

The « Med-Atlantic Ecobonus » project

A feasibility study on a financial incentive mechanism to support the trans-European transport network goal of developing sustainable freight transport services

1 Background

Due to the constant increase of international transport of traded goods over the last thirty years, the European Union (EU) has been faced with a number of social and environmental challenges addressing the negative impacts of freight mobility as well as with the need to secure and streamline the conditions for a sustainable transport market development and competitiveness.

In this context, the EU has tried tackling these issues through policy instruments, such as the Commission White Papers from 1992, 2001 and 2011, and the Regulations and Decisions setting out the implementing rules for all modes of transport, together with the subsequent funding programmes and other financial measures. Amongst the different aspects, the goal of sustainability through a greener and a more integrated, balanced and resource-efficient mobility has been a constant concern throughout the time, with different priorities and means of achieving and/ or supporting it.

On a national level, EU Members States have also implemented over the years certain instruments to mainly encourage multi-modality and more recently the use of alternative fuels, with different approaches.

As a result, the transport market is currently delivering more integrated solutions leading to freight mobility which is more competitive, flexible, reliable and greener. For instance, the great evolution should be noted on the environmental performance of the road following the implementation of the EURO standard Regulations. Likewise, the evolution from modes of transport performing at larger scales, such as the waterborne transport, towards customised services for road operators and freight forwarders should also be noted as a contribution to transport that is more integrated, balanced and optimised.

From today's perspective, and partly due to a smart combination of regulatory and financial measures from the EU institutions and the Member States, the market on its own is already delivering more integrated and optimized transport solutions. However, with this improved performance, new social and environmental challenges are being faced by the sector to keep reducing the external costs induced by freight mobility. Decarbonisation goals are today in the upfront of the international agenda. Air pollutant reduction targets are being progressively regulated and extended to all modes of transport. In parallel, resource efficiency and integration goals remain as priorities in the transport policy. Finally, reducing the social costs of transport such as congestion and accidents continues to be in the upfront of the policy, particularly for the road.

These goals might feature, in a nutshell, the socio-environmental priorities for transport market behaviour in the coming years as regards sustainable freight mobility.

The current EU guidelines on the further development of the TEN- t¹ and the Connecting Europe Facility² (CEF) for the period 2013-2020 already sought to promote these goals with a new approach, by not only taking infrastructure needs into account –as it used to be in the past– but also considering the contribution and the needs from freight transport services, with a main focus on green technologies. Consistently with the market evolution, this approach departed from the one given in the past by other EU funding programmes, namely Marco Polo_I and II³, that gave incentives to modal shift actions to compensate, in a way, the initial market losses incurred by transport operators in the launching of freight services that would shift traffic from the road (at a time where the road environmental performance was below the current one).

However, when looking towards the 2021-2027 period and beyond, the socio-environmental challenges are getting stricter from the regulatory perspective whereas measures supporting green technologies, which might demonstrate a funding gap, could be considered in certain cases insufficient for transport operators to swiftly adjust their socio-environmental behavior without harming EU transport market competitiveness. Moreover, there are other ways to improve the socio-environmental performance of freight mobility that are not necessarily technologically based (these are more related to transport operating patterns -with great impacts on energy consumption- that also relate to transport behaviour and could in that way be tackled).

Environmental regulation and financial support perform together as a sort of “*stick and carrot*” mechanism which leads to operant conditioning. The former is mostly set and outlined for the coming years, whereas the latter is under negotiation, at least for the coming 2021-2027 period. Moreover, while decarbonisation is the priority at international level due to the global effects, air polluting and social costs of transport, with more localised impacts, are also very important at national level.

This context set the grounds for the « Med-Atlantic Ecobonus » (MAE) project, a policy study aimed at taking the largest experience and lessons learnt that the EU has accumulated so far, and proposing a possible approach on ways to further support to sustainable freight transport services, with a combined effort from the EU and the MS to stimulate an improved socio-environmental behaviour of freight mobility.

This project has been developed by the transport ministries of Spain (as coordinator), France, Italy and Portugal, and benefits from EU funding under the CEF programme.

¹ Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network

² Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility

³ Regulation 1382/2003 adopted 22 July 2003 and Regulation 1692/2006 adopted 24 October 2006. These were updated by Regulation 923/2009 of 16 September 2009

2 The MAE project's main goals

MAE project is a policy study and is not an implementing Action. In this regard, the MAE project's goals are (i) to set up a debate on the framework and the principles for a common EU approach on eco-incentive measures and (ii) to perform a complete ex-ante analysis for the Motorways of the Sea (MoS), as an example, in line with current EU rules and recommendations. If broad consensus were to be achieved, this approach on eco-incentive measures could become a part of the EU funding priorities for supporting sustainable freight transport services within the next Multiannual Financial Framework 2021-2027 (i.e. CEF2). Indeed, the proposed approach to eco-incentives could render actions related to all modes of transport and in all EU regions eligible to EU funding. However, moving to real implementing actions based on this approach requires broad consultation and consensus at many levels, as well as certain support from the statutory and policy frameworks.

The reason the analysis carried out in this study is specific to MoS in the West-Mediterranean and Atlantic regions is twofold. On the one hand, their potential is still significant and is considered strategic in these regions. On the other hand, shipowners are facing investment decisions with the entry into force of the sulphur cap deadline in 2020⁴ and with the initial strategy set out by the International Maritime Organisation for the reduction of CO2 emissions from shipping. This context is considered as appropriate to assess the possible impacts of the proposed approach to eco-incentive measures that might stimulate the cleanest alternatives possible and be used to stimulate an improved socio-environmental behaviour of the door to door transport chain. Conversely, the risk of modal back shift (from maritime transport to land transport) as a direct consequence of the rising cost of fuels emitting less sulphur is real. Furthermore, when evaluating the environmental merits holistically, MoS remain a sustainable solution to the likely increase of freight transport services and an efficient complement to road transport.

3 The key stages of the MAE project

The activities of the MAE project have been carried out by the partners since the project's kick-off meeting and they should come to an end by the end of the year 2018. As mentioned, the study is intended for debate and a likely proposal. To that extent, the diagnosis, the formulation and the consensus activities have been three interrelated pillars in the methodological approach.

The diagnosis exercise has brought a good knowledge on the relevant EU regulatory framework and the different ways by which the EU and the MS have been tackling sustainability in freight mobility since almost three decades. It should be noted that many of the recommendations taken for the common EU approach come from the Commission's Communication on the results of the Marco Polo program (COM

⁴ Directive (EU) 2016/802 of the European Parliament and of the Council on the reduction of the sulphur content of certain liquid fuels

(2013) 278 final), the European Court of Auditors' Special Report N°3/2013 *'Have the Marco Polo programs been effective in shifting traffic off the road'* and the Commission's reply to this Special Report (COM(2013) 321 final). Also, the analysis on the different national schemes supporting freight transport has been quite useful to identify best practices, namely the Italian ecobonus that was in place during the period from 2007 to 2010.

The process of formulating the scheme is based on an *ex-ante* analysis, with relevant tools having been developed, namely the external cost calculator used to assess the environmental merits, which also allows to find the value of the eco-incentive. The common EU approach has been improved from the findings and results of this impact assessment. As a result, a preliminary report for consensus has been produced.

Finally, the consensus activity has been crucial to prepare the approach for the debate. In this regard, many informal contacts have been carried out during the formulating process of the scheme to keep consistent assumptions from the beginning. Then, a number of workshops and meetings are being scheduled with institutions and with the sector at EU and at national level to present the approach. Many interesting inputs on the different aspects concerning the approach are being brought to the debate on eco-incentive measures. These contributions will fine tune the scheme's formulation and the proposed approach will hence be ready for the debate as of 2019.

4 The main elements of the MAE project

The vision of the proposed common EU approach to eco-incentives schemes is aimed at enabling MS to target a transport market of their interest, to decide on the goals they want to address with the scheme and to establish the socio-environmental merit that will be given an incentive. These features shall be in any case compliant with the backing principles of the common approach as described below, as well as with the rules of the EU funding programme to which the scheme might be submitted.

Moreover, since the eco-incentive scheme must be justified on grounds of a socio-environmental merit (i.e. reduction in external costs), the goal should target greener transport. And this reduction of external costs shall be calculated using common references at EU level, such as the Handbook of External Costs of transport.

The MAE example features as follows. i) The targeted market is the ro-ro/ferry MoS servicing alternative routes to the road transport in the West-Mediterranean and Atlantic regions. ii) The goal is the greener performance of the maritime leg stimulated through demand. iii) The socio-environmental merit is estimated as the external cost savings from a freight unit when using the maritime option instead of the 'road-only' alternative, as a direct result of the green action.

4.1. On the common EU approach

The following list is proposed as a summary of the main common principles – which are applicable to any mode of transport and EU region – that should be part of any eco-incentive scheme to freight transport services seeking EU financial support:

- No market distortion
- Targeting mature markets (i.e. not targeted to start-up services or to compensate market losses)
- No longer pure modal shift goals, as in the Marco Polo programs
- Incentive calculation shall be based exclusively on demonstrated socio-environmental merits reducing negative externalities in transport (i.e. measuring external costs savings is needed based on common references).
- Technologically agnostic on how the socio-environmental merit is achieved
- Making funding conditional upon results
- Member States co-responsibility in the co-financing and implementation of the eco-incentive scheme (the intensities and duration of the eco-incentive might need compatibility assessment with state aid rules)
- Minimizing deadweight
- Minimizing the risk of fraud
- Minimizing the need for additional bureaucracy
- Demonstrating performance achieved (i.e. monitoring)

In addition to these common principles, granting financial support to an eco-incentive scheme shall be conditional to an ex-ante analysis showing whether and to what extent there is an EU added value.

Moreover, the eco-incentive scheme shall adequately address the consistency with the operational structures of the CEF or any other financing program to which the scheme is submitted.

In this regard, the Member States' co-responsibility principle in the common approach means that Member States should be the promoters of the Actions and those who mobilise and implement the necessary budget, provided these Actions and their budgets are eligible to the EU co-financing.

On the other hand, the eco-incentive schemes need to be contemplated within the relevant EU financial Regulation and also in the Work Programmes in order to be considered as eligible Actions.

Furthermore, the contribution from the EU budget could be modulated by the intensity on the CO₂ reduction attained by the eco-incentive scheme, whereas the MS contribution would be allocated to the

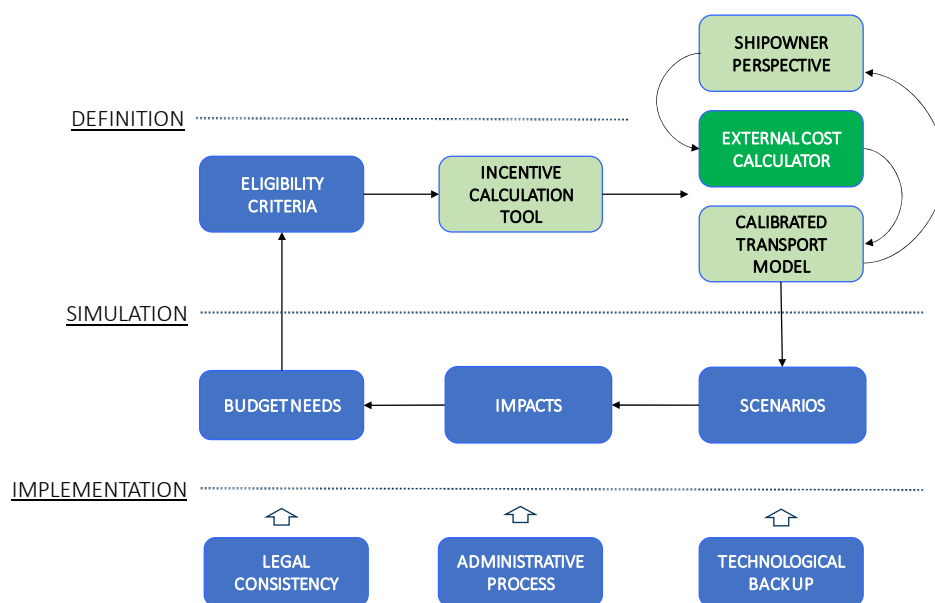
more localised impacts coming from air pollutants and social costs. This way the EU support could be justified on grounds of the global impacts, which is consistent with the main goal on decarbonisation.

This approach might also facilitate the assessment for the EU funding since the value per unit of CO₂ reduction would be the same for all Member States. As for the air pollutants and social externalities savings, the final values paid with national budgets could be agreed upon by the MS involved in the Action, based on common methodologies such as the Commission's Handbook.

Finally, other externalities such as those related with the infrastructure costs are not considered within the scope of this common EU approach to eco-incentive measures. This is a matter where other approaches could apply, such as the charging principle which is currently on the debate at the European Parliament with the Commission's proposal for a directive of the European Parliament and of the Council amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures (COM (2017) 275). Ultimately, there could be a sort of combined use of charging and incentives measures for the different components of the externalities incurred by transport.

4.2. On the ex-ante analysis. MAE case study

The "ex-ante" analysis is conceived as a simulation exercise to assess the impacts of the eco-incentive measure in the targeted market. The simulation must be carried out with the use of relevant tools, developed *ad hoc* for the targeted market, and limited through eligibility criteria. The main results sought are the calculation of the impact of the incentives, as well as the budgetary needs. This methodological approach would be transferable to other targeted markets, involving other modes of transport and/or EU regions, mainly by developing and adapting the specific tools (highlighted in green in the figure below).



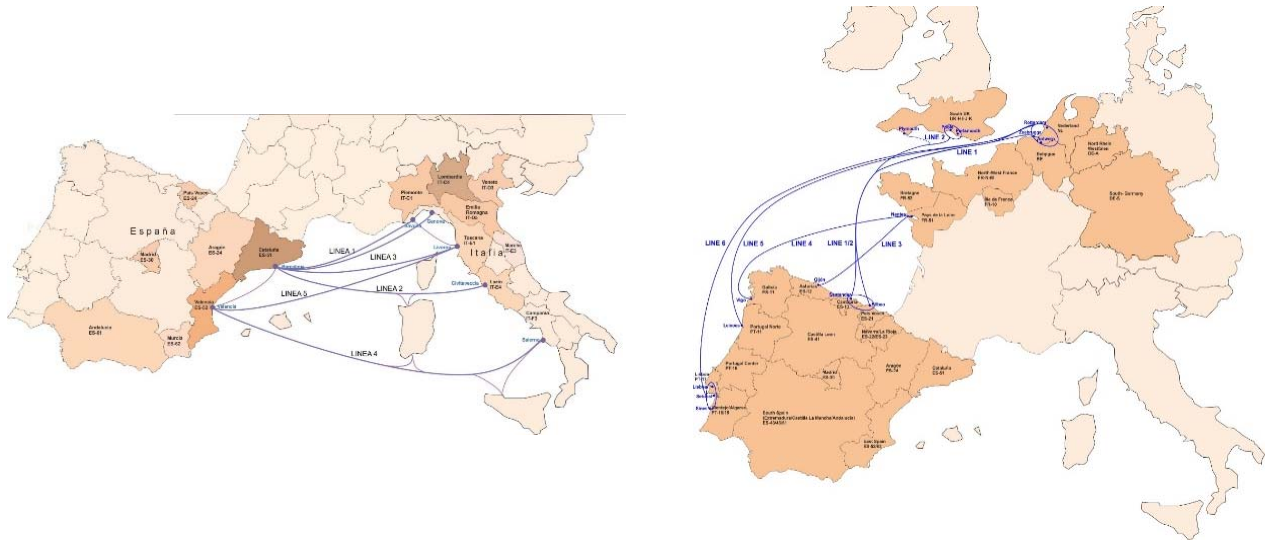
METHODOLOGICAL APPROACH TO THE EX-ANTE ANALYSIS (with the specific tools for the MAE example)

In this context, the following eligibility criteria are proposed for the MAE example (all criteria shall be considered together) ⁵:

- Only maritime services consisting in international lines with no more than 2 stops or one enroute call;
- Direct beneficiaries shall be the users of the maritime services upon proof of boarding and proof of purchase (i.e. provided by the transport operator and the shipowner). By users it is meant the purchasers of the maritime ticket. Users will be also responsible for the proof of the boarding event;
- Lines shall go from / to a port of the implementing Member States to / from another EU port or between ports of the implementing Member States;
- Domestic services are not eligible in the example;
- Only maritime services having a door-to-door road alternative in operation are eligible (i.e. no pure channel crossing lines);
- Only ro-ro, ro-pax or con-ro vessels are eligible (for ro-pax and con-ro, only freight on ro-ro units is eligible);
- Regular services with a minimum frequency of 1 departure per week by a dedicated vessel (i.e. no seasonal services);
- Services consisting in new or upgraded lines demonstrating a reduction in external costs per transported unit compared to the door-to-door road alternative. Such environmental merit shall be demonstrated and quantified -using the scheme's external cost calculator tool- and incur direct costs to the shipowner by means of a green action improving the environmental performance of the maritime service;
- Only accompanied or non-accompanied trips of rolling cargo, intended as freight that can be loaded and unloaded autonomously on the vessel (i.e. no cranes used), can be considered eligible. New cars would be considered eligible as long as they are loaded on trucks;
- Direct beneficiaries shall commit to a minimum number of trips (100 trips a year);
- Maritime services shall be open to all users under the same conditions and in a non-discriminatory way;
- Only services using vessels complying with 2020 thresholds as set in the Sulphur Directive (or its equivalent with abatement technologies) are considered eligible;

As a result, the lines considered for the simulation in the MoS case used as example are shown in the figure below (5 in the West-Mediterranean and 6 in the Atlantic):

⁵ It has to be noticed that the ex-ante analysis does not relate to any committed implementing action. Therefore, the eligibility criteria and the budgetary needs are likely to be adapted in the future and should be considered as a mere example



MOS CONSIDERED FOR SIMULATION. WEST MEDITERRANEAN AND ATLANTIC REGIONS.

Following the eligibility criteria, three main tools have been developed for the assessment

- 1) An external cost calculator developed specifically for the targeted market. This calculator is used to estimate the eco-incentive per unit, credited to each line. This value is measured per each line as the external costs savings from a road unit using the maritime service to complete the door to door transport compared to the road-only alternative. This external costs saving represents the environmental merit that is incentivized.

The main features of the external cost calculator tool are:

1. it takes into account the external costs of greenhouse gases, air pollution (NO_x, SO_x and PM particles) for both the maritime and the road transport, and the external social costs (congestion, noise and accidents) only for the road;
2. it uses specific vessel and route data to calculate the externalities of the maritime leg whereas it uses average data on the road (average of the truck fleet in road-only routes);
3. it measures the impacts at ports due to road access and vessels during port call;
4. it seeks to monetise the externalities by using the latest EU references, namely the “Handbook on estimating external cost in the transport sector” (IMPACT 2008), and the “Update on the Handbook on External Costs of Transport” (RICARDO-AEA 2014), both supported by the Commission;
5. the results are presented in € per truck for each alternative (road-only versus maritime-road);
5. the cost savings (€ per truck) give the maximum value of the incentive.

- 2) A transport modelling tool specifically calibrated for the market under study. This tool highlights the effects on modal choice and returns the impacts of the eco-incentive on the modal shift, as well as on the external costs, when it is directly attributed to the road operator. In addition, it estimates the indirect benefits for the shipowner (revenues generated by the additional units that are secured to the maritime service) and overall the indicative budgetary requirements of the eco-incentive scheme.
- 3) A shipowners' perspective tool which assesses the extent to which these effects provide the shipowner with an indirect benefit that could trigger the decision relating to the green action in the maritime leg. Indeed, the increase/secured demand should allow for the shipowners to improve the financial returns from the green actions they have to take to achieve the socio-environmental merit.

4.3. On the simulation scenarios and results

The following two scenarios have been selected and compared in the MAE case study (both as of 2020):

Base Scenario (conservative): All lines switch from HFO to MGO/ULSHFO fuel to comply with the IMO 0,5% sulphur cap. The environmental merit is very limited, and no eco-incentive is given to the users. On the other hand, the higher cost of the fuel leads to an average 12% increase in sea rates that is applied to all users from day one (estimated for all lines as a 50% fuel price increase x 24% weight of fuel over the total costs of the line).

Green Scenario⁶: All lines switch to LNG vessels from day one. Sea rates are maintained. The environmental merit is the highest possible, including at ports (auxiliary engines running also on LNG), and all users receive the maximum eco-incentive.

Further to these two scenarios, the following considerations apply to the simulation exercise:

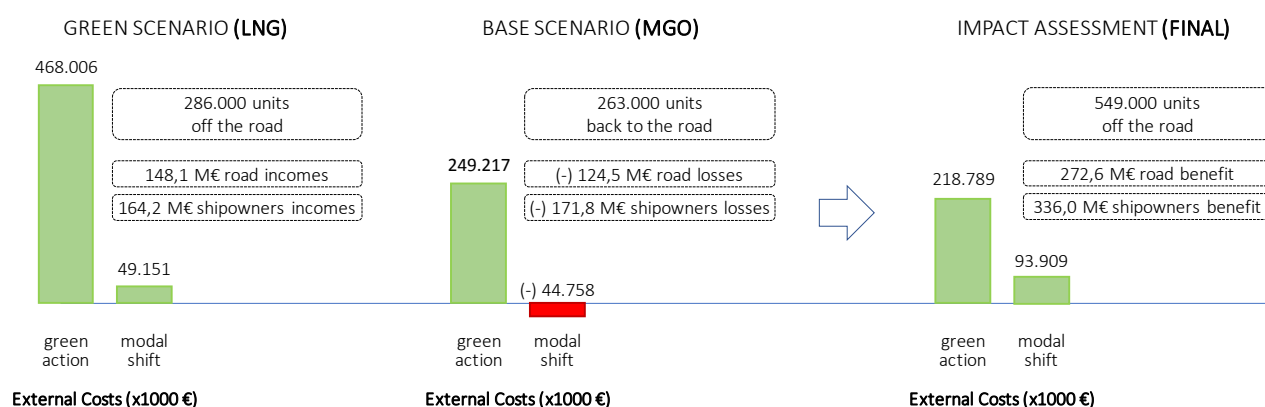
- The duration of the eco-incentive scheme is 5 years, from 2020 to 2024;
- Global mobility grows according to the available official GDP projections per each zone, and a 2% annual as a default;
- To measure the environmental merit and calculate the eco-incentive, it is assumed an average occupancy rate of 70% for the vessels;
- Market is mature, and no new lines are considered as a result of the eco-incentive measure, not in particular in the green scenario.

⁶ It should be noted that the green scenario does not reflect the MAE project's specific support or preference to the environmental merits based on the LNG use. Indeed, other alternatives such as the increasing of the vessel capacity would also credit an environmental merit to the lines. The LNG case has been selected just for practical reasons, to outline possibly one of the most demanding scenarios in terms of budget needs.

- Road transport is mostly EURO VI in 2020, starting with an average external cost ratio of 0,11 €/v.km in 2020 and reaching the level of 0,10 €/v.km as of 2024, based on the assumptions of the external cost calculator.

Both scenarios induce external cost savings in the transport system. The base scenario due to a 'regulation merit'. The green scenario due to the greener action that goes beyond the limits of the regulation and is stimulated by the eco-incentive scheme. Therefore, the merit that should be credited to the eco-incentive measure in the impact assessment is the difference (comparison) between the two scenarios.

As a main outcome of simulation, the eco-incentive measure proves its ability to trigger greener actions in the maritime leg within the targeted market.



	PERIOD 20-24 (€ x 1000)			
	ECO-INCENTIVE	IND. INCOMES	GREEN ACTIONS	EXT. SAVINGS
WEST MED	98.324	58.892	162.586	157.714
ATLANTIC	49.813	105.275	180.454	154.983
TOTAL	148.137	164.167	343.040	312.697

MAIN EFFECTS OF THE ECO-INCENTIVE MEASURE (€X 1000). WEST MED AND ATLANTIC.

In particular, and considering the green scenario for the MAE example, the eco-incentive scheme would clearly improve the financial conditions to trigger 343,0 M€ green investments in market conditions.

As a result, an overall 312,7 M€ external cost savings would be attained, of which 218,8 M€ would come directly from the green actions - improving the environmental performance of the maritime leg - whereas 93,9 M€ would be additional savings by securing 549.000 trucks off the roads from the West Med and Atlantic corridors.

It must be noticed that 27,9 M€ out of the total 312,7 M€ external cost savings are due to a net reduction of 820.000 tons of CO₂ emissions - based on the assumptions of the external cost calculator tool - which means reducing by 27% the emissions of CO₂ in the targeted market. This figure represents roughly 20% of the total budget for the eco-incentive scheme and could represent the share of EU financial support, if it were modulated by the contribution of the Action to decarbonisation.

All in all, the cost of the measure for the public funding in the most ambitious case scenario would be 148,1 M€ - i.e. the total amount of eco-incentives received by the actual and potential users of the maritime services during the five-year period. This would be the budget aimed at EU co-financing following the common EU approach.

The leverage effect of the eco-incentive measure is positive by all concepts and higher in the Atlantic, due to a higher elasticity to the incentive from the road freight operators in that region explained through the calibration exercise of the modelling tool -which is interpreted with the meaning that the MoS in the Atlantic are less developed and have therefore a higher growth potential-.

The eco-incentive scheme for the MAE study case would entail a budget need from the EU ranging from 30 M€ to 44 M€ for the five-year period depending on the co-financing rate -from 20% to 30%, according to the typical values considered by the CEF envelope for the sustainable freight transport services and MoS priorities-. The remaining budget would have to be complemented by the Member States, according to the co-responsibility principle as proposed for the common EU approach. Therefore, it would be up to each Member State to decide if and how to allocate this budget in the event of an implementing action following the proposed approach.

Therefore, and taking the case used as example, the eco-incentive scheme might stimulate 343,0 M€ investments on greener actions with a total EU funding of 44 M€, representing a 13% co-financing rate. The same investments could end up taking 102,8 M€ from the EU funding if a typical 30% co-financing rate in the MoS priority is considered.

Ultimately, the fact that the eco-incentive measure is contributing, by definition, to minimise the risk of demand, it could be reasonable to think that this scheme might grant the shipowners better access to EU financial instruments for their green actions. This would improve the financial results for the shipowners creating a sort virtuous circle by contributing on the other hand to the use of financial instruments aimed at increasing the leverage effect of the EU budget.

5 Launching a dialogue to obtain consensus on the MAE approach and scheme

The study seems to sufficiently demonstrate the viability of the approach, as well as the positive impacts of the scheme in the example of the study. However, these results are based on different assumptions that require broad consensus on several levels.

At the institutional level, the validation of the approach by the Commission, the Member States and the Parliament seems essential to provide the future legal basis for such actions, in particular with regard to

their eligibility through the EU annual or multiannual funding programmes. The ongoing negotiations on the next CEF Regulation (2021-2027), as well as the meetings of the CEF and TEN-T Committees could constitute the appropriate fora for further discussions of the approach and the implementation of the scheme.

In addition to the consensus needed on the approach, the ex-ante analysis uses different assumptions that need to be validated, including those related to the external cost calculator tool, which are essential for assessing environmental benefits and for calculating eco-incentives. These assumptions are related to the emissions factors and the monetization values of the socio-environmental performance of road and maritime transport. These assumptions should be confronted in particular with the ongoing revision of the Commissions' 'Handbook on External Costs of Transport', once it is published.

The calibrated transport modelling tool, which is essential to the impact assessment of the eco-incentive measure, incorporates some assumptions for the calibration exercise, due to the lack of available data. And although the calibration is considered valid from the statistical point of view, it could be further improved by providing additional data.

As for the shipowners' perspective tool, different assumptions have been taken regarding the additional investments, the fuel prices, the main financial parameters, etc. for which feedback from the industry would be most worthy.

The scenarios considered for the assessment incorporate assumptions that may be revised if needed (e.g. the 12% increase in the sea rate as a result of the higher cost of MGO by 2020 in the base scenario, as described).

The MAE study is aimed at proposing a new approach to eco-incentive measures towards sustainable freight transport services based on different assumptions and criteria that need further consensus before envisaging real implementing actions. That is why the present document, which is a summary of the main principles and assumptions taken for the common approach and for the case study used as an example in the "Med-Atlantic Ecobonus" project, is a working document meant to encourage your active participation in our discussion and to provide feedback on those different aspects. We do however strongly recommend reading the full preliminary report, as well as analysing the three excel files which correspond to each of the tools that have been developed: the external cost calculator, the calibrated transport model and the shipowners' perspective tool. A short user manual for each tool has also been produced in pdf format.

All these documents and information are available by clicking on the following link:
<https://www.dropbox.com/sh/7fmcr2nfvyytt6y/AAB-v9iJ0uK8TGaw-lSHqCP3a?dl=0>

If you wish to submit a written contribution, it can be sent to the following e-mail address:
mae.project@puertos.es