THE ENERGY POLICIES IN THE LIGURIA REGION

ire SPA infrastrutture recupero edilizio energia
agenzia regionale ligure

IRE spa - Divisione Energia

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Our Company

IRE SpA is a public equivalent body located in Genoa (IT) founded in 2014 by Liguria Region (Law nr. 6/2011) by merging the three companies :

Aims of IRE are **urban regeneration, infrastructures development and the implementation of energy policies** in Liguria.

Fields of action:

- new strategic infrastructures (hospitals, roads, bridges, river banks, etc.)
- urban regeneration and buildings refurbishment
- energy planning, energy efficiency and renewable sources of energy.

Staff: over **30** employees with technical skills and experience in design and planning, public procurement, project management, communication, training.

Our Company - Energy Department

The **Energy department** of IRE deals with:

- ❑ Support to the Region and local administrations in elaborating and implementing energy plans, energy balances, energy audits and in policy making
- ❑ Electricity and gas market
- ❑ Development of business plans
- ❑ Vocational training as well as information and communication on energy matters
- ❑ European projects.

Our Company - Energy Department

Fields of action

- Energy efficiency: elaboration of the regional regulation for the energy certification of buildings, development of the related specific software and participation in the Concerted Action on the EPBD directive (2010/31/EC). Elaboration of the methodology and template for the energy audit of buildings.

- RES: elaboration of feasibility studies and business plans for small RES.

- Energy Planning: elaboration of the regional energy & environmental plan, of more than 30 SEAPS (including those of Genoa and Savona) and of the approved ELENA proposal "PROSPER" signed by the Province of Savona.

- Energy management: set up of a monitoring and control structure for energy-related projects & works in all hospitals of Liguria; creation and management of the consortium for central procurement of gas and electricity on the free market for public entities.

- Smart city: partner of the FP7 Smart Cities project "TRANSFORM" on integrated energy planning for the city of Genoa and participation to the European Innovation Partnership on Public Lighting named "Humble Lamppost".

IRE - energy dept. is member and vice-president of **FEDARENE** (European network of energy agencies), of **RENAEL** (the national network of energy agencies) and of the **Genoa Smart City Association.**

Agenda

1. European Energy Policies and Legislation
2. Regional Energy and Environmental Plan
3. Energy Certification of Buildings
4. Energy Planning at local level: the Covenant of Mayors
5. Case Study: Municipality of Genoa SEAP, Smart City and Monitoring

EUROPEAN AND NATIONAL ENERGY POLICIES

Maria Fabianelli

ire SPA infrastrutture recupero edilizio energia
agenzia regionale ligure

IRE spa - Divisione Energia

The context: European Energy Policies

Gross inland energy consumption in the EU

	Gross inland energy consumption, in Mtoe						Energy dependency, 2013
	1990	2000	2006	2011	2012	2013	
EU	1 667.3	1 726.9	1 832.2	1 698.0	1 685.8	1 666.2	53.2%
Belgium	48.7	59.3	58.0	57.8	54.8	56.7	77.5%
Bulgaria	27.6	18.5	20.4	19.1	18.2	16.8	37.8%
Czech Republic	49.9	41.1	46.3	43.0	42.8	42.2	27.9%
Denmark	17.9	19.7	21.0	18.6	18.0	18.1	12.3%
Germany	356.3	342.3	351.7	316.7	318.6	324.3	62.7%
Estonia	9.9	5.0	5.5	6.2	6.1	6.7	11.9%
Ireland	10.3	14.4	15.6	13.9	13.8	13.7	89.0%
Greece	22.3	28.3	31.6	27.8	27.7	24.4	62.1%
Spain	90.1	123.6	144.4	128.2	127.7	118.6	70.5%
France	227.8	257.6	273.0	258.0	258.3	259.3	47.9%
Croatia	9.0	7.8	8.9	8.5	8.1	7.8	52.3%
Italy	153.5	174.2	185.3	172.0	166.3	160.0	76.9%
Cyprus	1.6	2.4	2.6	2.7	2.5	2.2	96.4%
Latvia	7.9	3.9	4.8	4.4	4.5	4.5	55.9%
Lithuania	15.9	7.1	8.5	7.0	7.1	6.7	78.3%
Luxembourg	3.5	3.7	4.7	4.6	4.5	4.3	96.9%
Hungary	28.8	25.3	27.5	25.1	23.6	22.7	52.3%
Malta	0.6	0.8	0.9	0.9	1.0	0.8	104.1%
Netherlands	66.7	75.6	79.5	80.2	81.8	81.2	26.0%
Austria	25.0	29.0	34.5	33.6	33.7	33.8	62.3%
Poland	103.3	88.6	96.9	101.0	97.8	98.2	25.8%
Portugal	18.2	25.3	26.2	23.6	22.5	22.6	73.5%
Romania	58.1	36.6	40.6	36.6	35.4	32.3	18.6%
Slovenia	5.7	6.5	7.3	7.3	7.0	6.9	47.0%
Slovakia	21.8	18.3	18.9	17.4	16.7	17.3	59.6%
Finland	28.7	32.5	37.6	35.8	34.7	33.9	48.7%
Sweden	47.4	48.9	49.6	49.7	49.8	49.1	31.6%
United Kingdom	210.6	230.6	230.5	198.0	202.9	201.1	46.4%
Norway	21.4	26.4	27.6	28.5	29.7	33.7	-470.3%
Montenegro	:	:	1.2	1.1	1.1	1.0	26.5%
FYR of Macedonia	2.4	2.7	2.9	3.1	3.0	2.7	47.9%
Albania	2.6	1.8	2.1	2.3	2.1	2.6	25.1%
Serbia	19.6	13.7	16.7	16.2	14.6	15.1	23.5%

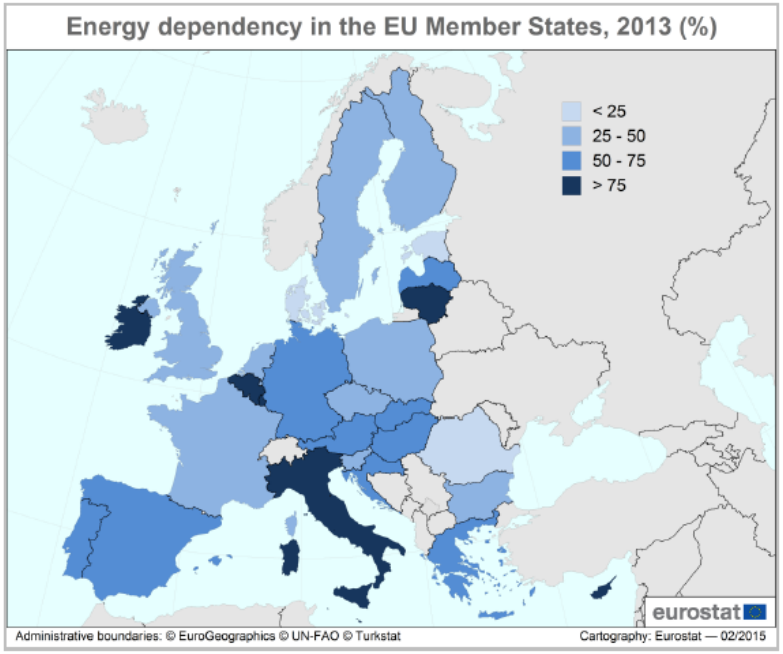
Energy Dependency 2016:

EU 53,2%

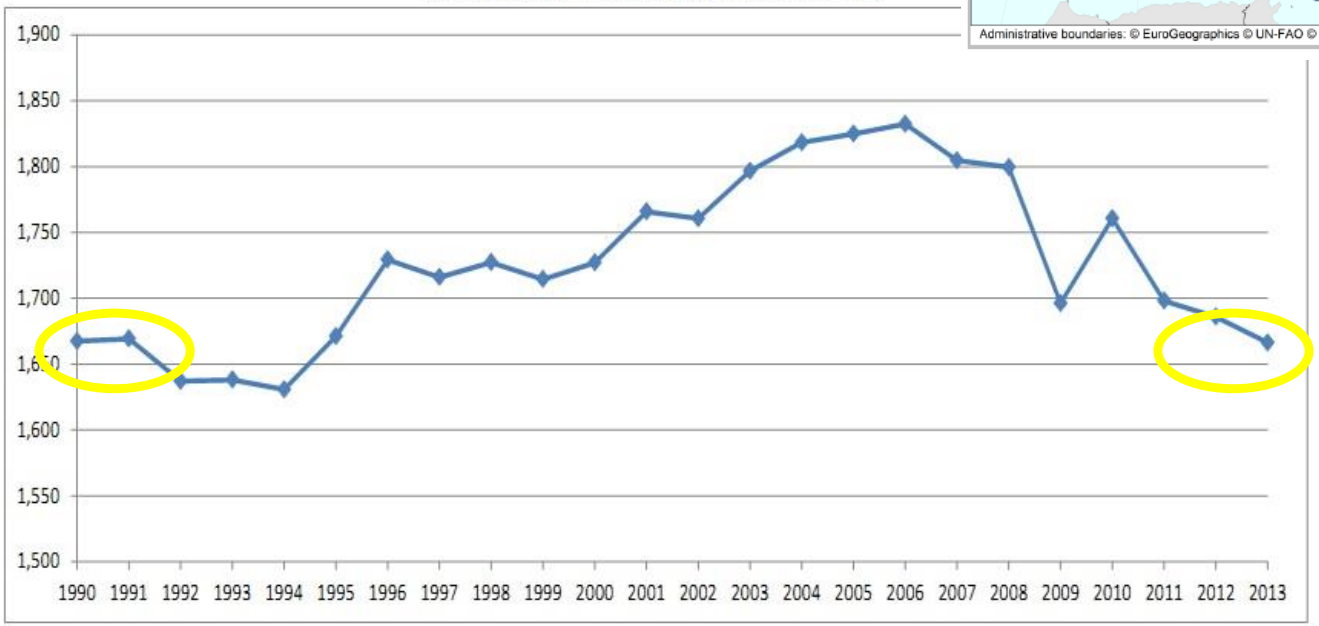
IT 76,9%

The context: European Energy Policies

Energy consumption in the EU in 2013 **down to its early 1990s level**

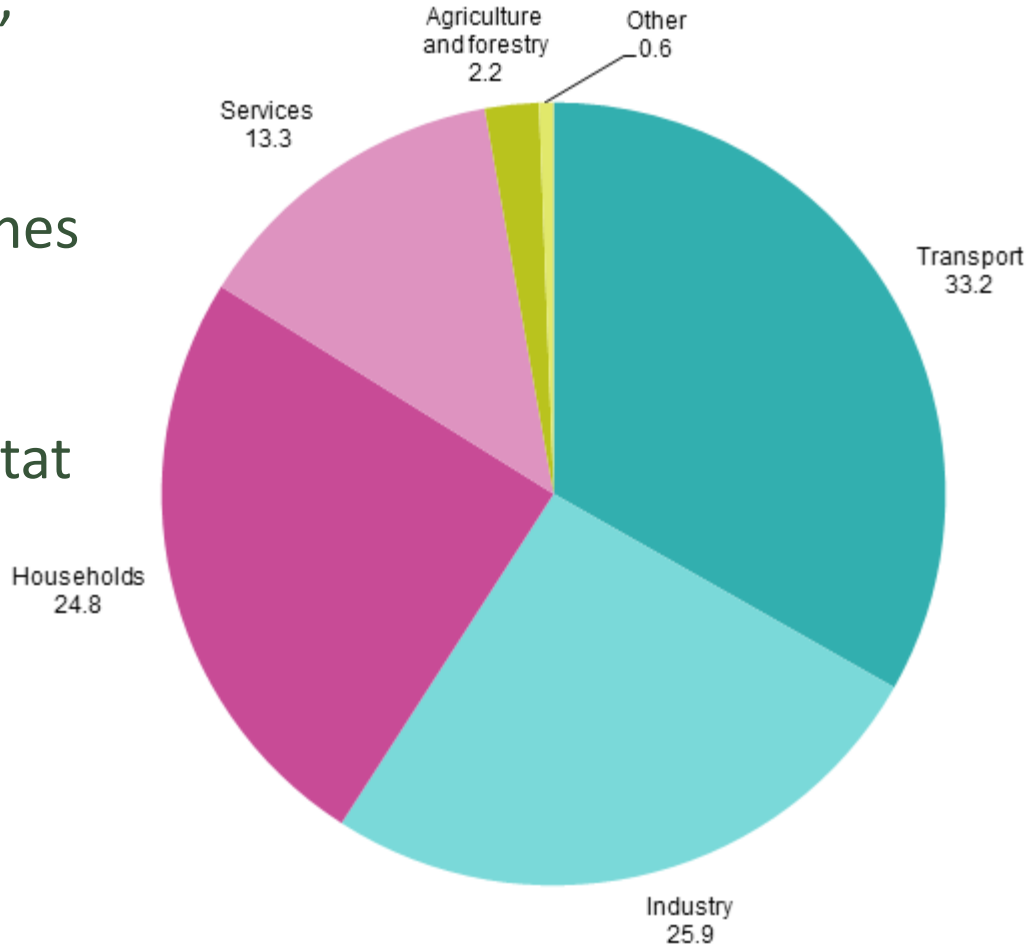


Gross inland energy consumption in the EU,
(in million tonnes of oil equivalent, Mtoe)



The context: European Energy Policies

Final energy consumption, EU-28, 2014 (% of total, based on tonnes of oil equivalent)
Source: Eurostat

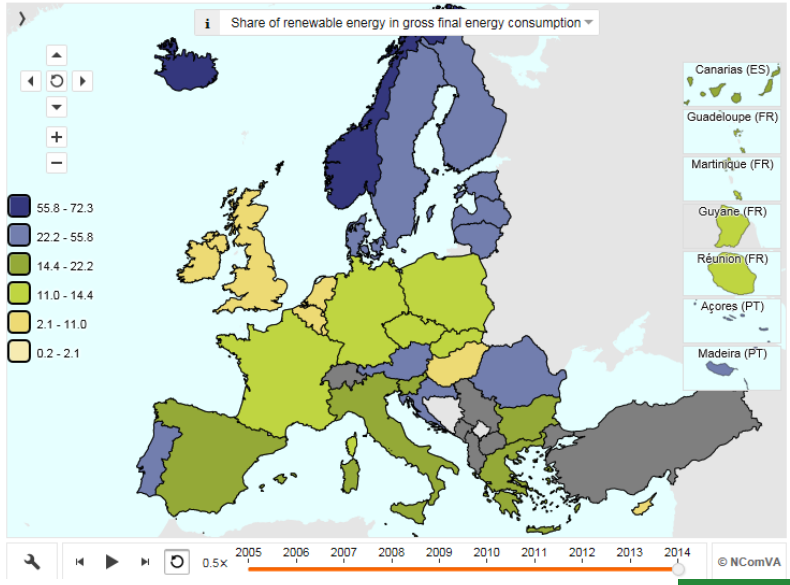


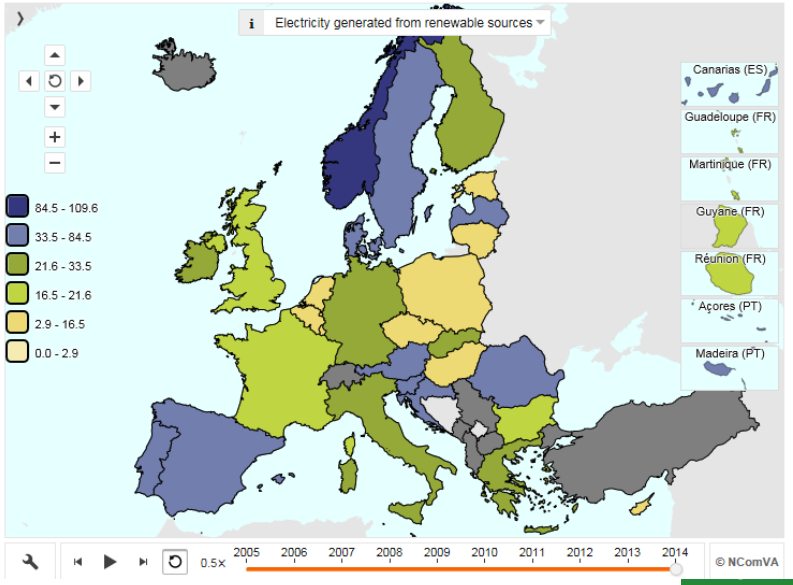
The context: European Energy Policies

Primary production by energy type, 2013

	Total primary production (in Mtoe)	of which (shares):					
		Solid fuels	Oil	Gas	Nuclear	Renewable sources[5]	Wastes (non-renewable)
EU	**789.7**	**19.7%**	**9.1%**	**16.7%**	**28.7%**	**24.3%**	**1.5%**
Belgium	14.6	0.0%	0.0%	0.0%	75.2%	20.0%	4.8%
Bulgaria	10.5	45.4%	0.3%	2.1%	34.8%	17.3%	0.1%
Czech Republic	29.9	59.0%	0.9%	0.7%	26.6%	12.2%	0.7%
Denmark	16.6	0.0%	52.3%	25.8%	0.0%	19.5%	2.4%
Germany	120.6	37.4%	3.1%	7.4%	20.8%	27.9%	3.4%
Estonia	5.7	78.3%	0.0%	0.0%	0.0%	19.9%	1.9%
Ireland	2.3	56.9%	0.0%	6.8%	0.0%	33.7%	2.5%
Greece	9.3	72.3%	0.8%	0.1%	0.0%	26.7%	0.2%
Spain	34.2	5.1%	1.1%	0.1%	42.7%	50.5%	0.4%
France	135.1	0.0%	0.9%	0.2%	80.9%	17.1%	0.9%
Croatia	3.6	0.0%	16.8%	41.6%	0.0%	41.4%	0.2%
Italy	**36.9**	**0.1%**	**15.9%**	**17.2%**	**0.0%**	**63.7%**	**3.1%**
Cyprus	0.1	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Latvia	2.1	0.1%	0.0%	0.0%	0.0%	99.7%	0.2%
Lithuania	1.4	1.7%	6.2%	0.0%	0.0%	91.1%	1.1%
Luxembourg	0.1	0.0%	0.0%	0.0%	0.0%	76.4%	23.6%
Hungary	10.1	15.9%	8.5%	15.3%	39.3%	20.5%	0.5%
Malta	0.0	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Netherlands	69.7	0.0%	3.1%	88.7%	1.1%	6.2%	0.9%
Austria	12.1	0.0%	7.2%	9.3%	0.0%	78.2%	5.3%
Poland	70.6	80.5%	1.4%	5.4%	0.0%	12.1%	0.6%
Portugal	5.8	0.0%	0.0%	0.0%	0.0%	97.5%	2.5%
Romania	26.1	17.8%	16.3%	32.9%	11.5%	21.3%	0.2%
Slovenia	3.6	30.3%	0.0%	0.1%	38.5%	30.2%	1.0%
Slovakia	6.4	9.1%	0.2%	1.6%	64.1%	22.9%	2.1%
Finland	18.0	9.4%	0.4%	0.0%	33.8%	55.2%	1.2%
Sweden	34.7	0.5%	0.0%	0.0%	49.4%	48.4%	1.7%
United Kingdom	109.5	6.7%	38.3%	30.0%	16.6%	7.7%	0.7%
Norway	193.9	0.6%	43.5%	49.3%	0.0%	6.4%	0.1%
Montenegro	0.8	48.9%	0.0%	0.0%	0.0%	51.1%	0.0%
FYR of Macedonia	1.4	77.9%	0.0%	0.0%	0.0%	22.1%	0.0%
Albania	2.0	0.0%	57.9%	0.7%	0.0%	41.4%	0.0%
Serbia	11.4	67.4%	10.8%	3.7%	0.0%	18.1%	0.0%

Figures may not add up due to rounding.
0.0 is used when the value is less than 0.05 or not applicable.





The context: European Energy Policies

European Union's energy policies
Three main objectives:

- **Secure** energy supplies to ensure the reliable provision of energy;
- **Competitive** environment for energy providers (affordable prices for homes, businesses, and industries);
- **Sustainable** energy consumption, through the lowering of greenhouse gas emissions, pollution, and fossil fuel dependence.

The context: European Energy Policies

Key policy areas:

- A European **Energy Union** that will ensure secure, affordable and climate-friendly energy for EU citizens and businesses by allowing a free flow of energy across national borders within the EU, and bringing new technologies and renewed infrastructure to cut household bills, create jobs and boost growth;
- A European Energy Security Strategy which presents short and long-term measures to shore up the EU's **security of supply**;
- A resilient and integrated **energy market** across the EU - the Internal Energy Market;
- Boosting the EU's **domestic production of energy**, including the development of renewable energy sources;
- Promoting **energy efficiency**;
- **Safety** across the EU's energy sectors with strict rules on issues such as the disposal of nuclear waste and the operation of offshore oil and gas platforms.

The context: European Energy Policies

To pursue these goals within a coherent long-term strategy, the EU has formulated targets for **2020**, **2030**, and **2050**.

2020 Energy Strategy

The EU has set 20% targets for renewable energy, greenhouse gas reduction, and energy efficiency for 2020.

2030 Energy Strategy

The 2030 Energy Strategy proposes targets for renewables, energy efficiency, and greenhouse gas reductions for the period between 2020 and 2030.

2050 Energy strategy

EU strategy for the transition to a competitive, secure and sustainable energy system by 2050 and for reducing greenhouse gas emissions by at least 80%.

Energy Security Strategy

The EU Energy Security Strategy aims to ensure a reliable supply of energy for EU countries.

The context: European Energy Policies

The **2020 Energy Strategy** defines the EU's energy priorities between 2010 and **2020**. It aims to:

- reduce greenhouse gases by at least **20%**
- increase the share of renewable energy in the EU's energy mix to at least **20%** of consumption
- improve energy efficiency by at least **20%**.

20-20-20 Objectives

The context: European Energy Policies

EU countries have agreed to the following objectives to be met by **2030**:

- 40% reduction in greenhouse gas emissions by 2030, compared to 1990;
- 27% of renewable energy in the EU;
- 27% increase in energy efficiency, to be reviewed by 2020 potentially raising the target to 30%, by 2030;
- the completion of the internal energy market by reaching an electricity interconnection target of 15% between EU countries by 2030, and pushing forward important infrastructure projects.

The context: European Energy Policies

The EU aims to achieve an 80% to 95% reduction in greenhouse gasses compared to 1990 levels by 2050. Its **Energy Roadmap 2050** analyses a series of scenarios on how to meet this target.

For further information

Summary of EU legislation:
http://europa.eu/legislation_summaries/energy/index_en.htm

European energy statistics

Key figures:
http://ec.europa.eu/energy/observatory/countries/doc/key_figures.pdf

Energy Observatory:
http://ec.europa.eu/energy/observatory/countries/countries_en.htm

European energy strategy

2020 strategy: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0639:EN:HTML:NOT

2050 roadmap:
http://ec.europa.eu/energy/publications/doc/2012_energy_roadmap_2050_en.pdf

European energy policy

European Commission — DG Energy:
http://ec.europa.eu/energy/index_en.htm

Questions about the European Union?

http://europedirect.europa.eu

From European to National Objectives

2020 EU Objectives

- ❑ reduce greenhouse gases by at least **20%**;
- ❑ increase the share of renewable energy in the EU's energy mix to at least **20%** of consumption;
- ❑ improve energy efficiency by at least **20%**.

Dir. 2009/28/EC (Renewable Energy Directive)

The Renewable Energy Directive establishes **individual national targets** to fulfill the 20% EU objective. All EU countries must also ensure that at least 10% of their transport fuels come from renewable sources by 2020.
EU countries must set out how they plan to meet these targets and the general course of their renewable energy policy in **national renewable energy action plans**.

Dir. 2012/27/EC (Energy Efficiency Directive)

The 2012 Energy Efficiency Directive establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. To reach the EU's 20% energy efficiency target by 2020, individual EU countries have set their own **indicative national energy efficiency targets**. Depending on country preferences, these targets can be based on primary or final energy consumption, primary or final energy savings, or energy intensity.

2020 IT Objectives

-17%

National Renewable Energy Action Plan (2010)

Absolute level of energy consumption in 2020

-Primary en. consumption: 158 Mtoe

-Final energy consumption: 124 Mtoe

National Energy Efficiency Action Plan (2014)

The National Energy Strategy

National Energy Strategy (SEN 2013) **three main objectives** by 2020:

- ❑ Reduce energy price for homes, businesses, and industries;
- ❑ Achieve EU targets by 2020;
- ❑ Reduce the energy dependence and secure energy supplies;
- ❑ Stimulate positive impacts on economic growth in *green and white economy*.

Key priorities:

- ❑ Energy efficiency;
- ❑ Gas market competitiveness;
- ❑ Renewable energy sources;
- ❑ Electric Market developement;
- ❑ Hydrocarbon production, Refineries and fuel distribution sustainable and competitive;
- ❑ Governance and decisional process improvement;
- ❑ Research and Innovation.

REGIONAL ENERGY AND ENVIRONMENTAL PLAN

Silvia Moggia

ire SPA infrastrutture recupero edilizio energia
agenzia regionale ligure

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The Regional Energy Policies in Liguria

Liguria Region approved in 2003 its Regional Energy and Environmental Plan

In 2009 a Decision by the Regional Council approved some modifications to the Regional Plan regarding wind farms

In 2013 Liguria Region started the process to develop the new Regional Energy and Environmental Plan (**PEAR 2014-2020**)

PEAR 2014-2020: The Process

Plan Scheme and Preliminary Environmental Report approved by Decision of the Regional Committee nr 1174/2013

Scoping Phase – Strategic Environmental Assessment

Plan Scheme, Environmental Report, Summary, Report on Environmental Incidence, approved by Decision of the Regional Committee nr 1517/2014

Publication in the Official Regional Bulletin (31st December 2014)

PEAR 2014-2020: The Process

Analysis of the Plan by the Competent Authority on Environmental Issues and Public Consultation

Comments on Environmental Issues (29th May 2015)

Next steps

- Revision of the Plan
- Approval by the Regional Council
- Monitoring

Principles of the PEAR 2014-2020

The Regional Energy Plan (PEAR 2014-2020) defines a general strategy for energy policies to be achieved by 2020, aiming to:

- fulfill the requirements of the European and National Legislation (Decree 15th March 2015 - **Regional Burden Sharing**);
- define the objectives of the European Regional Development Funds (ERDF 2014-2020);
- improve the quality of life of the citizens and the competitiveness of the SMEs in the Region.

Principles: Regional Burden Sharing

2020 EU Objectives

- reduce greenhouse gases by at least **20%**;
- increase the share of renewable energy in the EU's energy mix to at least **20%** of consumption;
- improve energy efficiency by at least **20%**.

Dir. 2009/28/EU
(Renewable Energy Directive)

2020 IT Objectives

-17%
National Renewable Energy Action Plan (2010)

National Decree 15th March 2015 by Ministry of Economic Development
sets up objectives for each Region in Italy to be achieved by 2020

Objective Liguria 2020 =

$$\frac{\text{Final Energy Consumption from RES}}{\text{Gross Final Energy Consumption}} = 14{,}1\%$$

Principles: Coordination with other Regional Plans

The Liguria Region intends to:

- ❑ coordinate the energy policies in PEAR 2014-2020 with the other Regional Plans

- ❑ define priorities for European Regional Development Funds (ERDF 2014-2020)

HOLISTIC APPROACH

- **Research and Innovation in the energy sector**
- **Training (green jobs)**
- **Economic Development and Competitiveness of the SMEs (support to green and white economy)**
- **Environmental Issues and Sustainability**
- **Waste management**
- **Development of rural areas**

PEAR 2014-2020: Methodology

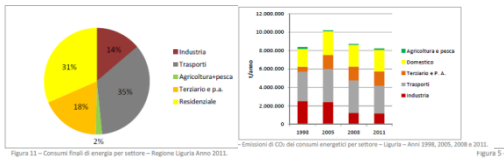
PHASE 1: ANALYSIS OF THE CURRENT SITUATION

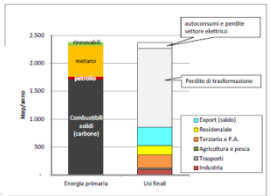
Regional Energy Balance

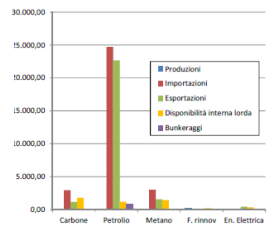
Anno:	2011
Bilancio Fonti Primarie:	Totale regionale
Unità di misura	Energetiche [kTEP]

MACRO SETTORE	SETTORE	Combustibili solidi	Combustibili liquidi	Combustibili gassosi	Fonti rinnovabili	Calore	Energia elettrica	TOTALE
Produzioni		0	0	0	169			169
Saldo import-export		1.788	2.029	1.450	0	0	-328	4.940
Bunkeraggi internazionali		0	-843	0	0	0	0	-843
Variazione delle scorte		0	0	0	0	0	0	0
Disponibilità interna lorda		1.788	1.186	1.450	169	0	-328	4.265
Settori di Trasformazione	Ingressi	-2.142	-1.505	-556	-121			-4.325
	Centrali elettriche	-1.714	-47	-556	-56			-2.373
	Cokerie	-429	0	0	0			-429
	Raffinerie di petrolio	0	-1.458	0	0			-1.458
	Altri impianti	0	0	0	-66			-66
	Uscite	386	1.425	0	0	69	960	2.840
	Centrali elettriche						960	960
	Cokerie	386						386
	Raffinerie di petrolio		1.425					1.425
	Altri impianti	0	0	0		69		69
	Trasferimenti	-621	-12	-294	-101	69	960	
	Energia elettrica	-618	-12	-294	-36		960	
	Calore	-3	0	0	-66	69		
	Altro	0	0	0			0	
Consumi e perdite del settore energia		-32	-47	-47	0	-3	-104	-233
Disponibilità interna		0	-1.060	-847	-47	-66	-528	-2.547
Consumi finali		0	-1.060	-847	-47	-66	-528	-2.547
	Usi non energetici	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	Industria	0	-48	-198	0	-7	-100	-353
	Manifatturiera di base	0	-43	-78	0	-5	-50	-176
	Manifatturiera non di base	0	-5	-120	0	-2	-49	-177
	Trasporti	0	-853	0	0	0	-27	-880
	Trasporti su strada	0	-852	0	0	0	0	-852
	Altre modalità di trasporto	0	-1	0	0	0	-27	-28
	Altri settori	0	-159	-649	-47	-59	-401	-1.315
	Agricoltura e pesca	0	-35	-12	0	0	-3	-49
	Residenziale	0	-73	-516	-47	-5	-162	-803
	Terziario e Pubblica Amministrazione	0	-51	-121	0	-54	-236	-462

- ❑ Supports decision making in energy planning
- ❑ Analyses the energy flows from production to final use per fuel
- ❑ Highlights the energy consumption and the fuel mix within the considered territory
- ❑ Provides a “picture” of the situation of the considered territory referred to a certain year



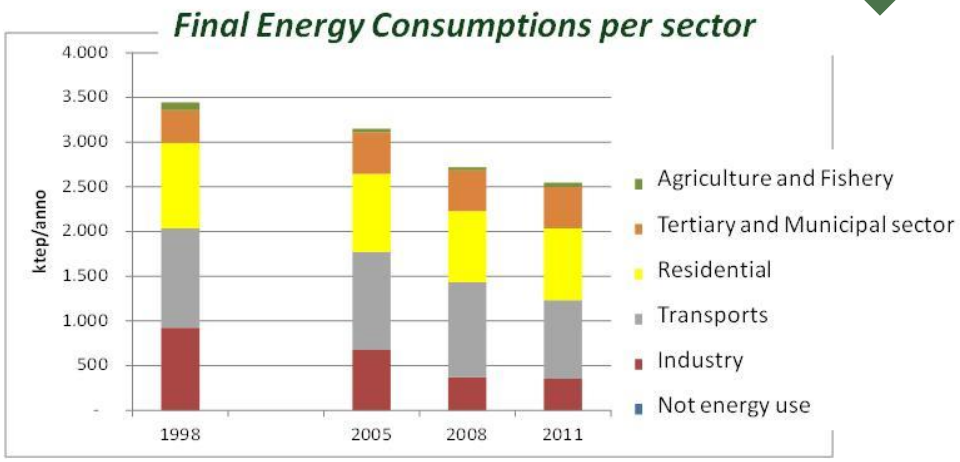


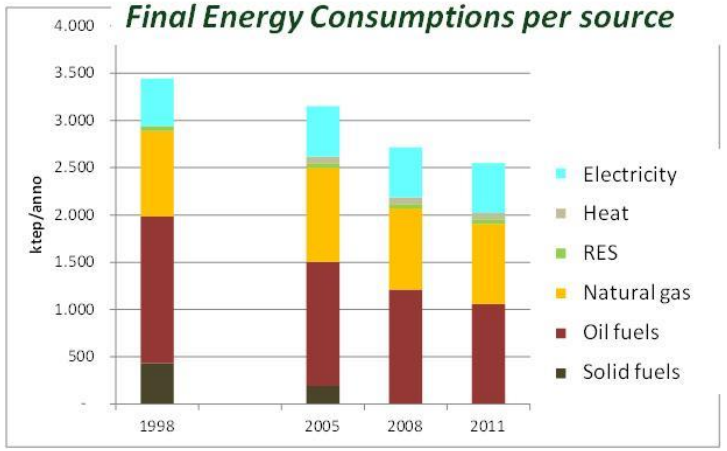


PEAR 2014-2020: Methodology

PHASE 1: ANALYSIS OF THE CURRENT SITUATION

Regional Energy Balance





Liguria 2012 = Final Energy Consumption from RES / Gross Final Energy Consumption = 6%

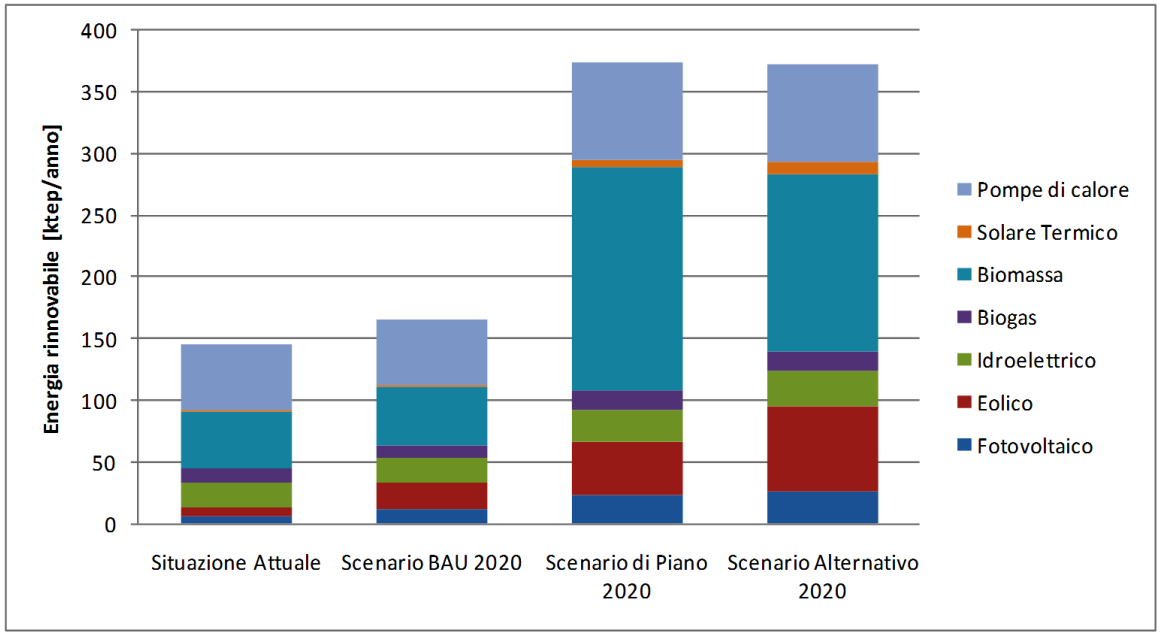
PEAR 2014-2020: Methodology

PHASE 2: SWOT ANALYSIS

Strengths, **W**eaknesses,**O**pportunities,**T**hreats regarding Renewable Energy Sources and Energy Efficiency Technologies

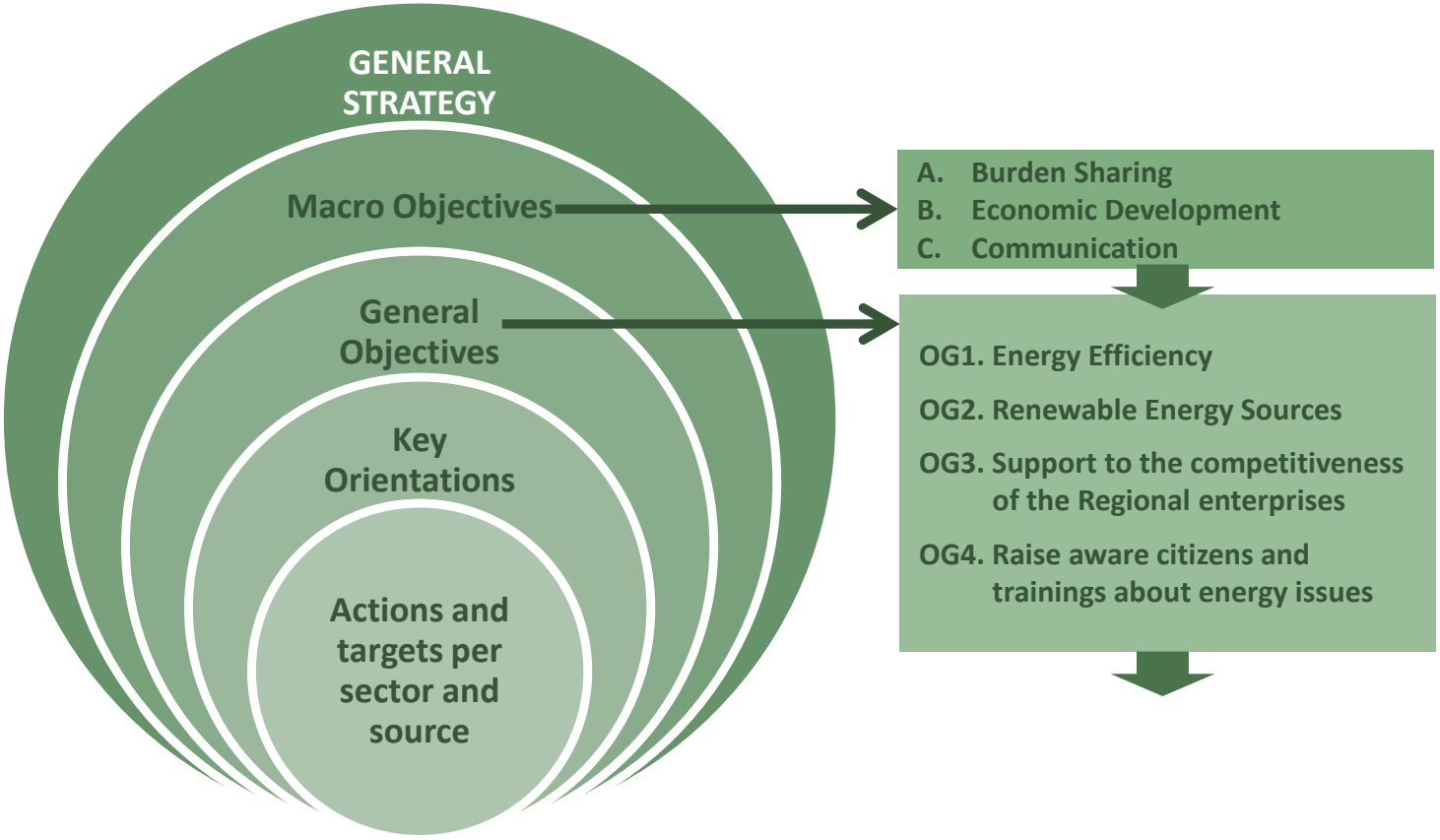
PHASE 3: SCENARIOS

Alternative hypotheses for the developement of the different technologies



PEAR 2014-2020: The Objectives

PHASE 4: GENERAL STRATEGY, MACRO-OBJECTIVES, GENERAL OBJECTIVES AND KEY ORIENTATIONS



PEAR 2014-2020: The Objectives

MACRO OBJECTIVE

BURDEN SHARING

GENERAL OBJECTIVES		KEY ORIENTATIONS
OG1. Energy Efficiency	EE.1.	Reduction of final energy consumption in the residential sector
	EE.2.	Increase energy efficiency in the tertiary sector, SMEs and production cycles
	EE.3.	Increase energy efficiency in the public buildings and lighting
	EE.4.	Promotion of innovative technologies like CHP/CCHP plants and district heating & cooling systems
OG2. Renewable Energy Sources	RES.1.	Promotion of PV plants on buildings in industrial or deteriorated areas
	RES.2.	Promotion of wind energy plants also by the simplification of authorization procedures
	RES.3.	Support to the realisation/revamping of small sized hydro power plants
	RES.4.	Increase energy production of biogas from waste
	RES.5.	Support to technological research in RES and energy efficiency
	RES.6.	Promotion of smart grids
	RES.7.	Support to small and medium sized biomass plants: development of the wood-energy chain and the use of local biomass
	RES.8.	Improve the solar thermal plants dissemination
	RES.9.	Promotion of heat pumps in the civil sector

PEAR 2014-2020: The Objectives

MACRO OBJECTIVE	GENERAL OBJECTIVES	KEY ORIENTATIONS	
ECONOMIC DEVELOPEMENT	O.G.3. Support to the competitiveness of the regional production system	ED.1.	Support to the companies operating in the “green economy” sector in Liguria
		EDE.2.	Boost the competitiveness of the companies operating in the construction and plant design sectors (energy efficiency and energy savings)
COMMUNICATION	OG4. Raise aware citizens and trainings about energy issues	IF.1.	Promotion of advanced professional training in the energy sector (new professional figures and young people)
		IF.2.	Involvement of energy stakeholders in the implementation stage of the Plan
		IF.3.	Raise awareness of citizens

PEAR 2014-2020: Objectives per sector and source

Burden Sharing Objective = Final Energy Consumption from RES / Gross Final Energy Consumption = **14,1%**

ENERGY EFFICIENCY Objectives

Starting point	Scenario BAU 2020*	Scenario PEAR 2020
Gross Final Energy consumption 2011 [ktep]	Gross Final Energy consumption 2020 [ktep]	Gross Final Energy consumption 2020 [ktep]
2.634	2.972	2.640

-332 ktep

*based on PAN (National Action Plan) Scenario for 2020

PEAR 2014-2020: Objectives per sector and source

Burden Sharing Objective = $\frac{\text{Final Energy Consumption from RES}}{\text{Gross Final Energy Consumption}}$ = **14,1%**

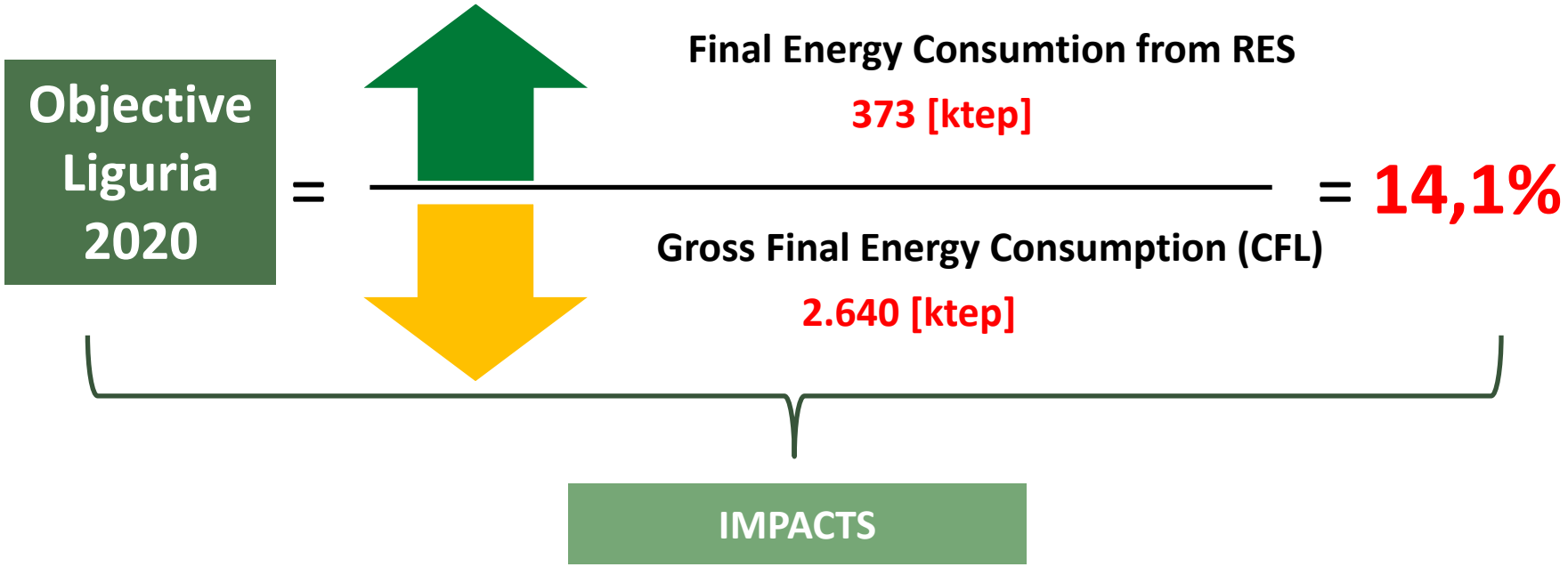
RES Objectives

RENEWABLE ENERGY SOURCE (RES-E e RES-C)	2012		PEAR 2020 Scenario	
	Installed power[MW]	RES Energy production [ktep]	Installed power[MW]	RES Energy production [ktep]
Photovoltaic	74	8	220	23
Wind Energy	47	8	250	43
Idro	86	20	110	26
Biogas	21	11	31	16
Biomass	451 (*)	47	1750	181
Solar Thermal	11	1	100	6
Heat Pumps	1400	53 (**)	2100	79 (*)
TOTAL		**146**		**373**

(*) To be updated
(**) Calculated accroding to RES EU Directive (2009/28/CE) and related Guidelines.

+227 ktep

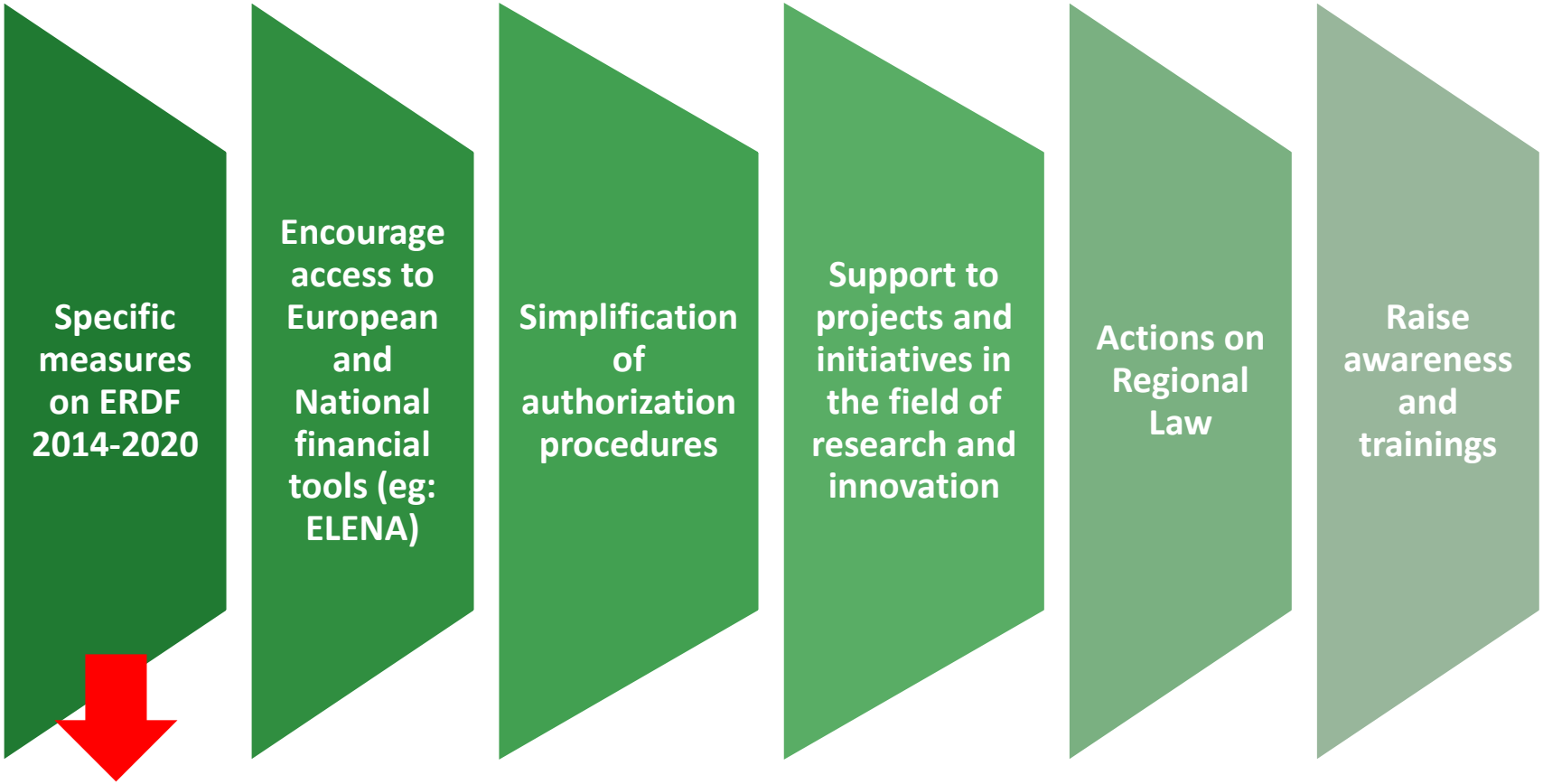
PEAR 2014-2020: Expected results



IMPACTS

- Reduction of energy costs for citizens and enterprises
- Economical development, employment and competitiveness in the energy sector
- Safeguard of local territory

PEAR 2014-2020: Actions



ERDF and the Operational Programme of Liguria 2014-2020

European Regional Development Funds (ERDF 2014-2020)

The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions.

The ERDF focuses its investments on several key priority areas:

- Innovation and research;
- The digital agenda;
- Support for small and medium-sized enterprises (SMEs);
- The low-carbon economy.

Regional Operational Programme (POR 2014-2020)

Approved by the European Commission in 2015, the Regional Operational Programme identifies priority areas for financing SMEs and Public Administrations on the basis of ERDF rules regarding the allocation of resources

Operational Programme of Liguria 2014-2020

POR 2014-2020 includes 5 “Thematic Objectives”:

TO1 Research, tecnological development and innovation	80.000.000 Eur	20,38%
TO2 Digital Agenda	41.000.000 Eur	10,44%
TO3 Competitiveness of small and medium-sized enterprises	135.000.000 Eur	34,39%
TO4 Sustainable energy and life quality	79.000.000 Eur	20,13%
TO5 Adaptation to climate change and prevention and risk management	42.000.000 Eur	10,70%

Strategic Axis nr 4: Energy
Strategic Axis nr 6: Cities

POR 2014-2020: Strategic Axis nr 4 - ENERGY

Strategic Axis 4 aims to:

- promote innovative technologies,
- increase energy efficiency,
- reduce polluting emissions.

Also sustainable urban transport represents a key point.

Main interventions:

Reduction of energy consumption in productive areas, SMEs and Public Properties (buildings and facilities), including RES for self-consumption

ENERGY CERTIFICATION OF BUILDINGS

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EU Policies: Energy Performance of Buildings

Buildings account for **40 % of the EU total energy consumption**. The sector is expanding and so too are its energy demands. By limiting them, the EU will reduce its energy dependency and greenhouse gas emissions and advance towards its goal of **cutting overall energy consumption by 20 % by 2020**.

ACT

Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings

WHAT DOES THE DIRECTIVE DO?

The legislation aims to **improve the energy performance of buildings** in the EU, taking into account various climatic and local conditions. It sets out **minimum requirements** and a **common methodology**. It covers energy used for heating, hot **water, cooling, ventilation and lighting**.

EU Policies: Energy Performance of Buildings

KEY POINTS

National authorities must set **cost-effective minimum energy performance requirements**. They should be reviewed every 5 years at the latest. These must cover **heating, hot water, air-conditioning and large ventilation systems**. The Commission is responsible for establishing the methodology to calculate the **optimal cost levels** for the energy performance requirements. New buildings must meet the **minimum standards** and contain **high-efficiency alternative energy systems**. Those owned and occupied by public authorities should achieve **nearly zero-energy status*** by 31 December 2018 and other new buildings by 2 years later. Existing buildings, when undergoing **major renovation**, must upgrade their energy performance to meet the EU **requirements**. National authorities operate an **energy performance certification system**. The certificates provide **information for prospective purchasers or tenants** of a building's energy rating and **recommendations** for cost-effective improvements. They must be included in all **commercial media advertisements** when the premises are offered for sale or rent. National authorities must ensure schemes are in place to inspect heating and air-conditioning systems. The Commission will assess, by 1 January 2017, the progress made on the energy performance objectives and make further proposals if necessary.

*__Nearly zero-energy building__: a building that has a very high energy performance. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.

EU Policies: Stepping up EU energy efficiency efforts

ACT

Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.

The Directive contributes to EU efforts to reduce its dependence on energy imports and scarce energy resources, whilst addressing climate change by reducing greenhouse gas emissions in a cost-effective way. It also accelerates the spread of **innovative technological solutions** and improves Union **industry's competiveness**. This will boost **economic growth** and create **high-quality jobs**, in line with the Europe 2020 Strategy.

EU Policies: Stepping up EU energy efficiency efforts

SUMMARY

The goal of this Directive is to achieve the Union's energy efficiency target of 20% by 2020 compared to 1990 levels and to pave the way for further energy efficiency improvements beyond that date. **It includes a requirement for all Member States to set indicative national energy efficiency targets for 2020**.

The Directive promotes energy efficiency across the Union through **a common framework of measures**. They cover **every stage of the energy chain**, from the transformation of energy and its distribution to its final consumption. Some measures - building on those in the Energy Efficiency Plan 2011 - are legally binding.

National energy efficiency targets

Member States have until mid-2014 to bring most of the Directive's provisions into national law. They must notably establish **indicative national energy efficiency targets** by 30 April 2013 (calculated with reference to primary or final energy limits).

Each Member State must also establish an **energy efficiency obligation scheme** or equivalent options. The aim is to ensure that energy providers achieve a cumulative end-use 1.5% energy savings target by the end of 2020.

EU Policies: Stepping up EU energy efficiency efforts

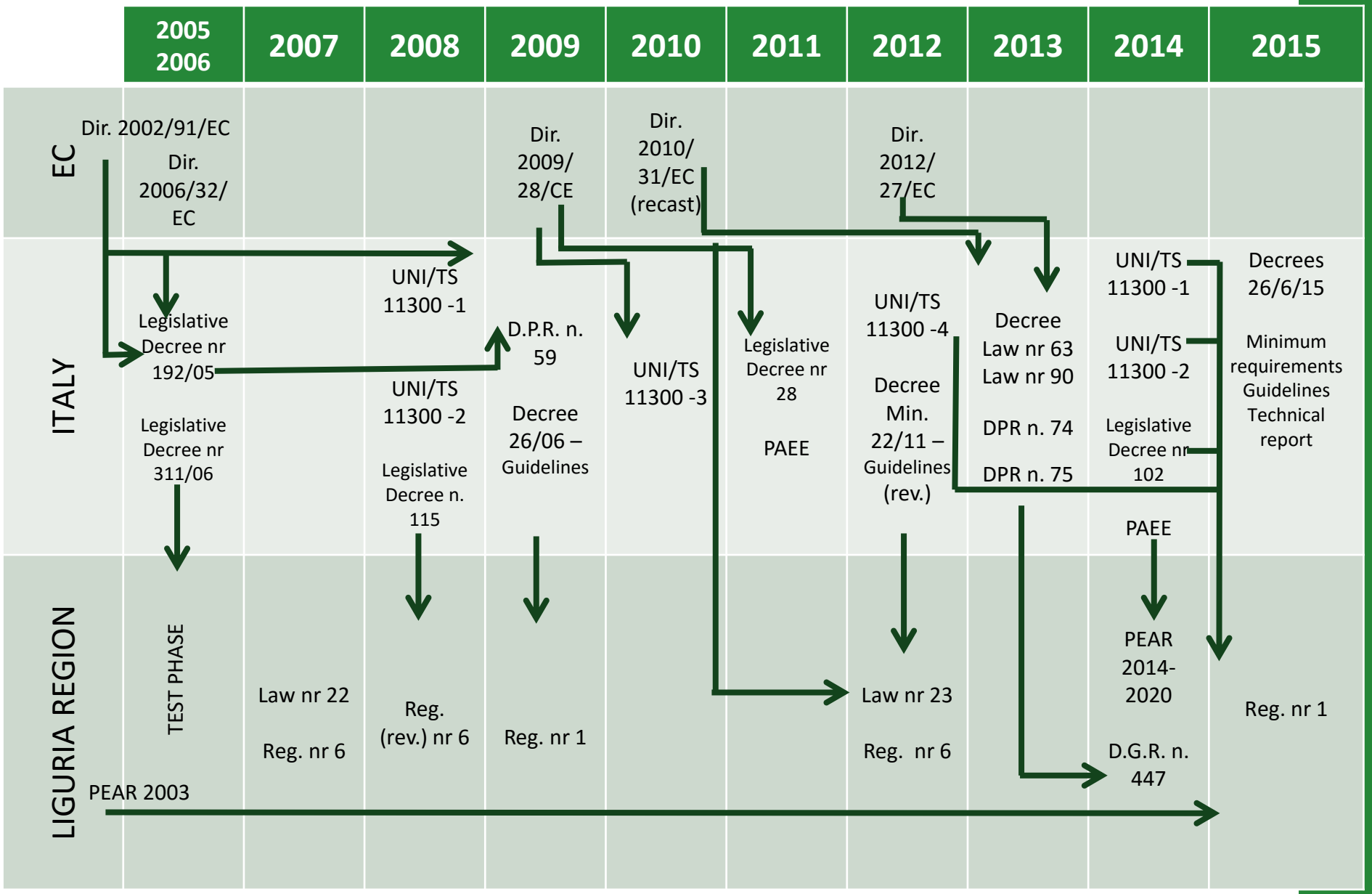
Public bodies

The Directive calls on public bodies at all levels to play an '**exemplary role**' in energy efficiency, since they have great potential to stimulate market transformation towards more efficient products, buildings and services. Each Member State must therefore ensure that **3%** of the total floor space of heated and/or cooled buildings owned by their **central government is renovated each y**ear, taking into account existing obligations in Directive 2010/31/EU.

Member States must establish a **long-term strategy for funding the renovation of public and private buildings**. They also must **assess** in depth the **energy savings** that could be realised from use of **high-efficiency cogeneration and efficient district heating and cooling**.

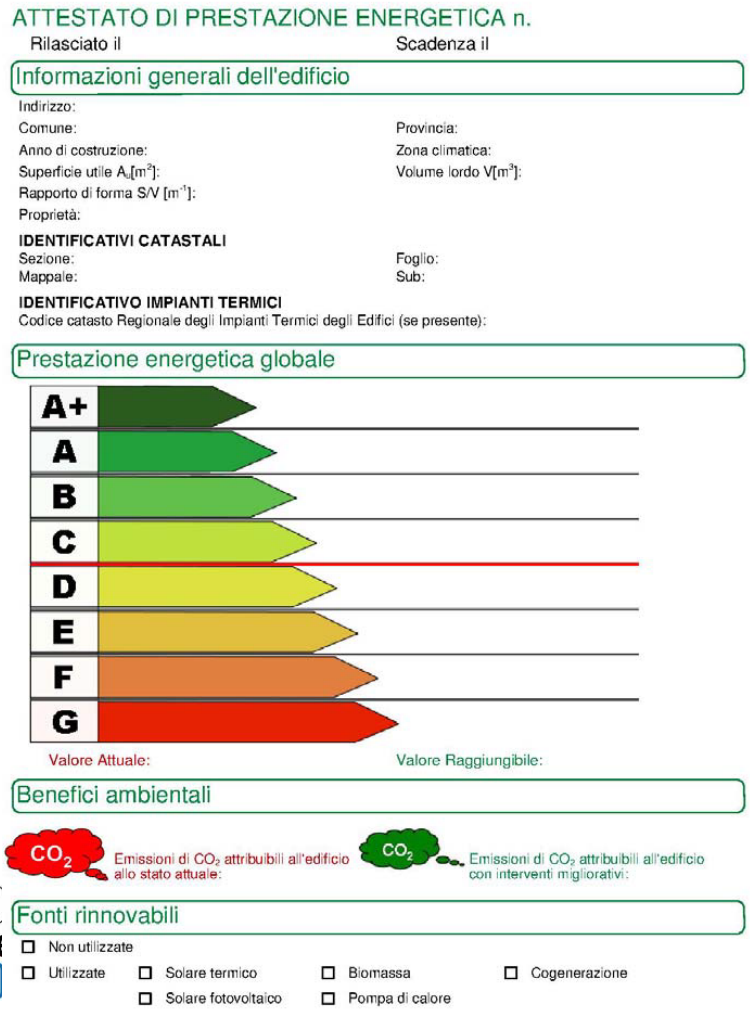
Further provisions in the Directive cover **energy audits, metering, consumer billing and help for SMEs**.

Legislation



Energy Performance Certificates Process

IRE is in charge, by law, of the **implementation and management of the Energy Performance Certificates process** in the region.



ATTESTATO DI PRESTAZIONE ENERGETICA n.

Rilasciato il Scadenza il

Informazioni generali dell'edificio

Indirizzo:
Comune: Provincia:
Anno di costruzione: Zona climatica:
Superficie utile A_u[m^2]: Volume lordo V[m^3]:
Rapporto di forma S/V [m^{-1}]:
Proprietà:

IDENTIFICATIVI CATASTALI
Sezione: Foglio:
Mappale: Sub:

IDENTIFICATIVO IMPIANTI TERMICI
Codice catasto Regionale degli Impianti Termici degli Edifici (se presente):

Prestazione energetica globale

A+ A B C D E F G

Valore Attuale: Valore Raggiungibile:

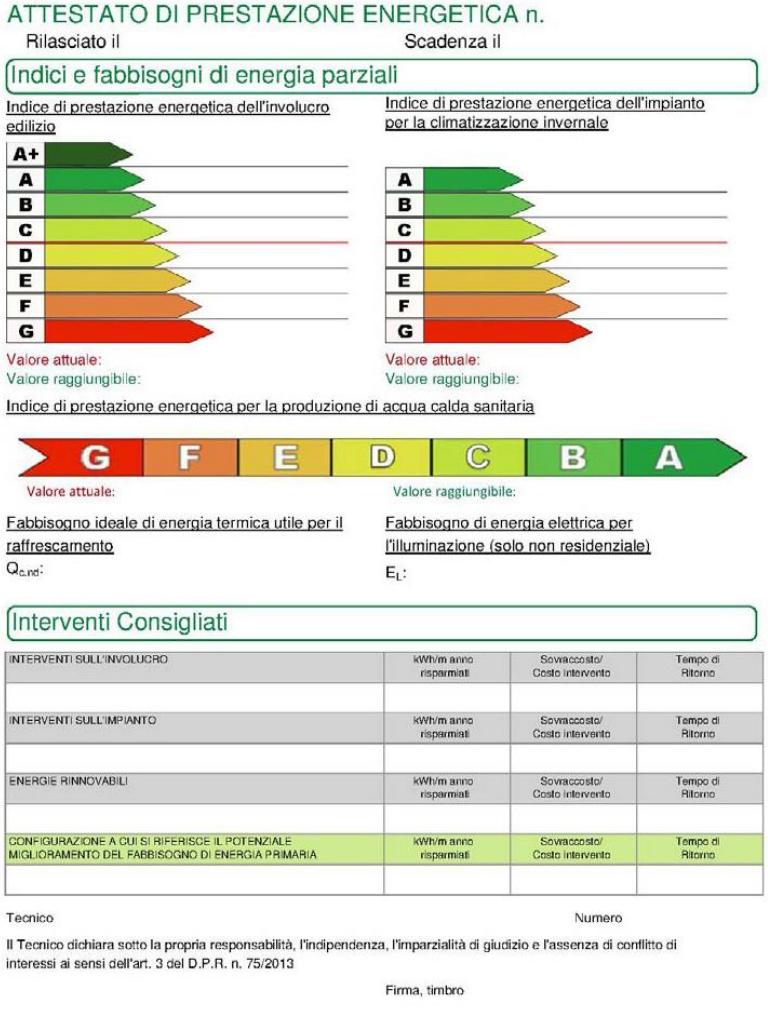
Benefici ambientali

CO_2 Emissioni di CO_2 attribuibili all'edificio allo stato attuale:

CO_2 Emissioni di CO_2 attribuibili all'edificio con interventi migliorativi:

Fonti rinnovabili

☐ Non utilizzate
☐ Utilizzate ☐ Solare termico ☐ Biomassa ☐ Cogenerazione
☐ Solare fotovoltaico ☐ Pompa di calore



ATTESTATO DI PRESTAZIONE ENERGETICA n.

Rilasciato il Scadenza il

Indici e fabbisogni di energia parziali

Indice di prestazione energetica dell'involucro edilizio

A+ A B C D E F G

Valore attuale:
Valore raggiungibile:

Indice di prestazione energetica dell'impianto per la climatizzazione invernale

A B C D E F G

Valore attuale:
Valore raggiungibile:

Indice di prestazione energetica per la produzione di acqua calda sanitaria

G F E D C B A

Valore attuale: Valore raggiungibile:

Fabbisogno ideale di energia termica utile per il raffrescamento
$Q_{c,nd}$:

Fabbisogno di energia elettrica per l'illuminazione (solo non residenziale)
E_L:

Interventi Consigliati

INTERVENTI SULL'INVOLUCRO	kWh/m anno risparmiati	Sovraccosto/ Costo intervento	Tempo di Ritorno
INTERVENTI SULL'IMPIANTO	kWh/m anno risparmiati	Sovraccosto/ Costo intervento	Tempo di Ritorno
ENERGIE RINNOVABILI	kWh/m anno risparmiati	Sovraccosto/ Costo intervento	Tempo di Ritorno
CONFIGURAZIONE A CUI SI RIFERISCE IL POTENZIALE MIGLIORAMENTO DEL FABBISOGNO DI ENERGIA PRIMARIA	kWh/m anno risparmiati	Sovraccosto/ Costo intervento	Tempo di Ritorno

Tecnico Numero

Il Tecnico dichiara sotto la propria responsabilità, l'indipendenza, l'imparzialità di giudizio e l'assenza di conflitto di interessi ai sensi dell'art. 3 del D.P.R. n. 75/2013

Firma, timbro

Energy Performance Certificates Process

In Liguria:

- **Technical and administrative assistance** is provided to Certifiers (6.980) and citizens (website, e-mails and phone calls);

- A **free Regional Software** (Celeste 2.0) for the preparation of the Energy Performance Certificate is available;

- **A Regional Database of the Energy Certificates** (290.000 since 2009) is set up and a statistical analysis of the information is ongoing;

- **200 controls** per year (including inspections in situ) are performed since 2013.

Energy Performance Certificates Process: Controls

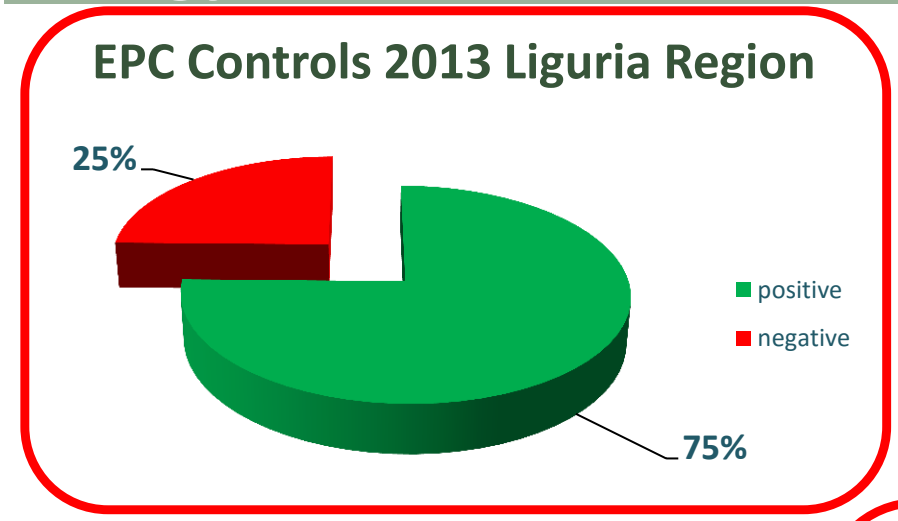
IRE Liguria is the Regional Organization performing the control of the quality and correctness of the EPCs issued in the Liguria Region.

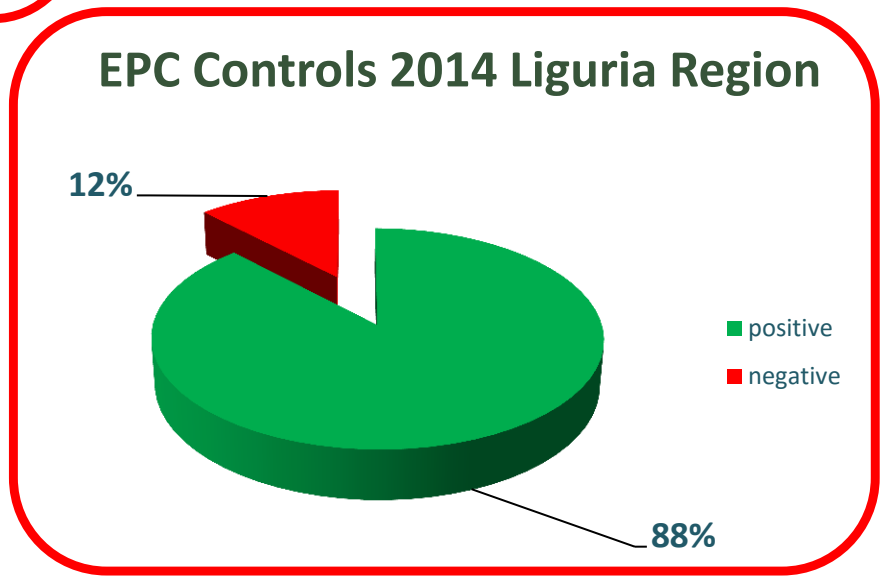
Selection of the 200 EPCs to be controlled yearly

Controls are performed according to option c), point 1 annex II Dir. 2010/31/EU:

*"**full check** of the input data of the building used to issue the energy performance certificate, **full verification** of the results stated in the certificate, including the recommendations made, and **on-site visit** of the building, if possible, to check correspondence between specifications given in the energy performance certificate and the building certified."*

Energy Performance Certificates Process: Controls





Significant improvement of positive outcomes

Energy Performance Certificates Process: next steps

Regional Law (DRAFT)

Transposition of the national decrees 26th June 2015

- Minimum requirements
- Guidelines
- Technical report

- **Regional Plan for 2% of issued EPC to be controlled**
- **Regional Databases on EPC and Heating System Integration**

ENERGY POLICIES AT LOCAL LEVEL: THE COVENANT OF MAYORS

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Covenant of Mayors

Context:

- European policies: "20-20-20 package"
- Urban areas account for 70% of european energy consumption and emit around 80% of greenhouse gases
- Urgent need for action at local level

Covenant of Mayors
Committed to local sustainable energy

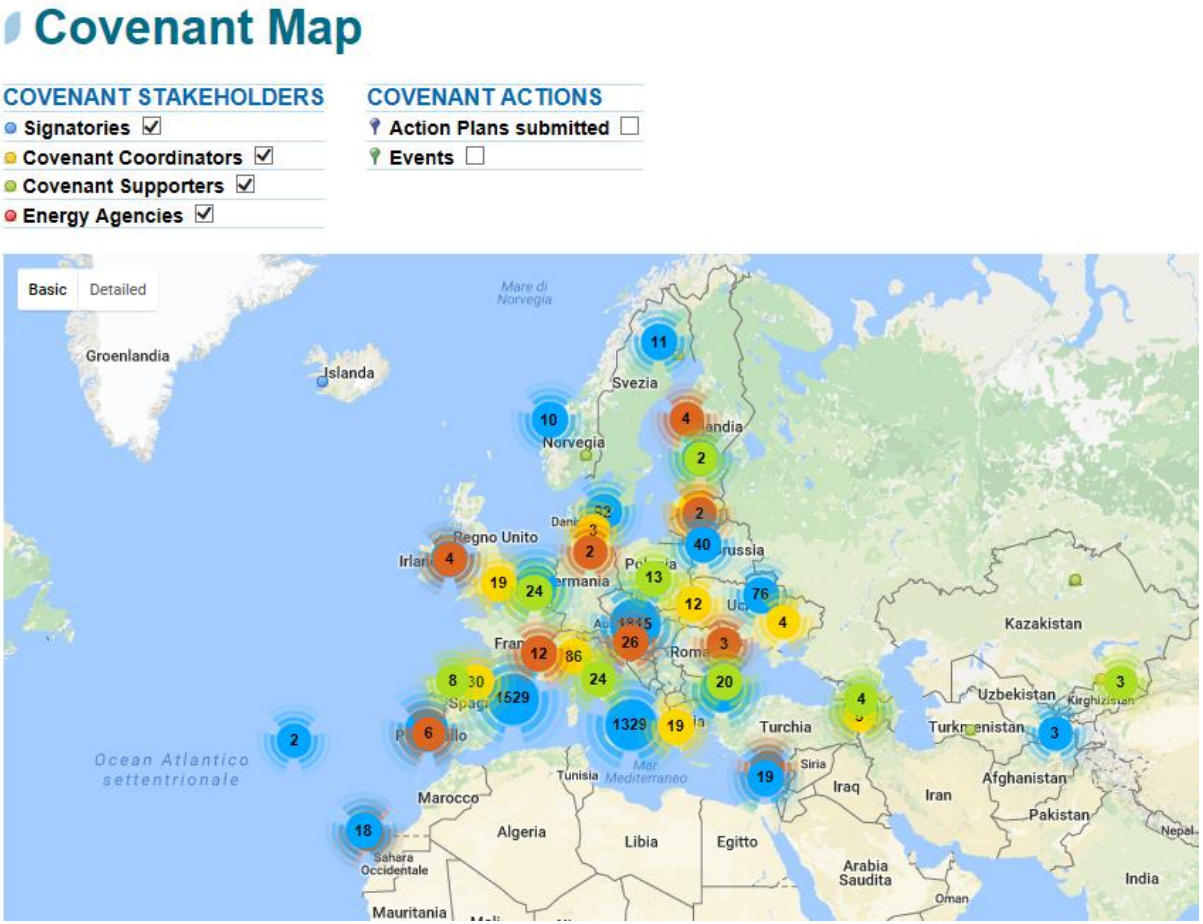
Agreement VOLUNTARILY signed by the Municipality with the European Commission.

The Municipality commits to go beyond 20% CO_2 emissions reduction by 2020 (compared to 1990).

ire SPA

Covenant of Mayors diffusion so far

- 6.278 municipalities joined the CoM
- 3.172 municipalities joined the CoM in Italy



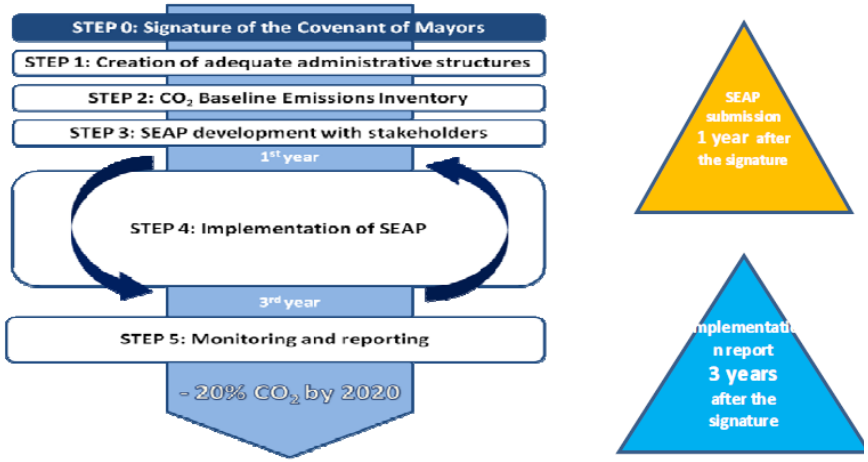
How you join

1. Presentation of the Covenant of Mayors to the City Council
2. The City Council formally adopts the Covenant and instructs the Mayor to sign the membership form
3. The municipality informs the EU Commission on its decision
4. The EU Commission confirms the adhesion via e-mail through the Secretariat of the Covenant (the so-called COMO) and informs on the next steps

The Covenant of Mayors Commitments

COMMITMENTS:

- ❑ To prepare a **Baseline Emission Inventory** (BEI) of the municipality;
- ❑ To submit the **SEAP** *within one year* after the formal signature of the CoM;
- ❑ To identify an internal office in the municipality in charge of the initiation and management of the process;
- ❑ To involve stakeholders and citizens;
- ❑ To organize the *monitoring* (every 2 years) and the verification activities;
- ❑ To develop communication, dissemination and sharing of experiences and initiatives related.



What is the SEAP?

The **Sustainable Energy Action Plan** (SEAP) is a key document defining signatory's strategy to meet 2020 target.

Taking into account the Baseline Emission Inventory data, the document identifies the most suitable **policy areas** and the most appropriate opportunities to achieve the goal of reducing CO_2.

It defines concrete **reduction measures**, together with timing and responsibilities, in order to translate the long-term strategy into action.

The sectors involved in the CoM

CoM includes actions related to public and private sectors.

- **Urbanized environment** (including new buildings and renovations of large size);
- **Urban infrastructure** (district heating, public lighting, smart grids, etc ...);
- Urban and territorial **planning;**
- Decentralized **renewable energy sources;**
- Policies for public and private **transport and urban mobility;**
- **Involvement of citizens and civil society participation.**

The reduction of emissions of greenhouse gases due to industrial delocalization is instead explicitly excluded.

Covenant of Mayors benefits

- **Improvement** in planning and monitoring **local energy policies** (also thanks to a better data management)
- Increase in **energy efficiency**
- **Costs** reduction
- **Emissions** reduction
- Increase in **cooperation** between departments, public services, citizens, etc..
- International **recognition**
- Tailored **financing schemes**

Step 1: creating the administrative structure

"The city structures adaptation, including the allocation of sufficient human resources "is a formal commitment by the signatories of the Covenant of Mayors.

All signatories of the Pact should adapt and optimize their internal administrative structures

PLANNING SEAP PROCESS

Collaboration and coordination of various departments of local government:

- ❖Environment,
- ❖Territorial planning,
- ❖Social affairs,
- ❖Municipal buildings,
- ❖Private buildings,
- ❖Mobility and transport,
- ❖Economic balance,
- ❖Contracting …

Local authorities, which do not have sufficient skills or resources to draft and implement their own SEAP, should be supported by administrations or organizations with such capacities (**Covenant Coordinators** and **Supporters**).

Step 2: Baseline Emission Inventory

SEAP

is an **operational tool** defining the local energy policies in 2020

is based on the results of the **"Baseline Emission Inventory" (BEI),** referred to a “baseline” year

Baseline Emission Inventory

- The Baseline Emission Inventory (BEI) quantifies the **CO_2 emitted into the territory of the local authority during the reporting year**.
- The BEI can identify the **main human sources of CO_2 emissions** and assign the appropriate priority to **measures for its reduction**.
- The inventory is a tool that will allow local authorities to **measure the impact of its actions** related to climate change.
- The BEI will show the **overall situation** within the territory of the local authority and the Monitoring Emissions Inventories (MEI) will show the progresses respect to the target.

Step 2: Baseline Emission Inventory – Key Concepts

Baseline year

It is a reference year: the achievement of the emission reductions in 2020 shall be compared to the baseline year. *1990* is the recommended baseline year for the BEI, but in case no comprehensive and reliable data are available for 1990, *the closest subsequent year can be chosen*.

BEI/MEI Boundaries and scope

- The **geographical boundaries** of the BEI / MEI are the administrative boundaries of the local authority.
- The inventory of CO_2 will be based primarily on the **final energy consumption**, including public and private energy consumption.

Step 2: Baseline Emission Inventory

The BEI quantifies the following emissions from energy consumption in the territory of the local authority:

a) **Direct emissions** due to fuels consumed in the territory (buildings, equipment / facilities and transport sectors);

b) **Emissions** (indirect) **associated with the consumption of carriers** (electricity, heat or cold) in the territory.

Step 2: Baseline Emission Inventory

The choice of the emission factors

- The **"Standard" emission factors** are in line with the IPCC (Intergovernmental Panel on Climate Change) principles, which cover all the CO_2 emissions that occur due to energy consumption within the territory of the local authority, either directly due to fuel combustion within the local authority or indirectly via fuel combustion associated with electricity and heat/cold usage within their area.

our choice

- The **LCA emission factors** (life cycle assessment), take into consideration the overall life cycle of the energy carrier. This approach includes not only the emissions of the final combustion, but also all emissions of the supply chain. It includes emissions from exploitation, transport and processing (e.g. refinery) steps in addition to the final combustion. This hence includes also emissions that take place outside the location where the fuel is used.

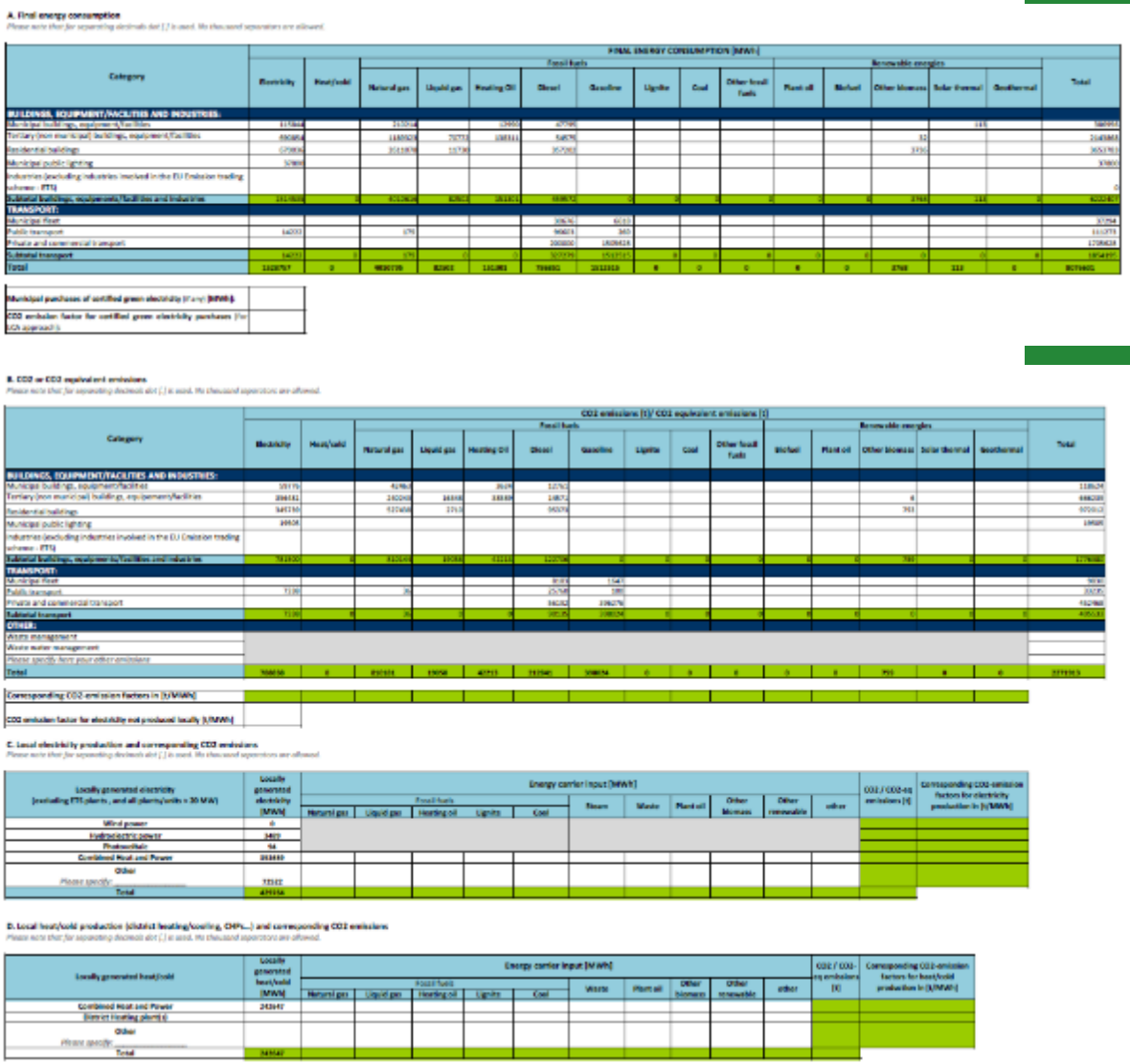
Step 2: Baseline Emission Inventory

Sectors addressed:

- Municipal buildings and facilities
- Buildings and equipment in the tertiary sector
- Buildings and equipment in the residential sector
- Public lighting
- Not ETS Industries (Optional)
- Municipal transport
- Public transport
- Private and commercial transport (urban, suburban optional)
- Local production of electricity and heat
- Cogeneration and district heating

Data collection from:

- **Internal databases** (public buildings and their consumption, municipal-owned vehicles ..) and databases owned by public companies
- **Sales** of fuels and electricity (Gas Distributor, etc...)
- Databases available at **different administrative levels** (Ex: Regional Environmental Database, Regional and Provincial Energy Balances ...)



Step 2: Baseline Emission Inventory

Data collection fundamentals

- The data should be **relevant to the particular situation of the local authority**. For example, **estimates based on national averages would not be appropriate**, as in the future, they would only reflect trends occurring at national level, and they would not allow taking into account the specific efforts made by the local authority to meet its CO_2 targets.
- The data collection **methodology** should be **consistent during the years**: in case the methodology changes, this may cause changes in the inventory which are not due to any action of the local authority to reduce its CO_2 emissions. For this reason, it is important to document very clearly the way data are collected and inventories are carried out, so that consistency can be kept in the future years. In case of methodological changes, recalculation of the BEI may be necessary.
- The data should cover at least **all sectors** in which the local authority intends to take action, so that the result of those actions can be reflected in the inventory;
- The data sources used should be **available in the future**;
- As far as possible, data must be **accurate**;
- Collection process and data sources should be **well documented and publicly available**, so that the process of elaboration of the BEI is made transparent and stakeholders can be confident in the inventory.

Step 3: Stakeholders involvement

Stakeholders are defined as those:

- ❑ whose interests are affected by the issue
- ❑ whose activities affect the question
- ❑ who own/control information, resources and necessary skills for the development and implementation of the strategy.
- ❑ whose participation/involvement are necessary for successful implementation.

Some stakeholders :

- Local governments: public owned-companies and municipal departments involved in CoM;
- Local and Regional Energy Agencies and Universities;
- Financial partners (banks, private funds, ESCO);
- Institutional stakeholders (chambers of commerce, associations of architects and engineers);
- Utilities and energy suppliers;
- Companies of transportation/mobility: public or private transport companies, etc..;
- The building sector: construction companies, building contractors;
- Companies and industrial companies;
- Supporting structures and energy agencies;
- NGOs and other representatives of civil society;
- Representatives of civil society, including students, workers, etc..;
- Representatives of the regional/ national government and / or neighboring communities.

Step 4: The vision

- The vision of a sustainable energy future is the **guiding principle** of the work of the local authority on the SEAP.
- It indicates the **long term strategy** that the local authority wants to pursue by 2020 and beyond: SEAP defines **a gradual approach to vision**.
- A comparison between the vision and current situation of the local authority is essential to identify the actions and development necessary to achieve the desired objectives.
- The vision is the **unifying element which may refer to all stakeholders**: from political leaders to citizens. It can also be used for the marketing activities of the local authority.
- The vision must be **compatible with the commitments** established by the Covenant of Mayors, which must include the goal of reducing CO_2 emissions by **20%** (at least) by 2020. However, it may also include more ambitious targets.

STEP 5: Definition of the Actions

Identification of the actions and definition of the overall goal of CO_2 reduction (>20%)

This phase translate the "Vision“ (long term strategy) into action, identifying the activities that will be realized by the Municipality

Priority: municipal properties or subject to the direct influence of the local authority

Aspects to be defined for each action :

- **Responsible**
- **Objectives**
- **Action description**
- **Expected results**
- **Timeframe**
- **Actors and promoters**
- **Financial coverage**
- **Possible obstacles and constraints**
- **Indications for monitoring**

STEP 5: Definition of the Actions

BUILDINGS
Energy audits for public buildings
Public buildings retrofitting: Energy Performance Contracts and ESCO (energy service companies) involvement
Public buildings retrofitting: reduction in taxes, financing schemes…
Energy efficiency in tertiary sector (hotels, shopping centers,..)
Replacement of boilers using gas oil or similar
Energy efficiency and renewables in Municipal Building Regulation

LOCAL ENERGY PRODUCTION
Public RES plants (PV, wind, geothermal..)
Private RES plants
Boost cogeneration and distric heating plants
COMUNICATION
Collective purchase (buying groups) of PV plants and green electricity
Training students on RES and energy efficiency
Public events
Public information desk on RES and energy efficiency
Web site of energy efficiency and RES
PLANNING
Municipal database on public buildings, vehicles and facilities
Zero-emissions hubs

SOME POSSIBLE ACTIONS

PUBLIC LIGHTING
Green electricity purchase (buildings and public lighting)
Innovative technologies for public lighting
Replacement of obsolete lamps by high efficiency lamps and LED (contracting with ESCO)
Power regulators for public lighting
MOBILITY
Replacement of municipal vehicles
Financing the local public transport
Public transport for tourists
Pedestrian areas and Interchanging hubs
Bicycle paths
Electric vehicles
Car Sharing, Car Pooling and walking paths

Covenant of Mayors for Climate and Energy

In 2015, the initiative took on new objectives: the Covenant of Mayors for Climate and Energy steps up the initial CO2-reduction commitment and includes adaptation to climate change.

Signatory local authorities share a vision for making cities **decarbonised and resilient,** where citizens have access to secure, sustainable and affordable energy. They commit to developing **Sustainable Energy and Climate Action Plans for 2030** and to implementing **local climate change mitigation and adaptation activities**.

Implementing or even going beyond the EU 2030 climate and energy targets

- At least **40%** lower CO_2 (and possibly other greenhouse gas) emissions by 2030 through improved energy efficiency measures and greater use of renewable energy sources
- Enhanced **resilience** to the impacts of climate change
- Increased cooperation with fellow local and regional authorities within the EU and beyond to improve **access to secure, sustainable and affordable energy**

- (At least) 40% lower CO_2 emissions by 2030 through improved energy efficiency and greater use of renewable energy sources;
- Increased resilience to the impacts of climate change;
- Increased cooperation with fellow local and regional authorities within the EU and beyond.

- Baseline review (i.e. Baseline Emission Inventory, Climate Risk & Vulnerability Assessment);
- Sustainable Energy and Climate Action plan and mainstreaming of mitigation/adaptation considerations into relevant plans within 2 years following the formal signing;
- Progress Report every 2 years following the submission of the plan.

CASE STUDY: GENOA SEAP AND SMART CITY

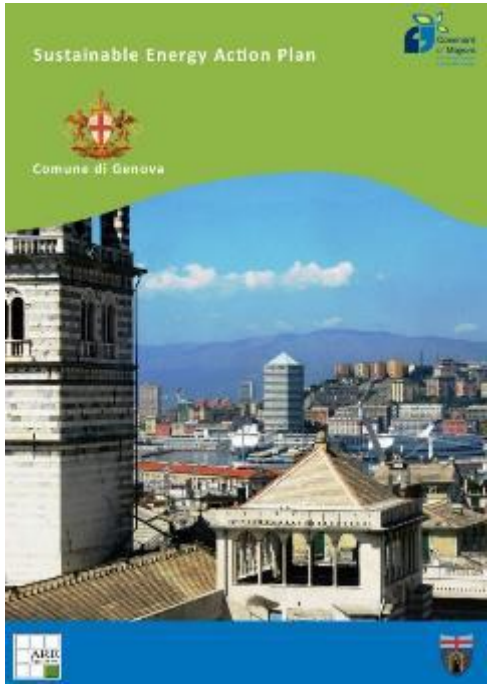
Maria Fabianelli

ire SPA infrastrutture recupero edilizio energia
agenzia regionale ligure

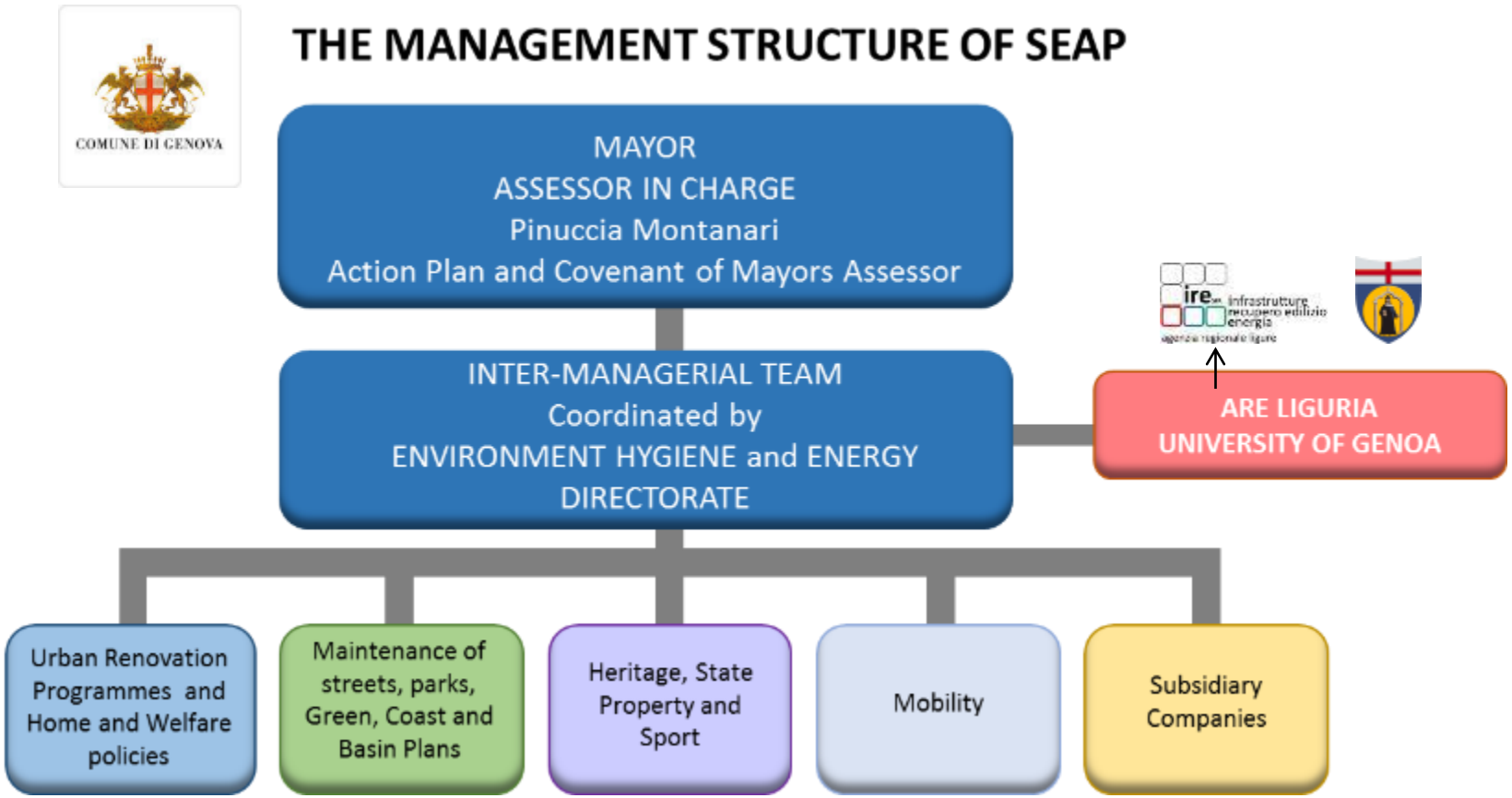
IRE spa - Divisione Energia

The SEAP in Genoa

- The Sustainable Energy Action Plan is an operational tool that defines the **local energy policies by 2020** (**"Vision"**);
- It is based on the results of **Baseline Emission Inventory**;
- It includes a set of "**Actions**" to be implemented by 2020 in order to achieve the CO_2 reduction target



The Management Structure



BEI 2005 -Final Energy Consumption [MWh]

Category	FINAL ENERGY CONSUMPTION [MWh]								
	Elettricity	Fossil fuels					Renewable energies		Total
		Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Other biomass	Solar thermal	
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:									
Municipal buildings, eq.t/facilitie	115.844	210.214		12.990	47.795			113	386.956
Tertiary (non municipal)	690.854	1.189.323	70.772	138.311	54.575		32		2.143.868
Residential buildings	670.036	2.611.078	11.730		357.202		3.736		3.653.783
Municipal public lighting	37.800								37.800
Industries	non included in SEAP								
Subtotal buildings, eq.t / f.ties	**1.514.535**	**4.010.616**	**82.502**	**151.301**	**459.572**	**-**	**3.768**	**113**	**6.222.407**
TRANSPORT:									
Municipal fleet					30.676	6.618			37.294
Public transport	14.222	179			96.603	269			111.273
Private and commercial transport					200.000	1.505.628			1.705.628
Subtotal transport	**14.222**	**179**	**-**	**-**	**327.279**	**1.512.515**	**-**	**-**	**1.854.195**
Total	**1.528.757**	**4.010.795**	**82.502**	**151.301**	**786.851**	**1.512.515**	**3.768**	**113**	**8.076.601**

BEI 2005 - CO_2 Emissions [t]

Category	CO_2 EMISSIONS [t]								
	Elettricity	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/f	59.776	42.463		3.624	12.761				118.624
Tertiary (non municipal)	356.481	240.243	16.348	38.589	14.571		6		666.239
Residential buildings	345.739	527.438	2.710		95.373		753		972.012
Municipal public lighting	19.505								19.505
Industries	non included in SEAP								
Subtotal buildings, eq.t / f.ties	**781.500**	**810.144**	**19.058**	**42.213**	**122.706**	**-**	**759**	**-**	**1.776.380**
TRANSPORT:									
Municipal fleet					8.183	1.647			9.830
Public transport	7.338	36			25.760	100			33.235
Private and commercial transport					56.192	396.276			452.468
Subtotal transport	**7.338**	**36**	**-**	**-**	**90.135**	**398.024**	**-**	**-**	**495.533**
Total	**788.838**	**810.181**	**19.058**	**42.213**	**212.841**	**398.024**	**759**	**-**	**2.271.913**

BEI 2005 – Electricity and heat

C. Produzione locale di elettricità e corrispondenti emissioni di CO2

Si segnala che per la separazione dei decimali si usa il punto [.]. Non è consentito l'uso di separatori per le migliaia.

Elettricità prodotta localmente (esclusi gli impianti ETS e tutti gli impianti/le unità > 20 MW)	Elettricità prodotta localmente [MWh]	Vettore energetico utilizzato [MWh]											Emissioni di CO2 o equivalenti di CO2 [t]	Fattori di emissione di CO2 corrispondenti per la produzione di elettricità [t/MWh]
		Combustibili fossili					Vapore	Rifiuti	Olio vegetale	Altre biomasse	Altre fonti rinnovabili	Altro		
		Gas naturale	Gas liquido	Olio da	Lignite	Carbone								
Energia eolica	-													
Energia idroelettrica	3.489													
Fotovoltaico	94													
Cogenerazione di energia elettrica e termica	353.659													
Biogas	72.522													
Totale	429.764	0	0	0	0	0	0	0	0	0	0	0	0	

D. Produzione locale di calore/freddo (teleriscaldamento/teleraffrescamento, cogenerazione di energia elettrica e termica...) e corrispondenti emissioni di CO2

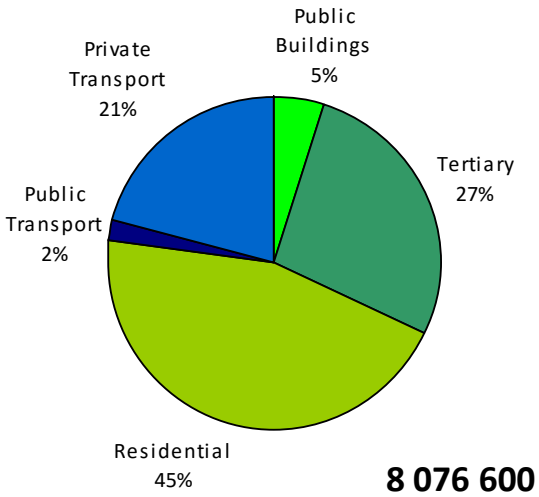
Si segnala che per la separazione dei decimali si usa il punto [.]. Non è consentito l'uso di separatori per le migliaia.

Calore/freddo prodotti localmente	Calore/freddo prodotti localmente [MWh]	Vettore energetico utilizzato [MWh]										Emissioni di CO2 o equivalenti di CO2 [t]	Fattori di emissione di CO2 corrispondenti per la produzione di calore/freddo in [t/MWh]
		Combustibili fossili					Rifiuti	Olio vegetale	Altre biomasse	Altre fonti rinnovabili	Altro		
		Gas naturale	Gas liquido	Olio da	Lignite	Carbone							
Cogenerazione di energia elettrica e termica	242.647												
Impianto(i) di teleriscaldamento													
Altro Specificare: _____													
Totale	242.647	0	0	0	0	0	0	0	0	0	0	0	

BEI 2005 local production

Energy consumption in the civil sectors and public transport in the municipality of Genova

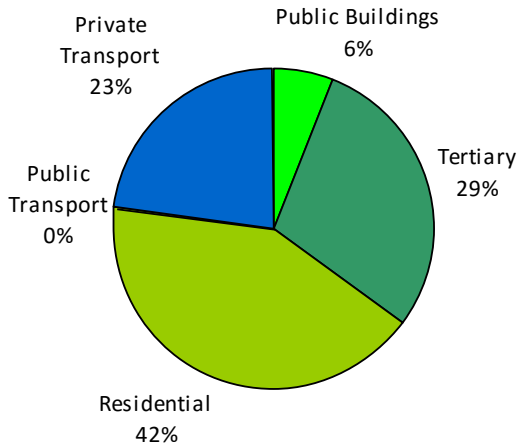
(2005, [MWh])



8 076 600 MWh

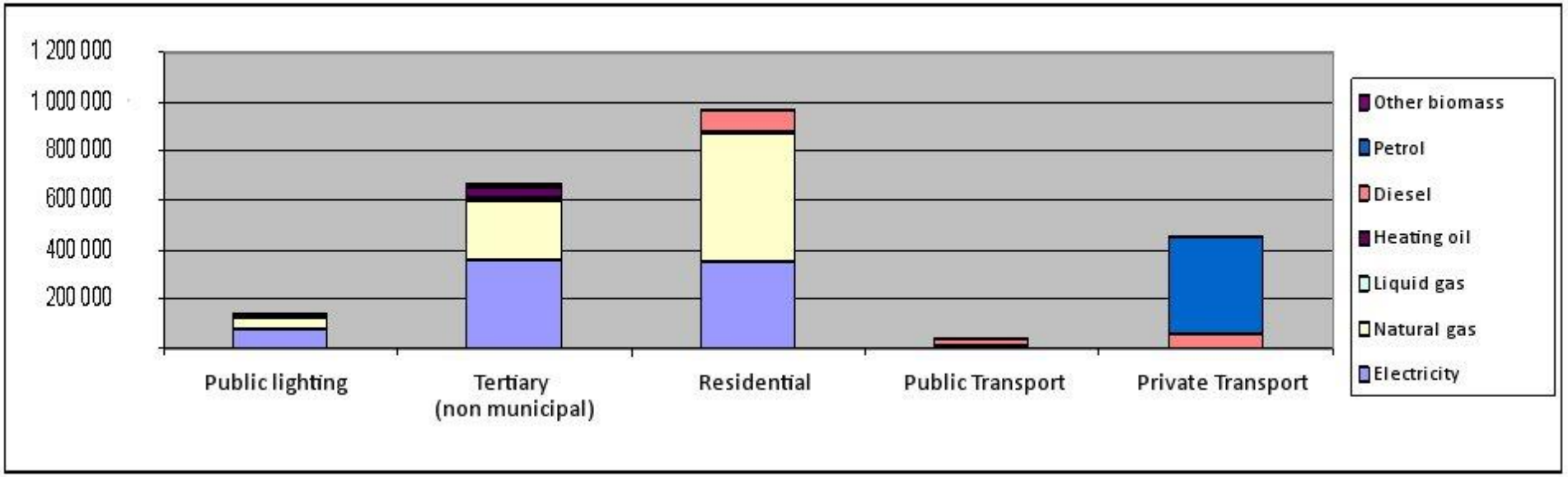
Emissions of CO_2 in the civil sectors and public transport in the municipality of Genova

(2005, [t])



2 271 900 t CO_2

BEI 2005: sectors and fuels

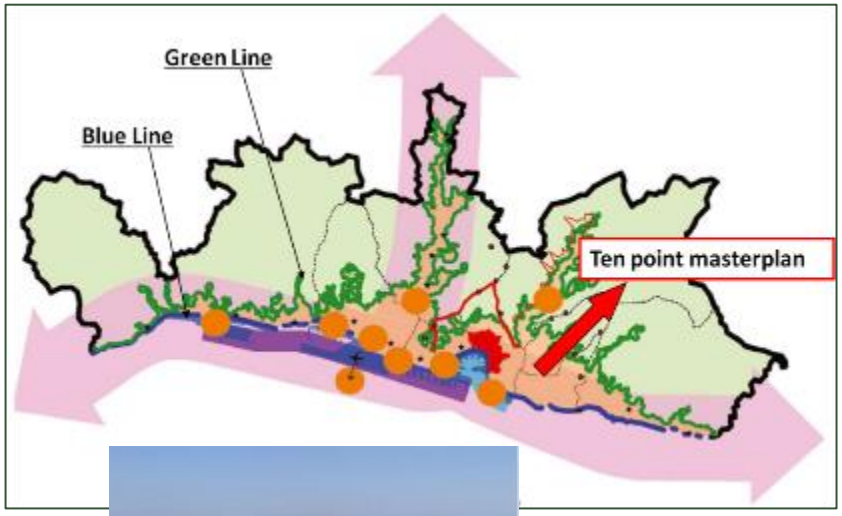


The SEAP in Genoa: Vision

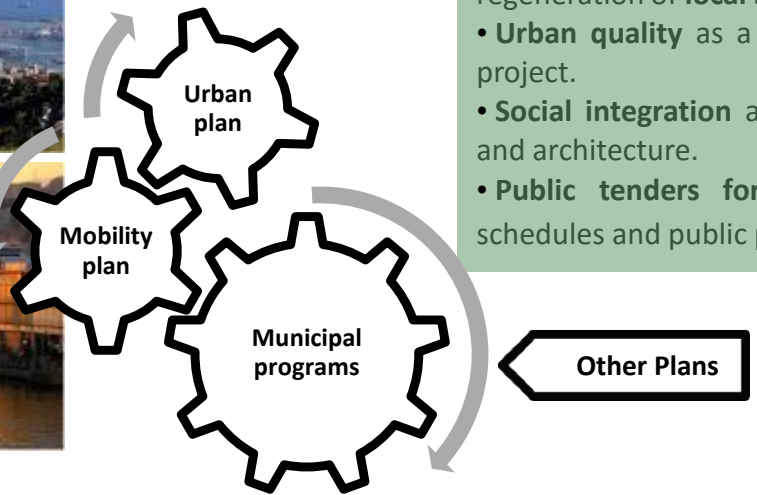
TECHNOLOGIES

TERRITORY

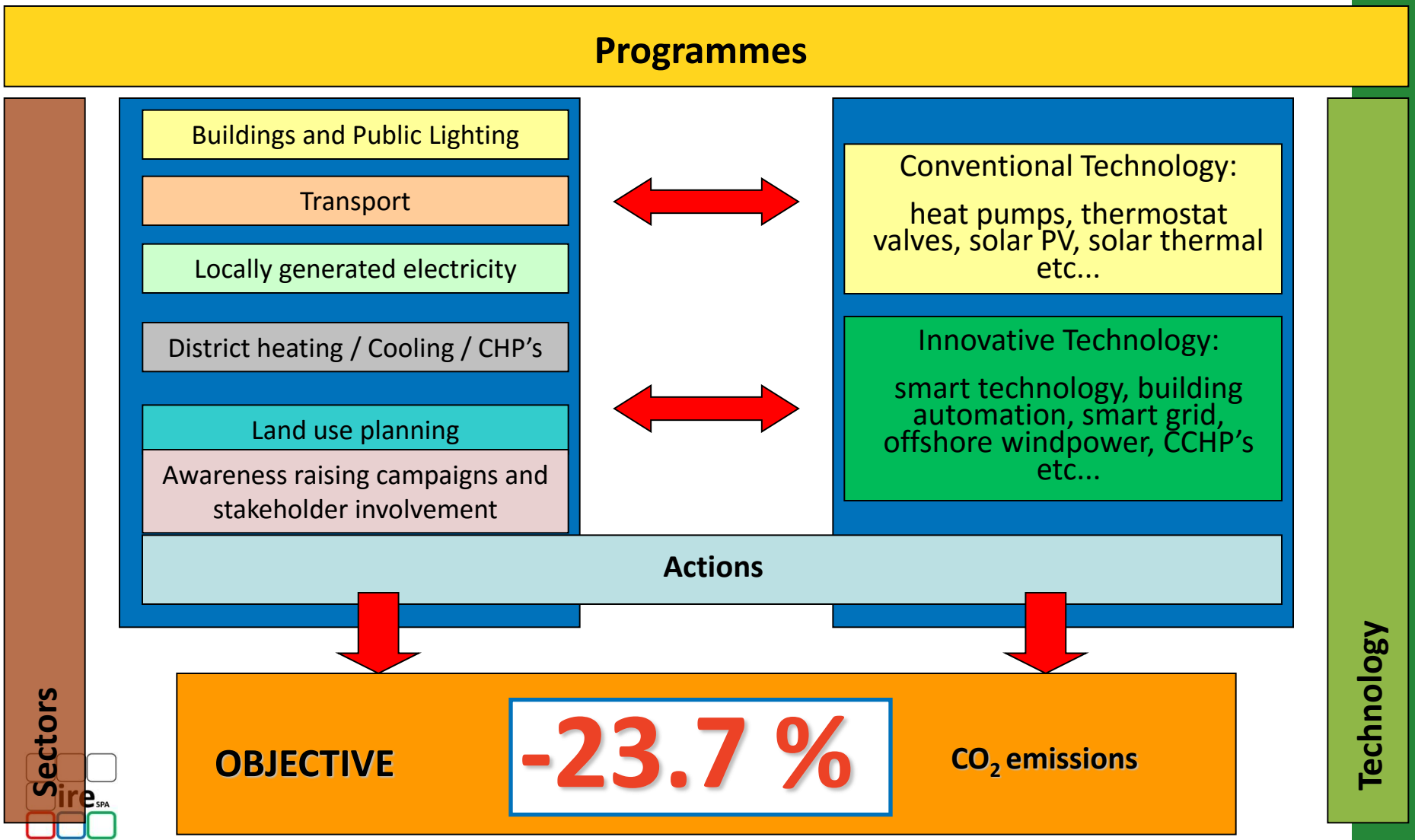
Strong link with Strategic Planning!



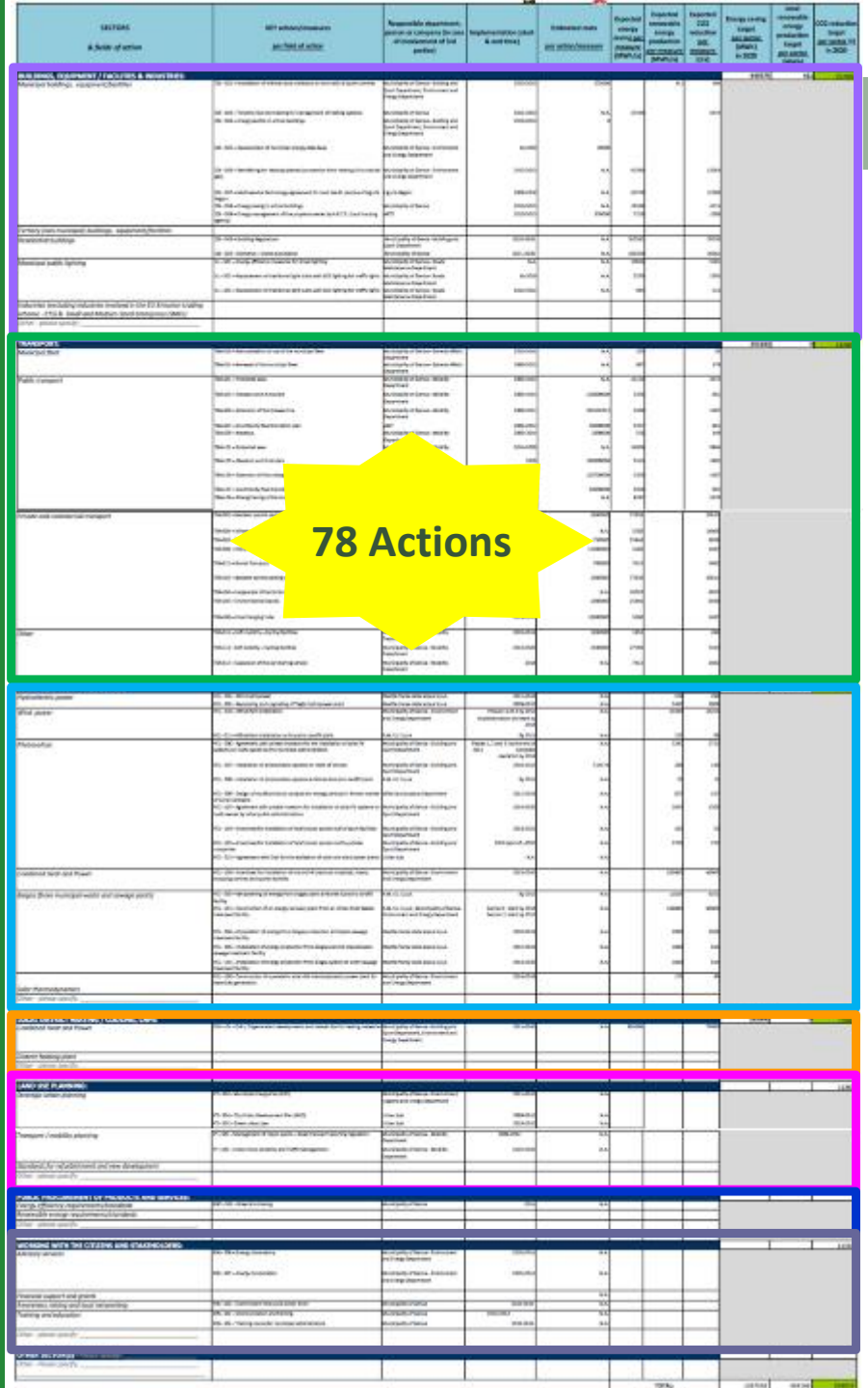
- The future Genoa as a **sustainable city** whose identity and development are inextricably linked to the harnessing of its natural resources.
- **The green and the blue line** are expressions of the relationship between the city, the green areas and the sea which is to be preserved, improved and reconstructed by identifying suitable ecological networks.
- Recreate a **relationship with green areas**.
- Recreate a **relationship between the city and sea**.
- **Build on built-up areas .**
- Promote **public transport.**
- Large and small projects for far-reaching urban transformation as well as the reclamation and regeneration of **local suburban areas**.
- **Urban quality** as a requisite for every redevelopment project.
- **Social integration** as a cornerstone of urban planning and architecture.
- **Public tenders for architects** to develop planning schedules and public projects.



Vision and Technology



The SEAP in Genoa: Actions



SECTORS & fields of action	Expected energy savings per measure [MWh] in 2020	Local renewable energy production target per sector [MWh] in 2020	CO2 reduction target per settore [t] in 2020	Contribution of action to overall target
Beuildings, equipment/ facilities	649.375		157.896	6,9%
Local trasport	453.183		112.809	5,0%
Local electricity production		433.735	167.590	7,4%
District heating / cooling, CHPs			77.000	3,4%
Land Use Planning			11.360	0,5%
Public procurement of products and services				
Working with citizens and stakeholders			11.360	0,5%
Other				
OVERALL CO2 EMISSION REDUCTION TARGET			538.014	23,7%
Baseline 2005 total CO2 Emissions			2.271.913	100,0%

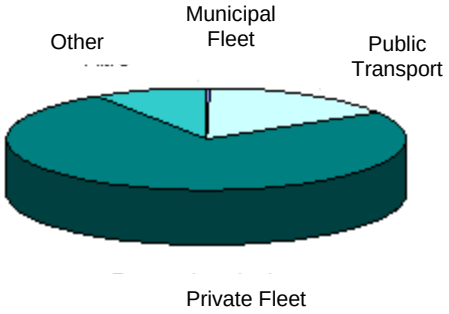
Buildings and Public Lighting

	KEY ACTIONS
Buildings, Equipment, and Facilities	Retrofitting for heating systems (conversion from heating oil to natural gas) (EDI-S06)
	Energy saving in school buildings (EDI - S08)
Residential Buildings	Building Regulations (EDI –S03)
	Home automation (EDI-L03)
Public Lighting	Energy efficiency measures for street lighting (ILL-S01)

Total reduction in emissions in the sector compared to total emissions in the Municipality of Genova

6.9 %

Transport



PUM – Urban Mobility Plan *(January 2010)*

Main objectives

- *Transition to ecological fleet*
- *Innovative railroad transportation*
- *Promoting light transport*

Municipal Fleet

Public Transport

Private and Commercial Transport

Others

KEY ACTIONS
Rationalisation and Renewal of the municipal fleet (TRA-S10 and TRA-S11)
Development of the local railway system (TRA-L09) Protected axes (TRA-S01 and TRA-L01)
Resident permit parking policy: extension of Blue Areas (TRA-S02 e TRA-L02) Environmental islands (TRA-S05 e TRA-05) Infrastructure (TRA-S04 e TRA-L04)
Light mobility – Cycling facilities (TRA-L14) Wireless city network (TRA-L15)

Total reduction in emissions in the sector compared to total emissions in the Municipality of Genova

5 %

Local electricity production

	KEY ACTIONS
Wind Energy	Wind-farm Installation (PEL-S10)
Photovoltaic	Agreement with private investors for the installation of solar PV systems on roofs owned by the municipal administration (PEL-S06 e PEL-L03)
CHP plants	Incentives for Installation of micro-CHP plants in hospitals, hotels, shopping centres and sports facilities (PEL - L08)
Biogas	Construction of an energy recovery plant from an Urban Solid Waste treatment facility (PEL - L01)

Total reduction in emissions in the sector compared to total emissions in the Municipality of Genova

7.4 %

District heating / cooling, CHP

CHP plants

KEY ACTIONS
Development of CHP/CCHP and relative district heating networks (DIS-L01)

Total reduction in emissions in the sector compared to total emissions in the Municipality of Genova

3.4 %

Planning and Districts

Planning tools and guidelines for new urban energy plans

	KEY ACTIONS
Strategic Planning	Municipal Energy Plan (PEC) (PT-S03) City Urban Development Plan (PUC) (PT-S04) Green urban plan (PT-S05)
Road transport Planning	Management of major events – Road transport planning regulation (PT-S01) Urban Plans, Mobility and Traffic Management (PT-S02)

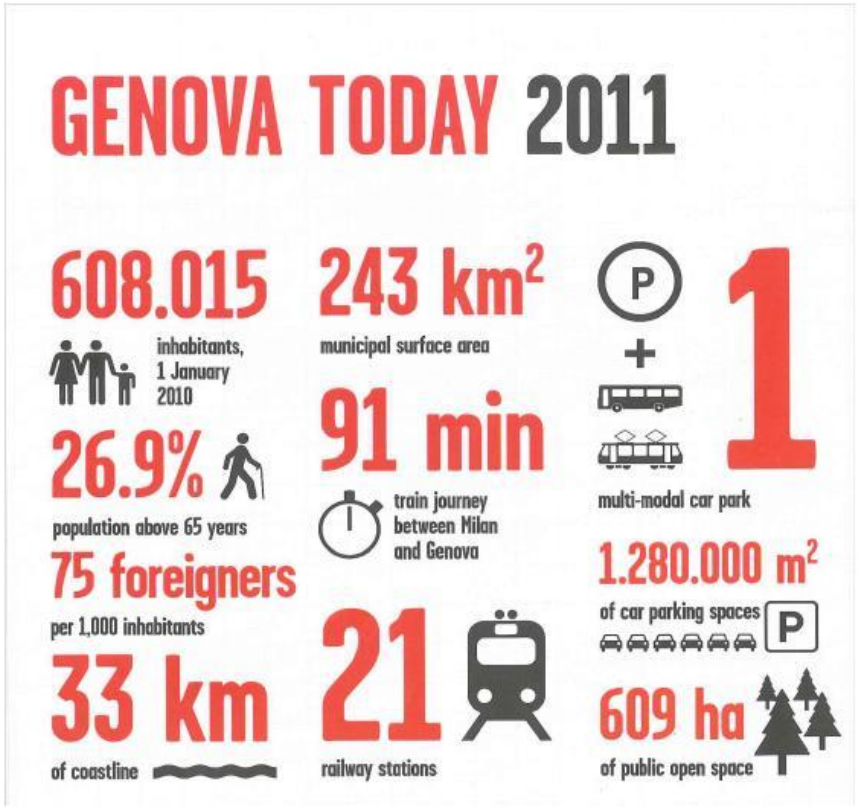
PUC – Urban Municipal Plan → Transformation Districts

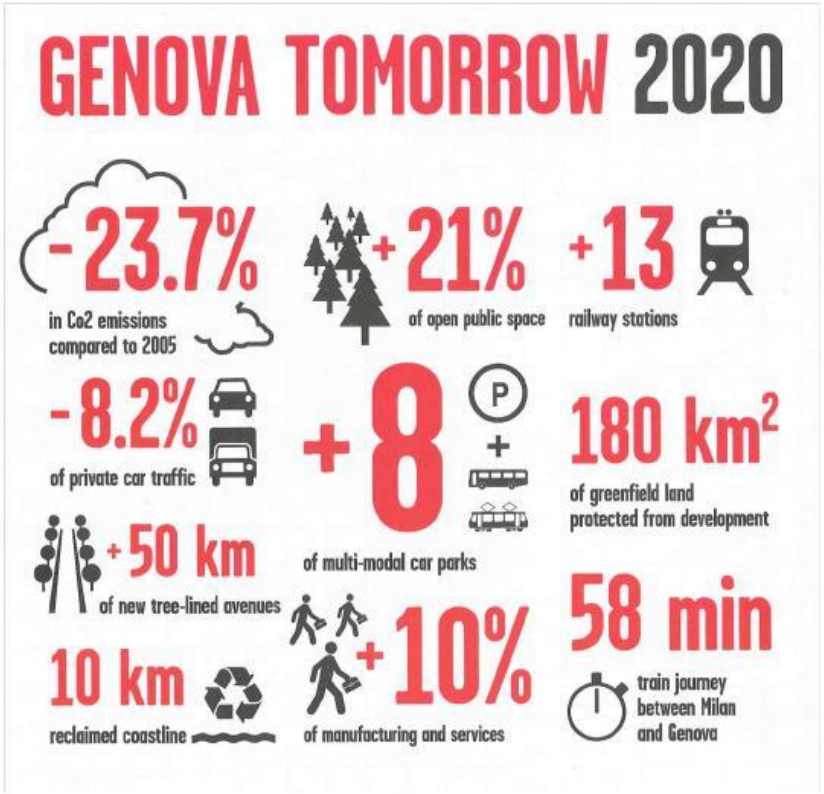
Participation and Awareness Raising

Short term and medium term strategic planning *(May 2010)*

	KEY ACTIONS
Consultancy Services	Energy observatory (PIN-S06) Energy consultation (PIN-S07)
Awareness raising activities	Environmental Policies and Green Points (PIN-S03)
Training courses and education	Communication and training (PIN-S01) Training courses for municipal administrators (PIN-S02)

Genoa Today and Tomorrow





Integrated Planning

Genoa Smart City

Genoa Smart City Association

Established in 2010

Founding Members:

- **Municipality of Genoa**
- **University of Genoa**
- **Enel Distribution**

Genoa Smart City Association

Institutions

AUTORITA' PORTUALE
CAMERA DI COMMERCIO
MUVITA
PROVINCIA DI GENOVA
REGIONE LIGURIA

Business

ABB
AMIU
ANSALDO ENERGIA
ANSALDO SIST. INDUSTRIALI
ANSALDO STS
ANSALDO T & D
D'APPOLONIA
ENEL Distribuzione
ENEL Green Power
ERICSSON
GENOVA RETI GAS
POSTE ITALIANE
QUI GROUP
SELEX ELSAG
SIEMENS
SOFTECO SISMAT
TELECOM
UNICREDIT – OFFICINAE VERDI

Ass

ASSEDIL
ASSISTAL
CONFINDUSTRIA
CONSORZIO SIIT PMI
FEDERABITAZIONE LIGURIA - CONFCOOPERATIVE
SIIT
UST CISL

SMEs

AIZOON
ALPHA TRADING
CLBS
COSTRUZIONI
DANIBEL
DEDALO ESCO
DIXET
ECOMISSION TEKNIT
ELETTROGREEN POWER
ELKROM
EUROPAM
FaSE
FOS
GENOVA CARSHARING
GENOVA HIGH TECH
GAS IT
GENOVA PARCHEGGI
GENOVARENT
GTER
IE SOLUTIONS
INFINITY TECHNOLOGY SOLUTIONS
ITALIA OIL (Green Div)
ORTEC Industriale S.p.A.
SINGULARITY
SIRCE
STUDIO VIBRACCI - KARISMA
SVILUPPO GENOVA
TECNOCONSUL
TECNOEDILE s.r.l.
TECNOPROCESS
TERMINAL SAN GIORGIO

Research

IRE SpA
CETENA
CNR
ISTITUTO DAVID CHIOSSONE
UNIVERSITA' DI GENOVA

Civil Society

COMUNITA' DI SANT'EGIDIO
FESTIVAL DELLA SCIENZA
MUSIC FOR PEACE
PRIVITERA Giuseppe

TRANSFORM Project

«Strategic sustainable Planning and screening of city plans»

Transform Project's main objective is to identify a clear methodology to turn a city into smart, setting up a "Transformation Agenda".
Website**: www.urbantransform.eu**

PARTNER CITIES: Amsterdam, Copenaghen, Genoa, Hamburg, Lyon, Wien

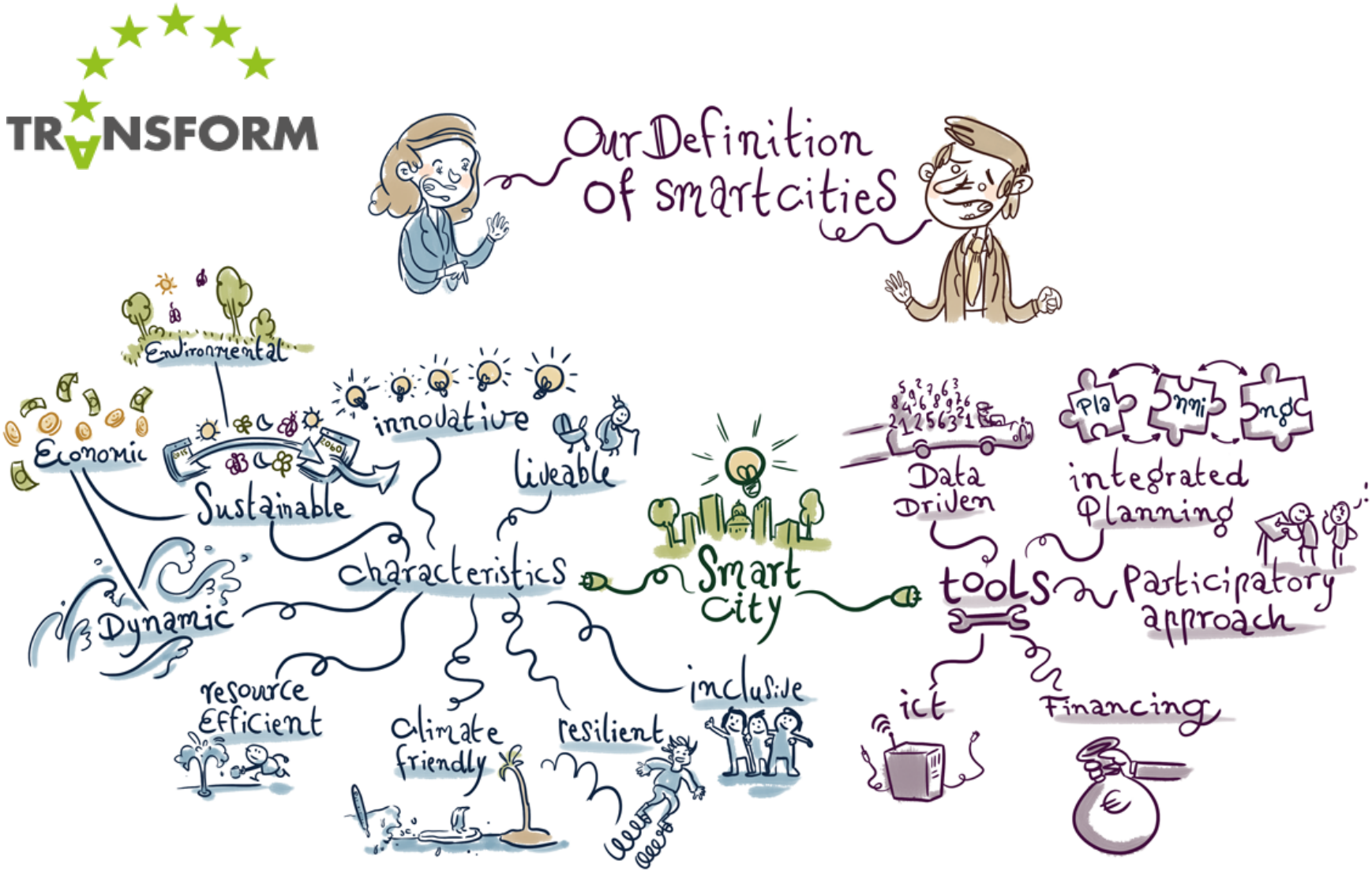
LOCALI PARTNERS IN GENOA: IRE SpA, University of Genoa, Enel Distribution

The TRANSFORM definition of a "SMART ENERGY CITY"

«The Smart Energy City is higly **energy and resource efficient**, and is increasingly **powered by renewable energy sources**: it relies on **integrated and resilient resource systems**, as well as insight-driven and innovative approaches to strategic planning. The application of **information, communication and technology** are commonly a means to meet these objectives.

The Smart Energy City, as a core to the concept of the Smart City, provides its users with a **liveable, affordable, climate-friendly** and engaging environment that supports the needs and interests of its users and is based on a **sustainable economy».**

TRANSFORM Project



The TRANSFORM Method

- Data Collection
  - **SEAP** if already available
  - **Qualitative (Set of KPI)** Assessment of the «maturity level» of the city and starting point to determine goal
  - **Quantitative**
- Political Commitment (Municipality of Genoa)
- Stakeholder analysis (Genoa Smart City Association)
- Selection and analysis of focus topics- "Intake workshops" with all relevant stakeholders, 1st draft of planned measures &a activities and SWOTs
- Verification of concepts by simulation (decision support tool) or testing in the field **(Smart Urban Labs)**
- Definition of measure & action plan

= Transformation Agenda

The Smart Energy City and KPI's

In connection with the definition of a Smart Energy City and the key elements a number of **Key Performance Indicators** (KPI's) were established. The reason for this was a need **to measure how far the cities were from the ideal situation - the Smart Energy City level**. If a city wants to become a Smart Energy City, it is also needed to know, where it is situated today.

The actual situation, or level of "smartness" of a city, can be described in two ways:

1) The actual situation on energy performance, measured on consumption or activities,
2) The actual situation on a policy scale, measured on policies, strategies and visions.

The TRANSFORM project therefore found it relevant to operate with **both sets of KPI's**

KPI's for the actual situation/energy performance were given the nickname "**hard KPI's**", since they were based on measureable facts (also called a baseline analysis);

KPI's for measuring the actual political actions and involvement were given the nickname "**soft KPI's**"

KPI's

KP1 Resource system
- integration
- Integrated
- energy planning
- Development of ICT use
- Use of ICT tools in city
- planning and mgmt.
- Waste (integration with resource systems)
- Transportation (integration with energy systems)

KPI2 Access to energy services
- Access to affordable energy services
- Level of energy services provided

KP3 Resilience
- Self-sufficiency distributed generation
- Energy price shock

KP4 Energy efficiency
- Reduction of energy use
- Increasing efficiency of distribution networks
- Increasing efficiency in the suply system
- Increasing end-use energy efficiency
- Reduction in primary energy demand

KPI5 Renewable energy
- Production of electricity and heat from RES
- Level of public and private investment in developing RES
- Penetration of RE in the city's energy portfolio
- GHG emissions caused by energy production & transportation

KPI6 Active users
- Smart City – reflective behaviour
- Awareness of the city's Smart energy vision
- Formal& informal hubs and innovation centers
- Self-sufficiency by users
- Engagement from users
- Investment

KPI7 Sustainable economy
- Investment in innovation (public&private)
- Availability and prevalence of green jobs in the city
- Green initiatives

KPI8 Smart Governance
- Local stakeholders involved in investment and maintenance
- Governance
- e-Governance
- Standards for data collection and analysis
- Government engagement with users

CASE STUDY: MONITORING GENOA SEAP

Silvia Moggia

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agenzia regionale ligure

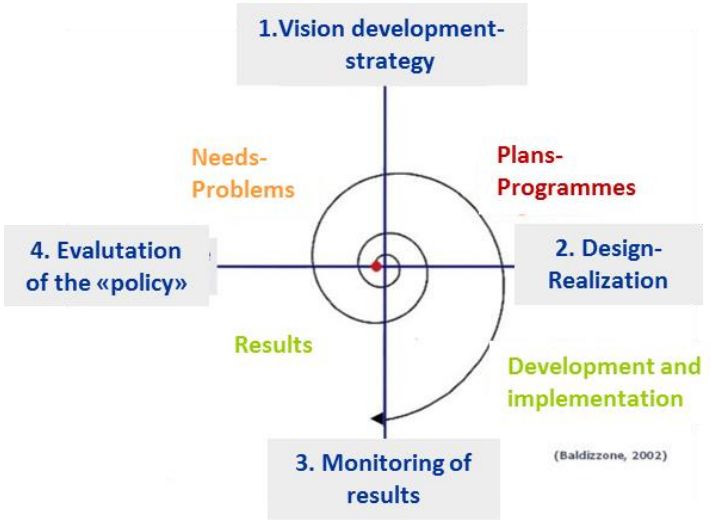
IRE spa - Divisione Energia

Monitoring the SEAP in Genoa: the approach

The SEAP of Genoa was designed as a **dynamic tool** in order to make possible a **continuous improvement**, and its monitoring represents the essential component of this **cyclic process**.

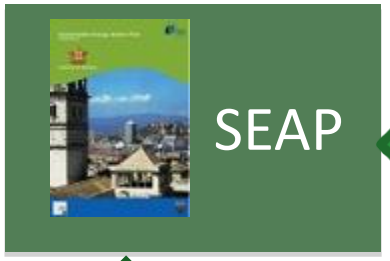
For its concrete implementation it's necessary to take into account not only the change of needs and the initiatives started inside the Public Administration, but also the **feedbacks from the local territories and the regulatory and economical framework**. The monitoring represents the essential tool to supervise the whole SEAP process, with particular reference to the **"re-calibration" of the objectives and of the instruments** useful for the implementation of SEAP actions.

Within this cyclic SEAP process, the municipal territory increases its quality, through consecutive steps towards a continuous improvement.



Monitoring the SEAP in Genoa: Vision

2010: The SEAP gave a strong impulse to the sustainable policies of Municipality.

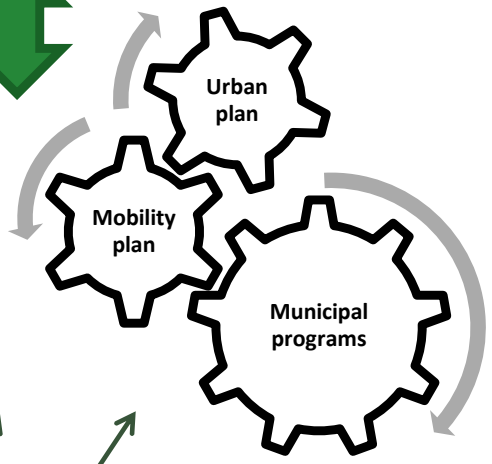


Vision update

Monitoring 2014: **INTEGRATION OF SMART STRATEGY AND PROJECTS INTO SEAP**

Smart Strategy is a way to move towards sustainability objectives through the use of renewable energy and the development of cities as networks able to receive data, energy, images…

Efforts to introduce the SEAP within the ordinary planning of the City and to adopt its criteria (inventory, indicators,...), procedures (data collection, monitoring, for example) and purpose (target results).



Results: Smart planning, Genoa Smart City Association (stakeholders involvement and new projects), Smart Week and other public events

Implementation and continuous monitoring of the SEAP (intermediate internal reporting 2011, 2012)

Monitoring the SEAP: Stakeholders and citizens involvement

In 2010, Genoa, aware of on-coming crisis and social challenges, started a **transformation process towards the Smart City**.

Innovative methodology following the concept of the **quadruple helix projects**, involving different but essential aspects:

- citizens' needs
- political vision & strategic planning
- academic community's creativity
- businesses marketing strategies
- job creation opportunities
- regulatory systems
- funding opportunities.

WORKSHOPS WITH CITIZENS AND ASSOCIATIONS

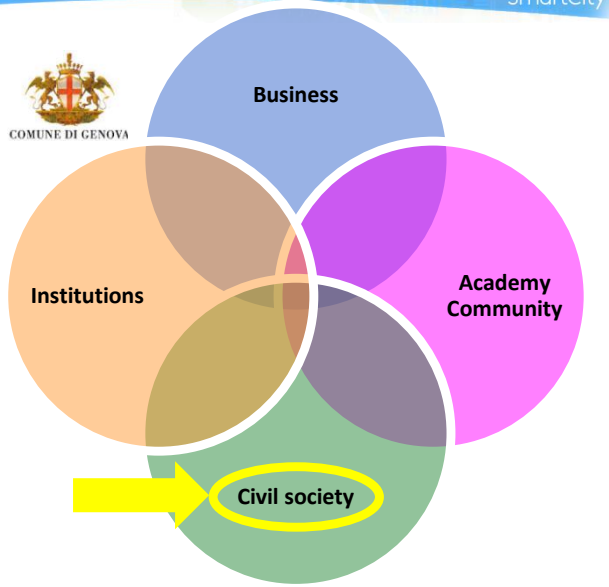
- ❑ **Smart Urban Lab**, organized within "Transform" project: intensive workshops on Energy, Mobility and Governance. Main objective: translate ideas and proposals into a real project
- ❑ Dissemination **events** (e.g. **Genova Smart Week**)

GENOA SMART CITY ASSOCIATION

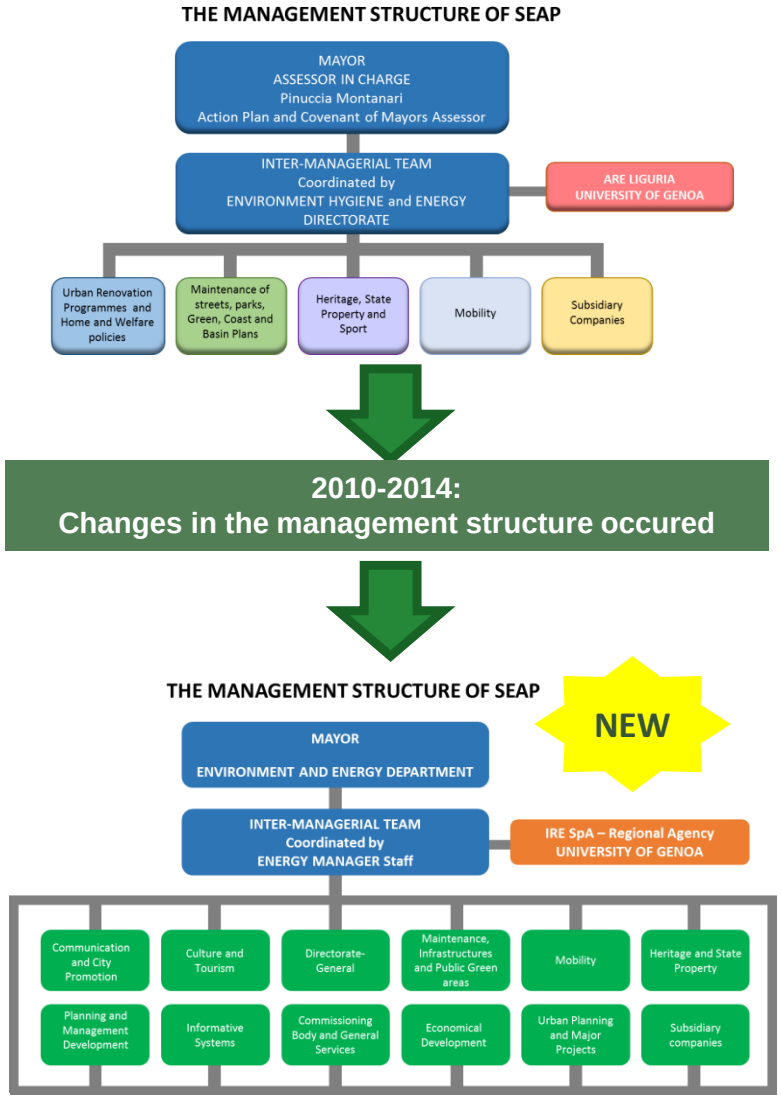
over 90 members (e.g. Large companies, SMEs, Business Associations, Citizens Associations, Port Authority, Region of Liguria, Chamber of Commerce, University of Genoa, National Research Center, IRE SpA).

SEAP -> Smart City

improving the quality of life through sustainable economic development based on innovation and research, led by the local government in a process of integrated planning.



Monitoring the SEAP in Genoa: Management structure



The management structure of the SEAP is the governance tool for the SEAP monitoring and implementation as well as for the preparation of the Action Plan.

THE MONITORING PROCEDURE:

❑ **Revision of the contact person in charge for each action** in case of re-organization of some departments and offices.

❑ **Phone calls/e-mails to contact people** in order to agree meetings and ask for information to be submitted for the SEAP monitoring (timing and procedures).

❑ **Technical meetings** with contact people, in charge of the implementation for each action (staff from Genoa Municipality Departments or external parties, like e.g. Liguria Region, ARTE, AMIU, AMT, etc).

❑ **Information collection.** During meetings and thanks to phone calls and e-mails, information regarding **qualitative and quantitative assessment of the actions progress** were collected. Critical situations were identified.

Monitoring the SEAP in Genoa: BEI & MEI

The BEI shows the overall situation within the territory of the local authority and the Monitoring Emissions Inventories (MEI) shows the progress respect to the target.

Full reporting: 2014

It's essential that the methodology for the preparation of BEI and MEI is consistent to make data comparable.

BEI 2005 was"re-calculated" in order to accept some comments of the **JRC Feedback Report** in MEI and make them comparable one to each other.

Moreover new and **more accurate data available** for 2005 BEI were included.

E.g.

- Changes in electricity emission factor (both in BEI, MEI and in **actions impacts** calculation (0,483 tCO2/MWh has been applied to the final electrical consumption)
- Biomass – residential sector: new and more reliable statistics available and a further improvement of these data is expected in the next year thanks to a sample case survey promoted by Liguria Region.
- Combined heat and power- electricity production: the CHP plant of Genova Sampierdarena was removed since the nominal power of the plant (not owned by the Municipality) is higher than 20 MW. The heat production was preserved, modifying the original value through the latest more reliable information.
- Biofuels: new calculation in accordance with the new SEAP Guidelines (namely considering 5% of the conventional diesel as biodiesel whose emission factor is equal to zero).

Monitoring the SEAP in Genoa: BEI 2005

NEW

A. Final energy consumption

Please note that for separating decimals dot [.] is used. No thousand separators are allowed.

Category	FINAL ENERGY CONSUMPTION [MWh]															
			Fossil fuels								Renewable energies					
	Electricity	Heat/cold	Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Plant oil	Biofuel	Other biomass	Solar thermal	Geothermal	Total
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:																
Municipal buildings, equipment/facilities	115.844		210.214		12.990	47.795								113		386.956
Tertiary (non municipal) buildings, equipment/facilities	690.854	51.913	956.305	70.772	138.311	54.575										1.962.730
Residential buildings	670.036	25.957	2.494.569	11.730	-	357.202							17.289			3.576.783
Municipal public lighting	37.800															37.800
Industries (excluding industries involved in the EU Emission trading scheme - ETS)																-
Subtotal buildings, equipments/facilities and industries	1.514.534	77.870	3.661.088	82.502	151.301	459.572	-	-	-	-	-	-	17.289	113	-	5.964.269
TRANSPORT:																
Municipal fleet						30.676	6.618									37.294
Public transport	14.222		179			96.603	269									111.273
Private and commercial transport						190.000	1.505.628					10.000				1.705.628
Subtotal transport	14.222	-	179	-	-	317.279	1.512.515	-	-	-	-	10.000	-	-	-	1.854.195
Total	**1.528.756**	**77.870**	**3.661.267**	**82.502**	**151.301**	**776.851**	**1.512.515**	**-**	**-**	**-**	**-**	**10.000**	**17.289**	**113**	**-**	**7.818.464**

CO2 or CO2 equivalent emissions

Please note that for separating decimals dot [.] is used. No thousand separators are allowed.

Category	CO2 emissions [t]/ CO2 equivalent emissions [t]															
			Fossil fuels								Renewable energies					
	Electricity	Heat/cold	Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Plant oil	Biofuel	Other biomass	Solar thermal	Geothermal	Total
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:																
Municipal buildings, equipment/facilities	55.953	-	42.463	-	3.624	12.761	-	-	-	-	-	-	-	-	-	114.801
Tertiary (non municipal) buildings, equipement/facilities	333.682	10.486	193.174	16.348	38.589	14.572	-	-	-	-	-	-	-	-	-	606.851
Residential buildings	323.627	5.243	503.903	2.710	-	95.373	-	-	-	-	-	-	3.484	-	-	934.340
Municipal public lighting	18.257	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.257
Industries (excluding industries involved in the EU Emission trading scheme - ETS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Subtotal buildings, equipments/facilities and industries	731.520	15.730	739.540	19.058	42.213	122.706	-	-	-	-	-	-	3.484	-	-	1.674.250
TRANSPORT:																
Municipal fleet	-	-	-	-	-	8.190	1.648	-	-	-	-	-	-	-	-	9.838
Public transport	6.869	-	36	-	-	25.793	67	-	-	-	-	-	-	-	-	32.765
Private and commercial transport	-	-	-	-	-	50.730	374.901	-	-	-	-	-	-	-	-	425.631
Subtotal transport	6.869	-	36	-	-	84.713	376.616	-	-	-	-	-	-	-	-	468.235
OTHER:																
Waste management																
Waste water management																
Please specify here your other emissions																
Total	**738.389**	**15.730**	**739.576**	**19.058**	**42.213**	**207.419**	**376.616**	**-**	**-**	**-**	**-**	**-**	**3.484**	**-**	**-**	**2.142.485**
Corresponding CO2-emission factors in [t/MWh]	0,483	0,202	0,202	0,231	0,279	0,267	0,249				-	-	0,202	-		

Monitoring the SEAP in Genoa: BEI 2005

NEW

B1. Municipal purchases of certified green electricity

Certified green electricity (MWh)	
CO2 emission [t/MWh]	

B2. Local/distributed electricity production (renewable energy only)

Local renewable electricity plants (ETS and large-scale plants>20MWe not recommended)	Renewable electricity produced [MWh]	CO2 emission factor [t/MWh produced]	CO2 /Coe eq. emissions [t]
Wind power			
Hydroelectric power	3489		
Photovoltaic	94		
Geothermal			
Biogas	72552	14510	
Total	76135	0,2	

B3. Local/distributed electricity production

Locally generated electricity (excluding ETS plants , and all plants/units > 20 MW)	Electricity produced (MWh)		Energy carrier input [MWh]										CO2/Co2 eq. Emissions (t)	
			Fossil fuels					Waste	Plant oil	Other biomass	Other renewable	Other		
	Total	from renewable sources	Natural gas	Liquid gas	Heating oil	Lignite	Coal						Fossil sources	Renewable sources
Combined Heat and Power														
Other														
Total	0													

B4. Local heat/cold production

Local heat/cold production plants	Heat/cold produced (MWh)		Energy carrier input [MWh]										CO2/Co2 eq. Emissions (t)	
			Fossil fuels					Waste	Plant oil	Other biomass	Other renewable	Other		
	Total	from renewable sources	Natural gas	Liquid gas	Heating oil	Lignite	Coal						Fossil sources	Renewable sources
Combined Heat and Power	77870		349527										69905	
District heating (heat-only)														
Other														
Total	77870		349527										69905	

New objective of CO_2 reduction by 2020:
-502.494 tCO_2
-23,1% of the total CO_2 emissions of 2005

Monitoring the SEAP in Genoa: MEI

Year 2011

DATA COLLECTION:

- ❑ Municipal buildings, equipment/facilities and municipal public lighting: data owned by the Municipality;
- ❑ Residential and tertiary (not municipal) buildings, equipment/facilities: natural gas data from SNAM Reti Gas; other energy sources from E²Gov;
- ❑ Municipal public lighting: data have been provided directly by the Municipal offices;
- ❑ Transport: data about the municipal fleet consumptions provided by the Municipality itself, data about the public transport from AMT (Manager of Local Public Trasport facility). Private transport data from traffic surveys and estimations on the basis of BEI 2005, applying the changes in terms of traffic flows and vehicle fleet referred to 2011.
- ❑ RES electricity production and heat/cold production (from CHP or district heating): data from E²Gov, integrated, if available, with other data provided directly from the companies managing the plants (e.g. electricity production from biogas and of thermal energy from CHP).

E²Gov

Regional Energy and Environmental Database of Liguria Region

Energy carrier	Data sources
Natural gas	- Direct survey on punctual power plants (questionnaires); - Municipal data (direct request to the distributor).
Oil products	- Direct survey on punctual power plants (questionnaires); - Regional data available from the Oil Bullettin of the Economical Development Ministry; - Oli products sales from the main storages in the region (questionnaires); - Oli products sales from the main wholesalers in the region (questionnaires); - Estimation model to calculate the road transportation consumption based on the sales in the Province.
Coal	- Direct survey on punctual power plants (questionnaires);
Electricity	- Direct survey on punctual power plants (questionnaires); - Data from GRTN/Terna (Manager of the National Transmission Network of Electricity; - Data from Enel Distribuzione.
Biomass	- Regional data from ISTAT (National Institute of Statistics).

The data of the punctual plants are collected by questionnaires and registered in the Regional Database; the others are collected at the highest available level of disaggregation (regional/provincial/municipal) and elaborated statistically so as to obtain the municipal level.

The estimate of road transport consumptions is performed separately for urban traffic consumptions from those related to town traffic and motorways; in fact the urban traffic consumptions are considered as diffuse sources, while those related to suburban traffic are considered, when huge and when data on vehicular flows are available, linear sources as highways.

Monitoring the SEAP in Genoa: MEI 2011

NEW

A. Final energy consumption

Please note that for separating decimals dot [.] is used. No thousand separators are allowed.

Category	FINAL ENERGY CONSUMPTION [MWh]															
			Fossil fuels								Renewable energies					
	Electricity	Heat/cold	Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Plant oil	Biofuel	Other biomass	Solar thermal	Geothermal	Total
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:																
Municipal buildings, equipment/facilities	109.722		191.733		457	33.842								113		335.867
Tertiary (non municipal) buildings, equipment/facilities	735.284	42.567	877.251	41.839	105.715	12.670										1.815.326
Residential buildings	664.765	21.284	2.171.561	7.726	-	185.323							16.578	272		3.067.510
Municipal public lighting	35.802															35.802
Industries (excluding industries involved in the EU Emission trading scheme - ETS)																-
Subtotal buildings, equipments/facilities and industries	1.545.573	63.851	3.240.545	49.565	106.172	231.835	-	-	-	-	-	-	16.578	385	-	5.254.504
TRANSPORT:																
Municipal fleet						27.561	5.932									33.493
Public transport	10.810		253			143.410	129									154.602
Private and commercial transport			8.061	19.371		560.865	826.674			29.029		29.519				1.473.519
Subtotal transport	10.810	-	8.314	19.371	-	731.836	832.735	-	-	29.029	-	29.519	-	-	-	1.661.614
Total	**1.556.383**	**63.851**	**3.248.859**	**68.936**	**106.172**	**963.671**	**832.735**	-	-	**29.029**	-	**29.519**	**16.578**	**385**	-	**6.916.118**

CO2 or CO2 equivalent emissions

Please note that for separating decimals dot [.] is used. No thousand separators are allowed.

Category	CO2 emissions [t]/ CO2 equivalent emissions [t]															
			Fossil fuels								Renewable energies					
	Electricity	Heat/cold	Natural gas	Liquid gas	Heating Oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Biofuel	Plant oil	Other biomass	Solar thermal	Geothermal	Total
BUILDINGS, EQUIPMENT/FACILITIES AND INDUSTRIES:																
Municipal buildings, equipment/facilities	52.996	-	38.730	-	128	9.036	-	-	-	-	-	-	-	-	-	100.889
Tertiary (non municipal) buildings, equipement/facilities	355.142	8.599	177.205	9.665	29.494	3.383	-	-	-	-	-	-	-	-	-	583.488
Residential buildings	321.082	4.299	438.655	1.785	-	49.481	-	-	-	-	-	-	3.340	-	-	818.643
Municipal public lighting	17.293	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.293
Industries (excluding industries involved in the EU Emission trading scheme - ETS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Subtotal buildings, equipments/facilities and industries	746.512	12.898	654.590	11.450	29.622	61.900	-	-	-	-	-	-	3.340	-	-	1.520.312
TRANSPORT:																
Municipal fleet	-	-	-	-	-	7.359	1.477	-	-	-	-	-	-	-	-	8.836
Public transport	5.221	-	51	-	-	38.290	32	-	-	-	-	-	-	-	-	43.595
Private and commercial transport	-	-	1.628	4.475	-	149.751	205.842	-	-	8.099	-	-	-	-	-	369.795
Subtotal transport	5.221	-	1.679	4.475	-	195.400	207.351	-	-	8.099	-	-	-	-	-	422.226
OTHER:																
Waste management																
Waste water management																
Please specify here your other emissions																
Total	**751.733**	**12.898**	**656.270**	**15.924**	**29.622**	**257.300**	**207.351**	-	-	**8.099**	-	-	**3.340**	-	-	**1.942.537**
Corresponding CO2-emission factors in [t/MWh]	0,483	0,202	0,202	0,231	0,279	0,267	0,249			0,279	-		0,202	-		

Monitoring the SEAP in Genoa: MEI 2011

NEW

B1. Municipal purchases of certified green electricity

Certified green electricity (MWh)	
CO2 emission [t/MWh]	

B2. Local/distributed electricity production (renewable energy only)

Local renewable electricity plants (ETS and large-scale plants>20MWe not recommended)	Renewable electricity produced [MWh]	CO2 emission factor [t/MWh produced]	CO2 /Coe eq. emissions [t]
Wind power			
Hydroelectric power	6757		
Photovoltaic	2450		
Geothermal			
Biogas	71066	14213	
Total	80273	0,2	

B3. Local/distributed electricity production

Locally generated electricity (excluding ETS plants , and all plants/units > 20 MW)	Electricity produced (MWh)		Energy carrier input [MWh]										CO2/Co2 eq. Emissions (t)	
			Fossil fuels											
	Total	from renewable sources	Natural gas	Liquid gas	Heating oil	Lignite	Coal	Waste	Plant oil	Other biomass	Other renewable	Other	Fossil sources	Renewable sources
Combined Heat and Power														
Other														
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0

B4. Local heat/cold production

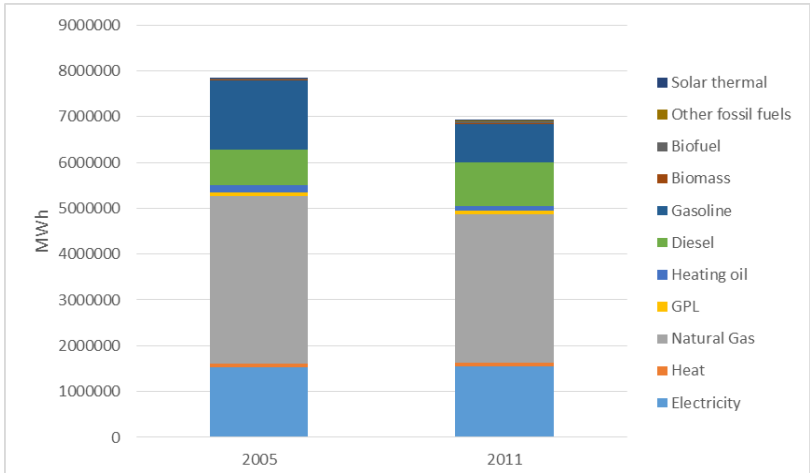
Local heat/cold production plants	Heat/cold produced (MWh)		Energy carrier input [MWh]										CO2/Co2 eq. Emissions (t)	
			Fossil fuels											
	Total	from renewable sources	Natural gas	Liquid gas	Heating oil	Lignite	Coal	Waste	Plant oil	Other biomass	Other renewable	Other	Fossil sources	Renewable sources
Combined Heat and Power	63851		190320										38445	
District heating (heat-only)													0	
Other													0	
Total	63851	0	190320	0	0	0	0	0	0	0	0	0	38445	0

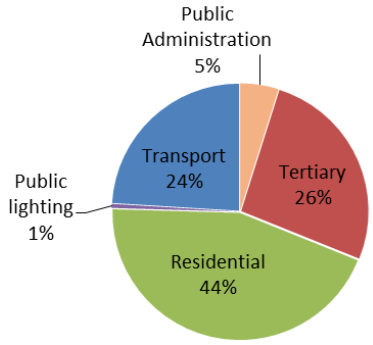
Monitoring the SEAP in Genoa: MEI Results

NEW

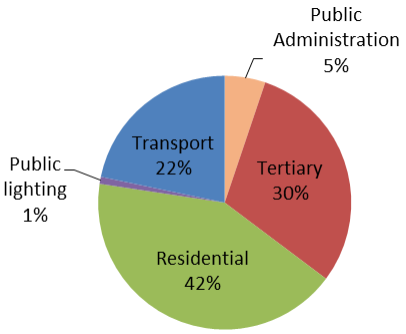
New objective of CO_2 reduction by 2020:
-23,1%

Comparison BEI/MEI - 9,4% CO_2 emissions

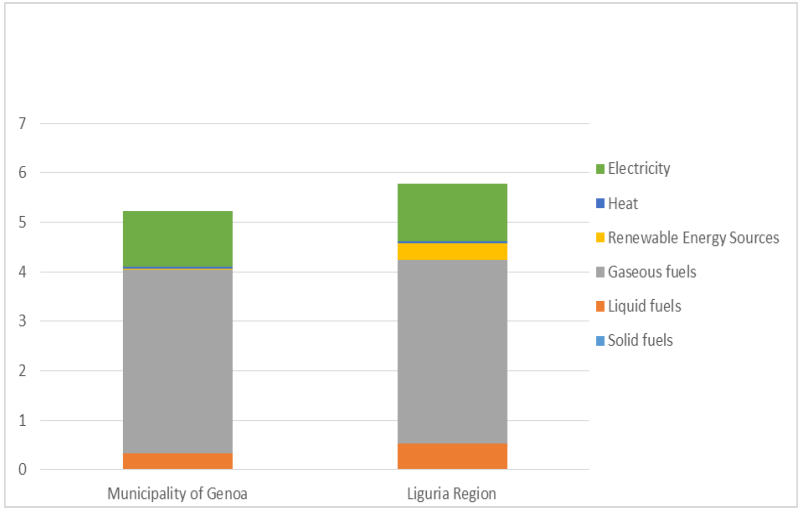




Energy consumptions per sector[%]



CO_2 Emissions per sector [%]



Monitoring the SEAP in Genoa: Actions

Code	Title
Intervention area	
Tools category	
Action promoter	
Person in charge	
Brief description of the action *Introduction* *Objectives* *Description of the action*	
Achievable results, energy saving and emissions reduction potential	
Time scheduling	
Involved actors/Promoters	
Ratings and financial strategies	
Possible obstacles or constraints/market barriers	

2014 Monitoring

Monitoring indications
Action progress Qualitative: Quantitative: %
Environmental monitoring Energy savings (MWh/year): RES production (MWh): Emissions reduction (tCO_2):
Staff
Costs
Barriers or obstacles

SEAP: dynamic tool

UPDATE of EACH SEAP ACTION:

- Intervention area
- Tools category
- Action promoter

JRC Guidelines

- New description and objectives if changed
- Update of time scheduling

NEW

2014 MONITORING:

Some Indicators:

- ❑ Power of RES plants (MW) and energy production per plant (MWh),
- ❑ nr and power of converted heaters (-, kW),
- ❑ nr of energy audits (-),
- ❑ specific energy consumption before and after EE interventions (MWh/mq),
- ❑ energy savings per publich lighting lamp replaced (MWh/lamp),
- ❑ urban underground extension (km),
- ❑ nr and engine size of municipal vehicles replaced (-, cm^3),
- ❑ nr of car sharing vehicles (-),
- ❑ length of bike paths (km)
- ❑ nr of bike parks (-),
- ❑ nr of meetings and participants to meetings with citizens stakeholders (-,-)…

Monitoring the SEAP in Genoa: Actions

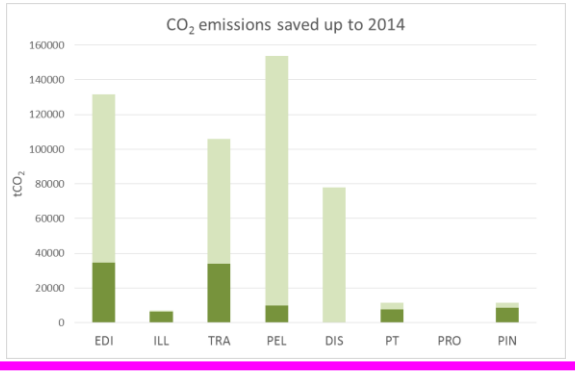
2014 Monitoring

Monitoring indications
Action progress Qualitative: Quantitative: %
Environmental monitoring Energy savings (MWh/year): RES production (MWh): Emissions reduction (tCO_2):
Staff
Costs
Barriers or obstacles

JRC Guidelines → •Full Time Equivalent Job –FTE •Investments

Environmental Monitoring:

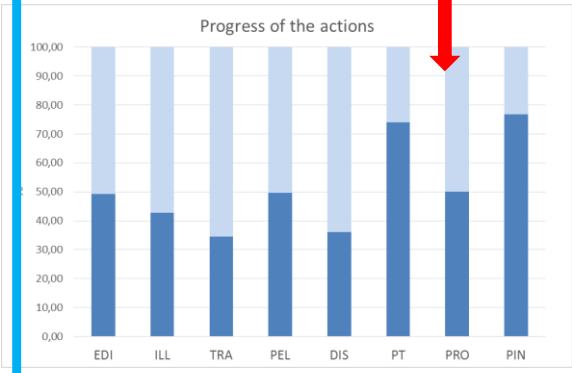
Energy savings (MWh), RES production (MWh) and CO_2 reduction (t/CO_2) achieved



Action Progress

– *Qualitative*: 8 classes

– *Quantitative:* progress percentages



4	NOT STARTED
12	IN DEFINITION PHASE
15	STARTED
18	ONGOING
11	ADVANCED
18	COMPLETED
6	POSTPONED
2	CANCELLED

Barriers:

- ❑ tender procedures,
- ❑ difficulties in the governance process,
- ❑ technical difficulties in some plants realization,
- ❑ lack of citizens and operators awareness on new technologies available..

Monitoring the SEAP in Genoa: update of actions

CODE	ACTION	MONITORING 2014			
		Energy savings/FER (MWh) achieved up to 2014	CO_2 Reduction achieved up to 2014 (tCO_2)	Progress	
				Qualitative	%
EDI - S01	Installation of thermal solar collectors on the roofs of sports centres	411	104	Completed	100
EDI - S02	Tenders/out-contracting for management of heating systems	0	0	In progress	90
EDI - S03	Building Regulations	0	0	Started	30
EDI - S04	Energy Audits on school buildings	0	0	Completed	100
EDI - S05	Development of municipal energy data-base	0	0	Advanced	70
EDI - S06	Retrofitting for heating systems (conversion from heating oil to natural	45390	12664	Completed	100
EDI - S07	Multi-service Technology Agreement for local health centres of Liguria Region	47180	17825	In progress	100
EDI - S08	Energy saving in school buildings	5700	3610	Started	70
EDI - S09	Energy management of the property owned by A.R.T.E. (local housing agency)	1496	377	In progress	25
EDI - S10	Energy rationalization in malls	0	0	Started	10
EDI - L01	Energy rationalization in hotels	0	0	In dephinition stage	5
EDI - L02	General interventions on the tertiary sector	0	0	In dephinition stage	5
EDI - L03	Domotics – Home automation	0	0	In dephinition stage	5
EDI - L04	Energy efficiency improvement MuMA	0	0	In dephinition stage	10
EDI - L05	R2Cities project	0	0	In progress	20
ILL – S01	Energy efficiency measures for street lighting	10816	5224	In progress	30
ILL – S02	Replacement of traditional light bulbs with LED lighting for traffic lights	2479	1198	Advanced	98
ILL – S03	Replacement of light bulbs of the elevated road	0	0	Postponed	0
TRA – S01	Protected axes	0	0	In dephinition stage	0
TRA – S02	Resident permit parking policy: extension of Blue Areas	38920	9924	In progress	50
TRA – S03	Elevators and funiculars	926,5	236	Advanced	50
TRA – S04	Infrastructure	50040	12760	Advanced	90
TRA – S05	Environmental islands	18162	4631	Started	70
TRA – S06	Extension of the underground line	5560	1418	Completed	100
TRA – S07	Eco-friendly fleet transition plan	3707	945	Completed	100
TRA – S08	Interchanging hubs	2780	709	Advanced	50
~~TRA – S09~~	~~Navebus (Bus-boat)~~			Cancelled	
TRA – S10	Rationalisation of use of the municipal fleet	148	38	In progress	80
TRA – S11	Renewal of the municipal fleet	600,5	153	In progress	90
~~TRA – S12~~	~~Goods Transport~~			Cancelled	
TRA – S13	Expansion of the car sharing service	3706	945	In progress	50
TRA – S14	Soft mobility – Cycling facilities	371	94,5	In dephinition stage	20
TRA – L01	Protected axes	0	0	Postponed	0
TRA – L02	Resident permit parking policy: extension of Blue Areas	0	0	Postponed	0
TRA – L03	Elevators and funiculars	0	0	Started	0
TRA – L04	Large-scale infrastructure	0	0	Started	0
TRA – L05	Environmental islands	0	0	Started	0
TRA – L06	Extension of the underground line	0	0	Started	0
TRA – L07	Eco-friendly fleet transition plan	674	180	In progress	0,04
TRA – L08	Interchanging hubs	278	71	Started	5
TRA – L09	Strengthening of the local railway system	0	0	Started	0
TRA – L14	Soft mobility – Cycling facilities	0	0	Postponed	0
TRA – L15	Wireless city network	8000	2000	Advanced	40

After Monitoring:
78 -> 86 SEAP actions in total, including the new initiatives already implemented or planned by the Administration.

NEW

- EDI - L04 "Energy efficiency improvement MuMA- Museo del Mare"
- EDI - L05 "Project R2Cities"
- PEL - S14 "PV plant installation in the Monte Scarpino landfill"
- PEL - S15 "PV plant installation on the technical bulding of Brignole Metro station"
- PEL - S16 "Integrated solar plant installation on the Media Val Bisagno Municipality building"
- PEL - S17 "PV plant and smart grid installation in the Lago Figoi sport centre"
- PEL - S18 "Wind-farm installation in Prà area"
- DIS - L03 "Installation of seapumps in the Green Apple Area, Voltri"
- PT - S06 "Project Transform"
- PT - L01 "PEAP. Environmental Energy Plan of the Port of Genoa"

~~TRA - S09 Navebus (Bus-boat)~~
~~TRA - S12 Goods Transport~~

Monitoring the SEAP in Genoa: update of actions

NEW

CODE	ACTION	MONITORING 2014			
		Energy savings/FER (MWh) achieved up to 2014	CO_2 Reduction achieved up to 2014 (tCO_2)	Progress	
				Qualitative	%
PEL - S02	Revamping and upgrading of Teglía hydropower plant	5432	2624	Completed	100
PEL - S03	Re-powering of energy from biogas plant at Monte Scarpino facility	11038	5331	Completed	100
PEL – S04	Completion of energy from biogas production at Volpara se treatment facility	2000	966	Completed	100
PEL – S05	Installation of energy production from biogas plant at Valpo sewage treatment facility	1600	773	Completed	100
PEL – S06	Agreement with private investors for the installation of sol on roofs owned by the municipal administration	0	0	Started	40
PEL - S07	Installation of photovoltaic systems on roofs of schools	286	138	Completed	100
PEL - S08	Installation of photovoltaic systems at Monte Scarpino land	25	12	Completed	100
PEL - S09	Design of multifunctional complex for energy services in fo of Corso Sardegna	0	0	In dephinition stage	10
PEL – S10	Wind-farm installation within Genoa Municipality territory	0	0	In dephinition stage	5
PEL – S11	Wind-farm installation at Scarpino Landfill plant	44	21	Completed	100
PEL – S12	Solar Purchase Groups (GAS)	0	0	Advanced	99
PEL – S13	Agreement with Enel for the realization of solar and wind p	0	0	Completed	100
PEL – S14	PV plant installation in the Monte Scarpino landfill	38	18	Completed	100
PEL – S15	PV plant installation on the technical building of Brignole M	15	7	Completed	100
PEL – S16	Integrated solar plant installation on the Media Val Bisagno building	15	7	Completed	100
PEL – S17	PV plant and smart grid installation in the Lago Figoi sport c	0	0	Started	15
PEL – S18	Wind-farm installation in Prà area	0	0	In dephinition stage	5
PEL - L01	Recovery plant installation from an Urban Solid Waste treat	0	0	Started	5
PEL – L02	Installation of energy production from biogas system at Vol treatment facility	0	0	Postponed	0
PEL - L03	Agreement with private investors for installation of solar P roofs owned by other public administrations	0	0	In dephinition stage	5
PEL - L04	Incentives for installation of hybrid solar panels on the roof facilities	0	0	Not started	0
PEL - L05	Incentives for installation of hybrid solar panels roof by pri companies	0	0	In dephinition stage	5
PEL - L06	Construction of a parabolic solar dish thermodynamic powe electricity generation	0	0	Not started	0
PEL - L07	Offshore wind platform installation	0	0	Not started	0
PEL - L08	Agreement with Enel for the realization of solar and wind p	0	0	Not started	0
DIS – S01	Installation of a CHP plant in the residential area in the forn factory, Molassana	0	0	Started	10
DIS – S02	Installation of a CCHP in the scientific-technological pole of	0	0	Completed	100
DIS - L01	CHP/Trigeneration developments and related district heati	0	0	In dephinition stage	5
DIS - L02	Criteria and technologies for energy efficiency in the City U and within POR	0	0	In progress	60
DIS - L03	Installation of seapumps in the Green Apple Area, Voltri	0	0	In dephinition stage	5
PT – S01	Management of major events – Road transport planning reg	0	454	In progress	20
PT – S02	Urban Plans, Mobility and Traffic Management	0	1362	Started	60
PT – S03	Municipal Energy Plan (PEC)	0	1589	Advanced	70
PT – S04	City Urban Development Plan (PUC)	0	2225	Advanced	98
PT - S05	Green Urban Plan	0	2043	In progress	90
PT – S05	Transform project	0	0	Advanced	80
PT - L01	PEAP	0	0	Completed	100
PRO - S01	Green Purchasing	0	0	In progress	50
PIN - S01	Communication and training	0	1135	In progress	60
PIN - S02	Training course for municipal administrators	0	1135	In progress	60
PIN - S03	Environment Policy and Green Point	0	1135	In progress	60
PIN - S06	Energy Observatory	0	1702,5	Advanced	90
PIN - S07	Energy Council	0	1702,5	Advanced	90
PIN - L01	Genoa Smart City Association	0	1702,5	In progress	100
		267838	101189	Progress of the actions:	48

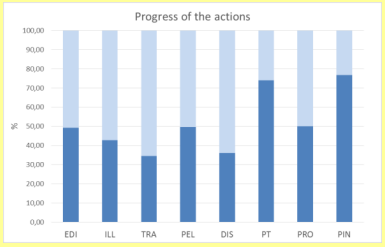
Benchmark of Excellence

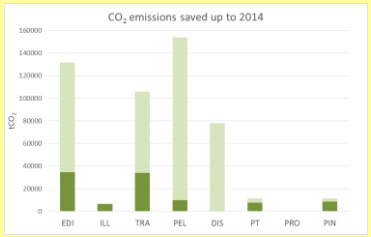
- **PT-S04 - City Urban Development Plan (PUC)**
- **PIN-S04 - Energy Observatory**
- **EDI-S06 - Retrofitting for heating systems (conversion from heating oil to natural gas**

Actions successfully implemented , that led to significant benefits. Only on-going and completed actions can be marked as BoE.

Monitoring the SEAP in Genoa: some highlights

Progress of the actions and impacts





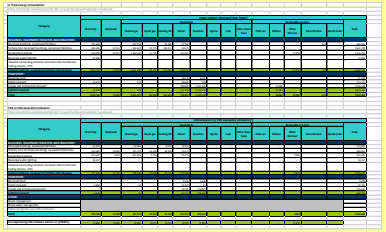
-4,72%

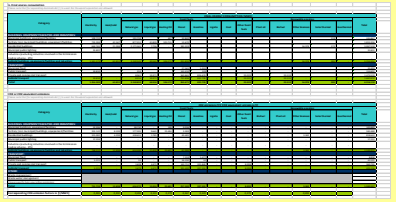
CO_2 emissions

-9,4%

CO_2 emissions

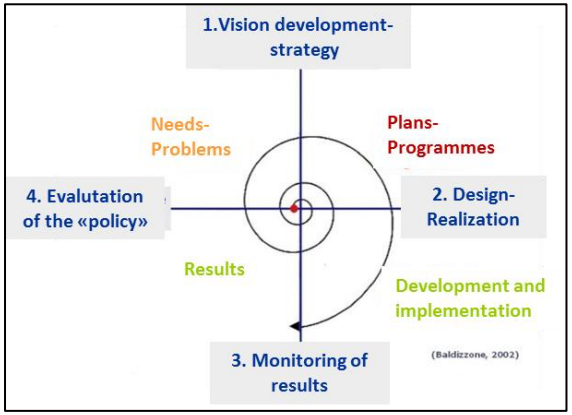
Comparison BEI/MEI





Exogenous factors:
Economic Crisis, Climate, …

NEED FOR A CONTINUOUS MONITORING AND RECALIBRATION OF THE ACTIONS ON THE BASIS OF THE RESULTS OF THE MONITORING



Thanks for your attention!

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