

Innovative Photocatalytic Paints use on the improvement of Indoor Air Quality (IAQ) and Energy Consumption.

Expected results

Among the existing various techniques (purging with outdoor air, using ultraviolet germicidal irradiation etc.) to mitigate the problem of contamination in the indoor environment, photocatalysis, as an alternative technology, is considered to be the most safe innovative, effective, economic and promising solution.

VISIONS set realistic targets for the resolution of the IAQ and energy consumption issues, using an already proven innovative photocatalytic nano-material which is able to degrade air pollutants using Visible Light, as opposed to the existing products on the market, which operate by the use of UV radiation.

The proposed technological solution will be able to reduce up to 40% of specific air pollutants (e.g. NO_x, VOCs), translated to reduction on the demand for air-cleaning systems, air conditioning and other mechanical ventilation, leading to up to 10% less energy usage with a significant impact on the long-term energy demand and elimination of the overall socioeconomic costs due to the adverse health impact, caused by indoor air pollution.

Therefore, VISIONS sharing the same perspective with the signatories of the Covenant of the Mayors for Climate and Energy, constitutes of a potentially new tool for the effective reduction of indoor air polluting agents, improving citizens day-to-day life, while contributing to the National and EU coordinated efforts for the promotion of GREEN DEVELOPMENT technologies for less energy consumption.

Partners:

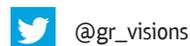
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EVOLUTION PROJECTS PLUS



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VISIONS - LIFE19 ENV/GR/000100

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Description: The main scope of the project is the production of an innovative photocatalytic paint, which aims at improving the quality of the indoor environment while it will enable significant energy savings in buildings.

Budget Info:

Total amount: 1,403,752 Euro (EC Co-funding: 54%)

Duration: Start: 07/09/20 – End: 06/09/23



Methodology for the development of the VISIONS photocatalytic paint

1 Design and development of the photocatalytic powder:

The design and development of the photocatalytic powder was performed with a simple precipitation method by FORTH. The photocatalytic powder based on titanium dioxide with transition metal is activated in the presence of visible light irradiation.

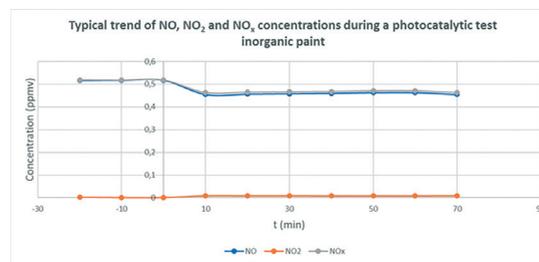
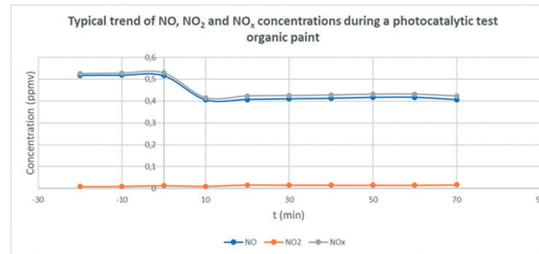
2 Semi-Industrial production of VISIONS Paints:

Semi-Industrial production of VISIONS Paints by mixing the optimized photocatalytic powder with 2 different kinds of paints was deployed by VITEX Industry and FORTH. More specifically, VITEX finalized the organic and inorganic formula and started the production for the real scale application needs.

3 Investigation and testing of the photocatalytic efficiency of VISIONS Paints:

Investigation of the VISIONS paints efficiency to degrade air pollutants was performed in NCSR D's photocatalytic lab reactor following CEN/TC/16980-1:2017. Results presented 21.5% Nitrogen Oxide degradation efficiency in Visible light and 83.5% in UV light for the organic formula while for the inorganic formula showed 12.0%

degradation efficiency in Visible light and 66.5% in UV light. These numbers are very promising for an industrial product.



Typical diagrams showing the reduction of NO under Visible light for the organic and inorganic paint



4 Application of the best performing VISIONS Paint at the case study buildings:

The best performing VISIONS paint will be applied at the pilot buildings of the Hellenic Naval Academy at Piraeus as well as the Demo Houses at the FORTH premises in Crete. Indoor air quality is monitored by the appropriate measurement instrumentation.

