



Horizon 2020  
European Union Funding  
for Research & Innovation



Achieving near Zero and Positive Energy Settlements  
in Europe using Advanced Energy Technology  
H2020 - 678407

# Transition from nZE Buildings to NZE Settlements using advanced energy technology

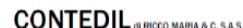
**Dr. M.N Assimakopoulos, Associate Professor**



HELLENIC REPUBLIC  
National and Kapodistrian  
University of Athens

Group Building Environmental Studies, Physics Department, NKUA, Greece

6th Jeffrey Cook Workshop in Desert Architecture  
25 November 2019, Beer-Sheva, Israel



# The ZERO-PLUS project

ZERO-PLUS is a comprehensive, cost-effective system for the design, construction and monitoring of Net Zero Energy Settlements that is being tested and implemented in four pilot projects across Europe.

Greater energy efficiency and economies of scale are achieved through a transition from single NZE buildings to NZE settlements in which the energy loads and resources are optimally managed.

- **Funding:** Horizon 2020, Innovation Action
- **Total budget:** ~ EUR 4,2 Million
- **Duration:** 60 months (Oct. 2015- Sep. 2020)
- **Coordinator:** National and Kapodistrian University of Athens
- **Consortium:** 16 partners from academia and the industry

Month  
50

# Who we are

## Case study owners



CYPRUS, Nicosia



FRANCE, Voreppe



ITALY, Granarolo dell' Emilia



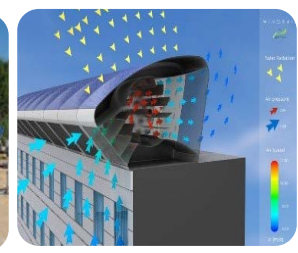
UK, Derwenthorpe

Energy production

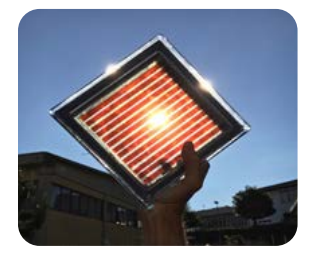
## Technology providers



FAE HCPV



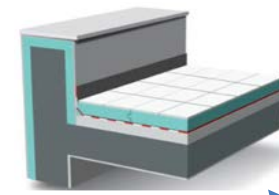
WindRail



SolarBlock biPV



REACT+



FIBRAN XPS



freesco HVAC

## Research partners

Monitoring and Evaluation of the Settlements' Performance

Market Analysis and Model for Business Growth

Design and Optimisation of Modular Envelope Components

Construction Management, Cost Management and Implementation of the Innovative Technologies

Energy management

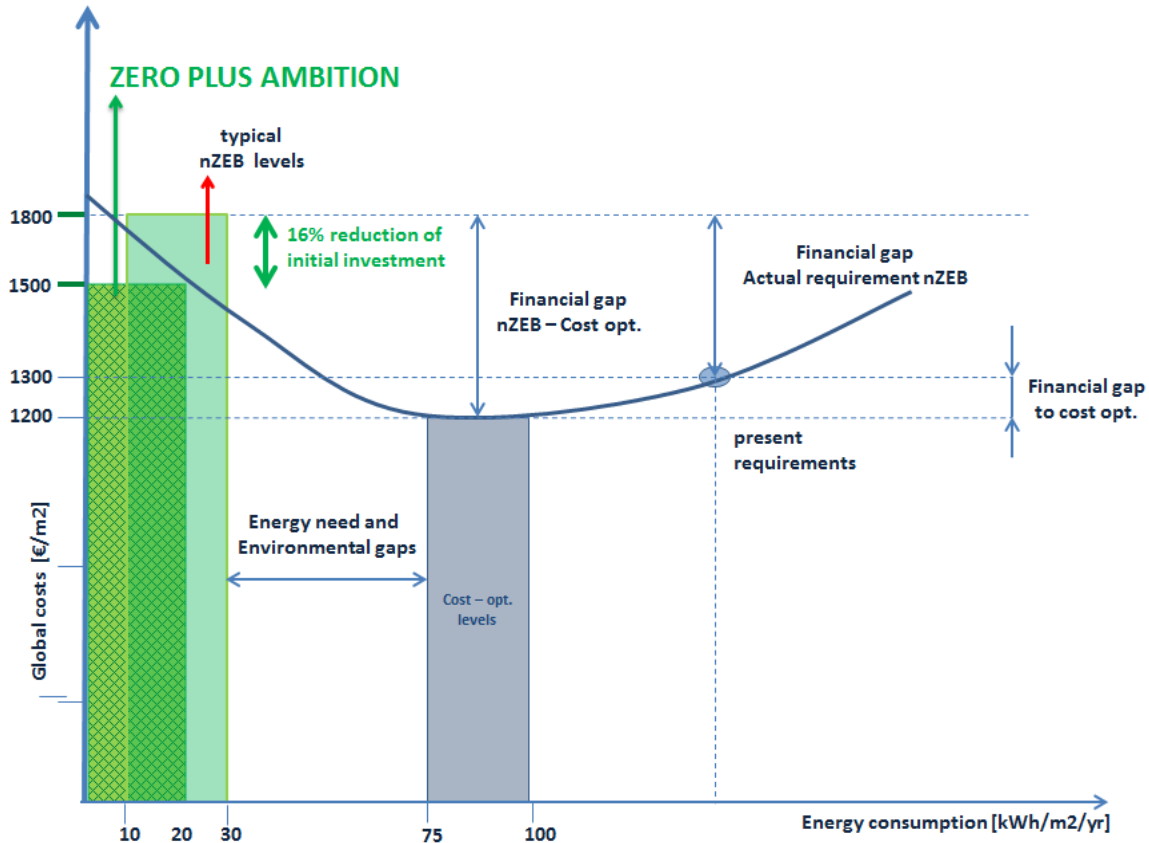
Management of Individual Buildings

Integrated Design and Optimisation of the Zero Energy Settlements

Energy conservation

Integrated Design and Optimisation of the NZE Technologies to be implemented at the Settlements Level – Creation of Simulation and Monitoring Protocols

# The ZERO-PLUS ambition



**Financial, energy and environmental gaps between cost optimal levels and NZEB levels in Europe, and the ambition of ZERO-PLUS**

# The ZERO-PLUS concept

## TARGET

To develop a method and accompanying tools that will provide an overarching solution mitigating the barriers to successful AND COST-EFFECTIVE construction of new residential Net Zero Energy Settlements (NZES).



## ZERO-PLUS building

- ✓ Net Regulated energy of **0-20 kWh/m<sup>2</sup> per year**
- ✓ RES energy production of **50kWh/m<sup>2</sup> energy per year**
- ✓ **16% reduction of initial costs**

## STRATEGIES (for cost reduction)

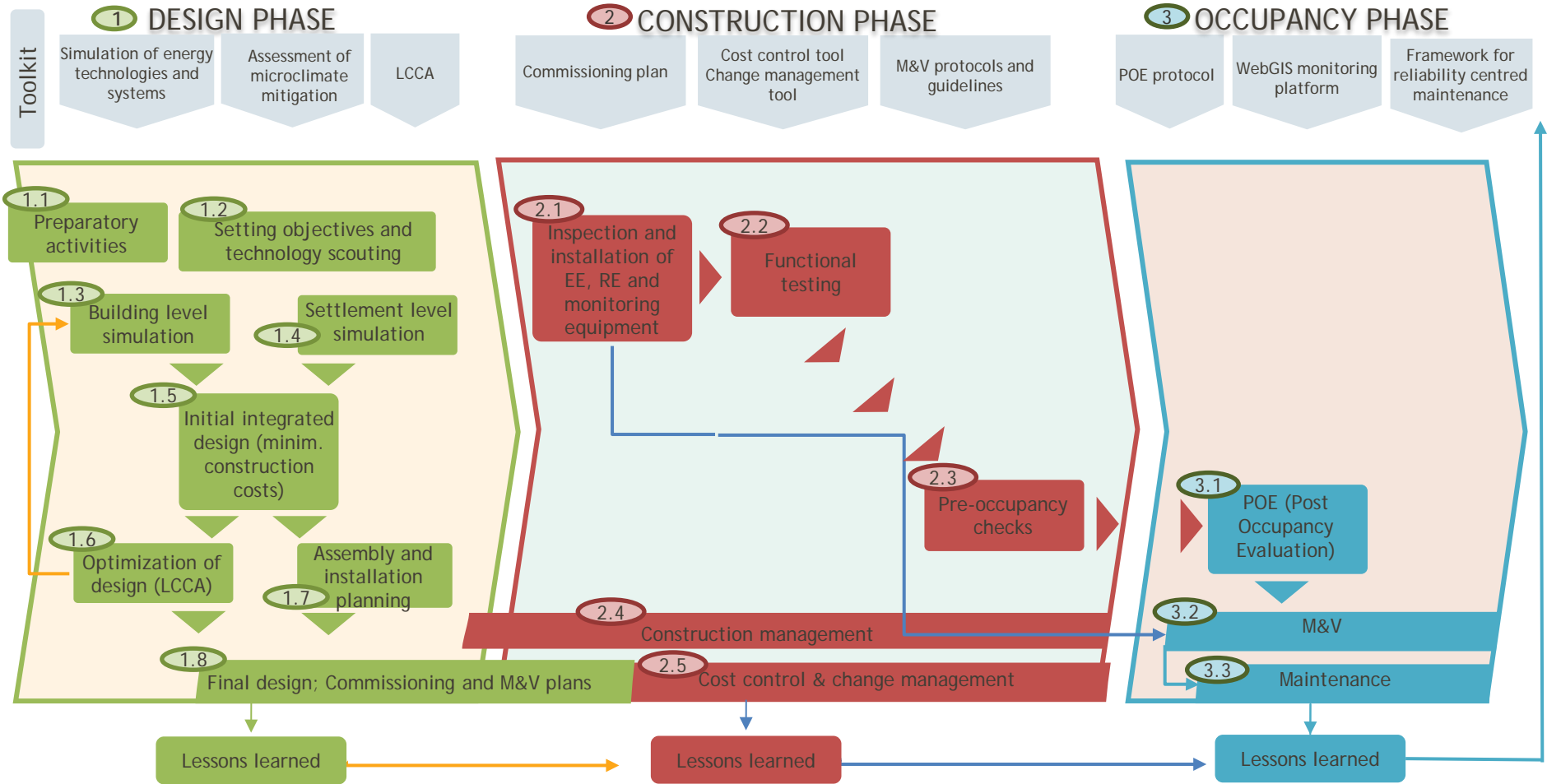
**Increasing the efficiency** of the components directly providing the energy conservation and energy generation in the NZE settlement.

**Reducing initial costs** through efficient production and installation processes and use of less material and space for energy conservation and energy production.

**Reducing operational costs** through better management of the loads and resources on a district scale rather than on the scale of a single building.

# The ZERO-PLUS approach

The ZERO PLUS concept for Near Zero Energy Settlement design and construction



# Benefits of the ZERO-PLUS concept



Without ZERO-PLUS



With ZERO-PLUS

# Four years in the project...

From

To



FRANCE, Voreppe



ITALY, Granarolo dell' Emilia



UK, Derwenthorpe



FRANCE,  
Voreppe



ITALY, Granarolo  
dell' Emilia



UK,  
Derwenthorpe



# Four years in the project...

From

To

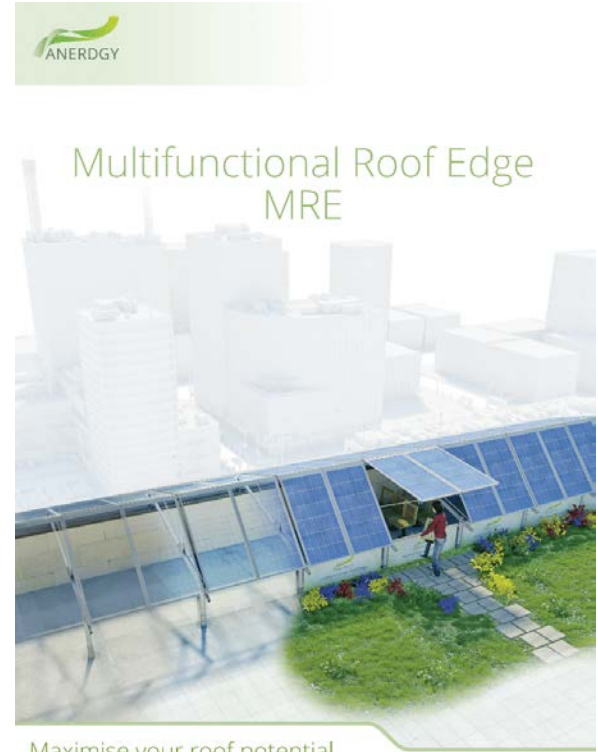


WindRail® C30



## MRE-light

Voreppe, France - In October 2018, MRE hybrid modules were installed on the roof of an apartment building.

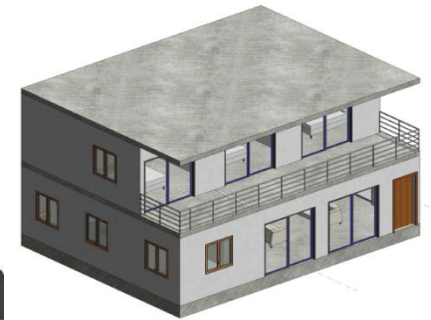


Maximise your roof potential

# Four years in the project...

From

To



**Peyia, Paphos, CYPRUS**

**CYI campus, Nicosia, CYPRUS**

# Four years in the project...

From



To



# Major learnings thus far

- **Urban planning:** Existing long-term urban plans are often not aligned with the approach, and currently limit the opportunities for its application
- **Building permits:** Local planning authorities are not familiar with the approach, increasing the risk that they will be reluctant to approve its implementation
- **Utilities:** Utility companies may not be willing to approve communal energy production and management systems
- **Residents:** may be reluctant to accommodate and use technologies they are unfamiliar with.
- **Owners/developers:** may find it difficult to find a common agreement on specific aspects ranging from the design, use, and maintenance of common technologies and monitoring system

# THANK YOU

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