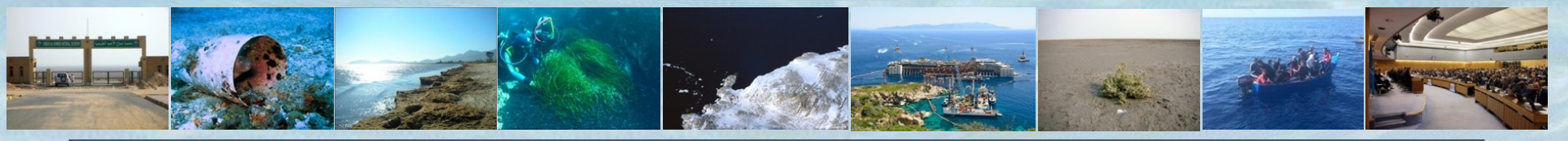
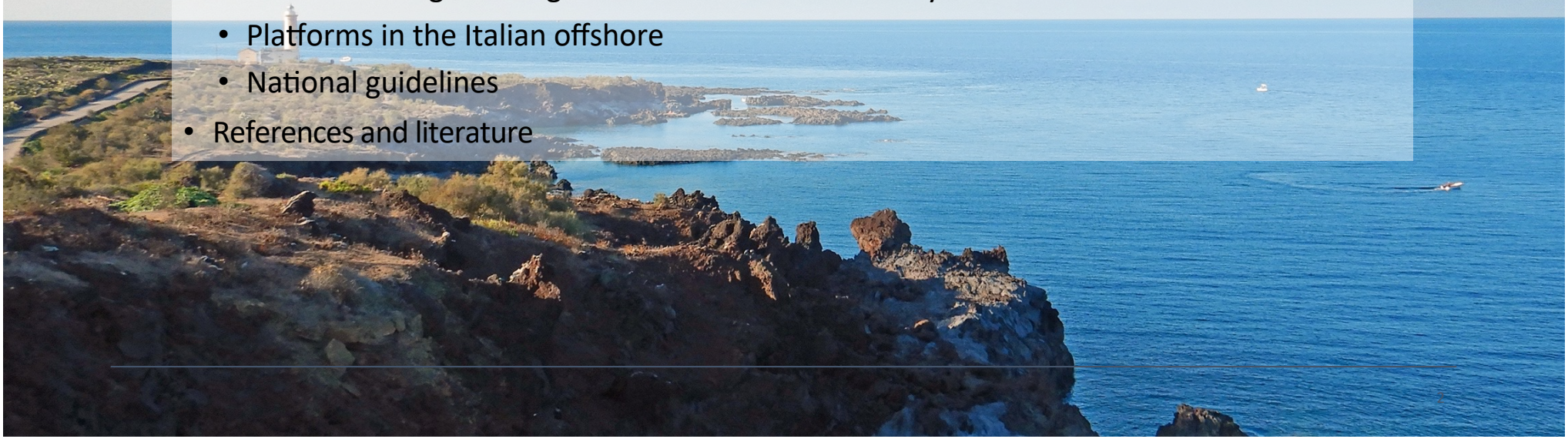
Environmental considerations in decommissioning operations offshore Country case study (Italy)



Summary

- Introduction
  - Biogeographical context
  - International and regional regulations
  - The Regional Marine Pollution Emergency Centre for the Mediterranean Sea (REMPEC)
- Decommissioning oil and gas offshore structures in Italy
  - Platforms in the Italian offshore
  - National guidelines
- References and literature



ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

Public environmental research institute and agency of the Italian Ministry for Ecological Transition

ISPRA CRE-EMA
Environmental Emergencies at Sea Unit

Party of the three Peripherical Committees of the National Committee devoted to offshore activities (Ref.: DL, 2015) in cooperation with the Italian Ministry for Ecological Transition, elaborates the annual Report to the Italian Parliament concerning the ecological effects of the use of airguns in offshore oil & gas exploration

The Mediterranean Sea

Landlocked sea

23 states have coasts facing the Mediterranean Sea

0.82% of total surface of oceans and seas

25% of global maritime traffic and 30% of world seaborne petroleum hydrocarbons trade (Ref.: UNEP/MAP, 2020)

12,000 species of marine organisms

18% of total marine biodiversity (Ref.: Coll *et al.*, 2010)

30% of the marine species are endemic

N

1300 km

Protection of the Mediterranean Sea

Four cooperation structures in Europe which contain specific **decommissioning requirements**:

(i) The Convention for the Protection of the Marine Environment in the North-East Atlantic of 1992 (following earlier versions of 1972 and 1974)—the OSPAR Convention (OSPAR);

(ii) The Convention on the Protection of the Marine Environment in the Baltic Sea Area of 1992 (following the earlier version of 1974)—the Helsinki Convention (HELCOM);

(iii) The Convention for the Protection of Marine Environment and the Coastal Region of the Mediterranean of 1995 (following the earlier version of 1976)—the Barcelona Convention (UNEP-MAP);

(iv) The Convention for the Protection of the Black Sea of 1992—the Bucharest Convention.

The European Community is a party to the first three Conventions.

REMPEC - Regional Marine Pollution Emergency Centre for the Mediterranean Sea

Among the main functions of REMPEC are:

- to assist coastal States of the Mediterranean region, which in cases of emergency so request, in obtaining assistance of the other Parties, or when the possibilities for assistance do not exist within the Mediterranean region, in obtaining international assistance from outside the region;
- to prepare and keep up-to-date operational arrangements and guidelines, aimed at facilitating co-operation between Mediterranean Coastal States in cases of emergency.

Decommissioning oil and gas offshore structures in Italy

Current international and regional regulatory frameworks are in favour of a **complete removal** at the end of the useful life of offshore oil & gas platforms, pipelines and other ancillary offshore infrastructure provided that maritime shipping, fishing and environmental protection are taken into account.

In the Italian seas, the default requirement is the **complete removal** of the platforms & connected infrastructures from the sea floor

Platforms in the Italian offshore

Tab. 1. Relationship between platform type, size and number of connected wells.
Rapporto tra tipo di piattaforma, dimensioni e numero di pozzi allacciati.

Platform typology	Average dimension (m)	N. connected wells
Mono-tu		
Bi-tubula		
Cluster		
Reticular		
Submarii		

Tab. 2. Terminology proposed for the productive state of a hydrocarbon well.
Proposta di terminologie per indicare lo stato produttivo di un pozzo petrolifero.

Well state		Definition (DGS-UNMIG)
Production (active)	Producing	a well drilled with a good result. The producing well is a production well that is currently extracting hydrocarbons or injecting fluids from/to
	Non-producing (suspended)	a well drilled with a good well is a production well th hydrocarbons from the re
Non-operative	(suspended)	Non-operative wells are w and could be productive; b impediments are not activ
Non-productive (inactive)	Closed about to close	Non-productive wells are considered to be not ecor

Tab. 3. Terminology proposal to define the productive state of a hydrocarbon platform.
Proposta di terminologie per indicare lo stato produttivo di una piattaforma petrolifera.

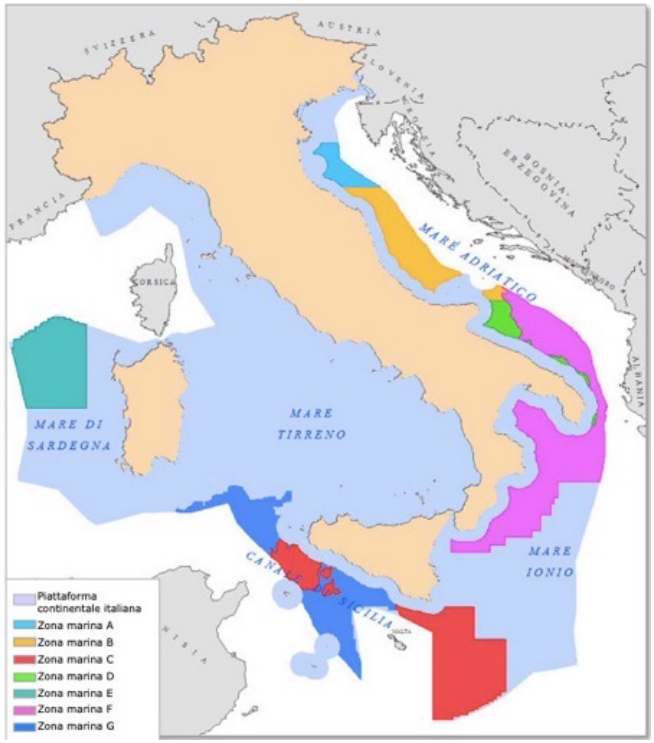
Platform state	Definition
Active	Connected to production (one or more producing or non-producing wells).
Non operative	In areas subject to regulatory constraints or pending the granting of the exploitation concession
Inactive	Not useful for producing a field or it does not support the production of a complex platform cluster. Related to all non-productive wells or non-producing wells (for more than 5 years)

Platforms in the Italian offshore

Table 1. Overview of offshore platforms in Italy from a report of the Ministry of Economic Development.

Number of Offshore Platforms	Status	Competent Port Authority	Structure's Characteristic
3	Inactive	*Chioggia*	Monotubular
35	Inactive: 2 Active: 33	*Ravenna*	Monotubular; reticular structure with 3,4,6,12 legs
19	Inactive: 3 Active: 16	*Rimini*	Monotubular; bitubular, reticular structure with 3,4,6,8 legs
8	Active	*Pesaro*	Underwater well head; reticular structure with 4 or 8 legs
2	Inactive	*Brindisi*	Underwater well head
24	Active	*Ancona*	Underwater well head; reticular structure with 3,4,8 legs.
3	Inactive:2 Active:1	*Porto Empedocle*	Underwater well head
11	Active	*San Benedetto*	Underwater well head; monotubular; reticular structure with 4 or 8 legs
12	Active	*Pescara*	Underwater well head; monotubular; bitubular; reticular structure with 3,4,8 legs
6	Active	*Crotone*	Underwater well head; monotubular; reticular structure with 4 or 8 legs
2	Active	*Termoli*	Reticular structure with 4 or 8 legs
6	Active	*Ortona*	Monotubular; reticular structure with 4 or 5 legs
6	Active	*Gela*	Underwater well head; reticular structure with 4,8,20 legs
1	Active	*Pozzallo*	Reticular structure with 8 legs

ly)



Italian offshore mining concessions

At the end of 2020, 140 offshore oil & gas installations were still in operation offshore the Italian coasts, within and outside the 12-mile zone (Ref.: MISE, 2020)

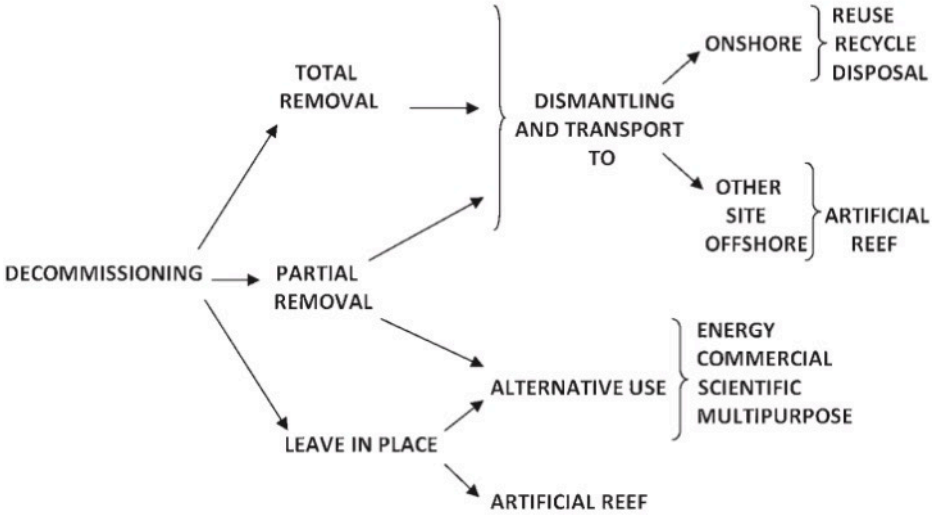
Decommissioning oil and gas offshore structures in Italy

All the activities concerning offshore installations' safety, operativity and maintenance are performed under the responsibility of the operators

… and must be authorized following the procedure currently in place (Ref.: DL, 2015; DM, 2019)

Ref.: Punzo E., 2020

Decommissioning oil and gas offshore structures in Italy



Decommissioning oil and gas offshore structures in Italy

In Italy, as well as in other parts of the world, the vast majority of the offshore oil & gas installations (mainly jacket steel platforms) were developed between 1960 and 1980.

In particular, 49 platforms, positioned in very shallow waters, already reached the end of their economic life and were decommissioned.

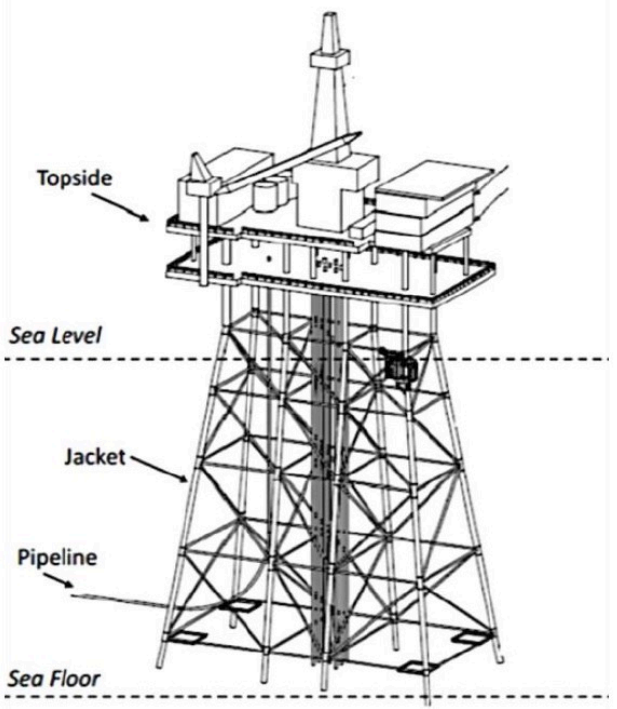
ENI's Adriatic offshore platform «ROSPO MARE»

Decommissioning oil and gas offshore structures in Italy

In the former decommissioning campaigns all the topsides, treatment facilities, deck infrastructures were dismantled and conveyed in dedicated onshore areas for the final recovery and disposal.

23 jacket steel infrastructures were used as an artificial reef in a pre-selected dedicated area in the Adriatic Sea, approximately 12 nautical miles offshore the coastline, named “Paguro”.

The remaining 26 decommissioned platforms were removed and treated in dedicated onshore areas for final disposal (Ref.: Archetti *et al.*, 2019; Grandi *et al.*, 2017)



Paguro

"Paguro" is the wreck of a drilling platform, built by AGIP S.p.A. in 1963 for the extraction of methane and located approximately 11 miles off the coast of Ravenna.

It collapsed in 1965 following an explosion. The submerged structure assumed the role of artificial reef (Bombace *et al.*, 1994) and has become an attraction for SCUBA divers and now is a Site of Community Importance.

These findings have been taken into consideration during the process of revisiting the Italian regulations concerning decommissioning of oil and gas structures in favour of a more flexible approach, depending on specific technical and environmental assessments.

Decommissioning oil and gas offshore structures in Italy

The decommissioning of offshore platforms begins with the mine closure programme, paving the way for the platforms to be removed

Offshore facilities that are not to be removed may be reused for scientific, environmental monitoring and various other purposes, including in the renewable energy field

Platform offshore Pantelleria Island (Photo ©A. Giordano)

Decommissioning oil and gas offshore structures in Italy

Platforms and structures to be removed without possibility of reuse

Platform name	Mining concession	Operator	Location (Lat/Long WGS84)	Platform type	Submission removal project deadline
ADA 3	A.C9.AG	Eni S.p.A.	45,183361 N 12,591176 E	Monotubular	Submitted
AZALEA A	A.C8.ME	Eni S.p.A.	44,171769 N 12,714258 E	Bi-tubolar portal	Submitted
PC 73	PORTO CORSINI MARE	Eni S.p.A.	44,385037 N 12,579101 E	Monotubular	Submitted
ARMIDA 1	A.C29.EA	Eni S.p.A.	44,475932 N 12,449540 E	Monotubolar	31/05/2022
REGINA 1	A.C17.AG	Eni S.p.A.	44,102781 N 12,834209 E	Monotubolar	31/05/2022

AZALEA «A»

Platforms and structures to be dismissed but with possibility of reuse in activities other than hydrocarbons mining

Platform name	Mining concession	Operator	Location (Lat/Long WGS84)	Platform type	Reuse application submission deadline
VIVIANA 1	B.C5.AS	Eni S.p.A.	42,65643 N 14,155021 E	Monotubolar	30/06/2022

Ref.: Italian Ministry of Economic Development, Annex A. “List of platforms and structures to be dismissed”. 31/7/2021 update

Decommissioning oil and gas offshore structures in Italy

According to the European Directive (Ref.: DL, 2015) and the related national law, activities to be carried out at any offshore installation must be submitted by operators to a National Committee with a report treating «major hazards» and a risks assessment

This Committee acts as the Italian competent authority, with regulatory, supervision and control functions, aimed at preventing «major accidents» during oil and gas offshore activities and if this happens, at minimizing their consequences

Benthic ecosystems

Only in recent years operators' risks analysis started considering the seafloor and benthic life in addition to "water surface", "water column" and "coast"

Naturally Occurring Radioactive Material (NORM)

Available online at www.sciencedirect.com
SCIENCE DIRECT
ELSEVIER
Journal of Environmental Radioactivity 74 (2004) 255–277
JOURNAL OF ENVIRONMENTAL RADIOACTIVITY
www.elsevier.com/locate/jenvrad

Results of the European Commission Marina II Study Part II—effects of discharges of naturally occurring radioactive material

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Abstract

Enhanced levels of naturally occurring radioactive materials (NORM) are produced through various industrial operations and may lead to discharges to the marine environment. A recent study, called MARINA II, carried out for the European Commission considered discharges of radionuclides from the NORM industries to north European marine waters and their consequences. There are two main sources that were considered in the study. The use of phosphogypsum during the production of phosphoric acid by the fertiliser industry and the pumping of oil and gas from the continental shelf in the North Sea which produces large quantities of water contaminated with enhanced levels of naturally occurring radionuclides. Discharges of alpha emitting radionuclides from these two industries have contributed significantly to the total input of alpha emitters to north European waters over the period 1981–2000 (data were not available prior to 1981). Discharges due to the use of

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Contents

Naturally Occurring Radioactive Material (NORM) are extracted from oil & gas wells along with the hydrocarbons and, in some cases, legally dispersed at sea from the platform

Effects of the **Naturally Occurring Radioactive Material (NORM)** on *biota* (other than *H. sapiens* as consumer) are not (yet) taken into consideration in the seas surrounding Italy. Their radioactivity is not considered a marine ecosystems' risks source

Decommissioning oil and gas offshore structures in Italy National guidelines

For the decommissioning of offshore installations to ensure the quality and completeness of the assessment of their environmental impact.

The Italian regulatory body for the oil and gas industry is the Ministry of Economic Development (MISE). On 15 February 2019 the MISE issued a list of guidelines regarding the decommissioning of offshore platforms, considering several options and specifying all the deadlines and duties linked to each decommissioning phase (Ref.: MISE, 2019).

Decommissioning oil and gas offshore structures in Italy National guidelines

Re-use projects (Ref.: DM, 2019)

Must foresee, at least:

- potential conflicts of use analysis (sea routes, marine protected areas, underwater archaeological heritage, etc.)
- “post-reuse” decommissioning and environmental restoration projects
- site production potential analysis concerning the foreseen re-utilization (fish farming, agriculture, renewable energy plant, etc.)
- foreseen overall production with the proposed different use esteem
- reasoned choice concerning the functions to be implemented in the installation’s “respect area”

Decommissioning oil and gas offshore structures in Italy
National guidelines

Re-use projects (Ref.: DM, 2019)

Must foresee, at least:

- in all project's phases (realization, exercise and post re-use decommissioning), environmental effects analysis concerning
  - possible weather and sea conditions' and natural resources alterations;
  - water, seafloor and marine ecosystems qualities impoverishment;
  - waste generation and disposal;
  - gas emissions and major accidents' risks;
  - underwater archaeological heritage, cultural heritage and landscape of territories facing the intervention
- Project's socio-economic impact analysis on international and national and local scale

Decommissioning oil and gas offshore structures in Italy National guidelines

Re-use projects (Ref.: DM, 2019)

- When decommissioning operations come to an end, if deemed necessary, it is mandatory to put in place environmental reinstatement

Furthermore, the recently issued Strategic Environmental Assessment (SEA) of the "PiTESAI" (Plan for the sustainable energy transition of suitable areas) integrates environmental issues int o the preparation and adoption of this plan to ensure the sustainability of the choices to be made, also concerning the decommissioning operations in Italian seas (Ref.: PiTESAI, 2021).

Highlights

- Biogeographical context – the Mediterranean Sea is in need of regulations coping with its peculiarities
- International and regional regulations – default requirement is the complete removal of the platforms and connected infrastructures from the sea floor
- Platforms in the Italian offshore – high density in the Northern Adriatic Sea, many ready for decommissioning on the basis of knowledge gained in the many operations carried out so far
- The national guidelines – a new tool for the decommissioning of the offshore installations to ensure the quality and completeness of the assessment of their environmental impact

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