Quantafuel -
“A view into the next generation of sustainable fuel-innovation”
Let's end wasteful practices...

..by re-using valuable resources

The problem we solve

Plastic waste is filling our oceans and cause serious harm.
Re-using the waste help clean up our future and create something valuable
Currently plastic waste, biomass and non-captured natural gas are unused resources causing huge environmental and financial problems.

Quantafuel’s alternative hydrocarbon feedstock

**Plastic waste**
- Global annual plastic production of >300 MT
- Only ~10 % reused
- ~60 % to landfills

**Biomass**
- US with ~100 million tonnes of wood waste
- All forestry with by-products
- Wood waste and return wood

**Natural gas**
- Market potential:
  - Local diesel prod. from clean gas
  - Associated gas (currently flared)
  - Stranded gas

**Other hydro-carbon sources**
- Crude oil
- Other oil products
- Coal
- Organic oil
- Food and other organic waste

**Time-to-market**

**Primary focus**

**Secondary focus**

**Not currently prioritised**
Quantafuel owns and operates small plants converting plastic waste into environmentally friendly, synthetic diesel sold in the regular diesel market.

**What we do**

- Ending wasteful practices and help avoid plastic ending up in nature
- Utilising waste with no alternative usage
- Stimulating local communities by creating jobs

- Unique, patented catalyst technology
- Highly efficient (~75%) plants give low-cost production (USD ~0,2 per litre)
- Extended market reach through small scale production plants

- Produce high-quality fuel with > 66% lower greenhouse gas emissions
- Commoditized end-product (currently priced at USD ~0,5 per litre)
- Growing focus and demand of environmentally friendly diesel

Capturing local plastic waste as a resource…

…through small plants with proven technology…

…producing high-quality, synthetic diesel
technology is developed over several stages since 2007 with several pilot plants and 3rd part verification

R&D process initiated
R&D dev. with research partners
Catalyst identified and tested
Technology patented application
1st commercial plant contracted
Pilot plant operational
BtL-pilot initiated and grant received


Test facility (1 l/h):
- Development and testing of catalyst (GTL)
- 3rd party verification
- Biomass

Demo plant (500 l/h):
- Verification and documentation
- Full-scale production for periods 2012-14

Patented:
- US system patent awarded August 2015 (US009199888B2)

Pilot plant (500 l/h):
- Capacity: 2.5 mill litres per year
- In operations
- Plastic waste

Pilot plant (20 l/h):
- In operations Q4 - 2018
- Wood chips and waste wood
Quantafuel has initiated construction of first European plant and has an extensive project backlog

**Where we are – Commercial**

Where we are

- Commercial
  - Investors in top-co, plants and R&D
  - Industry with fuel players, recycling and others
  - Strong support from gov. agencies, funds and NGOs

1) Including, but not limited to Skive kommune, Oslo kommune, Enova, Danmarks Grønne Investeringsfond, ZERO, WWF and more

**1st commercial plant**

Skive officially opened and construction initiated

- Skive plant officially opened, with all agreements and approvals in place
- Equity investors in place, 60 % debt facility under way – in place this year
- Expected first oil Q3 2018

**Market roll-out**

Significant, firm project portfolio and demand

- 7 firm plant projects with 270 MT/day total capacity
- Company scaling delivery capabilities
- Next feedstock: bio jet fuel being developed with leading industry players

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### Project development

<table>
<thead>
<tr>
<th>Location</th>
<th>Capacity</th>
<th>Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>60 MT/day</td>
<td>76% owned</td>
</tr>
<tr>
<td>Oslo</td>
<td>30 MT/day</td>
<td>100% owned</td>
</tr>
<tr>
<td>Mexico City</td>
<td>60 MT/day</td>
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<tr>
<td>Navojoa</td>
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<td>UK</td>
<td>30 MT/day</td>
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<td>Czech Rep</td>
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<td>60% owned</td>
</tr>
<tr>
<td>Italy</td>
<td>30 MT/day</td>
<td>50% owned</td>
</tr>
</tbody>
</table>

### EPC

- Est. production start: 2018
- Est. production start: 2019
- Est. production start: 2020

### Operations

- Est. production start: 2018
- Est. production start: 2019
- Est. production start: 2020

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Quantafuel’s Jet biofuel project

A natural next step with high yield-catalyst

Repeat our results on a relevant scale

Join the industry on the pathway to cost effective sustainable aviation

Bringing 11 years of RnD on proven technology
Quantafuel’s Jet biofuel project

Expected Innovation Objectives:

- Verify the jet fuel technology in pilot scale (wood chips)
- Provide data to widen feedstock range (forest residues)
- Proof of concept (Quantafuel’s F-T design for catalyst and reactor)
- Provide design data for upscaling
- Reduced GHG emissions in production of jet fuel

The checklist:

- Location
- Industry partner: AVINOR
- Independent environmental foundation: ZERO
- Initial funding: ENOVA
- Technology and research partner
- Partner funding
The pilot plant will contribute to…

Sending a clear message that the aviation industry is taking action in the global goal of reducing CO2-emissions

Following up on the IATA target and contributing to the goal of 1 billion passengers flying on bio jetfuel-mix by 2025

Show that Norwegian innovation in clean energy as well as forward-thinking policymakers will close the gap between the forest- and aviation industry, setting the pace for the next decades of sustainable air transportation

The potential to make global impact which lies in exporting an effective and cost-competitive technology that can be equally beneficial to implement in India or the U.S, as in Norway, regardless of feedstock qualities.
QUANTAFUEL help ensure sustainable plastic waste handling