





#### 4. DISCUSSION AND CONCLUDING REMARKS: A CHALLENGE FOR THE CONSTRUCTAL THEORY

The energy conservation Law has been here outlined with reference to the building system. Therefore, the exergy balance has been performed as a complementary method to estimate quantity and quality aspects on energy utilization. The Constructal law was initially formulated by Bejan in 1996 [18] as a principle of generation of flow configuration: "For a finite-size flow system to persist in time (to live) it must evolve in such a way that it provides easier and easier access to the currents that flows through it". Ref. [19] illustrates why the constructal law is even a law of thermodynamics but it is at the same time distinct and/or complementary to the other principles of thermodynamics. The first law accounts for a quantitative energy balance while the second law significance is linked to the irreversibility or entropy generation that prevents us from extracting all possible energy as work from various sources. The concept of quality of energy sources and energy conversion is at the basis of the exergy calculations here performed in Paragraph 3. It is worth knowing that the First and Second Laws of Thermodynamics speak of systems (the building in the case here treated) intended as "black boxes". They do not say anything about the possible internal configurations: classical thermodynamics is not concerned with non-equilibrium flow systems. The time sequence of drawings towards optimal configurations is the phenomenon covered by the Constructal Law, which is now leading in many directions. In this context, the investigation aimed to enhance the building performance represents one of the most promising challenge for the Constructal theory.

#### ACKNOWLEDGMENT

The Authors wish to thank the Italian Ministry of Education, University and Research for funding this study.

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