ETI Response to Ofgem Call for Evidence – Non-traditional business models: Supporting transformative change in the energy market

Personal details

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Contact details (Optional):

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This response is from (name) **Tony Dicicco**

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Summary

1. The Energy Technologies Institute (ETI) is considering the development of customer-centred value propositions within its Smart Systems and Heat (SSH) Programme. Customer value propositions are important to SSH because they give customers choice to switch to lower carbon energy systems: these value propositions could deliver specific benefits that solve peoples' problems and improve their lives.

2. The SSH Programme will test a range of value propositions that will look at increasing energy efficiency and comfort, improving well-being and reducing hassle. The ETI has produced four initial business model ideas (and two additional hybrids) representing a range of potential approaches to delivering value in the new low-carbon smart energy system. A sophisticated business model evaluation tool (BMET) has also been developed to help structure the ETI's thinking around the assessment of these models. Evaluation explicitly focuses on the drivers of value for each business model, rather than trying to predict uptake levels and associated cost and benefits. The numerical outputs of the evaluation are only a starting point: they reflect the assumptions and algorithms designed to represent the basic business model design and a set of currently available inputs and values.

3. The meaningful engagement of customers is critical to the success of NTBMs in driving innovation in the energy system. To date, consumers have shown little interest in energy system change: their imaginations have not been captured by a compelling proposition or brand. Consumer brands are lacking in the mass energy market and the products and services are not differentiated or attractive to the majority. The ETI is carrying out research which will increase understanding of consumer requirements. Sharing results and engaging with relevant consumer brands will identify the conditions under which such brands, with genuine consumer appeal, might invest in the new business models.

4. We agree that NTBMs have the potential to provide consumers with new, innovative products and services to facilitate the transition to a low-carbon energy system by increasing energy efficiency or enabling greater demand-side flexibility. We believe that this transition is more likely to be effective if driven by consumer demand within a constructive policy environment than via a top down implementation. Our approach therefore focuses on understanding value propositions that could encourage market pull, and then identifies features of the policy and regulatory framework that could help support uptake in the transition.

5. However good the business models, a well-designed policy framework will still be required. This is to address a number of important market failures, for instance in the market for low-carbon heating interventions. These include externalities (for example the lack of carbon price on gas), misaligned incentives (for example between landlords and tenants) and natural monopolies (for example district heat). There are also additional market failures in the transition. For example if a technology is cheaper at scale, but more expensive initially, it may never grow to replace an inferior incumbent technology. Unless the resulting policies are believed to be effective and stable, none of the models will be viable. Where the model involves a large sunk investment, investors must have the confidence that they will be allowed to earn sufficient profit in future years to justify the initial outlay.

6. NTBMs should offer a number of benefits such as more customer choice, increased competition, reduced costs to the consumer, increased security of supply and a reduction in carbon due to the introduction of NTBMs which offer energy from low-carbon sources and more energy efficient processes e.g. district heat from biomass-fired CHP schemes.

Background – ETI's work on Value Propositions

7. The ETI is considering the development of customer-centred value propositions within its Smart Systems and Heat (SSH) Programme. Customer value propositions are important to SSH because they give customers choice to switch to lower carbon energy systems: these value propositions could deliver specific benefits that solve peoples' problems and improve their lives. The SSH Programme plans to deliver this increased value by offering a bundle of products or services – these must be technically feasible and commercially viable.
8. Developing new customer-centred value propositions will be challenging because:
    - Businesses have been trying for a while and have not been successful;
    - Consumers do not value carbon or savings;
    - Consumers do not know what they value heat for;
    - New value propositions may only work if there are changes to the energy system;
    - It is difficult to see where technical/commercial opportunities lie.
9. The SSH Programme is preparing to carry out a live demonstration, starting around 2017 or 2018, to develop a living set of consumer value propositions. The demonstration will use Home Energy Management Systems (HEMS) as a key enabler to refine consumer value propositions. This will allow the SSH Programme to build a shared view and distil key insights and gaps to illustrate Consumer Insight, Technical Feasibility and Commercial Viability. Consumer Insight will allow us to understand more about what individuals want heat for, what they do today and how that might change. Technical Feasibility will allow us to understand more about the problems with new low carbon heat solutions such as heat pumps, district heat, insulation, storage and HEMS, and far they can be improved. We have some early insights about the key value drivers for business models and testing Commercial Viability will provide more information on what customers will be willing to pay for new heating solutions.
10. The SSH Programme will test a range of value propositions that will look at increasing energy efficiency and comfort, improving well-being and reducing hassle. The ETI has produced four initial business model ideas (and two additional hybrids) representing a range of potential approaches to delivering value in the new low-carbon smart energy system. A sophisticated business model evaluation tool (BMET) has also been developed to help structure the ETI's thinking around the assessment of these models.

11. Evaluation explicitly focuses on the drivers of value for each business model, rather than trying to predict uptake levels and associated cost and benefits. The numerical outputs of the evaluation are only a starting point: they reflect assumptions and algorithms designed to represent the basic business model design and a set of currently available inputs and values. BMET is particularly focussed on allowing exploration of the viability of business models and their impact on consumers over the long term, under different conditions. It allows the user to understand the drivers of value for each business model, and therefore, the suitability of business models for different conditions. It does not currently aim to predict uptake of business models in the short run.

12. One of the value propositions would provide a level of comfort to the consumer for a regular monthly fee – this would entail a new way of supplying energy, through comfort rather than on a per unit of consumption basis, and so would require a change to the existing regulatory and trading arrangements for electricity supply and financial settlement, and the development of a regulated market for heat.

13. Purchasing comfort, rather than kWhs of energy, removes the risk customers perceive around unfamiliar low-carbon technologies. Since the provider also takes responsibility for the efficiency of the heating technologies, there is a strong incentive to deliver the most efficient and reliable retrofits. It also transfers the risk of fuel price volatility from the customer to the provider. This will be attractive if the provider can hedge this risk at a cost that appeals to the customer.

14. Another potential value proposition is to supply electricity and heat to customers, with and without storage, with a compelling community brand appeal. Once again this would require a change to the existing regulatory and trading arrangements for electricity supply and financial settlement, and the development of a regulated market for heat. There would also need to be changes to the licensing and distribution of electricity and the development of similar rules for heat distribution.

Response to Discussion Points

Chapter 1

- *What is your view on our definition of non-traditional business models?*

15. We agree with the definition as laid out in paragraph 1.5 of the Discussion Paper. However, NTBMs by themselves may not deliver least-cost solutions to consumers in the longer term: policy and regulatory frameworks need to be developed which steer and support businesses to create consumer-friendly value propositions.

- *How we can engage with NTBMs more effectively in the future?*

16. We believe that the release of this discussion paper is a good start in engaging with potential developers of NTBMs. We believe that a strategic view needs to be taken of the longer term requirements of a transition plan that guides business model development. This would also help to provide business confidence, especially in developing longer term commitments to resource development, rather than just looking for shorter term drivers. It may be appropriate after the outcomes of this discussion paper are published for Ofgem to set up a working group to consider potential changes to the gas and electricity trading arrangements, and development of arrangements for a future heat market, which might facilitate the introduction of NTBMs.

Chapter 2

- *We would like to hear your views on the drivers for market entry. Do you think there are other important drivers?*

17. The first point that we would wish to make on Chapter 2 is that there seems to be too much focus on electricity and not enough on gas and heat. One of the key challenges that the UK faces over the next 30 - 40 years is the decarbonisation of heating in around 26 million properties - this will rely on the introduction of innovative business models and value propositions.

18. We agree that NTBMs have the potential to provide consumers with new, innovative products and services to facilitate the transition to a low-carbon energy system by increasing energy efficiency or enabling greater demand-side flexibility. We believe that this transition is more likely to be effective if driven by consumer demand within a

constructive policy environment than via a top down implementation. Our approach therefore focuses on understanding value propositions that could encourage market pull, and then identifies features of the policy and regulatory framework that could help support uptake in the transition. We believe that business model and policy solutions, acting together, need to:

- make it easier for consumers to choose the low-carbon options;
- tackle upfront costs, or develop compensating benefits; and
- manage risks and protect consumers during the roll out of district heat.

19. There may be more scope for innovation in the enabling technologies value chains. There should be less regulation of the business models and value propositions that sit on the customer side of the meter in the "smart home" market. This may provide more opportunities for innovative business models to emerge in these areas, potentially driven by new entrants to the energy sector. Policy developments will play an important role in driving this change. The sector is dominated by policy intervention and there are no signs of this diminishing.

20. Social drivers of policy may limit innovation. For example, Ofgem's regulations on tariff simplification may act as a direct limit to innovation in the sector. Further, making a return commensurate with high risk activities from end customers may become increasingly difficult as high profits could be deemed politically unacceptable. It may also mean that new entrants are reluctant to become involved in a sector where risks of loss of reputation are high.

21. Access to finance can be a key driver: ensuring that the NTBMs can secure finance is one of the challenges facing the sector and policy makers and regulators - they should act to reduce uncertainty and unnecessarily high costs for customers due to the high cost of capital and lack of lenders. A potential source of finance is from investors willing to make socially responsible investments below the market rate. Where these investors can be found, this can unlock access to new low-carbon technologies for customers with limited access to affordable credit.

Chapter 3

- *Have we accurately described the NTBM environment? Have we missed something?*

22. We believe that you have accurately described the NTBM environment. In our view, one area which needs careful consideration is how existing large providers, who have significant developmental and investment capability will evolve, and how smaller players will compete. A further area for consideration is how the joint production of heat and power would be facilitated in the current market place. Generators would need to follow a demand curve for their energy, not just power output, in a market that is following power only. A related issue is whether a business model that requires a significant take up percentage such as district heating, is really an NTBM? It cannot thrive without putting in place an appropriate policy and regulatory framework.

23. Another area that could be expanded is the potential sourcing of finance from investors willing to make socially responsible investments below the market rate (as mentioned above) – this could be an important means of unlocking access to new low-carbon technologies for customers with limited access to affordable credit.

- *We'd like to learn more about organisations using NTBMs. If you are prepared to discuss this, please contact us (see Appendix 1 for contact details).*

24. We would be happy to discuss our views on NTBMs and will contact you accordingly.

Chapter 4

- *Our main focus in this paper is on regulatory issues arising from future energy market transformation, but we recognise that there are relevant issues within current regulation. Please let us know if there are any other issues?*

25. As you point out in your Discussion Paper, there are a range of issues for small-scale NTBMs such as set-up costs, regulatory compliance costs, industry code compliance and environmental and social obligations. Liquidity in forward electricity trading has also been restrictive for NTBMs, as has the restriction in the number of core tariffs that suppliers can offer (although this may be partially offset through seeking a derogation).
26. Opportunities do exist in the existing electricity market, such as providing flexibility and demand side response and these should increase as smart meters are rolled out. All the business models that the ETI has considered require the delivery of a smart low-carbon system to be viable. This will only happen with significant policy intervention to meet the UK's carbon targets.
27. Recent examples of major policy change include Electricity Market Reform to support low-carbon electricity generation, the Green Deal to support domestic energy efficiency investments and the mandated smart meter roll-out to enable innovation in energy provision. The success of the business models being considered by the ETI will depend on the effectiveness of these, and similar, policies. Unless these policies are believed to be effective and stable, none of the models will be viable. Where the model involves a large sunk investment, investors must have the confidence that they will be allowed to earn sufficient profit in future years to justify the initial outlay. Investors may currently have legitimate concerns that any such profits will meet political resistance, particularly if they occur at times of rising energy costs. The biggest influence on the viability of all our business models will therefore be the success Government has in providing confidence to the market that it will deliver the carbon targets and allow successful companies to earn returns commensurate with the risks they will take.
28. Other sources of system flexibility such as storage and distributed generation may become widely available to industry parties, so we need to understand whether there are synergies between different sources of flexibility and how the system can make best use of all these sources to efficiently run its operation to the benefit of consumers.

Chapter 5

- *What are the benefits of different NTBMs to energy consumers?*

29. The greatest potential benefit to the consumer is the increased choice that NTBMs could offer. This should help to address the very low level of engagement between consumers and energy systems. Consumers are generally uninterested in spending time considering new energy options. They also have less access to information on new technologies and may be put off by unfamiliarity and associated perceptions of risk. By offering consumers the outcomes that they are interested in, rather than offering options around the means to achieving these outcomes, many of the barriers associated with rolling out the smart energy

system to consumers may be bypassed. However, the significant barrier of high upfront costs required for some low-carbon interventions, such as heat pumps, solid wall insulation and district heating, will need to be addressed first.

- *Are these benefits experienced by all energy consumers or only those directly receiving the NTBM's services?*

30. The greatest benefit will be to those directly receiving the NTBM's services but there could be knock-on effects to all energy consumers as "traditional" service providers try to compete with the new NTBMs.

- *Are there additional wider benefits to the energy system and beyond it?*

31. The introduction of NTBMs will increase competition as NTBMs compete amongst themselves and with more established parties. This could reduce the price of energy and related energy services and also increase security of supply. There should also be a reduction in carbon emissions due to the introduction of NTBMs which offer energy from low-carbon sources and more energy efficient processes e.g. district heat from biomass-fired CHP schemes. New policies and regulations will need to be introduced to facilitate such schemes.

- *Which of these benefits should be taken account of in regulatory policy-making and decision-taking and why?*

32. We believe that the decarbonisation of the UK's domestic heating is one of the key challenges facing the country, and therefore regulatory policy-making and decision-taking should be developed to facilitate this. This could mean that policies/regulations are introduced to help parties to offer bundled electricity and heat products, perhaps without the need to comply with all the obligations currently required by energy supply licensees.

- *Are there energy system costs or risks from any of the NTBMs? How might these be addressed?*

33. As discussed above, there are potentially significant high upfront costs required for some low-carbon interventions, such as heat pumps, solid wall insulation and district heating – these will need to be addressed if NTBMs around these interventions are to be successful. These costs could be recovered through a surcharge on energy bills and/or through general taxation. There are pros and cons for which recovery route is chosen: recovery through taxation is less regressive than through energy bills, but higher energy bills can be a significant factor in encouraging more energy efficient interventions. Where costs are recovered from energy bills, it is not optimal to load all of these on electricity as this will increase electricity costs compared to more carbon-intensive fuels such as gas and oil, and reduce the economic viability of lower carbon options such as heat pumps and electric resistive heating.

- *How will NTBMs help to drive innovation within the energy system?*

34. See above

- *How could NTBMs potentially transform the energy market and what fundamental challenges to regulatory arrangements could this entail?*

35. Electricity and gas are supplied and billed on a price per unit basis but in future, suppliers may choose to offer different products such as a monthly "all-in" price for "comfort" which includes heat and electricity. It is not yet clear what sort of licence arrangement would be required to achieve this but it may be that "selling" electricity in this way could be done through a derogation to the existing electricity supply licence. If this were the case, interested parties could apply to Ofgem for a derogation to supply customers on a "price for comfort" basis – this could require a change to an energy supply licence (or Licence Lite arrangement).
36. Changes to the electricity supply licence[1] prohibit any licensee from offering more than **four** Core Tariffs, as defined in Standard Licence Condition (SLC) 1, to any customer in any region in relation to any category of metering arrangement which is permitted under its licence. We understand the rational for introducing this change, in order to reduce tariff complexity and facilitate switching, but this may actually restrict NTBMs offering greater innovation.

- *How could regulatory arrangements change to accommodate NTBMs?*

37. Correcting market failures around externalities, such as the non-traded cost of carbon, and lock-in (where technologies are more expensive initially, but where costs could be expected to fall with economies of scale) will tackle some of the actual cost barriers associated with interventions. Regulatory arrangements and policies can also be designed to tackle barriers associated with upfront costs, and can be tagged to existing structures to reduce interest and awareness barriers.
38. An example of how regulatory arrangements would need to change is the treatment of community energy schemes which would introduce local monopolies for the supply of district heat. This could be a barrier given that high upfront costs of district heating mean that profit is likely to be negative initially, before being gradually recovered over time. If regulatory changes prevented this profit being earned, then the business model provider may never recover its initial costs.
39. This barrier could be helped by clear statements on regulatory intentions around heating networks, and by ensuring that any regulation recognises the long payback periods associated with district heating. Any regulatory burden should also be commensurate with the size of the service provider's operations.
40. There are also difficulties around planning approvals for heat networks, and a lack of local authority resources or expertise may act as barriers. This may require enablers such as fast track planning, as well as provision of standardised guidance and encouragement of information sharing between local authorities on planning issues associated with heating networks.
41. Running a private network for electricity generated through CHP requires a licence. Licencing requirements for IDNOs already differ from those for DNOs, limiting the regulatory burden. A further policy enabler could be to provide exemptions for sufficiently small private networks.

[1] Paragraph 2(b) of Standard Licence Condition (SLC) 22B (*Restrictions on Tariff numbers and Tariff simplification*)

- *What role do NTBMs and other parties have in managing energy market transformation and regulatory change?*

42. Changes are required across the value chain to allow NTBMs to be delivered. The current energy system value chain lacks the resources, processes and values (RPV) to enable transition. Structurally the value chain lacks a focal point, normally an Original Equipment Manufacturer (OEM) which orchestrates, coordinates and accelerates the development of systems and the evolution of performance. For example, responsibility for domestic energy supply, retrofit delivery and heating is spread among a range of players. None of these businesses have yet developed sufficient technical capability, or consumer confidence, to deliver whole house solutions to the standard and cost required. The appetite of energy and industrial companies to take a systems integration role to develop the necessary RPV in the value chain needs to be explored.

43. The meaningful engagement of customers is critical to the success of NTBMs in driving innovation in the energy system. To date, consumers have shown little interest in energy system change: their imaginations have not been captured by a compelling proposition or brand. Consumer brands are lacking in the mass energy market and the products and services are not differentiated or attractive to the majority. The ETI is carrying out research which will increase understanding of consumer requirements. Sharing results and engaging with relevant consumer brands will identify the conditions under which such brands, with genuine consumer appeal, might invest in the new business models.

About the ETI

44. The Energy Technologies Institute (ETI) is a public-private partnership between global energy and engineering firms and the UK Government. ETI carries out three primary activities:
    - modelling and strategic analysis of the UK energy system (power, heat, transport, infrastructure) to identify the key challenges and potential solutions to meeting the UK's 2020 and 2050 energy and climate change targets at the lowest cost,
    - investing in major engineering and technology demonstration projects through targeted procurement to address these challenges with the aim of de-risking solutions – both in technology and in supply-chain development – for subsequent commercial investors
    - providing support to enable effective third party commercialisation of project outcomes.
45. Recognising the need to focus and target investments to ensure value for money and leverage from public sector support, the ETI's techno-economic modelling and strategic analysis of the UK energy system is a critical tool for supporting effective system planning and innovation delivery. The ETI modelling approach is termed 'ESME' (Energy System Modelling Environment) and is now used by DECC and the Committee on Climate Change to aid with policy development, planning and effective investment targeting.

46. Insights from ESME analysis have been reviewed with the European Commission and the JRC. With their support ETI have now developed a prototype tool for use in assessing energy system design for the European Union area using the same approach used for the UK. A local (urban area) energy system-planning tool, EnergyPath Networks, is in development as part of the ETI Smart Systems and Heat programme.

47. The UK energy system development and decarbonisation priorities identified by ETI are:
    - **Efficiency** – introducing systems and technologies to reduce cost and improve buildings and transport efficiency.

- **Nuclear** – establishing a new build programme based on new supply chain capacity and increased investor confidence.
- **Bioenergy** – informing the science, technology and business cases for decisions on how to optimise the use of sustainable bioenergy resources as solid, liquid and gaseous fuels.
- **Carbon Capture and Storage** – providing system demonstration and strategic insights for capture, transport and storage building investor confidence.
- **Gas** – enabling long-term use of a critical fuel for power, heat, storage and potentially transport ('gas' = natural gas, synthetic combustion gases, biogas and hydrogen).
- **Offshore renewables –** reducing cost and building investor confidence.

48. The ETI has announced more than £211m of investments in projects across nine technology programme areas, including buildings, distributed energy and smart systems and heat. The work taking place in our Smart Systems and Heat (SSH) programme involves active communication with a number of local authorities across Scotland, England and Wales. The ETI is working with a selection of local authorities to host a demonstration of "smart" cost-optimised local energy designs for heating domestic and light commercial buildings. To help the ETI achieve this, we are working with local authorities to develop and test the 'EnergyPath' software tools that will allow the design of practical, cost-effective local energy systems (both heat and power) for their areas. Importantly, this activity will support and underpin national adoption of the capability and approach.