

SOCIAL CONSTRAINT MANAGEMENT ZONES TO HARVEST DEMAND FLEXIBILITY

Country/region	UK (Scotland and South of England)
Type of E1st approach	In front of the meter – Allowing E1st (Utility programmes or action plans)
Energy carrier(s) targeted	Electricity
Sector(s) / energy system(s) or end-uses targeted	Distribution
Implementing bodies	Scottish and Southern Electricity Networks (SSEN)
Decision makers involved	Scottish and Southern Electricity Networks (SSEN) and final consumers
Main objective(s)	Reducing winter evening peaks to avoid the reinforcement of the distribution grid
Implementation period	Operational since 2018
Authors of the example	Zsuzsanna Pató (RAP)

Instead of accommodating increasing electricity demand by extending the capacity of the network, the new Social Constraint Management Zones (SCMZ) initiative of Scottish and Southern Electricity Networks (SSEN) involves the procurement of “smart” or “non-wires” solutions from residential and community consumers in congested areas in its network.

1. Background

SSEN is the owner of two electricity distribution networks (in Scotland and South of England) and one electricity transmission network (in Scotland). It serves 3.5 million customers across one third of the UK’s landmass.

On winter evenings when the load peaks, sections of the local electricity network approach their maximum capacity. SSEN has been looking to alternatives to upgrading the cables and substations by managing local demand, storage and generation in areas with capacity constraints, e.g., mitigating peak load on a neighbourhood substation or mitigating peak infeed into the grid by consuming or storing locally produced energy ([SSEN, 2020](#)). It initially designated three areas as Social Constraint Management Zones (SCMZ) in 2018, out of which two areas are already operational: consumers can offer their demand flexibility to the DNO (distribution network operator, as DSOs – distribution system operators are called in the UK) in tenders.



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The SCMZ programme was funded through the Network Innovation Allowance, which is an element of the regulatory framework (called *Revenue=Incentives+Innovation+Outputs* or RIIO) defining the allowed revenue of network companies. The Network Innovation Allowance provides limited funding to network companies to use for smaller technical, commercial or operational projects directly related to the licensee's network that have the potential to deliver financial benefits to the licensee and its customers.

2. How has the E1st principle (or similar concept) been implemented?

The objectives of the Social Constraint Management Zones (SCMZ) initiative of Scottish and Southern Electricity Networks are to provide a way for communities to get involved in the solution and to receive payments for either reducing their peak demand, shifting their electricity consumption in time, or reducing their overall demand permanently.

Consumers and a variety of other suppliers who can deliver solutions to grid congestion, ranging from battery storage to energy efficiency, have been invited to offer flexibility services to the DSO. Anything that reduces or shifts demand is suitable, such as LED lighting installation programmes or utilising variable rate electricity tariffs. Here are two more examples:

1. A housing association plans to improve the insulation in its building stock to achieve the required standard assessment procedure ratings. By committing to this investment and focusing on the SCMZ area, the housing association can gain additional contributions toward the costs.
2. A local government wants to promote energy efficiency measures in a given area. By identifying and promoting the kinds of steps customers may take, the local government can receive payments toward furthering the initiative based on performance and measurable energy performance improvements (Reid et al. 2018).

Table 1 – Solutions considered for the SCMZ project and their attractiveness to the DNO

	Measure Type			Contract Type			Attractiveness to Network Operator
	Energy Efficiency & Savings	Indirect Demand Response	Direct Demand Response	Utilisation	Availability	Traditional Mix	
Domestic LEDs	X				X		✓✓
LED Streetlighting	X				X		✓✓✓
Commercial / Office LEDs	X				X		✓✓✓
Domestic Solar PV	X				X		✓✓
Loft insulation	X				X		✓✓✓
Cavity wall insulation	X				X		✓✓✓
Solid wall insulation	X				X		✓✓✓

Automation of heating controls	X				X		✓✓
Replacing electric showers	X				X	X	✓
Heat pump replacing peak rate electric heaters	X	X			X		✓✓✓
Leaflets and reminders	X	X			X	X	✓
Smart Apps for behaviour change	X	X	X		X	X	✓
Large domestic battery on a time-of-use tariff		X		X			✓✓✓
EV charging: delaying charge time	X	X		X			✓✓✓
Solar Battery		X		X			✓✓✓

(Source: [SSEN, 2020](#))

SSEN reviewed potential regions for the initiative and selected three zones in 2018 (shown in Figure 1) that have sufficient commercial value to proceed with a tender.

The two SCMZs that are operational are:¹

- Drayton area, where there is a need for up to 5MW of flexibility during November from 16:30 to 18:10 on weekdays. There may be about six congestion events per year depending on network demand.
- Coxmoor Wood area, where there is a need for 3.5MW of flexibility between December and February from 15:50 to 20:20. Again, there may be about six congestion events per year.

Scottish and Southern Electricity Networks has teamed up with the fuel poverty charity National Energy Action (NEA) to mobilise communities and community organisation to provide the needed flexibility services. The process, depicted in Figure 2, entails multi-staged bidding preceded by partnering workshops where potential flexibility suppliers have been invited. Projects are expected to be operational by the end of March 2021.

¹ <https://www.nea.org.uk/technical/scmz/>

CMZ: recent zones

DRAYTON-MILTON-FULSCOT

33/11kV Reinforcement
 Investment cost £2,480k
 CMZ Value/Cost £256,760

COXMOOR WOOD

132/33kV Reinforcement
 Investment cost £3,300k
 CMZ Value/Cost £348,790

BRAMLEY-ANDOVER-THATCHAM

132kV Reinforcement
 Investment cost £1,750k
 CMZ Value/Cost £171,970



Figure 1 – Social Constraint Management Zones

(Source: Reid et al., 2018)

Consumers/communities with as little as 50kW in demand reduction can enter the auction; no demand response aggregator is required for participation. This allows the plan to include a broad range of participants. Flexibility revenue can be matched by other financial sources, such as ECO, Warm House Fund or the Domestic Renewable Heat Incentive, to improve the business case of the projects.

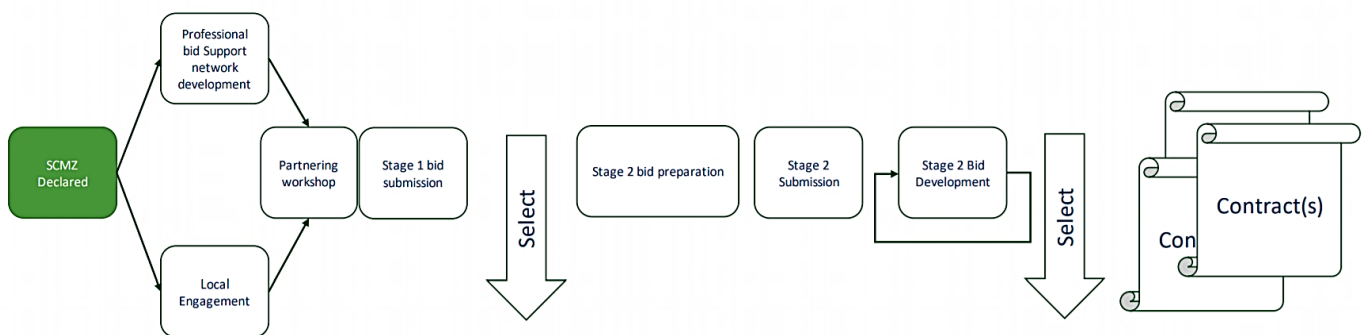


Figure 2 – The contracting process

(Source: Reid et al., 2018)

Potential EE/DR providers are provided seed funding and expert advice for those suitable proposals which pass a short prequalification questionnaire. Support is available to help them through the tender process as well.

Once the project is operational, SSEN will call upon the flexibility service when needed in various ways such as automatic dispatch, phone calls or email. One-day advance notice is expected on the potential service requirement. Validation of delivery is made through SSEN network monitoring. Payments are contingent upon validation and will be made as agreed by the contract.

The programme offers three different types of contract, usually for four years:

- Utilisation only: The provider is paid on a per-event basis when the flexibility is provided and used. It is best suited to behavioural signal projects.
- Traditional mix: Payments are made both during the specific network overload event (utilisation), and for the periods when flexibility is normally required. It is best suited to a traditional generation project.
- Availability only: Payments are made for flexibility during the tendered time window (whether or not a specific network constraint event occurs). It is best suited to energy efficiency projects.

Table 2 – Flexibility payments

		Drayton	Coxmoor
Utilisation only	Energy price	£868/MWh (1.6-hour availability requirement)	£638/MWh (4.5-hour availability requirement)
	Capacity price	-	-
Traditional mix	Energy price	£4963/MWh	£140/MWh
	Capacity price	£150/MW/h	£38/MW/h
Availability only	Energy price	-	-
	Capacity price	£33/kW available	£69/kW available

Source: <https://www.nea.org.uk/technical/scmz/>

3. Effects / impacts

As the operational phase has not started, results are not yet known. However a process evaluation is available ([SSEN, 2020](#); see also barriers and success factors below).

4. Changes over time, if any

No changes have been made yet as the project is in its initial phase.

5. Barriers and success factors

The main barrier for the business-as-usual application of using community-based small scale flexibility is that due to the low maturity of this market, the costs associated with the support for the communities significantly reduce the profitability of providing the service. As maturity of the market increases, the need for support is expected to be reduced ([SSEN, 2020](#)).

Main success factors identified:

- **Based on piloting**

The SCMZ initiative follows the encouraging outcomes of the Solent Achieving Value from Efficiency (SAVE) project pioneered by SSEN in partnership with the University of Southampton, DNV GL and Neighbourhood Economics from 2014 and 2019. The SAVE project, which involved 4,000 homes, tested four energy efficiency interventions to determine the extent to which energy efficiency measures can be a cost-effective,

predictable and sustainable tool for managing peak and overall demand as an alternative to network reinforcement. In addition, the SAVE project produced a network investment decision tool that allows DSOs to assess and select the most cost-efficient methodology for managing electricity distribution network constraints. The process considers the effects of different types and degrees of energy efficiency interventions, as well as more traditional techniques for network reinforcements ([EA Technology Ltd, 2017](#)). The project provides a blueprint for building closer relationships with customers and local stakeholder organisations by empowering them to better control their electricity consumption and, in turn, receive lower bills and achieve carbon reductions.

- **Partnering for efficient community outreach**

SSEN formed a partnership with NEA, an organisation that has good outreach to local communities: this is a good way to build trust for the quite novel project and to mobilise potential service providers with matchmaking events and support from the idea until the tendering.

- **Can be matched with other funds**

The flexibility revenue can be matched with already available ones for energy efficiency and fuel poverty. No exclusivity requirement.

6. Replicability and scalability potential

SSEN invested in the SAVE pilot and these operation flexibility project areas to replicate them elsewhere in its network where congestion requires either network capacity investment or peak shaving by consumers via demand response and energy efficiency.

7. Sources and references

Web sources:

<https://www.nea.org.uk/>

SSEN (2019a). [Maximising community opportunities and benefits through smarter electricity solutions](#). News on the website of the Scottish and Southern Electricity Networks, 4 February 2019.

SSEN (2019b). [SSEN scores a hat-trick at inaugural Network Awards](#). News on the website of the Scottish and Southern Electricity Networks, 27 March 2019.

Coyne, B. (2019). [SSE Networks to bring households into demand-side response this summer](#). *The Energyst*, 31 January 2019.

Peachey, A. (2019). [SSEN introduces SCMZs into network operations](#). *Network Magazine*, 5 February.

References:

EA Technology Ltd (2017). [Project SAVE- network modelling tool. Report on development.](#) Report prepared for Scottish and Southern Electricity Networks, 21 December 2017.

EA Technology Ltd (2014). [SAVE \(Solent Achieving Value from Efficiency\) Report 7.1 – SAVE Initial Network Model.](#) Report prepared for Prepared for Southern Electric Power Distribution, 5 December 2014.

Reid, S., Howison, A., and Edwards, C. (2018). Social Constraint Managed Zone Workshop [Presentation]

SSEN (2020). [Social Constraint Managed Zones – Process Evaluation.](#) Report of the Scottish and Southern Electricity Networks, March 2020.

ABOUT ENEFIRST

[ENEFIRST](#) is a 3-year project funded under the Horizon2020 programme, which gathers a consortium of partners from across sectors and regions: [IEECP](#), [BPIE](#), [Fraunhofer ISI](#), [CEU](#), [RAP](#), [IREES](#), [TU Wien](#).

From definition to implementation, ENEFIRST aims at making the “Efficiency First” (E1st) principle more concrete and operational, better understand its relevance for decision processes related to energy demand and supply, its broader impacts across sectors and markets, focusing on the building sector and related energy systems in EU Member States.

E1st gives priority to demand-side resources whenever they are more cost-effective from a societal perspective than investments in energy infrastructure in meeting policy objectives. It is a decision principle that is applied systematically at any level to energy-related investment planning and enabled by an “equal opportunity” policy design.

ENEFIRST combines policy analysis and quantitative assessments of E1st impacts to develop policy guidelines and recommendations, following a process with continuous exchanges with stakeholders.

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