HN_ZEB technologies applied for the construction of On Plein Air tourist villages and Standard Sustainable Production

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Abstract: The "Glamor On Plain Air" holiday system, combined in the luxury and ultra-luxury sector, represents a new large area of interest towards which the qualified tourist market is strongly oriented. One of the tourist assets is constituted by the sustainability and compatibility of the holiday in a system strongly oriented towards the circular economy, the containment of consumption as well as the significant respect for nature and the containment of the environmental impact towards a reduction of global warming. From this point of view, the use of HN_ZEB technology for the restructuring or design of this type of tourist facilities that require particular and exquisite tricks in every aspect of the project is perfectly framed, precisely to be included in the exclusive lists of relative use at international level.

1. Proposal and its role under the project
The Mediterrae Consortium (No Profit Organism), works in support of one of the Specialized and Consortium Companies that in the future we will define Promoter Companies which, in their future missions will intend to develop and finance the implementation of the project in question, through assistance for all the associated technical and economic assessments, assisted by the ITACA Srl, IFP Commercial and Engineering Srl Engineering Companies, the Ventrella & C Business Consultancy Firm as well as the specific Design Studies and related Works Management, established by Arch. Francesco Clori, from Ing. Rocco Luciano Uva and from Ing. Sergio Martano.

2. "On plain air" tourist market scenarios
The "Glamor Hotels 7 Stars On Plein Air" tourism represents more than 18% of the tourist presences registered every year in Italy. For example, there are regions like Puglia, which account for 36% of the entire tourist movement in open-air businesses, or regions such as the Veneto where open air presences are 27.9%. With particular reference to the areas of Puglia & Basilicata, as well as in the whole of Southern Italy, we can imagine, likewise, that the tourism offer of this sector can be based on the same figures, in the different perspective of a little developed tourist market in the internal areas and in the special areas with a strong tourist vocation. But to such an important dimension of the phenomenon, it does not seem to correspond an adequate cultural attention on the part of the experts and the "decision makers". Despite the current legislation aimed at giving central importance to the entire territorial offer, tourism, from a regulatory and political point of view, is still largely considered, internationally, a hotel-centric sector (where the part of lions, above all in the luxury sector, it is carried out by specialized tourist chains at Sheraton, Sofitel Hotel & Resort, Marriot, etc.). Yet in view of the trends on the demand side, and the need for nature, authenticity, freedom of spending, sustainability, the "Open Air" offer...
seems to have a lot in order, even to face the future for luxury demand (Deluxe 5 stars) and Super Luxury (Top Class Residence 6/7 stars).

A special McCann Erickson research of May 2010 revealed that the ideal place to stay must know how to offer:
1. non-invasive entertainment;
2. the possibility of choosing between luxury structures (6 or 7 stars) with few beds (40 max 50 p.l.);
3. so much to do, but without queues;
4. place for timid;
5. the cultural capacities of the place and the environment (concerts, theatrical performances that give the possibility to know the places and the host cultures);
6. high quality special fun;
7. offer of services for both children and adults who are not self-sufficient;
8. a wide offer of sports activities, with fields, and suitable equipment;
9. special quality food and wine certifications with services by star chefs;
10. certifications on invulnerability, plant and fire regularity, safety of places, environmental quality and continuous hygiene of the same environments (if anything controlled and continuously ensured by means of home automation that maintains high environmental quality both indoors and outdoors);
11. a complete and generalized range of services available (luxury car rental and shipping, Wi-Fi, multimedia equipment, augmented virtual reality, H.Q. music listening places, etc.);
12. a clear message of an eco-sustainable system, strongly oriented to the reduction of every environmental impact, to the circular economy and the containment of consumption and attentive to the adoption of every strategy in line with the techniques of local mitigation of Global Warming.

On closer inspection it is precisely the offers that characterize the heart of the proposal of a way of making holidays of the highest quality in contact with nature and with the maximum useful amenities for leisure time. In practice it is a question of combining the Deluxe or Top Class features of the large hotel chains with similarly organized structures that prefer, instead, fundamental aspects connected to the spirit "On Plain Air", "In_Zeb", "Sanification Enviroments" and "Smart Technologies". Open air tourism operators, how can they reach this goal? The challenge that in particular the managers of such innovative structures have to face is that of not remaining clinging to the old Spartan and poor camping model, which has characterized the plein air offer in past decades, and, at the same time, of not copy the other existing models (the current villages or hotels), but rather to identify and create an original and innovative hospitality proposal complete with top class services. As the experience of the "Tiliguerta Camping Village On Plain Air" on the Rei coast in Sardinia teaches as it is based on the Policy of "Wellbeing in its broadest sense", not by chance a leading Italian location in the Open Air, Life at Air Open must not be an oasis (nor much less a cathedral in the desert), but must be inserted in a compatible context, because its offer cannot live alone, without a valid territory complete with its own history, culture and ancient traditions. This model must be declined on several levels: it must succeed in translating itself into the internal architecture, in a graphic and communication style, and finally into a management style that does not slavishly resemble the hotel style. Original model then means "distinct", easily recognizable, the result of a mix of freedom, comfort, approach to nature and satisfaction of demand. This realization may be better characterized by the participation, in addition to the due Governance, of the Expertizes of highly qualified Companies, as well as the contribution of the status of the research and the implementation of the techniques achieved for the development of the sector. The entire initiative will be characterized by the aggregate philosophy connected to the concepts of Governance, Security, Leadership Production, Research, Sinergy, Assistance, Convenience, Comfort, Mobility, Integration, Pratically, Ideas Exchange, Operational Partnership, Smart Utilities, etc. for the development of a Brand - System that integrates Tourism, Mobility and Sustainability, together with being perceived as a structured organization for integrated growth, in one, with a real Territorial Incubator of other Companies: Global Structure prepared to develop every new interconnected asset (slow food catering, brunch wine bars, agro-foods, regional foods, etc.), or aimed at synergizing existing production capacities by combining them, in the concept of integrated territorial proximity, with Innovation and Sustainability as much as extended. Each "On Plain Air" structure will be supported by an integrated service area (Consulting and Adviory services, Training Support, Living Spaces, Banking Services, Restaurants, Educations, Gyms, Health, Leisure, Internet Wi-Fi, etc.).

3. Policies assigned to the project
Through the development of the epigraph project, we intend to support and develop three different activities aimed at:

a. promote and get approved, at Governmental level, a new policy, of a general nature, aimed at stimulating and setting up an innovative Tourism Brand, configured by a specific Logo and distributed in a non-invasive manner on the chosen territory, whether they are interventions non-invasive in the various regions of Southern Italy with a strong tourist vocation, both at the level of other national and international sites, chosen in order to stimulate vigorous tourism growth in the Top Class and Deluxe sectors;

b. design, develop “Site Evaluations and implement”, in the various areas with special tourist vocations, first of all in the Puglia Region and Southern Italy, some examples of“ Natural Glamor Tourist Residence 7 Stars on Plain Air ”complete with the necessary equipment for residence, agro-catering and leisure, in addition to all the necessary facilities aimed at making the entire structure of the proposed construction entirely sustainable and innovative;

c. employ the Technology "Healthy Nearly Zero Emission Building" (referred to in the acronym HN_ZEB) associated with the various innovative construction methods concerning, in this case, the innovative sectors:

1. Design, Architecture, Style, Materials Management Sciences in "On Plain Air” Constructions, Simulation Tools for Zero Energy Building (by arch. Clori);
2. Air Ventilation, Health, Sanification of Enviroments, Domotics, Buildings System Optimization (by eng. Uva);
3. Electric & Power Systems, Process Control, Servomechanisms, Energy Self-Production Systems, Electric Storage and Smart Technologies for Buildings (by eng. Martano).

4. Household, architectural aspects in the glamor & style marking on plain air construction materials, simulation tools for zero energy buildings (by Arch. Francesco Clori).

The "Natural Glamor Turistic Residence Plain Air" will be divided into different areas, within its structure, aimed at satisfying the following needs: to. Reception and Host treatment; b. Residence in structures compatible with the reality of typical local; c. Parking Facilities for Campers (possibly Caravans); d. Agro-Restaurant, Typical Cucines and Café-Wine Bar; is. Leisure, Gym and Multisport capabilities; f. Integrated Tourism of Proximity; g. S.P.A. Services (Sauna, Hammam, Therapy and Wellness, Thai Massage, etc.); h. Excursions typical areas; i. Leisure, Gym and Multisport capabilities; j. Service Bank and Internet Wi-Fi Global Area; Each project, certainly not invasive in the territory, will develop following the precise territorial vocations and architectural trends deriving from the place where the site will be implemented, with the satisfaction of a Policy aimed at full territorial, architectural and anthropological integration. The latest trend sees the more affluent social classes moving away from the hustle and bustle of the cities to create buen retirosin, pleasant places in which to be in contact with nature, connected to the rest of the world thanks to ICT technologies. Requests for projects of luxurious housing structures, equipped with all the comforts, created in a completely wild context, are increasing. Invisible residential structures, perfectly integrated into the surrounding nature, placed in places with a memorable panorama. Architecture integrated into the landscape is now a true stylistic trend of modern design. A field of application in which it is necessary to be able to combine the inspiration in the design with high-level technological skills with regard to energy independence, the treatment of the discharges and therefore the entire problem of the environmental sustainability of the housing structure. Residences of this type, in fact, being far from the big cities and the communication routes, must be designed with a special regard to functional autonomy and the ability to leave the least ecological footprint possible. In our specific case the design experimentation in relation to the residential intervention HN_ZEB, characterized by an extensive type of intervention, arises from an integrated systemic and holistic approach based on the respect of the bioclimatic characteristics of the place and the enhancement of its potential in order to to achieve the goals of sustainability with the maximum containment of energy needs (Casaclima gold class), almost to the limit of self-sufficiency.

5. Construction technology

Given the nature of the place and the landscape context in which the complex is inserted, a choice of sustainability was made through the use of innovative, experimental and sustainable construction technologies. Therefore the buildings are characterized by a very low energy requirement as they use all the energy saving features: elimination of thermal bridges, highly insulated windows, heating by heat
pump and enclosure, high performance from the thermal, acoustic and hygrometric point of view in as completely natural in hemp and lime, natural raw materials with low consumption and environmental impact production close to zero. The internal partitions are made of tufa, a local material with zero kilometers, while the external walls are made of an internal facing in tuff on which a first layer of 25 cm thick hemp and lime is sprayed with a ratio of 1: 1, followed from a second layer of about 5 cm with a ratio of 1: 4. This compound in hemp and lime (completely natural cement), a LEED® certified product, is a compound made of hemp vegetable chipboard with a lime-based binder in a variable ratio depending on the required thermal and mechanical performance. The floors are made of wood with hemp and lime screeds, while layers of cellular glass and lime-based screeds are placed in contact with the ground. This compound differs from other insulating materials in that it combines high insulation properties and thermal mass with a high eco-compatibility, recyclability and hygroscopic regulation as well as being a material with a negative balance of CO2 emissions capable of capturing and sequestering 60 kg of CO2 from atmosphere for every m³ of material. A separate chapter will be made up of intelligent glazing, able to modify the greenhouse effect at certain times and / or to change the brightness of the rooms. This innovative construction technology, unlike traditional building that tends to make casings made up of the coupling of several mineral, synthetic and natural materials, allows with a single homogeneous natural material both to fulfill at the same time the function of casing and insulation and to solve also all interstitial humidity problems due to the different value of vapor permeability of the materials used. At the same time, thanks to optimized plant design and the presence of an air treatment plant with heat recovery, perfectly permeable masonry to water vapor allows constant humidity levels to be maintained indoors, thus ensuring the absence of mold and pathogens. Furthermore, the innovative use of hemp and lime masonry together with all the other natural building components, eco-compatible, certified and with low or zero emission of volatile organic pollutant substances (VOC) guarantee a high air quality to protect the health and maximum well-being.

6. Air ventilation, health, sanification of environments domotics e buildings system optimization (by Eng. Rocco Luciano Uva)

One of the indispensable paradigms in modern times, in a sustainability-oriented project, is the integration into the building organism of systems with marked technology aimed at saving energy. The objectives with respect to which the choice of plant technology solutions will be oriented can be summarized as follows:

- Reliability and continuity of operation;
- Minimization of energy consumption (in particular with reference to the National Law 10/1991 and Legislative Decree No. 192 of 08/19/2005 and subsequent amendments);
- Achieving maximum safety for people and environments in compliance with regulations and minimizing the consequent risk;
- Rationalization and unification of the components of the distribution system ensuring easy maintenance;
- Cost-effectiveness of operation and management;
- Flexibility and expandability of the systems without resorting to burdensome rebuilding or replacement charges.

To overcome the existing dichotomy between architectural composition and technological design in an attempt to create synergies that make the project sustainable, the following criteria will be adopted:

- the first energy saving is that of energy not consumed;
- pursue maximum environmental compatibility.

The resulting actions will have an impact both on the "passive" side (ie relative to the reduction of energy requirements and to the conservation of the energy input in the building volume), and on the "active" side, in the various forms of plant optimization. In order to contain polluting emissions, the executive project will take into account the environmental compatibility analysis, according to standardized methods. The plant design, therefore, will start from the verification and the functional recovery of any plants present, preceded by an accurate energy diagnosis, proposing solutions that allow to optimize the available spaces, the maintainability of the systems, the use of different technologies and types, the maintainability of the finishes obtainable through the choice of durable and easily cleanable materials, the containment of energy consumption through the identification of low energy consumption equipment and the use of renewable energy plants. The design will be based on the reduction of the total energy requirement of the building compared to the situation before operations which may include the improvement of thermal bridges, the improvement of thermal insulation systems, the improvement of
the opaque envelope and the transparent envelope, the production and distribution of domestic hot water, improvement of internal environmental quality through technical solutions capable of ensuring: reduction of occupant exposure to pollutants (radon, emissions from thermal plants, fine particles from outside, etc.), control moisture. Particular attention, according to the dictates of the Itaca protocol, will be placed in the definition of the design indications for a better environmental quality inside all the environments subject to intervention and in particular will pay great attention to indoor thermo-hygro-metric comfort, natural lighting, control of the introduction into the internal environment of direct solar radiation, to interventions aimed at reducing as much as possible the indoor exposure to low-frequency magnetic fields, through the use of local, environmentally friendly and recyclable materials favoring materials with increasingly higher contents of secondary raw materials.

The efficiency project will also refer to different types of plant, especially with high performances, with the aim of: minimizing energy consumption to achieve adequate energy classes, implementing, completing and justifying all the proposals that, starting from energy diagnosis, we will identify with "energy" design choices such as the use of high efficiency heat pumps, the use of low enthalpy systems as last generation fan coils, based on the actual needs for each environment, the use of circulators on the latest generation hydronic circuit with built-in IE5 inverter, etc.

In conclusion, the objective to be achieved will be the design of a building with very high energy performance, such as HNZEB whose very low or almost zero requirement, should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on site or nearby ".

7. Electric & power systems, energy self production, process control, servomechanisms, electric storage and smart technologies for buildings (by Eng. Sergio Martano)

The informative concept at the base of the design of electrical and special systems, in compliance with the requirements of the HN_ZEB technology, is to use solutions that tend to reduce electromagnetic emissions, push energy savings and at the same time obtain maximization of the comfort of the rooms and their habitability. The electrical design must be closely integrated with the mechanical plant engineering regarding certain performance aspects such as, for example, environmental comfort, microclimate regulation, integration with the lighting system. The design choices will allow to combine different needs and essential benefits, depending on the plant. Below we cite, for example, those of greatest interest and, in some ways, very innovative.

Voltage levels: In areas of greater permanence or stay, for example in sleeping areas, the level of the power supply voltage of the lighting system will be in direct current at a level of 48 Vdc, coming directly from the photovoltaic system which will be discussed further on. This voltage level is safe and will result in an electromagnetic pollution level of "zero" in the environment. According to analysts, worldwide, in the very near future, with the creation of "smart" systems with self-production of energy, there will always be more and more the use of DC distribution systems. The alternating current distribution, 230-400 Vac, will be used for other applications.

Lighting fixtures and systems: The lighting fixtures, for indoor and outdoor, will be with LED technology, with low energy consumption and high efficiency, all powered at 48 Vdc. The luminous flux will be adjustable further reducing energy consumption. Automatic management will allow lighting to be used only where it is needed as it is served by presence devices and the contribution of natural solar light. With the approach of the evening hours, the lighting of the gardens with a low emission, for example at 30%, will come into operation; as a person approaches, the luminous flux increases progressively to ensure safe visibility.

Power supply lines: Where possible, in particular for rooms to be restored, the power lines will consist of a flat cable (0.25mm thick), which will stick to the walls along the paths; the resulting material will be significantly reduced and the absence of traces will not cause thermal dispersion. The flexible flat cable will be equipped, in addition to the energy conductors, also with additional tracks for the implementation of special systems (KNX / domotics / alarm / fire detection / etc.).

Electricity production: Electricity will be partly generated on site, by means of a photovoltaic renewable source production plant or consisting of vertical axis wind turbines, in direct current; a part will be converted into alternating current by hybrid inverters, while another part will be used directly in direct current after a suitable reduction. If the energy produced in the hours of solar radiation is higher than the demand, the excess energy will be stored in batteries (electric storage). The advantages will be:

- autonomy (full energy independence)
- self-consumption, increases the amount of self-consumed energy.
automation, management, home automation control of each component system.

Energy management: Innovative systems for energy management will be adopted in order to minimize energy consumption; the system will react to situations that can lead to unnecessary energy loss; for example it will not heat an environment if the window is open, it will not illuminate the garden if there is solar radiation, it will not irrigate when it rains, collecting a portion of water and storing it in special containers to be reused, again for watering the greenery, after a certain number of days of drought. During the absence, the power supplies of all the devices that use the energy in the rest state will turn off.

Automation: The systems used will allow all the automations of the case; the interface will be obtained through fixed touch screens, smartphones etc., for environment and area controls. All the components and systems, through self-diagnosis, will facilitate maintenance and allow a first intervention even at a distance. Sensors will be used, for example in the rooms, with artificial intelligence, able to self-learn changes of state: for example, if a person will be affected by a malaise, staying in bed for a certain time will activate an alarm signal; or if a person falls into an environment, the sensors will evaluate the environmental mutation and activate the planned rescue procedures.

8. Total cost of the project in relation to participation (direct and indirect costs, these are lump-sum and relative cost-benefit analysis).

All of this constitutes the sum of all the costs necessary for the realization of the Project, both those relating to the remaining share of the company and those covered by the European contribution fee. These costs must be divided by category: permanent staff, staff to be hired, consumption, area activities, etc., and described in as much detail as possible.

The total costs are correlated to the development of the various activities which, for each productive sector mentioned above, will be developed, each, for different and successive phases up to reaching the entire relative implementation envisaged. In fact, for many sectors the production framework will pass through the following phases:

1st achievement analysis of the relative demand, with implementation of a first core business, for each identified production area, related to the immediate satisfaction of the demand associated with the realization of the first 5 sites of "Natural Glamor Turistic Residence 7 Stars On Plain Air".

2nd achievement solicitation, in the short term of 2 years, of the national reference market and production framework pertaining to the associated demand of the neighboring countries, with the forecast expansion of the infrastructures envisaged also aimed at accommodating and integrating the collateral production processes present in situ, with implementation of the associated business partner, all with the addition of additional components that will involve the involvement of other collateral production processes, also in Italy (for example, we refer to the component parts of the structures for the Gym, those for the Sauna and for the various activity of a Spa, or for the Agro-Food sector, this can be associated, for example, with the proposed "BRAND MEDITERRAE", in reference to the pre-established mission, directly detectable from the relative online market website www.eatsouthitaly.it recently established, or more).

3rd achievement, in the medium term of 5 years, of full productive autonomy with a widened forecast of the Brand "Natural Glamor Turistic Residence 7 Stars Plain Air" and extended to most of the National territory and in particular of Puglia & Basilicata, through the formula of Franchising or other similar (associated with the constant and increasing verifiable demand, stimulated, also, by the help of both territorial and national political and administrative authorities).

The costs and the determination of the relative benefits, in one with the relative management analyzes, will therefore be developed, for each sector, by the productive organizations that will present the relative organizational and business Master Plans with the architectural and executive projects of the site, inherent to the development of the peculiar area assigned to them. Therefore, in principle it can be foreseen for each experimental site (with the aim of creating simple management structures with a maximum of 40/60 beds), in the hypothesis of implementing, over time, all the activities foreseen in the single "Natural Glamor Turistic Residence 7 Stars On Plain Air ", with the forecast of associated investments related to revenues and amortization of the first expenses already used in the first stage of construction and start-up. Once the entire approval framework of the Zoning Plan of the area framed and taken as a reference has been reached, the areas will be assigned to the relevant Stakeholders (who at the same time will be associated, in the relative permitted contractual forms, with Mixed Companies that have production capacity equal to).