ANNEX A

PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 2 GRANTS LASTING 24 MONTHS FOR CONDUCTING RESEARCH IN ACCORDANCE WITH ART. 22 OF LAW OF 30.12.2010 NO. 240 AT THE DEPARTMENT OF ENGINEERING AND APPLIED SCIENCES AT THE UNIVERSITY OF BERGAMO WITHIN THE RESEARCH PROGRAMME CALLED "STARS SUPPORTING TALENTED RESEARCHER" – 2017/2018 (CUP: F52F16001350001)

announced with decree of the Rector Rep. no 335/2018 of 16.05.2018 and posted on the official registry of the University on 16.05.2018

RESEARCH PROJECTS

Annex code 1

"Optimization of Concentrated Solar Power plants based on tower and Thermal Energy Storage"

Department of Engineering and applied sciences

Scientific Director: Prof. Giuseppe Franchini

A.R.F.: 09/C1 - Fluid machinery, energy systems and power generation - A.D. ING-IND/08 – Fluid machinery

The research project focuses on the modeling and optimization of Concentrated Solar Power plants based on tower and molten salt Thermal Energy Storage. The objective is the development of simulation models for customized plant configurations, whilst most current commercial codes deal with standard solutions. The developed models must predict the performance of each component and of the whole system, for different operating conditions (site location, power load,…). The attention will be mainly oriented to the optimization of the heliostat layout and to the control strategy of the energy storage.

Annex code 2

"Experimental investigations to improve the aero-thermal performance of film cooled gas turbine blades"

Department of Engineering and applied sciences

Scientific Director: Prof. Silvia Ravelli

A.R.F.: 09/C1 - Fluid machinery, energy systems and power generation - A.D. ING-IND/09 – Energy systems and power generation

The current project aims to experimentally investigate new film cooling solutions applied to a first stage turbine vane in a gas turbine engine, i.e. fan-shaped holes for vane cooling and slots for endwall cooling. The main goal is to increase the film cooling effectiveness, combined with minimum coolant consumption and reduced impact on the cascade aerodynamic performance. The research activity will be based on wind tunnel testing at engine-like conditions, according with the following steps:

1.definition and design of a reference geometry G0 of the cooled vane cascade.

2.aerodynamic testing on the G0 geometry to assess aerodynamic losses as a function of injection conditions, by means of a 5-holes aerodynamic probe.

3.thermal testing on the G0 geometry to measure the film cooling effectiveness distribution on vanes and end walls, as a function of injection conditions. Both Thermochromic Liquid Crystals and Pressure Sensitive Paint (PSP) will be used. To replicate engine-like conditions, testing will be performed using CO2 as coolant flow (to this end, a new CO2 feeding system will be required in the laboratory).

4.data processing of the G0 performance and definition of the new G1 geometry of the cooled vane cascade.

5.repetition of steps 2 and 3 for G1 geometry.

6.final processing of the measured data and performance evaluation of G1 vane cascade, as compared to G0.