# CE&EE Subgroup – List of Smart Community Energy Projects

| **Project Name** | **Brief Description** | **Issue project is trying to resolve** | **Issue (barrier or enabler) arising out of project** | **Applicable Options from WS6 Report\*** |
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| Gigha Energy Storage System- VRFB grid scale demonstration | Lead organisation: REDT  Community name: Isle of Gigha, Argyll, Scotland  Technology: On-site vanadium redox flow battery (105kW, 1.26MWh)  Funding source: DECC Energy Storage Competition  Status: Funding secured for activities 1 and 2, installation scheduled for Q4 2015.  Activity 3 (islanding) subject to further research and funding. | 1. Distribution network grid constraint limiting output of community owned wind turbine 2. Generation of additional income through other commercial/ grid services (e.g. energy arbitrage) 3. Intentional islanding of ‘Network Resilience Zone’ in the event of a wider supply interruption.   The linking of on-site generation and demand takes place across a private wire network (‘behind the meter’); however the grid services would be provided to customers across the public network (beyond the meter). | Barrier   1. Installation of energy storage can conflict with eligibility for some financial incentives administered by Ofgem 2. The generator commissioning process required for Feed in Tariff eligibility can be problematic if the energy storage system is not installed at the time of commissioning. 3. The market for services to DNOs by 3rd party storage operators is not yet established   Enabler   1. Short term- additional support from Ofgem staff regarding commissioning and incentive eligibility 2. Longer term- amendments to legislation/ guidance to clarify position of generators with on-site storage | I and C Options 1-4; 3rd party operation of storage; Domestic option 11 |
| Project ACCESS | Lead organisation: Community Energy Scotland  Community name: Mull and Iona Community Trust  Technology: Thermal storage, active generator control, and demand side management  Funding source: Scottish Government (Local Energy Challenge Fund) | Installation of actively controlled electric heating demand and thermal storage in c.100 houses, aggregated and managed as a Virtual Private Network to link directly to the output of a 400kW run of river community hydro scheme.  A failsafe network protection system ensures that the capacity of the local and wider network remains within safe limits at all times.  Dynamically calculated rebate payments will be made to participating customers depending on their level of consumption.  The linking of generation and demand takes place across the public network (‘beyond the meter’). | Barrier   1. Transmission network constraints apply across wide areas of the UK network. However non-firm access is not available to most small scale, distributed generators. 2. Use of system charges do not currently reflect the actual cost of transporting power in a local area when generation and demand are being actively controlled.   Enabler   1. This project will create a commercial model for enabling local markets for demand side management services 2. This project will measure the reduced demonstrate network losses created by localizing generation and demand, rather than exporting to the transmission network 3. In this model, the DNO only provides a grid connection offer, DSM services to the generator are provided by a third party aggregator/ supplier | Domestic 2b, 7b, 11 |
| Caol District Heating Scheme | Lead organisation: Highland Council  Community name: Caol Community  Technology: District Heating (Water Source Heat Pump  Funding source: Scottish Government | The key objective of this project is the provision of low carbon, sustainable, affordable heat via an innovative Water Source Heat Pump district heating network to Highland Council houses within the Caol community.  Simultaneously, the replacement heating within the local authority housing will accelerate progression towards national targets such as the Scottish Housing Quality Standards and the provision of low carbon heat for district heating.  Also, creation of a project that can be replicated in other parts of Scotland and the Highlands and Islands converting renewable electricity into heat in an efficient and cost effective manner |  |  |
| Energyzing Insch | Lead organisation: Insch Renewable Energy Consortium  Community name: Grampian Housing Association Ltd  Technology: Local energy grid - heat and electricity  Funding source: Scottish Government | The overall aim of the Energyzing Insch project is to develop an integrated community energy system to link local energy demand with local renewable energy generation.  To achieve this aim, the project has a number of separate objectives:   * To overcome the constraints in the area on renewable energy generation projects created by grid capacity issues. This will be achieved by constructing a community owned and controlled local energy grid that will deliver locally generated renewable heat and electricity to users. * To develop community involvement in a range of generation technologies that will provide renewable heat and electricity to users through the community owned grid. * To integrate a battery system within the local grid to provide energy storage and add stability and flexibility to the local grid system. * To integrate a fibre-optic network into the local grid to allow active network management of the whole energy system. |  |  |
| Levenmouth Community Energy Project | Lead organisation: Bright Green Hydrogen LtdCommunity name: Leven Valley Development Trust (LVDT)Technology: HydrogenFunding source: Scottish Government | This project aims to address some of Scotland’s most pressing energy issues: the provision of low carbon transport; and energy storage. The Hydrogen Office uses locally produced green electricity from its wind turbine (750kW) to produce green hydrogen by electrolysis; this is to be supplemented by solar electricity.It is intended that increased hydrogen production will fuel the largest fleet of hydrogen-powered vehicles in the UK. The transport element will involve the development and installation of 2 low-cost modular refuelling points on the site, a hydrogen dispenser at Bankhead and the purchase/operation of hydrogen fuelled vehicles.In addition stored hydrogen will be used to provide the business park with a source of zero carbon electricity through a private wire network. This is achieved through a fuel cell, when there is little or no wind/solar power available. This reduces the strain on the local grid, increases the community’s ability to make use of this energy and greatly reduces the carbon emissions associated with the local energy system.Proceeds from the sale of green hydrogen and electricity will be deployed in the community to alleviate fuel poverty and improve local transport services. |  |  |
| Reducing Fuel Poverty: Heat Storage Innovation | Lead organisation: Castle Rock Edinvar Housing Association  Community name: East Lothian Housing Association  Technology: Heat batteries plus micro-renewables  Funding source: Scottish Government | The objective of this project is to develop and implement local solutions to addressing fuel poverty designed around the use of innovative heat batteries.  This technology will enable more efficient utilisation of different renewable technologies, making a bigger impact for tenants as they seek to reduce energy costs.The project will work across a range of different property types, from sheltered housing for older people to individual households for social rent.  In each property type a heat battery will be installed and paired with other local renewable energy production.The use of the heat battery will enable us to create a direct link between local energy demand and local renewable energy production.  The project will demonstrate the benefit of local heat storage and the value of integrated renewable energy solutions.The beneficiaries of this project will be tenants, through access to lower cost heating and hot water.  This will make a significant difference to their cost of living, particularly for those tenants on housing benefit. |  |  |
| Orkney Surf 'n' Turf | Lead organisation: Community Energy Scotland  Community name: Eday Renewable Energy Ltd (ERE),  Technology: Hydrogen  Funding source: Scottish Government | 1. Integrate curtailed electricity supplies from two renewable sources (tidal stream and onshore wind) in the outlying Orkney island of Eday. Both are routinely curtailed as they are able to produce more power than their grid connections allow. 2. Supply the curtailed energy to an electrolyser on Eday to produce compressed hydrogen gas 3. Transport the compressed hydrogen over land and sea from Eday to Kirkwall. 4. Design, install and operate a fuel cell at Kirkwall Harbour.   The Harbour fuel cell is to have two key functions:   1. To generate electrical power for buildings and berthed ferries, as an interim step towards increased use of cold-ironing of marine vessels with renewable hydrogen. 2. To operate on dry land with the same standards as if it were installed in a vessel – and provide a training environment to lay the foundations for use of hydrogen on board for auxiliary power and main propulsion. | Barrier   1. Network constraints in the Orkney Islands maintain generators curtailed most of the time; this led to important loss of income and ultimately to projects going bankrupt.   Enabler   1. This project will help decarbonise marine vessels. 2. This project will allow curtailed electricity to be used in an efficient way 3. This project will provide a test bed for the integration of tidal and wind energy for the production of hydrogen. |  |
| ORIGIN project | Lead organisation: University of Strathclyde/ Heriot Watt University  Community name: Findhorn, Moray, Scotland  Technology: Thermal storage, demand forecasting, demand side management  Funding source:  EU (FP 7)  Status: Funding secured, project initiated | To increase the level of on-site renewable generation that is consumed by on-site demand customers, through improved forecasting of generation and demand, information provision to demand customers, financial incentives demand customer, and deterministic control of demand.  The linking of generation and demand takes place across a private wire network (‘behind the meter’). | Barrier  Project is entirely on private wire network- no immediate regulatory barriers but relevant technical and commercial learning.  Enabler  Project has demonstrated technical efficacy of generation/ demand matching system. | Domestic 10, 11 |
| Community Energy Generation, Aggregation and Demand Aggregation Shaping (CEGADS) | Lead organisation: Energy Local  Community name: Westmill  Technology: Smart meters and demand side management  Funding source:  TSB Localised Energy Systems  Status: Funding secured, project initiated | To enable half hourly settlement of domestic demand customers, and optimise demand profile for the supplier  The linking of generation and demand takes place across the public network (‘beyond the meter’). | Barrier  High cost of entering domestic customers into half hourly settlement.  Enabler  Aggregation of domestic customers to suitable scale units | Domestic 6b |
| Isle of Eigg Renewable Microgrid | Lead organisation: Eigg Heritage Trust  Community name: Isle of Eigg, West Highland, Scotland  Technology: microgeneration, battery energy storage, demand side management  Funding source: Scottish Government (CARES)  Status: Project complete | Maximising the consumption of energy from renewable sources on a community owned microgrid, using energy storage (batteries) and demand limits on the supply capacities to individual customers.  The linking of generation and demand takes place across a private wire network (‘behind the meter’). | Barrier   1. Lack of approved DC kWh meters for RO/FiT eligibility increases the cost and energy losses in DC systems (requires conversion to AC for metering purposes)   Enabler   1. With community support, caps on peak demand (demand limiting) can be implemented successfully | Domestic 8b), 11 |
| Williams MLC trial | Lead organisation: Williams Advanced Engineering  Community name: Isle of Eigg, Fair Isle  Technology: Flywheel storage  Funding source: DECC Energy Entrepreneurs Fund  Status: Funding secured, project initiated | To use flywheel energy storage systems to provide frequency control and voltage stabilisation to weak/islanded grids with high percentages of renewable generation. | Barrier  Project is entirely on private wire network- no immediate regulatory barriers but relevant technical and commercial learning.  Enabler  Learning from project can be applied to on-grid systems | Domestic option 11 |
| Applecross Hydro 2 Heat | Lead organisation: Applecross Community Company  Community name:  Technology:  Funding source:  Status: Design and feasibility complete, installation subject to funding | To use local heat demand to manage a community hydro scheme that is behind distribution (enduring) and transmission (temporary) grid constraints.  The linking of generation and demand takes place across a private wire network (‘behind the meter’), which in this case can be described as an electric **district heating network**, as all the on-site demand is thermal. | Barrier   1. Lack of standardised guidance for customers with export limited grid connections 2. Earthing/islanding rules for domestic electrical connections do not consider the case of electrically isolated circuits in same building being supplied from different sources | Domestic option 11 |
| Project ERIC | Lead organisation: Moixa Technology  Community name: Sustainable Chale  Technology: On-site battery storage and demand side management  Funding source: TSB Localised Energy Systems  Status: Funding secured, project initiated | To use battery storage in domestic properties to reduce grid export from on-site PV and reduce peak demand on local distribution network. | Enabler  Embedding storage on the customer side of the meter maximises the value of on-site generation |  |
| Orkney Demand Side Management | Lead organisation: Community Energy Scotland  Community name: Isle of Rousay, Isle of Hoy, Orkney, Scotland  Technology: Thermal storage, Electric Vehicles, Demand Side Management  Funding source: Scottish Government (CARES)  Status: Pilot scheme operational, phase 2 roll out subject to funding | To increase the output of community owned renewable generators (5MW) that are connected to the Orkney Active Network Management (ANM), operated by SSEPD.  This requires real time control of *new* electrical demand to match the output of generators at times when their output would have been reduced due to distribution network constraints.  Under the terms of the ANM connection offer, no compensation is paid to generators for curtailment, which creates a commercial opportunity for DSM services.  The linking of generation and demand takes place across the public network (‘beyond the meter’). | Barrier   1. Bespoke commercial arrangements are required to enable the transfer of value from generators to demand customers- tariffs currently available on the market are not suitable      1. The design of the commercial arrangements must take careful consideration of the ANM principles of access to ensure that no third parties are disadvantaged. This would be more straightforward if the principles of access were designed with DSM in mind form the start.   Enabler   1. New data interfaces with the ANM system are required to allow DSM services by third parties. This has been developed as part of the pilot project, through collaboration with SSEPD and Smarter Grid Solutions | DG option 1, Domestic 2b, 7b and 11 |
| Sunshine tariff | Lead organisation:  WPD/Regen SW  Community name: Wadebridge Renewable Energy Network  Technology: Solar PV  Funding source: NIA  Status: Will be registered in April 2015 | Distribution network constraint preventing development of community owned solar farm.  Trial will test concept of an ‘offset connection agreement’ where community increases demand to enable additional generation to be connected.  DSR incentivised using a static ToUT – the ‘Sunshine Tariff’ – along with feedback from community energy group.  The linking of generation and demand takes place across the public network (‘beyond the meter’). | Barrier   1. Use of system charges do not currently reflect the actual cost of transporting power in a local area when generation and demand are being actively controlled. 2. Sustainability of tariff for lifetime of solar farm – commercial model still to be decided   Enabler   1. Static ToUT for when solar PV output is high could relieve pressure on network, especially in southern England. And if linked directly to a community owned project, it could enable it to connect. | Domestic option 1 (and 6) |
| Clean Energy Balance | Lead organisation: WPD  Community name: Wadebridge Renewable Energy Network  Technology: wind, CHP, electrolyser, gas injection  Funding source: Applied for LCNF second tier  Status: Unsuccessful in funding application | Use of the gas  network to bypass electricity system constraints by converting constrained generation from community wind farm into hydrogen gas via electrolysis and either the storage of  hydrogen until either it can be converted back to electricity or  injected into the gas network for transportation. | Barrier   1. It was more expensive than a conventional alternative arrangement or reinforcement of the network 2. Some concern by the panel of Government’s Policy commitment to the use of hydrogen 3. Regulatory issue of spending money on electricity infrastructure to benefit gas customers and vice-versa | Appendix 2: storage |
| 3e-Houses | Lead organisation: PROMUSA, Bristol City Council  Community name: Bristol City Council  Technology: embedded power, domestic control and monitoring systems  Funding source: European Commission within the ICT Policy Support Programme  Status: Complete | Integration of ICT technologies in social housing in order to provide an innovative service for energy efficiency.   * Real time monitoring and management of the energy consumption. * Integration of renewable energies. * Creating the resources to lower energy consumption. | Barrier   1. Engagement of participants   Enabler   1. Registered Social Landlords coordinating programme of activity | Domestic 9, 11 |
| Hook Norton | Smart Hooky also allows homeowners to understand the impact of their own behaviour on their energy consumption and on the environment. | Smarter networks and demand management | Customer engagement | 10 |
| Greenwatt Way | Assessment of a highly energy efficient community, to better understand customer's needs as the UK moves to reduce its carbon emissions by 80% by 2050. | Smarter networks at the community scale. | Customer engagement | Not known |
| Shetland (NINES) | The project aims to improve and stabilise the electricity grid in Shetland, ultimately allowing more renewables to connect to the grid. | Islanded system with limited opportunities to connect more DG. | Grid connections  Customer engagement | 7c |
| Scilly Isles | The islands provide an effective self-contained location, with an 11,000 volt (11kV) and low voltage electricity distribution system that can be monitored and controlled to accommodate distributed generation and other low carbon initiatives. | Islanded system with limited opportunities to connect more DG. | Grid connections  Customer engagement | 7a |
| SOLA Bristol | Batteries installed behind the meter, with DC circuits and DSR to better manage microgeneration. | Voltage and thermal management at peak solar generation. | Behind the meter  Customer engagement  Grid connections | 7c |

\* WS6 Report can be found online at <https://www.ofgem.gov.uk/publications-and-updates/working-documents-work-stream-six> (Interim Report)