National Infrastructure Commission Studies – Call for ideas response form

Name/Organisation: Institution of Engineering and Technology – Communications

You have up to 500 words to outline the problem for a NIC study to focus on, and if you wish, to explain why this should be a priority. You must demonstrate how your suggestions fulfil the criteria outlined in this ‘Call for Ideas’.

Suggestion:

As the UK’s demand for increasingly ‘fast’ internet connections increase, we have so far continued to add new technologies to existing infrastructure to meet these needs. However, with the evolution of digital technology, and our economy's ever increasing reliance on fast broadband connections, it is becoming increasingly costly to provide the services required. The public investment estimated for universal superfast coverage we will soon need is between £10 and £30 billion for the fibre networks alone – well beyond the UK’s budget.

Therefore, the challenge we face is to ensure that we are able to provide the UK with the bandwidth that our society and economy requires, but at a price we can afford. We suggest that this can be achieved through a network that is responsive to user needs, rather than infinitely increasing bandwidth. The IET has proposed Demand Attentive Networks (DAN) as a holistic approach, encompassing a range of technologies with the design goal of not simply increasing access speed, but increasing network utility to deliver the desired outcomes. This will become critical as new applications place onerous requirements on network connectivity – to ensure “quality of experience”, bandwidth is necessary but not sufficient.

The Demand Attentive Network infrastructure requires new technologies, refinement of network architectures and protocols and processing capabilities distributed throughout the infrastructure. It will exploit software defined networking, virtualisation and evolved protocols, hence optimising the infrastructure performance and cost base in a way that “throwing bandwidth at the problem” simply cannot do.

For more information on DAN: http://www.theiet.org/factfiles/comms/dan-page.cfm?origin=/dan
Rationale:

1. Does the suggestion deal with a nationally significant issue?
Businesses and the public across the UK will become progressively more reliant on the increased improvement of broadband speeds, which we cannot deliver with our current infrastructure. Therefore, this task needs to be undertaken at a national, rather than regional level, to give equal access to a resource that is becoming vital to our economy and way of life.

2. Does the suggestion need to be considered now?
We are on the cusp of evolving to 5G mobile networks, and key technologies such as virtualisation, edge computing and distributed cloud computing are also maturing. With the components ‘ready to be assembled’, taking the holistic approach of DAN now will mean that these new technologies can be integrated in the most effective and efficient way.

3. Does the study deal with a challenging issue?
There are challenging issues related to regulation, planning laws and space/power availability that will need to be addressed to bring an optimal DAN approach to reality.

4. Would any potential recommendations be realistic in terms of cost?
This project optimise expenditure to deliver beneficial outcomes to users in the long term, rather than spending increasingly large sums on gaining faster speed test results, a course that will be effective only to a point. By investing the money in DAN instead, you would be providing users with a sustainable broadband network.

5. Would the NIC add value by considering this issue?
The particular position of the NIC will allow the issues identified above to be addressed in a co-ordinated, multi-disciplinary way that transcends industry silos. This essential level of co-ordination would ensure the most efficient and effective use of capital in a timely manner.

Please e-mail this form to: NationalInfrastructureCommissionSpecificStudy@HMTreasury.gsi.gov.uk
National Infrastructure Commission Studies – Call for ideas response form

Name/Organisation: Institution of Engineering and Technology – Energy

You have up to 500 words to outline the problem for a NIC study to focus on, and if you wish, to explain why this should be a priority. You must demonstrate how your suggestions fulfil the criteria outlined in this ‘Call for Ideas’.

Suggestion:

The UK's energy infrastructures will see transformational change as we deliver the carbon reductions required by the Climate Change Act. By taking a whole systems approach to this, that accounts for the multiple energy vector interactions, we will reduce the risk of compromising the security, integrity and reliability of our energy system at physical, operational and data levels.

The Future Power System Architecture (FPSA) report, commissioned by DECC from the IET with the Energy Systems Catapult, which focused on electricity, found that Britain's power system architecture requires transformative change by 2030. The IET believes that similar thinking should be applied to the infrastructures that deliver our other energy vectors, particularly gas, oil and heat, and that it should be extended to fully consider the linkages between them, with electricity, as a whole system. We believe that this approach would help identify the future risks and opportunities that we must manage to deliver a secure and affordable low carbon energy system.

We propose that the NIC could take the first step to carry out an analysis of the whole energy delivery system, taking the learning from the FPSA work, to draw initial conclusions about how the architecture of this whole system should be developed.

Further information on FPSA: https://es.catapult.org.uk/what-we-do/fpsa/
Rationale:

• **Does the suggestion deal with a nationally significant issue?**
  Transformational change through a coherent program rather than incremental adjustment, can mitigate serious risks such as: significant extra cost, material constraints on integration of new technology, compromises to system security and resilience and possibly failing to meet policy objectives.

• **Does the suggestion need to be considered now?**
  Transformational change to the wider energy system needs to be undertaken on the same timescale as electricity – by 2030 – thus a special focus and urgency is required considering the work necessary (defining, developing, risk assessing and testing) before solutions could be introduced into service at scale.

• **Does the study deal with a challenging issue?**
  The new functionality will encompass interactions spanning the whole system, from individual smart appliances to our largest power stations – very different to today’s compartmentalised view (for electricity) of generation, transmission, distribution and consumers. Such change, embracing a truly whole system approach, coordinated across multiple energy vectors, is a seriously challenging and complex issue.

• **Would any potential recommendations be realistic in terms of cost?**
  Beginning this project soon would distribute economic costs over intervening years, and importantly avoid much greater cost later on through increasing operational costs, ineffective investment, stranding of assets, and potentially failure to deliver service.

• **Would the NIC add value by considering this issue?**
  The NIC is in a unique position to take the whole system perspective required to ensure the effective and secure integration across multiple vectors and parties, ensuring we have a resilient and efficient system architecture in place for energy as a whole. The IET with the Energy Systems Catapult is able to offer a ready–tested methodology and synthesis team to assist in the development of such an analysis.

Please e–mail this form to: NationalInfrastructureCommissionSpecificStudy@HMTreasury.gsi.gov.uk