The role of SAF and other fuel-related measures for mitigating non-CO2 emissions

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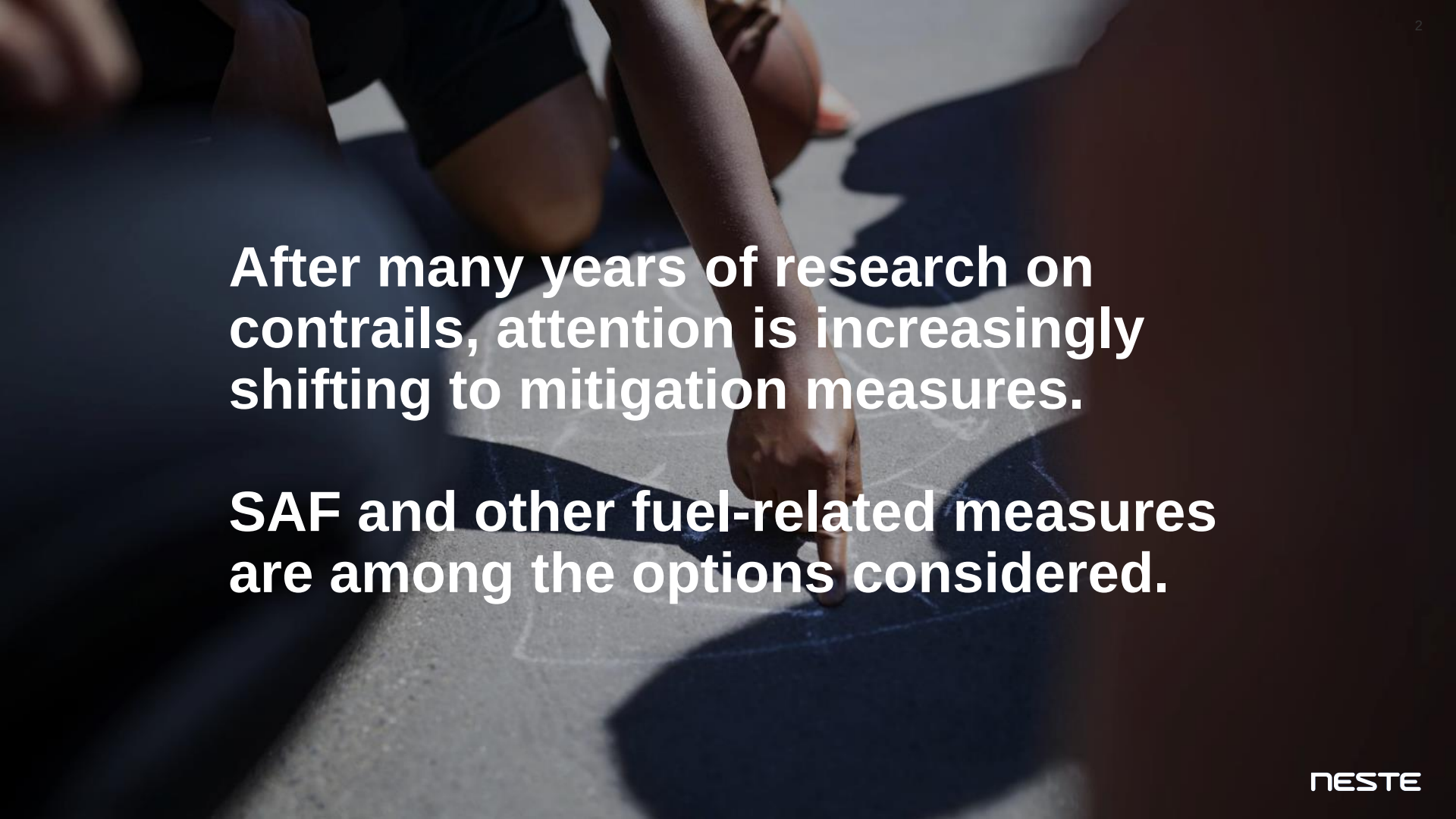


After many years of research on contrails, attention is increasingly shifting to mitigation measures.

SAF and other fuel-related measures are among the options considered.

As leading SAF producer, Neste has been following and participating in research projects related to non-CO2 impacts

Timeline of key research programs on aviation fuels and non-CO2 emissions, incl. highlights

2014

ACCESS-II project

HEFA-SPK reduces not only CO2 but also non-volatile particulate matter (nvPM) emissions

2015

ECLIF1 project

Aromatics & hydrogen content of fuel has impact on non-volatile particulate matters (nvPM) and contrail formation

2017 - 2020

JETSCREEN project

Fuels without aromatics can reduce non-volatile particle emissions by up to 80 %

2018

ECLIF2 project

Fuel design: 30% HEFA-SPK blend yields stronger nvPM and ice crystal reduction w/R 50% HEFA

2022 - 2024

Project by DLR, University of Stuttgart and Neste

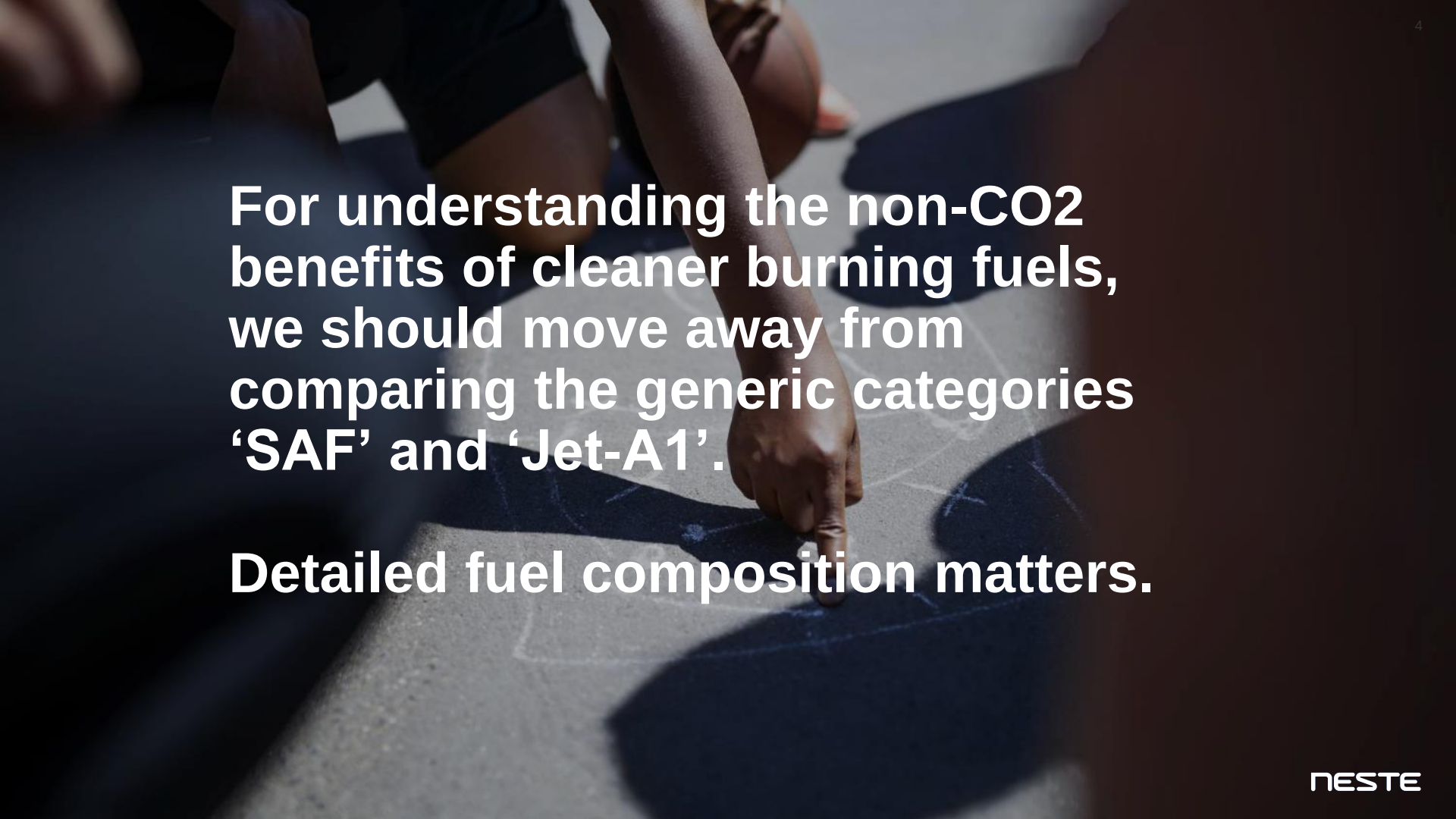
Neat HEFA-SPK leads to a particle emission reduction of 67-93% compared to Jet A-1, while blends containing HEFA-SPK come with significant particle emission reductions of 25% (for 30%-HEFA blend) and 47% (for 50-% HEFA blend).

2021 - 2024

ECLIF3 project by DLR, Airbus, Rolls-Royce and Neste

In-flight measurements with 100% SAF (HEFA-SPK) shows significant reduction in soot particle emissions (-35%) and formation of contrail ice crystals (-56%) compared to using a (cleaner than average) conventional aviation fuel. Global model simulations estimate 26% reduction in contrails' climate impact when using 100% SAF.

Measured with our Neste SAF (HEFA-SPK)



For understanding the non-CO2 benefits of cleaner burning fuels, we should move away from comparing the generic categories ‘SAF’ and ‘Jet-A1’.

Detailed fuel composition matters.

Basics of hydrocarbon chemistry and non-CO2 emissions

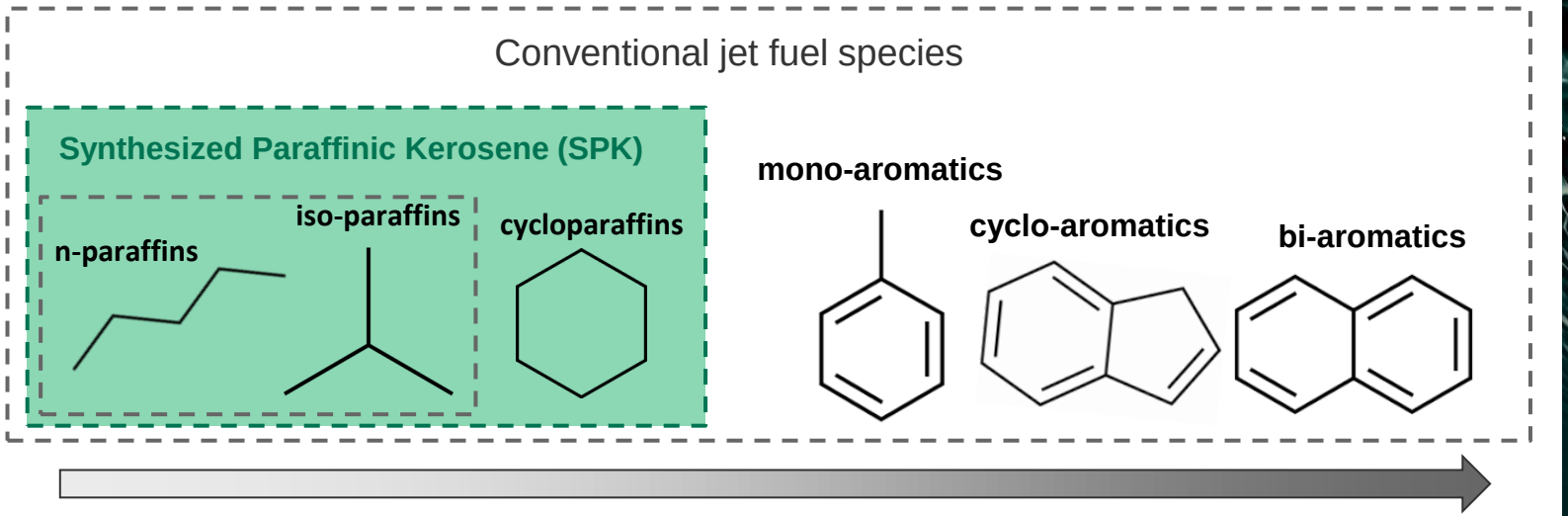
Non-CO2 emissions depend on fuel composition, not feedstock.

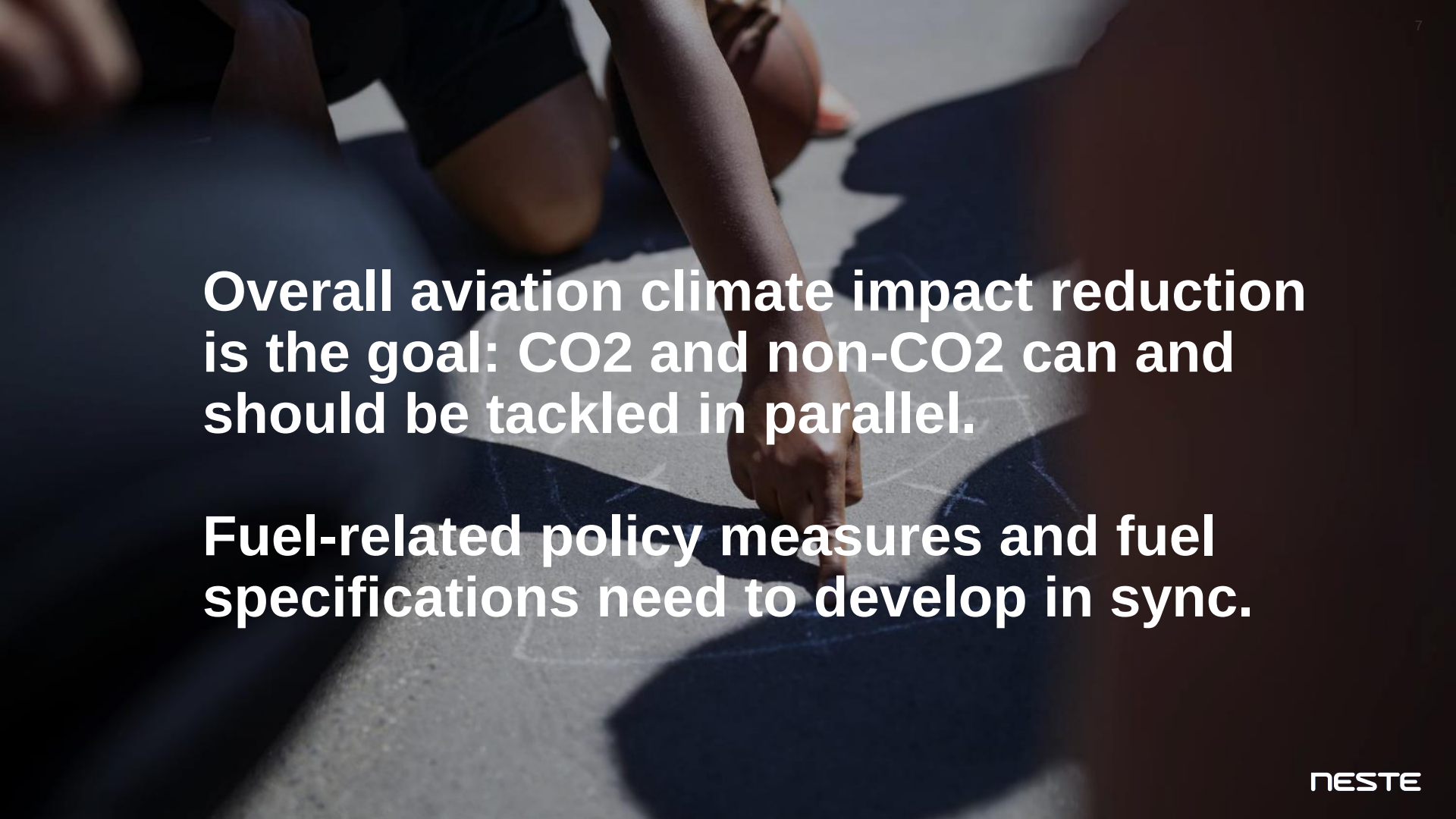
SAFs tend to be paraffinic, conventional jet fuel contains aromatics.

Paraffinic SAFs burn cleaner, reduce soot and ice crystal formation.

Our Neste SAF (HEFA-SPK) is paraffinic.
Typical value for aromatics content is 0.1 m-%.

Sooting tendency of hydrocarbons





Overall aviation climate impact reduction is the goal: CO2 and non-CO2 can and should be tackled in parallel.

Fuel-related policy measures and fuel specifications need to develop in sync.