Final conference

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Deliverable Number D.2.2.3.

Project Acronym	METRO
Project ID Number	10044221
Project Title	Maritime Environment-friendly TRanspOrt systems
Priority Axis	4
Specific objective	4.1
Work Package Number	WP2
Work Package Title	Communication activities
Activity Number	2.2.
Activity Title	Project events
Partner in Charge	University of Trieste, Dept. of Engineering and Architecture
Partners involved	Wärtsilä Italia Spa Port Network Authority of the Eastern Adriatic Sea Tehnomont Shipyard Pula Ltd Istrian Development Agency – IDA Ltd University of Rijeka - Faculty of Engineering University of Rijeka - Faculty of Maritime Studies
Status	Final
Distribution	Public

Summary

Description of the event

The goal of METRO (Maritime Environment-friendly TRanspOrt systems) project is the improvement of the environmental sustainability of tourist maritime transport in the North Adriatic, addressing some specific challenges of the area: more integrated, efficient and sustainable maritime connections between Italy and Croatia; reduction of traffic congestion caused by seasonal tourist flows; improvement in local stakeholders' competitiveness. The strong multidisciplinary approach applied in the project integrates the best technologies in the field of electrical shipboard power systems, a modern approach to the ship design, and the land infrastructure study.

The Final Event has presented the project and its main results, including interactive polls. It has constituted a place for exchanging information with the public in regards to sustainable maritime transport systems.

The Final Event was held via Zoom Webinar platform, due to the pandemic situation in the programme area , and was organized as follows:

Agenda:

15:00 - Welcome, opening of the event and institutional greetings

Andrea Vicenzutti, *Project Manager Lead Partner, University of Trieste – DIA*

Paolo Rotoni, *Interreg V A Italy - Croatia 2014-2020, Joint Secretariat*

Giorgio Sulligoi, *Scientific Manager Lead Partner, University of Trieste – DIA*

15:15 - METRO Project introduction

Andrea Vicenzutti, *Project Manager Lead Partner, University of Trieste - DIA*

15:30 – Sustainable propulsion systems with the use of actual vessel data

Lorenzo Brigati, *Manager, System simulation, Integrated Systems and Solutions - Wartsila Marine Power*

15:45 – Environment-friendly hybrid vessels for short-medium range routes

Mitja Koštomaj, *Sales project leader, Tehnomont Shipyard*

Obrad Kuzmanović, *Senior Designer, Flow Ship Design*

16:00 – Interactive polls I

16:15 – Hybrid Vessels Study: FEM, CFD and Seakeeping Analyses

Roko Dejhalla, *Head of Naval Arch. and Marine Eng. Dept., University of Rijeka – Faculty of Engineering*

16:30 – Break

16:45 – Challenges in the implementation of hybrid-electric ferry charging stations

Aleksandar Cuculić, *PhD, University of Rijeka - Faculty of Maritime Studies*

17:00 – Environmental sustainability and energy efficiency in Trieste and Monfalcone ports

Stefano Bevilacqua, *Project Officer, Port Network Authority of the Eastern Adriatic Sea – Ports of Trieste and Monfalcone,*

17:15 – Pilot activity in Region of Istria and action plan for establishment of new touristic routes based on green technology vessels

Andi Kalčić, *Associate for EU funds, IDA*

17:30 – Interactive polls II

17:45 – Final panel with the speakers

18:00 – End of the Event

Typology of the audience

The event was attended by 41 people (presenters excluded) from all the target groups detailed in the project AF. Specifically, 19 from Education and training organisations as well as universities and research institutes; 17 from Enterprises, transport operators including operators of multimodal logistics hubs, infrastructure providers; 2 from Local regional and national public authorities; and 3 from General Public. All the registered people (more than 55) have been informed, after the event conclusion, that all the project deliverables have been made available on the website.

Speakers' presentations

After a welcome from Andrea Vicenzutti, Project Manager of the Lead Partner and moderator of the event, Paolo Rotoni, from the Joint Secretariat of the Interreg V A Italy - Croatia 2014-

2020 opened the event with its institutional greetings and some comments about the project as a whole.

Then, Giorgio Sulligoi, Scientific Manager of the Lead Partner from the University of Trieste – DIA, provided a general introduction of the event, explaining how the project was conceived, its motivations, the partnership building, and providing a broad explanation of the project as a whole, highlighting the multidisciplinary approach applied in the project. The complexity of the project was discussed, depicting how the ship design complexity had to be conjugated to the routes and the available technologies, as well as to the land side infrastructure. Moreover, it explained why it makes sense to discuss about these topics and the future of these challenges here and now. While the motivation for the time is evident, the partnership and the location are backed up by the strength of the industrial partners, as well as the competences of the research partners in the field of electrical and marine engineers. The intervention was concluded by affirming that the legacy of METRO project has to be kept alive to answer to all the challenges that are actually open in the sector.

Andrea Vicenzutti, Project Manager of the Lead Partner and moderator of the event presented the METRO project scope, its main aims and goals, as well as its base organization. The presentation started with some context in regards of the policies for maritime sector environmental sustainability, followed by a discussion on how to possibly meet with the actual and future requirements. The complexity in designing a new sustainable maritime transport systems was also depicted, presenting the METRO Project as a possible step towards such direction.

Lorenzo Brigati, Manager System simulation of Integrated Systems and Solutions - Wartsila Marine Power, presented the work made in WP3 regarding the design of sustainable propulsion systems with the use of actual vessels data. Specifically, the hybrid solutions and integrated design approach for propulsion systems developed in Wartsila specifically for the METRO project was presented. The application of Data Driven Design to the Design of RO-RO Pax and Ferries was shown, starting from the navigation data of the routes, applying machine learning algorithms to extract main information, and combining such information with design assumptions in order to simulate several ship concepts to compare their performance. For both the ships studied in the project (a Ro-Pax for a medium route and a Ferry for a short route), multiple propulsion system configurations have been presented, both in terms of technical components and environmental performance. Finally, considerations about the two best

solutions were provided, explaining why the designed ships use their specific configurations and what may be the possible future directions in this regard.

Mitja Koštomaj, Sales project leader of Tehnomont Shipyard, and Obrad Kuzmanović, Senior Designer at Flow Ship Design, took the word for presenting the two environment-friendly hybrid vessels for short-medium range routes designed during the project. The main requirements for the ships were presented, followed by a presentation of the design methodologies used for determining the vessels hull forms, powering, main machinery arrangement, and ship plans. The approach used for selecting the battery size was also described, which made use of the route data for providing a better capacity determination.

A first round of interactive polls was made, to collect opinions from the public in regards to environmental sustainability of the maritime transport.

After the first poll, Roko Dejhalla, Head of Naval Arch. and Marine Eng. Dept. at the University of Rijeka – Faculty of Engineering, presented the studies that have been performed on the hybrid vessels on the topics of Finite Elements Modeling, CFD and Seakeeping Analyses. The mathematical modeling and the study hypotheses have been presented, together with the obtained results. The analyses demonstrated the correctness of the design, while highlighting some specific local areas on which a structural optimization can be applied to improve the ship design. Resistance and propulsion analyses has been also presented, which confirmed the hypotheses taken during the ship design process. Seakeeping was also tested, using the local meteomarine conditions to check the ships design. All the studies validated the proposed design for the two ships, which therefore constitute, with all the documentation provided in the project deliverables, a complete and correct basic design that can be used by a shipyard for evaluating the cost of such ships and start their construction.

After a short break, the event was resumed with the presentation from Aleksandar Cuculić, from the University of Rijeka - Faculty of Maritime Studies. The topic of the presentation has been the challenges in the implementation of hybrid-electric ferry charging stations, thus moving the focus from the ships to the land-based infrastructure. The ships designed require possibly clean energy supply from shore, by means of a correctly designed charging system. Being the ships berthed only for short times, the charging system must be a high power one, which stresses the port power system and possibly leads to both power quality and safety issues. This proved to be an issue in the small ports (the ones where the Ferry needs to operate), which may call for extensive infrastructural work on them and also local land-based

energy storage systems. Moreover, a lack in standardization is present, which introduces additional issues. During the presentation, the studies made for assessing these issues in the case studies and proposing solutions have been shown, providing a possible practice for the future stakeholders interested in developing and adopting such solutions. The multidisciplinary aspect of the problem was once again highlighted, as well as the need of proposing solutions made by making several stakeholders collaborate to manage all the involved systems.

Moving further into the land section of the project, Stefano Bevilacqua, Project Officer of the Port Network Authority of the Eastern Adriatic Sea – Ports of Trieste and Monfalcone, presented the environmental sustainability and energy efficiency actions applied in Trieste and Monfalcone ports. The results from the greenhouse gases emissions measurement in the ports in 2019 were presented, highlighting how most of the emissions (65%) is related to the activity of ships at berth. Therefore, projects like METRO are significant for talking these issues. In particular, METRO project was one of the several projects that the Port Network Authority of the Eastern Adriatic Sea started for improving the port environmental footprint. Specifically, the project was used to provide the final project design for the shore side supply of the passengers' ships in the port. Moreover, the several approaches applied by the port for tackling all the pollutant emissions have been presented, demonstrating how an integrated approach is the only possible solution for achieving a significant reduction in emissions.

A second round of interactive polls was made, to collect opinions from the public in regards to environmental sustainability of the maritime transport.

Finally, Andi Kalčić, Associate for EU funds from IDA presented the Pilot activity in Region of Istria and action plan for establishment of new touristic routes based on green technology vessels. The pilot study was based on the inputs collected through two round tables organized by IDA, whose results pointed towards installing interactive screens near ports in Istria where there are cross-border routes, as well as a passenger counter in Pula port for improving the monitoring system of the port. The installed systems (hardware and software) were presented, describing their functionalities and the provided services. Multi modal e-mobility was also considered, installing electric bike and electric scooters chargers in the systems. The action plan was also explained, starting from the two case study routes and adding a new route between Trieste and Pula. The effect of the introduction of the designed green ships in the routes was also presented, based on a study that considers both ship and well-to-tank equivalent CO2 emissions, highlighting a significant reduction in pollutant emissions. The actual capabilities of

the involved ports were also assessed and presented, to explain which will be the required actions for introducing and fully supporting the new green ships on such routes. Finally, a set of steps for establishing new routes based on environmentally-friendly ships was depicted, to aid stakeholders in comprehending how they can contribute in this regard.

After all the presentations, Andrea Vicenzutti provided some final remarks on the project, highlighting the lessons learned during the project.

Finally, the speakers answered to the questions from the public, and the moderator concluded the event.

Conclusions

During its three-hour length, the event provided to the audience with a large amount of information about the project and its results. Specific results, remarks, and comments are already included into the project deliverables; thus, they will not be addressed here. However, at the end of the event (and at the end of the project) the following facts proved to be clear to all the involved partners.

Electrification is surely one of the ways to improve environmental sustainability of maritime transport, as well-known today. However, being the maritime transportation framework a very complex one, the results of actions towards reducing its environmental impact depend on several different data and parameters.

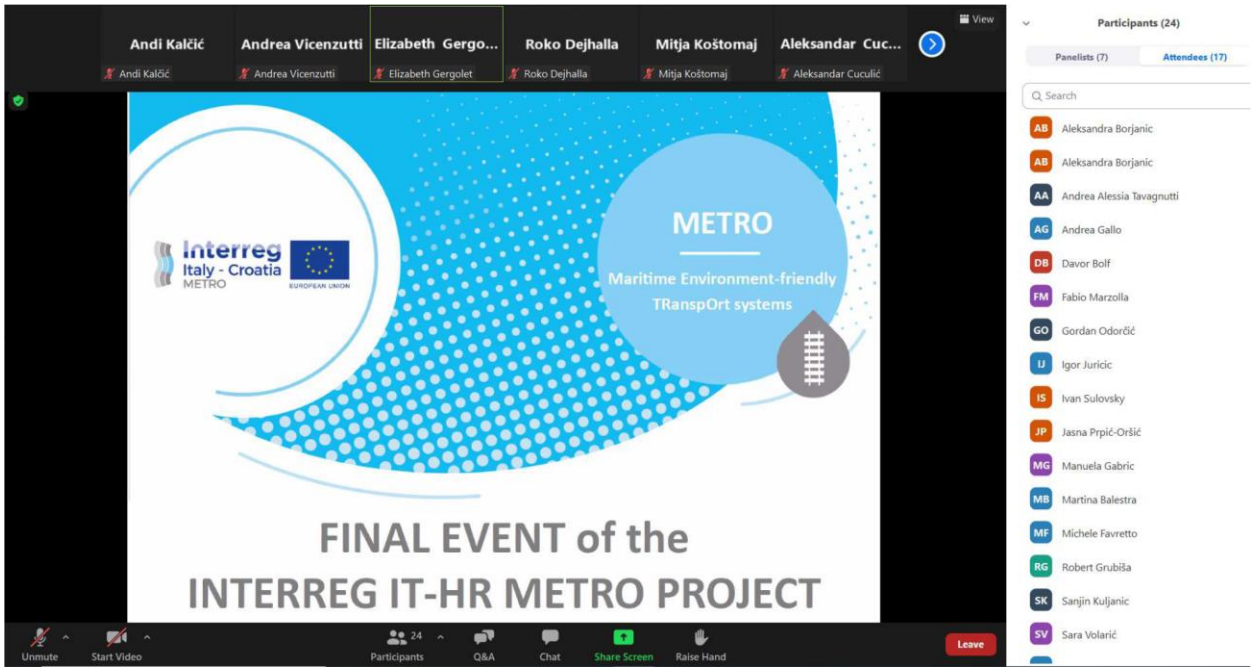
Ships need to be designed differently, depending on their type, size, route, and operative cycle, in order to provide the expected advantages. The port infrastructure also needs to be properly prepared to fully support the new green ships, otherwise the overall results may be impaired. The regulatory framework must be updated to include new technologies and environmentally sustainable solutions, to allow their diffusion.

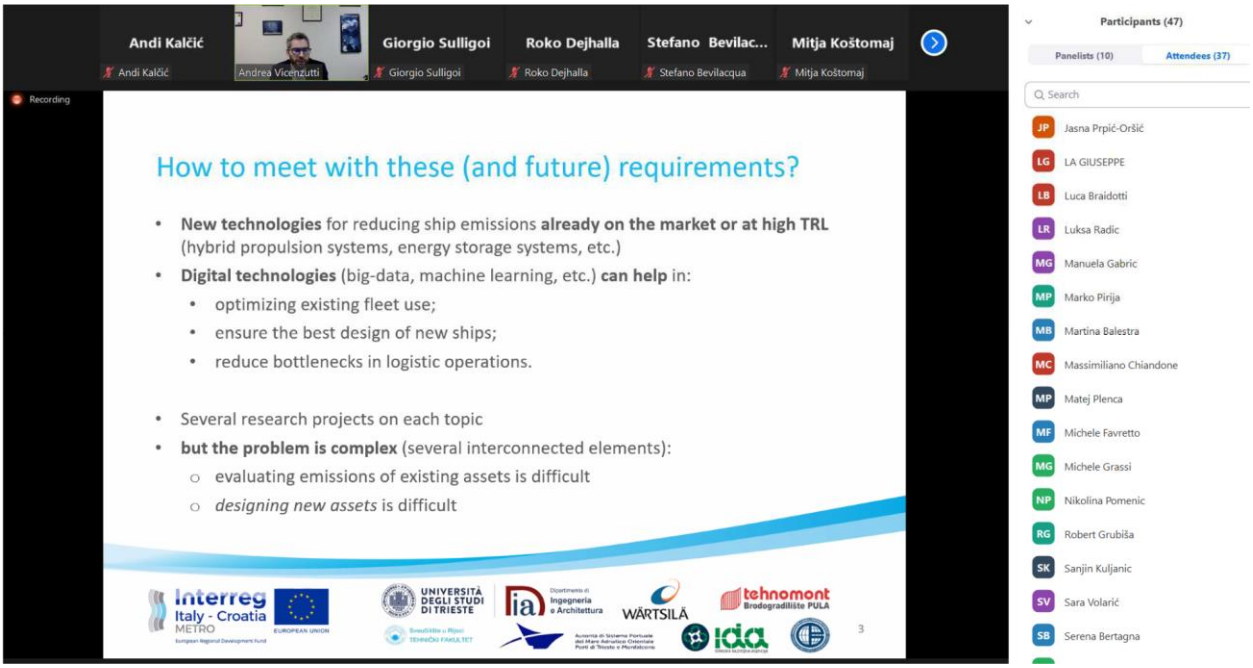
Therefore, designing a more sustainable transportation system requires an integrated approach, which starts from single technologies and components, but must be widened up at the point of considering all the interconnected elements involved in transporting something from a point of the world to another.

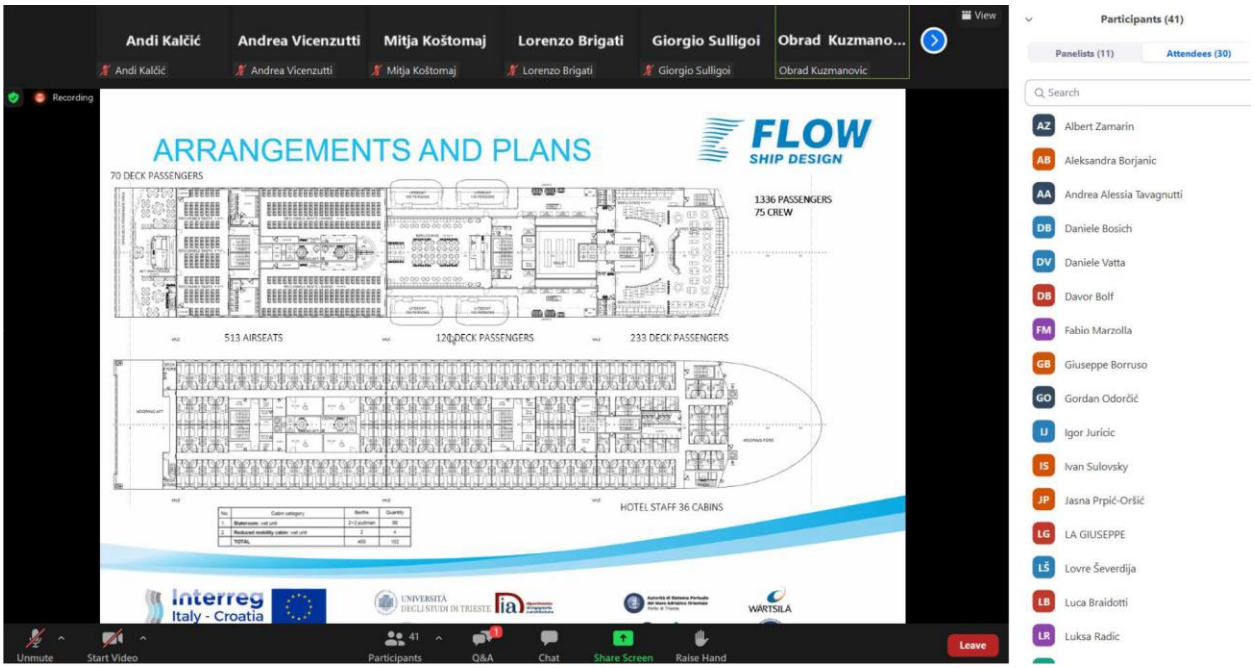
This means that now, and more and more in the future, an interdisciplinary approach is needed, and progress towards sustainable mobility require large partnerships made up from different partners each providing specific competences, in a collaborative framework.

Photos/screenshots

In the following some photos taken from the event are shown.




Andi Kalčić
Andrea Vicenzutti
Giorgio Sulligoi
Roko Dejhalla
Stefano Bevilac...
Mitja Koštomaj
Recording
How to meet with these (and future) requirements?
New technologies for reducing ship emissions already on the market or at high TRL (hybrid propulsion systems, energy storage systems, etc.)
Digital technologies (big-data, machine learning, etc.) can help in:
optimizing existing fleet use;
ensure the best design of new ships;
reduce bottlenecks in logistic operations.
Several research projects on each topic
but the problem is complex (several interconnected elements):
evaluating emissions of existing assets is difficult
designing new assets is difficult
Participants (47)
Panelists (10)
Attendees (37)
Search
Jasna Prpić-Oršić
LA GIUSEPPE
Luca Braidotti
Luksa Radic
Manuela Gabric
Marko Pirija
Martina Balestra
Massimiliano Chiandone
Matej Plenca
Michele Favretto
Michele Grassi
Nikolina Pomenic
Robert Grubiša
Sanjin Kuljanic
Sara Volarić
Serena Bertagna


Andi Kalčić
Andrea Vicenzutti
Mitja Koštomaj
Lorenzo Brigati
Giorgio Sulligoi
Obrad Kuzmano...
View
Recording
ARRANGEMENTS AND PLANS
FLOW
SHIP DESIGN
70 DECK PASSENGERS
1336 PASSENGERS
75 CREW
513 AIRSEATS
120 DECK PASSENGERS
233 DECK PASSENGERS
HOTEL STAFF 36 CABINS
Unmute
Start Video
Participants
Q&A
Chat
Share Screen
Raise Hand
Leave
Participants (41)
Panelists (11)
Attendees (30)
Search
Albert Zamarin
Aleksandra Borjanic
Andrea Alessia Tavagnutti
Daniele Bosich
Daniele Vatta
Davor Bolf
Fabio Marzolla
Giuseppe Borruso
Gordan Odorčić
Igor Juricic
Ivan Sulovsky
Jasna Prpić-Oršić
LA GIUSEPPE
Lovre Ševerdija
Luca Braidotti
Luksa Radic


Andi Kalčić
Lorenzo Brigati
Andrea Vicenzutti
Giorgio Sulligoi
Roko Dejhalla
Mitja Koštomaj
View
Interreg
Italy - Croatia
METRO
EUROPEAN UNION
WÄRTSILÄ
Ferry project – short route operation
Participants (46)
Panelists (10)
Attendees (36)
Search
Albert Zamarin
Aleksandra Borjanic
Aleksandra Borjanic
Alessandro Gratton
Andrea Alessia Tavagnutti
Andrea Gallo
Antonino Tamarino
Daniele Bosich
Daniele Vatta
Davor Bolf
Fabio Marzolla
Giuseppe Borruso
Gordan Odorčić
Igor Juricic
Ivan Sulovsky