

Review of Electricity Market Arrangements: Marine Energy Council response

Introduction

The Marine Energy Council (MEC) welcomes the opportunity to respond to the Government's Review of Electricity Market Arrangements (REMA) consultation.

The MEC is the voice of the UK's tidal stream and wave energy industries. Established in 2018, the MEC's membership spans technology and project developers, consultants, associations, manufacturers, and small and medium sized enterprises working in the supply chain. Our vision is for the marine energy sector to support a secure, cost-effective, and fair transition to net zero, enabling investment, exporting great British innovation, and levelling up with employment opportunities across the UK.

The past 12 months has highlighted the importance of a diverse generation portfolio in ensuring energy security, protecting households against rapid increases in the international cost of wholesale gas, and avoiding risks posed by overreliance on imported sources of energy.

Marine energy has a potential critical role in addressing these challenges:

- **Tidal stream energy** is entirely predictable and can provide 11%¹ of the UK's electricity demand. The predictability can reduce supply/demand mismatch in the energy system, arising from forecasting errors in other renewables which will reduce reliance on gas. This firm power energy resource can directly displace dependence on imports. Tidal stream can be deployed rapidly, with the construction time of a consented tidal stream farm being less than three years.
- **Wave energy** is more consistent and predictable than solar or wind and could provide up to 15%² of electricity demand. In addition, its harmonious relationship with wind means that wave energy will support a more cost-effective and efficient energy system.³

Predictable and consistent renewable generation, in a system that becomes increasingly reliant on intermittent sources, will be critical in delivering the UK Government's 2035 ambition, and in ensuring economic growth opportunities are created and shared in coastal communities and beyond in the transition to net zero.

¹ Coles et al (2021) 'A review of the UK and British Channel Islands practical tidal stream energy resource'. Available [online](#).

² Jin et al (2021) 'Wave energy in the UK: Status review and future perspectives'. Available [online](#).

³ In this response 'marine energy' is used to refer to tidal stream and wave energy.

Executive Summary

The MEC welcomes the Government's commitment to managing the REMA process in a manner that maintains investor confidence.

- The tidal stream ringfence in Allocation Round 4 of the Contracts for Difference (CfD) scheme was the first revenue support provided to the sector since 2016. The industry has responded and will deliver over 40MW across four projects at £178MWh, 15% below the Administrative Strike Price.
- This represents a 40% reduction in LCOE, with little to no revenue support since 2016.⁴
- Tidal stream is forecast to be cheaper than new nuclear at 1GW of deployment.⁵ However, continued cost reduction is only possible if the sector is provided with clear and consistent support from the Government. This can be achieved through setting a 1GW target by 2035 and committing to ongoing ringfenced support.
- Wave energy will be ready for ringfenced support in Allocation Round 6 (expected to close in 2024) and our members are in the process of making capacity eligible.

The UK will not meet its targets to reach net zero by 2050 and the decarbonisation of its electricity system by 2035 with existing technologies alone.

- By limiting the scope of the REMA consultation to increasing the deployment of existing technologies the Government will not put the UK on track to meet its key climate change targets. The International Energy Agency expects that half of the reductions required to get to net zero will be from innovative technologies.⁶
- The UK Government needs to go further on driving innovation and supporting the technologies of the future, that will be key to meeting net zero. Market changes need to accelerate and prepare for the deployment of existing and innovative technology.

Significant electricity market reform should not be undertaken without consideration of the UK's broader net zero, economic and levelling up goals. This should be reflected in the Government's vision.

- The REMA consultation notes the proposed changes are an opportunity to drive innovation across the energy sector, create hundreds of thousands of well-paid, highly skilled jobs, and to reduce dependency on energy imports. However, when setting out the impact of implementing various new arrangements, these opportunities do not seem to be considered.
- The MEC has proposed a slight change in the vision (pg6) to ensure that the benefits of the net zero transition are shared across the UK and this aim is embedded in the transition.
- Nova Innovation's Shetland Tidal Array was delivered with over 90% of its supply chain spend with UK SMEs. Rather than importing renewable technologies the UK has an opportunity to create over 4,000 jobs by 2030 with a significant amount of the economic benefit expected to be generated in coastal areas (50-60%).⁷
- The Resolution Foundation in its Economy 2030 report notes that technologies like tidal 'are not only likely to generate relatively high national economic returns, but also have the potential to contribute to regionally balanced growth.'⁸ Investment in wave and tidal technologies in less innovation-intense regions generate strong returns.

⁴ Catapult ORE (2022) *Tidal Stream cost reduction pathway report*.

⁵ Catapult ORE (2022) *Ibid*.

⁶ International Energy Agency (2021) *Net Zero by 2050*. Available [online](#).

⁷ Catapult ORE (2018) *Tidal Stream and Wave Energy Cost Reduction and Industrial Benefit*. Available [online](#)

⁸ Resolution Foundation (2022) *The Economy 2030 Inquiry*, available [online](#).

- Marine energy, provided with clear and consistent support, will directly create 22,000 jobs in the UK by 2040, with many more supported across the supply chain and in coastal communities.

The MEC supports the UK Government continuing to consider a move to nodal pricing and optimising the energy system

- The UK Government is right to explore optimising the energy system. The generation provided by the predictability of tidal stream, and the generation profile of wave energy (which is more consistent than other renewables), can avoid unnecessary investment in electricity network infrastructure or the expansion of costly nuclear power capacity closer to when demand exists.
- Research by the University of Plymouth has shown that tidal stream can reduce the power rating and energy storage capacity of inter-seasonal energy storage which will be a key driver of cost in the future energy system.⁹
- Nodal and zonal market design will allow local communities to benefit from the renewable resources that are being harnessed closer to their homes. This could support, maintain, and strengthen democratic legitimacy in the net zero transition. Zonal or nodal pricing could deliver £30bn of cost savings to 2035.¹⁰
- Any changes to locational pricing must not risk investment in renewables or delay necessary investment in network infrastructure.

The Government is right to consider splitting the market into variable and firm power. If this approach is taken tidal stream should be defined as firm power.

- Tidal stream is an entirely predictable renewable source of firm power. The Government should ensure dependability is properly valued in future electricity market arrangements.
- Modelling carried out by Research by Imperial College London shows that tidal stream can reduce natural gas capacity required by about 40%.¹¹ As more than half of UK gas is imported, firmer power renewable energy resources like tidal stream will be key in supporting the UK's energy security, a cost-effective transition to net zero that protects UK households from international gas price shocks.¹²
- Wave energy is more consistent than solar or wind and can provide a distinct service to the UK energy system.

Market changes need to deliver a diverse supply of energy generation that reduces reliance on imports and recognises and rewards the different services that renewable technologies provide to the energy system.

- Current high energy costs are due to international wholesale gas prices. In 2021 these costs were exacerbated by low wind yield that depleted gas reserves across Europe. This emphasises the importance of a diverse domestic renewable energy supply to protect UK households and businesses.
- REMA changes should be undertaken with an explicit aim to improve the UK's diversity of supply. This is inextricably linked with improving the UK's energy security as when there is low yield from wind or solar, other renewables such as tidal stream and wave need to be available.

⁹ Coles et al (2022) *Impacts of tidal stream power on hybrid energy system performance: An Isle of Wight case study*. Available [online](#).

¹⁰ Energy Systems Catapult (2022) *Location, Location, Location Reforming wholesale electricity markets to meet Net Zero*. Available [online](#).

¹¹ Frost (2022) *Quantifying the benefits of tidal stream energy to the wider UK energy system*, available [online](#).

¹² D. Pudjianto, G. Strbac (2022) *Role and Value of Tidal Stream Generation in the Future UK Energy Mix*.

- The UK should therefore consider if a premium for the services marine energy provides to the energy system should be introduced. This could be achieved through an optimised capacity market, changes to the CfD, or a shift to zonal or nodal pricing.

REMA should seek to deliver a secure and cost-effective transition to decarbonised energy system

- The University of Edinburgh’s research into the energy system benefit of tidal stream and wave energy provides strong evidence of the environmental and energy system benefit of marine energy. Swapping 1GW of:
 - offshore wind for 1GW tidal stream leads to 82 ktCO₂ emissions avoided p/a.
 - wind and solar for 1GW tidal stream leads to 87 ktCO₂ emissions avoided p/a.
 - offshore for 1GW wave energy leads to a 120 ktCO₂ emissions avoided p/a.
 - wind and solar for 1GW wave energy leads to 125 ktCO₂ emissions avoided p/a.
- Additionally, and critically for delivering a cost-effective energy system, adding under 13GW of wave and tidal stream energy will lead to an annual reduction in dispatch cost of £1.03bn p/a.¹³

Decentralisation of decision making may lead to sub-optimal outcomes for the UK energy system

- Supplier obligations if implemented without safeguards or interventions elsewhere may lead to outcomes whereby the cheapest energy is supported today which does not deliver a cost-effective or secure energy system in the future.
- Significant benefits will be realised prior to realising the above marine energy capacity. Just 1GW of tidal stream and wave energy will provide £114m of system benefit and 113kton of carbon emissions savings p/a.¹⁴ This benefit may not be captured if decisions are taken at a local level and by suppliers.

Alongside drastically increasing renewable capacity changes to the electricity market should consider how innovative approaches to deployment are encouraged.

- The MEC welcomes the Government considering how issues around intermittency can be addressed. Aggressively exploring the potential of co-location of wind and wave can help energy system optimisation. Waves provide a more consistent generation profile and can be harnessed 3-8 hours after the energy is initially harnessed by wind farms.
- This could be enabled through the existing CfD mechanism, via the introduction of a specific ringfence for projects which combine renewable technologies and solutions to address issues caused by intermittency.

The Government should explore adopting levelised value of energy and a better metric than LCOE

- LCOE is a blunt measure for judging which renewables to support which has led to an uneven energy generation portfolio. The MEC welcomes that the UK Government is seeking to optimise and address issues in the market, however these have largely been caused by an adherence to LCOE rather than taken a systemwide view of what the UK needs to deliver a secure and cost-effective net zero system in the future, and a transition that spreads opportunities fairly.
- This could follow the “enhanced levelized cost of energy” methodology originally devised by Frontier Economics and presented by BEIS in the report *Electricity Generation Costs 2020*.¹⁵

¹³ The University of Edinburgh is due to publish the Project EVOLVE work in October. The MEC would welcome the opportunity to discuss these results with the REMA team once these are available.

¹⁴ Pennock (2022) Ibid.

¹⁵ BEIS (2022) Electricity Generation Costs 2020

Significant barriers to increasing renewable capacity are not included in the REMA consultation

- Three primary challenges for increasing marine energy capacity are:
 - **Decommissioning bonds** – a single line in the Decommissioning Act that allows the Secretary of State to call in the bond, even in the absence of an event that would require the bond to be called upon, is a significant cost barrier to marine renewable deployment.
 - **Insurance** - Currently insurance costs are a significant and costly barrier to marine renewable deployment. In the absence of competitive commercial insurance options, the UK Government should explore the proposal being developed by Renewable Risk Advisers, to introduce an ‘Insurance and Warranty’ Fund.
 - **The Consenting Process** - As the UK has moved towards annual renewable auctions the 3-year timeline that currently exists for getting marine capacity to eligibility is too long. Clear long-term support that allows project developers to develop new sites, and speeding up the timescales as with offshore wind, will allow a diverse set of next generation projects to emerge.

Our response provides further information on these three barriers on page 16.

- MEC accepts that REMA might not be the right means of addressing these issues. However, without changes elsewhere the goals of the UK Government in undertaking the REMA process may be seriously hampered.

REMA Consultation: MEC Response

Chapter 1: Content, vision, and objectives for electricity market design

1. Do you agree with the vision for the electricity system we have presented?

The Marine Energy Council (MEC) supports the broad principles set out in the REMA consultation. The Government is right that current arrangements will not deliver a decarbonised electricity system by 2035, nor put the UK on the path to achieving net zero by 2050. A step change in the rate of deployment of low carbon technologies is imperative, making the UK more secure and less dependent on importing fossil fuels.

Whilst there is a high degree of uncertainty of the technological developments, what will be successful and what innovations may accelerate the net zero transition, there is insufficient consideration within the vision for the UK's role in driving that change. The UK must seek to be more than a world-leader in developing and exporting renewables in the net zero transition. This should be explicit within the Government's vision for the electricity system.

The MEC would support therefore the slight reframing of the first bullet from:

Deliver a step change in the rate of deployment of low carbon technologies and reduces our dependence on fossil fuelled generation.

To:

Deliver a step change in the rate of deployment, development, and innovation of low carbon technologies, reducing our dependence on fossil fuel generation and importing technologies.

The electricity market will be fundamental to the UK's net zero future and economic prosperity. It is therefore difficult and imprudent to not consider how the arrangements for the former align with the UK Government's priorities. The risk of doing so is evident in the addition of Supply Chain Plans (SCP) to the CfD mechanism, rather than this being embedded within the mechanism. SCPs recognise that the delivery of renewables can and should benefit from locally based supply chains, offering a low carbon footprint, and creating green jobs across the UK.

Tidal stream and wave energy projects are strongly positioned to support the UK's development as a world-leader in renewable deployment and development. Nova Innovation delivered its Shetland Array with over 90% of its supply chain spend with UK SMEs and Orbital Marine, which will deliver 2 of the projects from the latest renewable auction, built its O2 tidal stream device with over 80% of UK content. By comparison domestic content of early offshore wind has around 32%.¹⁶

The Resolution Foundation in its Economy 2030 report notes that technologies like tidal 'are not only likely to generate relatively high national economic returns, but also have the potential to contribute to regionally balanced growth.'¹⁷ Investments in wave and tidal technologies in less innovation-intense regions generate strong returns for those regions.

Maintaining public support is key to the successful management of the net zero transition. The Government is right that the future market arrangements should facilitate consumers to take greater control of their electricity use and engage in the electricity market that serves them. Rather than importing renewable technologies the UK has an opportunity to create over 4,000 jobs in tidal stream alone by 2030 with a significant amount of the economic benefit expected to be generated in coastal

¹⁶ ORE Catapult (2017) The Economic Value of Offshore Wind, available [online](#).

¹⁷ Resolution Foundation (2022) The Economy 2030 Inquiry, available [online](#).

areas (50-60%).¹⁸ Decisions on future electricity market arrangements should not be taken without consideration of employment growth, supply chain development and attracting investment in the UK.

2. Do you agree with our objectives for electricity market reform (decarbonisation, security of supply, and cost-effectiveness)?

The MEC agrees with the UK Government's objectives, however further work is required to define desired outcomes and reflect that current government thinking is aligned with developments in the energy industry.

Levelised cost of energy (LCOE) will not deliver the most cost-effective outcome for UK households.

The current CfD mechanism essentially awards contracts based on the lowest LCOE. This has been successful in delivering increasing renewable capacity from 7% of the UK's electricity supply in 2010, to over 40% today. The UK Government should be aware that a great deal of the cost-reduction achieved was because of other countries supporting indigenous renewable sectors and supply chains. These countries are now benefiting from thriving export markets.

In the 1980s Denmark invested heavily in wind, delivering projects with high levels of local content, and developing its domestic market. In the process it gained first mover advantage and in exports alone its wind sector generates over £7bn annually for the Danish economy. By contrast the UK's wind sector, Europe's largest generator of wind energy, exports less than £0.5bn annually.¹⁹

The UK Government demonstrated welcome international leadership in setting a ringfence for tidal stream in Allocation Round 4 (AR4). This will deliver over 40MW of projects benefiting UK supply chains and energy security. The four projects will power the equivalent of over 40,000 homes and marks an important first step in delivering the 11GW of potential afforded by the UK's geography.

Both tidal stream and wave energy will be cheaper than new nuclear at 1GW of deployment.²⁰ However, these technologies are not going to be the cheapest to deploy in the short term. To achieve the above cost reduction requires consistent policy support and foresight to understand the relationship between different renewable technologies and the need for a diverse energy generation portfolio.

Renewables are fundamental to energy security.

The objectives the Government sets out for electricity market reform are aligned with the traditional framing of the energy 'trilemma'. While the MEC does not disagree with these objectives this framing may, in certain instances, be unhelpful.

It is concerning that the UK's commitment to a full decarbonised and cost-effective electricity system by 2035 is caveated throughout the document by 'subject to security of supply'. The recent spike in the cost of wholesale gas and the impact of Russia's illegal invasion of Ukraine is evidence that the transition to renewables is key to security of supply. Framing these two aims as dichotomous is not reflective of reality.

Tidal stream could reduce natural gas usage in a net zero scenario by 40%.²¹ As more than half of UK gas is imported, a firm power renewable energy resource like tidal stream, and a consistent energy

¹⁸ Catapult (2018) Ibid.

¹⁹ State of Green (2021) *The economic benefits of wind energy*. Available [online](#).

²⁰ Catapult (2018) Ibid.

²¹ Frost (2022) Quantifying the benefits of tidal stream energy to the wider UK energy system, available [online](#).

generation supply provided by wave, will be key in supporting the UK's energy security and a cost-effective transition to net zero that protects UK households from international gas price shocks.²²

As the UK becomes increasingly dependent on variable renewables, marine energy will have a key role in supporting energy security.

The MEC agrees that cost-effectiveness and security of supply must remain as key objectives for the UK's electricity market arrangements.

Research by the University of Edinburgh shows that 1GW of tidal stream and wave energy will provide £114m of system benefit and 113kton of carbon emissions savings per annum.²³ This benefit is not captured effectively in the current CfD mechanism. REMA provides an opportunity to address this oversight.

Marine energy will make the energy system in the future cheaper, however the industry requires clarity from the policy sphere to encourage and accelerate investment.

The mechanisms that underpin the future energy system should encourage efficient use of the electricity network

REMA identifies the need for energy generation to better reflect energy system costs in terms of location. MEC would support the Government continuing to explore changes that reward availability and consistency of energy supply as provided by tidal stream and wave energy. Any market changes should encourage the market to respond through innovative approaches to deployment including co-location of wind with wave which would allow for efficient use of existing assets.

²² D. Pudjianto, G. Strbac (2022) Role and Value of Tidal Stream Generation in the Future UK Energy Mix.

²³ Pennock (2022) Ibid.

Chapter 2: The case for change

3. Do you agree with the future challenges of an electricity system that we have identified? Are there further challenges we should consider? Please provide evidence for additional challenges.

The scope of REMA is too narrow and fails to consider how best to encourage and accelerate innovation

The MEC supports the ambitions of REMA, for the UK to continue decarbonising whilst meeting the rapidly growing demand for electricity and reduce the reliance of fossil fuelled generation. The Government's consultation recognises that wind and solar will not be sufficient to deliver a secure net-zero electricity system and that there needs to be a focus on delivery of a diverse generation portfolio.

It is disappointing therefore that first-of-a-kind technologies or innovative renewables are not considered in REMA's scope unless they can be supported through existing schemes such as Contracts for Difference (CfD). The scale of the net zero challenge requires renewable generation to increase fourfold. As recognised by the International Energy Association, existing technologies will not be sufficient to deliver this capacity.²⁴ The UK Government needs to consider what mechanisms it will put in place to support the growth of emerging, disruptive technologies to play a necessary role in reaching a decarbonised power system.

The British Energy Security Strategy (BESS) commits the Government to aggressively exploring renewable opportunities afforded by its geography. Wave and tidal stream energy have the potential to provide 15% and 11% respectively of the UK's current electricity demand. The narrow scope presented by REMA is inconsistent with the Government's BESS ambitions and should therefore be reviewed.

The MEC strongly supports the next consultation process considering the support mechanisms that would help technologies at different technology readiness levels (TRL) reach commercialisation. This will deliver significant investment opportunities in the UK's R&D sector and provide routes for technologies to enter the new market arrangements implemented by REMA.

A key aim of REMA should be to position the UK to become a world leader in renewables, exporting great British technologies, jobs, and net zero solutions to the benefit of its Global Britain aspirations. The Resolution Foundation in its Economy 2030 report notes that technologies like tidal 'are not only likely to generate relatively high national economic returns, but also have the potential to contribute to regionally balanced growth.'²⁵ Investments in wave and tidal technologies in less innovation-intense regions generate strong returns for those regions.

4. Do you agree with our assessment of current market arrangements/that current market arrangements are not fit for purpose for delivering our 2035 objectives?

The MEC agrees that despite success in delivering increased wind and solar capacity the UK does not have the right market arrangements to deliver its climate change targets.

The MEC strongly disagrees that bespoke support schemes hinder competition. Renewables are currently at different stages of development, maturity, and commercialisation and therefore there is not a level-playing field upon which they can compete. This is particularly problematic when the

²⁴ International Energy Agency (2021) *Net Zero by 2050*. Available [online](#).

²⁵ Resolution Foundation (2022) *The Economy 2030 Inquiry*, available [online](#).

different services that renewables provide to the energy system are not understood or accurately valued. A completely predictable renewable resource like tidal stream is very well suited to a role in the future energy system as it reduces curtailment, supply/demand mismatch and reserve capacity requirement. This ultimately reduces the cost of the whole energy system.²⁶

The resource is also completely decoupled from wind and solar energy, with regular daily peaks. The recurring cyclical power generation profile gives tidal stream energy significant synergies with battery storage as the generation profile ensures batteries will stay topped up and mitigate against deep discharge. Wave energy provides a more consistent and predictable demand profile than other renewables and with the right support will play a key role in a diverse energy mix.

Currently neither the predictability of tidal nor the consistency of wave is properly valued in the UK energy system.

Research has shown that tidal stream and wave energy can displace dependence on fossil fuels and reduce the amount of nuclear that will be required in a future energy mix. It will not be the role of marine energy to dominate the UK's generation portfolio, which will predominantly be offshore wind, but that does not preclude it from playing a key role in the energy mix.²⁷

Competition within different renewable sectors can be maintained, and the benefits of competition, through ongoing ringfenced support. This will help develop and deliver a varied renewable generation portfolio.

In the REMA illustrative capacity mix (Figure 1 in the REMA consultation) does not list tidal stream nor wave energy. Tidal stream should be considered as Low Carbon Firm Power. Wave power should be considered as Low Carbon Variable capacity.

²⁶ Catapult ORE (2022) *Tidal Stream cost reduction pathway report*.

²⁷ D. Pudjianto, G. Strbac (2022) *Role and Value of Tidal Stream Generation in the Future UK Energy Mix*.

Chapter 3: Our approach

5. Are least cost, deliverability, investor confidence, whole-system flexibility and adaptability the right criteria against which to assess options?

MEC welcomes the Government's commitment to ensuring that whilst the REMA consultation process progresses, it will take action to ensure that existing schemes will continue in a manner that supports investor confidence. For marine energy this can be enabled through a commitment to ongoing ringfenced support for tidal stream and introducing a ringfence for the wave energy sector for a ringfence in future allocation rounds.

MEC broadly agrees with the criteria that BEIS has set out.

Proposed Criteria

Least cost

As noted in response to Question 3 judging renewables based primarily on current LCOE does not account for the system benefit tidal stream or wave energy provides. The EVOLVE Project demonstrate the significant role that just under 13GW of marine energy by 2050 will lead to an annual reduction in dispatch cost of £1.03bn p/a.²⁸

If the Government does not consider the broader context in which the electricity market is operating, it may not position the UK to be a leader in a world economy that will be increasingly dominated by competition in renewable development. The UK is currently an international leader in marine energy, however with countries like Canada and Israel offering competitive feed-in-tariffs and clear routes to market for tidal stream and wave energy, it risks sacrificing this leadership.

Deliverability

MEC welcomed the National Shipbuilding Strategy which set out clear principles and infrastructure challenges that need to be addressed to position that industry to succeed. The Strategy notes the significant port infrastructure that will be required, and this too is highlighted in the Floating Offshore Wind Manufacturing Investment Scheme. These measures should be undertaken in liaison with the tidal stream and wave energy sectors. There are numerous synergies between these industries that when identified could ensure that the UK gets value for money and avoids a piecemeal approach to infrastructure investment to achieve its long-term targets.

It should be noted that wave and tidal stream energy have distinct supply chains from FLOW. This means that adapting port infrastructure to accommodate wave and tidal stream will not undermine the UK's ambitious FLOW targets as these will be supported by distinct supply chains.

Investor confidence

MEC strongly supports investor confidence being a key aim of REMA changes. Maintaining clear and consistent support provides the certainty industries need to deliver investment and cost reductions.

The marine energy industry has been hampered by fluctuation in support. Prior to 2016, several sites were awarded revenue support via the Renewables Obligation (RO) scheme. This changed in 2016: the RO was replaced by the CfD and tidal stream was not provided with a ringfence. As it was at a

²⁸ The University of Edinburgh is due to publish the Project EVOLVE work in October. The MEC would welcome the opportunity to discuss these results with the REMA team once these are available.

different stage of development than other renewable technologies projects were unable to compete. This meant that until AR4, there was not revenue support available for tidal stream.

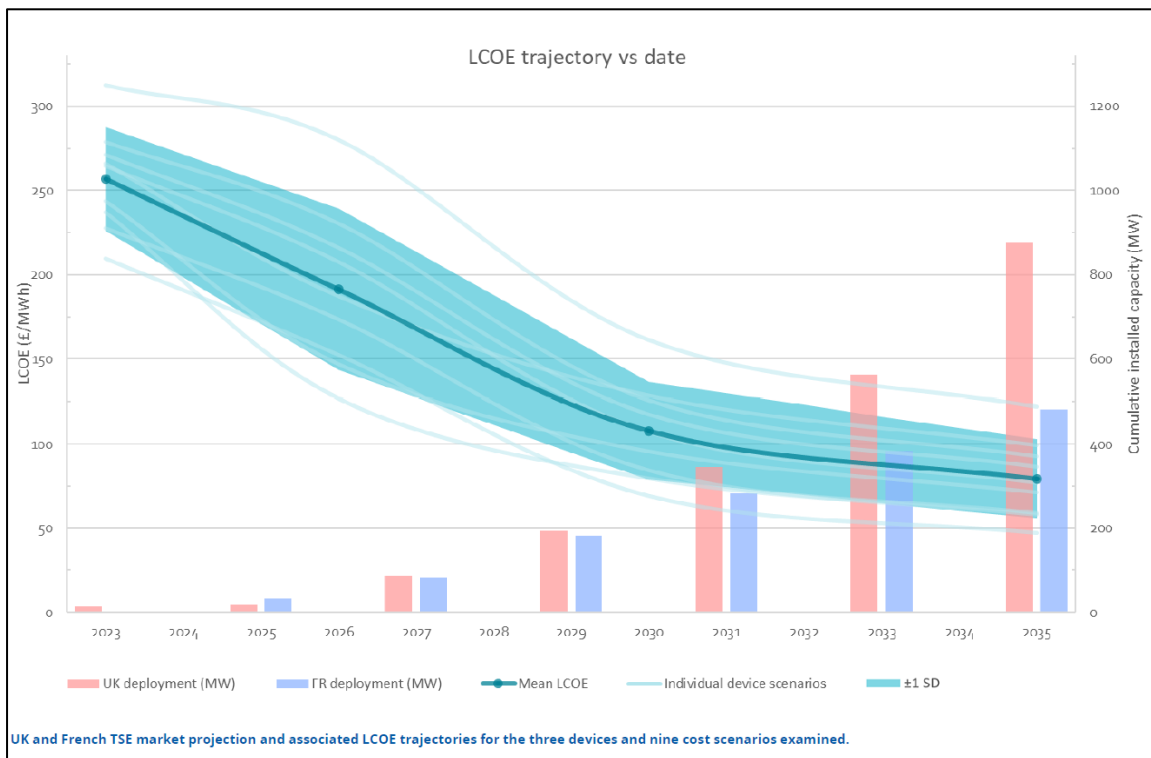
Despite this absence of support, when the Government demonstrated international leadership and set a tidal stream ringfence the industry responded strongly and will deliver over 40MW across four projects at £178MWh, 15% below the Administrative Strike Price, which represents a 40% reduction in LCOE, with little to no revenue support since 2016.²⁹

Additional Criteria

Energy security should be included as a key criteria against which to assess electricity market options. This is included in the document and appears to be an oversight to not include this in the criteria.

The Government should also consider including technology targets. This supports investor confidence and provides advanced sight to wider stakeholders including electricity networks to prepare for a decarbonised electricity system by 2035. This approach will in addition set the path toward a diverse energy generation supply portfolio.

ORE Catapult has demonstrated that if the UK were to set a 1GW marine energy target tidal stream could reach £80MWh by 2035 (potentially as low as £55Mwh for certain sites and technologies). This firm power renewable energy resource can therefore support cost-effective decarbonisation aligned with bolstering the UK's energy security.



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In the next round of the REMA consultation the Government should set out how it intends to weigh and measure different criteria, and clearly set out what success means for REMA reforms.

²⁹ ORE Catapult (2022) *Tidal Stream cost reduction pathway report*.

³⁰ Table copied with permission of ORE Catapult which will feature in its upcoming cost reduction report into tidal stream.

6. Do you agree with our organisation of the options for reform?

And

7. What should we consider when constructing and assessing packages of options?

The Government has set out the reforms it is considering in a clear manner. However, as the final decision could be a mix of the various options MEC welcomes the timeline and plan for extensive engagement on the reforms that are taken forward for consideration.

The consultation notes that REMA is an opportunity to drive innovation across the energy sector, create hundreds of thousands of well-paid, highly skilled jobs, and to reduce dependency on energy imports. However, when setting out the impact of implementing various new arrangements for these factors do not seem to be considered. The impact on jobs and supporting energy independence needs to be part of any review and decision of the final REMA package.

Maintaining investor confidence in the UK's energy system is critical in constructing the final package of options. MEC welcomes the plan BEIS has set out for ongoing consultation with industry to deliver the changes required for a secure and cost-effective net zero transition.

Chapter 4: Cross-cutting questions

8. Have we identified the key cross-cutting questions and issues which would arise when considering options for electricity market reform?

And

9. Do you agree with our assessment of the trade-offs between the different approaches to resolving these cross-cutting questions and issues?

The role of the market

The REMA document does not consider the role of nuclear power. The MEC believes this is an error. Tidal stream and firm power renewables can reduce the amount of nuclear power that might be required in a future energy system. The benefits of an energy system dominated by renewables and hydrogen should be considered and explored against the benefits of nuclear. Shielding the latter from REMA discussions is counterproductive.

The UK Government should be aiming for least cost capacity mix in a net zero energy system rather than lowest cost renewables today. This should include considerations of network infrastructure investment and how this can be undertaken in a cost-effective manner that optimises existing assets.

Extent of competition between technologies

The consultation document is right to note that a single market for renewables will not appropriately value all the attributes that the electricity system needs, and fairly consider the different characteristics of participating technologies. This is evidenced in the Capacity Market, which is dominated by gas plant with low capital costs, but high operational cost, against renewables with high capital cost and very low operational cost.

The REMA document states that immature technologies need protection from competition as they develop and the necessary enabling infrastructure is put in place. Whilst this is partly true it misses the point that competition does exist within different technology industries. Technically a ringfence may be said to be protecting certain technologies from broader competition in which it cannot compete on LCOE, but this does not mean that competition does not exist. This is evidenced in the competitive tidal stream AR4 auction process.

Extent of decentralisation

The REMA document is right to highlight that while market participants at a local level will have better information about their own and their customers' situations, they will be less well informed about the wider system issues and demands.

MEC welcomes more power given to local government bodies, however this would need to be delivered with increased resources as very few have the necessary capacity to engage in energy system decisions.

There is significant risk that economies of scale may not be accessible or that decision making becomes increasingly bureaucratic which would have a negative impact on how attractive the UK is as an investment opportunity.

The MEC believes key decisions will still need to be made centrally, whether in Westminster or the devolved administrations.

Minimising financing cost and operational signals

The CfD scheme has been successful in providing clarity to the renewable energy market and supporting the costs of projects being reduced. There are issues with insulation from market in not providing a clear signal to support co-location with storage or wave energy converter. However, these issues are significantly less detrimental to the energy system and the UK than the risk of reduced renewable deployment.

Therefore, if more accurate market signals are introduced this must be done so in a strategic manner. A specific ringfence for technologies that are being deployed innovatively should be explored. The REMA consultation is right to point out that the right balance of market exposure will depend on the type of technology in question. As tidal stream and wave energy are at an earlier stage of development than other renewables market signals should be limited until there is more equipment in the water, at utility scale.

More accurate price signals and the benefits for consumers

The MEC agrees with the Government that more efficient demand and supply behaviour can avoid costly new network capacity. There is a balance to be struck between ensuring there is investor confidence in renewables and ensuring unnecessary costs are not borne by households. Marine energy has a key role to play here in delivering a cost-effective energy system.

However, while there is a balance to be struck the risk that renewables might be over compensated should not be overstated. Research shows that the CfD scheme will lead to customers being paid back £10.49bn per year by 2027.³¹ The falling costs of wind and solar has altered traditional thinking around the net zero transition and the 'energy trilemma'. Marine energy is now on the same cost reduction journey. However, the service that wave and tidal will provide to the energy system will be different. Tidal stream and wave will support energy security through a diverse energy supply and will lead to cost reductions.³²

The MEC agrees that costly network reinforcement should where possible be avoided. Optimising existing capacity should be a key aim for the renewable industry. That provides further justification for a review into encouraging innovative renewable deployment, including co-location with wind and wave.

In addition, with high international wholesale gas prices the greater capacity of firm power the UK has the less exposed it will be to price fluctuations. Realising its 11.5GW of tidal stream potential will therefore have a key role in directly displacing gas usage.

Delivering more accurate locational signals

The MEC agrees that there is a need for more accurate locational signals in the UK energy system. It could also support local community buy-in to delivering renewable capacity as areas with good renewable resource such as Orkney, do not have low local energy prices.

Building increased transmission infrastructure will be necessary but could be minimised if the energy system operates in a more optimised manner. Particularly given current energy prices and demands on households delaying or avoiding transmission network infrastructure investment would be wise.

³¹ Luke (2022) *Renewed Importance how investing in renewables cuts energy bills*. Available [online](#).

³² ORE Catapult (2022) *Tidal Stream cost reduction pathway report*.

As renewable capacity increases there will likely be developments in harder to reach areas. The cost of undertaken this work should be managed in a manner to compare against the cost of optimising existing network assets.

In addition, cheaper electricity in the regions can be expected to incentivise many industries to position their business further across the UK to make the most of the local generation and anticipated lower energy costs.

Other actions to improve renewable marine deployment

The REMA process should consider three other significant barriers to deployment for marine renewables.

- **Decommissioning bonds should be revisited.** Currently projects will need around £1m per device, held in real cash terms. Larger projects only require a paper bond which states there is enough cash for decommissioning. This has not been provided by the bond market for tidal stream energy. The MEC believes this is a market failure, caused in part by a line in the Decommissioning Act, that allows the Secretary of State to call in the bond even in the absence of an event that would require the bond to be called upon. This can be quickly addressed through an amendment which allows novel and innovative generation projects to have a bond called in only if the bond is required and following appropriate events. This will remove a significant barrier for tidal stream and wave energy projects.
- **Improving the insurability of offshore energy projects through the introduction of an Insurance and Warranty fund.** The first deployments of tidal stream or wave energy projects invariably come with higher risks and therefore higher financing costs. Offshore wind has proven that financing costs can be dramatically reduced over a very short space of time. Currently insurance costs are a significant and costly barrier to marine renewable deployment. In the absence of competitive commercial insurance options, the UK Government should explore the proposal being developed by Renewable Risk Advisers, to introduce an 'Insurance and Warranty' Fund. This is an insurance service for the first mover pilot farms designed to balance the interests and incentives of public authorities, ocean energy developers, and investors. As well as directly reducing the costs of the first deployments, the Fund will generate data to 'crowd in' commercial insurers, and ultimately put itself out of business.³³ As part of deploying renewable technology at pace the Government should consider this proposal and similar financial measures, whether through REMA or a separate workstream.
- **Streamlining the consenting process.** It is welcome that the UK Government is prioritising the streamlining of the consenting process for offshore wind. This should be replicated for tidal stream and wave energy projects. There was 140MW of eligible capacity that could bid into the ringfence for AR4 (capacity that had lease agreement, marine license, and grid offer). As the UK has moved towards annual renewable auctions the 3-year timeline that currently exists for getting capacity to eligibility is too long. For example, it took over three years between the Meygen project securing a lease agreement from Crown Estate and getting a marine license from Marine Energy Scotland. Clear long-term support that allows project developers to develop new sites, and speeding up the timescales as with offshore wind, will allow a diverse set of next generation projects to emerge.

³³ OceanSET (2021) *Design Options for an Insurance and Warranty Fund*. Available [online](#).

10. What is the most effective way of delivering locational signals, to drive efficient investment and dispatch decisions of generators, demand users, and storage? Please provide evidence to support your response.

The MEC supports the Government continuing to consider moving to zonal or nodal wholesale pricing.

11. How responsive would market participants be to sharper locational signals? Please provide any evidence, including from other jurisdictions, in your response.

And

12. How do you think electricity demand reduction should be rewarded in existing or future electricity markets?

How responsive market participants will be to sharper locational signals will vary dramatically on the exact settlement. Clearly there is a limit and strong renewable resource will not be easily moved, however innovative solutions and using existing resource to its fullest extent should be explored prior to other, more costly, investments.

The Swedish experience provides an example of the risks of moving toward zonal pricing in the absence of sufficient transmission capacity. Despite Sweden producing more electricity than it uses, southern Sweden has seen energy prices increase dramatically due to poor transmission capacity.³⁴

The CCC forecasts that electricity generation supply may need to increase fourfold to reach the UK's 2050 net zero targets. Energy efficiency is outside of the scope of REMA, however, just as the deployment of innovative technologies should be included, the MEC believes that energy efficiency should be included in the next consultation round.

³⁴ Information on congestion issues on Sweden's transmission lines leading to prices reach (on occasion) 100 times greater in the south than north is available [here](#).

Chapter 5: A net zero wholesale market

13. Are we considering all the credible options for reform in the wholesale market chapter?

The MEC believes the REMA consultation sets out credible options for reform of the wholesale market and is not proposing other options to be considered.

14. Do you agree that we should continue to consider a split wholesale market?

The Government should continue to consider splitting the wholesale market, whilst acting to provide the necessary certainty investors require to support the transition to renewables that the climate change challenge demands.

It should be noted that the current high energy bills are caused by international wholesale gas prices and is a cost of energy dependence and being overly reliant on fossil fuels and imports. The UK's geography provides it with a tremendous wave and tidal energy resource which, when exploited, will protect UK households and businesses from unreliable imports and intermittency of renewables.

The role of marine energy in providing firm power to the energy system should be defined and valued as such in any wholesale market split.

15. How might the design issues raised above be overcome for: a) the split markets model, and b) the green power pool? Please consider the role flexible assets should play in a split market or green power pool – which markets should they participate in? - and how system costs could be passed on to green power pool participants.

The MEC questions the necessity of a 'green power' pool in a decarbonised energy system. Instead, renewables should be defined as providing different services to the UK energy system. In doing so any changes delivered by REMA should seek to deliver a diverse energy generation portfolio.

Whilst a split market model would be fairer and a shift from marginal pricing will allow households to benefit from increased renewable capacity, ensuring that the service that different renewables are providing to the energy system is of paramount importance.

Wave and tidal stream energy will generate energy during periods of low wind yield and regardless of whether the sun is shining. At that point the energy being harnessed is inherently more valuable as the future energy mix will likely be dominated by wind and solar. If wave and tidal are not supported this valuable service will not be enabled and other more costly (nuclear, storage) solutions will require significant investment.

16. Do you agree that we should continue to consider both nodal and zonal market designs?

And

17. How might the challenges and design issues we have identified with nodal and zonal market designs be overcome?

And

18. Could nodal pricing be implemented at a distribution level?

MEC supports the UK Government continuing to consider both nodal and zonal pricing for three primary reasons.

Firstly, nodal and zonal market design will encourage better optimisation of existing assets. Tidal stream and wave energy can support and provide a consistent energy resource during periods of intermittency for wind and solar. This could avoid or delay investment in costly transmission network infrastructure and ensure that development of sites where there is existing and unharnessed renewable capacity is encouraged.

Secondly, nodal and zonal pricing will allow local communities to benefit from the renewable resources that are being harnessed closer to their homes. This will help maintain democratic legitimacy for the net zero transition and incentivise communities to be active supporters of key project developments. It could also attract business investment into areas that have rich renewable resource and as a result consistently low electricity prices.

Thirdly, when the necessary and significant network investment that net zero will require is undertaken households can be confident that this is being implemented in a cost-effective manner. As the CCC forecast that electricity demand could treble by 2050 the amount of network investment required will be significant. As nodal and zonal pricing becomes better understood UK bill payers will understand that the renewable resource of offshore sites has been explored and invested in fully before more necessary and costly network investment is required. Zonal or nodal pricing could deliver £30bn of cost savings to 2035 with benefits to communities that are supporting the net zero transition.³⁵

The principle of not damaging investor confidence in the UK is key if there is a shift to either zonal or nodal pricing. Renewable projects need to locate where there is rich resource, and the right balance needs to be struck between supporting large scale renewable projects and a cost-effective energy system. Currently in areas where there is a rich renewable resource the energy costs are higher due to constrained networks and Transmission Network Use of System (TNUoS) charges, in addition to national pricing. The impact of a change to the latter needs to be investigated and understood fully before any shift takes place. MEC notes the Swedish experience of zonal market pricing which, despite as a country producing more electricity than it uses, southern Sweden has seen energy prices increase dramatically due to poor transmission capacity.³⁶

It is imperative that consumers are protected from significant price volatility. The MEC believes this needs to be addressed in any locational network price change and that this is a significant risk in a distribution-led market model. This introduces the added risk, as the REMA document notes, of leading to a costly energy system overall.

Zonal pricing could bring some first-of-a-kind low carbon technologies to new locations. In addition, it could encourage innovative renewable deployment approaches, such as co-location of wind and wave. Nodal pricing at a distribution level will introduce unnecessary complexity, make balancing difficult and could potentially discourage investment in the renewable projects required to deliver net zero.

³⁵ Catapult Energy Systems (2022) *Location, Location, Location Reforming wholesale electricity markets to meet Net Zero*. Available [online](#).

³⁶ Information on congestion issues on Sweden's transmission lines leading to prices reach (on occasion) 100 times greater in the south than north is available [here](#).

19. Do you agree that we should continue to consider the local markets approach? Please consider the relative advantages and drawbacks, and local institutional requirements, of distribution led approaches.

The MEC does not support the local markets approach which may have a negative impact on investor confidence in the renewable projects that will be critical to the net zero transition. That this approach has not been tested in practice anywhere else is concerning and given there is not a great deal of time to reach the UK's climate change targets, it is a significant risk. Research by the University of Edinburgh shows that 1GW of tidal stream and wave energy will provide £114m of system benefit and 113kton of carbon emissions savings per annum.³⁷ This benefit may not be captured in a local markets approach.

20. Are there other approaches to developing local markets which we have not considered?

The MEC does not think other approaches should be considered than those outlined in the REMA document.

21. Do you agree that we should continue to consider reforms that move away from marginal pricing? Please consider the relative advantages and drawbacks, and local institutional requirements, of distribution led approaches.

The UK Government should continue to consider reforms from marginal pricing. High international gas prices have led to high energy bills due to marginal pricing. Renewables, under the CfD scheme, will pay significant amounts of money back to households.

As the amount of renewable capacity increases the UK needs a diverse supply of energy to displace the role that gas provides to the energy system. Increasing capacity from tidal stream and wave energy has a clear role, providing a set amount of electricity upon which the UK can depend. A recent report into the wider energy system benefits of tidal stream found that as the UK reaches its net zero target, tidal stream has the potential to provide £100-600M in cost savings in the energy system per annum by 2050 and reduce natural gas capacity required by about 40%.³⁸ As more than half of UK gas is imported, a firm power renewable energy resource like tidal stream will be key in supporting the UK's energy security.³⁹

22. Do you agree that we should continue to consider amendments to the parameters of current market arrangements, including to dispatch, settlement and gate closure?

It is not clear that amendments to current market arrangements and changes to gate closure will deliver the changes that the UK Government is trying to achieve through REMA.

23. Are there any other changes to current wholesale market design and the Balancing Mechanism we should consider?

The MEC is not proposing other changes to the Balancing Mechanism.

³⁷ Pennock (2022) Ibid.

³⁸ Frost (2022) Quantifying the benefits of tidal stream energy to the wider UK energy system, available [online](#).

³⁹ D. Pudjianto, G. Strbac (2022) Ibid.

Chapter 6: Mass low-carbon power

24. Are we considering all the credible options for reform in the mass low carbon power chapter?

The MEC agrees that the options set out in Chapter 6 are credible and does not believe other options should be considered.

25. How could electricity markets better value the low carbon and wider system benefits of small-scale, distributed renewables?

To ensure energy security the UK requires a diverse generation portfolio with the different roles that different technologies will play being understood and supported. The Government being technology agnostic will not necessarily lead to a cost-effective or efficient energy system. As demonstrated by separate studies from the University of Edinburgh and Imperial College London tidal stream and wave energy are strongly positioned to provide overall system benefits.

Prior to shifting its focus to local solutions, the MEC would support the UK Government pursuing these larger system benefits and ensuring electricity markets better value the range of services provided at a transmission level.

26. Do you agree that we should continue to consider supplier obligations?

And

27. How would the supplier landscape need to change, if at all, to make a supplier obligation model effective at bringing forward low carbon investment?

And

28. How could the financing and delivery risks of a supplier obligation model be overcome?

The MEC is concerned that supplier obligation may lead to a scenario when cheapest cost at a local level is prioritised over solutions that deliver broader system benefit. If supplier obligations are introduced without safeguards and other mechanisms the UK may not secure a cost-effective electricity system in 2035 or 2050 as suppliers are not incentivised to support a broad generation portfolio.

In the absence of other government interventions that support a delivery of a diverse energy mix, the MEC would therefore not support suppliers being empowered to make decisions that dictate the UK's journey to net zero.

29. Do you agree that we should continue to consider central contracts with payments based on output?

And

30. Are the benefits of increased market exposure under central contracts with payment based on output likely to outweigh the potential increase in financing cost?

And

31. Do you have any evidence on the relative balance between capital cost and likely balancing costs under different scenarios and support mechanisms?

The current CfD mechanism has been very successful in increasing the UK's renewable energy capacity by de-risking investment. The MEC supports the Government continuing to consider a CfD with a strike range as an interesting proposal in introducing market exposure whilst still providing certainty to renewable investors.

It is critical that pot structures are set up in a manner that continues to support technology ringfences. As different renewables are at different stages of technology and commercial readiness, benefits that would be realised if these are developed in the UK will be missed if ringfences are not maintained.

On page 16 the MEC sets out three interventions that will accelerate the deployment of marine renewables. There are significant barriers posed by current insurance arrangements and decommissioning bond requirements. These issues should be addressed as part of the new REMA settlement to encourage and accelerate renewable deployment from technologies at different stages of readiness.

32. Do you agree that we should continue to consider central contracts with payment decoupled from output?

And

33. How could a revenue cap be designed to ensure value for money whilst continuing to incentivise valuable behaviour?

And

34. How could deemed generation be calculated accurately, and opportunities for gaming be limited?

The UK Government should continue to consider a revenue cap and floor, however the MEC is less convinced by the proposal to decouple payment from output. Decoupling payment from output would seem inherently problematic in optimising the energy system and appears to run counter to the other goals the UK Government sets out in the REMA document.

Tidal stream and wave energy have distinct generation profiles than other renewables. It would be of interest to explore how the increased security that these technologies will provide to the energy system could be supported via a cap and floor mechanism.

The MEC would not support a cap and floor approach taking the place of ringfenced CfDs if in this new approach does not give innovative technologies a clear route to market. This is what would happen if all technologies were judged only on LCOE.

Chapter 7: A net zero wholesale market

The MEC has not provided a response to Chapter 7.

35. Are we considering all the credible options for reform in the flexibility chapter?
36. Can strong operational signals through reformed markets bring forward enough flexibility, or is additional support needed to de-risk investment to meet our 2035 commitment? Please consider if this differs between technology types.
37. Do you agree we should continue to consider a revenue cap and floor for flexible assets? How might your answer change under different wholesale market options considered in chapter 5 or other options considered in this chapter?
38. How could a revenue cap and floor be designed to ensure value for money? For example, how could a cap be designed to ensure assets are incentivised to operate flexibly and remain available if they reach their cap?
39. Can a revenue (cap and) floor be designed to ensure effective competition between flexible technologies, including small scale flexible assets?
40. Do you agree that we should continue to consider each of these options (an optimised Capacity Market, running flexibility-specific auctions, and introducing multipliers to the clearing price for particular flexible attributes) for reforming the Capacity Market?
41. What characteristics of flexibility could be valued within a reformed Capacity Market with flexibility enhancements? How could these enhancements be designed to maximise the value of flexibility while avoiding unintended consequences?
42. Do you agree that we should continue to consider a supplier obligation for flexibility?
43. Should suppliers have a responsibility to bring forward flexibility in the long term and how might the supplier landscape need to change, if at all?
44. For the Clean Peak Standard in particular, how could multipliers be set to value the whole-system benefits of flexible technologies? And how would peak periods be set?

Chapter 8: Capacity Adequacy

45. Are we considering all the credible options for reform in the capacity adequacy chapter?

The MEC is not proposing the Government consider other options in the REMA consultation process.

46. Do you agree that we should continue to consider optimising the Capacity Market?

The MEC strongly supports the UK Government continuing to explore how the Capacity Market can be optimised.

Marine energy is strongly positioned to support the UK's efforts to optimise the Capacity Market

Marine energy is strongly positioned to provide increased, dependable, and predictable capacity, in a manner that is consistent with the UK's net zero goals. As highlighted in this response and executive summary, tidal stream and wave energy provide predictable and more consistent energy than other renewables, and therefore provide a unique service to the energy system.

Funding opportunities for technologies that improve the UK's energy security should be prioritised in the new REMA settlement.

Whether this is undertaken through an optimised capacity market or through other means, a net zero future requires the Government to more accurately value different sources of generation based on the service it provides to the energy system. This could be delivered through setting an amount of dependable, consistent energy that the UK requires, and allowing technologies within the marine space to compete to win contracts.

The Capacity Market has relied on gas which is inconsistent with the UK's net zero goals

The REMA consultation notes that 20GW of gas will be retired by 2035. As noted previously research by Imperial College has found that renewable generation provided by tidal stream, is able to directly displace dependency on gas. The MEC would welcome continued engagement with the Government as it develops adequacy measures to enable these technologies to accelerate deployment of these technologies, and the funding mechanisms that may be required to deliver this progress.

47. Which route for change – Separate Auctions, Multiple Clearing Prices, or another route we have not identified – do you feel would best meet our objectives and why?

The MEC supports Separate Auctions over Multiple Clearing Prices. In the former the Government will be able to ensure the UK has a diverse energy generation supply which is critical to energy security.

This approach could be delivered through a multiple clearing approach. The REMA document states that a benefit of this approach is to avoid target setting. Target setting should not be seen as a negative outcome in delivering capacity. It should be noted that competition within technologies will reduce costs and encourage innovation.

Marine energy should be defined as low-carbon, renewable firm power, and not considered as providing the same service to the energy system as other renewables. Separate auctions will therefore meet the UK's objectives of ensuring security of supply in a manner that is consistent with its net zero target.

48. Do you consider that an optimised Capacity Market alone will be enough for ensuring capacity adequacy in the future, or will additional measures be needed?

And

49. Are there any other major reforms we should consider to ensure that the Capacity Market meets our objectives?

The last twelve months has demonstrated that a diversity of generation types is critical for energy security. Any reform to the Capacity Market which does not recognise the need to encourage and accelerate the deployment of diverse generation means will not deliver the UK Government's objectives.

MEC strongly supports the delivery of a diverse energy supply being a key goal for the Government as part of REMA.

50. Do you agree that we should continue to consider a strategic reserve?

And

51. What other options do you think would work best alongside a strategic reserve to meet flexibility and decarbonisation objectives?

The MEC supports the UK Government continuing to consider a strategic reserve. A centralised system for ensuring energy security will allow solutions that deliver broader system benefits to be identified, valued, and delivered.

Tidal stream is highly predictable. The greater the capacity that the UK has, the smaller the strategic reserve will be required to ensure energy security.

As highlighted in the MEC response to Question 47, setting clear targets for how energy security will be ensured, and with which technologies, will help ensure that the UK gets the diverse energy generation portfolio that it requires. This should include marine, green hydrogen and storage solutions.

The MEC supports ongoing consultation for creative approaches to delivering a strategic reserve, and how required investment can support renewable generation and markets.

52. Do you see any advantages of a strategic reserve under government ownership?

The MEC believes that with the right measures in place the Government would not have to undertake ownership of strategic reserve assets.

53. Do you agree that we should continue to consider centralised reliability options?

The MEC agrees that the Government should continue to consider centralised reliability options and is not supportive of the critical issue of energy security being decentralised.

54. Are there any advantages centralised reliability options could offer over the existing GB Capacity Market? For example, cost effectiveness or security of supply benefits? Please evidence your answers as much as possible.

No response provided.

55. Which other options or market interventions do you consider would be needed alongside centralised reliability options, if any?

No response provided.

56. Do you agree that we should not continue to consider decentralised reliability options / obligations? Please explain your reasoning, whether you agree or disagree.

As stated previously MEC does not consider decentralised reliability options to be as effective as centralised options.

57. Are there any benefits from decentralised reliability option models that we could isolate and integrate into one of our three preferred options (Optimised Capacity Market, Strategic Reserve, Centralised Reliability Option)? If so, how do you envisage we could do this?

No response provided.

58. Do you agree that we should not continue to consider a capacity payment option? Please explain your reasoning, whether you agree or disagree.

The MEC disagrees with the decision not to continue considering a capacity payment option. There are renewable projects with a high upfront CAPEX, but low running, costs that would become attractive to investors if capacity payments were focussed on removing this initial barrier.

The UK has substantial tidal and wave energy resource that could play a key role in supporting energy security. If its dependability was valued, through a capacity payment option, that will attract greater investor interest, delivering cheaper capital to build infrastructure projects. The cost of capital is a key issue in delivering on the UK's marine energy potential.

59. Do you agree that we should not continue to consider a targeted capacity payment / targeted tender option? Please explain your reasoning, whether you agree or disagree.

The MEC believes that the Government should continue to consider targeted capacity payment options as a means of delivering a diverse generation portfolio that energy security requires.

60. Do you agree with our assessment of the cost effectiveness of a targeted capacity payment / targeted tender option, and the risk of overcompensation? If not, why not?

The MEC believes that the risk of overcompensation is overstated. In the scenario that renewable generation becomes attractive to investors, and the right generation technologies are supported, this will lead to the UK maintaining international leadership and seizing the opportunities associated with the net zero transition.

Competition has a key role in the net zero transition, and the MEC supports competitive processes as a means of encouraging innovation. However, these approaches should be deployed to support the UK reaching its net zero and climate change goals. Competition is not the target.

In the context of increasing energy costs, it is critical to remember that this is due to gas prices, and not due to renewable costs which have demonstrated a consistent and dependable ability to reduce cost and LCOE when the Government provides consistent support. These are an increasingly low cost on household and businesses' energy bills. Being overly cautious in supporting the renewable industries poses a far greater risk than the risk of overcompensation.

Chapter 9: Operability

The MEC has not provided a response to Chapter 9.

61. Are we considering all the credible options for reform in the operability chapter?
62. Do you think that existing policies, including those set out in the ESO's Markets Roadmap, are sufficient to ensure operability of the electricity system that meets our net zero commitments, as well as being cost effective and reliable?
63. Do you support any of the measures outlined for enhancing existing policies? Please state your reasons.
64. To what extent do you think that existing and planned coordination activity between ESO and DNOs ensures optimal operability?
65. What is the scope, if any, for distribution level institutions to play a greater role in maintaining operability and facilitating markets than what is already planned, and how could this be taken forward?
66. Do you think that the CfD in its current form discourages provision of ancillary services from assets participating in the scheme? If so, how could this best be addressed?
67. Do you think it would be useful to modify the Capacity Market so that it requires or incentivises the provision of ancillary services? If so, how could this be achieved?
68. Do you think that co-optimisation would be effective in the UK under a central dispatch model?

Chapter 10: Options across multiple market elements

69. Do you agree that we should not continue to consider a payment on carbon avoided for mass low carbon power?

The MEC agrees with the Government's assessment that the current CfD process is a better means of increasing renewable deployment than the introduction of a payment based on carbon avoided.

There is one potential benefit that by reframing technologies a future scheme could encourage a more diverse energy mix than within renewables. For example, tidal stream has the potential to reduce natural gas capacity required by about 40% when considering a net zero energy system.⁴⁰ The current CfD scheme is not effective at identifying or valuing these additional benefits. However, MEC supports this value being recognised through over means rather than through the introduction of a new scheme.

70. Do you agree that we should continue to consider a payment on carbon avoided subsidy for flexibility?

And

71. Could the Dutch Subsidy scheme be amended to send appropriate signals to both renewables and supply and demand side flexible assets?

And.

72. Are there other advantages to the Dutch Subsidy scheme we have not identified?

The MEC does not believe the Dutch Subsidy scheme would be better than the current CfD approach and therefore would not support the Government continuing to consider this within the REMA process.

73. Do you agree that we should continue to consider an Equivalent Firm Power auction?

And

74. How could the challenges identified with the Equivalent Firm Power Auction be overcome? Please provide supporting evidence

The Government should continue to consider how it realises some of the benefits that an Equivalent Firm Power (EFP) auction could deliver, however MEC does not believe that the EFP is the best approach to delivering these. EFPs could support the development of innovative deployment options including colocation of wind with wave energy devices.

The UK Government has provided support for research into co-location of floating offshore wind and wave energy converters.⁴¹ Marine Power Systems is developing floating platform technology for wind that also acts as a wave energy converter. This represents an exciting development and could support decreased power variability as wave and wind generation work in a harmonious nature. This in turn will allow for a more efficient use of critical network infrastructure.

⁴⁰ Frost (2022) Quantifying the benefits of tidal stream energy to the wider UK energy system, available [online](#).

⁴¹ Marine Power Systems (2022) *MPS lands £3.5m of funding from UK Government*. Article available [online](#).

The challenges that the REMA lists are significant. MEC supports the UK Government procuring system security at a system level and could risk forgoing economies of scale in procuring firm power sources of renewables, including tidal stream.

As stated previously the MEC does not believe that a technology neutral approach to auctions will put the UK on the path to lowest cost energy system in the future. If the UK Government does move toward an EFP approach it would need to be implemented in a careful and considered manner to avoid damaging investor confidence. Long lead times prior to its implementation would therefore be required.