

Why is **high value** recycling so important for steel?

Dr Philippa Horton

Business Manager, University Of Cambridge

pmh49@cam.ac.uk

In order to reduce emissions from steel **now**, we should:



1. Maximise **material efficiency** (i.e. use less steel)



2. Maintain the value of steel by **avoiding downcycling**



3. Create mechanisms to promote **fair access** to steel



4. Decarbonise steel **production** processes

Three take home messages for today

Material efficiency can be frightening

Steel products



Essential zero emission technology



Infrastructure for a just transition



“Sticking your head in the sand might make you feel safer, but it’s not going to protect you from the coming storm.”

— [Barack Obama](#)

What will constrain steel supply?

Secondary Steel Constraints:

- Total scrap available
- Unequal geographic location of scrap
- Downcycling of scrap



Primary Steel Constraints :

- availability of zero emission energy
- availability of zero emission hydrogen
- rate we can build new facilities




Is there a risk to steel supply?

Growing demand for green steel:

- Physically feasible production of green steel by 2050 is 1.6 Gt/year*
- IEA demand by 2050 is 2.5Gt/year**

How GM plans to be carbon neutral by 2040

 Scooter Doll | Feb 17 2021 - 4:47 pm PT |  0 Comments

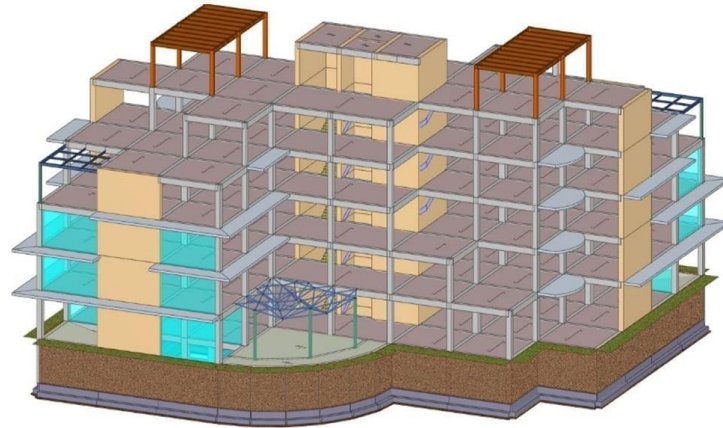


Steel is abundant now, but zero emission steel will be more difficult to access which could lead to shortages

Supply may not grow quickly enough to meet the growing demand.

We need more material efficiency

Plan B: Maximum Material Efficiency



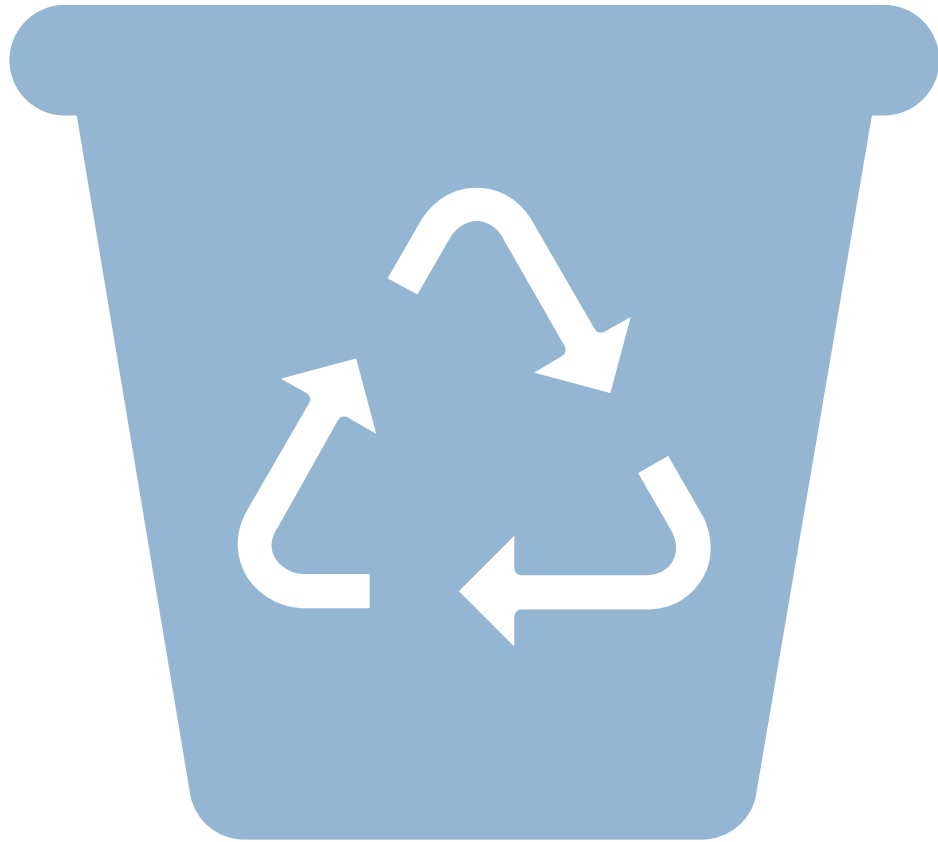
Car production: Minimising automotive production scrap can reduce steel demand by 30% *

Building design: Optimising building layouts and structural designs can reduce material demand by 50% **

Efficient design: material efficient component design can reduce demand in steel products by 14% ***

Longer life goods: Extend the life of transport and industrial equipment to reduce steel demand by 20% ***





Let's talk about recycling

MAXIMUM EFFICIENCY SCENARIOS
REQUIRE HIGH VALUE RECYCLING

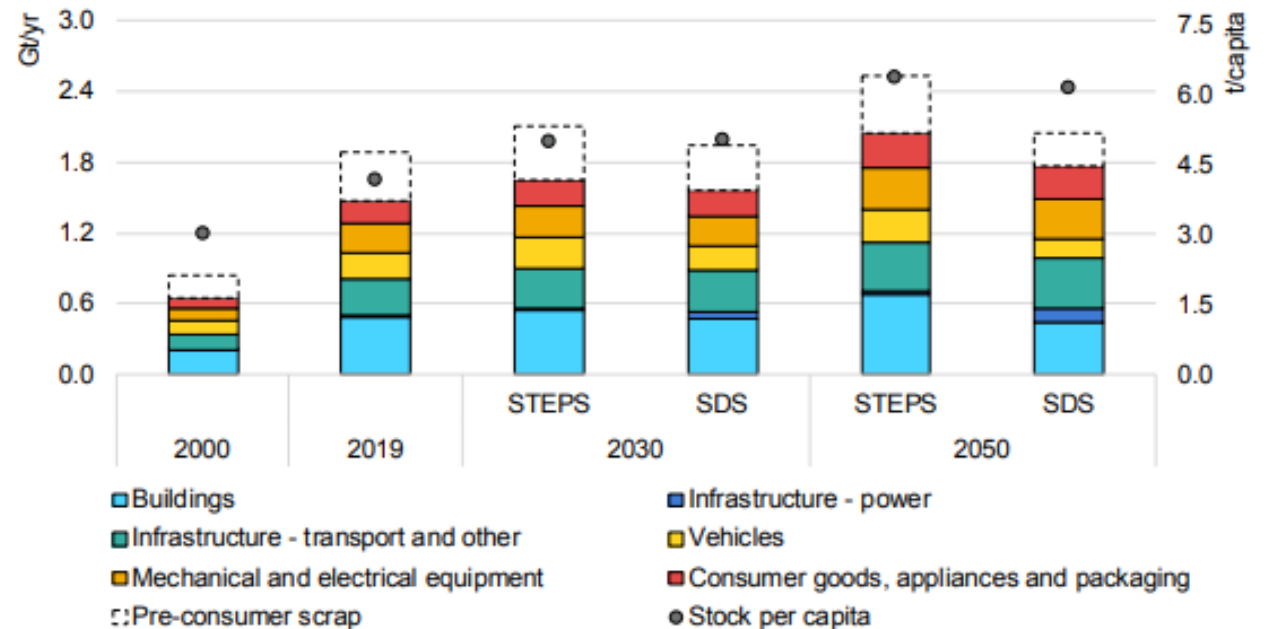
Hurray! We have maximised material efficiency

“Material efficiency strategies can help reduce growth in global demand for steel while delivering the same material services.

In the Sustainable Development Scenario, steel demand is 19% lower than in the Stated Policies Scenario in 2050.”

IEA Roadmap

Figure 2.2 Global end-use steel demand and in-use steel stock by scenario



IEA 2020. All rights reserved.

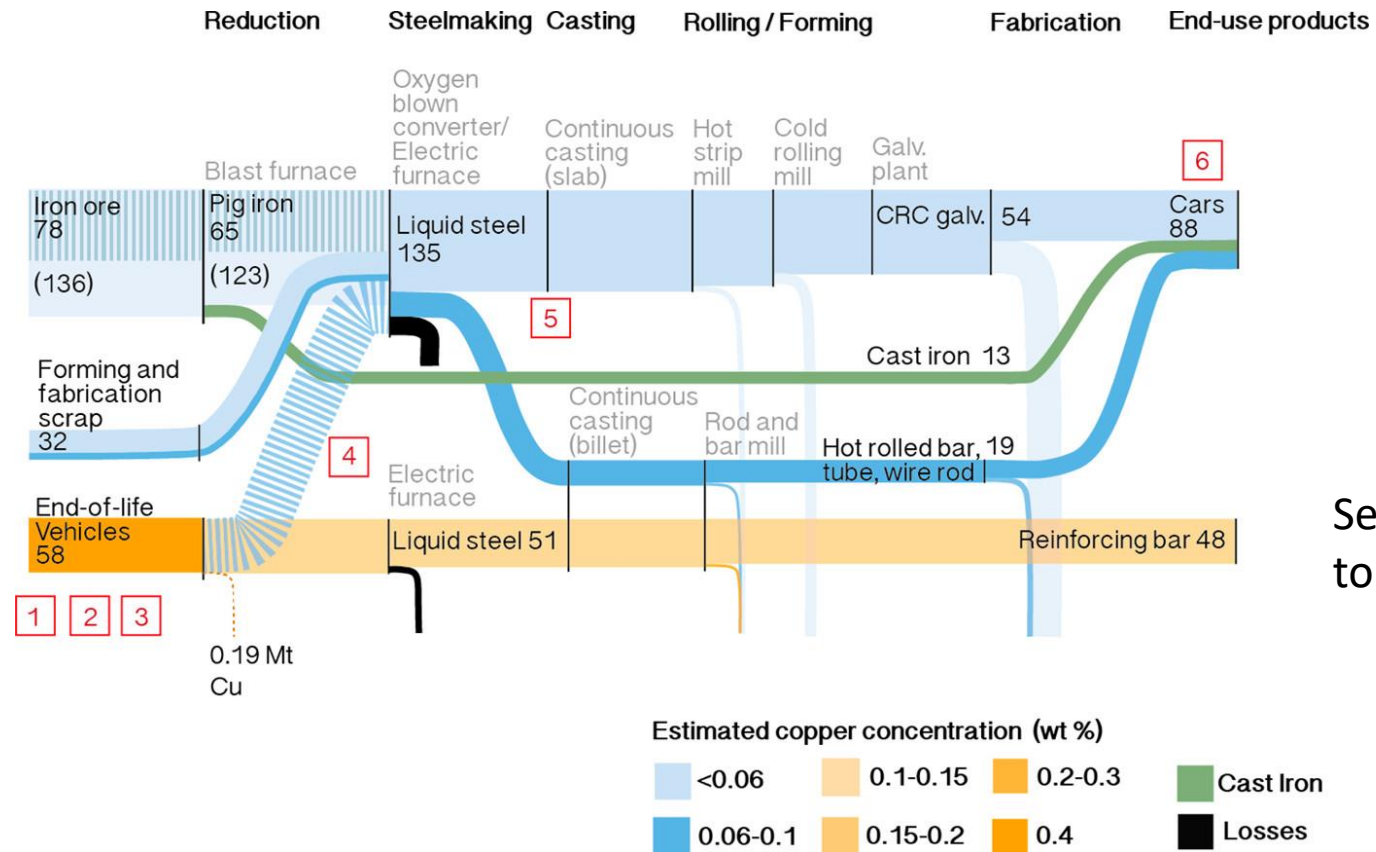
Note: STEPS = Stated Policies Scenario, SDS = Sustainable Development Scenario.

Source: IEA analysis informed in part by Pauliuk, Wang and Muller (2013), Cullen, Allwood and Bambach (2012) and Gibon et al. (2017).

Recycling is usually downcycling

Primary steel used to make a car

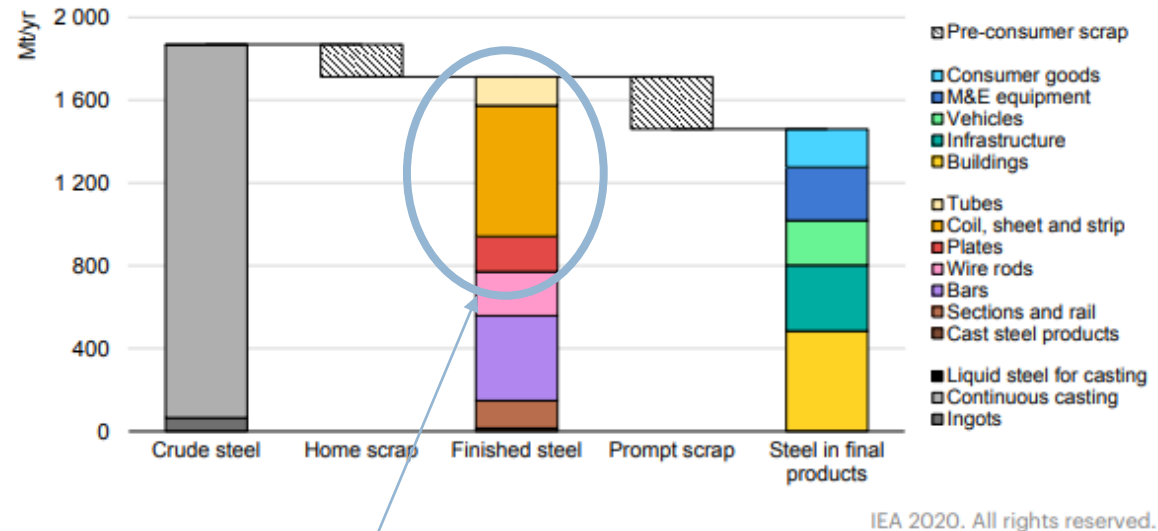
Car recycled into secondary steel



Secondary steel used to make a building

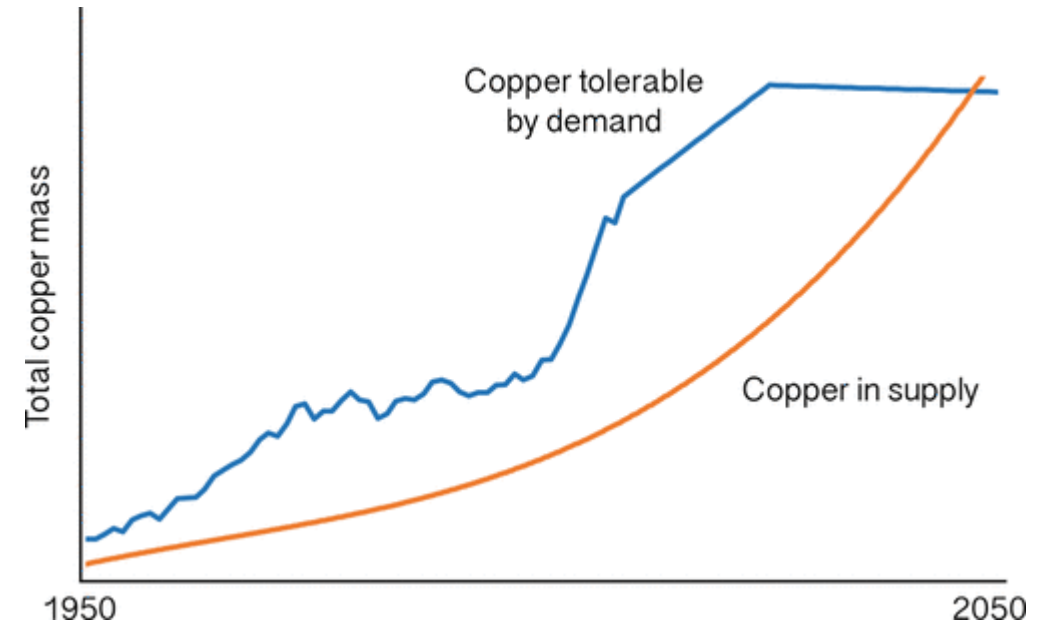
The downcycling problem

Figure 1.1 Global steel production by product and demand segment in 2019



IEA 2020. All rights reserved.

Requires high value recycling



Daehn, et al (2017)

We need high value recycling

Increased high value recycling enables:

- ❖ long term steel circularity, beyond 2050
- ❖ an immediate and direct reduction in emissions for high value steel products
- ❖ higher implementation of material efficiency on a global scale
- ❖ a more flexible supply chain with different production options available

“Improved scrap sorting and better separation techniques to reduce contamination by trace metals like copper will be important to ensure the majority of steel grades can be produced via the secondary route.”

IEA roadmap

But is that fair?

A just transition requires economic growth – and lots of steel – in regions which don't have much scrap.



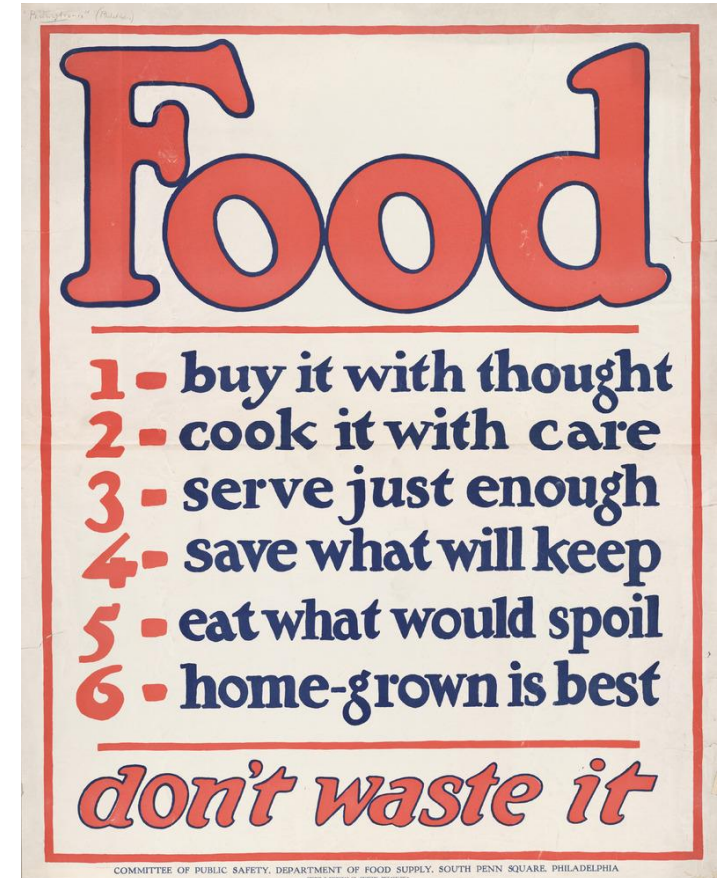
Does that mean that using scrap to make cars deprives growing economies of scrap for infrastructure and buildings?

This is **only** true if we have an abundant supply of zero emission primary steel

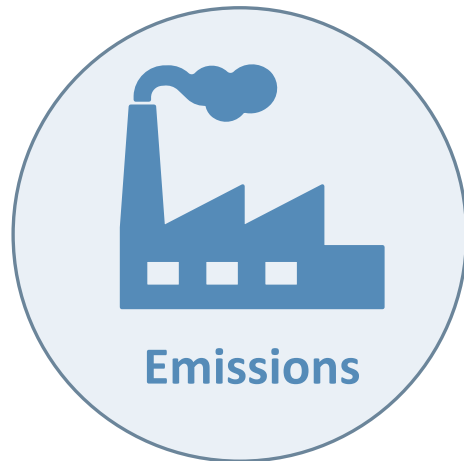
The answer to a just transition is more material efficiency... not downcycling

If primary production of zero emission steel is not available in excess supply, fair access to scrap steel could be created by:

- ❖ using much less steel through material efficiency
- ❖ high value recycling to provide production flexibility
- ❖ Creating mechanisms for excess steel supply (primary and secondary) to be used in regions which don't have sufficient scrap availability.



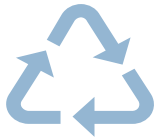
Why now... we've got 27 years left?



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Thank you
