

## INTRODUCTION TO THE JOHANNES LINNEBORN PRIZE AND THE 2022 WINNER LAUDATION

Wim P.M. van Swaaij  
Chairman of the Nomination Committee

The Johannes Linneborn Prize was established in 1994 on behalf of the European Commission by Dr. Wolfgang Palz to honor an European individual for an exceptional life-time contribution to the field of sustainable energy from biomass. In exceptional cases the award can be granted to a non-European. It is not a reward for scientific excellence only, but also technical and managerial merits are appreciated. This prestigious award was connected to the name of Johannes Linneborn, a German biomass pioneer and businessman, a manufacturer of more than 500,000 Imbert small-scale wood gasifiers used to fuel cars, when fossil liquid fuels were scarce. His ideal was a world in which mankind lives in harmony with nature with optimal exploiting of biomass for energy and materials.

From a long list of excellent candidates the Prize Committee selected as winner of the Linneborn Prize 2022:

**Prof. Univ.-Doz. Dipl. - Ing. Dr.  
Ingwald Obernberger**  
*University of Graz Austria  
and Director of  
BIOS BIOENERGYSYSTEME GmbH  
Graz Austria*

The prize is awarded to Ingwald Obernberger for his consistent excellence for over 30 years in pioneering research, development and management of implementation and promotion of bioenergy via modern and environmentally safe thermochemical conversion processes: combustion, gasification, and pyrolysis. An important focus was among others on fundamental studies, development, and innovations of close-to-zero emission biomass combustion on different scales. All the key challenges to reach this ideal were extensively treated in his work like economics, feedstock characterization, ashes and their useful applications, particles and dust, NO<sub>x</sub>, CO, advanced modeling, advanced process control etc. He successfully combined his knowledge on these areas from his ongoing industrial experience with fundamental insights and creative ideas from his continuous academic activities. This approach was also successfully followed in his many other developments such as small and medium scale combined heat and power generation and their integration in other systems of modern sustainable energy generation.

Ingwald Obernberger graduated in 1991 (with distinction) in chemical engineering at the Graz University of Technology and there he also obtained his PhD on a thesis: "Secondary Raw Material Wood Ash-Sustainable Economy with Energy Production from Biomass" (with distinction). Subsequently he continued and expanded his research and lecturing activities at the Institute for Process and Particle Engineering at Graz University of Technology. Habilitation took place in 1997.

He was Austrian representative in the IEA Bioenergy agreement, task 13 "Integrated Bioenergy Systems" (1995-1997) and later Austrian representative in the IEA, Bioenergy agreement, task 32 "Biomass Combustion and

Co-firing" (1998-2015). Ingwald was initiator and founder of the Austrian Competence Centre "Bioenergy 2020+".

In 1995 he created the engineering company BIOS BIOENERGYSYSTEME GmbH Graz, Austria. Initially a small firm with both an engineering section and R&D section. Under his leadership it grew to its present size with 17 full time employees in the department R&D alone (which he heads himself). He kept on teaching and researching at the Graz University and at other universities and in 2003 he was appointed university professor (part time) at the Technical University of Eindhoven, The Netherlands.

This combination of activities in industrial R&D, development, planning and plant optimization and vivid interest and talent for academic research is certainly at the roots of the successes in the work of Prof. Obernberger. It creates a unique combination of a deep knowledge on the actual true challenges in the industrial energy conversion, production and operation of the equipment, markets, norms, and standards etc. with the inflow of ideas of the university on modern advances in modeling, new experimental techniques and the creativity and innovative power of the generations of young students.

For the universities it reduces the risks on working on less relevant problems that still may look nice in publications and still may have educational value but just miss the opportunity of breakthrough in the application (in French called RANA, recherche appliquée, non applicable.)

The approach followed by Obernberger was applied to an important range of new biomass combustion, gasification, and pyrolysis processes. Examples are the development of close-to-zero-emission combustion technologies with focus on dust, ashes, and NO<sub>x</sub> and on different scales. Moreover new or improved small scale combined heat and power (CHP) technologies were developed (including ORC processes, screw-type engine, fixed bed gasification, fuel cells and advanced control.)

Examples of advanced modeling tools developed are simulations of chemical reactive flows in combustion, gasification, and pyrolysis plants under consideration of kinetic aspects using among others computational fluid dynamics (CFD).

Also a new method was developed to measure particulate matter at temperatures up to 1000 C (High Temperature Impactor) and many more techniques.

All these subjects were generously shared with the scientific, technologic and policy maker communities and the public in general. Obernberger realized over 250 publications in international scientific journals and other media and delivered over 200 scientific lectures at national and international conferences including 20 authoritative much appreciated key notes and overview lectures, and 6 books (among others, together with Thek Gerold, "The Pellet Handbook"). Ingwald served as member of the editorial board of the international scientific journal "Biomass and Bioenergy" from 1998 on. He also chaired the 23rd European Biomass Conference (EUBCE) in Vienna in 2015.

Dear Ingwald, in the field of Bioenergy you had exceptional contributions. You managed to bring together the strong points of academic research with R&D, implementation, and monitoring in an industrial setting. This also in a difficult area: small and intermediate thermochemical biomass conversion and its integration in the new renewable and sustainable energy systems. To face the future we need all the possible pathways and you made impressive contributions to several promising routes.

You showed great power in collaboration and leadership in your much appreciated personal and friendly style and hopefully we will have still many years to see your work in progress.

We are certain that the whole biomass community in Europe and the whole world will join the Linneborn committee in their warmest congratulation on this prestigious Prize.