1. Profile Suiker Unie

- Producer of sugar and other products
  - About 950,000 ton sugar/year
- Businessgroup of Royal Cosun, Breda
- Production sites:
  - Sugar factories:
    - Dinteloord, Vierverlaten and Anklam (Germany)
  - Specialties factories
    - Puttershoek and Roosendaal
- Headoffice: Dinteloord
- Turnover € 750 million
2. Digesters Suiker Unie

• Dinteloord
  – Methane reactor 2009
  – Digester 2011
  – From biogas tot natural gas (both) 2011

• Vierverlaten
  – Methane reactor (to 1,5 MWe) 2010
  – Digester (like Dinteloord) 2012
2. Digesters Suiker Unie
Green gas production, Dinteloord
2. Digesters Suiker Unie

*Methane reactor, Dinteloord*

- Operational from 2009
- Digestion:
  - organic matter from washing water from sugar beets (campaign, 135 days)
- IC (Internal circulation) reactors: Paques
  - 2 x 900 m³
- Biogas
  - 85% methane content
  - 4,5 million m³/campaign
2. Digesters Suiker Unie
*Digester Dinteloord*

- Operational from 2011
- 100,000 ton raw material:
  - Sugar beet tails, pressed beetpulp
  - Residues/products from other food and also agricultural companies
    - Potato industry, agricultural products
- Biogas:
  - 50-55% methane content
  - 16 million m3/year
2. Digesters Suiker Unie

**Digester Dinteloord**

- **Mesophilic digestion**
- **4 Digesters: 4 x 4,500 m³**
  - Residence time: 45 days
  - Organic load: 4,4 kg ods/m³/day (design)
- **1 Secondary digester: 1 x 3,000 m³**
  - Residence time: 12 days
- **Separation digestate to wet and dry**
  - Decantor
  - Liquid: water purification, fertiliser
  - Solid: fertiliser (compost)
2. Digesters Suiker Unie

**Digester Dinteloord**
3. From biogas to natural gas

**Dinteloord**

- **In million m³/year:**

<table>
<thead>
<tr>
<th></th>
<th>Biogas</th>
<th>Nat. gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane reactor</td>
<td>4,5</td>
<td>3,5</td>
</tr>
<tr>
<td>Digester</td>
<td>16</td>
<td>9,0</td>
</tr>
<tr>
<td>Total natural gas</td>
<td></td>
<td>12,5</td>
</tr>
</tbody>
</table>

- **For 9,000 households**
3. From biogas to natural gas

- Biogas compressed to 8 bar
- Biogas from both projects to water scrubber
- Scrub with excess water
- Methane content in gas to 89%
- Online quality analyser for natural gas
- Natural gas to public grid

- Recycled water from scrubber:
  - Decompress to 1 bar: CO2 escape
  - Recompress to 8 bar
4. Injection natural gas in grid

- Public grid:
  - National grid 40 Bar
  - Gasunie
  - Regional grid 8 Bar
    - Enexis 300 m from site
    - Intergas 4 km from site
- Requirements natural gas to grid:
  - Quality natural gas
  - Capacity grid
4. Injection natural gas in grid

Requirements

• Natural gas quality
  – CH4 content (Wobbe-index)
  – Water dew point, water content
  – Major, minor and trace elements

• Capacity of regional grid
4. Injection natural gas in grid

Consumption regional grid Intergas
4. Injection natural gas in grid
Connection to regional grid Intergas
5. Financial aspects

• Without subsidy: digestor project not achievable

• Goal sustainable energy in the Netherlands:
  – 14% in 2020 (EU Directive)

• SDE: subsidy sustainable energy production:
  – Category green gas, biomass
  – Price natural gas guaranteed for 12 years
    • € 0,583/Nm3
6. Summary

• Suiker Unie has multiple projects for sustainable energy production

• Dinteloord:
  – To natural gas from 2011
  – Natural gas from two installations

• Vierverlaten
  – Green electricity from 2010
  – Digestor to natural gas in 2012
Thank you for your attention

Questions???