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President

The Rt Hon Kwasi Kwarteng MP  
Minister of State  
Department of Business Energy and Industrial Strategy  
House of Commons  
London  
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Dear Mr Kwarteng

### **Why we need Whole System Engineering for economic and sustainable growth**

The Institution of Engineering and Technology (IET) believes there is a responsibility on all of us to extract learning from the tragedy of Covid-19 and to use it to plan the UK's recovery for a safer, more sustainable future. We strongly support the Committee on Climate Change's call to "act courageously" to address the climate emergency in its 2020 progress report to Parliament. We believe that a significant acceleration in decarbonising our economy is essential to meet our **Net Zero** ambitions.

The pandemic has dramatically shown how interconnected our world is, internationally and locally. It has also highlighted the interdependencies, unintended consequences, resilience issues and risks within complex systems that have multiple human, technical, regulatory and commercial interfaces.

It has also clearly demonstrated why society as a whole needs a joined-up approach, rooted in professional competence, skills and ethics, to deal with such crises now and in the future. This learning can be applied to address the challenges of the climate emergency as we navigate a path to **Net Zero**.

Whole System thinking embraces people, institutions, markets, technology, policy and regulation. It is holistic. It takes account of the relationships between multiple systems and is enabled by an agile, inclusive and co-ordinated governance and regulatory regime, so that decisions can be taken and implemented in a timely manner. It eliminates silo thinking, enhancing the functionality and efficiency of whole systems while recognising the needs of smaller sub-systems and touch points.

**Net Zero** encompasses agriculture, industry, transport, people, communities, government, education, communication, digital and energy. This is why we need a Whole System approach: to enable us to understand how the different sectors and stakeholders interact, the trade-offs that result and how to prioritise action in the most efficient and effective way.

The IET, with its focus on professional skills, competency and ethics, and other organisations with sector specific expertise need to come together to enable a systems engineering approach that covers the whole economy and our transition to Net Zero.

### **Future Power System Architecture Learning**

The IET worked with the [Energy Systems Catapult](#) on the Future Power System Architecture (FPSA) project, applying systems engineering principles to the future development of our power system. This project identified the functionality that the power system requires to facilitate decarbonisation and an agile governance mechanism to efficiently deliver it.

Although focused on power systems the FPSA learning and methodology can and should be replicated across the wider carbon reduction agenda.

The FPSA outputs have already been widely disseminated across the original target audience, but the IET is keen to share this learning as widely as possible, particularly as energy is such a fundamental element of the journey to **Net Zero**. The key findings from the FPSA project were:

- Government policies relating to carbon reduction must be properly informed and connected by the application of systems engineering principles
- Recognition that systems are about people as much as technology. All relevant stakeholders, particularly those developing new and disruptive technologies, must be engaged
- Renewed vigor should be applied to the delivery of agile governance designed to actively facilitate change

Based on the FPSA learning, we offer some suggestions to help make faster progress towards **Net Zero**. Although the UK is a leader in the development of economic regulation, our system is now challenged on three fronts:

- The urgent need to factor Net Zero explicitly into investment decisions
- The pace of change requiring a different balance between protection of market participants with response to rapid technological changes and new business models
- The need for consultation processes which reach outside 'those in the know' to other stakeholders

### **Agile & Inclusive Governance**

***We also believe government should consider setting up a Systems Engineering Advisory Group for energy; bringing together multi-disciplinary expertise to meet this challenge. This group should have the ability to report across departmental boundaries, recognising the scale of the challenge.***

***We urge government to set up a task force, involving the whole range of relevant stakeholders, to consider how governance and regulation can be adapted to be more agile and inclusive, with the explicit aim of facilitating the Net Zero transition. This may also complement the Energy Code Review.***

## Legislative reform

We expect that the adoption of the proposals set out here will raise wider issues for both energy and other sectors. The sector boundaries (e.g. energy and transport) are shifting, where the future energy system will be smarter, more distributed and more complex and where cities and regions will need to take an active role in the delivery of Net Zero.

***We believe that it will be necessary to consider legislative reform as part of the transformation of the energy sector in delivering Net Zero. The IET would be keen to contribute to any such initiative.***

### Call to Action for Government:

- Establish a Systems Engineering Advisory Group for energy, to bring together the multi-disciplinary expertise required to meet the **Net Zero** challenge
- Commit to and implement an agile Whole System approach to achieving **Net Zero**
- Urgently review, with stakeholders, how the current legal and regulatory structure of the energy industry could be reformed to facilitate the **Net Zero** transition for a range of scenarios
- Put in place arrangements to bring smaller stakeholders (supply chain, SMEs, innovation / start-ups etc.) to the table routinely

## Conclusion

The IET believes that a Whole System approach using systems engineering principles is essential if the green recovery and energy transition are to be realised. The Royal Academy of Engineering and many other parties are expressing similar views. We ask Government to urgently consider this.

In 2021, the IET celebrates its 150<sup>th</sup> anniversary. Throughout this period our membership has played a fundamental role in shaping our economy and society through many challenging times; championing professional competency, skills and ethics as a critical part of protecting society. We would welcome the opportunity to facilitate a discussion of the ideas raised in this letter and offer the skills and capabilities of our membership to play its part in meeting the **Net Zero** challenge.

Yours sincerely



Peter Bonfield