

Annual report on the activities of the KCORC foundation – 2022

May 2023, prepared by David T. Sánchez Martínez, 2023 Chairman

Introduction

The Knowledge Center on Organic Rankine Cycle technology (KCORC) is a not-for-profit international foundation of volunteers incorporated in the Netherlands. Its premises are in Kluyverweg 1, 2629 HS Delft, The Netherlands (RSIN: 858237799, Chamber of Commerce: 70288283). The KCORC Foundation operates globally, is run by a Board of five volunteers, and its main objective is to promote research, development and implementation of Organic Rankine Cycle (ORC) technology.

ORC technology is used in all fields where thermal energy is available for conversion into mechanical power or electricity. This enhances the use of renewable energy, energy conservation and reduction of greenhouse emissions. Capacities range from tens of kW for automotive applications and domestic cogeneration to the MW size for geothermal, solar and biomass power plants.

The foundation activities are currently funded from surplus from the organization of conferences and from contributions by affiliated universities, research institutes and companies. More information can be found in the KCORC Executive Plan 2023.¹

The purpose of this document is to give an overview on the activities and results achieved by the KCORC Foundation in the year 2022.

The biennial International Seminar on ORC systems

The KCORC Foundation organizes this event which is the reference for the ORC community since its first edition in Delft in 2011. In 2022, the Foundation main activities in regard to the conference were to:

- launch a call for proposals to host the event, amongst which the proposal submitted by Prof. David T. Sánchez Martínez, University of Seville (Spain), was selected,
- support the organization of the event at University of Seville and helping with finding industrial sponsors,
- contribute to the definition of the Scientific Committee,
- support in the review process of abstracts and papers submitted for presentation at the Seminar and for publication in the associated international peer-reviewed journals,
- confer the best paper award the best paper contributed to the Seminar,
- confer the “Prof. G. Angelino Award” to the best Poster Presentation contributed to the Seminar.

¹ Available online: www.kcorc.org/media/medialibrary/2020/05/18-02-20_Executive_plan_KCORC_2020.pdf

In 2023, the seventh ORC conference, ORC2023, will be organized by University of Seville (USE), with a foreseen attendance of 150 professionals from academia and the industry. The planning and initial preparation of the conference was a main activity of KCORC during 2022.

Scholarships

The KCORC Foundation proudly invests the surplus generated by the biennial Seminar to fund competitive scholarship for students and researchers aiming to carry out R&D activities in the field of ORC technology. These scholarships cover travel and accommodation related to short-term research projects of 3 – 6 months. The grants amount to €3000 – €10,000, depending on project duration and location of the hosting institution.

In 2022, one scholarship was awarded to Alessio Secchiaroli, Master student at University of Brescia (Italy), which will enable this young researcher acquire new competence and skills at Delft University of Technology.

Standards & Regulations

There is a committee active within the Foundation which involves professionals from companies and academic institutions which aims at defining “suggested standards and regulations guidelines” in the field of ORC systems. The long-term vision is to foster the establishment of a recognized international standard devoted to ORC technology, its design, performance definition, and other aspects related to the standardization of the technology. During 2022, the international committee incorporated Aldo Serafino (Enertime) as Vice-Chair, in support of Marco Astolfi (Politecnico di Milano), Chair of S&R. Information was provided by the committee, and periodic meetings were held to incorporate them into the master guidelines.

KCORC also established a liaison with the International Electrotechnical Commission to acting as advisory partner in the development of standards for low temperature (<100°C) and small (<100 kWe) ORC products.

Thermal Energy Harvesting Advocacy Group

During the years 2021 and 2022, the Thermal Energy Harvesting Advocacy Group (TEHAG) developed a white paper explaining opportunities and status of Energy Harvesting with ORC-technology -“Thermal Energy harvesting. The path to tapping into a Large CO₂-free European Power Source”-. This report was published on April 2nd, 2022, and distributed widely amongst scientific, industrial and government-related stakeholders. The communication and dissemination of the report and its content included attendance to and active participation in international meetings: Annual Event of the SET Plan Action on Energy Efficiency in Industry (virtual), 16th SET Plan Conference (Prague), Decarbonisation of Energy Intensive Industries - Decarb 2022 (Prague), Annual Technical Workshop of the European Turbine Network (Berlin), amongst others. Preparation of an updated version of this report incorporating new contents was started in the last quarter of 2022.

In 2022, a plan for the wider dissemination of the activities carried out by TEHAG was developed. This includes active participation in international events related to the energy transition towards meeting the objectives of Green Deal in Europe and decarbonization elsewhere, and interaction with stakeholders carrying out their activity in different areas: technology developers, users, policy-makers.

KCORC is an active member of SET Plan Action 6 and has contributed significantly with correct information about opportunities with ORC-technology in Energy Harvesting. Also, through TEHAG, KCORC is a registered association in the EU Transparency Register which allows active contributions to processes such as Horizon Europe, the EU Green Deal and the Strategic Energy Technology Implementation Plan.

Editorial (KCORC Website)

The KCORC website² is the main channel through which the Foundation activities are disseminated. The website is constantly developed and maintained by an Editorial Committee whose Chairman reports monthly to the board.

This website is the hub of a community of professionals from the academia and the industry dedicated to the promotion of ORC technology. Anyone can become a member of KCORC by submitting a registration form via the website, which is then approved by the Secretary of the Board. In case of doubt, the Secretary reports to the Board for a decision.

During 2022, the Editorial Committee worked on the revamping of the website of KCORC, with the objective to reorganize the contents available for the general public (unrestricted access) and the members (members-only section), making them more engaging and easier to navigate. The new website will be launched in 2023.

In the last quarter of 2022, the Editorial Committee also worked on a new communication strategy to foster the outreach to new stakeholder groups. This strategy is currently under review and will be implemented in 2023.

Collaborations

The Foundation works constantly to establish collaborations with other organizations active in the promotion of technologies related with energy conservation and the exploitation of renewable resources.

KCORC has collaborated with a number of research funding applications during 2022, in particular providing letters of support to several research and innovation actions and innovation actions submitted to the Horizon Europe program of the European Commission. In 2022, the DECAGONE project coordinated by ENERTIME was granted in call HORIZON-CL5-2021-D4-01. DECAGONE is an EUR 18 Million project (EUR 14 Million funded by the European Union) with the objective to develop an innovative ORC-based WHR system using enhanced capture designs and disruptive turbomachinery. The project will run from June 2022 to May 2026.

Several institutional collaborations have also been nurtured by the Thermal Energy Harvesting Advocacy Group of KCORC, as described in an earlier section. These include SET Plan Action 6, the European Turbine Network, the Joint Research Centre of the European Commission and, more recently, COGEN Europe and the European Heat Pump Association.

² <https://kcorc.org/en/>