PRESS RELEASE

Fraunhofer DYNAFLEX® High Performance Center

Production and energy supply of the future: flexible, modular and adaptable

How can manufacturing companies use more "green" electricity in the future? How can the process industry react to the shift in the raw material base from petroleum-based input materials to biomass? And how is it possible to cost-effectively produce smaller margins of different products? The Fraunhofer DYNAFLEX® High Performance Center develops scientific foundations and concepts for these topics and delivers them to industry, teaching and further education in order to enable an efficient sector integration of production and energy supply. The goal is to be able to plan coordinated, adaptable, flexible and modular production systems. The Institute will present first simulation models at the Hanover Fair (April 23 to 27) at the joint stand of the Fraunhofer Group for Production in hall 17, stand no. C18.

In the future, producing companies and energy operators will increasingly use low-carbon and renewable electricity. The advantage of the "green" electricity is counteracted by one disadvantage: It occurs in varying quantities because raw material sources such as sun and wind fluctuate. This means that both energy supply and production must adapt to the changing boundary conditions. Large systems in continuous operation are no longer the status quo. Rather, modular production systems are needed that can be flexibly and efficiently adapted to changing customer orders, production volumes and the availability of energy and raw materials.

Platform for Process Dynamics in the Ruhr metropolitan region

This is where the Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT comes in as coordinator of the DYNAFLEX® High Performance Center. Together with the three Ruhr district-based universities of Bochum, Duisburg-Essen and Dortmund and industrial partners, the institute investigates the dynamics of technical systems scientifically and application-oriented in order to optimize the overall system of the future and to predict the effects of fluctuations on production and energy supply.

"The goal is to build the leading platform for process dynamics and adaptivity in the energy transition and raw materials shift in the Ruhr metropolitan region with a network of science and industry", explains Prof. Görge Deerberg, Head of the High Performance Center and Deputy Director of Fraunhofer UMSICHT.

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The long-term aim is a cooperation with industry that allows for the methods to be tested and used in implementation projects. Potential partners are companies from the energy, production, chemistry, biotechnology, and plant construction sectors. Additionally, the research results will be passed on by partner universities and the Fraunhofer Academy, the further education institution of the Fraunhofer-Gesellschaft, directly to the next generation of scientists and for further education to professionals and employees. Internationally visible research, joint R&D roadmaps, digital business models as well as new aspects of teaching and further education form the basis of a long-term strategic partnership between science and industry.

Milestones

In concrete terms, this means: "We are for instance developing a toolbox to store outstanding scientific methods in the field of process dynamics, e.g. for dynamic balancing, analysis or modeling and we are building a structure-forming networking platform (www.dynaflex.de) for the formation of regional science clusters. All stakeholders should be able to exchange and utilize expert knowledge on this platform and use it to inform themselves about the topic and thus contribute to an open, interdisciplinary cooperation in simulation", explains Dr. Georg Janicki, Project Management.

The researchers are also developing new business models and operating concepts for the energy industry and production. This will facilitate the required optimization of industry's Verbund sites, for example in order to coordinate energy supply and energy needs of decentralized productions. Solutions are developed using simulation models, so that energy technology machines and processes retain their functionality for several years, despite highly volatile boundary conditions.

Competitiveness

"With DYNAFLEX® we are advancing the energy transition and raw materials shift. We deliver the scientific and application-oriented developments required to understand the dynamics of technical systems, which in turn increases the flexibility and adaptability of processes and technologies and thus ensure their competitiveness", explains Prof. Görge Deerberg.

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What does dynamic, adaptive and flexible mean?

Dynamic means that many dependencies and processes vary greatly over time, i.e. they are no longer constant and always the same. For example, in the future, buffers must be built into processes so that reactions do not come to a standstill when electricity fluctuates. Processes, machinery and devices must be designed to adapt to slightly changing boundary conditions, so that they are still usable in the long term and, if necessary, can be operated with different requirements, such as a changed supply situation (energy, raw materials). Additionally, future production systems must be flexible: Smaller, modular systems are for instance flexible in terms of capacity, variety of raw materials to be processed, and the different products that they are meant to produce.

Fraunhofer UMSICHT

Fraunhofer UMSICHT is a pioneer of a sustainable energy and raw materials management, providing scientific results and transferring them to businesses, society and politics. The dedicated team researches and develops together with partners sustainable products, processes and services that inspire. We want our developments to be economically successful, socially equitable and sustainable. The balance between these objectives is always at the forefront of our thinking. The institute has sites in Oberhausen, Willich and Sulzbach-Rosenberg. In 2016, the institute generated a turnover of more than 38.8 million EUR with a staff of 465 persons. As one of 72 institutes and research units of the Fraunhofer-Gesellschaft, the leading organization for applied research in Europe, we are part of a worldwide network and promote international collaborations.

More Information

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Web Press Release
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