

5th November 2020



COPING with FLOODS and CLIMATE CHANGE

TOWARDS VENICE CLIMATE ACTION PLAN

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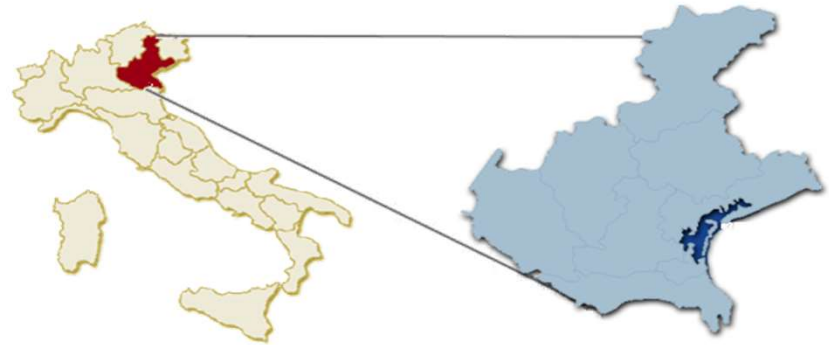


The Climate Action Plan or Sustainable Energy and Climate Action Plan

Mitigation  **Policies, strategies, measures that can be put in place to reduce climate-changing gas emissions**

Adaptation  **The effects of climate change are already underway and will continue in the future. It is necessary to increase understanding and contrast of the effects of this change**

VENICE: A FLOATING MASTERPIECE



Venice takes the climate crisis, how?

2011 – Commitment to the Covenant of Mayors;

2012 – Approval of SEAP (Sustainable Energy Action Plan: 40+3 actions to reduce carbon emissions);

2014 – Adhesion to the C40 Cities Climate Leadership Group as “Innovator City” with other 92 megalopolies;

2018 – Reinforcement of climate policies. SEAP Updating and new GHG emissions inventory (goal achieved! < 20% emissions compared to 2005);

Venice takes the climate crisis, how?

2019 – First draft of risk and vulnerability assessment as background for the adaptation plan and started implementation of mitigation plan (< emissions of 40% within 2030 and carbon neutrality within 2050);

2020 – Implementing Context, Past Climatic Events and Trends of risk analysis and completing the core of Climate Action Plan (Adaptation Plan + Mitigation Plan) with adaptation actions (adaptation plan) and mitigation actions (mitigation plan).

EU PROJECTS: Savemedcoast2; Hyperion; Adriaclim, I Storms, Stream, VIMINE

What is a **Climate Action Plan or Sustainable Energy and Climate Action Plan = SECAP?**

MITIGATION



ADAPTATION

Sustainable Energy Action Plan

an emission inventory and mitigation actions, i.e. reduction of climate-changing emissions

Venice already has the SEAP by 2020 but has voluntarily committed to implement it by moving the time horizon from 2020 to 2030 and to further reduce emissions up to zero by 2050

Adaptation Plan

risk analysis and identification of climatic vulnerabilities and actions to increase the resilience of the territory

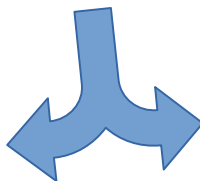
Venice does not have an adaptation plan (although many adaptation measures are already implemented), but it is drafting it: it has committed itself to drafting the main plan in two years (2019-2020)



Sustainable Energy Action Plan and its implementation



**Emission
Inventory**



**Action card for
GHG reduction**

2005	Baseline Inventory (BEI)
2005-2020	40+3 mitigation action
2012	approval
2014	biennial quality monitoring
2018	qualitative and quantitative monitoring
2018	Monitoring inventory (MEI)

EIB and MEI drawn up according to the Covenant of Mayors guidelines for the presentation of monitoring reports and indications of the Joint Research Center (EU)

Municipal buildings and facilities
Buildings equipment facilities of the tertiary sector
Residential buildings
Public lighting

**EVALUATED
SECTORS**

Municipal vehicle fleet
Public transport
Private and commercial transport

**EXCLUDED
SECTORS**

Electricity production
Industry
Agriculture
Waste



What kind of actions?

41+3 ACTION CARDS

EMISSIONI SECONDO IBE 2005		RIDUZIONI PER SCHEDE PAES	
SETTORE DI RIFERIMENTO	tCO ₂ /a	RIDUZIONE	PARI AL
Edilizia Residenziale	525.145	69.016	13,17%
Settore Terziario	512.859	106.367	20,74%
Mobilità	424.350	158.203	37,28%
Edifici Comunali	21.421	1.763	8,23%
Illuminazione pubblica	11.968	3.544	29,61%



SEAP ACTION CARDS

40+3 ACTION CARDS

F.R.E.E .: Renewable Sources and Energy Efficiency (19);
 P.U.R.E .: Urban Planning and Building Regulations (3);
 MO.VE .: Sustainable mobility for Venice (14);
 L.I.VE .: Light and efficient lighting for Venice (3);
 IN.FO .: Information and Training (4).

Each card is organized like this:

- title of the action;
- responsible for the action;
- indication of the objective;
- brief description of the project;
- execution and expected benefits;
- construction costs;
- method of financing;
- expected timing;
- associated energy savings
- CO2 reduction related to the action.

	CODICE AZIONE:	LIVE-03
	TITOLO AZIONE:	SOSTITUZIONE DELLE LANTERNE SEMAFORICHE DI VECCHIA CONCESSIONE CON LANTERNE A LED
	RESPONSABILE:	COMUNE DI VENEZIA - DIREZIONE P.E.L.
	ALTRI SOGGETTI:	CITELUM S.A.

OBIETTIVO: la riduzione dei consumi energetici per il funzionamento degli impianti semaforici.

DESCRIZIONE: L'intervento prevede la sostituzione delle lampade ad incandescenza delle lanterne semaforiche della terraferma con lampade a LED. L'installazione di questa tipologia di lampade nelle lanterne semaforiche consentirà di ottenere consistenti risparmi energetici nel tempo, minori consumi di energia, riduzione di valori di potenza installata, maggiore durata delle lampade e minori oneri di manutenzione.

ESECUZIONE E BENEFICI ATTESI: L'intervento prevede la rimozione di tutte le lanterne semaforiche della terraferma, dotate di lampade ad incandescenza e l'installazione di 2072 moduli a LED del diametro di 200 mm e di 796 moduli a LED del diametro di 300 mm.

La potenza attualmente stimata impiegata dalle lanterne semaforiche ad incandescenza, caratterizzate da una durata limitata e da estrema inefficienza, è pari a 84 kW. Inoltre i consumi di tali lampade sono incrementati dalla necessità di avere un filtro per convertire la luce bianca nei tre colori del semaforo, filtro che riduce in maniera consistente la luce trasmessa, in maniera differente a seconda del colore, mentre i LED possono fornire direttamente la luce colorata risultando più luminosi della versione tradizionale.

Le lanterne con ottica a LED offrono notevoli vantaggi rispetto alla soluzione tradizionale con lampada ad incandescenza, per quanto concerne l'abbattimento dei costi di gestione. Infatti vi sono:

- la riduzione del 90% dei consumi;
- manutenzione e cambio lampade nullo;
- una durata superiore (circa 10 anni);
- una maggiore sicurezza grazie alla riduzione di false segnalazioni dovute al riflesso dei raggi solari.

Inoltre la sicurezza è garantita dalla presenza di un dispositivo elettronico che, nel caso di malfunzionamento di un singolo LED, bypassa quest'ultimo ed aumenta l'intensità luminosa dei restanti LED senza creare zone d'ombra nel corpo luminoso.

COSTI: il costo previsto per l'intervento descritto è compreso nel contratto per la gestione degli impianti e per la fornitura dell'elettricità, per un ammontare medio di circa 6 milioni di euro all'anno (che comprende oltre ai costi di gestione, fornitura e manutenzione, anche quelli per la realizzazione delle azioni descritte nelle schede III-01 e III-02).

FINANZIAMENTI: non necessari.

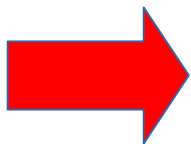
TEMPSTICA: il progetto sarà realizzato nell'anno 2012.

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020



Semafori a LED

	RISPARMIO ENERGETICO	837	MWh/anno
	EMISSIONI DI CO ₂ EVITATE	404	tonn/anno



SEAP Implementation and goals

In 2012: SEAP approved by the City of Venice



GOAL: reduce climate-changing gases by 20% by 2020

In 2018: Four-year SEAP monitoring approved (based on 2016 data)



Goal achieved!
but the SEAP ACTIONS continue: Adherence to initiatives aimed at implementing climate change mitigation and adaptation strategies in order to contribute to the implementation of the Paris Agreement.

SEAP FOUR-YEAR MONITORING approval

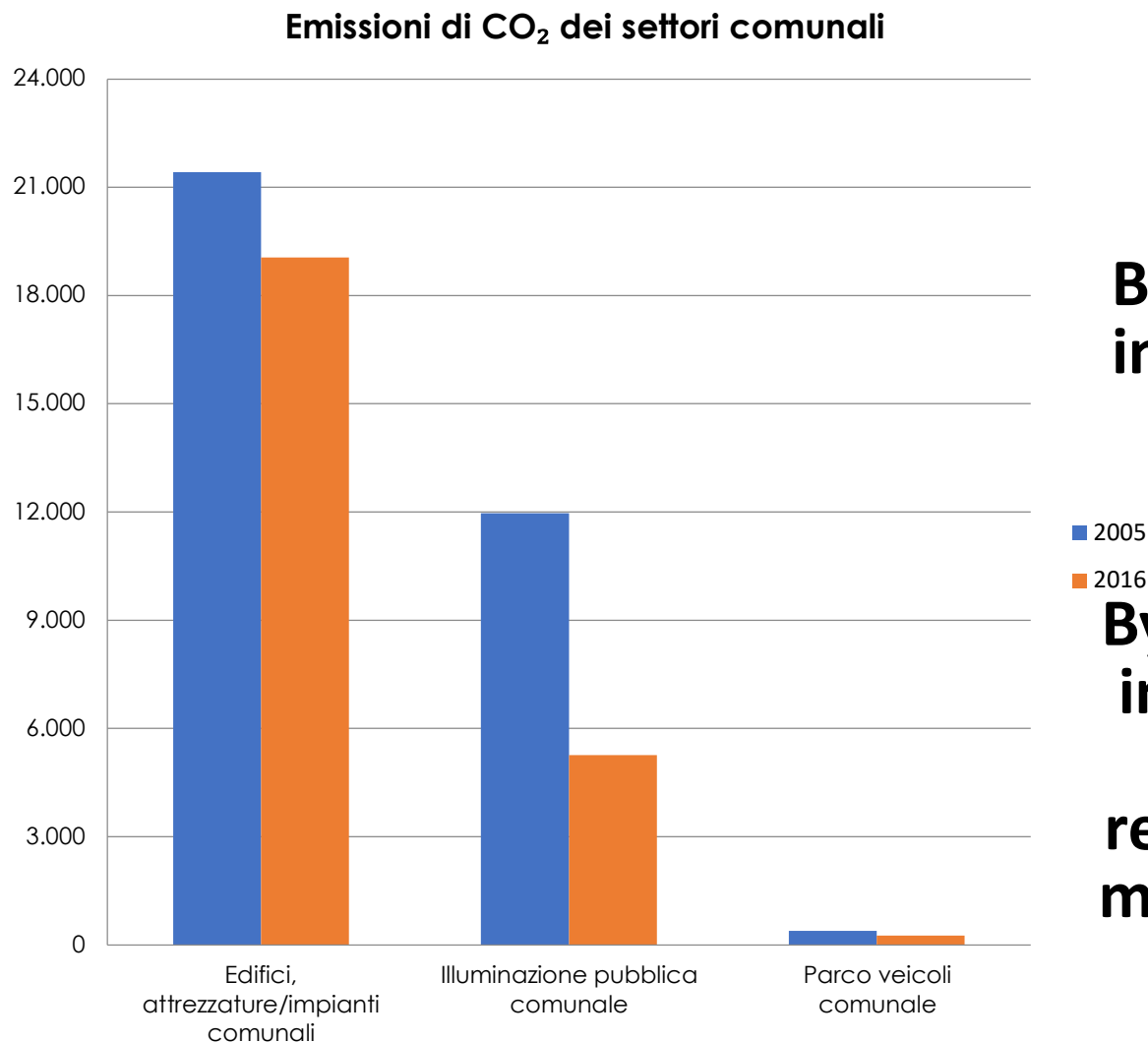


Monitoring of the degree of implementation of the Plan (monitoring of actions), at the same time checking the compliance of the intermediate results with respect to the expected objectives.



Energy-emission inventory update for 2005 and definition of a new inventory for 2016

SEAP four-year monitoring results



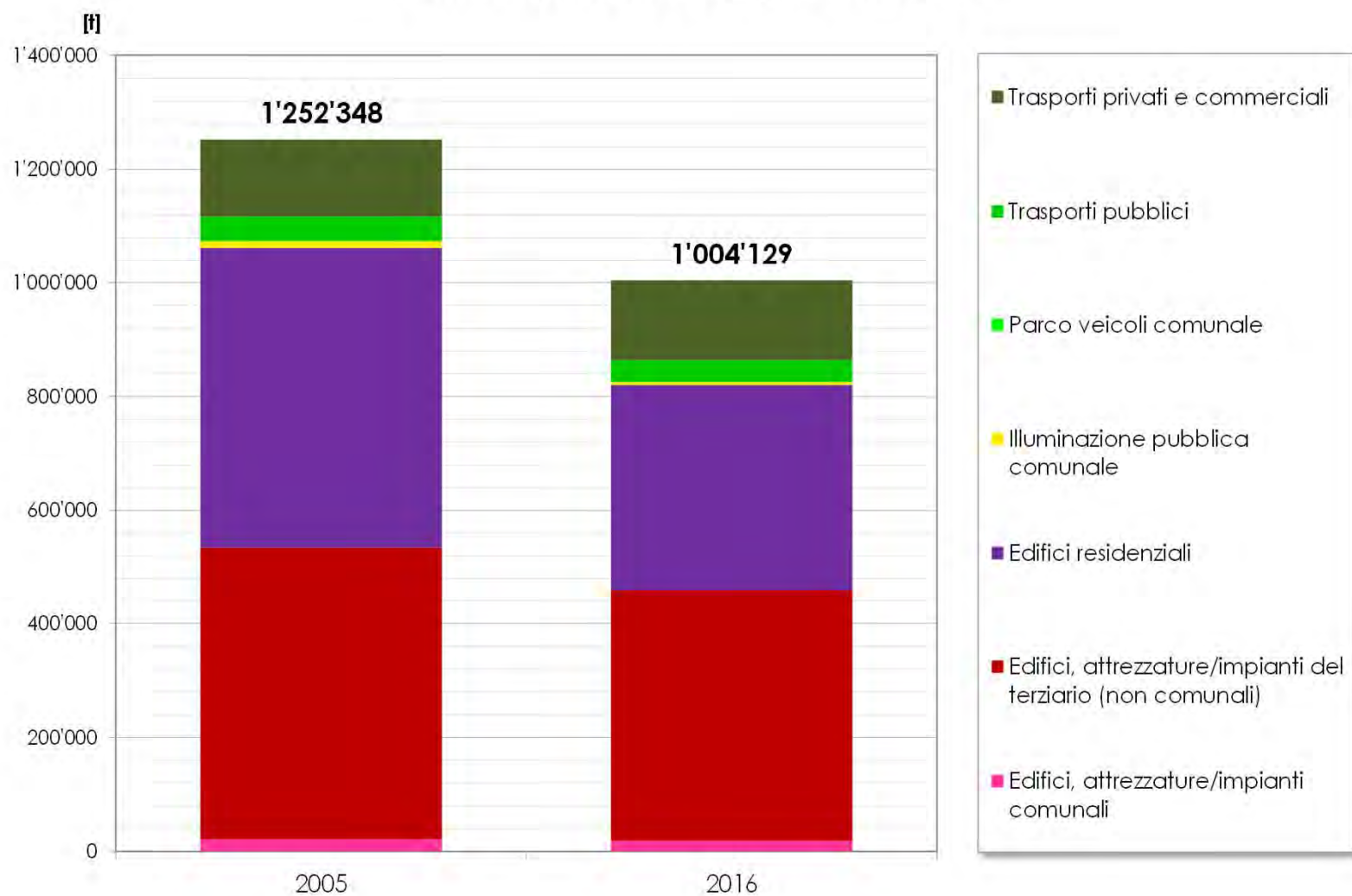
**20% reduction GOAL
achieved in 2016!**

**But the actions planned
in the SEAP that are not
yet concluded are
continuing!**

**By 2020 the SEAP will be
implemented with new
actions and the
reduction targets will be
moved to 2030 and 2050**

OBIETTIVO di riduzione del 20% raggiunto al 2016!

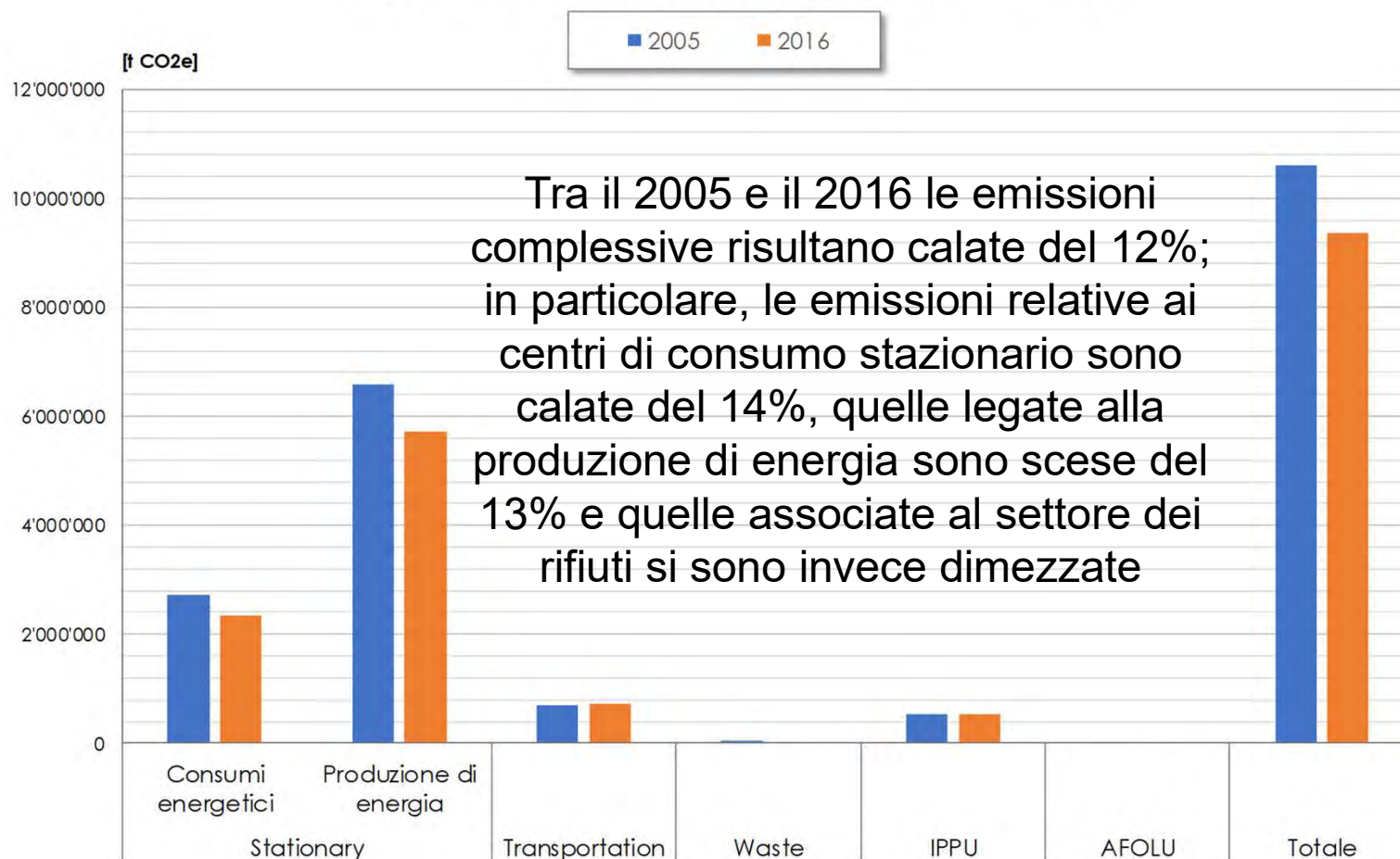
Emissioni di CO₂ per settore





Risultati del monitoraggio PAES con nuovo inventario Global Protocol for Community – Scale Greenhouse Gas Emission Inventories

Confronto emissioni estratte da CIRIS



SEAP updating update with targets for 2030 and 2050

Ready GPC inventory 2016

Updating GPC inventories to 2017/2018

I - **Stationary**: residential, public and private tertiary sector, industrial - including energy sector operators - agriculture

II – **Transport**: transport sector (including airports, railways, shipping)

III – **Waste**: waste sector (including waste water treatment)

IV - **IPPU** (Industrial Processes and Product Use), industrial processes or the consumption of non-energy raw materials;

V - **AFOLU** (Agriculture, forestry and other land use), primary sector, not attributable to energy consumption.

**EVALUATED
SECTOR**



PARIS AGREEMENT

Contain temperature rise
overall within 1.5 ° C compared to pre-
industrial levels

establishing an intermediate target for
2030

and neutrality of carbon emissions by 2050

**NEW GOALS and
NEW DEADLINES
SEAP implementation
in 2020.**

VENICE, A UNIQUE CASE IN THE WORLD

A great example of resilience and vulnerability

UNESCO site, natural and cultural heritage, protected ecosystem, commercial and touristic port, international airport, tourism, industrial areas, urbanized mainland...

Rappresentare un capolavoro del genio creativo umano	Criterio I
Mostrare un'importante integrazione di valori culturali	Criterio II
Rappresentare una testimonianza unica di una tradizione culturale	Criterio III
Esempio eccezionale di architettura o paesaggio	Criterio IV
Esempio eccezionale di insediamento	Criterio V
Forti associazione ideologico-culturale	Criterio VI



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HOW TO REACT TO CLIMATE CHANGE PRESENT and FUTURE EFFECTS/IMPACTS?



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Main adaptation reference policy documents, manual, toolkit...

**National Climate Change Adaptation Strategy (NAS) and draft of
National Climate Change Adaptation Plan (NAP)**

**C40 CITIES - Research Centre and Climate change adaptation in
delta cities**

**POLICY DOCUMENT on THE IMPACTS of CLIMATE CHANGE on
WORLD HERITAGE DOCUMENT**

Key issues (synergies, research needs and legal issues).

**GLOBAL COVENANT of MAYOR for ENERGY
and CLIMATE**



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What City of Venice did?

- 1. Obtained political support:** with DGC n. 266/2018 Mayor Brugnaro and its Board committed themselves with C40Cities to prepare the first Venice adaptation plan;
- 2. The Board identified human resource:** Directorate Strategic and environmental Projects - Environment department – Naturalistic and environmental observatory
- 3. Identified and obtained financing and funding:** € 40.000 (2019-2020) in City budget + EU funding (EU projects = SAVEMEDCOAST II started + ADRIACLIM ready to go about 50.000 for the implementation of adaptation plan (2020-2023));
- 4. Identified technical and scientific support:** main support of C40Cities and Connecting Delta Cities Network and public agreement with CORILA a consortium among Ca ' Foscari University of Venice, IUAV, University of Padua, National Research Council and National Institute of Oceanography and Experimental Geophysics
- 5. Found additional support** - main partnership in EU projects involved are:
VENETO ADAPT – Metropolitan City of Venice, IUAV and SOGESCA srl
SAVEMED COAST 2 – INGV, CMCC, CGIAM
ADRIACLIM – ARPAV, ULSS3, CMCC, ISMAR – CNR
HYPERION - SOPRINTENDENZA



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What City of Venice did and is doing?

6. Assessing climate change risks and vulnerability

7. Understanding past and present climate patterns - projections and future impacts - identifying urban sectors:

8. Conducting risks and vulnerability assessment

9. Identifying main adaptation concerns and defining objectives

10. Identifying adaptation options:

- creating a catalog of already existing and actuated adaptation actions - evaluate their consistency according with future climate patterns
- finding examples of good adaptation practice
- If necessary device new adaptation options

11. Conduct a cost benefit analysis of chosen adaptation options

12. Prioritizing adaptation option

13. Implementing adaptation measures

14. Monitoring and evaluating adaptations



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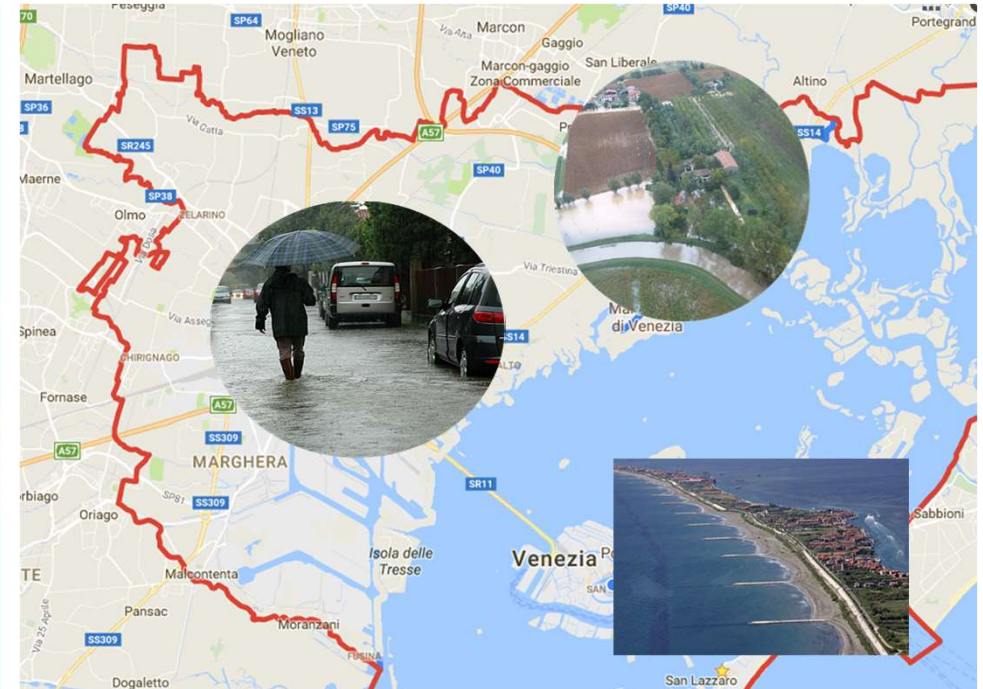


Climate related iussue

Main effects are caused by sea level and temperatures rise



Increase of tides' frequency according to s.l. affect monuments, good, citizens lives, water transport, waste collection, business, ecosystem and s.l. rise affects the costal and saltmarshes erosion



Summer overheating and heat waves of urbanized areas affects human healths, air quality (ozone and PM), welfare

Climate related iussue

Costal (sea) and saltmarshes (lagoon) erosion affects protected ecosystem, summer tourism, flora and fauna, human lives, health and goods;



Flooding, stormsurge, cloudburst affects environment and protected ecosystem, water quality
Mobility, infrastructures, cultural heritage, urnam hygiene;



Increase of storm violence and frequency affects human lives, health, mobility and territory

Drought affects agriculture, water supply and air quality

Increasing of air and water temperatures creates the conditions for new diseases transmitted by mosquitos, affects fisheries and aquaculture.



Specific priorities UNESCO site

Cultural heritage (i.e. HYPERION)

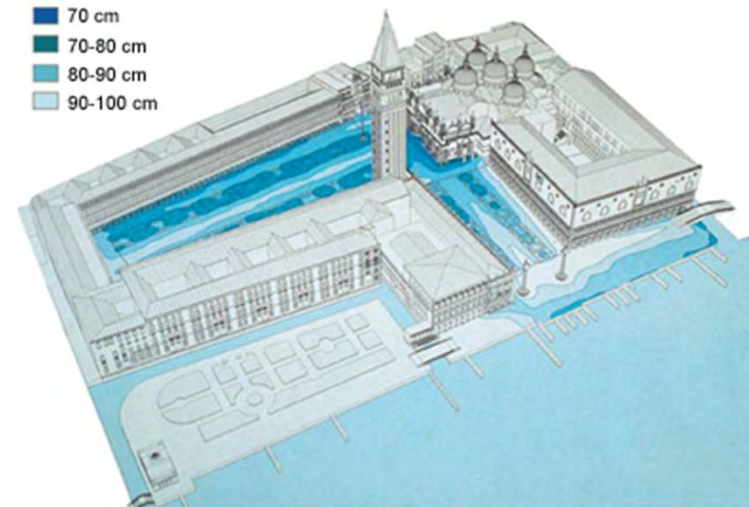


Local defence for urban centres in lagoon

Some examples SAN MARCO - VENICE

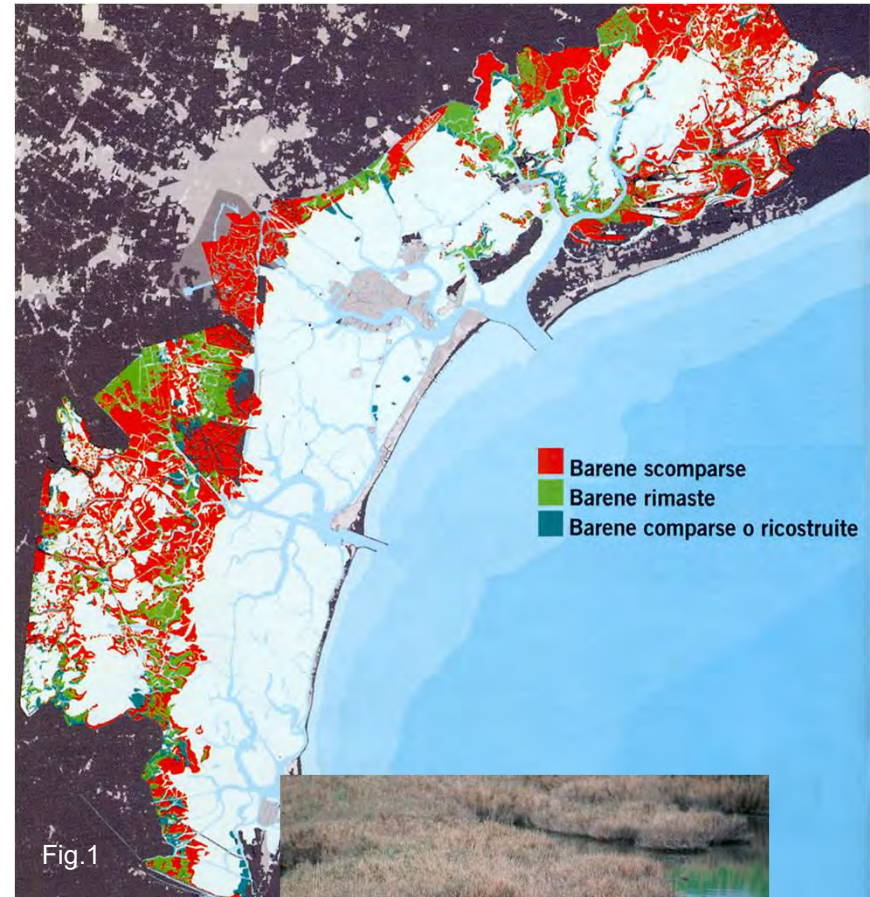


Internal historical centre



Specific priorities UNESCO site

Natural heritage:
reason of concerns a lagoon
in danger (i.e. VIMINE)



Conservative work on saltmarshes

VENICE INTEGRATED MANAGEMENT
OF INTERTIDAL ENVIRONMENTS



Wood bundle production



In the first early draft of adaptation plan:

- 1. Definition of morphological – territorial typologies**
- 2. Analysis of plans and strategies in order to mainstream adaptation measures into**
- 3. Analysis and identification of priority areas of intervention for tidal and temperature areas**
- 4. Implementation of information levels through new technologies for vulnerability analysis (s.l.m and temperature rise)**

Work in progress

- 1. Implementation of the climate risks assessment with detailed and updated past and present climate patterns (SAVEMEDCOAS 2 – 2020) and the likelihood of future climate hazards and the potential impact of these hazards (ADRIACLIM for slr combined with extreme events)**
- 2. Identification of the potential impact of these future hazards (ADRIACLIM for s.l.m. combined with extreme events) and HYPERION (determining the resilience of cultural heritage sites to natural and artificial hazards)**
- 3. Identifying adaptation options.**

Vulnerability analysis TIDAL

Tidal scenery in historical City of Venice (120 e 140 cm)



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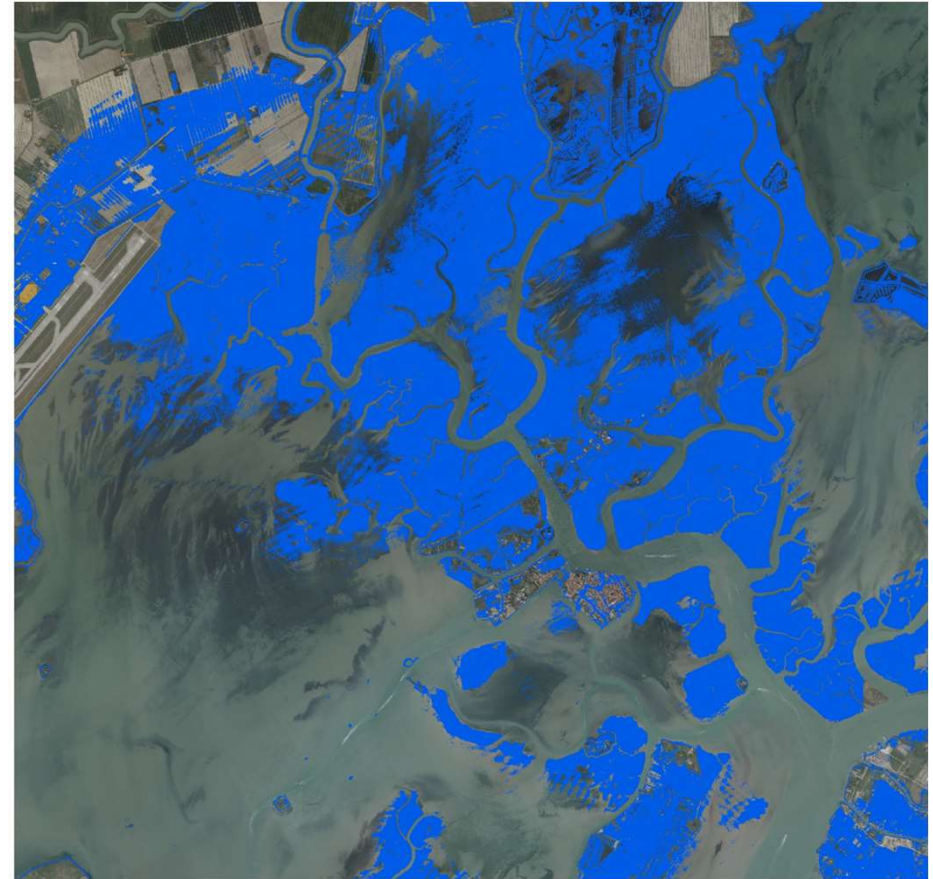
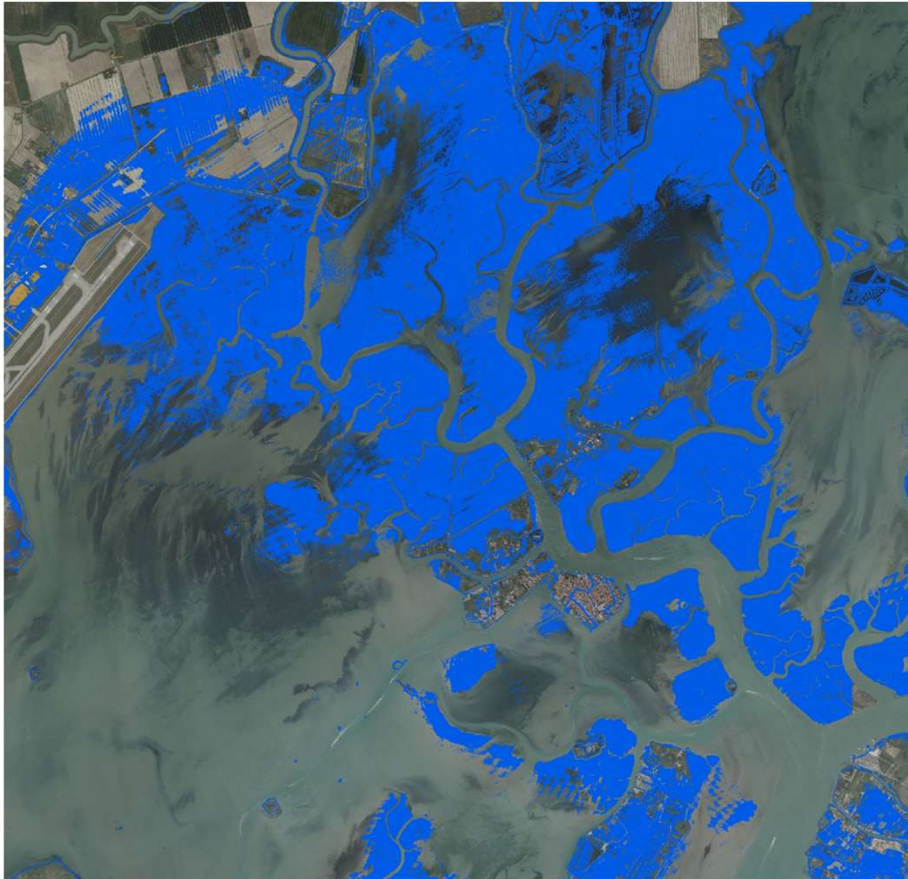
Vulnerability analysis TIDAL

Tidal scenery in Porto Marghera (120 e 140 cm)



Vulnerability analysis TIDAL

Tidal scenery in the lagoon (120 e 140 cm)



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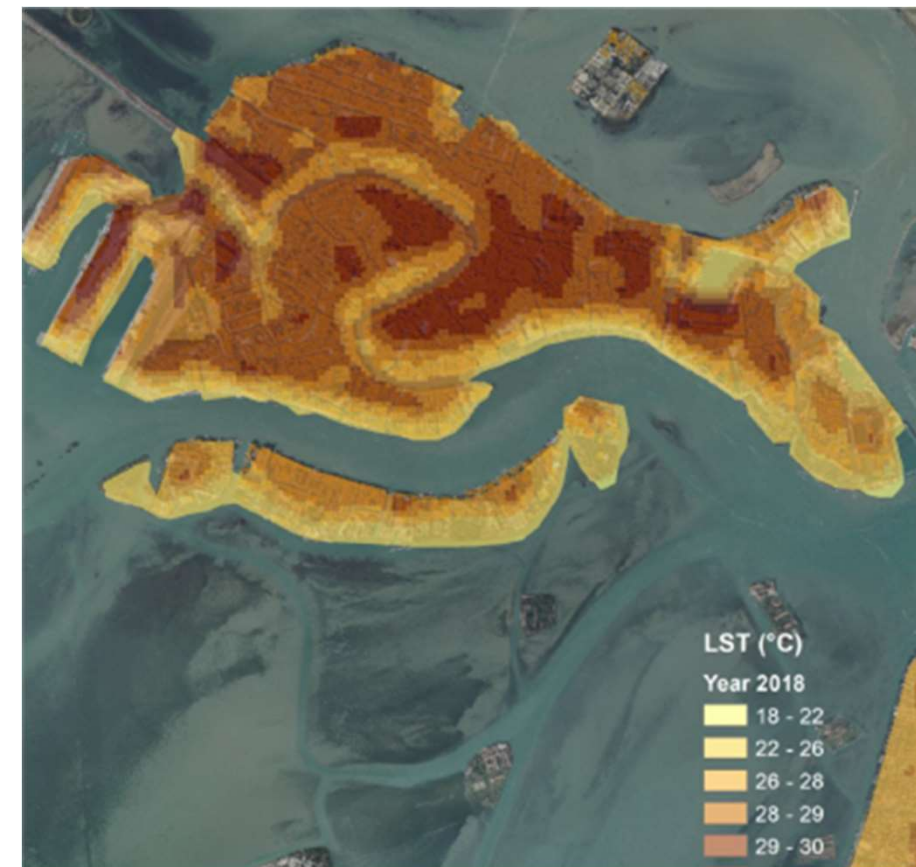
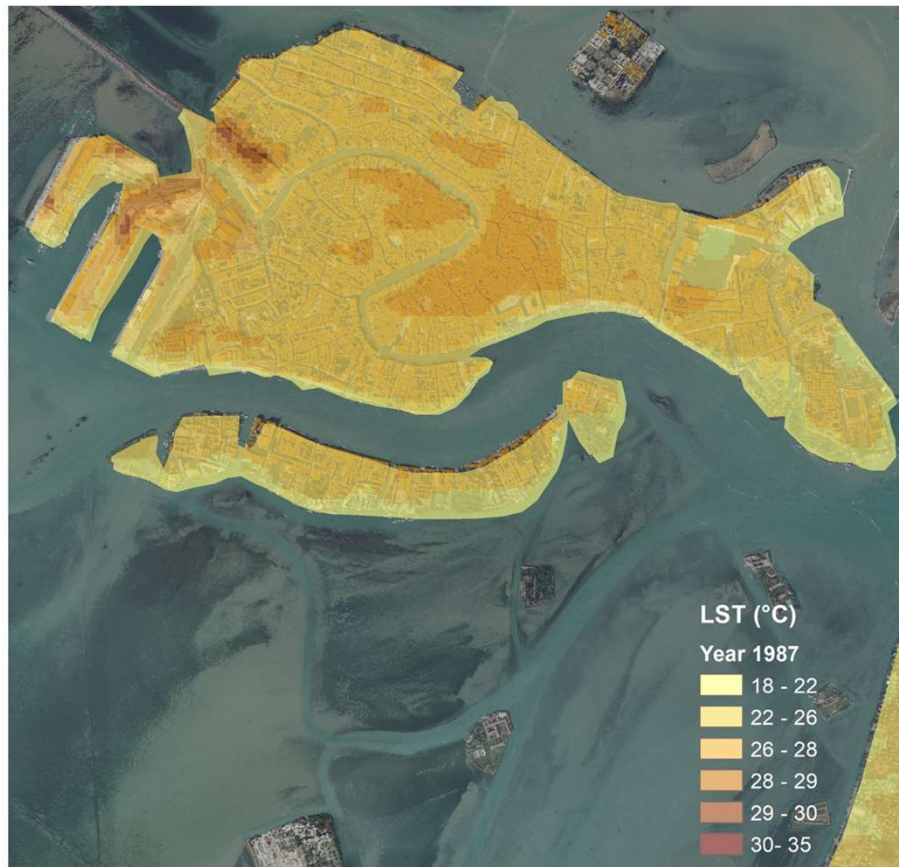
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Vulnerability analysis land surface temperature

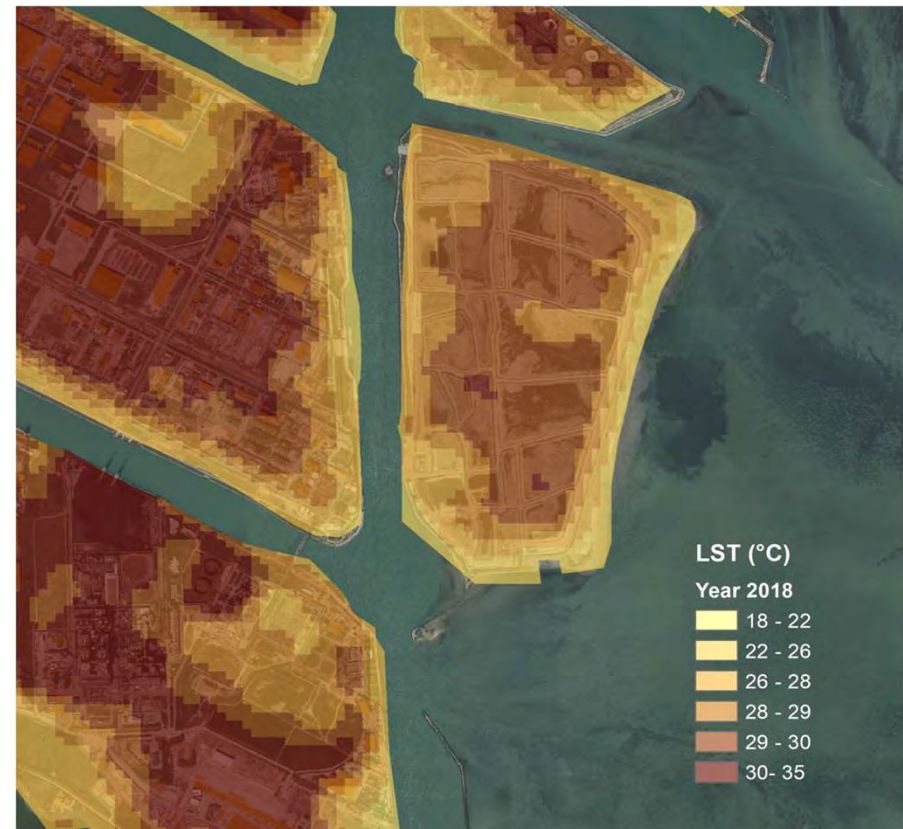
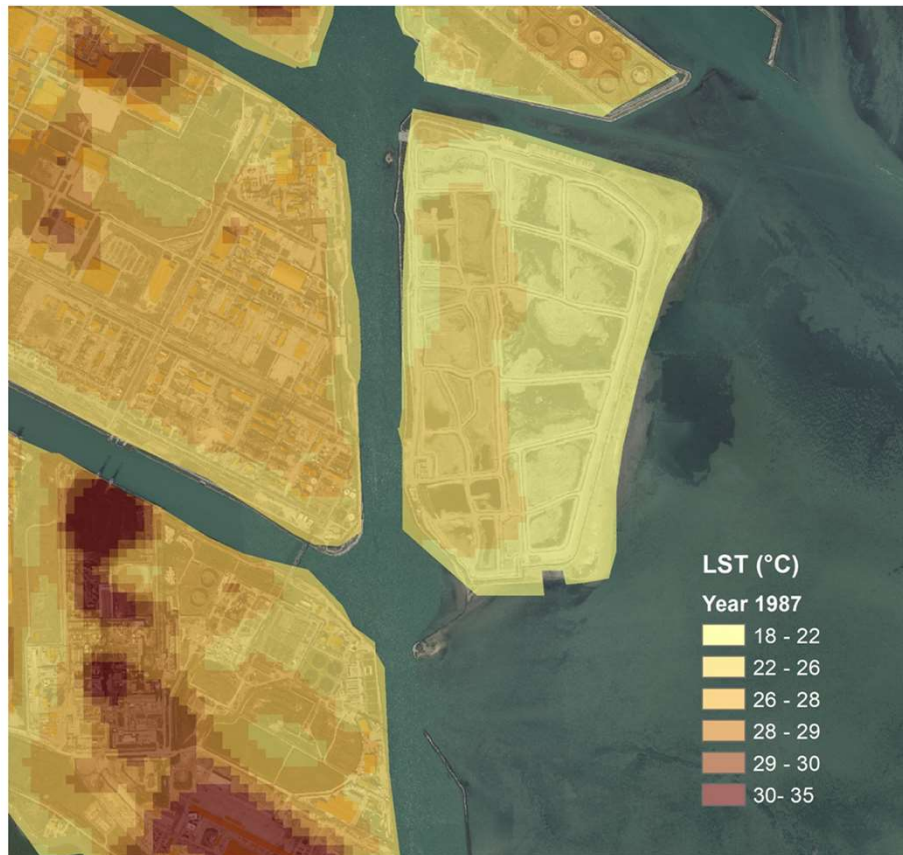
LST in the historical city of Venice

(1987 e 2018 cm)



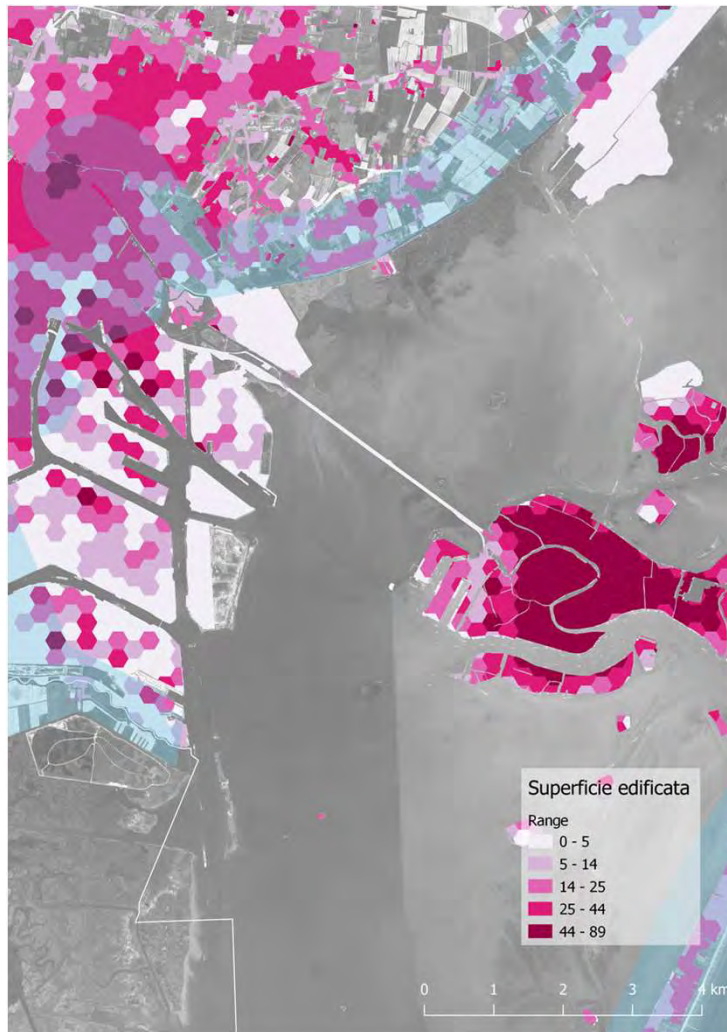
Vulnerability analysis land surface temperature

LST in the historical Porto Marghera (1987 e 2018 cm)

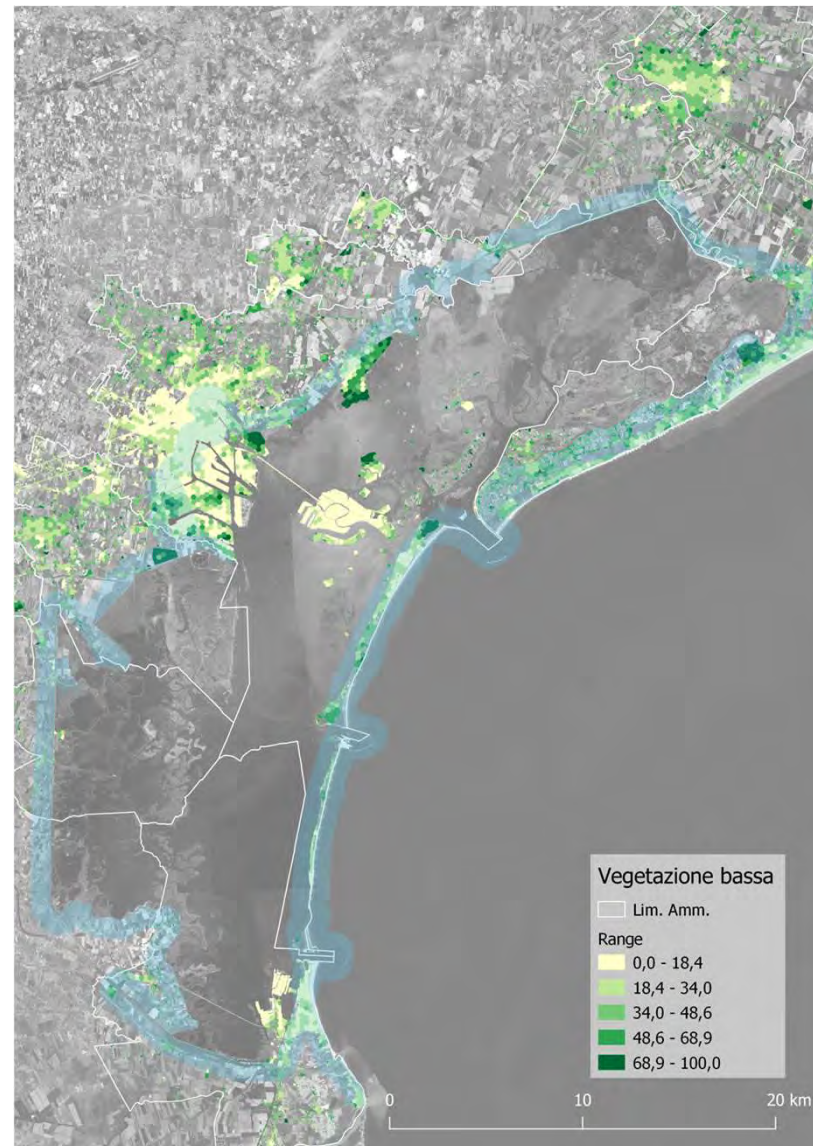


Information level for vulnerability analysis

Built surface (zoom)

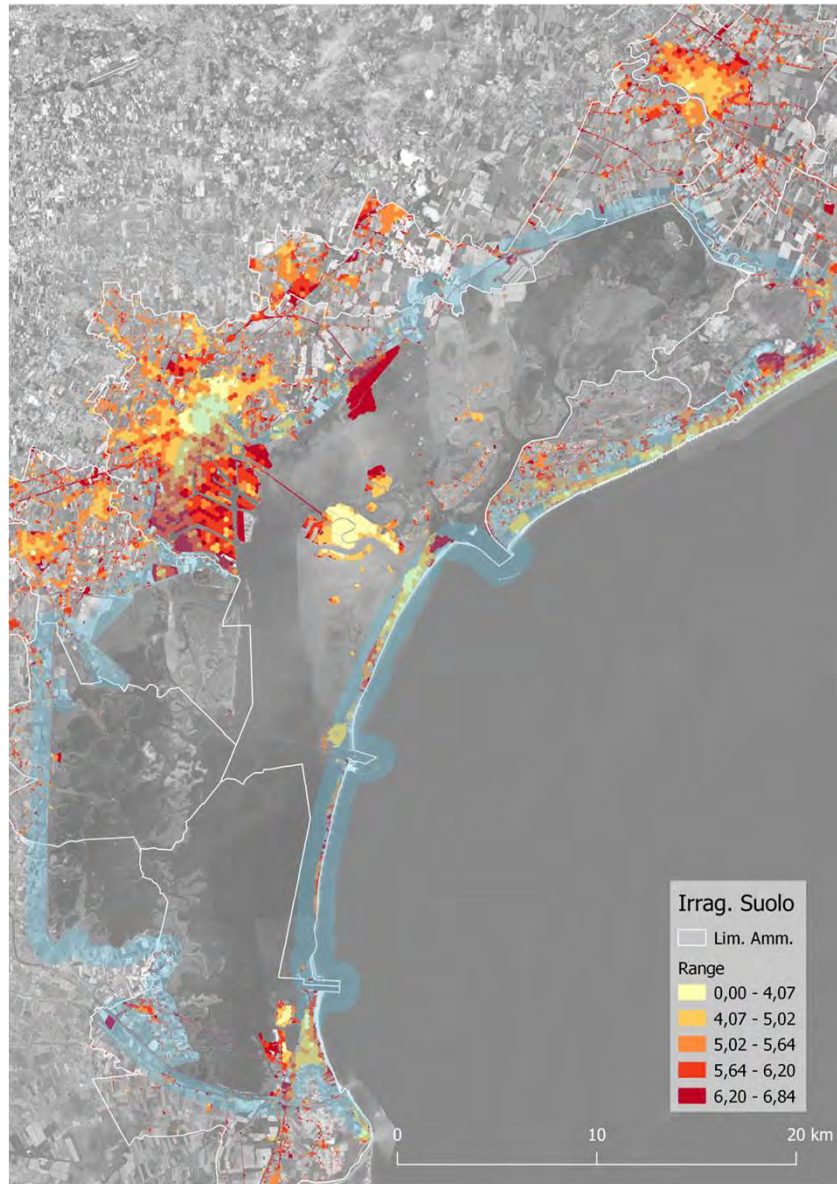


Low vegetation (zoom)

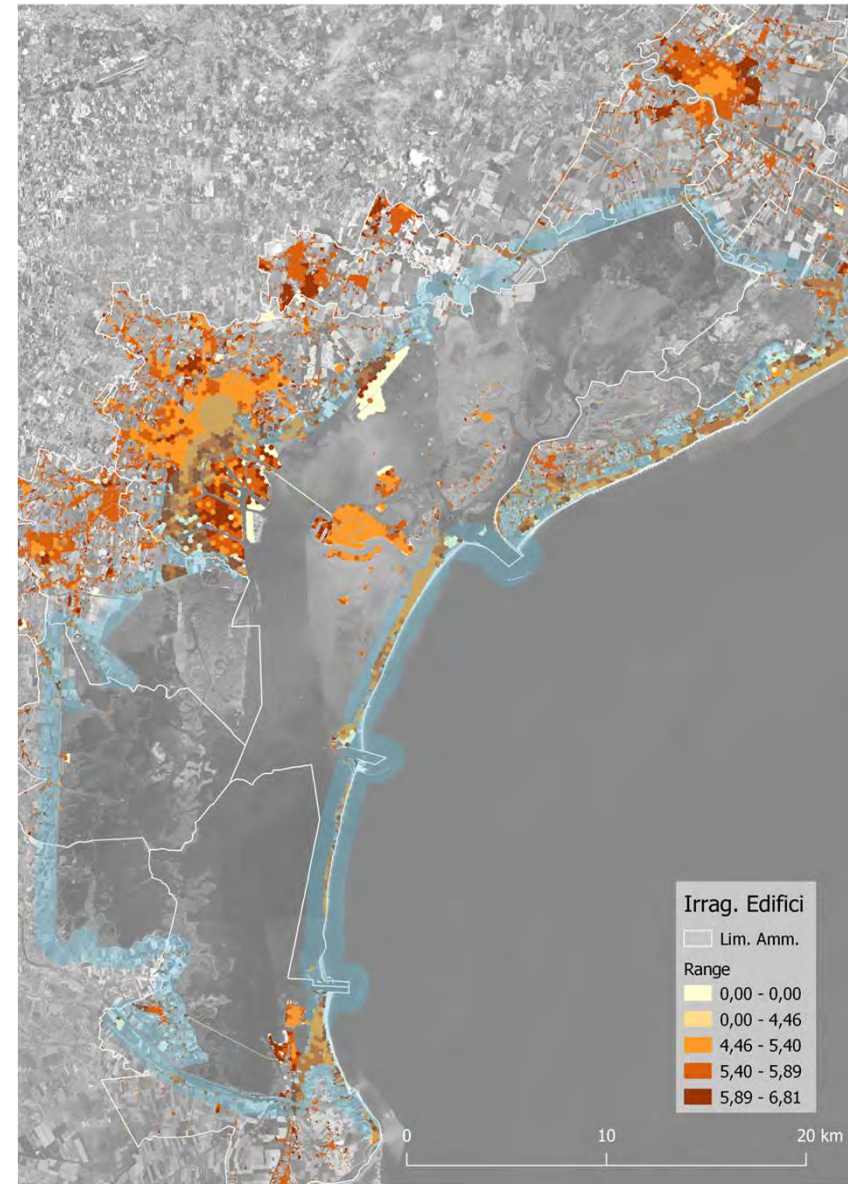


Information level for vulnerability analysis

Soil radiation

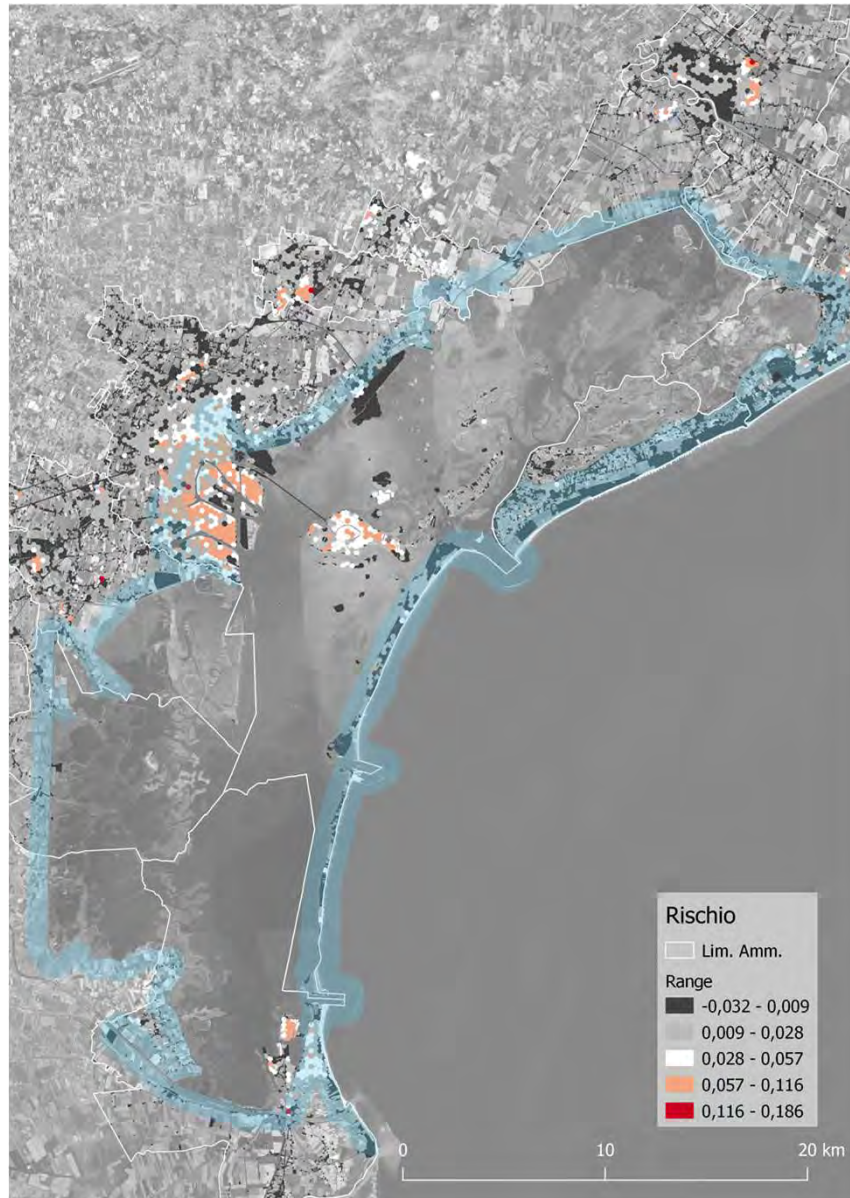


Building radiation

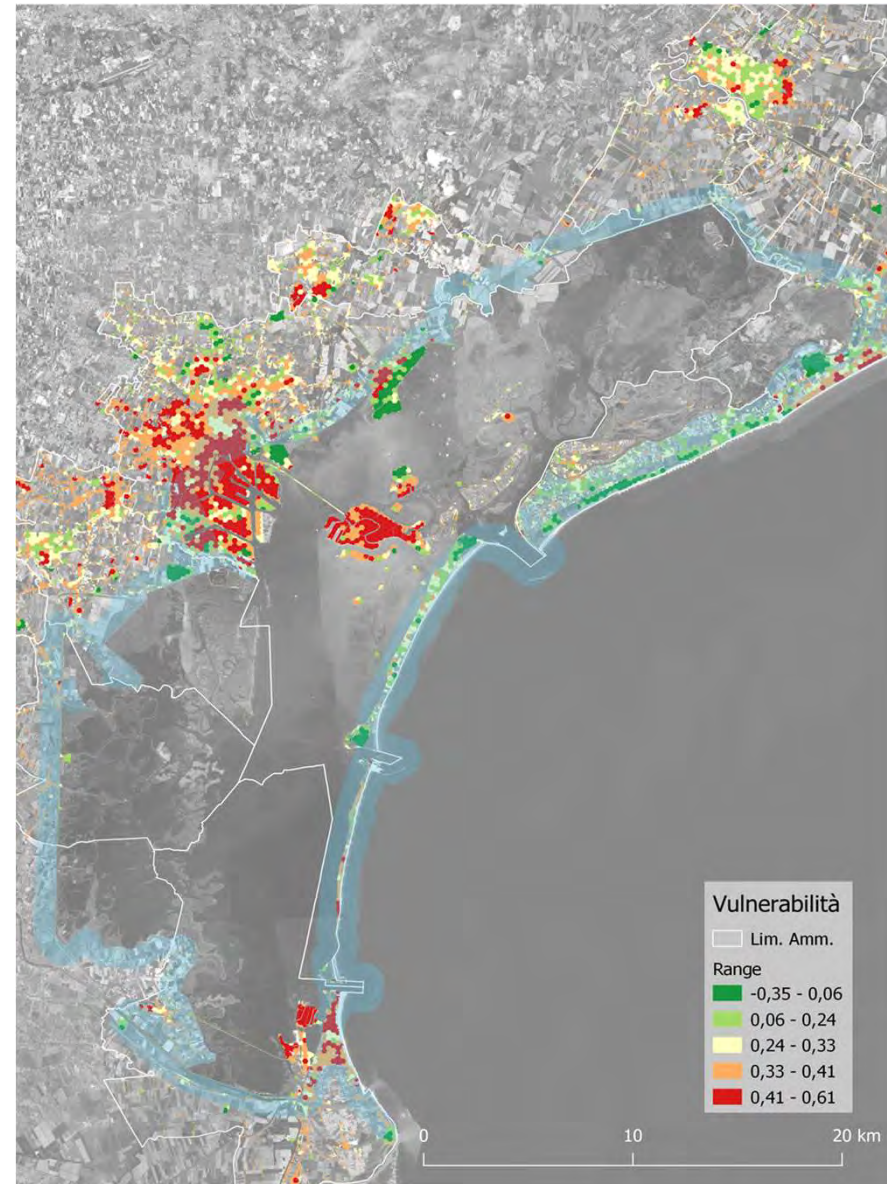


Information level for vulnerability analysis

Risk



Vulnerability



Resilient Venice: expected results



A more resilient city through adaptation and governance actions.



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