



Getting the most out of our waste

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Oslo

700 000
people



Waste management in Oslo

- › 1897: Agency for Waste Management established
- › 1932: The municipality become responsible for the collection of all household waste
- › 1967: First Waste-to-Energy Plant
- › 1986: Second Waste-to-Energy Plant
- › 1990: Source separation of glass packaging, paper and hazardous waste starts, first recycling station established
- › 2005/2006: Decisions to establish a circular waste system in Oslo
- › 2007: Closing of last landfill in Oslo
- › 2009: Landfill ban of burnable waste in Norway
- › 2009: Starting source sorting of food waste and plastic packaging, optical sorting plant
- › 2011: Extension of the WtE capacity
- › 2012: Biological treatment plant producing biogas and bio fertilizer. Complete sorting in all of Oslo
- › 2015: All commercial WtE company started
- › 2016: Test of carbon capture from Waste-to-Energy

Waste crisis in Oslo - 2016

VG NYHETER

Søppelkrisen i Oslo: Varsler fire nye uker med problemer

VEDVAKER: Veireno kan ikke løve noen løsning de neste fire ukene.
Foto: Tore Meek, NTB Scanpix

Av MAGNUIS NEWITH
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Bli kvitt dyre smålån

Hvor mye har du i kredittkortgjeld?

500 000 kr	250 000 kr
200 000 kr	150 000 kr

Mandag forklarte Oslos nye søppeltømmer hvordan det gikk galt og hvor lenge det skal vare.

Første fredag skrev VG hvordan Oslos nye

Scania lastebil i skispor



va mellom Tryvann og
en i Veireno dette bildet.

NYHETER

e i Oslo: Beboerne vil gen lomme for å rydde opp

en rydd om søpelet som hoper seg opp i Samlet Abbedengen på Skøyen.

older Veirenos samlede bot

Transport

#ScaniaFamilien #NextGenScania

oppdrag for Renovasjonsetaten på Grorud i Oslo. Foto: Søren Brænne

older Veirenos samlede bot

enova

NYHET!

Få støtte til
energiledelse
i din transport-
bedrift

Kontakt oss

Slik beregnes dagmulkten

Renovasjonsetaten har i innkjøringssperioden hatt et sterkt fokus på abonnentene

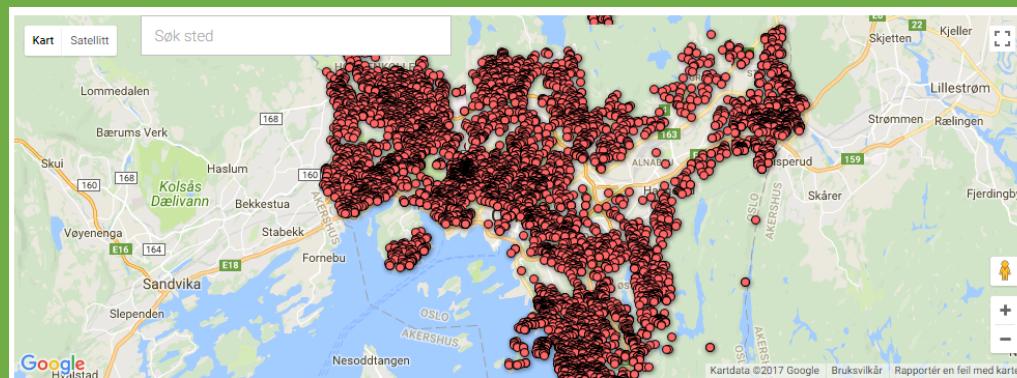
Mest lest ▶

Søppelåret 2016: 29.000 klager i Oslo

- Søppel blir fortsatt stående for lenge



**Over 20.000 klagde - kun hundre klager
førte fram**



Søppelklagene strømmer inn:

Sjekk søppelkrisa i Oslo gate for gate

Nå kan du søke selv blant søppelklagene i Dagbladets interaktive kart øverst i artikkelen. Kartet er nå oppdatert og inneholder over 31 000 klager fra Oslo-adresser frem til 9. januar.



Krass kritikk av Renovasjonsetaten

Our priorities

- Safe treatment of our waste
 - Health issues – infectious waste, hazardous waste, toxins in our waste
 - Reliable operation is a prerequisite
- No landfill
- Energy production – heating/cooling and power
- CO₂-reduction
- Returnable raw materials- resource efficiency

How do we treat waste in Oslo?

1 Mini Re-use stations



Plastic
packaging

Residual
waste

Food
waste

5

5 Gardening waste reception plant

6 Home compost



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Source separation

To day pr citizen:

- 6 kg/year plastic packaging
- 33 kg/year food waste

Possible goal:

- 10 kg/year plastic packaging
- 50 kg/year food waste.

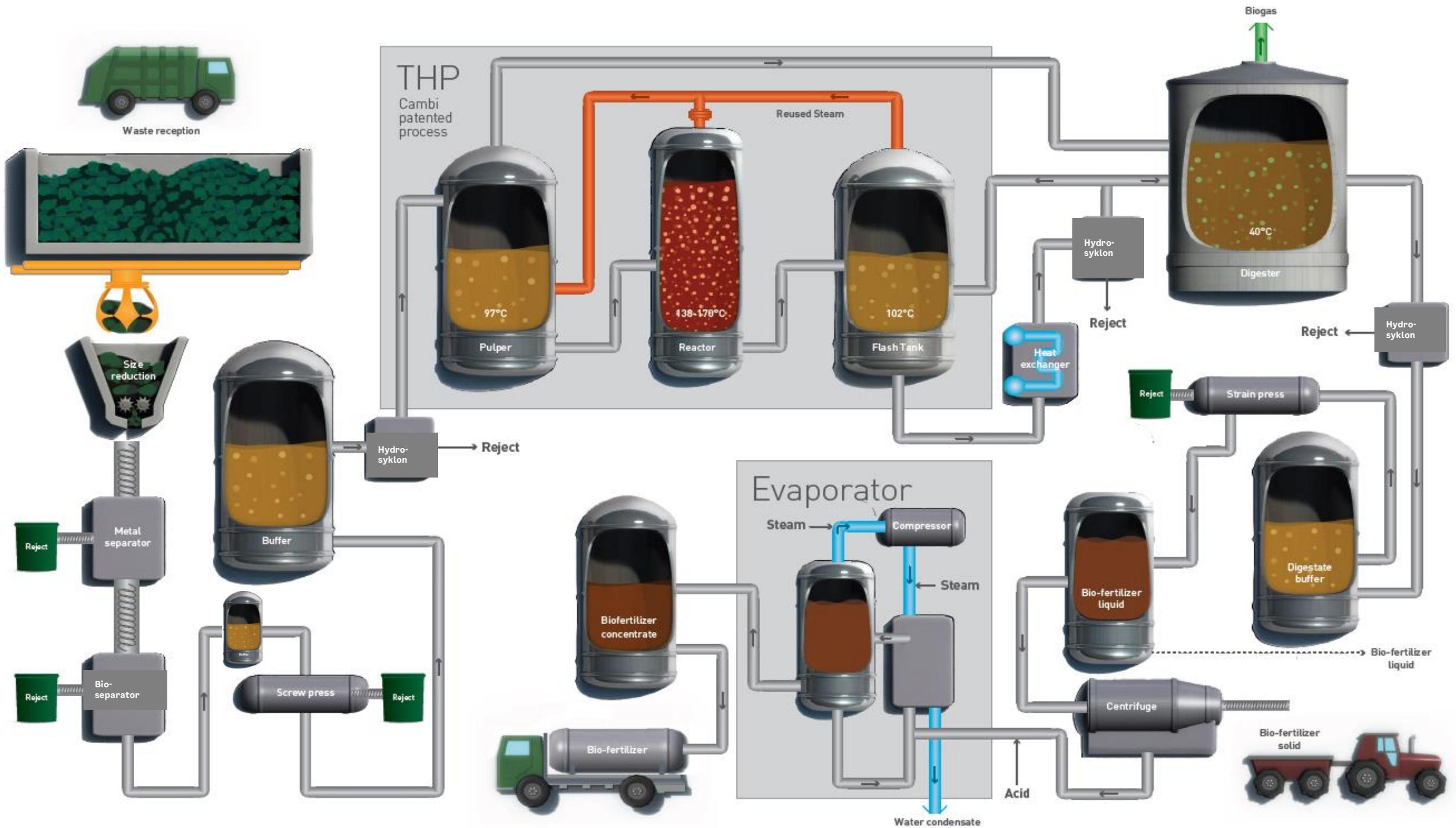
- 9 /10 say they source separate
- Good intention, but a wish is not the same as action, so allow 10 years for the city to adopt best sorting practice!



Biological treatment

Capacity: 50.000 tons foodwaste/year





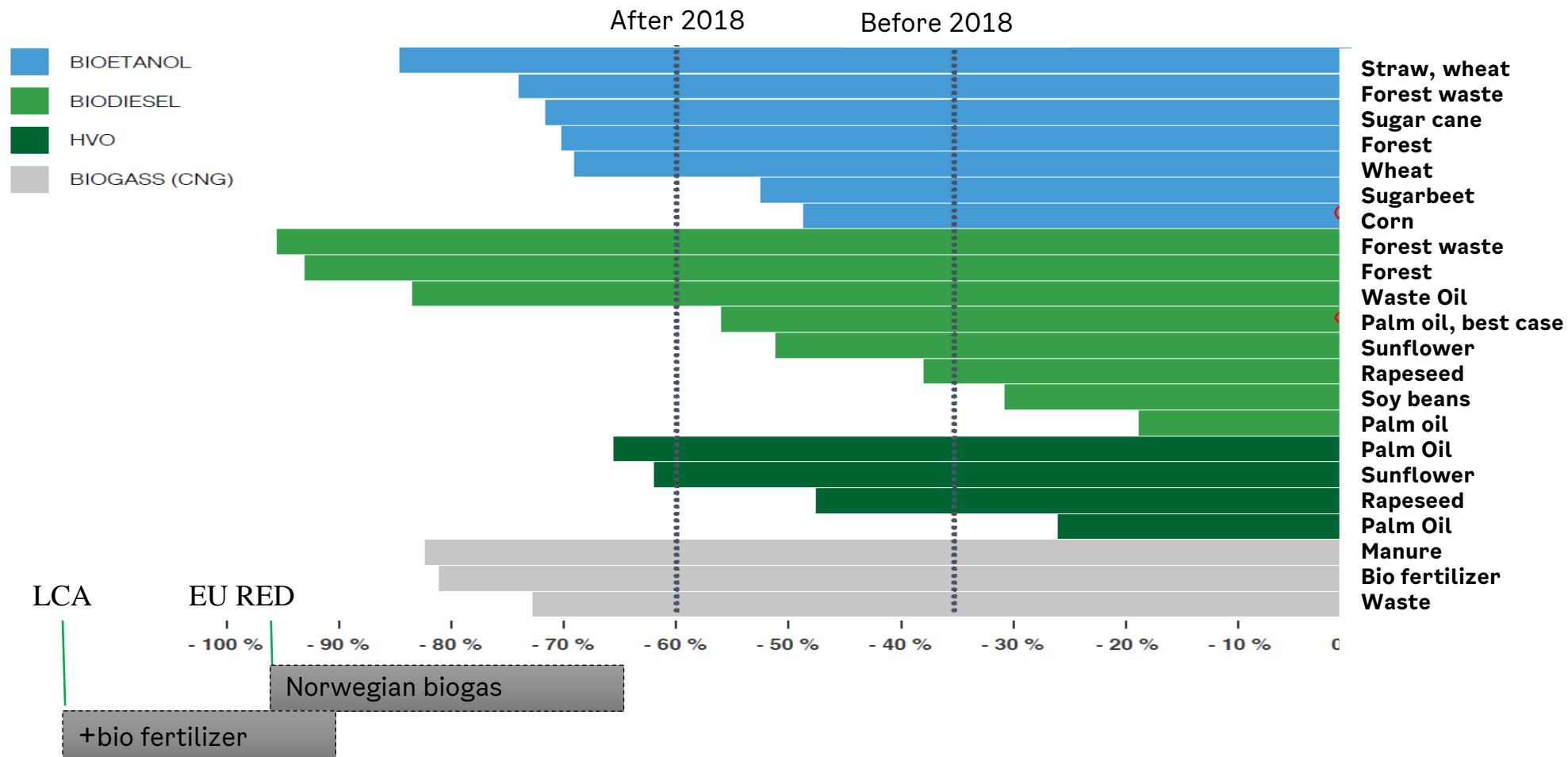
Transforming food waste to fertilizer and biogas

- Source sorting of food waste – securing the nutrients, also for avoiding heavy metals and other pollutions in the fertilizer
- Delivering nutritious bio fertilizer – replacing fossil fertilizers
- Returning phosphorous, nitrogen, potassium and carbon to soil
- Two kilos of food waste fertilizes 10-15 m² farmland
- 5 years of testing at University
- 5 years of testing at test farms, Developing solutions together with the farmers
- All fertilizer is used
- Delivering bio methane – reducing the carbon footprint of the city
- In addition: Processing and delivering compressed biogas from the wastewater treatment plant

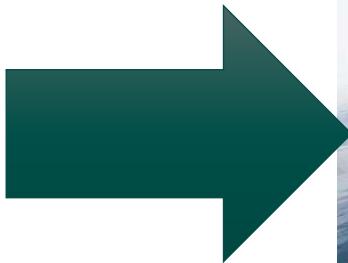


Climate effect values EU-method

Compared to fossil fuels



From municipal to commercial processes – engine in a circular economy



- ▶ Small “treatment plants», pilots
- ▶ Financed by gate-fee
- ▶ Municipal waste, decided by politicians
- ▶ Public procurement
- ▶ CBG, LNG as back-up
- ▶ Local markets
- ▶ 2017 - 300 GWh as fuel

- ▶ Large commercial «plants»
- ▶ Industrial-, farming and commercial waste
- ▶ Mature technology
- ▶ Production by demand, commercial users
- ▶ Security of supply in the global value chain
- ▶ LBG, LNG as back-up
- ▶ Regional/international market
- ▶ 2019 – ca 600 GWh as fuel (2/3 of bioethanol, 10% of biodiesel) – biofuels 17 % of total fuels for transport



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Waste to Energy



Haraldrud WtE – owned 100% and operated by the City of Oslo. Delivering all the energy to district heating network. Municipal waste

Klemetsrud WtE – owned 50/50 by the City of Oslo and Fortum. Operated by Fortum together with the district heating network. Fully commercial plant – 400' tons/year



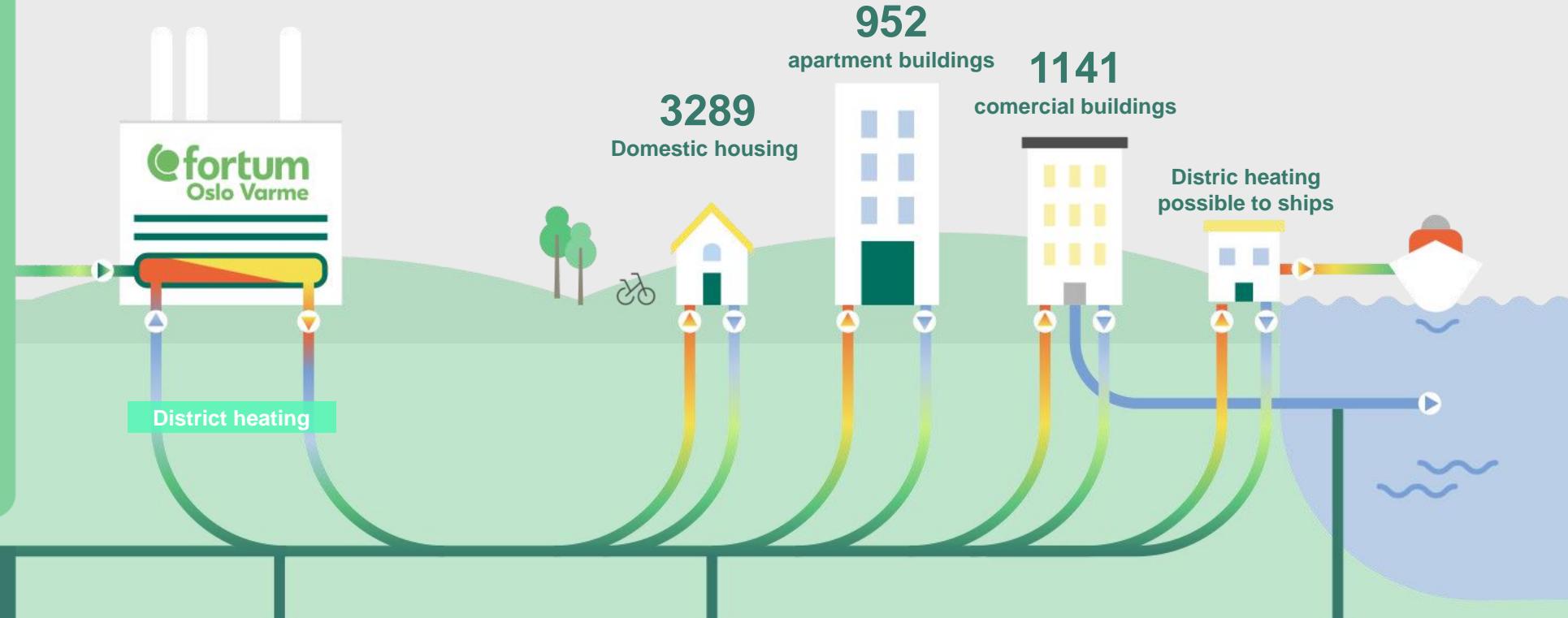
Energy sources:

- WASTE HEAT 65 %
- ELECTRISITY
- HEATPUMP/ SEWER
- DATACENTER
- WOOD PELLET
- BIOFUEL
- FOSSIL OIL
- LNG

**ENERGY RECOVERY
FROM 400.000 TONNES
WASTE/ YEAR**

Production approx
150 GWh
electricity (est. 2017)

Fortum Oslo Varme AS – 1,6 TWh



600 km district
heating network

30 mill liters hot water
distributed throughout
Oslo

District cooling

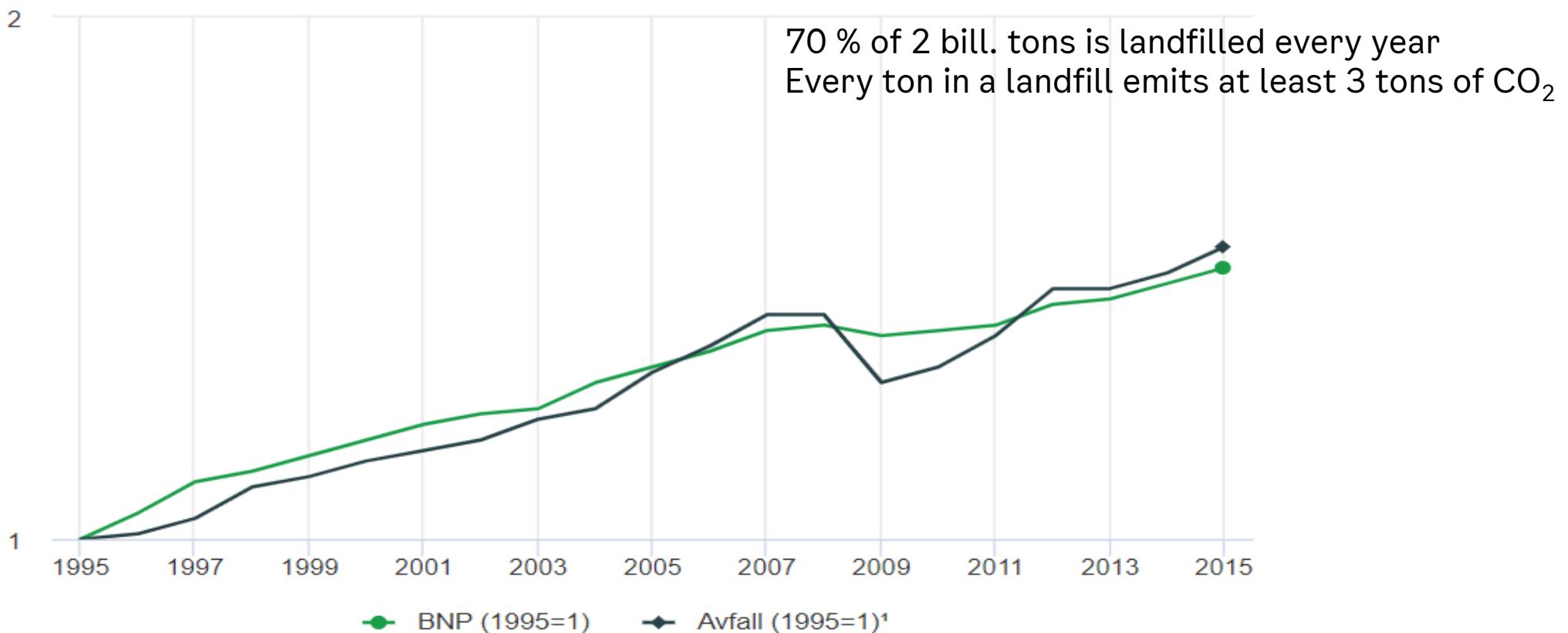
District heating covers 20% of the heating need in Oslo

Waste generation

Figur 1. Utvikling i avfallsmengder og BNP (faste priser)



Indeks 1995=1



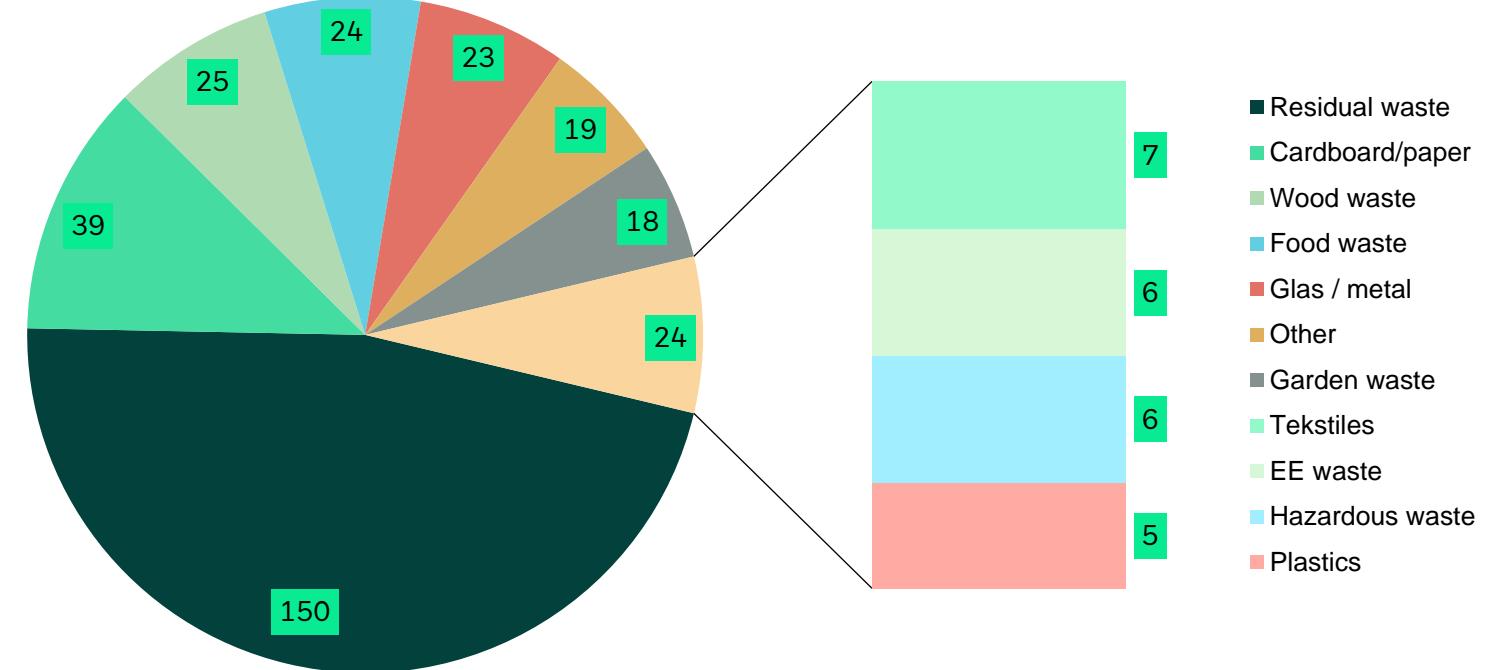
Kilde: Statistisk sentralbyrå. * Forurensede masser er ikke inkludert.

Results from Oslo

2018: 322 kg waste/person

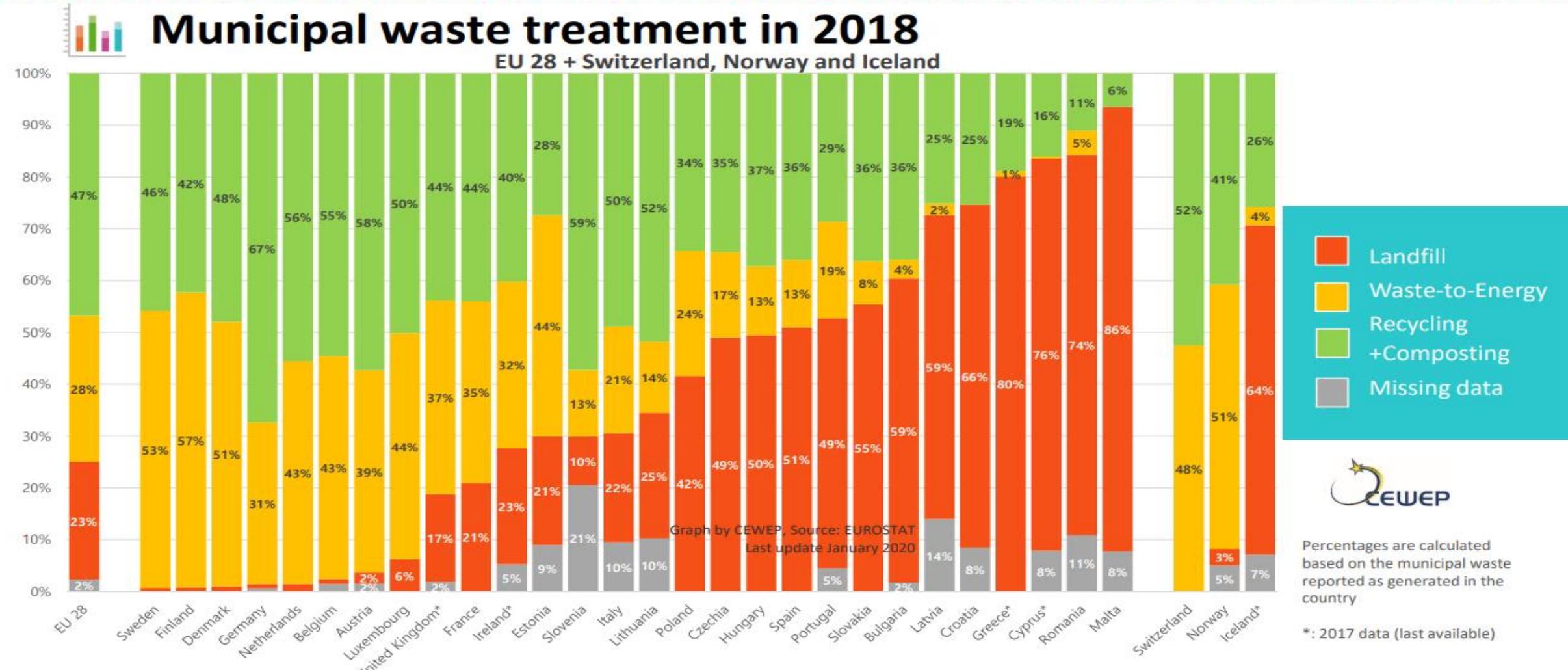
(In 2008 – 388 kg waste/person)

- ▶ 2,5 % to reuse
- ▶ 37 % to recycling
- ▶ 57,5 % to energy recovery
- ▶ 3 % to landfill



EU statistics

cewep





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Thank you for your attention

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