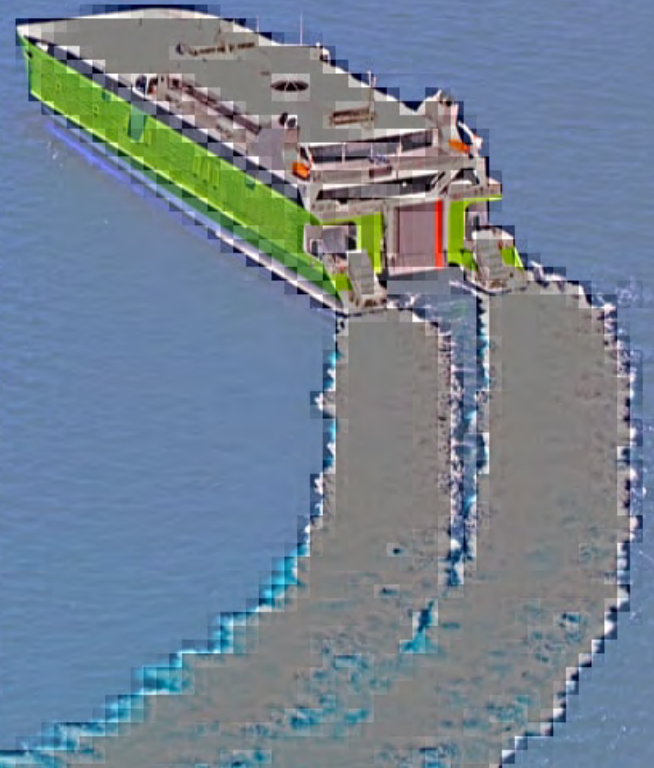


“Electrification – A prospect for sustainable short sea connections”

SSS Days, 13/6/2019

Panayiotis Mitrou

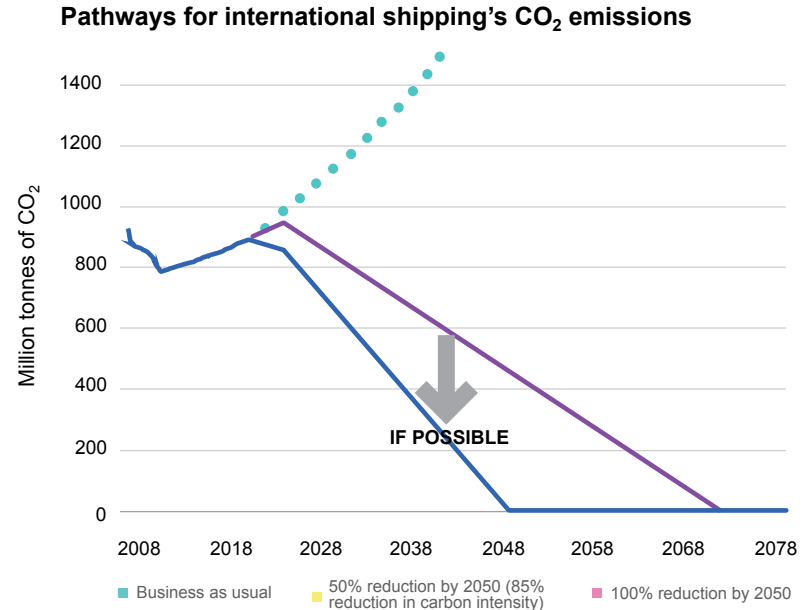
Technology & Innovation Manager, South Europe, Marine
& Offshore, Business Development



Why are zero-carbon solutions needed for full decarbonisation?

To achieve an absolute reduction in GHG of at least 50% by 2050.

- This equates to around **85%** reduction in carbon intensity
- Slow steaming, increase ship size, increased attention to efficiency in design & operation
- Zero-emission vessels need to be entering the fleet from 2030

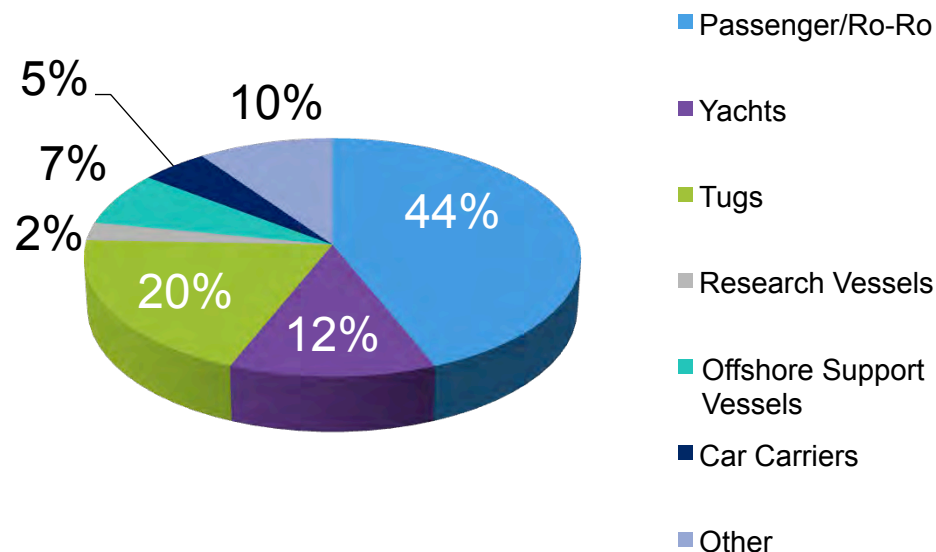


LR and Hybrid Ship Technology

- LR has an extensive - nearly 20-year - experience of battery installations on board ships and yachts
- Integrated approach to the acceptance of battery installations



Hybrid Fleet Around the Globe



Hybrid Ferries

Prominent Examples from LR Experience



Scandlines Prins Richard –
2.6MWh



Victoria of Wight– 1.0MWh



CalMac Hallaig– 500 kWh



BCFerries Hybrid Concept – 1.5
MWh



Teso Texelsroom – 900kWh

Greece: An endless opportunity for synergies

A vision for a carbon-neutral short sea shipping

Potential: More than 100 Short Sea Shipping connections in Greece – 30% under 5nm



More than 150 vessels operate these routes



Huge potential for Green Hybrid Technologies



5GW of RES installed in GR
Projection for more than 12GW by 2025



Marine transportation as a consumer of excessive RES electricity



First Cohesion Fund project in Motorways of the Sea

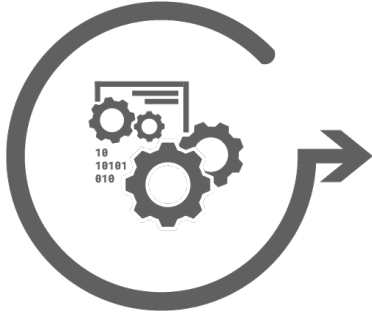


3 Member States – Participating Ports:

- Piraeus – Killini (Greece)
- Lemesos (Cyprus)
- Koper (Slovenia)

Cross-european maritime network and **macro-regional strategies** for Adriatic-Ionian Seas

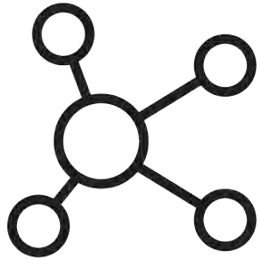




- Front End Engineering Design for **Piraeus, Limassol & Koper**
- Detailed Design for the Port of **Killini** and 1 Ro-Pax Vessel



- **Risk Assessment** studies for cold ironing and hybrid ships
- **Shipyard Preparedness** assessment



- **Regulatory Analysis** and Proposal for Port & Ship Electrification
- Operation, Safety and Training Requirements



- **Techno-economic assessment** tool for hybrid solutions
- Reports on port emissions, **renewable integration** and smart grid deployment

The case of Killini Port

The first cold ironing installation in the East-Med Area

- Serving the Zakynthos and Kefalonia Islands
- Port Installation for 2-4 Shore Connections Projected
- Real life application – crash test for similar port works
- Record time permitting process

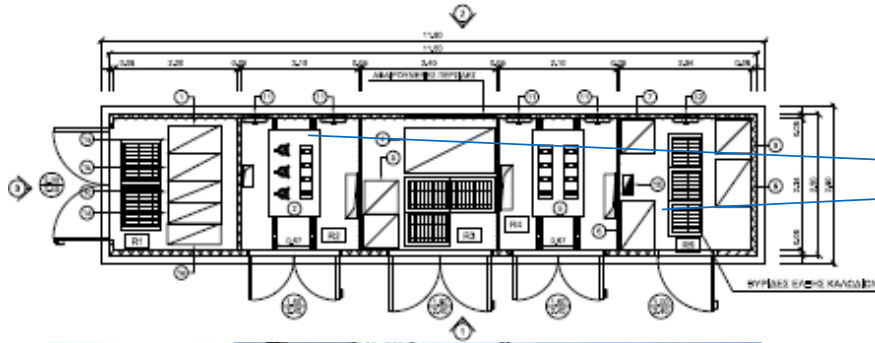


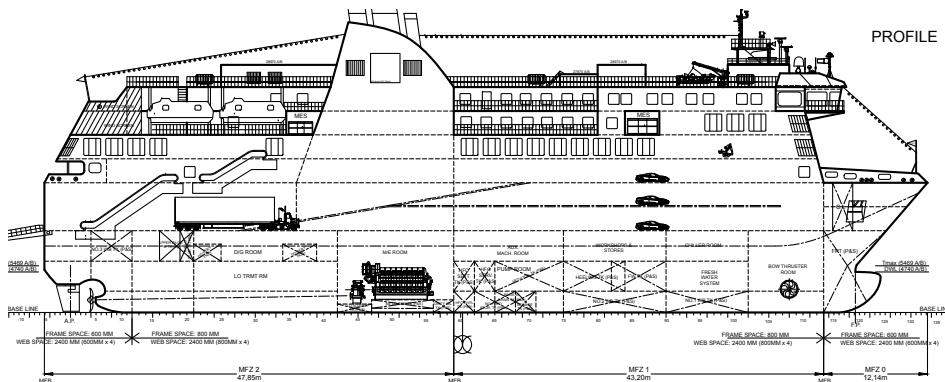
***Pilot installation: 1 berth supplying one Ro-Pax vessel
with approx. 500kVA needs during port stay***



The case of Killini Port

From Design to Implementation





- Twin Screw/Twin Hull Ro-Pax
- LOA 84.4m
- Breadth: 26.0m
- Draught: 3.8m
- 1000 Pax
- Service Speed : 17 kts
- All Electric Configuration
- Top Tier Deck allocated for solar panels

- **New Fuel Cost: less than 0.02 EUR/pax/nm**
 - Emissions Reduction:
 - 30-100% CO₂ (Depending on Electricity Mix)
 - 97% NOx
 - 99% PM
- Fuel Cost Comparison, Conventional Diesel VS all Electric configuration



Electrification in Ships & Ports

Elemed Proposal:

3 Pillar Proposal: Policy, Financial Incentives, Technical Requirements

Policy recommendations

- Ports supplying electricity for cold-ironing services (Eleftherios Venizelos Model)
- Support of renewable energy integration
- Simplification of permit procedure for installation & use of electric power within ports

National Policy Framework for Alternative Fuels Integration of Elemed Proposal




Recommendations on Funding/Financing

- Inclusion of electric power in the **marine fuels category** and application special taxation measures
- Design an efficient regulatory environment to ensure sustainable provision of Public Private Partnerships (PPPs), involving local insular communities
- Build an equivalent funding environment attracting investments in hybrid shipping for isolated insular routes

Greece tangibly supporting Ship Electrification

Ministerial Committee on shipping electrification

- Guidelines for shore side electricity in port and requirements for GR Flagged hybrid ships
- Established in September 2018
- Public Sector, Hellenic Coastguard, Academia, Industry Ports and classification
- National Framework on ship and shore electrification, providing incentives for owners and ports



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΝΑΥΤΙΛΙΑΣ & ΝΗΣΙΟΤΙΚΗΣ ΠΟΛΙΤΙΚΗΣ
ΑΡΧΗΓΕΙΟ ΛΙΜΕΝΙΚΟΥ ΣΩΜΑΤΟΣ-ΕΛΛΗΝΙΚΗΣ ΑΚΤΟΦΥΛΑΚΗΣ
ΚΛΑΔΟΣ ΕΛΕΓΧΟΥ ΠΛΟΙΩΝ
Γρ. ΔΙΕΥΘΥΝΤΗ ΚΛΑΔΟΥ

Ταχ. Δ/ση : Γρ. Λαμπράκη 150
Ταχ. Κώδικας : 18 518 Πειραιάς
Πληροφορίες : Γρ. Διευθυντή Κλάδου Γ
Τηλ. : 2131371959
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E-mail : dkc@hcg.gr

Πειραιάς, 27/09/2018
Αρ. Πρωτ.: 2070.0/71290/2018
ΠΡΟΣ: ΩΣ ΠΙΝΑΚΑΣ ΔΙΑΝΟΜΗΣ

Υπογραφή υπογεγραμμένο από ELISSAVE
ΤΣΑΜΑΛΙ
Ημερομηνία: 2018.09.27 17:39:51 EEST
Αίτια: ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ

Θέμα: «Συγκρότηση Ομάδας Εργασίας για την ανάπτυξη θεσμικού πλαισίου για την ηλεκτροδότηση, ηλεκτροφόρτιση, ελλιμενισμό και ηολόγηση ηλεκτρικών και υβριδικών πλοίων στο πλαίσιο του Ευρωπαϊκού Έργου ELEMED»

Σχετ: α) Η Αρ. Πρωτ. 10235/19-07-18 εντολή Γρ. ΥΝΑΝΠ
β) Το με Αρ. Πρωτ. 2070.0/60784/2018/13-08-18 έγγραφό μας

1 Σε συνέχεια του (β) σχετικού εγγράφου μας, παρακαλούμε όπως ορίσετε έναν εκπρόσωπό σας και τον αναπληρωτή του, γνωρίζοντας μας το ονοματεπώνυμο, την ιδιότητα και τα στοιχεία επικοινωνίας (σταθερό και κινητό τηλέφωνο και διεύθυνση ηλεκτρονικού ταχυδρομείου), προκειμένου να συμμετάσχει σε ομάδα εργασίας αποτελούμενη από στελέχη του Υπουργείου Ναυτιλίας και Νησιωτικής Πολιτικής, του Αρχηγείου Λιμενικού Σώματος - Ελληνικής Ακτοφυλακής και λοιπών Φορέων με σκοπό να αναπτυχθεί ένα θεσμικό πλαίσιο για την ηλεκτροδότηση, ηλεκτροφόρτιση, ελλιμενισμό και ηολόγηση ηλεκτρικών και υβριδικών πλοίων.

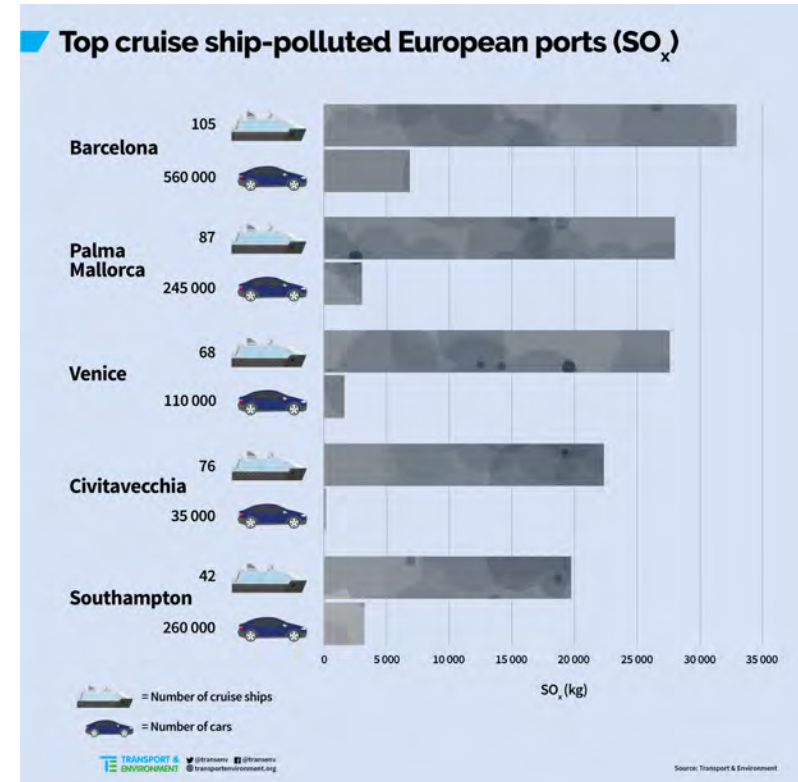
2. ΥΝΑΝΠ/Α.Λ.Σ-ΕΛ.ΑΚΤ./ΔΙΠΘΑΠ παρακαλείται ομοίως, σύμφωνα με την παράγραφο 2 του (β) σχετικού.

Ο Διευθυντής
Κλάδου Ελέγχου Πλοίων
Υποναύαρχος Α.Σ.(Τ) ΣΗΚΑΣ Ιωάννης

The Piraeus Case

Facts and Stats

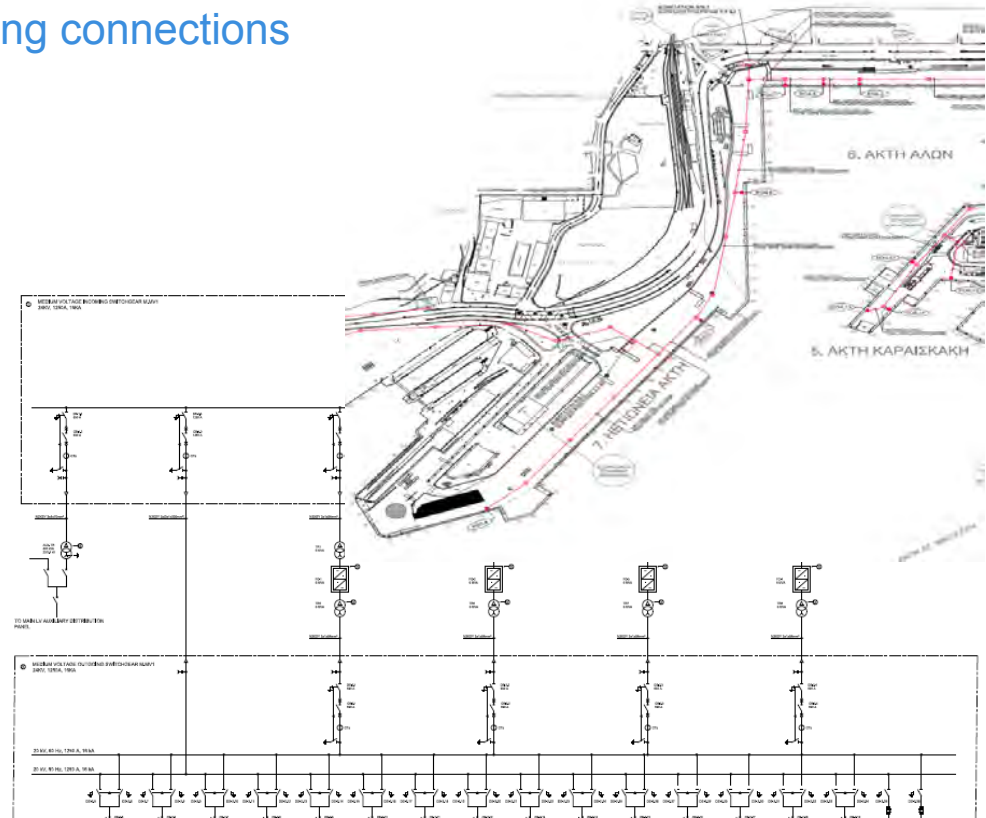
- ~600 Cruise ship arrivals last year
 - ~1200 Berthdays
 - At 8 MW load per ship and 10 cents /KWh saving
 - 230 GWh / year, 23 million Euro in savings
- ❑ Port lacks electrical infrastructure critical to growth
 - ❑ Significant electric bunkering potential in short sea connections and support vessels (e.g. tugs)



Elemed Project designs the solution

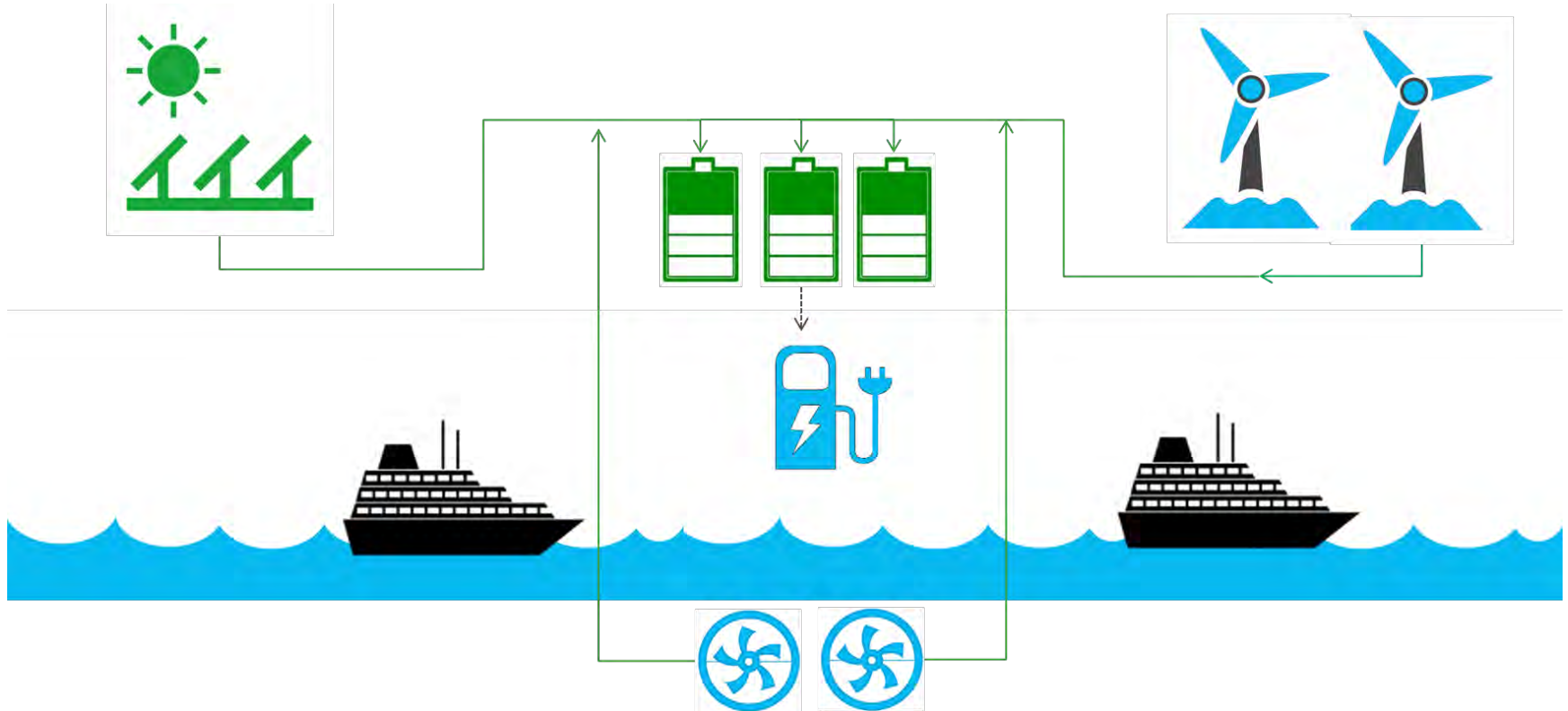
Port masterplan with proposed cold ironing connections

- Front End Engineering Design for:
 - 15 Shore Connection Points covering the whole passenger terminal
 - 1 Electric Bunkering berthing position
- Holistic approach for an eco-smart port:
 - Electric buses within terminals
 - Energy Storage Installation as buffer
 - Deployment of Renewables in free spaces
- Financing and funding schemes investigated



Wind & Sun to Propeller:

Shaping a sustainable future



Towards a new greener coastal and insular ecosystem

New Energy and Transportation Markets

- Potential for the islands to meet more of their own energy demands
- Enhanced Electro-mobility
- Drastic improvement in power availability and Grid Reliability
- Improved environmental conditions and GHG reduction
- Direct financial benefits in an emissions and noise free environment



Thank you



Panayiotis Mitrou
Technology & Innovation
Manager, South Europe, Marine
& Offshore, Business
Development