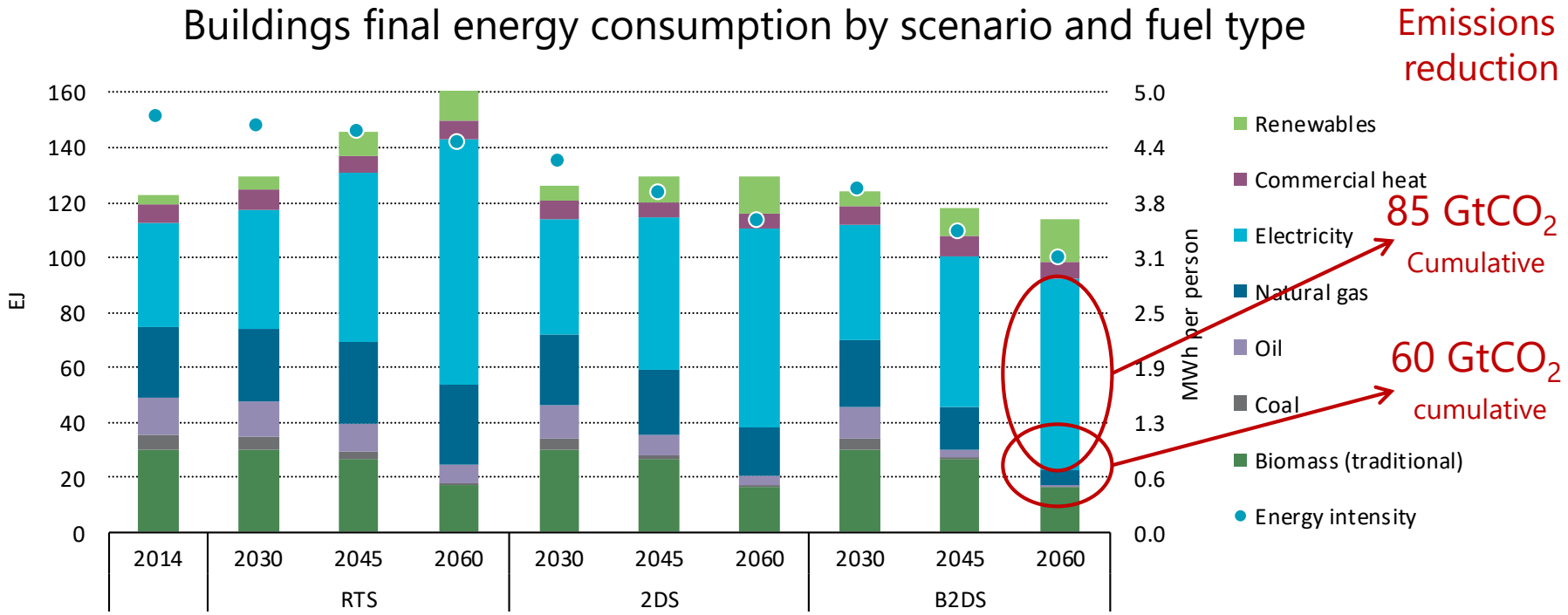
Building energy codes by country, state and province, 2016-2017



Nearly two-thirds of buildings today still do not have comprehensive mandatory building energy codes.

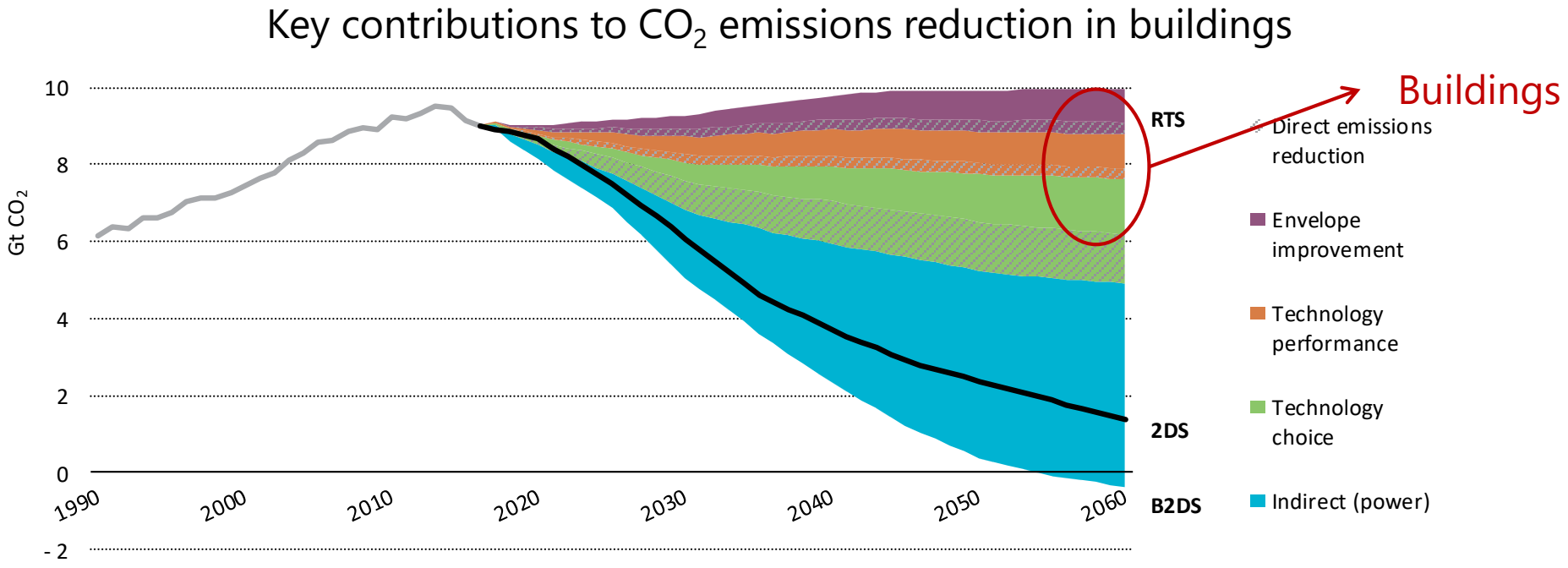
Source: GABC Global Status Report 2017

Capturing the enormous energy efficiency potential in buildings



Going from RTS to B2DS would save the equivalent of twice global energy production in 2014.

SBTs for buildings and construction: challenges



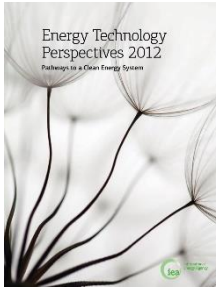
Boundaries for performances metrics (e.g. upstream power generation, building energy communities, off-site renewables) are not adequately captured in performance metrics.

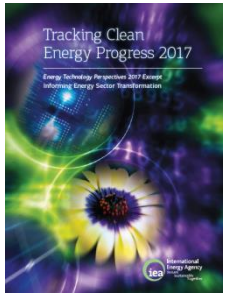
Scope 3: buildings construction and renovation

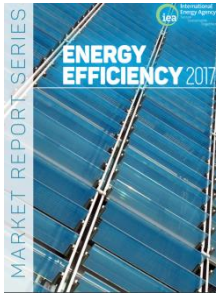
- What are the implications of design and material choices in broader energy/emissions portfolio?
- What role do / can buildings play in supporting economy-wide target?
- Are there strategies for building material demand intensities?
- What are opportunities for sustainable buildings (re)construction?

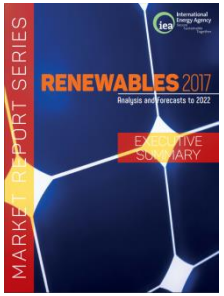
IEA energy technology activities

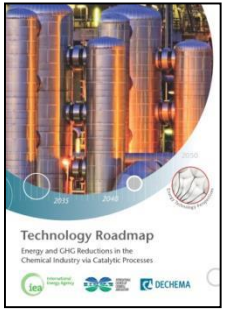
1. Where do we need to go?
2. Where are we today?
3. How do we get there?





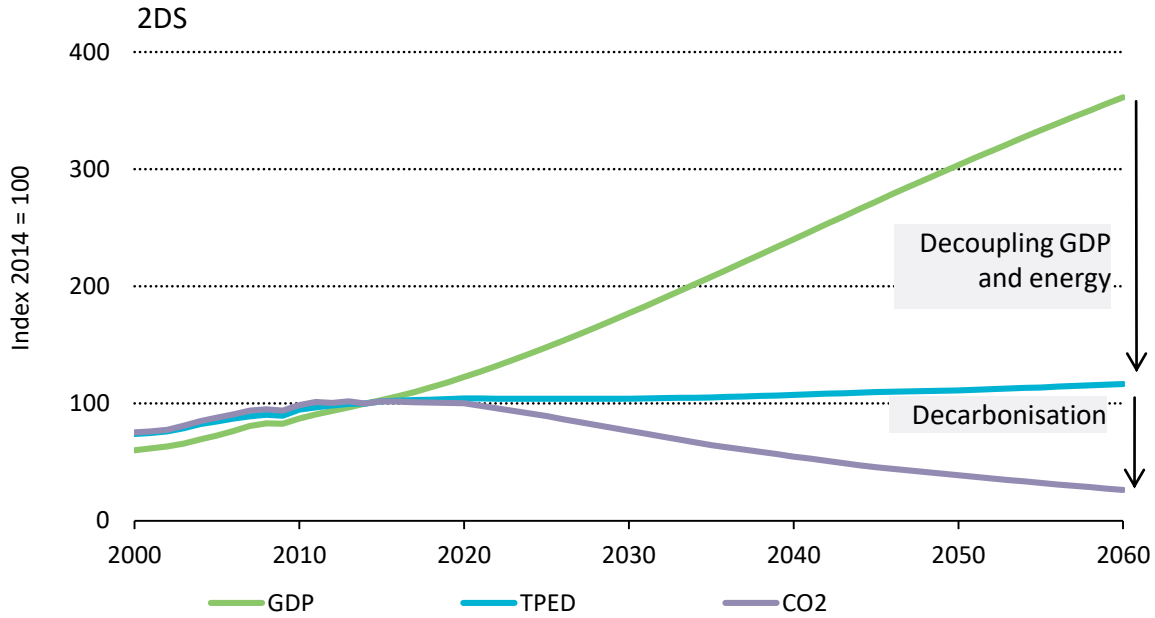






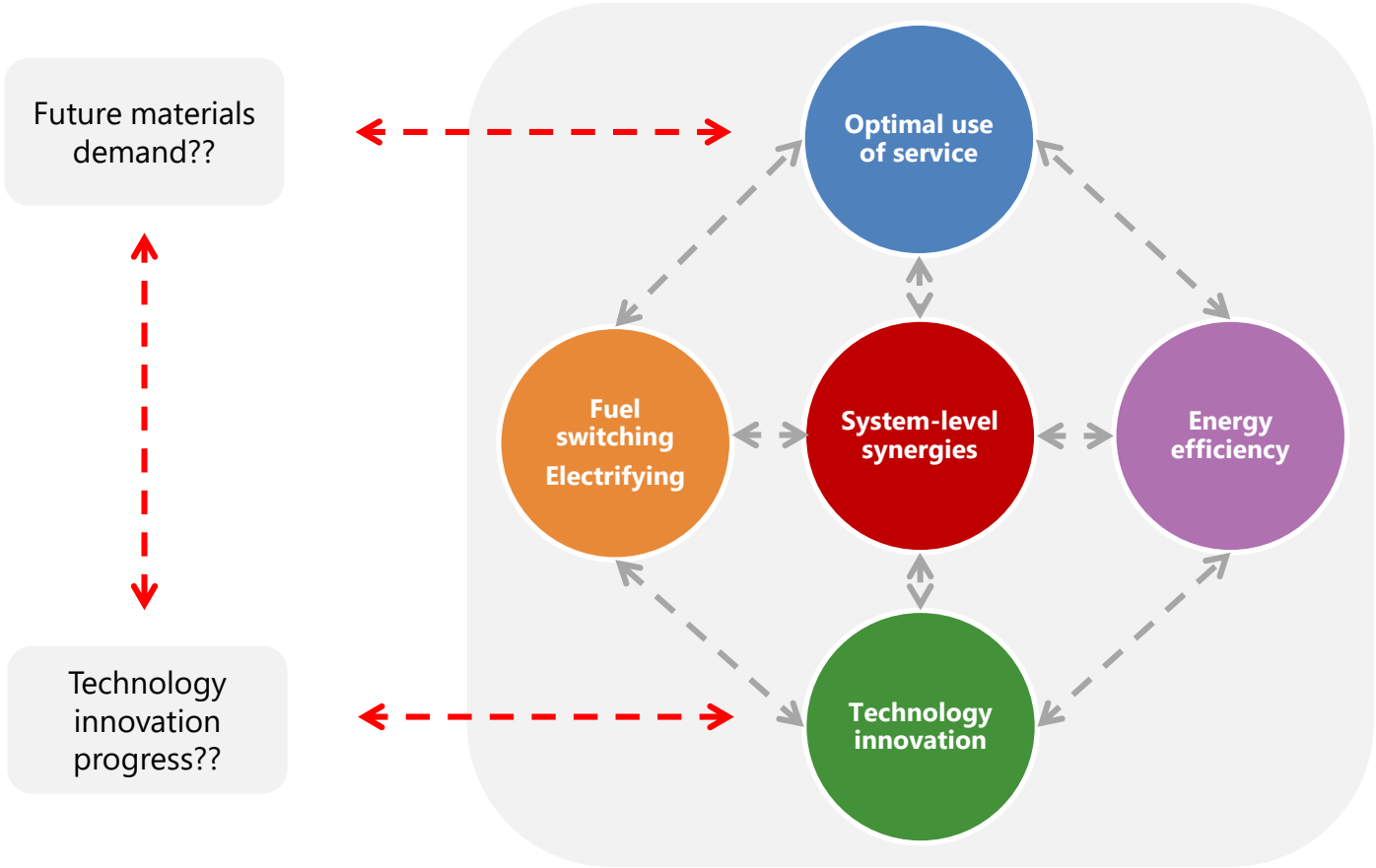
iea Energy Technology Network

The 2DS implications



Achieving the 2DS will require a significant decoupling between energy use and economic growth, with the decarbonisation of the energy mix occurring in parallel.

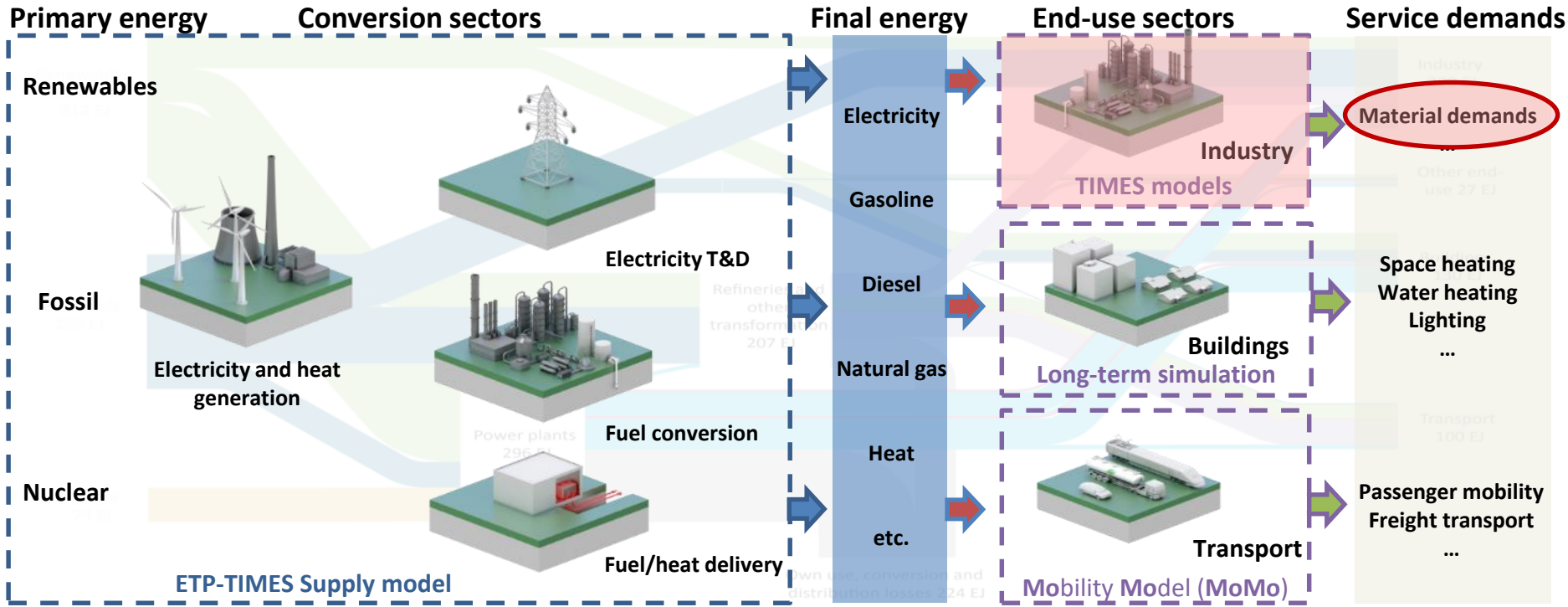
Sustainable strategies



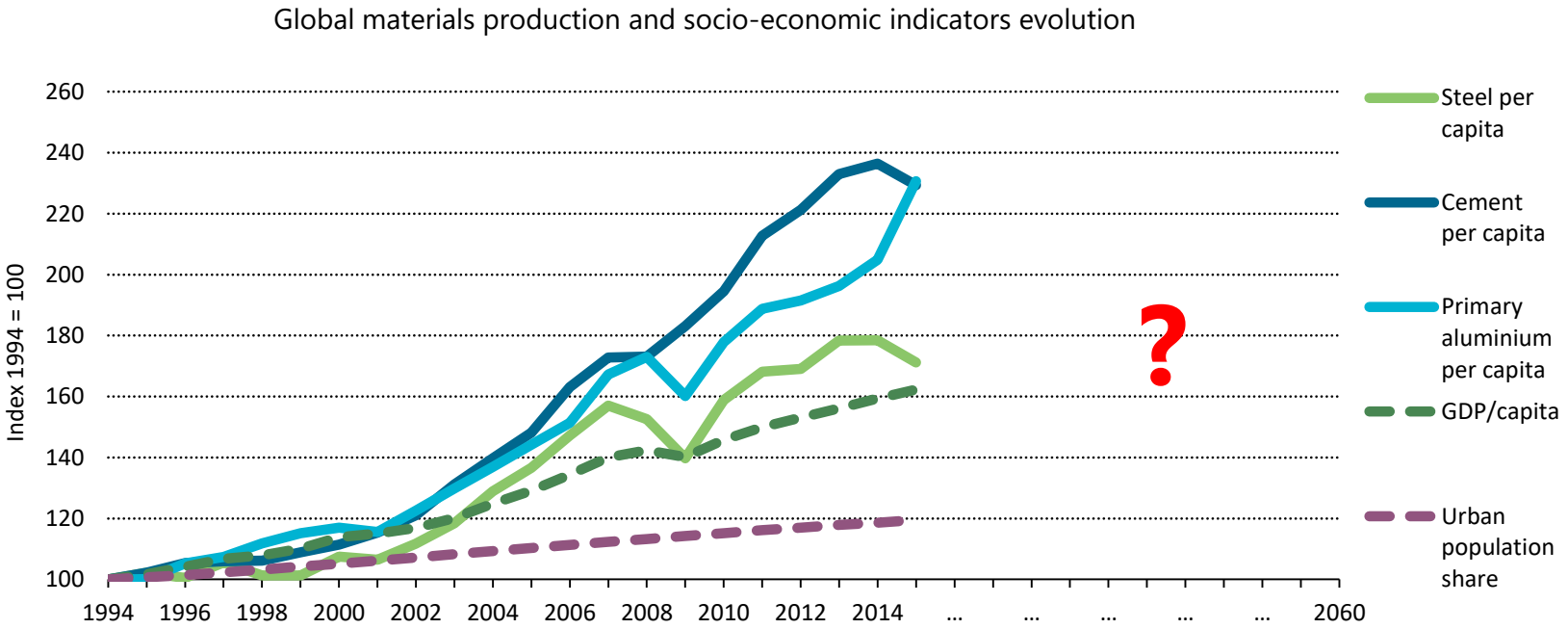
Managing uncertainty: IEA project exploring 2DS What-if variants

- General principle: analysed variants should meet 2DS carbon budget and similar annual CO_2 emissions in 2060
- Specific 2DS variants
  - Variant A: Limited CCS 2DS variant
  - Variant B: Materials flow and efficiency 2DS variant
- Global coverage but building on regional specific analysis
- Strong engagement with international stakeholders and research institutions
- Expected launch Q1 2019

Energy Technology Perspectives (ETP) modelling framework



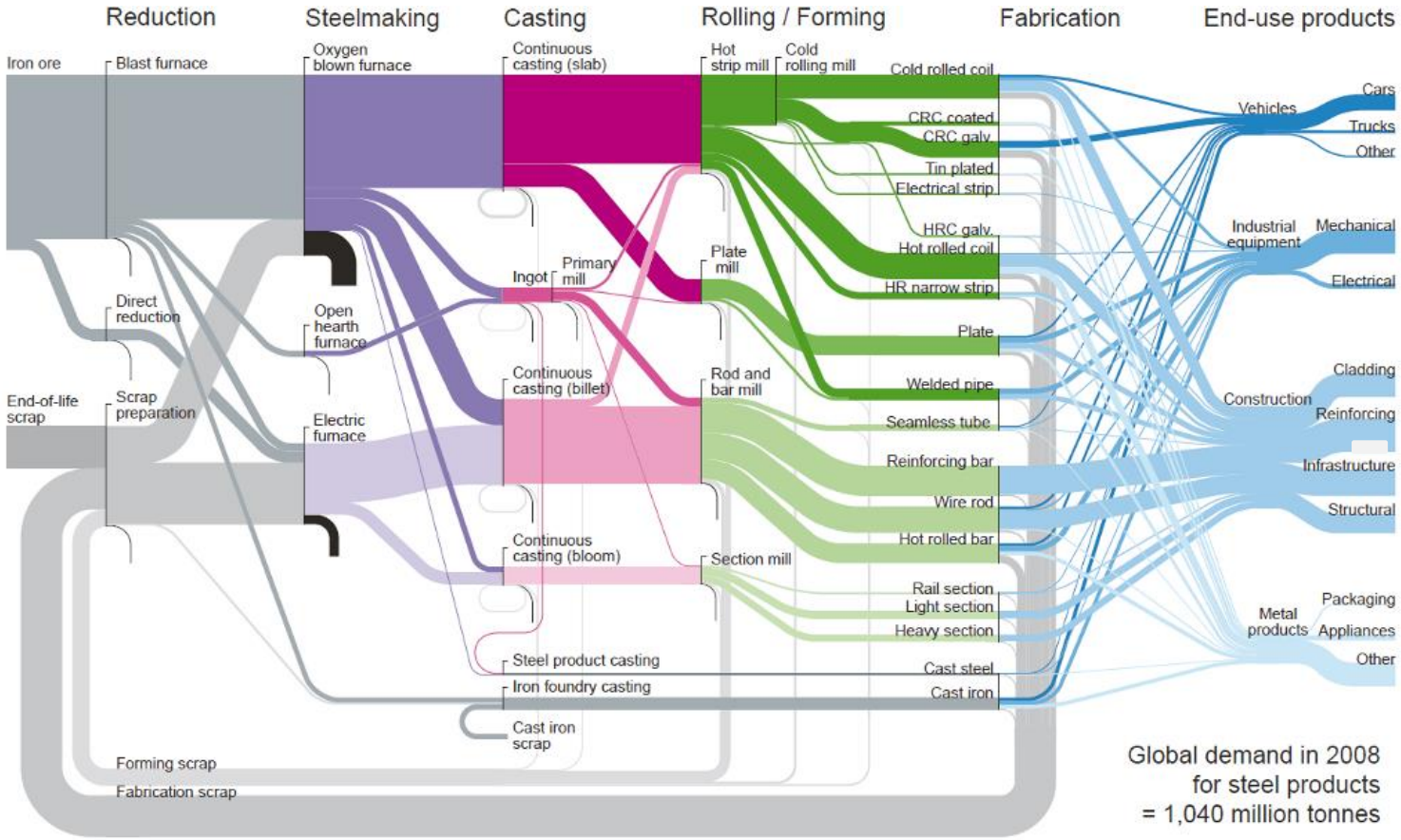
Projecting materials demand from socio-economic indicators… a difficult question!



Key materials demand responds differently across countries to per capita income and urbanisation trends depending on industrial structures, infrastructure development needs and other factors.

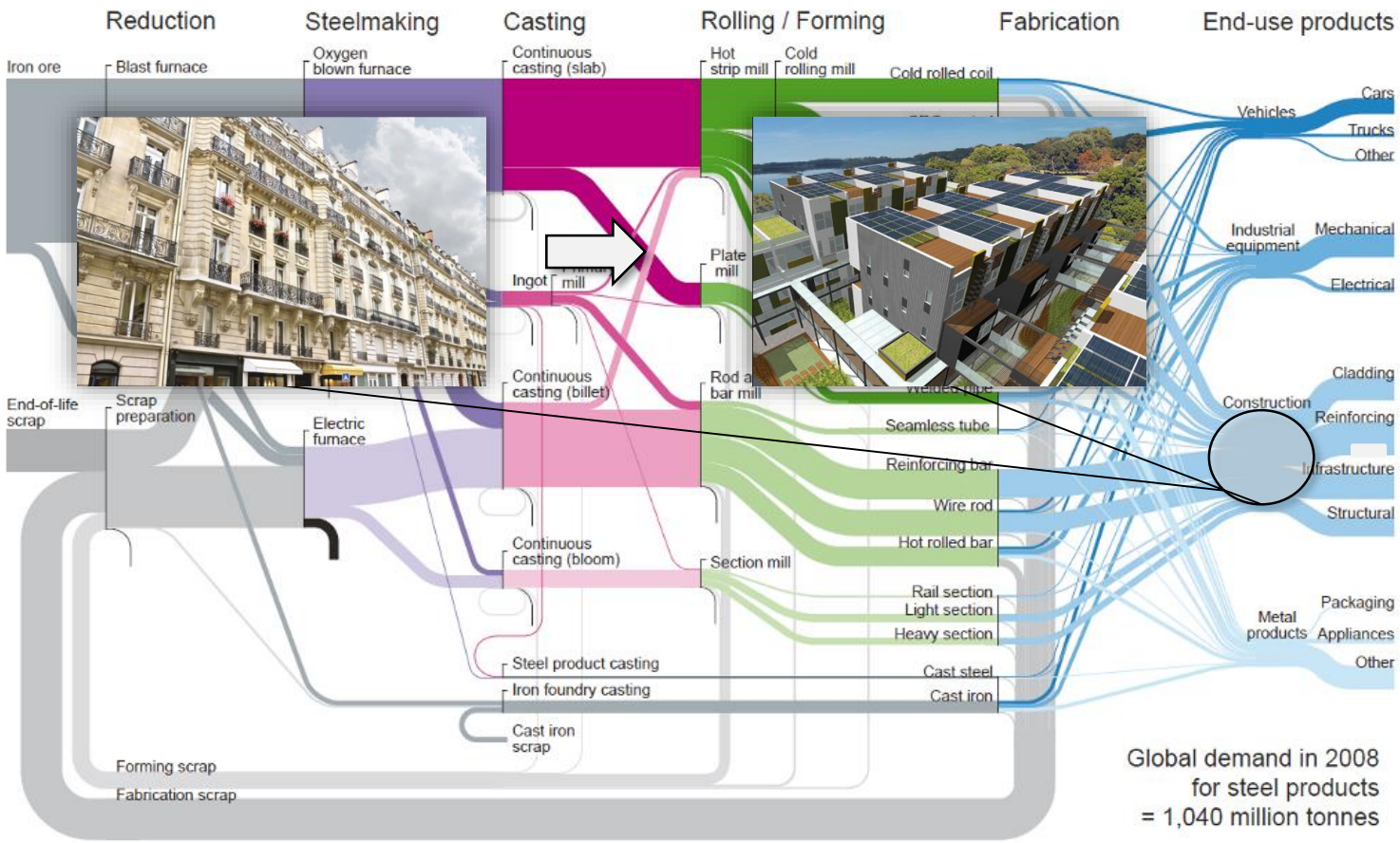
Source: USGS and Worldsteel statistic yearbooks, IMF, UNDESA databases

Understanding existing complex supply value chains is needed…



Source: Allwood and Cullen, Sustainable Materials – Both eyes open web pres., p.7

…but supply value chains are also continuously evolving

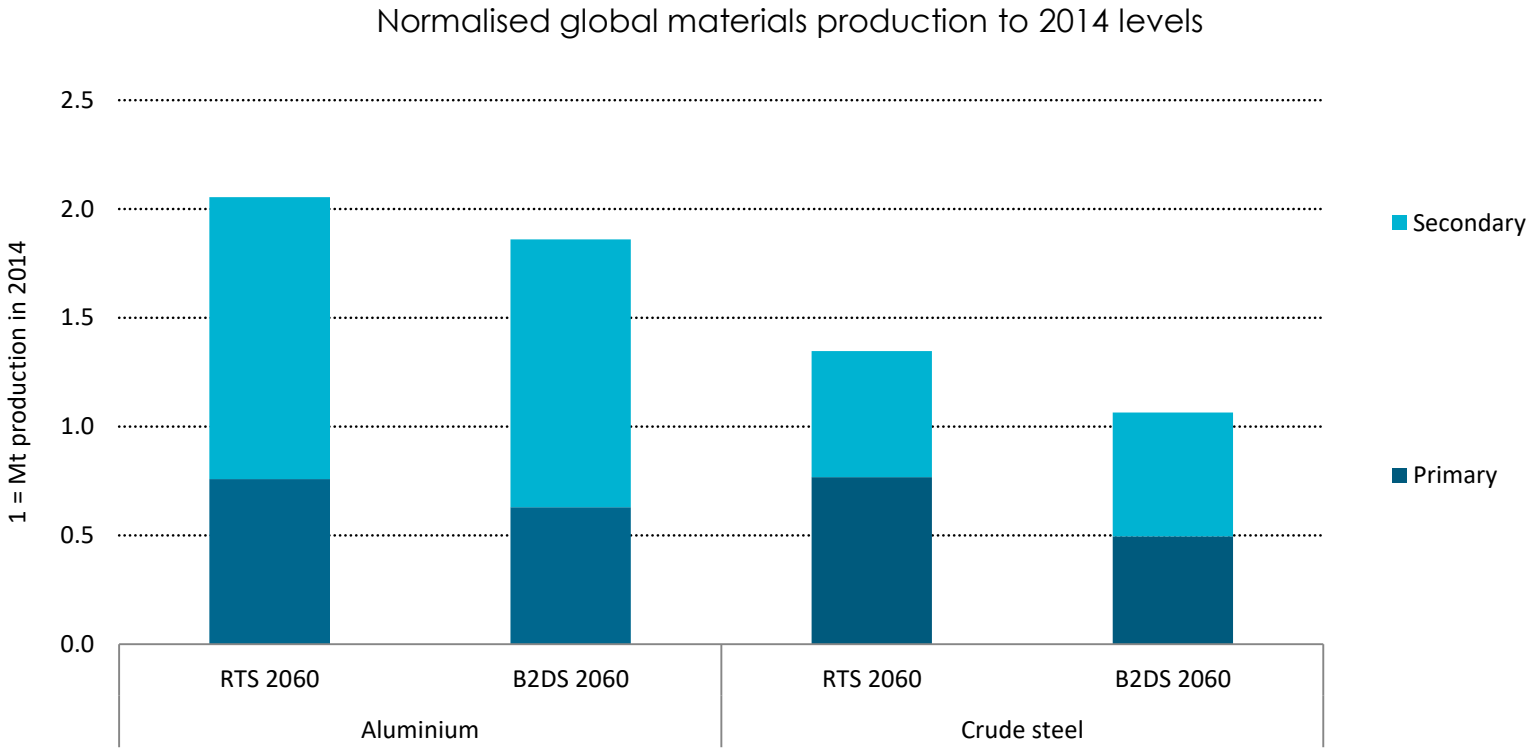


Source: Allwood and Cullen, Sustainable Materials – Both eyes open web pres., p.7

…and materials efficiency strategies also impact supply chains

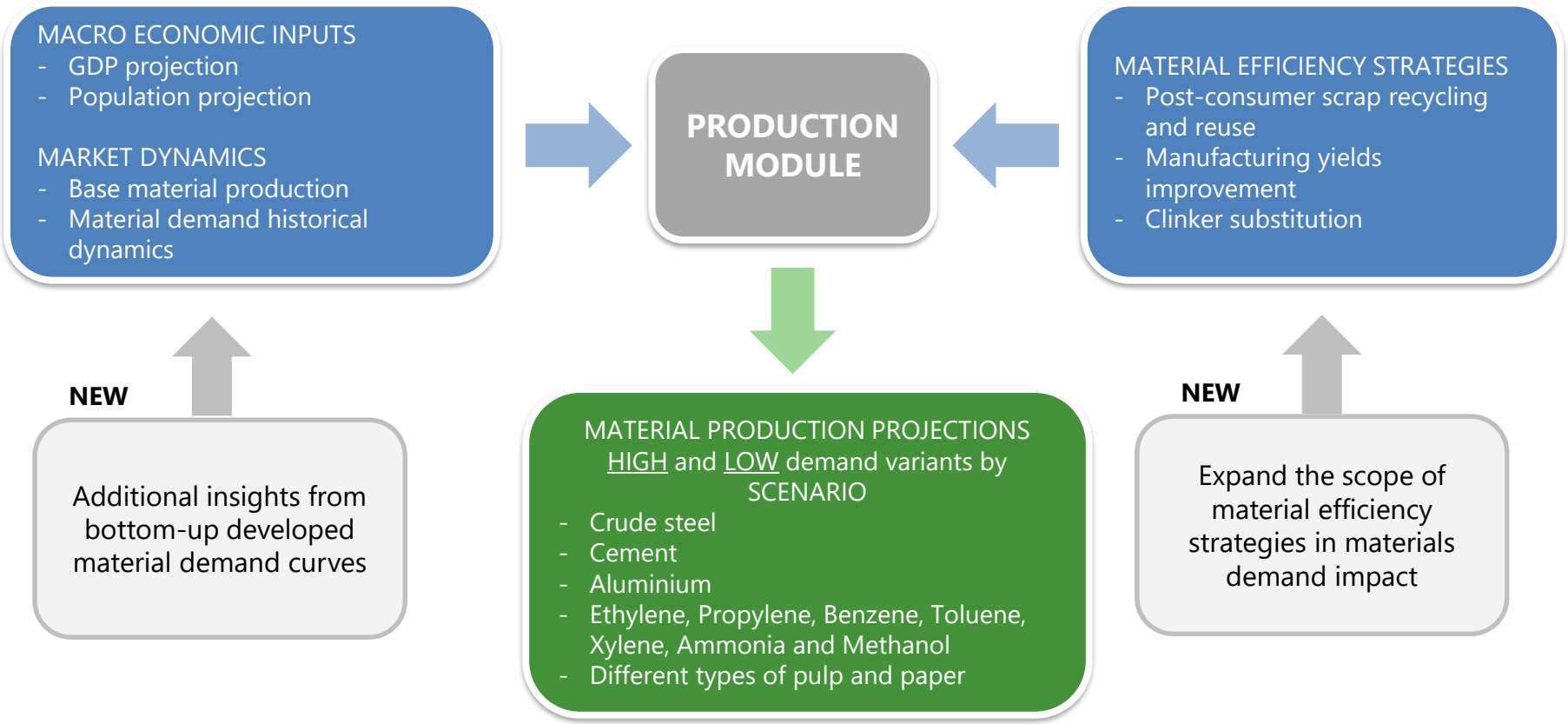
	Industry	Transport	Buildings	Supply
Light-weighting (using less materials for same service)	Producing less dense office paper or lighter plastic bottles. Using less detergent for same cleanliness level	Optimal component design strategies to reduce materials mass for same service; more shared transport and building services?; improved construction techniques		Optimum distribution grids routing
Reducing yield losses	Semi-manufacturing and manufacturing yields improvements			
Extending product life time or using products more intensively (related to users)	Longer-lasting industrial facilities Consumer products being used for a longer-time	Longer-lasting vehicles, including modular designs	Longer-lasting buildings and appliances; including modular designs	Longer-lasting infrastructures
Finding alternative ways of using scrap without remelting (scrap diversion)	Limited application			
Others	Clinker-to-cement ratio reduction			
Recycle		Steel, aluminium, plastics scrap recycling	Steel, aluminium, plastics scrap recycling	Steel, aluminium, plastics scrap recycling
Reuse	Post-consumer scrap fed directly to manufacturing processes. Re-use of plastic consumer products (e.g. bottles, packaging)	Remanufacturing; reuse/repurposing of components (e.g., batteries)	Reusable building components and assemblies	Reuse of components, e.g. remanufacturing of wind turbines

Material efficiency opens opportunities for energy and CO_2 savings

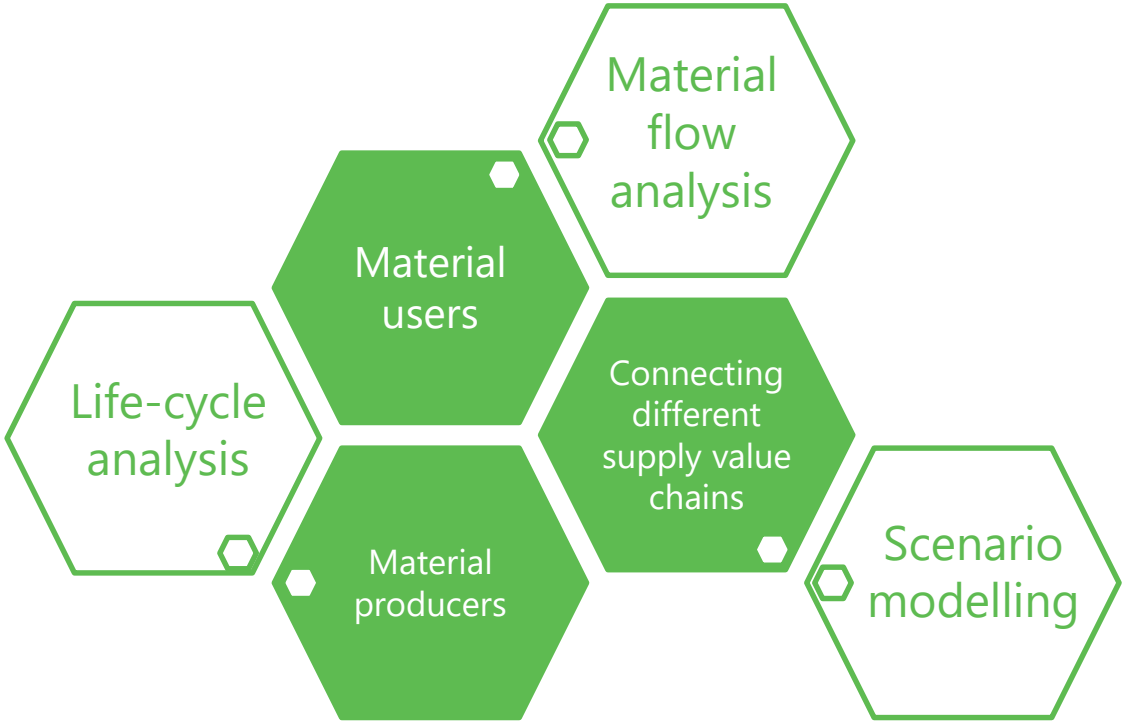


Wider implementation of material efficiency strategies lead to a reduced demand of materials, as well as to increased shares of secondary routes production in the B2DS.

Improving the analysis of future materials demand



Leveraging knowledge and providing a platform for exchange



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