

From waste to energy

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Facts and figures Twence BV



→ Euregional workfield

- **Shareholders:**
100% community owned

- **Figures:**
 - **200 employees**
 - **Revenue: 90 mln €**
 - **Profit: 10 mln €**
 - **EBITDA: 50 mln €**

History of Twence

Year	Facility	Input-output
1986	Landfill	Dump
1994	Composting facility	Organic waste into compost
1996	Soil bank	Slightly contaminated soil
1997	Waste-to-energy Incineration Plant	Combustible waste into energy
2002	Sorting plant	Raw materials, building and demolition materials, energy
2008	Biomass Power Plant	Biomass into electricity
2009	Third waste-to-energy Incineration Plant	Combustible waste into energy
2010	Heat supply (water and steam)	Heat from waste-to-energy Incineration Plant

What is Twence (2011)



Twence's waste activities:

- Composting / Digesting
- Separation
- Incineration
- (Landfill)

Twence produces:

- Energy: electricity, heat, steam
- Compost / Fertilizer
- Raw material for re-use (metals, bottom ash, etc.)



Vision Twence

Sustainable benefits for people and environment

Waste processing in all its aspects

Partner for municipalities and companies

Future oriented in a dynamic environment

Waste Separation Plant



Bio-conversion: Composting and Digestion



- Composting of Garden & Kitchen waste with digestate in tunnels

- Extensive pre-sorting of the input to size and for removal of non-conformities



Bio-conversion: Composting and Digestion

Typical input

- Garden & Kitchen waste
- Sludge and waste from food industry
- Supermarket outdated items



Components Digester

Reactor



- 50.000 t/y
- 6.800.000 Nm³/y
- 3.800 m³
- Height 30 m
- Thermal 55 °C

Gas buffer



- 500 m³
- Equalisation engines
- 25-50 mbar

Gas engines

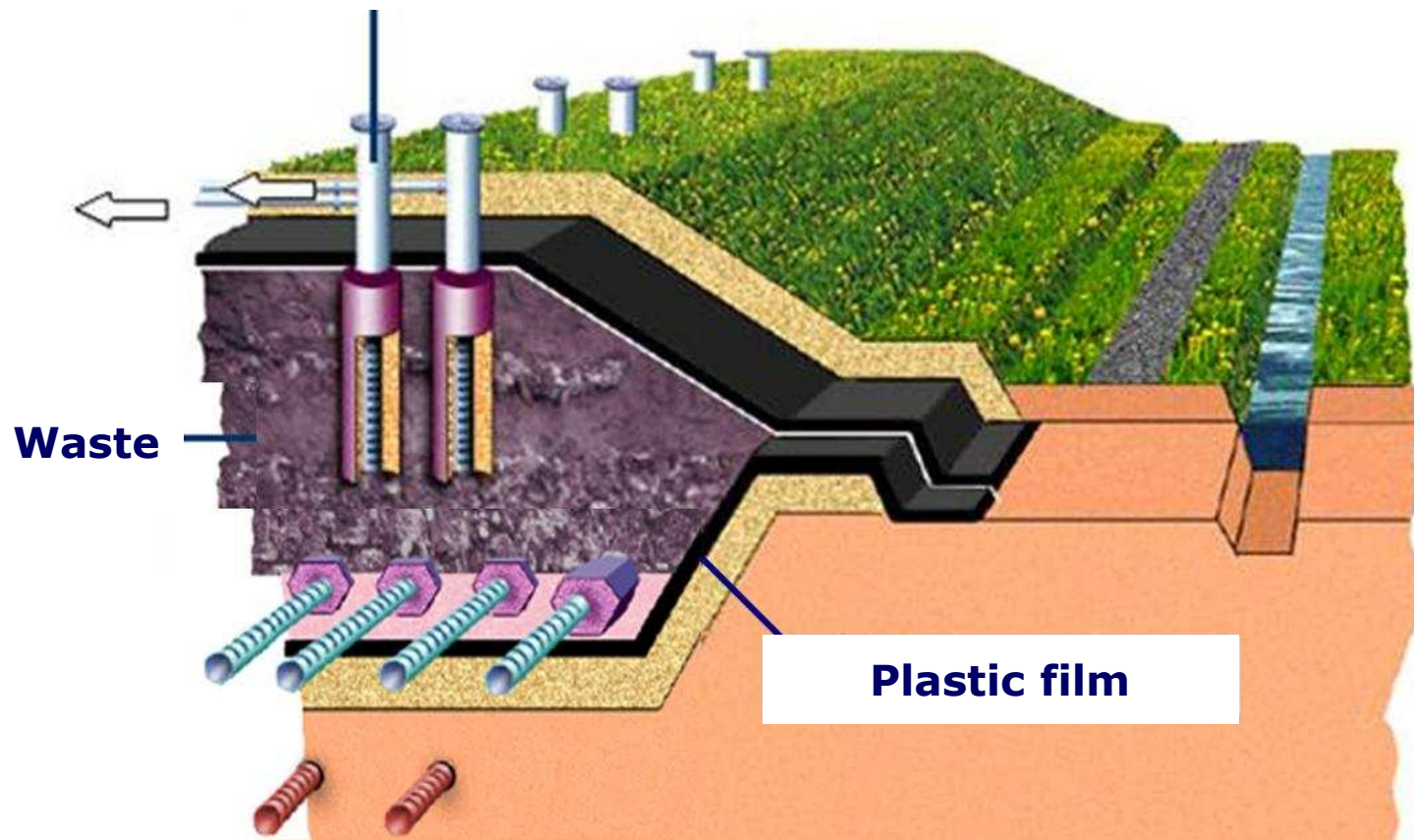


- 2 engines
- Total 2,4 MW
- Electricity and heat supply

- 14.000 MWh electricity/year (5.000 households)
- 14.000 MWh thermal/year (1.000 households)
- Natural gas saving: 4 mio m³/year
- CO₂ Reduction: 7.000 tonnes/year

Landfill gas recovery

Landfill-gas exhaust pipes





Plant overview

**2010 - Capacity
circa 3 * 20 MWe**

2008 - Biomass Electricity Plant
Capacity: 150.000 ton biomass

2009 - Waste Incinerator line 3
Capacity: 220.000 ton of waste

**1997 - Waste Incinerator
line 1 and 2**
Capacity: 300.000 ton of waste

Acceptance hall



Waste bunker



Flue-gas purification system



Legislation and performance - emissions

Concentrations	at 11% O ₂	EU-WID	Performance
Component	Unit	Dutch-BVA	Twence line 1 & 2
		Daily aver.	Year aver.
Dust	mg/Nm ³	5	0.6
NOx	mg/Nm ³	200 (70)	60
SO ₂	mg/Nm ³	50	0.9
HCl	mg/Nm ³	10	0.8
CO	mg/Nm ³	50	8
Dioxines /furaan	nanog/Nm ³	0.1	0.007

Slag reprocessing



Products from incineration

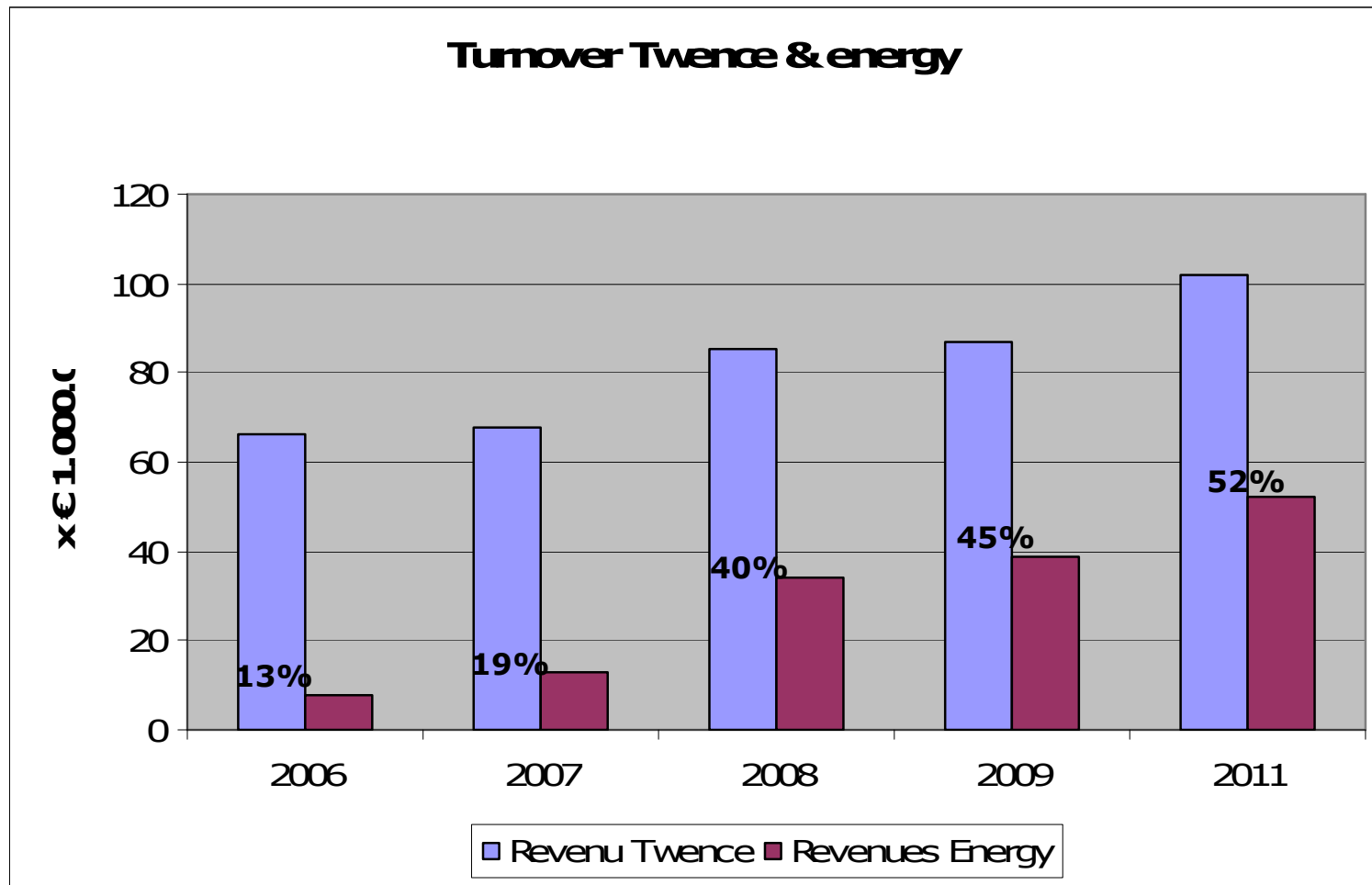
Component	% of waste input	Utilisation
Waste incinerated	100	Energy
Bottom ash	23	Construction material
Ferro	2,1	Metal-recycling
Non-ferro	0,4	Metal-recycling
Fly ash	1,1	Used as filling material for concrete and stabilizing mines
FGT residue	1,2	
Sludge	0,5	

Biomass Power Plant

- One of largest stand-alone installations in Netherlands
- 140.000 tonnes of biomass
- 100% green energy
- Natural gas saving:
38 mio m³/year
- CO₂ Reduction:
68.000 tonnes/year



Turnover Twence: Total vs. energy





~~Twence Waste management~~



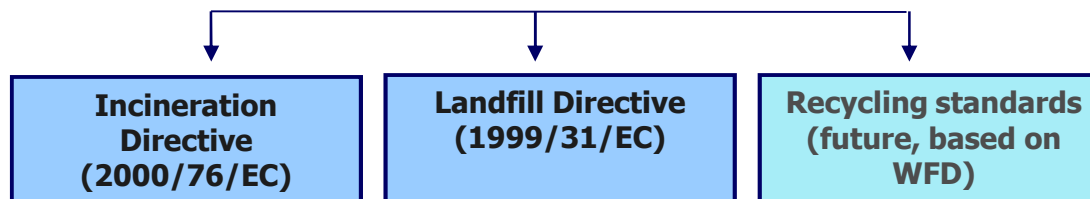
Twence **Waste and energy!**

Thematic Strategy on waste prevention and recycling

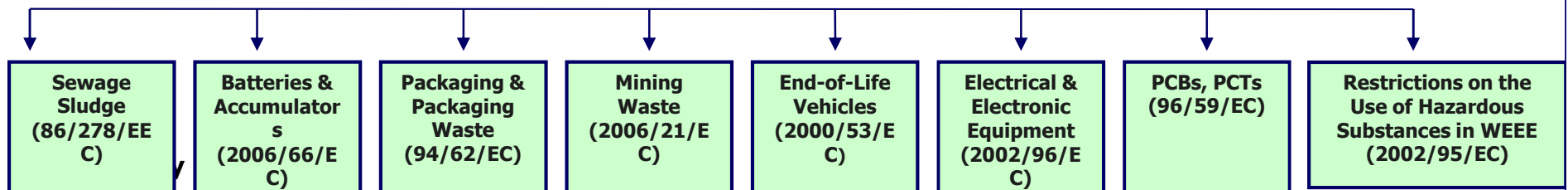
Framework Legislation



Waste Treatment Operations



Waste Streams



■ *Aspects Waste Framework Directive*

- Waste hierarchy
- Waste prevention
- Recycling targets
- Biodegradable Waste
- R1 Energy Efficiency Incineration
- Landfill

■ *Possible connection Italy – Netherlands (Twence)?*

- Scientific study CE Delft shows:
 - Environmental achievements differ between installations:
 - Electrical efficiency
 - Possibilities of heat supply nearby
 - Differences in emissions depending on ways of transport
- **Gains from efficient energy conversion in WtE plant, offsets effects of longer transportation in most cases**

Possible connection Italy – Netherlands (Twence)?

- Transport and Waste-to-Energy of 1 tonnes of MSW (examples based on 9.9 MJ/kg):
 - reduction emissions > thermal efficiency by 1% → - 6,2 kg CO₂
 - reduction emissions > electric efficiency by 1% → - 15,7 kg CO₂
 - more emission transport by E-train (1000 km v.v.)
→ + 20 kg CO₂
 - (Railway distance between Hengelo en Genova: 1400km)

→ Efficiency WtE plant of Twence compensates CO₂ emissions from longer transportation from Italy

Twence fit for handling waste from Italy

- Pre-consented recovery facility:
 - General notification for export of waste is extended up to 3 years (instead of 1 year)
 - R1 status incineration plant:
 - All Waste-to-Energy lines comply to R1-status
 - Import of waste from Germany: authorities are very satisfied
 - Experience with EAK 191212
 - ca 50kton/year RDF from Germany
- Excellent possibilities for WtE of RDF at Twence !

Contribution Twence to sustainability

Twence produces:

- Energy from waste and biomass by using innovative energy technologies
- Secondary commodities

Twence contributes to regional development:

- Sustainability
- Innovation and knowledge
- Employment
- Industrial and countryside development

Heat supplier



Warm water supply to district heating Enschede

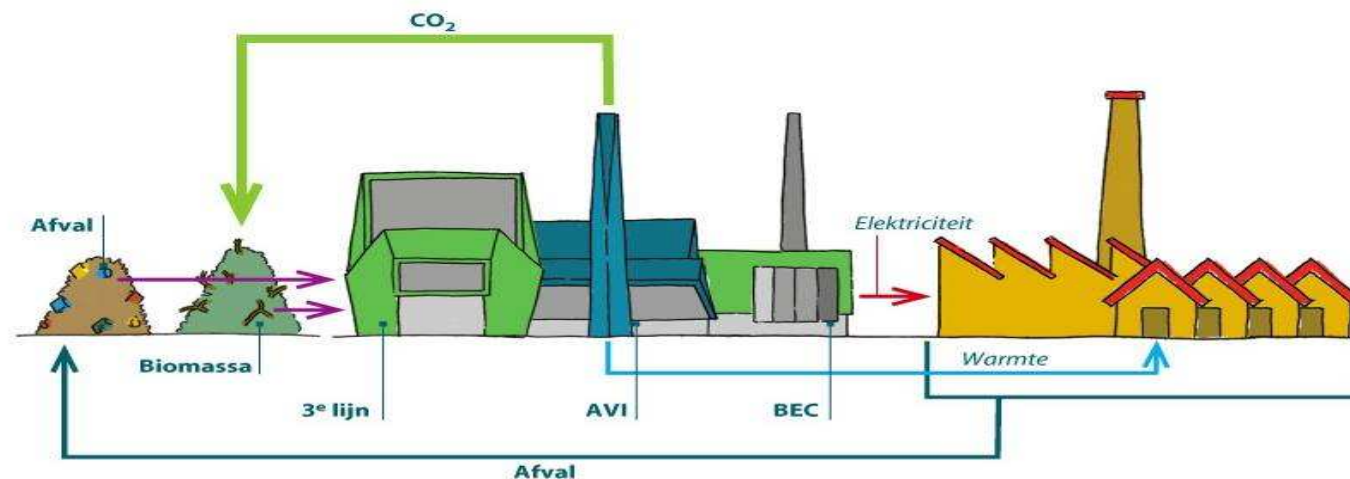


■ *Steam to Akzo Nobel (salt production facility)*



Optimal use of the resources of Twence results yearly in:

- Incineration of 520.000 tons of waste and 200.000 tons of demolition wood en composting overflow
- 407.000 MWh electricity \approx 123.000 households
- 421.000 MWh heat \approx 32.000 households



This means a CO₂ Reduction of 269.000 tonnes/year
(Natural gas reduction of 150 mio m³/year)

■ *Conclusions*

Twence:

- Community owned & reliable
- Modern, state-of-the art R1 lines
- Experience with import of RDF from Germany
- Vision of energy efficiency and sustainability

Twence can be **partner** for Italian communities:

- To comply with EU WfD
- To contribute to environment =
- To produce energy from your waste !

Thank you for your attention

Welcome to visit us
to discuss possible partnership

