



# NESTE RENEWABLE AVIATION

**We have moved from feasibility to execution.**  
Capacity of sustainable aviation fuel is now 100 kt  
and is being ramped up rapidly

Fossiilittoman liikenteen tiekartta,  
Lentoliikenteen alatyöryhmä  
18.3.2020 Henrik Erämetsä

# Disclaimer

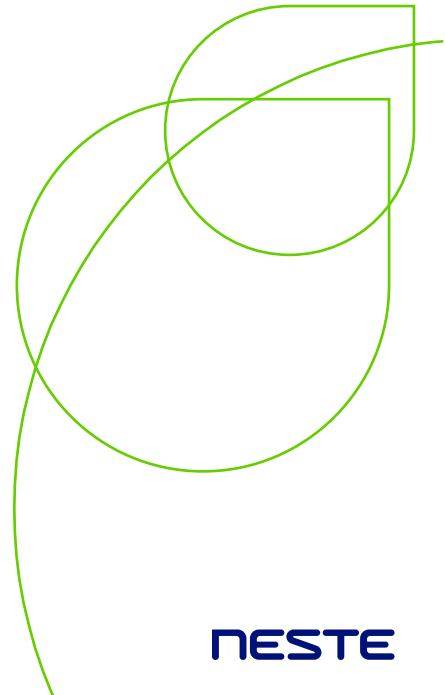
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# Neste has started commercial sales of Sustainable Aviation Fuel since 2019

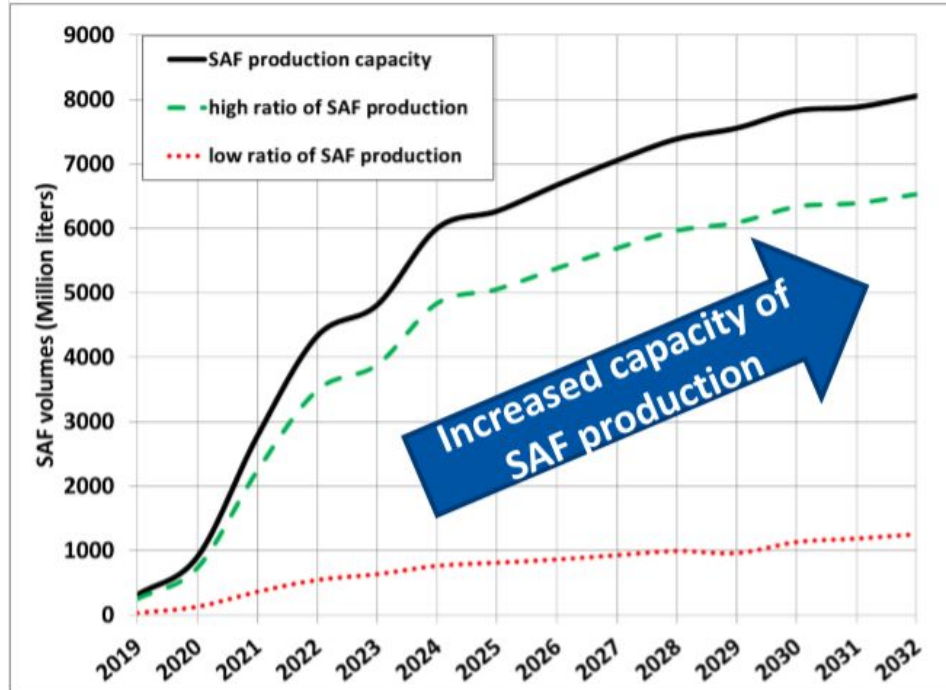


# ROLE OF SAF IN THE DEFOSSILIZATION OF AVIATION

- Short to mid-term, there are no alternatives to Jet-A1
  - Mid to long-term, disruptive technologies will play a large role in regional air traffic, but not in long-haul
- The role of SAF will be central for decades to come
- The needed volumes will be much more than the present total biofuels production



# ICAO expects an increased capacity of SAF production



According to ICAO, the production capacity of sustainable aviation fuels will continue to increase:

**8 Billion litres (6.5 MT) of SAF production capacity available by 2032, and 6.3 Billion litres (5 MT) in 2025.**

The graph is based on data collected from 26 SAF producers in April 2019.

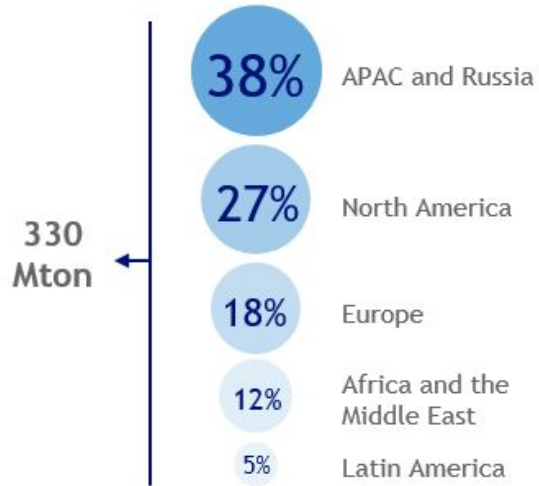
An update round will be made in April 2020

Source: ICAO @ SAF Stocktaking Event 2019-05-01



# SAF demand expected to grow substantially starting with first mandates in Europe

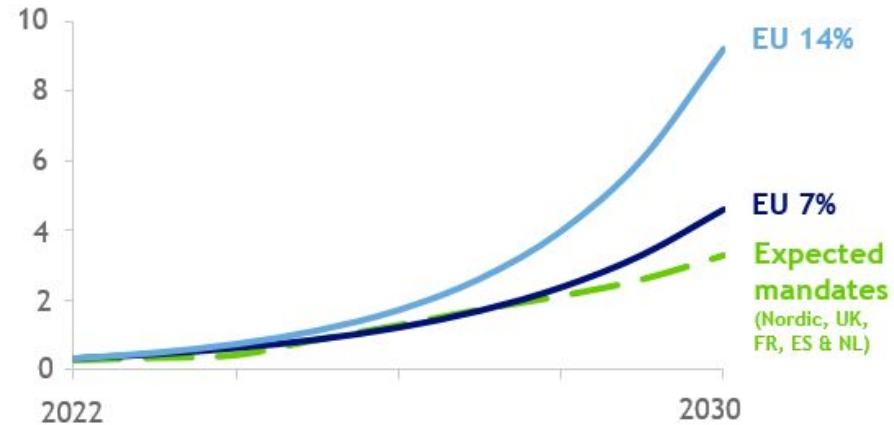
## Current jet fuel demand



Source: WoodMackenzie

## Case example: mandate-driven SAF demand potential in Europe (Mton/a) <sup>1</sup>

Scenarios where all EU countries implement an SAF mandate at a given blend percentage

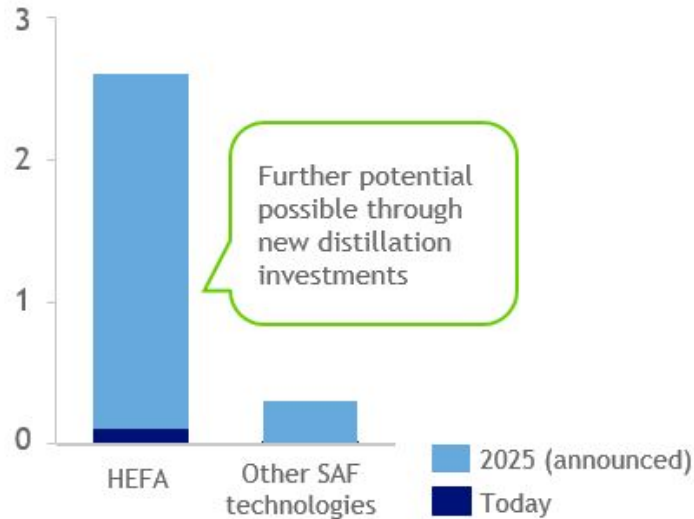


Source: Neste internal expert estimation.

1. Total EU jet fuel demand in 2030 estimated to be 66 Mton. Source: WoodMackenzie

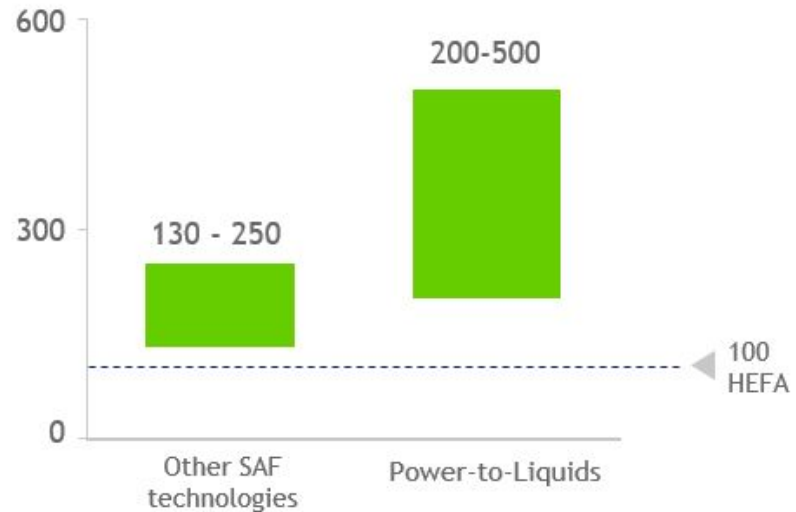
# Short-term, HEFA is the best placed SAF option due to high availability and economical scalability

## HEFA and other SAF current and future availability (Mton/a)



Source: Neste based on public announcements and IEA (2019).

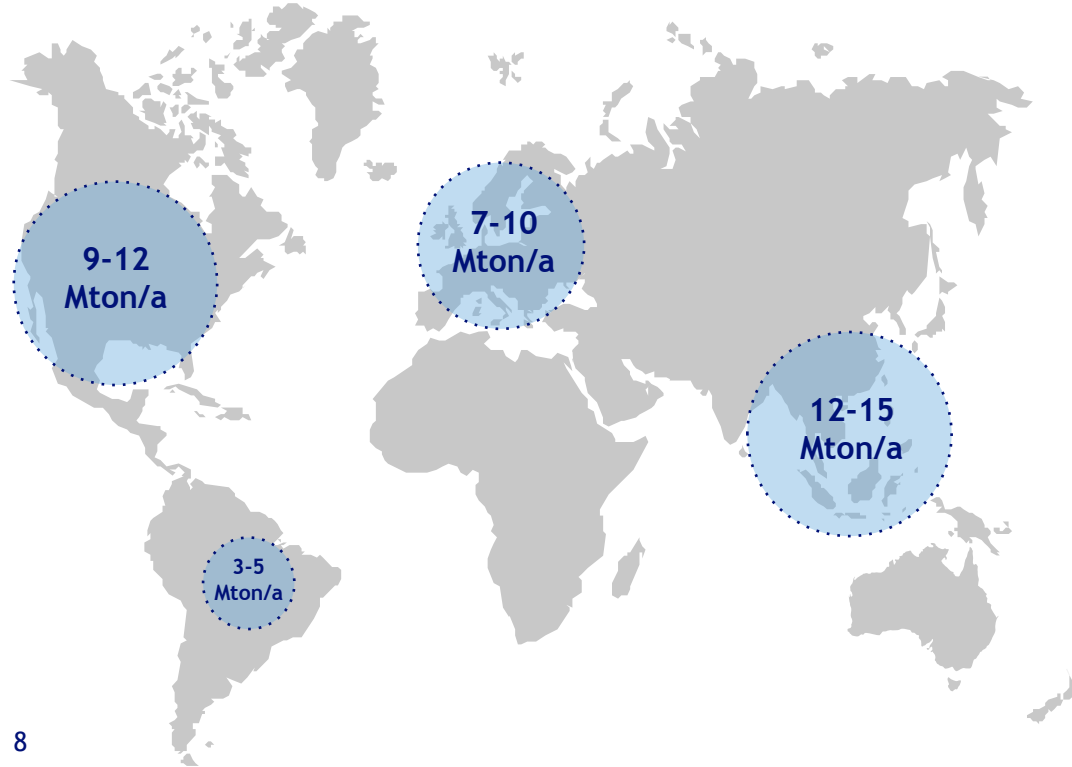
## SAF indexed production cost range (EUR)



Note: Other SAF technologies include gasification + Fischer-Tropsch and Alcohol-to-Jet. Source: Neste based on ICCT (2019), IEA (2019) and others.

# Waste and Residue oils and fats feedstock availability to grow to over 35 Mton/a by 2030

Regional split of currently identified waste and residue feedstock pool 2030



Existing feedstock pool growth to ~35 Mton

- Increased collection and aggregation rates
- Improved pretreatment technologies



# Neste feedstock strategy focused on waste and residues growth and development of new feedstock sources

## Feedstock strategy focus areas

Expanding range of waste and residues with low carbon intensity

Diversification of feedstock pool, including RED II Annex IXA feedstocks and new technologies

Development of novel vegetable oils from advanced agricultural concepts - importance expected to grow longer term

Targeting 100% waste and residues share by 2025

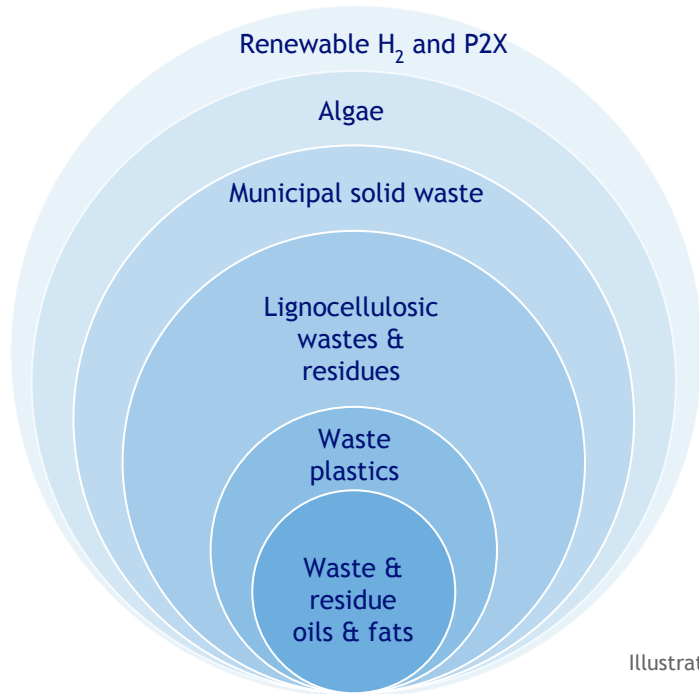
Share of new types of feedstock expected to grow towards 2030

# Longer-term, other technologies with better scalable feedstocks will provide the growth



# Feedstock potential is a multiple of the present global biofuels production

Estimated feedstock potential beyond 2040 (illustrative)

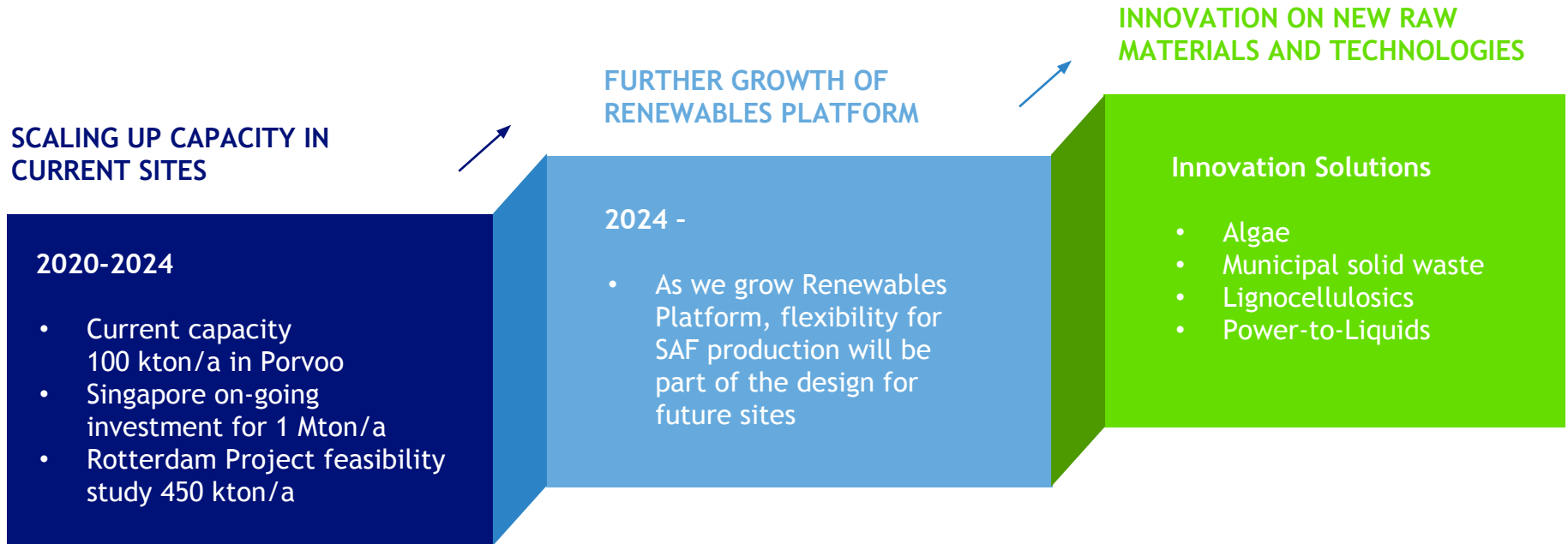


New feedstock pools can **multiply the GHG reduction** impact in fuels and chemicals

**New technologies and business models** can capture opportunities based on new feedstock pools

Illustrative based on IEA, UNDP, Correa et al 2019 and others

# Neste SAF production capacity to exceed 1 Mton in 2022 with continuous new feedstock innovation to provide optionality for growth



# Regulatory schemes applied in on-road and power sectors

## What would be best for SAF?

- Tax relief. Not possible in the tax-free aviation
- Mandate = obligation. So far best working market based scheme. In aviation, problem is the global competition
- Aviation's opt-in for on-road mandate. Easy start for smallish volumes. Car drivers are paying
- Feed-in-tarif. Used for power. State or customer paying the bill. Willingness for the same in aviation?
- Auctioning = "batch Feed-in"
- Investment support. Good way to bring TRL up, but not for long-time support. (PtL competitive with other SAF and present technology if power price = 0)
- R&D support

# Mandates are expected to play a key role in the deployment of SAF in Europe

- ✓ The current European States SAF promotion plans (announced or under development) could drive to a **SAF demand of about 6%** of jet-fuel use in the EU-28 in 2030.

		2017		2020			2022			2025			2030		
COUNTRY	POLICY/PLAN	Jet Fuel (Ton)	Jet Fuel (Ton)	SAF %	SAF (Ton)	Jet Fuel (Ton)	SAF %	SAF (Ton)	Jet Fuel (Ton)	SAF %	SAF (Ton)	Jet Fuel (Ton)	SAF %	SAF (Ton)	
NORWAY	% Blend	994.000	1.024.119	1	10.241	1.044.704	2	20.894	1.076.360	5	53.818	1.131.265	30	339.379	
SWEDEN	% Blend	1.022.000	1.052.968	0	0	1.074.132	2	21.483	1.106.680	5	55.334	1.163.131	30	348.939	
FINLAND	% Blend	911.000	938.604	0	0	957.470	1	9.575	986.482	5	49.324	1.036.803	25	259.201	
SPAIN	% Blend	6.401.000	6.594.957	0	0	6.727.515	0	0	6.931.366	2	138.627	7.284.935	5	364.247	
FRANCE	% Blend	7.226.000	7.444.955	0	0	7.594.599	0	0	7.824.723	2	156.494	8.223.862	5	411.193	
PORTUGAL	RNC2050	1.407.187	1.449.826	0	0	1.478.968	0	0	1.523.782	8	121.903	1.601.510	20	320.302	
UK	RTFO/F4C	11.759.890	12.116.226	0	0	12.359.763	1	120.000	12.734.276	1	127.343	13.383.852	5	669.193	
NETHERLANDS	Opt-in/KLM	3.894.390	4.012.394	0	0	4.093.043	2,5	100.000	4.217.066	2,5	105.427	4.432.179	5	221.609	
GERMANY	AIREG	10.011.000	10.314.343	0	0	10.521.662	1	105.217	10.840.478	5	542.024	11.393.452	10	1.139.345	
TOTALS		43.626.467	44.948.393		10.241	45.851.855		377.168	47.241.212		1.350.294	49.650.989		4.073.408	
		2017		2020			2022			2025			2030		
		Jet Fuel (Ton)	Jet Fuel (Ton)	SAF %	SAF (Ton)	Jet Fuel (Ton)	SAF %	SAF (Ton)	Jet Fuel (Ton)	SAF %	SAF (Ton)	Jet Fuel (Ton)	SAF %	SAF (Ton)	
EU-28		55.846.599	57.538.807	0,018	10.241	58.695.337	0,64	377.168	60.473.864	2,23	1.350.294	63.558.639	6,41	4.073.408	

\*Note: This chart is an estimate based on expert's judgement. An annual net 1% increase in jet fuel use has been estimated from 2017 (last Eurostat Jet Fuel use data in EU28) until 2030.

Source: Cesar Velarde @ ECAC 2019-10-16



# Our climate commitments

## HANDPRINT

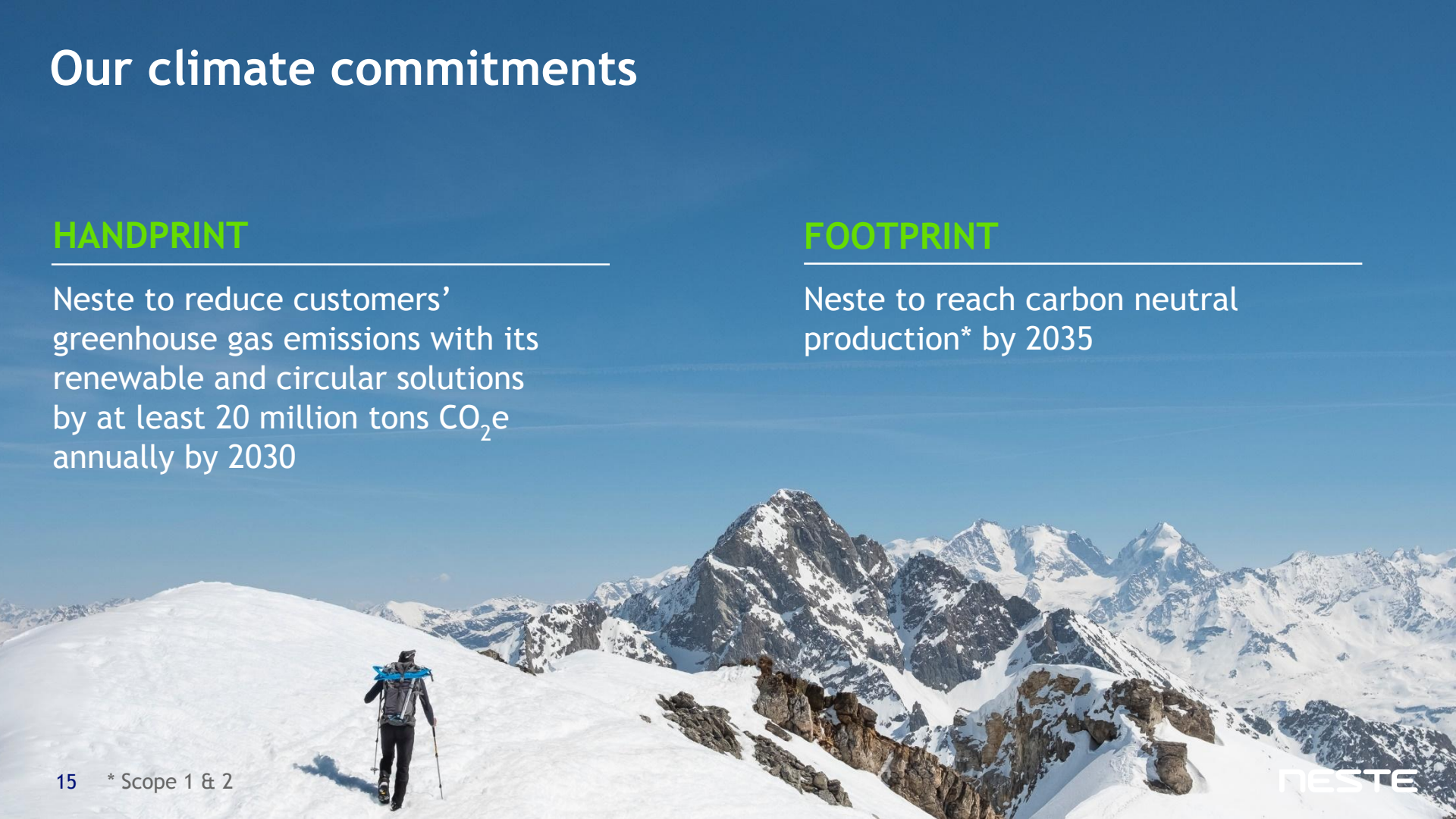
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Neste to reduce customers' greenhouse gas emissions with its renewable and circular solutions by at least 20 million tons CO<sub>2</sub>e annually by 2030

## FOOTPRINT

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Neste to reach carbon neutral production\* by 2035



OUR NEW VISION

Leading the way  
towards a sustainable  
future together







# Creating a healthier planet for our children