Siptex

The first automated, industry scale sorting plant for textile waste

Erik Perzon, PhD

ivl
SVENSKA
MILJÖINSTITUTET

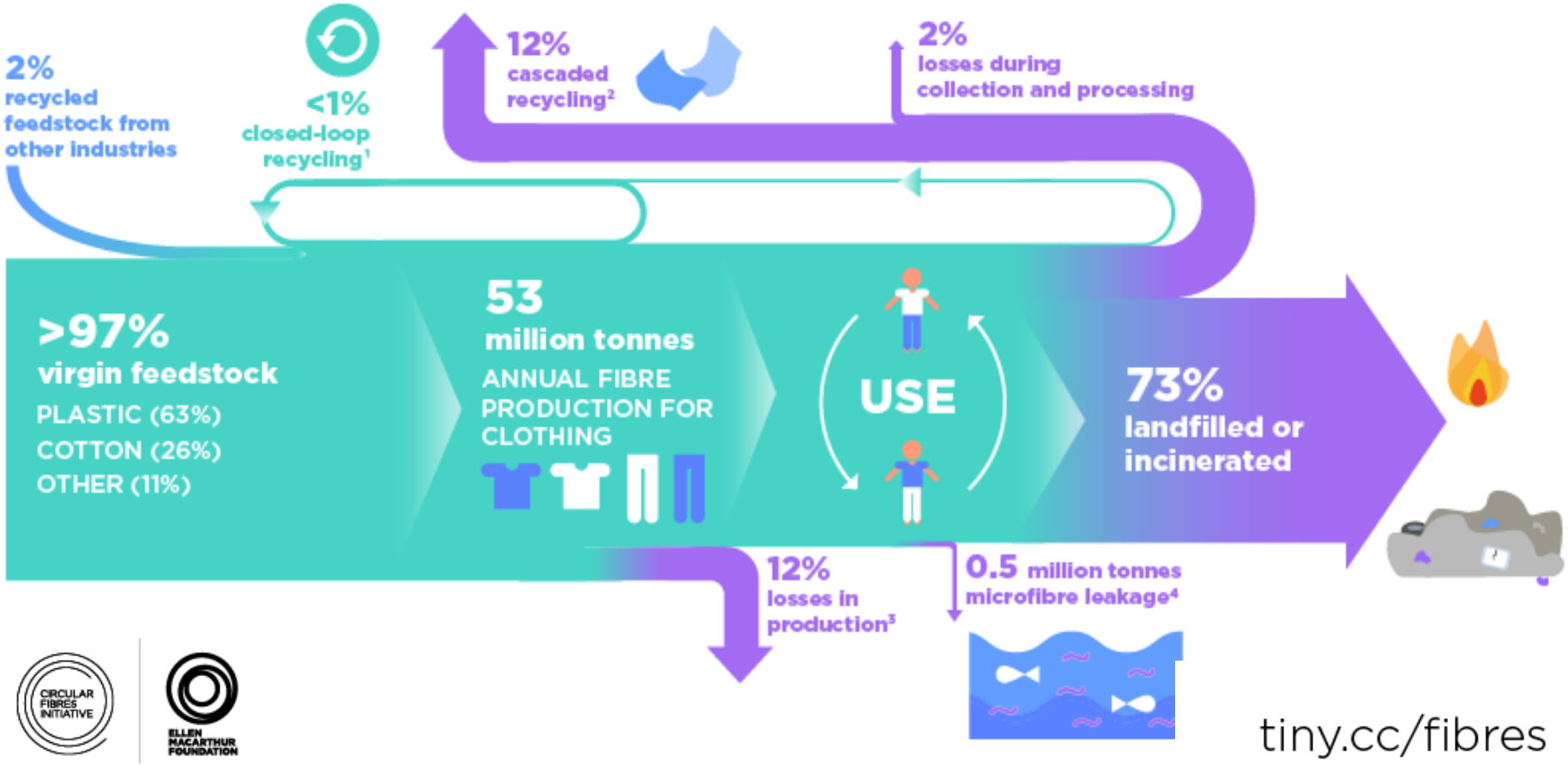

More than
one hundred million tonnes
of textiles are produced per year.

A fraction is recycled.
The rest is incinerated or landfilled.

Each second,
a truck full of clothes
is going to landfill
around
the world.

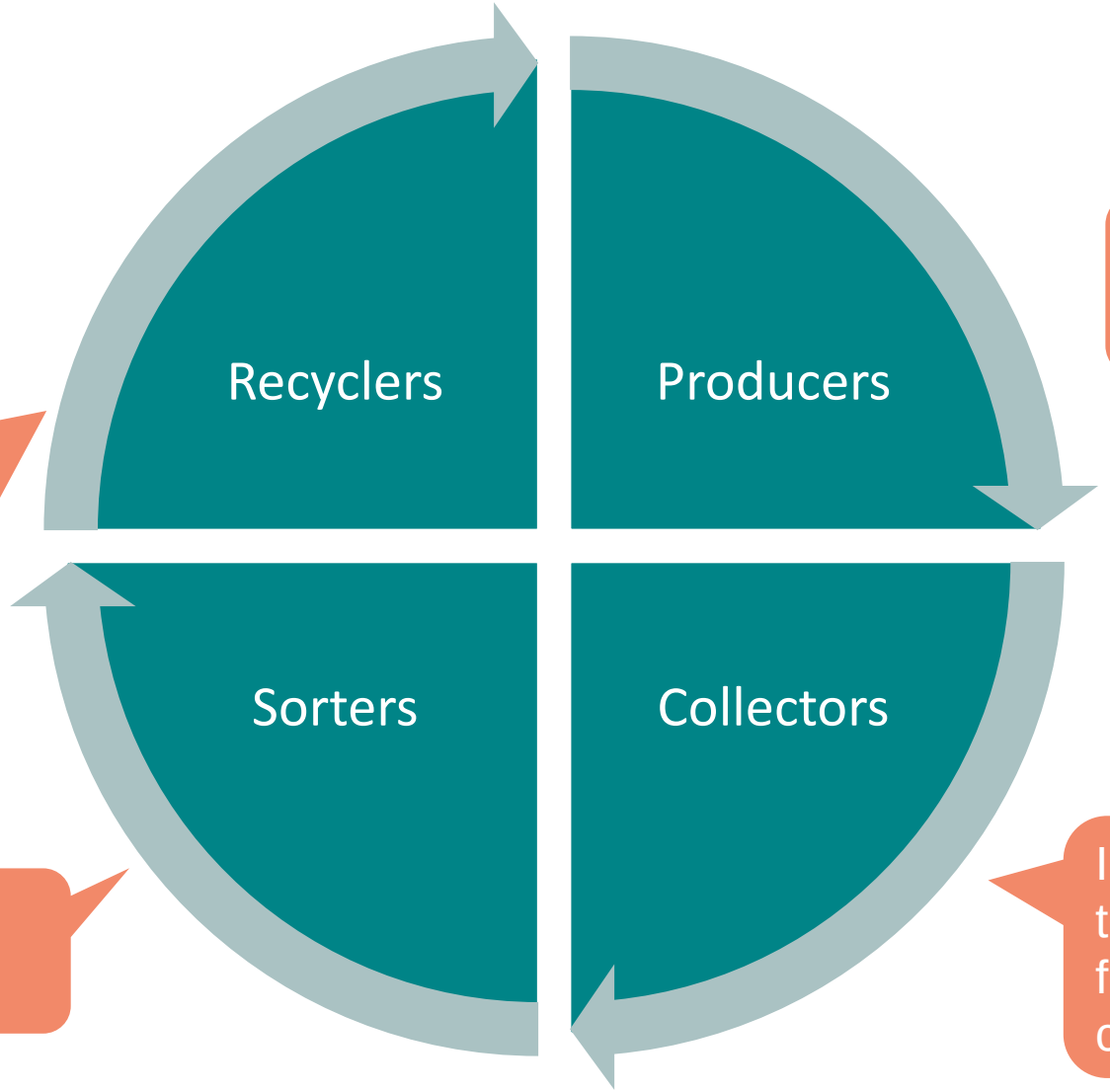
Ellen McArthur Foundation

Global material flows for clothing 2015



Challenges

The transition from pre-consumer waste to post-consumer waste places higher demands on the incoming materials



Difficult to obtain recycled raw material

Difficult to sell recycling fractions

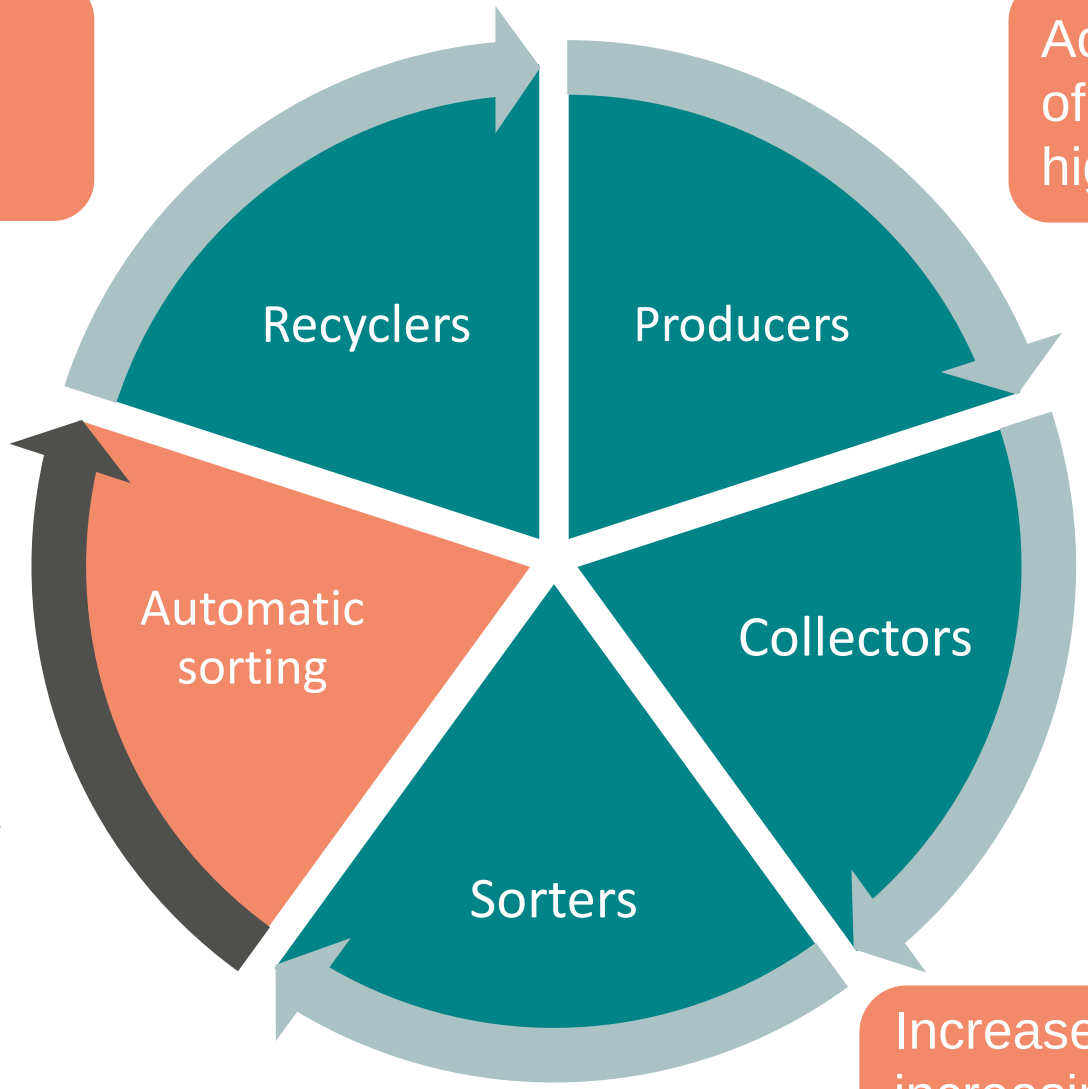
Increasingly difficult to obtain profitability for certain quantities collected

ivl SVENSKA MILJÖINSTITUTET

Access to customized raw material

Access to large quantities of recycled textile fibers of high and even quality

The missing link



Increased profitability for increasing amounts of recycled textiles in collected material

ivl SVENSKA MILJÖINSTITUTET

The Siptex project has reached stage 3: Commercial implementation

Purpose and goal

- By establishing the world's first automated sorting plant on an industrial scale for post-consumer textiles, Siptex contributes to **more circular and sustainable textile cycles**.
- Siptex is a new step in the textile value chain and creates conditions for **increased resource efficiency and profitability** in the handling of increasing amounts of collected textile waste and for increased fiber-to-fiber recycling of textiles.

The Siptex project: Key actors

- Funding – Challenge Driven Innovation program

VINNOVA
Sweden's Innovation Agency

- Project Management

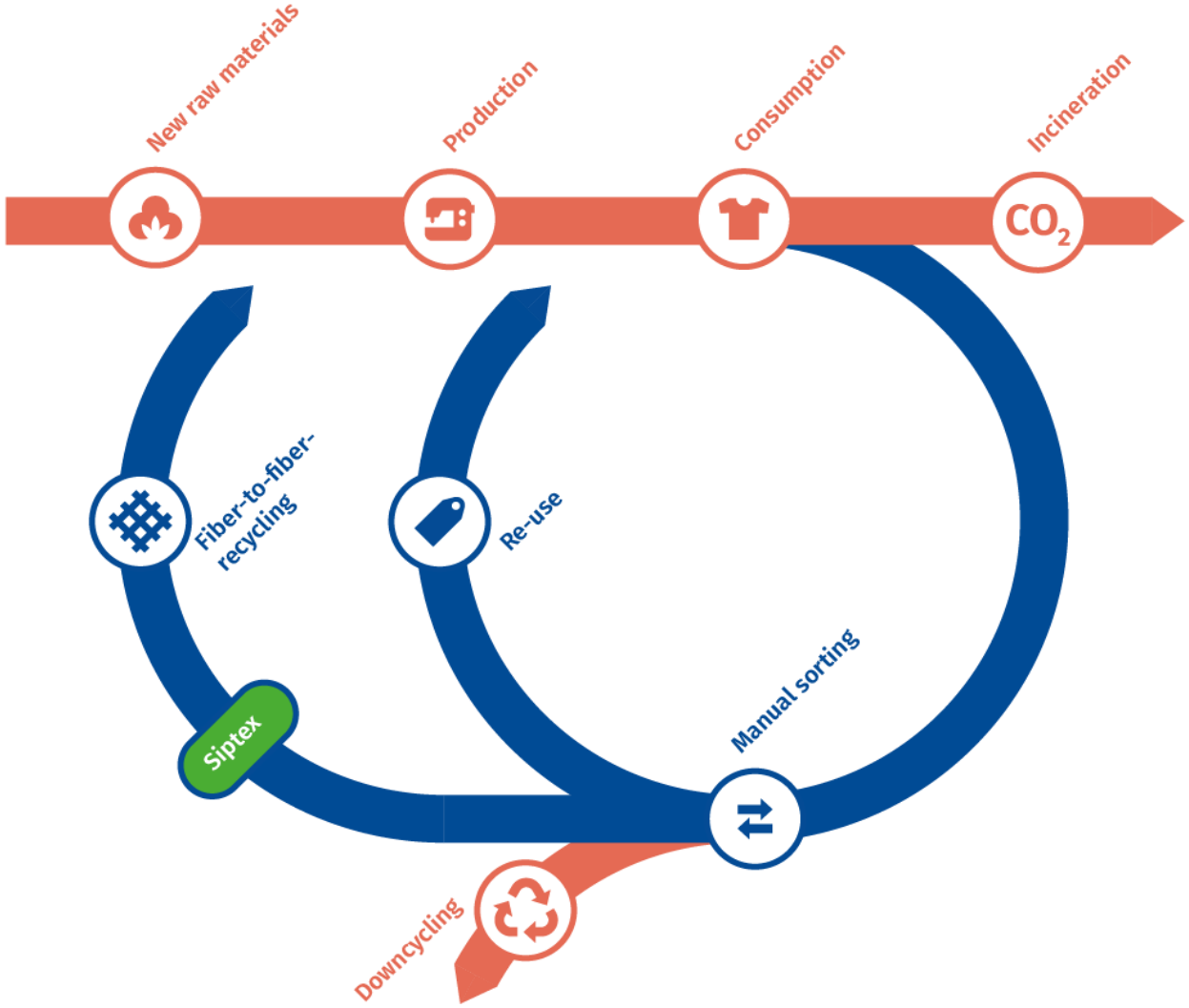
ivl
Swedish Environmental Research Institute

- Major investment and construction

SYSAV

ivl SVENSKA MILJÖINSTITUTET

Towards increased circularity



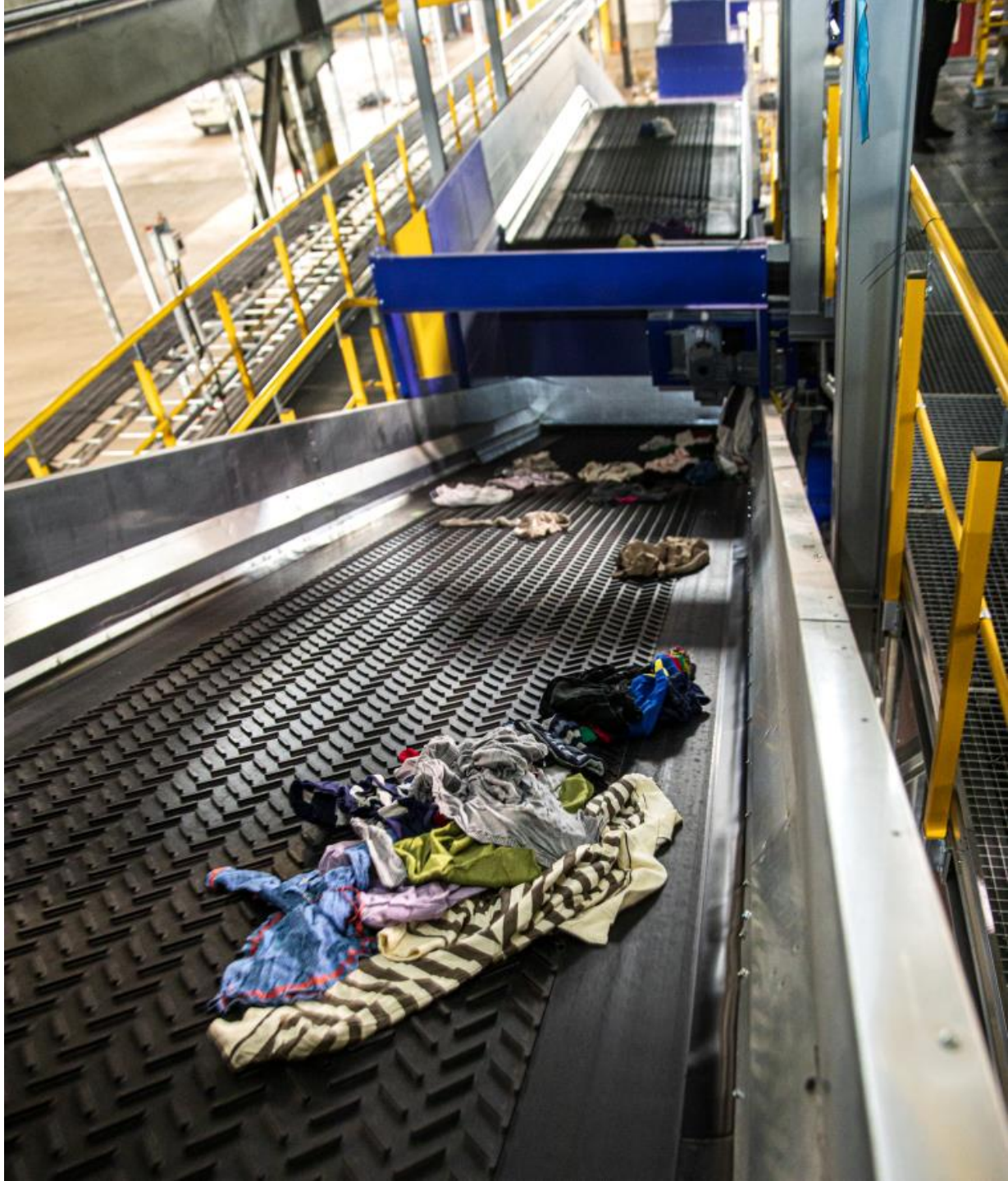
ivl SVENSKA MILJÖINSTITUTET

The Siptex project:
Strong partners from the entire value chain

ivl SVENSKA MILJÖINSTITUTET

Facts about the facility

- **Capacity:** 4,5 tonnes per hour (24 000 tonnes per year)
- **NIR/VIS-machines:** 3
- **Conveyor:** 260 meters
- **Manufacturer:** Staedler/Tomra
- **Location:** Bjurögatan 20, Malmö, Sweden



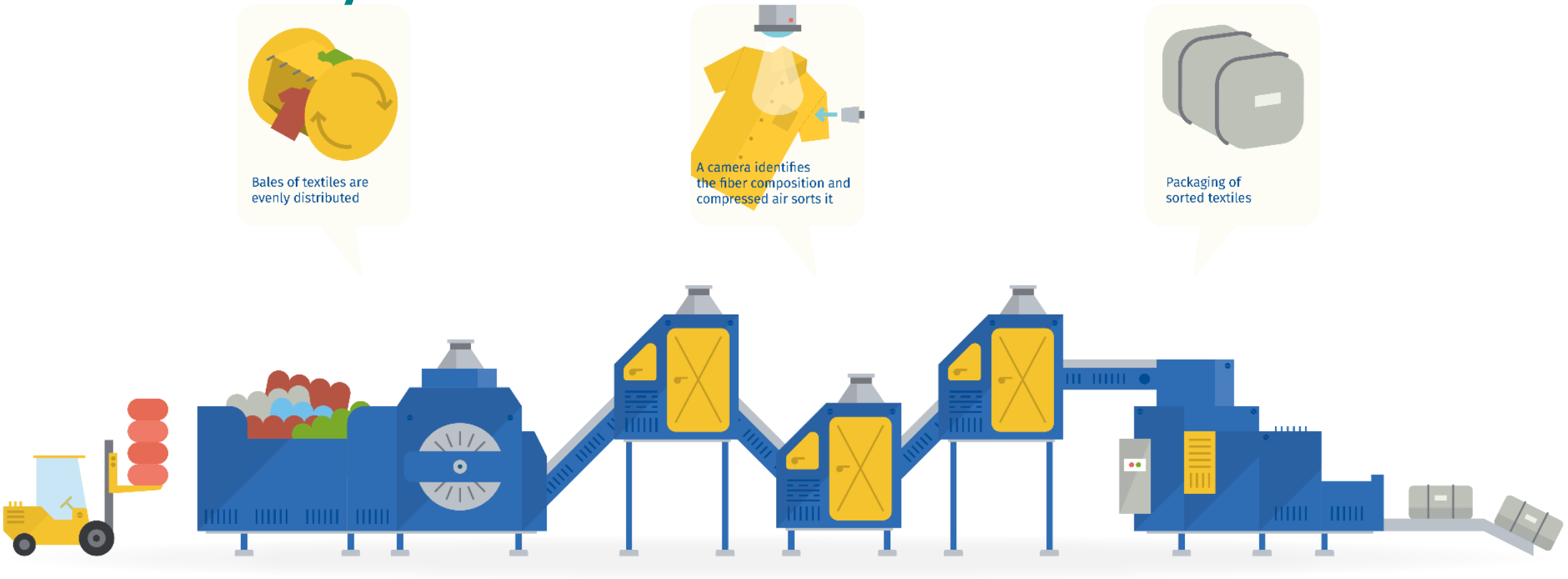
The technology

Siptex uses near-infrared light and visual spectroscopy (NIR / VIS) to identify the type of fiber and color.

Compressed air blows the fabric so that it ends up in the right container.

The plant can be programmed to sort out three different flows simultaneously.

The facility



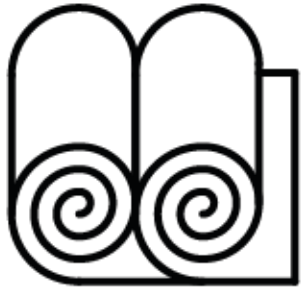
16 different fiber compositions

4,5 tonnes textiles per hour

3 different fiber types at a time

ivl SVENSKA MILJÖINSTITUTET

Product categories inbound

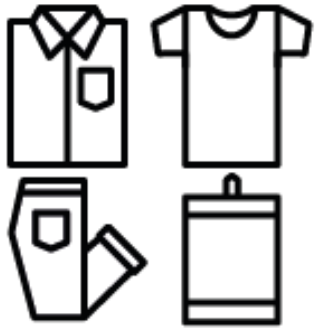


Textile from industry

Pre-consumer-materials from industry, e g leftover material from production.

Pre-sorted textile

Sorted post-consumer materials of specific product type, such as broken sheets or t-shirts.



Sorting residues

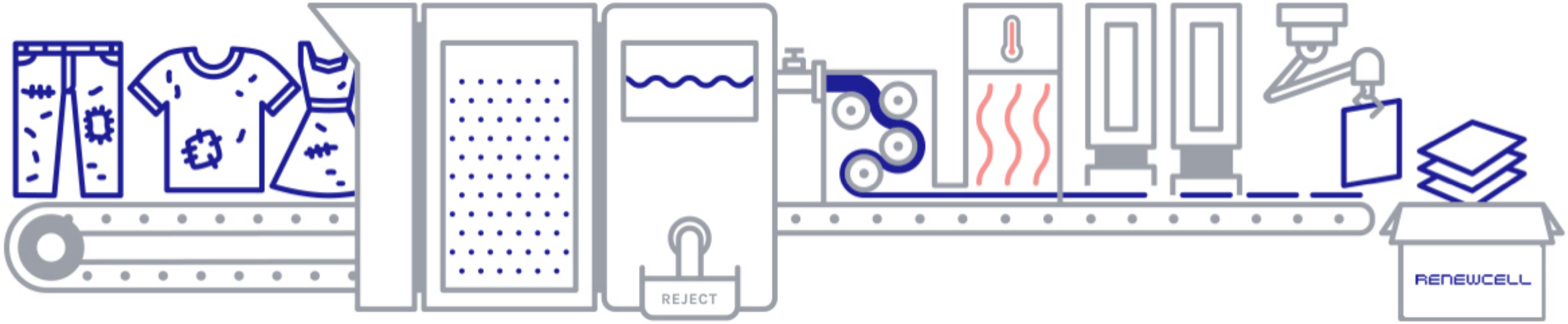
Sorted textile materials from consumer and industry, for example garments that cannot be reused.

Quality-assured products

Siptex will offer a standardized range of quality-assured recycling products with guaranteed fiber composition and color, adapted for various recycling processes.

Examples of products:

- **Cotton** (of specific purity and color)
- **Wool** (of specific purity and color)
- **Polyester** (of specific purity and color)
- **Viscose** (of specific purity and color)
- **Polyamide** (of specific purity and color)
- **Acrylic** (of specific purity and color)
- **Customized products:** the plant can sort out fiber compositions tailored to the customer's requirements



Chemical recycling: Renewcell Circulose®

- Textile waste with high cellulosic content, like cotton and viscose, is shredded and de-buttoned, de-zipped, de-colored and turned into a slurry.
- Contaminants and other non-cellulosic content are separated from the slurry.
- The slurry is dried to produce a pure dissolving pulp, packaged into bales and fed back into the textile production value chain.

ivl SVENSKA MILJÖINSTITUTET

Expected effects five years after the project is completed

1. Contribution to sustainable development through increased circularity in the textile value chain
   In 2026, the amount of textile waste in Europe that is recycled (excluding use as industrial cloths) has increased from the current 500,000 tonnes to 750,000 tonnes annually.
2. Contribution to secured supply of raw materials for textile producers
   In 2026, the use of recycled fibers in new textiles has increased by at least 20 percent.
3. Established automated textile sorting capacity in Europe
   In 2026, an annual automated sorting capacity corresponding to at least 125,000 tonnes of textile waste has been established in Europe.

… and more

ivl SVENSKA MILJÖINSTITUTET

More expected effects five years after the project is completed

4. Functioning markets for recycling products from automated textile sorting
5. Established ecosystem of actors who refine and use recycled products from automated sorting
6. Introduced instruments for more circular textile cycles and strategies for risk-free use of recycled textile fibers

Thank you!

www.ivl.se www.sysav.se/en/siptex