Cost of Energy Review Team
Department for Business, Energy and Industrial Strategy
6th Floor, Spur
1 Victoria St, Westminster
London, SW1H 0ET

5 January 2018

Dear Sir/Madam

Response to the independent Cost of Energy Review

Scottish Renewables is the representative body for the renewable energy industry in Scotland, working to deliver secure supplies of low-carbon, clean energy for heat, power and transport at the lowest possible cost. We represent around 270 organisations ranging from large energy suppliers, operators and manufacturers to small developers, installers, community groups and companies right across the supply chain.

The independent Cost of Energy Review makes a useful contribution to the ongoing discussion on the long-term future of our energy system and we look forward to working with both industry and Government to deliver clean growth and affordable energy for businesses and consumers as well as the aims of both the Industrial and Clean Growth strategies.

Along with supporting these ambitions, Scottish Renewables welcomes this Review's recognition of the centrality of renewable generation to our future energy system — and its recognition of the rapidly-falling costs of renewable energy.

It is our view that energy will be delivered at the lowest cost to the consumer if regulation encourages competition, policy is predictable, clear and stable and the market is open to participants to innovate and deliver low-cost solutions.

The renewable energy industry has delivered at pace both on carbon reduction and on the ambitions of the Industrial Strategy. However, to develop further the industry requires a fit-for-purpose policy framework which recognises its unique needs. As technologies mature, costs have reduced and our energy system has become more dynamic. That process has changed its economics; supporting mechanisms and policy frameworks must keep pace with these changes.

Where clarity of support has been given, our industry has delivered successfully. This is no more prominent than in the recent CfD auction allocation, where the cost of offshore wind projects given contracts to be delivered by 2022, will have halved in price from the contracts awarded at the last auction in 2015.

We would therefore strongly encourage government to deliver a holistic energy policy with clear and long-term routes to market for all renewable technologies. We believe that with mechanisms to support the pathway from innovation to full commercial operation, Government can not only deliver on its energy and Industrial Strategy objectives but will create a framework replicable across other sectors of our economy, enabling widespread growth.

Our detailed comments on the Review are set out in the enclosed response, though we wish to draw your attention to the following points in particular:

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- **Further renewable energy cost reduction requires backing**
  As noted in the Review, the costs of various renewable energy technologies have continued to fall substantially. Onshore wind and solar PV are now the cheapest forms of new low-carbon electricity generation, including when compared to gas CCGT. The 2017 Contracts for Difference (CfD) auction saw offshore wind reduce costs by 50% from the previous auction round. With the right framework and greater clarity over timescales and budgets, the renewables sector has the potential to show further cost reductions across a range of technologies. Allowing low-cost renewable technologies to compete will ultimately result in a net payback for consumers and help unlock the low-cost, low-carbon energy system envisaged in the Clean Growth Strategy.

- **A viable route to a viable market is essential**
  To achieve the aims of government policy and to meet binding targets it is crucial that the lowest-cost providers of low-carbon generation are able to compete in the energy market. Currently, onshore wind and solar PV are being denied access to compete in CfD auctions. Independent analysis has shown that at least 1GW of additional onshore wind capacity could come forward at a net payback for consumers (i.e. subsidy free) if allowed to compete in a future auction round.

  We believe the CfD mechanism has shown it is capable in its current form of delivering low-carbon generation while incentivising-cost reduction. The mechanism has provided certainty for investors and the single-contract model has allowed developers to secure low-cost financing arrangements. While the CfD may need tweaks (for example to the OFTO regime to better accommodate innovative technologies) we are concerned over the Review's proposed changes to the mechanism.

- **Innovative technologies need support to commercialise**
  Innovative technologies including heat pumps, marine energy, floating wind and some energy storage technologies are poised to bring significant benefits to our energy system. However, without sustained support to commercialise, the UK is in danger of losing the lead it has developed in many of these areas, as well as the resultant economic and environmental benefits. It is vital that the right frameworks to enable these technologies to develop through to market are in place. We would encourage Government to consider producing a strategy for energy innovation to deliver these multiple benefits for the UK.

- **Regulatory and market reform is essential to enable innovation across our energy networks**
  Regulation has been largely unable to keep pace with the developments across our energy system. Unintended regulatory barriers must be quickly tackled to allow innovation and ensure low-cost, low-carbon energy solutions can come forward.

  For example, co-locating energy storage with existing renewable sites can deliver many benefits (such as improving temporal alignment of delivery of power with demand). However, existing network regulation and Tariff administration proved a barrier to these sites developing. While in this instance, the industry, Ofgem and National Grid worked together to create a solution, regulatory barriers and unintended consequences of existing regulation could easily hamper the ability of the renewables industry to deliver innovative systems which would benefit the UK.

The UK and Scottish Governments must both work to ensure that all policy and fiscal levers, including Planning policy and Non-Domestic Business Rates, support respective energy policy ambitions, and enable low-carbon generation and innovation across our energy networks to take place.

As such, we would support consideration of a longer-term review of regulatory mechanisms to support technology and network innovation.

- **The full economic and system benefits of renewable generation go beyond energy production**
  Several benefits of renewable energy are not currently priced in the energy market, and we would encourage Government to think holistically about the value these technologies bring to our energy system, our economy and society as a whole. Many renewable energy sources are capable of providing valuable system services. While the System Operator has some procurement mechanisms, which we note are under review, there is a need for an overhaul of the service market so that it allows the full range of service providers in our energy system to participate.

  Additionally, renewable energy brings substantial socio-economic benefits, not least in rural areas, post-industrial towns and port/harbour regions. These benefits range from investment in infrastructure, employment throughout the supply chain, community ownership and funds, greater control over energy supply, income diversification and export of technology and expertise. By backing renewables, Britain can be at the forefront of the global clean energy economy.

Scottish Renewables is committed to working with both the UK and Scottish Governments to develop a smart, low-carbon energy system at the lowest possible cost. We would gladly contribute to your follow-up work on this independent Review.

Yours sincerely

Claire Mack

Chief Executive

Independent Cost of Energy Review: Scottish Renewables' detailed comments

Cost reduction and route to market

Scottish Renewables welcomes the review's recognition of the rapidly-falling cost of renewables and its aim to find a way to meet carbon emission reduction targets and deliver security of supply at lowest cost.

In November 2016 BEIS projected that, by 2025, it will be cheaper to produce one megawatt hour (MWh) of electricity from onshore wind and solar PV than it will be from any other technology, including nuclear, CCGT gas or offshore wind.[1]

Similarly, independent analysis by Baringa Partners[2] demonstrated that a further gigawatt (1GW) of additional onshore wind capacity could come forward through the Government's existing Contracts for Difference auction process at a clearing price of £49.40/MWh. This would mean that these projects would be delivered at a price below the long-term wholesale price for power, resulting in a net saving for consumers of £18 million in Net Present Value terms over the contracts' 15-year duration (i.e. subsidy-free). Further, this would generate around £1 billion of investment in clean energy production, protect and create jobs, and meet the equivalent annual demand of more than 600,000 homes.

Professor Helm noted in his report that "as the costs of renewables continue to fall, it is only the carbon price that is needed to ensure a level playing field as renewables become the new conventionals"[3]. Scottish Renewables supports a robust carbon price, and believes it plays a key role in the package of decarbonisation policy measures. However, in our view, delivering of the required cost reduction is dependent on mature renewables being able to bid in auctions for long-term contracts for clean electricity. This allows renewable energy developers to access stable revenues, which are required to mitigate against the volatility within a wholesale market based on short-term marginal cost.

Technologies which have been afforded this route to market and certainty of revenues have already demonstrated clear cost reduction. Offshore wind, with continued access to the Contracts for Difference mechanism, has delivered a 50% reduction in costs in less than five years, adding over 3GW of clean power to the UK's energy system when operational. The UK is home to 11.7GW of solar PV[4]. The cost of the technology has fallen by 70%[5], aided by access to the Feed-in Tariff.

A truly level playing field across renewable technologies, where each has a viable route to a viable market, is necessary to drive further cost reductions across our energy system. Government commitment and visibility of the future of renewables support will therefore help to de-risk this development activity for investors and allow a greater pool of competition to be available for future auctions.

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[1] https://www.nao.org.uk/wp-content/uploads/2016/07/Nuclear-power-in-the-UK.pdf (Figure 12, page 26)
[2] https://www.baringa.com/getmedia/598e2af5-f60e-48ae-97fb-88fedde15031/Scottish-Renewables-onshore-wind-report-release-FINAL/
[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/654902/Cost_of_Energy_Review.pdf
[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/643414/DUKES_2017.pdf
[5] http://www.r-e-a.net/upload/uk-solar-beyond-subsidy-the-transition.pdf

To align with government policy ambition, onshore wind and solar, the cheapest forms of low-carbon technologies, should be given the ability to compete in the market via the CfD at the earliest opportunity.

At the same time, we would support consideration of the Corporate Power Purchase Agreement (CPPA) market. CPPAs can represent a win-win for both generators and energy intensive users with the potential for both sides to secure certainty over costs and revenues, allowing energy intensive users to decarbonise their supply competitively and for generators to finance new-build generation through a committed demand.

Innovative technologies need support to commercialise

If we are to provide secure, low-carbon energy supplies at a reasonable cost to the consumer we will have to deploy advanced technologies and continue to develop innovative solutions. New methods of generating, managing and storing energy will be essential, and the UK has already secured a world lead in their development.

Supporting energy innovation is crucial, not just to secure a fit-for-purpose energy system for the UK, but to ensure our industry is able to reap the benefits of early development and adoption of the technologies which will enable this change.

The Review notes that "R&D and innovation elements will continue to require public support" and that innovation policy should "focus on designing a general capital grants and tax regime". While we support this, we have also called for the development of a UK Energy Innovation Strategy[6] to guide funding commitments and direct innovation spend to ensure delivery of maximum economic benefits.

It is important to note that support for commercialisation goes beyond capital funding, it is equally about developing a clear development pathway for early stage technologies. This was embedded in previous UK policy be means of different support levels for different technologies. However current auction processes which push innovative technologies to demonstrate price competitiveness before being awarded contracts don't take into account the different economics of innovative technologies and remove the previous policy flexibility.

At the launch of the UK Government's Clean Growth Strategy, a 'triple test' for innovation was established. That test dictates that innovative technologies must deliver carbon reduction, demonstrate a clear cost-reduction pathway and develop a lead for the UK in the global market[7]. We believe that the following technologies are well placed to meet the 'triple test' requirements and should be included in an energy innovation strategy:

- **Wave and tidal power:** The UK already leads the world in the development and testing of wave and tidal technologies. 1,700 people work in these sectors in the UK and this could grow to more than 20,000 in the next decade[8]. With some of the best wave and tidal resources on the globe, world-leading test and demonstration facilities and organisations such as Wave Energy Scotland and the Offshore Renewable Energy Catapult (both based in Scotland) to drive technology development, the UK is well placed to continue to lead these sectors internationally.

[6] https://www.scottishrenewables.com/publications/briefing-innovation/
[7] https://www.gov.uk/government/speeches/launch-of-the-clean-growth-strategy
[8] http://www.renewableuk.com/en/publications/reports.cfm/Wave-and-Tidal-Energy-UK-Capitalising-on-Capability

- **Energy storage**: Storage technologies enable increased renewables capacity (by storing the output of renewable technologies at times of low demand), prevent or delay the need for costly network upgrades and provide a number of ancillary services to the grid, such as frequency response. Small-scale devices empower communities and consumers, and deploying energy storage delivers security of supply. The global market for large-scale energy storage has been estimated to be almost £20 billion by 2022[9], and the UK has the opportunity to be a major player in this.
- **Low-carbon heat:** Heat accounts for 46% of UK energy demand[10], supports 32,600 jobs and is an industry which had a turnover of £4.9 billion in 2013 alone[11]. However, only 4.9% of the UK's total heat demand was renewable in 2014[12]. Decarbonising the sector will mean fully developing new technologies, supporting their large-scale deployment and integrating them into our wider energy system.
- **Floating offshore wind:** Floating wind affords access to deep-water. With the launch of the Hywind project, the UK has already taken steps to secure a world lead in this area, and continued utilisation the UK's offshore wind expertise to commercialise floating wind technologies will present opportunities to further exploit our offshore wind resources and to develop knowledge and skills which will be in demand in a growing world market.
- **Systems integration:** Our energy system can be made more efficient by thinking holistically across energy sectors and employing smart technologies. Integrating our heat, transport and electricity sectors will be fundamental to delivering secure, low-carbon, low-cost energy supplies, and technologies to enable this must be supported.
- **Network development:** The Committee on Climate Change states that achieving our carbon budgets with a more flexible power system has the potential to save consumers £3-3.5 billion per year[13]. Securing this flexibility will require a range of new technologies such as Active Network Management (ANM) systems, demand-side response, storage, and the increasing use of HVDC interconnection. While the UK has made significant progress in demonstrating these innovations, they have yet to be rolled out at scale across our networks.

We would support therefore the development of a policy set to enable early stage deployment pathways for technologies which meet the 'triple test' for innovation[14].

Regulatory and market reform

In its published Power Sector Scenarios for the fifth carbon budget, the Committee on Climate Change stated that achieving our carbon budgets with a 'more flexible power

[9] https://www.reportlinker.com/p02855276/Global-Market-for-Energy-Storage-Forecast-Opportunities-Trends-and-Challenges.html
[10] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48574/4805-future-heating-strategic-framework.pdf
[11] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416240/bis-15-206-size-and-performance-of-uk-low-carbon-economy.pdf
[12] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/437953/Renewable_energy_in_2014.pdf
[13] https://documents.theccc.org.uk/wp-content/uploads/2015/10/Power-sector-scenarios-for-the-fifth-carbon-budget.pdf
[14] https://www.gov.uk/government/speeches/launch-of-the-clean-growth-strategy

system' has the potential to save consumers £3-3.5 billion per year.[15] The National Infrastructure Commission also clearly sets out how a smart power revolution spanning storage, interconnection and demand response is worth up to £8 billion to UK consumers.

With more distributed generation connected than ever before, energy storage coming to market and innovations such as Active Network Management making significant savings on the networks themselves (with ANM having demonstrated cost savings of up to 90%[16]), it is clear that we are in the midst of a period of change in the energy system. This growth of flexibility will help to manage the variable production of renewables and lower the costs of system integration

We would stress that while we are aware that system integration costs have been a concern for policymakers, there is a growing body of evidence suggesting that previous concerns have been overinflated. A recent study by Imperial College London predicted that renewables system integration costs were likely to be less than £10/MWh in a range of scenarios[17]. We are aware that further work is underway.

Regulation, however, has been largely unable to keep pace with these developments. It is our view that alongside tackling 'easy fixes' to enable innovation to progress, a longer-term review of regulatory mechanisms is required.

For example, it is positive to see Ofgem move forward on defining battery storage, and we have been pleased to work with a range of stakeholders to remove barriers on co-locating storage with renewable energy sites. As far as holistic regulatory reform is concerned, we support the ongoing work under the System Needs and Product Strategy Review and the Charging Futures Forum.

Securing the benefits of a low-carbon, flexible energy system will require a range of new technologies such as Active Network Management (ANM) systems, demand-side response and storage, and will encompass efforts to better operate networks, including transitioning to a DSO. Markets and their regulation must enable these new technologies to come forward effectively and must retain a flexible approach to new technologies while working to ensure system flexibility is delivered at the lowest cost to the consumer.

The service market in particular is ripe for reform, not only in the context of a DNO-DSO transition, but given the imperative to realise savings for consumers while delivering a smart, low-carbon system. Price signals to allow the most efficient solutions to come forward must be developed. Importantly, if we are to meet our ambitions, the lowest cost technologies, often already embedded in the system, must be able to access service markets.

We welcome National Grid's SNAPs review and other workstreams considering service markets, and urge for these to be considered holistically.

Much of GB's offshore wind capacity is connected to the transmission system via Ofgem's 'Offshore Transmission Owner' (OFTO) regime. As the industry develops, and with the introduction of the competitive CfD mechanism for offshore wind assets, it is our view that continuing to hold separate auctions for export assets duplicates effort by both industry and the regulators. The OFTO regime fails to deliver value to the consumer – the balance of risk

[15] Ibid
[16] http://innovation.ukpowernetworks.co.uk/innovation/en/Projects/tier-2-projects/Flexible-Plug-and-Play-(FPP)/
[17] https://www.e3g.org/docs/Plugging_the_Energy_Gap.pdf

leans towards the OFTO, often affecting asset operations and maintenance while the allowed rate of return set by Ofgem is higher than market realities. We would support a review of the OFTO regime, with a focus on market simplification and cost-reduction.

A number of challenges across policy and regulation will require significant work and coordination between government, regulators, system operators and industry. For example, as more storage is deployed on the network, and existing assets stack new revenue streams, the behaviour of those storage assets will change. This will create new challenges and opportunities, and a greater focus on system planning will be required to account for this complexity.

It is crucial that government aligns its full suite of policy and fiscal levers to meet its energy objectives.

This is particularly true for the Planning system.

The cost of onshore wind has fallen significantly over the last 30 years, largely due to the evolution of turbine technology. These costs are projected to fall further as technology continues to develop and if it can deploy at scale. Failure to adopt the latest turbine technology could prevent these cost benefits reaching the consumer.

Scottish Renewables believes that new sites with the latest technology, and re-powering existing sites can deliver a number of major opportunities:

- Increased capacity and output with fewer turbines, sustaining and growing the level of renewable energy in Scotland.
- Sustaining existing development and construction jobs and the creation of opportunities for new supply chain jobs.
- With the right planning process, create a long-term, stable investment platform for a clear pipeline of repowering projects, easing pressure on consenting authorities and creating the conditions for inward investment in manufacturing facilities in Scotland.
- Reduce our dependency on fossil fuels resulting in lower CO2 emissions.
- The utilisation of two decades of experience in development and engagement with communities to improve siting, design and construction techniques to create better placed, more efficient projects.
- Development of renewables-related intellectual property which can be exported across the globe.

For a significant majority of the 7GW onshore wind pipeline in Scotland, and in the wider UK, planning applications are for an upper tip height of 125m or less, above ground level. In other comparable markets, such as Sweden or Germany, tip heights well in excess of 150m are the norm. It is in these markets that we are seeing the lowest Levelised Cost of Energy being delivered. Limiting the size of rotor and tower height in the consenting process limits the range of turbine models available to developers, often to relatively outdated technology. The combination of reduced energy capture from smaller rotors, shorter towers, and outdated technology significantly reduces the productivity of sites, increasing consumer costs.

It is essential a supportive planning framework is developed across all administrations to ensure projects can take place responsibly and efficiently. Since repowering will result in a continuation of the same kind of project on the same site, we suggest that any application is considered as one which proposes an ‘existing use’ and therefore has a presumption in

favour of consent. It is essential that planning authorities and relevant stakeholders understand the benefits of larger more technologically advanced turbines.

Recognising the full suite of socio-economic and system benefits

Several benefits of renewable energy are not currently priced in the energy market. We would encourage Government to think holistically about the value these technologies bring to our energy system, our economy and to society as a whole.

System benefits:

Numerous technologies, including many already operating, have the potential to provide system services. Currently, not all services are monetised in the market and not all renewable technologies are able to compete in procurement processes. It is our view that all technologies should be able to compete to provide services to ensure that the most efficient solutions are delivered for the system (we are therefore concerned that the Equivalent Firm Capacity Auction detailed in the Review would not be the most effective means of securing a capacity service). The creation of an appropriate balance between the provision of simple and transparent market mechanisms and the creation of suitable flexibility to allow different types of investment to come forward is essential.

We welcome the System Operator's review of System Services (System Needs and Product Strategy) as a valuable step in re-designing this market.

We are particularly keen to ensure that as service markets develop they recognise changing investment needs across a range of service providers. Ancillary services (previously a tertiary market) will now be used to underpin investment in a broad range of technologies.

Existing and new renewable assets provide a number of balancing services, such as frequency response, reactive power and inter-trip provision. As the economics of renewable energy resources change, we expect balancing services revenue to become a greater part of any new development's overall business case. At the same time, some service providers will operate under different sets of commercial drivers. For example, storage providers such as battery storage and pumped hydro storage may look to treat the balancing services market as core revenue.

Separate revenue streams earned from a range of different services need to attract cost-effective debt and equity finance to ensure that the lowest cost service provision is procured. This means designing service models with investors and consumers in mind, reflecting the reality that the financial characteristics of both new and existing assets are different from those in the past.

Socio-economic benefits:

Renewable energy projects bring substantial benefit to the wider economy and society as a whole, not least in rural areas, post-industrial towns and port/harbour regions[18]. These benefits range from investment[19] in infrastructure, employment[20] throughout the supply chain, community ownership[21] and funds, greater control over energy supply[22], income

[18] http://www.scottishrenewables.com/publications/industrial-impact-power-scotlands-renewable-sector/
[19] http://www.scottishrenewables.com/sectors/renewables-in-numbers/?edit_off#chart8
[20] http://www.scottishrenewables.com/sectors/renewables-in-numbers/?edit_off#chart12
[21] https://www.localenergy.scot/what-is-local-energy/read-our-cares-progress-and-impact-report/

diversification[23] and export of technology and expertise[24]. By backing renewables, Britain can be at the forefront of the global clean energy economy.

Renewable energy generators provide more than £11.5 million in Community Benefit funding to communities across Scotland every year[25]. That money has already been used, for example, to build or refurbish vital community infrastructure, provide transport options in remote rural areas and to support sporting and specialist interest groups. Many of these projects are based in areas which have historically received limited investment, and would not have been able to progress without Community Benefit funding.

Small-scale renewables, which often operate in remote areas of the country, bring substantial economic benefit to rural and peripheral areas[26].

This suite of socio-economic benefits is not captured when considering the levelised cost of energy (LCOE), and we would encourage a wider assessment of the economic benefit created by the industry, for example, considering a model such as the 'Societal Cost of Energy' put forward by Siemens [27].

[22] http://www.communityenergyscotland.org.uk/2012-impact-survey.asp
[23] https://www.nfuonline.com/assets/69296
[24] http://www.scottishrenewables.com/news/global-reach-scot-renewables-revealed/
[25] https://www.localenergy.scot/projects-and-case-studies/searchable-register-of-community-benefits/
[26] https://www.oecd.org/regional/regional-policy/Renewable-rural-energy-summary.pdf
[27] https://www.siemens.com/customer-magazine/en/home/energy/renewable-energy/scoe-the-true-cost-of-offshore-wind-power.html