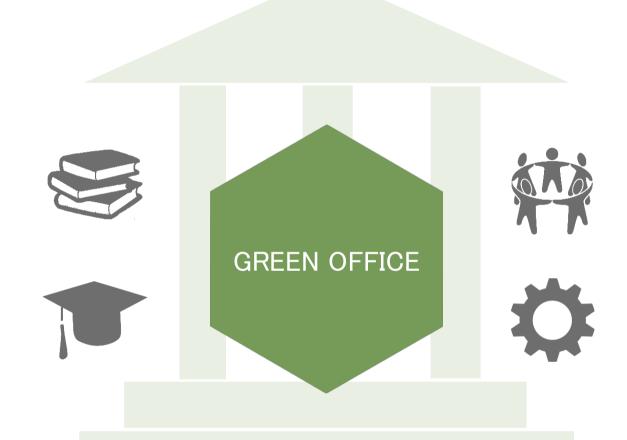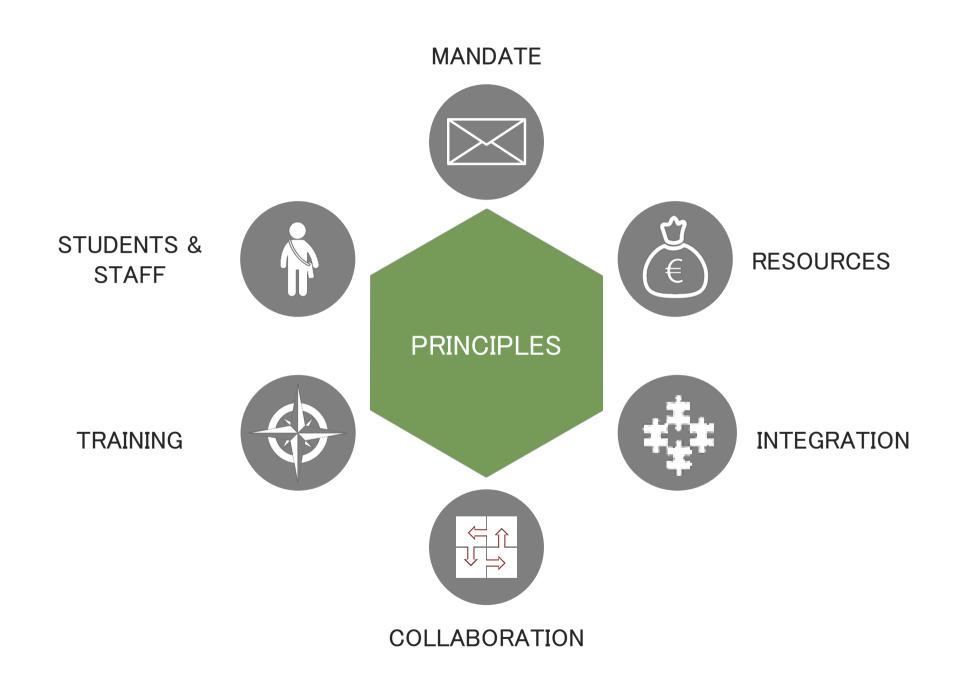# ENABLING STUDENT-DRIVEN CHANGE
# TOWARDS SUSTAINABILITY THROUGH
# THE GREEN OFFICE MODEL

Dario Cottafava – GreenUnito – University of Turin
Sara Rizzo – Terracini in Transizione – University of Bologna
In collaboration with
Giorgia Silvestri and Arianna Palmieri– rootAbility
Paolo Ruffino – GreenOffice Utrecth
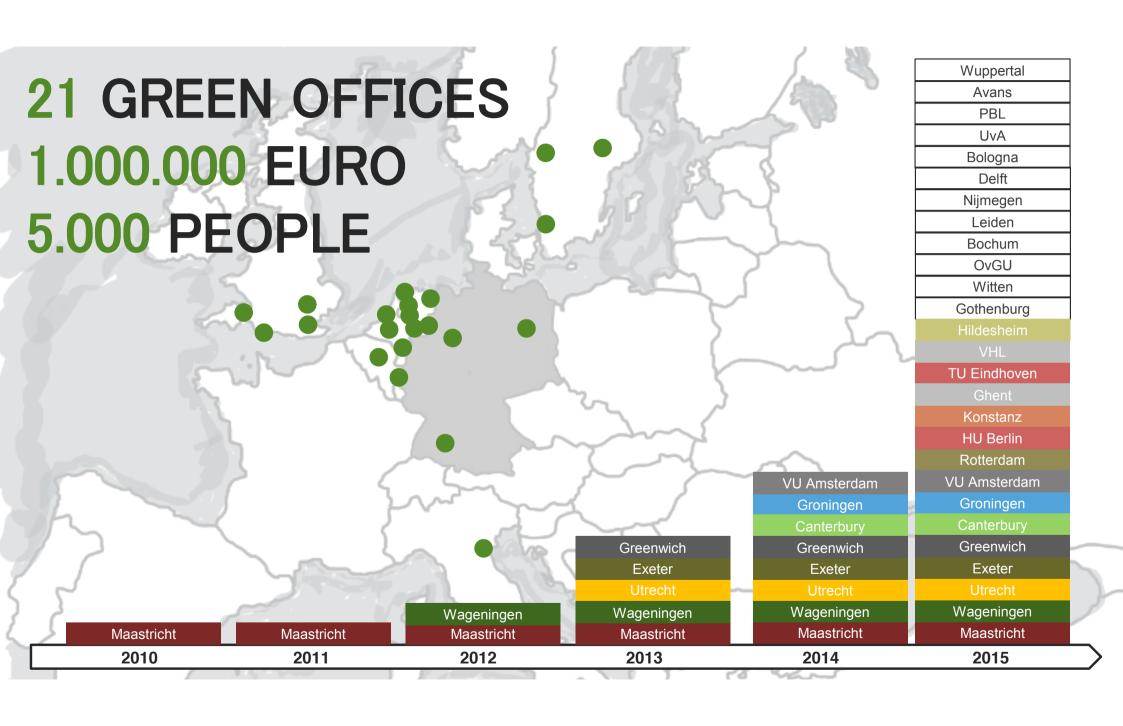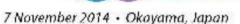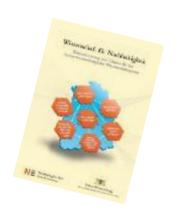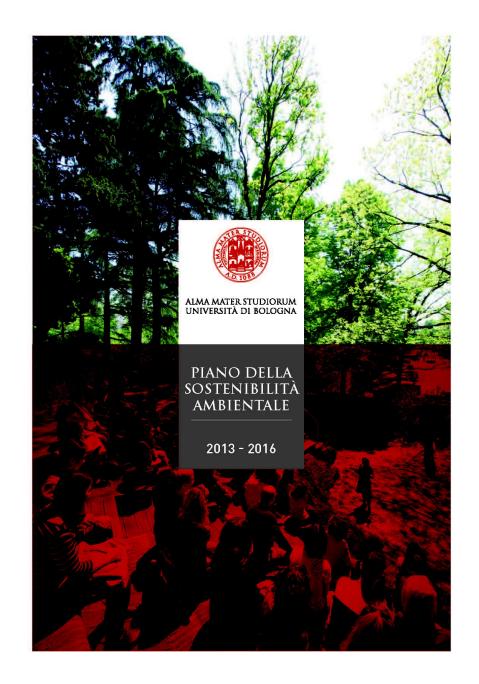Francesca Cappellaro – Terracini in Transizione

Sustainability committee

Environmental coordinator

Sustainability academics

EFFECTIVE

GREEN OFFICE

MANDATE

STUDENTS & STAFF

RESOURCES

PRINCIPLES

TRAINING

INTEGRATION

COLLABORATION

# 21 GREEN OFFICES
# 1.000.000 EURO
# 5.000 PEOPLE

| | Wuppertal |
|---|---|
| | Avans |
| | PBL |
| | UvA |
| | Bologna |
| | Delft |
| | Nijmegen |
| | Leiden |
| | Bochum |
| | OvGU |
| | Witten |
| | Gothenburg |
| | Hildesheim |
| | VHL |
| | TU Eindhoven |
| | Ghent |
| | Konstanz |
| | HU Berlin |
| | Rotterdam |
| | VU Amsterdam |
| | Groningen |
| | Canterbury |
| | Greenwich |
| | Exeter |
| | Utrecht |
| | Wageningen |
| | Maastricht |

| 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|
| | | | | VU Amsterdam | VU Amsterdam |
| | | | | Groningen | Groningen |
| | | | | Canterbury | Canterbury |
| | | Greenwich | Greenwich | Greenwich | |
| | | Exeter | Exeter | Exeter | |
| | | Utrecht | Utrecht | Utrecht | |
| | Wageningen | Wageningen | Wageningen | Wageningen | |
| Maastricht | Maastricht | Maastricht | Maastricht | Maastricht | |

UNESCO-Japan Prize
on Education for
Sustainable
Development

10 000 students & staff
100 Green Offices
by 2025

rootability.com/the-green-office-movement

# CASE STUDY



# Applying Transition Management within Terracini Campus, University of Bologna

# Unibo Sustainability Plan 2013-2016



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

PIANO DELLA SOSTENIBILITÀ AMBIENTALE

2013 - 2016

# Sustainability Action Plan University of Bologna

| | Measure | Location |
|---|---|---|
| **Energy** | **PV plant** | Scuola di Ingegneria via Terracini, Bologna |
| **Building** | **Green roofs** | Scuola di Ingegneria via Terracini, Bologna |
| **Building** | **LEED Certification** | Scuola di Ingegneria via Terracini, Bologna |
| **Water** | **Water saving measures** | Scuola di Ingegneria via Terracini, Bologna |
| **Water/waste** | **Water fountain** | Scuola di Ingegneria via Terracini, Bologna |
| **waste** | **Separate waste collection** | Scuola di Ingegneria via Terracini, Bologna >> Multi-campus |
| **waste** | **E-waste management** | Multi-campus |

# Transition Team

- Creating a multifunctional and transdisciplinary team

- Problems identification

- Sharing *vision and approach*



*Transition Training*

Terracini
in Transizione

# *Vision:* campus as «living-lab» of sustainability

**Building <u>real</u> connection among**

**Academia, Students and Staff**

· Mapping initiatives and stakeholders

· Bottom-up and Top-down approach

· Setting the Transition Arena

# Transition Arena: Laboratory of students



*World Cafè*

Resource and Recycling Course
Prof.ssa Alessandra Bonoli
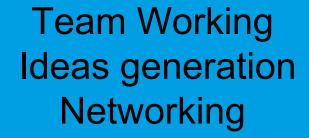
Laboratory Theme:
Green Off ce Unibo

- **Active involvement** of engineering students

- **Supervision**: members of Transition Team (researchers, technicians, administrative staff)

- **Experiential learning**

- Design of **Sustainability Plan** measures

# Participative approach

Team Working
Ideas generation
Networking

# Towards UNIBO Green Office



- Inter-dipartimental collaboration.

- Inter-faculty collaboration (Sociology, Engineering, Economy, Communication)

two Degree Thesis on Green Office Model in collaboration with University of Utrecht e rootAbility

- Meeting/Communication with Unibo Sustainability Office

- four Degree Thesis on Green Office Model in collaboration with University of Rotterdam, Delft and rootAbility



- project proposal



Workshop Universita' di Bologna

29 Maggio 2015

October 2014       October 2014 – February 2015       May-October 2015       May 2016

# Transition Network

# UNIVERSITY OF TURIN AT A GLANCE

## An Overview

| Building Stock And Users | • Over one hundred buildings (514387 m²)<br>• Over 66.000 Students<br>• Over 3500 Academic, administrative staffs |
|---|---|
| Annual Energy Consumption | • Over 23.48 GWh / 7.000.000€ ( Electric )<br>• Over 2082 TOE / 2.000.000 € ( Gas ) |

**With laissez-faire and price atomic
Ecology's Uneconomic
But with another kind of logic
Economy's Unecologic**

Kenneth E. Boulding

# GREENUNITO AND UNITOGO

## www.green.unito.it

### GreenUnito

**GreenUnito** is an Online Hub to lead the transition to a Sustainable Smart Green University.

**GreenUnito** is a web platform which collects and amplifies every project on sustainability.

**GreenUnito** is an OpenDatabase for thesis&paper, reports, datasets and bestpractices
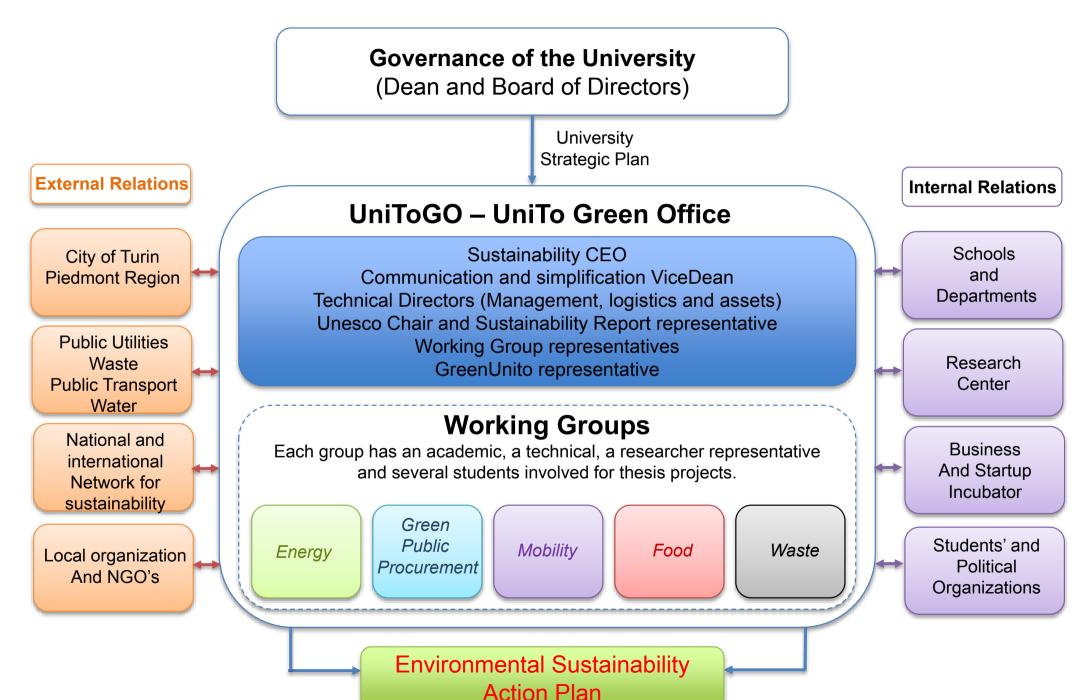
### UniToGO: UniTo Green Office

**UniToGO** is an interdisciplinary network composed by Professors, Researcher, administrative staff and students for sustainability.

**UniToGo** will coordinate and promote every activities and initiatives about sustainability.

**UniToGO** is the main promotor of the "Environmental Sustainability Action Plan"
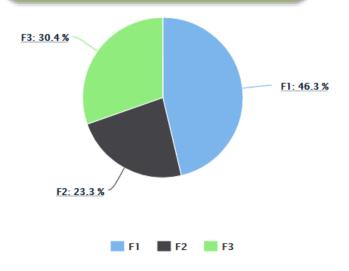
# THE STRUCTURE OF THE UNITO GREEN OFFICE

**Governance of the University**
(Dean and Board of Directors)

University
Strategic Plan

**External Relations**

**Internal Relations**

## UniToGO – UniTo Green Office

Sustainability CEO
Communication and simplification ViceDean
Technical Directors (Management, logistics and assets)
Unesco Chair and Sustainability Report representative
Working Group representatives
GreenUnito representative

### Working Groups
Each group has an academic, a technical, a researcher representative and several students involved for thesis projects.

| *Energy* | *Green Public Procurement* | *Mobility* | *Food* | *Waste* |

City of Turin
Piedmont Region

Public Utilities
Waste
Public Transport
Water

National and international Network for sustainability

Local organization And NGO's

Schools and Departments

Research Center

Business And Startup Incubator

Students' and Political Organizations

## Environmental Sustainability Action Plan

# GREENUNITO: ENERGY OPENDATA

**OpenData:**
**A common good**
**to improve**
**transparency**
**and sustainability**

Easy access to Geolocalized Data for each Building and Department
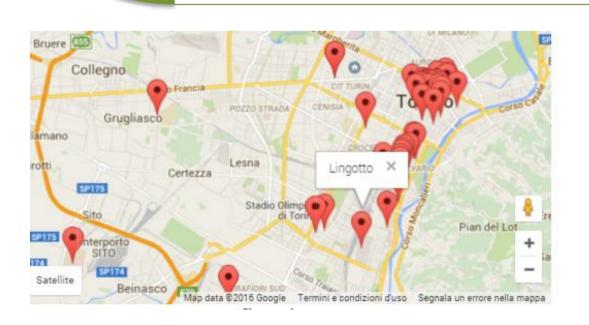
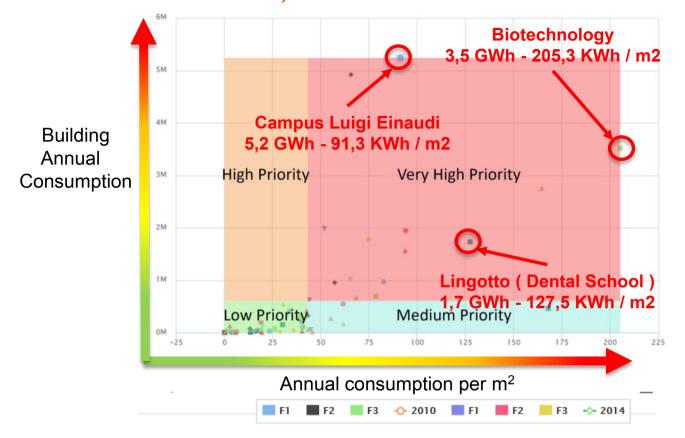Facilitate and speed up research project with outright dataset

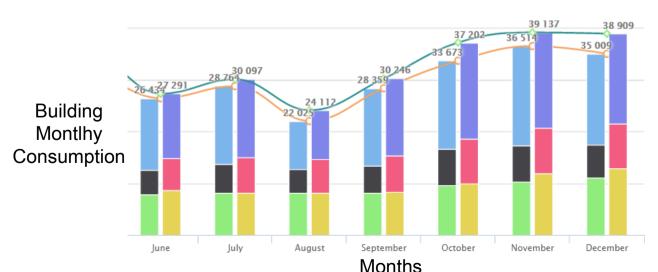Help decision-making process for high complexity management problems

Facilitate open roundtable organization among public and private

Boost end-user engagment and improve their awareness

F3: 30.4 %
F1: 46.3 %
F2: 23.3 %

F1    F2    F3

# GREENUNITO, OPENDATA AND INTERACTIVE GRAPHS

Building Annual Consumption

**Biotechnology**
**3,5 GWh - 205,3 KWh / m2**

**Campus Luigi Einaudi**
**5,2 GWh - 91,3 KWh / m2**

High Priority

Very High Priority

Low Priority

Medium Priority

**Lingotto ( Dental School )**
**1,7 GWh - 127,5 KWh / m2**

Annual consumption per m²

F1  F2  F3  2010  F1  F2  F3  2014

Building Montlhy Consumption

26 434   27 291   28 764   30 097   22 025   24 112   28 359   30 246   33 673   37 202   36 514   39 137   35 009   38 909

June   July   August   September   October   November   December

Months

## Management Support Tools

- Historical Consumption and Trend Monitoring
- Day/Night consumption analysis
- Straightforward anomalies identification

## Competition among different departments

- Comparison among different years and buildings
- Possibility to directly download data and graphs
- Involment of Departments' staff in sustainable management

## Users' Engagement

- Improvement of users' (students, researcher and staff) awareness about sustainability
- Easy understanding of impacts of wrong everyday habitudes.
- Easy access data for students' thesis

# COMFORTSENSE RESEARCH PROJECT: USERS' ENGAGEMENT & MANAGEMENT SUPPORT TOOLS



**INTERACTIVE MAPS**
**Indoor Geolocalized Data visualization**
Quick identification of anomalies
**Example: Feedback on Comfort (1-5)**
Average users' rate = 1.75 (discomfort)

**STOCKCHARTS**
**Multiple Data Comparisons**
Quick identification of correlations and trends
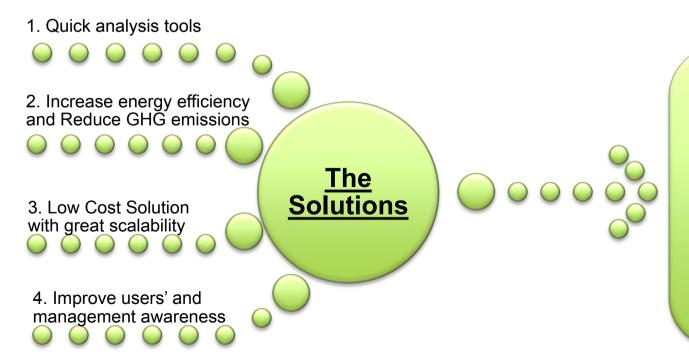**Example:  Occupancy VS Co2 Concentration**
Co2 sensors able to predict room Occupancy

# CONCLUSION

## General Problems

1. Inhomogeneity of datasets
2. Absence of monitoring equipment in historical buildings
3. Lack of tools for data visualization & analysis
4. Inadequate awareness for sustainability

**Some of these problems we found are typical of a large Public Organization, where attention to the responsible use of energy has been low. The approach and the tools we have presented may contribute to reverse this.**

1. Quick analysis tools

2. Increase energy efficiency and Reduce GHG emissions

3. Low Cost Solution with great scalability

4. Improve users' and management awareness

## The Solutions

1. Online tools & Energy Audit
2. IOT solutions for energy efficiency
3. OpenSource web applications
4. OpenData & best practices