



European
Copper Institute
Copper Alliance



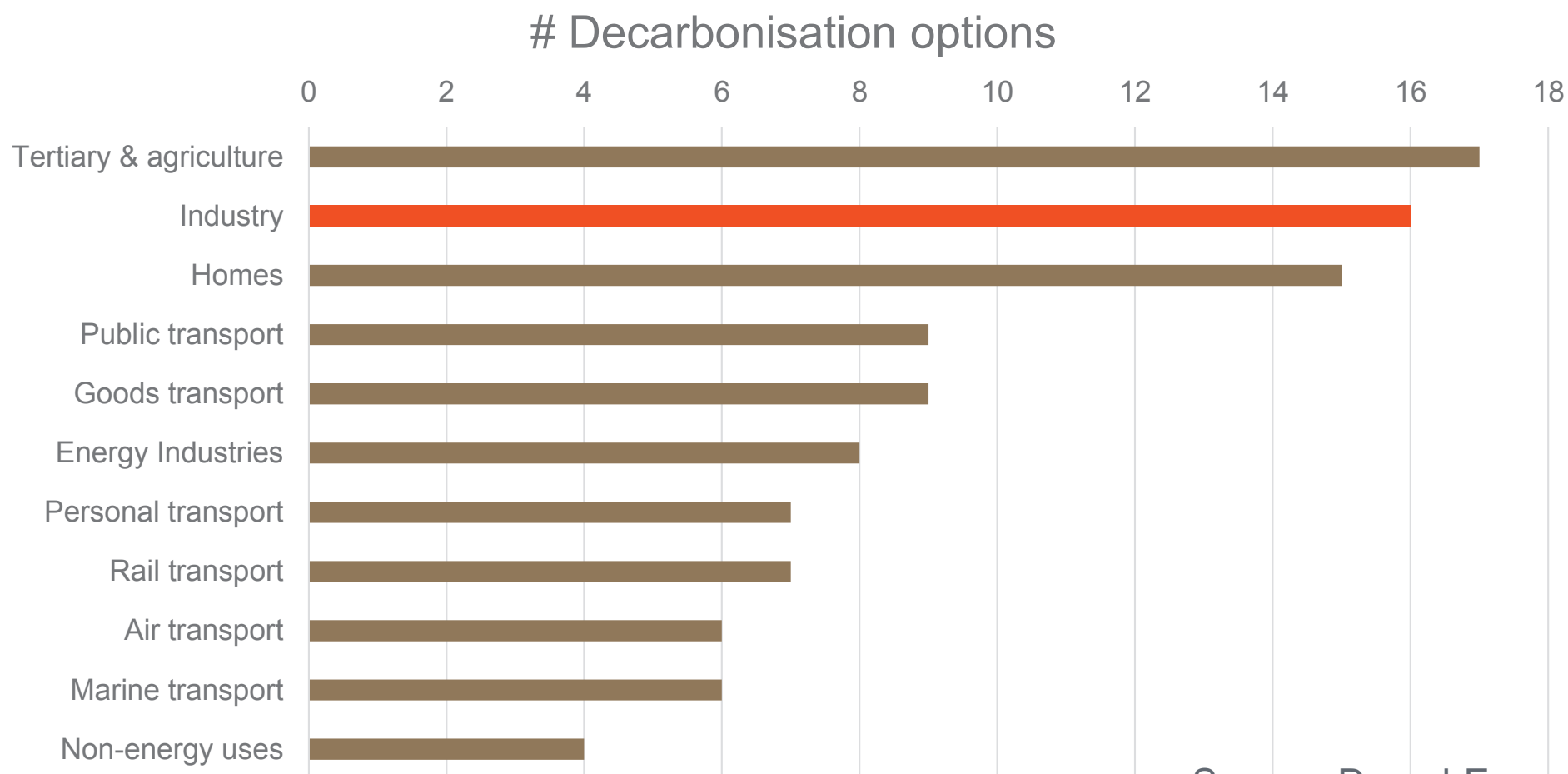
The challenges of decarbonising industry in a decarbonising Europe

Hans De Keulenaer
Final Conference of the EU-MERCI project, January 23, 2018, London



Mapping 20 decarbonisation options for 10 energy sectors

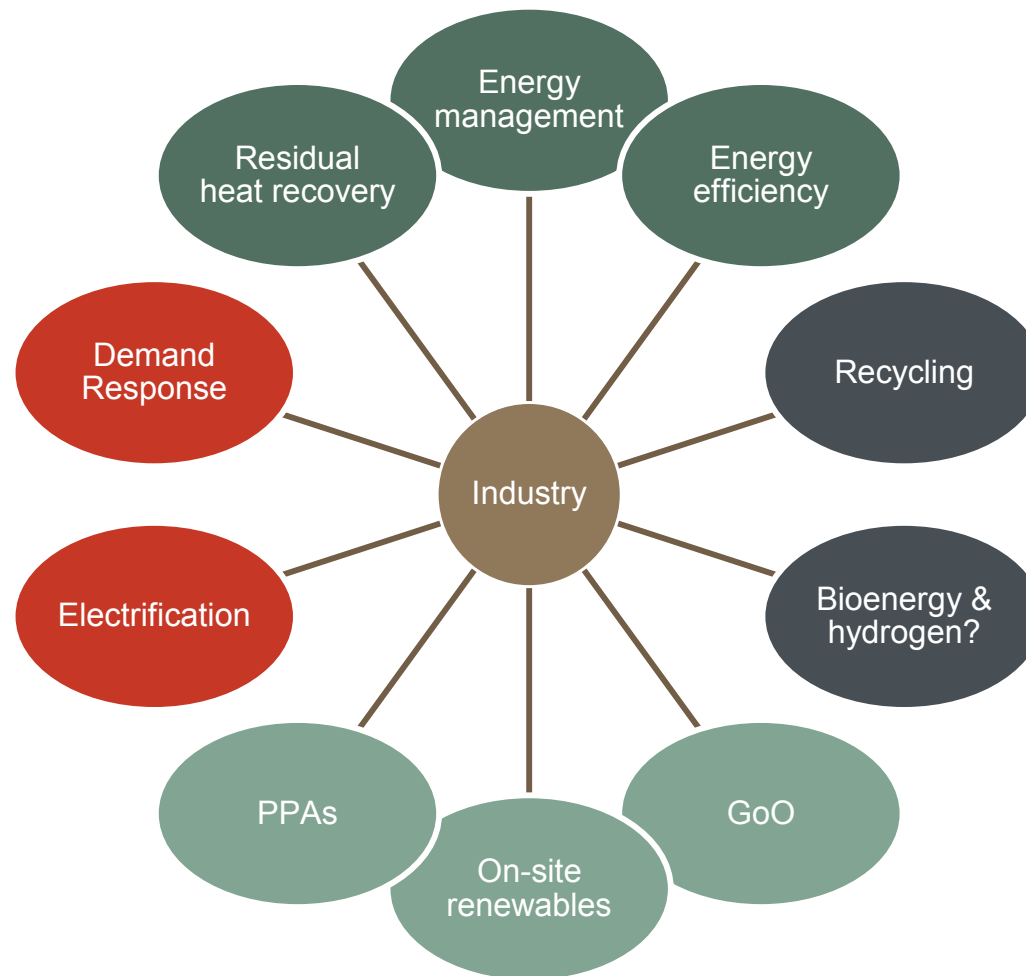
Cu



Source: DecarbEurope

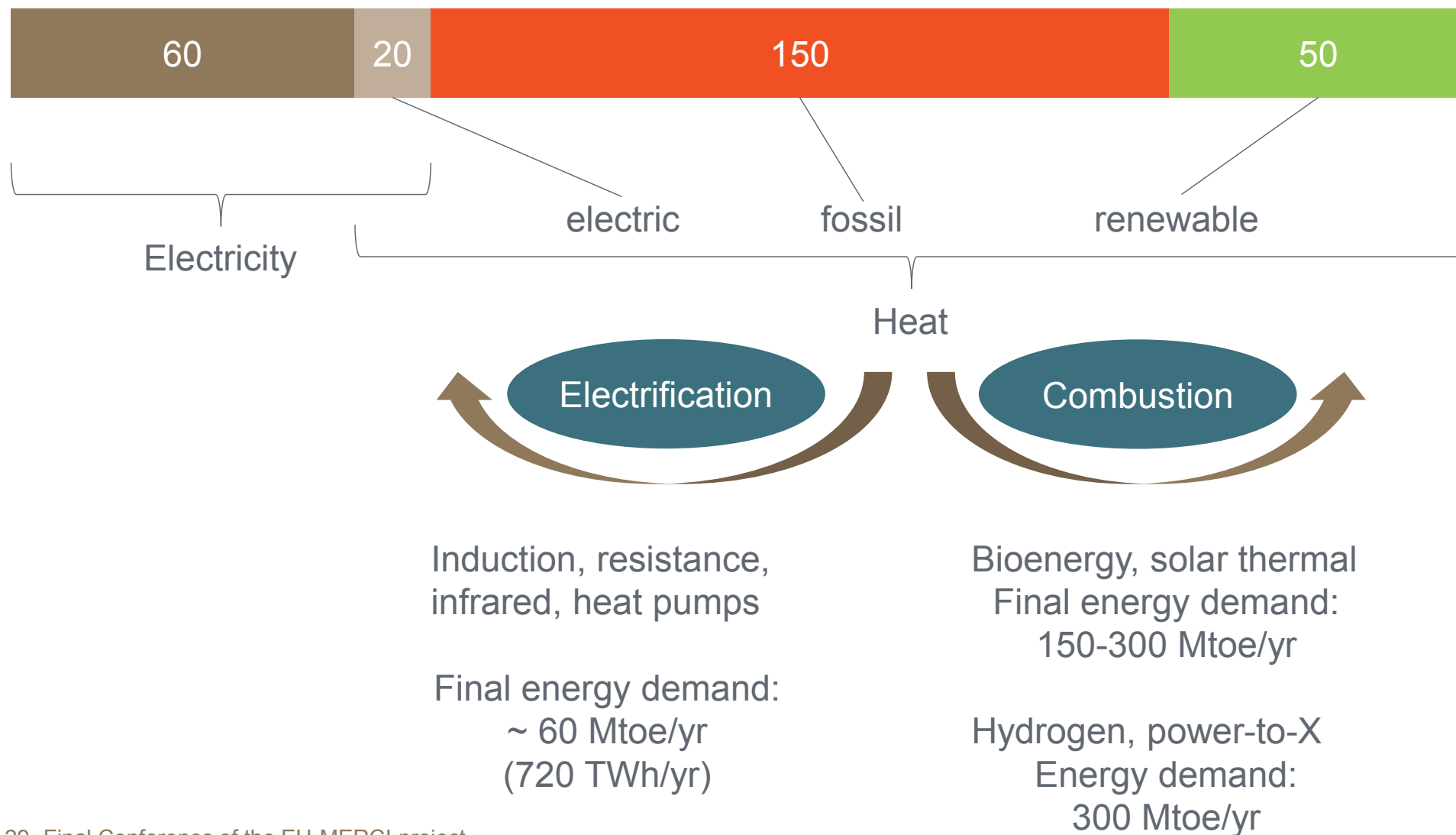
Decarbonization pathways for industry

Cu



Decarbonisation of heat in industry (energy demand in Mtoe/yr)

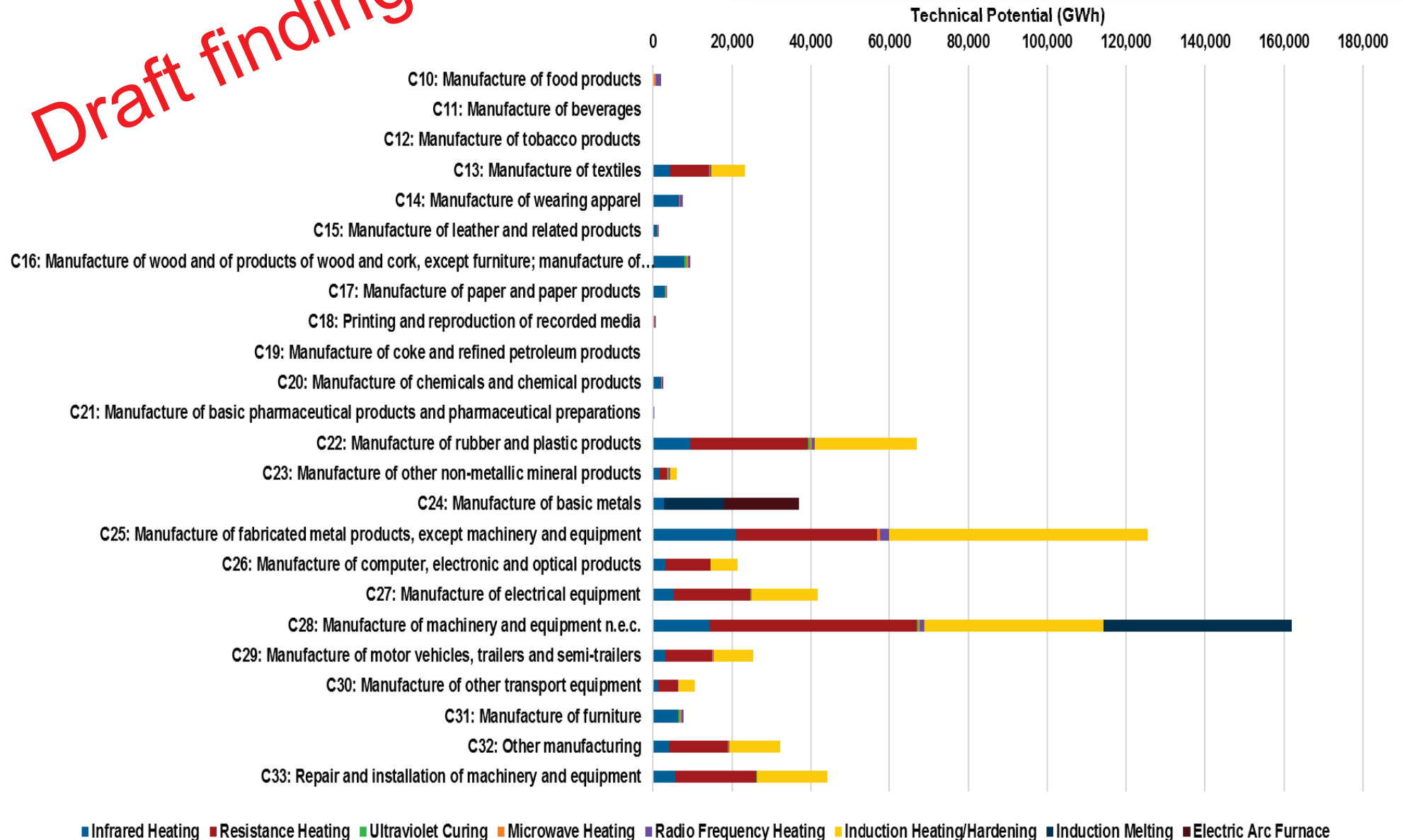
Cu



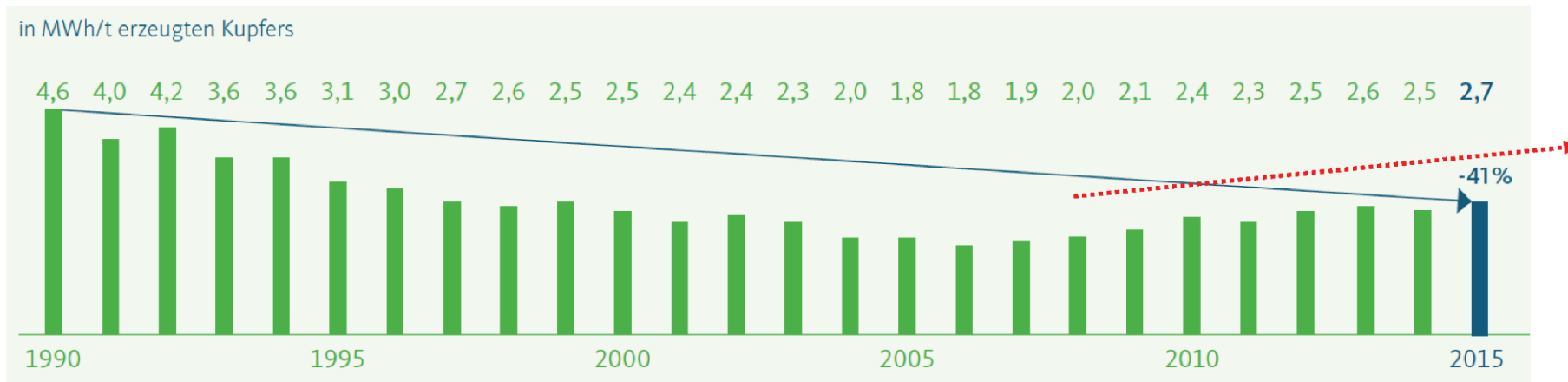
Technical Potential Results

Draft findings

Technical potential: Considers the full potential regardless of payback



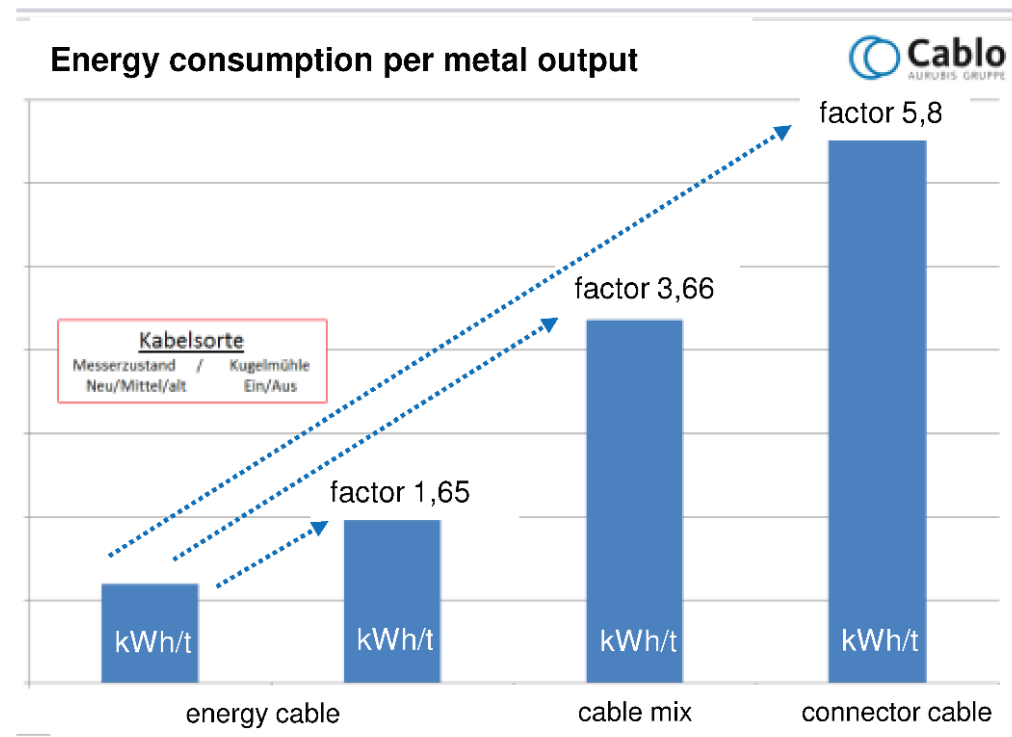
- » the energy consumption / demand and the efficient use of energy, is highly influenced by
 - » **degree of complexity and energy content of** recycling materials / concentrates
 - » environmental and resources **protection obligations**
 - » requirement of **flexible** energy use -> because of increasing volatile RE
 - » customer needs -> **complex products** with special requirements
 - » **site expansions** - new installations, operations, approaches, ...



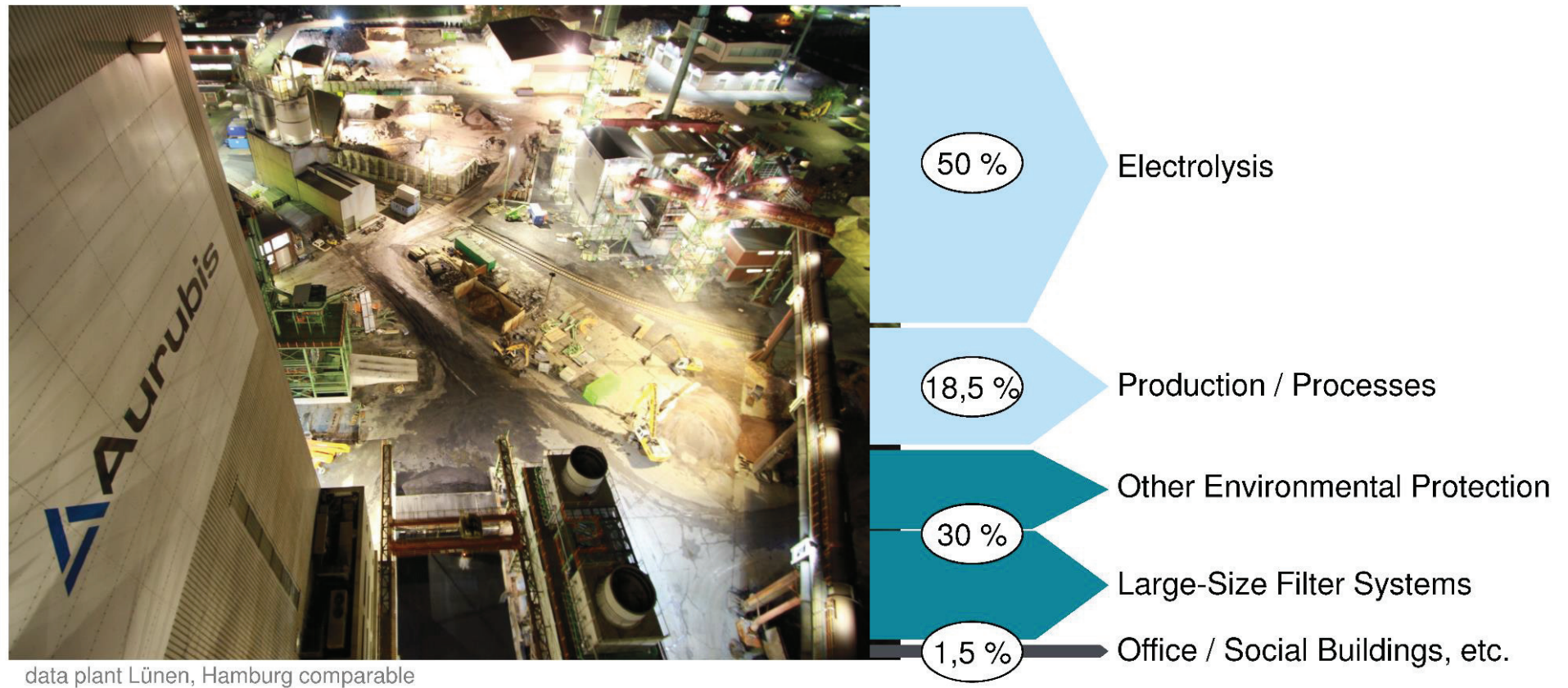
Legally requirements such as binding energy efficiency targets cannot solve such contradictions. The focus should not be on the energy consumption within the industrial process chains, but rather on the life cycle of products.

Challenges of energy and resource efficiency – one demonstrative example

- » Continuous **improvement of energy efficiency – contrary effects**
 - » currently the energy efficiency is decreasing (+3 % energy increase)
 - » implemented energy efficiency measures are not visible in the total energy consumption in comparison to the previous year
 - » Reason: energy efficiency is depending on the handling of different types of cables - respectively the availability of the cables on the market

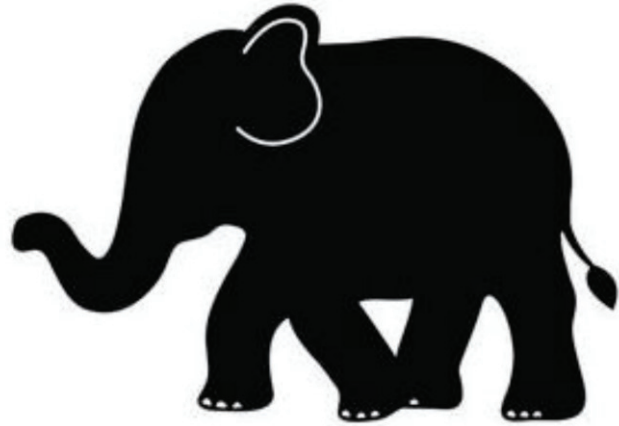


30% of the electricity consumption is needed for environmental measures



On average, about one-third of total capital expenditure in the Aurubis Group has been used for environmental protection.

The battle – demand response audit



5 – 15 days



≈ 2 hours



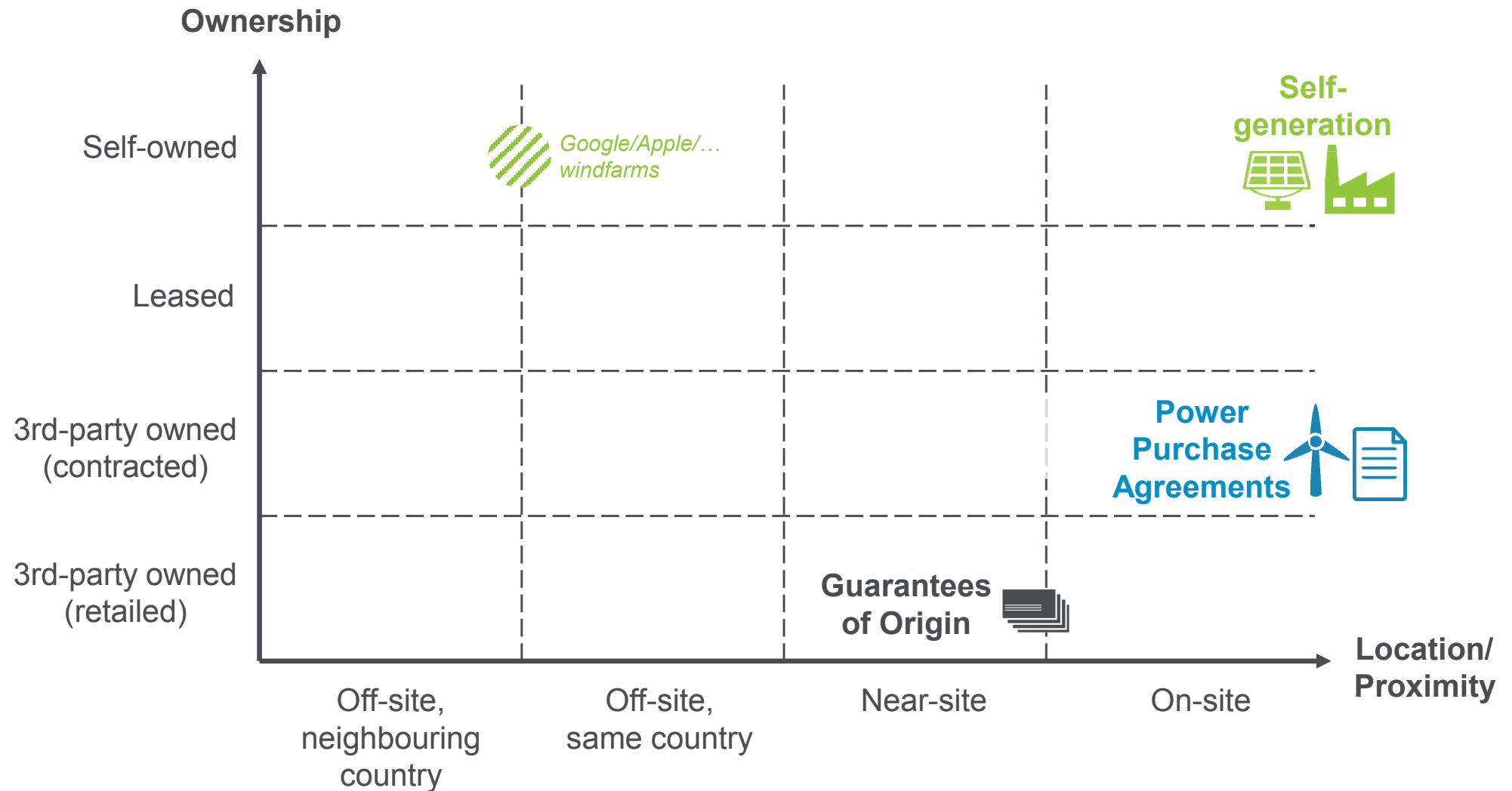
17.347 €/year



16.988 €/year

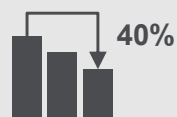


3 RENEWABLE ELECTRICITY SOURCING METHODS: OWNERSHIP AND LOCATION



THEORETICAL VOLUMES OF CERTIFICATE MARKETS IN 2030

Cap-and-trade allowances



GHG emissions

Size

Abatement*

1,333M
EUAs1,333M
tCO₂

In the year 2030, **1,333M** emission allowances are expected to be in circulation within the cap-and-trade system, equalling CO₂ abatement of **1,333M tCO₂**.*

* CO₂ abatement from different certificate schemes are not additive, as schemes overlap across sectors. For example, reduction or replacement of electricity consumption arguably does not reduce CO₂ emissions at all, as the power sector underlies the EU-ETS and energy efficiency measures or renewable energy generation have no direct impact on the pre-defined cap. Emission reductions in non-ETS sectors, however, can certainly be considered additional.

Tradable savings obligations



30% Energy efficiency

Size

Abatement*

283M
EECs~ 425M
tCO₂

In the year 2030, the potential volume of Energy Efficiency Certificates within the EU is **283M**, assuming that half of the efficiency target is achieved through Energy Savings Obligations across all sectors. CO₂ abatement depends on the development of emission and primary energy factors. Within the electricity and heating sectors, EECs could bring CO₂ abatement of **415M - 439M tCO₂** in 2030.

Voluntary markets for GOs



Renewable energy

Size

Abatement*

3,245M
GOs~ 1,470M
tCO₂

In the year 2030, the potential volume of Guarantees of Origin for renewable energy within the EU is **3,245M**, if energy tracking systems were introduced in all sectors. CO₂ abatement depends on the development of emission factors of conventional energy. Within the electricity and gas sectors, GOs could bring CO₂ abatement of **1,440M – 1,500M tCO₂** in 2030.

Industry has **many decarbonization pathways**

Carbon impact of **other regulatory requirements** (environment, circular economy) needs to be taken into account

The copper industry has **reduced its unit energy consumption by 60%** since 1990

A **stable investment climate** is needed for industry to map out our decarbonization strategies

Electrification provides a very promising decarbonization pathway, particularly for metal industries

Industry could provide **demand-side flexibility** in the right market framework