STRATEGIC INTEGRATION OF BIOMETHANE IN THE GAS GRID

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Leiter Realisierung Erneuerbare Energien
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Since more than 150 years committed to progress and improve development of an energy carrier.

Primary energy development from:
Wood, Coal, Petrol, Natural Gas to Biomass and Renewable Electrical Power
WE CONTINUOUSLY INCREASE THE CONTENT OF RENEWABLE GAS IN OUR GRID ...

First Biogas-Pilot-Plant 1997

Introduction of Biogas in the residential thermal energy market on basis of voluntary upgrade 2009

10% Biogas as default-product 2016

Increase number of operating Biogas-Plants and production capacity

Increase Renewable Gas in grid with Power to Gas
## OUR BIOGAS UPGRADING PLANTS

<table>
<thead>
<tr>
<th>Plant</th>
<th>Year</th>
<th>Annual Energy Production (GWh/a)</th>
<th>Fuel Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meilen</td>
<td>2010</td>
<td>3</td>
<td>Sewage sludge</td>
</tr>
<tr>
<td>Buchs (SG)</td>
<td>2015</td>
<td>2.3</td>
<td>Sewage sludge</td>
</tr>
<tr>
<td>Niedergösgen</td>
<td>2017</td>
<td>13</td>
<td>Industrial sewage sludge</td>
</tr>
<tr>
<td>Volketswil</td>
<td>2011</td>
<td>10</td>
<td>Organic waste</td>
</tr>
<tr>
<td>Biogas Zürich</td>
<td>2013</td>
<td>65</td>
<td>Organic waste + sewage sludge</td>
</tr>
<tr>
<td>Uzwil</td>
<td>2017</td>
<td>11</td>
<td>Organic waste</td>
</tr>
</tbody>
</table>
SWISS BIOGAS INJECTION INTO THE GAS GRID

Biogas Production CH (2016) : 308 GWh
Total Gas demand CH (2016) : 39’029 GWh

TARGET:
2030, 30% OF THE GAS IN THE RESIDENTIAL THERMAL SECTOR SHALL BE RENEWABLE

HOW TO INCREASE THE AMOUNT OF BIOGAS IN THE GRID

• Injection of Biogas into the gas grid instead of using it to produce electrical power
• Development of future biomass sources
• Increase production capacity of Renewable Gas with Power to Gas technology
WHY DO WE WANT TO INJECT BIOGAS INTO THE GAS GRID

Use of the entire energy in the biogas

• Only one third of the energy is transferred to electrical power. The remaining amount is available as heat, which is often not fully used, especially in the summer months

• With an injection into the gas grid the entire amount of energy is stored and can be transferred case by case to heat, electricity or fuel for mobility at the time of use throughout the year

Impact on CO₂ reduction

• The Swiss electrical energy mix has already a low CO₂ footprint and therefore the impact of the additional power is low or could in time of excessive power in the grid even worsen the situation

• High impact if biogas substitutes natural gas or if it is used in the transport sector and substitutes petrol.
THE ETHICS OF BIOGAS IS IMPORTANT

- First: Biomass shall be used for food production
- Second: Biomass shall be used to feed the livestock
- Biogas shall only be produced from residual material and waste
OUR VISION: FROM CO₂ REMOVAL TO POWER TO GAS

CO₂ is currently separated in a CO₂ Separation Plant

CO₂ shall be used with renewable H₂ and convert to additional methane

More renewable Gas can be produced with the Power to Gas Technology
MORE RENEWABLE GAS WITH POWER TO GAS

**Conventional CO₂ Removal Plant**

Biogas

\[ \text{CH}_4 / \text{CO}_2 \]

→

**CO₂ Separation plant**

\[ \text{CO}_2 \]

→

**Biomethan (CH4)**

**Power to Gas Technology**

substitution of a conventional CO₂ removal plant

Biogas

\[ \text{CH}_4 / \text{CO}_2 \]

→

**Methanation**

\[ \text{CO}_2 + 4 \text{H}_2 = \text{CH}_4 + 2 \text{H}_2\text{O} \]

→

**Biomethan (CH4)**

60% more renewable gas

**Conventional CO₂ Removal Plant**

- Removal of CO₂

**Power to Gas**

- Adding H₂
Large Potential in Switzerland

- **600 GWh**: Transformation of biogasplants in the vicinity of a gas grid from electrical power production to gas injection
- **540 GWh**: Application of the power to gas technology instead of CO₂ separation for existing and new biogas plants

### Renewable Gas production could be increased from 308 GWh to 1.5 TWh

<table>
<thead>
<tr>
<th>Number of plants</th>
<th>Existing biogas grid injection</th>
<th>Potential biogas injected to grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWTP</td>
<td>15</td>
<td>64</td>
</tr>
<tr>
<td>Biowaste-Digestion</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23</strong></td>
<td><strong>73</strong></td>
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</tbody>
</table>
THANK YOU!

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