Global Forum on Steel Excess Capacity

The Changing Nature of Steel Excess Capacity

GFSEC Workshop with Stakeholders

27 September 2023

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LAPLACE CONSEIL

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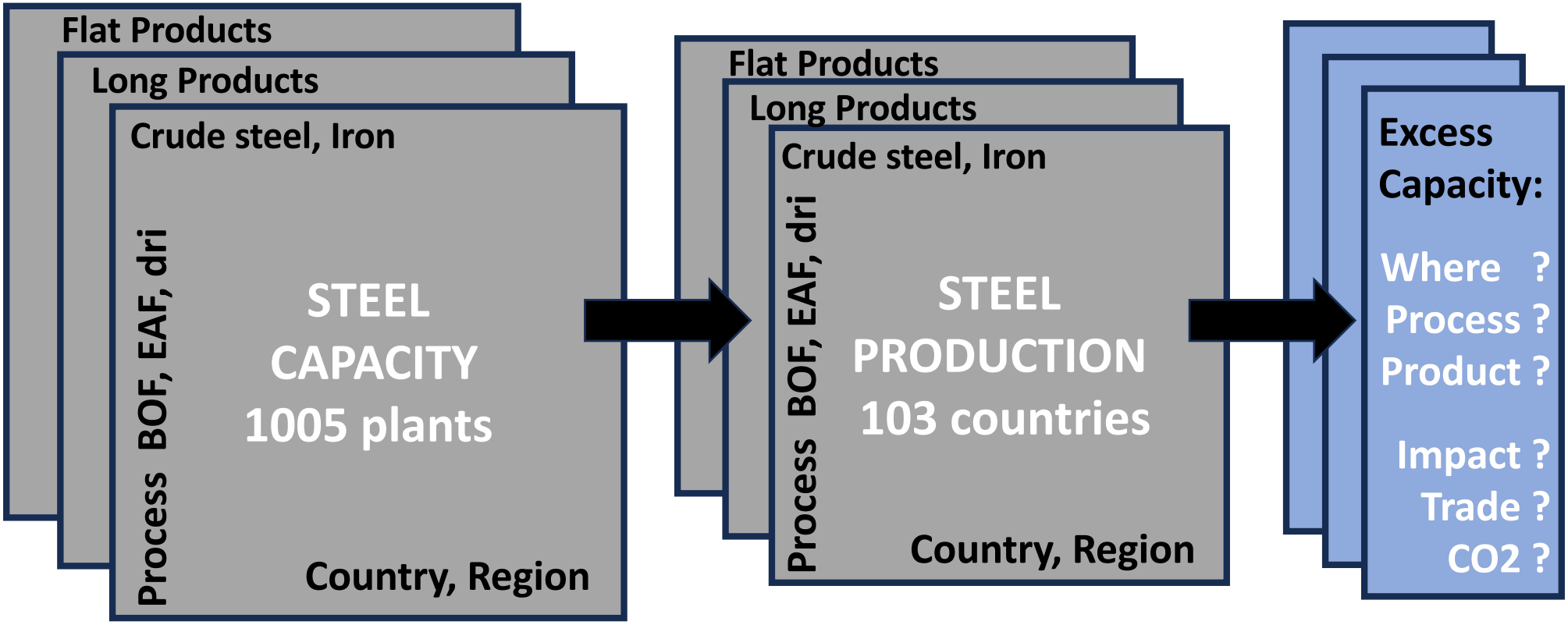
BETTER POLICIES FOR BETTER LIVES

Disclaimer

- This presentation was prepared by Marcel Genet, founder of Laplace Conseil, to illustrate the changing nature of the steel industry “excess capacity” as a result of global changes and energy transition.
- All primary data used in this presentation are **publicly** available:
  - **Worldsteel** is the main source for production data **by Country.**
  - **Capacity data by Plant** is obtained by aggregating various sources:
  - Industry associations (EUROFR, AISI, CISA, JISF, ILAFA,…)
  - Commercial data providers (Platts, Kallanish, Fastmarkets, J King,…)
  - Technology providers (Midrex, Danieli, Primetal,…)
  - NGO (Global Energy monitor, Global Steel Plant tracker)
  - Around 600 steel company web sites, all BOF plants, most EAFs
- Laplace Conseil has checked the **consistency** of the aggregated country data with the OECD capacity data base.
- All errors and omissions are the sole responsibility of Laplace Conseil.

We have built a **tool** to collect, aggregate, and analyze capacity and production of steel, broken down by country, process, product, trade and CO_2 impact



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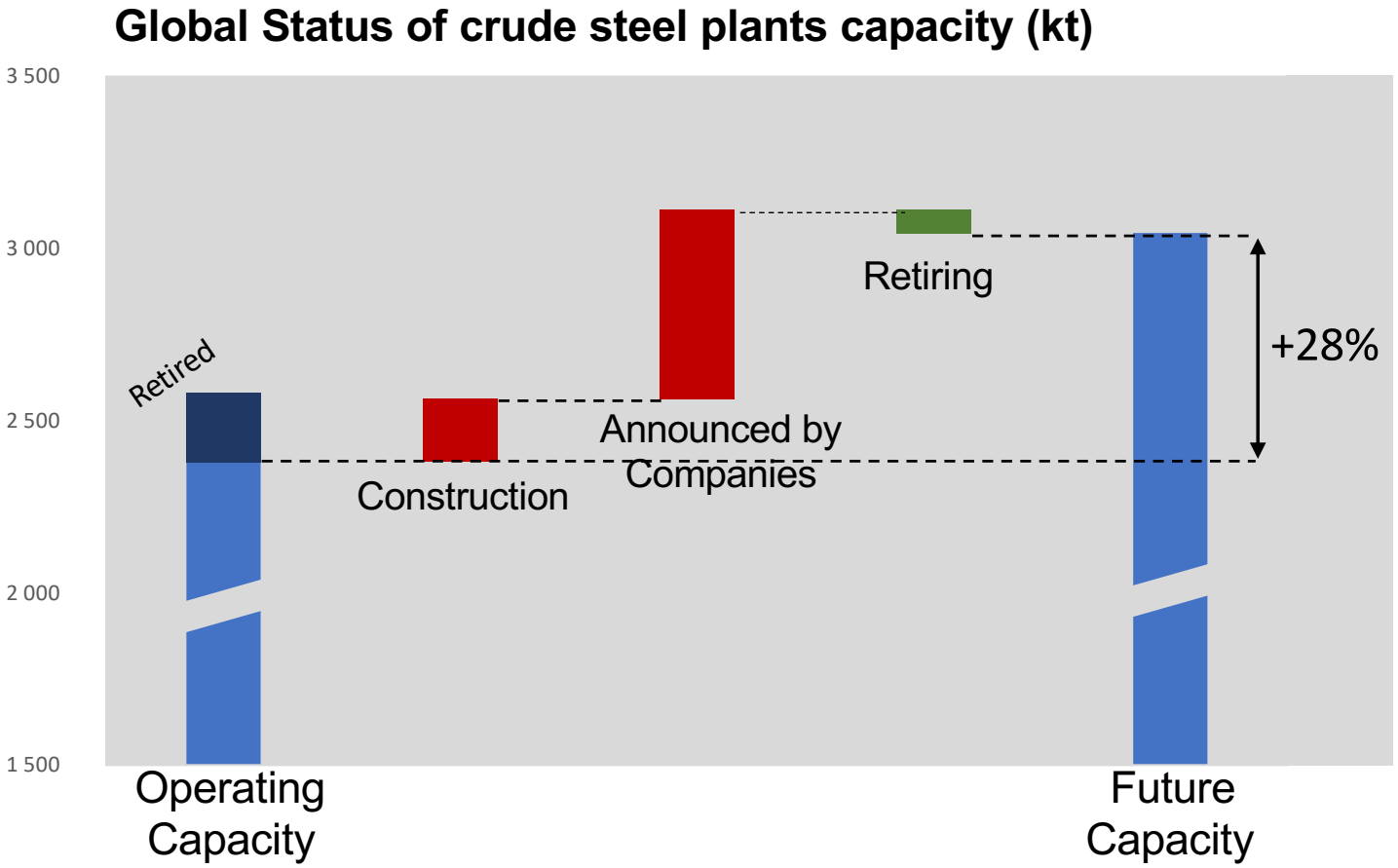
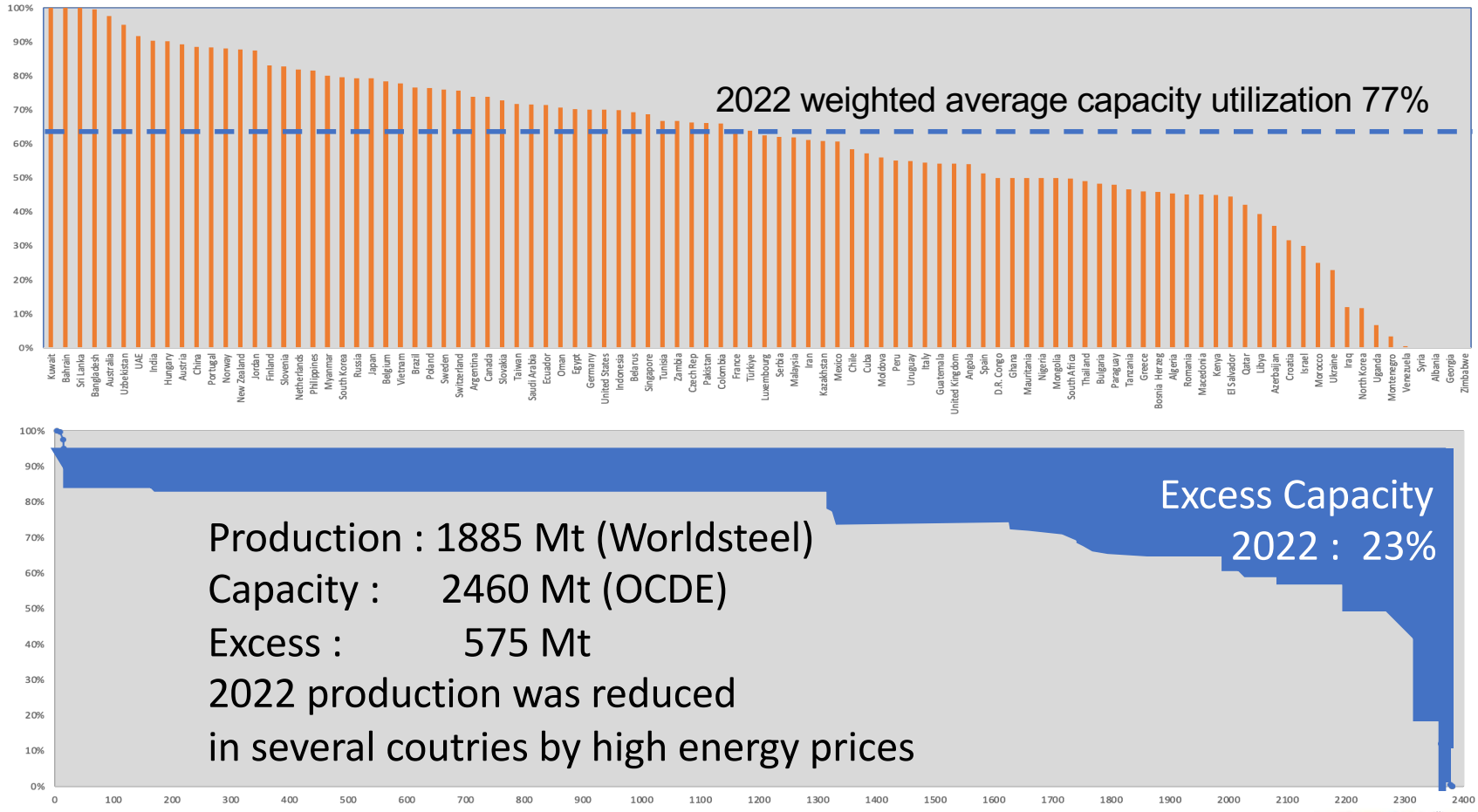
We are collecting capacity data by plants*, broken down by status: operating, construction, announced or retiring over the next 10 years and retired in the past 10 years



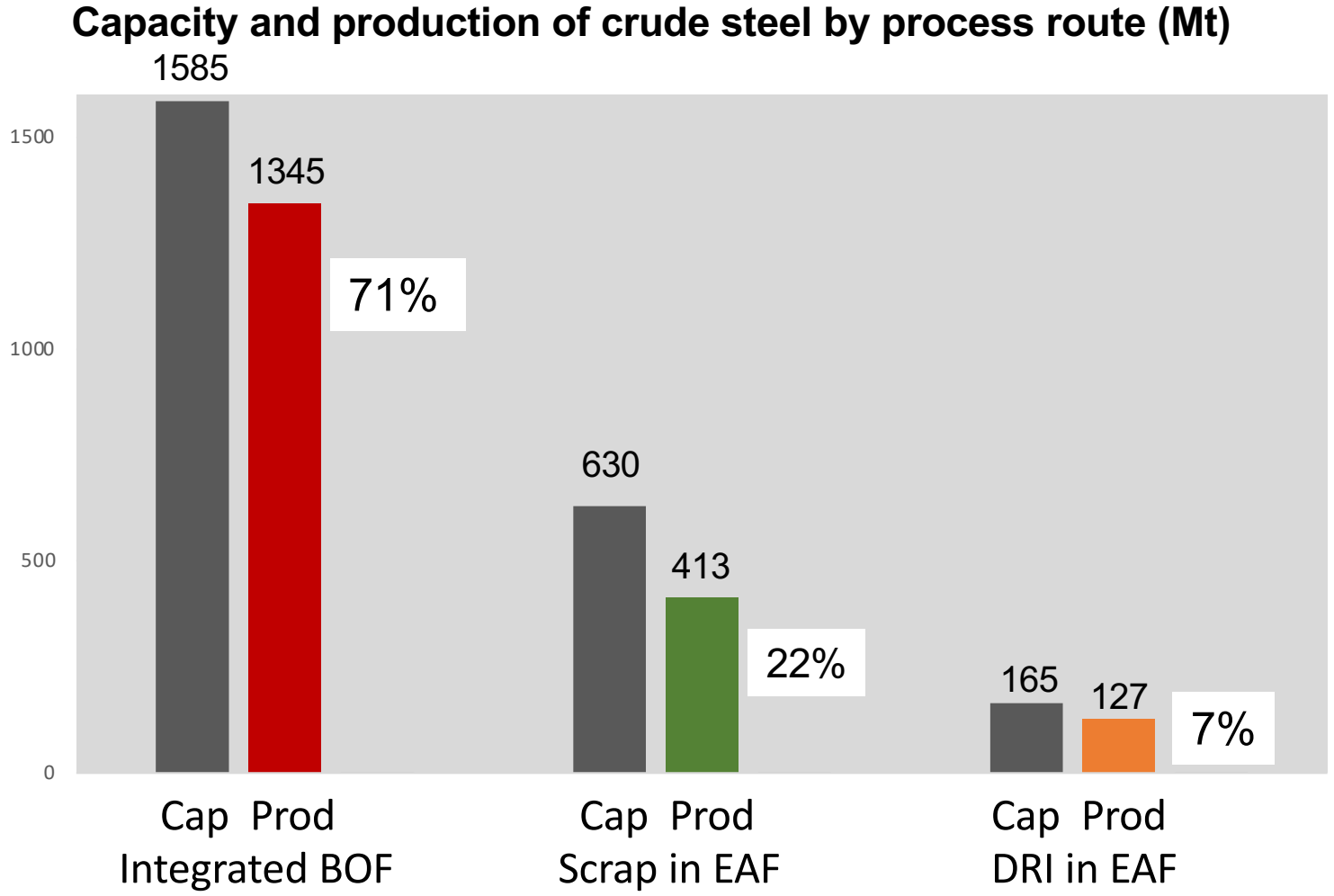
* We collect data for plants with crude steel and or iron capacity. Rerollers of semi are not included

Excess Capacity varies among countries as a result of market and non-market supply / demand forces

Country capacity utilization and global excess capacity

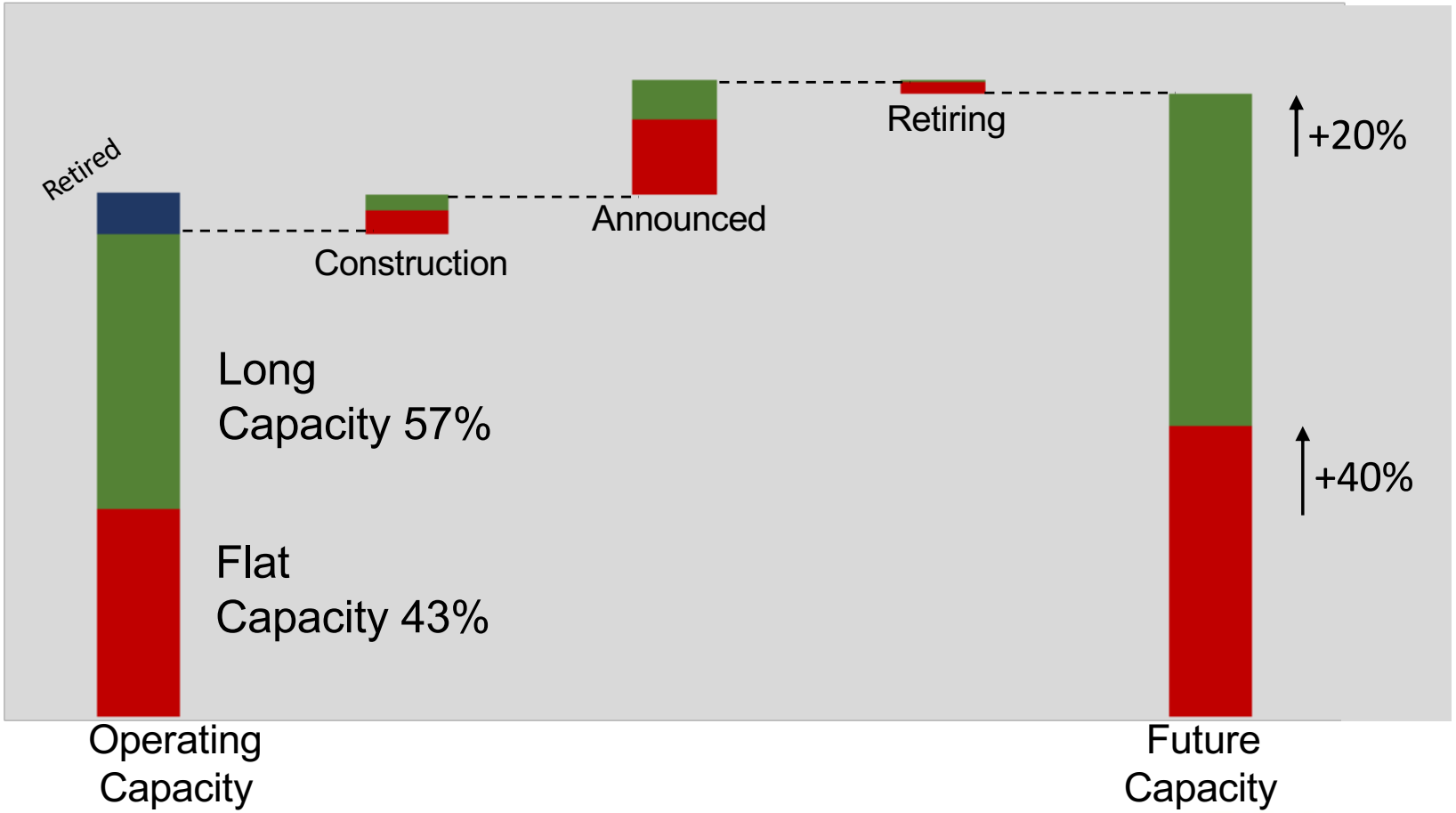


The industry uses three main processes. The BF/BOF route is the largest, but also the highest CO_2 emitter.



Long products capacity represents 57% of world total, but Flat products are expected to grow faster in the future

Breakdown of steel capacity in long and flat sectors



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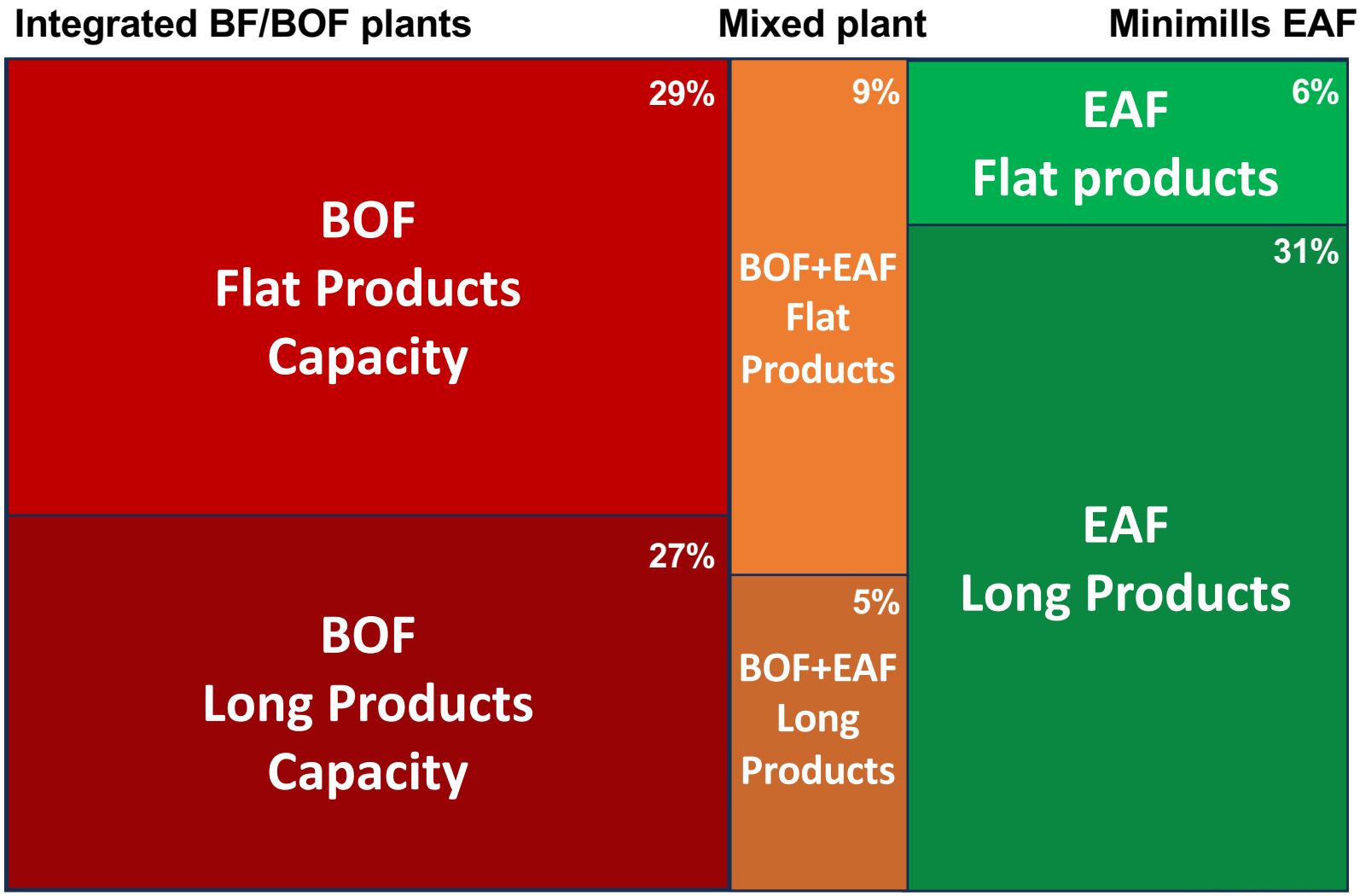
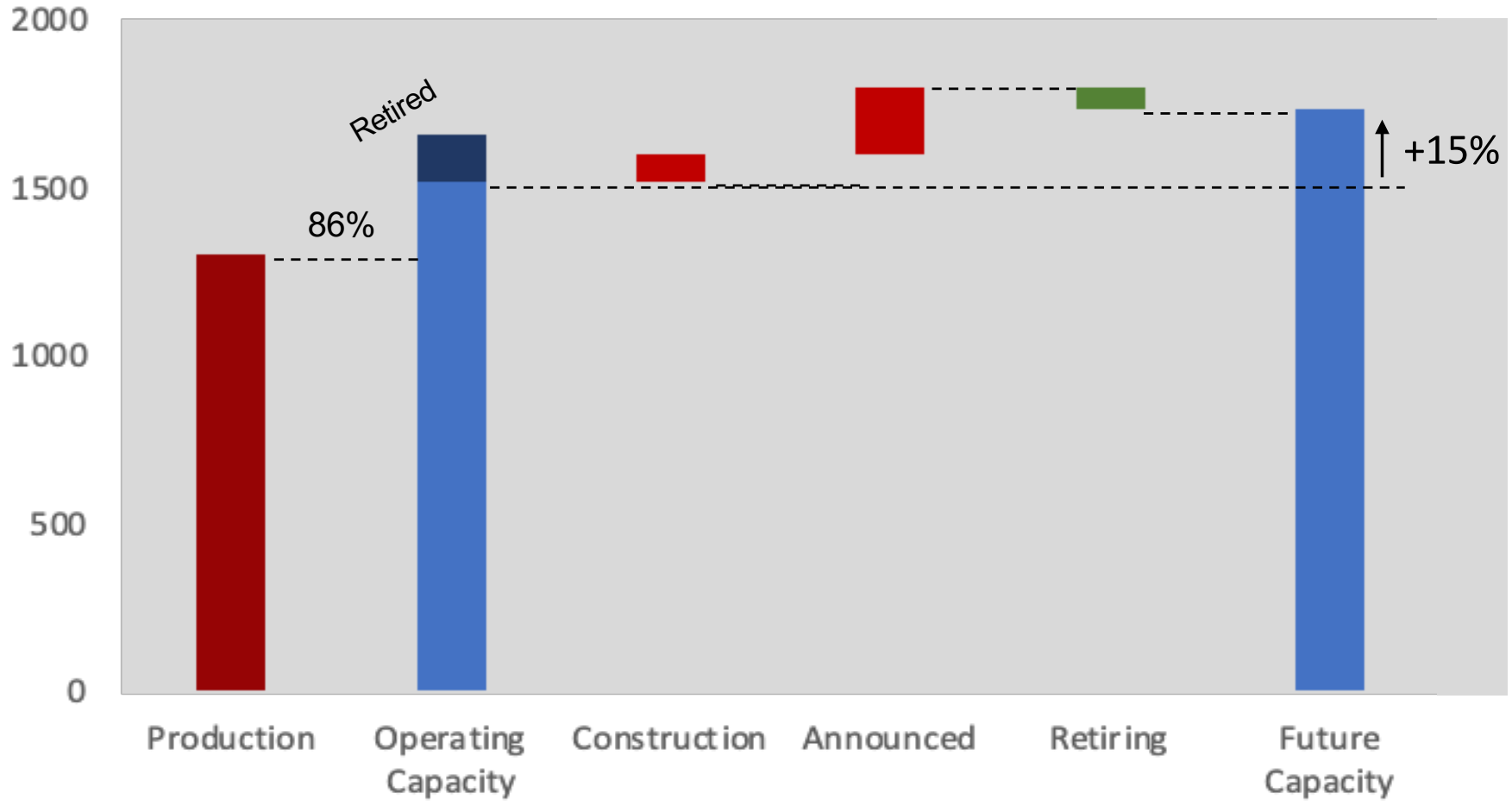
Integrated plants represent 55% of total capacity, EAF 31%, mostly long products, and mixed plants 14%



Blast-Furnace capacity is expected to increase by 15% despite significant past and future retirements



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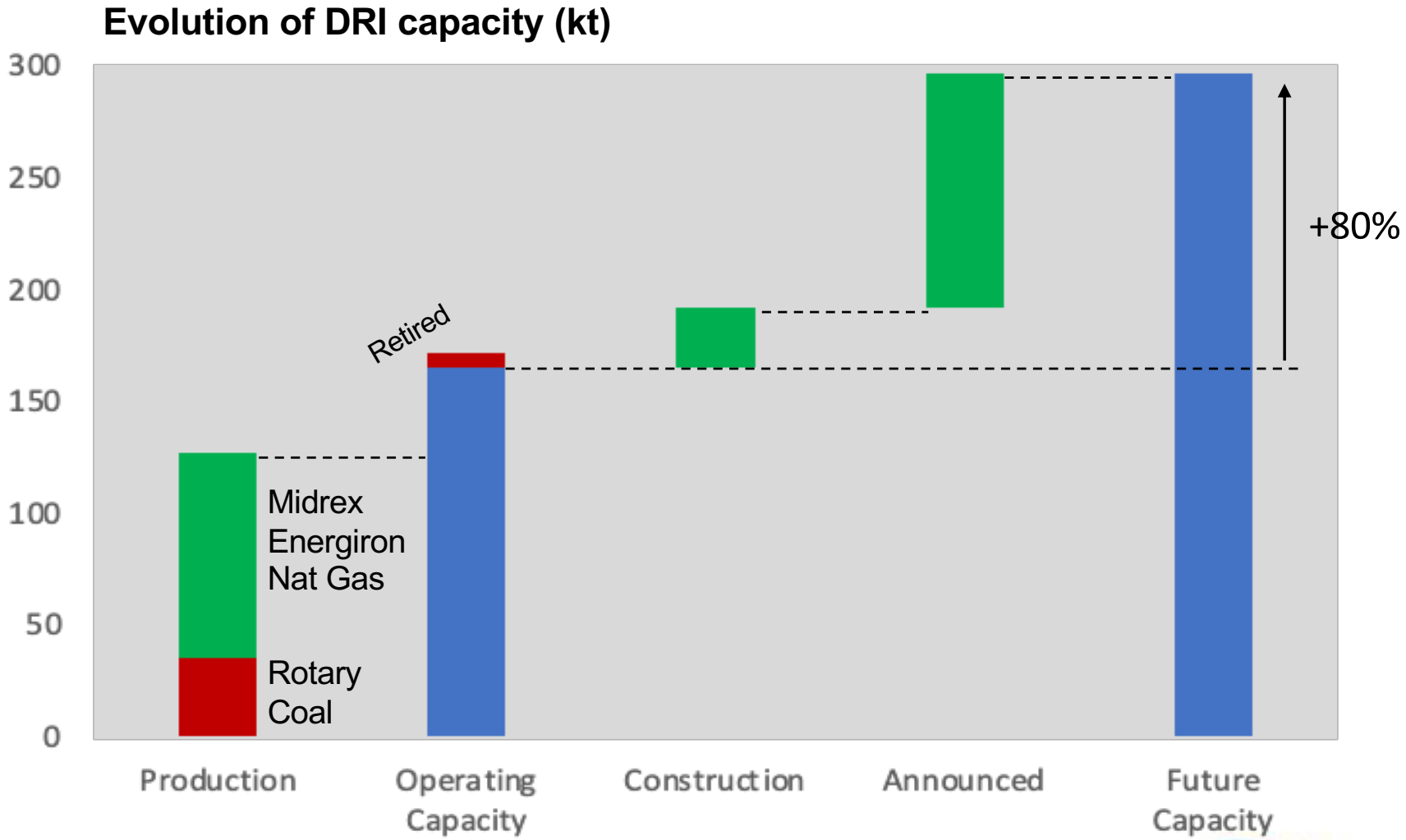
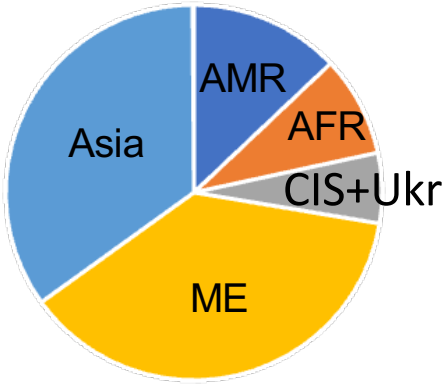
By 2030, the steel industry anticipate to increase DRI capacity by 80%

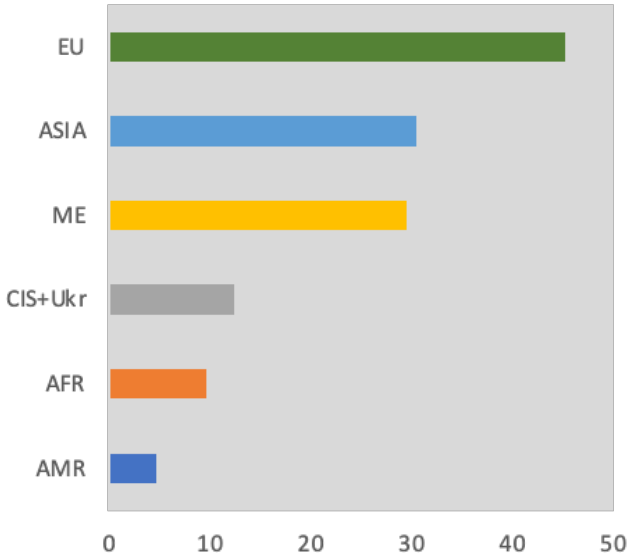


Europe produces very little DRI but will see the largest increase in DRI capacity, followed by Asia and Middle East

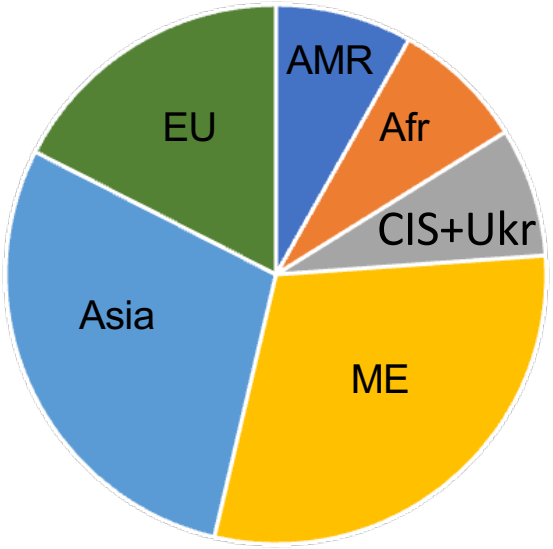
Current Capacity
127 Mt



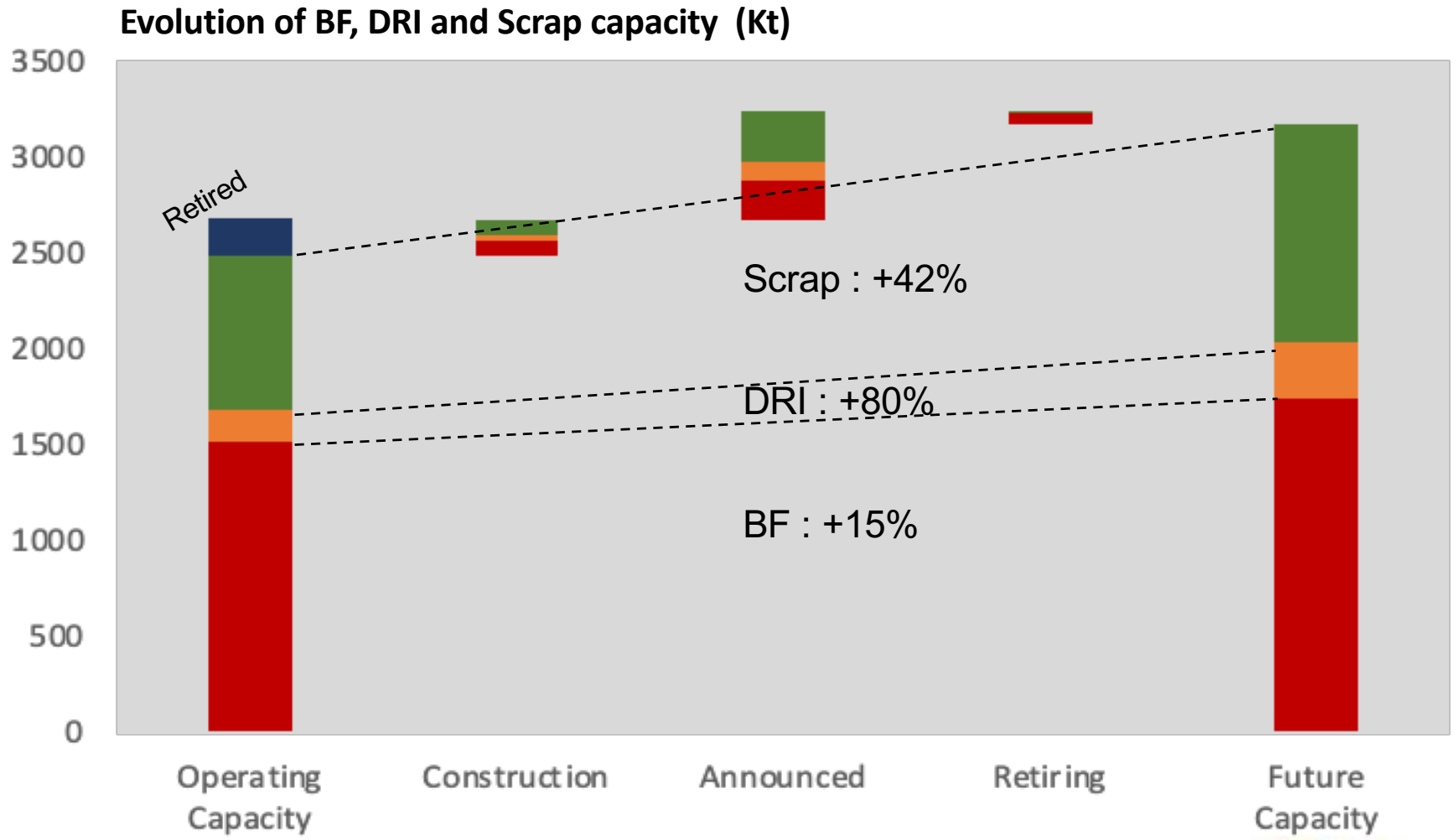
Construction and Announced
132 Mt



Future Capacity
259 Mt



To feed the actual and future crude steel capacity, BF will increase by 15%, DRI by 80% and Scrap by 42%



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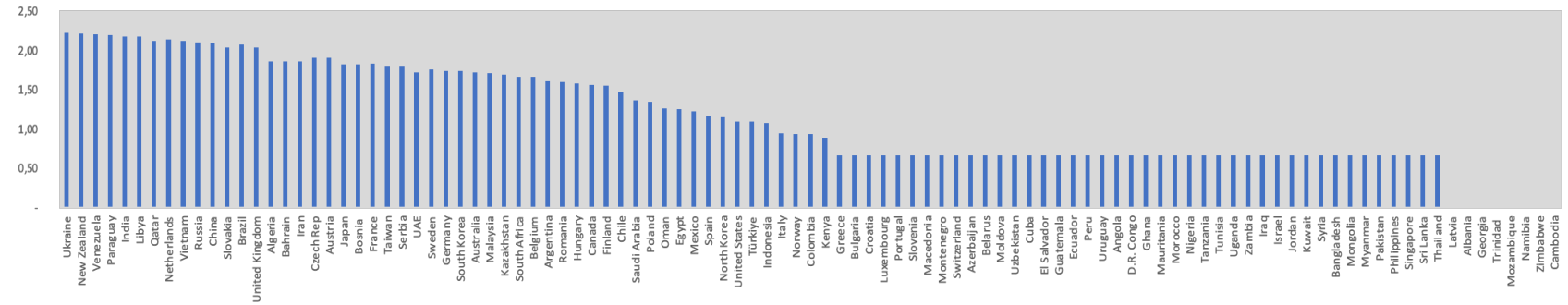
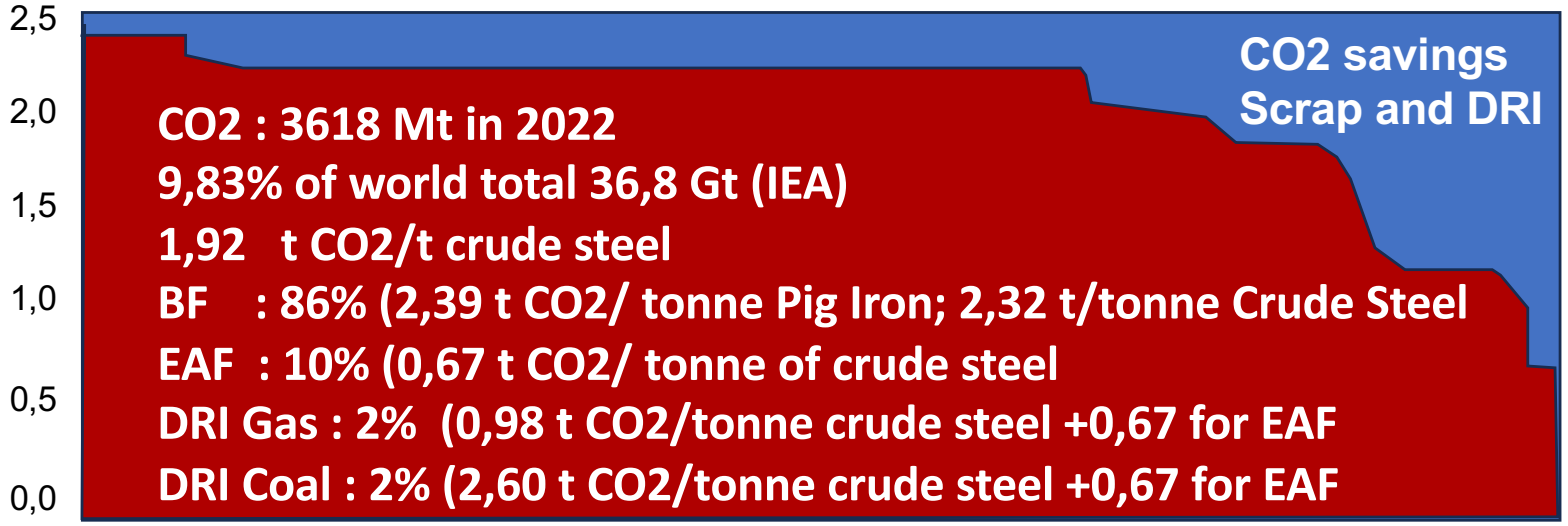
86% of the CO2 emitted by the steel industry originates from blast furnaces in 370 plants within 41 countries

CO2 per tonne of crude steel in each country (t/t)





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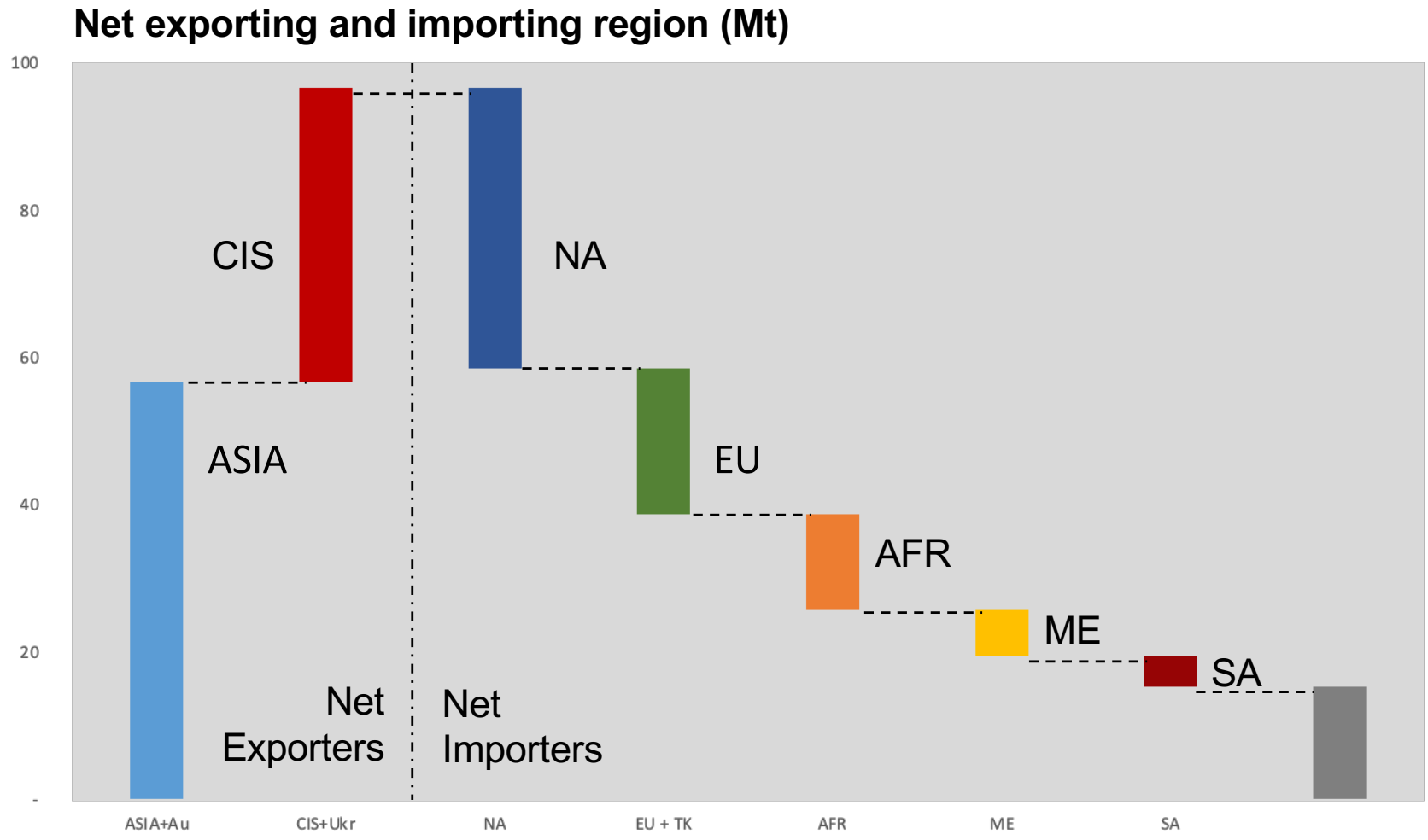
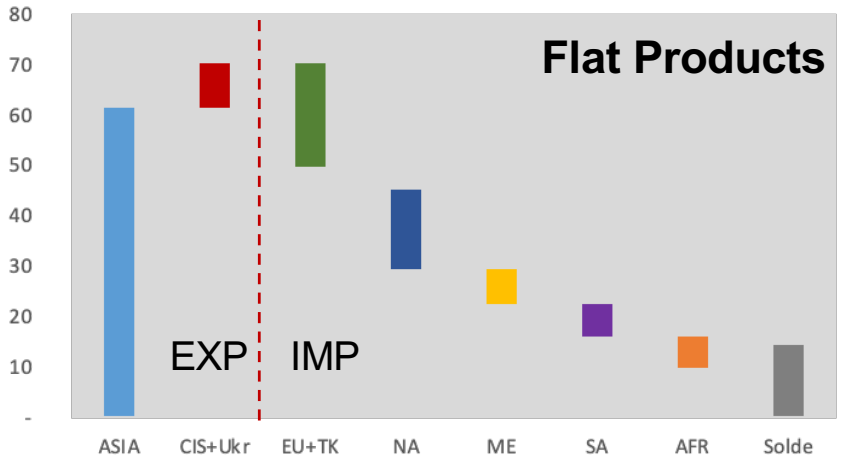
Our approach precisely quantify the magnitude of changes needed to reach Net-Zero in each segment

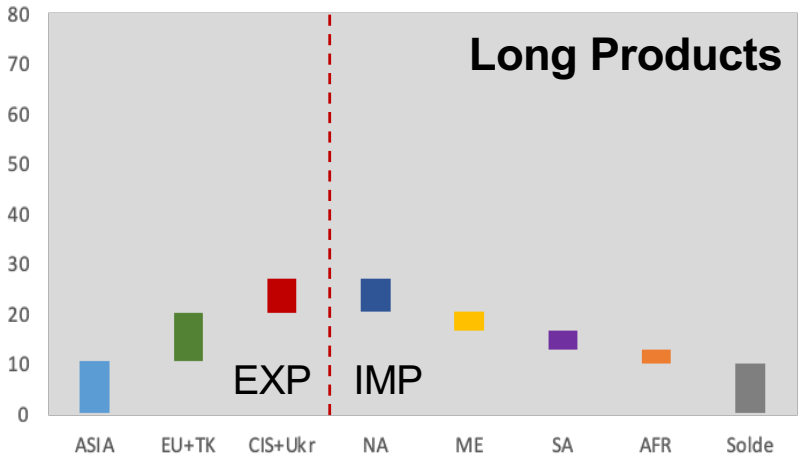
Products / Technologies	Flat Products Capacity	Long Products Capacity
Large Integrated BF/BOF	**893 Mt** (49% China) Most expensive problem Hydrogen + EAF ???	**758 Mt** (76% China) Progressively move to scrap based EAF
Midsized gas based DRI + EAF	**76 Mt** (mostly in MENA, Russia and Americas) Prepare conversion to H2	**89 Mt** (mostly in MENA and India with coal) Mostly use DRI for Flat
Small scrap based mini-mill EAF	**59 Mt** Lowest CO2 Need clean scrap or substitutes	**714 Mt** Lowest CO2 Growing scrap supply
New technologies Hydrogen Electro-metallurgy	**R&D** necessary Clean electricity needed Upscaling process	**Clean** electricity needed. Open markets for scrap Facilitate collection

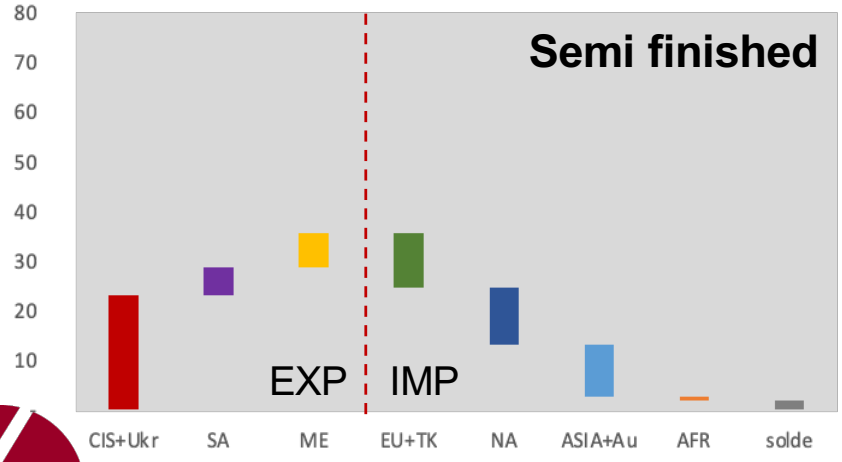
Asia and CIS are the two regions that are net exporters to the rest of the world for all products

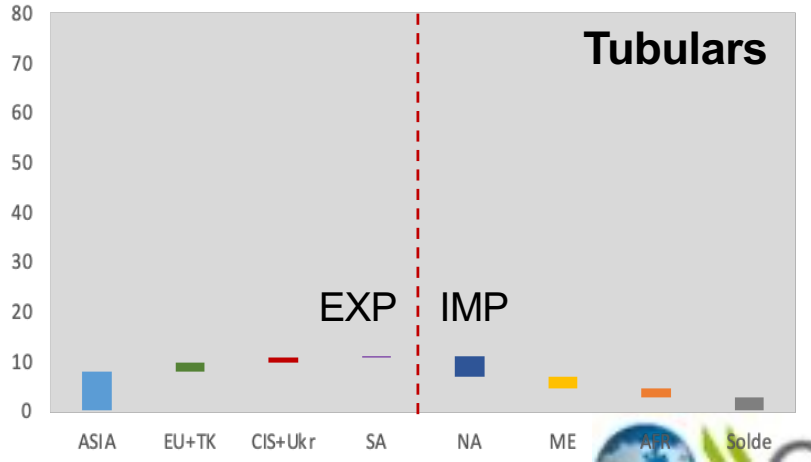


Net trade is dominated by flat products and semis (mostly slabs). Asia is largest exporter except for semis









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New capacities in construction or announced (± 700 Mt) will profoundly impact future trade flows

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- Europe is already a large importer of slabs and flat products and may increase its deficit. Europe will face difficulties to find natural gas cheap enough to operate its planned DRI facilities. Scandinavia buck the trend.
- America is already well advanced to replace its aging BF/BOF plants. With relatively cheap gas, and adequate financing options, the region can accelerate its transition. High steel prices will always act as a magnet for importers worldwide.
- Japan and Korea may choose to reduce their net export position, given the high cost of replacing BF/BOF and limited clean energy supply.

NON OECD

- China demand is peaking and excess capacity will grow, while scrap availability will slowly increase to allow for long product transition to EAF.
- MENA countries can leverage their favorable energy position to build export for DRI and construction steel for Africa and Europe
- Developing countries should refrain from building obsolete technologies BF/BOF and leapfrog to new technologies, DRI and electro-metallurgy

Conclusions

- Careful monitoring of steel industry announcements together with production report and statistics are essential to properly assess the building of excess capacity and its impact on trade and CO_2 emissions.
- In an era of accelerating technological transition away from coal and in favor of natural gas, hydrogen and clean electricity, it is important to break down the total excess capacity by products and processes so as to adapt recommended policy action for maximum efficiency:
  - By far, the main problem is with the Flat sector produced with BF and BOF. It is the most expensive sector to decarbonize and the most subject to trade distortion.
  - In most countries, Long products are produced by small, often family owned firms, with recycled scrap melted in EAF. This industry is much more local and international trade is less frequent and less distorted.
  - Only in China, which grew so fast in recent years that the country did not have time to accumulate much post-consumer scrap, are still long products made with the `BF/BOF technology, Soon, China will experiment the same technology transition that occurred in OECD countries.
  - In most countries with large BF/BOF capacity, gas based DRI is the best intermediate solution and it will pave the way for Hydrogen and perhaps later on electro-metallurgy.