Data provided for the
CDP Cities 2014 Report

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City of Venice

Written by

CDP
DRIVING SUSTAINABLE ECONOMIES

Report analysis & information design for CDP by

AECOM

In partnership with

C40 CITIES
CLIMATE LEADERSHIP GROUP

Bloomberg Philanthropies

CDP, C40 and AECOM are proud to present results from our fourth consecutive year of climate change reporting for cities. It was an impressive year, with 207 cities reporting on their climate change data (an 88% increase from 2013), making this the largest and most comprehensive survey of cities and climate change published to date by CDP. City governments from Denver to Jakarta to Abidjan participated, including over 90% of the membership of the C40 – a group of the world's largest cities dedicated to climate change leadership.

Over half of reporting cities measure city-wide emissions. Together, these cities account for 1.2 billion tonnes CO2e, putting them on par with Japan, the world's third largest economy and fourth largest emitter of greenhouse gas emissions. 60% of all reporting cities now have completed a climate change risk assessment. And cities reported over 2,000 individual actions designed to reduce emissions and adapt to a changing climate. CDP, C40 and AECOM salute the hard work and dedication of the world's city governments in measuring and reporting these important pieces of data. With this report, we provide city governments the information and insights that we hope will assist their work in tackling climate change.

This document contains the questionnaire data provided to CDP from the Comune di Venezia as part of its 2014 CDP submission.

To see all of the results for all participating cities, visit https://www.cdp.net/cities.

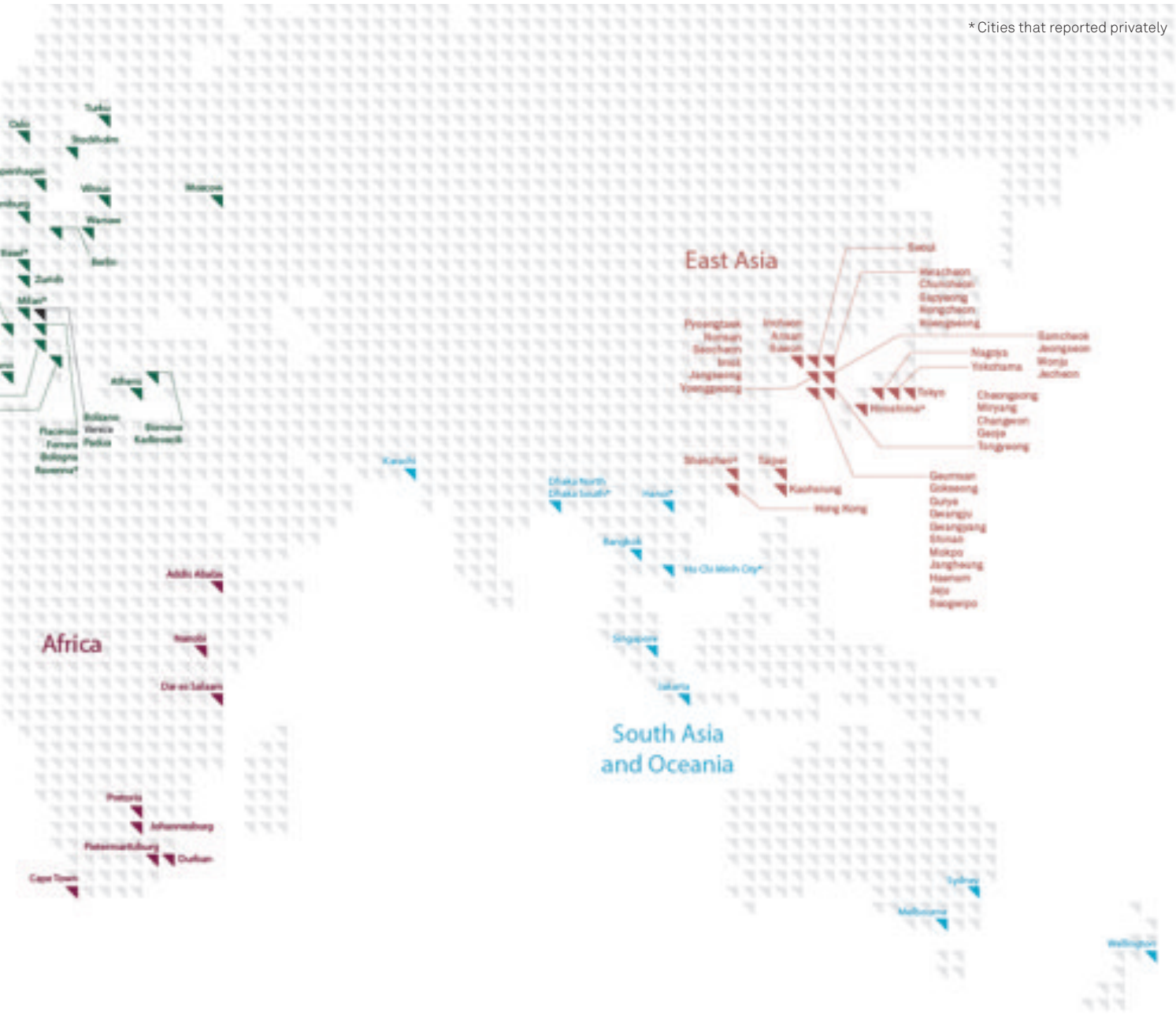
The graphics in this document are from the 2014 CDP Cities infographic and Protecting Our Capital Report

Venice in context

Number of cities responding per year

48	73	110	207
2011	2012	2013	2014
☐	☐	☑	☑

Venice participation



*Cities that reported privately

Total population of cities responding in 2014

394,360,000

Where Venice fits Venice **270,600** people

91 small
>600k population

59 medium
600k-1.6m population

57 large
1.6m+ population

Year reported

2014

Area

414

km²

Population

270,600

Venice in focus

Inventory method

GHG emissions inventory has been calculated on the basis of the Covenant of Mayors EC initiative

108 cities reporting emissions in 2014

80,000,000
metric tonnes CO_2e

10 cities reporting emissions
of greater than 30,000,000
metric tonnes CO_2e

50,000,000
metric tonnes CO_2e

8 cities reporting emissions
of 20,000,000 to 30,000,000
metric tonnes CO_2e

30,000,000
metric tonnes CO_2e

20,000,000
metric tonnes CO_2e

10,000,000
metric tonnes CO_2e

19 cities reporting emissions
of 10,000,000 to 20,000,000
metric tonnes CO_2e

Venice

1,418,344

metric tonnes CO_2e

5,000,000
metric tonnes CO_2e

70 cities reporting emissions
of less than 10,000,000
metric tonnes CO_2e

0 **Introduction**

The City of Venice is located in a coastal area of Northern Italy. The whole city covers an area of about 414km², with 257km² of water surface (the most important of which is the Venice Lagoon).

The area is very diverse but essentially it is divided between the lagoon and the mainland. Four different municipalities are sited on the mainland (Mestre, Favaro Veneto, Chirignago & Marghera) and there is also Porto Marghera, one of the most important industrial area in Europe.

Introduction

The lagoon includes the Ancient City of Venice, Burano and Murano islands, a great number of minor island and Lido and Pellestrina that are the barrier islands which separates the lagoon from the Adriatic sea. The whole lagoon area, including the historical archipelagus, has been identified by UNESCO as a world heritage site, for being a unique evidence of cultural heritage & civilisation, and as an outstanding example of construction, architectural, technological and natural complex.

Venice is the capital of the Province and the Veneto Region so that all the most important administrative activities at local and regional level are concentrated in this city.

The presence of two different universities, a great number of cultural foundations and research entities, cultural activities linked to art and architecture, the recurrence of cultural events (e.g. Biennale), exhibitions, conferences and festivals put Venice as the cultural capital for the entire North-east Italy and one of the most important in the world.

In addition, the 3rd Italian airport and one of the main ports in the Mediterranean linked to one of the most important industrial areas in Europe, railways and motorways make Venice a continuously evolving centre of interests.

The lagoon area keeps on being the place where important arts and crafts activities take place (e.g., the artistic glass of Murano and shipyards).

Venice is also the most visited city in Italy with more than 29.326.000 people arriving each year.

Almost the entire lagoon area (Venice, islands and estuary) are characterised by historical settlements that gradually have lost a great number of residents to give space to tourist activities, commerce and tertiary activities. The mainland areas were principally developed post war, also due to the employment opportunities in the industrial area of Porto Marghera.

In general, the population over the last 20 years has diminished even though, following some substantial changes in the Venetian territory and its mobility

systems, there is a renewed increase in the population thanks to the return of a part of the population which in the earlier years moved to the surrounding towns in the Venice mainland. This phenomenon, which has involved the urban centres in the eastern part of the Veneto, has brought the OECD to identify the territory included in the Cities of Venice, Padua and Treviso as a single city-region of metropolitan character.

The current process of reorganisation of the local bodies undertaken by the national government aimed at creating an administrative body for the governance of the metropolitan city is in line with the phenomenon occurring in the territory.

1 **Governance**

The City of Venice is now managing Climate Change issues from two different points of view: on the first side, during last December 2012 Venice adopted its own SEAP. With this planning instrument the City is now managing emissions mitigation through 43 actions aiming to reduce 23% of CO2 emissions by 2020 based on 2005.

On the other side Venice started its process to write a Climate Change Adaptation Plan: on January 24 the city approved a preliminary document called “Venice future climate”. The aim is to define the scopes where climate change will affect and consequently where to project adaptation actions.

Governance

Together with the SEAP, “Venezia Clima Futuro” configures the Climate Action Plan for the city of Venice.

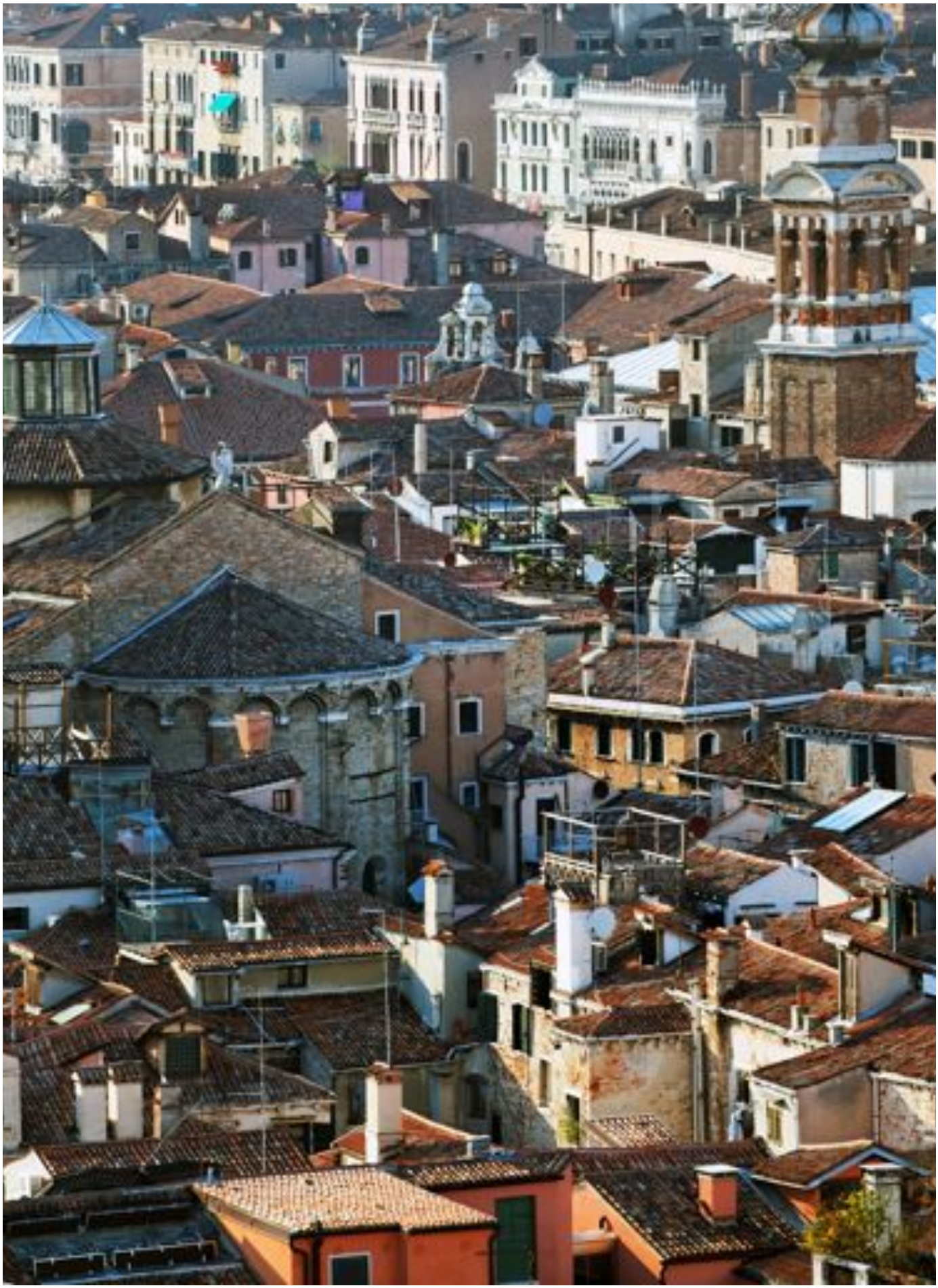
A great number of project is carried on by different institutions, autonomous departments and different government levels, sometimes working on the same scope and without a common frame. The starting point is to know all the activities, to have a realistic future climate scenarios and a complete picture of the hazards and the risk that will insist on the city; then it will be possible to coordinate the existing projects to enhance adaptation measures and resilience and to mainstream all the main projects in a general strategy: local organisations are already well equipped for disaster risk reduction but it’s possible, and necessary, do better.

Venice does not provide incentives for management of climate change issues, including the attainment of GHG reduction targets.

The impact of national and/or regional climate change activities on Venice's climate change activities are:

At the end of 2013 has been launched the process leading to the definition of the national strategy for adaptation: promoted by the Ministry of the Environment is in progress the consultation with the stakeholders to collect contributions from the different actors and, above all, to involve the local authorities.

Still goes on the activity of disaster risk reduction and prevention of the consequences of climate change promoted by national Civil Protection System: the national level foresees, according to the principle of subsidiarity, that regional and local authorities take charge of some operations. This system brings together the National Fire Watchers, the regional weather forecast department. In addition, these offices can count on the cooperation of volunteers, well organised and regularly trained.



2 **Physical risks**

Current and/or anticipated effects of climate change present significant physical risks to Venice:

Seriousness

Less Serious ! ! ! Serious ! ! ! Extremely Serious ! ! !

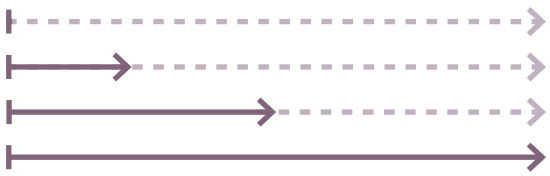
Timescale

Current

Short-term

Medium-term

Long-term



Risks & Adaptation

More hot days

Risk: !!! Timescale: 

Vulnerability assessment due to this hazard will be made while drafting the Climate Plan (including mitigation and adaptation to the climate change). This is scheduled for years 2014/15.

Hotter summers

Risk: !!! Timescale: 

Vulnerability assessment due to this hazard will be made while drafting the Climate Plan (including mitigation and adaptation to the climate change). This is scheduled for years 2014/15.

More frequent heat waves

Risk: !!! Timescale: 

Vulnerability assessment due to this hazard will be made while drafting the Climate Plan (including mitigation and adaptation to the climate change). This is scheduled for years 2014/15.

More intense heat waves

Risk: !!! Timescale: 

Vulnerability assessment due to this hazard will be made while drafting the Climate Plan (including mitigation and adaptation to the climate change). This is scheduled for years 2014/15.

More intense rainfall

Risk: !!! Timescale: 

More intense rainfall are being experienced in the whole Venice Region, and it has become systematic to have hydraulic problems during the main rain season (normally November). During the year 2007 the mainland of Venice has undergone a big flooding precipitations so intense as to locally exceed 100mm per hour and 200mm in 3 hours. The intensity of precipitations has led to widespread flooding with reported damages for as much as almost 50 M€ and over 6.000 assistance request from single citizens.

Reduced average annual rainfall

Risk: ! ! ! Timescale: 

Vulnerability assessment due to this hazard will be made while drafting the Climate Plan (including mitigation and adaptation to the climate change). This is scheduled for years 2014/15.

Sea level rise

Risk: ! ! ! Timescale: 

The City of Venice is put in the middle of the Venice Lagoon and this fact makes Venice be particularly susceptible to sea level rise. During the last century flooding tides higher more than 110 cm (which means 12% of the city flooded) has increased 13 times. Since 1872 exceptional events (>140cm) have been 15 times, 6 times in the decade 2001- 2010. 140cm flooding tide means almost 60% of Venice flooded.

Compounding factors may worsen the physical effects of climate change in Venice.

At this moment the city doesn't have evidence about these factors. It will be easier and more clear after having made a vulnerability assessment. At this moment we only have qualitative indicators.

Venice considers that the physical impacts of climate change could threaten the ability of businesses to operate successfully.

The impact of climate change has already been seen in Venice with some extreme weather events such as the flood of 2007 that caused significant economic damage in particular for productive activities. For example, while doing a simplified treatment of the problem, the increase in sea level and the event of high tides, can be dangerous to commerce and cultural heritage of the ancient city. We believe, as these hazards are expected to increase in the next future, that a threat is on.

Venice uses IPCC models and climate change impact assessment guidance as its primary method to evaluate physical risk to the city.

We are actually searching for funds to finance a local downscaling of regional models that will provide us hazards and indicators.

Cities are facing risks from climate change.

Percentage of cities facing different categories of natural risk.

3 **Adaptation**

Venice has a plan for increasing its resilience to the expected physical effects of climate change. Venezia Clima Futuro is a sort of Manifesto which defines boundaries of the Climate Plan for the City of Venice, including issues and topics about adaptation and mitigation.

Actions Venice is taking to reduce the risk to infrastructure, citizens, and businesses from climate changes include the following:

More hot days

Action: Crisis management including warning and evacuation systems

Actions will be evaluated after the drafting of vulnerability assessment This is scheduled for year 2015.

Hotter summers

Action: Community engagement/education

Actions will be evaluated after the drafting of vulnerability assessment This is scheduled for year 2015.

More frequent heat waves

Action: Tree planting and/or creation of green space

Actions will be evaluated after the drafting of vulnerability assessment This is scheduled for year 2015.

More intense heat waves

Action: Crisis management including warning and evacuation systems

Actions will be evaluated after the drafting of vulnerability assessment This is scheduled for year 2015.

More intense rainfall

Action: Flood defences – development and operation & storage

An extraordinary activity has been led after year 2007 flooding aimed at assessing risks, designing priorities hydraulic infrastructures and setting up building codes to avoid soil consumption and soil waterproofing.

Reduced average annual rainfall

Action: Water use restrictions and standards

Actions will be evaluated after the drafting of vulnerability assessment This is scheduled for year 2015.

Sea level rise

Action: Unspecified

At this moment the main action to defend Venice from high tides is MOSE mobile barriers that are being built in the 3 inlets of the Venice Lagoon. This system will isolate the Venice Lagoon from the sea when sea level rises +110cm. This infrastructure will work together with other measures like maintenance and raising the paving in the old city.

4 **Social risks**

Venice faces social risks as a result of climate change.

Increased risk to already vulnerable populations: Current

The phenomenon of the Urban Heat Islands that affects some part of the mainland city, is currently increasing. The Municipality, through the coordination of the Civil Protection Department and the Social Services, has an emergency plan to help vulnerable categories of citizens (elderly, sick) during the extreme events to assist and bring them in cool places.

Cities are at risk from climate change

Increased demand for public services (including health): Current

In the last decades the city had to develop some special services necessary to face events related to the climate change. The main actions are: - an early warning system that inform the population about exceptionally high tides, extreme rainfalls (it is also used for industrial accidents); messages reach registered citizens through multiple means of telecommunication (sms, web, fax, telephone, radio, newspapers...). - during exceptional high tides the City provides footbridges to guarantee the use of the main walkways; the extreme events are not covered by this service. - a wide number of interventions are carried on by the municipality to maintain the historic city against the degradation caused by time and climatic agents, the most serious of which is the sea level raising (raising of the pavements, restoration of building's foundations, excavation of canals, ensuring the safety of technological networks)

Population displacement: Current

As one of the major ports of the Mediterranean, in Venice arrive many migrants who leave their lands also because of climate change: the management of this phenomenon is already a major challenge for the city and is likely to increase in the short term.

5 **Opportunities**

Climate change action presents economic opportunities for Venice.

Opportunities

Venice is positioning itself to take advantage of opportunities from taking climate change action.

Development of new business industries (e.g. clean tech)

ADAPTATION - Developing scientific research (universities, research institutions,...). - Public services relating to extreme climate events (forecasts, early warning, interventions and installations during the events). - Developing technologies: mobile barriers system to stop the high tides (Mose system); morphological restoration of the lagoon and the seaside (projecting with nature). MITIGATION - Mobility: developing strong public transports system with a low environmental impact such as a city-wide electric tramline; revamping the bus and water-bus fleet with methane, electric and hydrogen propulsion. - Building refurbishment - Energy efficiency

Increased attention to other environmental concerns

Acting against the climate change means to take on the urban quality issue: infrastructures like the Mestre's Wood (useful as controlled flood plains for water courses, to catch the carbon emissions and to depollute the waters) have to be as natural as possible and have to be available for social purposes, to improve the life quality level.

Increased infrastructure investment

A public fire hydrant network as been realised in the historic city to fight the fire risk. In the mainland is in progress the works for the separation of the waste-water from the rain water drainage to reduce the risk of flooding. At the same time the city is increasing the disposal capacity of the drainage network (manifolds, canals, draining pumps).

Increased energy security

In the industrial area is under construction an experimental field to test batteries and accumulators of energy from alternative and renewable sources. The urban park of the Certosa's island, which also includes a marina and an area for the shipbuilding, is being developed as a unitary prototype which mixes innovative solutions for energy production and saving.

CDP cities represent a growing slice of the world's economy.

That's
28%
of world GDP...

...an incredible
$21 trillion
in total annual output.

Cities reporting to CDP
have a combined annual budget of
$954 billion
roughly the annual budget of the UK.

C **Date and boundary**

Venice is reporting a GHG measurement inventory for a period of one year.

Sat 01 Jan 2005 - Sat 31 Dec 2005

Boundary typology used for Venice's GHG emissions inventory:

Departments, entities or companies over which operational control is exercised

C **GHG emissions data**

Venice has used the GHG emissions inventory has been calculated on the basis of the Covenant of Mayors EC initiative.

Emissions – Local Government

Total (Scope 1 + 2) emissions for Venice:

76,400
metric tonnes CO_2e

Breakdown of Venice's GHG emissions by scope:

Scopes are a common categorisation method. Scope 1: All direct GHG emissions (with the exception of direct CO_2 emissions from biogenic sources). Scope 2: Indirect GHG emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling.

Total Scope 1 activity

55,094
metric tonnes CO_2e

Total Scope 2 activity

21,306
metric tonnes CO_2e

Total amount of fuel (direct/Scope 1 emissions) consumed in Venice during the reporting year:

Diesel/Gas oil

160,956MWh

Natural Gas

59,906 MWh

Motor gasoline (petrol)

68 MWh

Electricity, heat, steam, and cooling (indirect/Scope 2 emissions) that has been consumed by Venice during the reporting year:

Electricity

44,113 MWh

Venice does not measure Scope 3 emissions.

Venice does not currently measure Scope 3 emissions. The reason, at the moment, is the inability to collect the data, in particular, the crossing traffic. The emissions data for transport and mobility are calculated on the basis of sales in local distributors and according to the protocol of the Covenant of Mayor which excludes the highway traffic and rail. It is possible that in the future you decide to improve the counting of emissions including these two topics, however, to date there are no data available.

Breakdown of Venice's GHG emissions by department (total):

Public Transport - Gasoil Vehicles (scope 1)

42,792

metric tonnes CO_2e

Municipal Building - heat (scope 1)

12,083

metric tonnes CO_2e

Public Lighting (scope2)

11,968

metric tonnes CO_2e

Municipal building - facilities (scope 2)

9,338

metric tonnes CO_2e

Municipal Fleet - Gasoil Vehicles (scope 1)

184

metric tonnes CO_2e

Municipal Fleet - Natural Gas Vehicles (scope 1)

18

metric tonnes CO_2e

Municipal Fleet - Motor Gasoline Vehicles (scope 1)

17

metric tonnes CO_2e

Unfortunately, no data are yet available for the most recent inventory of emissions compared to the one presented last year and based on year 2005.

C External verification

Venice's emissions have not been externally verified. ARPAV, the Regional Environmental Agency has provided an Emission Inventory based on 2005 named INEMAR (Air Emission Inventory) which substantially confirms our bottom-up data.

C **Date and boundary**

Venice is reporting a GHG measurement inventory for a period of one year.

Sat 01 Jan 2005 - Sat 31 Dec 2005

Boundary typology used for Venice's GHG emissions inventory:

Geopolitical Boundary

Physical areas over which local government has jurisdictional control.

C **GHG emissions data**

Venice has used 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Our BEI (Baseline Emission Inventory) has been made according to the Covenant of Mayors Guide Lines.

Emissions – Community

Total (Scope 1 + 2) emissions for Venice

1,418,344

metric tonnes CO_2e

Breakdown of Venice's GHG emissions by scope:

Scopes are a common categorisation method. Scope 1: All direct GHG emissions (with the exception of direct CO_2 emissions from biogenic sources). Scope 2: Indirect GHG emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling.

Total Scope 1 activity

955,472

metric tonnes CO_2e

Total Scope 2 activity

462,872

metric tonnes CO_2e

Breakdown of these emissions by end user, economic sector, IPCC sector, GHG or any other classification system used:

End user: buildings, water, waste, transport. Economic sector: residential, commercial, industrial, institutional. IPCC sector: stationary combustion, mobile combustion, industrial processes, waste. Greenhouse gas: CO_2, CH_4, N_2O etc.

Residential Buildings

524,145

metric tonnes CO_2e

Tertiary (non municipal) buildings, equipment, facilities

512,859

metric tonnes CO_2e

Private and Commercial transport

381,340

metric tonnes CO_2e

Local electricity production

6,270

metric tonnes CO_2e

Total amount of fuel (direct/Scope 1 emissions) consumed in Venice during the reporting year:

Natural Gas

2,521,598 MWh

Gasohol

814,836 MWh

Motor gasoline (petrol)

625,162 MWh

Distillate fuel oil No.1

203,477 MWh

Liquefied Petroleum Gas (LPG)

69,679 MWh

Waste (municipal)

19,000
MWh

Venice does not measure Scope 3 emissions.

These data are not available to us.

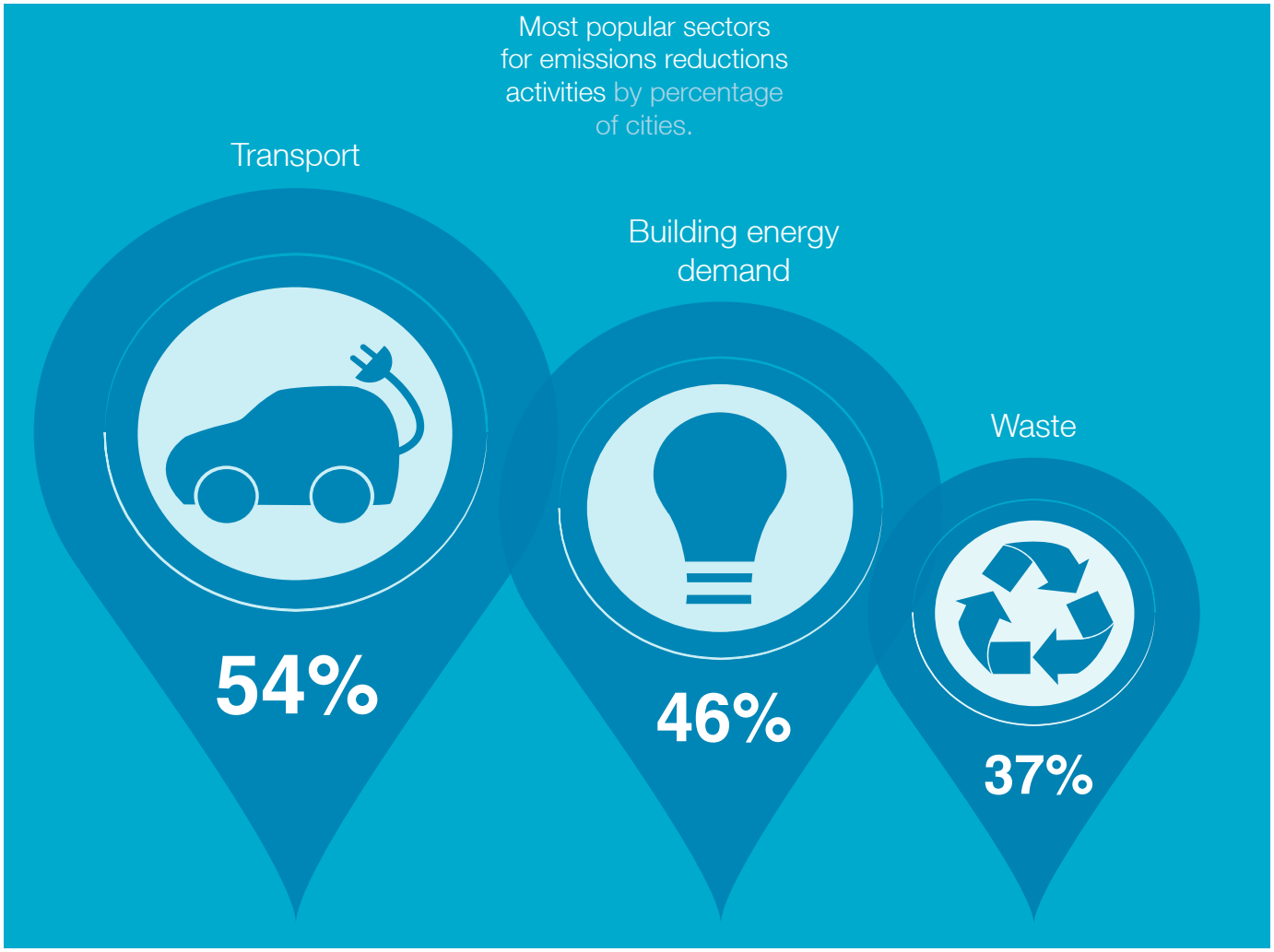
C **External verification**

Venice's emissions remained the same.
Our BEI is based on 2005. Unfortunately, we have not a more updated inventory so that's why we consider that our emissions have no change. Next update is scheduled for the end of 2014 and will be likely based on 2012 or 2013

Venice's emissions have been externally verified.

ARPAV (Regional Environment Protection Agency - Veneto) has built a emissions inventory which substantially confirms our BEI. ARPAV completed on behalf of the Veneto Region, the first regional inventory of emissions into the atmosphere (not only greenhouse gases but also pollutants). This inventory collects the estimation of emissions from human activities and natural located in the territory, according to a protocol shared with other regions of the Po Valley is one of the basic tools for regional planning as it identifies areas for focus measures and actions for the improvement of air quality in our region.

Cities are undertaking 2110 activities to mitigate and adapt to climate change



Strategy

6 **Local government operations – GHG emissions reduction**

Venice has a GHG emissions reduction target in place for local government operations.

Venice's local government operations GHG emissions reduction target for Public Buildings in detail:

Baseline year

2005

Baseline emissions

21,421

metric tonnes CO_2e

Percentage reduction target

8.2%

Target date

2020

Venice's local government operations GHG emissions reduction target for Municipal Fleet & Public Transport in detail:

Baseline year

2005

Baseline emissions

43,011

metric tonnes CO_2e

Percentage reduction target

20.1%

Target date

2020

Venice's local government operations GHG emissions reduction target for Public Lighting in detail:

Baseline year

2005

Baseline emissions

11,968

metric tonnes CO_2e

Percentage reduction target

29.6%

Target date:

2009

Venice's local government operations GHG emissions reduction target for Total inventory in detail:

Baseline year

2005

Baseline emissions

76,400

metric tonnes CO_2e

Percentage reduction target

18.3%

Target date

2020

Activities undertaken to reduce Venice's emissions in its government operations:

Energy Demand in Buildings

Energy efficiency/retrofit measures

Public building heat management contract

Renewable on-Site energy generation

Solar Roofs on public buildings

Energy efficiency/retrofit measures

Green Digital Charter: energy efficiency on public ICT

Transport

Improve fuel economy and reduce CO2 from motorised vehicles

From Diesel to Natural Gas Buses

Improve the efficiency of freight systems

New freight and new engines for public boats.

Transport

Improve bus transit times

Improve bus transit times and path

Outdoor lighting

LED / CFL / other luminaire technologies

Lighting plants switch to LED

Smart lighting

Tele control and tele management of public lighting grid

LED / CFL / other luminaire technologies

Traffic light switch to LED

7 **Community – GHG emissions reduction**

Venice has a GHG emissions reduction target in place for its community.

Venice's community
GHG emissions reduction target for Tertiary (non municipal) buildings, equipment/facilities in detail:

Baseline year

2005

Baseline emissions

512,859

metric tonnes CO_2e

Percentage reduction target

29.1%

Target date

2020

Venice's community
GHG emissions reduction target for Residential buildings in detail:

Baseline year

2005

Baseline emissions

524,145

metric tonnes CO_2e

Percentage reduction target

13.1%

Target date

2020

Venice's community
GHG emissions reduction target for Private and Commercial Transport in detail:

Baseline year

2005

Baseline emissions

381,340

metric tonnes CO_2e

Percentage reduction target

39.2%

Target date

2020

Venice's community
GHG emissions reduction target for Total inventory in detail:

Baseline year

2005

Baseline emissions

1,418,344

metric tonnes CO_2e

Percentage reduction target

22.9%

Target date

2020

Activities currently being undertaken to reduce emissions city-wide:

Energy Demand in Buildings

Energy efficiency /retrofit measures

Energy Efficiency at Veritas Ecodistrict

Energy Efficiency at Certosa Island

Cold Ironing at Venice Port

ACTV Bus Park lighting system renewal

Energy Efficiency and Renewable Energy Sources at IUAV (Venice Institute of Architecture

Carbon Management at University of Venice - Ca' Foscari

Plan for the management activities of the MOSE

Energy efficiency for the hospitality industry

Lighting renewal of Venice Museums

Renewable on-Site energy generation

Energy Efficiency and Renewable Energy Sources at Venice Port

Energy Efficiency and Renewable Energy Sources at Marco Polo Airport

Energy self -sufficient hospitals - AZIENDA ULSS 12 Veneziana

Promotion of PV systems/tertiary

Promotion of PV systems/residential

Energy Supply

Combined heat and power

Small district heating - Veritas

Energy Demand in Buildings

Building codes and standards

New building Code - Tertiary

New building Code - Residential

Transport

Improve fuel economy and reduce CO2 from motorised vehicles

New Tramway lines

Regional - Metropolitan railway system

Car Sharing

Electric Vehicles

Infrastructure for non-motorised transport

Bike Plan

Improve the accessibility to public transit systems

Park and Ride Program

Road Pricing

Transportation demand management

Mobility management

Urban Mobility Master Plan

Login - eco friendly logistics

Improve the efficiency of freight systems

Bifuel - LPG boats

8 **Planning**

Venice does not have a renewable energy or electricity target

The city has national targets but doesn't have a specific local target. There is an action within the Covenant of Mayors framework that is aimed at spreading the PV technology in the city but not a real and compulsory target.

At this moment it is quite difficult to list because the Climate Change adaptation plan has still to be written.

Venice does not incorporate desired GHG reductions into the master planning for the city.

9 **Water**

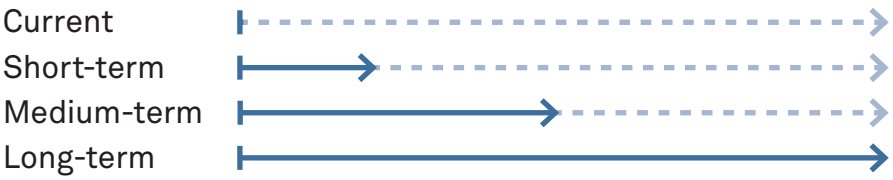
Venice foresees substantive risks to its water supply in the short or long term.

Risks to Venice's water supply as well as timescale:

Seriousness

Less Serious ! ! ! Serious ! ! ! Extremely Serious ! ! !

Timescale



Declining water quality

Risk: ! ! ! **Timescale:**

The large amount of water extracted from the wells increases the speed of the underground flow and reduces the rate of renewal of the water: this way the water quality worsens

Increased water stress or scarcity

Risk: ! ! ! **Timescale:**

The "hydrological balance" has evaluated relevant quantities of water (442 Mm3 / y input, 169 Mm3 / y flow out) that indicate an high volume for a system that serves a population of over 600,000 inhabitants. The balance between the use of groundwater and the groundwater recharge is negative though also due to a great demand for water for industrial and agricultural systems. The use of water from wells (of excellent quality) by private individuals is still characterised by high levels of wastage in contrast with current legislation and with the basic concepts of rational use of the resource.

Increased water stress or scarcity

Risk: !! **Timescale:** 

The decrease in total rainfall reduces the overall flow of the rivers; the increase of the concentration in a few, intense and short duration rainy events facilitates the surface water sliding: both of these phenomena reduce the possibility of groundwater recharge. Not obvious, hence the “less serious” in the column before.

Actions (on the supply and demand side) that Venice is taking to reduce risks to its water supply:

Declining water quality

Diversifying water supply (including new sources)

The management of the water must be oriented, rather than generalised constraints in the use of the resource, to the progressive differentiation of uses, not only for areas, but especially for aquifers. Must be strengthened systems for artificial recharge of the aquifer.

Increased water stress or scarcity

Water metering

Has been defined a “dynamic protection” for each well defining a buffer zone based on the “60 days isochrone”. Has also been defined the optimal location of a monitoring and warning network that will detect the presence of pollutants that can affect the wells before the pollutants reach pickup area: launched on an experimental basis, will be applied to all the Venetian area.

Increased water stress or scarcity

Efficiency regulations or standards

Have been introduced standards and limitations in the use of groundwater and in the intervention on rivers that interfere with it: the regulatory measures need to be strengthened.

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