

Waste Management Development in Sweden & State-of-the-Art Waste-to-Energy Plant

About us.

We provide electricity, district heating, district cooling, watertreatment and high speed broad band in and around Västerås.

- Owner: Västerås city
- Staff: Approx 700
- **Turnover 2015:** 2 800 million SEK (250 million Euro)



Heating.

Comfortable at home and at work.

- 98% of Västerås buildings/houses are heated by, and get their hot water from district heating
- Production of electricity and heat are made in CHP plants
- District cooling are supplied to commercial buildings.



Power Generation.

The CHP plant produce electricity

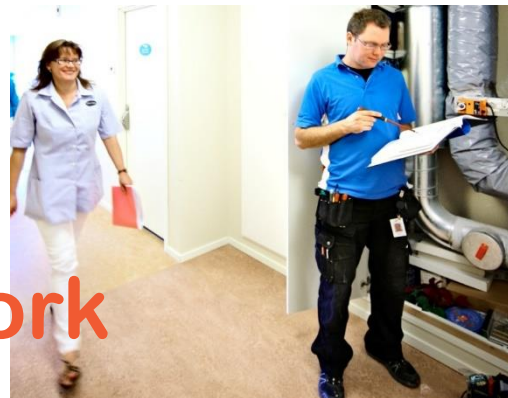


Electricity network.

Water supply.



Fiber network



Energy Services.



Sunpark



1,2 MW
1,2 GWh/year
91 sunpanels
72m² each

Mälarenergi buys
electricity for the next 15
years



New combined heat and power plant ready in autumn 2014

Modernisation Project Unit 6

A world-unique co-incineration plant



The combined heat and power plant 1963.



A new co-incineration plant 2014.



Fuel.

A motivational power for renovation



1960

1970

1980

1990

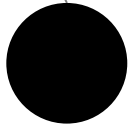
2000

2010

2014

2020

Oil 1963



Coal 1981



Bio 2000



Peat 2002



Waste + bio
2014



Investment goal.

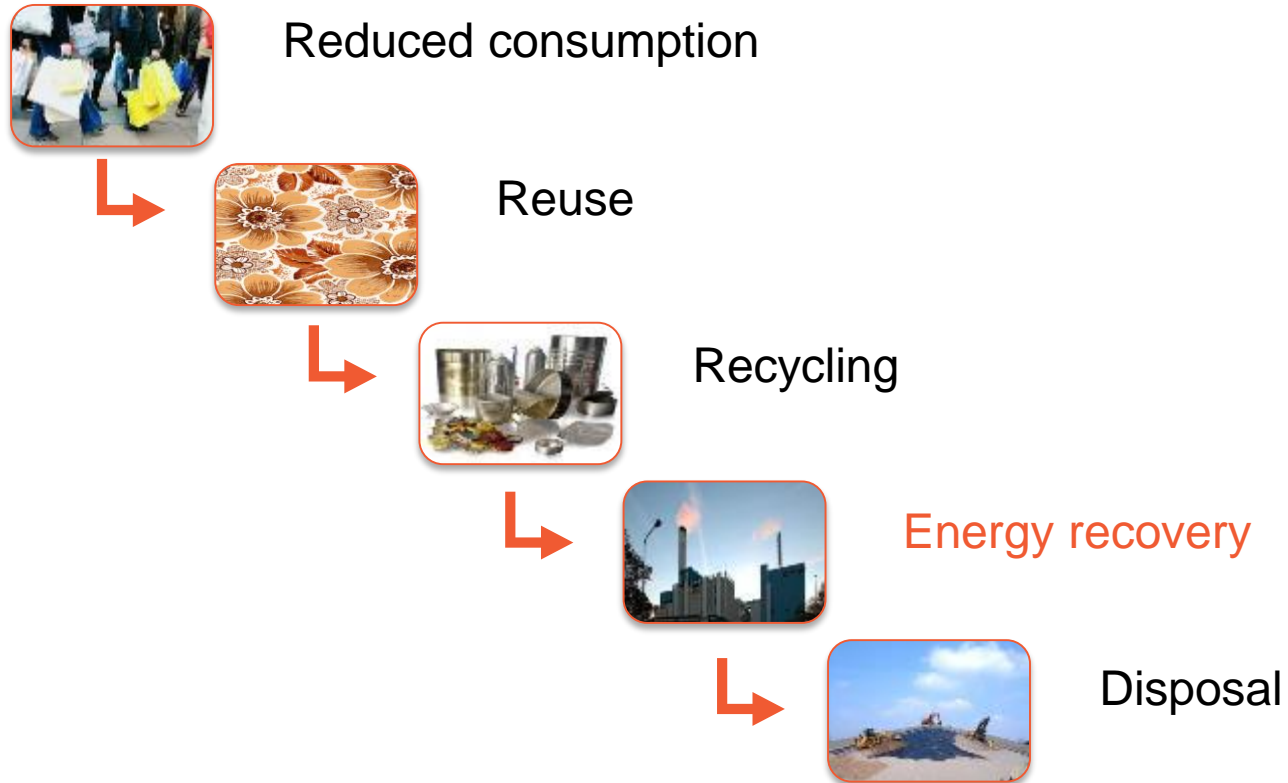
Fuel question in focus

- Mälarenergi needs to renovate the plant.
- We must maintain low district heating prices.
- We need to secure access to fuel.
- Reduce fossil-based CO₂ emissions.

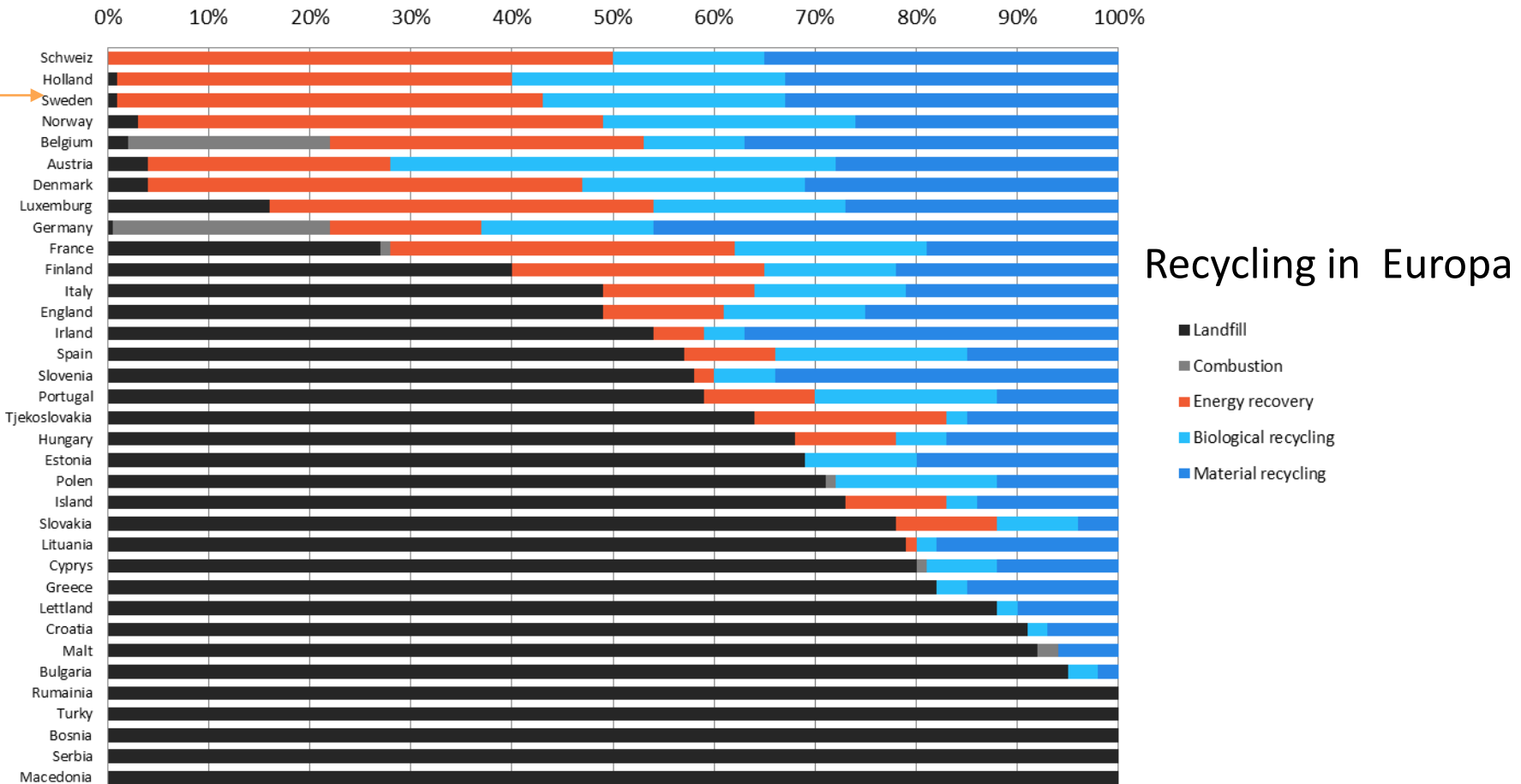


Waste as fuel.

European Waste Hierarchy.



Waste situation in Europe



Källa: Profu



Fuels.

Incinerable:

- Household waste, paper, plastic
- Industrial waste, wood, paper, plastic, metal
- Wood waste, for example, impregnated timber.

Inert material:

- The reception of waste is calculated at around 10-15% non-incinerable (reject). This is sorted and goes to material recovery (metal) or disposal (stone and glass).

- We will not be accepting and incinerating food waste (the brown bag at home) - instead it will be used as biogas for the local buses.

Modernisation Project Unit 6.

Overview



Fuel preparation.

A smart fuel preparation plant with both
Crushing and sorting

Reception, preparation, handling

480,000 tonnes of industrial and household waste annually.

Weighing-in, inspection and crushing

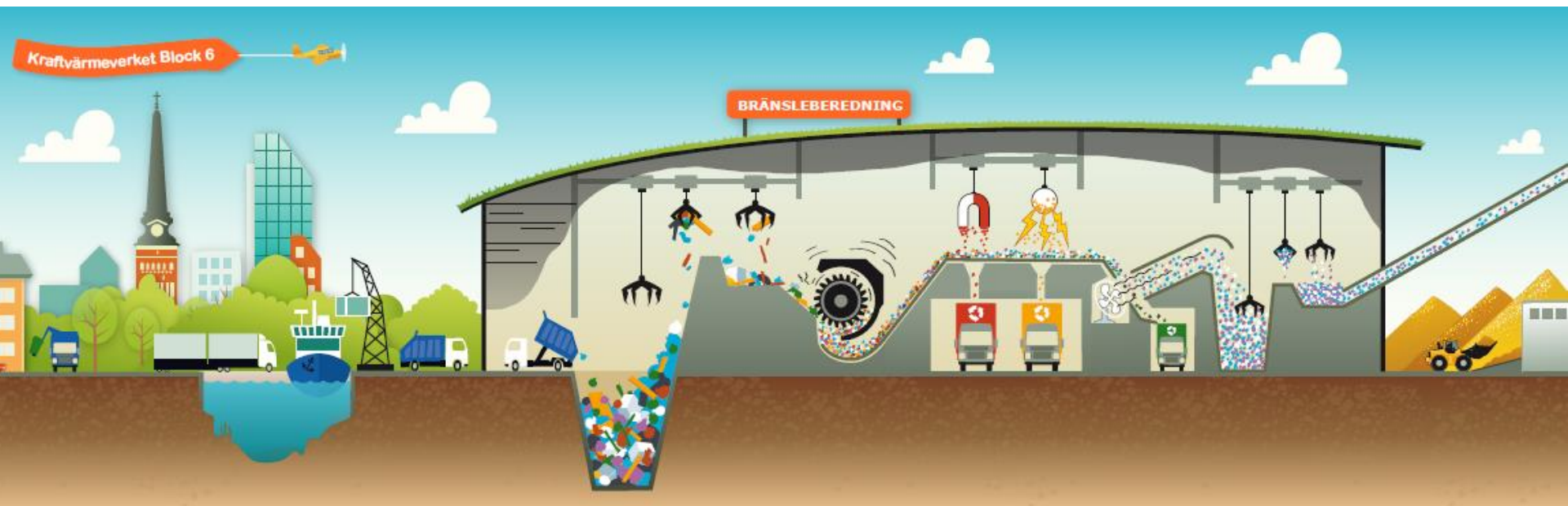
Separation of unwanted material

Bunkering

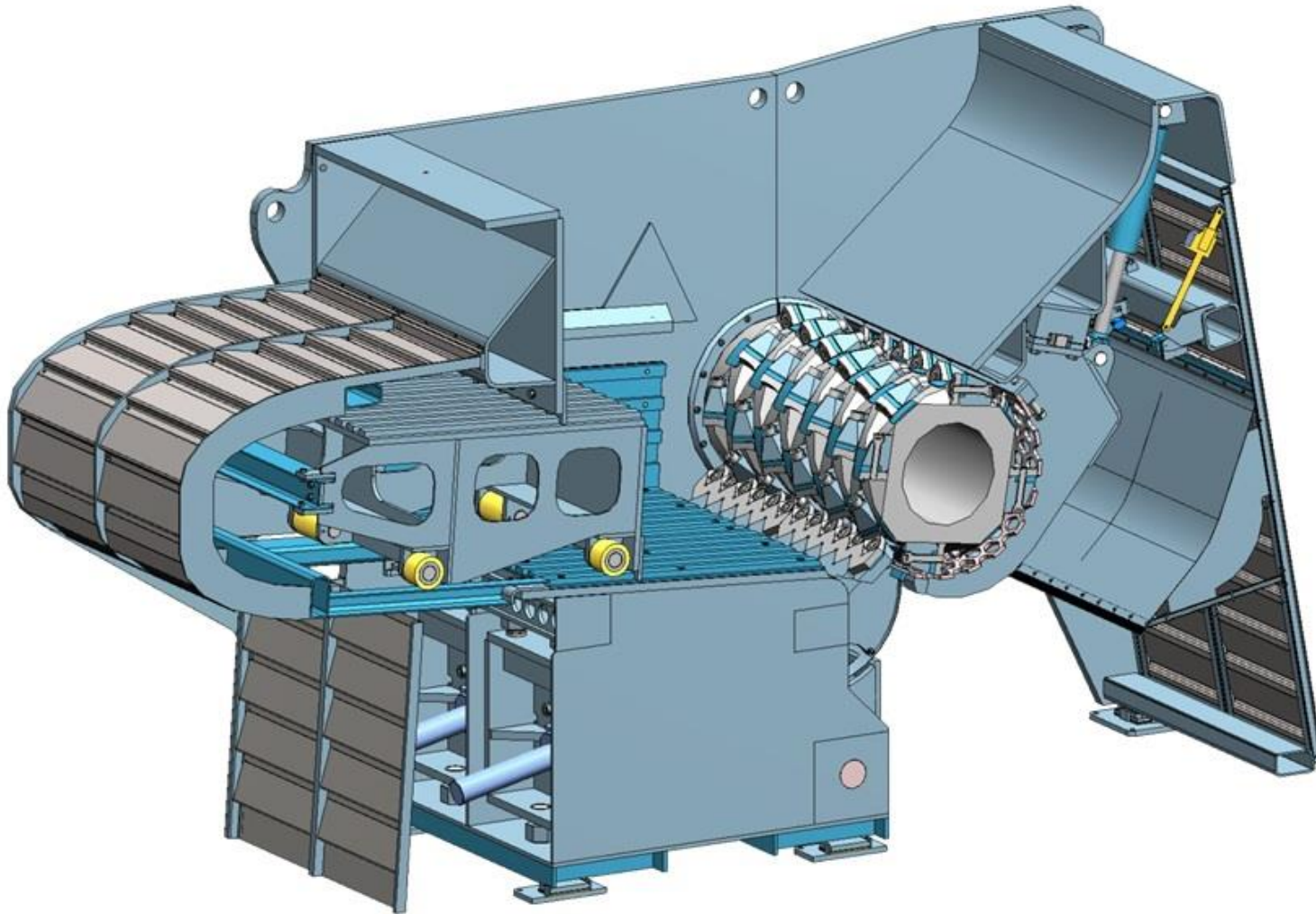
Transportation to the incinerator

Bunker for 5 – 6 days' full operation

Indoor storage for baled fuel



The shredder has a key function.



The Air Classifier secures the fuel quality.



In the fuel preparation plant, we manufacture the fuel.





Boiler.

General technology

- CFB technology – ability to build in one line and fuel-flexible.
- Consideration for other built plants. The largest waste combustion line in the world is currently Eissenhutzenstadt (CFB) with 150 MW fed fuel power.
- Scale advantages - a double-sized plant costs around 50 % more.
- 167 MW fuel power at MCR and up to 174 MW calculated fuel in excess of 11.5 MJ/kg and max 800 hours/year.
- Steam parameters 75 bar and 470°C – steam temperature set by the highest tested level.
- Availability higher than 96%.

Boiler 6.

Large, robust and efficient

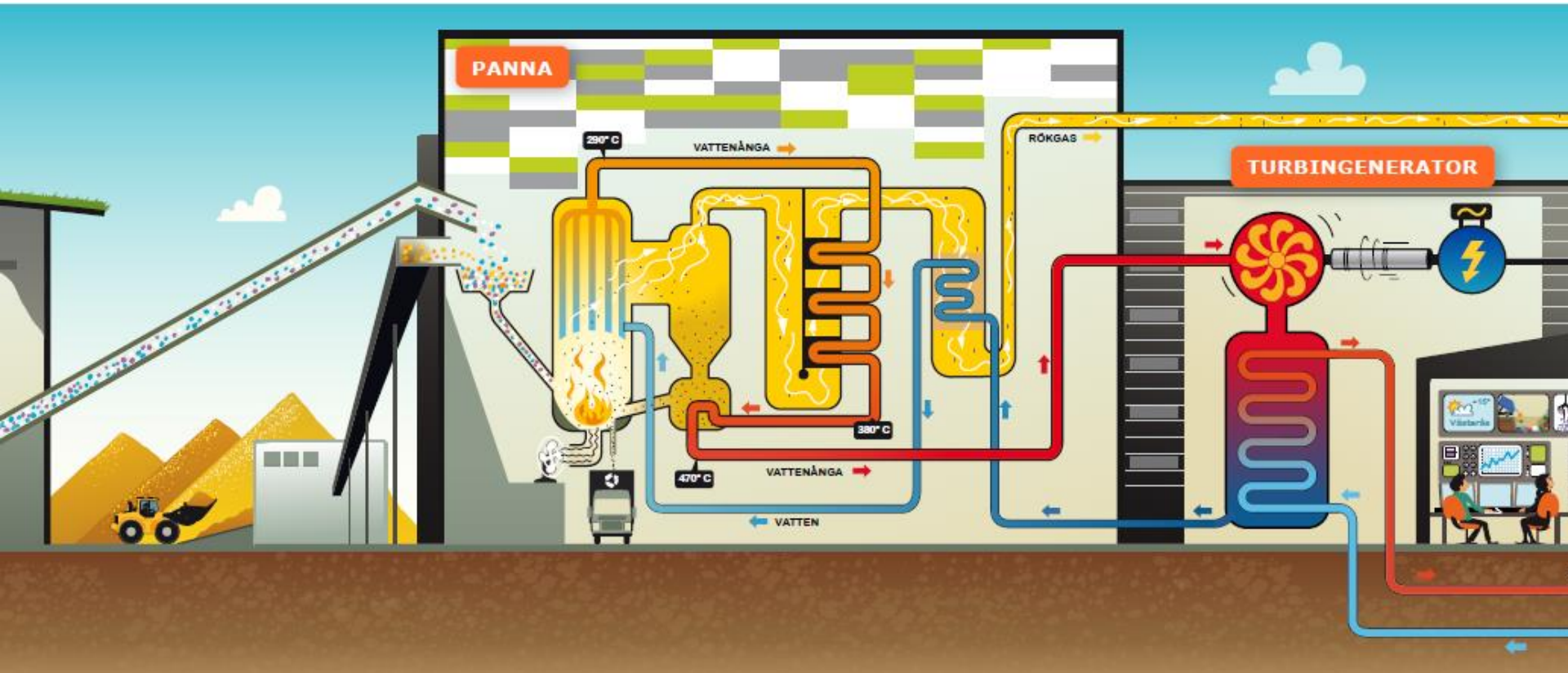
Max 60 tonnes/hour of fuel

Equals around 50 articulated truck loads per day

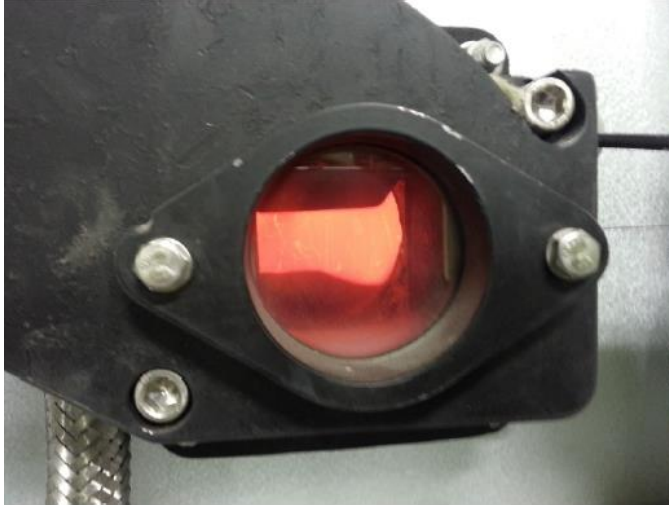
Circulating Fluidized Bed incinerator – CFB.

Steam production

Converts to around 50 MW electricity and around 100 MW district heating



The boiler supplies heat to the customers.



Turbine.

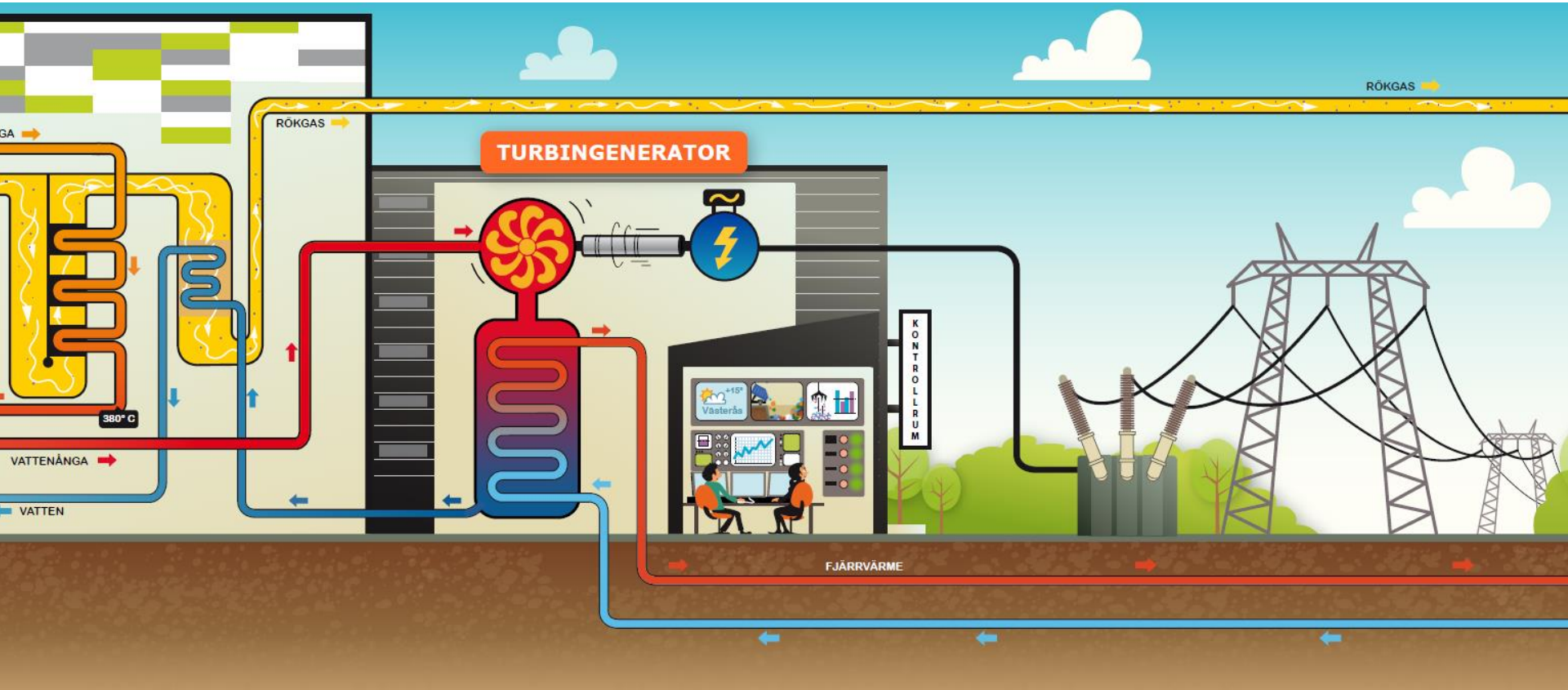
Powerful machine

Generates 46-51 MW electrical energy.

Remaining energy utilised in the turbine condensers as district heating.

Transforms 150 MW energy from the incinerator into electricity and district heating.

Influenced by the district heating system's temperature.



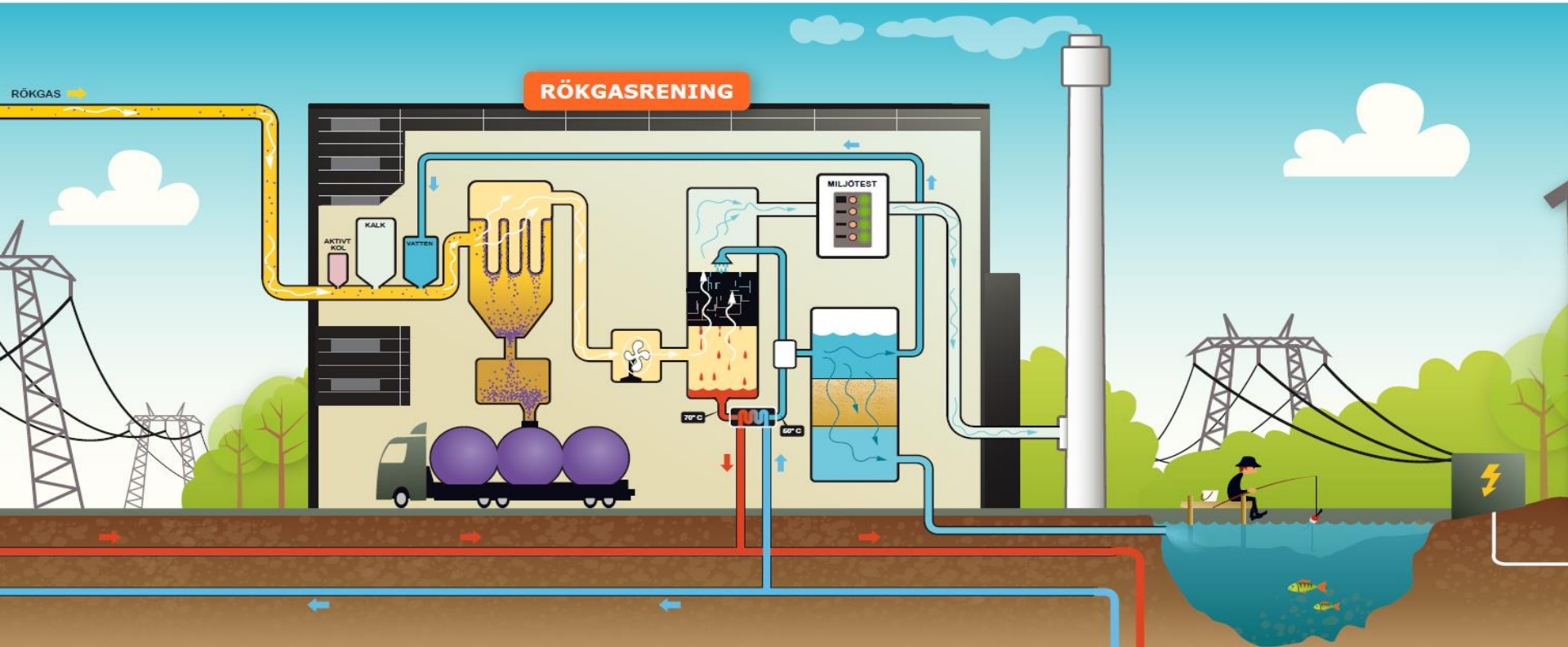
Turbine “GÖREL” – makes electricity .



Flue gas treatment.

Combined technologies makes it clever

- Flue gas condensation around 30 MW district heating
- Capacity influenced by the fuel's moisture content
- Flue gas purification in two stages
- Semi-dry purification from heavy metals and dioxins
- Condensing purification in stage two
- Purified excess water can be released into Lake Mälaren



Flue gas treatment.

Technology overview

- Semi-dry filtration technique with preceding addition of lime and active carbon, followed by wet purification with flue gas condensation and heat recovery.
- Only one residual product remains from the process – the dry residue from the semi-dry purification stage.
- Great flexibility and buffer facility in the system.
- High environmental goals with good margins against limit values.
- Recovery of up to 30 MW for the district heating network.
- Pure condensed water for re-use in the entire District Heating Plant.

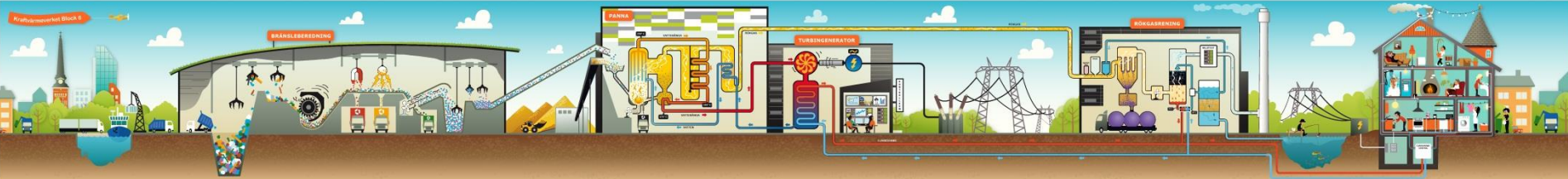


Safe delivery to the customer.

Waste has been beneficial as heating and electricity.



Together in a world-unique unit.



Waste as fuel.

Origin

- Around 50 % from the region and Sweden.
- Around 50 % imported.
- Dry household waste, paper and plastic.
- Industrial waste.
- Supplied in bales of around 600 kg up to 2 ton each.



Waste as fuel.

Verified importation

- Delivery by road, rail or ship.
- Quality control and evaluation of supply logistics for new suppliers.
- On-site inspections.
- Random inspections.
- Separation of unwanted material in the fuel preparation stage.



Focus efficient logistics.



www.malarenergi.se

Construction pictures, webcam, waste as fuel, news:

