



OFFSHORE WIND ENERGY DEVELOPMENT IN THE ADRIATIC SEA: THE P.O.W.E.R.E.D. PROJECT AS PLANNING POLICY

Università Politecnica delle Marche, Ancona, May 2013

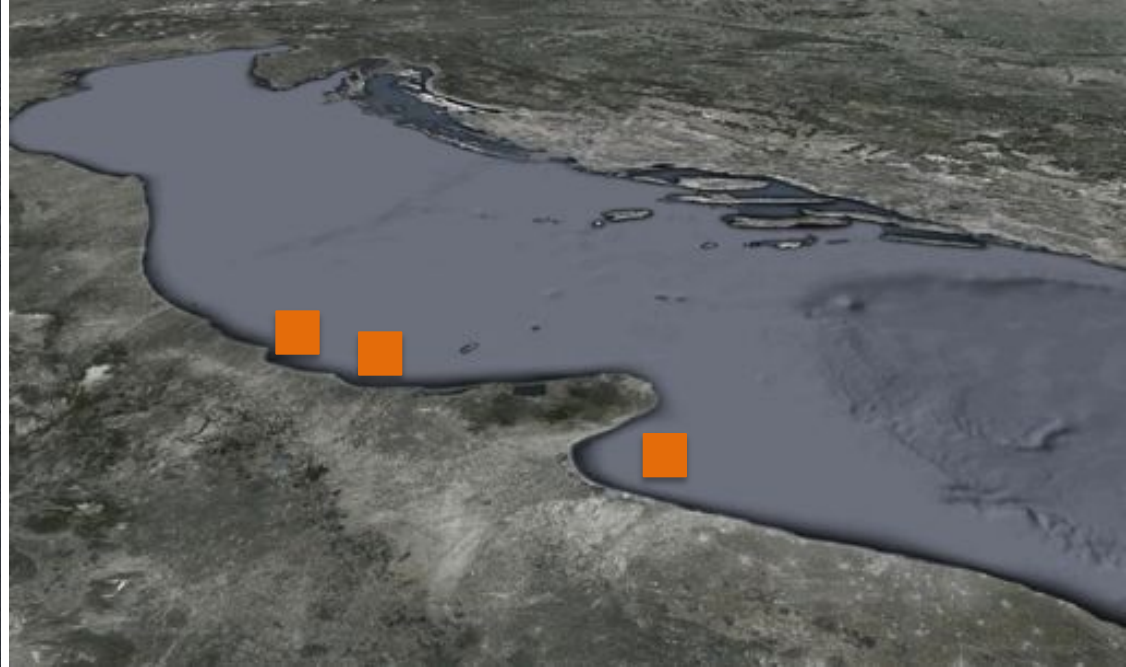
OFFSHORE WIND FARMS TOWARDS THE DESIGN OF A NEW LANDSCAPE

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**offshore wind farm Caucaia (Cearà Brasil)
Ende srl - Enerce ltda
masterplan
48 wga**



**offshore wind farm San Michele,
Termoli (CB) Effeventi
landscape study
54 wga**

**offshore wind farm Chieuti (FG) Trevienergy
new layout and landscape study
50 wga**

**offshore wind farm golfo di Manfredonia (FG)
Trevienergy _ landscape study
65 wga**

Danish experience from the past 15 years shows that offshore wind farms, if well placed, can be engineered and operated without significant damage to the marine environment and vulnerable species.

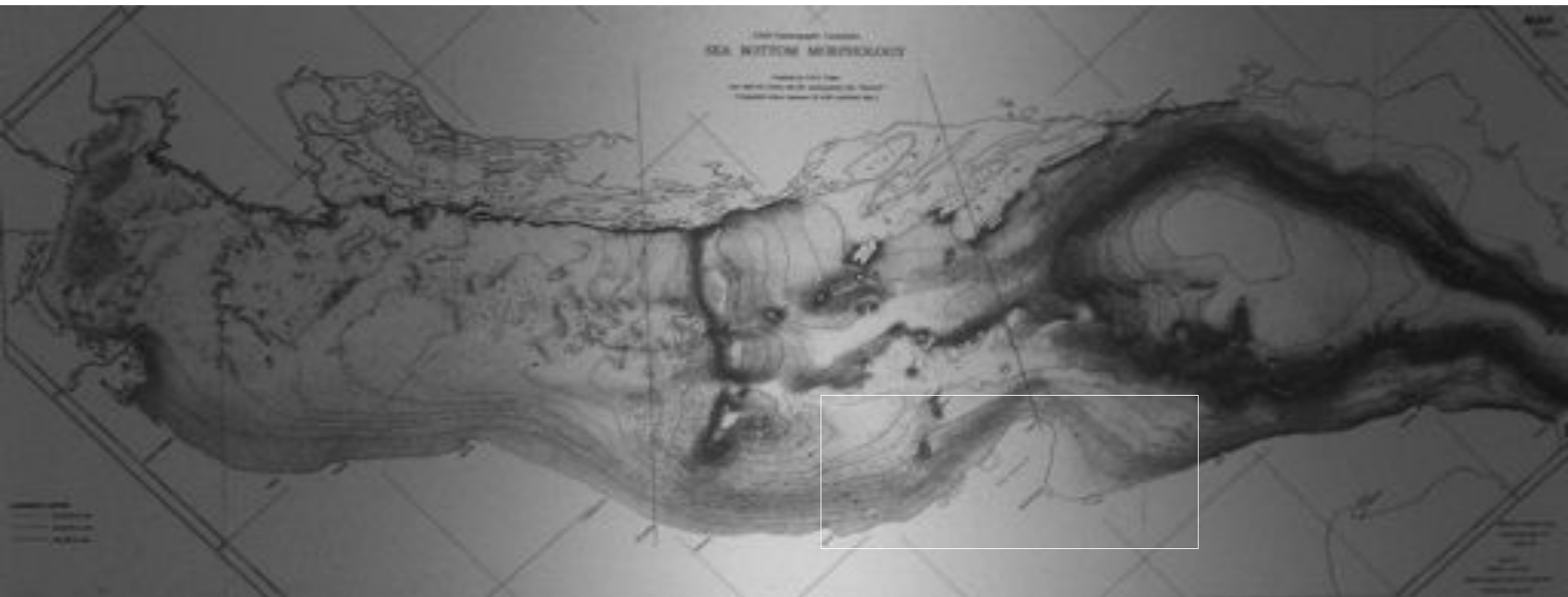
The monitoring also shows that appropriate siting of offshore wind farms is an essential precondition for ensuring limited impact on nature and the environment, and that **careful spatial planning is necessary to avoid damaging cumulative impacts.**

Another question regards the socioeconomic effects and the acceptance of the population. **The visual impact of an offshore wind farm could affect a turistic development of the territory?**

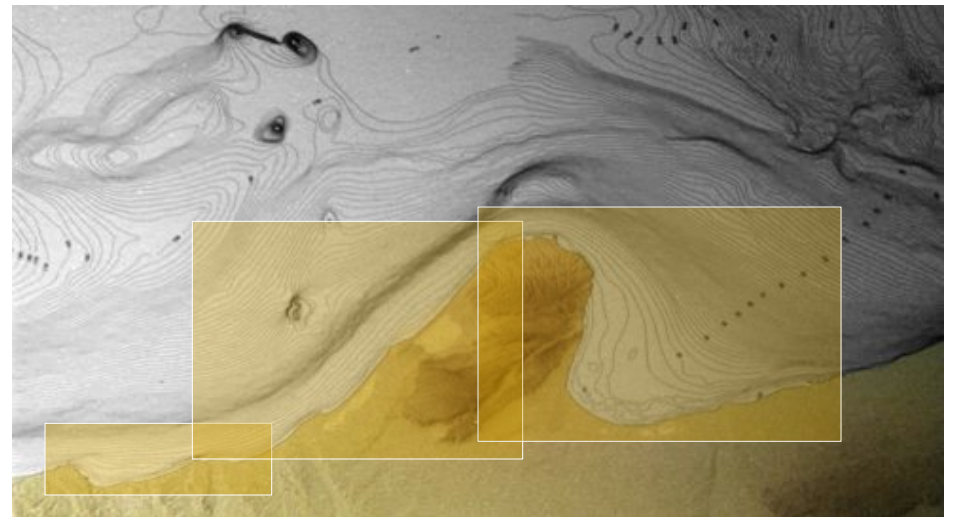
Through a careful planning is it possible to conjugate the protection of a cultural landscape with the production of new energy?

- **PROTECTING NATURE WHILE UTILIZING ITS POWER**
- **CONSTRUCTION OF NEW MAPS**
- **DESIGN OF NEW LANDSCAPE**
- **VISUAL IMPACT AND LANDSCAPE**
- **A NEW KIND OF TOURISTIC OFFER**
- **OFFSHORE AND COASTAL PROTECTION**

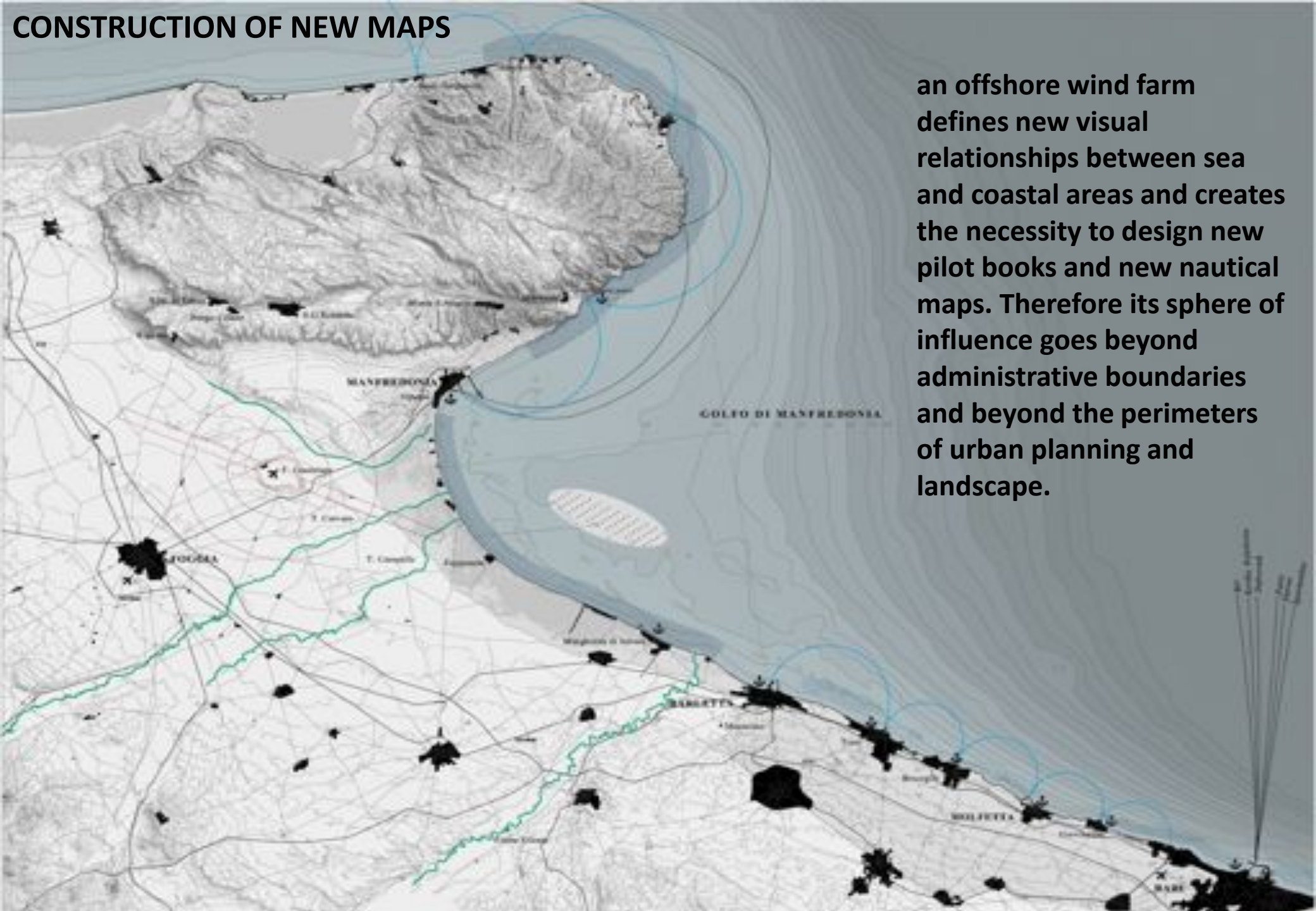
CONSTRUCTION OF NEW MAPS



Going beyond the scale of the landscape, even for the absence of relationship of short and medium distance between the object and the elements of the scenery, an offshore installation has to be designed thinking at the geographical scale.



CONSTRUCTION OF NEW MAPS

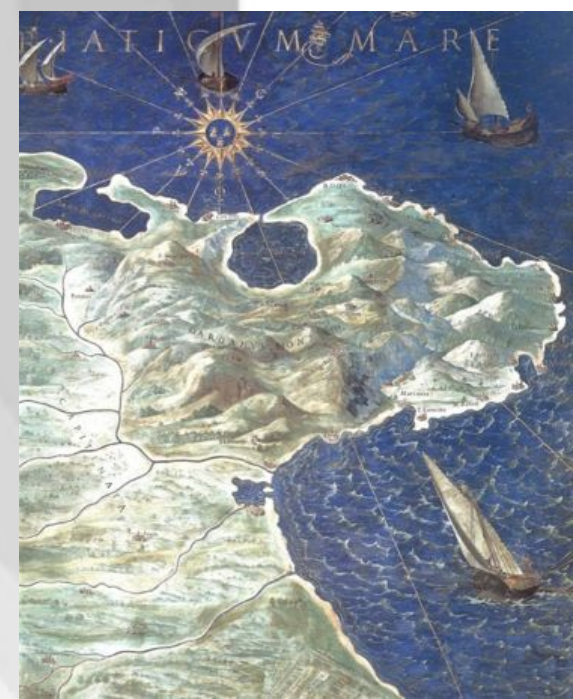


an offshore wind farm defines new visual relationships between sea and coastal areas and creates the necessity to design new pilot books and new nautical maps. Therefore its sphere of influence goes beyond administrative boundaries and beyond the perimeters of urban planning and landscape.

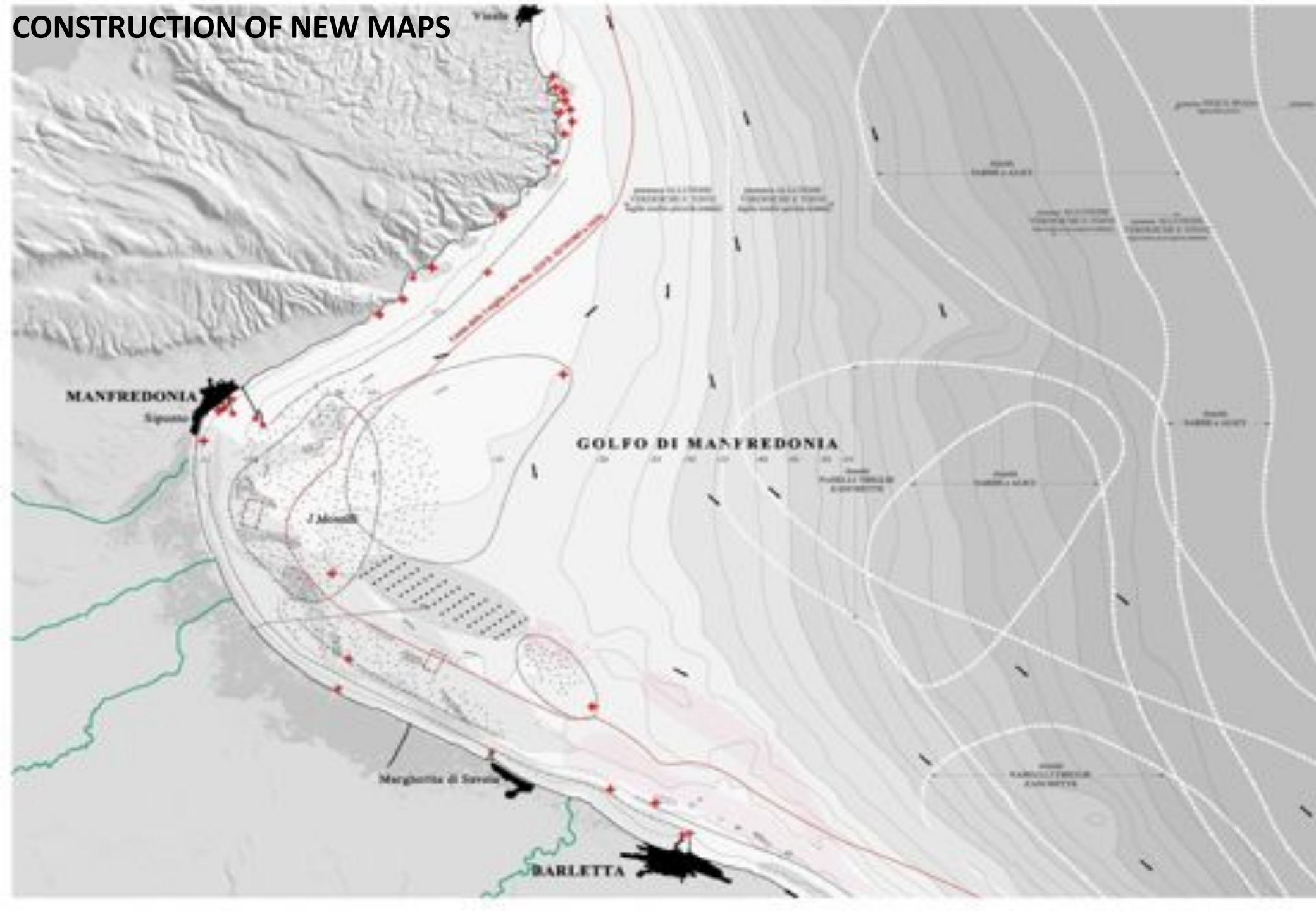
CONSTRUCTION OF NEW MAPS



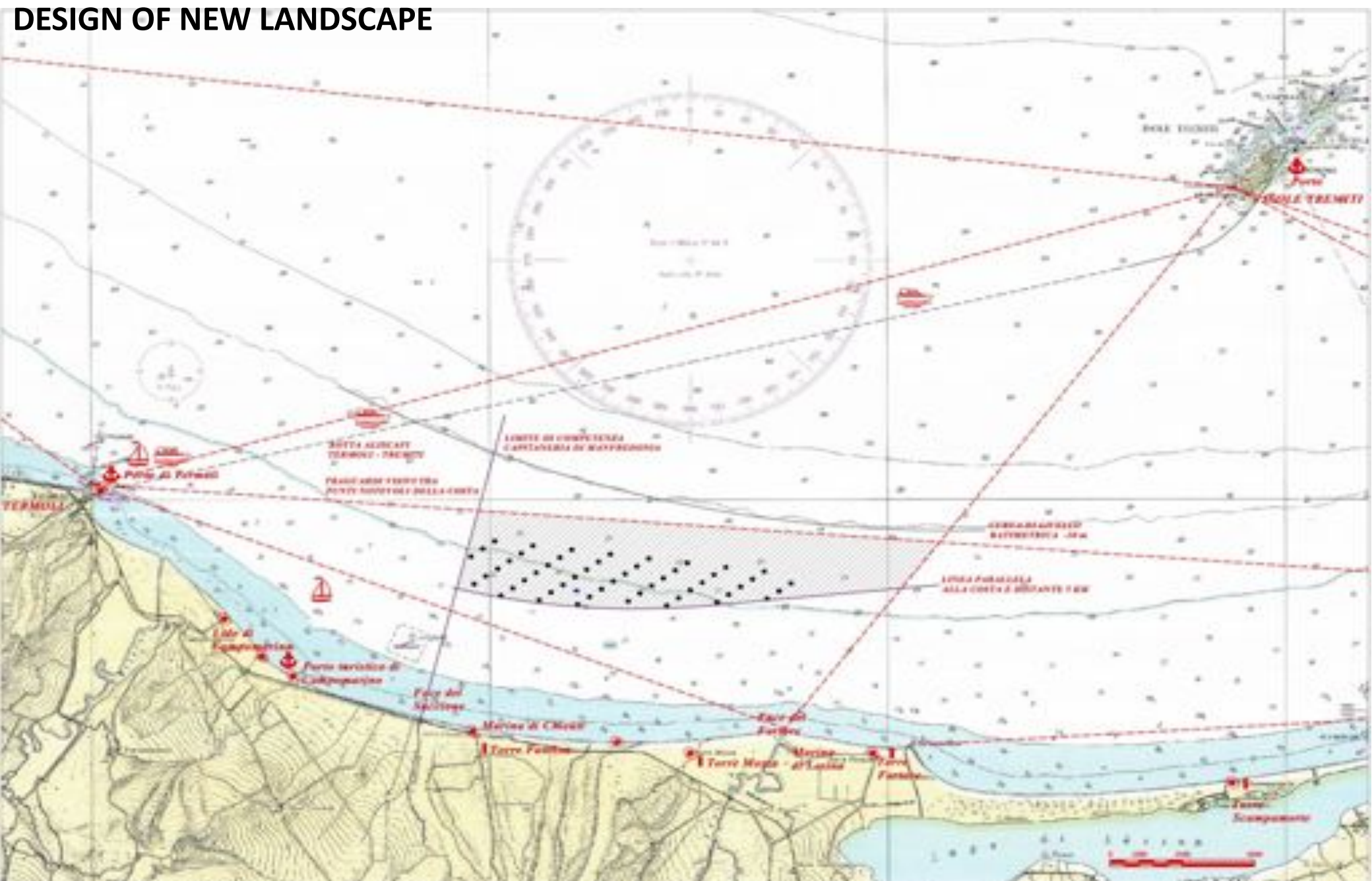
GOLFO DI MANFREDONIA



CONSTRUCTION OF NEW MAPS

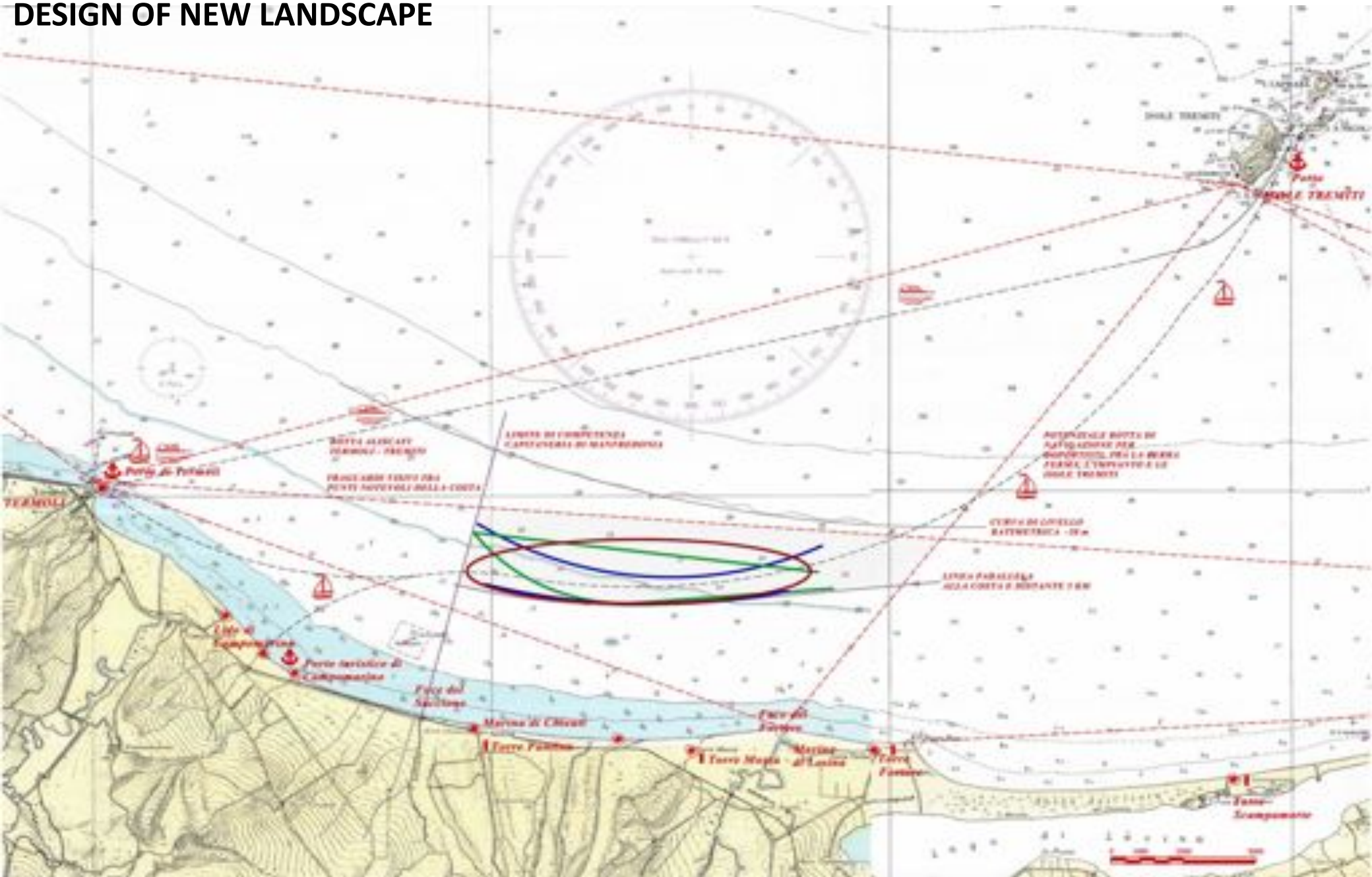


DESIGN OF NEW LANDSCAPE

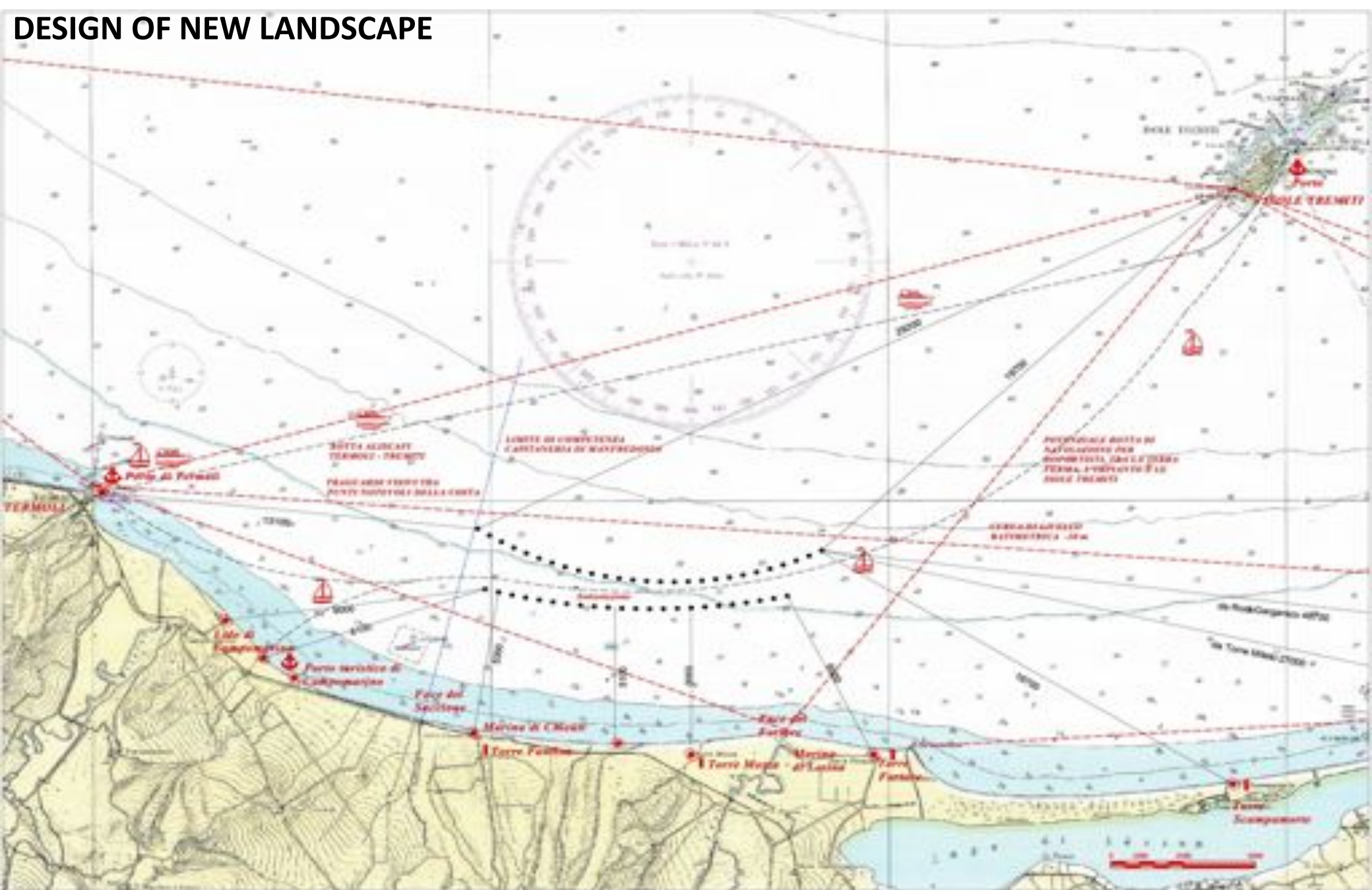




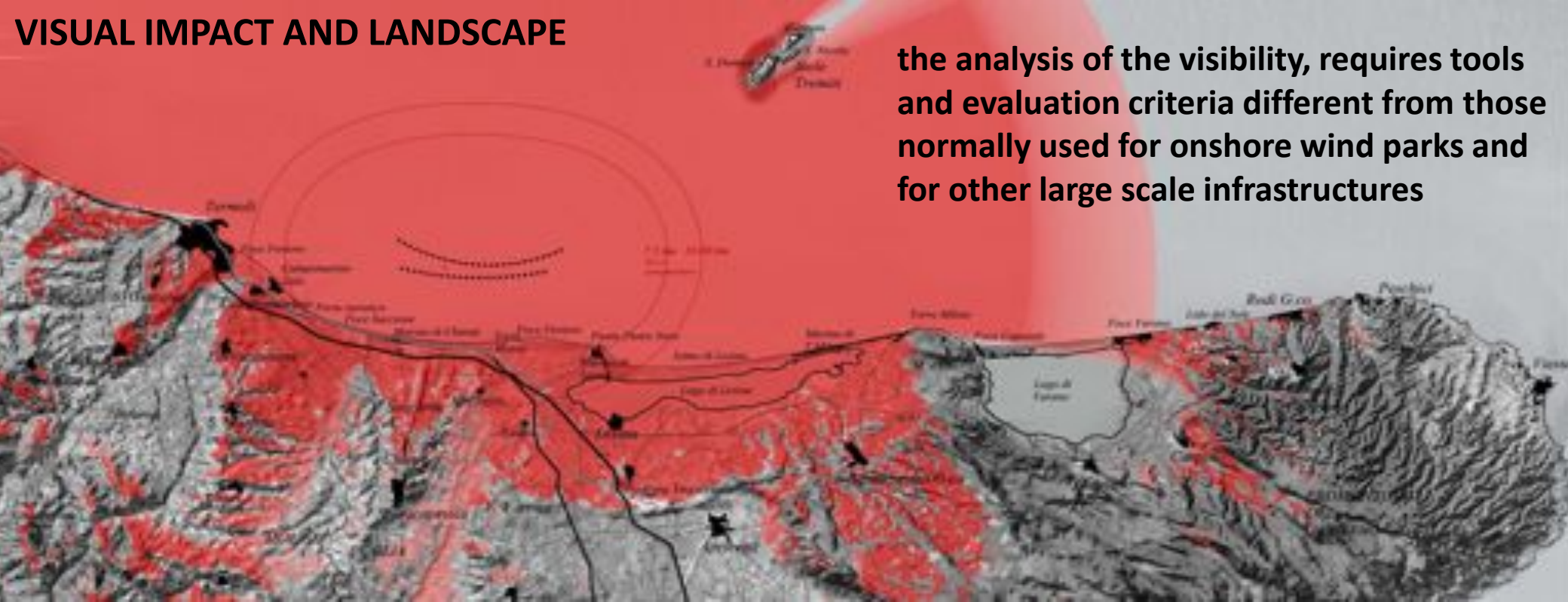
DESIGN OF NEW LANDSCAPE



DESIGN OF NEW LANDSCAPE



VISUAL IMPACT AND LANDSCAPE



the analysis of the visibility, requires tools and evaluation criteria different from those normally used for onshore wind parks and for other large scale infrastructures



VISUAL IMPACT AND LANDSCAPE

Termoli



Termoli - "Il Borgo"
 punto di vista: 20 m slm
 Minima distanza della centrale eolica
 Off-shore di Chieuti: 13 100 m

Foce fiume Biferno



Foce del Fiume Biferno
 vista dal livello del mare
 Minima distanza della centrale eolica
 Off-shore di Chieuti: circa 11 000 m

Campomarino centro storico



Campomarino centro storico
 punto di vista: 52 m slm
 Minima distanza della centrale eolica
 Off-shore di Chieuti: m. 10.500

Lido di Campomarino



Lido di Campomarino
 vista dal livello del mare
 Minima distanza della centrale eolica
 Off-shore di Chieuti: circa 9 000 m

VISUAL IMPACT AND LANDSCAPE



Termoli



VISUAL IMPACT AND LANDSCAPE



Face fiume Biferno



VISUAL IMPACT AND LANDSCAPE



Campomarino paese



VISUAL IMPACT AND LANDSCAPE

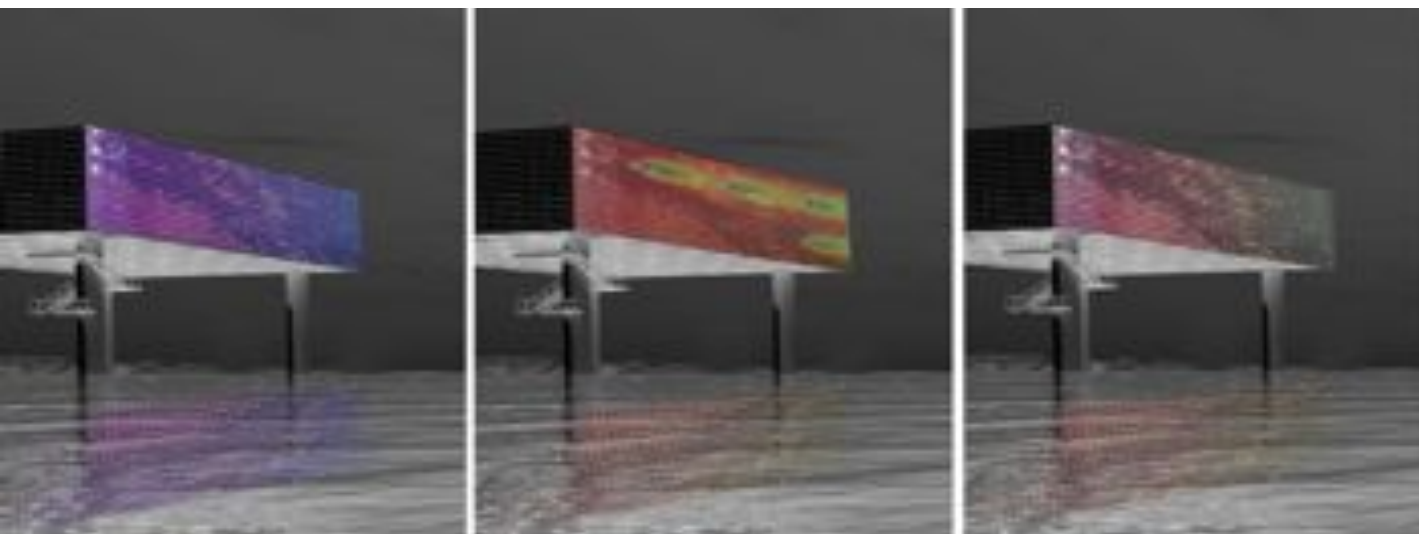
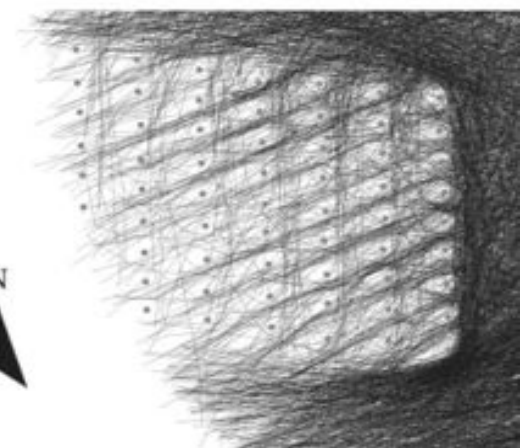
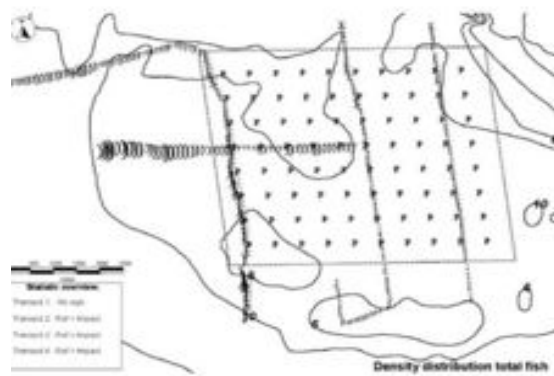


VISUAL IMPACT AND LANDSCAPE

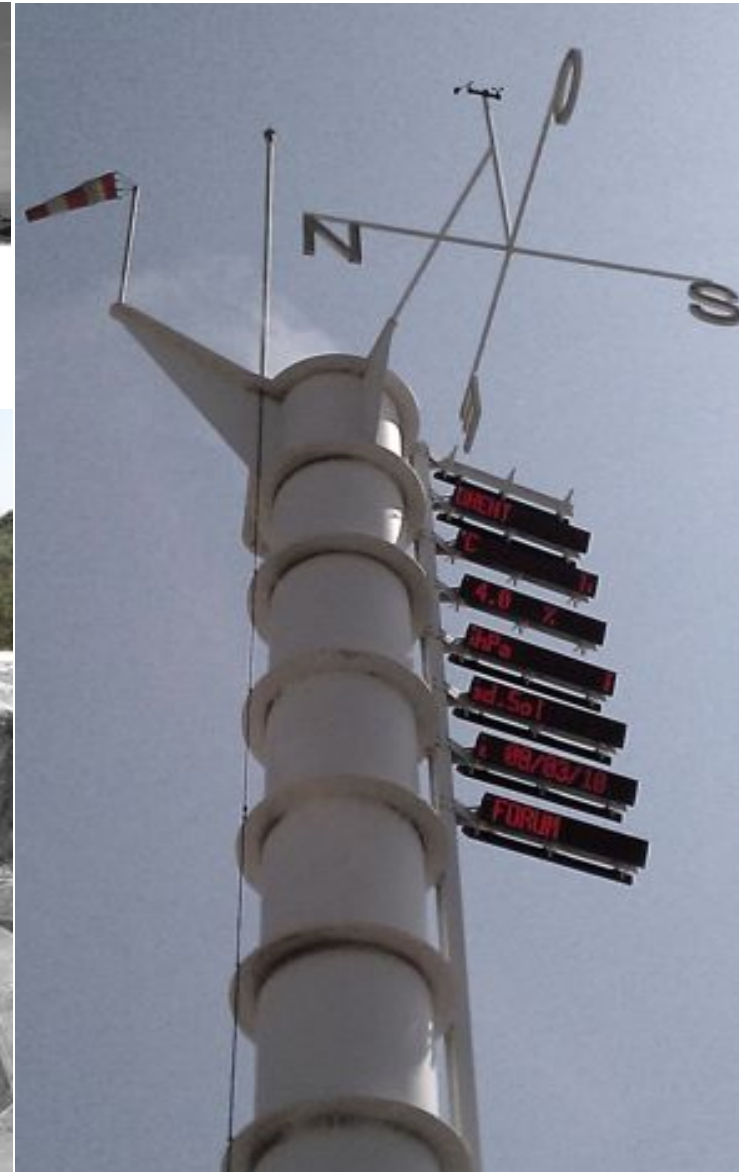


A NEW KIND OF TOURISTIC OFFER

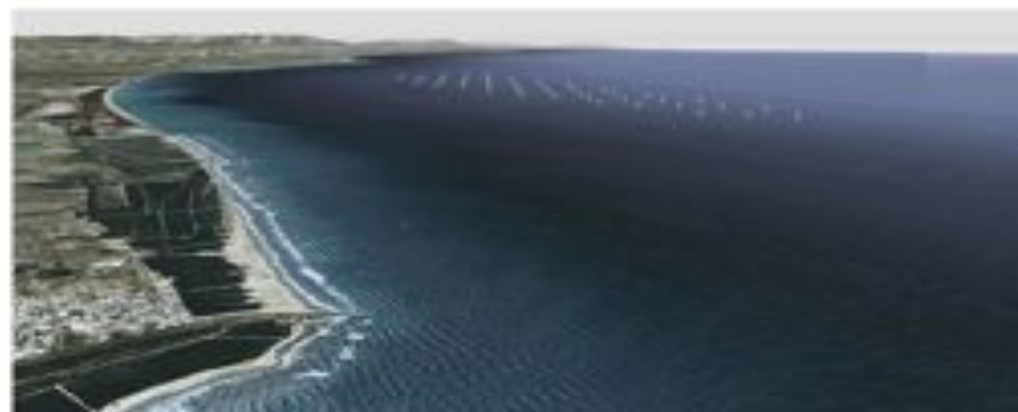
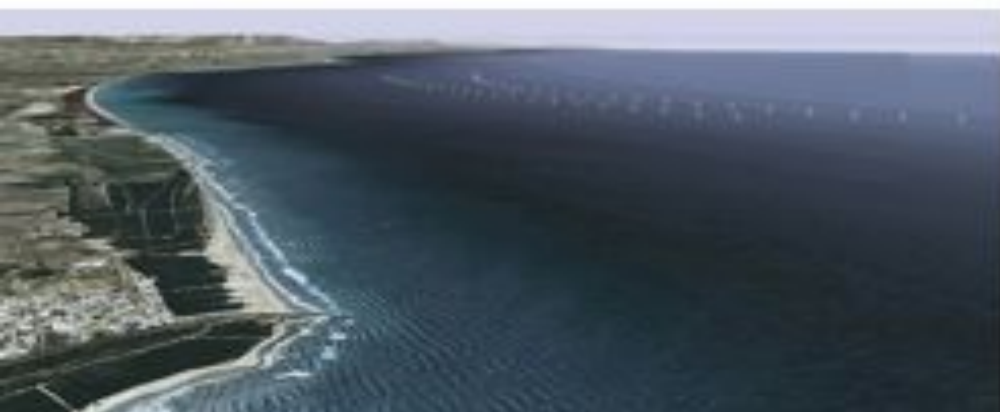
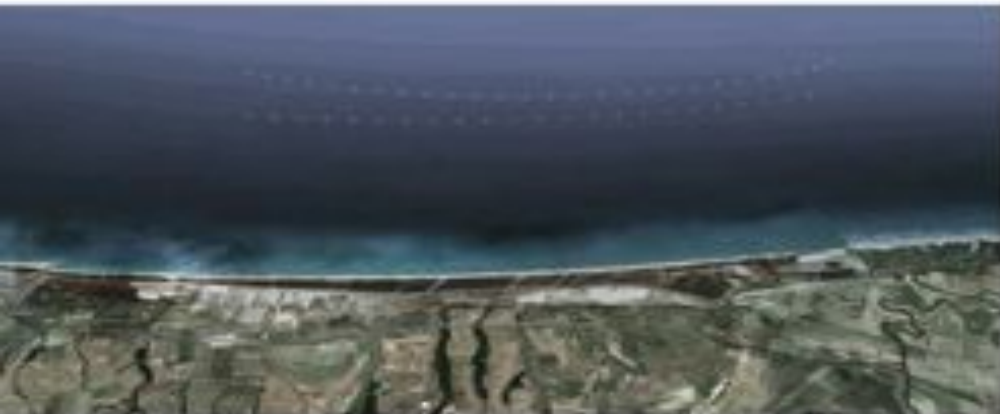
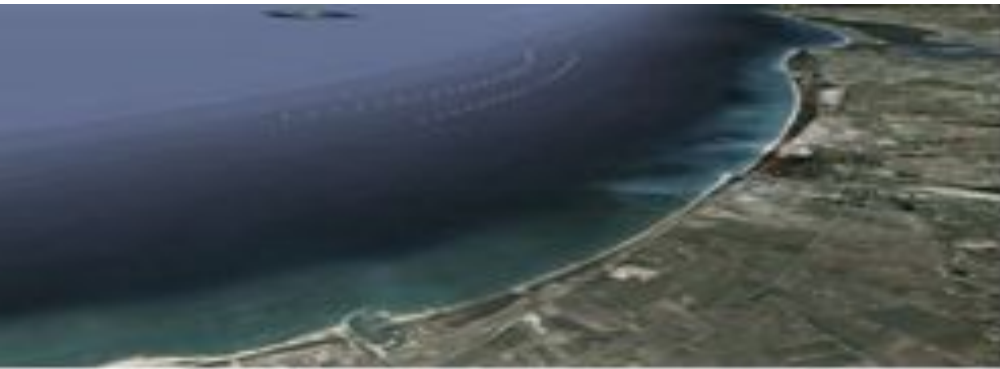
Development of a Tourism of "technology and environment"
Environmental communication linked to the monitoring program.
The sea substation could become a visitor center



A NEW KIND OF TOURISTIC OFFER



COMPARISON BETWEEN THE NEW LAYOUT PROPOSED WITH THE ORIGINAL ONE



COMPARISON BETWEEN THE NEW LAYOUT PROPOSED WITH THE ORIGINAL ONE

LAYOUT PROPOSTO



Termoli

LAYOUT PROGETTO ORIGINALE



Campomarino centro storico



schema della vista dell'impianto dalla rotta di navigazione da Termoli verso le isole Tremiti



COMPARISON BETWEEN THE NEW LAYOUT PROPOSED WITH THE ORIGINAL ONE

LAYOUT PROPOSTO



LAYOUT PROGETTO ORIGINALE



Foce fiume Biferne

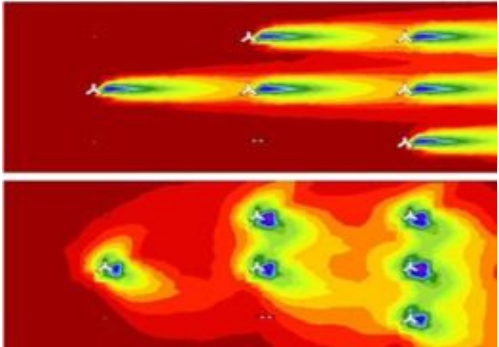


Marina di Chiuti

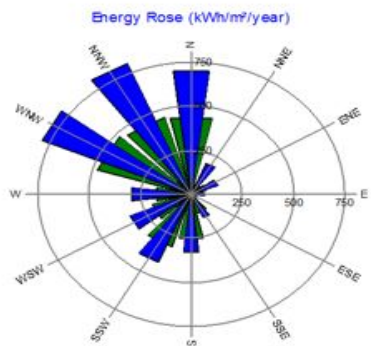
COMPARISON BETWEEN THE NEW LAYOUT PROPOSED WITH THE ORIGINAL ONE



layout originale a cluster
diagramma di produttività



layout alternativo aperto
diagramma di produttività



produttività a confronto tra
layout originale e
layout alternativo aperto

Turbine Type	WTG	Power [GWb]	Hub Height a.g.L. [m]	Mean Net AEP - 10% [GWb]	Total Net AEP [GWb]	Total Net AEP % - 10% [GWb]	Mean Wake loss [%]	Ore/an no
LAYOUT_ ORIGINALE	50	3,00	90,0	8,490	471,644	424,480	11,04	2830
LAYOUT_ ALTERNATIVO	50	3,00	90,0	8,720	484,454	435,977	7,87	2907



OFFSHORE WIND FARMS AND COASTAL PROTECTION



Stato do Ceará



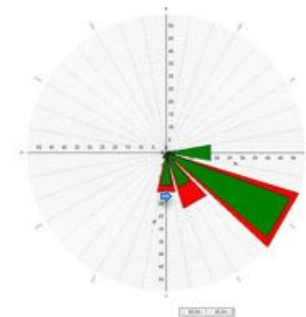
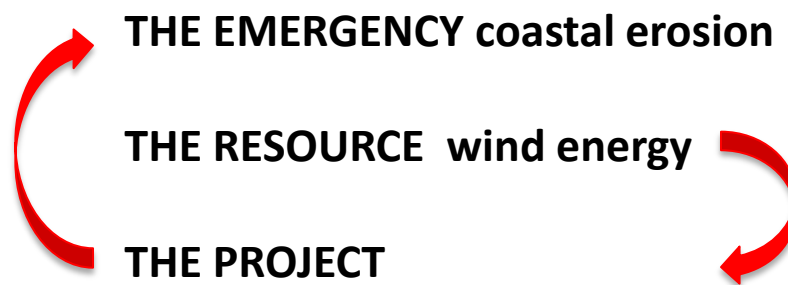
Stato do Ceará



municipio de Caucaia



OFFSHORE WIND FARM AND COASTAL PROTECTION



OFFSHORE WIND FARMS AND COASTAL PROTECTION



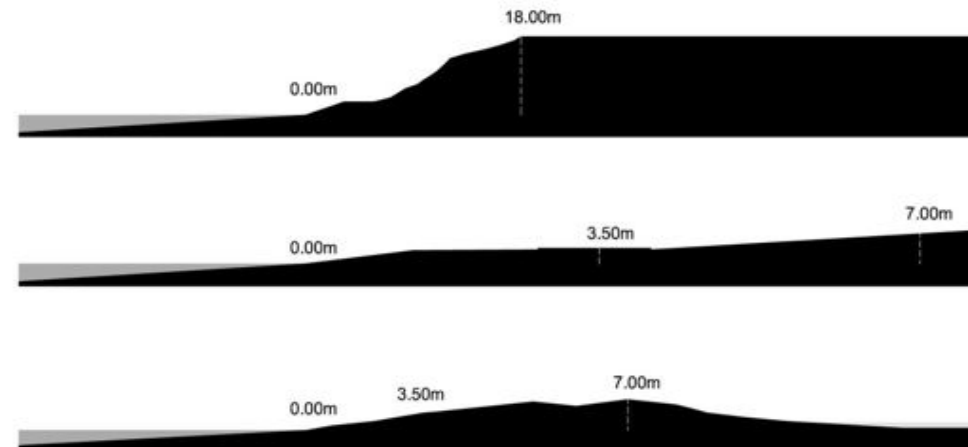
Pecem Port

Caucaia

Fortaleza

caucaia - Ceará, Brasil

OFFSHORE WIND FARMS AND COASTAL PROTECTION



OFFSHORE WIND FARMS AND COASTAL PROTECTION



Caucaia - Ceará, Brasile

OFFSHORE WIND FARMS AND COASTAL PROTECTION



OFFSHORE WIND FARMS AND COASTAL PROTECTION



OFFSHORE WIND FARMS AND COASTAL PROTECTION

