INPS GREEN FACADE
A PILOT PROJECT FOR THE MONITORING OF THE PERFORMANCES OF VERTICAL GREENING IN DENSE URBAN AREA

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BENEFITS OF VEGETATION
GENOVA, SESTRI PONENTE
Evaluation of the environmental, economic, and social benefits of green envelopes in dense urban areas

Main objectives of the research:

- Plant species selection and monitoring
  - Effectiveness of plant species for air quality improvement
  - Effectiveness of plant species for energy performances
  - Plant species health and growth
Evaluation of the environmental, economic, and social benefits of green envelopes in dense urban areas

Main objectives of the research:

- Plant species selection and monitoring
- Quantification of air quality improvement (fine dusts, NO₂)

in collaboration with the Delft University of Technology, Dr. Marc Ottelé

- Collecting capacity of fine dusts
- NO₂ monitoring
Evaluation of the environmental, economic, and social benefits of green envelopes in dense urban areas

Main objectives of the research:

- Plant species selection and monitoring
- Quantification of air quality improvement (fine dusts, NO₂)
- Energy performances improvement of the building envelope

In collaboration with Ricerca sul Sistema Energetico (RSE) S.p.A. (Research on energy system)

- Monitoring the cooling potential of green facades (energy demand for air conditioning)
- Monitoring the insulation properties of green facades (energy demand for heating)
Evaluation of the environmental, economic, and social benefits of green envelopes in dense urban areas

Main objectives of the research:

- Plant species selection and monitoring
- Quantification of air quality improvement (fine dusts, NO$_2$)
- Energy performances improvement of the building envelope
- Evaluation of users’ social perception

- Qualitative and quantitative analysis
- Surveys and interviews to INPS employees, residents and workers in the area
Evaluation of the environmental, economic, and social benefits of green envelopes in dense urban areas

Main objectives of the research:

- Plant species selection and monitoring
- Quantification of air quality improvement (fine dusts, NO$_2$)
- Energy performances improvement of the building envelope
- Evaluation of users' social perception

CBA: analysis of costs (installation and maintenance) in relation to economic benefits
Evaluation of the environmental, economic, and social benefits of green envelopes in dense urban areas

Main objectives of the research:

- Plant species selection and monitoring
- Quantification of air quality improvement (fine dusts, NO₂)
- Energy performances improvement of the building envelope
- Evaluation of users’ social perception
- Evaluation of economic impact of the vertical greening system
- Evaluation of environmental impact of the vertical greening system

LCA: evaluation of the environmental burden of vertical greening related to microclimatic and environmental benefits
Phase 1: quantitative analysis 3 months before the installation of the INPS green facade

July 2014

59 people interviewed:

- People working and/or living in the neighbourhood (44.1%)
- INPS employees (55.9%)
Survey on green facades of the University of Genoa, Department of Architectural Science (conducted in Italy, original version language Italian)

☐ Employee of INPS office in Sestri Ponente, Genoa
☐ Person working in Sestri Ponente, Genoa
☐ Person living in Sestri Ponente, Genoa

Some examples of green facades
Have you ever seen one or more?
☐ yes  ☐ no
Have you ever heard about it?
☐ yes  ☐ no

Select the importance of each of the POSITIVE EFFECTS of green facades in a city rating from 1 to 5 (highest):

More nature in cities
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Visually enhanced cityscape
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Better wellbeing of citizens
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Increase of biodiversity (small animals)
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Air quality improvement
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Shading and cooling in summer
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Thermal insulation during winter season
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Improvement of the city environment
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Reduction of noise pollution
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Environmental education
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Building aesthetic
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5

Select the importance of each of the NEGATIVE EFFECTS of green facades in a city rating from 1 to 5 (highest):

Frequent maintenance
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Problems related to falling leaves
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Problems with building restoration
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Obstruction of gutter or standpipes
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Less daylight inside the building
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Damages to the facades
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Dirty due to the presence of animals
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
More insects
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Management problems
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Additional costs
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Higher danger of theft
☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
Phase 1: quantitative analysis 3 months before the installation of the INPS green facade

July 2014

59 people interviewed

INPS GREEN FACADE – USERS PERCEPTION
Phase 1: quantitative analysis 3 months before the installation of the INPS green facade

July 2014

59 people interviewed:

- People working and/or living in the neighbourhood (44.1%)
- INPS employees (55.9%)

Most recognised positive effect: air quality improvement

Most recognised negative effect: more insects

Total scores:

- People working and/or living in the neighbourhood: 56.8% positive - 43.2% negative
- INPS employees: 47.4% positive - 52.6% negative
**COSTI E BENEFICI**
I fondi investiti per questa opera verranno recuperati nel tempo grazie alla riduzione dei costi per la climatizzazione estiva.

**RISPARMIO ENERGETICO**
Risparmiare energia significa una minore dipendenza dalla importazione di idrocarburi e la riduzione delle emissioni inquinanti in atmosfera. È dovere di tutti e gli enti pubblici devono dare il buon esempio.

**RICERCA E INNOVAZIONE**
La collaborazione tra Università e enti pubblici crea sinergie utili a mettere a punto soluzioni tecnologiche utili per migliorare la qualità ambientale nelle città e la qualità di vita dei cittadini.

**SOSTENIBILITÀ AMBIENTALE**
La valorizzazione delle capacità tecniche economiche del nostro Paese deve combinarsi con una riduzione dell’uso di risorse di disponibilità limitata e di importazione, come i prodotti petroliferi e il gas naturale.

**QUALITÀ DELL’ARIA**
La vegetazione assorbe polveri sottili ed inquinanti migliorando la qualità dell’aria nelle città, controllando anche il tasso di CO₂ presente in atmosfera.

**FACCIATA VERDE INPS**
una riqualificazione sostenibile
Phase 2: qualitative analysis 6 months after the installation of the INPS green facade

May 2015, with Roberta Prampolini

21 semi-structured interviews to a significant sample

Residents in the neighbourhood – 106 answers
People working in the neighbourhood – 85 answers
INPS employees – 55 answers

Investigation topics:

1. Photo elicitation to favour a dialog on the INSP Green facade
2. Green areas in the neighbourhood
3. Vertical green in other areas of the city
Phase 2: qualitative analysis 6 months after the installation of the INPS green facade
May 2015, with Roberta Prampolini

Investigation topics:

1. Photo elicitation to favour a dialog on the INSP Green façade
   - Reduced knowledge of the technology
   - Positive opinion due to: aesthetic, wellbeing, environmental and energy effects
   - Negative effects (less) due to: insects and maintenance needs
   - Critics arise during the installation were mentioned – only 3 of 21 highlight negative opinions
Phase 2: qualitative analysis 6 months after the installation of the INPS green facade

May 2015, with Roberta Prampolini

Investigation topics:

1. Photo elicitation to favour a dialog on the INSP Green facade
2. Green areas in the neighbourhood
   • Not enough
3. Vertical green in other areas of the city
   • Public funds

• The results show that communication plays a key role
• Younger people show positive opinion about the project
Phase 2: qualitative analysis 6 months after the installation of the INPS green facade
May 2015, with Roberta Prampolini

- to improve the area in a very busy street, I think it was built there for a reason!
- something positive for air pollution
- I was curious when I saw the facade.. I thought it was a waste of money then I understood this is a smart idea!
- some green.. Something new!
- It could be positive!
- .. In addition it could also protect the facade, so..
Thank you

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