Centre for the Evaluation of Complexity Across the Nexus

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Negotiating complexity in evaluation planning: A participatory systems map of the energy trilemma

A CECAN case study Evaluation Policy and Practice Note for policy analysts and evaluators

The energy trilemma describes the interaction in the energy system between sustainability and emissions, affordability and prices, and security of supply. The sheer number of programmes and policies with close interaction and overlap in this area has led to a crowded and complex policy landscape with a range of potentially complementary and conflicting aims. In this case study, CECAN and the Department for Business, Energy and Industrial Strategy (BEIS) worked together to build a richer understanding of this complex area by developing a participatory systems map of the energy trilemma.

What were the aims of the case study?

We aimed to explore, via participatory systems mapping, the energy trilemma policy landscape, and specifically:

- to map various relevant policies, their interaction and impact on the trilemma;
- to highlight their impacts on: the three 'legs' of the trilemma (emissions, prices, and security), common and/or contradictory aims and mechanisms amongst policies, and uncertainty and evidence gaps; and
- to explore the complexity in this area as fully as possible, embracing uncertainty, feedbacks, and all possible causal connections.

The case study also allowed us to further test and refine our emerging approach to participatory systems mapping in evaluation. The understanding developed during the mapping process, and presented in our **full report** on the case study, is helping to support evaluation planning, to make the case within BEIS for, and to develop, proportionate evaluation(s). The systems map can also help feed into, or put in context, individual policy maps and other mapping efforts.

Our approach to participatory systems mapping

Our approach builds on existing methods (e.g. fuzzy cognitive mapping, dependency modelling, theory of change) with a strong emphasis on: (i) a participatory approach, and (ii) a bespoke approach to analysis, using formal network analysis in combination with stakeholders' views of the system. In practice our systems maps are:

- Always built by as diverse a range of stakeholders as possible.
- Designed to capture complexity rather than simplify it away.
- Analysed using a bespoke approach, led by users and firmly rooted in combining network analysis and stakeholders' beliefs about important, changeable, and controllable factors in a system. This means using stakeholders' beliefs as key starting and reflection points for the formal network analysis.

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How is the map produced?

The approach involves teams of ideally no more than twelve people collaboratively constructing a causal map of the system. The map:

- Is made up of 'factors' and their causal connections. Factors can represent anything as long as they are variables (i.e. they can go up and down).
- Shows connections, these represent causal relationships, either positive, negative, or unclear/complex.
- Reflects the expertise and perspectives of the group of people that built it and so should not be assumed to be objective or comprehensive.
- Has value by virtue of the mapping process - the act of building a map can lead to important conversations, developing shared understandings and consensus.
- Can be analysed and presented to a wider audience following completion, though this needs to be carefully considered when we have large complex maps.

What learning did the case study produce?

The full systems map produced is shown in Figure 1: explore it, question it, critique it. One way to analyse the map is shown in Figure 2. Here, the focus is on those factors one causal connection 'downstream' of BEIS policies. It is therefore a relatively narrow view of the map. However, it does allow us to consider where influences of the policies might complement or contradict one another and gives a sense of where policies are crowded or more connected, or where they are more disconnected from others. Looking at this example, we may note:

- Fuel poverty's status as a key focus for BEIS is reflected in its position in the map, being affected directly by three BEIS policies. It may be fruitful to consider more closely exactly how these policies interact with bills for those in fuel poverty. Is coordination between the policies optimal?
- Many policies create an additional levy on consumer bills. The team building the map recognised this and discussed the tension between levies increasing bills whilst policies also impact other objectives and wholesale prices.
- Smart flexible energy was impacted by a range of policies which may not be directly related. Are policies which are not closely related coordinated when they have impacts on the same areas?

On a methodological front, we took valuable insights on how to apply our systems mapping approach in a new setting, and further refined our analysis approach, particularly in pulling out policy mechanisms that complement but also potentially contradict one another. This work is continuing in other CECAN case studies with BEIS and other government departments and agencies.

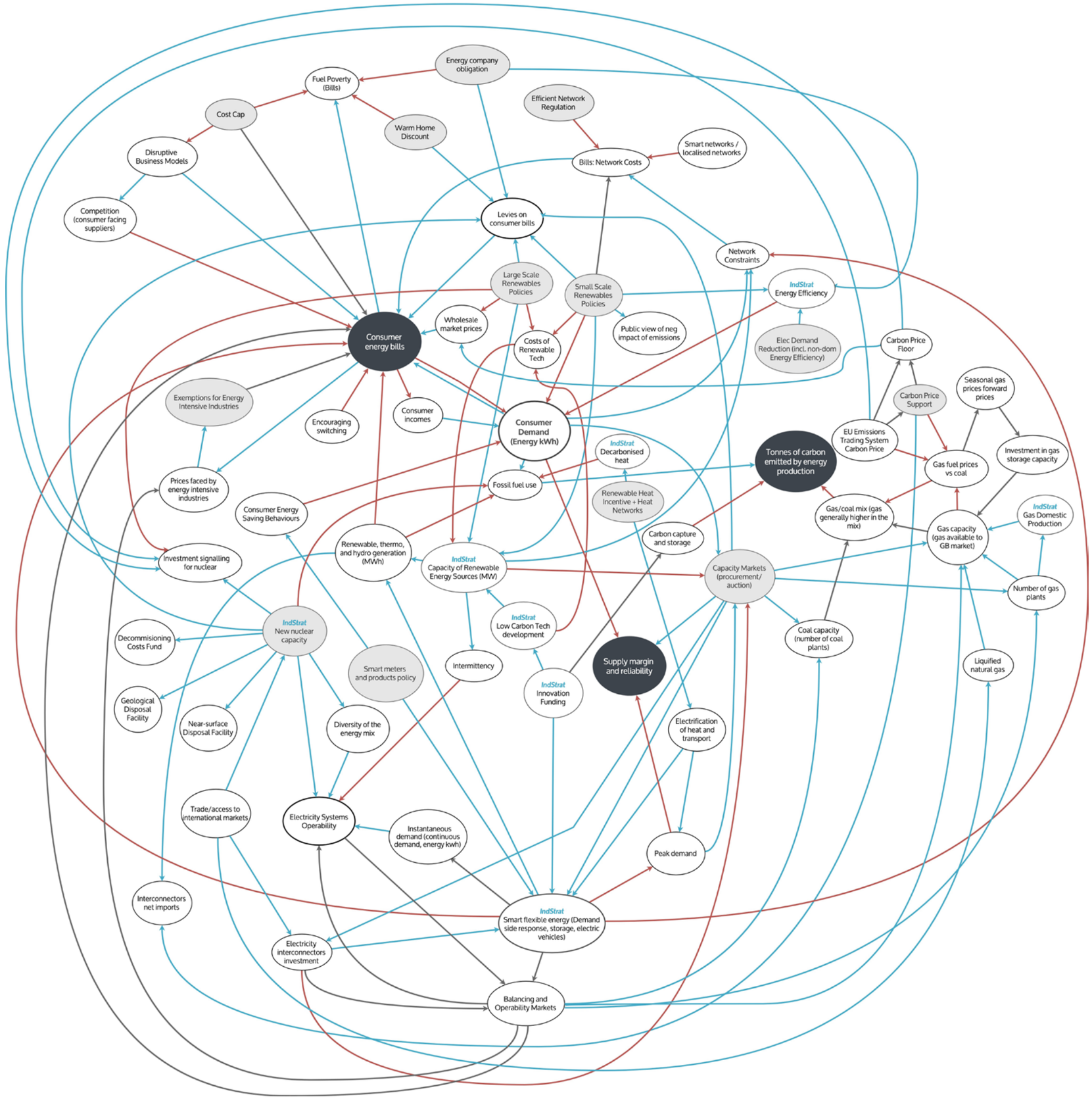


Figure 1
The full Energy Trilemma Map—**explore it, question it, critique it!**

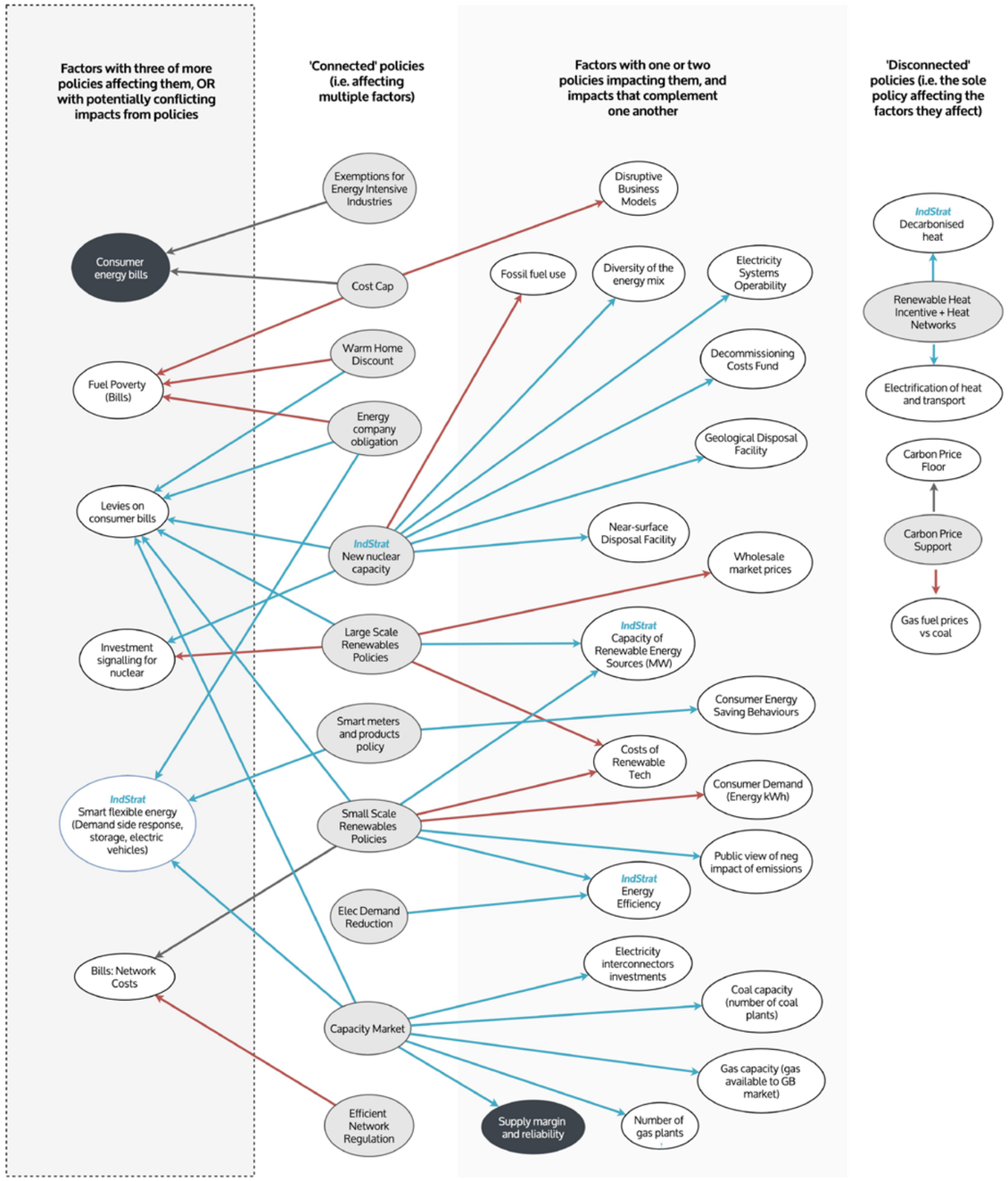
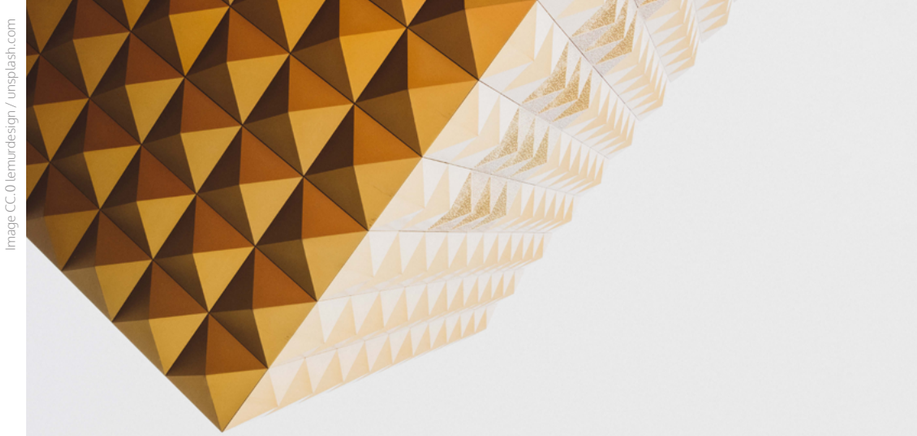


Figure 2
Connections 'downstream' of BEIS policies



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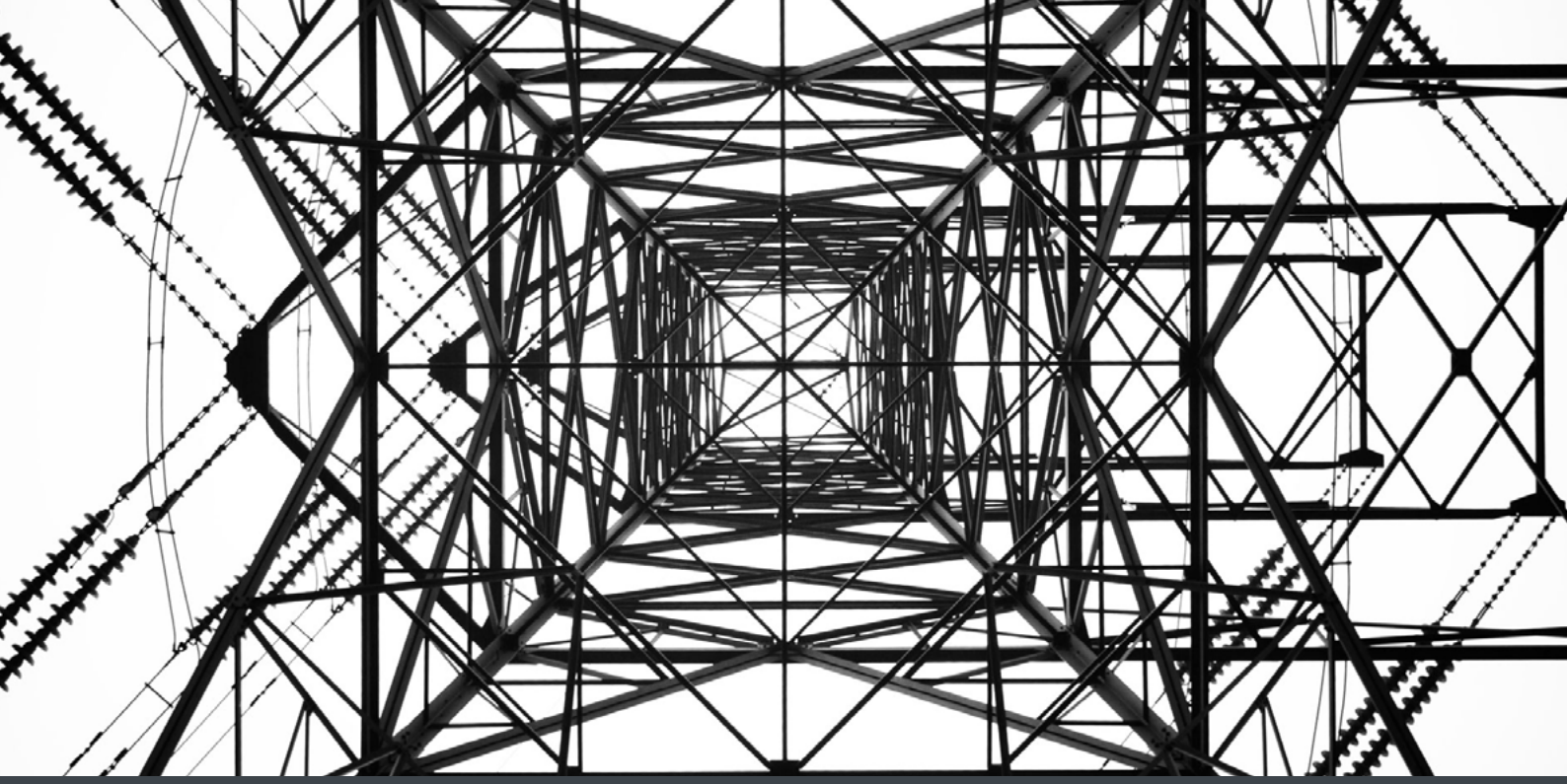
What are the implications for future policy evaluation?

This approach to participatory systems mapping can be helpful to evaluation:

- Where it serves specific needs (e.g. to identify impacts of wider context, or identify contradictory policy mechanisms, or to bring together stakeholders in a participatory and collaborative way).
- Where a general desire for a richer understanding of a system is expressed by the client or stakeholders.
- By producing maps and analysis that are highly complementary to other methods, for example, more meaningful theory of change maps or policy maps.
- To help inform and target data collection efforts during an evaluation, by highlighting areas and relationships that appear to be important drivers of impact and where there is high uncertainty.



References and further information

- Barbrook-Johnson, P. & Penn, A. (2018) A participatory systems map of the energy trilemma: A CECAN report for BEIS. December 2018, Online at **www.cecan.ac.uk**
- For info on the mapping workshop process, see Fuzzy Cognitive Maps: A Participatory Workshop Tool at **www.cecan.ac.uk/resources**.
- Penn AS, Knight CJK, Lloyd DJB, Avitabile D, Kok K, Schiller F, et al. (2013) Participatory Development and Analysis of a Fuzzy Cognitive Map of the Establishment of a Bio-Based Economy in the Humber Region. PLoS ONE 8(11): e78319. **https://doi.org/10.1371/journal.pone.0078319**
- Uprichard, E. & Penn, A. (2016) Dependency Model: CECAN EPPN No.4. Autumn 2016, Online at **www.cecan.ac.uk**

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The Centre for the Evaluation of Complexity Across the Nexus (CECAN) is a £3m national research centre hosted by the University of Surrey, which brings together a unique coalition of experts to address some of the greatest issues in policy making and evaluation.

This Evaluation Case Study Policy and Practice was written by Dr. Pete Barbrook-Johnson. The core team working on the case study also included, Dr. Alex Penn, Anna Kaxira (CECAN) and Tajbee Ahmed (BEIS).

CECAN has developed a set of co-produced case studies, working with government departments and agencies to tackle their intractable evaluation challenges in complex policy area. These case studies have involved sustained dialogue and an orchestrated succession of activities and relationship building. They are providing experiments in bringing together the expertise of evaluation practitioners, methods and domain specialists, social and natural scientists and policy analysts to develop shared understandings of evaluation challenges and to identify evaluation needs and solutions.

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