uhvnet

Universities High Voltage Network

www.uhvnet.org.uk

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ofgem
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Dear Ms Fletcher

UHVnet Response to Open Letter Consultation on the Development of Gas and Electricity Innovation Stimuli

Background to UHVnet

The Universities High Voltage network (UHVnet) was set up in 2004 to further the interests of high voltage research within the Universities in the United Kingdom. Current University membership of UHVnet comprises:

- Cardiff University
- Glasgow Caledonian University
- Leicester University
- Liverpool University
- Manchester University
- Southampton University
- Strathclyde University
- Surrey University

The UHVnet also has representation on its steering group from the following industrial organisations:

- Areva T&D Technology Centre
- National Grid
- NAREC
- PPA Energy

In general terms the main thrusts of UHVnet concern (a) raising the awareness of the research capabilities of University group members to UK high-voltage related industry, e.g. manufacturers, electricity supply companies, railways, etc., and (b) lobbying public bodies and research funding organisations to make them aware of the necessity of maintaining high voltage research in the UK and to ear-marked high-voltage related programmes. More specific key aims of UHVnet are:

- To increase the visibility and dissemination of work carried out in universities in the high voltage area both nationally and internationally;
- To ensure the future health of the discipline by attracting younger researchers, and establish a community of networked researchers;
- To improve training and learning for postgraduate students and researchers, and ensure continuity;
- To develop links between academic institutions and industrial organisations and contribute to the innovation and engagement agenda;
- To highlight contributions and establish a high profile for the discipline to attract and influence industry and government research funding;
- To develop and undertake multi-partner initiatives to address major issues faced by industry.

UHVnet welcome the opportunity to respond to the open letter consultation. UHVnet has a clear strategic interest in UK R&D related to electricity generation, transmission and distribution systems of the future, one of the areas the document highlights for innovation. Universities are key stakeholders in future UK research innovation and as such are vital partners with industry and government in driving a low carbon economy and sustaining the UK as a world leader in innovative solutions and effective solution implementations. As a group of Universities directly engaged in both fundamental research and innovation related to many facets of high voltage engineering, and also actively engaged in industrial partnerships and government funding initiatives, we would like to contribute to the open letter consultation as outlined below. We would also like to emphasise that there is significant ongoing recognised innovation coming out of UK University research currently being carried out with industrial partners. However there is still significant latent innovative research looking for applications in the future and it is hoped that this stimulus would strongly encourage these to come forward.

Specific Responses

What innovation might be required to facilitate a low carbon economy and securing supplies as efficiently as possible in each of gas distribution, gas transmission and electricity transmission sectors.

Smart Grid Technologies

There will be an unprecedented increasing demand in energy over the next decades, e.g. with the innovation of new electric cars, on-demand electricity sourcing, and the move away from reliance on oil and coal based energy generation. Smart grids require innovative technologies to allow large and small scale energy integration from renewable sources (customers and traditional suppliers). Examples of aspects which require particular attention are the monitoring and control

of load flow at both the local and wider distribution network, and more focussed data transfer and data management systems, to deal with the increased volume of information. To this end more innovative and efficient generation, transmission, distribution, and management of the intricacies of integrated electricity sources within smart grids are required. In addition, the reliability of integrated smart grids is critical in achieving electricity sustainability. Thus monitoring and managing smart grid functionality, productivity and efficiency is paramount to long term success in achieving renewable targets and a lower carbon economy.

Energy Storage Technologies

Though significant advances have been made in energy storage areas over the past decade, the requirement for improved and efficient localised and dispersed energy storage technologies is required. Large scale transmission system energy storage and small scale energy storage from integrated renewable sources is essential in order to provide increased long term energy capacity and capacity operation and thus reduction in the carbon footprint.

HVDC Technologies

There is growing impetus worldwide on HVDC transmission to improve the efficiency of electricity transport as well as produce more efficient and reliable electricity trading environments between national and international electricity generators and suppliers. Key innovations in HVDC technology to achieve these aims should include new switched HV network configuration and management systems, new DC cable technologies and cable routing strategies, as well as the design of new and more reliable HVDC system converters and other components which are able to operate at significant DC voltage levels in excess of 1000MV.

HV Insulation Materials and Technologies

Many HV AC and DC transmission system components and assets still rely on aging insulation technologies such as traditional oil, paper and resin based compounds. Vacuum and SF_6 gas are also still deployed across systems. Improvements to material response to inherent stresses will allow more compact devices to be constructed. In addition most insulation systems have been designed on technology for AC systems and not DC systems. In order to improve systems, improve safety, reduce carbon and increase the longevity of operation at lower costs, innovation is required in relation to developing, evaluating and implementing new insulation materials and insulation gases. This would include research into the application of new insulation oils, gases and compounds, as well as new nanotechnology innovations. Furthermore, a key problem requiring new ideas is the development of efficient and effective methods of oil waste disposal from aged insulation systems.

Integrated Asset Monitoring

Not only are new methods of monitoring and evaluating HV system components and assets required in order to improve system performance and asset longevity, but new methods of understanding and implementing integrated condition monitoring asset information into large and small scale transmission system reliability is required in order to improve operational efficiencies. Other areas related to this topic include new HV sensor technologies for asset monitoring and standardised integrated wireless connectivity solutions for asset data system communications.

How the annual level of funding to facilitate the innovation in each sector should compare to the £64M available annually under the LCN scheme.

The funding requirement figure is difficult for the UHVnet to estimate. It is acknowledged that government funding for Energy research in the UK has increased in the last few years. UHVnet Universities have benefitted from many R&D developments from government schemes and industry, many of which have had, and continue to have, a direct impact on industrial applications and innovations. We believe that Universities have a significant part to play in UK innovation with industry which we believe should not be underestimated or undervalued. We would like to see one outcome from this response being a strong recommendation of funding being directed towards promotion of industrial partnerships with Universities.

Details of potential projects you consider could meet the objectives of the gas or electricity stimuli and the potential cost of these projects.

Most of the potential projects are related to the areas of direct relevance to UHVnet Universities as outlined in the sections above. Typical R&D for proof of concept type innovation projects in collaboration with industry would perhaps be expected to be > £100k, with multiple partnership projects ranging up to £500k and above. We would also ask that any review would take into consideration that Universities are eager to engage in more than proof of concept initiatives, and would like to encourage active University engagement with practical demonstration of new innovations be an emphasis of the stimulus. Reference is made to the innovation stimulus being extended to suitably qualified non-network parties. It is unclear if this includes specifically Universities and if so how Universities can specifically contribute. For example is it directly through collaboration with the transmission and distribution companies and suppliers or potentially funded directly as outsourcing to Universities from companies?

What speculative investment companies should include in their business plans to be funded through the price control, versus what they should compete for through the stimulus and the potential value and required justification for this speculative investment.

Though UHVnet does not represent an “investment company”, we would ask that the stimulus take into consideration the fact that speculative investment companies can gain significant benefit from innovation partnerships with Universities. It is not clear in the open letter how Universities and University Research Institutes can play a role in this innovation stimulus. In addition it is not clear whether companies who can partner with Universities in potential projects could be driven from a speculative partnership or whether the stimulus itself will directly specify the projects. In relation to time spans there is no clear understanding of the anticipated length of time projects will be funded by the stimulus. If this is to be considered, then a steer on shorter term innovations as well as longer term innovations would be beneficial. The open letter is also not clear on whether the proposed funding will complement the Innovation Funding Incentive (IFI) or indeed whether the IFI funding will be embraced within the stimulus. Further, based on the track record of previous successful funding initiatives with Universities, such as the IFI, we would also suggest that to optimise and leverage University innovation into this stimulus, a ring

fenced portion of the stimulus funding be set apart and focused on University speculative research and the implementation of demonstrable University research outputs.

We hope these comments are appropriate and that due consideration will be given to the issues raised in our response.

Yours sincerely

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