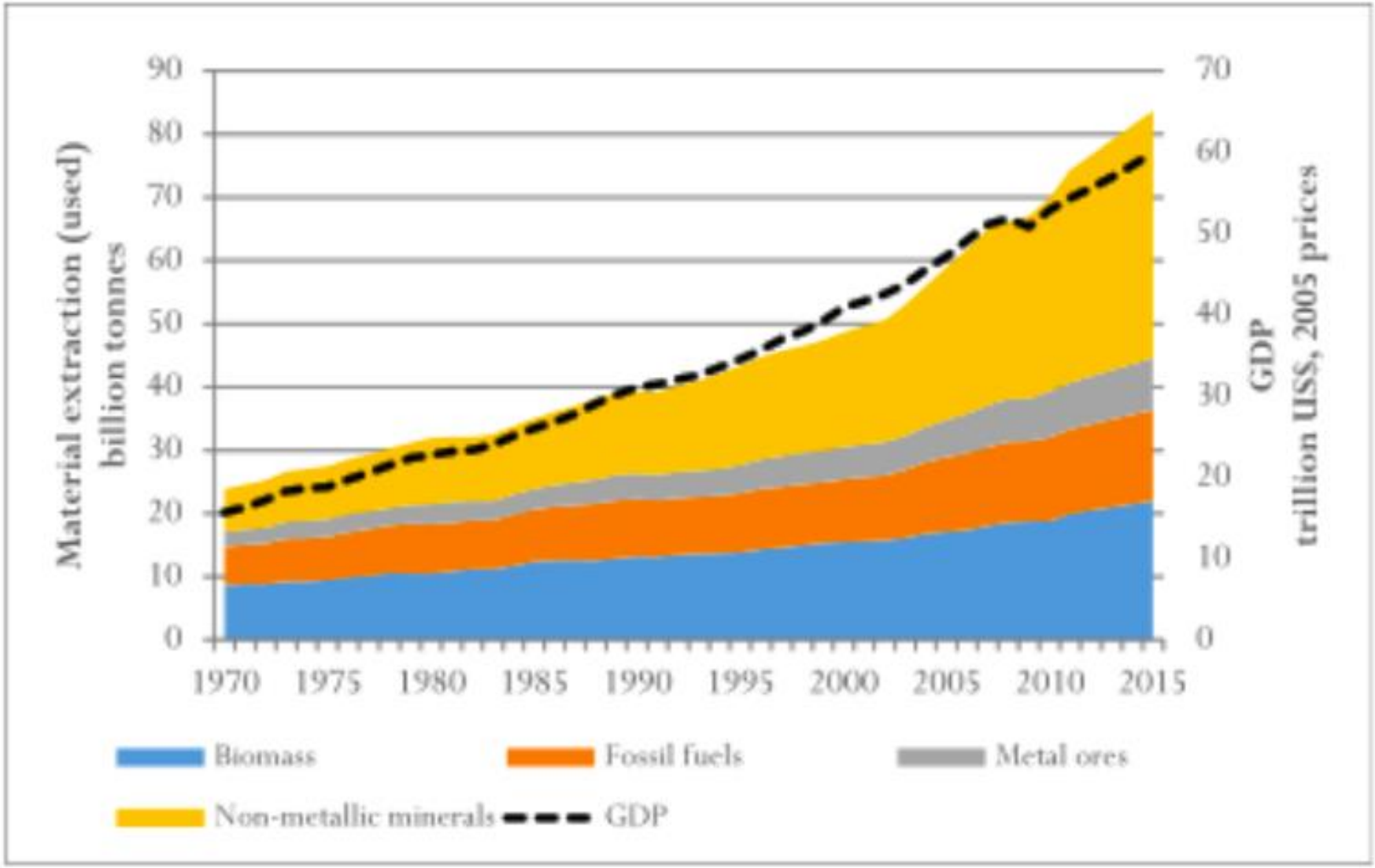
Why do we throw so much money away?

Anders Wijkman, chair Climate-KIC, chair Swedish Recycling Industry Association

MATERIAL ECONOMICS

Figure 3: Global material extraction in billion tons, and global GDP in trillion US dollars 2005 prices, 1970-2015.



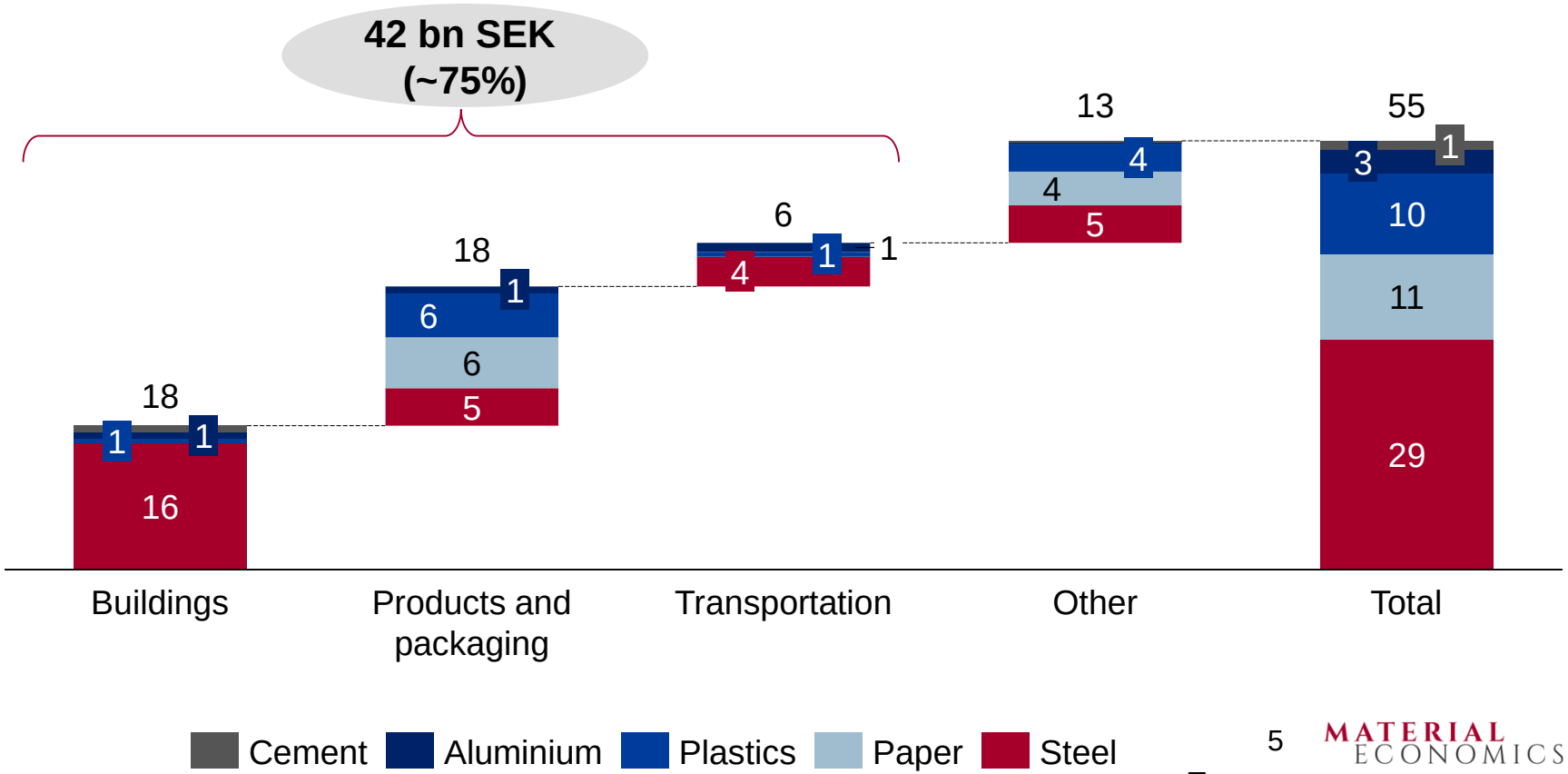
Source: Material extraction data from UNEP (2016a), GDP data from UNSD (2015).


On average, Europe uses materials only once.


Europe loses 95% of the material and energy value.

Steel, Cement, Aluminium, Plastics & Paper with an initial value of 55 billion SEK reach end of life annually in Sweden

- Initial value of end-of-life materials, broken down by product category and material
- Billion SEK per year, Sweden



MATERIAL ECONOMICS

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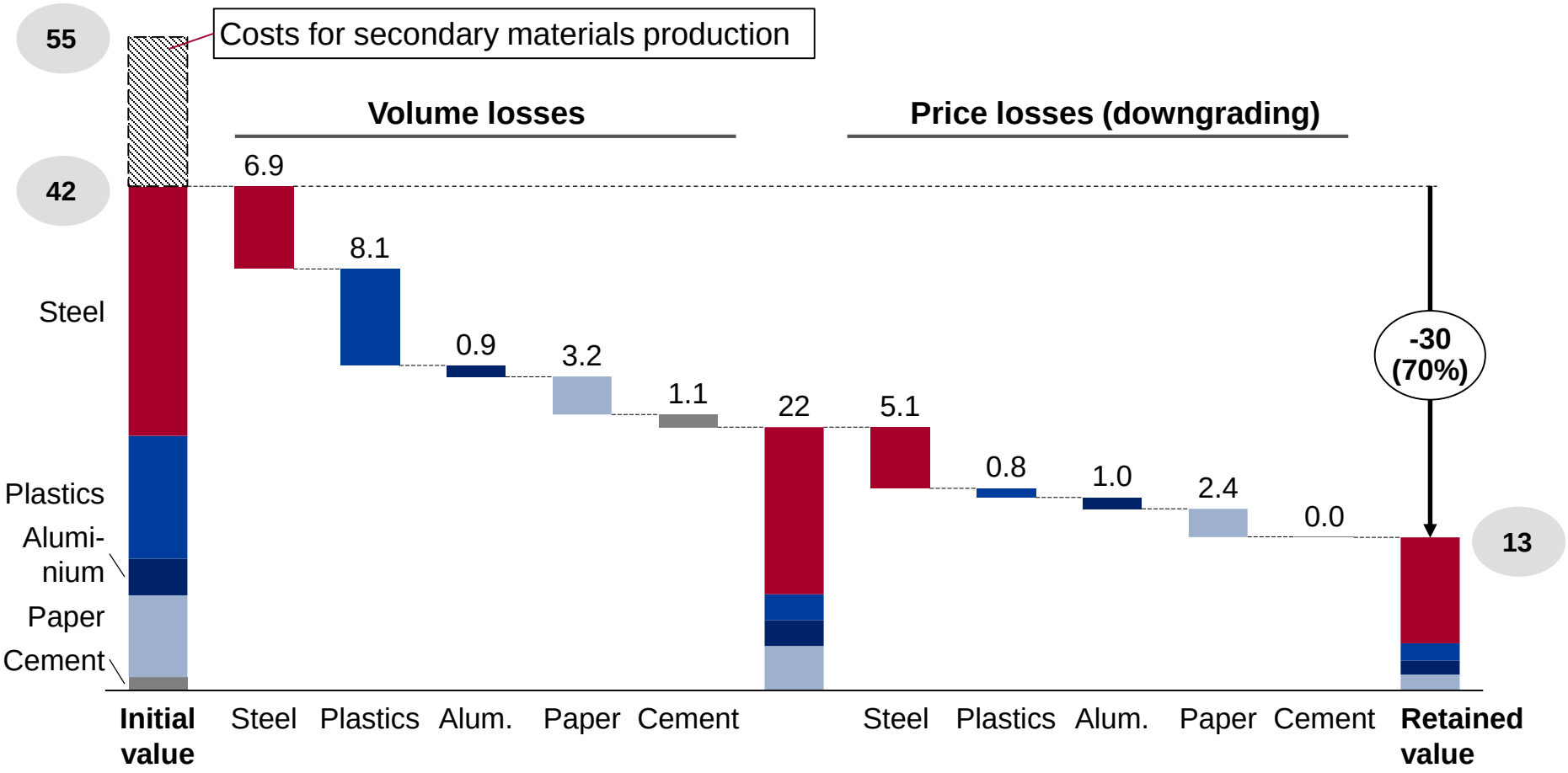
70% of inital materials value is lost each year due to volume losses and downgrading

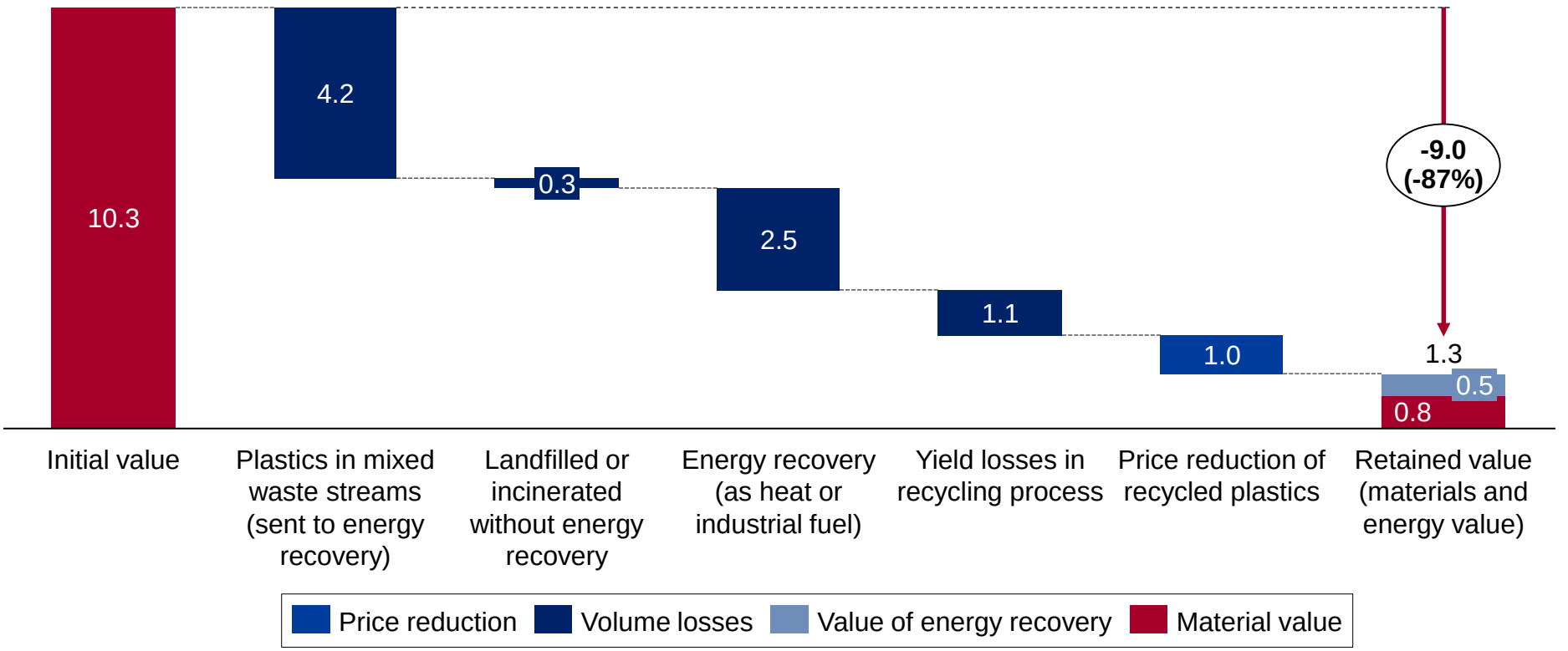
Materials value
Billion SEK per year, Swedish materials system



MATERIAL ECONOMICS

End-of-use plastics lose 9 bn SEK annually, or 87%, in every use cycle

Initial value and value lost in one use cycle of plastics
Billion SEK per year, Sweden

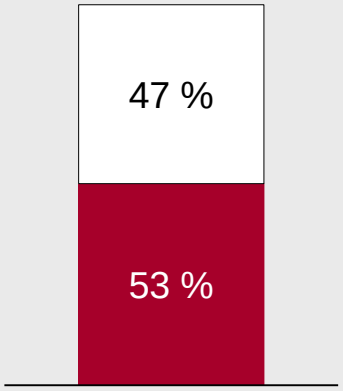


Note: Energy value from energy recovery is calculated as the cost for alternative fuel to generate the same effect
Source: Plasticportal; SMED, Kartläggning av plastavfallsströmmar i Sverige (2012); Naturvårdsverket, Sveriges återvinning av förpackningar och tidningar 2015; Swerec 2017; Energimyndigheten; Skatteverket; Ellen MacArthur Foundation, New Plastics Economy; Norden (2014), Plastic value chains, Case: WEEE; IVL (2013), Återvinning av plastavfall i byggsektorn

MATERIAL ECONOMICS

Plastics: Official statistics convey the impression of a circular system

Volume



- Swedish Statistical Office tells of 53% recycling of plastics
- But what is reported are the volumes collected

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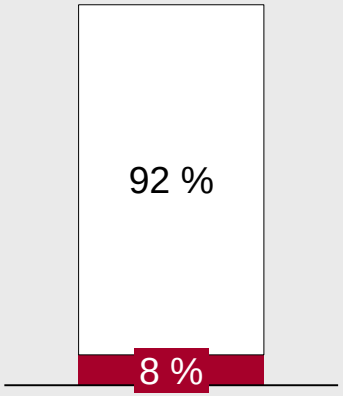
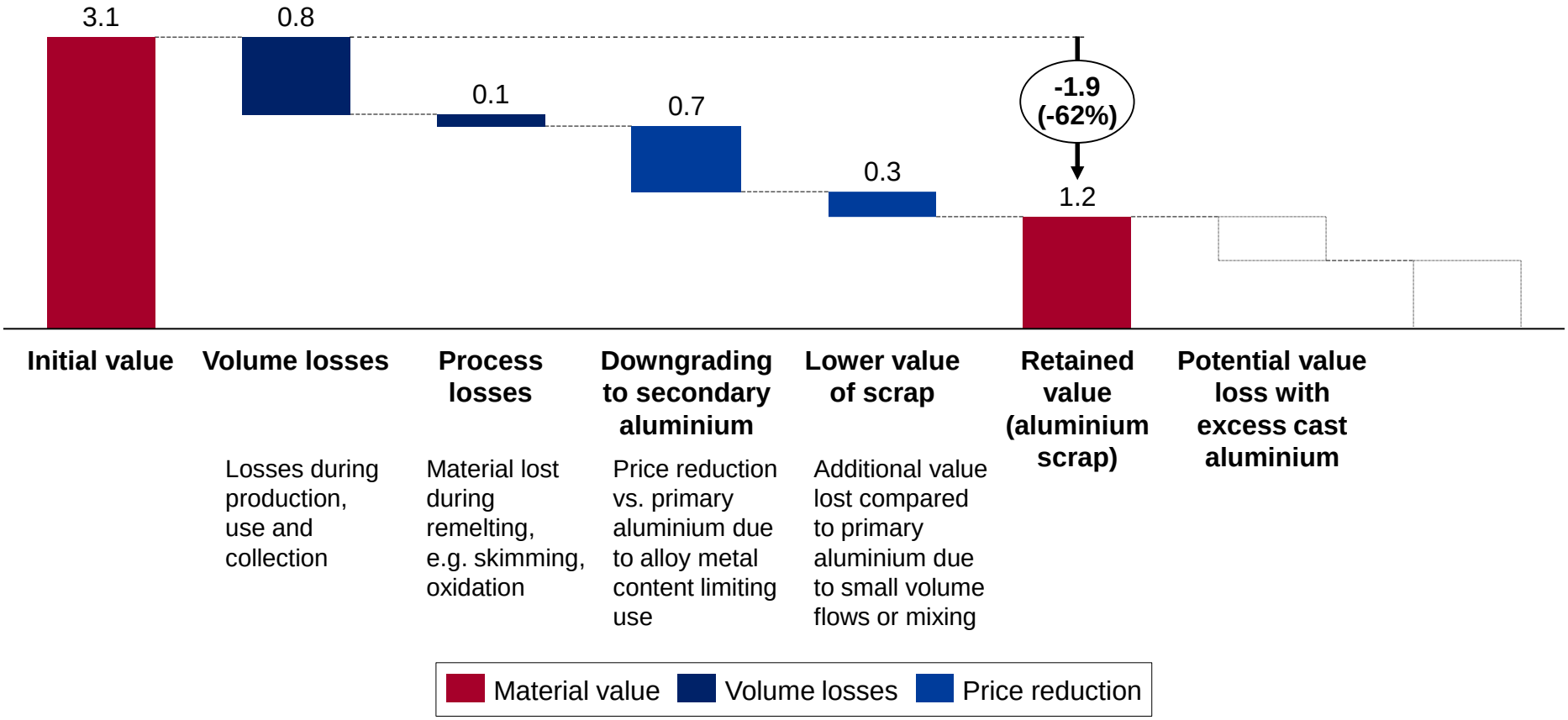
Value



- But in reality only 8% of the original value is captured

Aluminium loses 60% of value after the first use cycle

Initial value and value lost in one use cycle of aluminium
Billion SEK per year, Sweden



Source: LME, Metalbulletin, AluKrets, SCB, Stena Aluminium, Pantamera

Reasons for value losses differ

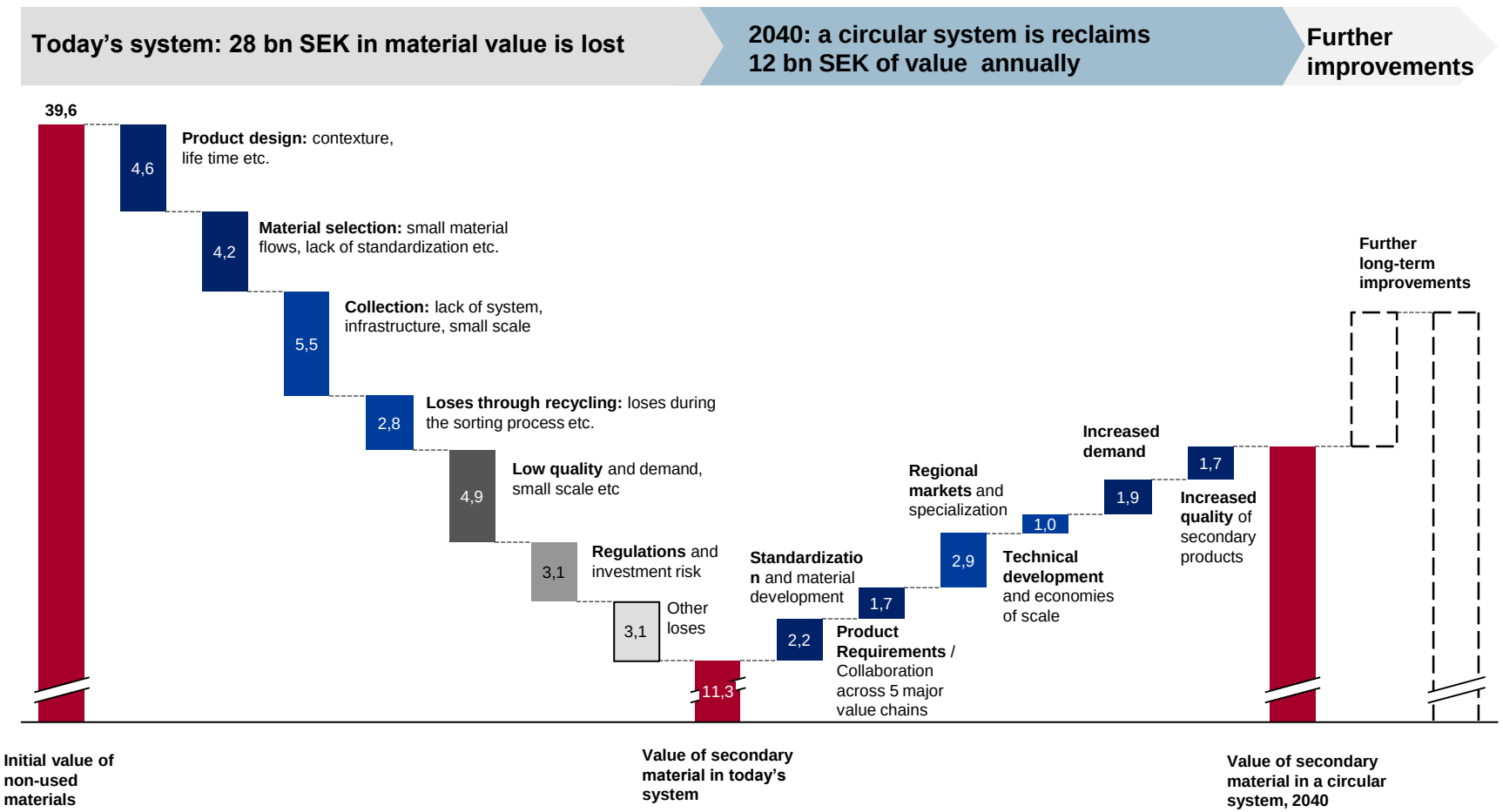
Plast	• **No more than 8% av initial value is retained after first use cycle** • Plastics are mixed, contaminated, part of composite materials, too little standards etc • 80-90 % is incinerated
Aluminium	• **No more than 38% is retained after first use cycle** • Too many alloys and composite materials
Steel	• **No more than 58% is retained after first use cycle** • Main reasons are waste in production and alloys • The mixture of steel and cupper is a major obstacle to effective recycling

Main reasons lack of standards, poor design and ineffective recycling

2040: a circular economy scenario reclaims 11 bn SEK of materials value annually (steel, plastics, aluminium)

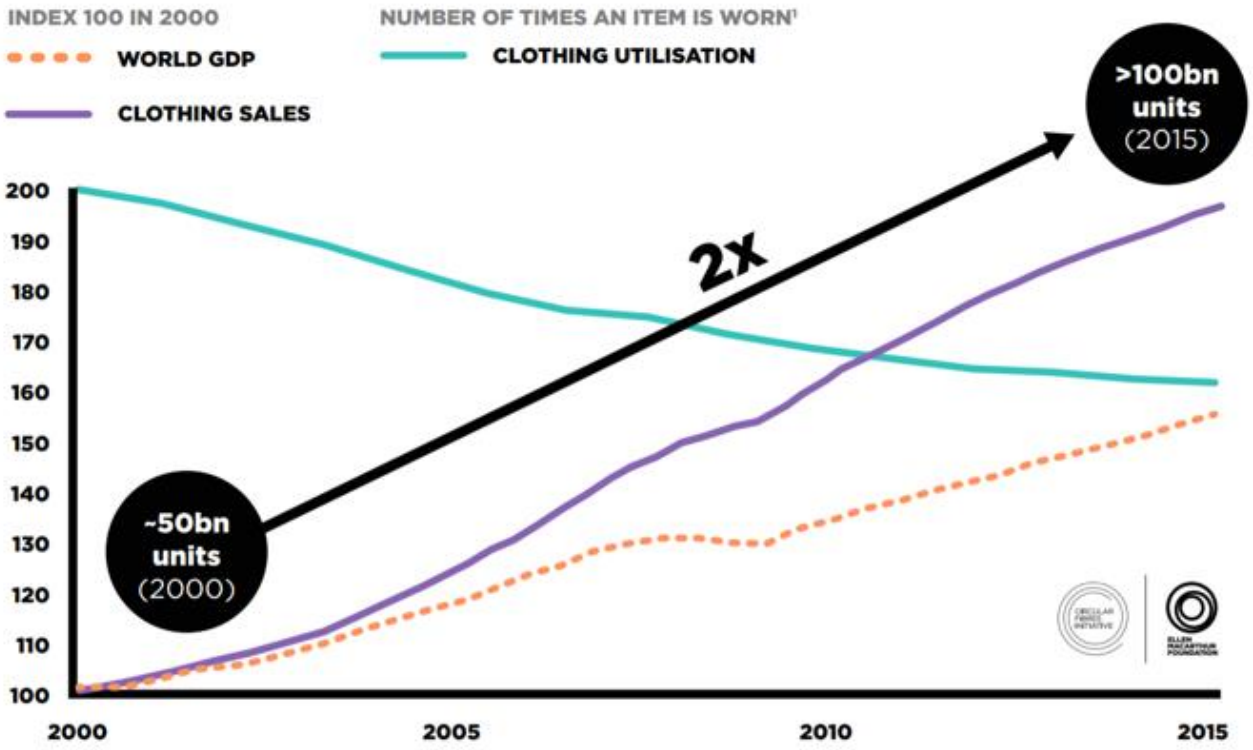
Annual value of non-used material in Sweden, 2040

Billion SEK per year, Sweden



MATERIAL ECONOMICS

We have doubled our clothes consumption since 2000...



MATERIAL ECONOMICS

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Textiles is no better
Of total production globally - roughly 120 mill tons p a - 60-70 % reach consumers; most of the rest is destructed

Waste at production 20-30%

16 mill tons textile waste in the US in 2016; 3 mill tons incinerated; 10 mill tons landfilled.

Polyester increasing its share(>50%) = microplastics in the oceans and the soils + CO2

Average time people keep clothing is 3 years

FIGURE 18: THE TEXTILES INDUSTRY USES SIGNIFICANT AMOUNTS OF RESOURCES

The production of 1 kilogram of cotton garments uses up to 3 kilograms of chemicals.

The equivalent of more than 3 trillion plastic bottles is needed to produce plastic-based clothes every year.[1]

Textiles production (including cotton farming) uses almost 100 billion cubic metres of water annually, representing 4% of global freshwater withdrawal.

1 Based on an average weight of 10 gram of a 0.5 litres PET bottle

Demand for basic materials is rapidly increasing

Estimates from International Resource Panel tell that the world will need to double urban infrastructure till 2050

Steel, cement, aluminium and plastics represent roughly 20 % of global carbon emissions.

Based on today´s materials and technologies we can forget Paris

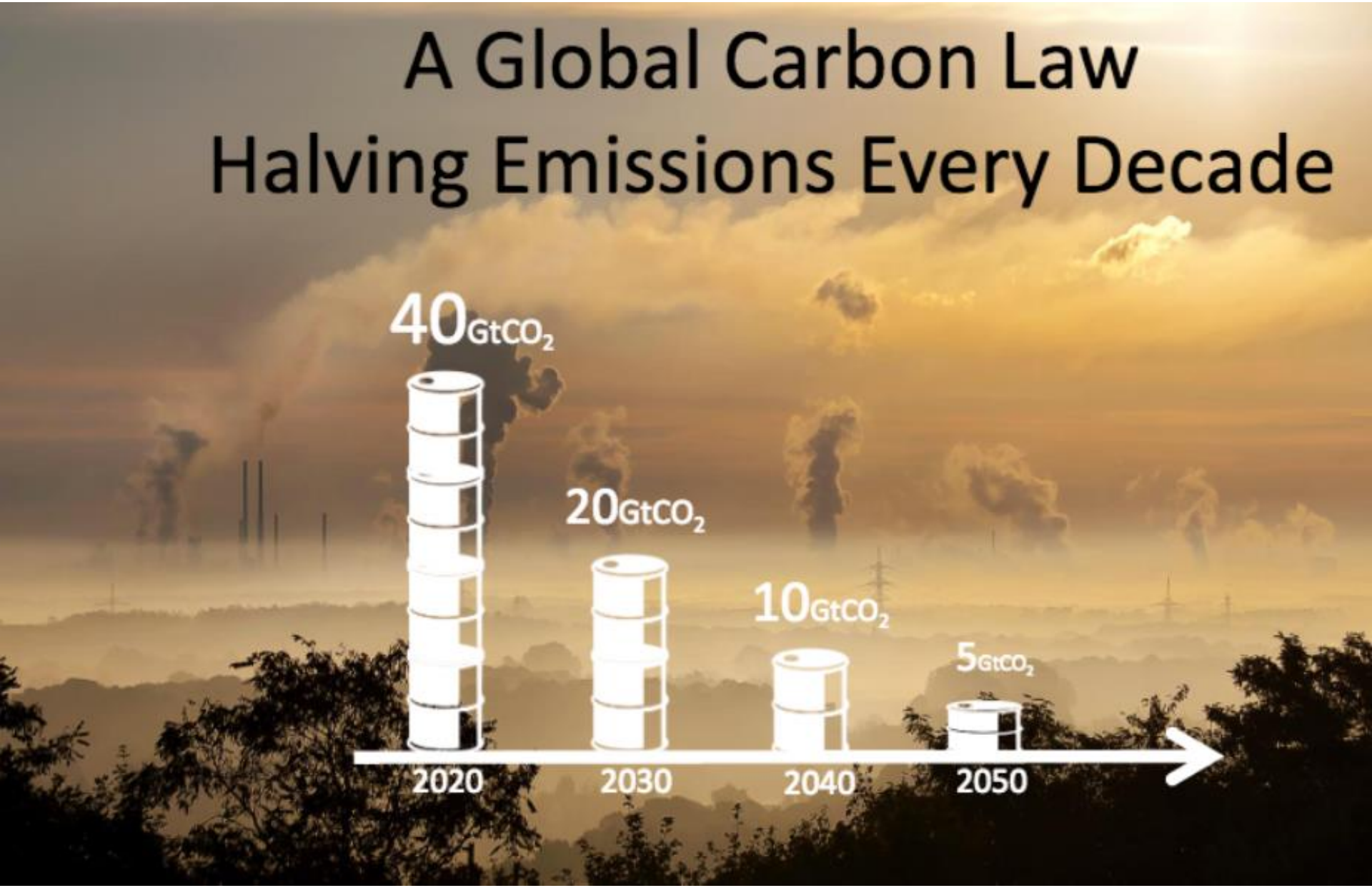
CLIMATE POLICY

A roadmap for rapid decarbonization

Emissions inevitably approach zero with a "carbon law"

By **Johan Rockström,[1] Owen Gaffney,[1,2] Joeri Rogelj,[3,4] Malte Meinshausen,[3,4] Nebojsa Nakicenovic,[4] Hans Joachim Schellnhuber[1,5]**

pose framing the decarbonization challenge in terms of a global decadal roadmap based on a simple heuristic—a "carbon law"—of halving gross anthropogenic carbon-dioxide (CO_2) emissions every decade. Comple-


A Global Carbon Law
Halving Emissions Every Decade
40GtCO2
20GtCO2
10GtCO2
5GtCO2
2020
2030
2040
2050

Policy measures to be considered:

1. **Adopt a long-term goal at EU and national level to retain material value after first use cycle; Recycling rates are totally insufficient as targets**
2. **Develop indicators that capture the value of material flows rather than recycling rates**
3. **Create the pre-conditions for a secondary materials market**
   - **Put a price on externalities (virgin materials normally less expensive than secondary materials**
   - **Strengthen Producer Responsibility Framework**
   - **Pave the way for cooperation between manufacturing, retail and recycling industries in sectors like construction, vehicles, food, textiles, electronics etc**
   - **Establish design requirements for ease of reuse and recycling**
   - **Public Procurement to play a pro-active role**
   - **Encourage new business models- offering services instead of selling stuff**
4. **Make material efficiency a priority in climate strategies**