





# Port Energy Upgrade

### Energy Transition in Ports and Logistics

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# Modern Port Challenges







# **Particular Port Problems**

- Many vessels concentrated in a small area
- Near large urban centers
- Local topography
- Visible» and «invisible» activity/pollution
- Generators operating outside optimum region







# **Particular Port Problems**

- Modern ports face new challenges in the area of innovative services with high economic and environmental impact
- OnShore Power Supply (cold ironing)
  - Air emission reduction at berth
  - Noise reduction
- Electric bunkering (electric vessel charging)
- Electric vehicle charging stations
- Use of energy storage (batteries) for peak shaving or excess energy (e.g. from RES or regenerative braking of electric cranes)





# **Particular Port Problems**

### Smart microgrids

- Reduction of environmental footprint
- RES self-producers
- Resource saving through digital transformation (net-metering)
- Two-way energy flow and smart metering
- Peak shaving
- Treatment of contingencies
- Energy hubs (energy trading) & participation in energy markets (+ETS)



# Holistic Energy Upgrade & Benefits





### The Proteus Plan

# **Holistic Energy Upgrade**





ELEMED – ELectrification of the Eastern MEDiterranean area

#### •Coordinator LLOYDS REGISTER

Funding scheme CEF

 Cultivation of «Cold Ironing» technology and hybrid or fully electric driven ships (with electric propulsion and rechargeable batteries) at the Fastern Mediterranean Corridor. implementation Pilot case at the port of Kyllini.

• Building design studies of short-sea waterborne vessels e.g. shuttle ferries distances <18 n.m.



ALFION – Alternative Fuel Implementation in IgOumeNitsa port

 Coordinator OLIG s.a.
Funding scheme CEF
Performing Technical Studies for the Transformation of the port of Igoumenitsa into a green energy hub of the Eastern Mediterranean Sea

•Ship-to-Shore

interconnection(cold ironing)

- Battery swapping system
- •Electric Vehicle Charging Stations
- Energy Storage System
- •Central Energy Management System

EALING – European flagship Action for coLd ironING in ports

- •Coordinator Valencia Port Foundation
- •Funding scheme CEF •Implementation of cold ironing in 16 European ports. In particular:
- Formulation of unified regulatory framework facilitating the implementation of the OPS infrastructure in the ports of the consortium
- •Reassurance of the OPS compatibility between and ports of the consortium and ships visiting them.
- Performance of the appropriate technical, economical, environmental and regulatory studies for the OPS installation.

Participation in Various Committees and Fora for OPS

- Participation in the preparation of National Strategic Framework for the Alternative Fuels
- Participation in the «ELEMED» Committee of the Ministry of Maritime Affairs and Insular Policy for the preparation of a Presidential Decree on the safe electric interconnection of ships at berth
- Contribution to the formulation of OPS guidelines of the European Maritime Safety Agency (EMSA)
- Participation in the IEC JWG28 preparing the IEEE/IEC/ISO 80005 series of standards for cold ironing
- Participation in the Marine Systems Coordinating Committee of IEEE, preparing the ship electric energy system standards.

#### Hellenic Port Energy Needs (Regulatory Energy Authority)

- •Funding Source: Regulating Authority of Energy (RAE)
- •Estimation of energy demands of ports in the perspective of massively implementing cold ironing in a great number of Hellenic ports
- Investigation of electricity pricing issues as an alternative maritime fuel
- Investigation of operating models of ports as energy hubs.













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### **Social & Environmental Benefits**

Public health

Emission reduction in port and urban areas

Zero emission solutions and RES in the shipping and port sectors

Noise and vibration reduction (elimination) at berth

Quality of life and benefits for tourism and trade

#### Employment

Current and future regulation compliance

Power from low C sources and self-production





### **Economic & Operational Benefits**

Trade activity and port competitiveness

Port grid integration in the area grid (smart grids)

Preparation for electric/hybrid ships

Sustainable shipping for small and medium distances

Energy cost reduction

Development through new technology adoption

Energy efficiency













Εισαγωγή

## **Current Regulations**

- MRV, Global Sulphur Cap 2020, EEXI/CII
- EMSA Guidelines for  $\gamma \iota \alpha$  OPS
- IEC/ISO/IEEE 80005-1/2/3 (for OPS)
- EU Directive **2014/94/EC** on the Deployment of Alternative Fuel Infrastructure
- EU Directive 2019/944 (5-6-2019): On Common Rules for the Internal Market for Electricity (EU D. 2012/27/EU)





## **Regulatory and Other «Bottlenecks»**

### Selection of «commercial model»

- Closed distribution center
- Energy trading
- Production/energy storage
- Regulated charges & VAT
- «Degree of Unbundling»
- Two-way flow
- Different charges/port
- Motives? Derogation? Solutions?





# Case Study: the Port of Igoumenitsa



Old port

EXNEIC

**Domestic Terminal** 

II New Port Phase I

(Under construction)

## Igoumenitsa Port Infrastructure











ALFION Alternative Fuel Implementation in IgOumenitsa Port

CEF-Transport-2019 – General Envelope» funding studies (up to FEED)

for:

- OPS (cold ironing)
- Battery swapping
- Electric vehicle charging stations
- Energy storage systems
- Energy management system platform
- Cost-benefit analysis required by the implementation phase



**Co-financed by the European Union** Connecting Europe Facility







### ALFION Alternative Fuel Implementation in IgOumenitsa Port

Funding

Connecting Europe Facility (CEF)

50% EU and 50% own resources

Total budget: € 1.080.000 (plus VAT)

Consortium			
Beneficiary	Acronym	Country	Role
Igoumenitsa Port Authority	OLIG	GR	Coordinator
Hellenic Electricity Distribution Network Operator	HEDNO	GR	Beneficiary
(ΔΕΔΔΗΕ)			
PROTASIS Engineering & Consulting S.A.	PROTASIS	GR	Beneficiary
HYDRUS Engineering Ltd	HYDRUS	GR	Beneficiary
National Technical University of Athens	NTUA	GR	Beneficiary





### **Thank You for Your Attention!**

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