

18 - URBAN ENVIRONMENTAL INDICATORS

In this chapter certain aspects intrinsic to an environmental assessment of Sicily are studied in depth via a spatial and temporal comparison of a set of urban indicators obtained from the Istat study “Survey of Environmental data in cities – 2009”, with regard to six subjects:

- *WATER* – domestic consumption of drinking water and management of sewerage;
- *ENERGY* – domestic consumption of electricity and gas;
- *AIR* – air quality;
- *TRANSPORT* – public and private urban transport;
- *GREEN AREAS*- public urban green spaces;
- *REFUSE*- collection and management of refuse.

The Istat survey “Environmental data in cities” has been carried out every year since 2000 with regard to the Provincial capitals of Sicily. The study was effectuated with the support of its own Regional offices and the Statistical offices of Trento and Bolzano; since these are situated in the Regions in question the more direct contact with the data-supplying enterprises facilitates the gathering of the required information.

The indicators elaborated for each environmental theme respond to models predisposed at the international level.

There is a table where municipalities are classified in order of greatest attention to environmental compatibility; this was compiled on the basis of all the principal indicators regarding causes of environmental impact and, at the same time, the response on the part of the authorities.

Analysis of environmental quality has the aim of stimulating comparisons and publishing information about environmental phenomena that is ever more complete and integrated, with an eye to the safeguard of our cities in the face of

the relentless advance of Man.

Water – The quality of water, along with that of refuse and air management, is the environmental emergency with the greatest everyday impact on the community.

In 2009 per-capita consumption of water in Italy for domestic use (understood as an average for the 115 Provincial capitals as a whole) amounted to 68 m³ per inhabitant, which represents a 0.7% drop over the figure for 2008. At the Regional level the average was 63.4 m³. Agrigento was the Provincial capital that was most careful about using water; in fact, with a figure of 35.4 m³ it had the lowest consumption figures in the whole of Italy. For the majority of Sicilian Provincial capitals consumption was lower than average; probably also as a result of the rationing measures adopted, water-consumption has been gradually falling over the years, but this might also indicate a greater attention to the use of water resources.

As regards the resident population served by purification plants for urban sewerage, data shows a clearly improving situation. The average figure for Sicily is lower by 18.2% than the national figure. Special mention should be made of the towns of Ragusa, Messina and Siracusa, where, in 2009, there was almost total coverage; bringing up the tail we find Catania, where the service only reaches 25% of the population.

Lastly, 19 Italian municipalities, in 2009, announced that they had to resort to rationing measures in the distribution of water for domestic use (compared with 20 in the previous year). In seven municipalities these measures were short-term (less than a month), concentrated in the summer season, whilst in the remaining 12 municipalities the longer duration of the measures indicated a greater scarcity of water resources. Rationing measures in the distribution of water, with few exceptions, remain the historical prerogative of the centre and south of the country.

Air – Air pollution is an environmental issue deeply-felt in local and central administration, and also by the public at large, due to the harm that it causes for human health and the environment in general. It is a factor affecting our well-being and represents a specific indicator of the quality of life of an urban population.

The factors that can alter air-quality are numerous: factories, heating fuel, the continuous increase in traffic and rapid urbanisation. Constant monitoring of air-quality is therefore required via control-units or monitoring services around the Region for the periodical measurement of pollution levels.

A figure of 2.1 permanent control-units for monitoring air-quality per 100,000 inhabitants was calculated, for all the Provincial capitals taken together in 2009, with a reduction of 4.5% when compared to the previous year. In Sicily, the

average figure was 2.5, which was higher than the National average. The Sicilian Province with most permanent control-units for monitoring air-quality was Caltanissetta with 5 control-units per 100,000 inhabitants, whereas lower figures were recorded in Palermo, Ragusa and Trapani. Agrigento was the only Sicilian town without permanent control-units for measuring levels of pollution. One of the worst pollutants for human health is the atmospheric particulate with a diameter smaller than 10 microns (PM10), made up of solid and liquid particles suspended in the air; it might have a natural origin (e.g. forest-fires) or might derive from Man's activity, i.e. industrial processes and traffic. In order to safeguard health and the environment the tolerance threshold for PM10, is 35 days; once these have been exceeded action needs to be taken to forestall and reduce emissions.

In 2009, the average number of times that the limit (for the safeguard of human health) was exceeded, for Italian municipalities, continued to fall, arriving at a figure of 54.1 days, whereas in 2008 excesses were recorded on 57 days. This reduction is probably the result of both meteo-climatic factors and the introduction of nationwide policies, such as incentives to trade-in old cars, or local policies, such as bans on the most highly-polluting road vehicles, as well as modifications to urban road networks brought in by town councils.

In Sicily (average Regional figure of 63.1 days) all municipalities find themselves below the average national figure, excepting the city of Palermo, with its 56 days of excess. The town of Siracusa (309 days of excess) is placed last not only in Sicily, but also among Italian municipalities (mainly because of the industrial complex situated nearby).

Energy – Problems linked to electricity consumption are assuming ever greater importance with regard to safeguard of the environment.

The variables taken into consideration are electricity consumption for domestic use (in Kwh per inhabitant) and the domestic use of methane gas for heating (in m³ per inhabitant).

Figures for energy consumption linked to domestic use are more or less stable. More specifically, per capita consumption of methane gas for domestic use for heating went from 401.8 m³ per inhabitant in 2008 to 402.5 m³ per inhabitant in the year 2009 (+0.2%), whilst per capita consumption of electricity saw a more modest increase of 0.01%, arriving at a figure of 1,207 kWh per inhabitant in 2009.

The stability of figures for energy consumption is relevant if one considers that in 2009 a slight fall in maximum daily temperatures was recorded when compared to 2008; this should have led to a greater utilisation of methane gas for heating during the cold season.

In Sicily, methane gas consumption was below the national average with heterogeneous values for most Sicilian municipalities. Enna (371.8 m³ per

inhabitant) and Caltanissetta (235.9 m³ per inhabitant) were the towns with the highest levels of methane gas consumption. The reason could be linked to climatic factors that characterise Sicily, with lower temperatures than other zones bringing about an increased per capita use of methane gas during the winter months.

As for electricity, most Sicilian municipalities have higher levels of consumption than the National average. Also in this case the reason could be connected to climate; in fact, the high number of air-conditioners used regularly in the summer months could help explain this result.

Lastly, ever greater attention on the part of municipal administrations is being directed towards the issue of energy consumption. This can be seen in the more frequent recourse to sources of renewable or alternative energy. It might be emphasised that the utilisation of energy produced from renewable sources, both solar and photovoltaic energy, is widespread throughout Italy, regardless of the geographic location. More specifically, as regards solar energy, the area of square metres installed per 1,000 inhabitants in municipal buildings went from 0.01 m² in 2000 to 0.1 m² in 2009, with an increase of 57.1% over 2008. At the same time, the number of municipalities announcing that they have installed thermal solar panels went from 3 in 2000 to 59 in 2009.

With regard to photovoltaic Energy, in 2009, 69 municipalities (out of 116 in the survey) stated that they were using this technology; at present the average power installed in municipal buildings has arrived at 0.5 kW every 1,000 inhabitants, whilst in 2000 the average power was practically zero and only a single municipality declared that it used photo-voltaic panels in its buildings.

In Sicily, Siracusa stands out with figures of 4.6 m² per 1,000 inhabitants. Ragusa has 2.7 m² per 1,000 inhabitants and Palermo 0.2 m² per 1,000 inhabitants.

Refuse – The management of waste is a crucial topical issue, also because of the continual emergencies recorded in the last few years in various Italian cities; moreover, economic growth and an increase in consumption have produced a high level of refuse and therefore an evident problem linked to its disposal. In this regard the differentiated collection of urban refuse will also be analysed, it being an essential basis for launching subsequent salvage operations.

In 2009 the collection of urban refuse in Italy was represented by 604.3 kg per inhabitant. Compared to 2008 there was a 1.5% drop in the total amount of refuse collected, confirming the decreasing trend previously recorded in 2007. This fall concerns, in particular, undifferentiated collection (-4.2% in 2009 over 2008), whereas the increase in differentiated collection proceeds, but at a slower pace from 2000 onwards (+5.1% in the last year); differentiated collection reached 30.4% of that total in 2009.

In Sicily, there was a tendency towards stability in figures for the collection of

urban refuse among the nine Provincial capitals.

The figures for Catania stand out, with 745.9 Kg/inh. being the highest figure of the capitals, followed by Trapani and Agrigento (646.1 and 606.8 Kg/inh). The towns of Enna and Messina are more virtuous, with 487.4 and 514 Kg. of refuse per capita. Between 2000 and 2009 considerable increases were recorded in Trapani (about 38%), whereas Palermo witnessed a reduction of 7.4%.

With regard to differentiated collection of urban refuse the Region of Sicily finds itself in last place in the table. At the Sicilian level the most virtuous municipalities, albeit a long way from national averages, are Ragusa (15.9%) and Agrigento (15.2%). In last place at both national and Regional level, Siracusa has figures of 3.8% for differentiated collection of urban refuse.

Transport – In our cities, for economic and social development, it is of fundamental importance to be mobile, since one can have access to those facilities and services provided for the whole community. Local councils provide public transport as a response to their developmental objectives, in order to reduce the negative effects deriving from traffic (acoustic and atmospheric pollution).

A significant environmental indicator is the demand for public transport, per inhabitant, as expressed by passengers carried by urban public transport (bus, tram, trolleybus, underground and funicular railway). In 2009, in Italy, an average of 228.7 passengers per inhabitant were carried by public transport, whereas, in Sicily, this value was considerably lower (65.7). In Sicily, the highest values were recorded in Palermo (97.6) and Catania (81.1), and this emphasises how demand is usually greater in Provincial capitals with their greater resident populations. The lowest figures were recorded in Ragusa (7.5) and Caltanissetta (11.6).

The demand for private transport is measured via the motorisation-rate (number of cars per 1,000 inhabitants), and the number of motorcycles per 1,000 inhabitants. The motorisation-rate, in 2009, was high in all Sicilian Provincial capitals and the average figure (634.9 motor vehicles per 1,000 inhabitants) was higher than the national average by 17.9%. Of the municipalities in the Region the highest values for the indicator were recorded in Catania (709.9) and the lowest in Trapani (582).

Urban green spaces – The creation of urban green spaces represents an essential requirement for the redevelopment and utilisation of open land in the urban environment. In terms of environmental improvement in the quality of life, vegetation is essential for noise-reduction and purification of the air from dust and other polluting agents. Plants have the capacity to reduce levels of atmospheric, acoustic and electro-magnetic pollution, protect the soil, alleviate the extremes of urban climate, as well as affecting Man's physical and

psychological equilibrium.

In 2009 the density of urban green spaces (as a percentage of the municipal area) in Italy amounted to 9.3%, proving to be more or less stable and in line with 2008 (+0.04%). Obviously, the high values of the indicator could in general be put down to the presence of large natural parks, wooded areas, protected areas and nature reserves (when these are situated close to towns or cities).

In Sicily, the density of urban green spaces makes up 5.8% of the total area. In this case Palermo stands out because its density of urban green spaces amounts to 31.9% of the municipal area, followed by Catania, with figures that are a little higher than the national average. All the other municipalities have a lower density of green spaces than the national average, Agrigento having the lowest figure, 0.5%.

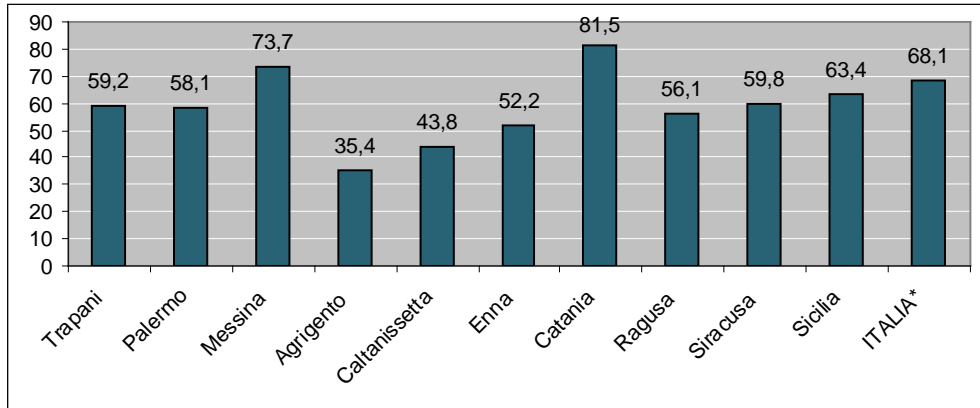
Synthetic indicator – An overall assessment of environmental eco-compatibility in Italian municipalities has been carried out by Istat, which has calculated a synthetic index made up of 20 elementary indicators that represent the seven subjects examined along with housing density.

The nine elementary indicators considered concern the impact exerted on the environment, or that which creates the impact; then there are 11 indicators regarding responses to the problems of attenuating or restoring environmental qualities in the urban scenario. Furthermore, 9 of these indicators represent actions by the general public and 10 those by municipal administrators, plus one, in which both the public and administrators, equally, are protagonists. The eco-compatibility table, worked out on the basis of the previously-described synthetic indicator, has the municipalities of Trento, Venezia and Bologna, among its first places for 2009, whereas last place is occupied by Siracusa.

Among Sicilian Provincial capitals, in 2009, the best-placed proved to be Caltanissetta, in 56th place, followed by Palermo (76°) and Messina (77°). Further down the table we find Trapani (93°) and Ragusa (96°), whilst the remaining municipalities of Agrigento (109°), Enna (112°), Catania (113°) and the above-mentioned Siracusa (115°) fill the bottom places in the table.

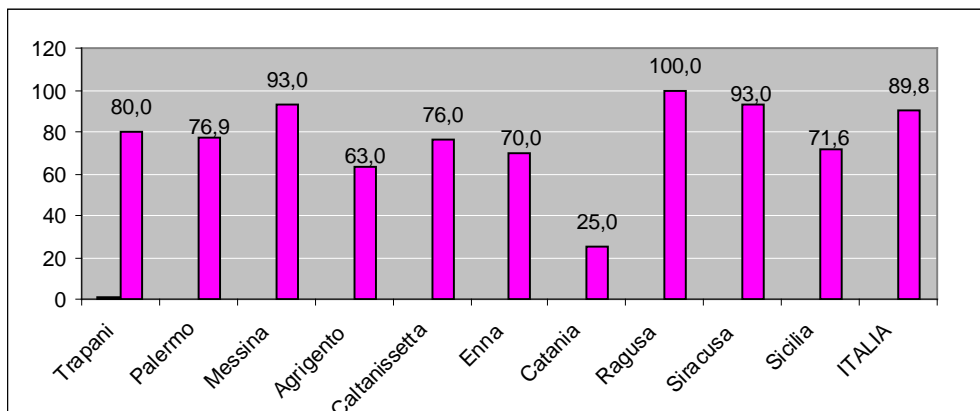
WATER

Fig. 18.1 - Water consumption for domestic use per Provincial capital in Sicily - 2009 (m³ per inhabitant)



*Aggregate values excluding the Commune of L'Aquila
Source: Istat, Environmental data in cities

Fig 18. 2 - Percentage of resident population in Provincial capitals in Sicily served by purification plants for urban sewerage - 2009



Source: Istat, Environmental data in cities

Tab 18. 1 – Water consumption for domestic use in Sicily per Provincial capital - 2000-09 (m³ per inhabitant)

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	63,0	63,2	62,1	60,8	61,6	61,4	61,5	59,4	59,4	59,2
Palermo	54,7	58,2	55,6	57,4	59,2	61,1	61,7	59,6	58,8	58,1
Messina	65,7	63,3	61,1	65,1	69,1	73,1	68,4	72,1	74,0	73,7
Agrigento	38,8	41,9	38,0	37,8	35,3	36,7	36,8	35,5	35,6	35,4
Caltanissetta	36,8	37,2	37,7	44,2	44,2	44,9	44,9	44,0	43,9	43,8
Enna	60,1	60,3	59,2	58,0	58,8	58,6	58,7	56,7	53,4	52,2
Catania	82,4	82,6	81,2	79,0	80,1	79,8	79,9	81,8	81,9	81,5
Ragusa	70,9	71,1	69,9	65,5	65,1	59,7	59,8	54,1	57,4	56,1
Siracusa	68,3	68,5	67,3	65,9	66,8	66,6	66,4	64,5	64,7	59,8

Source: Istat, Environmental data in cities

Tab. 18. 1- cont. – Water consumption for domestic use in Sicily per Provincial capital (percentage variations) - 2000-09

COMUNI	2001 / 2000	2002 / 2001	2003 / 2002	2004 / 2003	2005 / 2004	2006 / 2005	2007 / 2006	2008 / 2007	2009 / 2008
Trapani	0,3	-1,7	-2,1	1,4	-0,4	0,2	-3,4	0,1	-0,4
Palermo	6,4	-4,5	3,3	3,0	3,2	1,1	-3,5	-1,4	-1,2
Messina	-3,6	-3,5	6,5	6,1	5,8	-6,3	5,4	2,6	-0,4
Agrigento	7,8	-9,2	-0,6	-6,6	4,0	0,2	-3,4	0,1	-0,4
Caltanissetta	1,1	1,3	17,1	0,1	1,6	0,0	-2,1	-0,1	-0,4
Enna	0,3	-1,7	-2,1	1,4	-0,4	0,2	-3,4	-5,8	-2,2
Catania	0,3	-1,7	-2,7	1,4	-0,4	0,2	2,3	0,1	-0,4
Ragusa	0,3	-1,7	-6,2	-0,7	-8,3	0,2	-9,6	6,2	-2,2
Siracusa	0,3	-1,7	-2,1	1,4	-0,4	-0,2	-3,0	0,4	-7,6

Source: elaboration on Istat data

Tab. 18. 2 – Percentage of resident population in Provincial capitals in Sicily served by purification plants for urban sewerage. 2000-09

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	14,0	14,0	70,0	70,0	-	-	71,0	71,0	80,0	80,0
Palermo	72,9	72,9	73,0	73,0	73,1	73,1	74,4	75,6	76,9	76,9
Messina	90,0	92,0	94,0	96,0	96,0	96,0	96,0	96,0	93,0	93,0
Agrigento	70,0	70,0	70,0	70,0	74,5	74,5	85,0	85,0	85,0	63,0
Caltanissetta	60,0	61,6	70,8	71,5	71,5	71,5	72,7	76,0	76,0	76,0
Enna	60,0	60,0	60,0	60,0	60,0	60,0	60,0	60,0	60,0	70,0
Catania	18,0	18,0	18,8	20,6	23,0	23,0	21,0	23,0	23,0	25,0
Ragusa	80,0	85,0	98,0	98,0	93,0	94,0	100,0	100,0	100,0	100,0
Siracusa	80,0	86,0	91,0	92,0	88,0	88,0	88,0	88,0	93,0	93,0

Source: Istat, Environmental data in cities

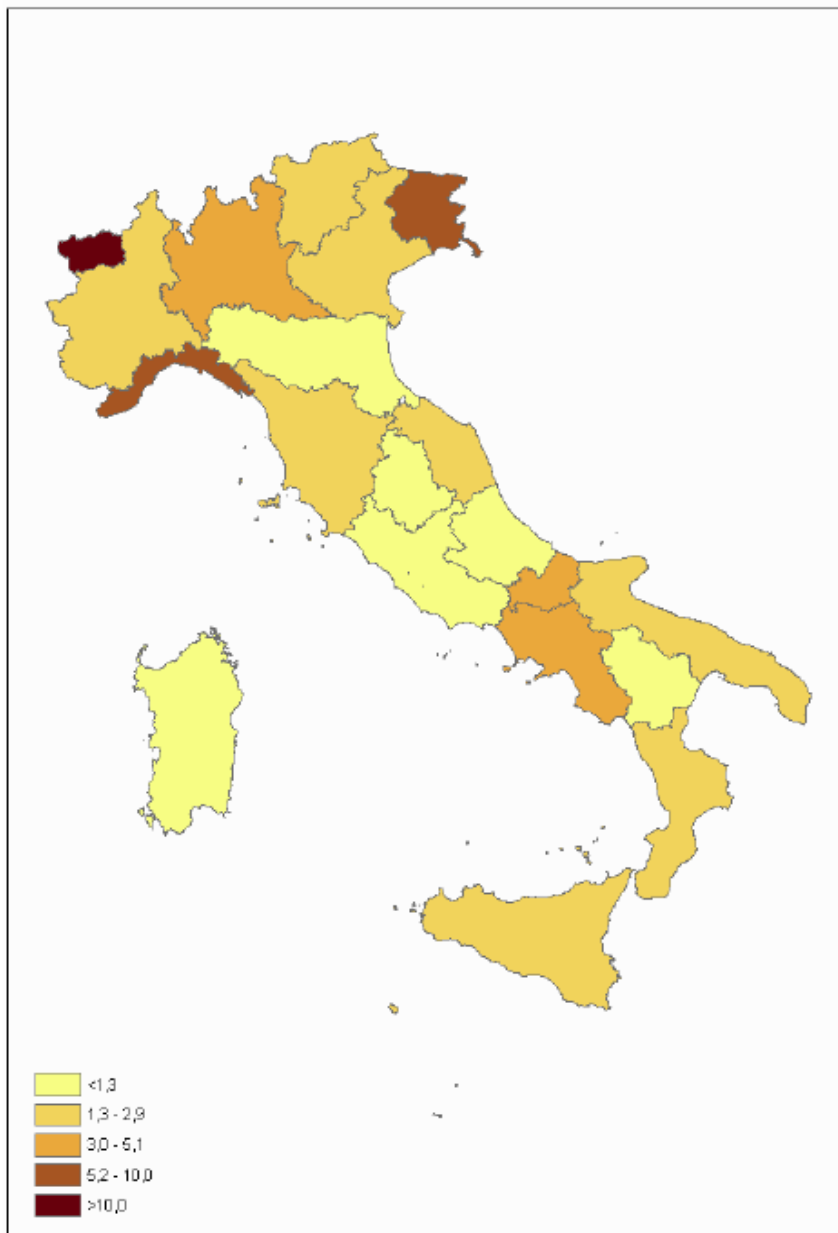
Tab. 18. 3 - Provincial capitals that adopt measures for rationing water-supply services for domestic use on the basis of the duration of the measure in the course of the year - 2009

COMUNI	Meno di un mese	Da uno a 11 mesi	Tutto l'anno
Como	X		
Massa		X	
Benevento	X		
Avellino	X		
Salerno			X
Foggia		X	
Andria	X		
Barletta	X		
Trani	X		
Bari		X	
Taranto	X		
Brindisi		X	
Lecce		X	
Trapani			X
Palermo			X
Agrigento		X	
Caltanissetta		X	
Enna			X
Catania		X	
ITALIA	7	8	4

Fonte: Istat, Dati ambientali nelle città

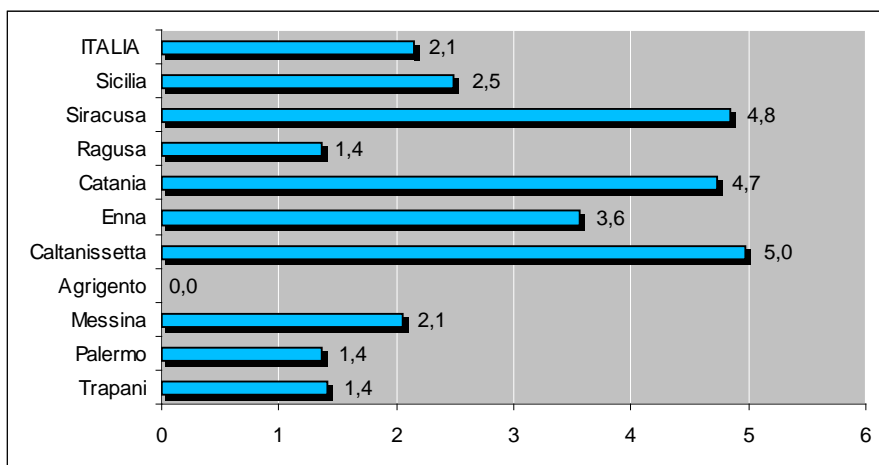
AIR

Fig. 18. 3 - Density of permanent control units for monitoring air-quality (control units per 100 km² of Communal area) in the Provincial capitals aggregated by Region - 2009



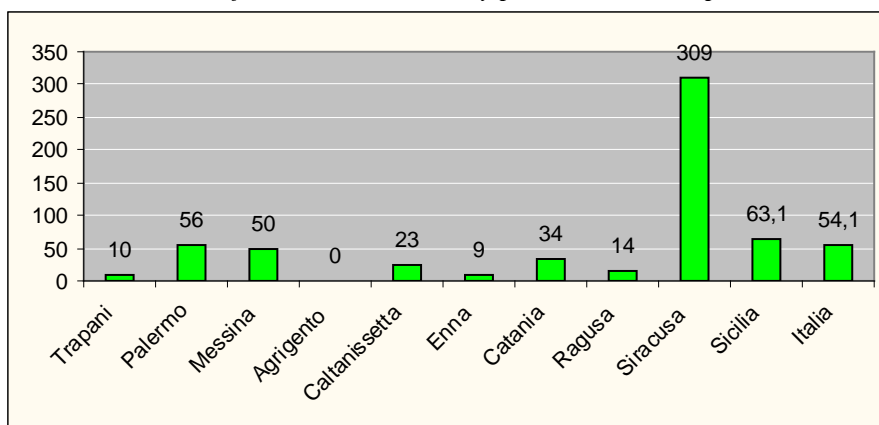
Source: Istat, Environmental data in cities

Fig. 18. 4 - Permanent control units for monitoring air-quality in Sicily in the Provincial capitals – 2009 (per 100,000 inhabitants)



Source: Istat, Environmental data in cities

Fig 18. 5 - Maximum number of times limit exceeded, for the safeguard of human health as laid down for the PM10 in Sicily per Provincial capital – 2009



Source: Istat, Environmental data in cities

Tab. 18.4 – Permanent control units for monitoring air-quality in Sicily in the Provincial capitals (per 100,000 inhabitants) - 2000-09

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	-	-	-	-	-	-	-	-	-	1,4
Palermo	1,0	1,0	1,2	1,2	1,2	1,3	1,3	1,4	1,4	1,4
Messina	1,9	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,1	2,1
Agrigent	5,4	5,5	5,4	-	-	-	5,1	5,1	5,1	-
Caltanissetta	4,8	4,9	4,9	4,9	4,9	5,0	5,0	5,0	5,0	5,0
Enna	-	-	-	-	-	-	-	-	3,6	3,6
Catania	5,0	5,2	4,2	4,2	4,6	4,6	5,0	4,3	4,7	4,7
Ragusa	-	-	-	-	-	-	-	-	1,4	1,4
Siracusa	-	-	4,9	4,9	4,9	4,9	4,9	4,9	4,8	4,8

Source: Istat, Environmental data in cities

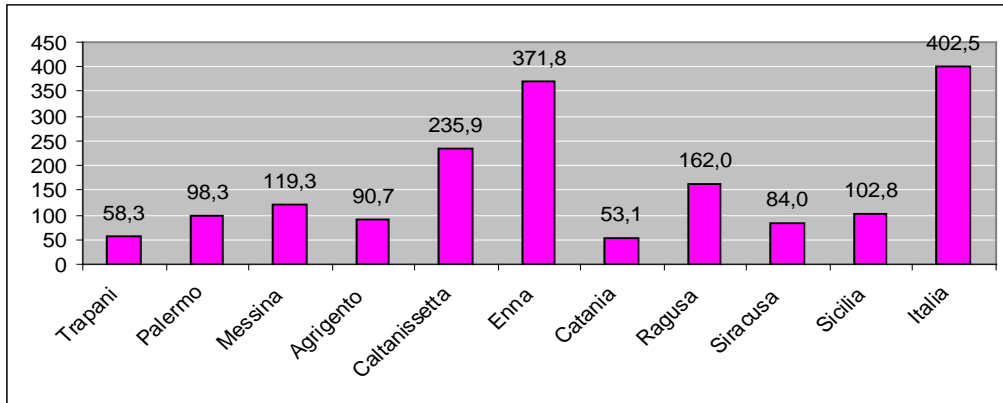
Tab 18.5 – Maximum number of times limit exceeded, for the safeguard of human health as laid down for the PM10 in Sicily per Provincial capital - 2003-09

COMUNI	2003	2004	2005	2006	2007	2008	2009
Trapani	-	-	-	-	-	-	10
Palermo	50	47	80	210	109	69	56
Messina	12	60	11	53	38	48	50
Agrigento	-	-	-	7	30	10	-
Caltanissetta	28	26	25	14	24	22	23
Enna	-	-	-	-	-	13	9
Catania	25	27	62	29	24	45	34
Ragusa	-	-	-	-	-	2	14
Siracusa	186	153	181	282	273	321	309

Source: Istat, Environmental data in cities

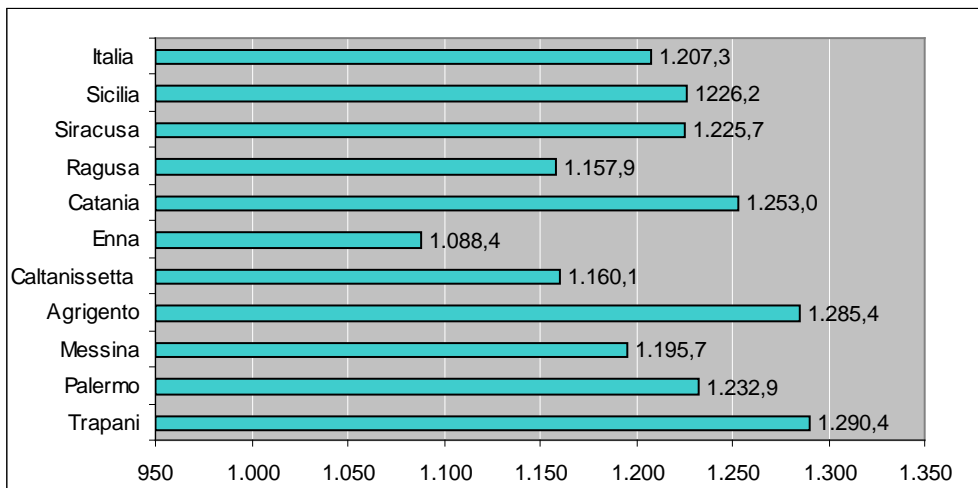
ENERGY

Fig 18. 6 - Consumption of methane gas for domestic use and heating in Sicily per Provincial capital - 2009 (m^3 per inhabitant)



Source: Istat, Environmental data in cities

Fig 18. 7 - Consumption of electricity for domestic use in Sicily per Provincial capital - 2009 (kWh per inhabitant)



Source: Istat, Environmental data in cities

Tab 18.6 - Consumption of methane gas for domestic use and heating in Sicily per Provincial capital - 2000-2009 (m³ per inhabitant)

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	53,6	48,0	47,1	55,8	57,9	63,6	60,1	63,6	63,0	58,3
Palermo	53,1	57,2	59,9	78,7	75,5	91,3	85,1	78,9	80,5	98,3
Messina	97,4	98,6	100,0	119,9	115,8	121,6	123,3	109,4	117,4	119,3
Agrigento	74,8	77,8	77,9	89,6	92,9	102,0	108,2	85,3	92,3	90,7
Caltanissetta	227,5	221,3	228,2	261,6	271,2	297,9	277,7	234,8	251,8	235,9
Enna	330,6	338,6	349,8	398,5	413,1	453,8	378,7	420,0	375,5	371,8
Catania	39,7	42,5	49,7	48,4	58,1	63,8	67,9	56,4	55,9	53,1
Ragusa	117,1	134,5	143,5	173,5	190,4	209,7	174,1	174,4	172,9	162,0
Siracusa	65,2	67,8	68,0	74,6	77,4	85,0	88,7	76,9	80,4	84,0

Source: Istat, Environmental data in cities

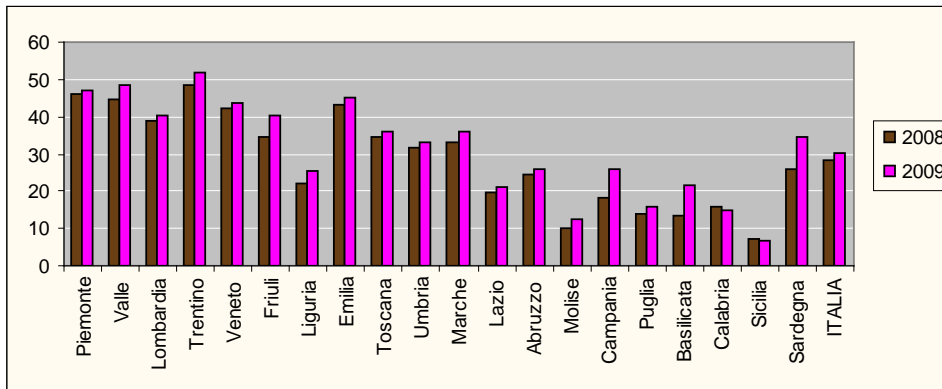
Tab 18.7 - Consumption of electricity for domestic use in Sicily per Provincial capital - 2000-2009 (kWh per inhabitant)

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	1.154,9	1.159,8	1.190,3	1.234,3	1.261,0	1.245,1	1.297,3	1.258,4	1.276,8	1.290,4
Palermo	1.186,5	1.143,7	1.191,8	1.203,8	1.248,3	1.270,7	1.301,5	1.241,8	1.228,6	1.232,9
Messina	1.067,4	1.057,0	1.087,7	1.148,2	1.152,9	1.164,2	1.239,1	1.181,4	1.199,1	1.195,7
Agrigento	1.198,8	1.231,0	1.252,7	1.230,3	1.240,3	1.278,7	1.319,2	1.266,6	1.281,3	1.285,4
Caltanissetta	1.047,2	1.048,0	1.071,1	1.112,0	1.133,6	1.160,8	1.174,9	1.189,4	1.164,2	1.160,1
Enna	890,7	897,4	922,3	982,8	1.013,4	1.001,4	1.053,7	1.078,0	1.066,1	1.088,4
Catania	1.116,5	1.137,6	1.214,9	1.258,7	1.294,6	1.290,0	1.383,0	1.262,6	1.263,1	1.253,0
Ragusa	1.084,6	1.069,2	1.089,9	1.108,5	1.106,6	1.118,6	1.164,1	1.141,7	1.147,0	1.157,9
Siracusa	1.080,6	1.070,6	1.110,6	1.170,4	1.173,3	1.209,6	1.174,4	1.202,4	1.228,3	1.225,7

Source: Istat, Environmental data in cities

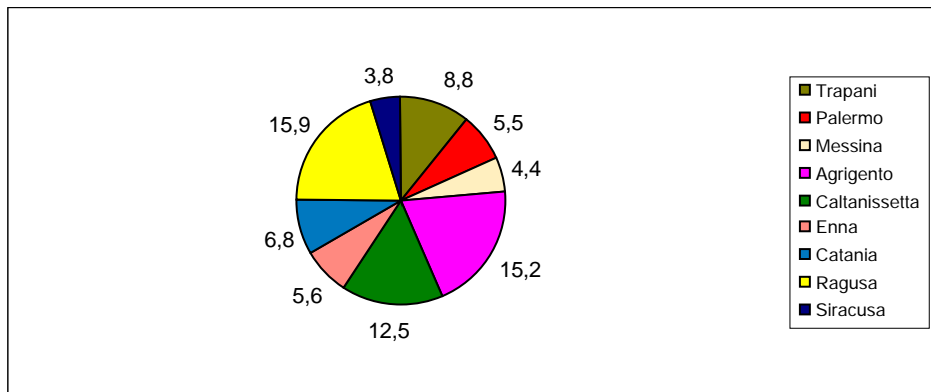
REFUSE

Fig 18. 8 - Differentiated collection of urban refuse in Sicily per Provincial capital aggregated by Region - 2008 and 2009 (percentage values)



Source: Istat, Environmental data in cities

Fig 18. 9 - Differentiated collection of urban refuse in Sicily per Provincial capital - 2009 (percentage values)



Source: Istat, Environmental data in cities

Tab 18.8 - Collection of urban refuse in Sicily per Provincial capital - 2000-2009 (kg per inhabitant)

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	468,5	458,9	467,1	508,4	498,3	513,1	536,6	495,2	511,0	646,1
Palermo	628,2	601,0	515,1	545,2	605,8	614,1	636,3	615,2	595,1	581,7
Messina	470,7	477,1	504,1	507,8	499,6	518,0	536,9	533,1	513,7	514,0
Agrigento	540,7	599,8	579,6	548,2	513,1	539,6	593,7	603,8	603,9	606,8
Caltanissetta	516,3	513,4	520,4	506,0	483,8	532,1	554,3	547,8	572,8	569,5
Enna	434,9	447,1	441,1	480,1	495,1	491,3	494,9	496,2	459,8	487,4
Catania	674,7	742,8	802,5	827,3	826,2	803,6	811,5	816,6	784,0	745,9
Ragusa	442,3	471,9	440,4	473,7	500,0	482,7	497,5	487,5	489,2	521,1
Siracusa	580,9	590,8	595,2	632,1	640,5	623,5	615,3	606,4	601,6	584,3

Source: Istat, Environmental data in cities

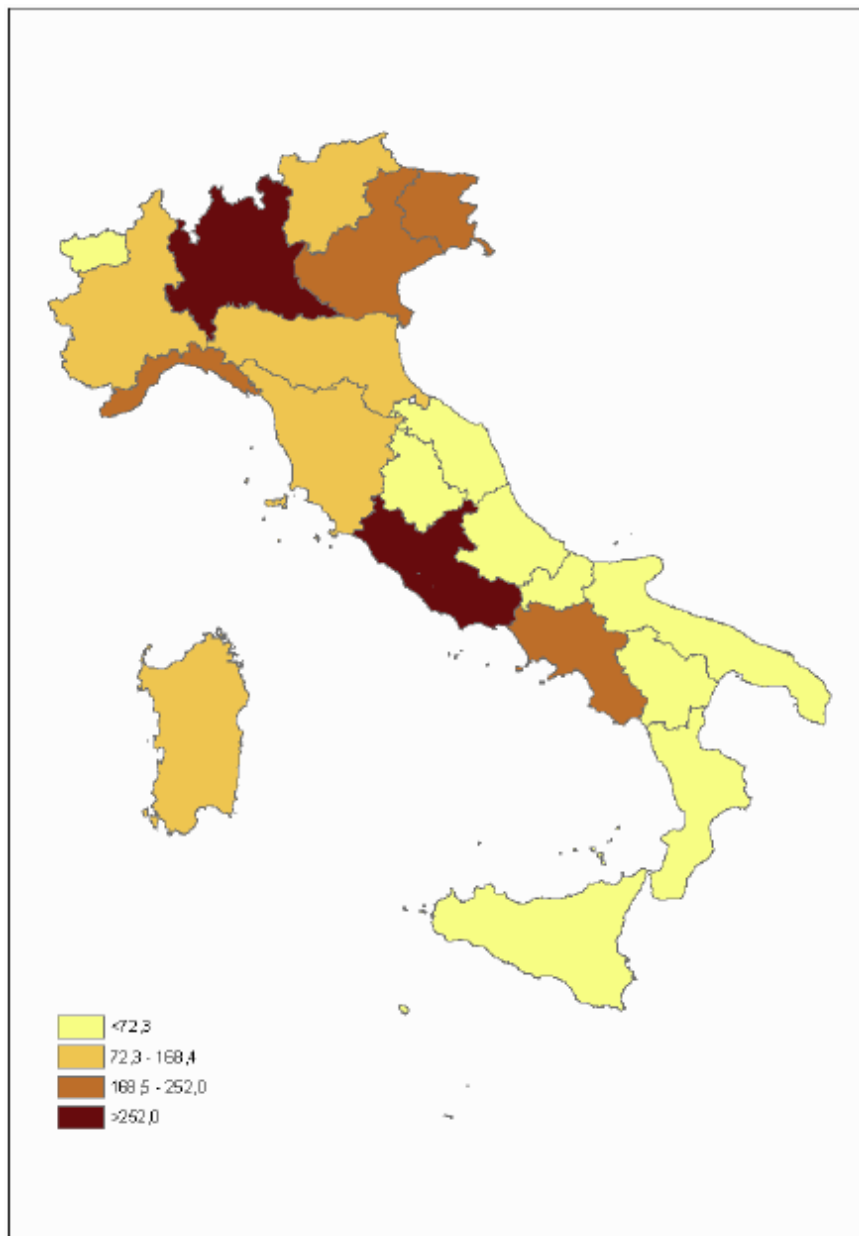
Tab 18. 9 - Differentiated collection of urban refuse in Sicily per Provincial capital 2000-2009 (percentage values)

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	5,2	5,5	4,7	5,1	6,0	5,3	8,5	10,8	11,4	8,8
Palermo	4,8	5,5	5,9	6,2	7,5	8,1	6,9	4,1	4,6	5,5
Messina	1,6	1,0	1,3	1,9	1,7	2,0	1,9	3,8	3,1	4,4
Agrigento	0,8	0,4	0,2	0,3	5,0	6,3	13,9	15,9	17,2	15,2
Caltanissetta	1,1	0,9	3,4	4,9	4,9	4,5	5,2	5,3	11,0	12,5
Enna	1,3	1,5	1,5	2,7	3,7	7,1	8,1	9,7	5,4	5,6
Catania	0,8	2,1	2,2	3,2	3,7	5,4	6,4	6,6	10,1	6,8
Ragusa	1,2	3,0	3,8	5,0	8,9	9,6	9,7	8,2	12,9	15,9
Siracusa	1,4	2,0	1,6	1,5	2,4	3,1	3,4	6,6	7,0	3,8

Source: Istat, Environmental data in cities

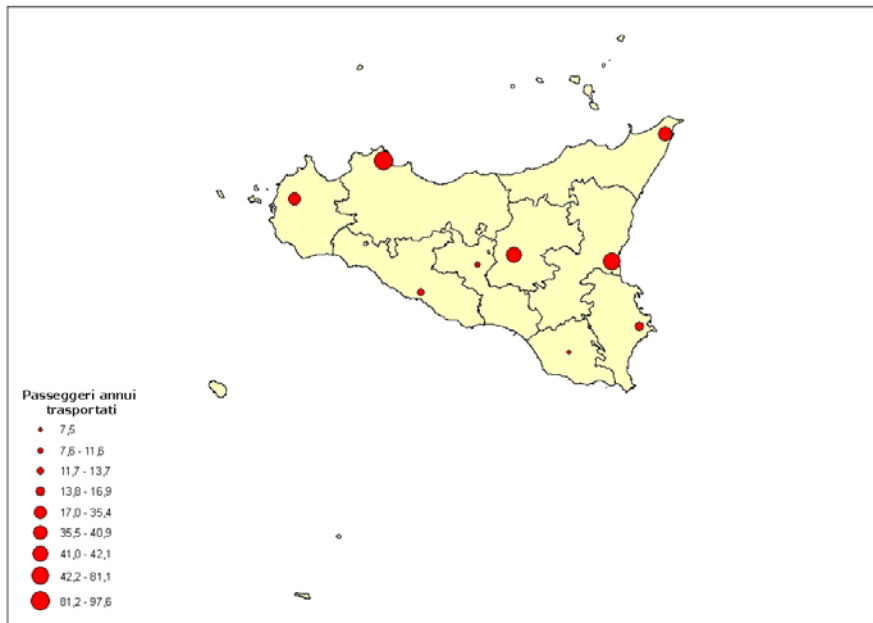
TRANSPORT

Fig. 18.10 - Supply of public transport (passengers carried by means of transport per inhabitant) per Provincial capital aggregated by Region - 2009



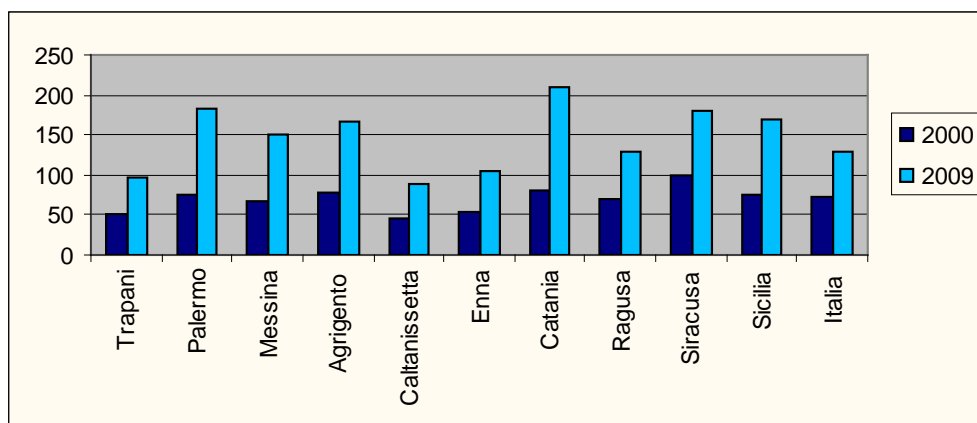
Source: Istat, Environmental data in cities

Fig. 18.11 - Supply of public transport in Sicily per Provincial capital - 2009
(passengers carried by means of transport per inhabitant)



Source: Istat, Environmental data in cities

Fig 18.12 - Motorisation rate in Sicily per Provincial capital - 2000 and 2009
(vehicles per 1,000 inhabitants)



Source: Istat, data ACI

Tab. 18.10 - Supply of public transport per Provincial capital - 2000-2009 (annual passengers carried by means of transport per inhabitant)

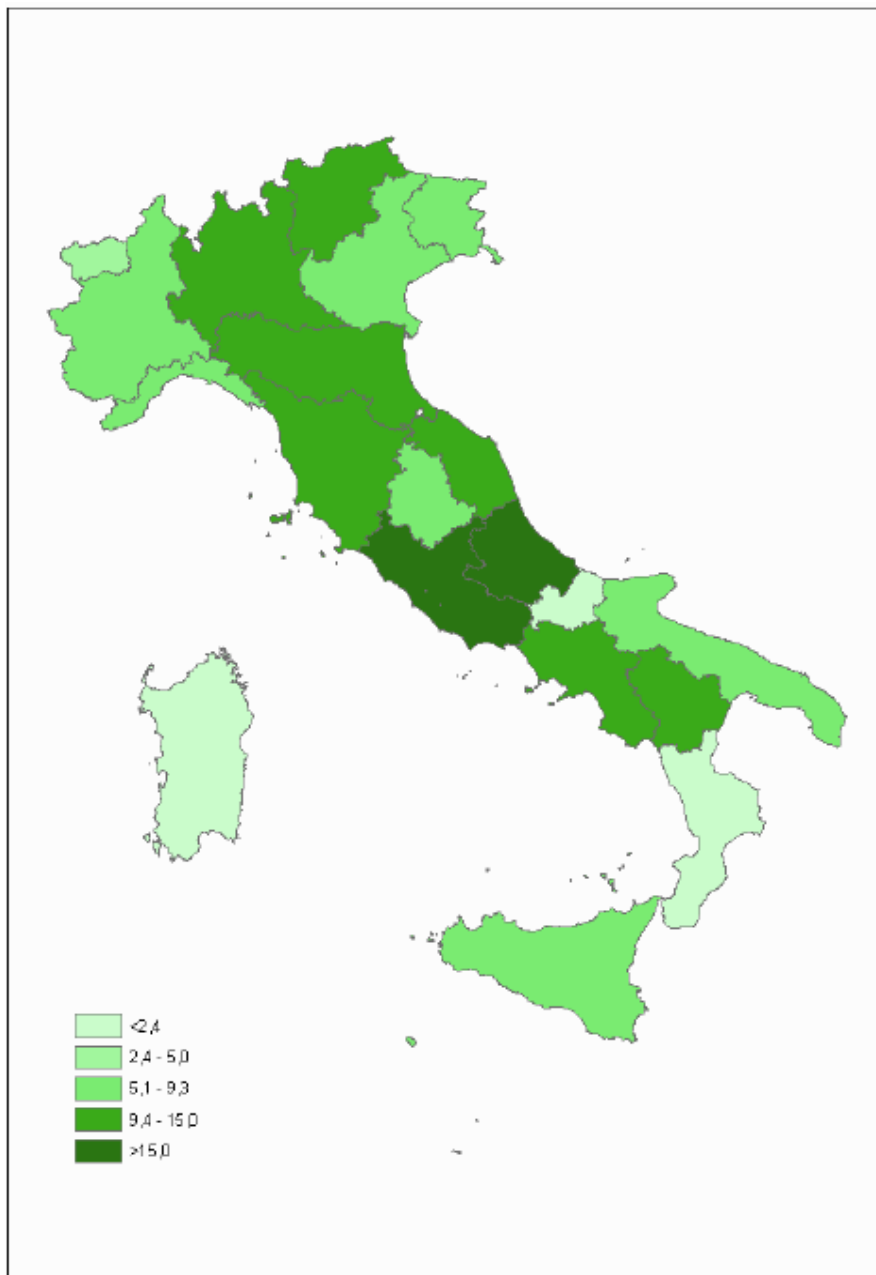
COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	34,8	35,6	35,0	33,4	32,1	30,7	37,6	40,8	39,8	35,4
Palermo	102,0	104,0	116,4	117,3	110,7	113,3	113,7	114,8	109,6	97,6
Messina (d)	29,8	31,2	31,8	42,4	41,7	43,0	41,4	39,9	40,0	40,9
Agrigento	24,8	24,2	23,3	21,6	20,3	19,5	18,7	21,4	13,5	13,7
Caltanissetta	14,8	14,7	14,0	13,1	11,4	11,2	10,9	10,5	10,1	11,6
Enna	37,7	37,6	37,6	38,1	38,6	39,4	39,6	40,8	43,0	42,1
Catania	133,3	136,3	130,2	122,7	117,6	112,7	103,7	98,0	90,0	81,1
Ragusa	4,9	5,0	4,9	5,8	5,8	5,9	5,9	6,1	7,4	7,5
Siracusa	12,1	13,3	15,3	17,2	20,7	20,7	20,6	18,8	16,2	16,9

Source: Istat, Environmental data in cities

^(d)Since 2003 the tram network has been operational

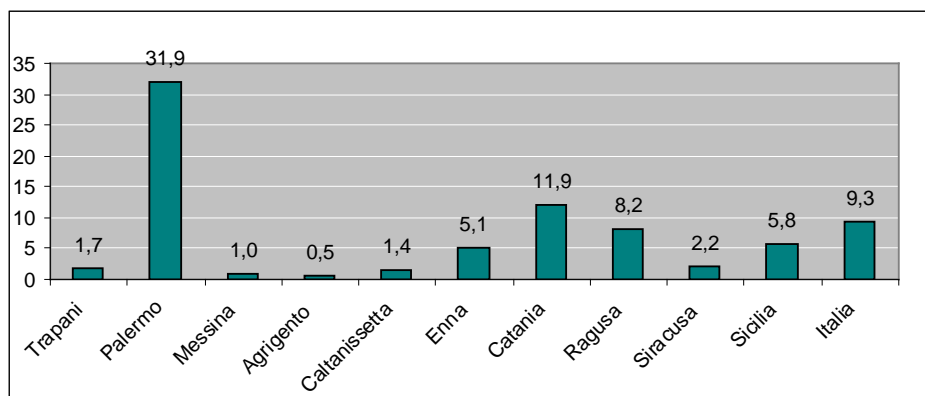
URBAN GREEN AREAS

Fig. 18.13 - Density of urban green areas per Provincial capital aggregated by Region - 2009 (percentage of Communal area)



Source: Istat, Environmental data in cities

Fig 18.14 - Density of urban green areas per Provincial capital - 2009 (percentage of Communal area)



Source: Istat, Environmental data in cities

Tab. 18.11 - Density of urban green areas per Provincial capital 2000- 2009 (percentage of Communal area)

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7
Palermo	27,3	31,0	31,0	31,0	31,1	31,1	31,4	31,6	31,6	31,9
Messina	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	1,0
Agrigento	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Caltanissetta	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4
Enna	5,1	5,1	5,1	5,1	5,1	5,1	5,1	5,1	5,1	5,1
Catania	11,7	11,7	11,5	11,6	11,6	11,7	11,9	11,9	11,9	11,9
Ragusa	8,2	8,2	8,2	8,2	8,2	8,2	8,2	8,2	8,2	8,2
Siracusa	2,1	2,1	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2

Source: Istat, Environmental data in cities

Tab. 18.12 - Availability of urban green areas in Sicily per Provincial capital (sq m per inhabitant) - 2000-2009

COMUNI	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trapani	65,9	66,4	66,8	66,8	65,7	64,6	64,6	64,7	64,8	64,8
Palermo	63,6	72,1	71,9	72,3	72,9	73,4	74,5	75,4	76,0	77,1
Messina	7,7	7,9	8,0	8,0	8,1	8,1	8,1	8,2	8,2	8,8
Agrigento	22,2	22,4	22,3	21,5	21,1	21,1	21,1	21,1	21,0	21,0
Caltanissetta	95,2	96,2	97,3	97,6	98,6	98,8	99,1	99,4	99,5	99,4
Enna	637,4	631,5	626,6	630,2	634,3	637,8	641,2	643,3	643,0	644,9
Catania	62,6	65,3	67,0	67,8	68,6	69,7	71,3	72,0	72,6	73,0
Ragusa	522,6	525,3	525,5	516,9	509,4	506,7	505,3	503,4	501,4	498,6
Siracusa	34,3	34,7	35,8	36,0	36,0	36,1	36,1	36,0	36,1	36,2

Source: Istat, Environmental data in cities

SYNTHETIC INDICATOR

Tab. 18.13 - Number of indicators for eco-compatibility index

Caratteristiche principali della rilevazione

Numero indicatori che compongono l'indice di eco-compatibilità per tema

Aree tematiche	Numero Indicatori
Densità di popolazione	1
Acqua	2
Aria	3
Energia	3
Rifiuti	3
Rumore	2
Trasporti	4
Verde urbano	2
Totale	20

Tab. 18.14 - Classification of Provincial capitals per greatest attention to eco-compatibility - 2008, 2009 (L'Aquila was not inserted in this classification because of the recent earthquake)

MUNICIPALITIES	N.d'ordine 2008	N. d'ordine 2009	Differenza n. d'ordine 2009-2008
Trento	1	1	0
Venezia	2	2	0
Bologna	3	3	0
Foggia	4	4	0
Ravenna	6	5	1
Sondrio	22	6	16
Avellino	15	7	8
Modena	7	8	-1
Terni	12	9	3
Biella	5	10	-5
Novara	9	11	-2
Forlì	8	12	-4
Padova	17	13	4
Asti	10	14	-4
Parma	11	15	-4
Caserta	34	16	18
Aosta	13	17	-4
Bergamo	20	18	2
Milano	14	19	-5
Brescia	16	20	-4
Belluno	18	21	-3
Cuneo	19	22	-3
Verbania	26	23	3

Tab 18.14 cont. - Classification of Provincial capitals per greatest attention to eco-compatibility - 2008, 2009 (L'Aquila was not inserted in this classification because of the recent earthquake)

MUNICIPALITIES	N.d'ordine 2008	N. d'ordine 2009	Differenza n. d'ordine 2009-2008
Nuoro	28	24	4
Brindisi	27	25	2
Lecco	25	26	-1
Reggio nell'Emilia	32	27	5
Villacidro	23	28	-5
Vercelli	31	29	2
Ferrara	56	30	26
Livorno	24	31	-7
Prato	21	32	-11
La Spezia	30	33	-3
Perugia	43	34	9
Gorizia	29	35	-6
Matera	35	36	-1
Pesaro	37	37	0
Cremona	33	38	-5
Piacenza	38	39	-1
Pisa	42	40	2
Lanusei	36	41	-5
Roma	39	42	-3
Taranto	40	43	-3
Bolzano-Bozen	45	44	1
Genova	44	45	-1
Benevento	73	46	27
Oristano	80	47	33
Verona	47	48	-1
Ancona	41	49	-8
Udine	51	50	1
Potenza	48	51	-3
Siena	50	52	-2
Macerata	78	53	25
Salerno	52	54	-2
Cagliari	58	55	3
Caltanissetta	49	56	-7
Alessandria	46	57	-11
Savona	54	58	-4
Grosseto	57	59	-2
Carbonia	63	60	3
Bari	55	61	-6
Firenze	61	62	-1
Tortoli	59	63	-4
Reggio di Calabria	53	64	-11
Isernia	60	65	-5
Arezzo	64	66	-2
Crotone	62	67	-5
Sassari	65	68	-3
Teramo	66	69	-3
Trieste	68	70	-2
Cosenza	101	71	30
Napoli	67	72	-5
Andria	72	73	-1
Rimini	85	74	11
Treviso	70	75	-5
Palermo	71	76	-5
Messina	74	77	-3
Vicenza	76	78	-2
Pistoia	79	79	0
Pavia	77	80	-3

Tab 18.14 cont. - Classification of Provincial capitals per greatest attention to eco-compatibility - 2008, 2009 (L'Aquila was not inserted in this classification because of the recent earthquake)

COMMUNES	No.of order 2008	No.of order 2009	Difference in order 2009-2008
Torino	82	81	1
Massa	112	82	30
Como	75	83	-8
Rovigo	69	84	-15
Pordenone	95	85	10
Campobasso	83	86	-3
Viterbo	86	87	-1
Tempio Pausania	84	88	-4
Lucca	90	89	1
Mantova	81	90	-9
Lecce	92	91	1
Trapani	99	92	7
Ascoli Piceno	94	93	1
Sanluri	88	94	-6
Ragusa	89	95	-6
Monza	93	96	-3
Lodi	98	97	1
Rieti	96	98	-2
Latina	97	99	-2
Varese	105	100	5
Imperia	102	101	1
Frosinone	106	102	4
Trani	103	103	0
Catanzaro	100	104	-4
Pescara	104	105	-1
Chieti	107	106	1
Barletta	108	107	1
Agrigento	87	108	-21
Fermo	109	109	0
Vibo Valentia	91	110	-19
Enna	110	111	-1
Catania	111	112	-1
Olbia	113	113	0
Iglesias	114	114	0
Siracusa	115	115	0

GLOSSARY

WATER

Water invoiced for domestic use: amount of water paid for by final domestic consumer.

AIR

Background station: a station located in a position such that the level of pollution is not influenced primarily by a single source or a single stream, but by the integrated contribution of all sources arriving at the station. In other words this provides a representative sample of characteristic levels of pollution in the area, with the arrival of the pollutants from outside the urban area and from emissions within the actual urban area. Stations of this type are not directly influenced by direct local emissions of an industrial type or by traffic.

Industrial station: a station located in a position such that the level of pollution is influenced primarily by single industrial sources or industrial zones in the vicinity. In other words this provides a representative sample for monitoring phenomena, located in industrial zones with high levels of concentrations of pollutants. These stations are located in areas in which the levels of pollution are mainly influenced by industrial-type emissions.

Limit-value for the protection of human health for PM₁₀: average daily concentration of 50 micro-grammes/m³ not to be exceeded more than 35 times per year (in accordance with the ministerial decree, D.M. 60/2002).

Permanent control-units for monitoring air-quality: fixed and permanent units, co-ordinated and run by a single operational centre on the basis of homogeneous criteria, where automatic instruments (analysers and sensors) have been installed, each of which measures the concentration of a specific pollutant.

Pollutant: any substance emitted directly or indirectly by Man into the surrounding atmosphere, and which might have damaging effects on human health or the environment. The following are to be considered as pollutants: SO₂= sulphur dioxide; NO₂= nitrogen dioxide; CO= carbon monoxide; O₃= ozone; NMHC= non-methanic hydrocarbons; BaP= benzo(a)pyrene; C₆H₆= benzene; T= toluene; Xi= xylene; H₂S= sulphuric acid; Pb= lead; PM₁₀= particulates with diameter<10 µm; PM_{2,5}= particulates with diameter<2,5 µm;

PM₁= particulates with diameter < 1 µm; As= arsenic; Cd= cadmium; Ni= nickel; Hg= mercury.

Traffic station: a station located in such a position that the level of pollution is influenced primarily by roads in the vicinity. In other words this provides a representative sample for pollution levels determined mainly by traffic emissions from roads in the vicinity, with medium-high flows of traffic. These stations are located in areas characterised by marked traffic concentration levels.

ENERGY

District heating: form of heating that consists in the distribution to dwellings/buildings of hot water, over-heated water or steam, coming from a large production- centre (and subsequent return to the centre)

Electricity consumption for domestic use: is the consumption of electricity associated with living areas and condominium consumption in the blocks housing these living areas.

Methane consumption for domestic use and heating: is methane gas consumption for domestic use and heating (individual and centralised). Individual heating is that which is envisaged for every flat predisposed for living quarters, whereas centralised heating is envisaged for blocks containing several flats predisposed for living quarters.

Municipal energy plan (PEC): law n. 10 del 9/1/1991 envisages the obligation for Municipalities with a population above 50,000 inhabitants to provide an Energy plan. This plan should aim to individuate strategic approaches in the energy sector, to verify the existence of conditions and resources for their application and to monitor their actual realisation over a period of time.

Photo-voltaic solar panels: installations capable of producing electricity.

Thermal solar panels: installations geared towards hot water production.

REFUSE

Differentiated waste: is the appropriate waste-collection (in accordance with criteria of limited costs, effectiveness, transparency and efficiency) for

grouping urban waste into homogeneous products, at the moment of collection; with regard to moist organic products, this might also occur at the moment of treatment. Packing refuse should be kept separately from other urban refuse. All this on condition that all above-mentioned waste is actually destined for re-utilisation (art. 183, par. 1, letter f), D.lgs. 152/2006).

RAEE: waste from electrical and electronic devices (D.lgs. 151/2005).

Urban refuse collection: is the sum total of differentiated and undifferentiated refuse collection in the municipal area. This includes: a) domestic refuse, (including bulky objects) from places and buildings intended for human habitation; b) non-dangerous refuse from places and buildings intended for different uses from those in a), assimilated with urban refuse as regards quality and quantity, in accordance with art. 198, par. 2, letter g); c) refuse from road-sweeping; d) refuse of any type or provenance, lying in the road or public spaces or private roads and areas used by the public or on sea-shores, lake-sides, and river-banks; e) vegetal refuse from green spaces, such as parks, gardens and cemeteries; f) refuse following exhumations and uncovering of graves, as well as other waste from cemetery activity differing from that in letters b), c) and e) (art.184 D.lgs 152/2006).

TRANSPORT

Motor-cycles: vehicles with two wheels, for carrying no more than two persons including the driver.

Motor vehicles: motor vehicles with at least four wheels, excluding those destined for transporting people, with at most nine seats, including the driver.

Public transport demand: number of passengers carried annually by public means of urban transport (bus, tram, trolley-bus, underground, funicular railway and other types of transportation, such as steamboats, lifts, escalators etc.). Public transport demand is expressed in terms of passengers per inhabitant.

Urban public transport: means of transport taken as a whole (bus, tram, trolley-bus, underground, etc), which, on the urban scale consent the citizen to exercise his/her right to mobility.

Urban traffic plan (PUT): technical-administrative instrument “geared towards obtaining improvement in conditions in driving and road-safety, a reduction in acoustic and atmospheric pollution and energy-saving, in

accordance with current town-planning instruments and transport plans, whilst respecting environmental values, establishing priorities and timing of intervention. The urban traffic plan envisages recourse to adequate technological systems, on an IT basis of traffic regulation and control, as well as speed-checks and parking-controls, in order to consent the required changes in traffic-flow as demanded by the objectives pursued” (art. 36, D.Lgs. 30 Aprile 1992, n. 285). Adoption of PUT is obligatory for all municipalities with a resident population of over 30,000 inhabitants. The PUT should be up-dated every two years, in order to conform to the general aims of socio-economic and territorial programming.

URBAN GREEN SPACES

Plan for urban green spaces: is an integrative instrument of the (P.R.G.) General Regulator Plan for the creation of a “system of green areas” within the urban landscape. The Plan for Green spaces is instituted following a specific decision by the city-council.

Census of urban green areas: periodic check on all the green areas managed (directly or indirectly) by the municipality and existing on municipal territory.

Urban green areas: green spaces and areas of land of a particular naturalistic or socio-historical interest, responding to set criteria as laid down by the law, managed (directly or indirectly) by public bodies (municipality, Province, Region, State) and existing on municipal territory. By urban green areas we mean the following types:

Equipped green areas: green areas in the local quarter, equipped with children’s playground, all-purpose pitches, cycle-paths etc.

Urban parks: areas provided for under article 136, Item II Title I Part III, of D. Lgs 22 January, 2004, n. 42, "Norms for the cultural heritage and the landscape": gardens, parks, not cared for by Part II of the present decree, and which stand out because of their particular beauty. Areas previously subject to the strictures of laws 1497/39, 431/85 and the D. Lgs. 490/99.

Historical green spaces: areas provided for under article 10, Item I Title I Part II, of D. Lgs. 22 January, 2004, "Norms for the cultural heritage and the landscape": gardens, parks that are of artistic or historical interest. Areas previously subject to the strictures of law 1089/39 and D. Lgs. 490/99.

Areas of urban adornment: green spaces created for aesthetic and/or functional reasons, such as wooded areas, roundabouts, parking lay-bys etc.

Special areas: areas that are exploited in particular ways. This type includes: school gardens, botanical gardens and nurseries, zoos, cemeteries and also categories not mentioned previously (protected areas, woods, green areas with plants but no other facilities)

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