INEOS

Future of Sustainability in Piping Systems

Georg Fischer Sustainability Day – November 2023

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Agenda

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Who are we?

INEOS and INEOS Olefins & Polymers Europe in a snapshot

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INEOS O&P Eu Pipe Grades

Complete Product Offer

Beyond normative requirements

New TUB NRG for the most demanding applications

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Low Carbon Footprint HDPE

Setting high example

Better than other conventional materials

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Sustainability & Piping Systems

Taking real actions accross the value chain

INEOS GROUP OVERVIEW

25,000
People

$68 billion
Sales

10 million tons
BOE per annum

Safety first
SHE is our highest priority

17 million tonnes
Refinery products

66 million tonnes
Chemical capacity

31 countries

179 Sites Globally

61
Sites in America

84
Sites in Europe

32
Sites in Asia

2
Sites ROW

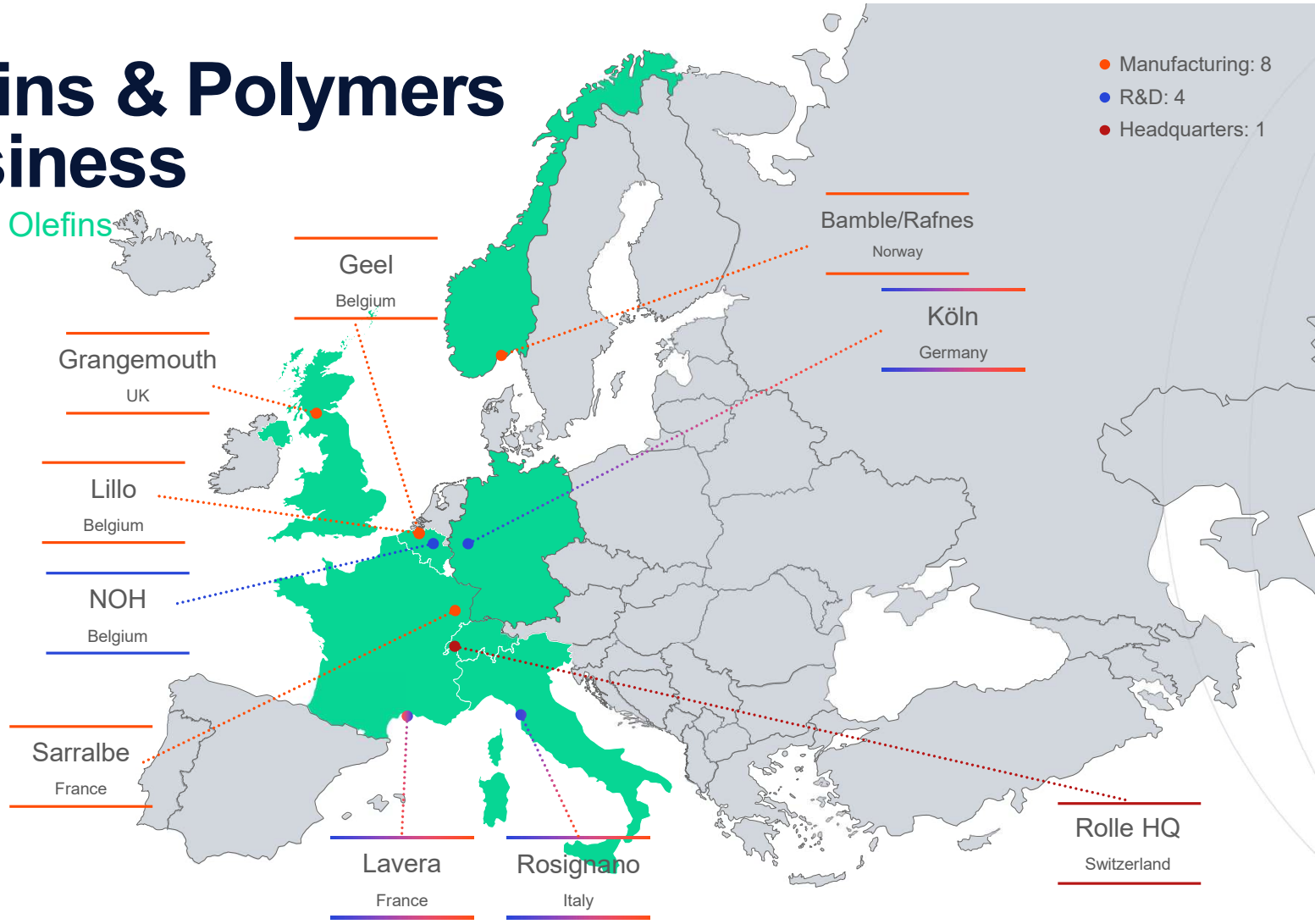
INEOS Olefins & Polymers Europe business

3 Mtpa Polyolefins, 6.5 Mtpa Olefins

Leading European producer of olefins and polyolefins

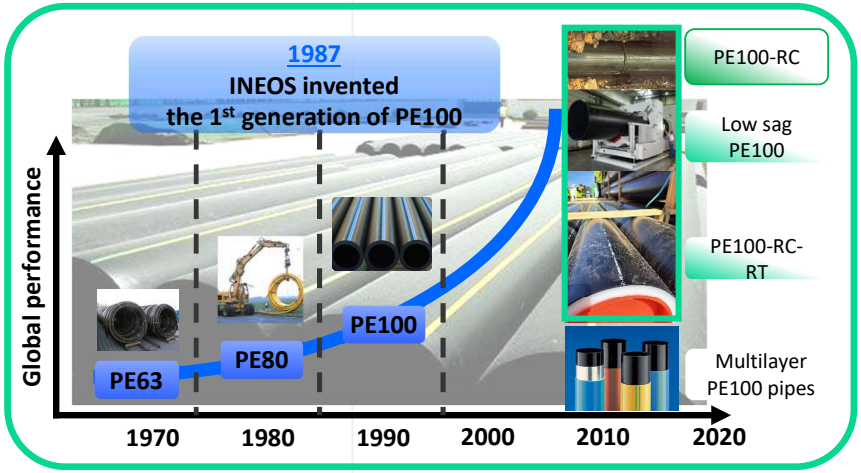
Manufacturing sites across Europe producing:

- Ethylene
- Propylene
- Butadiene
- Benzene
- Polyolefins (polyethylene and polypropylene)



INEOS O&P Europe Pipe Grades

Pressure pipe grades evolution drives the market



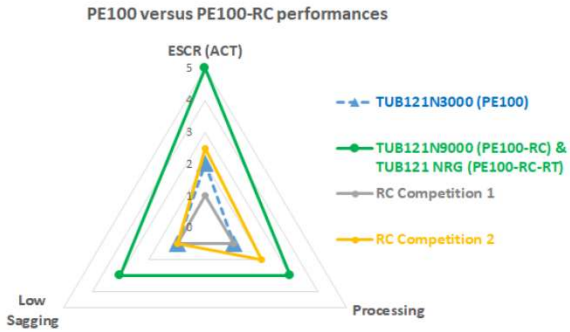
High Quality Pipe Grades produced in Europe

- Black PE80
- Black PE100
- Blue & Orange PE100
- Blue & Orange PE100-RC

- Black, Yellow & Blue PE80
- Black PE100-LS
- Black PE100-LS-RC-RT
- Natural RT Type II

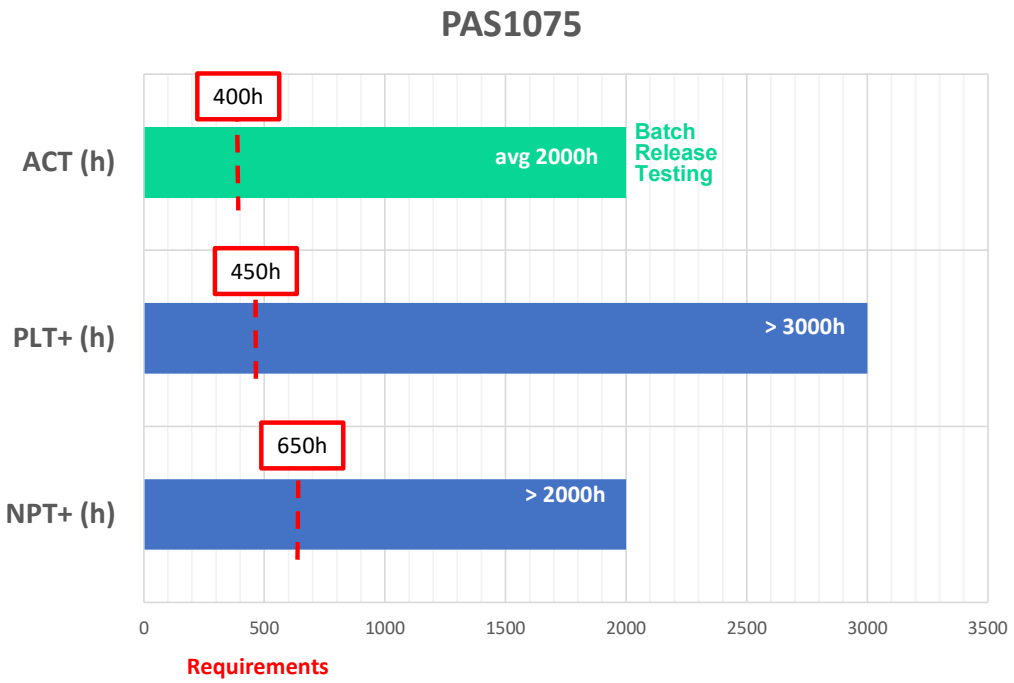
Unique R&T workflow, KH & proprietary Technologies

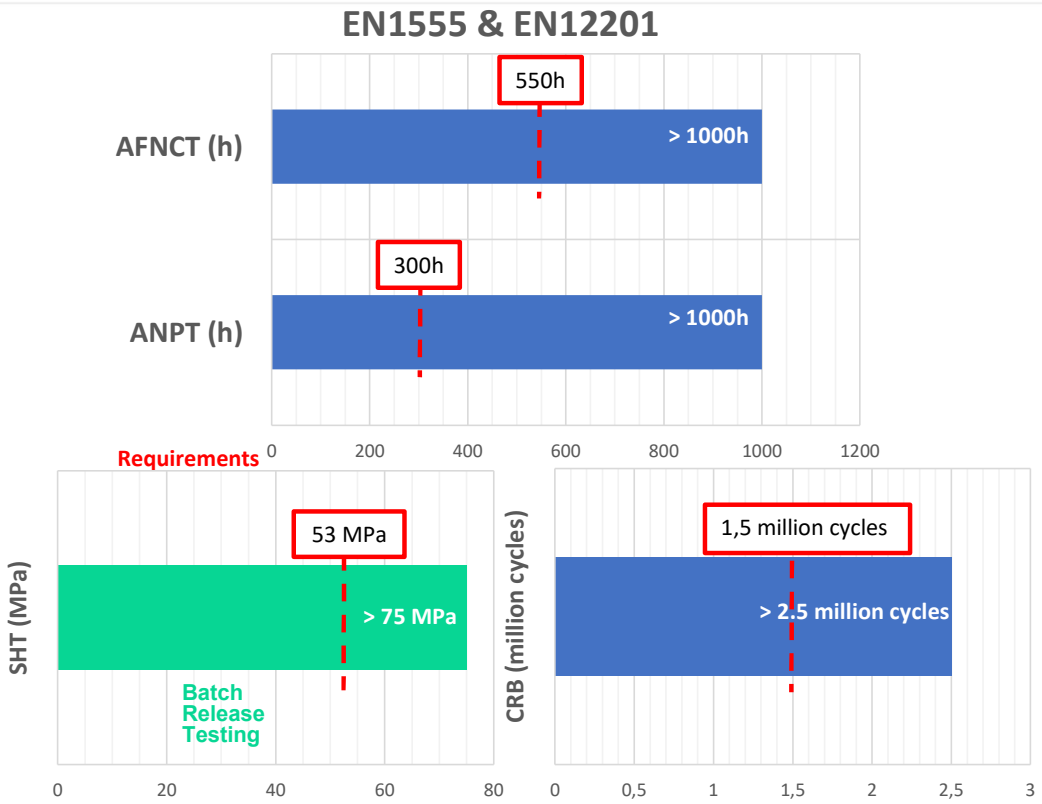
Best in class properties



INEOS O&P Europe Pipe Grades

Outstanding Stress Cracking Resistance makes it safe to install pipes made of PE100-RC in more severe conditions (no dig techniques or sandless trench installation)





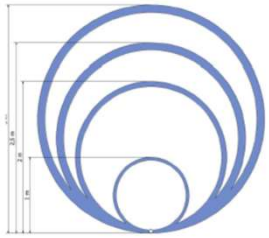
New TUB NRG **Universal** Pipe Grades

RC Slow Crack Growth Resistance

LS Low Sagging

RT Temperature Resistance

- Cost effective trenchless layout
- Very limited impact on environment during installation



- One size fits all

- Service temperature up to 70°C
- Withstand potential hot spots during HV electricity transmission
- Not limited to HVCD: Biogas transport (higher T°C)

INEOS NRG provides unrivaled and unique features. A new class of compounds with increased resistance to temperature & pressure

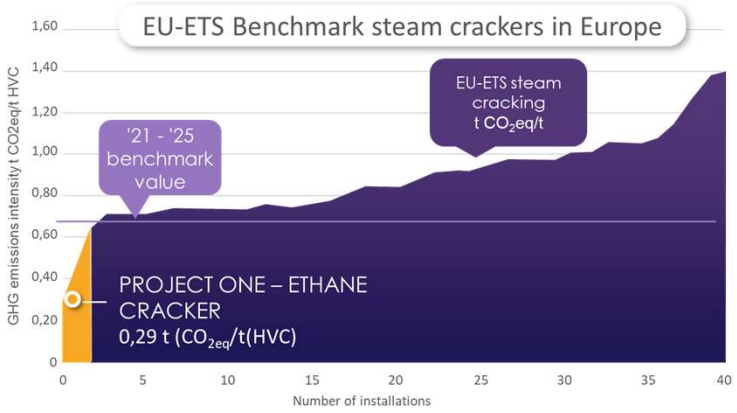
TUB120/121 NRG (natural & black) are market first PE100 solutions for Industrial applications

Project One: investing in low carbon ethylene

Biggest investment in European chemicals in a generation: €4 billion
World scale ethane cracker: 1.5Mt of ethylene production

Designed with best available technology for lowest emissions

- best available feedstock
- use of hydrogen
- renewable power
- highly integrated systems



= less than half the CO_2 emissions
compared to the 10% best crackers in Europe

Ready for **zero carbon within 10 years** of operations

(3 possible paths)

- **C-capture readiness**
- **100% H_2 fuelling**
- **Hybrid furnaces (H_2/electricity)**

Investing in critical **durable applications**

- €30m investment in Lillo plant
- Convert monomodal to proprietary bimodal
- Meet growing demand for durables
- NRG pipe resins for renewable power

Applying INEOS' expertise to ducting for underground high voltage cables that transport green energy safely and efficiently

Working closely in partnership with customers who manufacture pipes made from INEOS polyethylene to transport critical utilities into people's homes

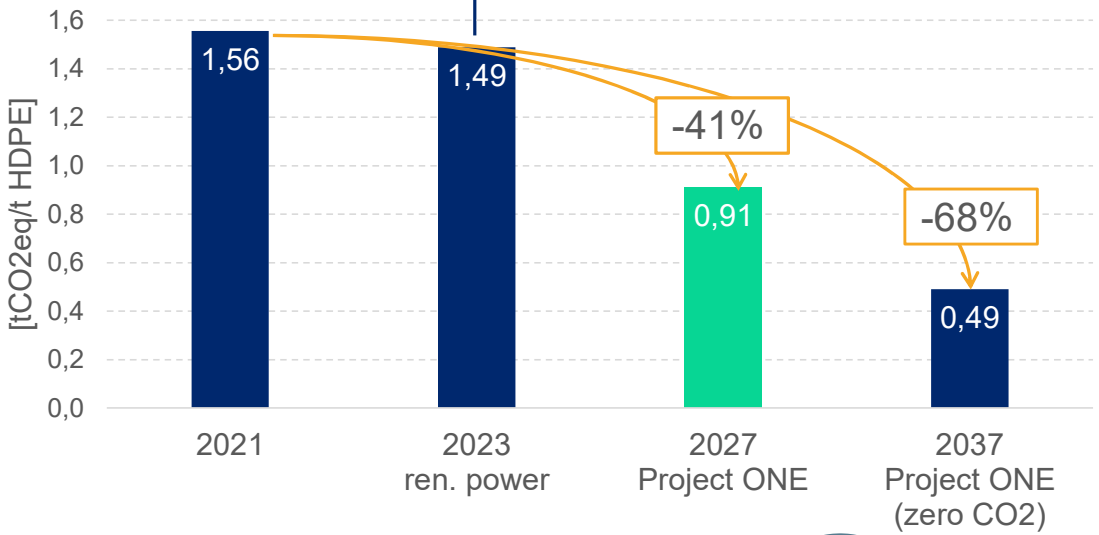
Collaborating with Brugge Brouwerij De Halve Maan to create a 3km beer pipeline from INEOS polyethylene that reduces downtown truck traffic and reduces emissions

Lillo HDPE Carbon Footprint

Setting high example

- Cradle-to-gate Product Carbon Footprint, 2021 data externally validated by TÜV Rheinland.
- Today: -17% lower product carbon footprint versus average HD produced in Europe.
- As from 2027: MIN -41% lower product carbon footprint vs today's EU average thanks to new cracker (Project One).

Contracted renewable power can be allocated to Lillo HDPE plant today

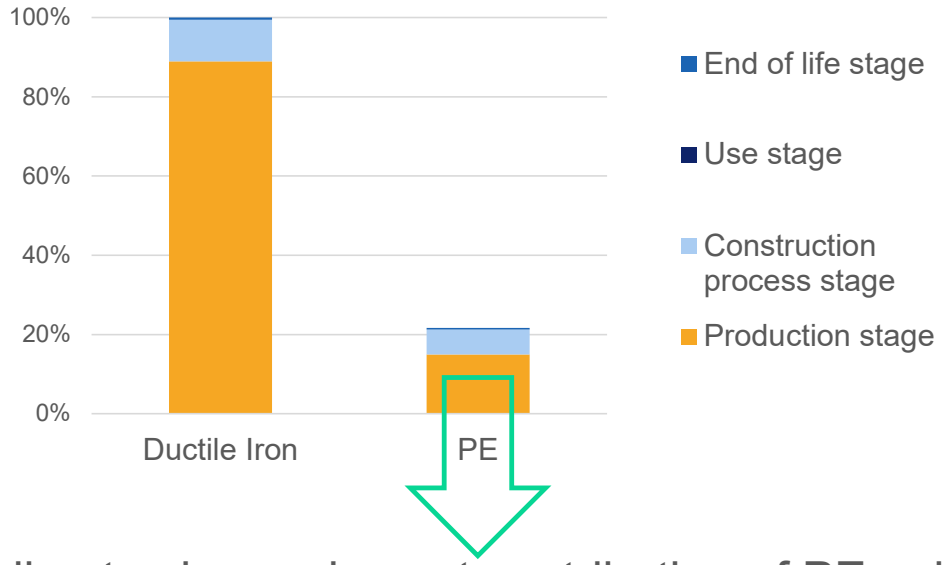


Better Carbon Footprint than conventional materials

Indicative: Pipe material PE *versus* Ductile Iron

- Various cradle-to-grave LCA studies – translated into EPDs – do exist.
- Reference is made to TEPPFA & PE100+.
- In terms of climate change (Cradle-to-Grave climate change PE vs DI*):

*Indicative cradle to gate global warming impact comparison between general PE pipe & general Ductile Iron pipe; Not INEOS O&PEU specific.
For more details on the methodology, declared unit, etc. please refer to the source material by TEPPFA: https://www.teppfa.eu/



Includes, among others, the climate change impact contribution of PE pellets
(average PCF HDPE: 1.80 [kg CO2-eq/kg] (EcoProfiles))

Here is where INEOS O&PEU can have a major impact with our HDPE material

INEOS

Olefins & Polymers Europe

CO_2 Reduction & Circular Economy

Our products and action across the value chain enable **a more sustainable future**

Sustainability : INEOS' commitments

Reduce operational greenhouse gas emissions by **33%** By 2030 (compared to 2019)

Reach **net zero** greenhouse gas emissions by **2050**

2025 pledge

Use on average **30%** of recycled material in polystyrene packaging products

Offer polyolefin products for packaging applications containing at least **50%** of recycled materials

Ensure **100%** of polymer products can be recycled

Incorporate at least **325 kt** of recycled material in our products

2030 pledge

We will incorporate at least **850,000** tonnes of recycled and bio-sourced polymer into our polymer products by 2030

INEOS only makes pledges that it can support with real world action plans

Renewable feedstock

INEOS O&P developed a range of bio-attributed olefins and polyolefins, based on alternative renewable feedstocks of different origins that do not compete with food production: CTO, UCO (being approved), etc. This contributes to a significant reduction in carbon emission.

sustainable feedstock
(**C**rude **T**all **O**il, **U**sed **C**ooking **O**il)

- Best GWP option (biogenic CO_2).
- Availability restricted subject to commercial agreement
- Drop-in solution in pressure pipe.
- ISCC+ certification (mass balance chain of custody)

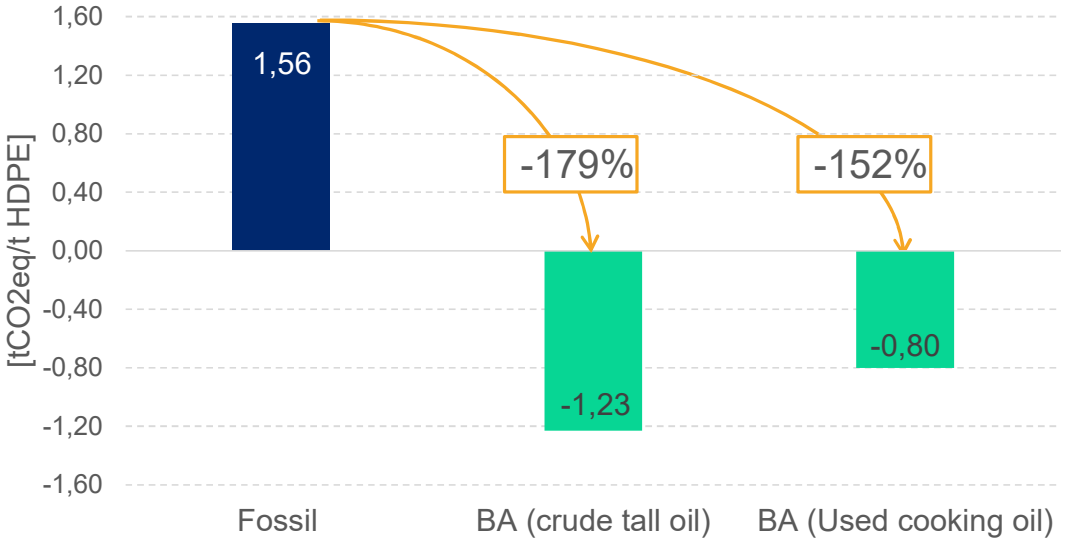
Example: French gas utility network operator, GRDF, has laid the world's first bio-based certified polyethylene gas pipeline using polymer supplied by INEOS

Renewable Feedstock

Impact on Carbon Footprint

- Cradle-to-gate Product Carbon Footprint, 2021 data externally validated by TÜV Rheinland.
- Bio-attributed cradle-to-gate PCF, builds upon model validated by TÜV Rheinland and is validated by SCS Global Services in the ISCC+ framework.
- Bio-attributed material is certified under ISCC PLUS standard (mass balance chain of custody).
- “Bio-circular” feedstocks (CTO/UCO).
- ISCC+ certification ensures traceability along the value chain.
- Significant GHG savings due to biogenic carbon in the bio feedstock.

HDPE-BA Lillo can be purchased today



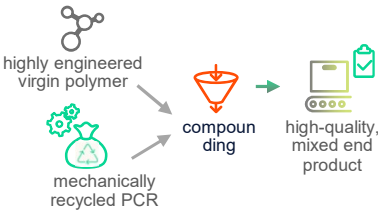
Advanced Recycling

Drop-in solution in pressure pipe

- Advanced recycling critical for creating recycled materials for demanding applications such as pipe (Pressure, Drinking Water).
- Long term option (PIEN investment project).
- Some volume available in the meantime.

- Agreement signed for 100,000 tons per annum, biggest use of the technology on the market.
- Addressing plastics circularity and food contact applications as a priority.

Mechanical Recycling



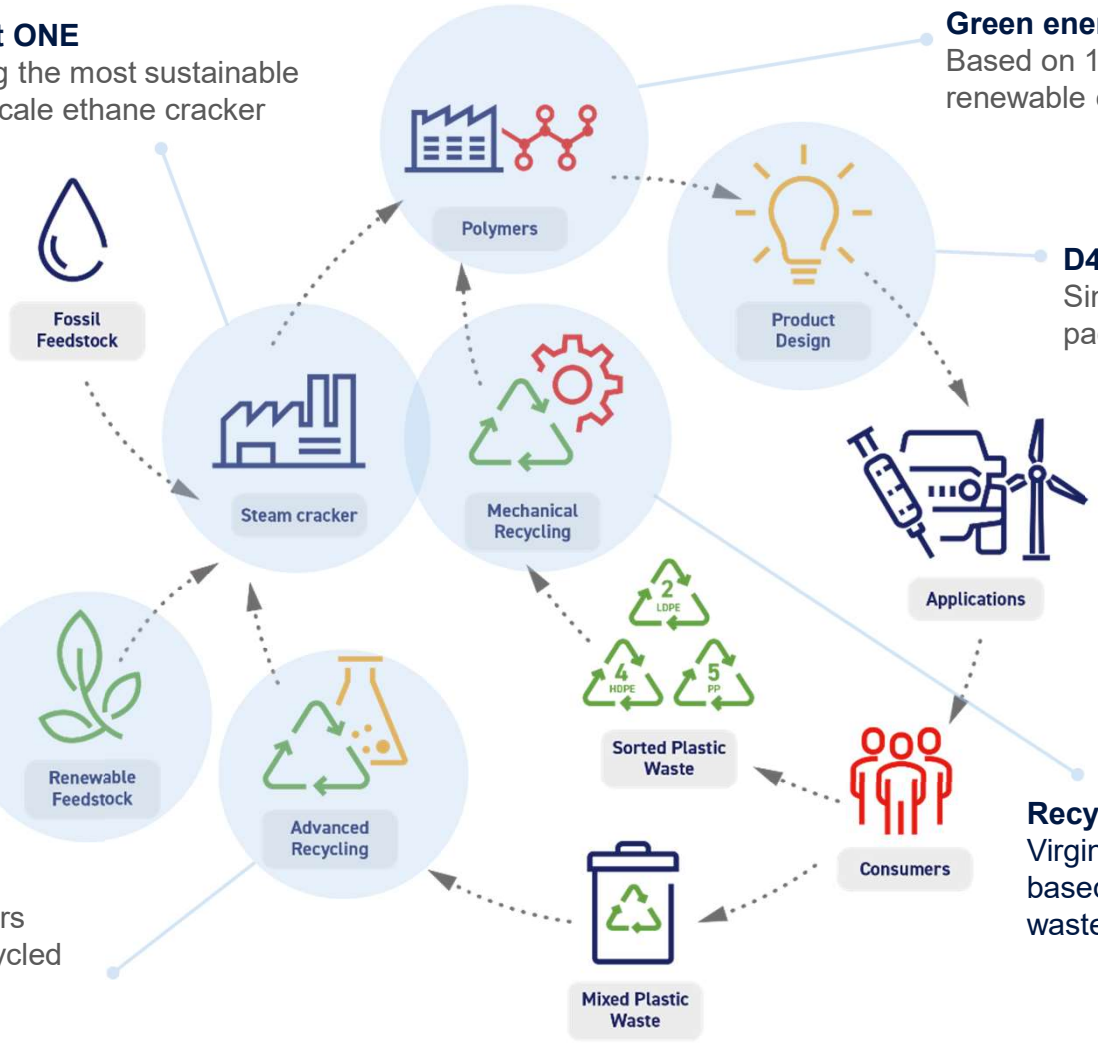
- Not for pressure pipe applications at the moment (strict standards to match)
- Option remains for non-pressure pipe applications (sewage and drainage)
- Challenge to create a stream of predictable and reliable quality PCR at competitive price
- Closed loop collection and reprocessing of waste pipes should pose a problem of material degradation

Taking **real action across the value chain**

Project ONE
Building the most sustainable world scale ethane cracker

Green energy polymers
Based on 100% renewable energy

D4R
Simplifying complex packaging structures



Renewable Feedstock
Large range of low carbon PE & PP polymers based on non fossil feedstocks
- ISCC+ Certified
- Range of feedstock options

Advanced Recycling
Identical to virgin polymers based on chemically recycled plastic waste eg for food packaging

RecycI-IN Hybrids
Virgin like polymers based on recycled plastic waste

Global Sustainability Report

- INEOS has published its global sustainability report for 2022
- Highlights best in class safety performance and strong progress against climate and circular economy goals:

Best in class safety performance of 0.17 injuries per 200,000 hours worked

12% reduction in greenhouse gas emissions compared to 2019

New target to incorporate 850 thousand tons of recycled or bio-attributed material into polymer products by 2030

The full report available from the INEOS website: https://www.ineos.com/sustainability/sustainability-reports

More information

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Thank You