Innovative Procedures Energy Efficient Environmentally friendly building modules

PR.I.M.E3 co-funded by MATTM – Italian Ministry of Environment-
Call "Energy Efficiency and Use of Renewable Energy Sources in Urban Areas."

CONTACT Website: www.prime3.it  Email: micardillo@prime3.it

Project /Architectural Design Manager: Arch. Maria Irene Cardillo
Scientific Manager: Prof. Arch. Mario Grosso

PARTNER – ATS PRIME3

So.Ri.Ser. S.c.r.l.
Italian consortium. Leader of PRIME3.

AE.C.I. S.r.l.  responsible for architectural/bioclimatic design,
sustainability architecture, energy efficiency.

CORMATEX S.r.l. responsible for innovative insulation panels
made of textile and tires waste materials.

INGE.CO. S.r.l. responsible for structural/construction design

Politecnico di Torino (Research Institute): responsible for
Thermal Insulation, Controlled Natural Ventilation and Domotics
PR.I.M.E3 is a project related to the industrialisation of modular building units, aggregated now undertaking prototype phase. The building module has been designed to fit to ANY ENVIRONMENTAL CONTEXT. The PR.I.M.E3 project integrates the sub-components systems in a design process leading to a modular unit characterised by the following performances:

- building elements components are factory pre-assembled;
- sub-modules are easily transportable;
- structural elements and concepts are innovative;
- spaces are functionally flexible;
- building elements are made of innovative recycled / recyclable materials;
- modules realisation costs are low;
- indoor air quality is an essential aspect of system design;
- the construction process is totally industrialised.

The main sustainability value of PR.I.M.E3 integrate environmental performance with each subsystem, with high level of technological innovation: the choice of aluminum as a material for the bearing structure; the synergy between bioclimatic elements; newly developed technical wall component (H-NAC wall: hybrid-Natural Air Conditioning wall), which substitutes HVAC conventional system with passive and hybrid physical mechanisms; life cycle assessment of materials and the reuse of waste materials.
The great originality and innovation of building module is precisely the integration of subsystems:
All subsystems are designed and analyzed using criteria/procedures characteristic of architectural and structural/construction design.

**TECHNOLOGICAL INNOVATION**

- **SUBSYSTEM 1:**
  CONTROLLED NATURAL VENTILATION/
  PASSIVE VENTILATED MICROCLIMATE COOLING

- **SUBSYSTEM 2:**
  BUILDINGS THERMAL INSULATION
  innovative insulation panels by waste

- **SUBSYSTEM 3:**
  WATER CYCLE/REUSE OF H2O/THERMAL ENERGY RECOVERY

- **SUBSYSTEM 4:**
  MICROCLIMATE CONTROL AND MONITORING
ARCHITECTURAL STRUCTURAL / CONSTRUCTION DESIGN: RECYCLED ALUMINUM

Innovative material such as ALUMINUM for structural components, has advantages: lightness, structural efficiency, simplification of the assembly steps, transport efficiency, reduction of the loads transmitted to the foundation.

PR.I.M.E3’s design approach responds to many challenges: the building is economically competitive, because lower considerably construction costs by using a logic of pre-fabrication and seriality. The main feature appears to be its total recyclability that offers benefits both for consumers and for the industry in terms of:

- energy saving;
- recovery for reusable raw material;
- Reducing amount of waste placed in landfills;
- reduction of the extraction of bauxite.
The application of PR.I.M.E3 concepts and results at the urban scale could lead to the realization of **ECO VILLAGES**, hence, promoting technological excellence in the area of Research and Development, consistently to an urban model characterized by high energy and environmental efficiency.

PR.I.M.E3 module’s functional and aesthetic flexibility is also suitable for **LUXURY SINGLE-FAMILY VILLAS**, which might have different forms and dimensions, various finishing, features of **high quality**, adaptable to any environmental context.
ECONOMIC AND SOCIAL IMPACTS

OPERATORS
- NEW SPECIALIZED PROFESSIONAL PROFILES

ENVIRONMENT
- REDUCTION ENERGY CONSUMPTION
- EMISSION ABATEMENT
- REDUCTION WATER CONSUMPTION

INSTITUTIONS
- PLANNING
- STANDARD ADJUSTMENT
- GREEN PUBLIC PROCUREMENT
- BUILDINGS’ ENERGETIC CLASSIFICATION SYSTEM

MARKET
- MODULE’S IMPLEMENTABILITY
- COMPETITIVITY (COST REDUCTION)
- SAVINGS ON ENERGY COSTS

SOCIETY
- INCREASE LIFE QUALITY
- MORE ENVIRONMENTAL AWARENESS
- COST SAVINGS

SECTORS
- TECHNOLOGY INNOVATION
- REDUCTION PRODUCTION COST
- REDUCTION WASTE COSTS

спасибо