Etanolix Göteborg - Why do we need advanced biofuels
Timo Huhtisaari
NEOT was established in January 2003 and operations started on the 1st of February 2004.

NEOT is registered in Finland and is owned by two Finnish companies SOK and St1 Nordic Oy. SOK owns 50.8% of the company and St1 Nordic Oy 49.2%.

NEOT is a significant independent fuel procurement company in the Baltic Sea region and actively operates on the global trading markets.

We offer high-quality sea transportation, road transportation and terminal services for third parties.

NEOT supply annually (2016 → ) approx. 8 billion liters of oil products.

Our market share of Finnish traffic fuel supply is approx. 43%.

North European Oil Trade Oy

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Terminal network and supply chain
Etanolix® - Integration to oil refinery

Production capacity
• Ethanol (as per 100% ETOH) 5,000 m³/a

Feedstock
• Industrial bakery waste / industrial process residue
• Packed and unpacked out dated waste bread from shops and markets
• Approx 20,000 tn/a feedstock is required (bread)

Products
• Anhydrous fuel grade ethanol
• Liquid animal feed for pig farms / feed for biogas plant (AD)

Etanolix 2.0 LIFE+ project
Etanolix® concept further development & demonstration:
• New raw material handling.
• Unique way of integrating the ethanol plant in a conventional refinery:
  • Direct ethanol blending to vehicle fuels and in an effective way distribution to the consumers
  • Utilize excess energy, cooling systems and wastewater treatment plant
• Refinery personnel's expertise and experience for safe and optimal operation.
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Transport & Deliveries could be made using the ED95 fuel. 
This will create close-loop ecosystem 
Significant CO2 and Particle emission reductions
ED95 ecosystem in Finland

Ethanol + water + additive

Larger fuel injection system
Different pistons to raise compression ratio
Different engine management programming
Ethanol resistant gaskets and sealings

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ED 95-proven fuel in Stockholm and Helsinki

1. Usability as good as conventional Diesel Engines

2. Energy consumption is the same as conventional diesel engines. Volume is 1.7 times higher due to ethanol’s lower energy intensity.

3. Local emissions are significantly lower
   1. Particle Matter (PM) - 80%.
   2. Very low NO2/NO ratio. NO2 defines the air quality limit

4. ED95-fuel can reduce up to 90% fossil Greenhouse Gases.
In trucks, pathway technology high biofuel drop-ins is cost efficient – Larger trucks could have negative abatement cost

WTW GHG abatement costs of MD\(^1\) and HD\(^2\) commercial vehicle 2030 [EUR/ton CO\(_2\)e]

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Abatement Cost [EUR/ton CO(_2)e]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel biofuel</td>
<td>&gt;1,550</td>
</tr>
<tr>
<td>Mild Hybrid</td>
<td>&gt;1,330</td>
</tr>
<tr>
<td>BEV(^3)</td>
<td>&gt;1,550</td>
</tr>
<tr>
<td>CNG(^4)</td>
<td>&gt;2,580</td>
</tr>
<tr>
<td>LNG</td>
<td></td>
</tr>
<tr>
<td>Fuel Cell(^5)</td>
<td></td>
</tr>
<tr>
<td>Increased vehicle length(^6)</td>
<td></td>
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<tr>
<td>Increased size(^7)</td>
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</tbody>
</table>

**For Diesel biofuel:**
- Recommended until 2030
- Not cost efficient until 2030

**For CNG and LNG:**
- High CO\(_2\) abatement costs for CNG and LNG within MD/HD/City Bus result from low quantities of vehicles (missing economies of scale) and CO\(_2\) abatement potential compared to Diesel is small (<5% savings/km)
- Commercial system cost and low lifetime mileage in medium duty trucks causes very high abatement cost, therefore incompatibility
- Increased efficiency due to aerodynamic measures to reduce drag
- Length and gross vehicle weight increase, increased transport efficiency by 10%

Source: Roland Berger, Expert interviews, IKA CO\(_2\) study

Summary

1. Smart Utilization of waste resources into advanced biofuels increases energy independence

2. Ecosystem thinking creates win-win situations

3. Advanced biofuels are most cost-effective and readily available way to fulfil the ambitious EU targets for decarbonization of transport