

# Transforming plastic waste into valuable low-carbon products

Corporate Update  
March 2020



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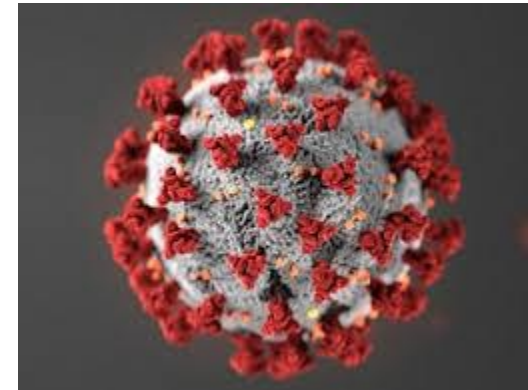
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# Impact of corona

- All employees in Norway working from home
- No lay-offs planned
- Progress in Denmark, but with reduced manning on site, app 50%
- Challenges with suppliers not able to travel
  - China
  - Switzerland
- Some challenges with supplies of parts
- Sufficient financing to stand through completion and through the year.
- Working on support packages both in Norway and Denmark





# Feedstock handling system





## 4 Pyrolysis reactor





## Unique catalyst solution





## Distillation column and storage



## Partners supporting our strategy



- Worlds largest oil trader
- 40 offices worldwide
- 5441 employees
- Revenue 231 BUSD

### Main interests

Blend-in fuels

JV-ownership of plants

Strong willingness to invest in SPV plants in Europe



- One of Europe's leading companies in supply of waste for recycling and energy recovery
- Delivers more than 1,4MT of waste to 80 recycling companies

### Main interests

Delivery of on-spec feedstock to Skive and future sites

Storage, logistics management, transport and pre-treatment of feedstock

Strong willingness to invest in Sorting and treatment technology to accommodate increased demand



- Worlds largest chemical company
- 41 offices worldwide
- 115 490 employees
- Revenue 65 BEUR

### Main interests

Produce recycled plastic products

Develop Naphtha in joint ownership of IP

Create circular recycling through linking petrochemical industry

Strong willingness to invest in Quantafuel plants in JV



- Specialized in research, development, production of catalysts
- Office in Malmø
- Lab to synthesizing and testing catalysts

### Main interests

Test, maintain and optimize new and existing catalysts for Quantafuel

Main partner for development of New naphtha-catalyst

Chemical and technical support in due-diligence work



Started preparation for two large scale projects – goal of 5

## Antwerp

- Aligned to start preparation for two large sites
- Antwerp and Amsterdam
- 100.000 ton + capacity per location
- Pre-engineering, site allocation, permitting, feed-stock supply, location, budgets
- 50/50 JV structure Vitol – QF
- 2 X 100 MUSD investment
- 150 MUSD revenue – 100 MUSD EBITDA potential
- FID right after Skive
- Pre-project financed by Vitol



## Amsterdam



## Strategic partnership with BASF

*Largest chemical company in the world with 65 BEUR turnover and 115.000 employees.*

- 20 MEUR investment – 10 MEUR equity, 10 MEUR convertible bond
- Access to process and operation capacity for the start-up of Skive
- Engineering resources to reach industrial scale roll-out
- Off-take in Denmark to build the market
- Development of a naphtha solution
- Intention to replace part of the 20 MTON use of naphtha with recycled material
- None-exclusive agreement
- Collaboration agreement signed





# ChemCycling is currently tested with first pilot products

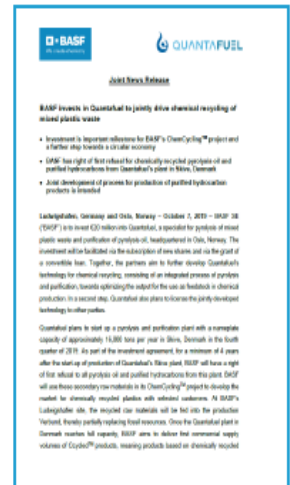
## BASF intends to realize the approach on an industrial scale

### 2018-2019 Product prototyping: Demonstrate principle

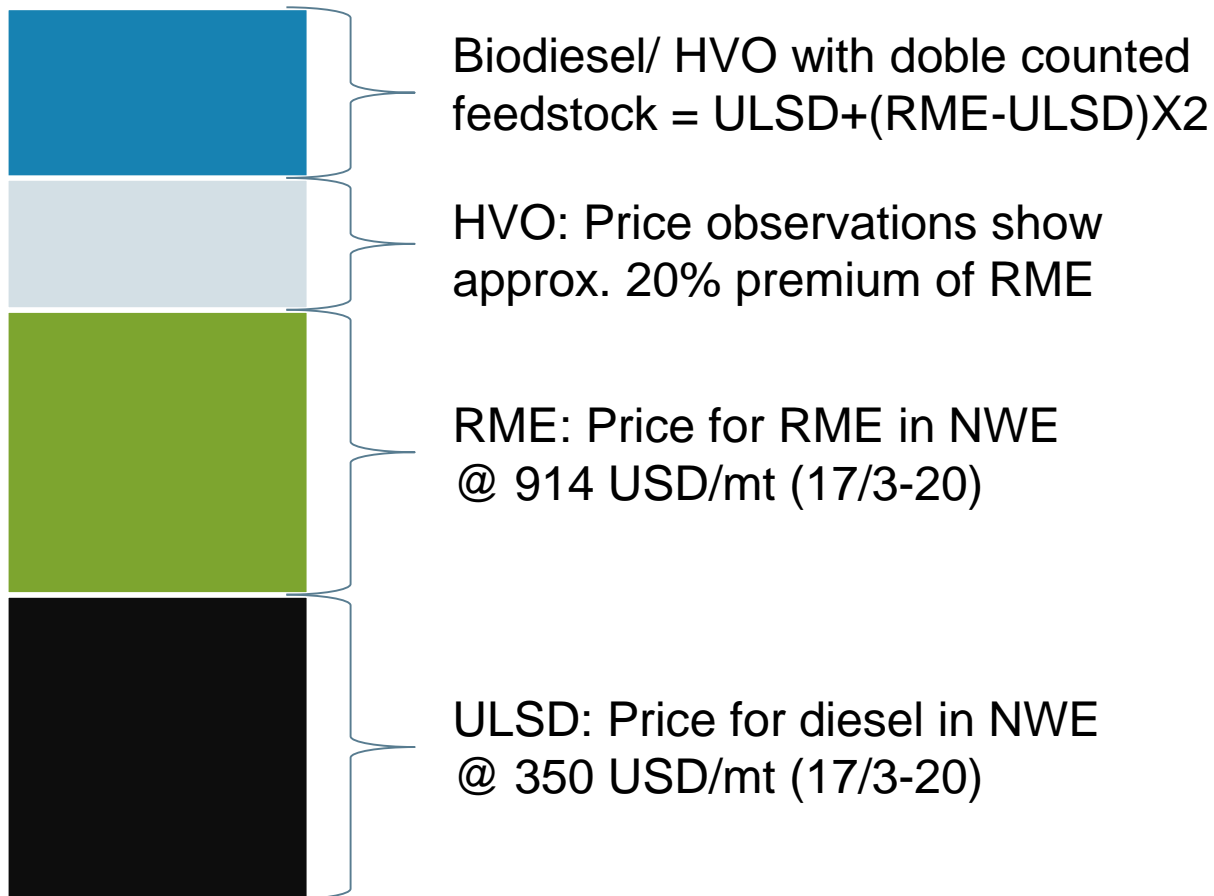
- ✓ Pyrolysis oil fed into BASF Verbund
- ✓ With partners first ChemCycling product prototypes realized and certified
- ✓ Certification system developed with Ecocycle for recycled products
- ✓ Network and partnerships along the value chain developed
- ✓ Investment into Quantafuel

### Next steps

- ☐ Final evaluation of technology
- ☐ Scale up
- ☐ Foster understanding and acceptance in the market



## Market Price Structure



- EU's RED II inclusion of Recycled Carbon Fuels (RCFs), makes Quantafuel's products equivalent to biofuels
- Quantafuel's diesel specifications, cold properties and GHG savings are closer to HVO than RME
- Quantafuel feedstock is based on waste plastic, but not yet listed amongst EU's double counted feedstock

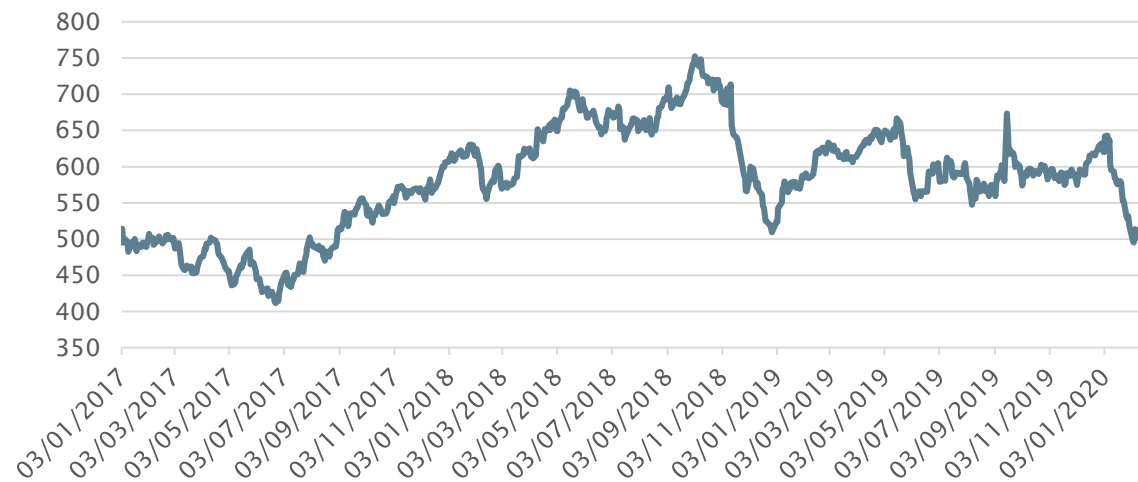


# Price Volatility and Market Drivers

## Drivers

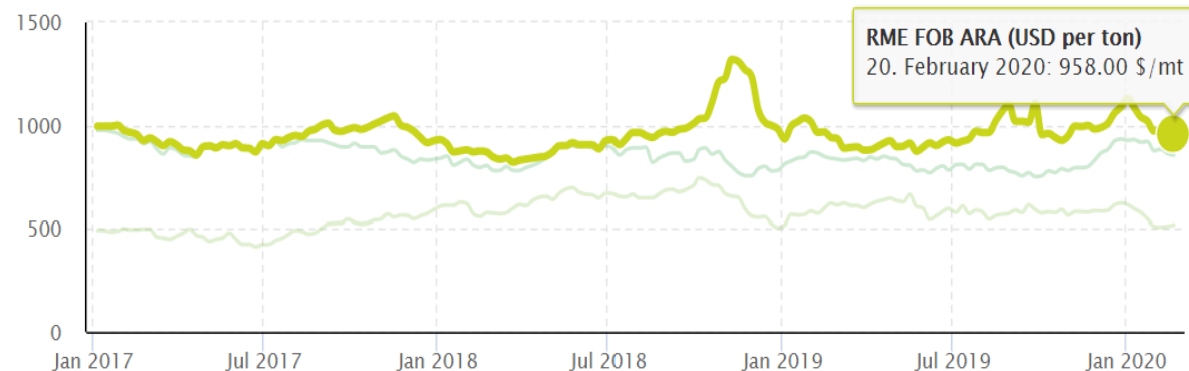
- Global market sentiment
- OPEC
- Geopolitics
- Etc.

## Diesel

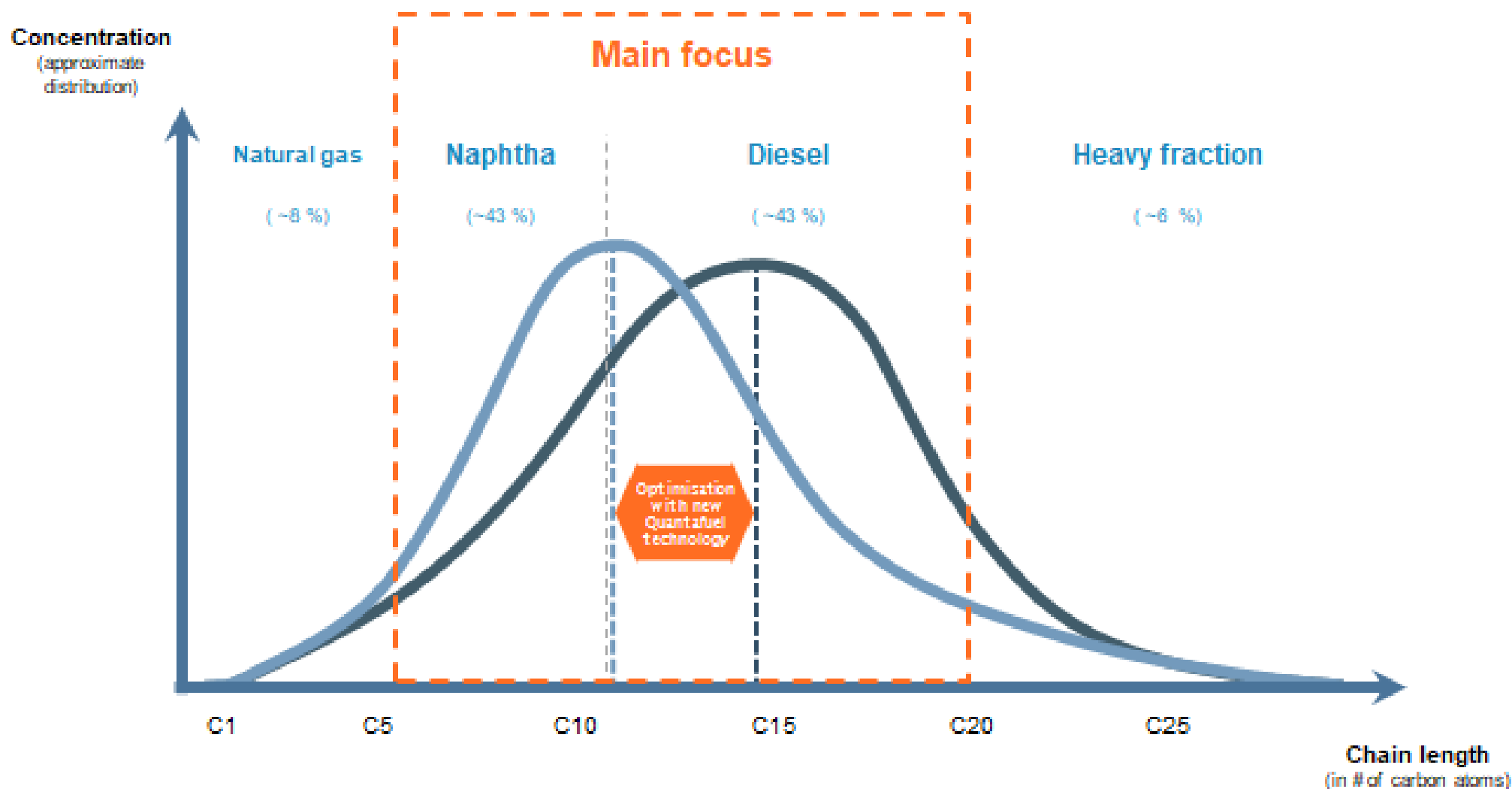


## Biodiesel

- EU and US (California) political policies
- Harvests yields



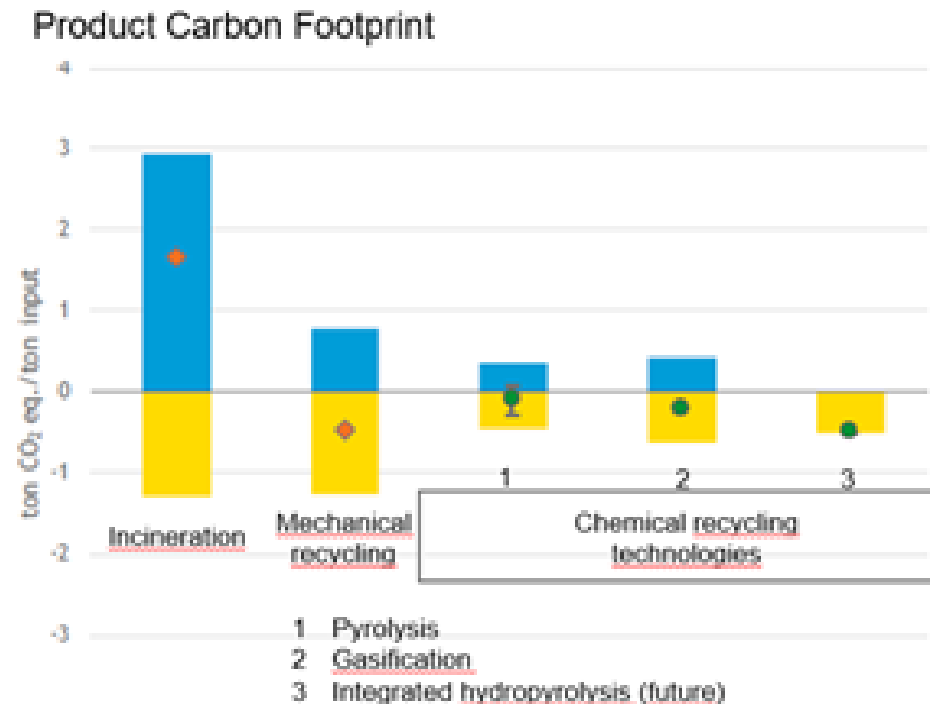
# Chemical recycling opens naphtha as high potential





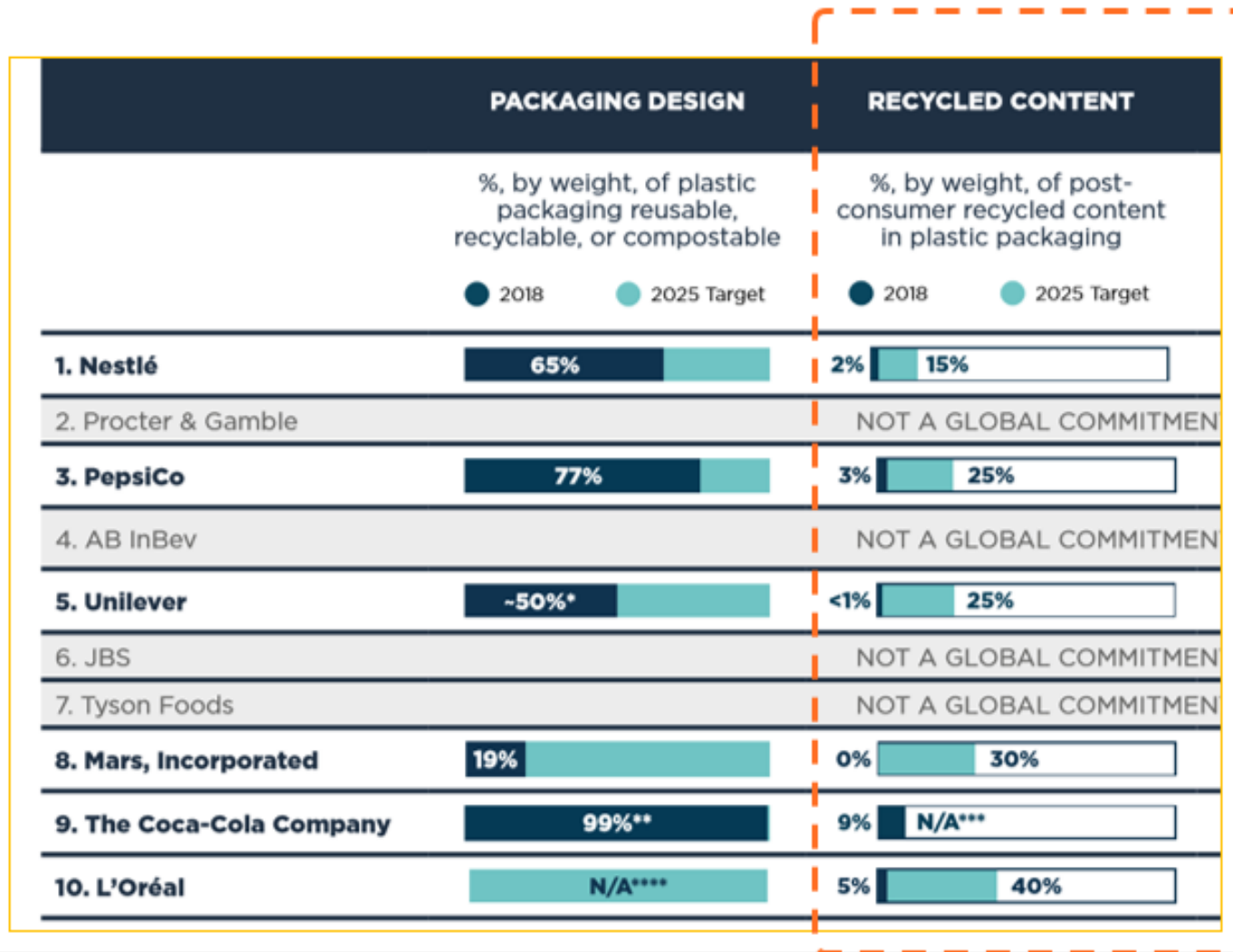
# The sustainability case for chemical recycling

- Reduces demand for virgin oil and gas
- Increases resource efficiency by "rescuing" waste from incineration or landfill
- Upcycling: mixed plastic waste can be upgraded to food-grade packaging
- Complements mechanical recycling by treating plastic waste unfit for existing recycling methods



Source: CE Delft on behalf of Dutch government (2019)

# Huge demand for recycled content



*Companies from across the plastics value chain have committed to quadruple post-consumer recycled content by 2025*





# EU targets and actions drive the market

- 50% recycling of plastic packaging by 2025
- Pledge to use more than 10 million tonnes of recycled plastic in 2025
- Strengthened Waste Framework Directive
- Strategy for Plastics in the Circular Economy calls for innovation in chemical recycling
- Circular Economy Action Plan published March 2020

*"The Commission will propose **mandatory requirements** for recycled content"*

EU Circular Economy Action Plan



# Tighter regulation expected



Circular economy will become the norm for policy-making



Higher recycling targets



*Polluter pays*-principle strengthened: Higher CO2 tax on incineration



Requirements for recycled content in products



Forthcoming EU Chemicals Strategy for Sustainability to develop regulation further



*«Miljøstyrelsen vurderer umiddelbart, at jeres proces kan betragtes som genanvendelse forudsat at produkterne (naphta, diesel og tung fraktion) alle anvendes som råvare i produktionen af plast og ikke bruges som brændstof i plastproduktionen..»*

**Sonja Canger**

Kontorchef i Cirkulær Økonomi & Affald



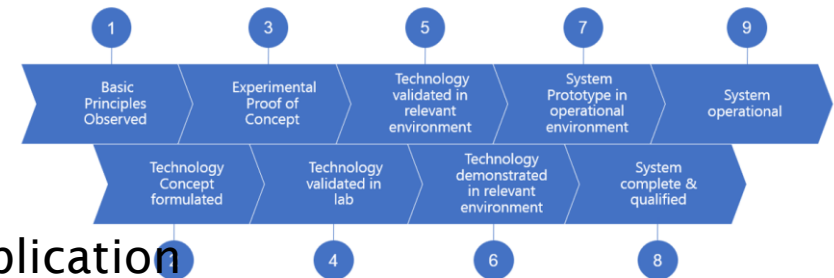
# QF Project portfolio 2020

- All QF projects to follow a standard execution template
- DG process for qualification and evaluation
- Current capacity 2 plants(FEEDs)/year

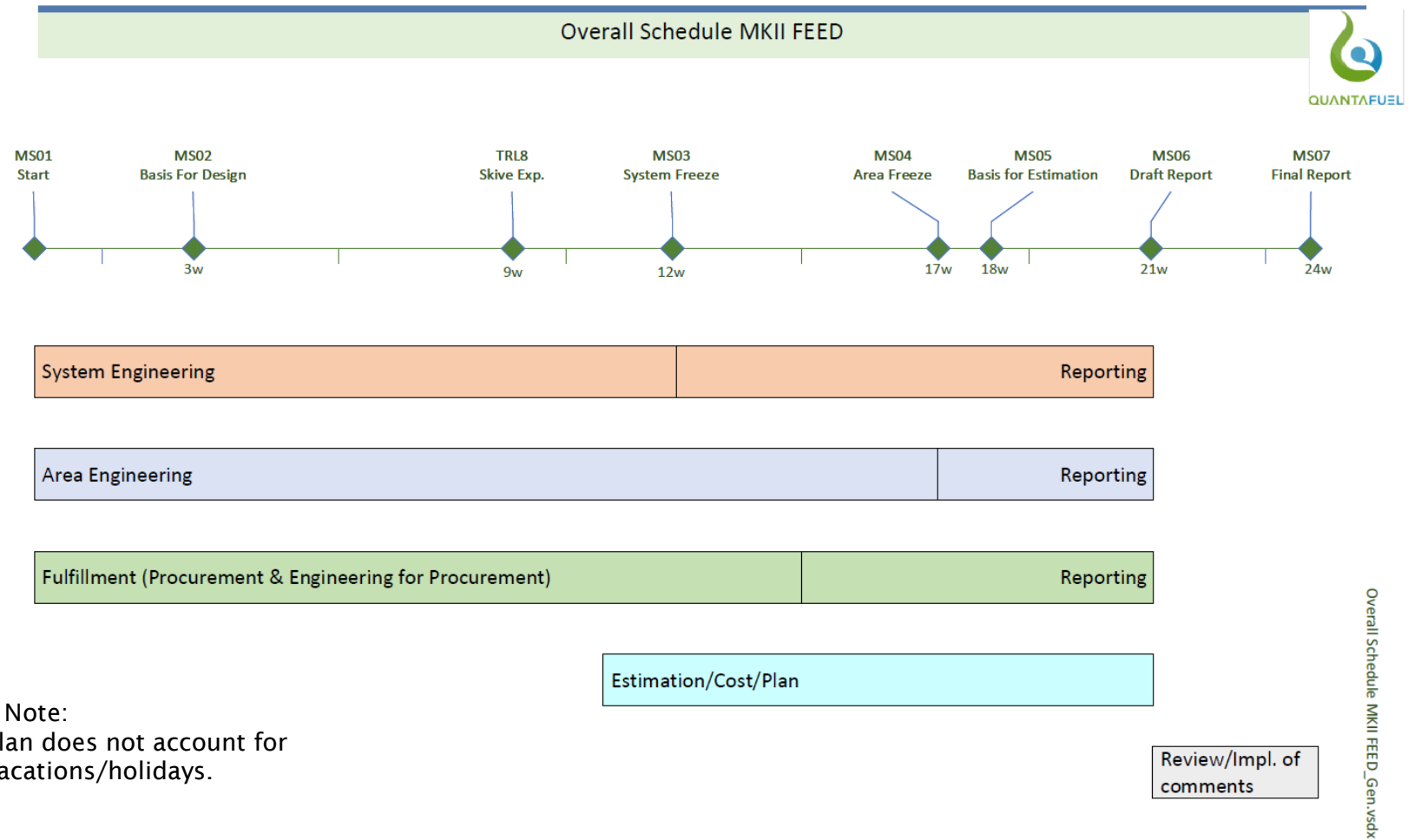
## Portfolio:

- Skive 1 – 20000 T/y, in comissioning/start-up
- QF MK 2 – 40000 T/y, in FEED, scalable through duplication
- QF MK 2 light – 10000 T/y, focus on durability/flexibility
- QF MK 3 – new reactor, catalyst etc. capacity > 100000T/y
- QF MK2 - Skive 2 – 40000 T/y

## Innovation Chain – EU H2020 Technology Readiness Level

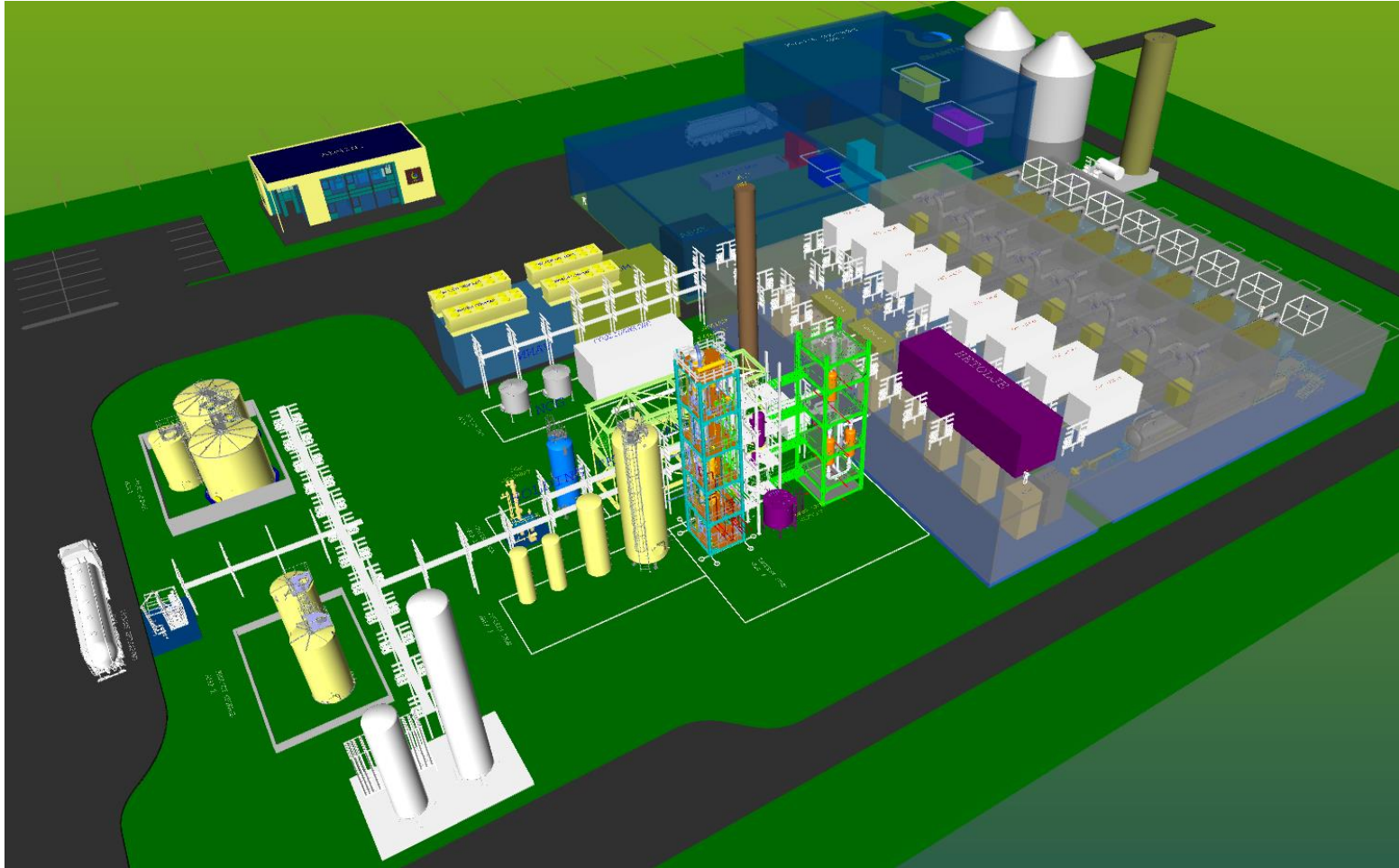


# QF MK2 FEED plan

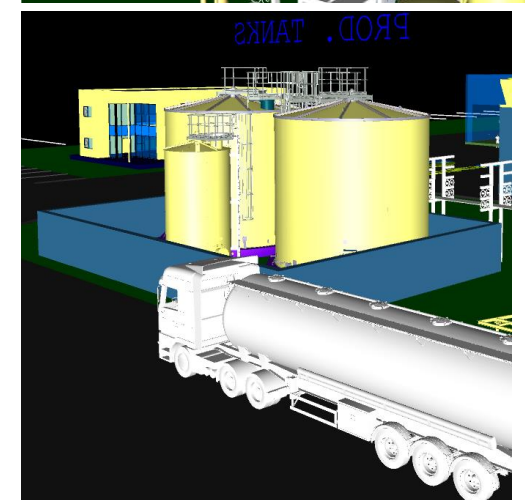
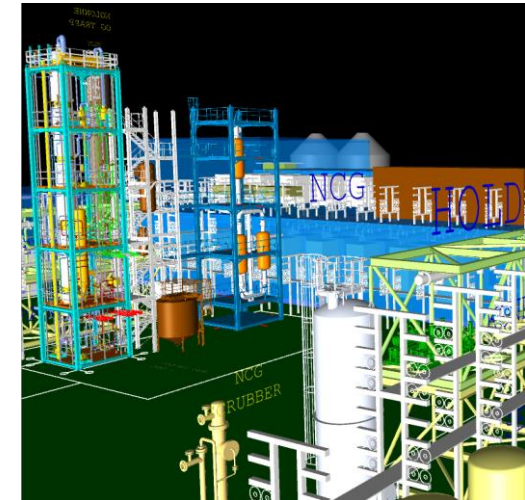
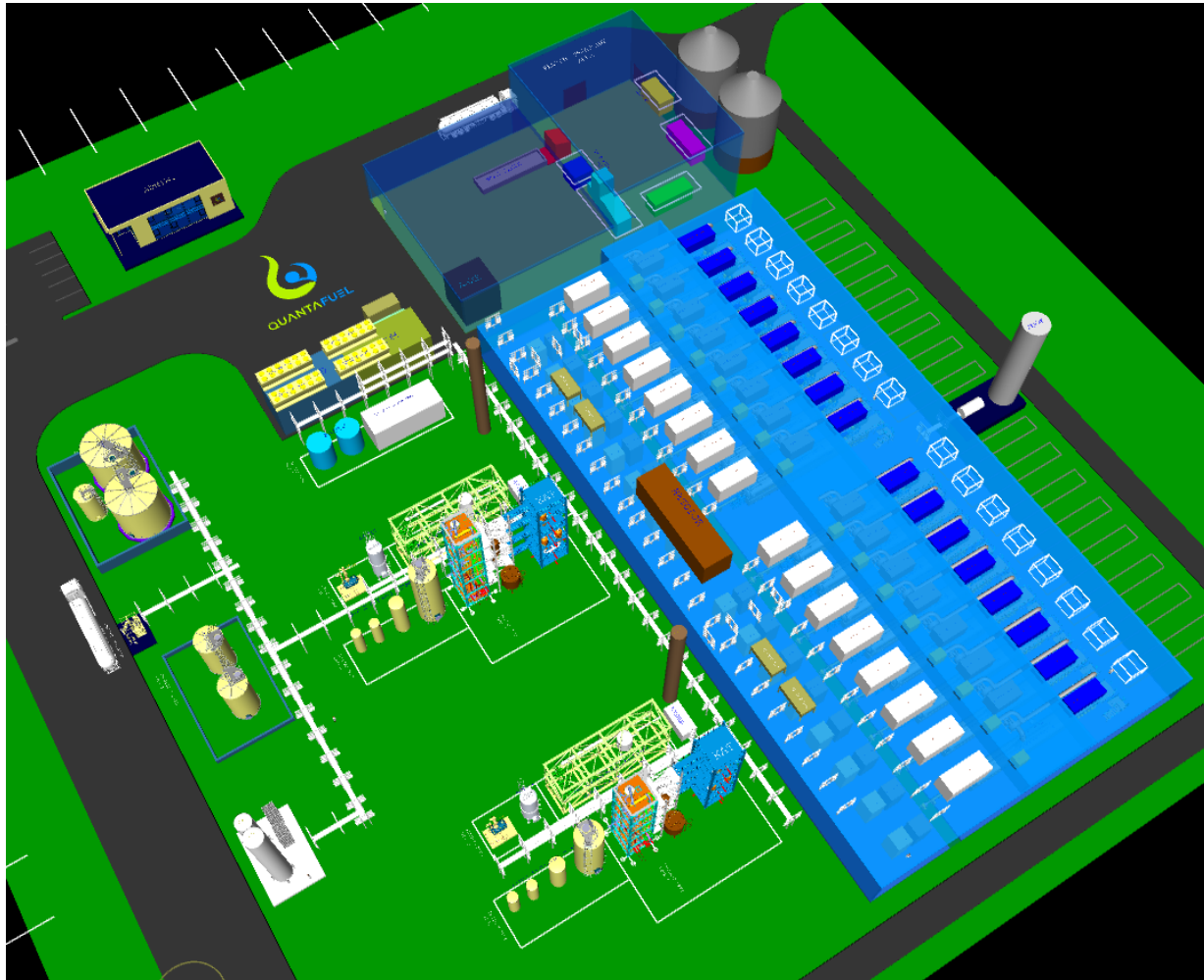




## QF MK 2 – 40000T/y typical layout



## QF MK 2 – 80000T/y typical layout





To the beginning of  
a partnership

