

## MINUTES OF ESS INSTRUMENT SEMINAR, MARCH 6, 2024 – EXECUTIVE SUMMARY

Lars Börjesson, chairman of the ESS High-Level Industrial Forum (HLIF), welcomed the hybrid meeting at the Swedish Research Council, VR, and greeted the host Lisbeth Olsson, secretary of the Research Infrastructure Committee at VR. Lisbeth Olsson briefly presented VR: Research infrastructure is becoming increasingly important for advancing the frontiers of science. The annual budget for research infrastructure is SEK 2.7 billion, of which ESS accounts for the largest part. Lars Börjesson also presented HLIF's role as a forum for leading international industrialists who advise ESS on relations with industry and society. The participants introduced themselves.

Helmut Schober, Director General of ESS, briefly presented the facility. ESS is one of the largest European investments in research infrastructure that Sweden hosts in collaboration with Denmark. A total of 13 countries are members who share the costs of construction and operation. The neutron spallation facility will be ready for use in 2027 with 15 instruments to advance our knowledge. All instruments are to some extent relevant for industry, but the capacity is limited, and ESS has room for 37 instruments. Since none of the 15 instruments built today will focus on industrial needs, it makes sense to add a versatile instrument intended for industrial use. This needs to be built by a consortium that finances the investment and runs the operation and service in close collaboration with ESS.

Daniel Söderberg, professor at KTH, described the creation of an industrial consortium to build the Formax instrument at the MAX IV synchrotron facility. The first step was taken when the Wallenberg Foundation (KAW) donated a large sum to a scientific program aimed at studying forest material. In 2015, the organization Treesearch started operations with 18 paying member organizations and >400 researchers involved. At the end of 2018, the construction of the instrument started, and it opened to users in early 2023. The investment was SEK 100 million, financed by KAW, while the other members committed to a 12-year contract to share the operating costs of approximately SEK 8.5 million per year. In terms of instrument time, 20 percent is devoted to instrument development, 10 percent to training, while 35 percent is earmarked for consortium members to apply (and marketable for experiments on other instruments) and the last 35 percent is open to all users by application. The Treesearch organization focuses both on advancing science and spreading knowledge within the industry. This has led to 250 industrial PhD students gaining knowledge of synchrotron research.

Daniel Söderberg emphasized the many advantages of neutrons, as they can penetrate materials deeply, are electrically neutral and gentle on the studied material. With neutron spallation, researchers can see hydrogen and study processes in situ and while operating.

During the discussion that followed, Helmut Schober invited the participating industry representatives to enter a dialogue on how to create an industrial instrument at ESS. Hitachi Energy is willing to participate in such a process, and both Alfa Laval and Volvo expressed interest in participating. Tetra Pak will also be invited. Pia Kinhult at ESS will coordinate the first meeting.

**The industry partners agreed that the first step is to perform a scoping study that will describe the concept before launching a pilot study. This first step must be completed before Innovation Day in Lund on August 27, where the results of the scoping study will be presented to CTOs to attract additional future consortium members and find common ground.**

List of participants at the seminar:

Lars Börjesson, chair of ESS High-Level Industrial Forum  
Håkan Björklund, member of ESS High-Level Industrial Forum  
Arne Karlsson, member of ESS High-Level Industrial Forum  
Björn Savén, member of ESS High-Level Industrial Forum (until 1045)  
Maria Strömme, member of ESS High-Level Industrial Forum (from 1000)  
Johan Söderström, member of ESS High-Level Industrial Forum  
Helmut Schober, Director General ESS  
Tobias Hansson, CEO Hitachi Energy (from 1100)  
Sinisa Zubic Research Center Manager Hitachi Energy Sweden (from 1100)  
Daniel Söderberg, professor KTH  
Julien Gennetier, VP Energy Division at Alfa Laval  
Emma Mattsson, Head of Strategy & Governance, Volvo Global Trucks Technology  
Pia Kinhult, ESS  
Carolin Lyons, ESS  
Maria Borelius, Aspekta  
Thomas Pålsson, Aspekta