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Submitted to Call for evidence on Net Zero review
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About you

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What is your organisation?

Organisation:
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Where are you/your organisation based?

Please expand on your answer here:
UK

What sector do you/does your organisation operate in?

Please expand on your answer here:
Innovation, Research & Technology sector

Are you happy for your response to be published?

Yes

Would you like to be contacted when the consultation response is published?

Yes

How did you hear about this consultation?

Where did you hear of this consultation?:
GOV.UK alert

Other (please specify):

Overarching questions

1 How does net zero enable us to meet our economic growth target of 2.5% a year?

Answer here:

- o Net zero will have an impact across the full range of industrial sectors and businesses.
- o Its implementation necessitates technological and process innovations that will provide growth opportunities in both domestic and international markets, growing the UK export potential.
- o In the longer term, transitioning to low carbon energy sources offers the opportunity to streamline and create efficiencies in consumption of energy, which in turn could provide reduced energy costs and increased energy security. Lowering energy costs will increase UK productivity and competitiveness.
- o Failure to pursue net zero goals will result in increased direct energy costs and ever-increasing environmental damage and costs.
- o A strategy for pursuing net zero is an integral part of future economic stability and growth; conversely, not addressing the opportunities of net zero risks stagnation and decline.

2 What challenges and obstacles have you identified to decarbonisation?

Answer here:

- o A major challenge is the implementation of current and future technologies to achieve net zero. All stakeholders (government, industry, public) need to have confidence in both the required technology and its implementation. The role of large-scale demonstrators and independent verification of impact will be important, as will the effective deployment of expertise to establish the evidence for 'what works' at a holistic systems level.

- o This confidence will be sustained by a clear, consistent long-term technology and industrial strategy, with effective implementation and communication.
- o In the short-term there is likely to be perceived conflict between bolstering national energy security in the short term and the drive towards lowering carbon emissions in the same time frame. The government strategy and argumentation must address this.
- o Public engagement is a challenge which must be grasped. Achieving the understanding of the population in regard to the need to decarbonise life in the UK is key to attaining personal commitments needed to effect changes; affordability for the transition to new technologies is a limiting factor.
- o It is clear that innovation will give rise to the technologies required to decarbonise, but the installation and adoption of these technologies will require new skills and capabilities to be developed and deployed across the UK. This is both a challenge but also an opportunity for job and wealth creation.

3 What opportunities are there for new /amended measures to stimulate or facilitate the transition to net zero in a way that is pro-growth and/or pro-business

Answer here:

- o The technology and industrial strategy will ideally be cross party, allowing long-term stability and predictability in government actions. These actions will include regulation, financial support, and the driving of expansion in R&D, implementation capacity, skills, and new capabilities.
- o This strategy and resulting action will provide the confidence for industry to invest in and adopt net zero technologies, helping to promote growth and productivity.
- o This demands an effective partnership between government and the private sector, within a clear and pragmatic regulatory framework.
- o Cross-party and interdepartmental alignment of objectives, placing net zero above political sparring, will be very important to maintain consistency of approach and strategy over multiple parliamentary cycles.

4 What more could government do to support businesses, consumers and other groups to decarbonise?

Answer here:

- o Based on an effective, long-term strategy to implement net zero, government support (either with information and/or funding) can be planned for all stakeholder groups, including personal/domestic users and businesses. Government has key leadership and convening roles to play in developing mechanisms for the effective deployment of expertise to establish the evidence for 'what works' at a holistic systems level.
- o Be more pro-active in communicating the need for, and benefits of decarbonisation of the UK, so that we enrol the public with the journey to a net zero transition.
- o Invest and plan for developing the green skills needed to sustain a green economy.
- o Review the green levy, with the regulator, so that consumers, who choose to procure energy from net zero sources are not penalised financially.

5 Where and in what areas of policy focus could net zero be achieved in a more economically efficient manner?

Answer here:

- o Developing a long-term and consistent technology and industrial strategy will allow a coordinated policy for net zero across all government departments (national and local). This will result in more efficient and effective use of public money in supporting the drive to net zero. This effective use of public money will give industry confidence and thereby catalyse their investment in the development and implementation of net zero technologies.
- o Linked to the point above, there is a need for a national 'controlling mind' to better coordinate evidence-based actions nationally, congruent with the net zero aims. This may follow the 'What works centre' model.
- o Consistent policy and avoidance of changes in direction will avoid wasted effort in R&D and in the adoption of innovative developments.
- o Government and industry could be more selective in choosing areas of the economy to target for growth. Regulation and tax policy could be utilised to encourage demand and growth in some areas and moderate demand in areas of high carbon emission, for example across all forms of transport.

6 How should we balance our priorities to maintaining energy security with our commitments to delivering net zero by 2050?

Answer here:

- o Energy security and net zero must be treated as a single challenge. Hence the long-term government net zero technology and industrial strategy must consider energy security. In the short-term the two priorities must both be addressed and coordinated. In the medium and long-term net zero objectives in developing renewable and nuclear technologies will provide a major part of the solution to enhancing energy security.
- o Energy strategy should avoid overdependence on any one technology, source of supply or assumption as to future market drivers.
- o The UK has assets in natural renewable energy sources (such as wind) which it should exploited for maximum use. Whilst levels of wind are not fully consistent, tidal energy is entirely predictable, and should be developed in a range of sites around the UK, which are ideally suited to harness this renewable energy source, with appropriate infrastructure.

7 What export opportunities does the transition to net zero present for the UK economy or UK businesses?

Answer here:

- o The effective implementation of net zero technologies domestically will result in increased competitiveness and productivity of UK industry in the export of knowledge, technology, and equipment to an increasing world market for net zero.
- o Within the Innovation, Research and Technology (IRT) sector, there is already significant activity undertaken for overseas public and private customers. This has the potential to significantly increase as the UK's knowledge base, capabilities, and facilities in net zero technology are increased.
- o Protection of relevant UK originated IP could be prioritised to maximise returns on investment in R&D.
- o The UK could aim to lead the world in development of regulation and standards for a net zero future, building on its already high reputation in these areas.

Questions for businesses

8 What growth benefits/opportunities have you had, or do you envisage having, from the net zero transition?

Answer here:

- o The IRT sector and specifically AIRTO members are already active in net zero development and implementation, supported by public and industrial funding and initiatives. Member laboratories actively support the adoption of innovative developments aimed at achieving net zero as a core part of their missions. This activity is expected to increase significantly, both for projects that are primarily net zero driven and those that have net zero considerations.
- o As well as net zero activities becoming a part of the work of existing members, some dedicated organisations have been set up to specifically address net zero challenges. These include:
 - o EMEC (www.EMEC.org.UK)
 - o Energy Systems Catapult (www.es.catapult.org.uk)
 - o Glass Futures (www.glass-futures.org)
 - o Net Zero Technology Centre (www.netzerotc.com)
 - o Off-shore Renewable Energy Catapult (www.ore.catapult.org.uk)
- o There are also a significant number of collaborative initiatives set up to develop and implement net zero, involving AIRTO members and industry. A few examples of these are:
 - o Catapult Hydrogen Innovation Initiative (<https://catapult.org.uk>)
 - o Floating Offshore Wind Centre of Excellence and Supergen Offshore Renewable Energy Hub (www.ore.catapult.org.uk)
 - o North West Hydrogen Cluster (<https://hynet.co.uk>)
 - o The Industrial Decarbonisation Research and Innovation Centre (www.idric.org)
 - o Tidal Stream Industry Energiser (www.interregTiger.com)
- o However, to provide the full support that industry needs in developing and implementing net zero technologies, the IRT sector needs capital investment, particularly for large-scale demonstrators and test beds. Many of these facilities are not-for-profit entities and need to be supported by public funding, which in turn stimulate industry funding its own individual project usage.

9 What barriers do you face in decarbonising your business and its operations?

Answer here:

- o AIRTO members have the same challenges in decarbonising their business and operations as a whole range of industry.
- o Some members have energy intensive operations, requiring the use of heavy machinery, the heating of horticultural plant growing research facilities, piloting new foundation industry processes and operating clean and environmentally controlled laboratories and facilities.
- o In the short-term, energy costs are driving investments in lower cost alternatives.
- o Long-term, net zero will require the upgrading of buildings and facilities. The costs of this will be challenging, particularly for not-for-profit organisations that do not have core government support.

10 Looking at the international market in your sector, what green opportunities seem to be nascent or growing?

Answer here:

- o AIRTO members already undertake R&D and innovation activities in the field of technologies which will support decarbonisation/net zero for organisations worldwide. This market will grow significantly, particularly if enabling technologies and facilities are further developed. As discussed above, this development of enabling technologies and facilities for R&D and innovation can be enhanced by the strategic use of public funding.
- o There is a market for assisting other nations to monitor and manage their own carbon reduction measures.

11 What challenges has the net zero transition presented to your business?

Answer here:

For members of the Innovation, Research & Technology sector challenges are as follows:

- o The financial investment needed to fully exploit the R&D and innovation opportunities both nationally and overseas.
- o The recruitment of people and talent with appropriate R&D knowledge and skills.
- o The risks entailed in early adoption of potentially pervasive new and different technologies in risk averse industrial cultures and pivoting to new markets in evolving and politically complex areas of the economy.
- o Uncertainty over consistency of government support and associated timescales going forward.
- o Lack of finalised plans and sufficient verified operating efficiency data associated with new technologies such as domestic heat pumps, electric vehicles etc, coupled with imposed deadlines limiting availability of current technologies (e.g., internal combustion engine vehicles, gas boilers). This creates significant uncertainty over consumer and supply chain demand and, consequently, hesitancy over investment intentions.

12 What impacts have changing consumer choices/demand had on your business?

Answer here:

- o Changing consumer choices/demand do not have a direct impact on AIRTO members' business. However, consumers will drive the requirements of industrial partners with the resultant need for technology in diverse areas such as battery storage and electric vehicles, energy efficient housing, renewable energy generation and supply, and energy efficient agriculture. See above also concerning uncertainty of future demand from affected business clients.

13 What impacts have decarbonisation/net zero measures had on your business?

Answer here:

- o Negative: increased costs of operation. Uncertainties over future patterns of demand.
- o Positive: increased demand for R&D and innovation, with a refocusing of aims and objectives.

14 What more could be done to support your business and/or sector to decarbonise?

Answer here:

- Help with recapitalisation in preparation for transition to new technologies, particularly for not-for-profit organisations.

15 Do you foresee a role for your business within an expanded UK supply of heat pumps, energy efficiency, electric vehicles, hydrogen or clean power?

Answer here:

- o Not directly, but AIRTO members support the development and implementation of the current and future technology necessary for these key components of the UK's strategy for attaining net zero.
- o Members will be involved in testing, performance validation, demonstration, and certification of these new technologies. Also, skills development and training of the workforce in these areas.

16 For clean power industry: what barriers to entry have you found in deploying clean energy?

Answer here:

- o The major barrier is uncertainty, which has a range of causes from government strategy and funding, regulation, planning constraints, to fully developed and demonstrated technologies.
- o The clear, consistent government strategy, discussed above, must address these barriers, which will then give industry the confidence to make the required investments.

17 How many green jobs do you estimate will be created in your sector by 2030?

Answer here:

- o The IRT sector employs an estimated 57,000 people, a large proportion of which are research and technical staff.
- o To meet the demand created by the advance towards net zero, and the investment in resources discussed above, this number could easily increase by 2030, through the expansion of existing organisations' operations and the creation of new R&D centres.

Questions for the public

18 Have you or are you planning to take personal action to reduce your carbon emissions (for example through how you travel, what you buy, how you heat your home)? If so, how?

Answer here:

19 Do you face any barriers to doing this? What are they?

Answer here:

20 What would help you to make greener choices?

Answer here:

21 What is working well about the measures being put in place to reach net zero?

Answer here:

22 What is not working well about the measures being put in place to reach net zero?

Answer here:

23 Do you have any further comments on how efforts to tackle climate change are affecting you?

Answer here:

Questions for local government, communities and other organisations delivering net zero locally

24 What are the biggest barriers you face in decarbonising / enabling your communities and areas to decarbonise?

Answer here:

25 What has worked well? Please share examples of any successful place-based net zero projects.

Answer here:

26 How does the planning system affect your efforts to decarbonise?

Answer here:

27 How can the design of net zero policies, programmes, and funding schemes be improved to make it easier to deliver in your area?

Answer here:

28 Are there any other implications of net zero or specific decarbonisation projects for your area that the Review should consider?

Answer here:

Questions for academia and innovators

29 How can we ensure that we seize the benefits from future innovation and technologies?

Answer here:

o As discussed in the AIRTO "More D!" (<https://www.airto.co.uk/wp-content/uploads/2020/03/AIRTO-More-D-Position-Statement-31-MARCH-2020-web.pdf>), the UK has a strong science base, but relative to comparator nations is less resourced to fully exploit the research that the science base produces. Exploiting research is part of the core mission of the IRT sector. However, when measured against competitor nations, the UK under-invests and under-utilises this sector. Provision of sufficient public funding for R&D will allow increased public investment in the translation and implementation of basic research, without compromising the funding for the academic sector. Therefore, to seize the benefits from future innovation and technologies, the government must have a cohesive plan for the resourcing the IRT sector. An added benefit of such investment will be the increased industrial funding that the public funding will 'gear in'.

o Using government procurement in an 'early adopter' role will accelerate industrial take up of and investment in emerging technologies, and accelerate them along the path to net zero.

30 Is there a policy idea that will help us reach net zero you think we should consider as part of the review?

Answer here:

o The development of net zero/growth/R&D policies and strategy that have cross-party support to ensure long-term aims, objectives and stability.

Attainment of Net Zero greenhouse gas emissions is an existential necessity for the future security of life on planet earth, and so it is far too big and far too important for to be a 'political football'.

o The promotion of the UK's skills, knowledge and capabilities, worldwide, in a comprehensive, structured way by government and government agencies. This will require a full understanding of the UK's R&D and innovation infrastructure for development of green technologies.

o The role of public procurement for early adoption of innovative developments.