

LIBERTINE



Sustainable mobility initiative

FPE full-hybrid powertrain and test vehicle

LIBERTINE
LINEAR POWER SYSTEM

PROJECT DESCRIPTION AND INVESTMENT OPPORTUNITY

July 2021

Who we are:



Giovanni Mariani (1952)
Chief Technology Officer



Mechanical engineer, started his career in Dell'Orto. He crossed the history of the internal combustion engines for motorcycles of the last 30+ years. Very well known and respected in Europe and in the far East as a technical expert and creative engineer

Mario Pagani (1961) - CEO



Nuclear engineer, he worked for more than 20 years as a process and strategy consultant for many industries around the world. Today he manages OMI and seat in the board of directors in two industrial companies listed at Milan S.E.

Antonio Tentorio (1972)
Director.
Vehicle design & engineering



Coming from the experience in race activities (Ferrari and Toyota F1), he built a solid experience in motorcycle vehicle engineering working for Ricardo and Royal Enfield UK and India

Pietro Speroni(1961)
Director
Engine design & engineering



More than 30 years of practical experience in motorcycle engines design. He worked for MV Agusta, Husqvarna, SWM. Strong experience in design team supervision in multicultural projects

- Established in 2018 as a merge between Paton, a racing motorcycle factory born in 1958 and ETA engines, an engineering focused on internal combustion engines born in 1998
- Strong experience in all the type of motorcycle engines, for road use and racing
- Main focus on far east clients
- Business model: R&D, prototyping and test

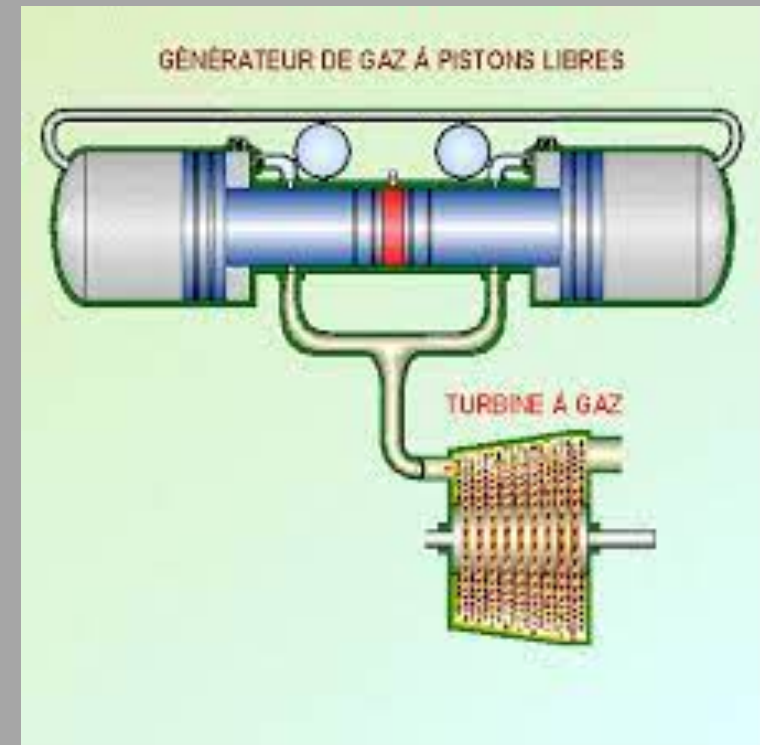
FPE: Free Piston Engine - what is it

Free Piston Engines are so called because the pistons in the engines move linearly inside their cylinders without any mechanical constraint such as a [crankshaft](#). This simplifies engine design and the engines are potentially more efficient because they do not have frictional and other losses associated with more normal mechanical linkage designed to convert the reciprocating motion into [rotary motion](#).

The first modern free piston engine was designed by the Argentine engineer Raúl Pateras Pescara. The first design was for a compressor developed and marketed by Pescara Auto-compressor Company which was launched in 1933.

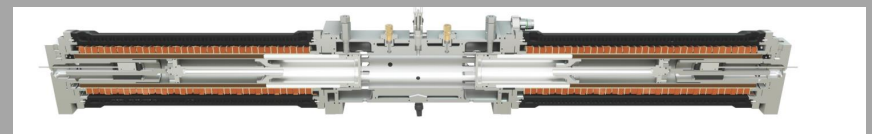
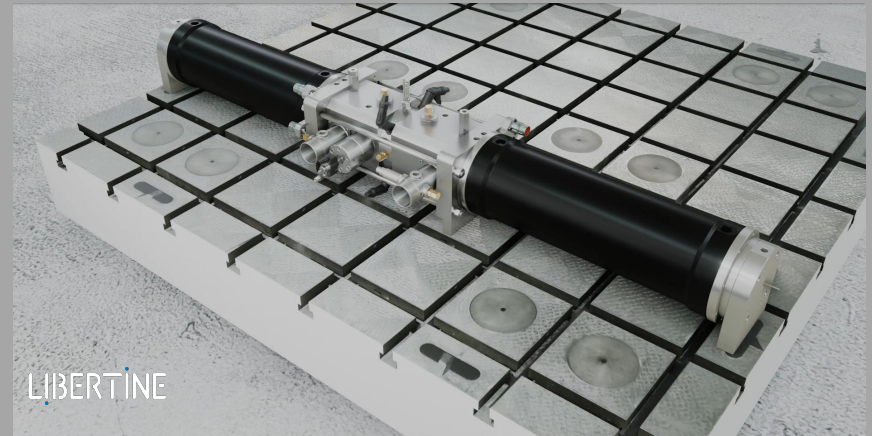
The development of this type of engine continued with their use as gas generators in which the high-pressure exhaust from the engine is used to drive a gas [turbine](#).

Free piston engines have also been coupled with some form of linear generator that can exploit the alternate movement of the piston to provide an electrical output.



FPE: where it stands in the electric mobility future

- Libertine developed the FPE concept to create “linear electric machines”, generators able to produce electricity
- This machines are able to “feed” a battery constantly and become virtually unlimited “range extenders” for electric vehicles
- Libertine has a strong basis of prototyping and patents, with focus on engines for heavy vehicles (trucks-buses)
- OMI will develop and apply the same technology and solutions to light vehicles



What type of light vehicles could be converted to FPE



- The “form factor” of an FPE engine is quite bulky for a motorcycle
- The ideal application will be for super scooters, three wheelers and small 4 wheelers for utility and urban use
- The potential market in these sectors is huge and the level of current electrification is very low

DONOR VEHICLES AVAILABLE FOR PROTOTYPING



Who we are

LIBERTINE

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