

INPS GREEN FACADE

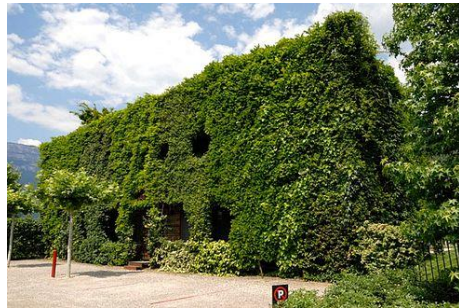
A PILOT PROJECT FOR THE MONITORING OF THE PERFORMANCES OF VERTICAL GREENING IN DENSE URBAN AREA

Katia PERINI, Adriano MAGLIOCCO
Department of Sciences for Architecture, University of Genoa (Italy)





Seoul



Bolzano



Amiens



Copenhagen



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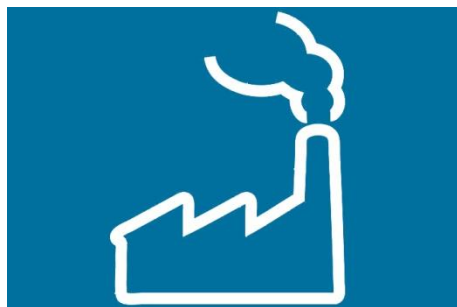
Lima



Milan



Amsterdam



BENEFITS OF VEGETATION





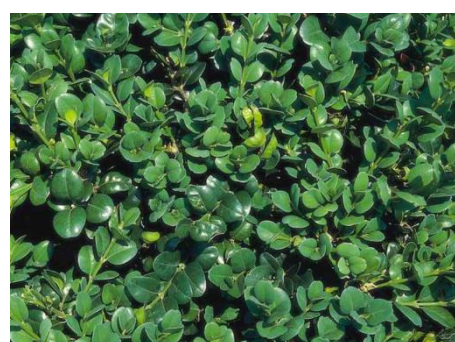
GENOVA, SESTRI PONENTE



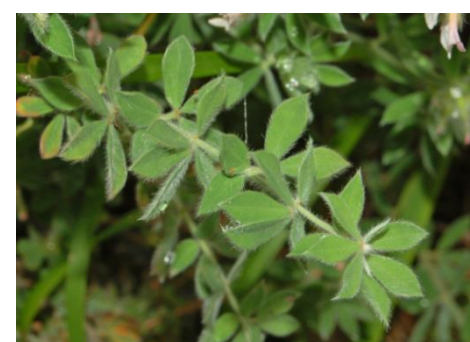
Rhyncosperma jasminoide



Phlomis fruticosa



Buxus sempervirens rotundifolia



Dorycnium hirsutum



Nerium oleander



Euonymus bravo



Teucrium chamaedris



Viburnum tinus eve price



Cistus Jessami beauty



Atriplex halimus



Cistus crispus



Hebe franciscanus

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, NO₂)



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, NO₂)



Energy performances improvement of the building envelope



Evaluation of users' social perception



Evaluation of economic impact of vertical greening systems

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



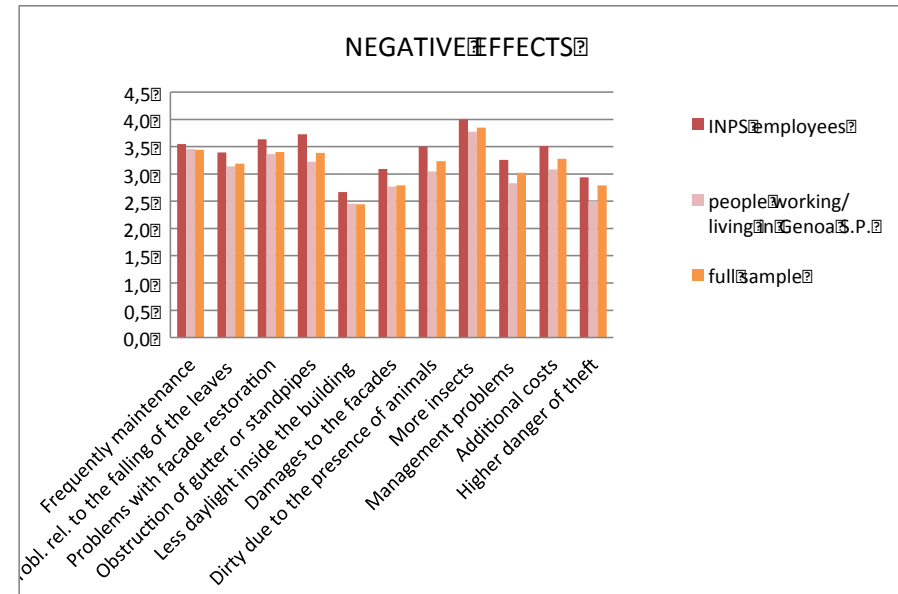
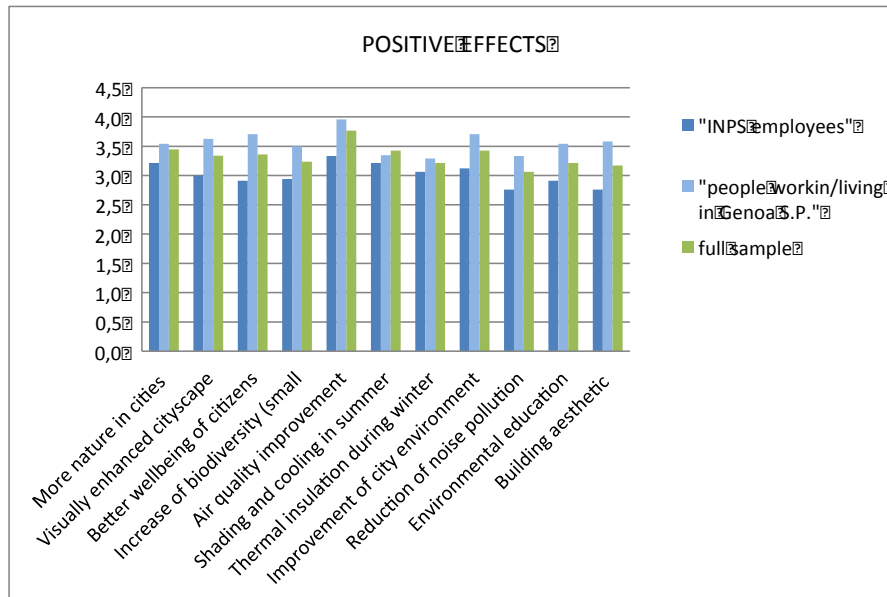
Università degli Studi di Genova
Dipartimento di Scienze per l'Architettura
University of Genoa
Department of Sciences for Architecture



Phase 1: quantitative analysis 3 months before the installation of the INPS green facade

July 2014

59 people interviewed





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.**

riduzione condizionamento: 10-20%



aumento resistenza termica: 0,09 m²KW⁻¹

analisi impatto economico (CBA)

SOSTENIBILITÀ AMBIENTALE
 La valorizzazione delle capacità tecnico 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.

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.

ipotesi riduzione inquinanti: 15-30%

analisi impatto ambientale (LCA)

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.

monitoraggio delle prestazioni energetiche

monitoraggio della qualità dell'aria con microscopio ESEM



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.



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!*

*A building with flowers
with an aesthetic value
only, a modern project,
lets say!*

*It could be
positive!*

*.. In addition it
could also protect
the facade, so..*



Thank you

kperini@arch.unige.it
ecosystemics@arch.unige.it



<http://www.ecosystemics.eu>