

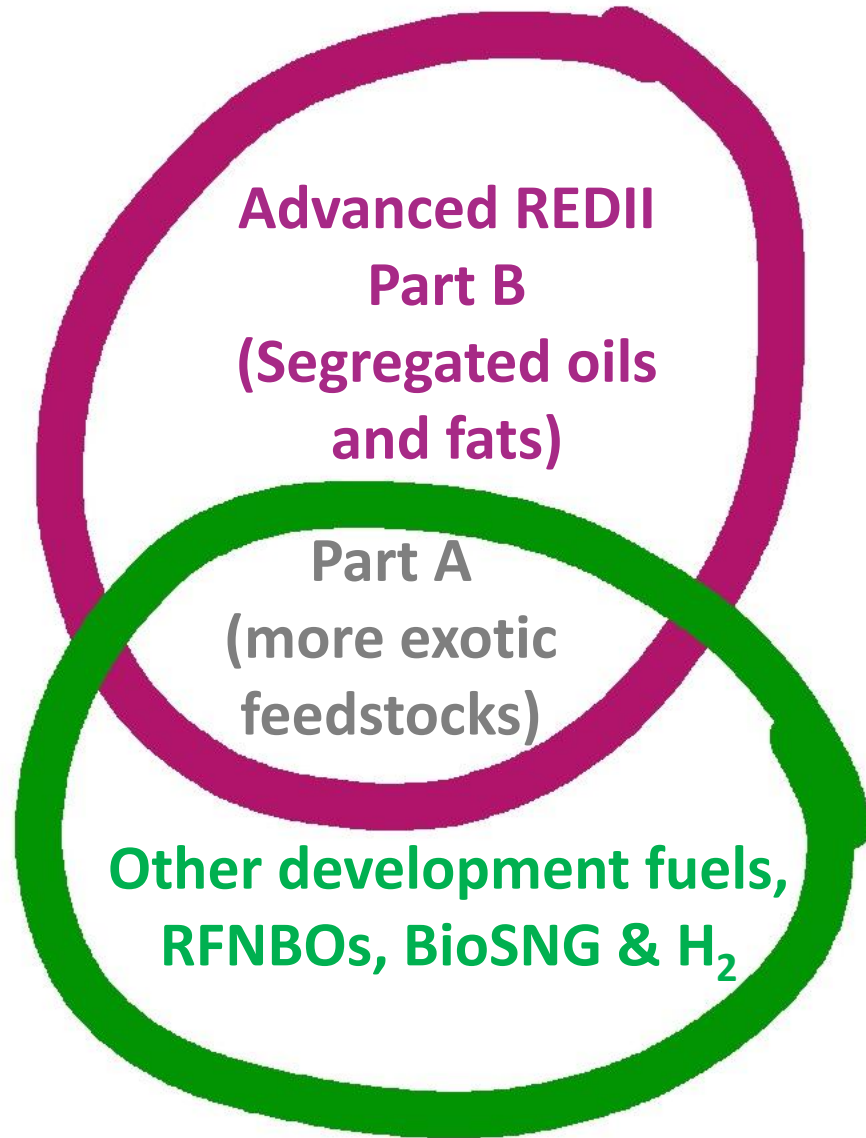
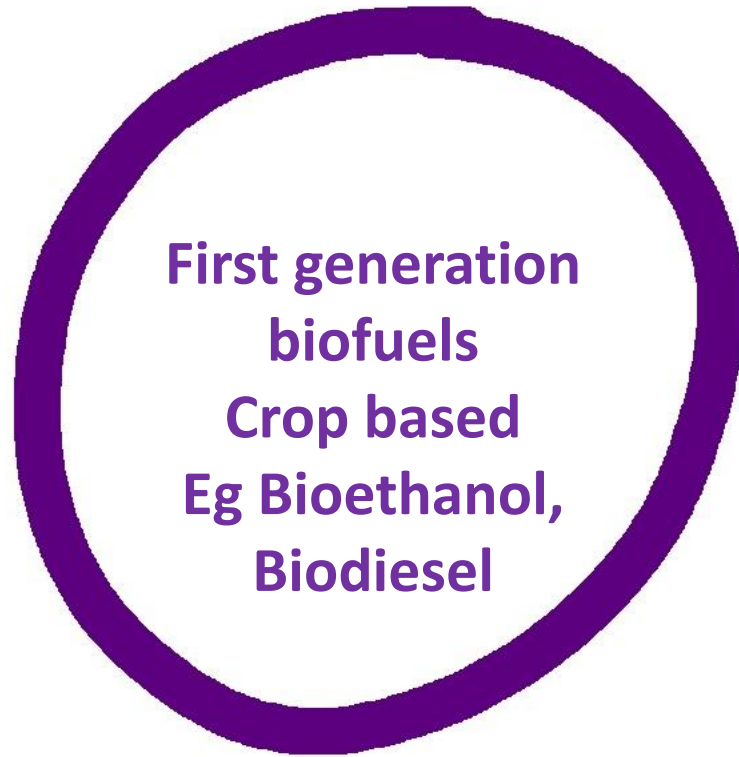
# Next Generation Fuels

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## Annex IX Part A (advanced biofuels)



- Algae if cultivated on land in ponds or photobioreactors
- Biomass fraction of mixed municipal waste
- Bio-waste
- Biomass fraction of industrial waste not fit for use in the food or feed chain
- Straw
- Animal manure and sewage sludge
- Palm oil mill effluent and empty palm fruit bunches
- Tall oil pitch
- Crude glycerine
- Bagasse
- Grape marcs and wine lees
- Nut shells
- Husks
- Cobs cleaned of kernels of corn
- Biomass fraction of wastes and residues from forestry and forestry-based industries
- Other non-food cellulosic material
- Other ligno-cellulosic material
- Renewable liquid and gaseous transport fuels of non-biological origin
- Carbon capture and utilisation for transport purposes, if energy source is renewable
- Bacteria, if energy source is renewable

**Capped in  
RTFO**

First generation  
biofuels  
Crop based  
E.g. Bioethanol,  
Biodiesel

Advanced REDII  
Part B  
(Segregated oils  
and fats)

Part A  
(more exotic  
feedstocks)

**Capped  
@1.7% in  
REDII 2030**

**Min 3.5%  
2030 in  
REDII**

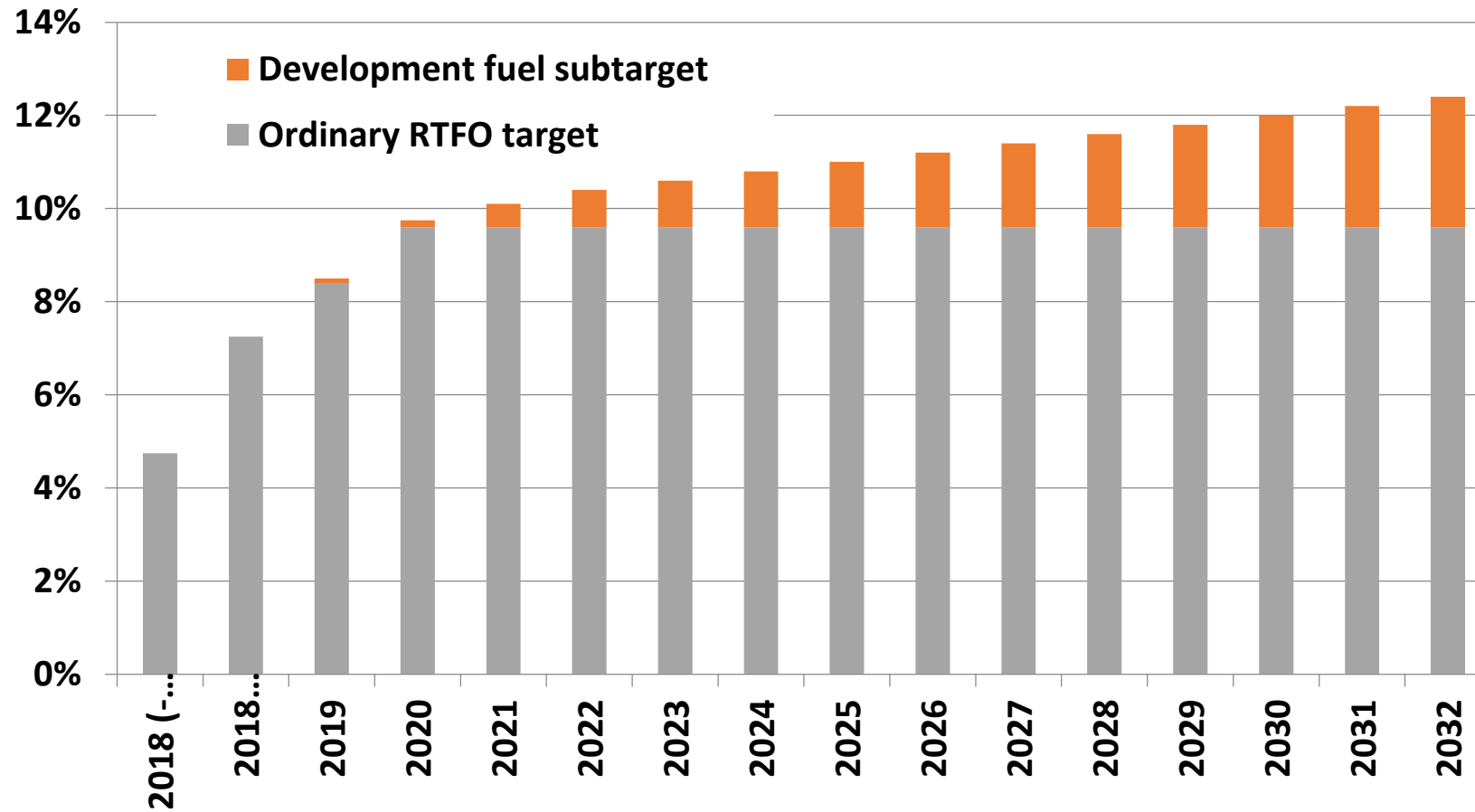
Other development fuels,  
RFNBOs, BioSNG & H<sub>2</sub>

**Dev. Fuel  
Target in  
RTFO**

# Development fuels

- A UK-specific group of fuels
- Stimulated under the amended RTFO
- Given a specific sub-target, and higher buy out price (80p/litre)
- Have to meet dual criteria of being made from certain feedstocks (wastes/RFNBOs but not segregated oil/fat) *and* being particular end fuels (drop in, aviation, hydrogen or bioSNG)
- A fuel that can be blended at levels of at least 25% (by volume) whilst still meeting BS EN: 228 / BS EN: 590
- Comprises only growth in RTFO post-2020

# RTFO targets



# Paraffinic diesels

- Hydro-treated Vegetable Oil (HVO) – ***is not a RTFO Development Fuel*** if made with segregated oil / fat
- Drop in paraffinic diesel ***is a development fuel*** if made from renewables fuels of non-bio origin (RFNBOs) (eg GtL, PtL)

# Aviation fuels

- E.g. Avtur / Avgas made from mixed renewable and fossil fuel (e.g. black bin bag waste) = part RTFO development fuel, part Low Carbon Fossil Fuel (LCFF)
- The DfT *may* support LCFFS via the RTFO from 2021





# Challenges

- High but uncertain level of incentive – tickets in theory £160/litre (as x 2 counted)
- Risk that success in one development fuel may “swamp” target
- Very diverse fuels in one basket

Gas	RTFCs/ kilogram
Biomethane /bio-substitute natural gas (CH <sub>4</sub> )	1.9
Biobutane or biopropane (C <sub>4</sub> H <sub>10</sub> , C <sub>3</sub> H <sub>8</sub> )	1.75
Hydrogen (H <sub>2</sub> )	4.58
Any other renewable gas of biological origin	1
NB all of the above are doubled if the feedstock that produced them is a double counting waste or residue, or if the gas is a RFNBO.	

# Very diverse fuels in one basket

	Drop in liquid	Aviation fuel	RFNBO liquid	Electrolysis-produced H <sub>2</sub>	Thermally-produced H <sub>2</sub>
Feedstock constrained?	✓	✓		x	✓
Technology development required?	✓	✓✓	✓	x	✓
Complex to produce?	✓	✓	✓	x	✓
High cost to produce	✓	✓	✓✓	(✓) see note	✓
Infrastructure changes required to use fuel?	x	x	x	✓	✓



- ▶ Before dRTFCs can be applied for, the specific fuel production route needs to be assessed by the RTFO Administrator.
- ▶ The assessment will determine what type of RTFC the fuel may be eligible for, and how many RTFCs per litre or kg.





- ▶ Applicants receive an official letter stating the outcome of the assessment
- ▶ The assessment letter may be 'conditional'...

E.g. where blend testing has yet to be completed





- ▶ Assessment requests since April 2018:
  - ▶ 19 waste derived feedstocks
  - ▶ 10 RFNBO
  - ▶ 4 'other'





- ▶ Assessment requests since April 2018:
  - ▶ 8 hydrogen
  - ▶ 3 Bio SNG
  - ▶ 5 Aviation fuel
  - ▶ 10 'drop in' petrol
  - ▶ 12 'drop in' diesel







If you think you may have a development fuel, please contact the RTFO Administrator for an assessment.



# Hear more about it

- Parallel session one
- Commercialisation of next generation fuels
- Ben Madden, Element Energy, H2ME
- Neville Hargreaves, Velocys
- Andy Cornell, Progressive Energy



# Thank you

## Gaynor Hartnell,

Head of Renewable Transport Fuels and LFG

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RENEWABLE TRANSPORT FUELS:

**DECARBONISING TRUCKS, TRAINS,  
BOATS AND PLANES**

3<sup>rd</sup> December 2019  
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