WORKSHOP: TOWARDS A FOSSIL-FREE PROCESS INDUSTRY
Preliminary summary

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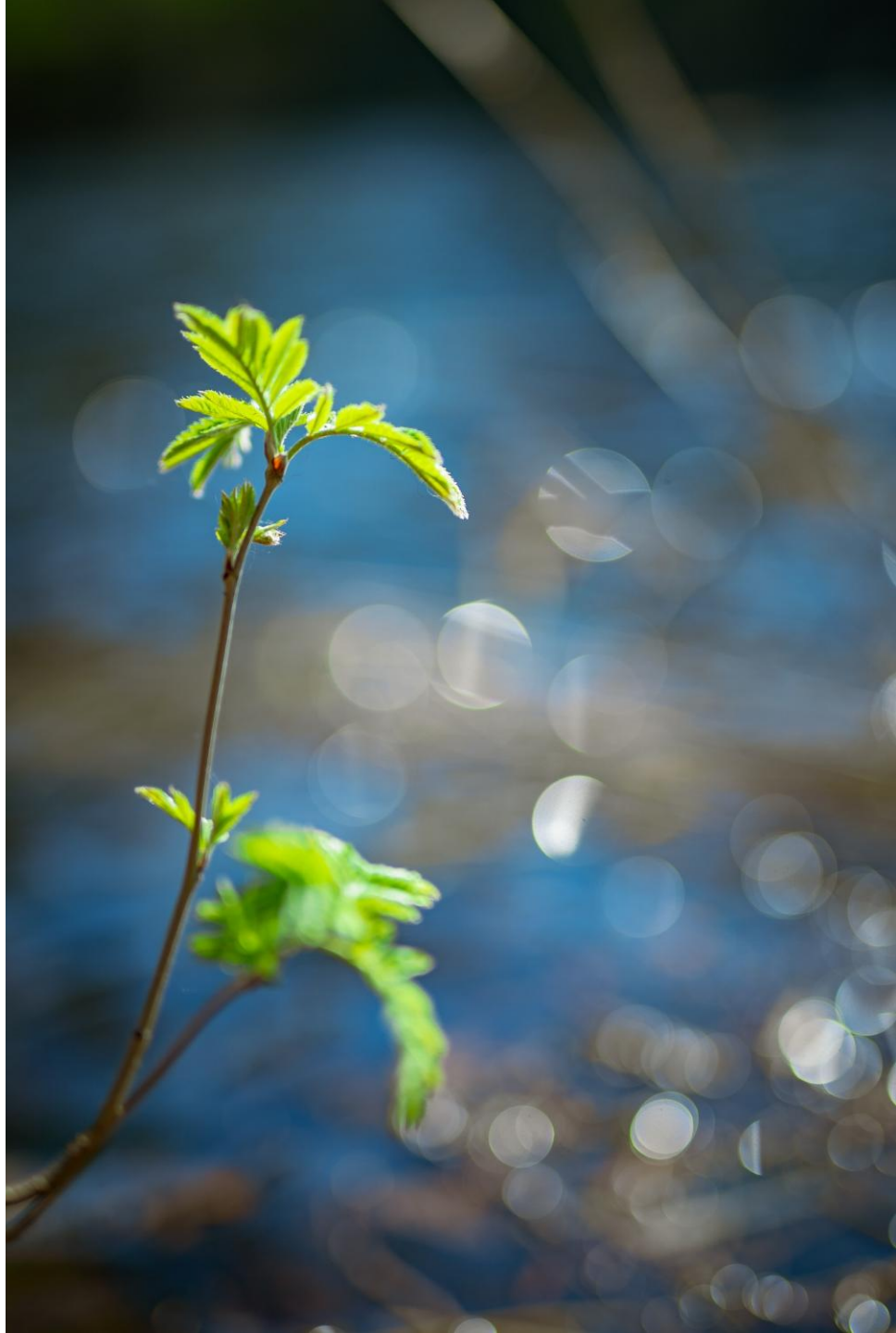
INTRODUCTION

The transition of Finland's process industry towards fossil-free solutions is a key part of the green transition, as well as the strengthening of national competitiveness and security of supply. Although there is already growing market demand for fossil-free products, particularly in aviation and maritime transport, phasing out fossil fuels in the process industry remains challenging in many ways. According to research conducted by LUT University, the forest, technology, and chemical industries together form the core foundation for building a fossil-free process industry in Finland, and the alignment of the value chains of these sectors is a key prerequisite for the success of this transition.

The workshop Towards a Fossil-Free Process Industry was held on March 17, 2026, at the European Commission Representation in Finland's Europa Hall in Helsinki as part of LUT University's and ETLA's FinGeo project (Finland's Geoeconomic Playbook: Strategies for Value Generation and Capture). The FinGeo project examines Finland's innovation and industrial policy in the era of geoeconomics, in which the green transition, changing geopolitical conflicts, and shifting global power relations affect the economy, value chains, and opportunities for value creation. The aim of the workshop was to gather the views of industry experts on the key solutions, transition pathways, and strategic choices for a fossil-free process industry, as well as to produce material for Finland's geoeconomic playbook. In addition, the workshop results will be used in the preparation of LUT University's fossil-free process industry Co-Innovation project.

The workshop was carried out as a combination of expert presentations and small-group work. The group work focused on three themes: raw materials, technologies, and economic and political factors. In the solutions workshop, participants defined measures for addressing challenges. This report compiles a preliminary summary of the outcomes of the group work conducted during the workshop. The report serves as an initial synthesis of key findings and proposed measures, as well as a basis for further work. The results will be further specified as part of Finland's geoeconomic playbook within the FinGeo project. The report is structured according to the workshop themes—raw materials, technologies, and economic and political factors—followed by a summary of the main findings.



RAW MATERIALS

The workshop highlighted that building fossil-free fuel, chemical, and PtX value chains requires ensuring the availability of biogenic CO_2, bio-based carbon, and recycled carbon. This, in turn, requires a functioning CO_2 market, cost-efficient capture, logistics and infrastructure solutions, and a predictable regulatory environment. In addition, value-chain collaboration and an active role for the state in sharing risks and kick-starting markets are needed.

1. Strengthening the availability of raw materials	2. Strengthening cooperation in raw material supply
• Establish a viable CO_2 capture market (pricing mechanisms, Contracts-for-Difference (CfD), public procurement) • Strengthen chemical recycling and restrict the incineration of recyclable plastics → redirect recycled carbon to higher value-added uses • Utilize sustainable biomass by freeing it for industrial use through electrification • Develop alternative carbon pathways (e.g. gasification) • Build CO_2 pipeline and liquefaction infrastructure and streamline permitting processes	• Build end-to-end consortia across the entire value chain • Implement joint investments in CO_2 infrastructure • Strengthen the role of the state as a risk-sharing actor and remover of bottlenecks • Leverage the role of universities in knowledge creation, knowledge integration, and network building • Promote cross-industry workshops to facilitate the emergence of new industrial ecosystems

TECHNOLOGIES

The workshop emphasized that the renewal of Finland's process industry requires accelerating the maturation of technologies, strengthening pilot and demonstration infrastructure, and building effective collaboration networks. Key solutions include long-term funding, digitalization and electrification, as well as the systematic development of value chains.

1. Improving the maturity of new technologies

- Increase long-term R&D funding, including high-risk innovations
- Strengthen pilot and demonstration environments to overcome the "valley of death"
- Support commercialization and ensure profitability and scalability already in the early stages of development
- Create tax incentives, direct CAPEX support for investments, and public–private partnerships

2. Technological solutions to accelerate the renewal of the process industry

- Leverage digitalization, artificial intelligence, and process electrification
- Develop production pathways based on domestic raw materials (e.g. RWGS, fermentation, synthetic biology, lignin-based products)
- Improve CO_2 capture and waste heat utilization
- Promote the optimization of sub-processes and sector integration

3. Strengthening cooperation in technology development and scaling

- Utilize shared pilot and demonstration environments
- Build industrial clusters and value chains across sectoral boundaries
- Strengthen long-term funding for the Veturi and Co-Innovation models
- Clarify funding conditions and streamline funding processes
- Utilize industrial doctoral programs to enhance collaboration

ECONOMIC AND POLITICAL FACTORS 1/2

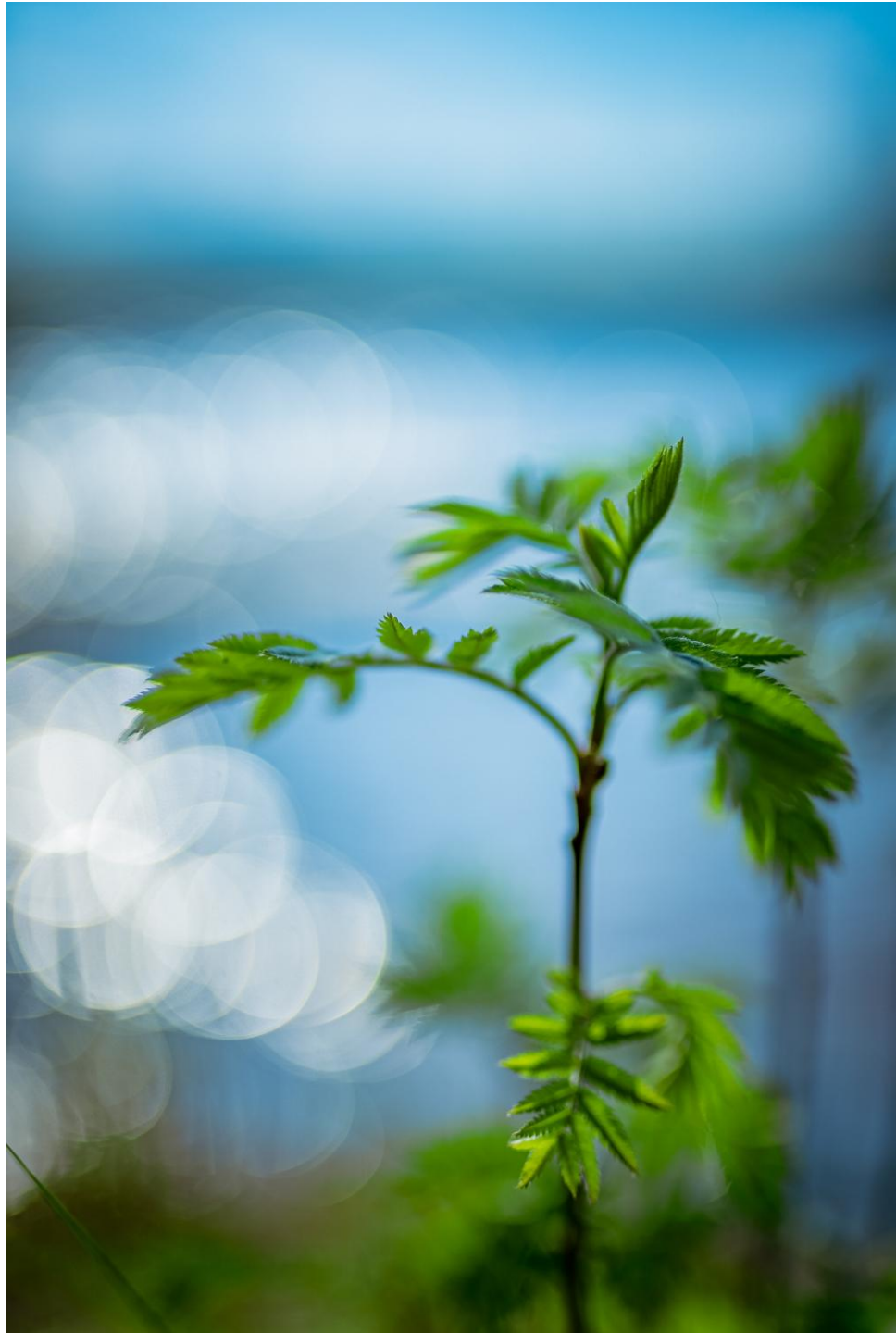
The workshop emphasized that the breakthrough of renewable products requires predictable market-based policy instruments and bankable business models. Key solutions include stable carbon pricing, long-term contractual models, as well as demand-strengthening blending mandates and EU-level support mechanisms.

1. Developing the revenue logic of renewable products

- Strengthen the predictability of carbon pricing and the stability of the emissions trading system (EU ETS)
- Utilize CfD models, offtake agreements, and as-a-service solutions to share risks
- Utilize waste streams and product characteristics to improve competitiveness
- Kick-start the market through early-stage tax incentives and investment support

2. Reducing demand uncertainty for renewable products

- Introduce long-term blending mandates (e.g. SAF, e-fuels)
- Utilize double-sided auctions to reduce investment risks
- Leverage EU-level price gap compensation mechanisms
- Promote sector-specific progress to strengthen demand predictability



ECONOMIC AND POLITICAL FACTORS 2/2

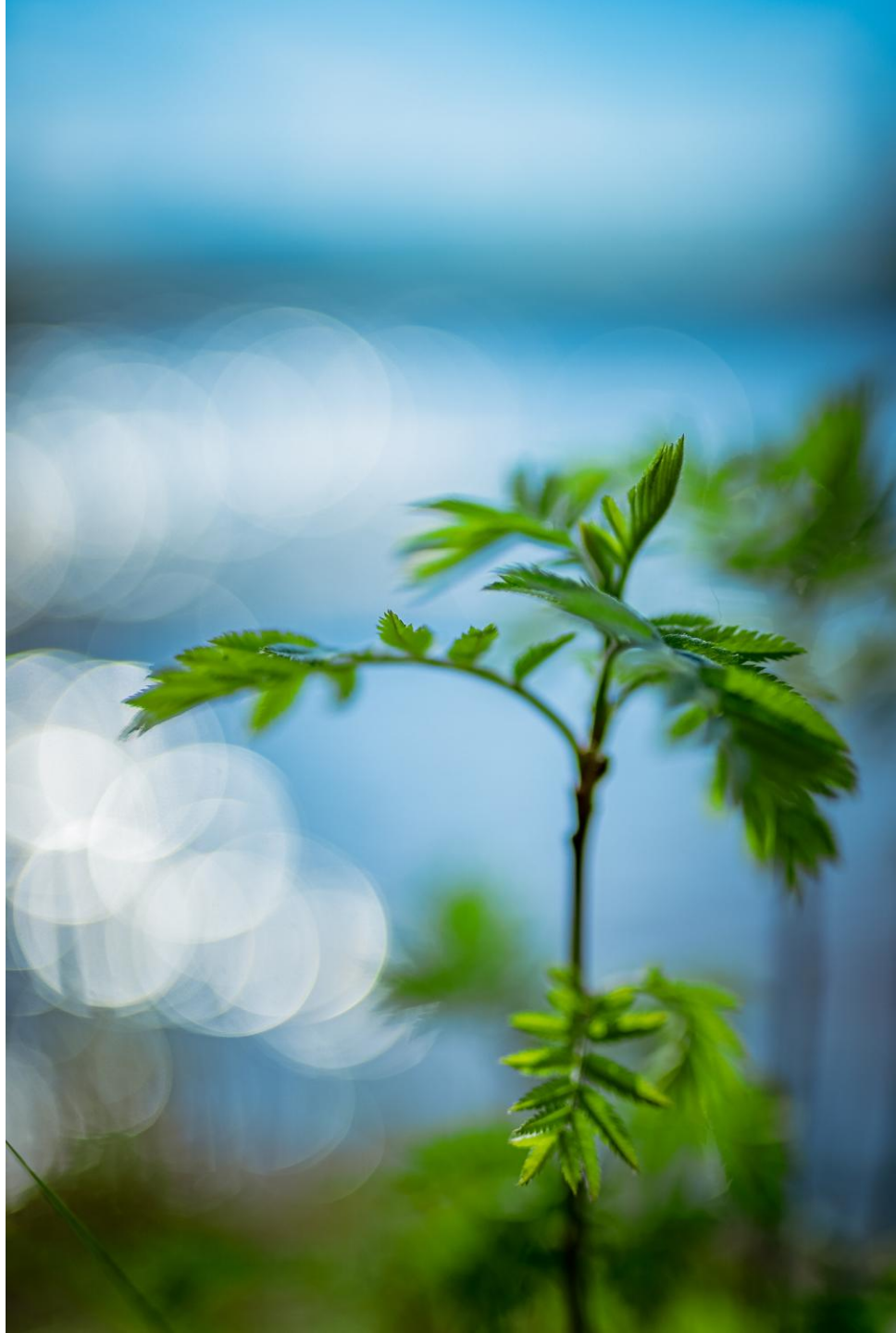
The workshop emphasized that promoting industrial investments requires long-term and predictable policies, as well as close cooperation among value-chain actors. Key solutions include infrastructure investments, regulatory alignment, and cooperation structures that support risk sharing and the initiation of investments.

3. Strengthening policy guidance to support industrial investments

- Build predictable industrial policies that extend beyond individual government terms
- Accelerate the entry into force of legislation to clarify the investment environment
- Implement key infrastructure investments (electricity, CO_2)
- Strengthen the harmonization of EU-level regulation to ensure a level playing field
- Utilize a “Buy European” approach to support the competitiveness of European industry

4. Strengthening cooperation to address economic and political challenges

- Build value chains through consortia and joint initiatives
- Utilize long-term contractual models to share risks and costs
- Strengthen dialogue between industry and policymakers
- Develop a complementary funding model to the Veturi program for new initiatives
- Clarify value-chain coordination and the distribution of benefits



SUMMARY

The low-carbon transformation of Finland's process industry requires accelerating the deployment of technologies, ensuring the availability of sustainable carbon-based raw materials, and creating a predictable economic and regulatory environment. The transition is built on value-chain collaboration, piloting and demonstration, as well as national and EU-level policy instruments. At the same time, CO_2 infrastructure, stable market signals, and long-term policies are needed to initiate investments and scale solutions to an industrial level.

Raw materials – How can availability be ensured competitively?

- Create functioning CO_2 and bio-based markets through pricing mechanisms, contractual models, and, where necessary, public procurement
- Strengthen recycling and the utilization of waste streams for higher value-added products
- Increase the availability and use of sustainable biomass and alternative carbon sources
- Build cost-efficient CO_2 infrastructure (pipelines, logistics, storage) and streamline permitting processes
- Strengthen value-chain collaboration to support raw material availability and risk sharing
- Promote end-to-end consortia and joint initiatives to activate supply chains and markets

Technologies – How can maturation and deployment be accelerated?

- Increase long-term R&D funding and commercialization support with clear conditions
- Strengthen investments in pilot and demonstration plants and utilize shared testing environments
- Leverage tax incentives, CAPEX support, and public–private partnerships
- Develop production pathways based on domestic feedstocks and utilize digital, electrified, and optimized solutions
- Focus on profitability, scalability, and commercialization already in early development stages
- Establish cross-sectoral industrial clusters and value chains

Economic and political factors – How can demand, investments, and policy support be ensured?

- Ensure a predictable investment environment through carbon pricing, emissions trading, and clear tax and regulatory frameworks
- Utilize long-term contractual models (CfDs, offtake agreements, as-a-service models, double-sided auctions) to reduce investment risks
- Strengthen demand-side measures such as blending mandates and EU-level pricing and compensation mechanisms
- Enhance public funding and infrastructure investments, particularly in electricity and CO_2 solutions
- Harmonize regulation and clarify the operating environment to accelerate investments
- Strengthen value-chain collaboration and consortium models to share risks and support industrial progress