



Project Number: 2022-1-PT01-KA210-SCH-000083508

24 months: 31-12-2022 until 31-12-2024



Sustainable cities\_Sustainable future

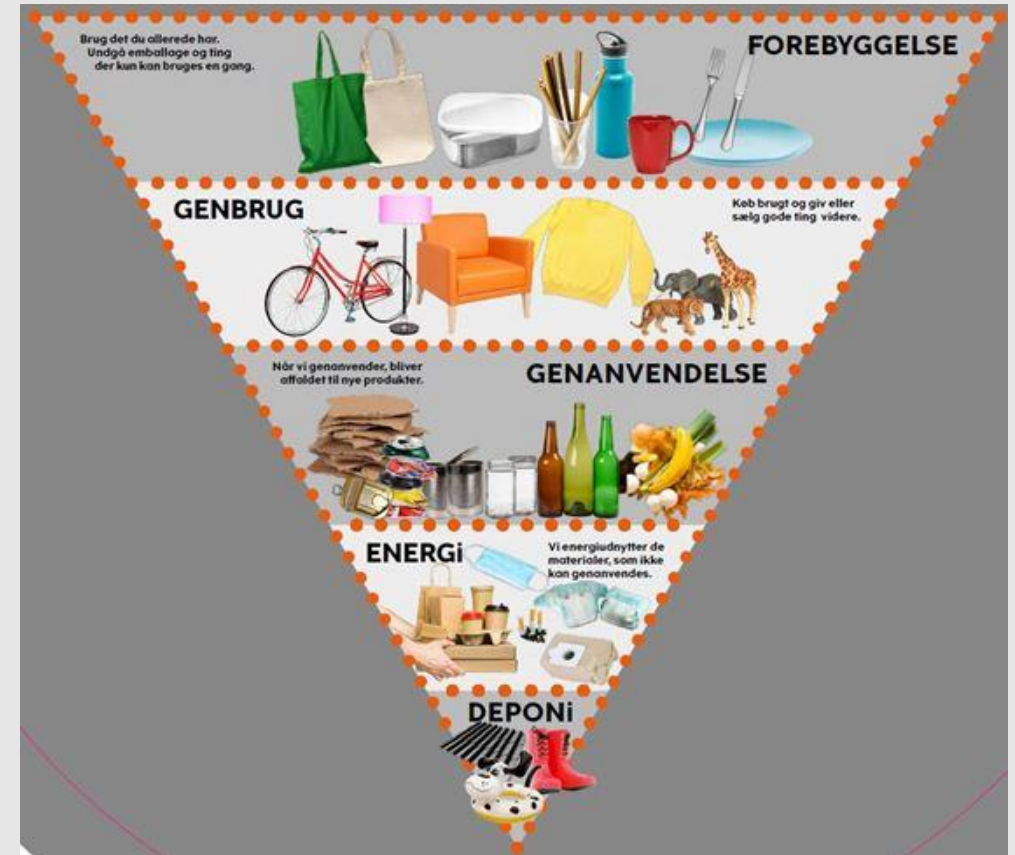
# LTT Waste Management and Recycling - On Site Visit Blended – 6<sup>th</sup> to 10<sup>th</sup> Nov 2023



# Waste Hierarchy

Ca. 12 million tons annually:

- 47% is recycled (collected for recycling)
- 25% goes to other final material recovery
- 25% is incinerated
- 3% is deposited



# Disposal



Dumping sites (ca. 41 in Denmark)



Waste that cannot be recycled, reused or used for energy (because it cannot be burnt/produces toxic smoke/it is not yet know how to recycle it.



Environmentally harmful substances are not released into our recycling chains.



3% of the waste is disposed (at EU level: 24%)



- ✓ Soft PVC, such as air mattresses
- ✓ inflatable toys, and garden hoses
- ✓ Contaminated soil
  
- ✓ Eternit roof sheets
- ✓ Contaminated construction waste

# Disposal

When filled up: the areas are transformed, e.g., nature areas.



Klintholm, Fyn

# Energy

- Waste from citizens, businesses, and recycling centers that cannot be reused or recycled, and not suitable for landfilling.
- Waste from hospitals.
- Hazardous waste (e.g., chemicals and paint)
- Incineration plants (25 in Denmark)
- Sorted waste is collected from households, businesses, recycling center.

Waste is brought the plant and deposited in siloes -> Mixed -> Burnt in ovens ->

-> Water in boilers is heated.

- Transformed to vapours
  - Vapours are directed to turbines
  - Kinetic energy
  - Kinetic energy -> electricity by generators
- Energy from waters is transferred to district heating pipes

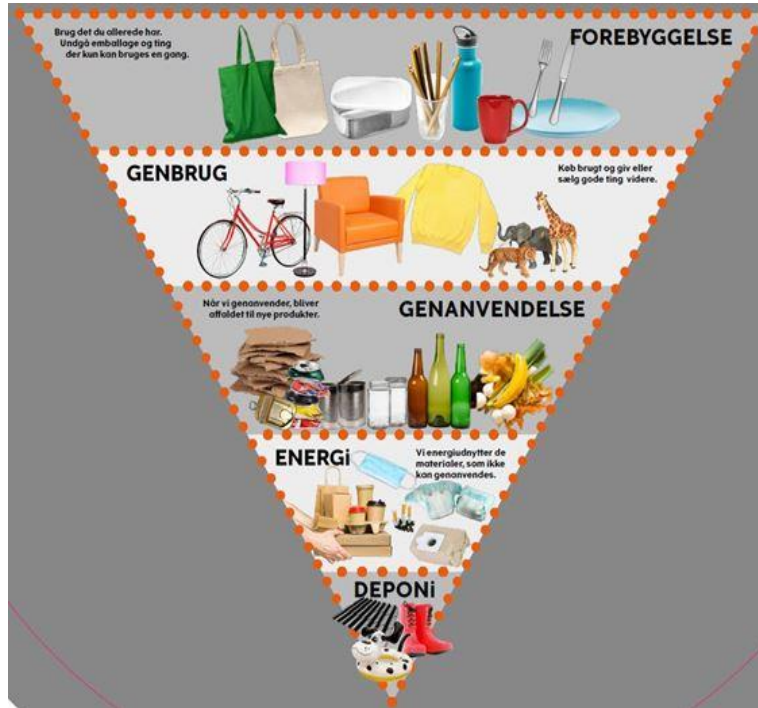


Ca. 27% of district heating demand  
Ca. 5% of the Danish electricity demand

4.1 mln. tons of waste in 2019 (ca. 15% imported, mainly from the United Kingdom and Germany)

Total CO2 from waste sector: ca. 2.7 million tons in 2018 (waste incineration: 60%)

## Waste Hierarchy in Denmark



## Waste Framework Directive



# Energy - Future

- In June 2020, the Danish Parliament reached an agreement on a climate plan for a green waste sector and circular economy.
- To ensure less waste for incineration
- Reduce the capacity limit for waste incineration by 30% in 2030, from ca. 4 million tons to 2.6 million tons.



# Recycling

Each municipality has responsibility for the management of waste collected from citizens, private and public institutions.



# TYPES OF CONTAINERS



# RECYCLING STATION



# AFTER SORTING



Paper and cardboard is transported to factories in Denmark, Sweden or Germany where is cleaned and new paper, from high quality paper to egg trays is made. Can be recycled 6-7 times.



Plastic is resorted into different types of plastic, melted and turned into small plastic granules. Sold to companies that is using it further. Some plastic is sent for incineration, where it is converted into electricity and district heating.



Metal is resorted on types and treated in factories in Denmark and abroad. It sold to companies that is using it further.

## AFTER SORTING



Glass is crushed, washed, sorted by colours and sent to a glass factory where is melted to create new glass. Whole bottles can be reused directly after a thorough cleaning for up to 27 times before they need to be melted down.



Residual waste is converted into heating and electricity at an incineration plant.



Separated and treated in sorting facilities:

- A part is incinerated for electricity and district heating
- Recycled to produce new products (oil, metal parts)
- Buried in the ground in a specially designed landfill

# AFTER SORTING



Food waste is utilized for biogas and natural fertilizer. Biogas is used to produce district heating and electricity. It can also replace gasoline or diesel; in Copenhagen, the garbage trucks run on biogas.



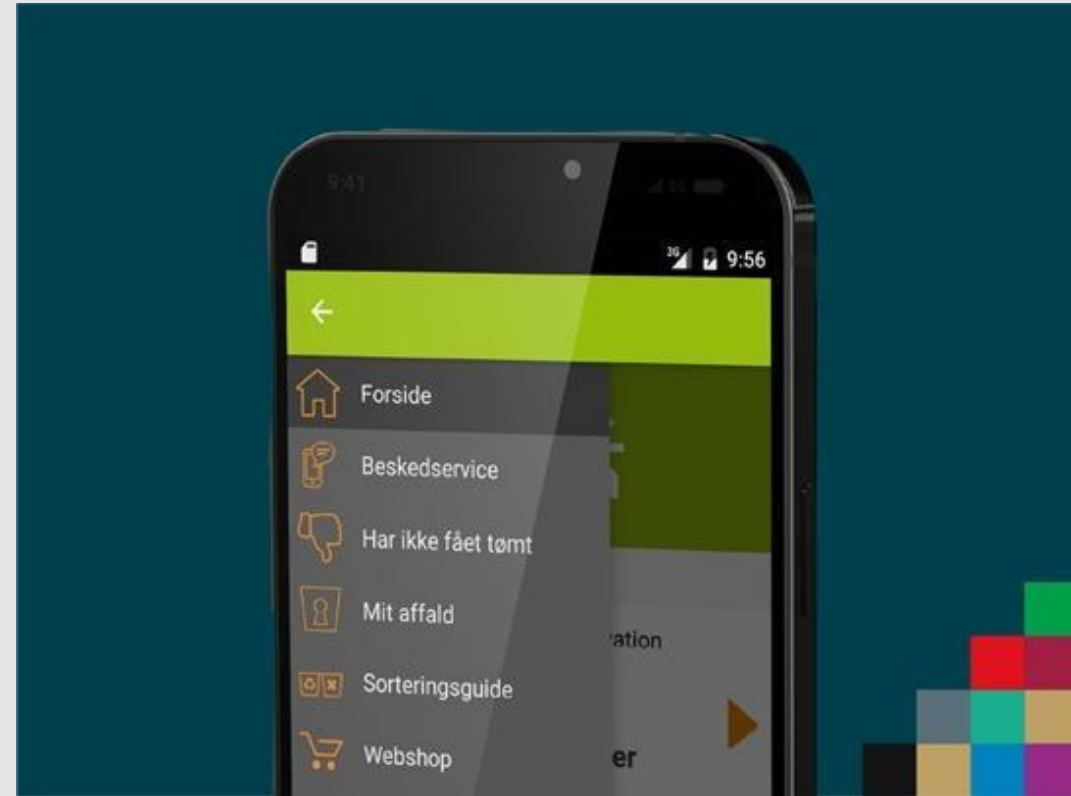
80% paper and 20% plastic. In factories, the layers are which are used to make new food and beverage carton packaging



Some clothing goes for reuse either domestically or abroad. A lot of clothing is made from various materials that need to be separated for reuse, and the technology for sorting and recycling textiles is still in development.

# GUIDE FOR CITIZENS

- HOW TO SORT
- NEXT EMPTING
- OPENING HOURS IN RECYCLING CITES
- COMMUNICATION WITH THE MUNICIPALITY
- ETC

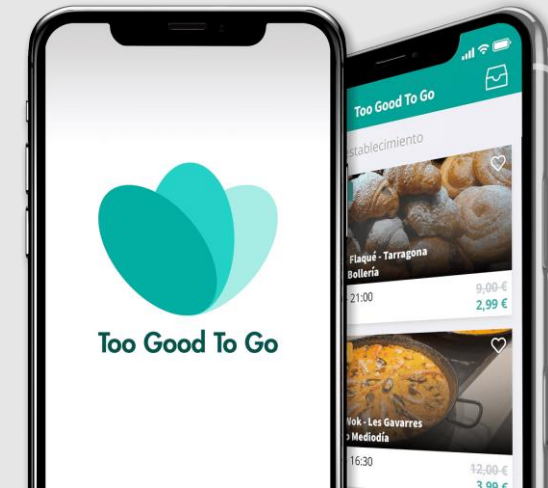


# Best Practices in Re-use and Prevention

- Prevention of food waste
- Re-use of everyday consumer items
- Re-use of clothing
- Second-hand platforms
- Education

# Prevention of Food Waste

- ❖ 2.5 billion tons of food annually goes to waste annually;
- Too Good To Go: an app to contribute at reducing food waste;
- Connects consumers with restaurants, bakeries, supermarkets other food establishments that have surplus food at the end of the day;
- Instead of letting the excess food go to waste, these establishments use the app to offer it to consumers at a reduced price;
- Started in 2015 in Denmark, now present in 17 other countries
- Saved 79 mln. meals in 2022
- Launched LOOK - SMELL-TASTE label: past best before date ≠ it is no longer edible.
- LOOK - SMELL-TASTE label: 13 countries, 532 brands



# Re-use of everyday consumer items

- Volunteer community that assists locals to repair faulty items, e.g., electronics, clothing, or household items, etc.
- Free of charge
- “Change today’s throw-away society by teaching consumers that it is possible to repair, rather than just throwing out and buying new.”
- 96 repair cafés in Denmark (first in 2012)
- Supports the Right to Repair campaign in Europe
- <https://www.repaircafe.org/en/>



# Re-use of clothes

- ❖ The Danes set the record among the Nordic countries in buying new clothing.
- ❖ Each Dane buys an average 15 kilograms of clothing per year; 4 out of 10 clothing items are not used.
- **Trendsales:** a second-hand marketplace for clothing and accessories. Free to use. App and Web.
- **Reshopper:** a second-hand marketplace for items for children (clothes, toy, equipment etc).
- **Containers:** Nonprofit organisations collect clothes and shoes.



**Reshopper**



# Second-hand platforms

- **Den Blå Avis** (The Blue Newspaper): one can find anything: furniture, clothes, cars, kitchenware, electronics, paintings etc.
- **Gul og Gratis** (Yellow and Free): one can find anything: furniture, clothes, cars, kitchenware, electronics, paintings etc.
- **Second-hand stores: ca. 800 stores** (first in 1972)  
(The International Blue Cross; Red Cross; DanChurchAid; DanChurchSocial)



# Education

- Professor Skald, primary school: <https://professorskald.dk/>
- Affald.dk: aimed at children and young people, providing information about waste, the environment, and climate
- Guided tours for schools at recycling and sorting stations. Adjusted to the age of the students
- App about sorting
- Etc.

