Deliverable 2.2 TRANSFORMATION AGENDA City of Genoa

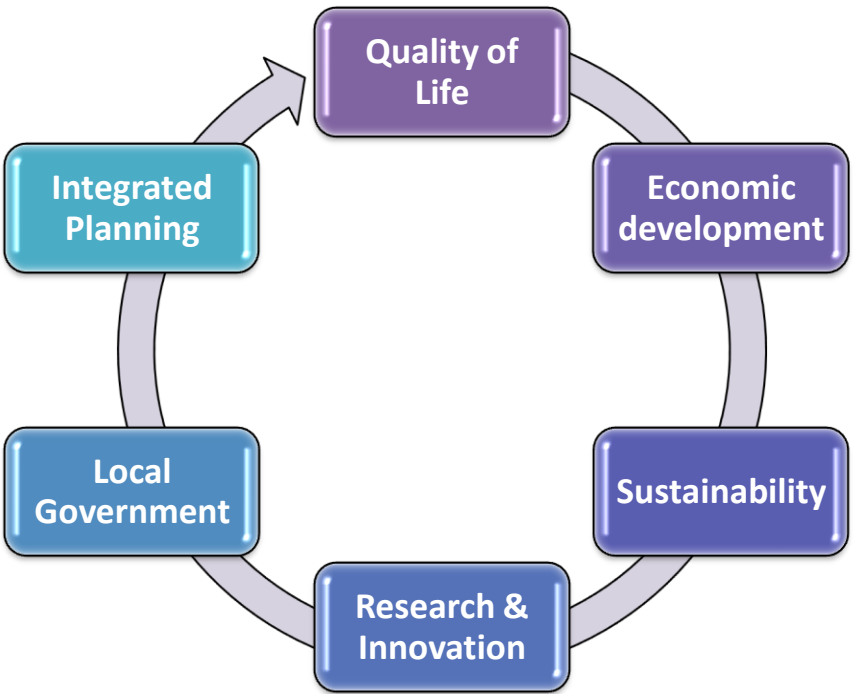


Table of contents

INTRODUCTION

1 Goal of the Transformation Agenda

The Transformation Agenda guides a city in its transformation towards a Smart City through a systematic, replicable methodology, both strategic and pragmatic.

It takes the Smart City process a step further helping define a long term Smart City Vision and strategies and actions to make it come true.

The TA will also show how to involve stakeholders listening to both their needs and proposals in a joint process.

Smart City is a new approach to cities' growth and development which starts a process of transformation, constantly learning from experiences, leading to the Transformation Agenda's continuous improvement and updating.

TRANSFORM brought six European cities and a competent group of business and research experts to determine a common methodology yet flexible enough to be concretely applicable in different cities.

The TA therefore depicts the whole scenario from the status quo to the final goals and needs to be both an operational tool, with indications on activities and investments, and a political and communication tool

The TA covers different stakeholders' requirements in the path towards a Smart City:

- ***Politicians***, in shaping a Strategic Vision, committing to it, organizing involvement, and translating it into concrete actions;
- ***Municipality and other public bodies***: offering concrete methods and actions to implement and realize the Strategic Vision, respecting specific contexts but pragmatically pushing selected goals;
- **Business, big and small**: involving them in the transformation process through a participative methodology connecting public/private opportunities and needs;
- **Research**: using their knowledge and expertise at the same time concretely connecting it with public bodies and business in order to produce useful tangible results leading to investigate and innovate in fields approved by the public sector and interesting for the private one;
- **Citizens**: involving them in the process to better understand their needs and adapt policies, research, actions and products consequently

2 Overview of the content of the TA

Part A - The story (Status-Quo Report, vision and quantitative goals): presents the general framework in each city, its SEAP, vision and goals;

Part B - Evaluation of the city's energy strategy and transformation process: In this section the city will assess its climate plan or SEAP comparing real and ideal development, by coupling two approaches: the Intake Workshop and the City Concept Assessment. Based on the results of these two approaches, the city will identify themes and strategic elements that need improvement to achieve energy and climate goal (i.e. the transformation process they will have to go through).

Part C - Improving abilities to implement – selected themes: the city describes the Transformation path it will have to go through to improve its energy strategy so as to meet its energy and climate objectives. This will be done at two levels: the thematic level (by detailing concrete measure on the 3/5 themes selected during the intake workshop) and the strategic level (as a result of the strategic working groups)

Part D - What has been achieved so far and impact on the city existing energy strategy : This section details the first steps achieved by the city to implement above detailed measures, as well as the plan of the city to use above outputs to improve their energy strategy.

PART A: THE STORY

(STATUS QUO, VISION & QUANTITATIVE GOALS)

1 Background

Genoa started transformation towards a smart city by a raising awareness on environmental issues connected to the strong need to support a sustainable economic development and involve stakeholders in an integrated, systematic planning methodology and consequent actions and projects. It soon became clear that the strategic goal concerned not only energy and emissions but also a better liveability, improved connections and information, innovation, job creation, etc..

The following steps were followed:

Covenant of Mayor's SEAP: Data Collection and Concrete Actions

The need to start from real data and to contemplate concrete feasible actions was realized by Genoa's signing the Covenant of Mayors[1] in 2009 and approving its **Sustainable energy Action plan (SEAP)** in 2010, setting the 2020 202020 goal at -23.7% in CO_2 emissions and determining eighty actions with indication of actors, costs, timeline.[2]

The SEAP, for its completeness, has represented a milestone in the framework of the municipal strategic planning and has paved the way for a real innovative integrated planning process. Starting from the 2005 "Baseline Emission Inventory" (BEI) showing energy flows and CO_2 emitted due to energy consumption, eighty improvement actions in buildings, transport, energy production, lighting, awareness, integrated planning were found. The SEAP is the starting and reference point for constant monitoring of real situations.

Stakeholder Involvement

It soon became clear that transformation towards a smart city is a continuous process requesting involvement form institutions, academia, business of all sizes, civil society in a joint effort towards an improved quality of life. This led to founding the Genova Smart City Association, now counting over 90 members from all groups, working together to achieve results in improved environment, job creation, easier and happier liveability.

Vision

The need for a long-term vision emerged, leading to a participative process defining the ten strategic goals to which Smart Genoa thrives, the **Smart City Decalogue**[3]**.**

Urban Master Plan (PUC)

At the same time the Municipality was in the process of redrawing its Urban Master Plan, Piano Urbanistico Comunale, so called **PUC**[4], which, for the first time, integrated concepts of a vision of the city's future[5] with a connection to other planning tools such as the SEAP.

---

1 The Municipality of Genoa has been one of the first cities in Italy to submit its Sustainable Energy Action Plan (SEAP) in accordance with the Covenant of Mayors initiative of the European Commission, whereby each city makes a voluntary and unilateral commitment to reduce its CO_2 emissions beyond the target of 20% by 2020 in respect of a selected baseline year

2 http://mycovenant.eumayors.eu/docs/seap/492_1320854736.pdf

3 Smart City Decalogue…

4 PUC

5 with substantial contribution from Architects and Urban Planners, in the first place the Genoese Renzo Piano, as well as Rick Burdett, Oriol Bohigas, Amanda Burden, Richard Rogers

Genova Smart City Association (AGSC)

To support the smart process the Genoa Smart City Association[6] (AGSC) was created in 2010, now involving over 90 members from public bodies, research, business big and small, and civil society, working together in helping transform Genoa into a smart[7] city, i.e. a better place to live in, safer, more sustainable, job creating, happier. The Association creates a previously random or non-existent dialogue among stakeholders trying to facilitate the process and intercept possible funding and projects to realize actions leading to a more intelligent, more sustainable, happier city.

Integrated Planning

In order to consent a real implementation of smart transformation, integration among planning instruments was considered essential, so a strong dialogue and interactive method was followed to attain coherence and harmony among Decalogue, PUC, SEAP, Municipality's internal goals.

Definition

This led to Genoa's definition of its Smart City:

"Genova Smart City improves quality of life through sustainable economic development based on research & innovation, led by the local government in a process of integrated planning."

The strong need for concrete translation of vision and models into tangible actions led to investigating possible funding opportunities, such as national, regional and European Union projects. Genoa was the only European city, together with Gothenburg, to win the three Smart Cities and Communities 2012 FP7 calls, on District Heating and Cooling with **Celsius**[8], Energy Efficiency in Buildings with **R2Cities**[9] and Strategic Planning with **Transform**. Many other EU projects in related topics involving business, research and the Municipality were won, as well as national ones

- Illuminate
- Electra
- VerySchool
- Harmonise
- iCity

6 http://genovasmartcity.it

7 http://www.genovasmartcity.it/index.php/en/

8 http://celsiuscity.eu

9 http://r2cities.eu

2 Status-Quo[10]

Genoa facts and figures:		
Municipal area	244	km^2
Built-up area	103	km^2
City centre surface area	1.118	km^2
Population	611.171	inhabitants
Resident families (source: Istat 2009)	300.708	families
Total homes	301.898	homes
Population density	2.509	inhab /km^2
Average population density of the 10 largest Italian cities	4.000	inhab /km^2
Income per family (source: Inland Revenue 2007)	31.448	€/family
Average income per Italian family	22.470	€/family

Energy consumption and CO_2 emission methods

The following section describes results of the statistical analysis implemented in accordance with Covenant of Mayors methodology and guidelines.
Specifically energy production and consumption within the territory of the city of Genoa, and related CO_2 emissions are quantified as related to the sectors **included in the SEAP**, namely:

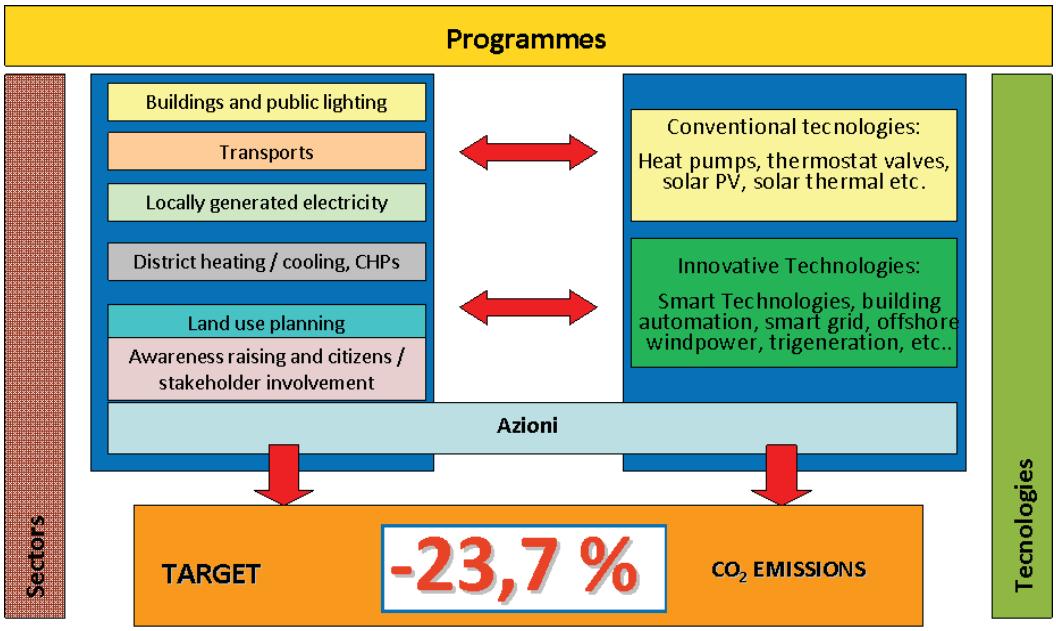
- civil (residential and tertiary) sector
- local transport
- locally generated electricity
- district heating and cooling and CHP (Combined Heat and Power) plans.

Industry and long-distance transport (railway, highways, sea-and air-transports) energy consumption data are not reported in SEAP.
The final energy consumption sectors included in the **2005 BEI**[11] are classified as follows:

- municipal buildings, equipment/facilities;
- tertiary (non municipal) buildings, equipment/facilities;
- residential buildings;
- municipal public lighting;
- municipal fleet;
- public transport;
- private and commercial transport.

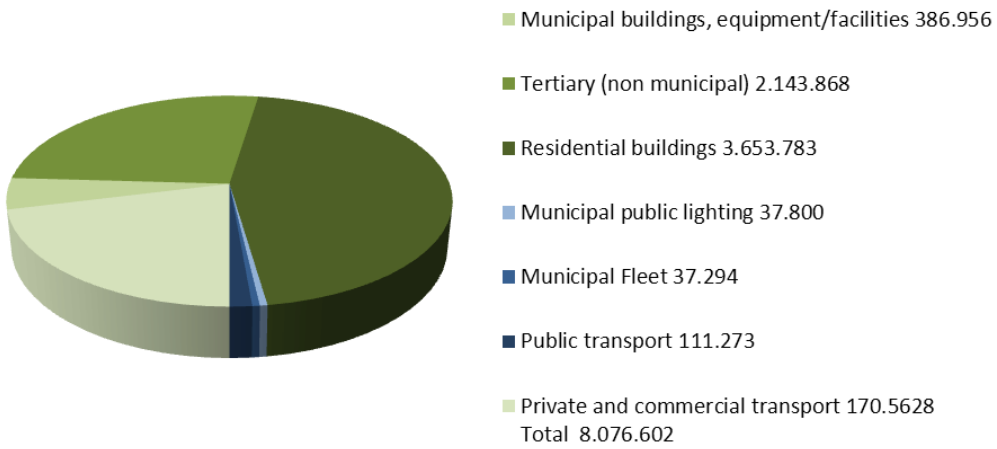
10 see Status Quo …

11 BEI Baseline Emission Inventory



Data collection for development of BEI has been implemented in view of creating a municipal data-base of energy data and information going beyond specific needs related to SEAP actions serving as basic instrument to support and enable subsequent accompanying implementation.

Results of data analysis for 2005 of Genoa energy flows[12], divided by sector are shown in the following graphic[13]:



Graph 1 : Energy flows

12 For the CO_2 emissions calculation, the methodology involves the use of the guidelines of the Intergovernmental Panel for Climate Change (IPCC), and in particular the "Bottom Up" approach, based on fuel end-use sectors. Where no data were available a "top-down approach have been used, resorting to statistical analysis of aggregate data at provincial level (Ref.: Greenhouse Gas Emissions Inventory of the Province of Genoa). Following the "Standard" reference methodology (IPCC 2006 and Covenant of Mayor Guidebook "How to Develop a Sustainable Energy Action Plan" Part II "Baseline Emission Inventory), the total CO_2 emissions (tons/year) have been calculated for each sector on the basis of emission factors evaluated on the basis of the carbon content of each fuel.
The total CO_2 emissions were calculated by summing the contributions for each energy source. For electricity consumption CO_2 emissions in tons/MWh have been determined by the relevant emission factor (National/European Emission Factor).

13 all tables and graphs refer to Genoa 2005

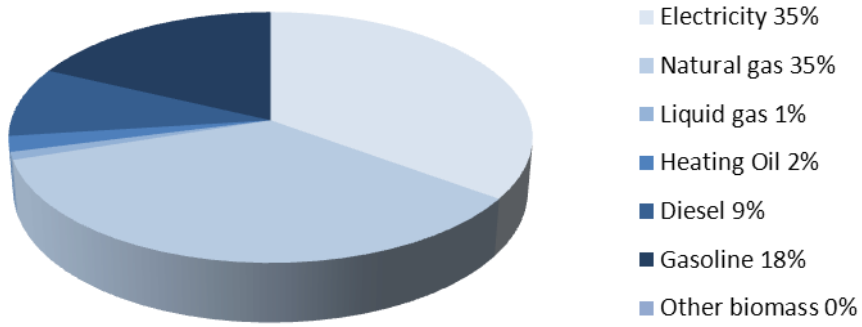
To summarize results, the assessment of the 2005 baseline scenario has identified a number of criticalities, opportunities and reduction potentials for energy consumptions and related CO_2 emissions such as:

- **residential sector**: energy performance improvement potentials of existing buildings are considerable and may be achieved via **improvements of heating systems**, **retrofitting** and renewable energy systems, namely solar energy systems (both PV and thermal);
- **tertiary sector**: energy performance improvement in existing buildings may be achieved improving air-conditioning and acclimatization systems, retrofitting and application of Home automation / building automation technologies;
- **local transports:** on-going policies to increase local public should be continued including increase of electric fleets, and so-called vertical transports, namely public elevators, funicular and similar.

These data lead to some basic considerations:

- civil sector energy consumption (buildings, equipment/facilities of the residential and tertiary) represents by-far the prevailing use of energy;
- natural gas is the main fuel source being used in Genoa, primarily used in the residential sector;
- local transports in Genoa are less pronounced (in comparison to national average) which is evidence of the relatively high exploitation of public transports by inhabitants (approximately 43% of the population);
- electricity consumption is significant and growing in the tertiary sector, showing increasing summer air-conditioning;

The SEAP focuses on the civil sector and local transports, showing a similar share of CO_2 emissions among **electricity** (35%) **natural gas (35%)** and LPT **fuel** (gasoline and diesel) (27%) **consumption.** High CO_2 emissions from electricity, compared to the apparently low share of final electricity consumption itself, is due to the known low efficiency of thermal power plants, in Italy as in Europe.



Graph 2: CO_2 emissions per sector

Overall total of **2.271.913 tons of CO_2 emissions** in 2005 is the 100% reference value considered for comparison and quantification of all emission reduction targets and of effective results to be achieved by individual SEAP actions.

Genoa has monitored[14] SEAP progress at the end of 2011 and of 2012, assessing both progress in action realization and CO_2 emissions difference in relation with 2005 Baseline Emission Inventory[15].

SEAP Actions Implementation monitoring

	2011	***2012***	***2014***
To be defined	-	9	4
Definition stage	10	13	13
Started up	16	19	15
On-going	11	8	18
Advanced	8	12	11
Completed	5	12	18
Postponed	2	3	6
Cancelled	-	1	2

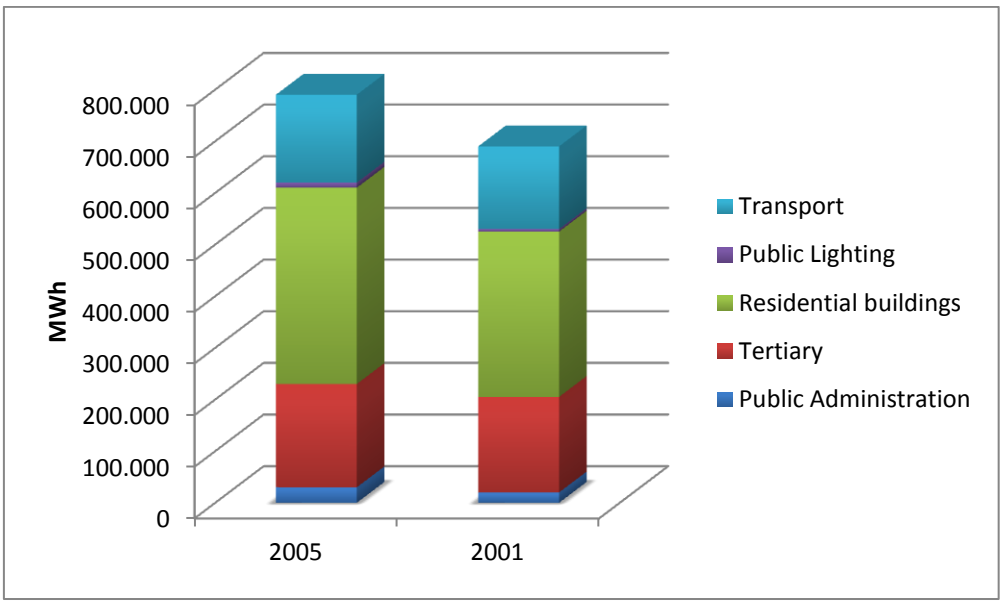
Table 1: SEAP Actions Implementation

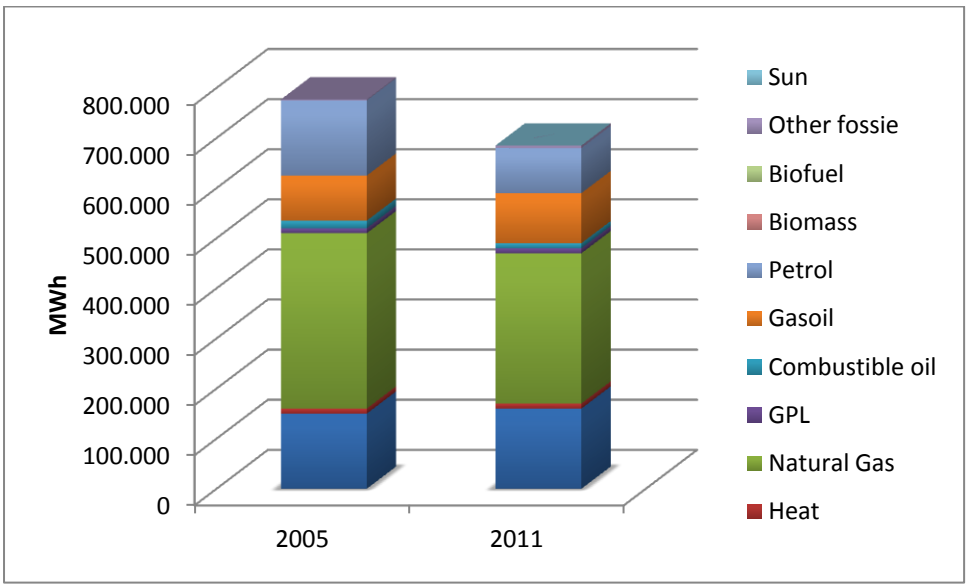
It is important to underline the two indicators progress independently from each other: an action can be almost completely with no CO_2 reduction, because environmental benefits will be counted only starting from actual installation (typically for infrastructures), or both might go together as happens with changes that bring down present emissions. For actions with no numeric measurement, advancement coincides with attribution of CO_2, because these actions were deemed to bring added value to the whole process, therefore contributing (indirectly in the reality, but directly in the calculation) to target attainment.

Looking at SEAP monitoring is interesting for two main reasons: for entering in the monitoring mechanism and its articulation and complexity, but also for checking the level of fulfilment of the objectives. The monitoring aims are in fact substantially two: the actual realization of the envisaged interventions and the degree of "capability" of the Administration to accomplish the actions contained in the agenda. It could therefore be relevant to focus on SEAP monitoring process and management so far, as a fundamental step for creating the basis and spirit of the Transformation Agenda.

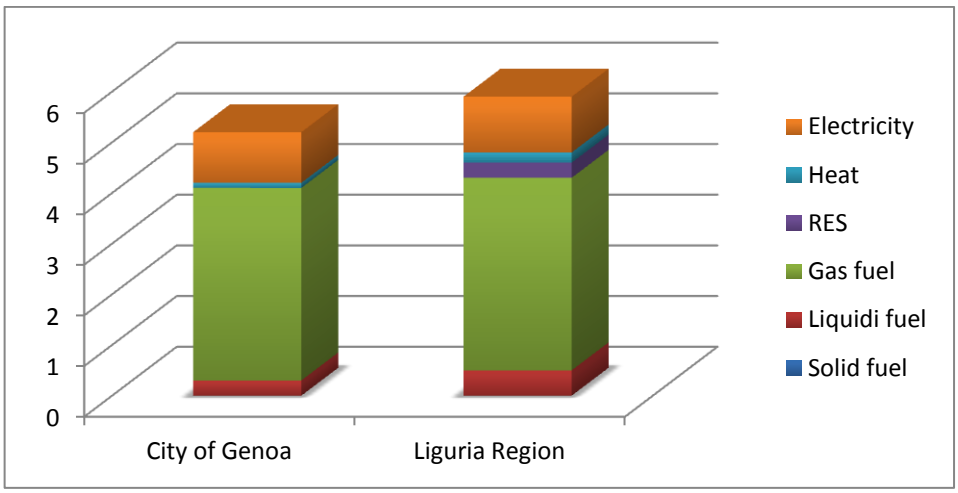
[14] Covenant of Mayors rules for moniotring have only been published in 2015

[15] the four-years report called Monitoring Emission Inventory (MEI) is substantially an updated version of the BEI, not based on removal of CO_2 shares as consequence of achieving actions' advancement (as biennial one is), but due to a postponed re-calculation of the BEI.

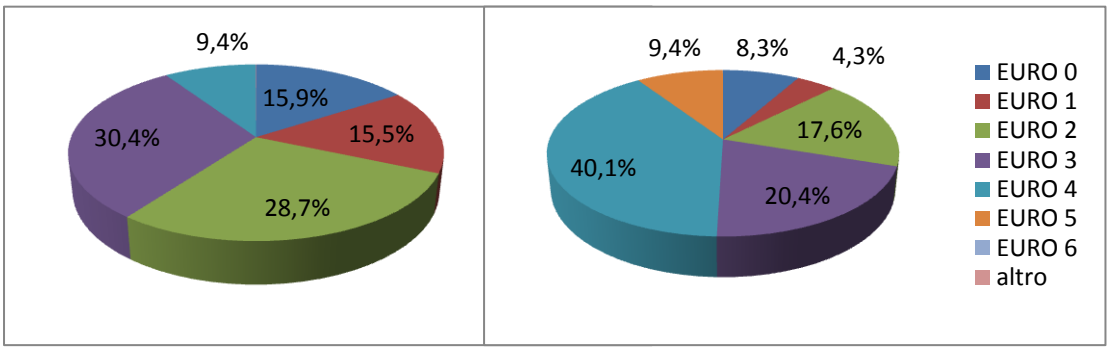




Graph 3: Final consumption per source BEI 2005 - MEI 2011



Graph 4: per capita consumption residential sector City of Genoa & Region Liguria 2011



Graph 5: cars per Euro class 2005 - 2011

Energy transition Regulatory Framework

National, regional and local laws regulate energy.

National

EU "**Climate action and renewable energy package**" launched in 2008 sets binding targets for 2020:

	Italy	Norm
RES/ final gross consumption (S_{2020})	17 %	*Dir 2009/28/CE*
Greenhouse gases 2020/ 2005	-13 %	*COD 406/2009/CE*
RES in final gross energy consumption in transport	10%	*Dir 2009/28/CE*

Table 2: 2020 Italian Energy Goals

Tax deduction incentivises application of EU Directives on buildings' energy performance and certification.

Regional

Region Liguria's 2020 RES goal is set at 14.1% for 2020 with three main sub-goals:

- ★ RES burden sharing
- ★ Economic Development
- ★ Communication

Specific actions being RES promotion (electrical and thermal), "smart" distribution networks (smart grid), and energy efficiency in residential, commercial, public lighting, business and production cycles sectors.

Local

Local authorities are continuously and actively involved in planning and monitoring actions, especially within Covenant of Mayors and Smart Cities initiatives.

Energy Transition Financial /Fiscal Framework

Energy transition, smart appliances and infrastructures, retrofitting must be financed by a flexible and innovative combination of sources and business plans
Available funds are:

EU funds:

- ★ ERDF European Regional Development Funds: Liguria's 2014-2020 Operational Programme offers capital funding for hard measures in innovation, energy saving and smart transformation, mainly **for buildings and small RES**.
- ★ ERDF PON (Piano Operativo Nazionale) Metro: the national operational programme for Metropolitan cities finances **infrastructure development, digital agenda and energy efficiency in existing buildings**.
- ★ Horizon 2020: calls finance smart applications, infrastructures, methodologies.
- ★ ELENA: European Investment Bank (EIB) tool for energy efficiency in local bodies, finances technical assistance to prepare and launch calls with an ESCO model.

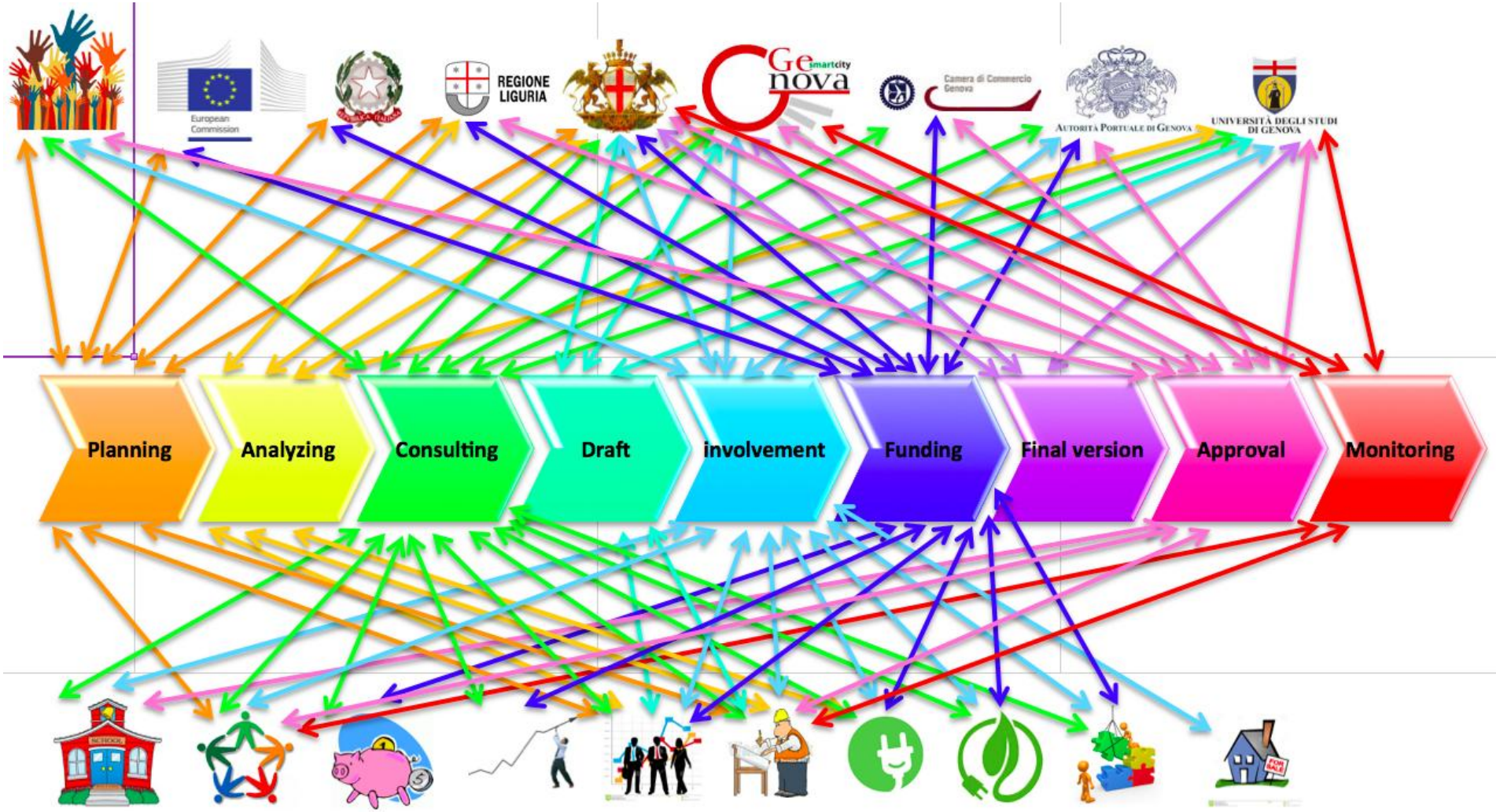
National funds:

The Italian government offers a series of incentives for energy, targeting both private and public beneficiaries:

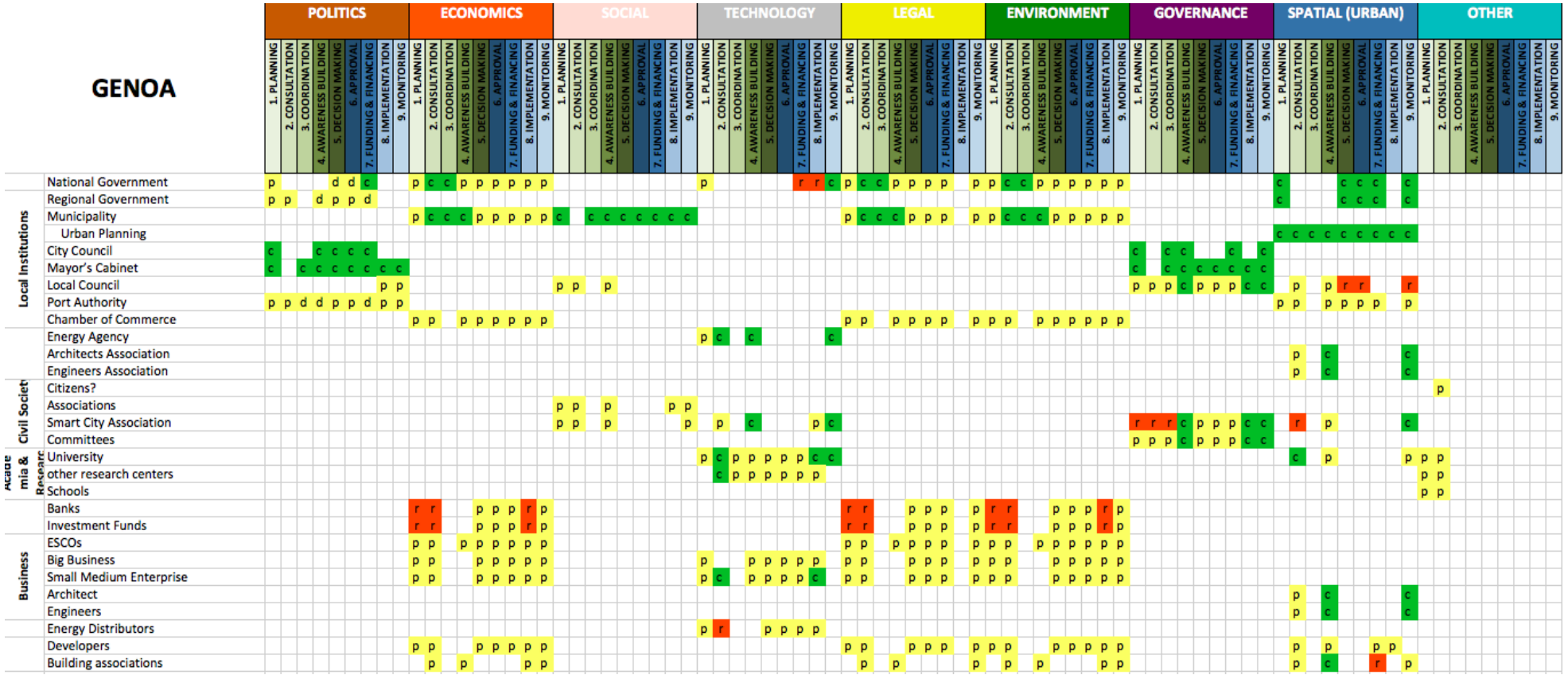
- ★ Private: small biomass heaters can be financed by "Conto Termico", i.e. Thermal Account, while small energy saving measures can benefit of 65% tax deductions
- ★ Public: small energy efficiency interventions can be financed by Conto Termico
- ★ RES are financed through Feed in tariff and Green Certificates depending on size
- ★ White Energy Certificates promote bigger energy efficiency interventions for ESCos, DSO, public bodies and residential multi dwelling buildings

- ★ PPP (Public-private partnership) the private party provides a public service or project assuming substantial financial, technical and operational risks
- ★ Third Party Financing: ESCOs' investment is paid back by energy savings.

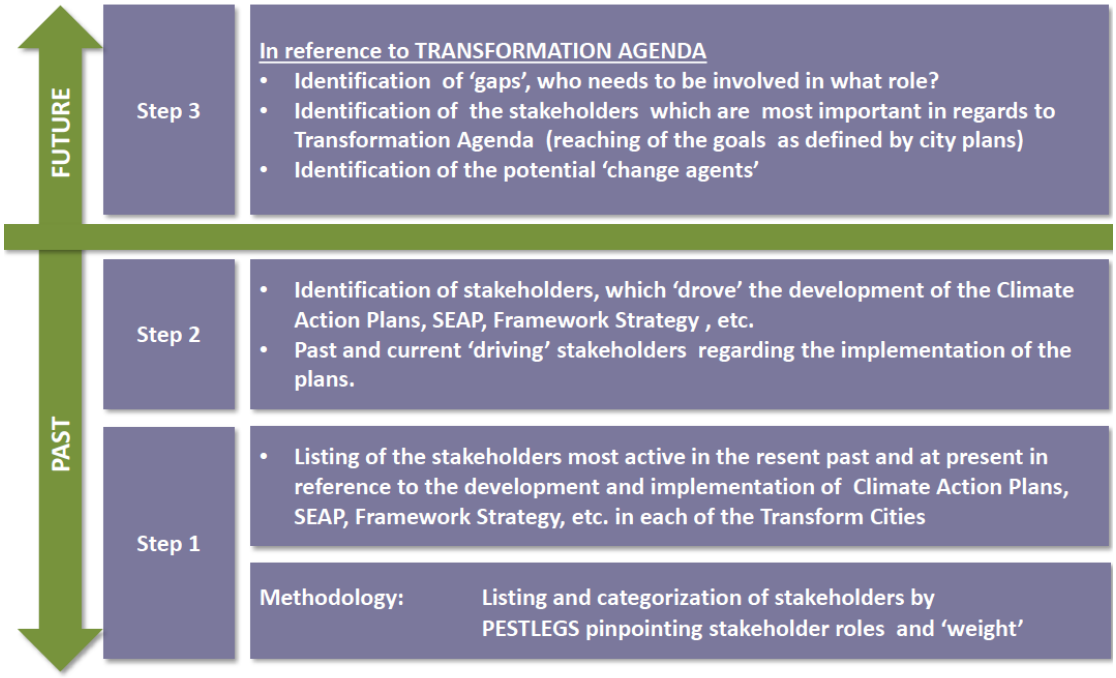
3 Stakeholder Mapping



GENOA


POLITICS
ECONOMICS
SOCIAL
TECHNOLOGY
LEGAL
ENVIRONMENT
GOVERNANCE
SPATIAL (URBAN)
OTHER
1. PLANNING
2. CONSULTATION
3. COORDINATION
4. AWARENESS BUILDING
5. DECISION MAKING
6. APPROVAL
7. FUNDING & FINANCING
8. IMPLEMENTATION
9. MONITORING
Local Institutions
Civil Societ
Acade mia & Researc
Business
National Government
Regional Government
Municipality
Urban Planning
City Council
Mayor's Cabinet
Local Council
Port Authority
Chamber of Commerce
Energy Agency
Architects Association
Engineers Association
Citizens?
Associations
Smart City Association
Committees
University
other research centers
Schools
Banks
Investment Funds
ESCOs
Big Business
Small Medium Enterprise
Architect
Engineers
Energy Distributors
Developers
Building associations

Aim and Steps of Stakeholder Mapping in Transform



PESTLEGS categories and mapping symbols

- ***Political:*** Citizenship Committee, Members of the Council
- ***Economic:*** Chamber of Commerce, Banks, Investment Funds, ESCOs, Private Business, Developers etc.
- ***Social:*** Churches, Associations, NGO's
- ***Technological*:** Energy agencies, Energy Supply Companies
- ***Legal:*** National Government, EU, etc.
- ***Environmental:*** Environmental associations, consumer associations etc.
- ***Governance:*** Local government, local administration
- ***Spatial:*** Institutes of Architects/Engineers/Agencies/Built environment sector/Developers
- ***Other:*** Research, educational establishments, schools, colleges, universities, Expert panels, consultants or organisations with specific expertise

Note: Some of the Stakeholders are involved in more than one category (i.e. economic, but also technological). In such case an additional coloured symbol is inserted next to the stakeholder name, providing the reference to the multiple roles and overlaping categorization of the particular stakeholder.

- Stakeholder role on the entire city level/considering large scale or impact
- Stakeholder role in a specific sector and/or in a specific area/district
- 'Driving' stakeholder
- Stakeholder required in this role
- Strengthening of the role of stakeholder is required
- Small role

POLITICAL

Stakeholder – Political	‚Owner' Planning	Consultation	Coordination	Awareness Building	Decision making	Approval	Funding & Financing	Implementation	Monitoring
National Government	●				●	●	●		
Regional Government	●	●		●	●	●	●		
City Council	●			●	●	●	●		
Mayor's Cabinet	●		●	●	●	●	●	●	●
Port Authority	●	●	●	●	●	●	●	●	●
Local Council (Municipio)								●	●

ECONOMIC

Stakeholder – Economic	‚Owner' Planning	Consultation	Coordination	Awareness Building	Decision making	Approval	Funding & Financing	Implementation	Monitoring
National Government	●	●	●	●	●	●	●	●	●
Municipality	●	●	●	●	●	●	●	●	●
Chamber of Commerce	●	●		●	●	●	●	●	●
Banks	✖	✖			●	●	●	✖	●
Investment Funds	✖	✖			●	●	●	✖	●
ESCOs	●	●		●	●	●	●	●	●
Private Businesses	●	●			●	●	●	●	●
Developers	●	●			●	●	●	●	●
Builders' Associations		●		●				●	●

SOCIAL

Stakeholder – Social	„Owner" Planning	Consultation	Coordination	Awareness Building	Decision making	Approval	Funding & Financing	Implementation	Monitoring
Municipality	●		●	●	●	●	●	●	●
Local Council (Municipio)	●	●		●					
Genova Smart City Association	●	●		●					●
Associations	●	●		●				●	●

TECHNOLOGICAL

Stakeholder – Technological	„Owner" Planning	Consultation	Coordination	Awareness Building	Decision	Approval	Funding & Financing	Implementation	Monitoring
National Government	●						●✖	●✖	●
Genova Smart City Association		●		●				●	●
University	●	●	●	●	●	●	●	●	●
Other Research Institutions		●	●	●	●	●	●	●	
Energy Agencies	●	●		●					●
Energy Supply Companies	●	✖			●	●	●	●	
Businesses	●	●		●	●	●	●	●	

LEGAL

Stakeholder - Legal	„Owner" Planning	Consultation	Coordination	Awareness Building	Decision	Approval	Funding & Financing	Implementation	Monitoring
European Union	●			●	●	●	●		●
National Government	●	✖	✖	●	●	●	●	●	●
Region Liguria	●	●	●	●	●	●	●	●	●
Port Authority	●	●	●	●	●	●	●	●	●
Municipality	●	●	●	●	✖		●	●	✖

ENVIRONMENTAL

Stakeholder - Environmental	‚Owner' Planning	Consultation	Coordination	Awareness Building	Decision	Approval	Funding & Financing	Implementation	Monitoring
National Government	●	●	●	●	●	●	●	●	●
Region Liguria	●	●	●		●	●	●	●	●
Municipality Energy & Environment Department	●	●	●	●	●	●	●	●	●
Genova Smart City Association		●		●	✖	✖		✖	●
Energy Agencies	●	●		●				●	●
University		●		●			●	●	●

GOVERNANCE

Stakeholder - Governance	„Owner" Planning	Consultation	Coordination	Awareness Building	Decision	Approval	Funding & Financing	Implementation	Monitoring
City Council	●		●	●			●		●
Mayor's Cabinet	●		●	●	●	●	●	●	●
Local Council (Municipio)	●	●	●	●	●	●	●	●	●
Genova Smart City Association	●✖	●✖	●✖	●	●	●	●	●	●
Other Associations	●	●	●	●	●	●	●	●	●

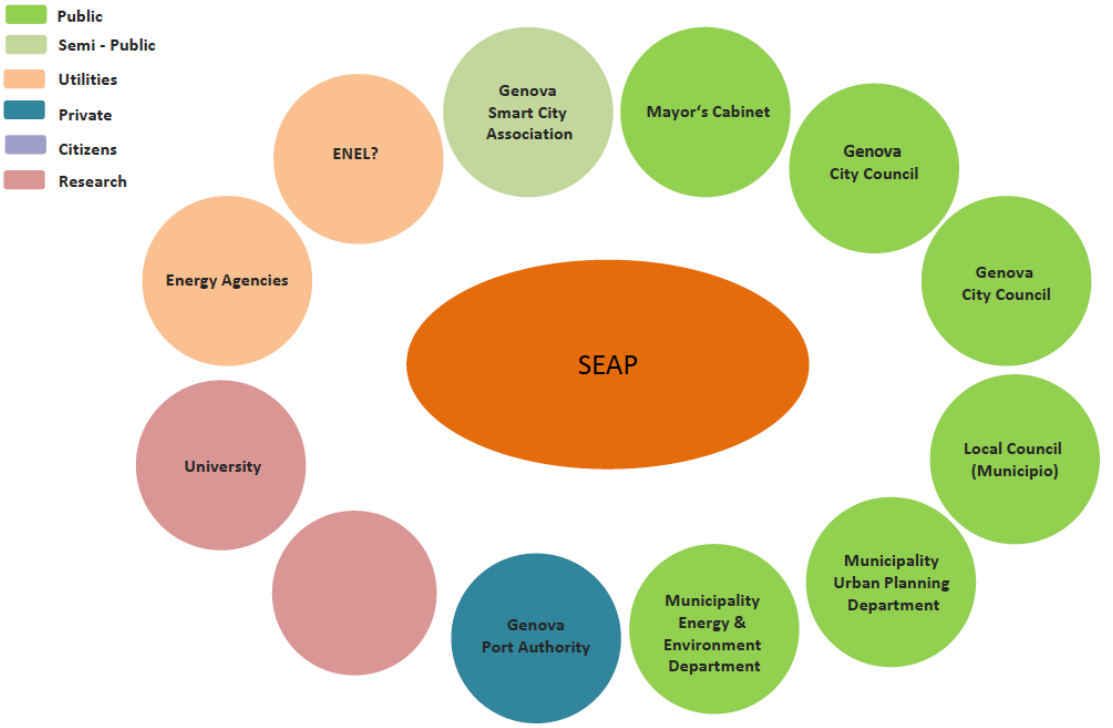
SPATIAL (URBAN)

Stakeholder - Spatial	„Owner" Planning	Consultation	Coordination	Awareness Building	Decision	Approval	Funding & Financing	Implementation	Monitoring
National Government	●				●	●	●		●
Region Liguria	●				●	●	●		●
Municipality Urban Planning Department	●		●	●	●	●	●	●	●
Local Council (Municipio)		●		●	✖	✖			●
Genova Smart City Association		✖		●					●
Port Authority	●	●		●	●	●	●		●
University		●		●					●
Building Associations		●		●			✖		●
Developers		●		●			●	●	
Real Estate		●		●			●	●	
Architects, Engineers , etc.		●		●					●

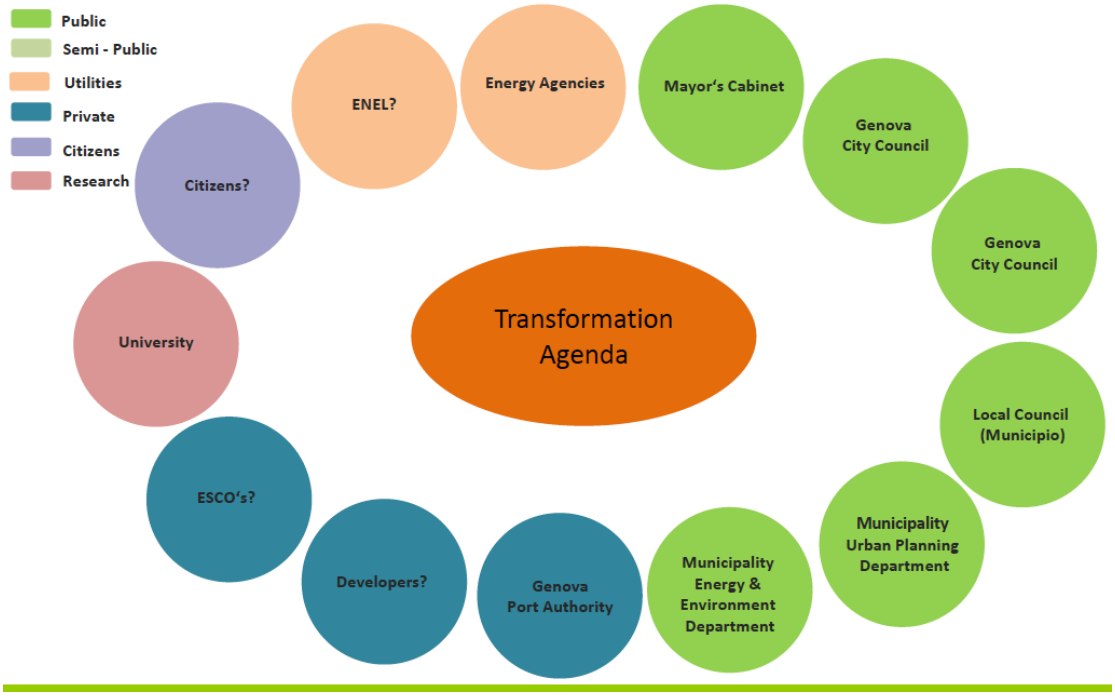
OTHER

Stakeholders - other	„Owner" Planning	Consultation	Coordination	Awareness building	Approval	Funding & Financing	Implementation	Monitoring
University	●	●						
Other Research Institutes	●	●						
Schools	●	●						
Citizens		●						

Driving Stakeholders at present and in the recent past (SEAP)



Key Stakeholders to be considered in TA



5 Vision & quantitative goals

Starting from the definition of Genoa as a Smart City, and using the fertile and positive environment offered by the Genoa Smart City Association, involving public bodies, research, business and civil society, the long-term vision, going beyond the SEAP was established:

Illustration 1: Smart City Decalogue

Part B - Evaluation of the city's energy strategy SEAP and transformation process

1 City concept assessment

Three planning instruments sustain deployment of Genoa's Energy Strategy:

Urban Master Plan, PUC

It goes beyond planning and becomes a programmatic tool, aiming at targets through a holistic integrated process.

- ★ legally binding
- ★ no economic indication
- ★ no financial indication
- ★ no timeline indication

SEAP

- ★ non binding (political)
- ★ economic indications
- ★ timeline indications
- ★ city-wide (not district or territorially related): this represents a ***crucial gap***

Municipality's Internal Planning Goals (DUP[16])

Giving Managers and offices specific goals related to the political strategy and vision.

- ★ Binding
- ★ Economic indicators
- ★ Timeline indicators

Major Gaps from Theory to Reality in deploying the Energy Strategy emerging from Transform process:

- ★ a stronger role for the Municipality and its partners in selecting priorities and actions in the energy transformation strategy is needed.
- ★ non-specifically energy aspects, such as governance and hydro-geologic emergencies, linked to climate action, need to be included in smart city transformation.
- ★ higher attention to energy in Urban Planning is needed

One positive result of the Smart City Transformation process is a good connection between PUC, SEAP and DUP regarding energy targets, as Intake Workshop's results show.

[16] Documento Unico di Programmazione

2 The intake workshop

The process of prioritizing themes for the Genoa Transformation Agenda took place during the Intake Workshop (IW), held in October 2013.

Genoa used three sources for the down-selection process:

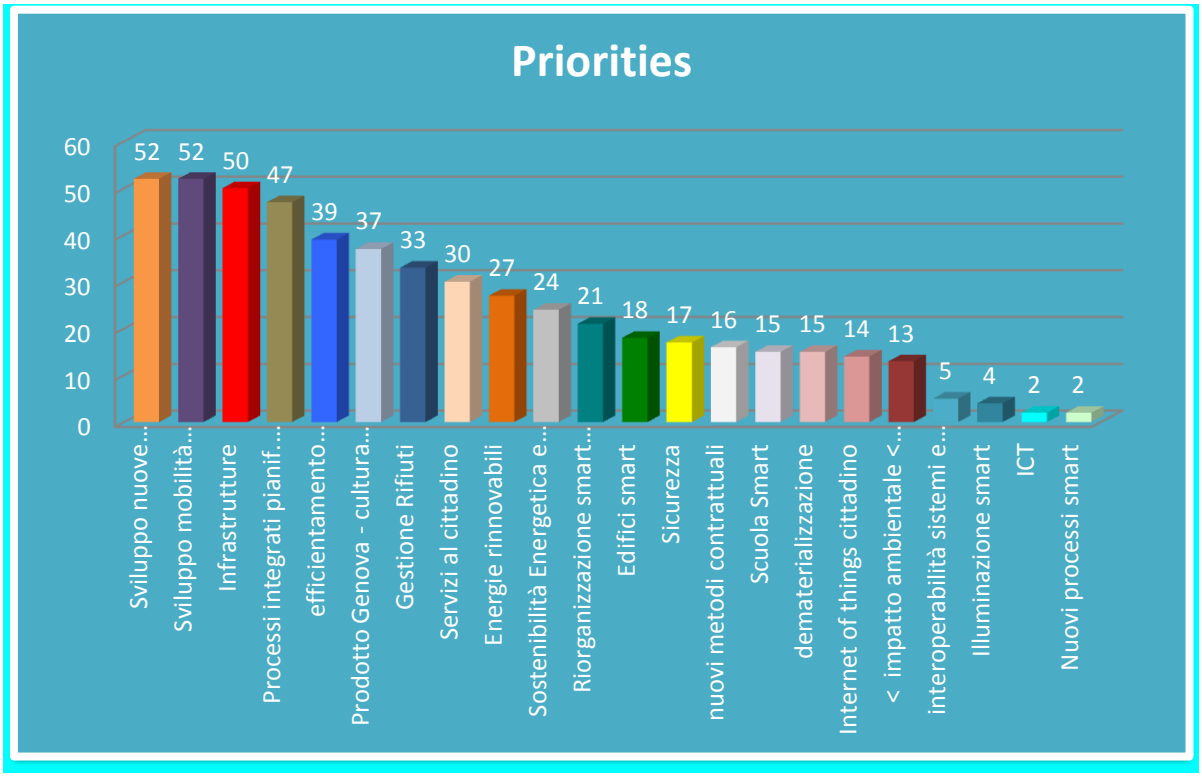
I. **Smart Goals**: goals chosen by Mayor, Alder people and Directors of the Municipality
II. **SEAP Actions**
III. Smart City Vision as summarized in the **Smart City Decalogue**'s Ten Points.

During the IW, participants were invited to work in groups with the aim to:

1. Analyse Smart Goals and confront them with Smart City Decalogue
2. Analyse SEAP actions and confront them with Smart Goals
3. Prioritize Smart Goals
4. Draw SWOT Analysis of Six Priority Themes.

The Intake Workshop produced the following results:

1. Share Smart Goals
2. Update Smart City Vision by reviewing the Decalogue
3. Deepen knowledge of SEAP and its actions
4. Define the six Key Themes to focus on within the smart city Transformation Agenda
5. Identify priorities to focus on.

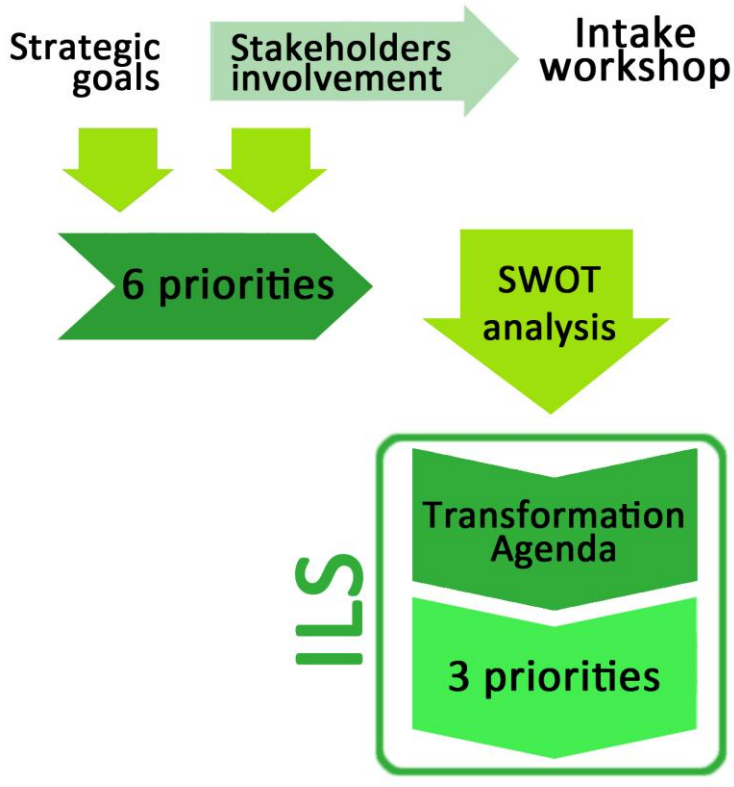


Chosen Key Themes were, in order of importance:

1. **Mobility**
2. **New Entrepreneurship**
3. **Enabling Infrastructures**
4. **Integrated Planning**
5. **Smart Buildings**
6. **Sustainability and Renewable Energy Sources**.

The Intake workshop represents a starting point for stakeholder cooperation and involvement within the Transformation Agenda making. The best IW's results were, indeed, the good cooperation and discussion between the different stakeholders (public bodies, companies. research, etc.). The presence and strong commitment of politicians and municipal workers was a key asset of the day. This good collaboration has to be taken forward and enlarged in the future to make it very fruitful.

As a general comment, Transport appeared to be one of the most important sectors to focus on also as a means to improve the economic scenario. The city needs a strong promotion policy to increase productivity and entrepreneurship, also to mitigate the high youth emigration flow.
Due to recurrent floods and landslides, safety and hydrogeological risk prevention and mitigation become essential in the "Smart City" scenario.



Starting from the City's Goals, the Transform team began reflecting on the relationship among the contents of the Transformation Agenda at the city level, the items of the Intake Workshop, the main aspects to be deepened during the Intensive Lab Session and the working groups (thematic and local) to be boosted consequently.

Here below, the resultant framework.

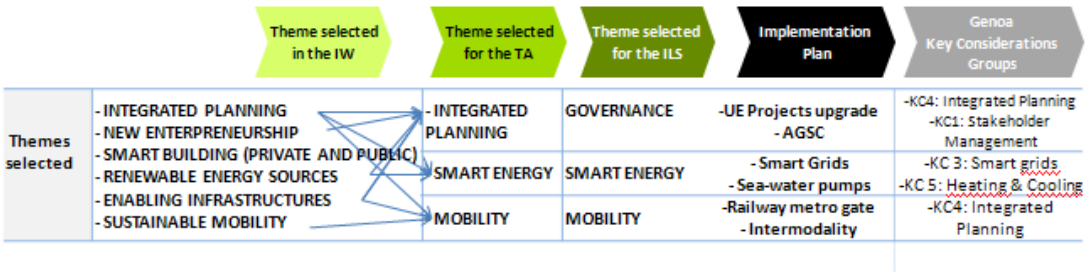


Illustration 2: choosing priorities

Results of the IW were applied in the Smart Urban Lab and connected Intensive Lab Session, following a coherent and logical methodology to choose territorial priorities following city-wide goals and vision.

The enabling themes for the ILS became:

1. Integrated planning
2. Energy
3. Mobility

Genoa was then involved into the related Key Considerations Groups:

KC3 Smart Grids

The objective of the Key Consideration working Group on Smart Grids was to set a common vision/understanding on the role of the so-called enabling infrastructures in paving the way toward a Smart City. The starting point of the KC3 activities was to reach a shared and comprehensive description, among the members, on the meaning of a Smart Grids both from a technological and functionalities perspective. In this regard, the KCWG set out the following description: “A Smart Grid is a smart electricity able to integrate all the actions of the users connected to it, such as energy producers, costumers, procurers, in order to distribute electricity in a sustainable, safe, efficient and cost-reduction way. Smart Grids apply innovative systems along with cutting-edge technologies for monitoring, control and communication in order to improve the operational efficiency of the grids while improving the quality of the services for the end user”. After having lay down the core description of a Smart Grids each member has carried out a status quo analysis in order to assess the technological penetration of the core elements of a Smart Grids in the related urban context. After the status quo definition, all the members have jointly identify the most promising smart grids technologies that are deemed to be of utmost importance for support the City transition toward a Smart City :

- Advanced automation and control functionalities to increase the hosting capacity of the grids for the integration of RES
- Grid empowerment to enable the grids to provide new added value services (such as electric mobility)
- Citizens engagement through customer awareness technologies

KC4 – Integrated Planning

In the Integrated Planning KC, we approached the matter starting with this question: Which measures can be named as “best practice” in your city? What are the experiences in linking urban planning with energy planning? Genoa responded with short summary of its actions regarding the theme that can be useful to be disseminated, but also to watch at own proper experience in order to improve it.
About this activity, led by Genoa, as a survey on key-planning issues, TRANSFORM KC4 team purposes some general themes that cities Europe-wide have considered as crucial for a better sustainable and smart implementation of environmental policies.
Three recommendations were drawn out, that are more interesting also for the Genoa case.
The most important is about the clarification about the Open Data Issue.
In fact, there are still lacking or partial application of EU indications in fact of open data (COM(2011) 882) and the treatment of energy data and their public use in general. The Efficiency Directive 27/2012 is somewhere confusing about the aims the information can be delivered for. This fact causes misunderstanding and mistaking interpretations at the local level that do not assure the right application of the Directive in itself and do not permit the realization of the expected results.

After the definition of the know-how and best practice sharing on the most promising technologies, each member has used the KCWG outcomes as the stepping-stone to deliver the Transformation Agenda.

Part C . Improving abilities to implement: selected themes and strategic city working groups

1 Improving the city's ability to implement chosen Themes

Description of the selected theme: Context and objectives

Following Intake Workshop and Intensive Lab Session's results, the Municipality of Genoa will now concentrate its planning efforts in the three selected priorities. Each can be split into sub-themes, linked with Municipal Departments' priorities.

1. **Mobility**
2. **New Entrepreneurship**
3. **Enabling Infrastructures**
4. **Integrated Planning**
5. **Smart Buildings**
6. **Sustainability and Renewable Energy Sources**.

Smart Mobility

Sustainable mobility, Sustainable public means of transport, Smart transport and mobility planning also through a decision support system

Since 2008, with the first review of the Urban Mobility Plan, Genoa has foreseen transport measures for transforming, in a long-term perspective, the way of moving inside the city-boundaries. These ideas are reported also in the SEAP and are systematically revised and monitored: a well-connected "surface" public transport, a group of pedestrian areas for little boroughs' protection, urban elevators etc., are some of the adopted actions. A very important one, from the smartness point of view, is the development of a metropolitan wireless network, with an integrated system of data exchange which informs people about transport, connections, delays and so on, but also about accessibility to services. Data are available via mobile phone or via message panels making public transport means more attractive. Also private share can be improved thanks to "real time" traffic information, exploiting internet maps or video cameras systems, spread out all over the city and especially in the most critical points.

Another important action refers to inter-modality: parking hubs, well-connected metro-bus-railway stations are considered as decisive for the quality of transport services and as contribution to the achievement of a better urban life-style. This priority is visible in the Genoa SUL interventions: projects on Green Apple are focused on the intermodal change between national and local trains, linked with buses, bikes and cars (electric, too).

Building mobility scenarios being crucial for planning, Genoa included electric mobility and car sharing actions in Transform DST.

Mobility

Theme Description

Developing and reorganizing smart mobility.

Genoa has an extremely complex geographical position. The Apennines dive directly into the sea with no solution of continuity, and the two northward valleys run along the course of two rivers, usually almost dry but which can become deadly and damaging when flood occurs, more and more frequently in recent years. There are 22 mostly hidden streams which can however become extremely dangerous, e.g. Fereggiano killed six women in 2011.

The City's history goes to back to prehistoric times and has been built starting from the natural port and growing into the mountains, Mobility is therefore extremely hard for a number of reasons:

1. uphill (downhill) twisting roads making electric mobility more demanding
2. narrow roads requiring short buses
3. few garages meaning cars parked everywhere further narrowing circulating space
4. ageing population (244 over 65 /100 under 15) with difficulty in moving and even taking buses
5. very compact and ancient city (19.000 inhabitants/sq.km) , with listed buildings, making any infrastructure building difficult and disturbing for population
6. rainbow shape, 25 km along the coast with only two valleys entering for 5 km; this makes west-east circulation the only possible one and the available roads are already fully used and there is no space for more
7. old bus fleet and difficult economic situation hindering upgrading as focus is on transport company's survival and determining a closed attitude towards innovation as efforts are channelled towards every day's business and there is no vision or long term planning capacity

General Goals

Lower need for transport, improve Local Public Transport, Smart Mobility and Fleets

Actions

- ★ Inter-modality
- ★ Behavioural changes lowering need for movement
- ★ Smarter private and public fleets, electric and alternative fuelling
- ★ Improve LPT quality by innovating
- ★ Policies favouring LPT
- ★ Electrically assisted bikes and bike lanes
- ★ Vertical transports, elevators, funicular and similar.
- ★ Pedestrian areas
- ★ Water-based transport.

Field	#	Action	Expected energy saving per (MWh/a)	2020 CO_2 reduction target (t/a)
TRA	S01	Dedicated bus lanes	11.120	2.973
TRA	S02	Extending resident permit parking area (Blue Area)	77.838	20.812
TRA	S03	Elevators & funiculars	3.706	991
TRA	S04	Infrastructures	5.560	14.866
TRA	S05	Environmental Islands	25.946	6.938
TRA	S06	Extending subway	5.560	1.487
TRA	S07	Turning fleet eco-friendly	3.707	991
TRA	S08	Exchange hubs	5.560	1.487
TRA	S09	Boat bus	556	149
TRA	S12	Freight	7.413	1.982
TRA	S13	Extend car sharing	7.413	1.982
TRA	S14	Soft mobility - bicycle lanes	1.853	496
TRA	L01	Dedicated bus lanes	14.826	3.964

	TRA	L02	Extending resident permit parking area (Blue Area)	77.838	20.812
	TRA	L03	Elevators & funiculars	7.413	1.982
	TRA	L04	Large scale infrastructures	18.533	4.955
	TRA	L05	Environmental Islands	25.946	6.938
	TRA	L06	Extending subway	5.560	1.487
	TRA	L07	Turning fleet eco-friendly	3.336	892
	TRA	L08	Urban use of railway	9.267	2.478
	TRA	L14	Soft mobility - bicycle lanes	27.799	7.433
	Short and Long term (S or L) action are foreseen; Parking measures (so-called Blue-areas) and bus-lanes dividing private and public circulation cause the biggest CO_2 reduction.				
Impacts	See above				
Achievements Qualitative Analysis	Transport actions - Implementation monitoring comparison (Monitoring Report end of 2012)				
				Short Term	***Long Term***
			To be defined	2	3
			Started	5	5
			On-going	2	1
			Advanced	2	2
			Completed	2	0
			Postponed	1	0
Municipality involvement	★ Mobility ★ Urban Planning ★ Energy & Environment				
Key-actors	★ Municipality ★ AGSC ★ AMT Local Transport Company, 100% Municipality owned ★ Italian Railway System ★ Local Councils ★ AMIU 100% municipality owned Waste Company ★ Autostrade per l'Italia ★ Citizens				

Table 3: Mobility Description

Results from IW SWOT analysis:

Theme	Strength	Weakness	Opportunity	Threat
Mobility	Transversal competences among industry /university /public administration Spread knowledge of the territorial characterization System of infrastructures (in compliance with the regulatory master plan) Technological know-how within Genova Smart City Association Mobility urban plan (PUM) Public administration's leading role towards private companies Infomobility (already developed)	Lack of interaction between public administration's offices Difficult connection between priorities' selection process and political commitment Static society towards innovative changes Data collection problems (different and sometimes incompatible sources) Architectural barriers Geomorphologic diseases Aging public transport's fleet	Alignment to European programs (Horizon2020) Intermodal transport system Development of new transversal relationships (liaisons) (Transform project) Participation of the citizens to the public decisions (ex. Urban Center, experiences of débat publique) Decision Support System Problem solving know-how Turn over of the public transport fleet with more environmentally friendly vehicles Smart paradigm internalization Increasing awareness by citizens	Lack/rationalization of economic resources Difficult development from start-up initiatives to ordinary praxis Normative uncertainty Lack of training's offer according to market request Absent dialogue between innovative and older public services

Table 4: Mobility IW SWOT

New entrepreneurship

- ★ Creation of districts for smart production also through smart start-ups and involvement of: The Youth, Genoese social capital, Genoa Smart City Association, Public companies (ASTER, AMIU, etc.)
- ★ Research on solutions for RES and energy efficiency

Enabling infrastructures

5. Enabling Infrastructures	
Description of the theme	The enabling infrastructures represent the milestone to develop an urban environment in a "Smart" way. They are crucial to catalysing progress in areas where energy production and distribution; mobility and transport; information and communication technologies (ICT) are closely linked and offer new opportunities to provide added value services, for citizens and Public Administrations. Enabling infrastructures are at the core of a Smart City; they represent the basic platform to enable new innovative services, as promoted also by the European Smart City Stakeholders Platform, aimed to: ➢ Increase quality of life; ➢ Enhance efficiency and competitiveness of neighbourhoods; ➢ Move towards sustainability of cities by improving resource efficiency and meeting emission reduction targets.
General Goals	As previously said the Smart Electricity Grids represent one of the main "Enabling Infrastructures". In this context the electricity grid is renewed in order to accommodate the flows of electricity from distributed energy sources, optimize energy flows, enable new services for customers, thus ensuring on one hand a better management of the distribution grids and the security of electric system and on the other hand the participation of citizen, through the utilization of sustainable services, towards a Smart City. Moreover through the Smart Grids it is possible to implement an electric mobility system and an innovative and sustainable Public Lighting system.
Actions	➢ Energy Demand reduction and optimization by enabling In-Home Energy Management Services and Active Demand functionalities through the Smart Info. ➢ CO2 reduction through electric vehicle roll out and reduction of networks losses ➢ RES production by increasing hosting capacity of grid ➢ Efficient public lighting system through the use of LED technologies
Impacts	A smart grid will deliver electricity more cost-effectively and with lower greenhouse gas emissions. Notably Smart Grids technologies will allow the grid to be operated with tighter margins of error – and thus more efficiently8. The Electric Power Research Institute (EPRI) estimates that reductions in line loss attributable to voltage regulation could save from to 28 billion kWh in 2030. Smart Grids technologies also contribute to the CO2 reduction and to stimulate the economy providing, among others, green jobs. However a detailed assessment on field of the Smart Grids impact is needed to calculate the exact impact.
Qualitative analysis of what has been achieved so far on this theme	Genoa has 611,000 habitants, of whom 401.824 are energy customers, and aims to cut the CO2 emissions baseline of 2.3million tons by 24 per cent. In Genoa there are 396.734 smart meters installed in the end-user's households. Moreover Genoa is frontrunner city in the electric mobility development at urban area. Notably there are already 17 installed public and private recharge infrastructures for electric vehicles.. Furthermore other qualitative measures that have been put in place By Enel Distribuzione in the frame of Smart Grids are:

	1. Technological upgrade according to the smart evolution of the grid of 45 MV-LV electrical substations on the basis of the state-of-the-art solution (other 22 substations scheduled for the next years); 2. Voltage level adaptation according to the EU standard (more than 5.000 customers involved).
Municipality involvement	➢ Urban Planning ➢ Energy & Environment ➢ ICT ➢ Public Works
Key-actors	➢ Politicians ➢ DSOs ➢ ESCO ➢ AGSC ➢ Research ➢ ICT ➢ Developers ➢ Research ➢ Innovation companies ➢ Citizens

Integrated Planning

Integrated planning (transport, mobility, urban, building, infrastructure, port) through advanced Decision Support ICT tools

Planning concepts and methodology were improved by integrating buildings and transport with ICT tools leading to use of the Urban IoT (Internet of Things) as an enabling factor. The planning phase is carried a step further in order to include efficient ways of implementing it, for instance through free city-spread Wi-Fi free home automation in schools and museums, urban extension of the Ultra Broad Band.

At the same time, the port is connected in this objective, because of its internal "pervasiveness" inside the city. The way of scoring such meaningful goals is a transversal matter in which also the Port Authority, with its competency in port planning, has been involved since the very beginning of the process.

Multilevel governance (region, municipality, district)

A need for more systematic governance emerges, integrating various levels, and raising the level of subsidiarity, coherence and connection among different public bodies, using technology to make it feasible and "well-equipped". Technology is considered an essential element in the planning roadmap: collecting data, integrating them into maps from different sources, providing information in real time, setting new forms of participating process or stakeholders' involvement.

Here again the Port is included as a parallel level of governance, representing the National government within a local context.

Polycentric planning

This is a very important issue for the city of Genoa and depends in the first place from its geographical conformation and, secondly, for historical reason of how suburban settlements were built and governed. Genoa was a cluster of little "nuclei", each with specific character.

The acknowledgement of this typicality became also a way of governing suburban contexts: Genoa is organized in Municipi (districts) and the planning process foresees their participation. Some services have been so far decentralized from the city-centre to each district, in order to make services more accessible.

Integrated planning in synergy with touristic/cultural exploitation needs

Urban transformations, often connected to important events such as 1992 Columbus exhibition, 2001 G8 Summit, 2004 European Culture Capital, brought Genoa to be well-known in the European context and not only, giving it its deserved role as (cultural) tourism target. This change of mentality regards all levels of population: politicians as well as residents, investors and traders, students and foreigners. Even commercial activities have changed since the Nineties; fairs and night events are increasing, so the comprehensive image of the city took a clear direction. This process has to be accompanied also by planners, who are responsible for setting up the necessary conditions for related economic development, for example by means of the rules included in the new Urban Master plan.

Smart infrastructure

Infrastructures, both material and immaterial must be included in territorial planning as enablers for innovation in all fields. Wireless communications between road signals and vehicles, vessels monitoring systems, fleet remote control, parking control, ticketing and pricing process organised through ICT tools are only few examples. The streets represent more and more a 'theatre' where innovative applications can be exploited and become an added value for the smart community, and they can also simply be assessed in their effectiveness.

Risk management plan

Top priority for a city, which has paid dearly in terms of lives and damages, especially concerning hydro-geological situation. The Municipality decided not only to invest in physical infrastructures but also in a smart alert system which can keep slides and water levels under control. Urban Internet of Things deals with a technological pervasive infrastructure (cloud and big data analytics) including these aspects, conceived for different uses: alert system for floods, traffic data management, just-in-time public energy consumptions monitoring. This has led to a higher integration of four urban policy key-points: Energy, Mobility, Buildings and Safety & Security. The framework is based on the future Internet strategy, where Interoperability, Internet of Services and Things and Ultra Broadband are connected.

6. Integrated Planning	
Description of the theme	Smart Cities need an integrated approach linking various plans and focusing them towards common, agreed-upon goals.
General Goals	Planning instruments include: ➢ Urban Plan (PUC – Piano Urbanistico Comunale) ➢ SEAP ➢ Municipality's Internal Planning (DUP) ➢ Mobility Plan ➢ Territorial Planning (regional and inter-regional) Integration is even more essential in a culture not accustomed to it and should lead to very positive results, saving resources, energy, improving overall quality of life and simplifying work for all actors.
Actions	★ Energy demand reduction: integrated planning can strongly reduce the overall demand by

	compensating excess of demand and supply, and informing and agreeing with customers on different consumption models ★ CO_2 reduction: better planning can lead to significant reduction ★ Renewable energy production: integrated planning can support, promote and privilege RES reducing peaks and need for fossil fuels ★ Energy efficiency: the city seen as a system can strongly improve in this field
Impacts	Long term effects, assessment is complex
Achievements	
Municipality involvement	Mayor, Director General, Urban Planning, Energy & Environment, ICT, Public Works, Mobility, Accounting & Finance, Procurement
Key-actors	Politicians, AGSC, Research, Energy Companies, ICT, Developers, Transport Actors, Innovation companies, Citizens

Table 5: Integrated Planning Description

Results of IW Integrated Planning SWOT Analysis:

Theme	Strength	Weakness	Opportunity	Threat
Integrated Planning	PUC/PRT city internal expertise Subsidiary decentralized network Presence of companies of national relevance Harbour Presence of associative networks Concentration of industrial and research expertise (IIT) Genoa Smart City Association (AGSC) Inter-institutional dialogue Beauty of the area Infrastructure network vision Integration of internal expertise	PUC/PRP possible divergences Delays in decisions Economic crisis and support to medium-sized enterprises Fragmentation of associative network Population aging (facilities and costs) Dated technological facilities dated Right/laws complexity Natural and anthropic territory fragility Orography Air quality Complexity of decision-making processes Lack of internal intersectorial dialogue	PUC/PRP integration Historical and touristic potential Polycentrism Science & Technology Park (Erzelli) Community legislation Territory quality Coordination of infrastructure planning Territorial expertise integration	Lack of PRT financial and managerial autonomy Super ordinary legislation Centralized decision-making centers Loss of competitiveness Social integration crisis Right/laws uncertainty Events due to climate change Lack of external dialogue

Table 6: Integrated Planning IW SWOT

Smart Buildings

Public and private buildings smart refurbishment
Private involvement

★ Promote incentives for private
★ Qualification of professionals and blue collars in the construction/refurbishment supply chain
★ Promotion of home automation

3. Smart Buildings

Description of the theme	We deal with both improvement of energy performance of existing building as well as with construction of new, smart buildings. Expected outcomes and impacts are: - lower energy bills and lower CO2 emissions homes that are more comfortable to live in
General objectives	The main challenges are: ➢ increase citizens awareness on energy consumption of buildings and therefore increase demand for low energy buildings. ➢ Increase building managers ability to cope with energy efficiency projects ➢ Create financial schemes for building renovation ➢ Increase professionals and planners ability to design smart buildings SEAP foresees a number of actions to reach 202020 goals

Actions	Field	#	Action	Expected energy saving per (MWh/a)	Local RES (MWh/a)	CO2 reduction target (t/a) in 2020
	EDI	S01	Thermal solar collectors on sports centres		411	104
	EDI	S02	Heating systems management contracting	27.100		5.474
	EDI	S03	residential buildings regulation	323.382		78.730
	EDI	S04	Energy audits on schools			
	EDI	S05	City's energy data base			
	EDI	S06	heating from oil to natural gas in schools	45.390		12.664
	EDI	S07	multi-service technology agreement for local health centres	47.576		12.760
	EDI	S08	energy saving in school	16.539		4.715
	EDI	S09	energy management of social housing	5.718		1.388
	EDI	L03	home automation	169.330		34.662
Impacts	See above					
Achievements						
Municipality involvement	➢ Urban planning: design of new, smart or ZeB buildings ➢ Private buildings: works authorization; promotion of energy efficiency solutions through new building regulations ➢ Public works: to renovate/maintain public buildings					
Key-actors	Politicians, AGSC, urban planners, architect and engineers, installers, developers, builders, Citizens, Research, Innovation companies					

Results from IW Buildings SWOT analysis

Theme	Strength	Weakness	Opportunity	Threat
Smart Public Building	Shared political and technical views on the issue among various stakeholders Presence of frameworks such as Smart City Association and Covenant of Mayors Consumption mapping and cadastre Technological infrastructures Industrial cultural background	Low knowledge at citizens level (and low care) Communication issues Obsolete infrastructures and plants Lack of financial resources Public tendering process system Not enough qualified building companies and professionals Lack of a culture for planned maintenance and standard application Heritage Protection Offices not involved	Dwellings as local economic development engine Involvement and awareness of the personnel (organisation improvement) Efficiency as resources generator EU and national financial resources PPP – New contractual models	Public officers not understanding the process Too burocratic National incentives Lack of specific financial mechanisms Too many limitations deriving from buildings protection
Smart Private Building	Shared political and technical views on the issue among various stakeholders	Low knowledge at citizens level (and low care) No specific bank loans or	Dwellings as local economic development engine Potential new skills and	Citizens rather not understanding the potential Too many limitations

	Presence of frameworks such as Smart City Association and Covenant of Mayors Creation and Implementation of the "Smart Dwellings" model Strong involvement of all the stakeholders having to do with the "city" topic Technological infrastructures	financial tools Legal barriers preventing interventions in dwellings (see recent legal changes) Not enough qualified building companies and professionals	expertise (green dwellings managers, energy diagnosis makers, etc.) Family savings Improved quality of life Environmental improvement Dissemination of the "Smart dwellings" model (increasing Genoa's and its companies' visibility)	deriving from buildings protection Difficult access to loans by dwellings Big players could take more advantage of the process than the local SMEs (eg. Green deal –GB)

Sustainability and Renewable Energy Sources

Energy production

Exploit opportunities coming from geographical and climate conditions (eg. water and solar energy)

Smart Grid

The main Smart Grids measures identified for the Municipality of Genoa and notably for the Mela Verde districts are the following:

- Electricity Grids preparation and empowerment: in order to make the electricity distribution grids capable to enable new added value services there must be foreseen the implementation and installation of smart grids devices aiming to increase the hosting capacity of the grids, to ensure the grids stability and so on.
- Active Demand/Smart Info: Enel smart info is a smart device that will enable the end-user to be always aware on the electricity consumption data collected by the smart meters and to optimize its electricity consumption heading toward more efficient behavior. Perfectly integrated with the remote management system (Telegestore), Enel smart info provides an easy access to the data through and dedicated display, a computer and/or a smart phone.
- Electric mobility: to scale up the recharge infrastructure of electric vehicle tacking also into consideration the in the municipality center there are already 34 public and private recharge infrastructure.

Public Lighting

Results from IW RES SWOT Analysis:

Theme	Strength	Weakness	Opportunity	Threat
Sustainability and Renewable Energy Sources	Local and national politics commitment Environmental impact reduction (mainly thermal renewals) Governance (AGSC) Existing institutional and private actors within the territory, with technological capabilities, able to work in network Ability in taking advantage of real opportunities (heat and electricity from treatment plants exhaust gas)	Administration/authorization procedures Difficulty in finding appropriate economic/financial contractual models Difficulty in obtaining funds (Stability Pact)	High national/EU interest Existence of incentives Development of new entrepreneurship Favourable environmental conditions (Sun, Sea, Wind, Water, etc.). Local industrial network, considerable research in Energy topic National/EU strong interest	Incentives randomness Investment difficulty (credit access) Weak awareness of citizens (agreement) Mistrust in using waste as an energy source

Action plan

Starting from the Intake workshops, cities will have about one year to work on the 3-5 themes with the objectives to come up with concrete measures, business plan and stakeholders commitment.
The cities have to define the process to ensure that work will be achieved by the end of the project (methodologies, timelines, number of meetings, etc.)
City will describe its action plan for the selected themes, following the PESTLEGS criteria, the spatial intervention strategy (link with WP3) and the Implementation of the measures.

Please note that in annexe you can find leading questions to support you in the definition of the action plan/measure for each selected theme (cf. appendix of the present

Genova MORE THAN SMART: objectives and actions to 2030

Theme	Action	Sub-action	Leader	Stakeholders	Priority Areas	Timeline	Budget	Funding	Goal	Barriers
Smart Mobility	Sustainable mobility	intermodality	Municipality	RFI, AMT						
		bike lanes	Municipality							
		electrical vehicles	Municipality	Enel, Car Sharing, Business, Research						
		better access to public services	Municipality	Research						
	sustainable means of public transport	eco public transport	Municipality + Region	AMT, Research, Business						
		municipal fleet	Municipality	Business, Research	Muncipal Police			Municipal		
	smart transport and mobility planning		Municipality							
	Decision Support System									
New Entrepreneurship	Creation of districts for smart production	smart start-ups		youth, civil society, research, business						
	Research on solutions for RES and energy efficiency									
Enabling Infrastructures	Energy Demand reduction and optimization	enabling In-Home Energy Management Services								

Theme	Action	Sub-action	Leader	Stakeholders	Priority Areas	Timeline	Budget	Funding	Goal	Barriers
		Active Demand functionalities through Smart Info								
	Electric vehicle roll out									
	networks losses reduction									
	RES production by increasing hosting capacity of grid LED technologies for efficient public lighting									
Integrated Planning	include: urban, transport, mobility, building, infrastructure, port		Municipality + Region + Port Authority	AMT, ASTER, citizens						
	ICT Decision Support Tools									
	Multilevel governance	Region, Municipality, district	Municipality + Region	Municipii						
	Policentric planning		Municipality							
	touristic/cultural exploitation		Municipality	Region + tourism operators						

Theme	Action	Sub-action	Leader	Stakeholders	Priority Areas	Timeline	Budget	Funding	Goal	Barriers
	smart infrastructure	public lighting	Municipality	ASTER				TPF		
		Smart Grids	Enel Distribuzione	Civil Protection						
		Water distribution system	Municipality + IREN					water taxes		
		smart waste collection	Municipality					waste taxes		
	risk management plans		Municipality							
Smart Buildings	public buildigns smart refurbishment		Municipality		Schools, Sports facilities, social housing			ERDF, FFT, PPP		
	private buildings smart refurbishment based on smart dwelling concept (condomini intelligetni)		Municipality					65% tax reduction		
	qualification of profesionals and blue collar workers in the construction/refurbishment supply chain		Region + Buildings Schools					ESF		
	promotion of home automation		Municipality					Sponsors		

Theme	Action	Sub-action	Leader	Stakeholders	Priority Areas	Timeline	Budget	Funding	Goal	Barriers
Sustainability & RES	Energy Production	Exploit opportunities coming from geographical and climate conditions (eg. water and solar energy)								
	Smart Grids	Active Demand								
		Smart Info								
			raise awareness and change behaviour							
		Electric mobility								
	Public Lighting									

2 City strategic working groups

(This section is currently under development)

This chapter is dedicated to the work that has to be done in the local strategic working groups.

Objective of the strategic local working groups: formulate recommendations to improve the strategic part of the SEAP/city energy strategy by focusing on one or several of the following challenges:

- *Vision : (in regard of the fact of having a clear vision with objectives and timeline defined)*
- *Governance (in regard of the stakeholder mapping, and in regard of the need of the objective of having an integrated approach)*
- *Financing tools*
- *Spatial and IT tools*
- *Monitoring tools*
- *Resilience , changing agents*

In this section it is requested to city-co to describe how they have addressed the challenge they identified at the strategic level (i.e. the main challenges identified by the gap analysis between actual situation and the objectives opt the SEAP/city strategy objectives) and to formulate recommendations on how they are able to improve their energy strategy.

Recommendations

Part D What has been achieved so far and impact on the city existing energy strategy

(This section is currently under development)

1 What has been achieved so far?

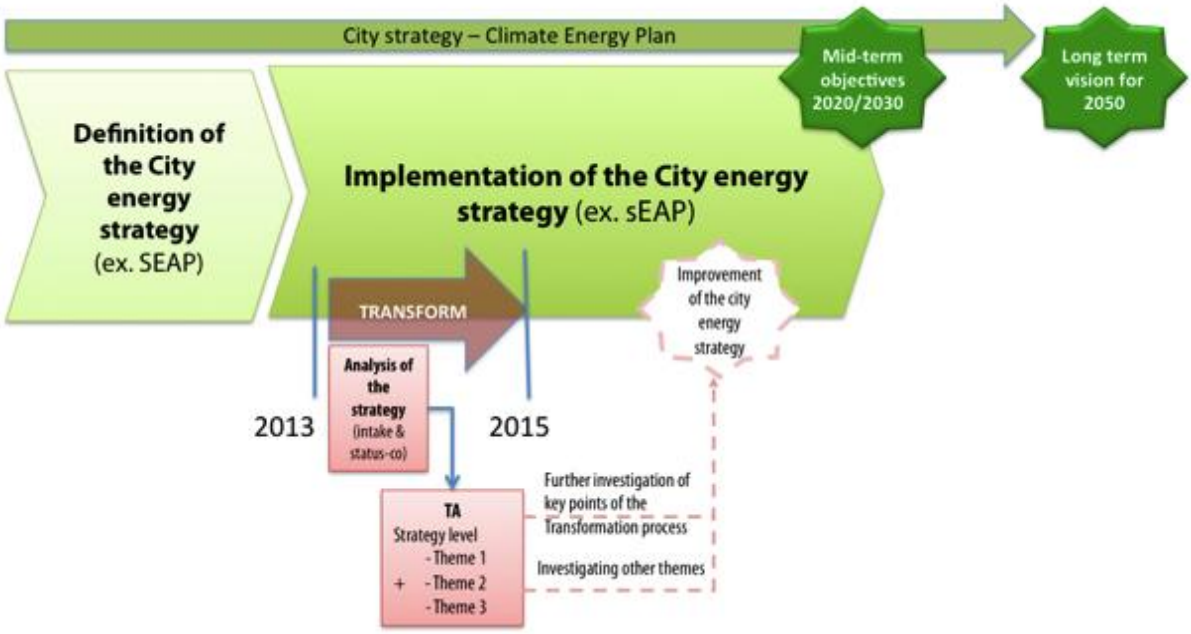
Theme 1: Integrated planning.
Theme 2: Energy.
Theme 3: Mobilty

The intensive Lab Session is a 3 day workshop with a core of about 30 participants, who join the whole programme. The core of participants consists of a mix of public, private and knowl-edge partners. All the essential stakeholders in the development of the Smart Urban Lab "Green Apple" have been involved.
The three days of the ILS have their own function. Day one is about understanding, day two is working in groups and on day three the groups present their findings.

Due to the early stage of the SUL "Green Apple", the Implementation Plan aims also to support the promotion and the actual decision for a realization. The understanding of the Implementation Plan is closely connected to its embedding in the municipal landscape of programs and strategies, which are variously related to the Smart City conception.
As known, Smart City is above all an urban planning task and this also means that every society must develop a self-image along with a mission statement that serve a vision, define goals and set things in motion.
The challenge for Genoa is trying to decline this concept, referred to the overall city, to one selected small district: Green Apple in Voltri.

2 Impact of the TRANSFORMATION agenda on the city energy strategy and related policies.

The objective of this section is to detail how the outcomes of WP2 would enable the city to improve its existing strategy. The work will provide inputs that will allow a real breakthrough for the next revision of the city strategy. Depending on the city, the revision of the existing energy strategy can happen during the TRANSFORM timeframe (ex. Amsterdam) or after the end of TRANSFORM project. The dynamic generated by the TRANSFORM project can continue after the project ends as detailed on the graphic below.



Gloria Piaggio - City of Genoa
Mirella Marrazzo – City of Genoa
Ilaria Del Ponte – Università degli Studi di Genova
Ilaria Pittaluga - Università degli Studi di Genova
Roberta Casapietra – IRE Liguria
Filippo Gasparin – ENEL

Business, Research

Results of data analysis for Genoa's 2005 energy flows by sector and energy source:

Final energy consumption

FINAL ENERGY CONSUMPTION [MWh]										
Category	Electricity	Heat/ cold	Fossil fuels					Renewable energies		Total
			Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Other biomass	Solar thermal	
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:										
Municipal buildings, equipment/facilities	115844		210214		12990	47795			113	386956
Tertiary (non municipal) buildings, equipment/facilities	690854		1189323	70772	138311	54575		32		2143868
Residential buildings	670036	242647	2611078	11730		357202		3736		3896430
Municipal public lighting	37800									37800
Subtotal buildings, equipments/facilities and industries	1514535	242647	4010616	82502	151301	459572	0	3768	113	6465054
										TRANSPORT:
Municipal fleet						30676	6618			37294
Public transport	14222		179			96603	269			111273
Private and commercial transport						200000	1505628			1705628
Subtotal transport	14222		179	0	0	327279	1512515	0	0	1854195
Total	**1528757**	**242647**	**4010795**	**82502**	**151301**	**786851**	**1512515**	**3768**	**113**	**8319249**

Table 7 : Final Energy Consumption

Genoa 2005 – CO_2 emissions generated by civil sector and local transports

CO_2 EMISSIONS [t]									
Category	Electricity	Heat/ cold	Fossil fuels			Diesel	Gasoline	Renewable energies		Total
			Natural gas	Liquid gas	Heating Oil			Other biomass	Solar thermal	
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:										
Municipal buildings, equipment/facilities	55953		42463		3624	12761				114802
Tertiary (non municipal) buildings, equipment/facilities	333683		240243	16348	38589	14571		6		643441
Residential buildings	323628		527438	2710		95373		753		949901
Municipal public lighting	18257									18257
Subtotal buildings, equipments/facilities and industries	731520	0	810144	19058	42213	122706		759		1776380
TRANSPORT:										
Municipal fleet						8183	1647			9830
Public transport	7338		36			25760	100			33235
Private and commercial transport						56192	396276			452468
Subtotal transport	7338	0	36	0	0	90135	398024			495533
Total	**738858**	**0**	**810181**	**19058**	**42213**	**212841**	**398024**	**759**		**2221934**

Table 8: CO_2 emissions generated by the civil sector and by local transports

Locally generated electricity and heat/cold:

Locally generated electricity

Locally generated electricity (excluding ETS plants, and all plants/units > 20 MW)	Locally generated electricity [MWh]
Wind power	0
Hydroelectric power	3489
Photovoltaic	94
Combined Heat and Power	353659
Biogas	72522
Total	**429764**

Table 9: Locally generated electricity

Locally produced heat/ cold

Locally generated heat/cold	Locally generated heat/cold [MWh]
Combined Heat and Power	242647
Total	**242647**

Table 10: locally produced heat and cold

Energy

Actions	Target	Leader	Stakeholders	Outcome	Threats
EV recharge stations	EV system integration CO_2 reduction	Municipality	RFI (parking area) Port Authority Enel Citizens AMT Services suppliers	Economic savings Mobility environment impact reduction	Regulatory Financial aspects
Public lighting	Energy savings CO_2 reduction Quality of Services Added value services (innovative hub)	Municipality	Municipality/ASTER/know how support ESCO	Innovative lighting provider agreement Innovative ESCO agreement	Financial aspects
Smart Info	Energy savings CO_2 reduction Active demand End-user awareness	Enel Distribuzione	AEEG Enel Citizens Training: Municipality and school	Smart Info distribution	Regulatory Smart users
Sea Water Heat Sea Water coupled heat Pumps	Energy and costs savings for end-users CO_2 reduction Buildings comfort increase	Municipality Users consortium	Port Authority Cost guards Region/ARPAL Users and building managers ESCO PPP	Implementation systems in the territory	Unwillingness to change Permission denial

Table 11: