#EMD2022

EMD

EUROPEAN MARITIME DAY

RAVENNA EMD 2022 OFFSETTING OF CO2 EMISSION PLAN

Mims
Ministero delle infrastrutture
e della mobilità sostenibili

Comune di Ravenna

INTRODUCTION

The European Commission aims to reduce the CO2 footprint for the European Maritime Day and to encourage participants to offset their climate impact via green projects delivering value for the environment.

In order to offset the CO_2 emissions produced by the 2022 edition of the EUROPEAN MARITIME DAY, the **Municipality of Ravenna** together with the **European Commission, Directorate General for Maritime Affairs and Fisheries** decided to support actions of trees planting in the wider area of Ravenna.

CLIMATE AND TERRITORY FEATURES OF THE RAVENNA AREA

SEASONS AND CLIMATE

In Ravenna, the seasons are still what they are intended to be. Namely, Winter is very cold, Autumn is cold and wet, Spring is mild and windy and Summer is really hot with a high level of humidity.

Over the course of the year, the temperature typically varies from 0°C to 30°C and is rarely below -4°C or above 34°C.

The hot season lasts from June to September, with an average daily high temperature above 25°C. The hottest month of the year is July, with an average high of 30°C and low of 19°C.

The cool season lasts from November to March, with an average daily high temperature below 11°C. The coldest month of the year is January, with an average low of 0°C and high of 6,5°C.

Ravenna experiences extreme seasonal variation in the perceived humidity. The muggier period of the year lasts for 4 months, from May to September, during which time the comfort level is muggy, oppressive or miserable at least 16% of the time. The month with the muggiest days in Ravenna is August, with 18 days that are muggy or worse.

TERRITORY

Ravenna lies at the end of the Pianura Padana plain and its territory confines directly with the Adriatic Sea. The area is also part of the river Po delta and it includes a great variety of landscapes ranging from long stretches of pine forests, to coastal sand dunes and vast beaches, river and canal banks, reed beds, wet brackish meadows, brackish ponds and lagoons, reclaimed valleys, flooded forests and salty wetlands.

This complex combination of climate, geographic position and soil features together with constant salty winds created an extremely rich ecosystem with a great biodiversity but it also makes effective and successful human interventions extremely difficult.

The following planting project has been elaborated to fit harmoniously in this delicate context and environment.

THE CONTEXT
PLANTING STRATEGIES IN THE RAVENNA AREA

After many years of experience in the maintenance of green spaces (carried out by our colleagues of the Environment Department), it is possible to say that the implementation of renovation systems for present tree plantations, along with the addition of new tree and shrub plantings, has produced mixed results.

Over the past three years – thanks to a regional urban reforestation project – the area of the Municipality of Ravenna has been enriched with the planting of new trees in uncultivated lands, which will thus become woods.
At the moment of the planting, the plants were about 12,000, and were planted both by the Public Administration and private individuals.

Both for public and private plantings, the plants were provided by nurseries in partnership with the regional project.
Along with the planting of forest plants – which are small-sized (15-20 cm tall), the Public Administration also carried out the planting of taller trees of about 2 metres of height.

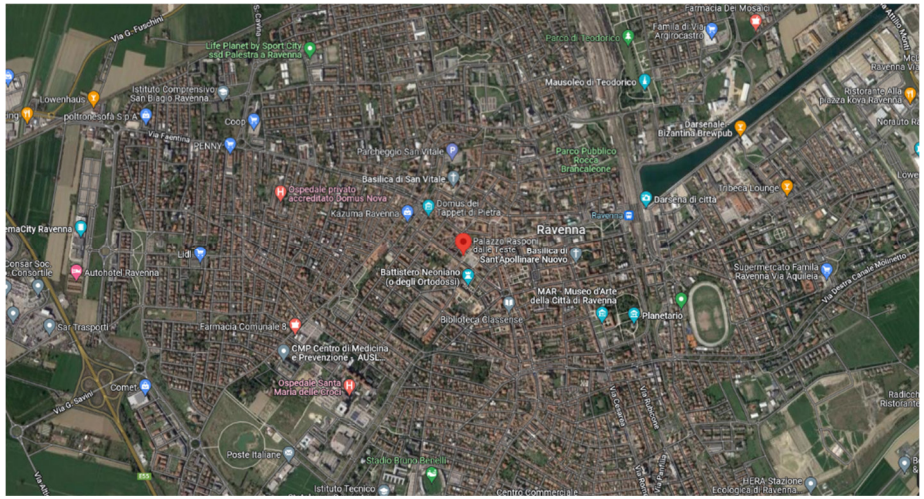
The result of these plantings varies according to the area and proved to be directly related to the kind of irrigation provided after the planting.

The lack of rain in the last few years has significantly affected the results of the plantings.

THE PROJECT

Thanks to the funding of the EU/European Commission, the “planting project” pointed out by FIAB (the Italian Federation for Environment and Bicycles) is the right approach to achieve good results in terms of correct kinds of plants and a higher possibility of positive results after the planting.

Laying a Quercus Cerris – which is 3-metres tall and has a trunk circumference of 18 centimetres at 24/26 centimetres from the ground – in the court of Palazzo Rasponi, creates the conditions for a “natural machine” capable of absorbing carbon dioxide in an urban area.



Palazzo Rasponi Dalle Teste – Ravenna city centre

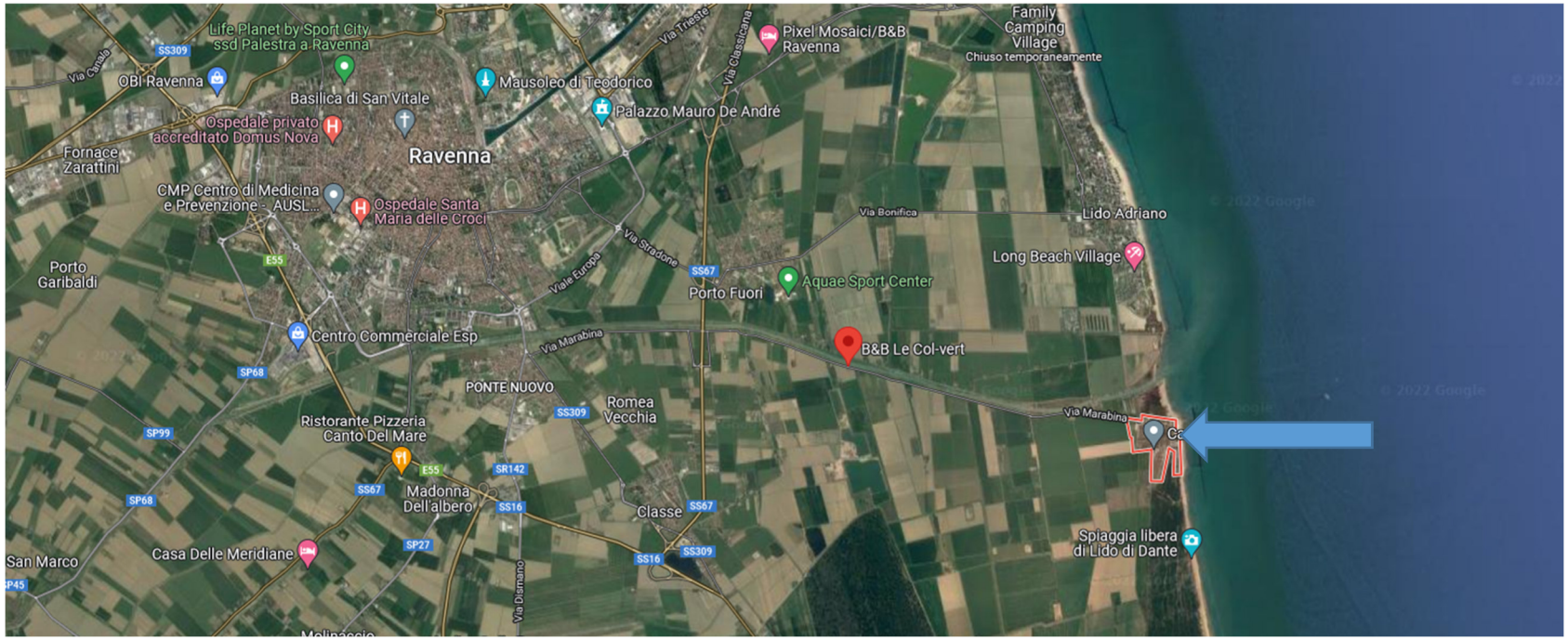
Palazzo Rasponi Dalle Teste – front view

Palazzo Rasponi Dalle Teste – garden (back view)

Palazzo Rasponi dale Teste – garden (planting point)

This plant will be placed in a historical courtyard that has already hosted many other trees of equal importance. The tree will be watered by an automatic system providing the right amount of water to ensure that it roots. The dry weight of the plant represents an absorption of 40,00 Kg of CO_2/year, with a 15% increase each year.

Besides the aforementioned Quercus Cerris, the plan is to plant twenty-six 120-140-centimetres-high Tamarix Gallica in Lido di Dante, a coastal area that is exposed to salt winds for much of the year. It is a species with a good resistance to this kind of weather conditions and its dry weight provides a strong capacity of CO_2 absorption.



Ravenna and Lido di Dante

Lido di Dante Sea Park

Lido di Dante Sea Park (detail)

Lido di Dante Sea Park (detail)

Lido di Dante Sea Park (detail)

It is a typical plant already present in the territory, as it is able to adapt to the weather conditions of the area, where salt winds make the growth of plants very difficult; its ability to root in highly sandy soils has made it the right plant to protect the coastal dunes from wearing away. Moreover, its resilience has made it a native plant of the coastal area of Ravenna.
The maintenance plan includes a watering service providing irrigation with a tank truck 6 times per year in the first two years, in order to enable the plants to sustain themselves in the following years.

PLANTING PERIOD

March 21st – 31st, 2022

THE PLANTING TEAM

Nine people will be involved in the planting team of Palazzo Rasponi Dalle Teste Garden.

Twelve people will be involved in the planting team of Lido di Dante Sea Park.

FEATURES OF THE SELECTED PLANTS

The Quercus Cerris is a typical plant of the Ravenna territory. In the past, as a landmark, it surrounded the noble country houses and farms. Moreover, it is identified as one of the plant species that has the maximum capability of CO_2 absorption.

The Tamarix Gallica has always been considered as one of the best plant species to adapt and survive to the areas of the Ravenna shoreline and coastline. It perfectly resists to the local salty winds and it has a great capability of anchoring its roots to the local sandy soil, thus improving soil resistance too.

INAUGURATION CEREMONY WITH THE EMD AUTHORITIES

FIAB will produce two celebratory signs to be positioned on the sites of the planting: one on the side of the Quercus Cerris in the garden of Palazzo Rasponi dalle Teste and one on the side of the 26 Tamarix Gallica in Lido di Dante.

The EC Commissioner together with the Italian Minister of Infrastructures and Sustainable Mobility will meet in Ravenna at Palazzo Rasponi Dalle Teste on the afternoon of May 19th. On that occasion, there will be a welcoming meeting and our idea is to let the Commissioner and Minister unveil the celebratory sign in the garden of Palazzo Rasponi dalle Teste before opening the meeting. In addition, we could eventually let them cut an inaugural silk ribbon that would be positioned around the tree and fill the tree diameter with some final sacks of local produced bio-compost.

THE EVALUATION OF PARAMETERS

The dry weight of the plants represents an absorption of 2,50 Kg of CO_2/year each, with a 15% increase each year.

To calculate the dry weight of the trunk, branches and roots, it was necessary to use allometric formulas based on the diameter of the plant at 1,30 metres from the ground (Nicese & Lazzerini 2013): trunk log10(y) = 2,32log10(x) – 0,95 branches log10(y) = 2,35log10(x) – 1,84 roots log10(y) = 1,98log10(x) – 1,10 y represents the dry weight in kg and x stands for the diameter at 1,30 metres from the ground in cm. The total dry weight results from the sum of the three values.

The amount of CO_2 absorbed by each plant in a year was calculated with these formulas.

The total absorption of CO_2 by forest plants was calculated with the mean value of the range reported in literature, that is 0,2 kg/year/each, multiplied by the number of plants and increased by 0,1 kg every two years of development. A reduction in the number of planted plants was also considered, as the mortality due to the lack of roots accounts for 10% every year in the first five years.

Below is a table highlighting the amount of CO_2 absorbed by plants in the described scenario: the laying of a Quercus Cerris that is 3-metres tall and has a trunk circumference of 130 centimetres at 24/26 centimetres from the ground and the laying of twenty-six 120-140-centimetres high Tamarix Gallica. The oak would be placed in Ravenna, in the courtyard of Palazzo Rasponi, while the tamarisks in a green area of Lido di Dante.

The data show a considerable amount of kg of CO_2 absorbed within 10 years.

Absorption of CO_2 within 10 years in Kg

	Quercus Cerris h: 300	Tamarix galllica h: 120
Number of plants	**1**	**26**
KG abs / year / each	35	2,5
Year 1	40,25	57,5
Year 2	46,29	66,13
Year 3	53,23	76,04
Year 4	61,22	87,45
Year 5	70,4	100,57
Year 6	80,96	115,65
Year 7	93,1	133
Year 8	107,07	152,95
Year 9	123,13	175,89
Year 10	141,59	202,28
TOTAL	**852,22**	**1.169,96**

As shown, the growth of the selected plants is not proportional but exponential, this means that the dry volume of the plants grows in a more than proportional way during the years.

Having both selected species an average life close to one hundred years, consequently, the expectation of their CO_2 absorption is extremely significant as reported in the following chart.

Weight gain equal to 5% yearly growth of plants dry volume capable of CO_2 absorption

Plant life years	CO_2 Tons	Plant life years	CO_2 Tons	Plant life years	CO_2 Tons
10°	2,2	27°	5,04	44°	11,56
11°	2,31	28°	5,29	45°	12,14
12°	2,43	29°	5,56	46°	12,74
13°	2,55	30°	5,84	47°	13,38
14°	2,67	31°	6,13	48°	14,05
15°	2,81	32°	6,44	49°	14,75
16°	2,95	33°	6,76	50°	15,49
17°	3,10	34°	7,10	51°	16,26
18°	3,25	35°	7,45	52°	17,08
19°	3,41	36°	7,82	53°	17,93
20°	3,58	37°	8,21	54°	18,83
21°	3,76	38°	8,62	55°	19,77
22°	3,95	39°	9,06	56°	20,76
23°	4,15	40°	9,51	57°	21,79
24°	4,36	41°	9,98	58°	22,88
25°	4,57	42°	10,48	59°	24,03
26°	4,80	43°	11,01	60°	25,23

Plant life years	CO_2 Tons	Plant life years	CO_2 Tons	Plant life years	CO_2 Tons
61°	26,49	76°	55,07	91°	114,49
62°	27,81	77°	57,82	92°	120,21
63°	29,20	78°	60,71	93°	126,22
64°	30,67	79°	63,75	94°	132,53
65°	32,20	80°	66,94	95°	139,16
66°	33,81	81°	70,29	96°	146,12
67°	35,50	82°	73,80	97°	153,42
68°	37,27	83°	77,49	98°	161,09
69°	39,14	84°	81,36	99°	169,15
70°	41,09	85°	85,43	100°	**177,61**
71°	43,15	86°	89,70		
72°	45,31	87°	94,19		
73°	47,57	88°	98,90		
74°	49,95	89°	103,84		
75°	52,45	90°	109,04		

FIAB – ITALIAN FEDERATION OF ENVIRONMENT AND BICYCLES

FIAB Federation of Environment and Bicycles Ravenna is the local NGO chosen by the Municipality of Ravenna to accomplish the planting task.

FIAB is an Italian national environmentalist organisation whose mission is to promote bicycle as an eco-friendly means of transport for the sustainable redevelopment of urban and suburban environment.

FIAB RAVENNA is the local branch of the national federation whose primary mission is to promote bicycle as a simple, low-cost and sustainable means of transport improving local environment quality. Among its goals is to suggest, search for and give value to cycle paths and to raise awareness on these subjects in citizens and public administrations (www.fiabravenna.it).

FIAB Ravenna projects range from institutional relations and advocacy with public authorities, to training courses and educational activities for young people (i.e. “Progetto Scuola”, “Bicibus” and “Bike to School”), communication

campaigns, urban cycling and touring during national events (March 8th – International Women's Day; April 25th – Anniversary of Italy's Liberation; Earth Day; World Bicycle Day; European Mobility Week, etc.).



Latest planting tree actions include:

NOVEMBER 2020 - FIAB RAVENNA AND LIONS CLUB RAVENNA ROMAGNA PADUSA
Planting trees for the covid-19 victims

One hundred trees planted to commemorate the victims of the Covid-19 virus together with two one-meter high holm oak trees planted on the side of two different cycling paths to underline the will of FIAB to increase sustainable mobility and cycling pathways.

FEBRUARY 2021 - FIAB RAVENNA
Let's lay down roots for the future

FIAB Ravenna embraced the *Let's lay down roots for the future* campaign promoted by the Emilia-Romagna region to "transform the region into the green corridor of the country".

FIAB Ravenna planted 20 young trees along the *Cycling track of the sea* connecting Ravenna to Marina di Ravenna and Punta Marina, one of the most experienced cycling tracks in the area by tourists and residents alike.

NOVEMBER 2021 - FIAB RAVENNA
National day of trees

In the occasion of the 2021 *National Day of Trees*, FIAB planted 50 additional young plants to improve air quality and local environment. The trees were settled in another section of the *Cycling track of the sea* between the underpass and the bicycle maintenance post donated by FIAB.