

# The Certosa Island Redevelopment: A Public - Private Partnership for Sustainability in the Venice Lagoon

#### **Alessandro Costa**

Venice International University
Head of Strategic Development & International Cooperation

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# What I'll be talking about

- What is Certosa Island (and where)
- A little bit of history...
- The PPP masterplan
- The remediation process
- The sustainabe energy plan
- Pilot projects
- Q&A

#### Isola della Certosa



New urban park, currently under completion, including a protected remenant woodland.

Large marina (300+ berths), that can host yachts up to 60 m of length.

Dry docks, shipyards, sailing school, hosting facilities (hotel, bar, restaurant).

Area: 24 hectares

Current built surface : 5.000 sqm

• **Next building develoment:** additional 23.000 sqm (45 buildings demolished and to be re-built)

Managed water surface: 45.000 sqm

• Berths / average boat length: 320 / 16 m



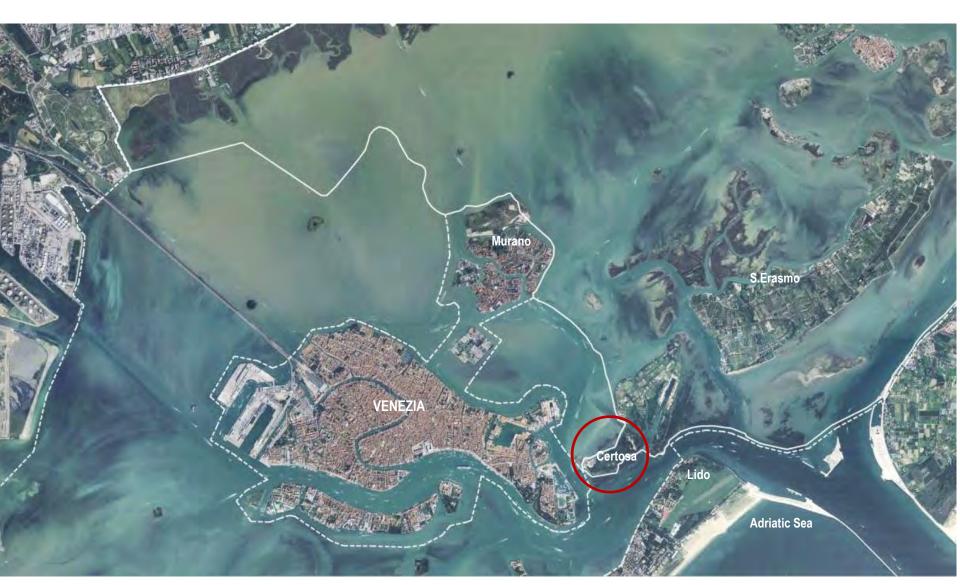






# **Certosa location**





# **Certosa surroundings**



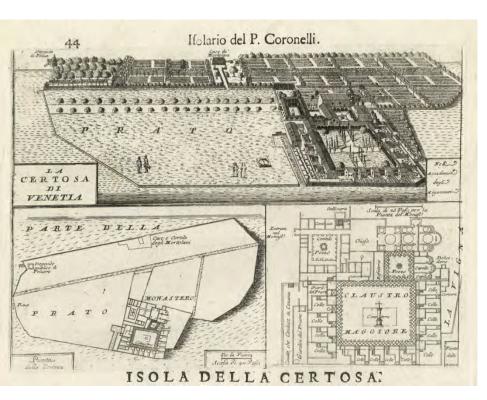
Certosa strategic position, at the heart of an insular subsystem.



# The history of Certosa Island



Between the 13<sup>th</sup> and the 18<sup>th</sup> Century, the island was home to a monastery of Augustinian and Carthusian monks, who carried out both religious and agricultural activities.



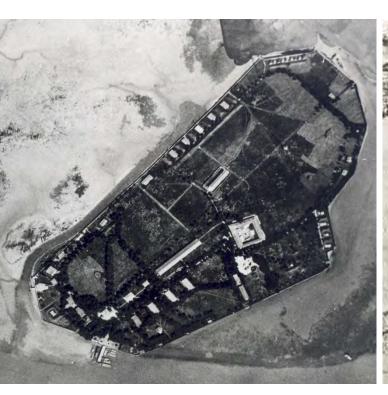


Carthusian monastery, XV century

# The history of Certosa Island



Following the suppression of religious orders by Napoleon, the island was converted into a military factory. In early 20<sup>th</sup> Century, it became the "Pirotecnica della Certosa", an ammunition factory with adjoint firing ground.





The ammunition factory 1806-1962

# The history of Certosa Island



The military factory was **shut down** in the early 1960s.

Military property administration had **no plans nor resources** to locate new activities at Certosa.

The island was **left abandoned** for more than **30 years**, becoming an **illegal waste tip**.

In 1996, the City of Venice, together with the Venice Water Authority, used **EC funds** (ERDF, PIC RETEX) to implement some preliminary operations: the reconstruction of the island's sea wall, the construction of the first new buildings (shipyard, hotel & restaurant), regenerating 4 Ha of land.

In 2005 **Vento di Venezia** started a 100-berths-large marina, a shipyard and a sailing school.







### The Certosa regeneration timeline



**2009**: VdV won a *public tender* to start a PPP to create and manage a urban park at Certosa, with no financial impact for public administrations. In return, VdV could run a list of approved economic activities on the island.

**2010**: Approval of the *redevelopment* masterplan presented by VdV (park + economic activities).

**2010**: Signing of the 50-year long correspondent concession (*park in progress*).

**2011**: Approval of the *environmental remediation plan*.

**2011**: Enlargement of the marina

2013: Approval of the Certosa Sustainable Recovery Plan (IMELS - City of Venice - VdV): energy & infrastructures

**2015**: Completion of the *first phase of the environmental remediation* work and opening of the *urban park*.

Creation and management of the urban park

Regeneration of landscape and natural-environmental heritage











# The starting point – 2009 – built environment





# **Redevelopment process – Masterplan 2010**





# Redevelopment process – Masterplan 2010 – building uses





# Park in progress - 2011



The regeneration and upgrade of Certosa took off in September 2011 with the following activities:

- dredging of the canals surrounding the island
- expansion of the moorings all over the western side
- development of walking paths to connect all marina facilities.







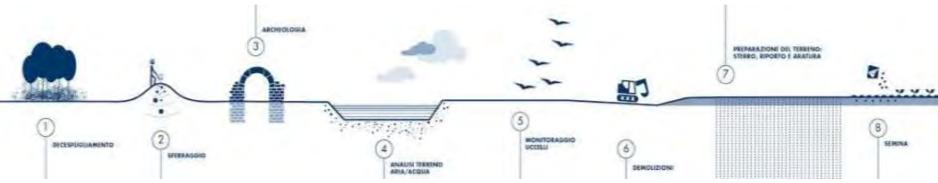


# **Environmental remediation plan - 2011**



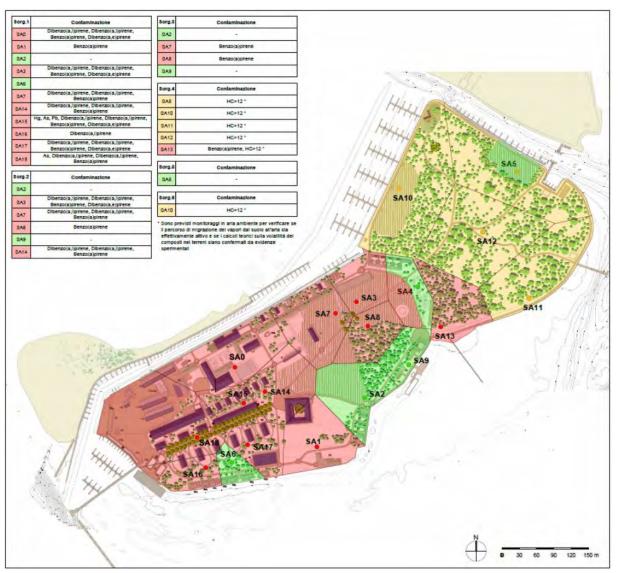
- 1. Detailed **environmental characterization** of the area, **health risk** and **environmental analysis**: a diffuse contamination, at low to medium level from PAH's and heavy metals, of surface soils in most of the western area of the island.
- **2. Preliminary activities**: vegetation selective cutting, asbestos reclamation, ordnance clearance with archeological discovery.
- **3. Main strategies** of action: removal of a localized hot spot (mostly, heavy metals), covering of a number of contaminated areas with clean soil, use of phytoremediation techniques (rhizodegradation).
- **4. Monitoring**: constant monitoring of progress in every activity of recovery and possible actions on agronomic aspects affecting the efficiency of the rhizodegradation process (estimated up to three years).

The **remediation** campaign **enabled the reuse** of *construction materials* (about 7.500 m<sup>3</sup>) coming from the demolition to realize a surface cover in the park (including pedestrian paths); reuse of *green materials* as soil amendments; discovery and cataloguing of archeological findings.



### **Characerizing soil contamination**





- Results from site assessment and site-specific risk analysis
- Diffuse contamination of surface soils in most of the eastern-central area of the island
- Contamination at low to medium level (<1 mg/kg) from PAH's (B(a)P, DB(a,i)P and DB(a,l)P); locally from heavy metals (Hg, Pb, As); no compounds related to explosives
- Exposure pathways: direct contact (ingestion + dermal absorption); inhalation (1 HS)
- No contamination of groundwater

### **Environmental remediation actions**

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Selective cutting, 2012 – Asbestos reclamation, 2012 Ordnance clearance, 2013 – Archeological discovery, 2013



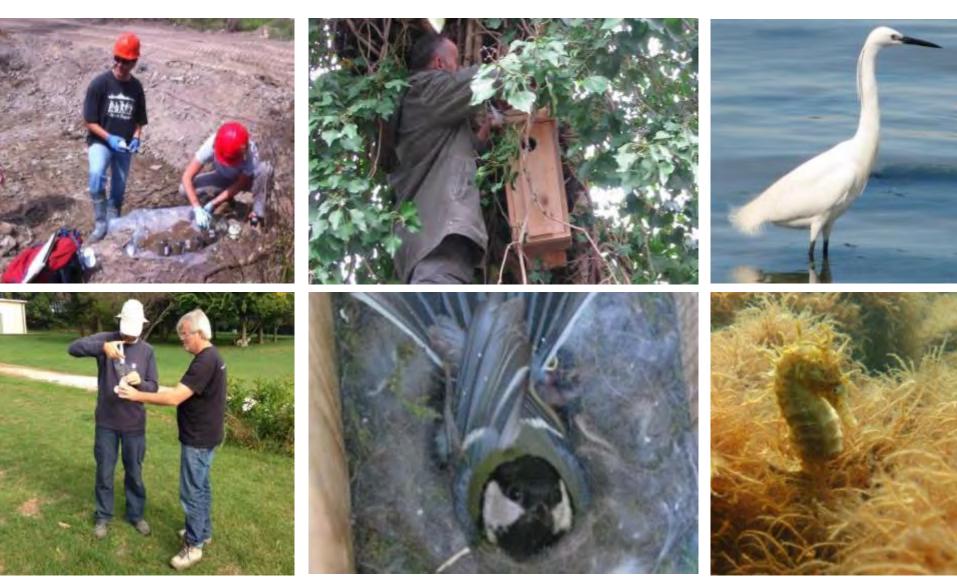






# **Environmental analysis and monitoring** 2013-2015





# Demolition of old buildings, crushing and reuse, 2014

















# Adopting national strategies





Measures to reduce GHG emissions:

- 1. Increase the adoption of **energy efficiency best practices**
- 2. Increase the production of renewable energy
- 3. Create new jobs and stimulate green innovation



2007

Italian Government had created a € 40 million fund aimed at co-financing promotion of energy efficiency and renewable energy measures in partnership with public and private entities



2008

**Italian Ministry of the Environment Land and Sea** adopted the above fund with a dedicated Decree Law dated April 8<sup>th</sup> 2008



#### 2010



The Municipality of Venice, started a program of initiatives to sustainably redevelop and re-qualify three strategic areas:

### Arsenal, Certosa Island, Porto Marghera

- che la significatività di tali due iniziative non è peraltro legata solo alle straordinarie valenze proprie dei luoghi che vengono nuovamente integrati nel tessuto urbano, ma anche alle caratteristiche stesse dei progetti, ovvero all'attenzione per la sostenibilità ambientale, per l'utilizzo di energie rinnovabili, per la sperimentalità delle soluzioni proposte in relazione al carbon footprint;
- che in particolare il Comune intende realizzare specifici progetti pilota finalizzati:
  all'autonomia energetica dell'isola di Certosa, attraverso la generazione di elettricità,
  alimentata da fonti rinnovabili/biocumbustibili; alla realizzazione con i criteri avanzati
  dell'efficienza energetica e "solarizzazione con tecnologie innovative delle strutture
  dell'Arsenale destinate ad ospitare il Polo veneziano di eccellenza in campo
  ambientale; all'illuminazione con sistemi ad alta efficienza energetica e luminosa
  degli spazi pubblici nella zona dell'Arsenale; alla valutazione del Carbon Footprint del
  programma di riqualificazione e recupero dell'Arsenale e dell'isola di Certosa;

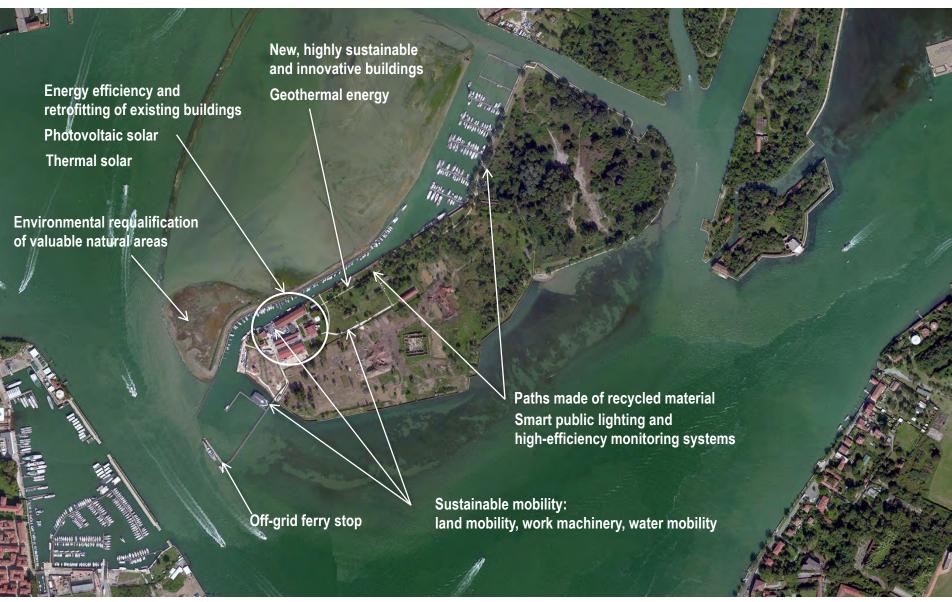


That was perfectly in-line with the purposes of the governmental Fund

The Agreement attracted the interest of the private sector, allowing VdV to start up a series of collaborations

#### PLAN FOR THE SUSTAINABLE RIGENERATION OF THE CERTOSA ISLAND





#### PLAN FOR THE SUSTAINABLE RIGENERATION OF THE CERTOSA ISLAND (1/2)

Ministry for the Environment, Land and Sea - City of Venice - VdV



#### ENERGY EFFICIENCY AND HIGH EFFICIENCY INFRASTRUCTURES

- Existing buildings & infrastructures, improvements to efficiency:
  - Energy Efficiency and retrofitting of buildings currently in use (e.g. envelope, systems)
  - Recovery, recycling and transformation of demolition wastes and by-products to realize paths and open surfaces.
- New buildings & infrastructures (smart solutions)
  - New, highly sustainable and innovative buildings (e.g. construction materials, technologies, systems)
  - Smart, high efficient public lighting system.
  - Smart monitoring and control systems. Broadband development and distribution.
  - The water cycle: diffuse storm water collection system and management scheme, reactivation of existing artesian well

#### RENEWABLE ENERGY GENERATION & STORAGE

- <u>Photovoltaic</u>: implementation of a photovoltaic system and associated distribution systems and networks
- Geothermal energy: hydro-geothermal systems for heat generation
- <u>Electricity storage systems</u>

#### PLAN FOR THE SUSTAINABLE RIGENERATION OF THE CERTOSA ISLAND (2/2)

Ministry for the Environment, Land and Sea - City of Venice - VdV



#### PILOT PROJECTS

- Off-grid ferry stop: Equipping the ACTV public boat transport service pontoon with devices for the generation
  of renewable electrical energy and electrical energy storage systems
- <u>Education and training program</u>: Information, dissemination, education and training activities about the environmental regeneration of valuable natural areas. Creation of didactic paths within the island.

#### SUSTAINABLE MOBILITY IN THE VENICE LAGOON

- <u>Electification of land mobility</u> (e.g. caddies, electric mowners).
- <u>Electification of work machinery</u> (e.g. cranes, fork lift).
- Hybrid & full electric water mobility:
  - Water taxi retrofitting, professional use 18-24h/day (parallel hybrid, electro-diesel)
  - Goods transport barge retrofitting, professional use 8-15h/day (serial hybrid, electro-diesel)
  - Water shuttle retrofitting, use 18-24h/day (hybrid, electro-diesel)
  - Electric boat sharing pilot program (10 boats fleet, full-electric engine)

# Smart, high efficient public lighting system.



#### Features required to the lighting system

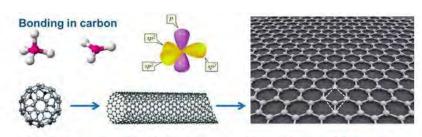
- Functionality: pre-programmed on-off and dimmering, dimmering on passage/presence, site-specific functions and customization, control of energy consumption and diagnostics, coupled with videosurveillance, data messaging and data transmission, etc.
- Energy efficiency: integrated design, based on LED technology, evolved control system.
- Excellent landscape compatibility: design, dimensions, materials, colours.
- **Durability and reduced maintenance**: materials, components.





# The water cycle: groundwater well













# **Off-grid public transport stop (ferry wharf)**



- Led lights
- Ticketing, infosystem, wi-fi service
- PV and micro-eolic
- E storage













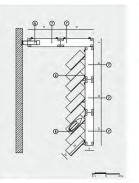
### **VEBS-VENICE ELECTRIC BOAT SHARING**



- Pilot project for a small shared electric boat fleet (first batch of 10 units)
- Managed like a car sharing service, with satellite fleet control
- Relying on dedicated vessels, infrastructures and docking lots
- Spread over the main strategic transit knots of Venetian mobility







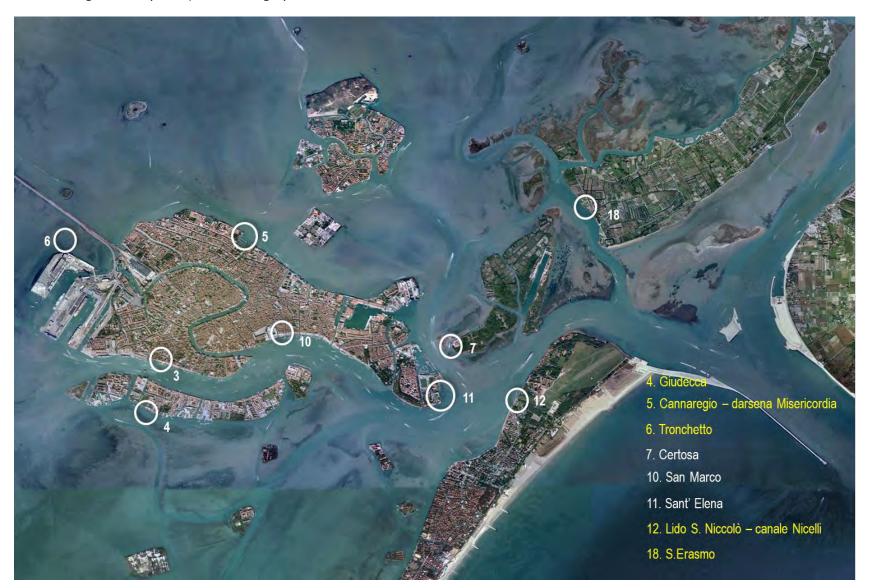




### **VEBS - VENICE ELECTRIC BOAT SHARING**

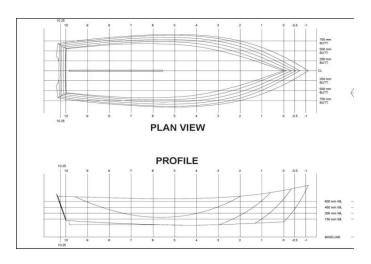


Moorings lots (swap & charge)



### **VEBS - VENICE ELECTRIC BOAT SHARING**







#### **Vessels**

- 6 m
- 1.8 m
- 6 pax
- m. plywood
- built at Certosa

# **Electric engines & batteries**

- 4 kW
- Li-Mn
- 48 V
- < 20 kg
- 6 hours
- 6 kn



# **Catalyzing territorial redevelopment**



Certosa regeneration is a catalyst for the redevelopment of surrounding areas.





- 1. Public-private partnership as strategic tool to activate the island's regeneration process.
- The environmental remediation as an opportunity to start the redevelopment of the island throught public & private investments into a public property.
  - 3. Sustainability through a smart synergy of tools & existing technologies.

# ENVIROMENTAL, ECONOMIC, SOCIAL



The redevelopment plan of Certosa as an "in-progress showcase" and innovation test bed for new strategies in sustainable development and rigeneration of the area.

Certosa regeneration is a **catalyst** for the redevelopment of surrounding areas.







# THANKS FOR YOUR ATTENTION

# alessandro.costa@univiu.org

PROMOTER: VdV S.r.I. Polo Nautico Vento di Venezia

MASTERPLAN – ARCHITECTURAL PROJECT: arch. Tobia Scarpa

COLLABORATORS: arch. Elena Colonnello, arch. Martina Giovannini

SPECIALIST CONSULTATION SERVICES: InTeA S.r.I.

VdV S.r.l. - Polo Nautico Vento di Venezia Isola della Certosa – Venezia - Italy Tel. +39 041 5208588 Fax +390415222497 e-mail info@ventodivenezia.it www.ventodivenezia.it

www.parcodellacertosa.it

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### **Certosa carbon Footprint**

The plan for sustainable regeneration of Certosa included a strategic carbon management study in order to manage, monitor and certify the energy & climate effects of the decision making processes of the transformation, and as part of the requirements of the Governmental funding, it was decided to a strategic study, including:

- 1. The adoption of a Carbon Management Policy and a Carbon Management Team (CMT)
- 2. The construction of a GHG inventory, aligned with international standards
- 3. The identification of the effects on GHG emissions of different development scenarios of the Island, Business As Usual or With Measures
- 4. The construction of a simple carbon & energy management tool enabling the CMT to constantly evaluate sustainable alternatives to new developments, together with training workshops to transfer basic knowledge of carbon & energy related calculations.

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