Climate change mitigation and adaptation
Parallel Session, Thursday, 23 April 2015

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Venice can be divided at least in 3 different macro-areas.

Each of one is going to face climate changes with its own specific approach.

This approach (mitigation/adaptation) depends on:
- the history of the area;
- the culture of its stakeholders and their awareness of climate changes;
- the availability of financial resources;
- the regulatory framework (international/national/local)
Water city: long history and experience of mitigation and adaptation to environmental (in general) changes

Environmental changes

- Risk of Lagoon burial because of the sediments transported by the rivers
  - By the 16th Century: rivers have been moved outside the Lagoon to prevent the deposit of sediments (MITIGATION)

- Risk represented by the sea to overcome the defense level of islands
  - Stone walls to protect the Lagoon from the sea (ADAPTATION)

- Risk of flooding tide
  - Raising pavements (ADAPTATION)
  - Monitoring, Forecast, Information and Early Warning (ADAPTATION)
  - MOSE System (ADAPTATION)
MO.S.E.: how it will work

A System that temporary closes the inlets; when open, the barriers rest on the bottom of the inlets.
Operating in 2016
Cost: 5.4 BLN €, financed by the national government. Goals: prevent the City from tying > 110 cm (up to 3 m).

MO.S.E.: the background knowledge that motivated the project (2002)

Changes in the mean sea level (cm), 1872-2002

Annual distribution of high tides ≥ +110 cm recorded in Venice 1872-2002

MO.S.E.: how climate change effects predicted by IPCC (Intergovernmental Panel on Climate Change) can be taken into account?
This is the challenge that now water city is actually going to face: introducing the IPCC scenarios into the assessment of future MO.S.E. management

changes in the mean sea level predicted by IPCC scenarios

This leads new questions!
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<th>QUESTIONS:</th>
<th>ANSWERS:</th>
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<td>1) taking the IPCC scenario, how many times in the next years the tide is expected to overcome the limit value of 110 cm?</td>
<td>From the actual 4 events/year to 143 events/year!!!</td>
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<td>2) How many times MO.S.E. will be activated?</td>
<td>143 times/year ????</td>
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<td>3) Which consequences a prolonged closing of the inlets will bring to the City (vessel traffic stops) and its Lagoon (changing in morphology, lowered interaction between lagoon and sea)?</td>
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These are the new border of ADAPTATION that Water City is going to face right in these months.
- less experience of mitigation and adaptation to environmental (in general) changes;

- a relationship between human and water which is not daily experienced as in the water city;

- a high overbuilding in the last decades;

leads to some events of flooding (in particular that one on September 2007) and the need to take actions in order to prevent other similar phenomena.

The regulatory framework has been recently updated, in particular a new P.A.T. (a kind of general plan for the urban development of the City) has been approved, giving indications and prescriptions in order to guarantee the hydraulic balance of the territory and to preserve the mainland from rainfall events whose frequency is expected to be once/50 years.
Please, note that the concept “rainfall events whose frequency is expected to be once/50 years” (i.e. rains whose intensity statistically happens once every 50 years) is based on historical data that don’t consider the effect of climate change!

IPCC tells that in next years the number of extreme rainfall is going to raise up. This is a critical condition that has to be implemented into the local regulatory framework.

The statistical/historical rainfall data must to be replaced by the rainfall scenario based on IPCC predictions (but this work, in the mainland, has still to be done!!!)

This is an examples of a situation (the mainland) where MITIGATION (already done in our SEAP – Sustainable Energy Action Plan, whose actions mainly regard the mainland itself) is not in sinergy with ADAPTATION
Industries, flyghts, ships (when sailing) and power generation >20MW are not included in our SEAP – Sustainable Energy Action Plan.

These sectors have been not involved yet about MITIGATION, since the regulation framework for their CO2 emissions is not local.

A “Manifesto for Clima” draft a possible interaction with them in the field of green economy, waste management, renewable sources… But the work concretely has still to be done.
City of Venice - Directorate Environment and Youth

Air Protection and Energy Sources

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