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Fraunhofer Innovation Platform in Stellenbosch

Sustainable solutions with South Africa in the fight against water scarcity

As a predominantly arid country, South Africa faces the enormous challenge of managing existing resources sustainably. In addition to the scarce water resources, South Africa also faces energy shortages within a system that is dominated by fossil fuel generation, as well as challenges with regard to food security. Stellenbosch University and the Fraunhofer-Gesellschaft have now established the "Fraunhofer Innovation Platform for the Water-Energy-Food Nexus at Stellenbosch University" as part of a strategic partnership. The objective of this long-term cooperation is to jointly develop tailored technological and cross-sectoral solutions for water, energy and food security – for the benefit of people and the environment.

In the beginning of 2018, the acute water shortage in Cape Town hit the news worldwide: Water had to be rationed for the citizens of the South African metropolis. This crisis drastically emphasized the crucial role of water in our societies and the urgent need for innovative solutions to address water related challenges. In close collaboration with partners in South and Southern Africa, Fraunhofer therefore sets out to contribute to the development of solutions that address water insecurity.

For several years now, scientists from the Fraunhofer-Gesellschaft and Stellenbosch University have been researching how Fraunhofer know-how and technologies can be applied in the field of water treatment and water use in South Africa. The most recent example is the project "Energy efficient and sustainable water supply technologies for desalination and microbial control in food production for Africa – WASTEC", which started in 2019.

With the "Fraunhofer Innovation Platform for the Water-Energy-Food Nexus at Stellenbosch University" (FIP-WEF@SU), the collaboration is now being consolidated and enriched by the topics energy and food security. The objective is to develop innovative solutions that create value in South Africa and the sub-Saharan countries. In the energy sector, cooperation focuses on concepts and technology developments that offer solutions for the conversion of the coal-based energy industry to a regenerative one. In addition, the promotion of decentralized energy supply for rural areas, for urban and peri-urban areas as well as their interlinking is of demand.

Editorial Notes

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In February this year, Fraunhofer President Prof. Reimund Neugebauer and Prof. Eugene Cloete, Vice-Rector of Stellenbosch University signed a cooperation agreement marking the launch of the Fraunhofer Innovation Platform.

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Prof. Reimund Neugebauer, President of the Fraunhofer-Gesellschaft, said: "With the signing of the agreement to establish the Fraunhofer Innovation Platform, we are further expanding our strategic partnership with Stellenbosch University and the Republic of South Africa. Furthermore, with this cooperation we are contributing to the implementation of the United Nations' sustainable development goals, which the German Federal Ministry of Education and Research is also pursuing as part of its Africa strategy. This partnership aims for nothing less than combating water, energy and food insecurity with innovative solutions".

Prof. Eugene Cloete, Vice-Rector Research, Innovation and Postgraduate Studies at Stellenbosch University, explained: "The newly established Fraunhofer Innovation Platform will address the entire nexus of water, energy and food security in the region – from research and development to the transfer and implementation of technologies. On our side, the Water Institute and the Center for Renewable and Sustainable Energy Studies at Stellenbosch University are among the participants".

Prof. Gideon Wolfaardt, Director of the FIP-WEF@SU and of the Water Institute at the University of Stellenbosch, added: "The SU Water Institute offers a virtual umbrella where teams can be assembled with unique combinations of expertise as required by the challenge. We have been working on several water-related projects with Fraunhofer since 2016, and look forward to explore the many new opportunities offered by a long-term relationship with the Fraunhofer-Gesellschaft".

The position of Vice-Director of the FIP-WEF@SU is taken over by Dr. Ursula Schließmann, Managing Director of the Fraunhofer SysWasser Alliance and head of the environment business area at the Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB. "On the IGB side, we are contributing our know-how in integrated water management to the cooperation," said Schließmann. "This means that we consider the entire water cycle and view wastewater as a resource for nutrients and energy. In combination with new process technologies and innovative sensor technology, we want to develop solutions at the FIP-WEF@SU that range from the provision of clean drinking water to system approaches for the recycling of water and the modeling of water resources".

Due to the COVID-19 pandemic, the FIP-WEF@SU was opened in June 2020 with a virtual kick-off meeting of all parties involved. Dr. Markus Wolperdinger, Director of Fraunhofer IGB, presented the objectives of the new Fraunhofer Innovation Platform on behalf of the Fraunhofer Executive Board. "With the FIP-WEF@SU, the expertise of two leading institutions will be brought together to develop cross-sectoral sustainable technologies for water, energy and food. In this way, the FIP will contribute to bioeconomic

solutions that improve people's health and quality of life, enable sustainable agriculture and reduce the burden on the environment".

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Prof. Louise Warnich, Dean of the Faculty of Science at Stellenbosch University, underlined the importance of the FIP for the University: "It is important to establish the FIP as a key player in the region and as an innovation hub for South Africa and the Southern African Development Community (SADC)".

In addition to Fraunhofer IGB, the Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB, the Fraunhofer Institute for Surface Engineering and Thin Films IST and the Fraunhofer Institute for Solar Energy Systems ISE are also involved. The Fraunhofer Energy Alliance is a further associated partner.

At the beginning of July 2020, all participating partners defined topics and fields of action in virtual in-depth workshops. This marks the next phase of the German-South African cooperation on its path to develop localized solutions to major global challenges.

Fraunhofer Innovation Platforms

Fraunhofer Innovation Platforms are long-term cooperations over a period of five years. Fraunhofer Institutes work together with excellent universities from all over the world. The projects are established with local university partners and promote the exchange of know-how and the transfer of technology from science to practice. Applied and demand-oriented research and development is supported by close cooperation with local industry.



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The contract for the new Fraunhofer Innovation Platform was signed in early February 2020 by Fraunhofer President Prof. Reimund Neugebauer (left) and Prof. Eugene Cloete, Vice-Rector of Stellenbosch University. © Stellenbosch University



Research on innovative water technologies needs to consider the interconnections with the energy and food sectors especially in decentral applications. © Fraunhofer

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Alternative water sources such as treated wastewater will become increasingly important in future water management strategies. © Fraunhofer