Case Study
Municipal Innbygda WWTP
Trysil (Hedmark), Norway

Project Name: Innbygda WWTP
Location: Trysil, Norway
Type of Plant: Municipal
Biowater Process Used: CFAS® + DAF Separation (chemical precipitation of P)
Operational Since: November 2010

The Challenge
The municipality of Trysil is home to the largest ski resort in Scandinavia. Due to seasonal tourism in the region, the treatment plant must handle fluctuations in load depending on the number of tourists visiting at any given time. In addition, the plant had to have the ability to withstand extremely cold temperatures during the winter months. The existing wastewater treatment system was at the end of its useful life.

The Design
Many factors affected the design. As mentioned, the cold temperatures and load fluctuations as well as the customer’s desire for a compact, highly efficient technology. Biowater was in competition with conventional MBBR technology combined with a separation unit. In the end, Biowater CFAS® (IFAS) Combined Fixed-film Activated Sludge process was chosen because of its small footprint and reliability.

Achievements
By choosing the Biowater CFAS® biological process combined with DAF separation the client was able to build the plant as compact as they had planned and still achieve the effluent quality that they were aiming for. Due to the use of DAF separation, the plant could be built without a gravity thickener unit which was in the original design. The plant is so flexible that in the off season only one Biowater CFAS® reactor is needed and the other is shut down to save energy.
### Design Load

<table>
<thead>
<tr>
<th>Flow</th>
<th>2.8 MGD</th>
<th>26,000 PE/447 m³/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>3,665 lb/d</td>
<td>1,666 kg/d</td>
</tr>
<tr>
<td>TSS</td>
<td>3,698 lb/d</td>
<td>1,681 kg/d</td>
</tr>
<tr>
<td>TP</td>
<td>99 lb/d</td>
<td>45 kg/d</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>64°F high / 41°F low</td>
<td>18°C high / 5°C low</td>
</tr>
</tbody>
</table>

### Effluent Requirements

- BOD: 3,665 lb/d, 1,666 kg/d, 70% removal or < 25 mg/l
- TSS: 3,698 lb/d, 1,681 kg/d
- TP: 99 lb/d, 45 kg/d, 95% removal or < 0.5 mg/l

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Three Biowater CFAS® Reactors, each with 60% media fill

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Influent Inlet

Septage Receiving Screening Grit Removal Chemical Feed Polymer Centrifuge

Grit Chamber Primary Sedimentation

Sludge Blending Conditioning Storage

Three Biowater CFAS® Reactors each with 60% media fill

DAF

Effluent Out

Reject Water Centrate

Sludge Disposal

CFAS® (IFAS) Reactor

BWT X Media

Outside of the Reactor