

# People first: PPP-WtE Projects and the Circular Economy

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Hon President German Waste Association DGAW

Publicly appointed and sworn expert assessor for waste management

# About EEW Energy from Waste



# Our core business and our new growth market

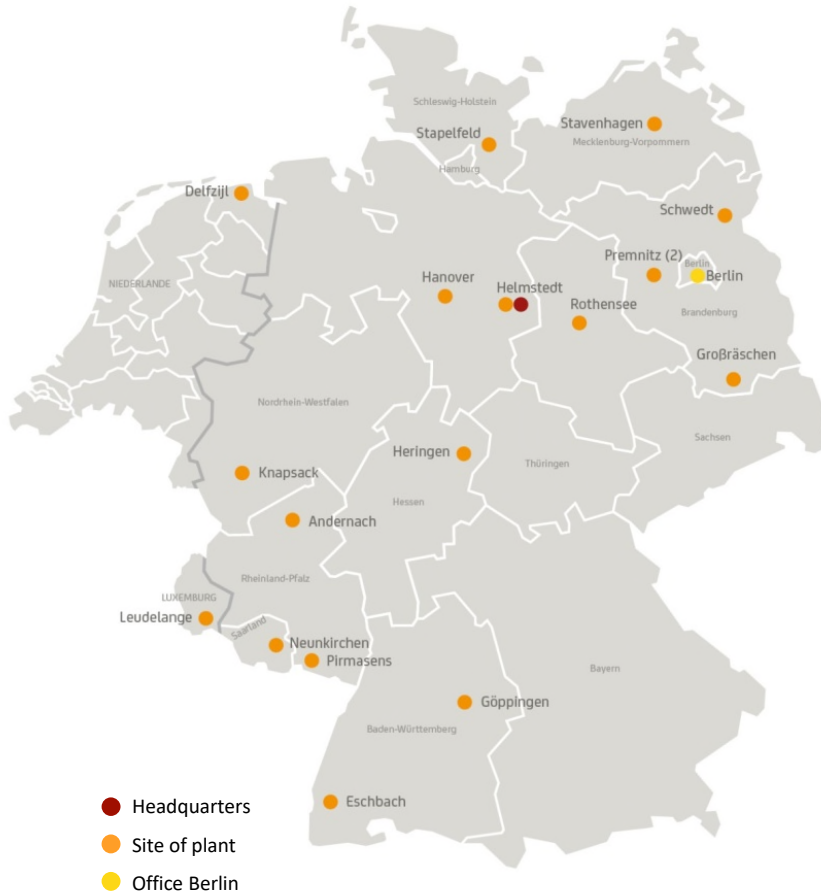
## Leading in waste recycling

- Further development of conventional waste incineration to a highly efficient process
- Disinfection and reduction of waste hazards
- Recycling of waste (metals, agglomerates CO<sub>2</sub>)
- Recovery of energy (industrial steam, district heating, power)

## Groundbreaking in sewage sludge recycling

- Sewage sludge full of contaminants was used for decades in agriculture as a fertilizer
- The legislator has now prepared the ground for a much more environmentally friendly disposal of sewage sludge
- As a partner of the municipalities we are on hand to develop resource-sparing solutions for thermal sewage sludge recycling

# EEW – Network of 18 plants








## EEW ownership

|                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |
| Andernach                                                                          | Delfzijl (NL)                                                                       | Göppingen                                                                           | Großräschen                                                                         | Hannover                                                                            |
|  |  |  |  |  |
| Helmstedt                                                                          | Heringen                                                                            | Neunkirchen                                                                         | Premnitz 1                                                                          | Premnitz 2                                                                          |
|  |  |  |                                                                                     |                                                                                     |
| Rothensee                                                                          | Stapelfeld                                                                          | Stavenhagen                                                                         |                                                                                     |                                                                                     |

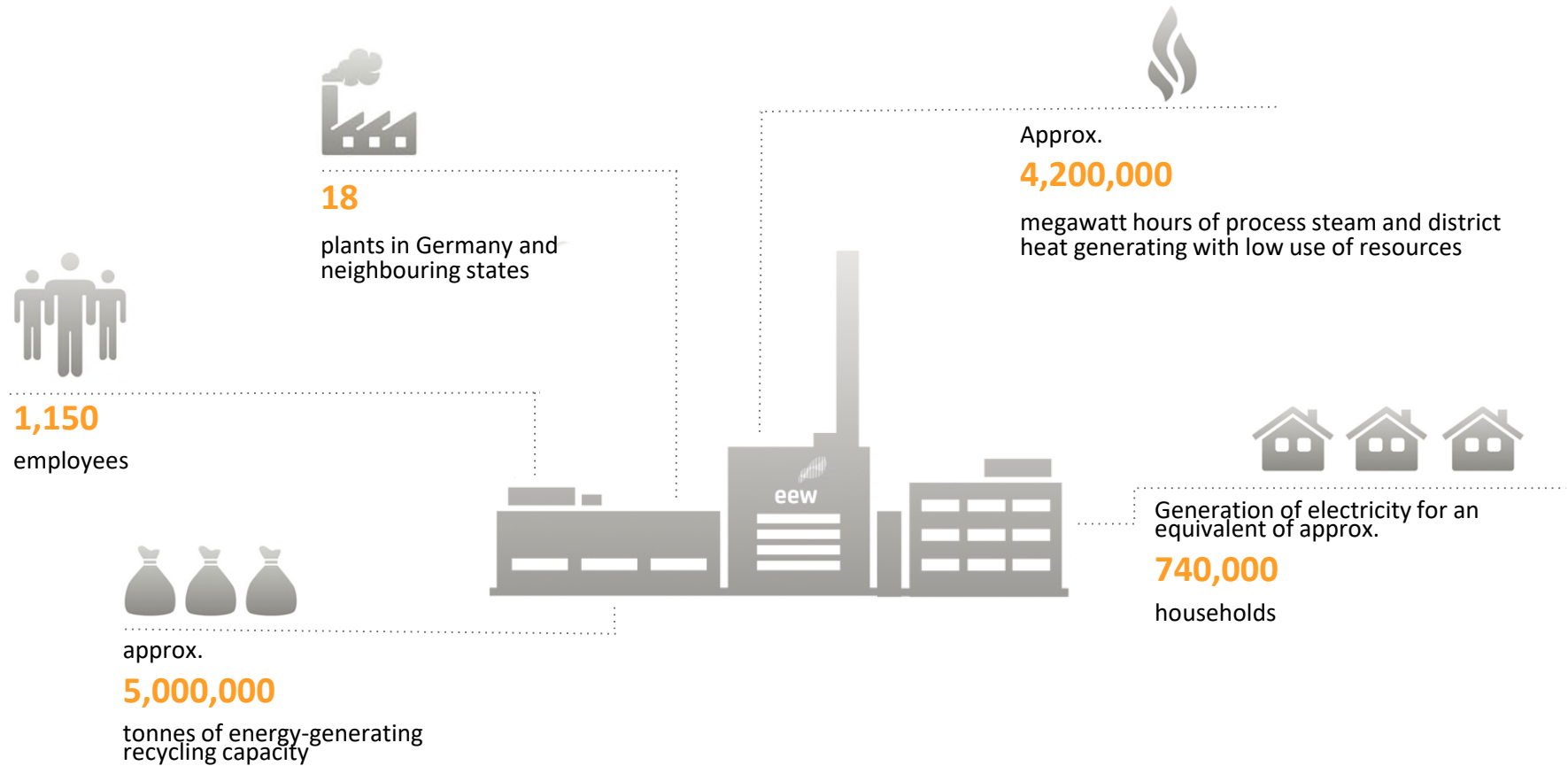
85% ownership (Hannover, Premnitz 1, Premnitz 2, GroBräschen, Delfzijl)

51% ownership (Rothensee, Helmstedt)

## EEW operatorship

|                                                                                      |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |  |
| Eschbach                                                                             | Knapsack                                                                              | Leudelange (LU)                                                                       | Pirmasens                                                                             | Schwedt                                                                               |

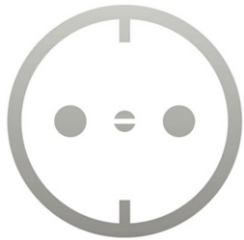
# E EW key data



Reference: the quantities of electricity, district heat and process steam generated in 2019 from the current 18 EEW plants. Assumed average annual requirements per household: 3,500 kWh.

As at: 06/2020

# We create power, steam, and heat



**Environmentally sustainable power from waste:**



Power for over 900,000 premiere league football matches under floodlights.



**District heat**

- for heating
- for cooling (adsorption refrigerators)



District heat to supply more than 95,000 homes.



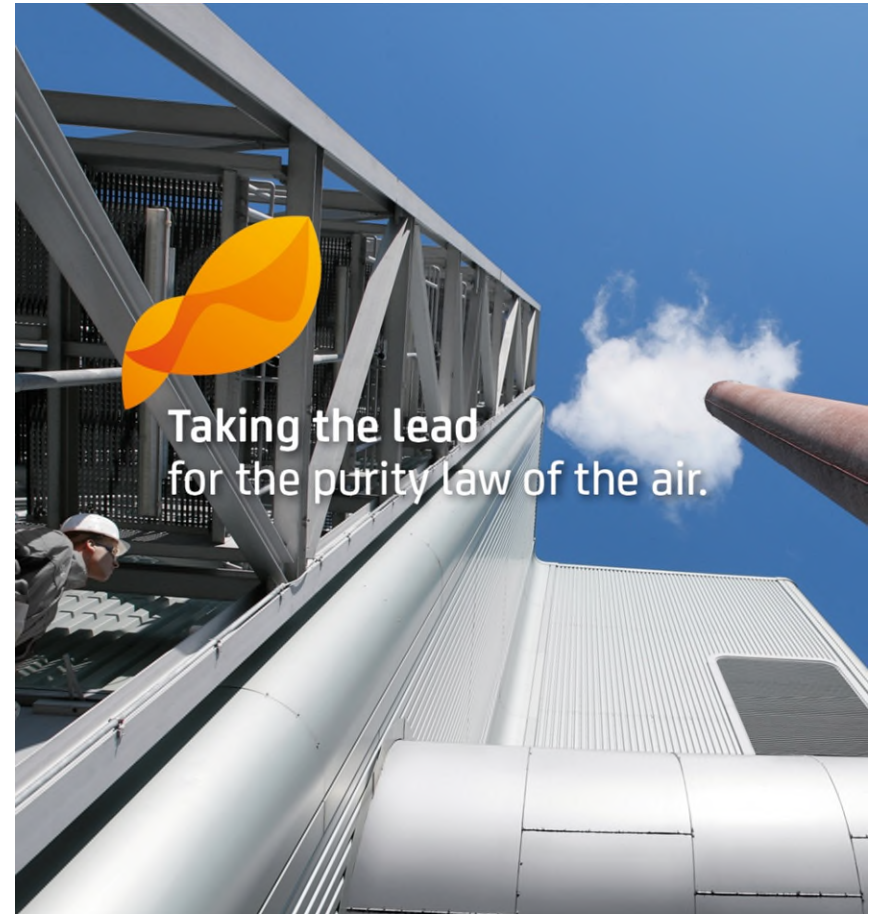
**Steam for industrial processes:**



Steam for the production of paper, steel, fibres, salts, plastics, etc.

# The benefits of waste incineration

- Volume reduction by more than 90%
- Recovery of all residual materials
- Generation of power and heat
- Renewable energy source
- Saving natural resources
- Pollutant reduction
- Reduction of climate-relevant CO<sub>2</sub> emissions
- Low total emission values



# PPP Models





# Advantages of a PPP model for building and operation of a WtE plant

- PPP models allow spreading of risks among partners with each party contributing their specific expertise and resources

## EEW

- Expertise in operations
  - Inhomogeneous fuel
  - High environmental standards
  - Disposal security
  - Reliability regarding energy supply
- Synergies in maintenance and revision
- Flexibility regarding recruiting and training
- Experience in increasing public acceptance

## Public Partner

- Guarantee of waste supply (obligation to dispose)
- Distribution of energy (electricity and heat)

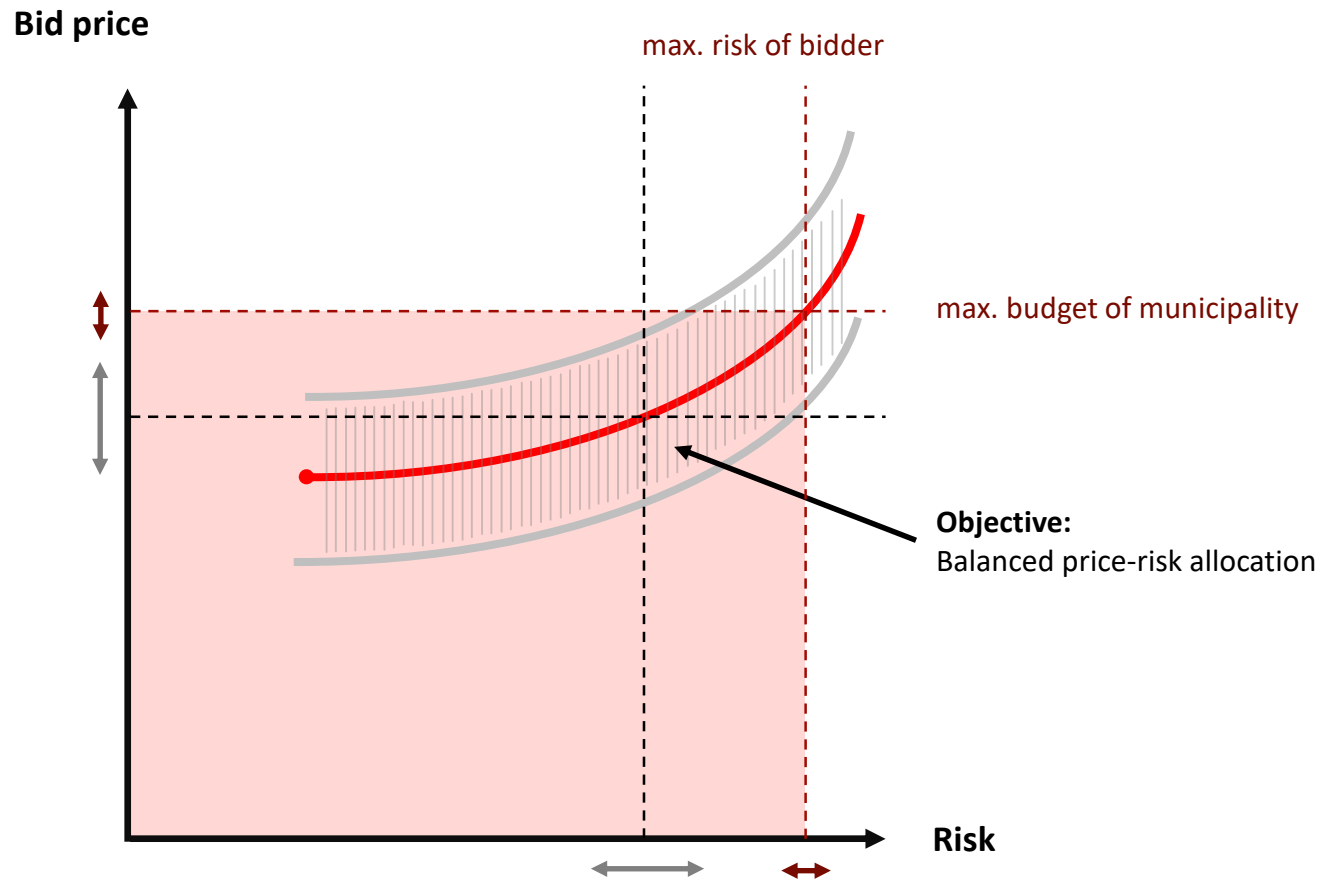
# Allocation of risks of Public Private Partnership

| Risk                       | Private partner (EEW) | Public partner (municipality) |
|----------------------------|-----------------------|-------------------------------|
| Utilisation (waste supply) |                       | X                             |
| Construction               | X                     |                               |
| Operation and maintenance  | X                     |                               |
| Residues disposal          | X                     |                               |
| Financing                  | X                     |                               |



Public entity ensures waste supply

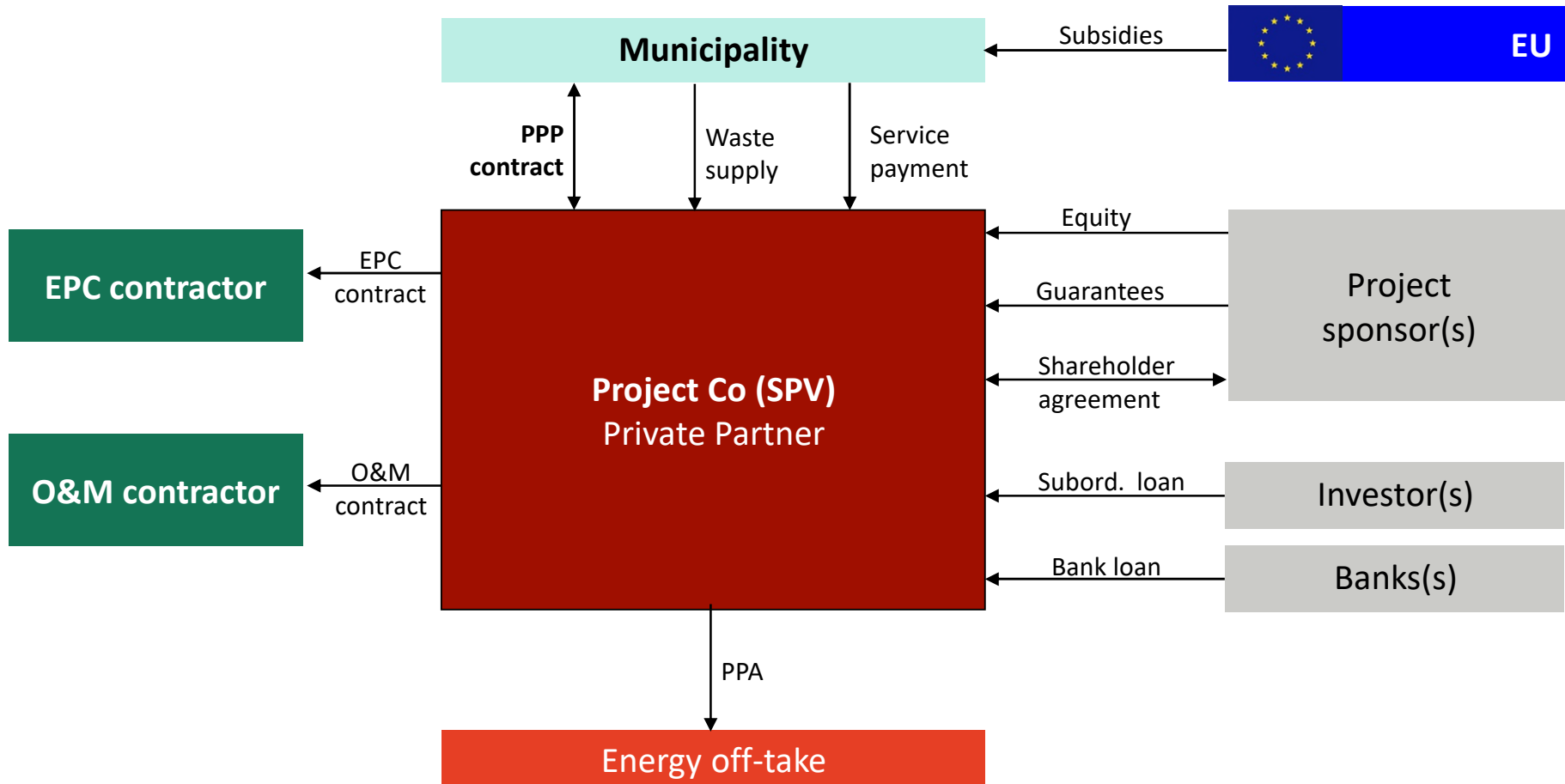
# Risk-price-function (in a PPP model)



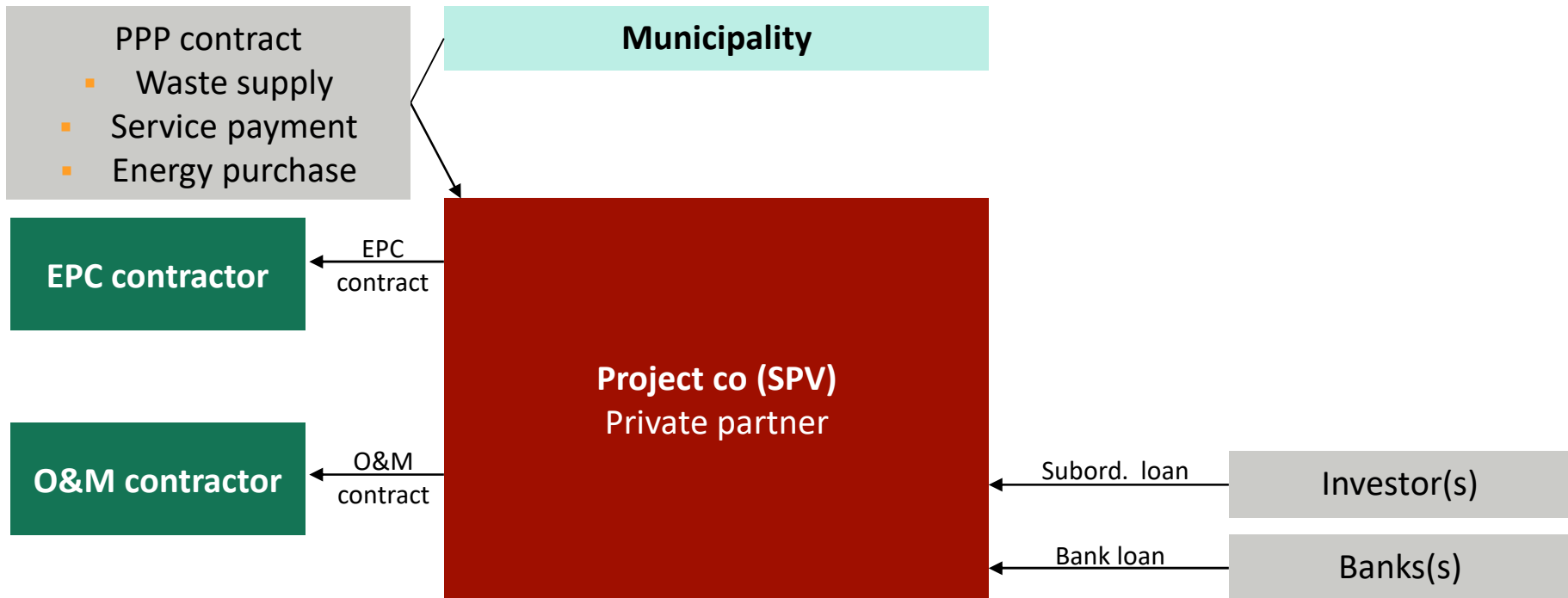
## Project delivery methods

- **Design-Build (DB)**
- **Design-Build-Operate (DBO)**
- **Design-Build-Finance-Operate (DBFO)**

# Typical PPP project structure (simplified DBFO)



# PPP project structure Pirmasens (simplified DBFO)



## Pirmasens EfW PPP (DBO)

Public sector:

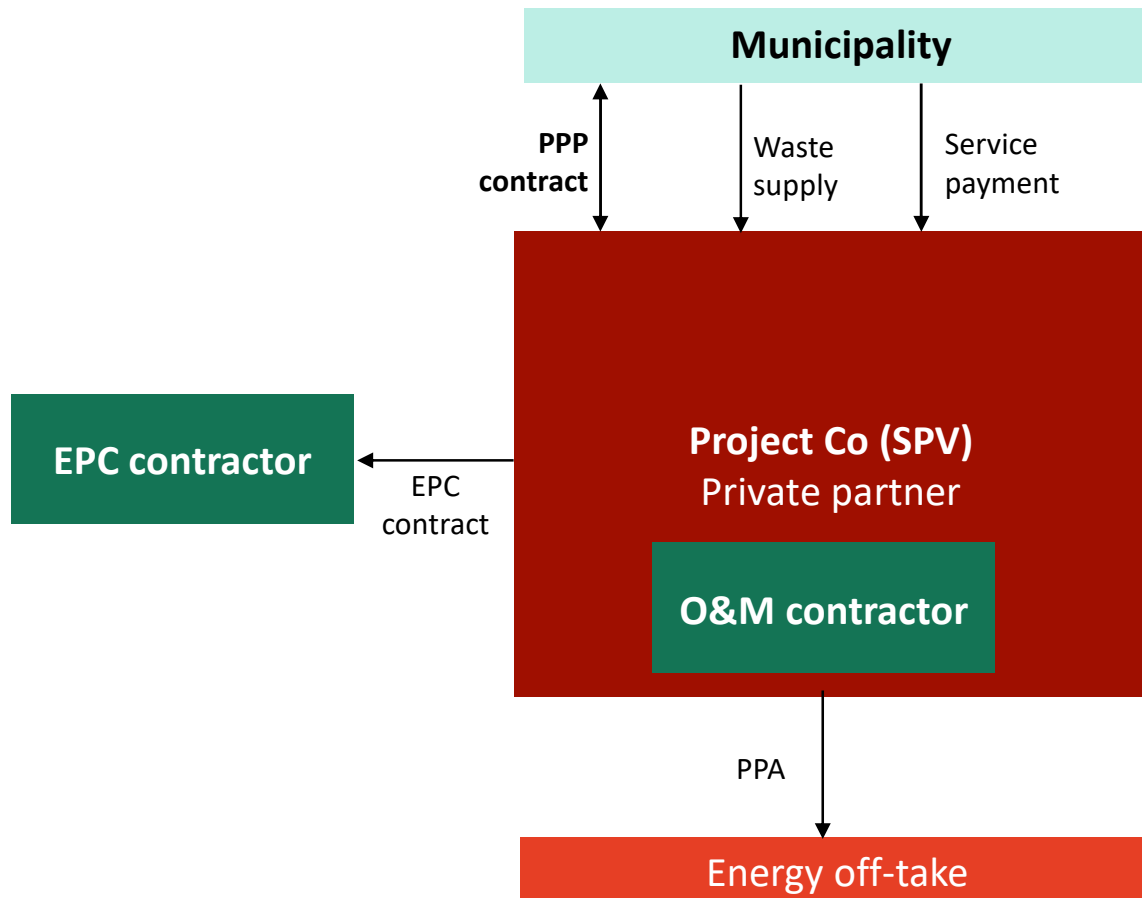
- Waste supply
- Energy sale
- Guarantee for financing

Private partner:

- Asset owner
- Design & construction
- Operation & maintenance
- Financing
- Permit existent, change risk



# PPP project structure Leudelange (simplified DBO)





## Leudelange EfW PPP (DBO)

Public sector:

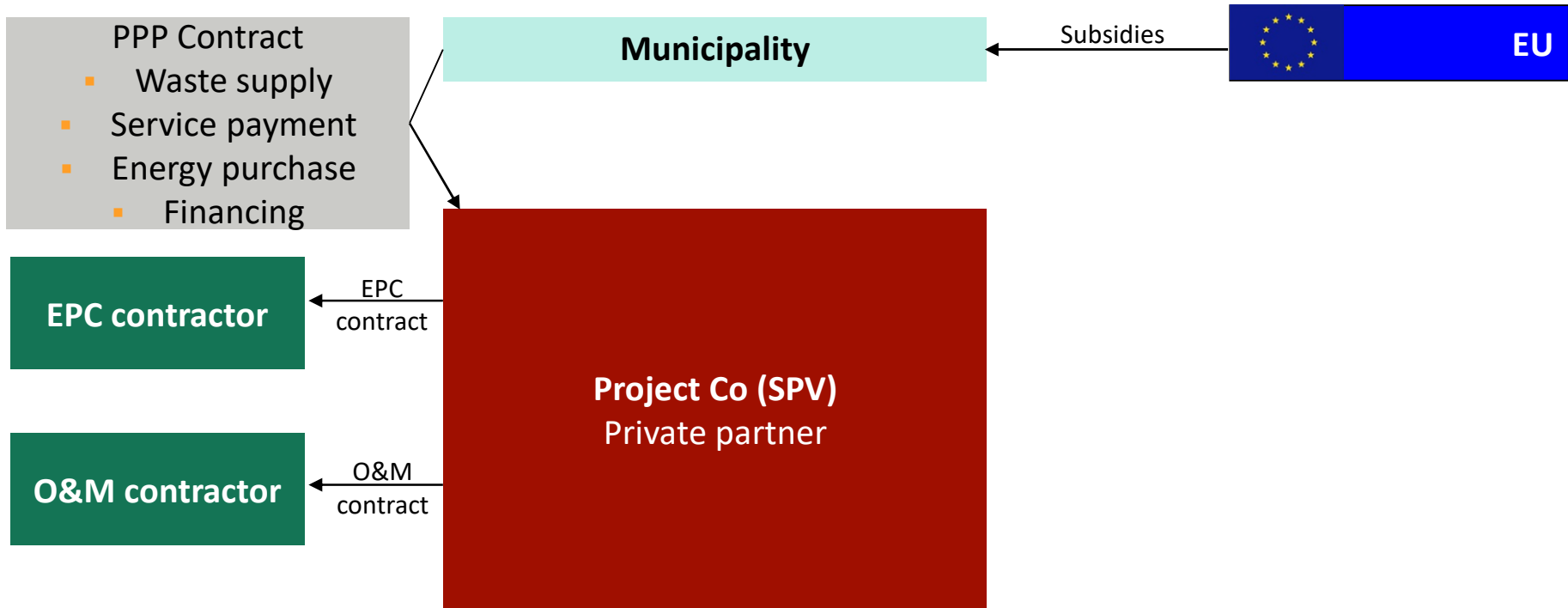
- Financing
- Asset owner
- Waste supply

Private partner:

- Permit application
- Design & construction
- Operation & maintenance
- Energy sale



# PPP project structure Gdansk (simplified DBO)



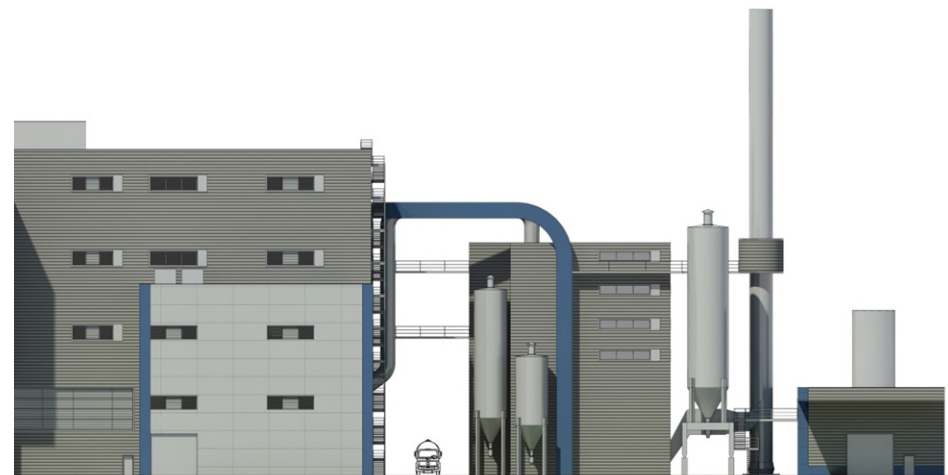
## Gdansk EfW PPP (DBO)

Public sector:

- Permit application
- Financing
- Asset owner
- Waste supply
- Energy sale

Private partner:

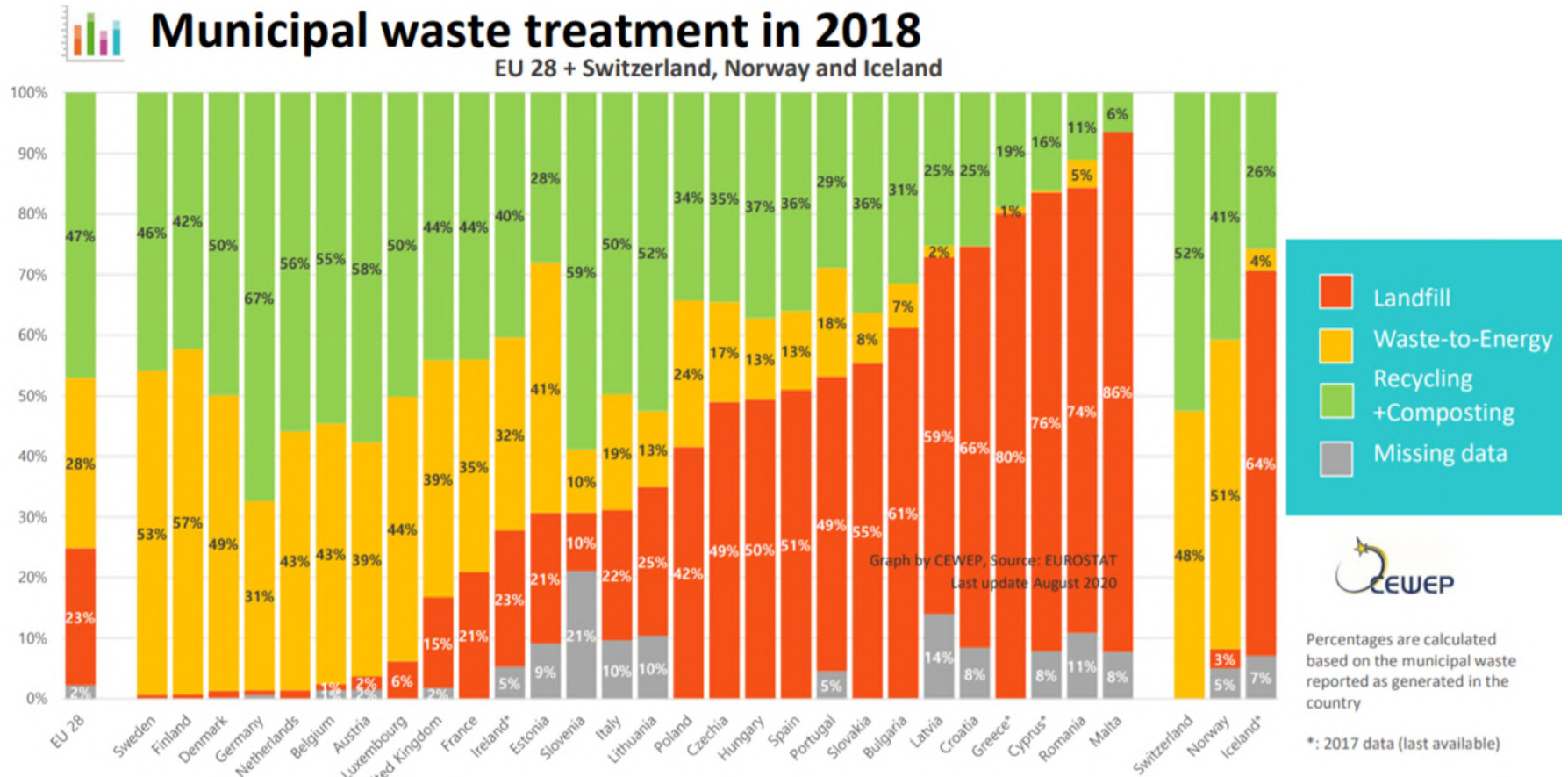
- Design & construction
- Operation & maintenance



# The European WtE Gap

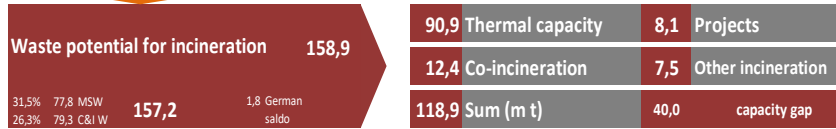
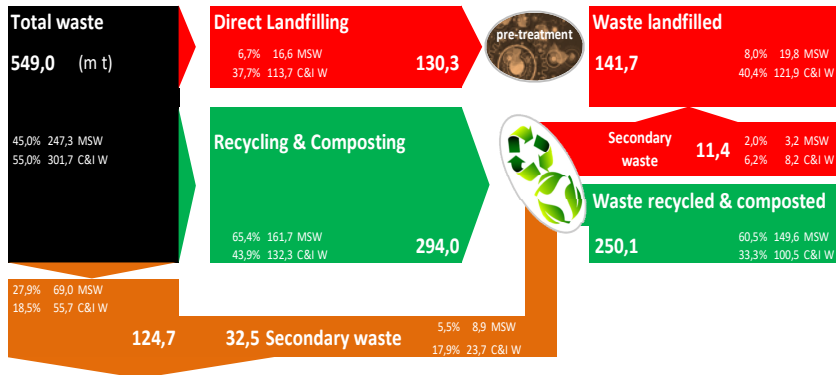


# Even in the EU more than 20% on landfill

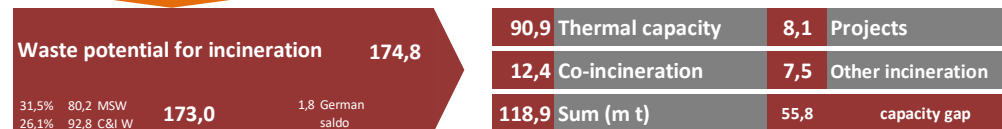
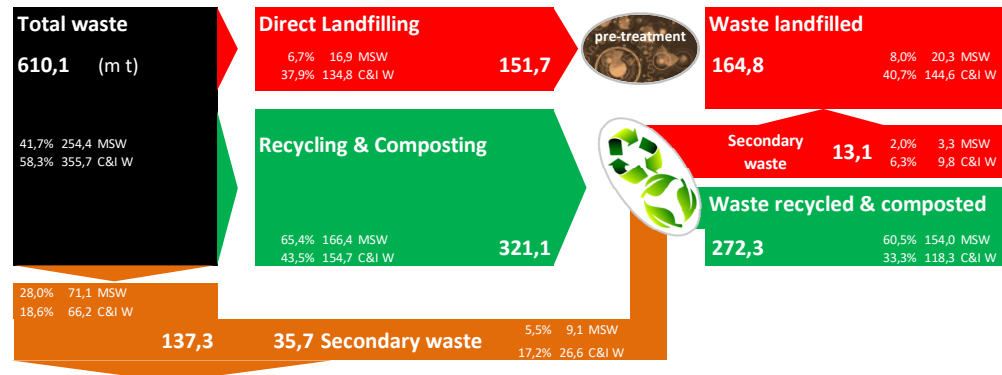


# Waste arising and WtE gap if Circular Economy goals EU are achieved now and 2035

2019



2035



# GHG emissions and WtE



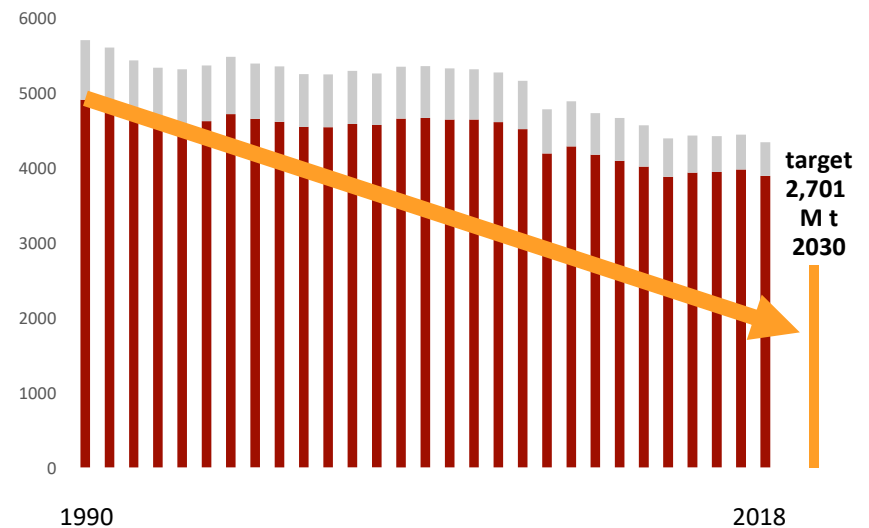
# EU CO<sub>2</sub> emissions reduction plan 2030

## GHG emissions EU-27+UK by sector (in Mio. Tons CO<sub>2</sub>-equivalent)

| Greenhouse gas sources and sinks                | 1990       | 2018       | Change since 1990 |
|-------------------------------------------------|------------|------------|-------------------|
| Energy                                          | 4.346      | 3.279      | -24.6%            |
| Industrial processes                            | 515        | 372        | -27.8%            |
| Agriculture                                     | 546        | 435        | 20.2%             |
| Land use, land use change and forestry (LULUCF) | -255       | -273       | -                 |
| <b>Waste</b>                                    | <b>241</b> | <b>138</b> | <b>-42.7%</b>     |
| Others*                                         | 4          | 2          | 61.7%             |
| Total (incl. LULUCF)                            | 5,397      | 3,953      | -26.8%            |
| Total (w/o LULUCF)                              | 5,652      | 4,226      | -25.2%            |

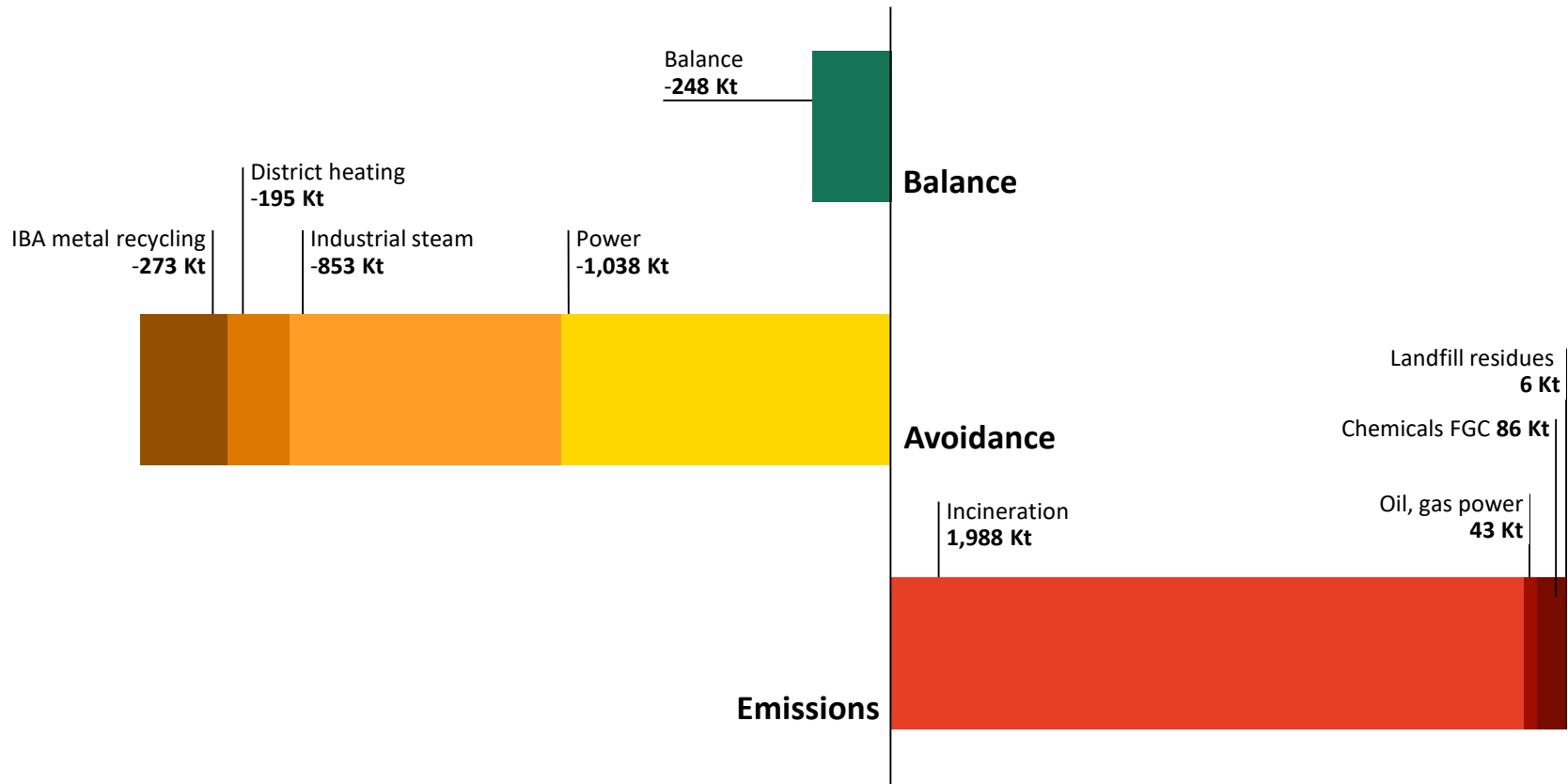
Source: European Environmental Agency, EEA

## GHG emissions EU-27+UK total (in M tons CO<sub>2</sub> equivalents)





# EEW fleet is at least net zero regarding GHG emissions



GHG emission in Kt CO<sub>2</sub>

# Q & A UNECE



## Q & A UNECE (1/3)

1. How feasible is moving the waste to energy industry into a circular economy direction? .... Of course the whole issue is the circular economy and the feasibility of the concept of a waste free society.

A waste free society is an illusion and an undesirable fiction.

Please keep in mind, the first task of a sustainable waste management is to preserve the health of people, and the environment. Waste incineration was started after the cholera epidemic in European metropolitans like London and Hamburg. Uncontrolled composting or landfilling of putrescibles are emitting methane, a much more severe GHG than Carbon Dioxide. Only metals and glass can be recycled on and on. Paper fibres are shorter after each recycling loop and the physical performance of recycled plastic is getting worse after each melting and the additives will accumulate. Some waste fractions are not recyclable. As long as we consume and our products are not 100% made out of organic compounds, we have to treat waste and we should do it in a sustainable way.

WtE has already stepped into the Circular Economy and will accelerate its move. Without WtE no high quality recycling is possible. IBA and FGCR are already resources for secondary raw materials and further potential will be raised soon. CO<sub>2</sub> can be recycled as well. And WtE will increase its role for a renewable heat transition.

## Q & A UNECE (2/3)

2. What is your impression of government programs on waste and waste to energy overall? Do you think they are doing enough to eradicate the use of landfills? What are the main barriers to changing their policies? Are there ways in which the public and private sectors can work better together in order to phase out landfills more quickly? I appreciate you know Germany but I was wondering if you could say something about Eastern Europe including Central Asia and the prospects for Waste to Energy there.

Gov. waste programs are mainly focussing on recycling goals. But recycling quotas do not help the Circular Economy and are often used as green washing. Only a minimum content of secondary material in products will help. WtE has not enough support by politicians. Some do not understand the interconnectivity between recycling and thermal recovery, some are misled by NGO`s, others want to divert the sketchy role of agriculture and traffic concerning GHG emission by blaming WtE.

The transition period for landfills is much too long and needless. Main barrier are costs. Poland has stopped landfilling but hasn`t invested enough in MRF`s and WtE. Prices have exploded and nowadays they have opened them again.

Asia and the Middle East are the booming areas of new WtE projects.

## Q & A UNECE (3/3)

3. One of the proposed follow-ups for this meeting, is to elaborate an international UNECE standard on WtE projects. Such a standard would set out the best practice benchmarks on type of project, the best model, financing, technology etc.. to governments and the private sector. Such a standard will, we are confident, help to lower transaction costs and make high-quality WtE projects more mainstream. Any observations you might have on this aspiration, would be very welcome. And of course we would be delighted if you could join us in this project to develop a standard, should it go forward.

This is absolute necessary and in Europe we do have the Sevilla process, which has developed BAT standards for WtE plants. The approving authorities have to follow them and the results have to be transferred in national ordinances.

Of course, I'm ready to support UNECE.