19 June 2025 h 14.45

Politecnico di Milano,
Dipartimento di Energia

Sala Consiglio, Dipartimento di Energia

via Lambruschini, 4a- Milano

Registration form:
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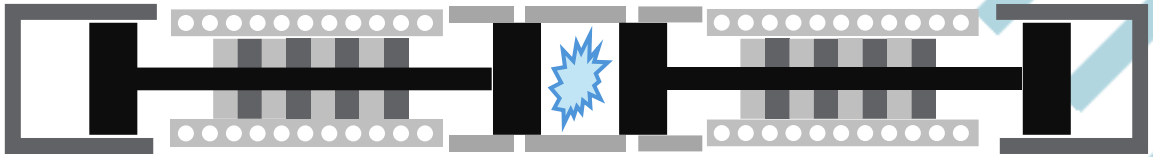
Technology of free piston linear generators

Opportunity and challenges for research and industrialization



POLITECNICO MILANO 1863 | DIPARTIMENTO DI ENERGIA

STEMS

Politecnico di Torino

FLEX-GEN

Technology of free piston linear generators

Opportunity and challenges for research and industrialization

Free piston linear generators (FPLG) represent an innovative volumetric propulsion technology which is able to convert the fuel chemical energy into electricity directly from the piston motion without additional rotating mechanical parts. FPLGs evolve the traditional concept of internal combustion engines, becoming much more suitable for the generation of electrical power in different fields which are currently relevant in the context of energy transition.

Fuel flexibility allow operation with low or zero carbon fuels (biogas, syngas, hydrogen, ammonia, methanol) and operation of low-temperature combustion modes allow >45% efficiency with near-zero NOx.

The "Flex-Gen" research project funded by Italian MUR (Ministry of University and Research) in the context of PRIN 2022 initiative joins the efforts of CNR-Stems, Politecnico di Milano and Politecnico di Torino in a detailed assessment of FPLG technology, the development of numerical tools for the analysis of performance, emissions and control.

The workshop presents the main results achieved in the context of the Flex-Gen project, contributions from other institutions working on FPLGs and will include open-discussions involving industrial and academic experts to define possible next steps for the research activities and understand the industrial feasibility of the FPLG technology in Italy.

14.45 **Introduction**
Prof. Tommaso Lucchini

Session 1: Free piston linear generator research projects in Italy

15.00 *Overview of alternative and advanced thermal propulsion and power generation concepts*
Giancarlo Dellora (STC)

15.20 *The Flex-Gen projects: objectives and main achievements*
Dr. Carlo Beatrice (CNR-STEMS)
Prof. Mirko Baratta (Politecnico di Torino)
Prof. Tommaso Lucchini (Politecnico di Milano)

15.50 *Free-Most project*
Prof. Davide Liuzza (Università degli Studi del Sannio)

16.05 *Integrated modeling for Free Piston Linear Generators: a multidisciplinary approach*
Prof. Alberto Dolara (Politecnico di Milano)

Session 2: Open-discussion involving participants from industry and academia

16.20 *FPLG technology: a key opportunity for distributed power generation, sustainable mobility, and the growth of Italy's industrial supply chain*

17.00 Conclusions

17.15 Networking and refreshments