



**SP ENERGY
NETWORKS**

**Low Carbon Networks Fund
Full Submission Pro-forma
Appendices**

**Demand Side Management
of
Electric Storage Heating**

Ref SPD Tier 2-LCNF2010

3rd September 2010

Summary

The following is a summary of the appendices that have been included with the Low Carbon Networks Fund Full Submission Pro-forma:

Appendix 1 Letter of Support

This appendix includes a letter from Jim Mather MSP, Energy Minister for Scotland endorsing the Project.

Appendix 2 Memorandums of Understanding, Letters of Intent and Engagement

The appendix includes the following letters of engagement:

- Signed Letters of Intent between ScottishPower Distribution and BT, the University of Strathclyde, Glasgow Housing Association, ScottishPower Energy Wholesale and Glasgow City Council. These letters illustrate the support for this project and its aims and objectives;
- Signed Memorandums of Understanding between ScottishPower Distribution and collaboration partners GE, and ScottishPower Retail. These Memorandums of Understanding cover the pre-contract stage of the project prior to establishing Collaboration Agreements in the event that this project is successful in securing Tier 2 LCN funding; and
- ScottishPower Energy Networks letter written to a number of other energy suppliers to determine if they wish to be involved in the Trial.

Appendix 3 Existing and Proposed Control Scheduling

This appendix illustrates the existing input signals and communications for demand control of the storage heating loads, and those to be considered for optimised demand management response.

Appendix 4 The Customer Journey

This appendix illustrates the proposed customer engagement process from the initial communications campaign and community interaction through the project Trial period with on-going community liaison, feedback and one-to-one project close-out interviews.

Appendix 5 New Point of Supply Configurations

This appendix illustrates the new control equipment arrangements required at the point of supply in each Trial property.

Appendix 6 Communications Strategy

This appendix outlines the key communication activities to be actioned to ensure that appropriate parties (both external and internal) are fully aware of, and engaged in, the project.

Appendix 7 FlexNet Summary

This appendix provides a summary of the connectivity solution proposed for the project. This will provide the communications between the demand control units and the Network Management System.

APPENDIX 1

LETTER OF SUPPORT FROM JIM MATHER

T: 0845 774 1741
E: scottish.ministers@scotland.gsi.gov.uk

Martin Hill
Low Carbon Networks Manager
Scottish Power Distribution
New Alderson House
Dove Wynd
Strathclyde Business Park
Bellshill
North Lanarkshire
ML4 3FF

3rd September 2010

Dear Mr. Hill,

DEMAND SIDE MANAGEMENT OF ELECTRIC STORAGE HEATING PROJECT

I writing to you as Scotland's Energy Minister to offer my support for the demand side management of electric heating project proposal developed by Scottish Power Distribution to assess and address the challenges of balancing load on electricity networks

As you know, in August 2009, Ofgem announced a Low Carbon Networks Fund as part of its price control regime for Distribution Network Owners to encourage and enable DNOs to trial new technology, operating and commercial arrangements which can aid the transition to the low carbon energy sector.

Scotland is in a strong position to demonstrate the benefits from the transition to a low carbon economy and the Scottish Government has set ambitious climate change targets which underpin the strategic direction to this government is taking to secure the transition to a low carbon economy, and to delivering the environmental, climate change and emission reduction benefits from such a transition. The Scottish Government is also keen to support and maximise the community, social sustainability and economic growth opportunities and benefits from such a transition. Our forthcoming Low Carbon Economy Strategy will focus on these, as well as the importance of delivering innovation in energy systems and management as a key part of a low carbon future.

In that context, this demand side management project contains important elements of co-operation between suppliers, generators, technology providers and other parties working to explore how networks and local storage capacity can help deliver low carbon and energy savings, while ensuring security of supply in an increasingly diverse energy supply mix. It aims to deliver a better understanding the potential of demand management and the impact on network assets, with a specific emphasis in this instance of energy storage capability and possibilities within an urban domestic electric storage heating system. The involvement of local housing associations and local authorities is a key element and will keep the supply to – and interests of - communities and energy users at the heart of the project. It will deliver potential associated benefits of helping further develop and test approaches on smart

network and meter development and roll out. The fund is also aimed at delivering solutions and outcomes that provide valuable learning for the wider energy industry and other parties. In each of these important respects I believe the project and the application for funding strongly meets the aims of the Fund. In response to the call for funding projects from the Low Carbon Networks Fund, and on behalf of the Scottish Government, I therefore strongly support this project funding application from Scottish Power Distribution.

I trust that this information will be sufficient for the endorsements required by the call for proposals. Should require anything else or have questions of clarification, please do not hesitate to contact my official, Mr Colin Imrie, Head of Energy Markets on 0300 244 1085 or colin.imrie@scotland.gsi.gov.uk

Yours sincerely
Jim Mather
JIM MATHER

APPENDIX 2

MEMORANDUMS OF UNDERSTANDING, LETTERS OF INTENT AND ENGAGEMENT

MEMORANDUM OF UNDERSTANDING made on 3rd September 2010

between

- (1) **SP POWER SYSTEMS LIMITED**, a company incorporated in Scotland (Registered Number: SC215841) having its Registered Office at 1 Atlantic Quay, Glasgow, G2 8SP ("SPPS"); and
- (2) **IGE ENERGY SERVICES (UK) LIMITED**, a company incorporated in England (Registered Number: 039119944) having its Registered Office at The Arena, Downshire Way, Bracknell, Berkshire, RG12 1PU, England (the "Collaborator").

WHEREAS:

- (A) as part of the electricity Distribution Price Control Review 5 ("DPCR5"), Ofgem has put in place a Low Carbon Networks Fund (the "LCN Fund"), which is to be made available to DNOs in accordance with the Governance Document. The purpose of the LCN Fund is to encourage DNOs to use the period of the DPCR5 to run trials of new technology, operating and commercial arrangements aimed at helping all DNOs understand how they can provide security of supply at value for money as Great Britain moves towards a low carbon economy;
- (C) the LCN Fund is split into two tiers: (a) the first tier allows DNOs to recover a proportion of expenditure incurred on small scale projects; and (b) the second tier provides funding for a small number of significant "flagship" projects, which will be selected by Ofgem (following a competitive process among DNOs) on an annual basis during each year of the DPCR 5 Period ("Tier 2 Funding");
- (D) SPPS is responsible for the provision of operational, network investment and other services in relation to the Distribution Networks licensed to and owned by SP Distribution Limited ("SPD") and SP Manweb PLC ("SPM") respectively by virtue of an agreement between these parties dated 31 March 2006. SPD and SPM both hold licences pursuant to the Electricity Act 1989 (as amended) to distribute electricity within their licensed areas;
- (E) SPPS intends to submit an application to Ofgem for Tier 2 Funding for the proposed Project in the current Funding Year, which Project would involve SPPS working in collaboration with the Collaborator;
- (F) the Collaborator has agreed to provide its expertise and assistance to SPPS in connection with preparing the Submission, and has agreed to enter into good faith negotiations with SPPS with a view to agreeing one or more Project Agreements with SPPS in connection with the Project in the event that the Submission is approved by Ofgem; and
- (G) the parties have agreed to enter into this Memorandum of Understanding ("MoU") for the purposes of:
 - (a) governing the parties' relationship in connection with the Submission during the term of this MoU; and
 - (b) setting out the parties' shared understanding of the key principles to be reflected in any Project Agreements entered into between the parties in connection with the Project in the event that the Submission is approved by Ofgem.

NOW THEREFORE IT IS HEREBY AGREED as follows:

1. STATUS OF MOU AND INTERPRETATION

- 1.1. The parties agree that the terms of this MoU:
 - 1.1.1. are intended to be legally binding between the parties; and
 - 1.1.2. are not exhaustive in respect of the terms that will be included in any Project Agreement.

- 1.2. In this MoU (including the recitals and the annexed Schedule) (the "MoU"), the following words and expressions shall (unless the context requires otherwise) have the meanings given to them below:
- 1.2.1. "**Confidentiality Agreement**" means the confidentiality agreement entered into between the parties dated on or about 28 January 2010;
 - 1.2.2. "**DNO**" has the meaning given to it in paragraph 1.16 of the Governance Document;
 - 1.2.3. "**Effective Date**" means 19 July 2010 (notwithstanding the date or dates of this MoU);
 - 1.2.4. "**Funding Year**" means 2010;
 - 1.2.5. "**Governance Document**" means the LCN Fund Governance Document v.3 produced by Ofgem dated 22 July 2010 (as amended, updated and/or replaced by Ofgem from time to time);
 - 1.2.6. "**Intellectual Property Rights**" means any copyright, patent, trade mark or trade name, design rights, database rights, know-how or other similar right of whatever nature, registered or unregistered, present or future, together with any application for, and the right to apply for, any of the foregoing and any renewals or extensions thereof anywhere in the world;
 - 1.2.7. "**Key Partners**" means any third parties that may be involved or engaged by SPPS in connection with the Project from time to time, including (without limitation) the parties identified in Part 2 of the Schedule;
 - 1.2.8. "**Ofgem**" means the Office of Gas and Electricity Markets (or its statutory successor from time to time);
 - 1.2.9. "**Project**" means a demand-side management trial of an electric storage heating system in Greater Glasgow, as described further in the Submission;
 - 1.2.10. "**Project Agreement**" means any formal, definitive agreement negotiated and entered into by the parties in connection with the Project in the event that Ofgem formally approves the Submission;
 - 1.2.11. "**SPD**" and "**SPM**" respectively have the meanings given to them in recital (D);
 - 1.2.12. "**Submission**" means the full submission prepared by SPPS for Tier 2 Funding in the Funding Year in connection with the Project;
 - 1.2.13. "**Submission Assistance**" has the meaning given to it in clause 2.1; and
 - 1.2.14. "**Tier 2 Funding**" has the meaning given to it in recital (C).

2. SUBMISSION ASSISTANCE

- 2.1. The Collaborator agrees that it shall provide such assistance as SPPS may reasonably request in preparing the Submission and responding to any comments, queries and/or requests for information received from Ofgem in connection with the Submission ("Submission Assistance"). The parties agree that the Submission Assistance will include, without limitation, the activities described in Part 1 of the Schedule to this MoU and such other activities as the parties may mutually agree.
- 2.2. The Collaborator shall ensure that the Submission Assistance is provided:

- 2.2.1. in a timely manner (having regard, in particular, to the deadline for receipt of the Submission by Ofgem) and in accordance with any timescales specifically agreed between the parties;
 - 2.2.2. in accordance with good industry practice;
 - 2.2.3. by personnel who possess a degree of skill and experience which is appropriate to the tasks required of them in connection with the Submission, who shall perform those tasks in a workmanlike and professional manner; and
 - 2.2.4. in compliance with the Governance Document.
- 2.3. The Collaborator shall not be entitled to be paid any fees, charges, costs and/or expenses in connection with the provision of the Submission Assistance or otherwise in connection with this MoU, except that SPPS shall reimburse Collaborator for:
- 2.3.1. its reasonable and properly incurred travel expenses in connection with travel outside Scotland to any meeting that SPPS specifically requests the Collaborator to attend in support of the Submission (e.g. travel to London) after the date that the Submission is sent to Ofgem; or
 - 2.3.2. such other reasonable and properly incurred expenses as SPPS may (in its sole discretion) agree in writing to reimburse to the Collaborator,
- provided always that no expenses will be reimbursed by SPPS to the Collaborator unless SPPS has provided its prior express written approval to the expenses being incurred.
- 2.4. The Collaborator agrees that it shall appoint a person responsible for liaising with SPPS in connection with the Project and the Submission. The parties agree that they shall meet regularly during the term of this MoU for the purpose of discussing the Project and the progress of the Submission.
- 2.5. Nature of Relationship
- 2.5.1. SPPS agrees that it will not collaborate, in connection with a particular Submission for which the Collaborator provides Submission Assistance in the Funding Year, with any third party that provides products, services or expertise that are the same as or substantially similar to the products, services or expertise that SPPS envisages the Collaborator providing in connection with the Project.
 - 2.5.2. The Collaborator agrees that it will not collaborate, in connection with any application for Tier 2 Funding in the Funding Year, with any other DNO in relation to any project that is intended to deliver the same or substantially similar outcomes or metrics to the Project.
 - 2.5.3. Nothing shall prevent SPPS from discussing other opportunities with any other company or competitor of the Collaborator and nothing in this MoU is intended to imply or create a preferential relationship with the Collaborator.
 - 2.5.4. SPPS agrees that participation in the activities contemplated under this MoU shall not prevent or act as a barrier to Collaborator being granted work under a Project Agreement or participating in a public bid for work on the Project for SPPS.

3. PROJECT AGREEMENT

- 3.1. In the event that the Submission is successful and SPPS will be provided with Tier 2 Funding in connection with the Project, SPPS and the Collaborator agree that they shall commence good faith negotiations and use reasonable endeavour to enter into Project Agreement as soon as reasonably practicable after formal notification of the Tier 2 Funding award is received by SPPS from Ofgem.
- 3.2. The parties have a shared understanding that the terms of any Project Agreement will incorporate (without limitation) the following key principles:
 - 3.2.1. the Project will be implemented in accordance with the Submission;
 - 3.2.2. the parties will comply with the terms of the Governance Document in the implementation and management of the Project;
 - 3.2.3. the Collaborator will work in conjunction with the Key Partners in connection with the Project;
 - 3.2.4. the Collaborator will perform its obligations in connection with the Project in accordance with good industry practice and in compliance with all applicable laws; and
 - 3.2.5. the parties will comply with the principles set out in section five of the Governance Document in relation to the ownership and use of Intellectual Property Rights related to the Project.

4. INTELLECTUAL PROPERTY

- 4.1. Except as expressly set out in this clause 4, the parties acknowledge and agree that neither party shall acquire any right, title or interest in or to the Intellectual Property Rights of the other party (or its licensors) under and/or pursuant to the terms of this MoU.
- 4.2. SPPS hereby grants to the Collaborator a limited, non-exclusive, non-transferable, royalty-free licence to use, for sole purpose of providing the Submission Assistance and solely during the term of this MoU, such of SPPS's Intellectual Property Rights as the Collaborator reasonably requires to use in order to provide the Submission Assistance.
- 4.3. The Collaborator hereby grants to SPPS (and SPD and SPM) a limited, non-exclusive, non-transferable, royalty-free licence to use, for the sole purpose of receiving the Submission Assistance and solely during the term of this MoU, such of the Collaborator's Intellectual Property Rights as SPPS reasonably requires to use in order to receive the Submission Assistance.
- 4.4. The parties agree that SPPS shall own copyright in and to the Submission.
- 4.5. For the avoidance of any doubt, the parties agree that:
 - 4.5.1. except as provided for in this clause 4, no transfer of any Intellectual Property Rights of any party to the other party is inferred or agreed by virtue of entering into this MoU, and
 - 4.5.2. the arrangements for ownership and use of Intellectual Property Rights in connection with the implementation of the Project shall be set out in, and governed by, the Project Agreement.

- 4.6. Each party (the "indemnifying party") agrees to indemnify the other party against any claim that any copyright, patent, trade mark or trade name and/or design rights, in effect in the U.S., an EU member state or country of delivery (provided, in the case of patents, there is a corresponding patent issued by the U.S. or an EU member state), or extensions thereof licensed by the indemnifying party to the other party pursuant to clause 4.2 or 4.3 (as applicable), when used in accordance with this MoU, infringe any copyright, patent, trade mark or trade name and/or design rights, in effect in the U.S., an EU member state or country of delivery (provided, in the case of patents, there is a corresponding patent issued by the U.S. or an EU member state), or extensions thereof of any third party (an "IPR Claim"), provided that:
- 4.6.1. the other party notifies the indemnifying party in writing immediately upon becoming aware of an IPR Claim or potential IPR Claim;
 - 4.6.2. the other party does not make any admission as to liability or agree to any settlement or compromise of any IPR Claim without the indemnifying party's prior written consent; and
 - 4.6.3. the indemnifying party will, at its own request and expense, be entitled to have sole control of the conduct of and/or to settle negotiations and/or litigation arising from any IPR Claim and the other party will, at the indemnifying party's request and expense, provide to the indemnifying party such reasonable assistance as the indemnifying party may require.
- 4.7. An indemnifying party shall have no obligation or liability with respect to any claim based upon: (a) any products or services that have been altered, modified, or revised by or on behalf the indemnified party without the indemnifying party's consent; (b) the combination, operation, or use of any products or services by or on behalf of the indemnified party with other products or services when such combination is part of any allegedly infringing subject matter; (c) failure of the indemnified party to implement any update provided by indemnifying party that would have prevented the claim; (d) unauthorized use of products or services; or (e) products or services specifically made or performed to the indemnified party's specifications.
- 4.8. Without prejudice to the indemnity granted under clause 4.6, should any product or service, or any portion thereof, become the subject of an IPR Claim, the indemnifying party may, at its option (a) procure for the other party the right to continue using the product or service, or portion thereof, (b) modify or replace it in whole or in part to make it non-infringing, or (c) failing (a) or (b), take back products or services and refund any fees received by the indemnifying party attributable to the infringing product or service.
- 4.9. Clauses 4.6 to 4.8 states the parties' entire liability for indemnification for IPR infringement under this MoU. The parties waive any moral rights. Notwithstanding the foregoing, with respect to any products or services, or portions thereof, which are not manufactured/developed by a party to this MoU, only the indemnity of the manufacturer/developer, if any, shall apply.

5. CONFIDENTIALITY

- 5.1. Subject to the other provisions of this clause 5, the parties agree that the terms of the Confidentiality Agreement shall apply (as applicable) to information shared between the parties pursuant to and/or in connection with this MoU.
- 5.2. The parties acknowledge and agree that nothing in this MoU or the Confidentiality Agreement shall prevent SPPS from submitting the Submission to Ofgem or responding to any queries raised by Ofgem in connection with the Submission.

- 5.3. Subject to clause 5.4, the Collaborator hereby acknowledges and agrees that the entire contents of the Submission will be made available in the public domain by Ofgem. The Collaborator acknowledges that all parts of the Submission that are made available in the public domain by Ofgem shall not comprise "Confidential Information" for the purposes of the Confidentiality Agreement.
- 5.4.
- 5.4.1. In the event that the Collaborator (acting reasonably and in good faith) considers that any part of the Submission contains information that the Collaborator can demonstrate is confidential or commercially sensitive and would be exempt from disclosure under relevant freedom of information and access to environmental information laws, the Collaborator shall notify SPPS in writing not less than two business days prior to the date on which the Submission is due to be submitted to Ofgem, which notice shall set out in detail the information that the Collaborator believes falls within the scope of this clause 5.4.1..
- 5.4.2. Provided that any notification under clause 5.4.1 is received by SPPS in compliance with the timescale set out in clause 5.4.1, SPPS shall request to Ofgem that the relevant sections of the Submission are not made available in the public domain. In the event that Ofgem refuses any such request by SPPS to keep the information notified to SPPS by the Collaborator pursuant to clause 5.4.1 confidential, SPPS shall give Collaborator notice of such refusal, in which event the Collaborator may (at its sole option and without any obligation or responsibility on the part of SPPS) petition Ofgem on the Collaborator's own account.
- 5.4.3. For the avoidance of any doubt, SPPS shall not be deemed to be in breach of the Confidentiality Agreement in the event that Ofgem refuses any such request and the relevant information is made available in the public domain, provided that SPPS has complied with its obligations set out in clause 5.4.2.
- 5.5. The parties agree that in the event of any conflict between the terms of the Confidentiality Agreement and this clause 5, this clause 5 shall have precedence.

6. PUBLICITY

The Collaborator shall not make any press announcements or publicise this MoU or its contents or subject matter in any way during the term of this MoU without the prior written consent of SPPS. In the event that the Submission is approved by Ofgem, the parties shall jointly agree a press announcement.

7. TERM AND TERMINATION

- 7.1. This MoU shall commence on the Effective Date and shall continue until the earliest of the following to occur:
- 7.1.1. the parties enter into a Project Agreement; or
- 7.1.2. the parties mutually agree in writing to terminate this MoU or the parties mutually agree in writing that this MoU is to be superseded by another memorandum of understanding; or
- 7.1.3. SPPS receives formal notification from Ofgem that the Submission has not been accepted in relation to the Funding Year; or
- 7.1.4. SPPS notifies the Collaborator in writing that SPPS will not be submitting the Submission in the Funding Year or that SPPS has withdrawn the Submission for the Funding Year; or

- 7.1.5. the expiry of a period of twelve months after the Effective Date (or such other period as the parties may agree in writing).
- 7.2. In the event that this MoU is terminated pursuant to clause 7.1.3 or 7.1.4, the Collaborator agrees that, on the request of SPPS, it shall work with SPPS in good faith to enter into a memorandum of understanding (on the same or substantially similar terms to this MoU) with SPPS in connection with an application for Tier 2 Funding for the same or a similar project in a subsequent funding year.
- 7.3. Subject to clause 7.6, the parties agree that any termination of this MoU pursuant to clause 7.1 shall not of itself give rise to any liability on the part of either party.
- 7.4. Termination of this MoU shall not affect the accrued rights of the parties arising out of this MoU as at the date of expiry or termination, nor shall it affect the continuance in force of clauses 4.4, 4.6, 5, 7.2, 7.3, 7.4, 8 and 9.

8. LIABILITY

- 8.1. Neither party's liability to the other for any death or personal injury caused by the negligence of that party or its employees, agents or sub-contractors shall be limited in any way.
- 8.2. Subject to clause 8.1, neither party shall be liable to the other party under and/or pursuant to the terms of this MoU for any loss and/or liability in connection with the performance and/or breach of that party's obligations under this MoU, except where such loss and/or liability:
 - 8.2.1. arises in connection with that party's breach of clause 5; and/or
 - 8.2.2. arises under and/or pursuant to the indemnity granted by that party set out in clause 4.6.
- 8.3. Subject to clause 8.1, neither party shall in any event be liable to the other party under and/or pursuant to the terms of this MoU for any loss and/or liability arising from or as a result of any:
 - 8.3.1. loss of anticipated savings or profits, any loss of profit, loss of revenue, loss of contracts or loss of goodwill, any loss of data, loss of computer time or loss of management time; and/or
 - 8.3.2. loss which is indirect, special or consequential.
- 8.4. The parties agree that the scope and extent of their respective liabilities in connection with any implementation of the Project shall be set out in, and governed by, any Project Agreement entered into between the parties.

9. MISCELLANEOUS

- 9.1. The parties shall each bear their own costs and expenses incurred in complying with their obligations under this MoU.
- 9.2. Neither party shall be entitled to assign, novate, sub-contract or otherwise transfer any of its rights and/or obligations under this MoU without the prior written consent of the other party, provided always that SPPS shall be entitled to assign, novate, sub-contract or otherwise transfer its rights and/or obligations to SPD and/or SPM without the prior consent of the Collaborator.

- 9.3. All notices to be given under this MoU (including approvals, consents and other communications) shall be in writing and shall be sent by first class post or electronic communication to the following addresses:

SPPS	Collaborator
<p>Legal Director SP Power Systems Limited New Alderston House Dove Wynd Strathclyde Business Park BELLSHILL ML4 3FF</p> <p><u>With a copy to:</u> ScottishPower Strategic Market Development Manager SP Power Systems Limited New Alderston House Dove Wynd Strathclyde Business Park BELLSHILL ML4 3FF</p>	<p>Smart Grid Segment Leader GE Digital Energy Lauder House Almondvale Business Park Livingston West Lothian EH54 6BX Scotland</p> <p>With a copy to: General Manager GE Digital Energy Lauder House Almondvale Business Park Livingston West Lothian EH54 6BX Scotland (UK)</p>

- 9.4. This MoU (together with the Confidentiality Agreement) supersedes any prior agreements and arrangements between parties and constitutes the entire agreement between the parties relating to the subject matter of this MoU.
- 9.5. No addition to or modification of this MoU shall be effective unless it is in writing and signed by a duly authorised representative of each party.
- 9.6. Nothing in this MoU shall create, or be deemed to create, a partnership or joint venture between the parties or the relationship of principal and agent between the parties, and neither party shall have any authority to act on behalf of or otherwise to legally bind the other in any way.
- 9.7. No delay or failure on the part of either party to exercise or to enforce any right given to it by this MoU or at law, or any custom or practice of either party at variance with the terms of this MoU shall constitute a waiver of either party's respective rights under this MoU or operate so as to prevent the exercise or enforcement of any such rights at any time.
- 9.8. This MoU is entered into by SPPS for the benefit of SPD and SPM. The parties agree that each of SPD and SPM shall have the benefit of and may enforce the terms of this MoU as if it were a party hereto.
- 9.9. This MoU shall be governed by and construed in accordance with the laws of England and Wales and the parties hereby submit to the exclusive jurisdiction of the English Courts.

THIS IS THE SCHEDULE REFERRED TO IN THE FOREGOING MEMORANDUM OF UNDERSTANDING BETWEEN SP POWER SYSTEMS LIMITED AND IGE ENERGY SERVICES (UK) LIMITED

SCHEDULE – PART 1

SUBMISSION ASSISTANCE

- Provide support with defining SPPS's technical solutions relating to the Project in connection with the Submission.
- Assist SPPS with compiling the Submission and any other relevant key materials.
- Provide costs estimates for products/solutions/services cost estimates as required to support Submission.
- Work closely with Key Partners and other relevant third parties as required by SPPS in connection with the Submission.
- Manage (as applicable) any supply chain matters relevant to the Collaborator in connection with the Submission.
- Provide project and programme management capabilities in connection with the Submission.

SCHEDULE – PART 2

KEY PARTNERS

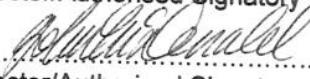
Name	Outline of Proposed Role in Project
ScottishPower Energy Retail Limited	Marketing Assistance, Customer Access and Customer Complaint Handling
BT	Telecommunications Assistance
[SP Energy Wholesale – details TBC]	Assistance with Energy Pricing Information and Settlements

IN WITNESS WHEREOF this MoU has been executed as follows:-

SIGNED for and on behalf of
SP POWER SYSTEMS LIMITED
acting by:

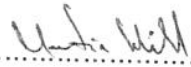


Director/Authorised Signatory



Director/Authorised Signatory

in the presence of:-

Witness... 

Full Name... MARTIN HILL

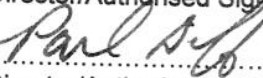
Address... NEW ALDERSTON HOUSE,

DOVE WYND, BELLSHILL ML4 3FF


SIGNED for and on behalf of
IGE ENERGY SERVICES (UK) LIMITED
acting by:



Director/Authorised Signatory



Director/Authorised Signatory

in the presence of:- 

Witness... STEPHEN BERDIS

Full Name... STEPHEN JOHN BERDIS

Address... LAIRD HOUSE, ALMONDVALE

BUSINESS PARK, LIVINGSTON

EH54 6BX

MEMORANDUM OF UNDERSTANDING

between

- (1) **SP POWER SYSTEMS LIMITED**, a company incorporated in Scotland (Registered Number: SC215841) having its Registered Office at 1 Atlantic Quay, Glasgow, G2 8SP ("SPPS"); and
- (2) **SCOTTISHPOWER ENERGY RETAIL LIMITED**, a company incorporated in Scotland (Registered Number: SC190287) having its Registered Office at 1 Atlantic Quay, Glasgow G2 8SP (the "Collaborator").

WHEREAS:

- (A) as part of the electricity Distribution Price Control Review 5 ("DPCR5"), Ofgem has put in place a Low Carbon Networks Fund (the "LCN Fund"), which is to be made available to DNOs in accordance with the Governance Document. The purpose of the LCN Fund is to encourage DNOs to use the period of the DPCR5 to run trials of new technology, operating and commercial arrangements aimed at helping all DNOs understand how they can provide security of supply at value for money as Great Britain moves towards a low carbon economy;
- (C) the LCN Fund is split into two tiers: (a) the first tier allows DNOs to recover a proportion of expenditure incurred on small scale projects; and (b) the second tier provides funding for a small number of significant "flagship" projects, which will be selected by Ofgem (following a competitive process among DNOs) on an annual basis during each year of the DPCR 5 Period ("Tier 2 Funding");
- (D) SPPS is responsible for the provision of operational, network investment and other services in relation to the distribution networks licensed to and owned by SP Distribution Limited, company number SC189125, ("SPD") and SP Manweb PLC, company number 02366937, ("SPM") respectively by virtue of an agreement between these parties dated 31 March 2006. SPD and SPM both hold licences pursuant to the Electricity Act 1989 (as amended) to distribute electricity within their licensed areas;
- (E) SPPS intends to submit an application to Ofgem for Tier 2 Funding for the proposed Project in the Funding Year, which Project would involve SPPS working in collaboration with the Collaborator;
- (F) the Collaborator has agreed to provide its expertise and assistance to SPPS in connection with preparing the Submission, and has agreed to enter into a detailed contractual arrangement with SPPS in connection with the Project in the event that the Submission is approved by Ofgem; and
- (G) the parties have agreed to enter into this MoU for the purposes of:
 - (a) governing the parties' relationship in connection with the Project during the term of this MoU; and
 - (b) setting out the key principles of any contractual relationship to be entered into between the parties in connection with the Project in the event that the Submission is approved by Ofgem.

NOW THEREFORE IT IS HEREBY AGREED as follows:

1. STATUS OF MOU AND INTERPRETATION

- 1.1. The parties agree that the terms of this MoU:
 - 1.1.1. are intended to be legally binding between the parties; and
 - 1.1.2. are not exhaustive in respect of the terms that will be included in any Project Agreement.

- 1.2. In this MoU the following words and expressions shall (unless the context requires otherwise) have the meanings given to them below:
- 1.2.1. **“Confidentiality Agreement”** means the confidentiality agreement entered into between the parties dated on or about 1st September 2010;
 - 1.2.2. **“DNO”** has the meaning given to it in paragraph 1.16 of the Governance Document;
 - 1.2.3. **“DPCR5 Period”** means 1 April 2010 to 31 March 2015;
 - 1.2.4. **“Effective Date”** means **19th July 2010** (notwithstanding the date or dates of this MoU);
 - 1.2.5. **“Funding Year”** means the calendar year of 2010;
 - 1.2.6. **“Governance Document”** means the LCN Fund Governance Document v.3 produced by Ofgem dated 22 July 2010 (as amended, updated and/or replaced by Ofgem from time to time);
 - 1.2.7. **“Intellectual Property Rights”** means any copyright, patent, trade mark or trade name, design rights, database rights, know-how or other similar right of whatever nature, registered or unregistered, present or future, together with any application for, and the right to apply for, any of the foregoing and any renewals or extensions thereof anywhere in the world;
 - 1.2.8. **“Key Partners”** means any third parties that may be involved or engaged by SPPS in connection with the Project from time to time, including (without limitation) the parties identified in Part 2 of the Schedule;
 - 1.2.9. **“MoU”** means this memorandum of understanding (including the recitals and the annexed Schedule);
 - 1.2.10. **“Ofgem”** means the Office of Gas and Electricity Markets (or its statutory successor from time to time);
 - 1.2.11. **“Project”** means a demand-side management trial of an electric storage heating system in greater Glasgow, as described further in the Submission;
 - 1.2.12. **“Project Agreement”** means any formal, definitive agreement entered into by the parties in connection with the Project in the event that Ofgem formally approves the Submission;
 - 1.2.13. **“SPD” and “SPM”** respectively have the meanings given to them in recital (D);
 - 1.2.14. **“SP Group Companies”** means SPPS or the Collaborator, as appropriate, and any of its associated companies or any other person having control over any such associated company (the terms “associated company” and “control” bearing the meanings given in Section 416 of the Income and Corporation Taxes Act 1988);
 - 1.2.15. **“Submission”** means the full submission to be prepared by SPPS for Tier 2 Funding in the Funding Year in connection with the Project;
 - 1.2.16. **“Submission Assistance”** has the meaning given to it in clause 2.1; and
 - 1.2.17. **“Tier 2 Funding”** has the meaning given to it in recital (C).

2. SUBMISSION ASSISTANCE

- 2.1. The Collaborator agrees that it shall provide such assistance as SPPS may reasonably request in preparing the Submission and responding to any comments, queries and/or requests for information received from Ofgem in connection with the Submission ("Submission Assistance"). The parties agree that the Submission Assistance will include, without limitation, the activities described in Part 1 of the Schedule to this MoU.
- 2.2. The Collaborator shall ensure that the Submission Assistance is provided:
 - 2.2.1. in accordance with any timescales agreed between the parties;
 - 2.2.2. in accordance with best industry practice;
 - 2.2.3. by personnel who possess a degree of skill and experience which is appropriate to the tasks required of them in connection with the Submission Assistance, who shall perform those tasks in a workmanlike and professional manner; and
 - 2.2.4. in compliance with the Governance Document.
- 2.3. Unless expressly agreed to the contrary between the parties in writing, the Collaborator shall not be entitled to be paid any fees, charges, costs and/or expenses in connection with the provision of the Submission Assistance or otherwise in connection with this MoU.
- 2.4. The Collaborator agrees that it shall appoint a person responsible for liaising with SPPS in connection with the Project and the Submission. The parties agree that they shall meet regularly during the term of this MoU for the purpose of discussing the Project and the progress of the Submission.
- 2.5. The parties agree that, provided the Submission is successful:
 - 2.5.1. SPPS agrees that it will not collaborate, in connection with any application for Tier 2 Funding for the Project in the Funding Year, with any third party that provides products, services or expertise that are the same as or substantially similar to the products, services or expertise that SPPS envisages the Collaborator providing in connection with the Project; and
 - 2.5.2. the Collaborator agrees that it will not collaborate, in connection with any application for Tier 2 Funding in the Funding Year, with any other DNO in relation to any project that is the same or substantially similar to the Project.

3. PROJECT AGREEMENT

- 3.1. In the event that Ofgem formally notifies SPPS that the Submission has been successful and that SPPS will be provided with Tier 2 Funding in connection with the Project, the parties shall, acting reasonably, use all reasonable endeavours to enter into a Project Agreement as soon as reasonably practicable after such formal notification is received by SPPS from Ofgem.
- 3.2. The parties agree that the terms of any Project Agreement will incorporate (without limitation) the following key principles:
 - 3.2.1. the Project will be implemented in accordance with the Submission;
 - 3.2.2. the parties will comply with the terms of the Governance Document in the implementation and management of the Project;
 - 3.2.3. the Collaborator will, to the extent reasonable and necessary, work in conjunction with the Key Partners in connection with the Project;

- 3.2.4. SPPS and the Collaborator will perform their obligations in connection with the Project in accordance with best industry practice and in compliance with all applicable laws; and
- 3.2.5. the parties will comply with the principles set out in section five of the Governance Document in relation to the ownership and use of Intellectual Property Rights related to the Project.

4. INTELLECTUAL PROPERTY

- 4.1. Except as expressly set out in this clause 4, the parties acknowledge and agree that neither party shall acquire any right, title or interest in or to the Intellectual Property Rights of the other party (or its licensors) under and/or pursuant to the terms of this MoU.
- 4.2. SPPS hereby grants to the Collaborator (and all SP Group Companies) a limited, non-exclusive, non-transferable, royalty-free licence to use, for the sole purpose of providing the Submission Assistance, such of SPPS's Intellectual Property Rights during the term of this MoU as the Collaborator reasonably requires to use in order to provide the Submission Assistance.
- 4.3. The Collaborator hereby grants to SPPS (and all SP Group Companies) a limited, non-exclusive, non-transferable, royalty-free licence to use, solely in relation to the Submission, such of the Collaborator's Intellectual Property Rights during the term of this MoU as SPPS reasonably requires to use in order for SPPS to receive the Submission Assistance.
- 4.4. The parties agree that SPPS shall own all Intellectual Property Rights in and to the Submission.
- 4.5. For the avoidance of any doubt, the parties agree that the arrangements for ownership and use of Intellectual Property Rights in connection with the implementation of the Project shall be set out in, and governed by, the Project Agreement.
- 4.6. Each party (the "indemnifying party") agrees to indemnify the other party against any claim that any Intellectual Property Rights licensed by the indemnifying party to the other party pursuant to clause 4.2 or 4.3 (as applicable), when used in accordance with this MoU, infringe the Intellectual Property Rights of any third party (an "IPR Claim"), provided that:
 - 4.6.1. the other party notifies the indemnifying party immediately upon becoming aware of an IPR Claim or potential IPR Claim;
 - 4.6.2. the other party does not make any admission as to liability or agree to any settlement or compromise of any IPR Claim without the indemnifying party's prior written consent; and
 - 4.6.3. the indemnifying party will, at its own request and expense, be entitled to have the conduct of and/or to settle negotiations and/or litigation arising from any IPR Claim and the other party will, at the indemnifying party's request and expense, provide to the indemnifying party such reasonable assistance as the indemnifying party may require.

5. CONFIDENTIALITY

- 5.1. Subject to clause 5.2 and 5.3, the parties agree that the terms of the Confidentiality Agreement shall apply (as applicable) to information shared between the parties pursuant to and/or in connection with this MoU.
- 5.2. The parties acknowledge and agree that nothing in this MoU or the Confidentiality Agreement shall prevent SPPS from submitting the Submission to Ofgem or responding to any queries raised by Ofgem in connection with the Submission.

- 5.3. Subject to clause 5.4, the Collaborator hereby acknowledges and agrees that the entire contents of the Submission will be made available in the public domain by Ofgem. The Collaborator acknowledges that all parts of the Submission that are made available in the public domain by Ofgem shall not comprise "Confidential Information" for the purposes of the Confidentiality Agreement.
- 5.4. In the event that the Collaborator considers that any part of the Submission contains information that the Collaborator can demonstrate is confidential or commercially sensitive and would be exempt from disclosure under relevant freedom of information and access to environmental information laws, the Collaborator shall notify SPPS in writing. SPPS shall take into account any notification provided by the Collaborator pursuant to this clause 5.4, and shall, if it considers appropriate, request that the relevant part(s) of the Submission are not made available in the public domain. For the avoidance of any doubt, SPPS shall not be deemed to be in breach of the Confidentiality Agreement in the event that Ofgem refuses any such request and the relevant information is made available in the public domain.
- 5.5. The parties agree that in the event of any conflict between the terms of the Confidentiality Agreement and this clause 5, this clause 5 shall have precedence.

6. PUBLICITY

The Collaborator shall not make any press announcements or publicise this MoU or its contents or subject matter in any way during the term of this MoU without the prior written consent of SPPS. In the event that the Submission is approved by Ofgem, the parties shall jointly agree a press announcement.

7. TERM AND TERMINATION

- 7.1. This MoU shall commence on the Effective Date and shall continue until the earliest of the following to occur:
- 7.1.1. the parties entering into a Project Agreement; or
 - 7.1.2. the parties mutually agreeing in writing to terminate this MoU; or
 - 7.1.3. SPPS receiving formal notification from Ofgem that the Submission has not been accepted in relation to the Funding Year; or
 - 7.1.4. SPPS notifying the Collaborator in writing that SPPS will not be submitting the Submission in the Funding Year or that SPPS has withdrawn the Submission for the Funding Year.
- 7.2. In the event that this MoU is terminated pursuant to clause 7.1.3 or 7.1.4, the Collaborator agrees that it shall provide SPPS with a right of first refusal with regard to the possibility of a submission being made for Tier 2 Funding for the same or a similar project in any subsequent funding year. SPPS shall notify the Collaborator whether or not SPPS wishes to exercise its right of first refusal under this clause 7.2 within 60 days of (i) receipt of notice of the nature described in clause 7.1.3 or (ii) issue of notice of the nature described in clause 7.1.4 (as applicable). In the event that SPPS exercises its right of first refusal pursuant to this clause 7.2, the parties (acting reasonably) shall use all reasonable endeavours to enter into a memorandum of understanding (on the same or substantially similar terms to this MoU) with SPPS in connection with an application for Tier 2 Funding for the relevant project in the relevant funding year.
- 7.3. Subject to clause 7.4, the parties agree that any termination of this MoU pursuant to clause 7.1 shall not of itself give rise to any liability on the part of either party.
- 7.4. Termination of this MoU shall not affect the accrued rights of the parties arising out of this MoU as at the date of expiry or termination, nor shall it affect the continuance in force of clauses 4.4, 4.6, 5, 7.2, 7.3, 8 and 9.

8. LIABILITY

- 8.1. Neither party's liability to the other (i) for any death or personal injury caused by the negligence of that party or its employees, agents or sub-contractors, or (ii) pursuant to the indemnity set out in clause 4.6, shall be limited in any way.
- 8.2. Subject to clause 8.1, neither party shall be liable to the other party under and/or pursuant to the terms of this MoU for any:
- 8.2.1. loss of anticipated savings or profits, any loss of profit, loss of revenue, loss of contracts or loss of goodwill, any loss of data, loss of computer time or loss of management time; and/or
- 8.2.2. loss which is indirect, special or consequential.

9. MISCELLANEOUS

- 9.1. The parties shall each bear their own costs and expenses incurred in complying with their obligations under this MoU.
- 9.2. Neither party shall be entitled to assign, novate, sub-contract or otherwise transfer any of its rights and/or obligations under this MoU without the prior written consent of the other party, provided always that SPPS shall be entitled to assign, novate, sub-contract or otherwise transfer its rights and/or obligations to SPD and/or SPM without the prior consent of the Collaborator.
- 9.3. All notices to be given under this MoU (including approvals, consents and other communications) shall be in writing and shall be sent by first class post or electronic communication to the following addresses:

SPPS	Collaborator
Legal Director SP Power Systems Limited New Alderston House Dove Wynd Strathclyde Business Park BELLSHILL ML4 3FF	Legal Director ScottishPower Energy Retail Limited Cathcart Business Park 144 Spean Street Glasgow G44 4BE
<u>With a copy to:</u> ScottishPower Strategic Market Development Manager SP Power Systems Limited New Alderston House Dove Wynd Strathclyde Business Park BELLSHILL ML4 3FF	<u>With a copy to:</u> Head of Business Transformation ScottishPower Energy Retail Limited Cathcart Business Park 144 Spean Street Glasgow G44 4BE

- 9.4. This MoU (together with the Confidentiality Agreement) supersedes any prior agreements and arrangements between parties and constitutes the entire agreement between the parties relating to the subject matter of this MoU.
- 9.5. No addition to or modification of this MoU shall be effective unless it is in writing and signed by a duly authorised representative of each party.

- 9.6. Nothing in this MoU shall create, or be deemed to create, a partnership or joint venture between the parties or the relationship of principal and agent between the parties, and neither party shall have any authority to act on behalf of or otherwise to legally bind the other in any way.
- 9.7. No delay or failure on the part of either party to exercise or to enforce any right given to it by this MoU or at law, or any custom or practice of either party at variance with the terms of this MoU shall constitute a waiver of either party's respective rights under this MoU or operate so as to prevent the exercise or enforcement of any such rights at any time.
- 9.8. This MoU is entered into by SPPS for the benefit of SPD and SPM. The parties agree that each of SPD and SPM shall have the benefit of and may enforce the terms of this MoU as if it were a party hereto.
- 9.9. This MoU shall be governed by and construed in accordance with the laws of Scotland and the parties hereby submit to the exclusive jurisdiction of the Scottish Courts.

These presents consisting of this and the six preceding pages, together with the Schedule in two parts annexed hereto, are executed as follows:-

SUBSCRIBED for and on behalf of
SP POWER SYSTEMS LIMITED
on the 3 day of September 2010


.....
Director/Authorised Signatory (Business Function)

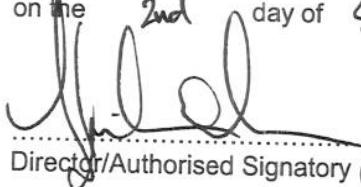
Print Name: SCOTT MATHIESON

And


.....
Director/Authorised Signatory (Control Function)

Print Name: JOHN McDONALD

SUBSCRIBED for and on behalf of
SCOTTISHPOWER ENERGY RETAIL LIMITED
on the 2nd day of September 2010


.....
Director/Authorised Signatory (Business Function)

Print Name: ALISTAIR ORR

And


.....
Director/Authorised Signatory (Control Function)

Print Name: MARC ROSSI

THIS IS THE SCHEDULE REFERRED TO IN THE FOREGOING MEMORANDUM OF UNDERSTANDING BETWEEN SP POWER SYSTEMS LIMITED AND SCOTTISHPOWER ENERGY RETAIL LIMITED

SCHEDULE – PART 1

SUBMISSION ASSISTANCE

- Provide support with defining SPPS's technical solutions relating to the Project in connection with the Submission.
- Assist SPPS with compiling the Submission and any other relevant key materials.
- Provide cost estimates for products/solutions/services as required to support Submission.
- Work closely with Key Partners and other relevant third parties as required by SPPS in connection with the Submission.
- Manage (as applicable) any supply chain matters relevant to the Collaborator in connection with the Submission.

SCHEDULE – PART 2

KEY PARTNERS

Name	Outline of Proposed Role in Project
IGE Energy Services (UK) Limited	Provision of demand control devices and IT
British Telecommunications plc	Telecommunications Assistance



SCOTTISHPOWER

Energy Wholesale

F.A.O Martin Hill

Strategic Market Development Manager
SP Distribution Limited
c/o New Alderston House
Dove Wynd
Strathclyde Business Park
Bellshill, ML4 3FF

1st September 2010

Dear Martin

**Low Carbon Network Tier 2 Fund (the "Tier 2 Fund")
Proposed Demand Side Management of Electric Storage Heating Trial (the "Trial")
2010 Submission – Letter of Intent**

This letter (the "Letter") sets out the intentions and commitment of Scottish Power Energy Management Limited, 1 Atlantic Quay, Robertson Street, Glasgow, G2 8SP (SC215843) (**Collaborator**) to assist SP Distribution Limited, 1 Atlantic Quay, Robertson Street, Glasgow, G2 8SP (SC189125) (**ScottishPower**) in respect of the 2010 submission to Ofgem for funding of the Trial as part of the Tier 2 Fund (**the "2010 Submission"**). The Letter is intended to be a statement of the Collaborator's present intentions and commitment only and accordingly shall not be construed as constituting a promise as to future conduct or imposing on the Collaborator any obligations other than those set out in this Letter. If deemed appropriate at a later date by the Collaborator and ScottishPower (together the "**Parties**") the Parties may agree to enter into a written legally binding agreement should the 2010 Submission be successful.

This letter is exhaustive and is intended to be legally binding in its terms between the Parties.

1. COMMITMENT

1.1 The Collaborator has agreed to provide ScottishPower with the following commitment in respect of the Trial and 2010 Submission:

- 1.1.1 sharing information deemed relevant by the Collaborator in relation to the existing Radio Teleswitch system;
- 1.1.2 sharing any other information deemed relevant by the Collaborator when requested by ScottishPower as part of undertaking this Trial; and
- 1.1.3 working with ScottishPower to ensure that the Trial does not significantly impact or prejudice any existing processes of the Collaborator.

1.2 The Collaborators continued commitment shall be conditional on:

- 1.2.1 ScottishPower being successfully awarded Tier 2 funding for the 2010 Submission; and
- 1.2.2 If deemed appropriate by the Parties, the Parties using reasonable endeavours to negotiate terms and enter into a written contract for the continued provision of support and assistance by the Collaborator to ScottishPower in relation to the Trial and 2010 Submission.

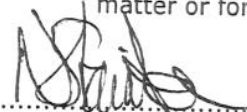
ScottishPower Energy Management Limited, Cathcart Business Park, Spean Street, Glasgow G44 4BE
Telephone 0141 568 2000. Fax 0141 568 4909


2. GENERAL

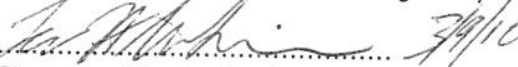
- 2.1 Each Party shall be responsible for its own costs in connection with this Letter, any agreement or contract to follow hereon and any documents contemplated by them.
- 2.2 Each Party may terminate its involvement in relation to the 2010 Submission and/or this Letter at any time on condition that it has provided the other party with 7 days written notice.
- 2.3 The Collaborator shall not make any press announcements or publicise this Letter or its contents or subject matter in any way without the prior written consent of ScottishPower. In the event that the 2010 Submission is approved by Ofgem, the Parties shall use reasonable endeavours to jointly agree a press announcement.
- 2.4 The Parties acknowledge and agree that nothing in this Letter shall prevent ScottishPower from submitting its 2010 Submission to Ofgem or responding to any queries raised by Ofgem in connection with the 2010 Submission.
- 2.5 Subject to paragraphs 2.6 and 2.7, the Parties hereby agree that Ofgem are permitted to make available the entire contents of the 2010 Submission in the public domain.
- 2.6 In the event that the Collaborator considers that any part of the 2010 Submission contains information that the Collaborator deems confidential or commercially sensitive the Collaborator shall notify ScottishPower in writing not less than 2 business days prior to the date on which the 2010 Submission is due to be submitted to Ofgem, which notice will set out in detail the information that the Collaborator believes falls within the scope of this paragraph 2.6.
- 2.7 Provided that any notification under paragraph 2.6 is received by ScottishPower in compliance with the timescales set out in paragraph 2.6, ScottishPower shall request to Ofgem that the relevant sections of the 2010 Submission are not made available in the public domain. In the event that Ofgem refuses any such request by ScottishPower to keep the information notified to ScottishPower by the Collaborator pursuant to paragraph 2.6 confidential, ScottishPower shall give the Collaborator notice of such refusal, in which event the Collaborator may (at its sole option and without any obligation or responsibility on the part of ScottishPower) petition Ofgem on the Collaborators own account.

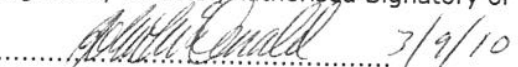
3. GOVERNING LAW AND JURISDICTION

- 3.1 This Letter, and any and all discussions between ScottishPower and the Collaborator in connection with the 2010 Submission (the "Discussions"), and all disputes or claims arising out of or in connection with the Letter or Discussions or their subject matter or formation (including non-contractual disputes or claims), shall be governed by Scots law.
- 3.2 The Parties irrevocably agree that the courts of Scotland shall have exclusive jurisdiction to settle any dispute or claim that arises out of or in connection with this letter or its subject matter or formation (including non-contractual disputes or claims).


..... NEIL STANTON, HEAD OF TRADING 2 SEPT 2010
Signed by Director/Authorised Signatory of ScottishPower Energy Management Limited


..... JONATHAN LINTFORD, FINANCE DIRECTOR 2 SEPT 2010
Signed by Director/ Authorised Signatory of ScottishPower Energy Management Limited


..... 3/9/10
Signed by Director/Authorised Signatory of SP Distribution Limited


..... 3/9/10
Signed by Director/ Authorised Signatory of SP Distribution Limited

1st September 2010

F.A.O Martin Hill
Strategic Market Development Manager
SP Energy Networks
New Alderston House
Dove Wynd
Strathclyde Business Park
Bellshill, ML4 3FF



Dear Martin

**Low Carbon Network Fund – Tier 2 Full Submission
Proposed Demand Side Management of Electric Storage Heating
Trial (“the Trial”)**

This letter sets out the principal terms on which the Collaborator (**Glasgow Housing Association**) is willing to provide a commitment to SP Distribution Limited (**ScottishPower**) in respect of the 2010 Submission to Ofgem for funding of the Trial as part of the Low Carbon Network Tier 2 Fund (**the 2010 Submission**). If deemed appropriate by the parties considering the nature of the commitment, the parties may agree to enter into a legally binding agreement should the 2010 Submission be successful.

This letter is not exhaustive and is intended to be legally binding between ScottishPower and the Glasgow Housing Association. This letter will evidence certain agreements and understandings between ScottishPower and the Glasgow Housing Association in relation to the 2010 Submission.

1. COMMITMENT

- 1.1 The Glasgow Housing Association has agreed to provide support to Scottish Power in respect of the 2010 Submission and has committed to:
 - 1.1.1. Appoint a Project Manager or single point of contact to assist ScottishPower with facilitating the installation of equipment as part of the project,
 - 1.1.2. Join ScottishPower in the community meetings and assist with ongoing communications to residents,
 - 1.1.3. Work with ScottishPower to develop a solution for handling complaints or enquiries.

Call us
0800 479 7979

Email us
talk@gha.org.uk

Visit us
Granite House
177 Trongate
Glasgow
G1 5HF

2. CONDITIONS

The Glasgow Housing Association proposed commitment is conditional on the following:

- 2.1 ScottishPower being successfully awarded Tier 2 funding for the 2010 Submission; and
- 2.2 the Parties signing, where appropriate, a legally binding agreement prepared by ScottishPower, and revised by Glasgow Housing Association.


3. GENERAL

- 3.1 Each party is responsible for its own costs in connection with its participation in the preparation and commitment to the 2010 Submission, whether or not it proceeds (including without limitation the preparation and negotiation of this letter, any agreement and any documents contemplated by them) and any party may end its involvement in relation to the 2010 Submission at any time, provided that it has provided the other party with 30 days written notice.
- 3.2 The Glasgow Housing Association shall not make any press announcements or publicise this Letter or its contents or subject matter in any way without the prior written consent of ScottishPower, unless required to provide information by a court of law, regulatory body or in terms of statutory authority. In the event that the 2010 Submission is approved by Ofgem, the parties shall jointly agree a press announcement.
- 3.3 The parties acknowledge and agree that nothing in this letter shall prevent ScottishPower from submitting its 2010 Submission to Ofgem or responding to any queries raised by Ofgem in connection with the 2010 Submission.
- 3.4 Subject to paragraph 3.5, the Glasgow Housing Association hereby acknowledges and agrees that the entire contents of the 2010 Submission will be made available in the public domain by Ofgem.
- 3.5 In the event that the Collaborator considers that any part of the 2010 Submission contains information that the Collaborator deems confidential or commercially sensitive the Collaborator shall notify ScottishPower in writing not less than 2 business days prior to the date on which the 2010 Submission is due to be submitted to Ofgem, which notice will set out in detail the information that the Collaborator believes falls within the scope of this paragraph 3.5.
- 3.6 Provided that any notification under paragraph 3.5 is received by ScottishPower in compliance with the timescales set out in paragraph 3.5, ScottishPower shall

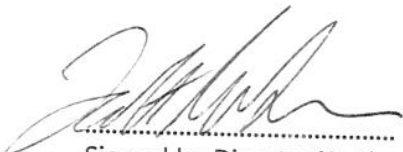
request to Ofgem that the relevant sections of the 2010 Submission are not made available in the public domain. In the event that Ofgem refuses any such request by ScottishPower to keep the information notified to ScottishPower by the Collaborator pursuant to paragraph 3.5 confidential, ScottishPower shall give the Collaborator notice of such refusal, in which event the Collaborator may (at its sole option and without any obligation or responsibility on the part of ScottishPower) petition Ofgem on the Collaborators own account.

4. GOVERNING LAW AND JURISDICTION

- 4.1 This letter, and the discussions between ScottishPower and the Glasgow Housing Association in connection with the 2010 Submission, and all disputes or claims arising out of or in connection with them or their subject matter or formation (including non-contractual disputes or claims) will be governed by Scots law.
- 4.2 The parties irrevocably agree that the courts of Scotland shall have exclusive jurisdiction to settle any dispute or claim that arises out of or in connection with this letter or its subject matter or formation (including non-contractual disputes or claims).



Signed by Authorised Signatory of Glasgow Housing Association



3/9/10

Signed by Director/Authorised Signatory of SP Distribution Limited



3/9/10

Signed by Director/ Authorised Signatory of SP Distribution Limited

F.A.O Martin Hill

Strategic Market Development Manager
SP Energy Networks
New Alderston House
Dove Wynd
Strathclyde Business Park
Bellshill, ML4 3FF

30th August 2010

Dear Martin

**Low Carbon Network Fund – Tier 2 Full Submission
Proposed Demand Side Management of Electric Storage Heating Trial (“the Trial”)**

This letter sets out the principal terms on which the University of Strathclyde (**Collaborator**) is willing to provide a commitment to SP Distribution Limited (**ScottishPower**) in respect of the 2010 Submission to Ofgem for funding of the Trial as part of the Low Carbon Network Tier 2 Fund (**the 2010 Submission**). If deemed appropriate by the parties considering the nature of the commitment, the parties may agree to enter into a legally binding agreement should the 2010 Submission be successful.

This letter is not exhaustive and is intended to be legally binding between ScottishPower and the Collaborator. This letter will evidence certain agreements and understandings between ScottishPower and the Collaborator in relation to the 2010 Submission.

1. COMMITMENT

- 1.1 The Collaborator has agreed to provide Scottish Power with the following commitment in respect of the Trial:
- 1.1.1 The Collaborator will investigate advanced methods for optimal scheduling of electric storage heating load, subject to local network constraints and constraints articulated for relationships with consumers taking part in the scheme and taking account of available real-time measurements.
 - 1.1.2 The Collaborator will develop a prototype facility for the purpose of the Project as set out in the 2010 Submission. This will be tested and demonstrated by the Collaborator in a lab-based simulation and made available for trialling in the full-scale demonstration setting identified by ScottishPower.
 - 1.1.3 The Collaborator will assist with the monitoring and appraisal of the storage heating scheme’s performance and to the reporting and dissemination of results and learning outcomes.
 - 1.1.4 The Collaborator will provide sharing of knowledge from other investigations which it has conducted and make available undergraduate, MSc and PhD students to work on specific aspects of the Trial. Through gearing within an existing strategic framework between Collaborator and Scottish Power, the Collaborator will provide its services at a lower cost than that established for other third parties.

2. CONDITIONS

The Collaborator's proposed commitment is conditional on the following:

- 2.1 ScottishPower being successfully awarded Tier 2 funding for the 2010 Submission; and
- 2.2 the Parties signing, where appropriate, a legally binding agreement prepared by ScottishPower.

3. GENERAL

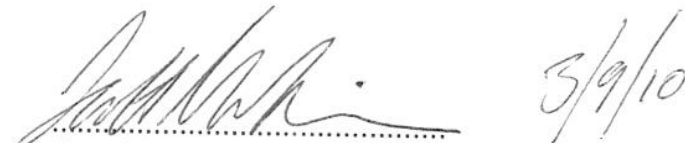
- 3.1 Each party is responsible for its own costs in connection with its participation in the preparation and commitment to the 2010 Submission, whether or not it proceeds (including without limitation the preparation and negotiation of this letter, any agreement and any documents contemplated by them) and any party may end its involvement in relation to the 2010 Submission at any time, provided that it has provided the other party with 30 days written notice.
- 3.2 The Collaborator shall not make any press announcements or publicise this Letter or its contents or subject matter in any way without the prior written consent of ScottishPower. In the event that the 2010 Submission is approved by Ofgem, the parties shall jointly agree a press announcement.
- 3.3 The parties acknowledge and agree that nothing in this letter shall prevent ScottishPower from submitting its 2010 Submission to Ofgem or responding to any queries raised by Ofgem in connection with the 2010 Submission.
- 3.4 Subject to paragraph 3.5, the Collaborator hereby acknowledges and agrees that the entire contents of the 2010 Submission will be made available in the public domain by Ofgem.
- 3.5 In the event that the Collaborator considers that any part of the 2010 Submission contains information that the Collaborator can demonstrate is confidential or commercially sensitive and would be exempt from disclosure under relevant freedom of information and access to environmental information laws, the Collaborator shall notify ScottishPower in writing. ScottishPower shall take into account any notification provided by the Collaborator pursuant to this paragraph 3.5, and shall, if it considers appropriate, request that the relevant part(s) of the 2010 Submission are not made available in the public domain.

4. GOVERNING LAW AND JURISDICTION

- 4.1 This letter, and the discussions between ScottishPower and the Collaborator in connection with the 2010 Submission, and all disputes or claims arising out of or in connection with them or their subject matter or formation (including non-contractual disputes or claims) will be governed by Scots law.
- 4.2 The parties irrevocably agree that the courts of Scotland shall have exclusive jurisdiction to settle any dispute or claim that arises out of or in connection with this letter or its subject matter or formation (including non-contractual disputes or claims).



.....
Signed by Alison McFarlane
Deputy Director, Research and Knowledge Exchange Services, University of Strathclyde



.....
Signed by Director/Authorised Signatory of SP Distribution Limited



.....
Signed by Director/ Authorised Signatory of SP Distribution Limited



F.A.O Martin Hill

Strategic Market Development Manager
SP Energy Networks
New Alderston House
Dove Wynd
Strathclyde Business Park
Bellshill, ML4 3FF

31st August 2010

Dear Martin

**Low Carbon Network Fund – Tier 2 Full Submission (“the 2010 Submission”)
In connection with Proposed Demand Side Management of Electric Storage Heating
Trial (“the Project”)**

This letter sets out the principal terms on which British Telecommunications plc, 81 Newgate Street, London, EC1A 7AJ (01800000) (**Collaborator**) is willing to provide a commitment to SP Distribution Limited, 1 Atlantic Quay, Robertson Street, Glasgow, G2 8SP (SC189125) (**ScottishPower**) in respect of the 2010 Submission and the Project. If deemed appropriate by the parties, considering the nature of the commitment, the parties may agree to enter into a legally binding agreement should the 2010 Submission be successful.

This letter is not exhaustive and is intended to be legally binding between ScottishPower and the Collaborator. This letter will evidence certain agreements and understandings between ScottishPower and the Collaborator in relation to the 2010 Submission and the Project.

1. COMMITMENT

1.1 The Collaborator has agreed to provide Scottish Power with the following commitment in respect of the 2010 Submission and the Project;

- 1.1.1 The Collaborator agrees that it will comply with the relevant provisions of Ofgem’s LCN Fund Governance Document in connection with the Project.
- 1.1.2 The Collaborator will work as the communications partner with ScottishPower to provide the most suitable communications solution (including the required infrastructure, transmission and control equipment) to the Project which from work carried out to date is believed to be Long Range Radio.
- 1.1.3 The Collaborator will work with its other partners (Arqiva and Detica) to deliver this solution to the Project along with other collaborators identified by ScottishPower in the 2010 Submission.
- 1.1.4 The Collaborator and its partner (Arqiva) will commit to the investment as detailed in BT’s Letter of the 27th August 2010 in respect to the communications solution for the Project.



2. CONDITIONS

The Collaborator's proposed commitment is conditional on the following:

- 2.1 ScottishPower being successfully awarded Tier 2 funding for the 2010 Submission; and
- 2.2 the Parties signing, where appropriate, a mutually acceptable legally binding agreement.

3. GENERAL

- 3.1 Each party is responsible for its own costs in connection with its participation in the preparation and commitment to the 2010 Submission, whether or not it proceeds (including without limitation the preparation and negotiation of this letter, any agreement and any documents contemplated by them) and any party may end its involvement in relation to the 2010 Submission at any time, provided that it has provided the other party with 30 days written notice.
- 3.2 The Collaborator shall not make any press announcements or publicise this Letter or its contents or subject matter in any way without the prior written consent of ScottishPower.
- 3.3 The parties acknowledge and agree that nothing in this letter shall prevent ScottishPower from submitting its 2010 Submission to Ofgem or responding to any queries raised by Ofgem in connection with the 2010 Submission.
- 3.4 Subject to paragraph 3.5, the Collaborator hereby acknowledges and agrees that the entire contents of the 2010 Submission will be made available in the public domain by Ofgem.
- 3.5 In the event that the Collaborator considers that any part of the 2010 Submission contains information that the Collaborator can demonstrate is confidential or commercially sensitive and would be exempt from disclosure under relevant freedom of information and access to environmental information laws, the Collaborator shall notify ScottishPower in writing. ScottishPower shall take into account any notification provided by the Collaborator pursuant to this paragraph 3.5, and shall request that the relevant part(s) of the 2010 Submission are not made available in the public domain.

4. GOVERNING LAW AND JURISDICTION

- 4.1 This letter, and the discussions between ScottishPower and the Collaborator in connection with the 2010 Submission, and all disputes or claims arising out of or in connection with them or their subject matter or formation (including non-contractual disputes or claims) will be governed by Scots law.
- 4.2 The parties irrevocably agree that the courts of Scotland shall have exclusive jurisdiction to settle any dispute or claim that arises out of or in connection with this letter or its subject matter or formation (including non-contractual disputes or claims).

[Handwritten signature]

.....
Signed by British Telecommunications plc



[Handwritten signature]

3/9/10

.....
Signed by Director/Authorised Signatory of SP Distribution Limited

[Handwritten signature]

3/9/10

.....
Signed by Director/Authorised Signatory of SP Distribution Limited



Executive Director
Steve Inch
BSc(Hons) DipTRP

**Development & Regeneration
Services**

Glasgow City Council
229 George Street
Glasgow G1 1QU

Phone 0141 287 8555
Fax 0141 287 8444

Martin Hall
Strategic Market Development Manager
SP Energy Networks
New Alderston House
Dove Wynd
Strathclyde Business Park
BELLSHILL
ML4 3FF

Our ref **SG/cf**

Your ref

Ask for **Sandy Gillon**
Phone Direct **0141 287 8607**
Fax Direct **0141 287 6030**
Email **sandy.gillon**
 @drs.glasgow.gov.uk
Date **1 September 2010**

Dear Martin

**LOW CARBON NETWORK FUND - TIER 2 FULL SUBMISSION ("the 2010 Submission")
PROPOSED DEMAND SIDE MANAGEMENT OF ELECTRIC STORAGE HEARING TRIAL ("the
Trial")**

This letter sets out the principal terms on which Glasgow City Council (**GCC**) as a leading stakeholder in Sustainable Glasgow is willing to provide a commitment to SP Distribution Limited (**Scottish Power**) in respect of the 2010 Submission to Ofgem and the Trial as part of the Low Carbon Network Tier 2 Fund. If deemed appropriate by the parties considering the nature of the commitment, the parties may agree to enter into a legally binding agreement should the 2010 Submission be successful.

This letter is not exhaustive and is not intended to be legally binding between Scottish Power and GCC except as specifically set out in this letter. This letter will evidence certain agreements and understandings between Scottish Power and GCC in relation to the 2010 Submission.

1. COMMITMENT

- 1.1 Subject to paragraph 2 below, GCC has agreed to provide Scottish Power with the following commitment in respect of the Trial and the 2010 Submission:
 - 1.1.1 GCC supports Scottish Power with the 2010 Submission, and acknowledges the efforts of Scottish Power in working with GCC to reducing Carbon emissions through projects of this nature.
 - 1.1.2 GCC recognises that the 2010 Submission in line with GCC's objectives to reduce carbon emissions and commits to working through the Sustainable Glasgow Partnership to maximise its opportunities and benefits from the Trial.
 - 1.1.3 Scottish Power may use the recognition and support from the GCC as part of the 2010 Submission.
 - 1.1.4 Scottish Power will work with GCC to share the learning derived from the Trial and provide ongoing updates of the Trial's progress.

Glasgow – Proud Host City of the 2014 Commonwealth Games

Building Control & Public Safety, Corporate Services, Economic & Social Initiatives, Housing Strategy & Investment, Planning Services,
Project Management & Design, Property Services, Transport & Environment.

Glasgow City Council is an equal opportunities employer

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2. CONDITIONS

GCC's proposed commitment is conditional on the following:


- 2.1 Scottish Power being successfully awarded Tier 2 funding for the 2010 Submission; and
- 2.2 The Parties signing, where appropriate, a legally binding agreement prepared by Scottish Power which will include details of each party's role and responsibilities. Including but not limited to, the treatment of information and data, intellectual property rights, Freedom of Information, costs and publicity.

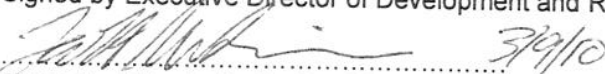
3. GENERAL

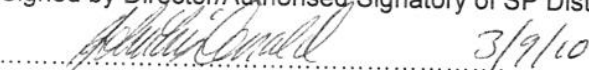
- 3.1 This paragraph 3 is legally binding.
- 3.2 Each party is responsible for its own costs in connection with its participation in the preparation and negotiation of this letter and any party may end its involvement in relation to the 2010 Submission at any time, provided that it has provided the other party with 30 days written notice.
- 3.3 Neither party shall make any press announcements or publicise this Letter or its contents or subject matter in any way without the prior written consent of the other party. In the event that the 2010 Submission is approved by Ofgem, the parties shall jointly agree a press announcement.
- 3.4 The parties acknowledge and agree that nothing in this letter shall prevent Scottish Power from submitting its 2010 Submission to Ofgem or responding to any queries raised by Ofgem in connection with the 2010 Submission.
- 3.5 Subject to paragraph 3.5, GCC hereby acknowledges and agrees that the entire contents of the 2010 Submission will be made available in the public domain by Ofgem.
- 3.6 In the event that GCC considers that any part of the 2010 Submission contains information that the GCC can demonstrate is confidential or commercially sensitive and would be exempt from disclosure under relevant freedom of information and access to environmental information laws, GCC shall notify Scottish Power in writing. Scottish Power shall take into account any notification provided by GCC pursuant to this paragraph 3.5, and shall, if it considers appropriate, request that the relevant part(s) of the 2010 Submission are not make available in the public domain.

4. GOVERNING LAW AND JURISDICTION

- 4.1 This paragraph 4 is legally binding.
- 4.2 This letter and the discussions between Scottish Power and GCC in connection with the 2010 Submission, and all disputes or claims arising out of or in connection with them or their subject matter or formation (including non-contractual disputes or claims) will be governed by Scots law.
- 4.3 The parties irrevocably agree that the course of Scotland shall have exclusive jurisdiction to settle any dispute or claim that arises out of or in connection with this letter or its subject matter or formation (including non-contractual disputes or claims).


Signed by Executive Director of Development and Regeneration Services, Glasgow City Council

 3/9/10
Signed by Director/Authorised Signatory of SP Distribution Limited

 3/9/10
Signed by Director/Authorised Signatory of SP Distribution Limited

Mr XXX

30 July 2010

Dear Mr XX

In April 2010, Ofgem set up a Low Carbon Networks Fund. The Fund will allow up to £500m support to projects sponsored by the distribution network operators (DNOs) to explore new technology, operating and commercial arrangements. The objective of the projects is to help all DNOs understand what they need to do to provide security of supply at value for money as Great Britain moves to a low carbon economy.

ScottishPower EnergyNetworks are currently in the process of developing projects as part of the 'tier two' element of the LCNF which is an annual competition for up to £64m of funding. One of our proposed projects is a trial of demand side management for a group of customers in the greater Glasgow area. The project will be beneficial in preparing for a future in which electrical heating and other electrical loads (e.g. electric vehicles) are significantly more prevalent than today. The focus will be on a group of approximately one thousand customers who currently have electric storage heating. The aim of the project is to assess how large electrical loads can be optimised and controlled within the constraints of the network and a range of other factors such as the availability of renewables.

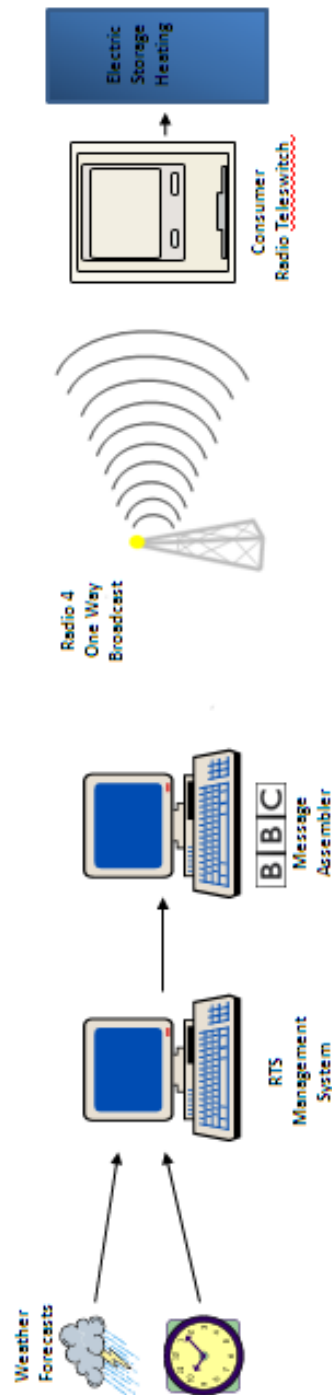
In order for Energy Networks to achieve this, we will require to install a device within the customers' premises which would allow remote control of the heating load. To get full benefit from the trial we wish to maximise the number of customers taking part. To that end we would like to invite you to contact us should you wish to find out more information and discuss the possibility of your customers being part of this trial. Please contact Martin Hill who is leading our Low Carbon Networks projects if you require any further information: .

Yours sincerely

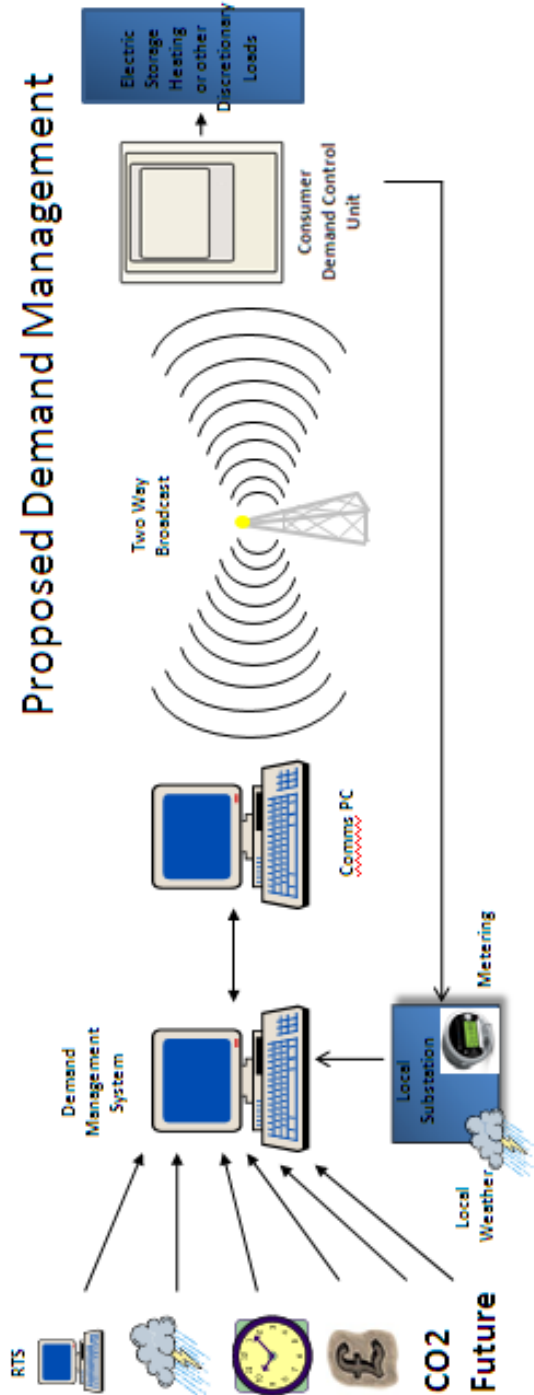
Jim Sutherland
Network Development Director

APPENDIX 3

EXISTING AND PROPOSED CONTROL SCHEDULING



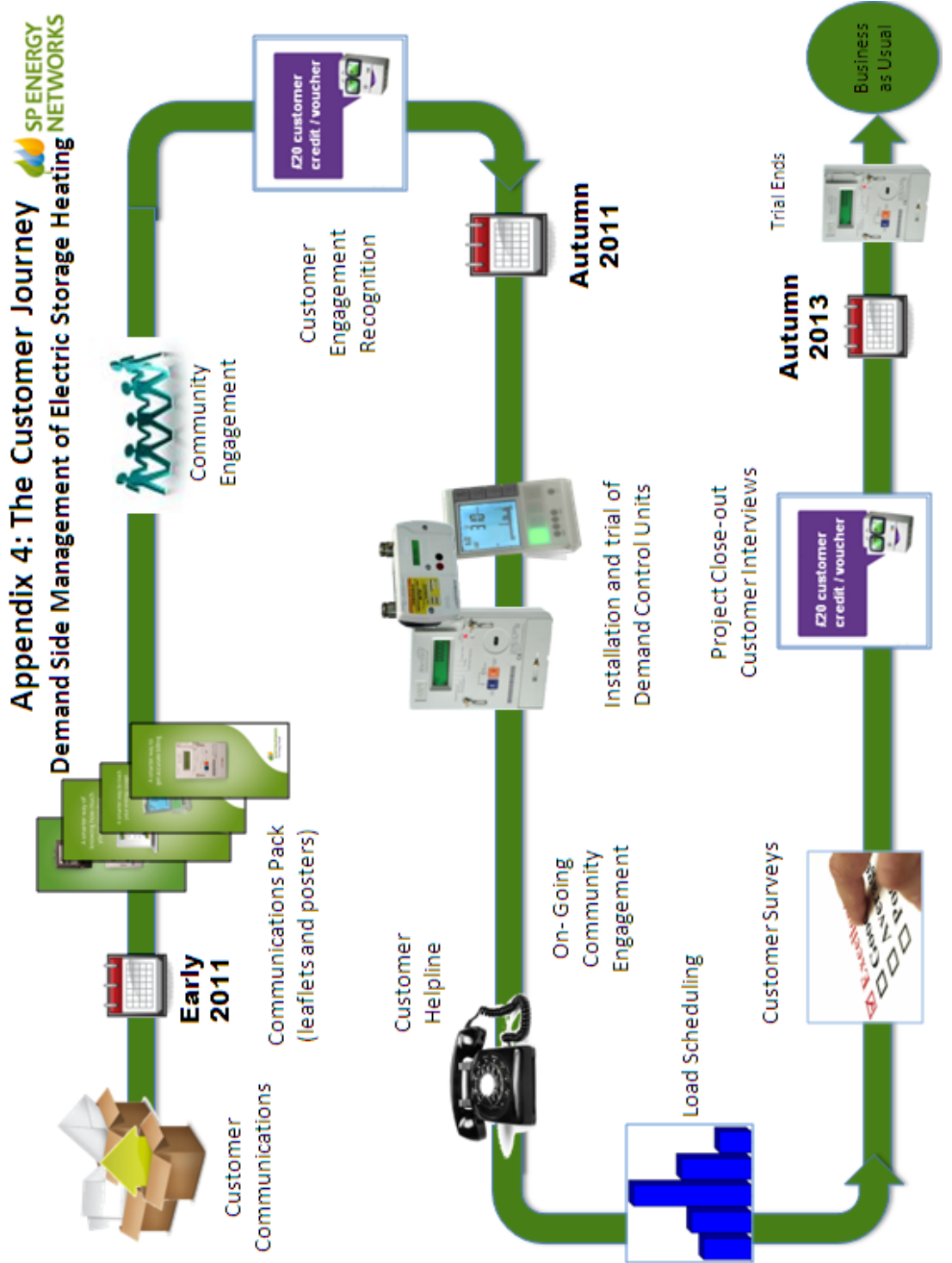
Existing Demand Management



Proposed Demand Management

APPENDIX 4

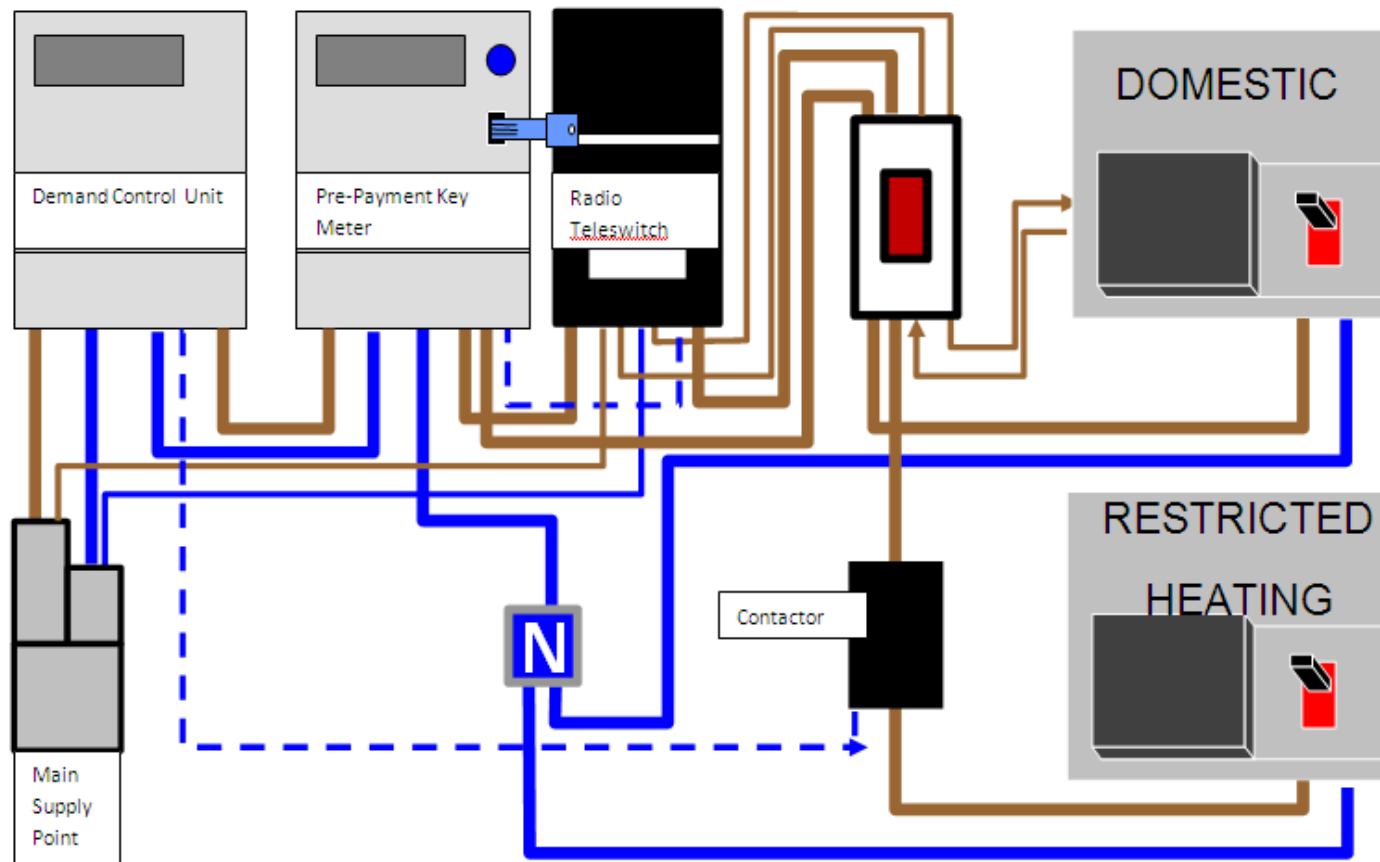
THE CUSTOMER JOURNEY



APPENDIX 5 NEW POINT OF SUPPLY CONFIGURATIONS

This appendix illustrates the typical installation of the new demand control unit and associated contactor to provide the control of the restricted heating load (storage heating load). The new demand control unit will be installed after the cut out and before the fiscal meter (pre-payment meter in this case). The demand control unit will be used to control the charge to the storage heating load via the contactor during a restricted charging period only and consequently this unit was never intended to replace the fiscal meter. The radio teleswitch will remain in circuit and will exert an 'external' control over the restricted heating load. Consequently, the centralised Network Management System will first check that the radio teleswitch has been closed prior to sending a signal to the demand control unit to operate. Another reason for retaining the fiscal meter and the radio teleswitch is that in the event that the demand control unit fails it will fail safe i.e. the unit will fail in the closed position such that the normal supply monitoring and control arrangements will prevail.

NEW POINT OF SUPPLY CONFIGURATION



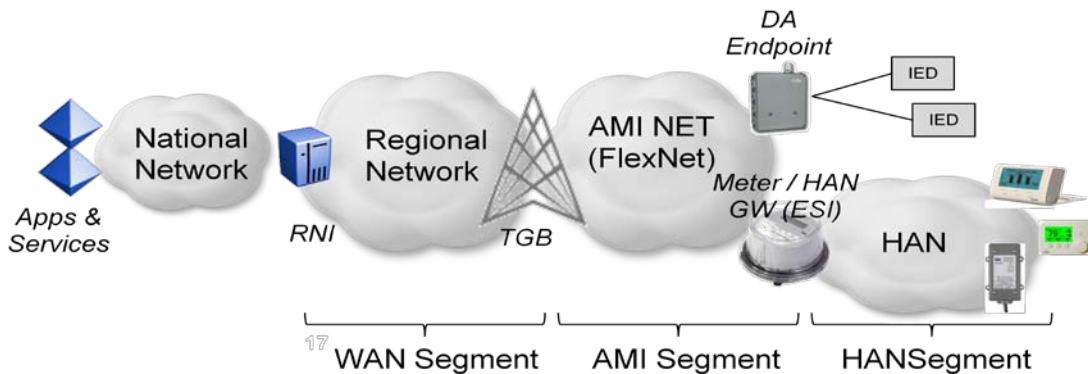
APPENDIX 6 COMMUNICATIONS STRATEGY

Communications Strategy	Communication Focus		Timeline	Actioned
	Internal	External		
Letter other Energy Retailers which supply electricity to the residents in the trial area to raise project awareness and ensure their on-going support.		Yes	August 2010	Yes
Letter the Glasgow Housing Authority to secure project buy-in and on-going support with tenant engagement.		Yes	August 2010	Yes
Project Endorsement. With both GHA and SPEN being part of the Sustainable Glasgow Initiative endorsement of project will be sought by the Sustainable Glasgow Board. This will consequently raise awareness, and the profile, of the project with a number of key associated stakeholders.		Yes	August 2010	Yes
Presentation of the 'Customer Journey'. PowerPoint presentation to illustrate customer engagement during the project.		Yes	Q1 2011	
Customer rewards for engaging in the project. SPEN to work with GHA to identify what would be most important and appropriate reward mechanism. Rewards could be front and back-ended (tied to one-to-one close-out interviews with tenants)		Yes	Q1 2011. (Summer 2013 for back-ended rewards)	
Appointment of Community Liaison Officer (CLO) to work with Glasgow Housing Association (GHA) appointed Project Manager, Local Housing Officer(s), concierge, tenants and others as appropriate to raise awareness of proposed trial and act as a focal point for any issues and concerns arising.		Yes	Q1 2011	
Leaflet Potential Customers outlining the demand side control and scheduling of electric storage heating trials, benefits and potential impact anticipated from a customer perspective. Include a Question and Answer section to cover anticipated question that may arise.		Yes	Q1 2011	
Poster Campaign in lobbies of High Rise premises to reiterate the key project messages (aims, objects, benefits, customer impact) and point of contact		Yes	Q1 2011	
Community Meetings and Road Show which GHA would facilitate and assist SPEN in undertaking.		Yes	TBA	
Complaints and Enquiry Handling. Work with the GHA to develop a solution for handling complaints or enquires.		Yes	Q1 2011	
Communications with SP Field Staff. Raise awareness of project with relevant SP operational staff. Facilitate the necessary installation training to be provided by GE.	Yes		Q1 2011	
Communications during Installation Work. CLO to accompany equipment installers to allay any customer concerns.		Yes	Summer 2011	

Communications Strategy	Communication Focus		Timeline	Actioned
	Internal	External		
Key Activities				
Seek an Impartial Perspective of the Project. It is intended that an impartial perspective of the project will be obtained by engaging University of Strathclyde during the trials.		Yes	Autumn 2011 to Autumn 2013	
Feedback Surveys. Conduct customer surveys and feedback to GHA.		Yes	TBA	
Project Reporting. Regular reporting of project progress against milestones, identification of issues and risks arising and proposed corrective actions.	Yes		Scheduling to be agreed	
Information Dissemination including project feedback to OFGEM and learning outcomes to other DNOs.		Yes	By end 2013	
Dynamic and Visual Project Presentation. Representation of the project by interactive model and computer graphics.	Yes	Yes	By end 2013	
Project Close-Out Report to summaries the project success against aims and objects and to capture valuable lessons learnt.	Yes		By end 2013	

FlexNet™ Infrastructure

FlexNet™ is a dynamic Automatic Meter Infrastructure (AMI) network system developed for over 10 years to specifically address the challenges of Smart Metering and Smart Grids. FlexNet™ provides dedicated meter communications, Home area network (HAN) and Distribution Automation (DA) solutions using the same AMI infrastructure as shown in the figure below.



FlexNet™ is the only solution which allows independent networks to share a common infrastructure while maintaining separation of duties and isolation of systemic impacts from various operations. Each Tower Gateway Basestation (TGB) is equipped with multiple transceivers for traffic segregation. This ensures metering data and commands will not contend with the DA operation nor would DA data and commands impact the system's ability to communicate to the smart metering portion of the network.

How FlexNet™ Works

1. FlexNet™ SmartPoints collect meter consumption and status information and communicate that data to the TGBs
2. The TGB forwards data to the RNI via standard telecommunications, but stores data in the event of communication interruption
3. Once data reaches the RNI, a utility is able to perform billing, account management, network management, data warehousing and customer hand-off functions based on the information received

Benefits of the FlexNet™ system include:

Continuous, Overlapping Coverage

Unlike cellular networks, FlexNet™ is designed to provide continuous overlapping coverage. Each base station listens to all channels for every endpoint transmission simultaneously. The result is a one-to-many relationship. FlexNet™ endpoints do not need to be re-assigned to ensure successful transmission. If a single base station is currently busy, an adjacent base station will pick up the inbound signal for processing.

Software Defined Radios

The FlexNet™ system consists of software-defined radios which provide additional spectral capacity and reduced latency. In addition, the software-defined radios provide utilities with the flexibility to update applications over-the-air, reducing the need for manual dispatches.

Message Channelization

The FlexNet™ system uses multiple frequency channels within its licensed spectrum to transmit specific endpoint data back to each TGB. Both metering and DA transmissions are delivered using separate, dedicated channels within the spectrum, an industry first. FlexNet™ also is the only solution available in the market that can simultaneously manage outages and DA without shutting down receivers.

Daily Read Intervals

All endpoints may be designed to gather and hold data for extended periods of time. However, it is the ability to deliver consistent data on a regular basis that is important to all parties involved from the end consumer to the original generator of the energy. A recommended SLA is that all intervals from the previous day ending at midnight be gathered and stored ready for dissemination to all parties no later than 5 am of the following day. An example would be the data from Monday would be available in the database by 5 am Tuesday. 99% of all the previous day's intervals shall be gathered in this time. Additionally, data should be gathered throughout the day so that the average latency of all endpoints within the network is less than six (6) hours.

“Last Gasp” Functionality and Momentary Outage Filtering

Under normal operations, both cellular and FlexNet™ systems will manage data traffic effectively. However, a cellular network's connectivity may fail or be dropped during capacity constrained scenarios, i.e., outages, or other times of great demand. FlexNet's ability to process outage and restore activity is a major differentiator in the market.

All FlexNet™ endpoints are designed with capacitors to store enough energy (six to ten minute) to manage a graceful shutdown of the internal processes while notifying the base station of an alarm state. Other technologies are blind during an outage or only have enough “hold-up” energy to keep alive for a fraction of a second. Competitors use batteries to overcome this challenge and increase the “hold-up” energy; however, implementing this strategy creates additional maintenance issues and costs to the utility regarding battery replacement. FlexNet™ endpoints provide our customers with fifteen (15) years of service without concerns of endpoint battery maintenance requirements.

While the reporting of outage is important, the ability to also filter normal operations is also critical. This is referred to as momentary outage filtering. To identify a momentary outage from a true, positive power outage, the communications board in each FlexNet™ endpoint process four “last gasp” messages with the last message notifying the utility of a true outage. This unique functionality provides additional value to a utility's power management processes.

Discretionary load control

If the meter used contains a “fifth terminal” feature that is used as a remote-controlled relay or secondary load control module, the FlexNet™ system can send commands to activate and de-activate the discretionary load connected to the fifth terminal.

Group addressing and multicast messages

The FlexNet™ system excels with regards to its capabilities to perform multi-cast operations. Each endpoint has the capability to receive not only direct and broadcast messages, but also directed group broadcast messages. Unlike normal IP addressing, the FlexNet™ devices have the ability to respond to 8 different group addresses that are completely independent from one another.

On-Demand Read Intervals

On-demand reads or commands may be issued at any time to the various endpoints regardless of the scheduled time of transmission. An on-demand request read for a single meter should be completed 95% of the time within 10 seconds.

Communications Manager

The Sensus RNI (FlexWare) will serve as the main communications manager. In addition, Sensus PowerVista and SCADA-Xchange provides a management application and link to GE ENMAC SCADA system for substation metering applications.

FlexNet™ Performance Management

The FlexNet™ solution provides the ability to manage all communications of installed smart meters and measuring devices. Its unique design allows for clear, uncluttered messaging of smart meter readings, DA, and polled responses transmissions through the use of separate, dedicated channels within its licensed spectrum. In addition, alarms are transmitted on a separate priority channel within the same spectrum. By allocating dedicated channels and transmitting data to multiple base stations simultaneously, FlexNet™ ensures reliable service and optimal network performance to customers.

Time Synchronization

During normal operation when the meter endpoint is communicating with the FlexNet™ network, routine time synchronization messages would broadcast every fifteen minutes by FlexNet™ to ensure on-going accurate and reliable time synchronization with NTP. In the event of a power loss, each meter offers carryover capacity to operate the RTC for up to several days. Some meters also offer battery carryover capability to operate the RTC for extended periods of time, however, this is not a requirement with FlexNet™. When power is restored the meter's time clock will be synchronized with NIST time within fifteen minutes using the routine fifteen minute time synchronization message broadcast by FlexNet™. The DA endpoints will have the capability to update the RTM time via the RNI using v2.0.1 plus a patch number.

Conclusion

FlexNet™ is the overwhelming first choice for utilities implementing an end-to-end solution for Smart Metering, HAN and Smart Grid requirements. FlexNet's tested and proven solution has the flexibility and adaptability to meet the most challenging network requirements while minimizing additional O&M costs. Utilities can measure, manage, and control their system efficiently with FlexNet's interoperability and resource conservation features. With FlexNet™, utilities gain access to the industry's smartest real-world solutions all in a single AMI network.