People-first PPP Case Study on Waste to Energy

Gevag, Switzerland

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Switzerland has 150 years history of waste treatment

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1880</td>
<td>Switzerland has a long history of waste treatment.</td>
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<td>1900</td>
<td>The first KVA in Zürich was established.</td>
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<td>1920</td>
<td>The KVA in Basel was founded.</td>
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<td>1940</td>
<td>KVA was recognized by the UN.</td>
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<td>1960</td>
<td>Switzerland made significant progress in waste management.</td>
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Städte sind nicht mehr Zweige, es wachsen Abfallberge


Der Abfall ernt gern, dann wird er gesammelt

Erst wurde die Wasserversorgung ausgedacht. So hatten sich die Städte über die Wasserversorgung an die Städte. Die Städte haben sich über die Wasserversorgung an die Städte. Die Städte haben sich über die Wasserversorgung an die Städte.

Aus den Augen, aus dem Sirene, verbrannt scheint vorerst nicht schlimm

In Zürich baute man 1904 eine erste Kläranlage in der Stadt. Die Kläranlage war die erste in der Stadt und ein großer Erfolg. Die Kläranlage war die erste in der Stadt und ein großer Erfolg. Die Kläranlage war die erste in der Stadt und ein großer Erfolg.

Man gleitet bequem ins Umweltproblem

Die Entsorgung ist eine der größten Herausforderungen in der Stadt. Die Entsorgung ist eine der größten Herausforderungen in der Stadt. Die Entsorgung ist eine der größten Herausforderungen in der Stadt.
Six reasons to burn waste for tackling climate change

1. **Reduction of volume**
   Reduction of volume about 93% [cubic metre, m³].

2. **Mass reduction**
   Reduction of mass about 78% [tons].

3. **Disinfection**
   Bacteria, microbes and so on will be destroyed in the fire.

4. **Avoiding of climate-relevant gases**
   Methane will result from dumping of rubbish. Methane gas is 21 times more climate-relevant than CO₂.

5. **Concentration point for hazardous substances**
   In the WTE hazardous substances can be systematically concentrated and afterwards processed in safe techniques.

6. **Energy production**
   The heat will be converted to district heating or electricity, so primary energy carrier can be conserved.
Waste-to-energy (WtE) plants in Switzerland

- 30 Waste to Energy (WtE) plants currently in activity
- Capacity: 3.9 Mio.t
- Capital Invested: over 8 billions CHF
- 100% owned by municipalities representing the public means citizens
On cooperation (1)

• The safe, clean and timely elimination of household waste must be guaranteed at any time. The 30 WtE plants must cooperate and **back each other up** in case of emergency or to **coordinate** maintenance break.
• A WtE plant is **complex and expensive**. Such high-tech infrastructure needs **well trained staff** to be operated. The Swiss plants cooperate to **design and carry out training program** for the staff.

On cooperation (2)

• The managers of the plants profit greatly from **sharing their know-how**. Networking is essential.
• Waste treatment is **very tightly regulated**. The plants must pool together and speak up with one voice in order to **be heard by the regulating authority**. A constructive dialog with the authority guarantees **practical and efficient regulations** with high level of compliance.

30 WtE plants work together: **Cooperative competition**
On competition

- There is **no competition** for household waste, because it is assigned by law to the nearest WtE plant.
- There is a **strong competition** for waste from industry, because it is **not** assigned to any specific WtE plant.
- Competition **puts pressure on the gate-fee.** For the industry, this means that the costs of waste disposal are kept low and affordable.
- Legal waste disposal must be affordable. That is the best way to curb illegal waste disposal!

30 WtE plants work together:

Cooperative & competition
In Switzerland, Waste to Energy is

- Trusted (and owned) by the people!
- Reliable
- Transparent
- Clean
- Innovative
- Affordable

…and we will work hard to keep it that way!

*People first PPP must ensure large stakeholders engagement*

Quoted from Robin Quartier, Executive Director of VBSA
(100% public) ownership and Not for profit structure is key to insure high emission standards.

Energy supply by means of district heating, the optimization electricity production and the flexibility of contribution to the power grid.

*People first WtE PPP must fits to the purpose to protect the environment as the priority, and fully engage with the internal and external stakeholders with transparent mechanism.*
High quality operation through standard occupation training
- internal stakeholders engagement

To ensure the quality operation, the plant management are selected by the communities and citizens, all employees are taking occupation training course in Gevag on work safety and health, new regulations and new processes and technologies study etc. for delivering high quality public services as the return to the public / citizens.
Innovation consisting through PPP model and long life operation

- Waste storage, firing system & electrostatic filter 1975
- Implementing of flue gas washer 1988
- Using heat for energy production 1990
- SCR Catalytic converter 1998
- Advanced wastewater treatment and processing the heavy metal containing dust from ash 2005
- Advanced separation of metals contained in slag (especially of non-ferrous metals like aluminium, copper, brass, bronze, ect.) 2006
Innovation consisting for full fill the demand of the increasing life quality

Expansion of Logistic area, build district heating Chur, replacing old flue gas washer
2010

- Water Cooled Combustion system
- Flue gas wash
- ESP
- SCR
- Ash metal recycling
- Slag metal recycling
High standard deliverables

Savings of around 5.5 million litre of heating oil per year

Energy transfer by steam (max. 230°C)

District heating yearly savings: ~5 million litre of heating oil / year

Energy transfer by hot water (max. 130°C)

Electricity output: 3.5% of the need from Kanton Grison (net)
The plant built close to the household to be economic effectiveness with citizen`s trust
Impact investment for People first

1 bag = 1.5 liter crude oil

1 truck loaded with waste (22 tons) contains an equal of energie of 8'000 liter heating oil

The financing sources are the tax on waste bag from all the households and industry users of the 25 communities;

Sales income generated from electricity, heating and high valued metal recycling.

The sales of electricity generated exchange turnover per year is approximately CHF 22 million.

The capacity of waste treatment per year is 100'000 tons, with 2000 tons of metals gained from the process of waste.

Value of burning waste and turning to energy
People first PPP

• Improve access and equity
• Be economically effective
• Invest in resilience and climate change
• Be replicable
• Ensure large stakeholder engagement

Presentation sources provided by Gevag and VBSA

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