GeNova Laboratory for the smart cities: a scientific approach to city needs
European context and the role of “Smart City”:

  - 20% reduction in greenhouse gas emissions
  - 20% increase in introduced Renewable Energy Sources
  - 20% improvement in energy efficiency
European Innovation Partnership on Smart City

- more than 20% reduction in CO2 emissions
- more than 20% increase of RES use for electricity production, heating and cooling
- more than 20% increase of end-use energy efficiency, increase the public transport vehicles share, powered by alternative fuels, by 50%
• “Intelligent Energy for Europe”: Covenant of Mayors

- involve municipalities in achieving the EU objectives set for 2020
- action plan which provides the goals for reducing CO2 emissions, the actions to undertake and the time for implementation

Sustainable Energy Action Plan (SEAP)
Genova’s peculiarities:

The city between Mediterranean and Europe
The sunny and windy city
The compact city
The ancient city
The steep city
The harbour city
Genova’s route toward sustainability: the “Mayors agreement” the “SEAP”
Genova SEAP

- is a reference at European level
- contains numerous main actions in relation to the Smart Cities program:
  - Works on buildings
  - In transport sector
  - In smart energy networks
  - On local electricity production based on biogas, photovoltaic, wind and hydroelectric
The Association “Genova smart city”

the City Council
the University
the Industrial Association
• Result of the Smart City initiative on Genova

- Better management of the environmental resources
- More livable urban area
- Development of enterprises
- Investment in research
- Increase of employment
- Improvement of its image
The **Thematic areas:**

- Efficient buildings
- Sustainable mobility
- Energy
- Harbour

**4 Matrices:**
Efficient buildings Matrix:

- Public bodies
- Services sector
- Residential sector
Examples of technologies for Efficient buildings

- Heat pumps
- Thermal and photovoltaic solar systems
- Remote controls/domotics (wireless and cable)
- Modulating water valves
- Efficient lighting systems
- Refitting with gas of diesel-fired heating systems
- Technical upgrade of heating and air conditioning systems
- Replacement of window and door frames with thermally insulating materials

- Refitting of building exteriors with thermally insulating plaster
- Thermally insulated roof with integrated photovoltaic systems
- Co-generation
- Tri-generation
- Refitting with gas of oil-fired heating systems
- Transformation of vapour networks in hot water networks
- Remote control of technical systems
- High efficiency motors
Integration of Distributed and CHP Systems

Windows Thermal Pane
Advanced Building Materials, Insulation
Foundation
Ventilation
- Ducts
- Piping
- Fans
- Blowers
Weather Station
Roofing Materials

University of Maryland Test Bed
Low Voltage Grid
Controls DG
Instrumentation

Power
Heating/Cooling
Humidity Control
Indoor Air Quality
Storage
Reject
Sustainable mobility **Matrix:**

- Nodes, networks and logistics for the mobility of persons
- Nodes, networks and logistics for the mobility of goods
Examples of technologies for Sustainable mobility

- Technologies and ICT solutions for advanced management of basic processes (urban component)
- Decision support systems and architectures (urban component)
- Advanced processes and systems for safety and security
- Innovative sensor systems
- Telecommunication infrastructures and integrated services supporting the vertical themes of the Mobility macro-sector
- Technologies and solutions for integrated logistics
- Advanced materials, technologies and solutions to limit environmental impact
Energy Matrix:

- Energy networks
- Distributed generation and renewable sources
Example of technologies for Energy

- New automated/remotely controlled primary and secondary substations
- Replacement of aged cables
- Broadband communication/WiMax/optical fibers
- Low voltage remotely controlled switchgears
- Diffusion of Active Demand (Smart Info)
- Power factor correction
- Private and public infrastructures to recharge electric vehicles
- Building automation
- Urban scale tri-generation
- Remote heating and cooling using low enthalpy energy sources
- Distributed co-generation from renewable solar sources
- Demand Response programs
- Photovoltaic refitting of old buildings or harbour subsystems
- Eolian energy systems in an harbour environment (mini-eolian)
- Thermodynamic solar systems
SMARTGRIDS
Harbour Matrix:

- Monitoring
- Mobility of persons in the harbour area
- Transport of low impact goods
- Energy networks
- Distributed production of energy with renewable sources
- Energy efficiency
Examples of **technologies** for Harbour

- Technologies and sampling techniques to define the natural/artificial origin of polluting powders and gaseous composites
- Technologies for the introductions of innovative fuels in maritime applications
- Technologies for tractors and other harbour service vehicles
- Improvements of harbour service crafts
- New devices for the displacements of goods
- On-shore/off-shore eolian systems
- Thermal and photovoltaic energy systems
- Biomasses

- Geothermal systems
- Energy production from waves
- Co-generation/Tri-generation
- Heat pumps
- Remote controls/domotics
- Modulating water valves
- Efficient lighting systems
- Refitting with gas of oil or diesel-fired heating systems
<table>
<thead>
<tr>
<th>Company</th>
<th>Project/Service</th>
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<tbody>
<tr>
<td>ENEL</td>
<td>Renewable resources and Smart Grid</td>
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<tr>
<td>ABB</td>
<td>Intelligent Hospital</td>
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<td></td>
<td>Green Port</td>
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<td>Open technology Lab</td>
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<td>ERICSSON</td>
<td>Mobility monitoring via cellphones</td>
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<td>IBM</td>
<td>Intelligent instrument panel</td>
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<tr>
<td>SELEX-ELSAG</td>
<td>Energy consumption monitoring for different classes of buildings</td>
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<td>Historical centre safety/security</td>
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<td>SIEMENS</td>
<td>Intelligent historical building</td>
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<td>Vertical farm</td>
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<td>Green airport</td>
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<td>TELECOM</td>
<td>Smart school</td>
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<td>Mini fiber optic cuttings</td>
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<td>TOSHIBA – ANSALDO TD</td>
<td>Waterways efficiency improvements</td>
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<td>Energy improvements of “David Chiossone” Museum</td>
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<td></td>
<td>Technological pole</td>
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</tbody>
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Official agreements with associated firms:
The Proposal of members: 25 projects for Genova

Efficient buildings: 9 projects
Sustainable mobility: 5 projects
Energy: 9 projects
Harbour: 2 projects
The proposals for **Smart cities European Calls:**

3 projects for Genova

- **Strategic sustainable planning and screening of city plans:**
  - **Sustainable Planning for the Voltri area**

- **Large scale systems for urban area heating and/or cooling:**
  - **District Heating network in the Bisagno valley**

- **Demonstration of nearly Zero Energy Building Renovation for cities and districts:**
  - **Energy Renovation of the Begato district**
Official Agreements
+
Members’ proposal
+
European Smart Cities Calls

“Genova Smart City” City Project
“Genova Smart City” City Project

EFFICIENT BUILDINGS
ABB (Open technology Lab + Intelligent Hospital + Data Center energy consumption improvements)
SIEMENS (Intelligent historical building + Vertical farm + Green airport)
TELECOM (Smart school)
TOSHIBA - ANSALDO TD (Energy improvements of “David Chiossone” Museum + Technological pole)
COMUNE (Energy Renovation of the Begato district)

SUSTAINABLE MOBILITY
SIIT (Mobility coordination center - MC2)
ERICSSON (Sustainable Smart Mobility Genoa)
ANSALDO STS (Scot-fer)
ANSALDO ENERGIA (New e-urban mobility)
SELEX (SILOS – Innovative Services for Smart City logistics)

ENERGY
ABB (Fast recharge of electric vehicles + Integrated Sustainable Area + Intelligent management of power loads)
SELEX (Smart energy management for sustainable city)
ENEL (Smart Energy Network)
DINCEL (Intelligent system for buildings and district electric distribution networks management)
IBM (Intelligent instrument panel)
ELKROM (Electric energy supply with ELK 50-250 eolian generator)
COLUMBUS (Design and prototyping of an SMES device with MgB2 superconducting cables)
CITY COUNCIL (District Heating network in the Bisagno valley)

HARBOUR
ENEL (Eolian system on the outer breakwater of Genoa harbour)
ANSALDO SISTEMI INDUSTRIALI (Shore to ship connection)
Examples of projects already active:

**SlimPort (Safety, Logistics, Harbour intermodality)** studies an *innovative harbour project* built around modular solutions designed to make more effective the operational processing of good in the last mile at sea and in the first mile at land.

**ACIS (Advanced Cooperative Infomobility System)** studies an *integrated infomobility system* mainly oriented to two goals:

- Information services for both individual and collective mobility.
- Development of applications based on vehicle-vehicle and vehicle-infrastructure communication (*context-aware cooperative driving*, *road traffic management*, *vehicle safety management*)
The future

Activation of a new thematic area: social

Activation of pilot projects

Participation at HORIZON 2020

Involving other municipalities of the Region

Communication initiatives to the citizens

Realization of a Smart City business incubator
SMART PEOPLE
Thank you for the attention....