Carbon Footprinting and Solar Cooling at the University of Rome «Tor Vergata»

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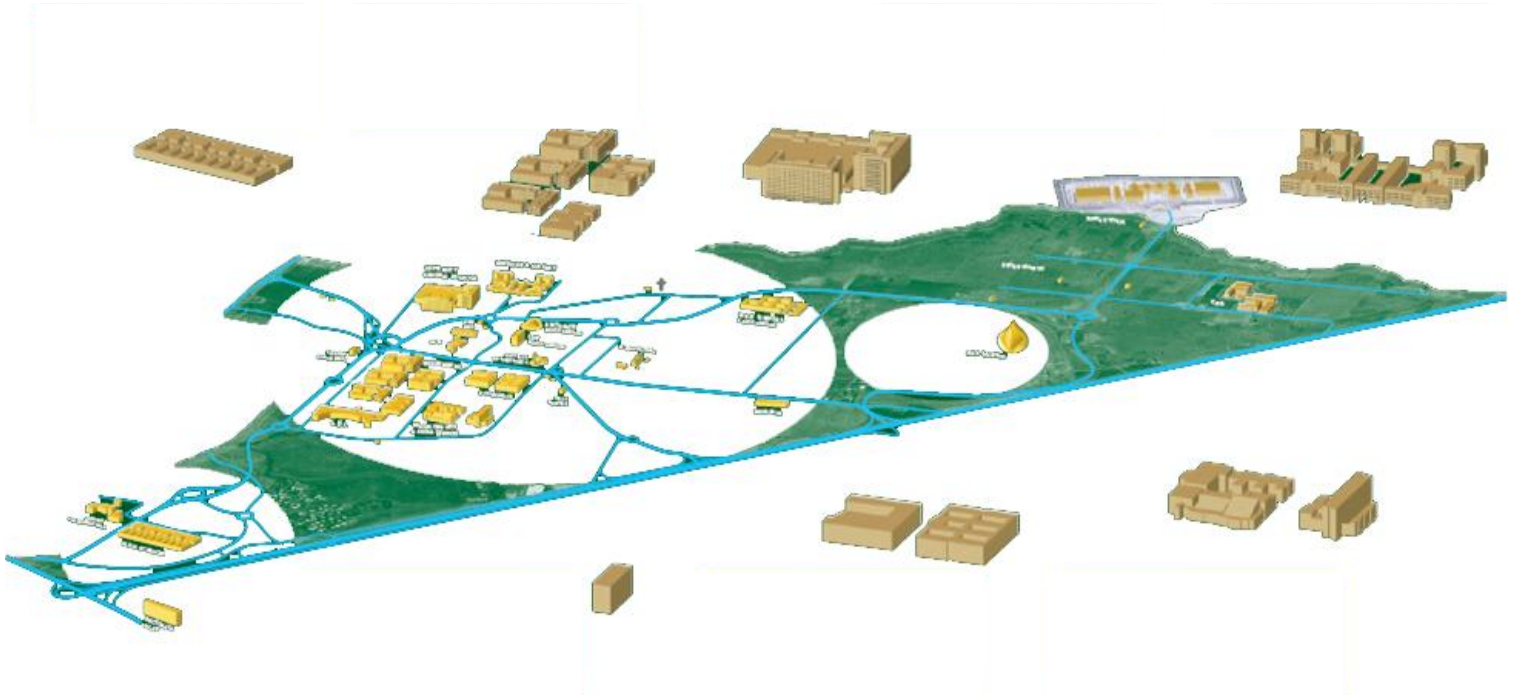
Summary

- The use of the Carbon Footprint as a decision tool:
  - the test application
  - some results
  - Proactive actions
- An energy efficient application:
  - the Solar Cooling plant
  - some results

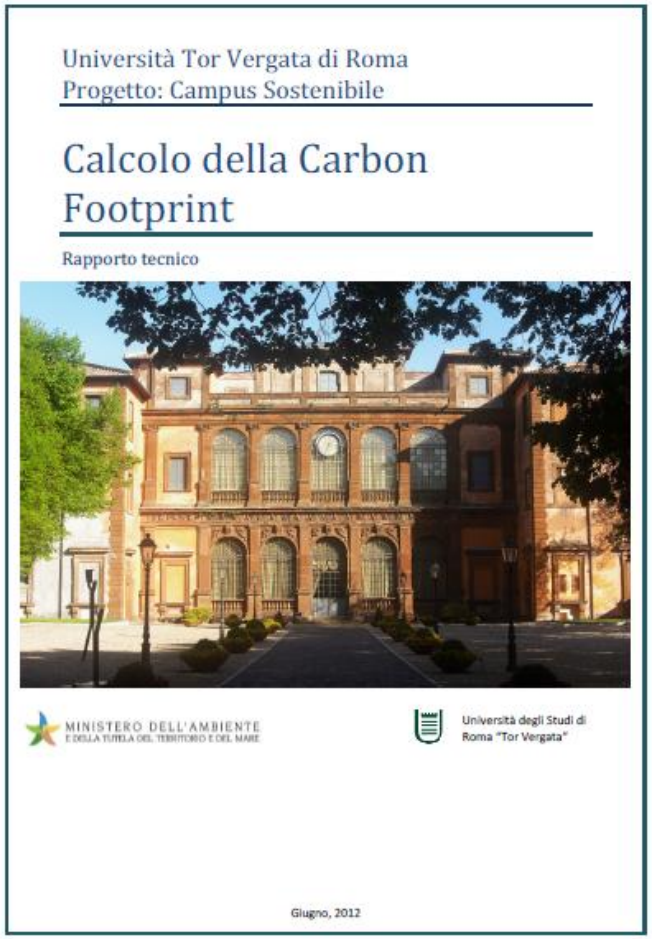
The Campus



- Six schools (Law, Business and Enterprise, Engineering, Humanities, Science, Medicine)
  - **40.000** **Students**
  - 1.570 Faculties (staff)
  - 1-000 Technician and administration (staff)

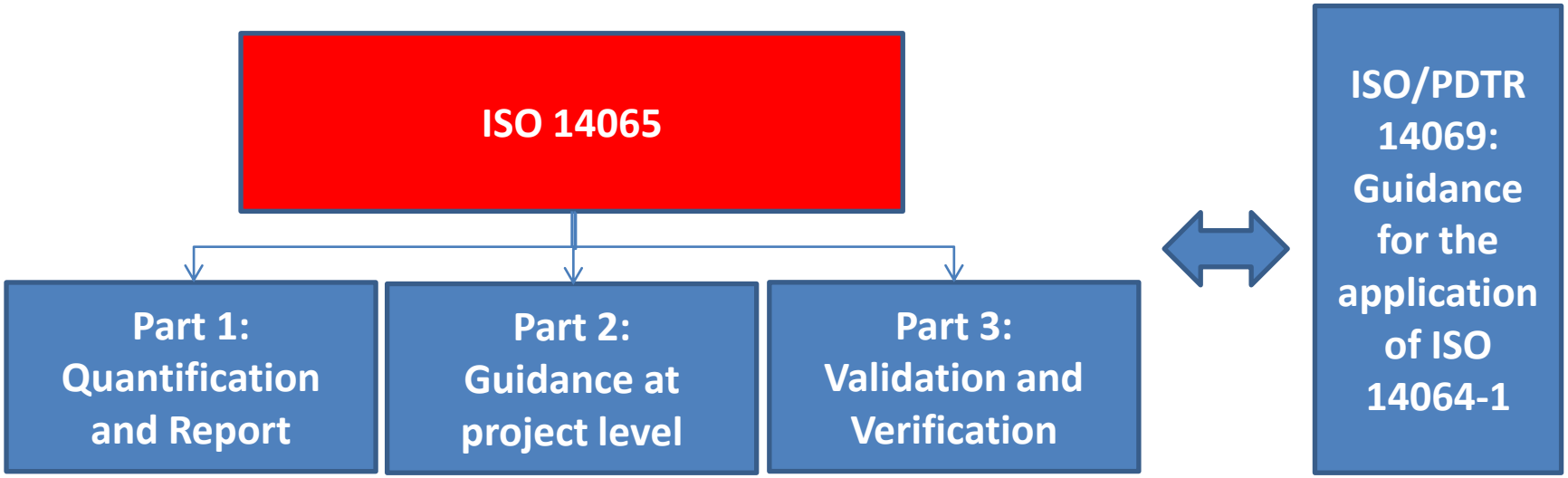

Leadership & Governance
Partnership & Engagement
Estate and Operations
Learning & Teaching

- The Carbon Footprint report



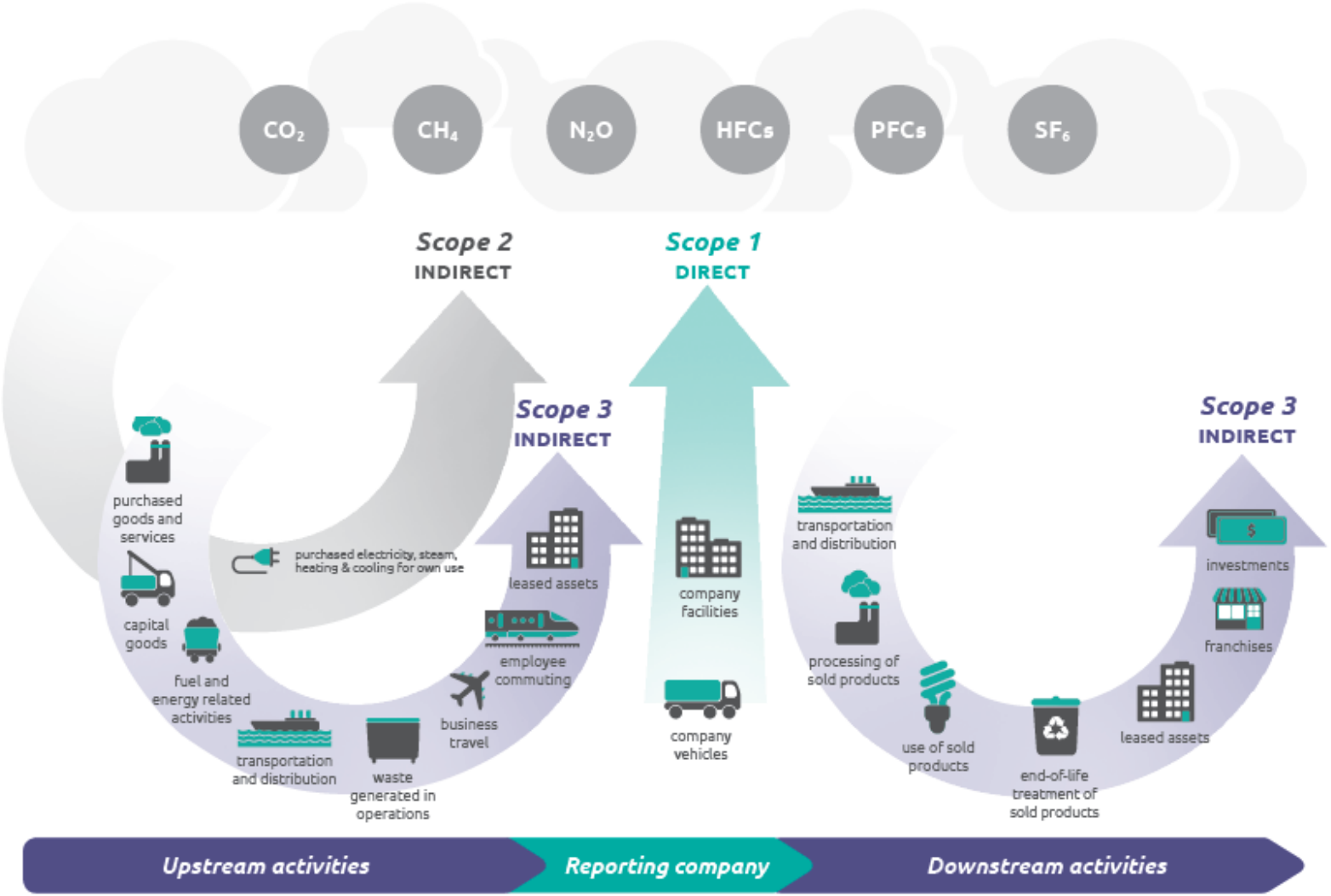
- Carbon is a footprint measure of the greenhouse gas emissions, in carbon dioxide equivalents, that are directly and indirectly caused by an activity or are accumulated over the life stages of a product/service.

International Standard and Guidance



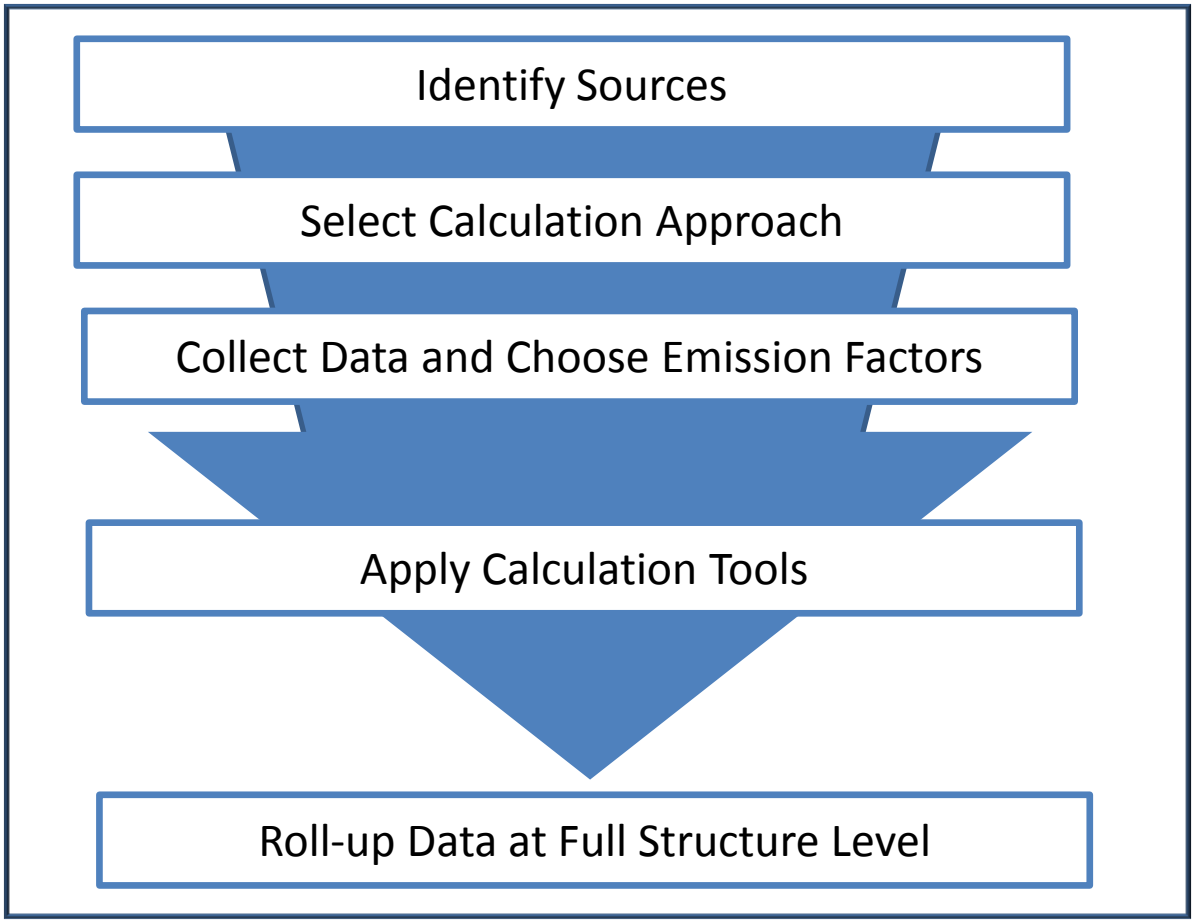
- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (1st ed. and revised ed.)
- ISO 14064 part 1 Specific with Guidance at the Organization Level for Quantification and Reporting the Greenhouse Gas Emissions and Removals
- Draft ISO/TR 14069 Carbon Footprint for Organizations

Overview of GHG Protocol scopes and emissions across the value chain



http://www.ghgprotocol.org/

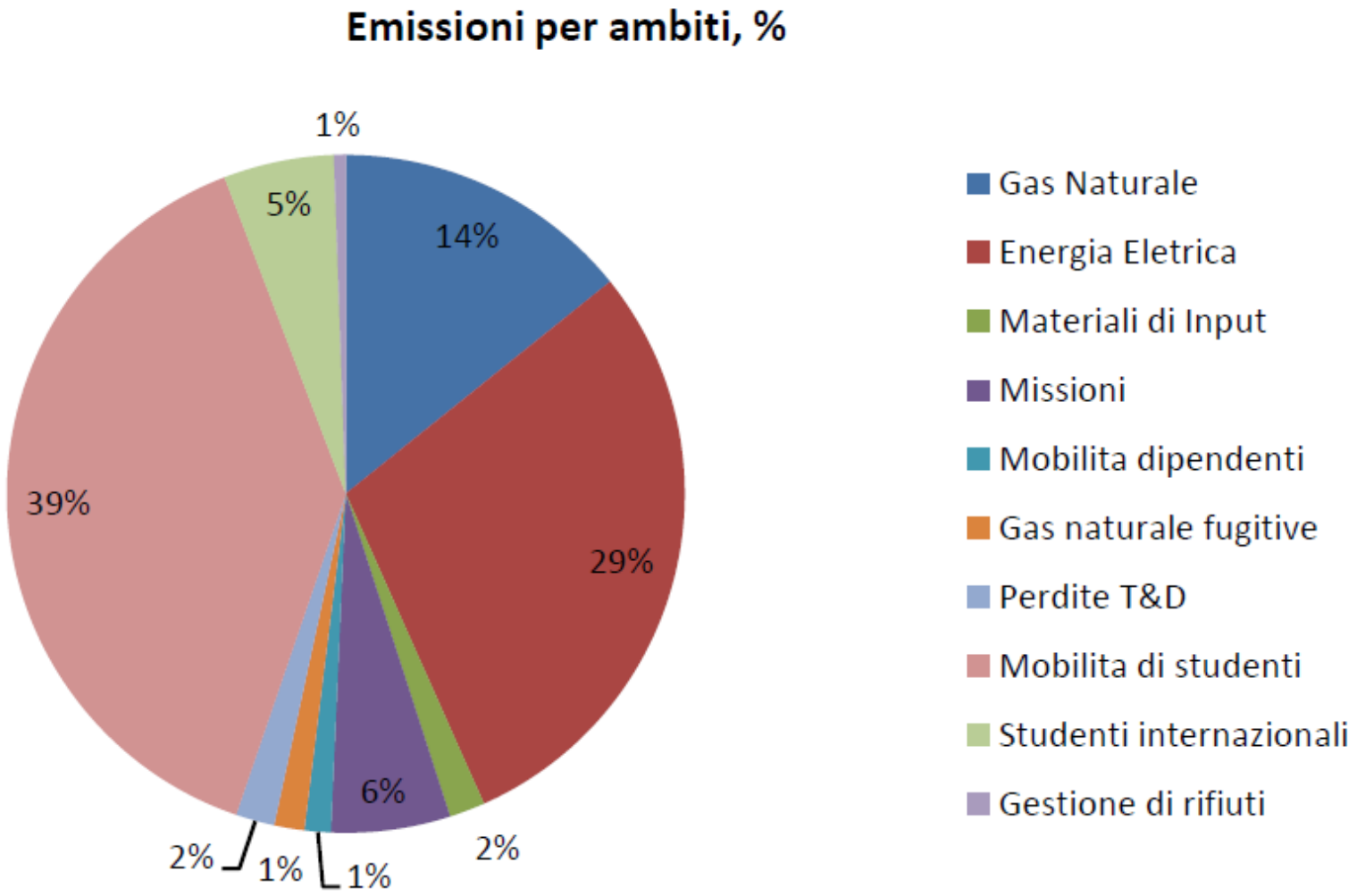
Identifying and Calculating GHG Emissions



Certification

- The CF calculation have been certified by Bureau Veritas Italia S.p.A.
- Bureau Veritas Italia S.p.A. has verified :
  - the completeness, the accuracy and the coerence of the GHG emissions inventory within the defined boundaries
  - the correcteness of the methodology applied to the evaluation of GHG emissions.

Results

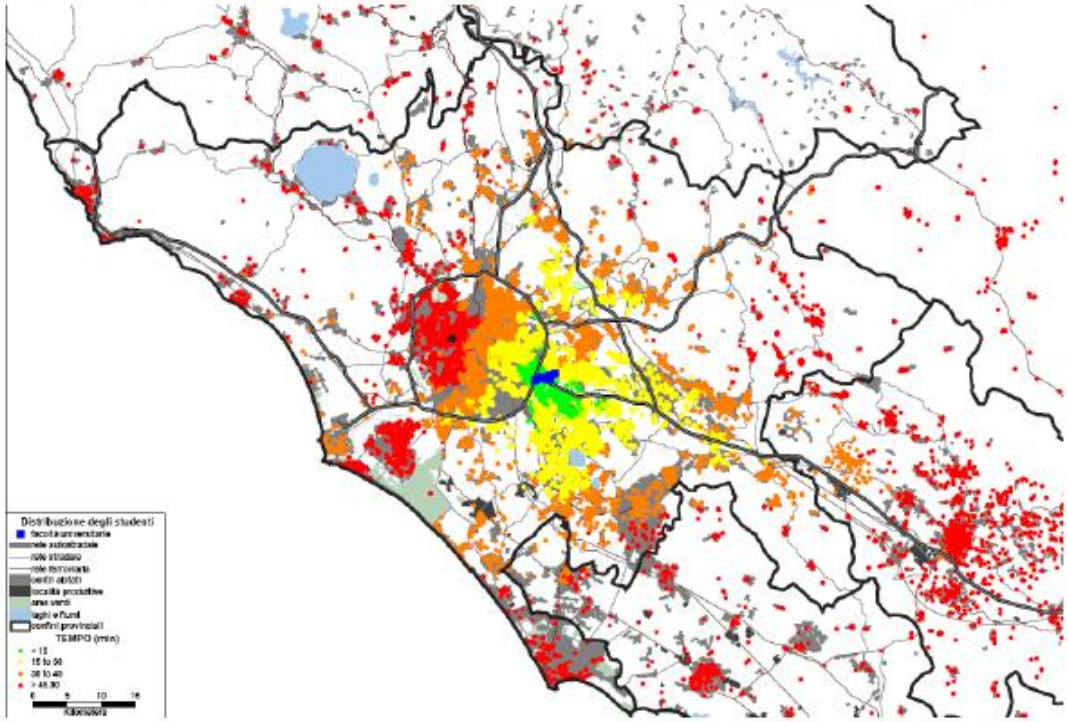

Emissioni per ambiti, %
1%
5%
14%
39%
29%
6%
2%
2%
1%
1%
Gas Naturale
Energia Eletrica
Materiali di Input
Missioni
Mobilita dipendenti
Gas naturale fugitive
Perdite T&D
Mobilita di studenti
Studenti internazionali
Gestione di rifiuti

Some preliminary conclusions

- Energy efficiency is paramount
- Transportation is another significant contribution

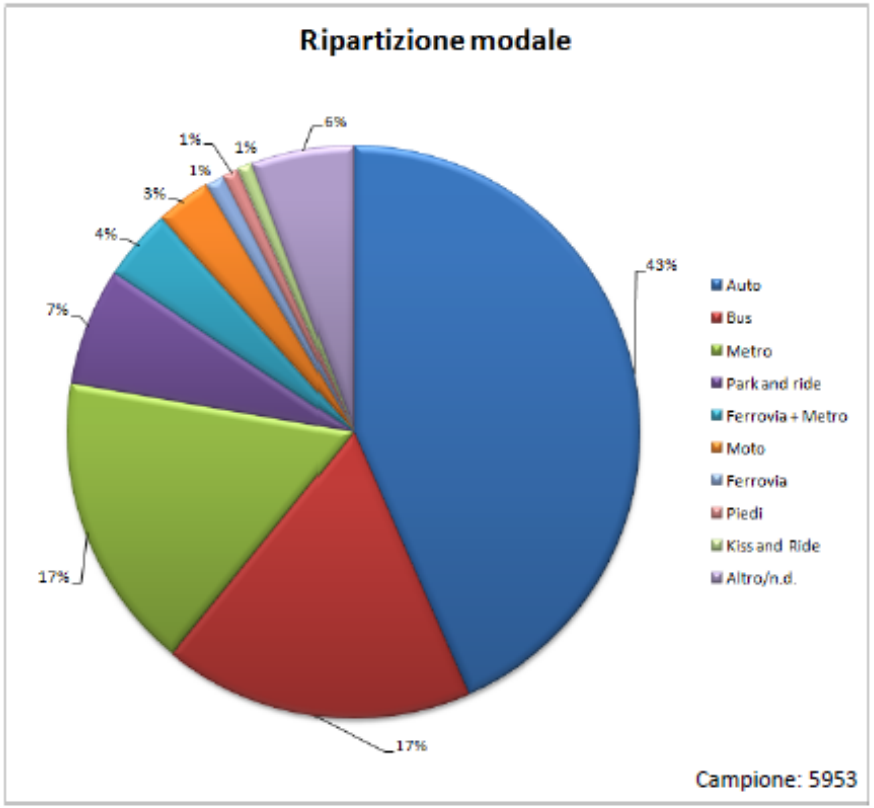
Scenario Attuale

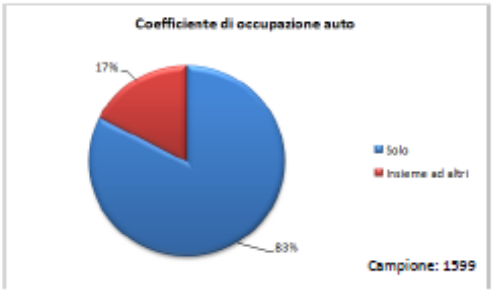
Distribuzione delle residenze e tempi di accesso in auto



Scenario Attuale

Ripartizione per modo di trasporto (studenti)





Some preliminary conclusions

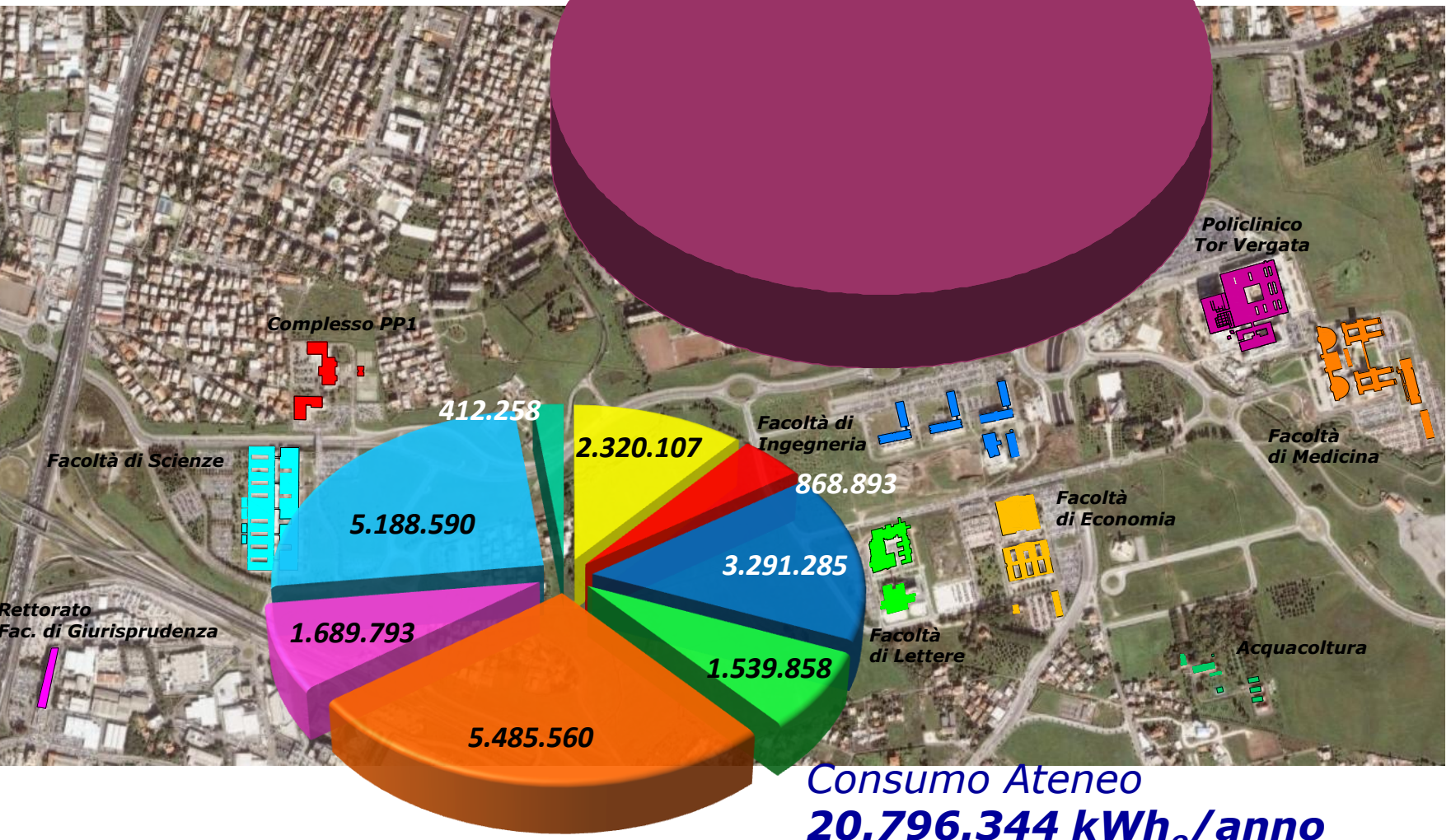
- Energy efficiency is paramount
- Transportation is another significant contribution
- Prioritization is fundamental

The Solar Cooling Application

Energy use Campus + Polyclinic

Consumo PTV

27.869.266 kWh$_e$/anno



Consumo Ateneo

20.796.344 kWh$_e$/anno

Università degli Studi di Roma "Tor Vergata"

- “PTV” University Polyclinic

PTV
Azienda Ospedaliera Universitaria
POLICLINICO TOR VERGATA

- n. 205 vacuum operated solar panels with nominal surface of 4,5 m^2, for a total of 922,5 m^2,
- n. 1 high efficiency single stage absorption cooler with a nominal cooling power of 340 kW, producing chilled water at 7-12°C
- n. 2 evaporative cooling towers;
- n. 2 heat storage tanks for a total of 6.000 l,
- n. 1 boiler for hot water production

A wide surface

Integration

Giorno 10 dicembre 2013

Grafico giornaliero potenza solare / resa impianto

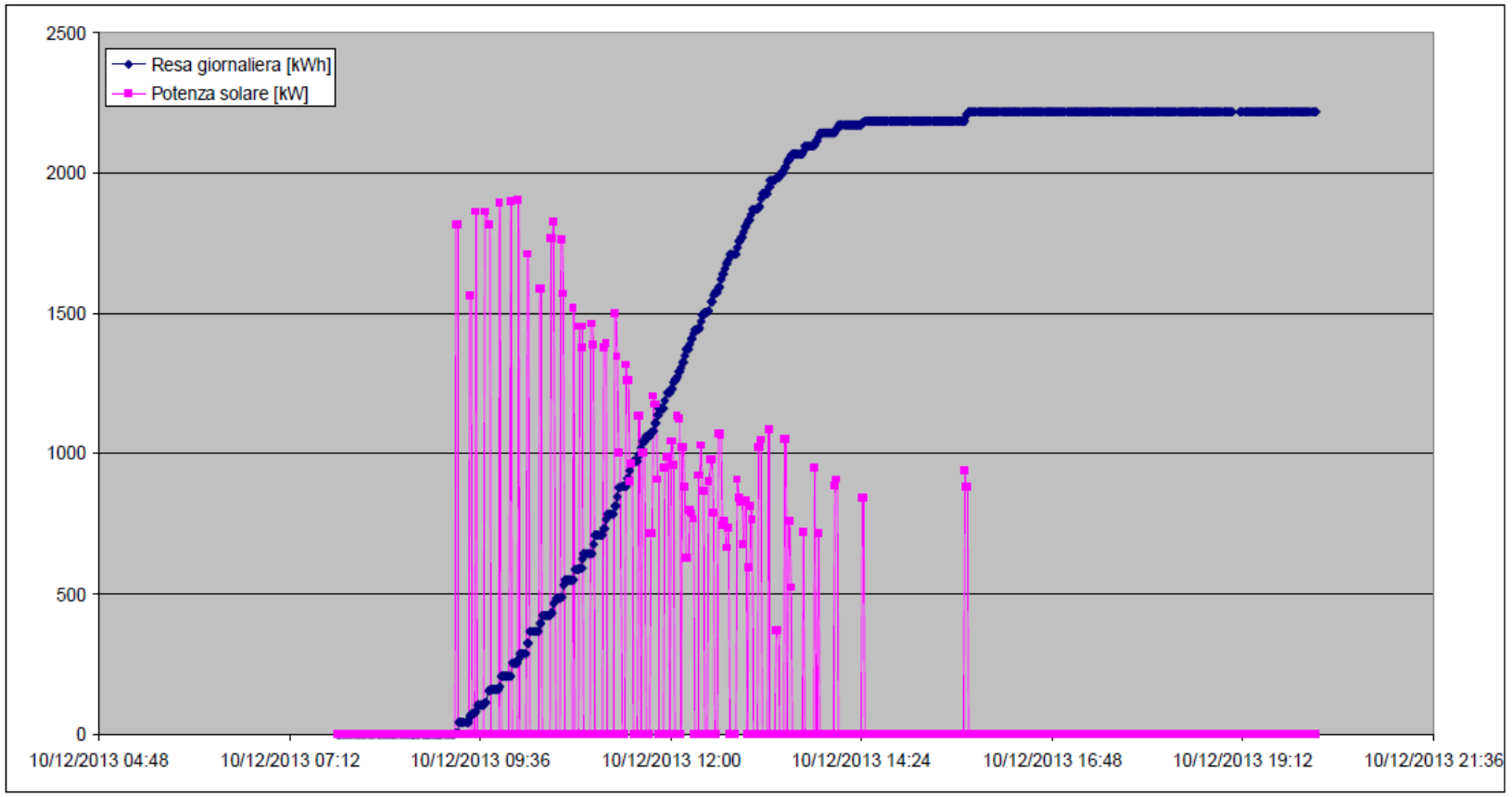
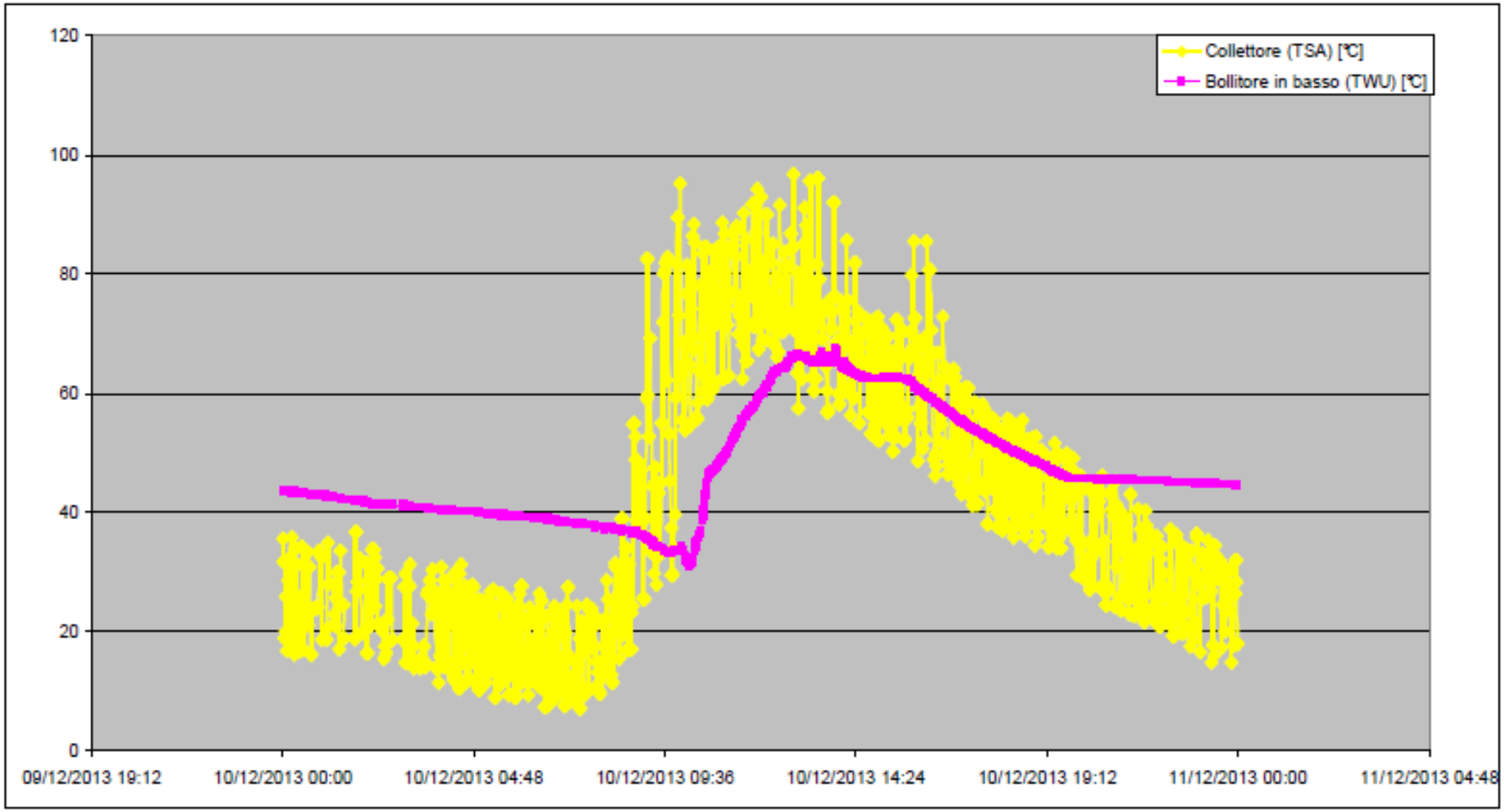


Grafico Temperature collettore solare (sonda TSA) / accumulo solare (sonda TWU)



CO2 avoided

- Avoided CO2 emissions (203 gCO_2/kWh) 25,5 ton (4 months).
- Energy saved (11.628 kWh/TEP) 10,8 TEP.

- Thank you for your attention!

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