



RESOURCE EFFICIENCY
Using less, living better

Circular economy towards a resource- efficient society

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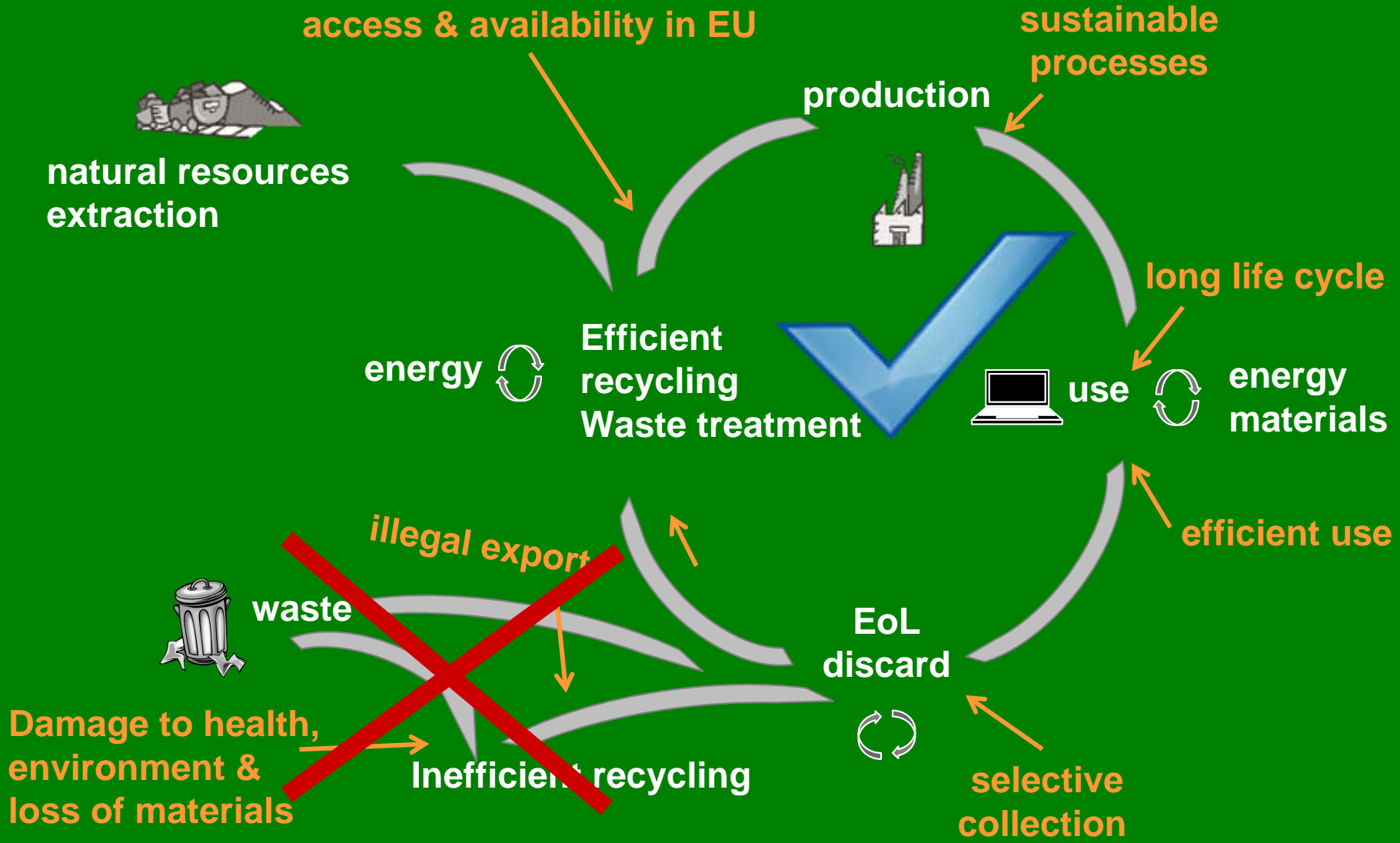
Senior Vice President

Umicore

 **GREEN WEEK**

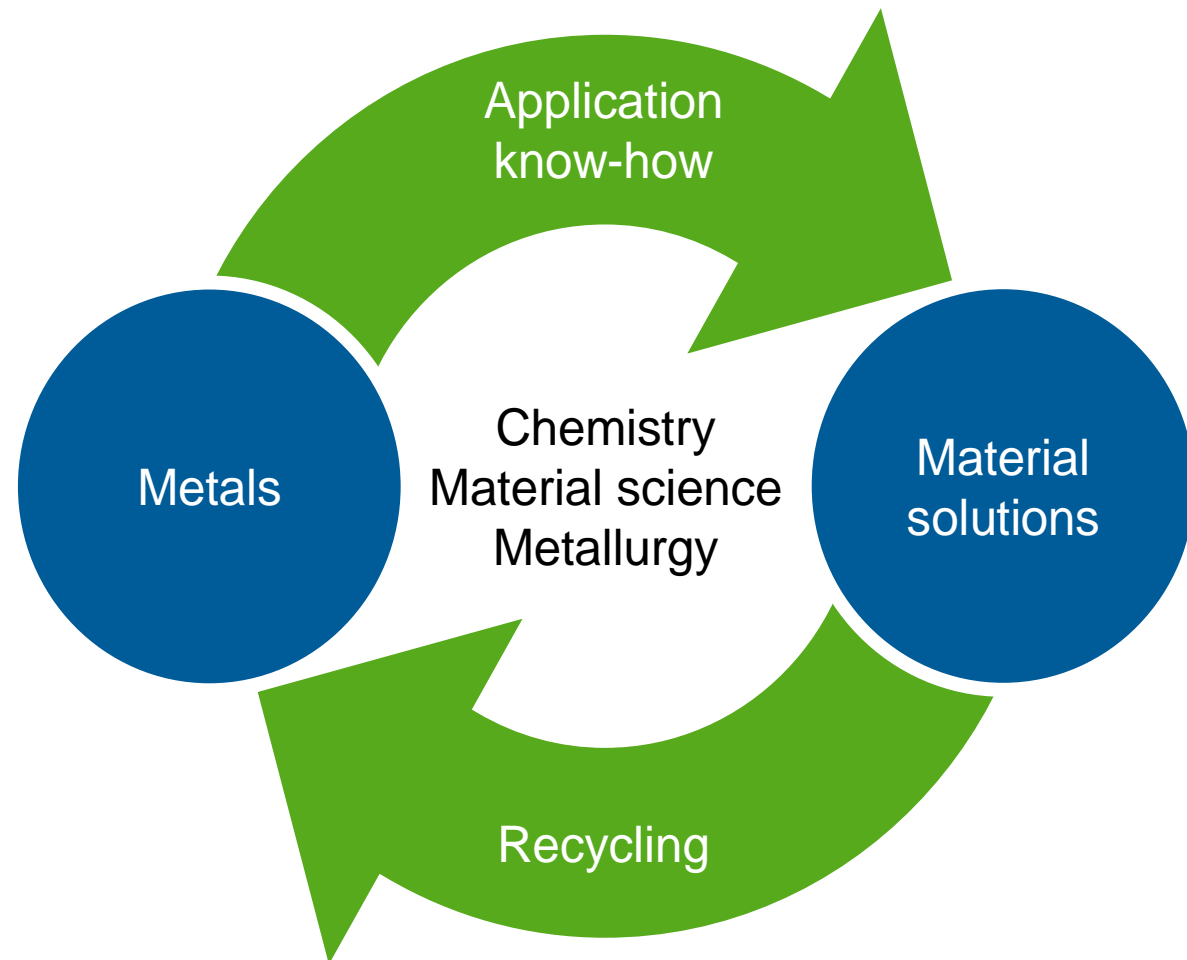
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Towards a circular economy



Umicore's close loop business model

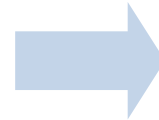
- We transform metals into hi-tech materials
- We close the loop and secure supply by recycling production scrap and end-of-life products for us and our customers
- We build on unique metals properties: metals are infinitely recyclable



Umicore contributes to ...



**More stringent
emission
control**



We provide catalysts for 1 out of 3 cars in the world as well as for trucks & non-road vehicles



**Renewable
energy**



We supply key innovative materials for high-efficiency solar cells and other photovoltaic applications



**Electrification
of the
automobile**



We are a leading producer of key materials for rechargeable batteries for laptops, mobile phones as well as electrified vehicles



**Resource
scarcity**



We are the largest recycler of precious metals; we are able to recycle more than 20 different metals

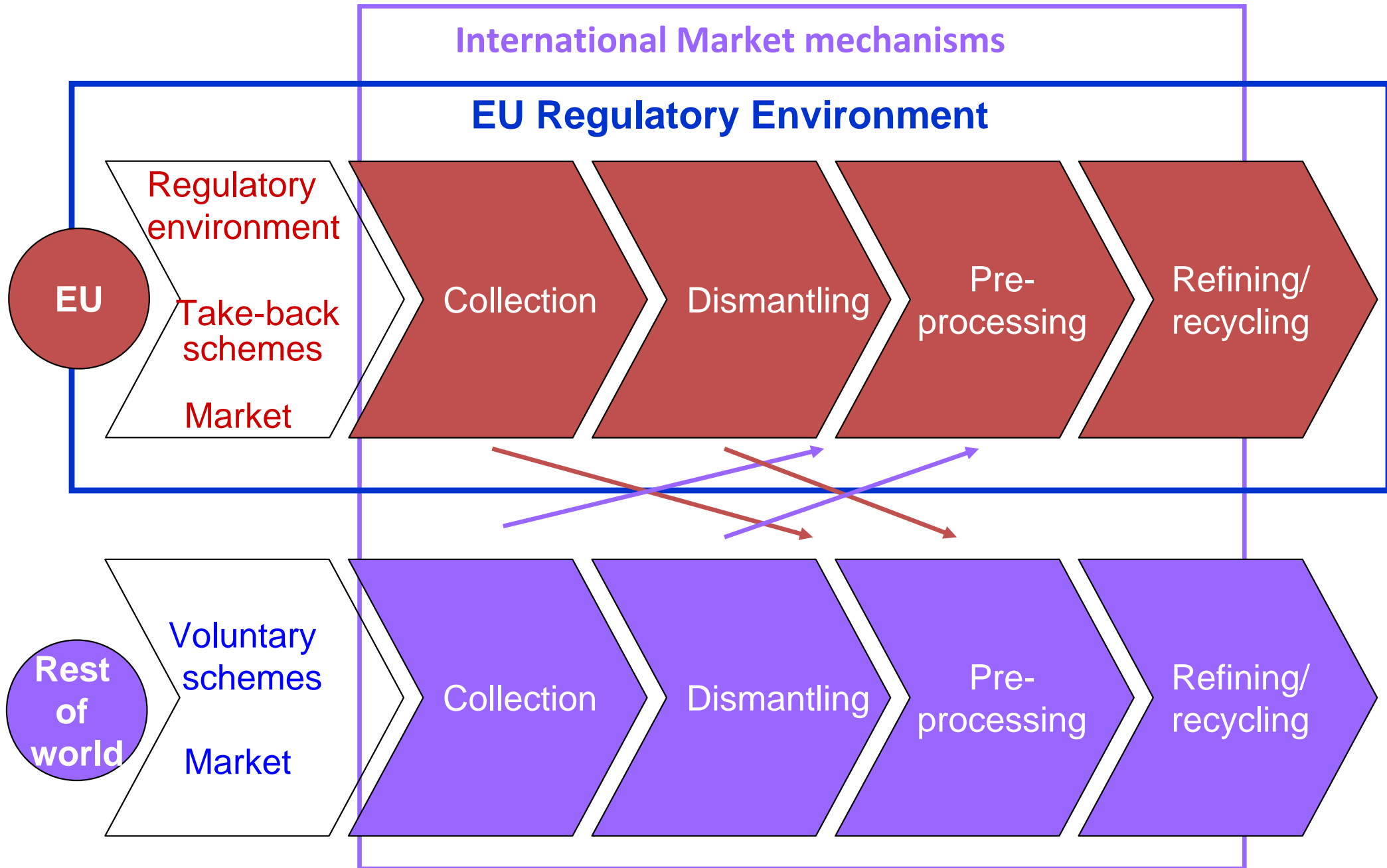
Umicore's recycling

- Umicore operates the world's largest precious metals refining installation in Hoboken, Belgium
 - 0.5 billion Euros invested in past 15 years in innovation
 - 17 metals of which 7 precious metals recovered
 - Up to 350,000 tons of material from industrial by-products and urban mines processed per year
- Expanding recycling to rechargeable batteries, PV production scrap, ... and enlarging the range of recovered materials
- Umicore's efficient recycling turns industrial by-products, EoL products and waste into valuable resources

Degree of circularity of the economy

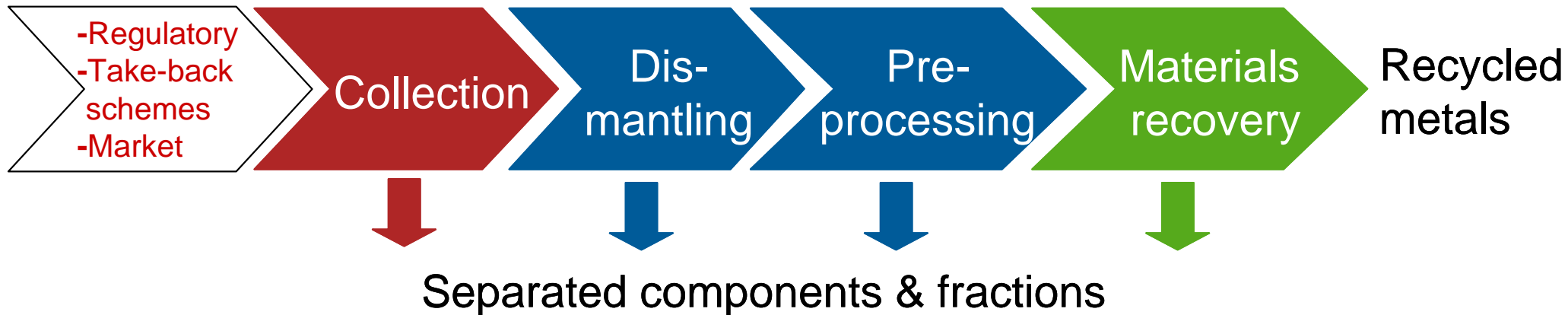
Whether a critical material is substituted by another or the useful life of a product extended, the degree of circularity of the economy is determined by the ability to actually re-use the contained materials once the product can no longer be used

Recycling value chain



Recycling performance depends on effectiveness of each step in the value chain

Example: 50% x 90% x 80% x 95% = 34%



Complex products require a well organised & dedicated recycling chain!

Public & private sectors complementary roles

The public sector must

- Boost collection
- Enforce conditions for waste shipment
- Define and enforce recycling standards
- Promote innovation

The private sector must

- Develop new technologies
- Invest in new recycling capacities
- Reach out to the whole value chain to build a robust circular economy

Public & private sectors complementary roles

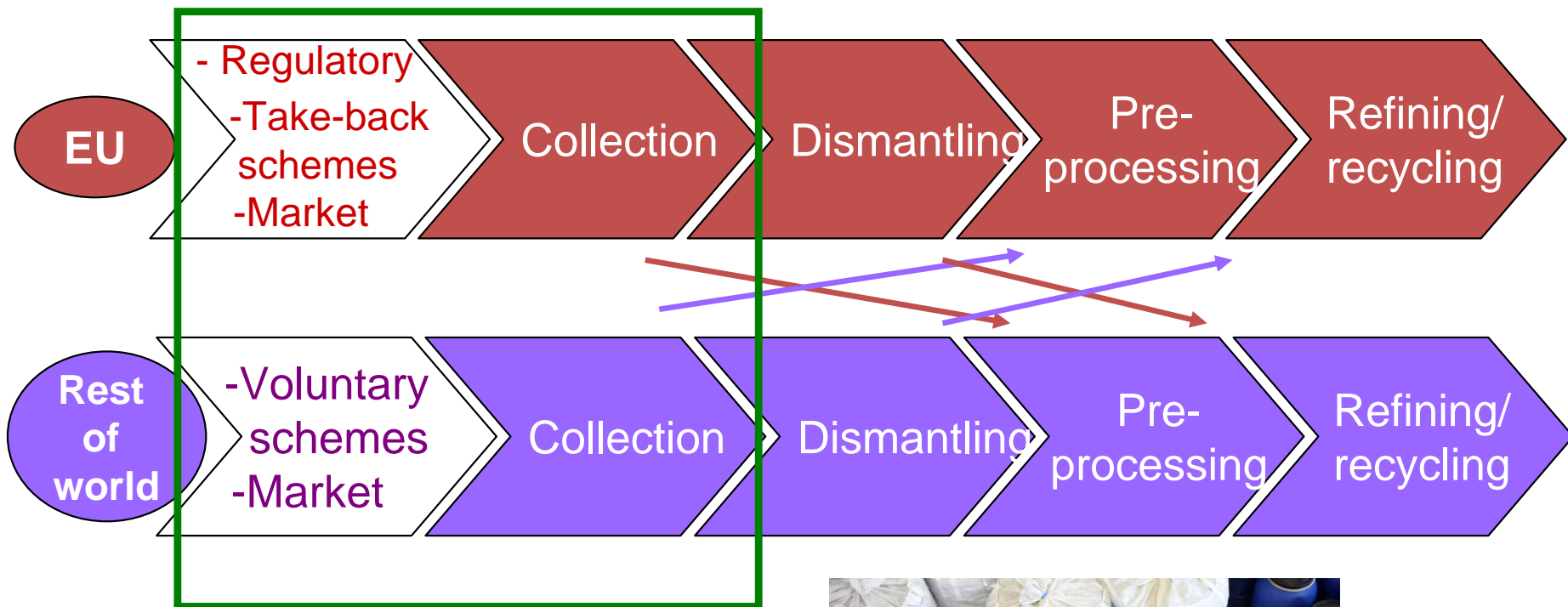
Jointly they must strive for

- Increasing recycling performance
- Maximising the re-use of materials
- Minimising the leakages out of the circular economy

Increase actual collection: e.g. Mobile phones

Recycling potential (global): 800 million units or 80,000 tons per annum

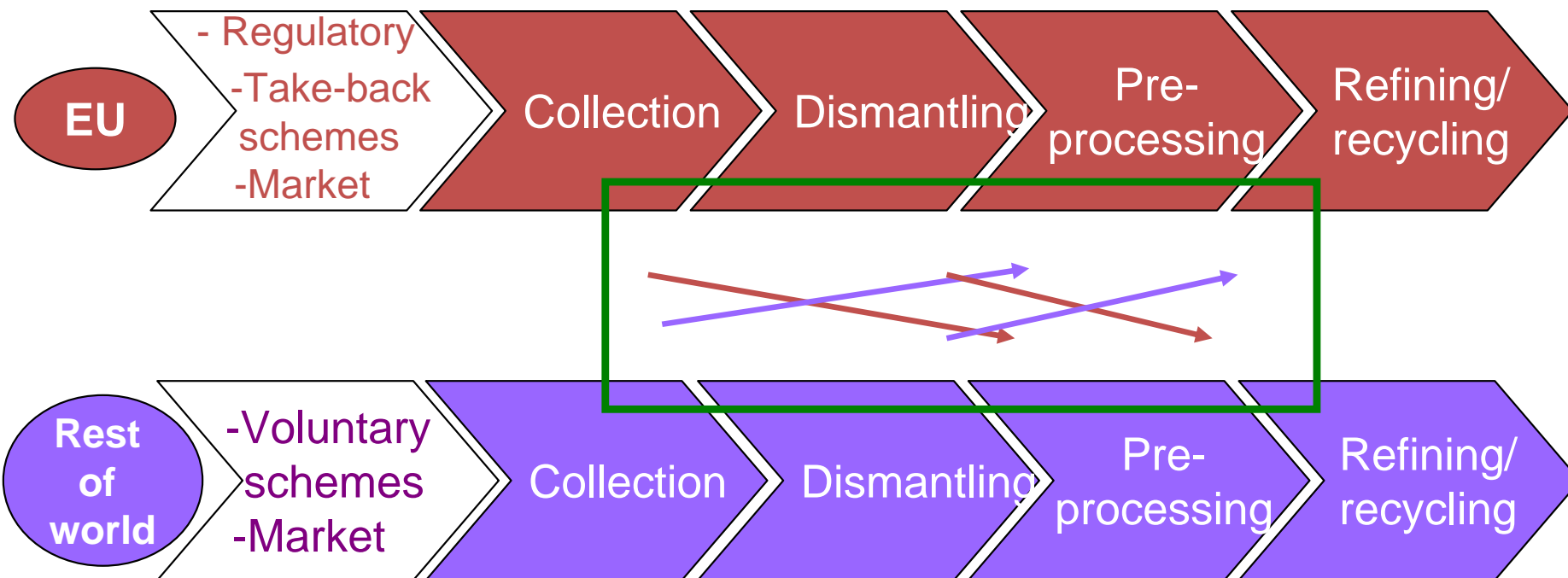
- Reality is less than 3% recycled
- Largest portion is not collected (drawer & disposal with household waste)
- Most collected phones are exported for reuse to developing countries with no/poor recycling at EoL.



Enforce conditions for waste shipment

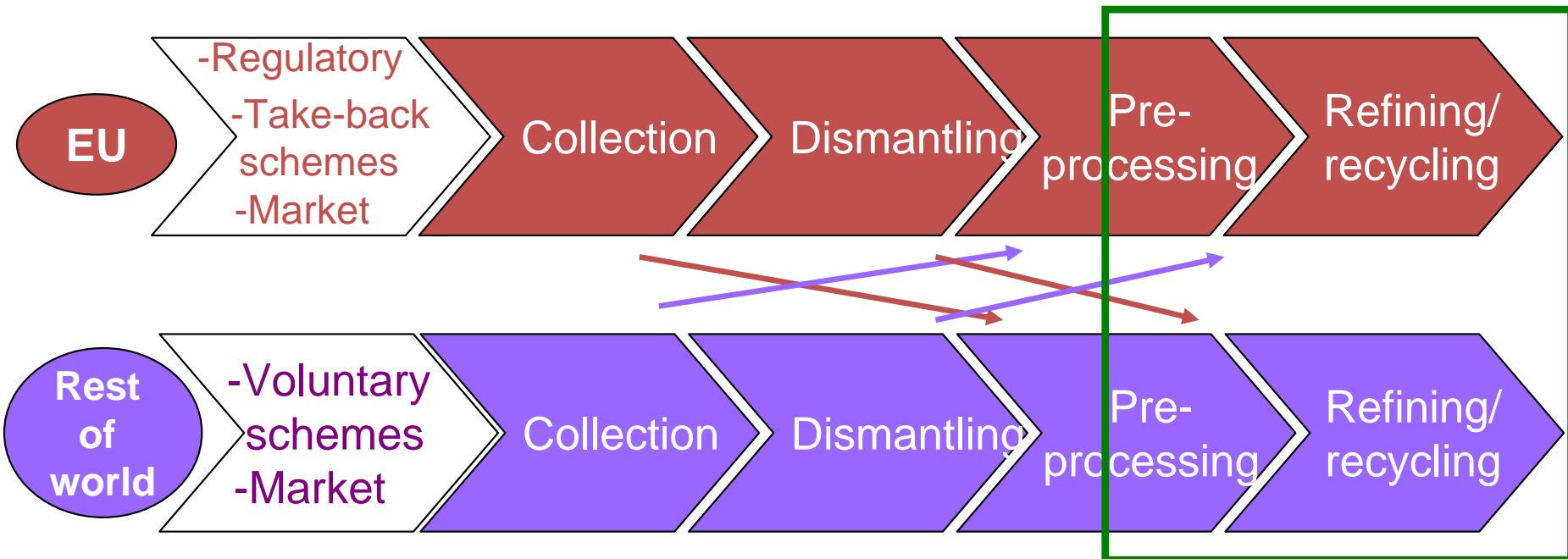
Significant volume of electronic scrap exported to emerging countries

- Often exported under false declaration or hidden in vehicles for re-use
- Waste Shipment Regulation ESM (Environmentally Sound Management) principle very poorly implemented and enforced

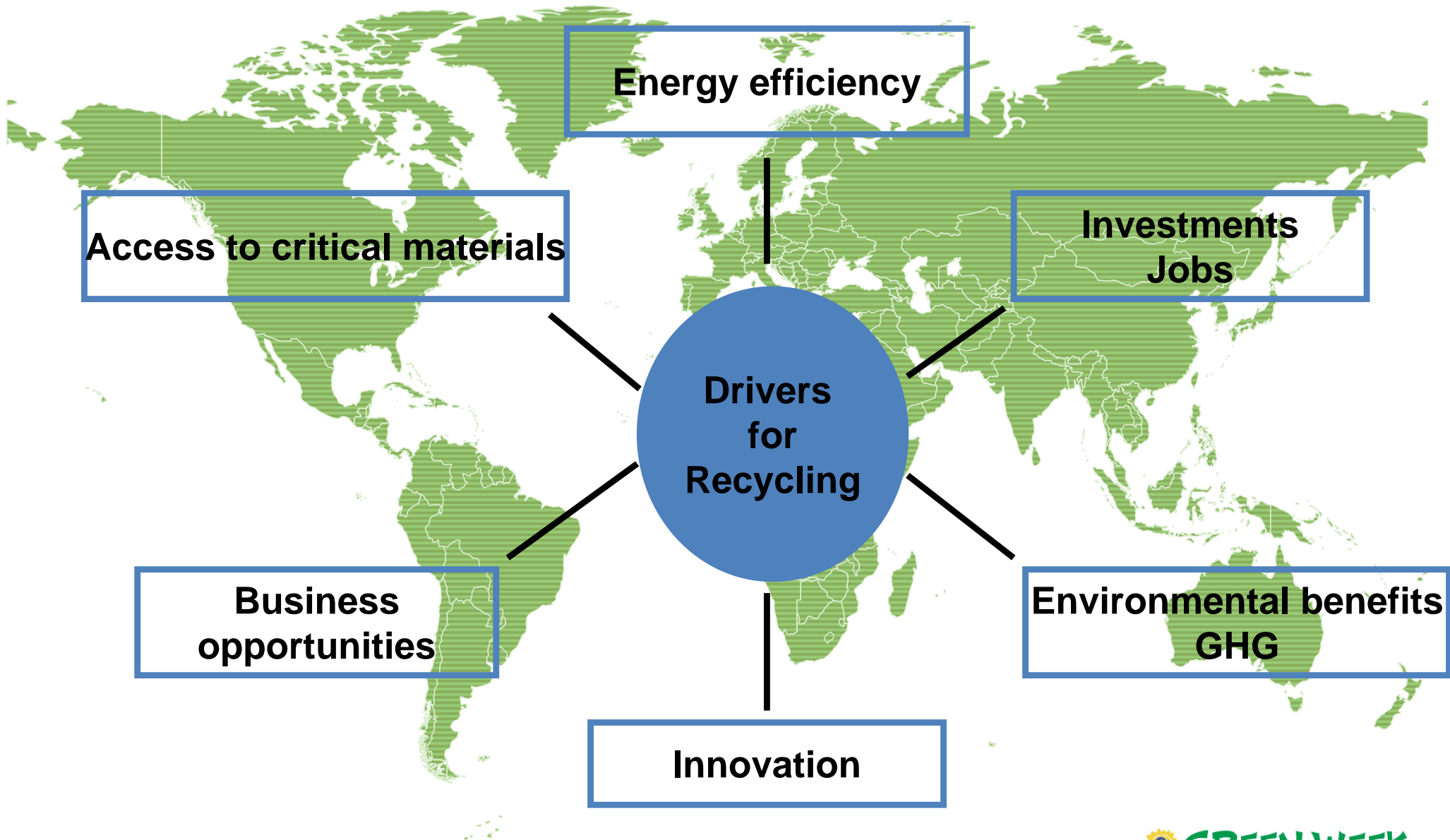


Define and enforce recycling standards

- High metal losses (Gold yield around 25% only)
- Huge damage to health & environment
- 60% of WEEE from Europe is not properly recycled



EU leading role to foster a circular economy



Conclusions

- Today, close to 50 % of Umicore's metal supply requirements comes from in-house recycling. This contributes to the circular economy and reduces CO₂ emissions substantially.
- Efficient materials use, wider scale collection and recycling are essential to ensure a resource efficient society.
- Umicore has been demonstrating that efficient recycling is a profitable and sustainable business model offering investment, innovation and employment opportunities for Europe ... and the world.