



## Venice salt marshes as a carbon sink: from theory to practice

Venice 27-28 January 2020

In partnership with [Laguna B](#) we have been exploring the potential of salt marsh protection and restoration in the Venetian Lagoon as an instrument for carbon offsetting. This work could expand the funding options for Venice as well as be relevant to similar projects elsewhere in the world.

### MONDAY 27 JANUARY

10.00 Meet at [People Mover Terminal](#) on Tronchetto  
16.00 Return to San Zaccaria

*The visit will include natural salt marsh, artificial salt marsh, [Life Lagoon Refresh](#) project, and different examples of salt marsh protection techniques in the northern lagoon and Murano, primarily for the benefit of non-local participants with the involvement of as many local experts as possible.*

*The boat might be heated but this is also typically the coldest time of year, known as “i giorni della merla”. Hat, scarf and gloves highly recommended. If the weather is too foggy, we will travel by road to the Life Lagoon Refresh project instead.*

### TUESDAY 28 JANUARY

The meeting will take place at [Palazzo Giustinian Persico](#), just off Campo San Tomà. Attendees should follow Calle del Traghetto past Ciak cafe, cross the bridge and then the gate is immediately on your right-hand side.

9.00 **Welcome and Outline of project context and scope**  
*Jane da Mosto (WahV) & Marcantonio Brandolini d’Adda (Laguna B)*

9.20 - 9.40 **The global dimension of wetlands as a resource and their fragility**  
*Mariá José Viñals - Spanish Environment Ministry/Ramsar*

9.40 - 10.20 **Economic valuation of ecosystem services of Venice’s salt marshes**  
*Laura Onofri (Università di Padova) & Camilla Bertolini (Univ. Ca’Foscari)*

COFFEE BREAK



11.00 - 11.30 **Quantifying the opportunity and how the system can work**

*Antoine Diemert, International Carbon Reduction and Offset Alliance/IETA*

11.30 - 12.00 **Engineering and biological aspects of nature based interventions in the Venetian Lagoon with specific reference to recent experience**

*Seresto - Adriano Sfriso, Ca' Foscari*

*Life Lagoon Refresh - Alessandra Feola, ISPRA*

*Life VIMINE - Alberto Barausse e Tommaso Musner, Università di Padova*

*Realizzazione di elementi della barena artificiale - Paolo Peretti, IPROS*

12.00 - 13.00 DISCUSSION, QUESTIONS AND ANSWERS

LUNCH in Palazzo Persico

14.00 - 16.00 **PARALLEL DISCUSSIONS**

**Valuation of Ecosystem Services**

**Best practices for nature based solutions**

**From Science to Policy**

TEA BREAK

16.30 - 18.00 SUMMING UP AND ARTICULATION OF NEXT STEPS

## **PARTICIPATING ORGANISATIONS**

FAI; Regione Veneto; Città Metropolitana Venezia; Comune di Venezia; ISPRA; CNR ISMAR; Università di Padova; Università di Ca' Foscari; Istituto Universitario di Architettura di Venezia; University of Cambridge; IPROS; International Emissions Trading Association; Società Veneziana di Scienze Naturali; Bloomberg Environment



## PROJECT BACKGROUND

As the world is becoming more aware of climate change and its consequences, means of offsetting damaging emissions, such as carbon offsetting schemes, are making an appearance worldwide. A **carbon offset** is a reduction in emissions of carbon dioxide or other greenhouse gases made in order to compensate for emissions made elsewhere. Offsets are measured in tonnes of carbon dioxide-equivalent (CO<sub>2</sub> e). One tonne of carbon offset represents the reduction of one tonne of carbon dioxide or its equivalent in other greenhouse gases. The offset is a trading scheme, whereby carbon credits are bought in carbon markets. In the European Union, this happens under the European Union Emission Trading Scheme, which was the first large greenhouse gas emissions trading scheme in the world and a major pillar of European Union Policy (towards the 20% emission reductions to be achieved by 2020, relative to 1990).

Carbon offsetting projects have however been heavily criticized. Examples include investments in renewable energy projects, and land use change/reforestation. The criticism arises mostly due to poor transparency in these 'offsets', because the offset is implemented far away or in other countries, making it possible for fraudulent activity to take place. National Geographic recently covered this issue.\* Moreover, offsetting projects are mostly conducted in developing countries (most reforestation occurs in South America). But offsetting can also be conducted locally, with an aim to offset emissions closer to where they are produced and to put industries back in touch with their own surrounding territory.

We are proposing Venice as an optimal test area for this concept. Firstly, Venice is home to famous artisanal industries which interact with many international companies operating in energy-intensive industries - such as transport, chemical, tourism and glass-making. Venice is also geographically unusual, as a collection of islands located in a lagoon which extends over 550 km<sup>2</sup> with the historic city in the centre, plus smaller human settlements on other islands. The lagoon is characterised by some unique features such as the largest tidal system in the Mediterranean, comprising a great diversity of habitats. The rich biodiversity associated with this includes a wide variety of birds, fish and endemic flora. Only a small portion has been designated as a Ramsar site, whereas the historic city together with the lagoon system and all the bordering towns have been designated a UNESCO world heritage site.

The lagoon consists of 67% water, 13% mudflats, 12% salt marshes and 8% islands. Salt marshes ('barene') are a characteristic feature and their ecological functions are vital to the health of the whole system. However the area of salt marsh has fallen sharply, and continues to decline (it used to cover 25% of the lagoon). Pristine salt marshes are



estimated to stock cca 170 tons C/m<sup>2</sup>; wetlands are known to be high carbon sequestration systems and are placed at the 'top' of carbon-storing ecosystems. Findings from a recent review (Were et al., 2019 – *Earth Systems and Environment*) state that in light of climate change, carbon sequestration by wetlands can be enhanced both via measures aimed at increasing their spatial extent and by measures that will alter certain components of the wetlands to enhance their carbon storage potential. The authors state that actions for the conservation of natural wetlands must be prioritised.

We are currently working to understand the feasibility for a Venice-based carbon trading scheme, which will be centered upon saltmarsh protection and restoration. To ensure the validity of such a scheme, we need to answer to the 5 basic principles of good restoration:

- **Baseline and Measurement**

What greenhouse gas emissions would occur in the absence of a proposed project? What are the proposed performance indicators and how will they be measured?

- **Additionality**

Would the project occur anyway without the investment raised by selling carbon offset credits? There are two common reasons why a project may lack additionality:

- (a) if it is intrinsically financially worthwhile due to energy cost savings
- (b) if it had to be performed anyway due to current environmental laws or regulations.

- **Permanence**

Are some benefits of the reductions reversible?

- **Leakage**

Does implementing the project cause higher emissions outside the project boundary?

- **Co-benefits**

Are there other benefits in addition to the carbon emissions reduction, and to what extent?

The first step for us will be to run a pilot salt marsh restoration project, designed to showcase a self-sustaining and resilient system, thus encompassing other aspects that would be present on a naturally occurring interfaces (e.g. fringing oyster reefs that should protect and help saltmarsh persistence and expansion, maximising its carbon stock potential).

In addition, the marketability of "carbon offsetting" needs to be further explored on the basis of kgC/km<sup>2</sup> or m<sup>2</sup>.



The Venice lagoon will be a perfect environment to trial this due to the large number of institutions working within it (ISMAR-CNR, University of Ca' Foscari, University of Padova, ISPRA, Thetis...) and the amount of data already present from years of monitoring. This can make it an example to be followed.

### **AIMS OF THE WORKSHOP:**

- 1) Introduce the concept and the project to local and international institutions
  
- 2) Understand what is needed to implement it in a proper carbon trading scheme:
  - a) Location for pilot project
  
  - b) Which data is it essential to collect?
    - i) Ecological
      - To quantify the CO<sub>2</sub> (either per hectare or in terms of the total area of existing salt marsh or potential in terms of lost area of salt marsh and/or area of new saltmarsh)
      - To input in the models
      - Calculate the carbon budget/footprint of the metropolitan area or just Venice in terms of the lagoon city and other island settlements to estimate the share that can be balanced out via salt marsh
    - ii) Economic
      - Uncertainties
      - Finance mechanisms
      - Other aspects to make it worthwhile
    - iii) Societal
      - People's perceptions
  
  - c) What are the best methodologies?
    - For ecological reasons
    - Cost-benefit
    - Location-dependent
    - Learning from previous projects
  
  - d) Which institutions want to be involved and how?
    - How to involve politicians
    - Other project partners



**A small selection of useful references:**

Gibbens S. (2019): What are carbon offsets? Here's why travelers are buying them. Sales are on the rise — but not all carbon offsets are created equal, [\*National Geographic\*](#)

Were, D., Kansiime, F., Fetahi, T. *et al.* Carbon Sequestration by Wetlands: A Critical Review of Enhancement Measures for Climate Change Mitigation. [\*Earth Syst Environ\*](#), 327–340 (2019)

Yang, H., Tang, J., Zhang, C., *et al.* Enhanced carbon uptake and reduced methane emissions in a newly restored wetland. [\*Journal of Geophysical Research: Biogeosciences\*](#), 125 (2020)