

# The Contribution of Advanced Renewable Transport Fuels to **Transport Decarbonisation** in 2030 and beyond

Case Finland  
Nils-Olof Nylund



# Outline

- Finland in a nutshell
- Data on energy use and vehicles
- Policies for emission reductions in transport
- The Finnish biofuels obligation
- Summary



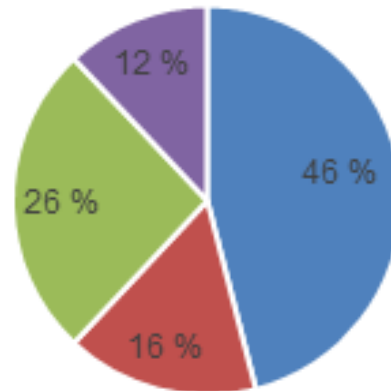
# Finland in a nutshell

- Finland is a large, sparsely populated country
  - 338,000 km<sup>2</sup>, some 1400 km from North to South
  - Population appr. 5 million, 15 people/km<sup>2</sup>
  - Transport work per capita is high
- Finland has large biomass resources but no oil or gas
  - 73 % of the land area is forest
  - The forest industry is important from the viewpoint of national economy
- Finland has quite ambitious goals for decarbonizing the whole society
  - Target to be carbon neutral by 2035



# Final energy consumption by sector

Final energy consumption by sector 2017

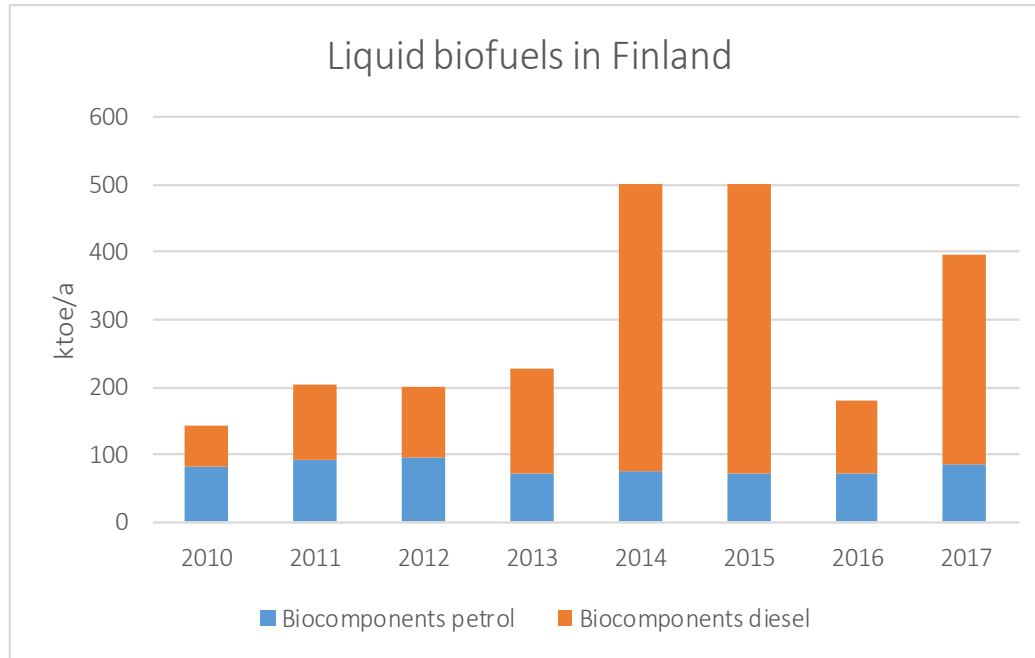


■ Industry ■ Transport ■ Space heating ■ Others

# Road transport fuels (liquid and gaseous) in 2017

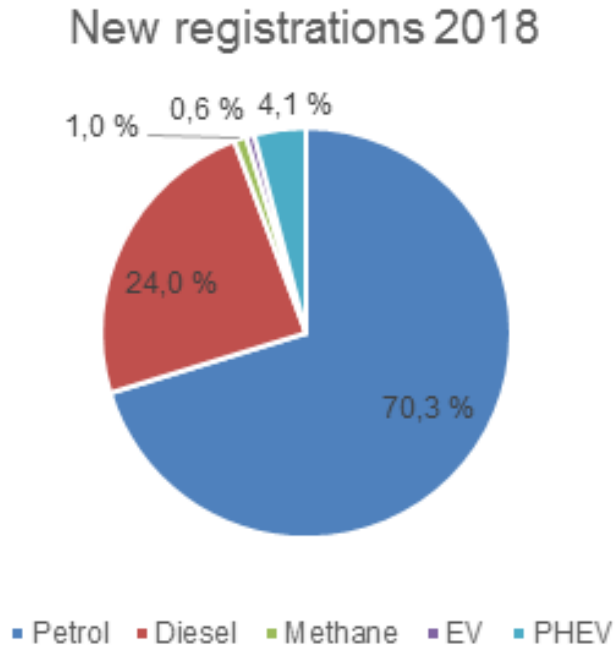
		ktoe	% of total	% renewable
Petrol, E85	Total	1349	35 %	6 %
	E5	444		
	E10	899		
	E85	6		
	Renewable	86		
Methane	Total	5	0,1 %	54 %
	Natural gas	2		
	Biogas	3		
Diesel	Total	2547	57 %	14 %
	Fossil	2237		
	Renewable	310		
Total		3901		
	Fossil	3503		
	Renewable	398		10,2 %

# Liquid biofuels in road transport



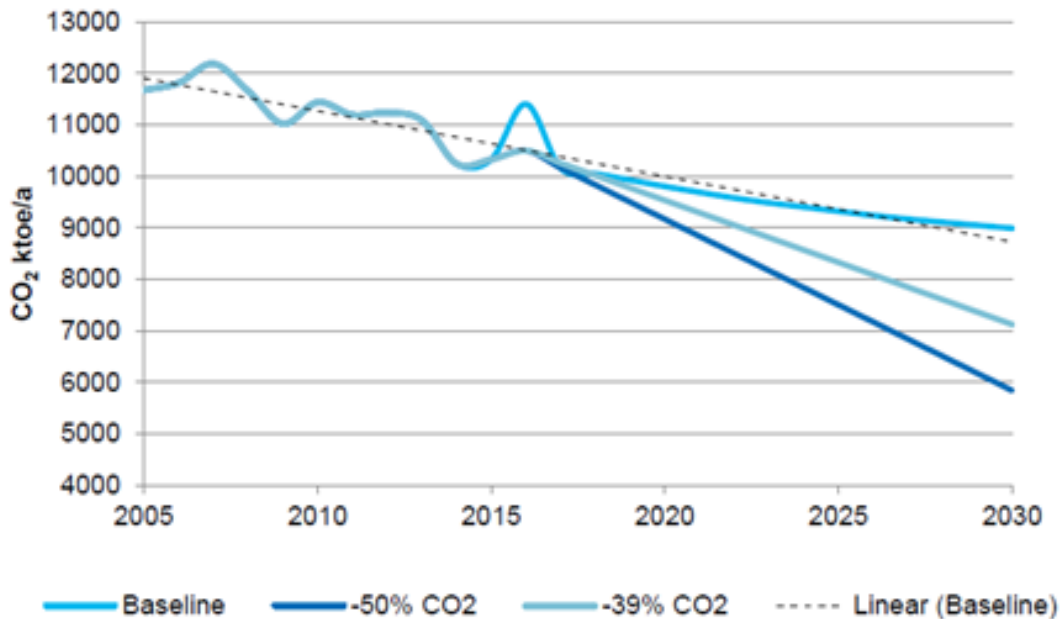
Year-to-year variations  
due to a flexible biofuels  
obligation

# New passenger car registrations 2018



Total new registrations 2018 120,000  
Current passenger car fleet ~ 2.7 Mio

# Trajectories for transport CO2 emissions



According to the EU effort sharing rules, Finland has to reduce its CO2 emissions in the non-ETS sector By 39 % by 2030 (reference 2005)



# Targets for emission reductions in road transport

- Recent guidelines for emission reductions in transport can be found, e.g., in:
    - The 2015 Government Programme of Prime Minister Juha Sipilä
    - The 2016 national energy and climate strategy
    - The 2019 Government Programme of Prime Minister Antti Rinne
- 
- <https://valtioneuvosto.fi/en/sipila/government-programme>
  - <https://tem.fi/en/energy-and-climate-strategy-2016>
  - <https://valtioneuvosto.fi/en/rinne/government-programme>

# 2016 national energy and climate strategy

- The strategy for 2030, presented in November 2016, calls for a 50 % reduction of CO<sub>2</sub> emissions from transport by 2030, the reference year being 2005. Three key measures to reduce emissions are listed:
  - Improving the energy efficiency of the transport system
  - Improving the energy-efficiency of vehicles
  - Replacing oil-based fossil fuels with renewable and/or low emission alternatives

# 2016 national energy and climate strategy

- Within the three key measures, several detailed measures or sub-targets are mentioned. For renewable and low-emission energy carriers the following measures and targets are listed:
  - **Increasing the physical share of biofuels (energy content) in road transport fuels to 30 %**
  - Expanding the refuelling infrastructure for alternative energies in transport (recharging of electric vehicles, gaseous fuels including hydrogen)
  - Encouraging the uptake of alternative vehicles, the minimum targets set for 2030 being:
    - 250,000 electric vehicles (battery electric vehicles, plug-in hybrids, fuel cell vehicles)
    - 50,000 gas fuelled vehicles

# The 2019 Government Programme of Prime Minister Antti Rinne

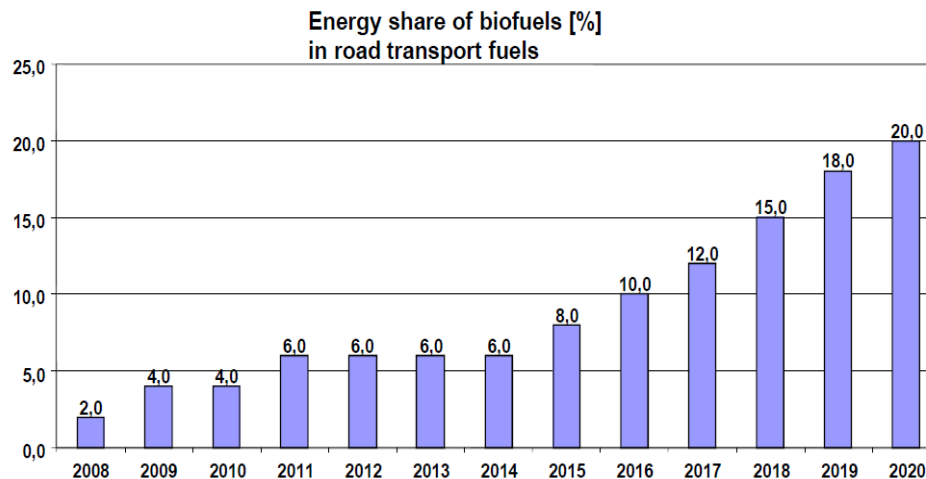
- For the upper level, states, among other things:
  - Finland will achieve carbon neutrality by 2035
  - Finland aims to be the world's first fossil-free welfare society
  - The transition to a low-carbon economy will require additional investments, particularly in bioeconomy, circular economy, clean energy solutions, energy efficiency, emissions- free forms of energy production, energy storage solutions, carbon recovery and energy utilisation, along with research, development and innovation activities and measures to bring these solutions to the market

# The 2019 Government Programme of Prime Minister Antti Rinne

- Specifically on transport, among other things:
  - **Finland will reduce transport emissions by at least 50 per cent compared to the 2005 level** (reduced transport work, promoting the transition towards more sustainable mobility and phasing out fossil fuels).
    - In principle repetition of the 2016 national energy and climate strategy
  - **The transition to sustainable biofuels in heavy goods vehicles and air transport will be promoted**
  - **Sustainably produced biogas will be included in the scope of the biofuels distribution obligation**
  - An obligation will be set for petrol station chains to provide a certain number of charging points for electric cars
  - **Piloting of carbon neutral synthetic fuels and launching of their production in Finland will be promoted**

# The Finnish biofuels obligation 2008 – 2020

## ”Double counting” allowed



# Drafting the biofuels obligation for 2030

- In 2018, in preparation for the update of the biofuels mandate for 2021 to 2030, the Prime Minister's Office (PM Juha Sipilä) launched a tender for a study with the title "Cost effective pathways of biofuels until 2030". A consortium led by Pöyry Management Consulting Ltd won the tender.
- The final report of the study was published in early October 2018 ("Biofuels 2030"). The study confirmed the definition of policy set in the 2016 national energy and climate strategy, **Finland will need some 30 % liquid biofuels in 2030 to meet a 50 % emission reduction target in road transport.**
- The study resulted in a proposition by the Government to the Parliament on the update of the biofuels mandate already within the month of October. **The new biofuels obligation law was approved in March 2019.**

# Key points in the new biofuels mandate 2021 - 2030

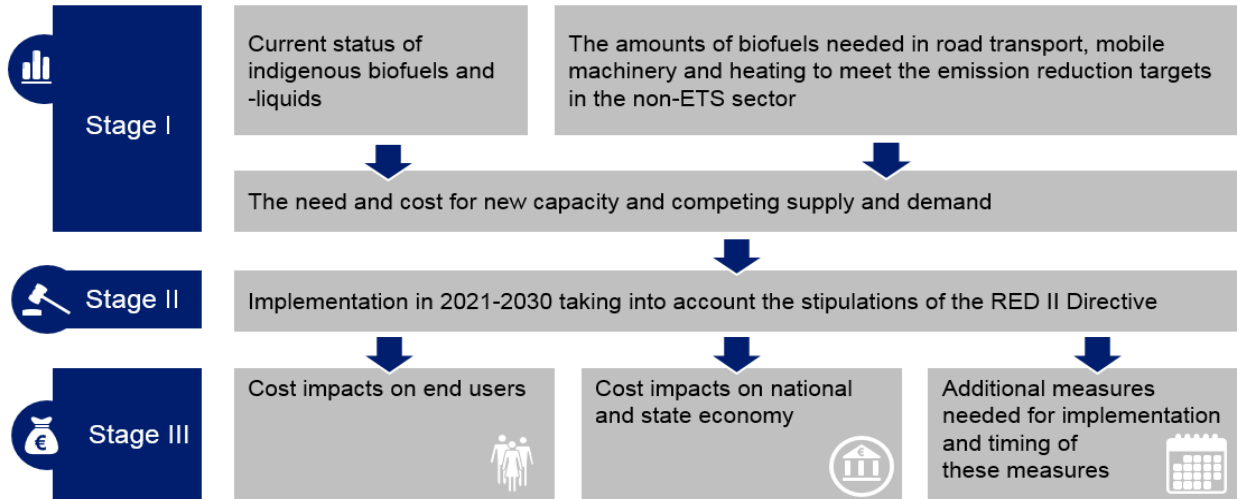
- Total 30 % share (energy) of biofuels in road transport in 2030
  - increasing linearly from 18 % (physical) in 2021 to 30 % in 2030
- Sub target of 10 % advanced biofuels in road transport in 2030
  - starting at 2 % in 2021 - 2023
  - feedstocks according to Annex IX A of the RED II Directive
- A new 10 % biocomponent obligation for light fuel oil is written in a separate law.
  - <https://www.finlex.fi/fi/laki/alkup/2019/20190418> (Biofuels in road transport)



# The biofuels 2030 study

## STRUCTURE OF THE WORK

The objective of the study was to assess the impact of increasing the share of transport biofuels in Finland to some 30 % by the year 2030, thus reaching a 50 % reduction in road transport CO<sub>2</sub>

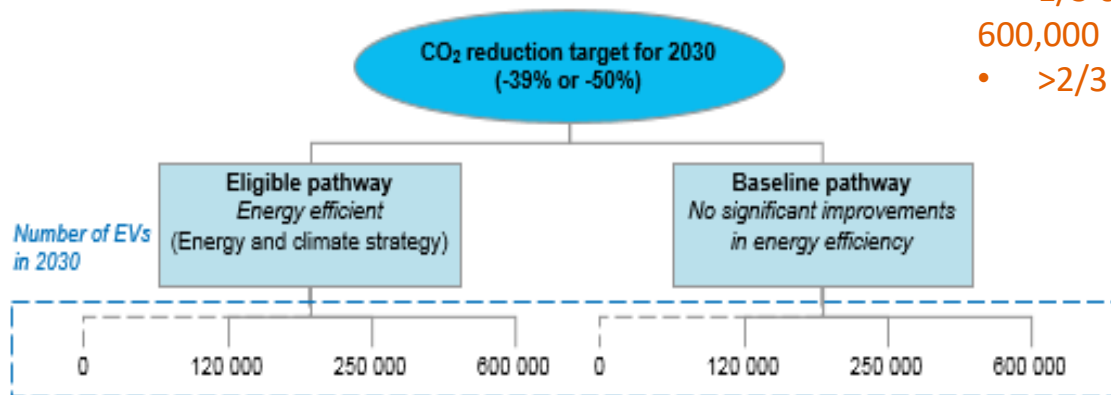


Source: Pöyry Consulting



# The biofuels 2030 study

## AMOUNT OF BIOFUELS NEEDED IN THE NON-ETS SECTOR



250,000 EVs:

- 1/3 of registrations in 2030

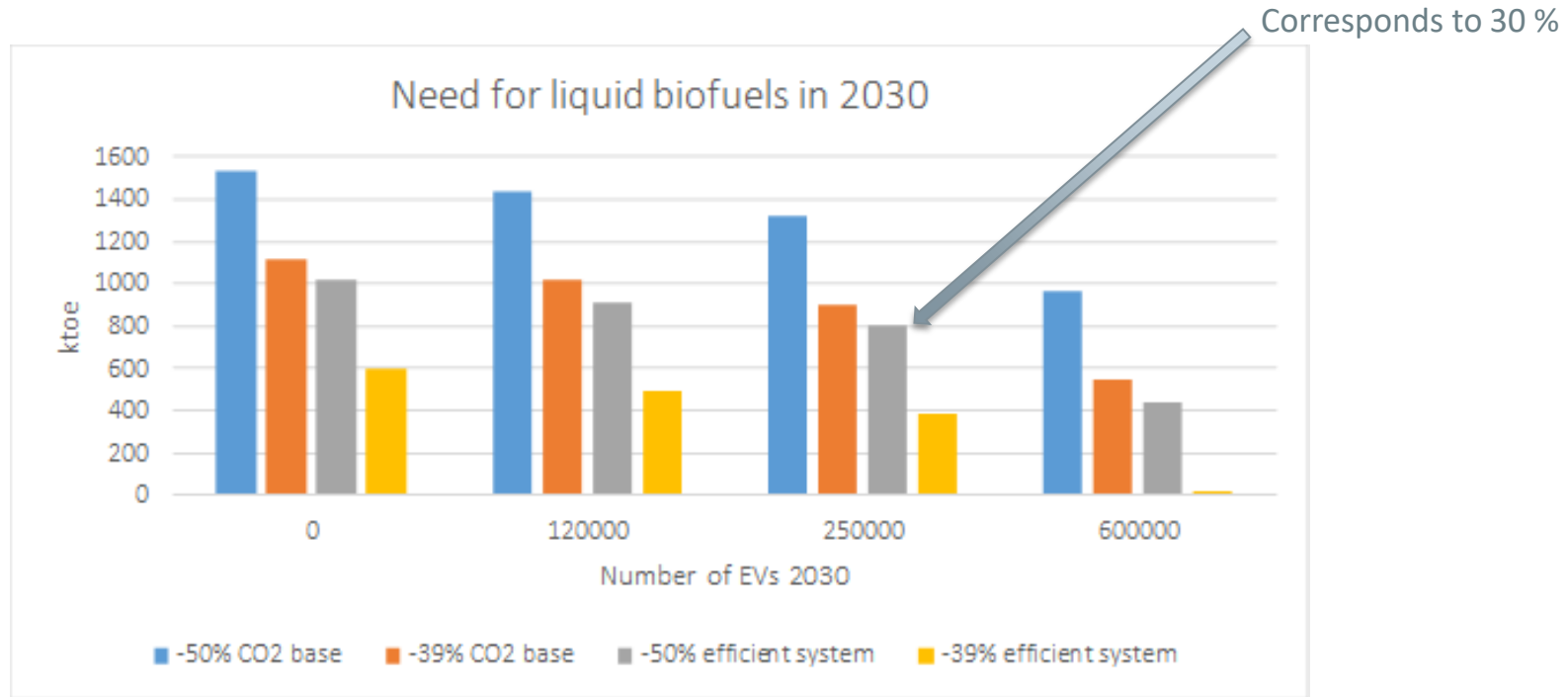
600,000 EVs:

- >2/3 of registrations in 2030

**Outcome: The amount of biofuels needed to reach CO<sub>2</sub> emission reductions of -39 % or -50 % in transport (variables energy efficiency and number of EVs)**

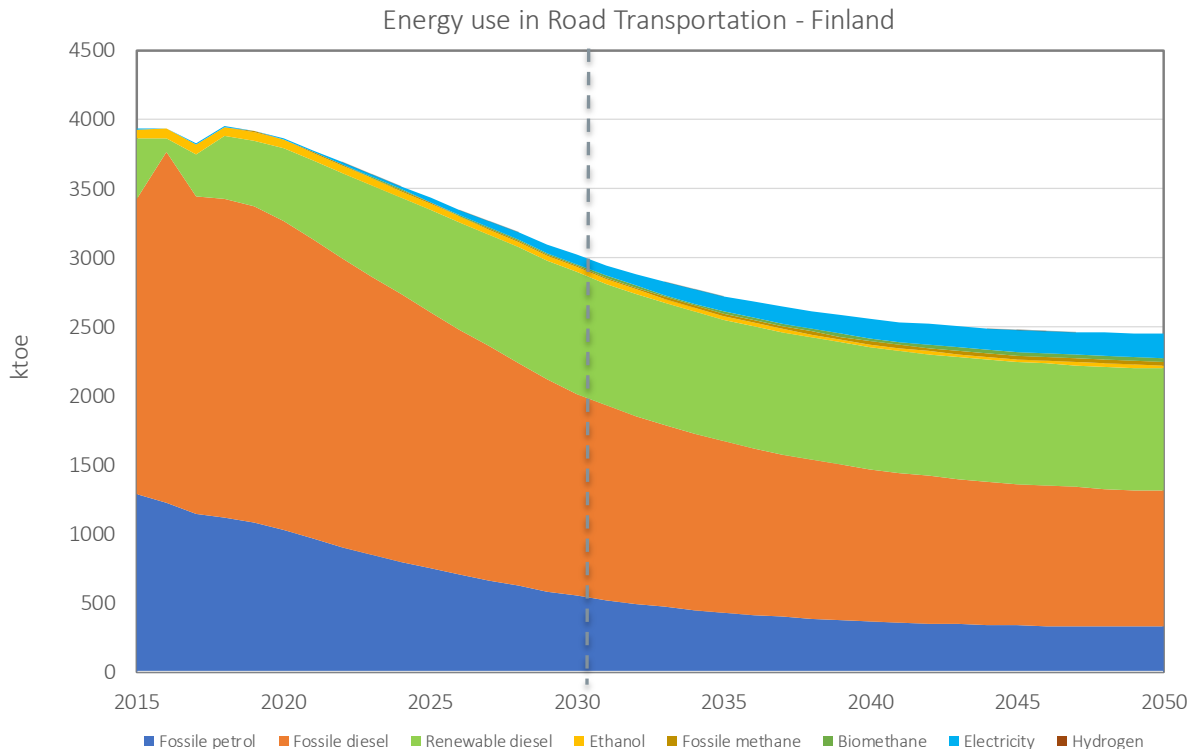
Source: Pöyry Consulting

# Need for liquid biofuels in 2030



Source: Pöyry Consulting

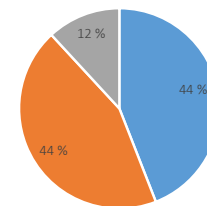
# Split of energies towards 2050



## CO2 reductions in 2030:

- 2005 reference 11.7 Mt
- Energy efficiency & traffic management -2.6 Mt
- EVs -0.7 Mt (250,000 EVs)
- Biofuels -2.6 Mt (30 % share)
- Target 5.8 Mt

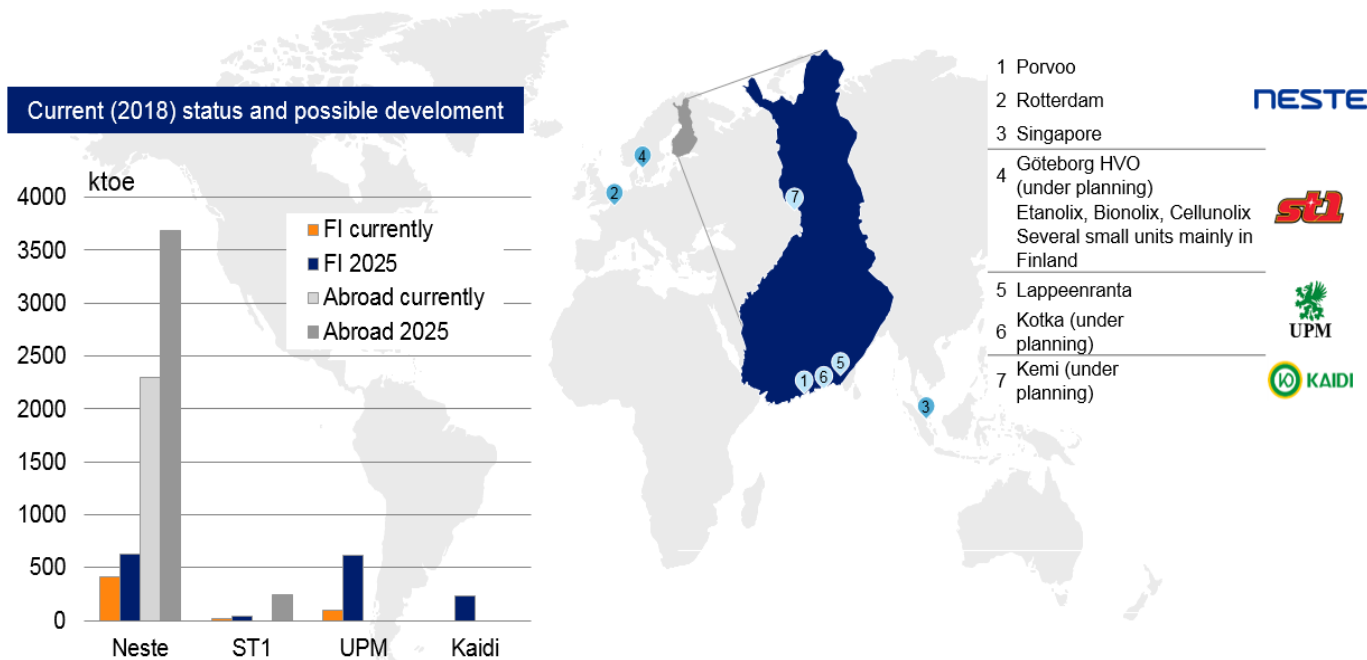
Contribution to CO2 reductions



■ Efficiency & transport management ■ Biofuels ■ EVs

# Finnish biofuel actors

## BIOFUEL PRODUCTION BY FINNISH COMPANIES



# Summary

- Finland has very ambitious climate targets
  - Carbon neutrality by 2035
  - 50 % CO2 emission reduction in transport by 2030
    - Energy efficiency, low-carbon fuels, electrification
- Finland has already set an ambitious biofuels obligation for 2030
  - 30 % biofuels (true energy share)
  - 10 % (1/3) sub-target for advanced biofuels
- The future of biofuels is seen in heavy-duty vehicles, ships and airplanes
- Finnish energy companies are very active in biofuels
- Carbon neutral synthetic fuels have made their way into the most recent Government Programme

# The Contribution of Advanced Renewable Transport Fuels to Transport Decarbonisation in 2030 and beyond

More information: <https://iea-amf.org/content/news/TD-WS>

Contact: [dina.bacovsky@best-research.eu](mailto:dina.bacovsky@best-research.eu)