Introduction to Circular Economy

Part 4. Circular product repair, remanufacturing, recycling: examples of practices and policies

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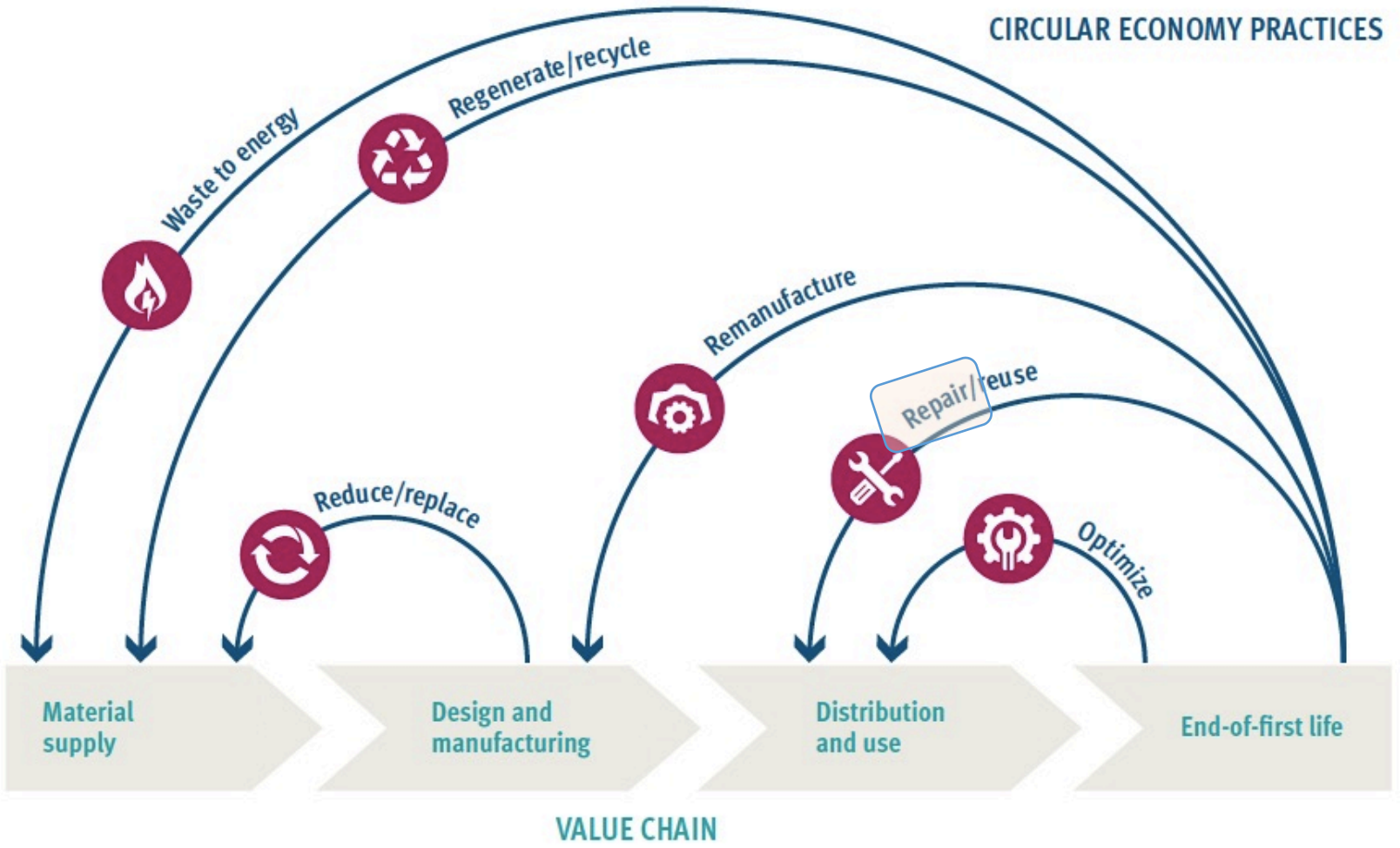
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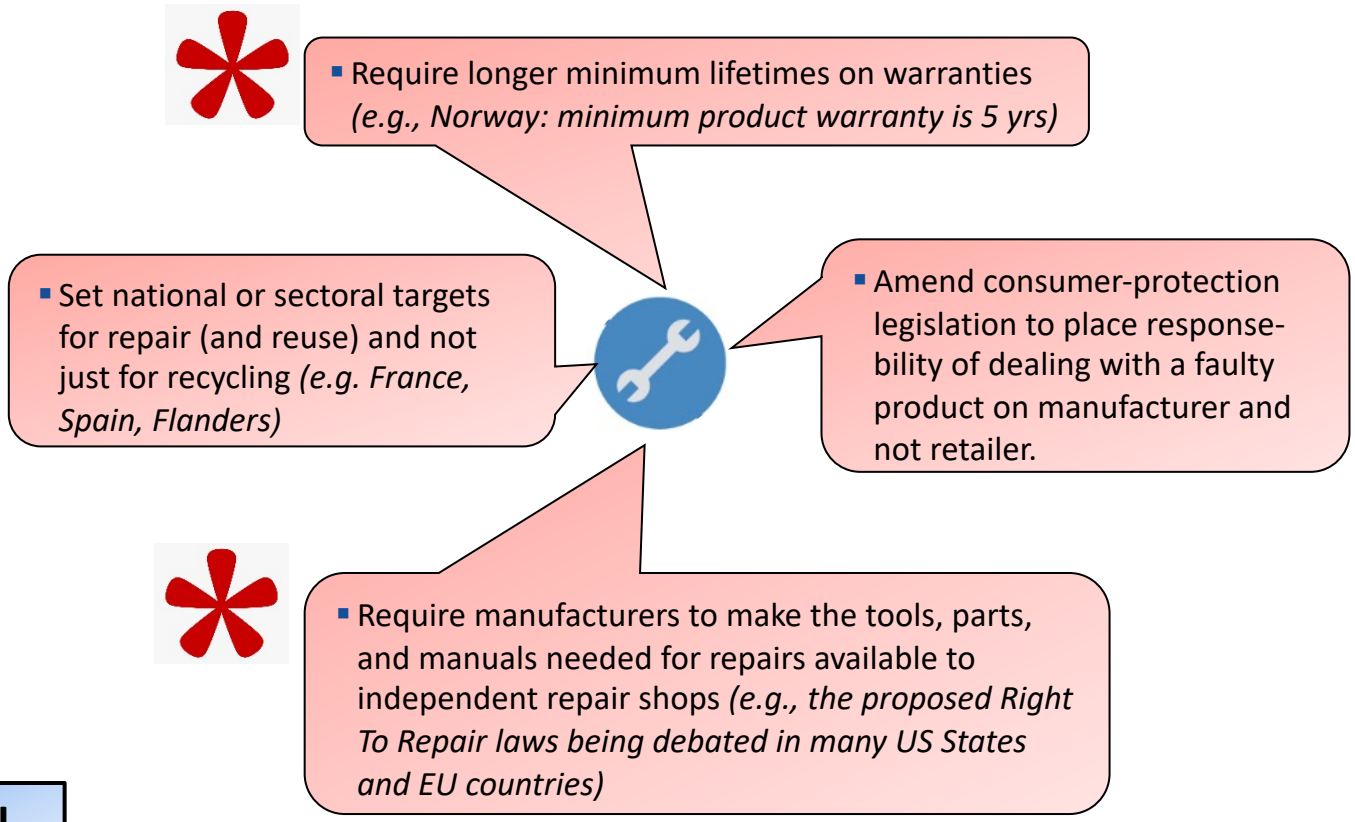
Waste to energy
Regenerate/recycle
Remanufacture
Repair/reuse
Reduce/replace
Optimize
Material supply
Design and manufacturing
Distribution and use
End-of-first life
VALUE CHAIN

Issues with Repair

- Repair is a hot issue right now. Many countries in the EU, many States in the US, are pushing for legislation on the Right to Repair.
- The idea is to push manufacturers to make repair easier and – very importantly – less expensive.
  - *In a Eurobarometer survey, 77% of people said they would like to have their items repaired but they tend to replace them because they find it too expensive to repair.*
  - *People tend to repair their products if the cost of repair does not exceed 30-50% of the price of a new product.*
- Planned obsolescence is also a big issue: manufacturers designing products to break quickly. To prevent this, some countries are requiring warranty periods to be longer: e.g., from 3 to 5 years.
- The more frequent use of software in products is also an issue. Manufacturers can "turn off" a product and push users to buy a new one.

Policies to promote Repair



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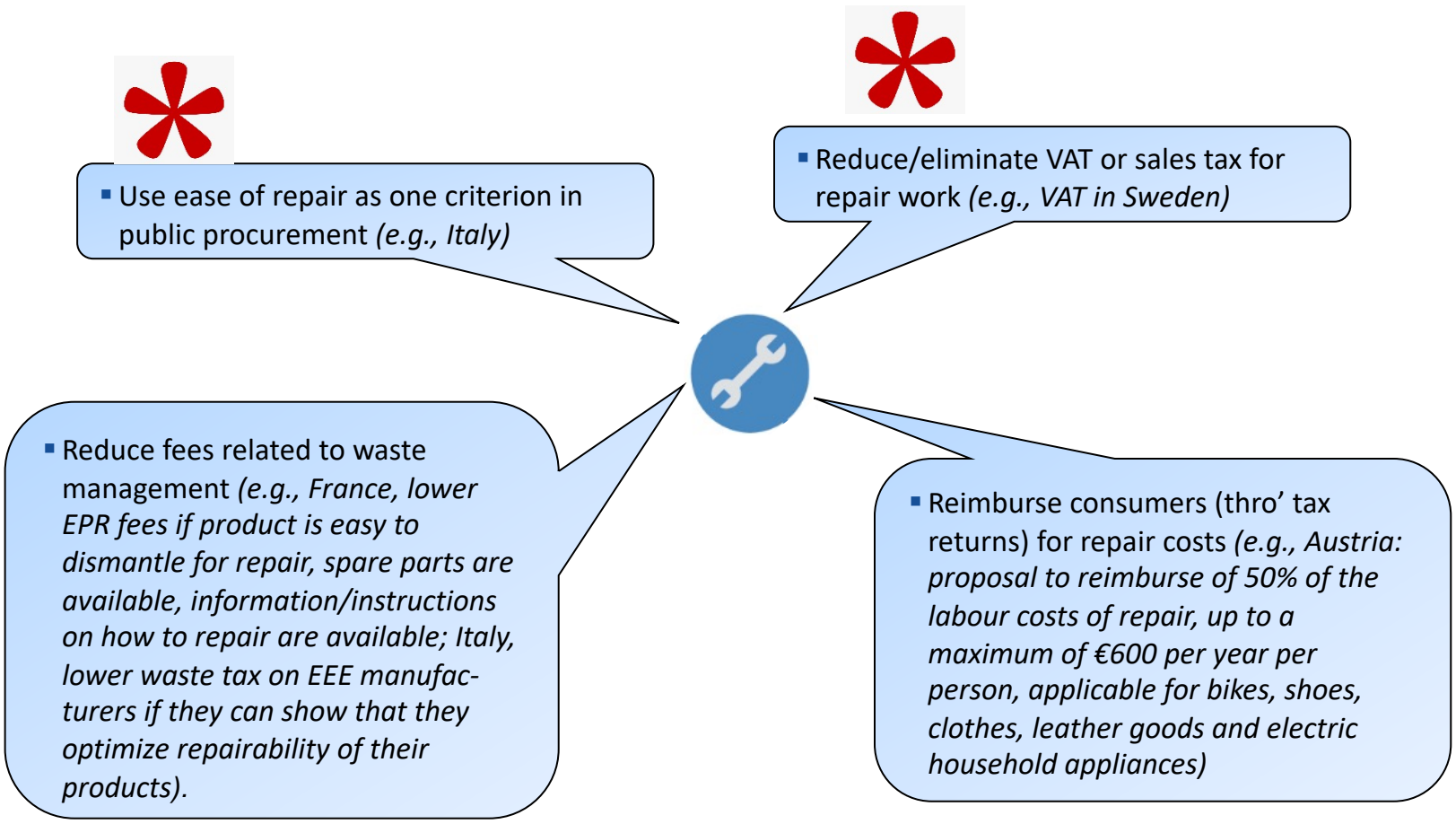
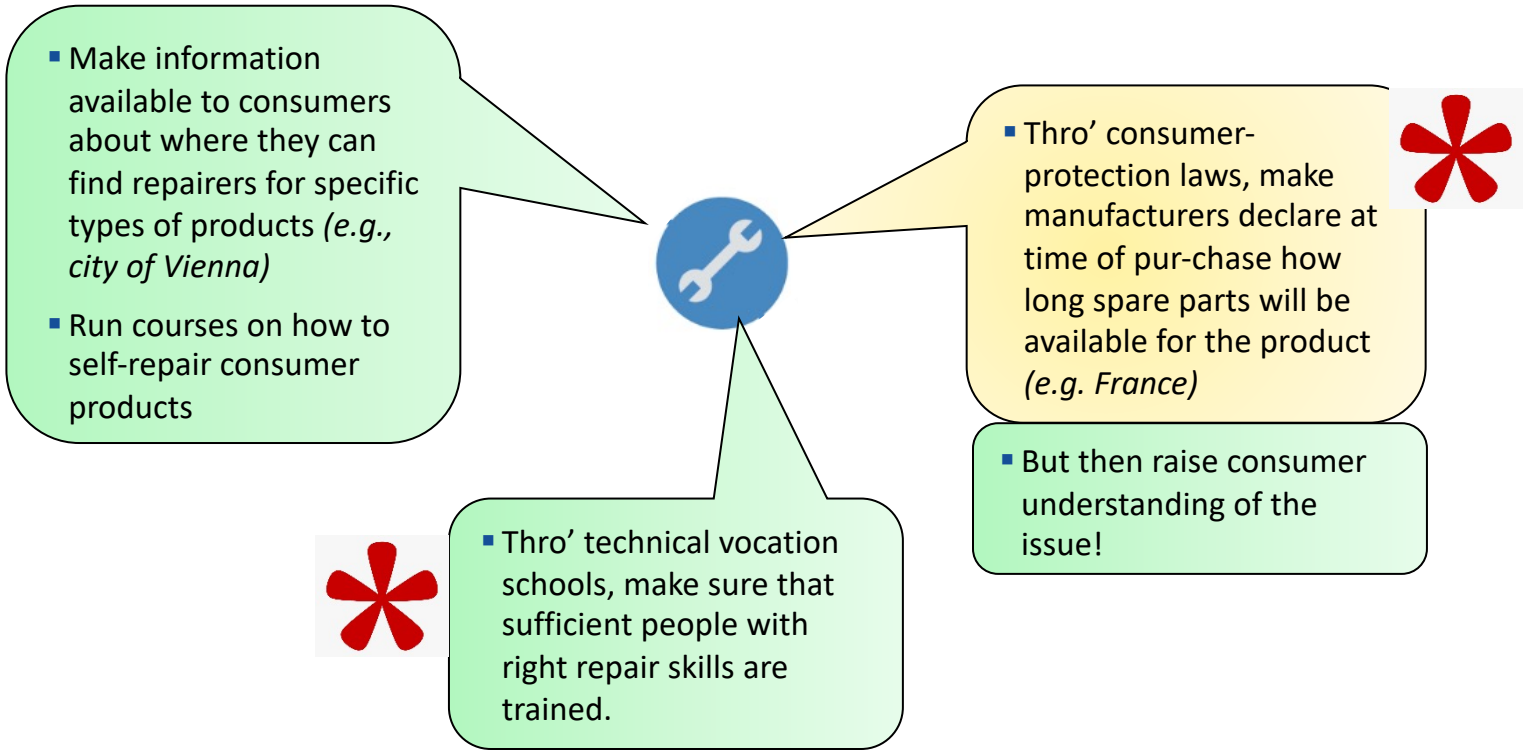
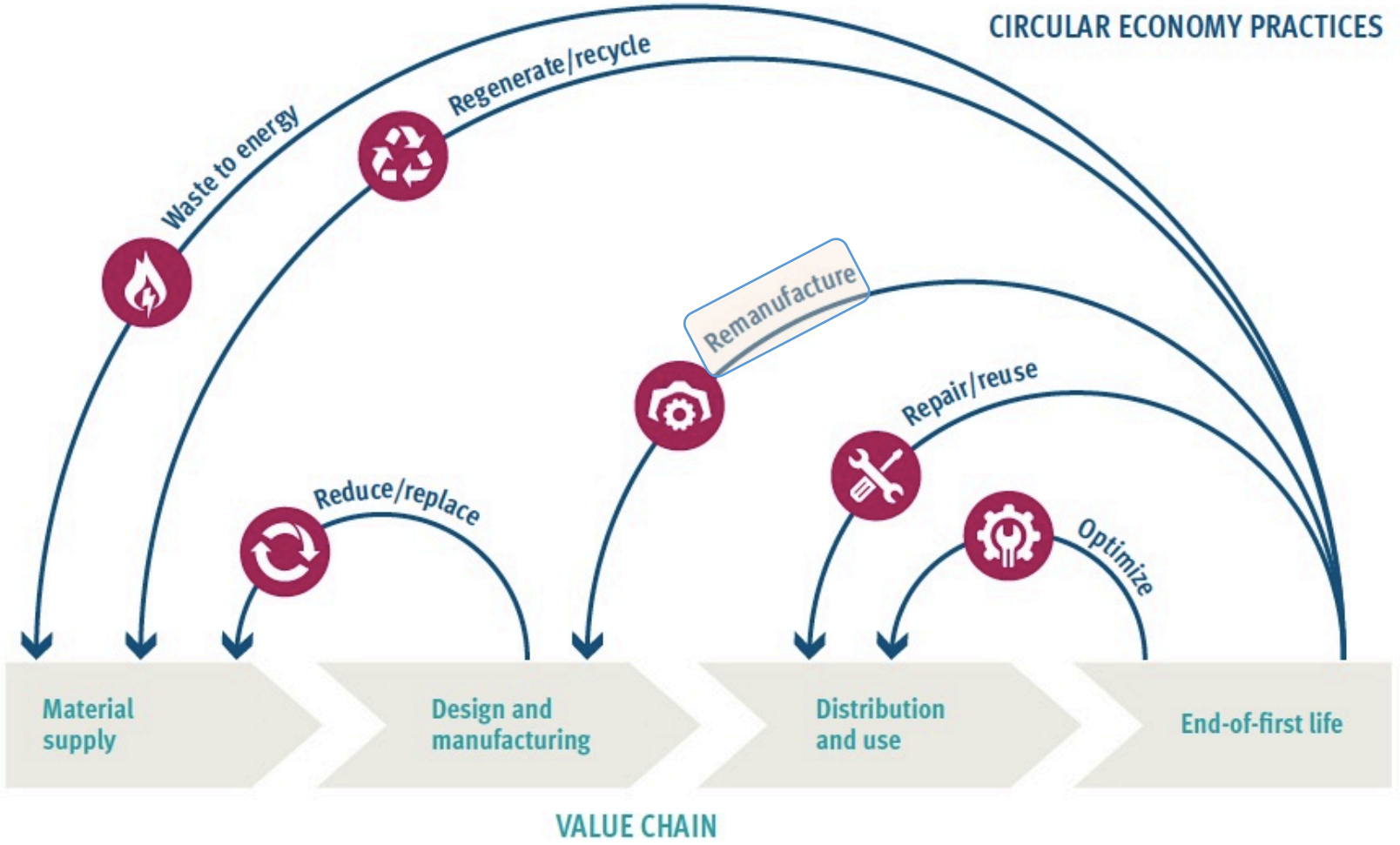
Policies to promote Repair



Policies to promote Repair

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Remanufacturing / Refurbishing

- Remanufacturing and refurbishing are ways to recycle and reuse **parts** rather than material. Remanufacturing is the higher quality operation.
  - A used product is completely disassembled. The parts are cleaned. Used or broken parts are replaced, with a combination of reused, repaired and new parts. Software is updated. Everything is reassembled.
  - The reassembled product is tested to ensure it meets or exceeds Original Equipment Manufacturer's (OEM) performance specifications.
  - The remanufactured product carries a **warranty** that is equivalent to that of a new product. It is "as good as new".
- Because a remanufactured product is equivalent to a new product, the original manufacturers are often in charge of the remanufacturing: it is an integral part of their business model.
- "Refurbishing" is a less high quality version of remanufacturing – and consequently the warranty is not so good. Original manufacturers may not be involved in refurbishing.

Remanufacturing / Refurbishing

- Currently, products which are remanufactured have a high value, are durable, the technology doesn't change quickly, and fashions for those products doesn't change quickly – airplanes, robots, medical equipment, etc.
- The role of governments is to take action to extend remanufacturing to more classes of products.
- Remanufacturing & refurbishing are currently going on globally – although the developed countries tend to dominate the market.
- Remanufacturing / refurbishing could become a new growth area for developing countries.
- Remanufacturing jobs are highly skilled jobs.
- NOTE: In a number of cases, it's not the whole product which is remanufactured / refurbished, it is one part of it, e.g., engines in vehicles: this is called the core. The rest of the product might be stripped for spare parts or recycled.

Examples of Remanufacturing / Refurbishing

- Remtec is South Africa's leading remanufacturer of petrol and diesel engines for light commercial and passenger vehicles.
- It supplies remanufactured engines for Toyota, Volkswagen, Isuzu, Opel, Chevrolet, Ford, Nissan and Land Rover vehicles.

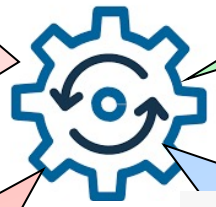
- European car makers are looking to North Africa to establish remanufacturing facilities to supply the European market.
- Africa has many mining operations. Mining equipment are ideal candidates for remanufacturing. Reman Africa, a Division of Reman USA, offers Africa's mining industry remanufactured equipment. But are they remanufactured in Africa?

Policies to promote Remanufacturing

- Establish a TVET centre specifically for reman.

- Develop "how to" guides & tools on business models.
- Run awareness-raising campaigns on remanufacturing
- Develop a certified "remanufacturing mark" to build confidence in reman. products.

- Amend waste legislation so that "cores" being shipped to remanufacturing facilities are not categorized as "waste".
- Amend legislation exempting remanufactured products from meeting product requirements which are new since they were first manufactured.

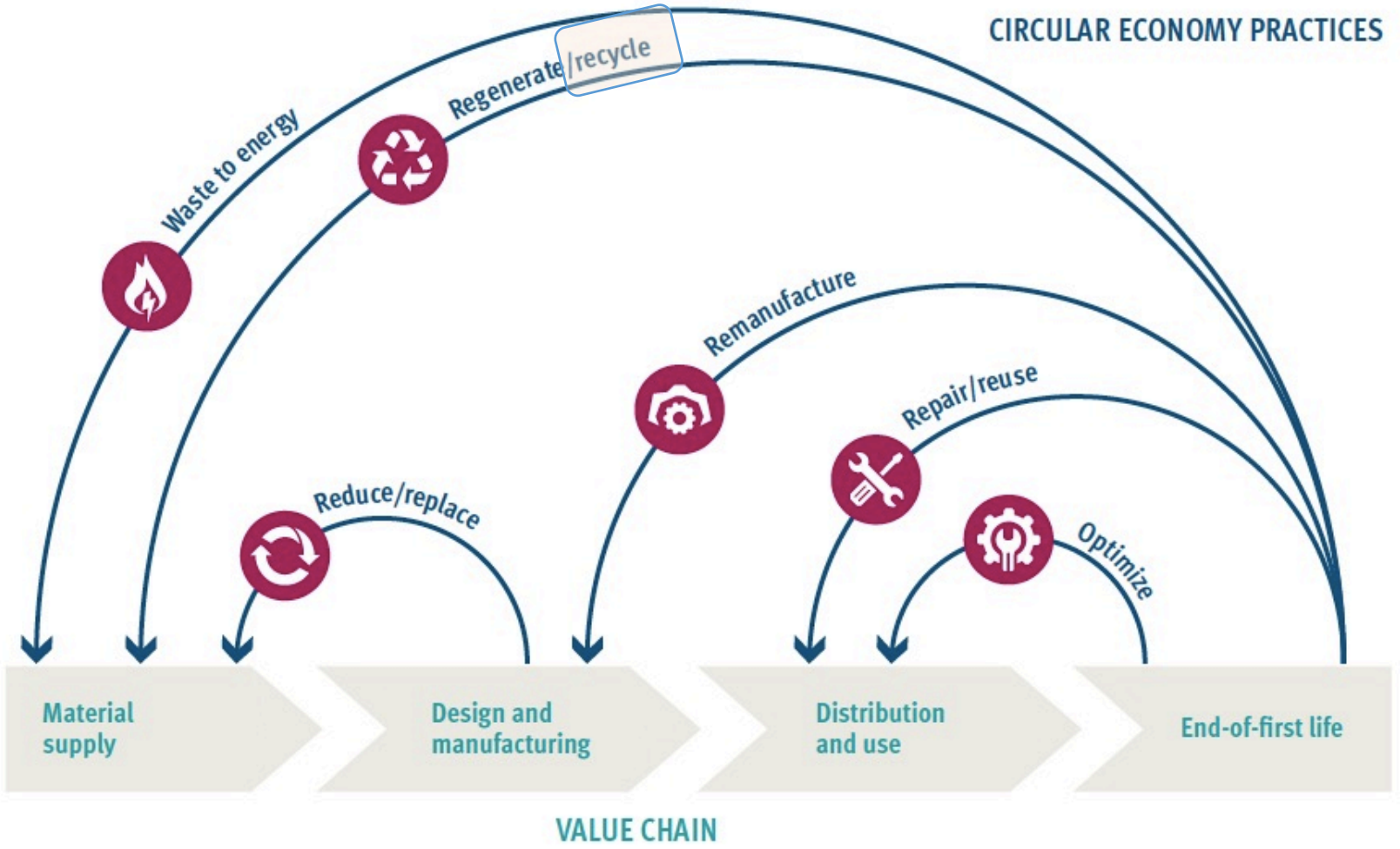


- Use public procurement to promote reman. products (*e.g., reman. cars for gov't car pools*).
- Reduce/eliminate VAT or sales tax on reman. products.
- Subsidize sales of reman. products.
- Co-fund R&D programs in new technologies and equipment for remanufacturing.

- Set national / sectoral targets for reman. and not just recycling.

Remanufactured goods in International Trade

- The confusion about whether or not cores are “waste” extends to the international sphere.
- As in the case of 2nd-hand products, governments have imposed both import and export restrictions on cores and remanufactured products. *Turkey: prohibits import of reman parts and export of cores or used parts; Brazil: prohibits the import of cores or used parts; Russia: prohibits export of used parts or cores.*
- Should we encourage international trade in cores and remanufactured products? If yes, a number of actions would be useful:
  - ✓ Push for a globally-accepted definition of what “remanufacturing” is.
  - ✓ Work through the World Customs Union to have a special customs code for reman. goods.
  - ✓ Work to exclude/exempt “cores” from the Basel Convention’s remit.
  - ✓ Work with governments to remove restrictions on the import / export of cores and reman. products.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How are we doing on recycling?

- Metals: In principle, infinitely recyclable. Some are well recycled (e.g., iron/steel – about 67% of steel is produced from recycled iron/steel; about 70% of aluminum). Others (e.g., rare-earth metals) are poorly recycled (one reason why governments are so keen to promote recycling of electronic equipment).
- Other materials have OK-to-good recycling rates:
  - About 50% of post consumer paper waste is recycled;
  - About 20% of glass produced is recycled (for container glass, it's 30%, for flat glass it's 10%).
- Other materials are much more problematic:
  - No more than 2% of waste plastics are recycled!
  - Only ~1% of textile waste is properly recycled. 19% is down-cycled (rags, stuffing, etc.). The rest is incinerated or landfilled, what a huge loss of value!

The 3 “Musts” for “Recyclable” to become Recycled

- A waste material can only go from being “recyclable” to really being recycled when three conditions are met:
  - There is a cost-effective recycling technology / process for it

    AND
  - There is a potential market for the recyclate* which the technology / process produces

    AND
  - The price of that recyclate is lower than equivalent virgin material.

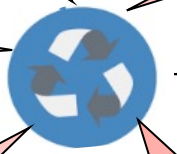
- The role of government is to make sure that these conditions exist.

* “Recyclate” is the desired material being extracted from the recycled raw material.

Example of Recycling – e-Waste in Rwanda

- After an initial inventory to assess the e-waste situation, the government developed a National e-Waste Management Policy.
- Rwanda's Green Fund invested nearly US$1.5 million to establish a state-of-the-art e-waste collection center and dismantling facility. The facility can recycle 15,000 tonnes of e-waste/yr. It employs 300 people.
- A series of collection centers have also been established in each of the country's districts. These centers have created more than 1,000 jobs.
- Collectors who bring e-waste to the plant for recycling are paid US$100 for every 13-15 kg e-waste.

Policies to promote Recycling



- Ban the disposal/incineration of certain categories of waste
- Set standards on recycled content of products
- Set national or sectoral targets for recycling *(e.g. EU)*
- Regulate the recycling business*
- Require households to segregate their wastes
- Adopt Extended Producer Responsibility (EPR) legislation *(e.g. EU, Japan, Canada)*

* Any recycling process will generate not only the desired recyclate, **but also** residues which need to be managed appropriately.

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Policies to promote Recycling

- Tax/remove subsidies from virgin materials
- Remove any taxes from recycled materials
- Give subsidies for recycled materials??

- Use public procurement to purchase products with recycled content

- Use deposit schemes

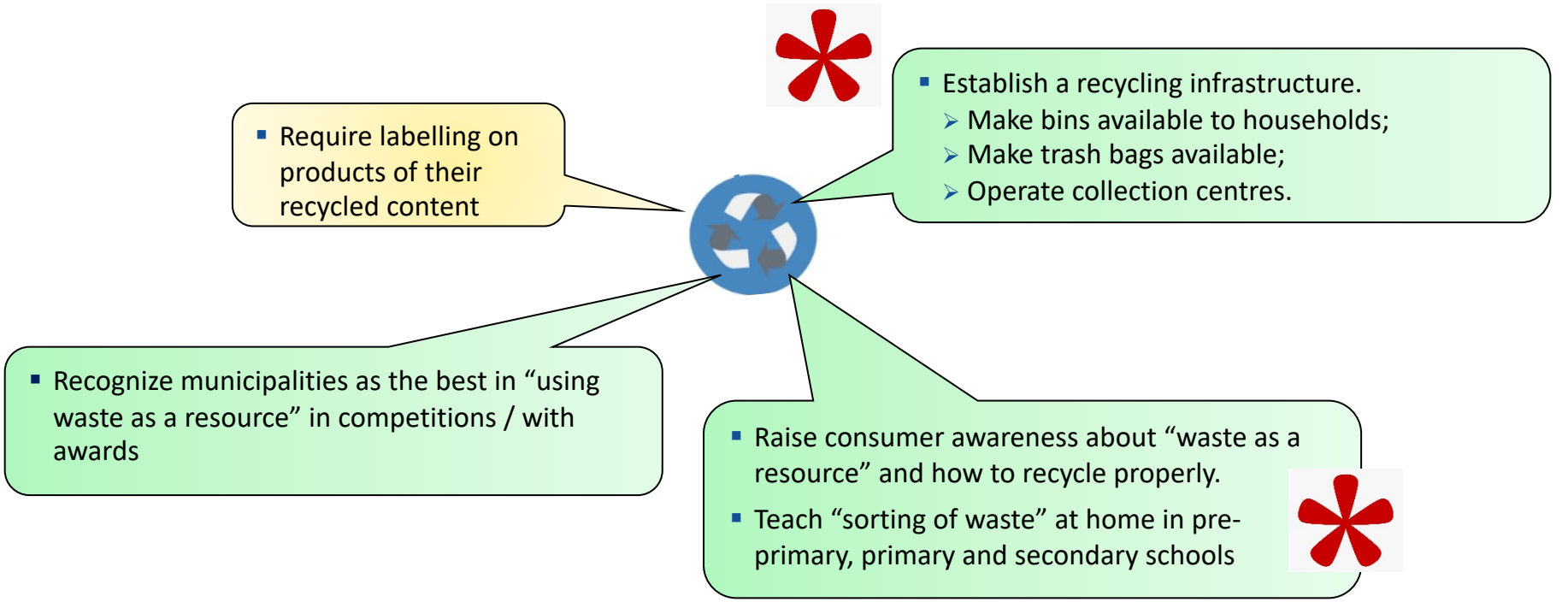
- Co-fund R&D programs in new technologies and equipment for recycling

- Levy waste taxes on consumers
- Levy waste taxes on producers / retailers

(In either case, make waste going to recycling pay no or less tax

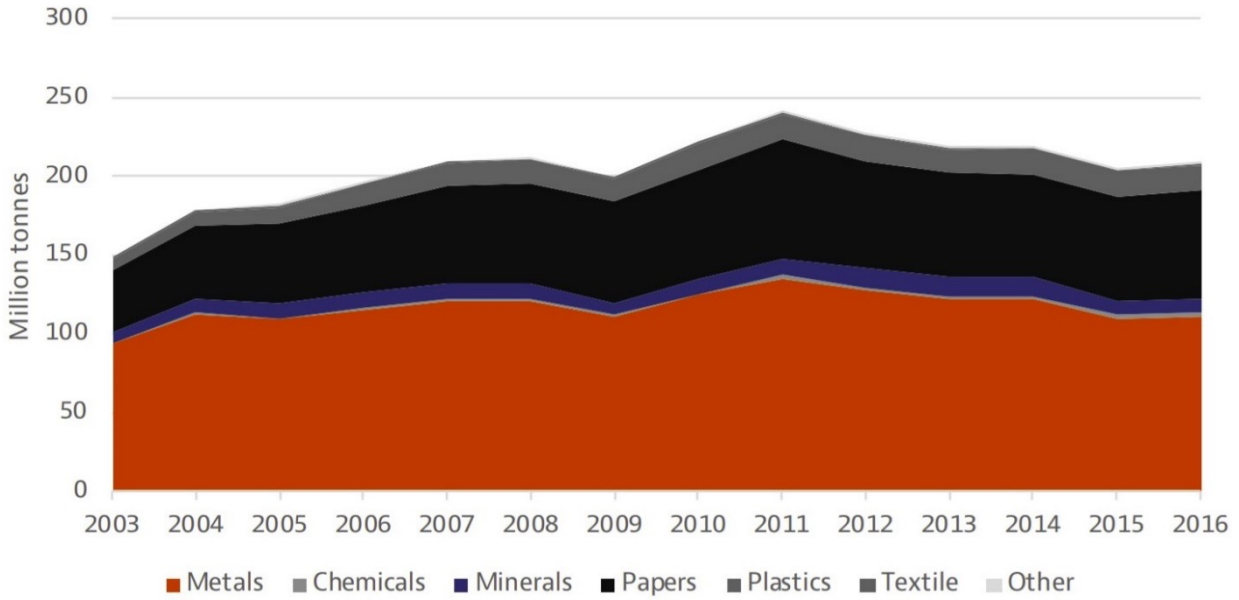
- Give fiscal advantages to recyclers, reverse logistics operators, and use of IoT

Policies to promote Recycling



Recyclable waste in International Trade

- There is a flourishing international trade in wastes.
- In some cases, the wastes are being traded to be recycled (e.g., waste metals, paper)
- In other cases, they are being traded to be dumped or "recycled" (in reality, dumped).
- For some countries, processing imported waste is good business, e.g. India has limited domestic steel scrap but accounts for 13% of global 2ry steel production. On the other hand, we have China that decided to limit import of plastic waste because its recycling was too polluting.



Source: OECD, "International Trade and the Transition to a Circular Economy", 2018

Recyclable waste in International Trade

- Then we have shady (if not downright criminal) activities where no longer working products are being exported to developing countries as functioning 2nd-hand products and hazardous wastes are being dumped in these countries.
- The developing countries must use the international mechanisms and processes available to them (e.g., the Basel Convention) to ensure that international trade in recyclable materials which leads to true recycling is encouraged, while any other kind of waste trading is severely restricted or banned.

Questions?