Request of Proposals for consultancy support on: "EU Electricity Market Design assessment and review".

1 Requested services

1.1 Background Material

The EC, in its "toolbox" Communication of 13 October 2021[1], tasked the EU Agency for the Cooperation of Energy Regulators (ACER) with conducting an assessment of the benefits and drawbacks of the EU current wholesale electricity market design and with providing recommendations for its improvement by April 2022 and a preliminary assessment by mid-November 2021.

ACER reached to the conclusion[2] that based on its analysis the current wholesale electricity market design ensures efficient and secure electricity supply under relatively 'normal' market conditions. As such, ACER's assessment is that the current market design is worth keeping. In addition, some longer-term improvements, including making short-term electricity markets work better everywhere, driving the energy transition through efficient long-term markets, increasing the flexibility of the electricity system, protecting consumers against excessive volatility whilst addressing inevitable trade-offs, tackling non-market barriers and political stumbling blocks and preparing for future high energy prices in 'peace time' while being very prudent towards wholesale market intervention in 'war time', are likely to prove key in order for the framework to deliver on the EU's ambitious decarbonisation trajectory over the next 10-15 years, and to do so at lower cost whilst ensuring security of supply.

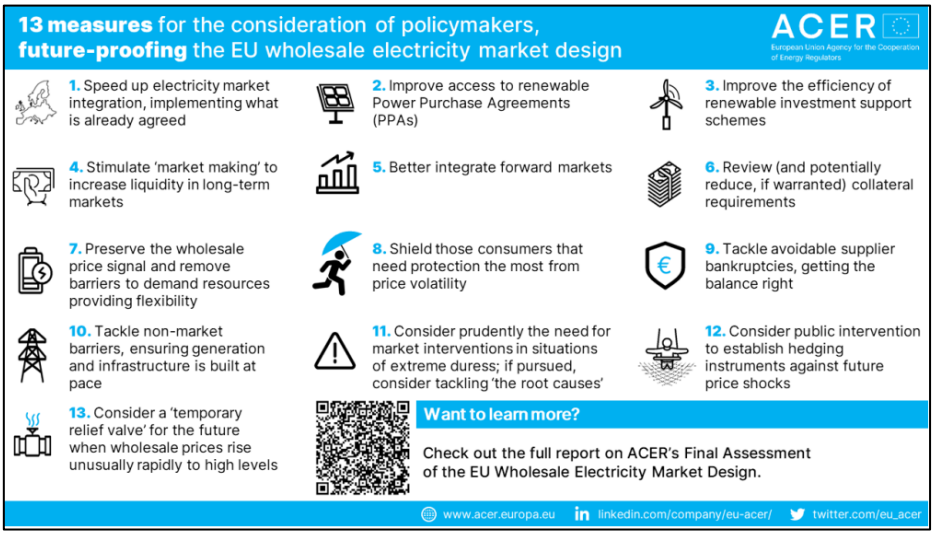

Figure 1 - 13 measures proposed by ACER for the consideration of policy makers

[1] https://ec.europa.eu/commission/presscorner/detail/en/IP_21_5204
[2] https://www.acer.europa.eu/events-and-engagement/news/acer-submits-european-commission-its-preliminary-assessment-europes-high

https://www.acer.europa.eu/events-and-engagement/news/press-release-acer-publishes-its-final-assessment-eu-wholesale

In parallel, the UK government, within the context of its commitment in the British Energy Security Strategy to undertake a comprehensive review of electricity market design, to ensure that it is fit for the purpose of maintaining energy security and affordability for consumers as the electricity sector decarbonizes, launched a consultation on 18.07.2022 on the Review of Electricity Market Arrangements (REMA). The document, set in public consultation till 10.10.2022, explored options to deliver an enduring market framework that works for businesses, industry and households[3].

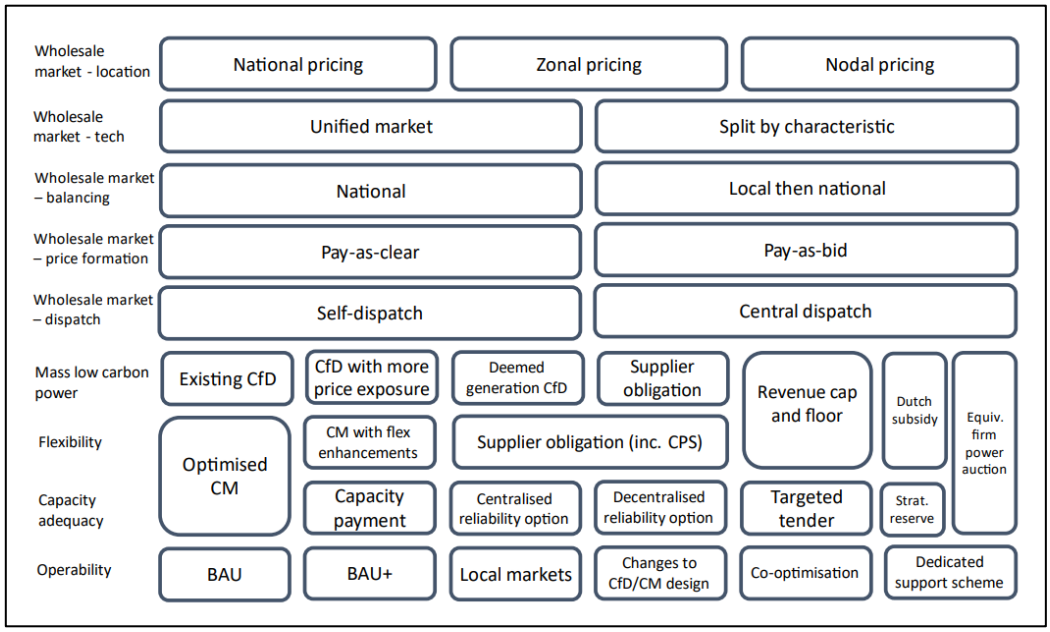

Figure 2 - Options under consideration in REMA (UK)

It is without doubt that over the last decade, cross-border trade and the major efforts undertaken to further integrate electricity markets in Europe have delivered significant benefits for consumers. The benefits are due to the structure of the wholesale energy market enabling cross-border trade between MS and improving security of supply across a larger geographical area. However, the current electricity market design is not designed for the 'emergency' situation that the EU currently finds itself in. The ongoing political discussions on various exceptional measures for intervention bear witness to this.

Furthermore, going forward, the EU's ambitious decarbonisation trajectory requires fast and massive transformation across sectors. Given enhanced electrification of energy demand is amongst the most cost-efficient ways to drive down emissions from the wider economy, this trajectory is likely to be driven in large part by the decarbonisation of the electricity sector. Electricity market integration across EU Member States will be key to pursue such power sector decarbonisation at lower cost, in turn ensuring security of supply by being able to draw on neighbouring jurisdictions in times of need. Put differently, whilst increased energy independence vis-à-vis (particular) third-countries is a policy objective of growing importance, realising this may well depend on enhanced energy inter-dependence amongst EU MS. This particular task will demand the market design to facilitate a massive rollout of low-carbon generation, and in particular renewable generation characterised by high upfront investment

[3] https://www.gov.uk/government/consultations/review-of-electricity-market-arrangements

costs, while ensuring that flexible resources complement intermittent renewable production where and when needed. Related to this, price volatility in the electricity system is likely to increase in the years ahead, indicating increasing flexibility needs of the system. Hence the market design will need to reveal the value of flexibility.

In relation to the above, the European Council has called on the EC to work swiftly on the structural reform of the electricity market, with the dual objective of securing European energy sovereignty and achieving climate neutrality. The planned reform of the electricity market design was announced by President von der Leyen in her annual State of the Union Speech last year[4] while the outline of an improved electricity market design was presented to Ministers by Commissioner for Energy Kadri Simson at the Energy Council on 19 December 2022.

To this effect, on 23 January 2023 the EC launched a public consultation on the reform of the European Union's electricity market design to support a clean and affordable energy transition[5]. According to the EC, a reform is needed to better shield households and businesses from high energy prices, to increase resilience and to accelerate the transition set out in the European Green Deal and REPowerEU Plan. The consultation, which runs till 13 February 2023, focuses on four main areas: a) Making electricity bills less dependent on short-term fossil fuel prices and boosting the deployment of renewables, b) Improving market functioning to ensure security of supply and fully utilise alternatives to gas, such as storage and demand response, c) Enhancing consumer protection and empowerment and d) Improving market transparency, surveillance and integrity. The feedback taken of all stakeholders and other interested parties will support the EC's work on a legislative proposal for amendments to the electricity market design aimed to be delivered in March 2023.

1.2 Scope of requested services

In order to avoid ill-designed measures or distorting price signals by interfering in market price formation that may roll back EU market integration and overall competition, thereby endangering the benefits achieved up until now and possibly increasing the overall cost of the energy transition up ahead, as further expanded above in section 1.1, the Regulatory Authority for Energy (RAE) of Greece, driven by the key policy objectives of security of supply, cost-

[4] 14.09.2022 State of the Union Address by President von der Leyen: *"[…] So, we have to decouple the dominant influence of gas on the price of electricity. This is why we will do a deep and comprehensive reform of the electricity market. […]"*

https://ec.europa.eu/commission/presscorner/detail/ov/speech_22_5493

[5] https://ec.europa.eu/commission/presscorner/detail/en/ip_23_324

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13668-Electricity-market-reform-of-the-EUs-electricity-market-design_en

23.01.2023 Address by Commissioner for Energy Kadri Simson: "*The EU's electricity market has served us well for over twenty years. But the unprecedented energy crisis we are facing shows that we need to make the electricity market design fit for the future, allowing it to deliver the benefits of affordable clean energy to everyone. I look forward to the contributions from a wide variety of stakeholders, which will help guide our legislative proposal this year.*"

effectiveness and decarbonization, takes the initiative to request consultancy support on an in-depth assessment of the EU Electricity Market Design and concrete proposals for its review, complementing EC's and ACER's work. The review is expected to focus both on the short-term and on the long-term, e.g. on the enduring market design that is needed to deliver a fully decarbonised and cost-effective electricity system by 2030, while ensuring security of supply. To this effect, it shall focus on options for reform for all (non-retail) electricity markets: the wholesale market, including balancing mechanism and ancillary services as well as policies that impact these – including the evolution of alternatives to the Contracts for Difference (CfD) products/schemes and the Capacity Market.

Regarding the in-depth assessment of the EU Electricity Market Design, the selected Consultant shall thoroughly review the detailed findings and analysis of ACER's assessment on the wholesale market design (see section 1.1) and consider them as a basis for further elaboration and quantitative analysis provision, but, also, extend its evaluation on the currently applied CfD products/schemes and existing Capacity Market arrangements in Europe. The outcome of its assessment shall include options for design improvement, including minor fine-tuning amendments that are easy to implement but, also, major reforms to the design that will enhance its efficiency and enable it to deliver the EU long-term policy targets.

The expected outcome will be a High-Level Market Design (HLMD) that will: (a) propose and support the best integrated option for reforming the EU electricity market environment, taking into account the specifics of the each MSs' electricity sector, in terms of market shares, liquidity, RES penetration, price formation and regulated mechanisms, for the economic benefit of market participants and end-consumers and (b) propose the best -yet feasible in terms of resources and implementation time- complete option, compatible with the currently in force EU Network Codes and Guidelines, which enable EU wholesale electricity market integration.

1.3 Market design options for reform under consideration

Figure 3 below presents the Electricity Market design options for reform that should be taken into consideration and assessed one-by-one by the selected Consultant, before combining them into an integrated proposal for re-design. These refer to the wholesale market (net-zero target), the mass low carbon power, the flexibility and the capacity adequacy and the competition of the market as discussed further below.

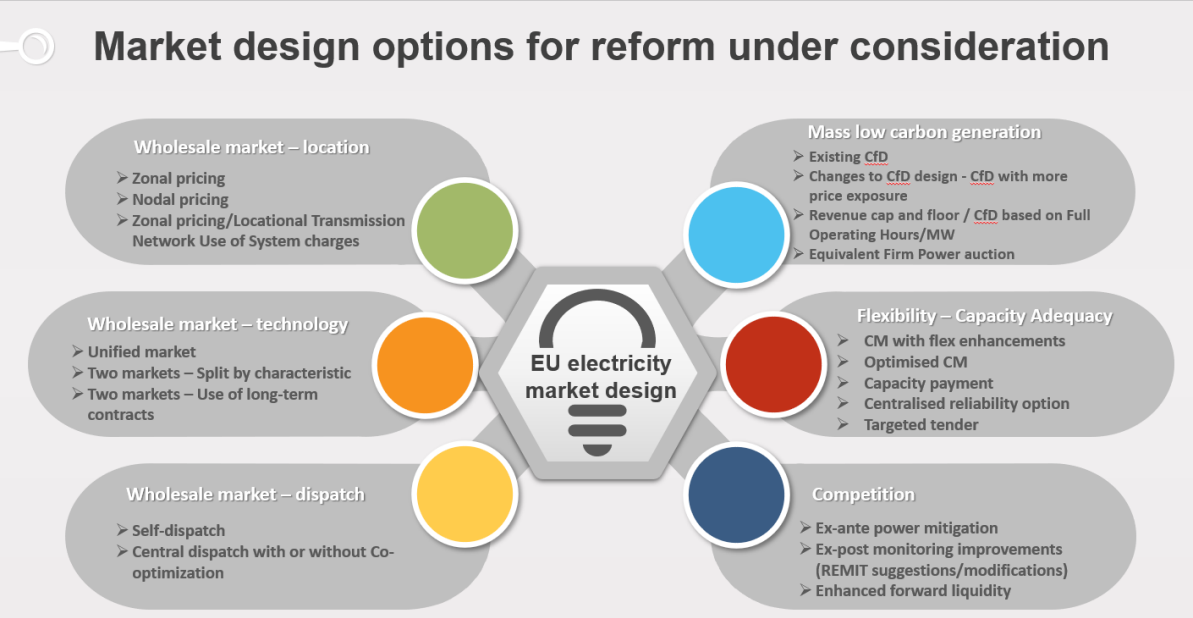

Figure 3 - Market design options under consideration

1) Wholesale market options towards a net-zero target

Taking the option of pay-as-clear for the wholesale energy market price formation as granted, the selected Consultant will consider whether alternatives to the wholesale market and balancing mechanism would better suit our renewables-intense future, particularly by ensuring that there are sufficient operational signals for low carbon flexibility and investment in renewable energy.

In order to address the challenges of the EU clean energy ambitious future, the focus for this review of the wholesale market design and operation will be in considering:

- Maintaining the approach of a unified market, splitting it into separate markets for variable (as available) and firm (on demand) power, which is currently a model under research, mainly proposed as a solution to price cannibalization (where renewables capture low wholesale market prices) and the resulting price volatility or contractually separate electricity produced from variable power from that generated by firm power (a split contract market (green contracts, RES PPAs platform contracts, above contract - wholesale price-related, etc)).
- Maintaining the zonal (regional) approach for locational pricing, introducing a Transmission Network Use of System (TNUoS) charging system or even more granular locational signals into the wholesale electricity prices via nodal pricing design, where the price in each location in the transmission network (node) represents the locational value of energy.
- Reviewing the current dispatch arrangements and selecting which fits better with the overall design proposal: self-dispatch, where generators are responsible for dispatching their portfolio to meet their declared position based on their availability and capacity for each settlement period or central dispatch, where participants notify the system operator on their availability ahead of time through day-ahead and intraday markets while investigating, in parallel, whether modifications to current practices like co-

optimising energy and reserves under a central dispatch model are optimal taking into account that ensuring operability through the provision of ancillary services is crucial for the efficient and safe functioning of the electricity system.

- Changing several parameters to improve slightly the current market design such as the timescale of market settlement and the gate closure to increase temporal granularity in the market and to make the most of the opportunities for flexibility across the system or parameters of the balancing mechanism with the aim to lower further balancing costs while addressing, also, the redispatching issue.

2) Mass low carbon generation

The selected Consultant should consider options for supporting investment in low carbon technologies, which are expected to produce the majority of low carbon electricity, i.e. any plant (renewables, energy from waste, small modular reactors) which is expected to operate at or close to its highest possible load factor. The majority of the available alternatives involve long-term contracts with the government, as this seems likely to be the best way to deliver the volumes of investment that are required at least cost.

Therefore, the options that should be assessed include, but are not limited to:

- The currently applied CfD products/schemes
- CfD variants with increased price exposure (a CfD with a strike price range or changes to the reference price methodology)
- A revenue cap and floor, where generators would be guaranteed a minimum revenue in each period while in parallel a revenue cap is introduced or alternatively, a CfD variant where the payment is based on a fixed number of Full Operating Hours/MW
- The Equivalent Firm Power auction, which is a single unified auction for procuring system capacity, acting as an evolution of the Capacity Market, integrating CfD within it, so that renewables – contracting alongside flexible assets – and firm capacity compete for capacity contracts based on their equivalent firm power.

The above options under consideration, except the currently applied CfD and the Equivalent Firm Power auction, aim to increase the role of the market, in order to minimise costs which are passed to consumers.

3) Flexibility – Capacity Adequacy

As flexibility – the ability to shift the consumption or generation of energy in time or location – is of high importance for balancing supply and demand, enabling the integration of low carbon power, heat and transport, and maintaining the stability of the system, the selected Consultant shall assess options that address the increasing need for flexibility technologies (electricity storage, flexible demand, hydrogen-fired generation, power CCUS, electrolysis, interconnection) to respond to the variation in renewable output.

Apart from the evaluation of options regarding the wholesale market, that should provide the right market signals for flexibility, several options regarding the setting of a mechanism to de-

risk investment on an enduring basis, in case these signals are not enough, shall be taken into consideration and be evaluated such as:

- A Capacity Market with flexibility enhancements, for example
    - by running specific auctions for flexibility, open to all low carbon technologies which meet an agreed set of flexibility criteria or
    - by introducing multipliers to the clearing price for particular flexible attributes (i.e. response time, duration, location), in order to create a mechanism to reward specific flexibility needs and provide stronger investment signals in flexible technologies.

Furthermore, the selected Consultant shall consider all options for delivering, reliably and in the most efficient way, the capacity adequacy, which is required to ensure security of supply. System stress events are likely to be driven by weather patterns and significant amounts of firm capacity will be needed to manage extended low wind/sun periods. As the system becomes increasingly dominated by renewables, this firm capacity will be pushed out of the wholesale market, limiting the opportunities for these assets to recover their costs ("missing money problem").

As a result, a wide range of options for capacity adequacy procurement, shall be assessed:

- An optimized Capacity Market with the introduction of low carbon capacity participation, which is a similar approach as the Capacity Market with flexibility enhancements, as described above, with the main difference of targeting directly generators with low carbon or new build characteristics.
- Capacity payments, which is a market-wide approach that sets an explicit price for capacity and all capacity is eligible for a capacity payment for every 'trading period' in which they are available, including demand side response.
- Centralized reliability options, where the incentive to provide power is signaled through the level of wholesale market pricing instead of by targeting a system stress event.
- Targeted tender, which is a centrally coordinated process to secure the construction of a specified quantity of new capacity which is determined to be needed to improve the balance of supply and demand.

4) Competition

As the exercise of market power can result in "deadweight" losses of social welfare along with large wealth transfers from buyers to sellers (and occasionally the reverse), the selected Consultant shall evaluate options for Ex-Ante Market Power Mitigation, such as price caps, bidding restrictions, or mandated prices that reflect anticipated costs and for Ex-Post Market Power Mitigation through the prospect of investigations, after-the-fact mitigation, and costly penalties (e.g., fines, damages, payments, etc.) and propose indices that are needed for identifying and mitigating market concentration in the EU Wholesale Electricity Markets. Within the context of Ex-post Market Power Mitigation improvement proposals, REMIT modifications/suggestions are expected. Furthermore, options for enhancing forward liquidity shall be considered and proposed by the selected Consultant.

1.4 Description of tasks

The deliverable of the Consultant is the provision of two (2) assessment reports (preliminary and final) for the in-depth assessment of the EU Electricity Market Design and concrete proposals for its review, the content of which is described in detail below. The selected Consultant shall take into consideration the current status of operation of the EU Day-ahead, Intraday and Balancing Markets, the relevant EU regulatory framework and the MSs' commitment to full integration to the SDAC, the SIDC and the European platforms in line with the EU Regulation 2017/2195 (EBGL). In this respect, close cooperation between the Consultant and RAE is expected.

All not publicly available sources that may be deemed necessary to fulfil the tasks described in this RfP will be provided by RAE to the Consultant under a Confidentiality Agreement. It is noted that some of these sources may be available only in Greek.

In light of the above, the services requested include:

Task 1: Critical assessment of the current EU Electricity Market Design arrangements, regarding the wholesale market model, CfD products/schemes and Capacity Markets' operation in the EU.

The detailed findings and analysis of ACER's assessment on the wholesale market design (see section 1.1) shall be thoroughly reviewed and be considered as a basis for further elaboration. Furthermore, the currently applied CfD products/schemes and existing Capacity Market arrangements are expected to be evaluated as well.

Apart from the qualitative assessment, a quantitative analysis of the above-mentioned current market model is also expected by using existing simulation tools in order to conclude on the EU's social welfare both considering the current energy mix and the energy mix of 2030.

Task 2: Detailed comparative analysis of the advantages and disadvantages of the examined alternative market design options under consideration, presented in section 1.3, regarding the wholesale market (net-zero target), the mass low carbon power, the flexibility and the capacity adequacy and the competition of the market. The long-term improvements, as proposed in ACER's assessment, may be taken into consideration as well.

Task 3: High-level market design (HLMD) presentation of concrete proposals for the EU Electricity Market reform accompanied with their respective quantitative analysis regarding the EU social welfare (current energy mix and energy mix of 2030).

At least three (3) options for improvement are expected to be presented:

1) HLMD with minor fine-tuning amendments that are easy to implement
2) HLMD with important amendments to the current design and
3) HLMD with major reforms to the design that will enhance its efficiency and enable it to deliver the EU long-term policy targets.

All proposals should, also, include, apart from the main HLMD model for operation under 'normal' market conditions, temporary measures to be introduced by the MS (taking into account the Council Regulation (EU) 2022/1854 of 6 October 2022 on an emergency intervention to address high energy prices) as a 'back-up' plan, in case of an 'emergency' situation in order to mitigate the impact of high electricity prices and shield consumers from the impact of volatility.

The assessment of these proposals shall be based on the following criteria: security of electricity supply within each MS, smooth competition development both in the generation and supply sectors, required resources, implementation time and cost (where possible existing infrastructure should be exploited to the maximum extent), smooth RES integration under market arrangements, market liquidity and compatibility with the currently in force EU Network Codes and Guidelines.

Task 4: Out of the options assessed under Task 3, presentation of (a) the best integrated option for reforming the EU electricity market environment, taking into account the specifics of the each MS' electricity sector, in terms of market shares, liquidity, RES penetration, price formation and regulated mechanisms, for the economic benefit of market participants and end-consumers and (b) the best -yet feasible in terms of resources and implementation time- complete option, compatible with the currently in force EU Network Codes and Guidelines, which enable EU wholesale electricity market integration.

Task 5: For the final proposals presented under Task 4, presentation of a detailed roadmap for a step-wise evolution of the EU Electricity Market towards internal market reform. The requested roadmap should be accompanied by a detailed action-plan for each organization involved (Regulatory Authorities, NEMOs, TSOs, Market Participants, other involved parties) indicating the main-milestones and relative risks. Special consideration should be given to the required modifications on the current EU regulatory framework as well as on the computational infrastructures of the SDAC, the SIDC and the platforms for the balancing energy exchange.

Task 6: Support during the consultation phase including presentation of the HLMD proposals to the stakeholders as well as provision of written answers and clarifications to selected comments received during the consultation phase.

The selected Consultant will present the final deliverable at RAE's premises (or via teleconference), where based on his proposals, a thorough discussion with RAE, taking into consideration the results of the public consultation, the best policy path for an EU related Electricity Market reform path will be identified.

1.5 Timetable of requested services

First Deliverable: Within one month from project commencement, the selected Consultant will submit the first deliverable (preliminary assessment report) as per the requested services under Tasks 1-2. Within two weeks RAE will provide its comments. One week following comments receipt, the final version of the first deliverable will be submitted.

Second deliverable: Within three months from project commencement, the selected Consultant shall submit the second deliverable as per the requested services under Tasks 1-5. Within two weeks RAE will provide its comments. One week following comments receipt, the final version of the second deliverable will be submitted.

The above two deliverables should be of the proper quality and detail in order to support the understanding of the market stakeholders under the relative Public Consultation process.

Consultation Support: The selected Consultant will undertake to present the proposed HLMD proposals to the stakeholders during a public workshop. The date of the workshop will initiate the beginning of a corresponding consultation procedure, organised and run by RAE, during which the selected Consultant is expected to assign appropriate time and effort in view of supporting RAE in clarifying and replying selected comments (Task 6).

It shall be noted that RAE reserves the right to extend or review this time frame without changing the scope of work and the agreed fee. Detailed dates for workshops, presentations, etc and the need for physical presence at RAE premises will be further discussed and agreed with the RAE relevant staff/ Project Monitoring Team.

1.6 Project Management

With a view to a smooth project implementation the selected Consultant should establish regular and frequent communication with RAE. Progress presentations/ reports should take place every two weeks in order to ensure common understanding is achieved.

1.7 Fee

RAE will pay for the consulting services a fee up to the amount of a hundred thousand euros maximum (€ 100.000) excluding VAT. This is a total fixed price that includes all costs related to the performance of the requested services.