

# **THIRTY YEARS OF ORGANIC RANKINE CYCLE DEVELOPMENT IN ITALY AND WORLDWIDE**

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## **ABSTRACT**

The general ORC concept, that is a Rankine Cycle using a working fluid different from steam, dates back more than a century. Actually, at the beginning of the 20<sup>th</sup> Century, small boats called Naphta Launches navigating American waters utilized a hydrocarbon as the engine's working fluid.

However, the ORC concept can be implemented in many different ways and for many different applications, hence the development of ORC machines is today far from reaching its ebbing point, and an exciting future for ORC technology lies ahead.

This presentation traces the beginning and the growing success of the Italian line of ORC power systems, from the early studies by Prof. Gianfranco Angelino, to the founding of Turboden and up to the majority acquisition of the company by Pratt and Whitney Power Systems, part of the American giant United Technology Corporation.

The characteristics, the hopes and sometimes the mishaps of early machines for Solar Thermodynamic Conversion and for Geothermal power are described, together with the following development of Biomass power units.

Also, the current larger turbo-generators for a wide number of applications are examined. Finally, the growth and the evolution of the ORC system as a product are reviewed from a personal point of view.