

DINAMIC SYMMETRY
TURBINES
INVESTORS REPORT

RELEASE 1.EN

MAY 14, 2013

INDEX

1. EXECUTIVE SUMMARY..... 3

2. BRIEF HISTORY OF THE PROJECT 5

3. DESCRIPTION OF THE TECHNOLOGY 8

4. STATE OF SITUATION..... 10

5. STRATEGIC VIEW..... 11

 5.1. GENERALITIES 11

 5.2. MARKET ENVIRONMENT AND PROSPECTIVE 12

 5.3. OPPORTUNITIES 16

 5.4. RESEARCH 17

 5.5. RISKS 19

6. BUSINESS PLAN..... 21

 6.1. MODEL..... 21

 6.2. START-UP PHASE 21

 6.3. CONTINUATION PHASE 24

 6.4. SUMMARY 25

7. PROMOTER 26

ANNEXES

- ANNEX 1: POPULAR TECHNOLOGY ARTICLE
- ANNEX 2: PATENT APPLICATION (ENGLISH)
- ANNEX 3: INTERNATIONAL SEARCH REPORT

1. EXECUTIVE SUMMARY

This document intends to provide prominent information to evaluate the possibilities of investment in a new technology-based business project. The objective of the project is to industrially exploit a novel design strategy applicable to gas turbines called dynamic symmetry and with potential to provide a qualitative leap in the benefits of this type of machines. In spite of being conceptually simple, it is a technique which application generates architectures with atypical geometries that depart significantly from the conventional paradigm of design and manufacture of gas turbines so that its comprehension and acceptance may not be immediate. The strategy of the dynamic symmetry is oriented to the design of gas turbines in its broadest sense not being restricted to a specific field of application. This new designing philosophy has a direct impact on physical aspects such as the working temperature of the materials, heat recovery, the distribution of structural stresses or the weight. However, that does not mean that a certain increment in efficiency or a certain reduction in weight could be linked to the mere fact of applying the criterion of dynamic symmetry. Quantifying these advantages will depend entirely on the development process of the particular product. For this reason, the start-up phase of the project will have as objective the generation of one or more designs in order to demonstrate the degree of real improvement achievable through a work of quality engineering. The success of this phase will be to determine the value and acceptance of this technology in the target market.

Gas turbines are machines that convert thermal energy of a fuel into mechanical energy. They are used in the generation of electrical energy and as an engine to drive industries or vehicles of all kinds. Forecasts of energy demand and the favourable expectations in the technical improvement of the turbines foretell a promising future for this technology in the coming decades. An emerging market and with high potential for growth is the one of the very small power gas turbines or micro-gas turbines. Either generating distributed electrical energy or powering small sized vehicles, the characteristics of this market and of the own micro-gas turbines make it a preferred target to test the innovation because it is expectable that thanks to it they can operate in more extreme conditions increasing their efficiency and benefit from other improvements. The chosen business model will have as main activity the commercialization of exploitation licenses for this technology, currently patent pending, and become a benchmark of R&D on the same. The initial investment that is described in this report is the required to execute the start-up phase whose mission is to demonstrate through research the benefits achievable when applying the criteria of dynamic symmetry. Having identified the market of micro-gas turbines as a priority, and with the objective of minimizing the economic risk, it was decided to plan an initial research consisting in the design of micro-gas turbines technically feasible in the short-term and commercially disruptive. If there is success in the start-up phase a continuation phase will be subsequently attacked in which a more definitive infrastructure to the business activity would be adopted.

Regardless of how different aspects of the project are labelled, the only information undoubtedly objective is the actual description of the technology and the fact that there is an international patent record that is progressing well. Some evolution expectations of the market or a financial projection in

the exploitation of the innovation itself would not be more than opinions, estimates or extrapolations of questionable validity and accuracy and subject to interpretation. Therefore the information provided in the document is not focused to establish speculations but is basically geared to form a clear perception of the usefulness of the new technology. This report is addressed to people and to private or public entities interested in investing in technology-based projects potentially relevant to the energy production, propulsion and defence markets. The considered hypotheses are not immovable at all and the proposed business model does not constitute the only admissible formula to lead the exploitation of this technology. It is only an alternative to assess, but that does not exclude other investment or collaboration options. To evaluate this report it is convenient to have a basic knowledge on engineering and gas turbines industry. From a scientific and technological point of view it does not require a degree of scholarly understanding of thermodynamics, fluid dynamics, chemistry, metallurgy or structural strength to fully understand this innovation because it affects only the geometry of the rotors without conditioning materials or manufacturing processes.

Warning: It has been found that the simple vision of a dynamic symmetry turbine for the first time can cause an immediate rejection effect that determines any subsequent evaluation. Contrary to what happens with those who have training related to strategic planning, the technical staff does not usually be forewarned of the great influence of certain cognitive defects in the decision-making processes. This can lead to the fact that the preference of the investor by ideas that break with the established collide with the prejudice of the technician that irrationally associates an idea which breaks with the established to a bad idea. Throughout the document resources to try to prevent this problem are provided.