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The EU Commission approves
€111M in State Aid to develop a re-
newable hydrogen production project
(*Green Hydrogen Project*)

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The European Commission does not raise objections to state aid for the deployment of a renewable hydrogen production project (Green Hydrogen Project)

Introduction

The aid to Motor Oil Hellas Corinth Refineries S.A. ('MOH') concerns the 'Green Hydrogen project', an investment in a 50 MW electrolyser to produce *renewable* hydrogen through water electrolysis. The aid amount equals 111.77 million euros and will be financed through RRF.

I] Description of the measure

1. The project

The project aims to partially revert the method used by MOH for the production of hydrogen. Instead of producing "grey" hydrogen through the traditional SMR process, MOH will produce (a) "blue" hydrogen in the frame of another project (i.e. SMR-produced with carbon capture and storage technology - CCS) and (b) "renewable" hydrogen produced by a 50 MW electrolyser in the frame of the commented project.

The capacity of the electrolyser will reach 30 MW at

a first stage and will be funded from Horizon Europe. The renewable hydrogen produced when the electrolyser reaches its full capacity will be 5,000 to 6,000 tonnes per annum out of the 100,000 to 200,000 tonnes per annum produced by MOH.

The renewable hydrogen will be used for five different purposes, i.e.:

- in the mobility sector (Hydrogen Refuelling Stations);
- in the production of 'green' lubricants;
- in the production of alternative fuels;
- for injection into MOH's gas turbine; and
- for injection into the (natural gas/hydrogen) grid.

2. Existence of state aid

The measure constitutes state aid, as:

- it will be granted by the Ministry of Energy and Environment through a Ministerial Decision (imputable to the State);
- it is financed through RRF funds granted and administered by national authorities (use of state resources);
- it will take the form of a non-repayable direct grant not available on the market (advantage);
- the aid is only awarded to MOH and favours the production of certain goods (selective advantage) and
- it strengthens MOH's position in a market open for competition (distortion of competition) with significant intra-EU trade (affects trade between MS).

The procedural obligation of art. 108 (3) TFEU was met, as the aid was not granted before the approval decision. The compatibility of the measure with the internal market was assessed on the basis of art. 107 (3) (c) TFEU (aid to facilitate the development of certain economic activities) as detailed by the Guidelines on State aid for climate, environmental protection and energy (CEEAG).

3. The factual and the counterfactual scenario (CEEAG points 28, 38, 47, 48, 51, 52, 53, 56, 57, 90)

The Commission found the net present value (NPV) of the factual scenario, i.e. *the difference between the positive and negative cash flows over the lifetime of the investment*, appropriately discounted ¹, to reach -111.77 million euros. Therefore, (a) the costs of the project (negative cash flows) exceed the revenues of the project (positive cash flows) rendering the investment not profitable and (b) the amount of 111.77 million euros constitutes the upper limit for the aid amount.

On the contrary, in the counterfactual scenario, i.e. without the aid, the investment will not take place at all therefore the NPV will equal zero. The lack of incentive effect absent the aid is based on three indicators, i.e. the investment:

- is not profitable and it will not significantly decrease EU ETS required for the beneficiary's refinery activity (an *economic* indicator);
- concerns markets with development uncertainties (a *market characteristics* indicator); and
- is not obligatory for the beneficiary to meet EU environmental standards (a *legal* indicator). ²

This conclusion is not overturned by (a) the beneficiary's intention to install a CCS mechanism, as it concerns the SMR process and (b) other competitors' projects since they are narrower in scope (therefore offering minor competitive advantage) and some of them are funded by the EU. ³

Given the counterfactual scenario, the NPV of the factual scenario also constitutes (a) the NPV of the project and (b) the funding gap which constitutes the upper limit for the aid amount.

The Commission examined the credibility of funding gap calculations noting that:

- the *costs* are based on external data, studies and, to a lesser extent, internal estimations (*data reliability*); it is worth noting that the data reliability of the revenues estimation was not examined;
- the projection of the *revenues* includes all revenues linked to the envisaged uses of renewable hydrogen, accrues over the operation period of the project and takes into consideration end-user's willingness-to-pay (*data completeness*);
- the beneficiary's WACC [5%-15%] is used (*data specificity*). ⁴

Both the factual and the counterfactual scenario take into consideration EU ETS since in the factual scenario any related revenues are calculated and in the counterfactual scenario ETS alone would not deliver the project.

4. The assumptions (CEEAG points 35, 36, 115, 120)

The assumptions concern (a) the feasibility of the project, (b) its technical characteristics (emissions reduction) and (c) economic estimations.

As to the feasibility, the key documentation, i.e. a detailed schedule for project implementation and management proves the beneficiary's technical and financial capacity and the project's level of maturity. Moreover, the Greek authorities will use control and monitoring measures (a) provided under the RRF framework (documentary evidence and on-site visits) (b) provided under the national aid granting act (including sanctions for non-compliance) and (c) verification that renewable hydrogen is produced. Finally, MOH has performed a feasibility study with DESFA S.A. as to the injection into the (now natural gas) grid and the electricity needed for the operation of the electrolyser will be sourced through a PPA with a PV which has been granted connection terms by virtue of a Ministerial Decree.

As to technical assumptions, the fossil fuel comparator set out in the Renewable Energy Directive and its Delegated Acts is used, leading to an emission factor of 94 gCO₂ per MJ of hydrogen produced through the SMR process contrary to a zero emission factor of hydrogen produced through water

1. Commission Notice on the notion of State aid as referred to in Article 107(1) of the Treaty on the Functioning of the European Union, C/2016/2946, p. 1, footnote 159. In footnote 49 of the commented decision, the Commission notices that "[t]he NPV of the Green Hydrogen project is the sum of the discounted value of costs [...], the discounted value of revenues [...], the discounted terminal value of the project [...] as well as the discounted value of other grants, taxes and changes in net working capital".

2. The terms *economic*, *market characteristics* and *legal* indicator are not used by the Commission.

3. Furthermore, the beneficiary would not have an incentive to invest in additional SMR produced hydrogen as such hydrogen would not be able to replace renewable hydrogen in the downstream markets.

4. The terms *data reliability*, *completeness* and *specificity* are not used by the Commission.

electrolysis. As to indirect emissions, the *conservative* scenario is taken into account, (a) the electricity used for downstream energy consumption is considered to stem from the grid instead of RES and (b) the electricity mix of the grid is considered to remain unchanged. The quantification of the emissions ⁵ is based on the “Green Tank” (an independent non-profit think tank) estimations.

As to economic assumptions, all financial details (costs, revenues) have to be discounted so as to represent equal *real* value. Other than that, the following non-discounted figures were found:

- investment costs [200-300 million] euros including equipment costs and retrofitting costs;
- operating costs reaching [400-500 million] euros including raw materials, personnel, administrative costs and overheads;
- in discounted terms, these costs equal to [200-300] million euros.
- The revenues reach [500-600 million] euros throughout the project’s operation, i.e. [100-200 million] euros in discounted terms and encompasses all revenues related to the sale of renewable hydrogen for downstream use. The calculation (a) duly applied the arm’s length principle and (b) took into account customers’ willingness to pay which is bounded by two factors, namely the higher price of renewable hydrogen and the avoidance of EU ETS through the use of renewable hydrogen.
- The terminal value of the project, i.e. the value of the project for the beneficiary at the end of project’s life is found with the application of the Gordon growth formula and reaches [80-90 million] euros ([10-20 million] euros in discounted terms).
- The value of other grants, taxes and changes in net working capital is not quantified.

The subsidy was calculated to equal 94.26 euros per CO2 tonne avoided.

5. Cumulation and the claw-back mechanism (CEEAG points 30, 56, 58, 98, 123)

The Green Hydrogen project builds on EPHYRA and TRIERES, projects funded by Horizon Europe. In order to avoid any risk of overcompensation, the

costs covered by Horizon Europe have been entirely removed from the NPV and funding gap calculation of the Green Hydrogen project. ⁶

Furthermore, the existence of a claw-back mechanism guarantees that the aid is limited to the necessary minimum. In particular, if the revenues of the project exceed the costs the beneficiary will reimburse 60% of the surplus to the state. The claw-back mechanism has three important characteristics; (a) the revenues also include actual state aid disbursements; (b) it is not the whole surplus that is reimbursed to the state in order for the beneficiary to have incentive to render its project more efficient and (c) emphasis is given on cash flows calculation credibility (ex post figures, independent auditor, separate analytical accounting, market terms).

It is noted that the mechanism does not operate in favour of the beneficiary, as the aid will not be modified when the costs are underrated or the revenues overrated.

II] The assessment of state aid

1. Compatibility with other EU policies (CEEAG points 23, 24, 25, 32, 71, 89, 93, 117)

The project aims to reduce GHG emissions by promoting the production of *renewable* hydrogen in an existing industrial facility. Therefore, the aid is aligned with the objectives of EU climate, environment and energy policies (including the ones concerning the transportation sector) as well as with national legislation (including NECP ⁷ and RRP ⁸).

As to the reduction of GHG emissions, the emissions avoided are far greater than the emissions indirectly caused, as:

5. Which reach 32,061 tonnes.

6. The same applies as to aid under the de minimis Regulation.

7. National Energy and Climate Plan.

8. Recovery and Resilience Plan.

- GHG emissions directly avoided by the use of the new method reach 1,000,000 to 2,000,000 tonnes;
- GHG emissions directly saved through the partial substitution of the natural gas reach 88,582 tonnes;
- no indirect emissions will be caused, as electricity will be supplied by a PV farm;
- indirect emissions for the consumption of electricity for downstream uses will reach 27,853 tonnes and for electricity for use of the gas turbine will reach 4,208 tonnes.

On the other hand, the emission savings in the downstream markets were considered to be out of the project's boundaries.

2. State aid falling under point 96(g) (CEAAG points 58-61, 95, 96, 99, 103, 104, 107)

CEEAG provides for a series of exceptions of certain criteria *when*

a project has been selected following an open call to form part of a large integrated cross-border project, jointly designed by several Member States and which aims to have an important contribution to environmental protection in the Union's common interest, and either it applies an innovative technology, which follows on from a research and development and innovation (R&D&I) activity conducted by the beneficiary. One may notice the following divergences in favour of such projects:

- MS do not have to state reasons why the aid does not include all projects and technologies in competition;
- public consultation is not required ⁹;
- the aid does not need to be granted through a competitive process;

The project falls under the exception as it (a) was selected following an open call to participate in Hy2Use, an important project of common European interest (IPCEI) ¹⁰ and (b) applies innovative technology following prior research and development by the beneficiary. The fact that the prior research and development were also funded (by Horizon Europe) did not raise any concerns as to the application of the

exceptions.

3. Investment grant (CEAAG points 121, 122)

The aid will take the form of a direct grant. Consequently, according to the Commission, the special framework that applies to operation-linked aid and to short-term aid shall not apply. The Commission's position shall be approved, as investment aid indeed *does not depend on nor varies according to the operation and output* of the project while it rather aims to cover non short-term costs.

4. Market position after the aid (CEEAG point 132)

While the beneficiary holds an *established* position in the Greek refinery sector, the Commission found that the measure causes no distortion of competition. Four focal points were examined, namely (i) competition in the hydrogen production market, (ii) competition in downstream markets, (iii) the risk of overcapacity and (iv) the risk of a subsidy race between MS.

As to the competition in the hydrogen production market, no competition concerns were identified since (a) it constitutes a *new* activity for the beneficiary, (b) the production of renewable hydrogen will be *limited* and *significantly lower* than the SMR-produced hydrogen, (c) overall production of hydrogen will remain limited, and (d) other market players have *ample* opportunities to enhance their position.

As to the downstream markets, the following criteria were taken into consideration:

9. On the contrary, the transparency requirements still apply.

10. It is maintained that the Commission did not take into account that the Green Hydrogen project is not itself cross-border. In my opinion, it was *right* to do so as the projects forming part of a cross-border IPCEI shall be treated like the cross-border projects, as their objectives and operation are equal.

- *more than one uses*: the renewable hydrogen will have five different uses, thus the impact in each of the five sectors is limited;
- *overall capacity*: the renewable hydrogen will replace (instead of being added to) the non-renewable hydrogen and natural gas;
- *limited output*: the output of produced alternative fuels will be limited compared to (i) MOH's current production of conventional fuels, (ii) the EU sustainability targets and (iii) the projected demand at EU level; in parallel, the number of HRS to be supplied will be limited compared to the HRS required to be deployed in Greece;
- *internal use*: the injection in the turbine is intended purely for internal use;
- *competitors' position*: a series of similar projects publicly funded are in place; MOH's contribution in the injection of hydrogen in the natural gas grid will reach 16% leaving ample possibilities for competitors.

No risk of overcapacity was identified, as production or supply of new products will be limited and it will leave ample space for competitors.

As to the risk of a subsidy race between MS in particular as to the choice of location, the project is intended for internal use (or user's reachable from the existing facility), therefore the choice of location is driven by the existing industrial facility and its advantages (the possibility to connect and integrate the new activity therein and to reach off-takers).

5. Innovation and do-no-significant harm (CEEAG points 34(b), 72)

The projects presents the following innovative elements:

- the highest power capacity across industrial sites in Europe;
- the electrolysis technology presents enhanced performance compared to state-of-the-art technologies;
- the largest alkaline stacks industrially used; and
- an innovative waste heat harvesting technology using an ORC system will be deployed in the frame of the earlier EPHYRA project funded by Horizon Europe.

As to the 'do-no-significant' harm principle, the screening criteria established in the Commission

Delegated Regulation 2021/2139 were met, as the project:

- contributes to climate change mitigation producing renewable hydrogen with emission savings exceeding 70% compared to a fossil fuel comparator;
- is not expected to lead to any adverse impact, since:
 - the electrolyser will be located in an existing industrial site with a desalination unit;
 - a detailed environmental impact assessment and a river basin management plan will precede the electrolyser's installation;
 - applicable regulations and Best Available Techniques will be respected; and
 - no chemical substances will be produced.

Conclusion

In summary, the legal implications of the decision include the following:

- there are three type of indicators (economic, market characteristics, legal) for establishing that no investment will take place but for the aid;
- Commission examines economic data reliability, completeness and specificity;
- as to the cumulation with other projects funded by the EU (or state resources), while the costs may not be double covered, the innovative aspects of the previous projects are also taken into account for the later projects. In my opinion, while in this case the project presents innovative elements on its own, this differentiation shall be *duly* justified in general;
- emission savings in downstream sectors are not considered relevant;
- in order to assess the beneficiary's market position after the aid, five criteria are used; the number of downstream uses, overall capacity, limited output, internal use and competitors' position.

Lastly, as a general comment it shall be maintained that the current structure of CEEAG promotes projects with limited renewable energy output (to avoid excessive competitive advantages) instead of projects with enhanced energy output.

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CEEAG Section/ Point	Condition	Grounds of approval
Positive Condition		
3.1.1	Identification of the economic activity which is being facilitated by the measure, its positive effects for society at large and, where applicable, its relevance for specific policies of the Union	
23	Identification of the facilitated economic activities and contribution to the development of those activities	The measure aims at promoting the production of renewable hydrogen and the integration of the production process in an existing industrial facility. It also contributes to the development of the downstream markets (e.g. mobility sector).
24	The development of economic activities can be facilitated by increasing the sustainability of the economic activity concerned.	The measure increases the sustainability of those activities, as the hydrogen will be produced in an environmentally friendly way reducing greenhouse gas emissions.
25	Contribution to the objectives of Union climate, environmental and energy policy / The expected benefits of the aid in terms of its material contribution to environmental protection, climate change mitigation, or the efficient functioning of the internal energy market.	The aid is aligned with the objectives of the European Green Deal, the European Climate, the EU Hydrogen Strategy and the REPowerEU Plan
3.1.2	Incentive effect	
28	Identification of factual and counterfactual scenario	Factual Scenario: -111.77 million Counterfactual Scenario: the investment will not take place [a) non-profitability, b) market development uncertainties and c) no breach of EU environmental standard]
29	Initiation of the works before the aid application	The works started after the application (yet before the notification of the Commission decision at the beneficiary's own risk)
30	Content of aid application (name, description of the project including its location, amount of aid)	The application (in the form of expressing their interest for participating in Hy2Use IPCEI) had the content required
32	Aid to cover the cost of adapting to EU standards lacks (in principle) incentive effect	The technology to be used, water electrolysis, is neither regulated by any Union standards nor any GHG emissions limits apply.
3.1.3	No breach of any relevant provision of EU law	
33	Non-severable violation of EU law	No violation of EU law

Negative Condition		
4.1.3.1	Need for State intervention	
89	Identification of the measures already in place to reduce GHG emissions	National Energy and Climate Plan (NECP) Greek Recovery and Resilience Plan (RRP)
90 (and 38)	The aid is necessary for the activities given the counterfactual scenario and the relevant costs and revenues	Funding gap of 111.77 million (see above under para. 28) including costs and revenues related to EU ETS A claw-back mechanism is in place.
4.1.3.2	Appropriateness of the aid	
93	Presumption of appropriateness if the aid aims to reduce GHG emissions	Presumed
4.1.3.3	Eligibility	
95	In principle, Member States should give reasons for measures which do not include all technologies and projects that are in competition.	a) The project was selected following such an open call to form part of IPCEI Hy2Use. b) The project applies an innovative technology, which follows from prior research and development activities of the beneficiary itself, which will be funded by Horizon Europe.
96(g)	An exception to point 95 (above) is provided where (a) a project has been selected following an open call to form part of a large integrated cross-border project, jointly designed by several Member States and which aims to have an important contribution to environmental protection in the Union’s common interest, and (b) either it applies an innovative technology, which follows on from a research and development and innovation (R&D&I) activity conducted by the beneficiary or by another entity as long as the former acquires the rights to use the results of the previous R&D&I, or it is amongst the early adopters of an innovative technology in its sector.	
4.1.3.4	Public consultation	
99	Footnote 61 offers an exception in cases falling under point 96(g).	The projects falls under point 96(g) therefore public consultation is not required.
	Proportionality	

47	The aid amount is proportionate if limited to the minimum needed for carrying out the activity	The aid amount discounted to its present value based on beneficiary's WACC does not exceed the funding gap.
48	The aid is in principle limited to the minimum needed if it corresponds to the funding gap	
103 and 104	Aid for the reduction of GHG emission shall in principle be granted through a competitive process	The aid falls under the exception set out in point 107 therefore another assessment method will apply.
107	An exception to points 103 and 104 (above) for cases falling under point 96(g)	
51	The measure will be examined on the basis of a comparison between the factual and the counterfactual scenario as to profitability in order to calculate the funding gap. The funding gap shall include (a) all main costs and revenues, (b) the estimated WACC of the beneficiaries for future cash flows to be discounted and (c) the NPV of both scenarios over the project's lifetime.	Point 52 applies therefore the funding gap can be approximated by the negative NPV of the factual scenario. As to the credibility of funding gap assumptions: (a) the costs are based on external data, studies and, to a lesser extent, internal estimations; (b) the projection of the revenues includes all revenues linked to the envisaged use of renewable hydrogen, accrue over the operation period of the project and takes into consideration end-user's willingness-to-pay; (c) the beneficiary's WACC [5%-15%] is used.
52	When in the counterfactual scenario the project does not take place, the funding gap is assumed to be the negative NPV of the factual scenario.	
53	For cases of individual aid the calculations and projections in point 51 need to be presented at the level of the detailed project business plan	
3.2.1.3.1.	Cumulation	
56	If the Member State allows aid under one measure to be cumulated with aid under other measures, the total amount of aid for a project or an activity shall not lead to overcompensation or exceed the maximum aid amount allowed under these guidelines.	The costs covered by Horizon Europe have been entirely removed from the funding gap calculation of the Green Hydrogen project. A claw-back mechanism is in place to avoid overcompensation.
57	If State aid is combined with Union funding, the total amount of public funding granted in relation to the same eligible costs must not lead to overcompensation.	
3.2.1.4	Transparency	

58 to 61	The Member State must ensure the publication, in the Commission's transparency award module or on a comprehensive State aid website, at national or regional level.	The Greek authorities have informed that they will publish the ad hoc aid under this measure on the website of the administering authority (www.ypen.gr) and on the Commission's transparency register (https://webgate.ec.europa.eu/competition/transparency/public?lang=en).
4.1.4	Avoidance of undue negative effects of the aid on competition and trade	
70	The Commission will approve measures for a maximum period of 10 years.	Greece estimates that the aid will be granted by 2025, and in any event within 10 years after the notification.
115	The subsidy per tonne of CO ₂ equivalent emissions avoided must be estimated for each project. Short- and long-term interactions with any other relevant policies or measures, including the Union's ETS, should be considered.	The Greek authorities provided an estimate of a subsidy corresponding to EUR 94.26 per tonne of CO ₂ e. ETS are taken into account in (a) determining the counterfactual scenario (ETS alone would not have delivered the project) and (b) calculating revenues as to the funding gap.
117	The aid for the decarbonisation of industrial activities must reduce the emissions directly resulting from that industrial activity.	The project is expected to lead to the avoidance of [1 000 000 – 2 000 000] million tonnes of CO ₂ e throughout its duration avoiding direct GHG emissions linked to hydrogen production. In parallel, using a share of the renewable hydrogen produced to partially substitute natural gas in the gas turbine used by MOH to produce energy will lead to a further reduction in direct GHG emissions of 88 582 tonnes.
116	The aid must not merely displace the emissions from one sector to another and must deliver overall greenhouse gas emissions reductions	Emissions linked to electricity consumption (for the production of renewable hydrogen, compression, purification and distribution) amount to 32 061 tonnes of CO ₂ e based on the conservative assumption that the electricity mix (and the Greek grid emission factor), would remain unchanged at the 2024 level of 267.6 gCO ₂ e/kWh. GHG emissions linked to the electricity used to produce renewable hydrogen are close to zero (in line with the Renewable Energy Directive). Therefore, the GHG emissions produced remain significantly lower than the total GHG emissions savings.

127	The aid measure may not stimulate or prolong the consumption of fossil-based fuels and energy Member States must explain how a lock-in to industrial production technologies using natural gas will be avoided	The electrolyser will exclusively operated using renewable energy supplied through a PPA in line with sectoral legislation and with the principles of additionality and of temporal and geographical correlation (Renewable Energy Directive). The aid will enable the beneficiary to engage in the production of renewable hydrogen, an environmentally friendly activity. At a secondary level, the aid enables the decarbonisation of downstream activities by replacing fossil fuels partially or entirely.
128-129	The aid does not support new investments in energy or production based on fossil fuels.	N/A
120	Reasonable measures will be taken to ensure that the project will actually be developed.	The authorities have assessed the maturity and feasibility of the measure based on information submitted by the beneficiary including a detailed schedule for project implementation and management. The authorities have assessed the beneficiary's technical and financial capacity. The authorities will use monitoring and control measures of the RRF. The authorities will also monitor compliance with the requirements set out in the national granting act.
121	Aid may take various forms but when it covers costs mostly linked to operation rather than investment Member States should demonstrate that the aid is designed so that it results in more environmentally friendly operating decisions.	The aid takes the form of an investment grant. The aid neither depends on nor varies according to the operation and output of the plant.
122	Special monitoring requirements when aid covers short-term costs.	N/A. The aid covers investment costs.
123	The aid must be designed to prevent any undue distortion to the efficient functioning of markets and preserve efficient operating incentives and price signals.	The aid is not modified if the operating costs of the beneficiary increase. A 60% of the surplus will be clawed back if costs decrease or revenues increase.

124	In case the measure concerns dedicated infrastructure, the Commission will undertake a case-by-case assessment	Pipelines, injection facility and compressor constitute infrastructure in the sense of point 124. The infrastrucure is not dedicated, since: (a) the injection point into the natural gas grid concerns injection into a network open to third-party access, therefore not intended to connect the beneficiary to only one user or a limited group of users; (b) all other parts of the infrastructure are located within MOH's industrial facility.
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132	For individual aid measures or schemes benefitting a particularly limited number of beneficiaries or an incumbent beneficiary, Member States should, in addition demonstrate that the proposed aid measure will not lead to distortions of competition, for example, through increased market power. The Commission will also assess the potential negative effects on trade, including the risk of a subsidy race between Member States that may arise in particular with respect to the choice of a location.	The analysis concerns (a) competition in hydrogen production, (b) competition in downstream markets (mobility, fuels production) and (c) the risk of overcapacity. In particular: (A) The beneficiary's position in the market of hydrogen and renewable hydrogen production: the project will not result in a significant increase in MOH's overall hydrogen production capacity and to the undue strengthening of MOH's market position, since: - the production of renewable hydrogen is a new activity for MOH. - the production of renewable hydrogen will remain limited, expecting to represent 1.4% of the Greek market (based on the volume targets included in the NECP for 2030) with numerous other projects publicly announced or having received funding and 0.05% at EU level (according to Aurora Research and the European Hydrogen Observatory). - as to the hydrogen market in general (including all types of hydrogen), MOH currently holds particularly low shares (2.1%) in the EU market and is expected to decrease (1.8%) by 2030 (according to the European Hydrogen Observatory). - the volumes of renewable hydrogen to be produced remain significantly lower than the volumes of hydrogen produced through the SMR process. - the project is not expected to jeopardise the ample opportunities of existing market players to expand their position or of new market players to enter the production and supply of hydrogen. (B) The beneficiary's position in the downstream markets: The renewable hydrogen produced will be supplied to five different sectors characterised by an expected growing demand, therefore the impact of the aid on each downstream market is limited. - as to the mobility sector: the number of HRS to be supplied - in Peloponnese and Attica - is a limited share of HRS needed to be deployed in Greece according to Alternative Fuel Infrastructure Regulation; - as to the production of 'green lubricants', the renewable hydrogen supplied to LPC S.A. will entirely replace (instead of being added to) the non-renewable hydrogen currently used;
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		- as to the alternative fuels, despite being a new activity for MOH, it will not increase its overall production capacity and market position as a supplier of conventional and alternative hydrogen-based fuels, since (i) the output volume will be very limited compared (i) to MOH's current production of conventional fuels (0-1%), (ii) to the EU sustainability targets (0.009%) and (iii) to the projected demand at EU level, while (iv) at national level, there is already significant competition for the supply of sustainable transport fuels (c. 18 plants). - as to the injection of hydrogen into the gas turbine, it is intended purely for internal use replacing equivalent quantities of natural gas; - as to the injection of hydrogen into the natural gas grid, MOH's contribution to the national grid injection target will reach 16% annually allowing ample possibilities for other market players to contribute. (C) Based on the previous findings and most notably (i) on the limited involvement that MOH will have in the supply or production of new products and (ii) on the ample possibilities remaining open for MOH's competitors a risk of overcapacity is not entailed. As to the risk of a subsidy race between MS in particular as to the choice of location, as the project is intended for internal use or external use to user's reachavle from the existing facility, the choice of location is mainly driven by the existing industrial facility and the advantages that it offers (an operational industrial site, the possibility to connect and integrate the new activity therein, as well as the possibility to reach and supply renewable hydrogen off-takers).
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133	Know-how dissemination where the aid is granted without a competitive bidding process and the measure benefits a particularly limited number of beneficiaries or an incumbent beneficiary.	Knowledge dissemination activities target a wide audience including other market players. MOH will disseminate know-how (i) participating in international conferences targeting hydrogen stakeholders (ii) engaging in scientific and industrial publications and (iii) organising workshops and seminars targeting the scientific community. The following areas of knowledge will be covered: (a) renewable hydrogen production via pressurised alkaline electrolysis; (b) integration and balancing of renewable hydrogen production in an existing industrial facility; (c) energy management system linked to renewable hydrogen production in an industrial facility; (d) distribution of hydrogen and safety aspects.
	Other elements noted in the frame of avoidance of undue negative effects of the aid on competition and trade	
35 and 36	The aid addresses residual market failures.	The aid addresses well-defined residual market failures, i.e. negative environmental externalities linked to the production of hydrogen via the conventional SMR process. Other EU initiatives, such as EU ETS or ReFuelEU Aviation and FuelEU Maritime, were not capable of closing the cost gap between the conventional fossil-based process and the aided process.
71	The project will provide significant CO ₂ e savings.	1,217,755 tonnes of CO ₂ will be avoided throughout the 20-year lifetime of the project.

72	Do no significant harm principle	The criteria of the Commission Delegated Regulation (EU) 2021/2139 were met, as: (a) the project contributes to climate change mitigation producing electricity-based hydrogen with emission savings exceeding 70% compared to a fossil fuel comparator; (b) the project is not expected to lead to an increased adverse impact to climate change adaptation; (c) the project is not expected to affect the sustainable use of water and marine resources, as it will be located in an existing industrial site with a desalination unit and it will be implemented in line with a detailed environmental impact assessment and a river basin management plan; (d) the project is not expected to adversely affect circular economy by significantly increasing the generation, incineration, or disposal of waste or leading to significant inefficiencies in the use of natural resources; (e) the project is not expected to lead to water, air or land pollution as (i) it will use materials and equipment in accordance with the applicable regulations and Best Available Techniques and (ii) it will not involve any of the substances listed in Appendix C to the Commission Delegated Regulation (EU) 2021/2139 and (f) the project is not expected to negatively affect the protection of biodiversity and ecosystems, as it will be located in an industrial rather in a protected area and it will be subject to an environmental impact assessment.
34(b)	Innovative technology and addressing technological challenges and technical risks.	The innovative elements regard (a) the electrolyser's power capacity (50 MW), which is higher than electrolyzers currently in operation in industrial sites in Europe (not exceeding 20 MW) and (b) the electrolysis technology which is based on large-scale pressurised alkaline systems with advanced or superior electrode technology with enhanced performance compared to state-of-the-art technologies while the largest alkaline stacks that have been deployed at a commercial scale in industrial facility will be used and (c) innovative waste heat harvesting technology using an organic rankine cycle (ORC) system with capacity of up to 1 MW will be deployed in the frame of the earlier EPHYRA project funded by Horizon Europe.

Weighing up the positive and negative effects of the aid		
134	Assumption of positive balance for decarbonisation measures	(a) The positive condition is fulfilled; (b) The negative condition is fulfilled; and (c) there are no obvious indication of non-compliance with the “do no significant harm” principle.