

Technological Innovations and Climate Change: Community Energy

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A. Executive summary

A.1. Government should support the creation of a regulatory sandbox for community energy groups as this will produce greater innovation and ultimately lead to new energy services and markets for the UK. The regulatory sandbox is a tool being used by governments across the world enabling for experimentation with new business models within a contained environment (i.e. limited timeframe and number of participants), under supervision of a government body/agency. The results of the sandbox help inform policymakers on new developments in innovation and how regulation can be adapted to enable new business models.

A.2 Broad citizen engagement with the energy system is limited by the UK's current reliance on the supplier hub model. Given the potential for inequity and the need to facilitate citizen engagement in the energy transition, **Government should commission a joint review by Ofgem, BEIS, MHCLG and CMA on how collective self-consumption** (where local groups share locally generated renewable energy amongst themselves) **can deliver consumer engagement and protection in a transitioning energy system and identify the associated regulatory constraints.**

A.3. The supplier hub model also acts as a barrier to disruptive innovation and constrains the shift to local, distributed renewable energy markets. Small, local parties are not able to comply with all licence and code requirements and industry incumbents influence change processes to protect their market dominance. **Government should support Ofgem's move to a principle-based form of regulation to redress the dominance of incumbent energy market actors.** One particular licensing issue for community energy groups is the local provision of licence exempt supply through a public network. **Government should encourage Ofgem and code authorities to find a solution and unlock the contribution of community energy groups.**

A.4. Ofgem's current Sandbox 'Innovation link' offers potential, but some revisions are required to support innovation specifically by community energy groups. In particular **Government should support Ofgem in expanding the departments and authorities offering sandboxes through Innovation Link to cover the non-energy regulations,** avoid silos between departments and policies, and remove constraints from the development of community energy.

A.5. For community groups to run successful trials, the sandbox should make provisions for: finance for innovation; long timeframes (up to 10 years) to cover technology payback costs; capacity building and knowledge exchange amongst participants. **Government could identify relevant innovation funding and find mechanisms to link these sources to community-led sandbox projects to develop rapidly replicable business models for community enterprises.**

A.6. Evidence on the pioneering community energy sandbox run by the Dutch Enterprise Agency is provided as an example and comparisons with the UK approach are made to show how Ofgem can further support community energy innovation.

Inquiry: What role should Ofgem play in supporting community energy and resolving regulatory issues, such as decentralisation and incorporating community energy projects into smart electricity grids?

B. Introduction

B.1. We are a team of academics working on the project ‘Social Entrepreneurship at the Grid Edge’¹ which looks at community energy in the United Kingdom (UK) and the Netherlands (NL). We bring together expertise from law, energy social sciences and social entrepreneurship.

B.2. We focus on local renewable electricity and demand management projects that can be designed and delivered by community energy groups. Our project analyses current regulatory and policy frameworks for community energy in both UK and NL. The NL framework is more supportive, leading to more community energy innovation. **There is clear evidence about how a regulatory sandbox can be used to support community energy innovation**².

B.3. Mission-orientated approaches have an important role to play in supporting governments to tackle wicked problems, like climate change³. They allow governments to direct innovation by setting a clear goal and use policy instruments to encourage a diversity of approaches and actors to find solutions. Sandboxes are pivotal because they support innovators to experiment in advance of regulation changes and identify any barriers to implementing new products and business models. Extending sandboxes to include community groups, for example, is essential to energy innovations.

- **The Government should support the creation of a sandbox for community energy groups** as this will produce greater innovation and ultimately lead to new energy services and markets for the UK.

C. Supplier hub model constrains broader citizen engagement and local energy innovation

C.1. The energy transition can only be achieved through broad based citizen engagement and societal transformation⁴. To this end, the European Commission’s Clean Energy Package creates legal requirements to recognise Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs) and their right to collective self-consumption (where local groups share locally generated renewable energy amongst themselves). This provides a framework for citizens and communities to be directly involved in local energy provision and distribution. While the UK was involved in developing the Clean Energy Package, it is no longer required to transpose the associated laws.

C.2. Instead, UK energy law and regulation continue to use a supplier hub model, meaning the consumer has one access point to the energy system through their licenced supplier. Consumers are not encouraged to build capacity in smart local energy management for their neighbourhood. The supplier hub model is presented by Ofgem and industry as being simple and convenient for consumers⁵, and yet **51% of consumers do not engage with the energy market** (2019 data⁶) and are penalised for their lack of

¹ <https://www.creds.ac.uk/social-entrepreneurship-at-the-grid-edge/>

² E.C. van der Waal, A.M. Das, T. van der Schoor, Participatory experimentation with energy law: Digging in a ‘regulatory sandbox’ for local energy initiatives in the Netherlands, *Energies*. 13 (2020) 1–21. <https://doi.org/10.3390/en13020458>.

³ M. Mazzucato, *Mission Economy: A Moonshot Guide to Changing Capitalism*, Allen Lane, 2021.

⁴ Future Energy Scenarios 2020, National Grid <https://www.nationalgrideso.com/document/173821/download>

⁵ Energy UK (2019) ‘The Future of Energy: the future retail market and customers’ relationship to it.’ [https://www.energy-uk.org.uk/files/docs/The_Future_of_Energy/2019/FutureofEnergy_ReportSection_Chapter1_04.19\(1\).pdf](https://www.energy-uk.org.uk/files/docs/The_Future_of_Energy/2019/FutureofEnergy_ReportSection_Chapter1_04.19(1).pdf)

⁶ Ipsos MORI February 3, 2020, Consumer Engagement Survey https://www.ofgem.gov.uk/system/files/docs/2020/02/2019_consumer_survey_report_0.pdf

engagement. Ofgem is concerned local energy creates complexity for consumers, and yet research by Professor Shipworth's group at UCL Energy⁷ has shown consumer appetite for having multiple suppliers, include a local energy supplier⁸. While UKERC research has raised concern that energy supplier innovation in consumer offers for smart flexible energy risk exacerbating existing social inequities⁹.

- The supplier hub model limits broader citizen engagement with the energy system. Given the potential for inequity and the need to facilitate citizen engagement in the energy transition, **Government should commission a joint review by Ofgem, BEIS, MHCLG and CMA on how collective-self consumption can deliver consumer engagement and protection in a transitioning energy system and identify the associated regulatory constraints.**

C.3. The supplier hub model also acts as a barrier to business model innovation and constrains the shift to local, distributed renewable energy markets¹⁰. Small, local parties are not able to comply with all licence and code requirements and industry incumbents influence change processes to protect their market dominance.

- **Government should support Ofgem's move to a principle-based form of regulation¹¹ to redress the dominance of incumbent energy market actors.**

C.4. One recent example is the progress of P379¹² code change¹³. This change could have enabled license exempt¹⁴ suppliers such as community energy groups to retail local renewable energy alongside a consumer's main supply. However the option to include license exempt supply (such as renewable electricity from a small community PV array for example) was removed from consideration six months into the process¹⁵. The code change proposal was completely withdrawn when incumbent suppliers rejected the costs¹⁶. Those supporting the modification agreed that P379 constituted a 'large and complex industry change', but that this was necessary and suggested the Ofgem carry out a Significant Code Review. A Significant Code Review is controlled by Ofgem rather than industry, allowing for far reaching change. The previous one took three years¹⁷. The sandbox should allow community energy groups to experiment in local supply and explore costs and benefits before a Significant Code Review is completed.

- **Government should encourage Ofgem and code authorities to find a solution for the local provision of licence exempt supply through a public network.**

7 <https://www.ucl.ac.uk/bartlett/energy/research/energy-and-buildings/pace-research-group-people-adaptability-comfort-and-smart-energy>

8 N.E. Watson, G.M. Huebner, M.J. Fell, D. Shipworth, Two energy suppliers are better than one: Survey experiments on consumer engagement with local energy in GB, *Energy Policy*. 147 (2020) 111891. <https://doi.org/10.1016/j.enpol.2020.111891>.

9 Hall, J. Anable, J. Hardy, M. Workman, C. Mazur, Y. Matthews, Matching consumer segments to innovative utility business models, *Nat. Energy*. (2021). <https://doi.org/10.1038/s41560-021-00781-1>.

¹⁰ R. Bray, B. Woodman, P. Connor, *Policy and Regulatory Barriers to Local Energy Markets in Great Britain*, Exeter, 2018 <http://hdl.handle.net/10871/33607>

¹¹ Future insights Series 3: Local Energy

https://www.ofgem.gov.uk/system/files/docs/2017/01/ofgem_future_insights_series_3_local_energy_final_300117.pdf

¹² P379 was a proposal to change the Balancing and Settlement Code. This is one of a series of Codes used by the energy industry to govern access to and operation of wholesale and retail energy markets. The codes are managed by Code Authorities. Ofgem shares oversight of these codes with the industry themselves, allowing industry to self-govern aspects of the market.

¹³ <https://www.elexon.co.uk/mod-proposal/p379/>

¹⁴ Small suppliers supplying no more than 5MW (of which no more than 2.5 MW is supplied to domestic consumers) can be exempt from a license for the supply of electricity.

¹⁵ Elexon, P379 Workgroup Meeting 8 Summary, London, 2019. <https://www.elexon.co.uk/wp-content/uploads/2019/09/P379-Workgroup-8-Summary-1.1.pdf>.

¹⁶ CEPA Economics, P379 CBA: Emerging conclusions, London, 2021. <https://www.elexon.co.uk/documents/p379-bsc-panel-slides/>

¹⁷ Competition and Markets Authority (2016) *Energy Market Investigation: Final Report*. London.

D. The UK's current regulatory sandbox and suggested changes to support community energy innovation

D.1. In 2017 the UK launched, Innovation Link, a regulatory sandbox enabling experimentation with new energy models in order to assess legislation constraints on the basis of trial results¹⁸. The focus is on supporting innovation that works with current licensing arrangements and those who take part must be a licensee, work with a licensee or be a party to industry codes that allow them to participate in the live system.¹⁹ Innovation Link was relaunched in 2020 with a new focus on providing advice to innovators. This aimed to improve the transparency around advice given, but the protection of commercially sensitive business models remains central. The relaunch also included Sandboxes for two of the electricity codes, the Balancing and Settlement Code (BSC)²⁰ and the Distribution Connection Use of System Agreement (DCUSA)²¹. This is a pioneering approach to supporting innovation in the energy sector, which promises to bring new business models into the system. However more could be done specifically to support innovation in community energy.

D.2 The current sandbox creates a number of constraints to community energy engagement. First, it requires license holders to be involved, which limits options for innovating community-led projects in general, and collective self-consumption in particular. Second, there is no emphasis on developing easily replicable projects that can be picked up and deployed by other community energy groups nationally (in the way the Feed in tariff supported rapid replication by different local groups). This is due to the emphasis on commercial projects over social innovation projects and it results in limited options to build capacity of the existing community energy sector. Third, there is no link to innovation funding. Community energy groups largely rely on crowdsourced finance for projects, but this is not appropriate to use for innovation trials that contain higher risks. A related issue is that trial timeframes are short (2 years) and this does not cover technology pay back times. Consequently, community energy is not adequately supported by Ofgem's current iteration of Innovation Link.

- The Next Generation Community Energy Programme run by Power to Change is a good example of supporting community energy innovation, including capacity building and knowledge exchange²². While BEIS Innovative Domestic Demand-Side Response has also enabled community energy groups to access innovation funding. **Government could identify relevant innovation funding and find mechanisms to link these sources to community-led sandbox projects to develop rapidly replicable business models for community enterprises.**

D.3 Regulatory constraints to community-led local energy go beyond energy regulations and encompass local development and housing. To maximise the effectiveness of community energy sandboxes, the design process should include relevant stakeholders such as Distribution Network Operators, Data Communications Company, as well as authorities including Department for Business, Energy & Industrial Strategy (BEIS), Competition and Markets Authority (CMA), Ministry for Housing, Communities and Local Government (MGCLG) in order to gain a full picture of regulatory constraints affecting community-led local energy and ways to relax these for community-led experimentation.

- **Government should support Ofgem in expanding the departments and authorities offering sandboxes through Innovation Link.**

¹⁸ <https://www.ofgem.gov.uk/about-us/how-we-engage/innovation-link>

¹⁹ https://www.ofgem.gov.uk/system/files/docs/2020/07/sandbox_guidance_notes.pdf

²⁰ <https://www.elxon.co.uk/bsc-and-codes/bsc-related-documents/bsc-sandbox-procedure/>

²¹ <https://www.dcusa.co.uk/wp-content/uploads/2019/11/DCUSA-Sandbox-Guidance-Documents.pdf>

²² <https://www.next-generation.org.uk/>

E. The Netherlands' (NL) approach to community energy sandboxes

E.1. The Netherlands provides an internationally pioneering approach to facilitating community group involvement in the energy transition. Between 2015-2018, the Dutch Enterprise Agency (RVO) ran a regulatory sandbox to support local groups develop local renewable energy projects. The sandbox allowed Energy cooperatives or Home owners' associations to experiment with generating, distributing and retailing energy locally. Specifically the groups could seek the following derogations from:

- the obligation to have a supply permit;
- the prohibition to carry out DNO tasks;
- certain specific rules that apply to data processing;
- certain specific rules regarding transparency and liquidity of the energy market; and
- rules regarding metering device requirements.

Additionally, groups could seek the freedom to determine grid tariffs, tariff structures, and requirements as set by the Netherlands Authority for Consumers and Markets

E.2. Projects needed to increase the amount of renewable energy used at local level, lead to a more efficient use of the existing energy infrastructure, and let electricity users have a larger say on their energy consumption. The sandbox provided an exemption for ten years, which covered the payback period of the majority of the energy technologies and infrastructures used in the projects. Two types of projects were defined for the sandbox:

- Large experiments: involving up to 10,000 energy consumers and running in partnership with the regional grid operator.
- Grid experiments: involving a maximum of 500 users on a separate grid and connecting to the main electricity grid by a single connection.

Distribution Network Operators (DNOs) raised concerns around the technical safety of community-run grids and allowing community groups freedom, but these concerns have not been substantiated in trials.

E.3. Projects need to be replicable by other groups in the Netherlands. The text of the sandbox explicitly states that an application will be rejected if it cannot be replicated by other groups in the country (article 7.1 sub u)²³. The sandbox included capacity building knowledge exchange activities. The projects are ongoing, but if deemed successful, the Minister of Economic and Climate Affairs can decide to amend the applicable legislation so that they can continue running beyond the set timeframe.

E.4. The NL approach demonstrates the potential that regulatory sandboxes have for promoting and championing community group innovation. It enabled citizens to be involved in developing and testing smart grid solutions and built their skills for contributing towards the energy transition. This grassroots approach can yield acceptable and replicable local energy business models. It also demonstrated the need for support (i.e. financial, capacity-building and improved communications between institutions) along with exemptions, and to identify the related non-energy regulations and align relevant ministries.

²³ Dutch Ministry of Economic Affairs, 99 Decree of 28 February 2015, deviating by way of experiment from the Electricity Act 1998 for decentralized generation of sustainable electricity (Decree on experiments on decentralized sustainable electricity generation), Official Gazette of the Kingdom of the Netherlands, Netherlands, 2015

F. Key comparisons and comments

	NL	UK	Comment
Lead	Enterprise Agency	Energy regulator (Ofgem)	UK supports existing license requirements, NL works to revise them in support of community groups.
Trial duration	10 years	2 years	2 years is unlikely to cover pay back period of technology.
Trial scale	Small and large scale possible	Small scale more typical	Projects of varying sizes allow more diversity in experiment and potentially offer more learning. The NL sandbox encouraged a range, but found small scale projects to be more successful, while larger ones struggled to develop a suitable business model.
Replicability	Business models must be replicable by other groups in NL	Business models protected as commercial IP	Risk of reducing the speed and equity of the energy transition if driven only by profit-making enterprises ²⁴
Capacity building	Explicitly included	Not included	Potential to improve the energy market and speed the transition by building the capacity of citizens, community groups and non-profit intermediaries.

F.1 In sum, the NL model supports community energy innovation and helps community groups find viable business models that can be replicated by other community groups in other local areas. The UK model favours licenced suppliers' innovation and helps commercial actors develop commercially sensitive business models alongside licenced suppliers. Given the need for rapid societal response to climate change, we suggest there is both space and benefit for adding a sandbox to Innovation Link that supports community energy groups and citizen-led projects.

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²⁴ P. Devine-Wright, Community versus local energy in a context of climate emergency, *Nat. Energy*. 4 (2019) 894–896. <https://doi.org/10.1038/s41560-019-0459-2>.