

DEVELOPING FUTURE POWER NETWORKS

Project FALCON
SDRC Application



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1. Executive Summary

FALCON was awarded funding in December 2011 and commenced Mobilisation in January 2012, it closed in September 2015. It generated significant learning, meeting all the SDRCs while completing to schedule and under budget.

The problem it sought to address was the perception that the cost and limited flexibility of traditional approaches to 11kV network reinforcement threaten to constrain the uptake of low carbon technologies. FALCON sought to investigate six smart techniques that could complement traditional reinforcement. FALCON was a large programme of work that covered many aspects of the challenge ahead. We summarise the solution and outcomes briefly below.

THE SOLUTION

The methods used were:

- The trialling of a Method that comprised a new 11kV planning tool, the Scenario Investment Model (SIM) linked to a network trials area in Milton Keynes.
- The Scenario Investment Model (SIM) sought to identify network constraints under multiple future network load scenarios and determine the most cost-effective and timely combination of techniques to resolve them.
- It trialled a new WiMAX telecommunication network
- It trialled four engineering and two commercial techniques that were used as alternatives to reinforcement on the Milton Keynes network, and reflected their operation within the SIM.

OUTCOMES

There are a number of key messages that we will detail within this report but we summarise them here for completeness.

- We have achieved a greater understanding of the practical application of the techniques that were trialled. This will inform our use of these techniques as they are applied.
- We have seen that the value for money of smart techniques is highly dependent on situational parameters and are therefore developing projects to support modelling rather than adopting rules of thumb for planning.
- We have confirmed that traditional reinforcement will still play a major role in future investment for the foreseeable future which will be reflected in our policies.
- This project had a legacy in the form of the NIC bid last year for Telecoms Templates, which didn't receive funding, but WPD is actively exploring other avenues
- The SIM is being explored as a strategic planning tool and we are exploring opportunities around Energy Modelling and Forecasting

- The results of the Load Estimation and SIM workstreams have evolutionary follow on projects that we're looking at around data, specifically what data we need in the future and how we can make our existing data better
- We are exploring other storage projects and other DSR projects as well as exploring new projects in the areas of using ALT and the revision of Open Points to lower losses as well as a new project with Aston University around Dynamic Transformer Rating
- The datasets and tools from FALCON have been shared with other academic bodies for use in their own research. This extends the learning of FALCON over and above that delivered by the SDRCs.

Throughout this report we will provide detailed information about the performance of this programme of work, evidence we feel supports our application for the SDRC discretionary award.

2. Successful Delivery Reward Criteria

Successful Delivery Reward Criteria are the key measures of projects like FALCON. They set out the measures of success. FALCON had seven SDRCs in its lifecycle. The full details of the SDRCs (and their underlying criterion) that were delivered can be found in the Closedown Report, a link to which is provided within Section 6.5. We have explored below the high level criterion in detail and provide the relevant evidence as links to further show completion of the required deliverables.

In addition to the planned schedule of documents and reports, we also published an additional detailed report on the learning obtained from FALCON including publishing the entire learning spreadsheet. FALCON has been an invaluable learning exercise for WPD, the insights it has provided are being explored through follow on work and initiatives in a number of key areas and we believe that there will be a significant business legacy from its learning.

We also discovered some useful techniques that we are taking forward and in particular in the use of Proof of Concepts. We established a test laboratory in Milton Keynes very early on and this was visited by many stakeholders including the JRC and Ofgem. The use of Proof of Concepts is something that we firmly believe should and will be used in future trials. They enable the testing of new equipment in a clean environment before actually making them live on the network. This has throughout FALCON proven a useful tool and indeed is being used in our other projects.

In addition along the way the project team participated in other events, webinars, workshops and on-site visits to share our thoughts and learnings these included with other DNO's, JRC and Ofgem. We also shared our learnings through specific FALCON events, for example the Season 1 Commercial Trials learning event in July 2014 and other arranged events such as the Annual LCNI conferences.

As this was a long and complex programme of work we have detailed below the Phase and their headline SDRC and not each criterion, we do however explain how we achieved each one in detail.

Phase & Deliverable	Status	Additional Commentary and links to evidence
Mobilisation- Commercial Agreements in place with Logica(now CGI), Cranfield University, Aston University, Alstom and Cisco	<p>This was achieved and the project successfully transitioned into the delivery phase of the project.</p> <p>During the mobilisation phase we successfully mobilised the team, agreed contracts with all partners.</p>	No evidence of the achievement of this SDRC was required to be disseminated.
Design Phase- The SIM design blueprint was to be completed by September 2012, a	This was SDRC 2 and the report was published on schedule. It was disseminated to stakeholders	The primary deliverable of FALCON was the Scenario Investment Model. This SDRC was a signpost to the industry of the functionality of the SIM . This SDRC aimed to share with all interested

<p>prototype visualisation to be developed and shared with the industry</p>	<p>including Ofgem directly. It was also peer reviewed by other DNOs.</p> <p>Feedback from stakeholders was incorporated in the final document.</p> <p>This SDRC contained a number of related criteria as detailed within Section 5.2.2 of the Closedown Report.</p>	<p>parties the overall blueprint. Not only that, it aimed to share it and take on board feedback into the development of the SIM. This SDRC was met, with feedback from Ofgem and DNO's informing the overall design as appropriate.</p> <p>The main document is here:</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2012/SIM-Design-Blueprint-FINAL.aspx</p> <p>Press release: http://www.westernpowerinnovation.co.uk/News/Design-phase-for-Project-Falcon-successfully-compl.aspx</p>
<p>Design Phase- An interim report containing analysis results i.e. the applicability of calculated data vs. measured data, including analysis of error margins and model data validity across network types and time variations will be shared in October 2012.</p>	<p>This was SDRC 3 and the report was published on schedule.</p> <p>This SDRC contained a number of related criteria as detailed within Section 5.2.2 of the Closedown Report.</p>	<p>This was a report to take the designs undertaken and the new models built and start the process of analysis. This was very much a first pass of what was to follow. The rest of the underlying work is summarised within the Final Report and this then links to other reports published throughout on this subject.</p> <p>The main document is here:</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2014/5-Hotspot-Map-SDRC-3-Report-v1.aspx</p> <p>The overall Load Estimation Final Report is here:</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Load-Estimation.aspx</p>
<p>Trials Implementation Phase- Load scenarios based on a range of low carbon uptakes in the trials area will be created for use by the SIM by October 2014.</p>	<p>This was SDRC 4 and the report was published on schedule.</p> <p>This SDRC contained a number of related criteria as detailed within Section 5.2.4 of the Closedown Report.</p>	<p>This report follows on from SDRC 3, taking the analysis to next stage, with more retrieved data, running the Energy Model and sharing the results with other DNOs' through the use of a consultation process and a questionnaire. We included within the summary feedback from other DNOs.</p> <p>The main documents are here:</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2014/SDRC4-Report-October-2014.aspx</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2014/FALCON-SDRC-4-Output-Falcon-Scenarios-Report-v2-0.aspx</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2014/FALCON-SDRC-4-output-Energy-Model-</p>

		Comparision-of-E.aspx
Trials Implementation Phase- The Engineering Intervention Technique trials 1-4 will be deployed onto the network and the results loaded on the SIM (the outcomes of the trials will be used to modify the model, which feed into the SIM). The results will be analysed and available for dissemination by December 2014	<p>This was SDRC 5 and the report was completed to schedule.</p> <p>This SDRC contained a number of related criteria as detailed within Section 5.2.4 of the Closedown Report.</p>	<p>This was a report to take initial trials learning, share it with the industry and specifically how those results were then intended to inform the SIM to better inform the outputs.</p> <p>The main documents are here:</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2014/SDRC-Report-Initial-FALCON-trials-learning-Dec-201.aspx</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2014/SDRC5-Report-December-2014.aspx</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2014/Technique-4-Functional-Spec-v1-issued.aspx</p>
Trials Implementation Phase- The Commercial intervention technique trials will be deployed onto the network. The results will be analysed and dissemination by December 2014.	<p>This SDRC 6 and the report was completed to schedule.</p> <p>This SDRC contained a number of related criteria as detailed within Section 5.2.4 of the Closedown Report.</p>	<p>The purpose of this report was to take the learnings from Season 1, and the plans for Season 2 and share them with stakeholders. We had made some refinements to the plans for Season 2 and this was an opportunity to start sharing early results and views. The commercial trials were a particularly successful part of the overall programme of work.</p> <p>The main document is here:</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2014/SDRC6-Report-December-2014.aspx</p>
Consolidate and Share- Assess the suitability of the Method for mainstream adoption and produce and optimum investment plan by 30th September 2015.	<p>This was SDRC 7 and was a series of 13 reports which were published on schedule; they were for all of the relevant workstreams, an overall summary and other associated documents detailing all learning and findings. This was completed to schedule.</p> <p>This SDRC contained a number of related criteria as detailed within Section 5.2.5 of the Closedown Report.</p> <p>This was an extensive set of deliverables; it was followed up by a formal presentation</p>	<p>The links to all of the reports are provided in Sections 6.3 (SDRC documents) and 6.4 (the detailed workstream reports).</p> <p>Slides for Closing Event on 11th November can be found here:</p>

	<p>in London for interested parties. Feedback from the event, and especially about the content and quality of the findings was extremely positive. This has also been followed up with other parties for them to explore with us how we might collaborate and take the learnings further.</p> <p>We also disseminated the findings to local stakeholders on 22th September at the OU, including the local MP Iain Stewart</p>	<p>http://www.westernpowerinnovation.co.uk/Document-library/2015/FALCON-Close-Down-Event-Presentation-FINAL.aspx</p> <p>Dissemination Slides for 22/09/2015</p> <p>http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-WPD-220915.aspx</p>
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Table 1: Headline SDRCs and their accompanying evidence

3. Cost Effectiveness

3.1 Overview

Project FALCON delivered against its objectives, aims and SDRCs and it did it under budget. This we believe to be an outstanding achievement for the project team. Below we detail the budget and explain in more depth some of the various cost variances.

There was a change request pertaining to the budget and a link to it is contained within Section 6.1. In summary the change request was fundamentally about aligning the actual spend and the project budget. The original budget was an estimate based on what we knew at the time, as the project progressed during 2013/2014 into actually spending money on the techniques and finalising some of that spend, it became clear that whilst the numbers were broadly right overall they were misaligned in the original representation. So for example, there was a budget for contractor labour in the engineering techniques which we believe, in hindsight, to have contained other spend associated with the techniques. Ensuring an accurate budget was crucial as we needed real costs for the SIM. We do accept that it took us longer than it should to have finally got to the point where we were comfortable with the redistribution and we have taken this on board for future projects. We don't accept though that this was a Project Management failing.

3.2 Tendering activity

The following aspects of the delivery were competitively tendered:

Solution	Reason for tendering	Successful Bidder
Services to support Load Estimation around use of Supplier Volume Allocation Agent	This was a very technical requirement and required niche skills. The basis of tendering was to ensure that the solution procured delivered the exacting requirement for a competitive price. Assessment criteria included expertise, resource availability, technical fit with FALCON plan and commercials.	Logica UK Limited, more latterly CGI IT UK Limited
Trials Distribution Management System	We needed a bespoke solution to provide offline ability to manage specific trials and manage the data from those trials. Tender has very specific design criteria to fit within overall WPD IT requirements and assessment included integration, fit within FALCON solution, commercials and lead time.	GE
Battery Devices for Technique 4	There was a robust tendering exercise for the storage devices, we received a number of applications which were evaluated and based on the "best and final	GE

	offers” an award was made. The criteria were financial, technical and support arrangements.	
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Table 2: Tendering activities

By utilising our core purchasing team and a clear set of requirements we ensured that there was a best use of the funds available.

3.3 Final Budget

The budget detailed below is the revised one and the numbers associated with each element now accurately reflect the real spend. These numbers, for the techniques, are the ones utilised within the SIM and are therefore the ones driving the cost benefit analysis undertaken by it.

More information on the cost effectiveness of the various techniques can be found within the SIM Final Report which can be found here:

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-SIM.aspx>

The financial table below is the one contained within the updated Closedown Report (this was published on 9th March 2016 it was updated as the finances contained an error in the first published document) and we cover off the variances in more detail where appropriate:

CATEGORY	DESCRIPTION	BUDGET	ACTUAL	VARIANCE	VARIANCE %	NOTE
Labour		1,601	1,472	129	-8%	
	Technique 1 - Site Works	35	23	12	-34%	1
	Technique 2 - Site Works	135	123	11	-8%	
	Technique 3 - Site Works	219	210	9	-4%	
	Technique 4 - Site Works	86	75	11	-12%	2
	LV Monitoring - Site Works	95	87	8	-8%	
	WPD Project Management & Design Team	1,032	954	78	-8%	
Equipment		1,900	1,900	-	0%	
	T1 - Dynamic Asset Relays, Enclosures & Sensors	182	182	-	0%	
	T2 - Phasor Measurement Units, GPS, Enclosures	89	89	-	0%	
	T2 - WiMax & CT Mods	15	15	-	0%	
	T2 - Switchgear	146	146	-	0%	
	T3 - Protection relays	256	256	-	0%	
	T3 - Switchgear	184	184	-	0%	
	T4 - Battery Storage Devices x 5	786	786	-	0%	
	LV Monitoring - Installation Materials	242	242	-	0%	
Contractors		6,640	6,286	354	-5%	
	T1 - Site Works	9	6	3	-34%	3
	T1 - Design Support	106	75	31	-30%	3
	T1 - Academic Support	51	50	1	-1%	
	T2 - Site Works	34	31	3	-8%	
	T2 - Design Support	106	75	31	-30%	3
	T2 - Academic Support	51	50	1	-1%	

CATEGORY	DESCRIPTION	BUDGET	ACTUAL	VARIANCE	VARIANCE %	NOTE
	T3 - Site Works	55	52	2	-4%	
	T3 - Design Support	106	75	31	-30%	3
	T3 - Academic Support	51	52	-1	3%	
	T4 - Site Works	22	19	3	-12%	3
	T4 - Academic Support	51	50	1	-2%	
	LV Monitoring - Site Works	24	22	2	-8%	
	Telecoms - Planning & Design	901	891	10	-1%	
	SIM - Design, build and support	1,104	1,104	1	0%	
	SIM - Academic Support	160	149	10	-6%	
	Techniques 5&6 - Design & Develop	288	238	50	-17%	4
	Techniques 5&6 - Attitudinal Surveys	30	30	-	0%	
	Load Estimation - Design & Develop models	950	950	-	0%	
	Logica Project Management & Design Team	1,448	1,450	-2	0%	
	WPD Design & Build Team	701	541	161	-23%	5
	Bath Uni - Knowledge Capture & Dissemination	395	378	16	-4%	
IT		3,073	2,982	91	-3%	
	Telecommunications Equipment	891	891	-	0%	
	Telecommunications Installation Services	309	304	5	-2%	
	Telecommunications IT software & licenses	239	219	20	-8%	
	Telecoms Engineers	86	81	5	-6%	
	Telecoms Planning & Design	164	164	-	0%	
	Trials Data - Distribution Management System	1,032	1,032	-	0%	
	Trials Data - Ihost integration	15	15	-	0%	
	SIM - Network Modelling tool	166	164	2	-1%	
	SIM - IT equipment	20	19	1	-5%	
	Techniques 5&6 - Billing System	54	54	-	0%	
	WPD IT	97	40	57	-59%	6
Travel & Expenses		2	2	-	0%	
	Technique 1	0.3	0.3	-	0%	
	Technique 2	0.3	0.3	-	0%	
	Technique 3	0.3	0.3	-	0%	
	Technique 4	0.3	0.3	-	0%	
	SIM	0.5	0.5	-	0%	
Payments to Users		240	163	77	-32%	7
Other		668	619	49	-7%	
Contingency		-	-	-	0%	
		14,123	13,423	700	-5%	

Table 3: Financial status

Note	Description
1	Reduced cost due to use of contractors- we used contractors to give us flexibility as well as we used some to cover some roles where we did not feel that they could be covered by internal staff.
2	Reduced cost due to use of contractors- see above.
3	Contractors costs less than originally envisaged
4	Design costs less than estimate
5	Contractors filled some roles where WPD could not due to availability of staff
6	Less expenditure due to use of other solutions that didn't require internal IT resources

Note	Description
7	Payments to users were lower than expected due to lack of reliability and also due to lack of take up on Technique 5 despite increased incentive in season 2

4. Project Management

As with all WPD projects, FALCON was governed under WPD's project management governance arrangements. Over time this model has been amended to better suit innovation projects over normal business projects.

FALCON was a complex and multi layered programme of work, delivering new IT as well as new techniques necessitated a robust project board and governance arrangements. As the project had a number of active partners as well it was imperative to also consider communications for the project at the earliest possible opportunity. This required a considerable amount of effort during the mobilisation phase which also included completing all of the partner contractual arrangements, sorting out resourcing and office space as well. An initial draft of the communications plan for the project was also completed.

4.1 The role of the Project Board

The following diagram shows the project structure with reporting lines. The Project Manager reported back to the Project Board (sometimes also called Project Review Group) which consisted of 5 Senior Stakeholders, including the Project Sponsor. The Project Board also agreed terms of reference and their responsibilities are included below the diagram.

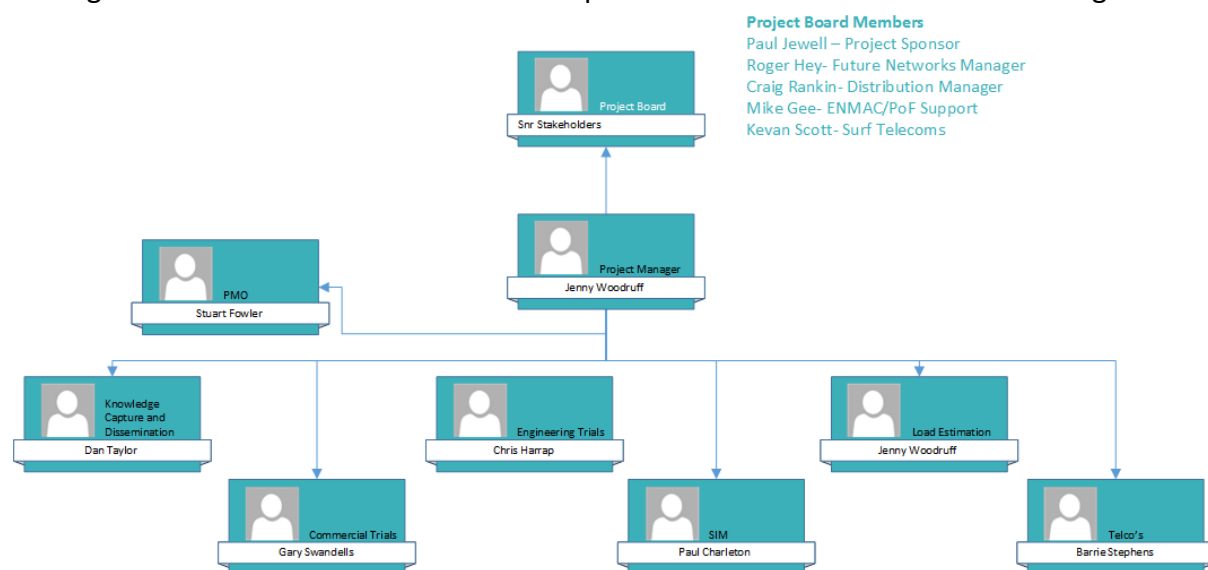


Fig. 1- FALCON project and reporting structure

The Project Board had the following terms of reference:

- Ensure the project is aligned with organisational strategy.
- Ensure the project makes good use of WPD assets.
- Resolve escalated issues and related risks.
- Provide advice and guidance on business issues facing the project.

- Approve or reject changes to the project with a high impact on quality, timelines and budget, as defined by the PM.
- Assess project progress and report on project to senior management and other authorities.
- Use influence and authority to assist the project in achieving its outputs, where highlighted by the PM.
- Review and approve final project deliverables.
- Perform Gateway reviews at agreed stage boundaries.

Decisions were made by consensus and approved by the Project Review Group Chair.

Throughout the project the Project Review Group met 20 times throughout the project (they were also kept up to date through dissemination of regular monthly updates), the primary purpose of the Board was to firstly keep them abreast of developments and for them to approve the transitions from phase to phase. Various members of the board also reviewed disseminated reports throughout the project and had active roles in the resolution of challenges throughout.

4.2 The delivery plan & methodology

Below we show the original high level plan from the Final Submission Proforma. We believe that this is the best way of presenting the overall shape of the project. It was a complex delivery requiring many people from the partners and WPD alike.

The project had a series of distinct phases;

Mobilisation- wholly about setting the project up and getting everyone together as a team, shaping the schedules together, reviewing risks, assumptions, issues and dependencies. At the start of January there was a kick off meeting with all partners to shape the mobilisation phase and bring everyone up to speed.

Design- this was about designing the telecoms solution, the Scenario Investment Model, the Engineering trials, the Commercial trials and scoping the load estimation work. We also set about setting the framework for Knowledge Capture and Dissemination.

Build- this was about taking those designs and building everything in preparation for the trials.

Trials Implementation – once built we had to run the tests that had been designed early on in the project, and then make any enhancements to the SIM(if needed) and re-run our trials.

Closure (or Consolidate and Share)- this phase was about pulling everything together and sharing it with Stakeholders.

The high level plan below is one that was detailed within the bid, and is a very useful diagram for showing the intended phasing and deliverables, along with key decision points.

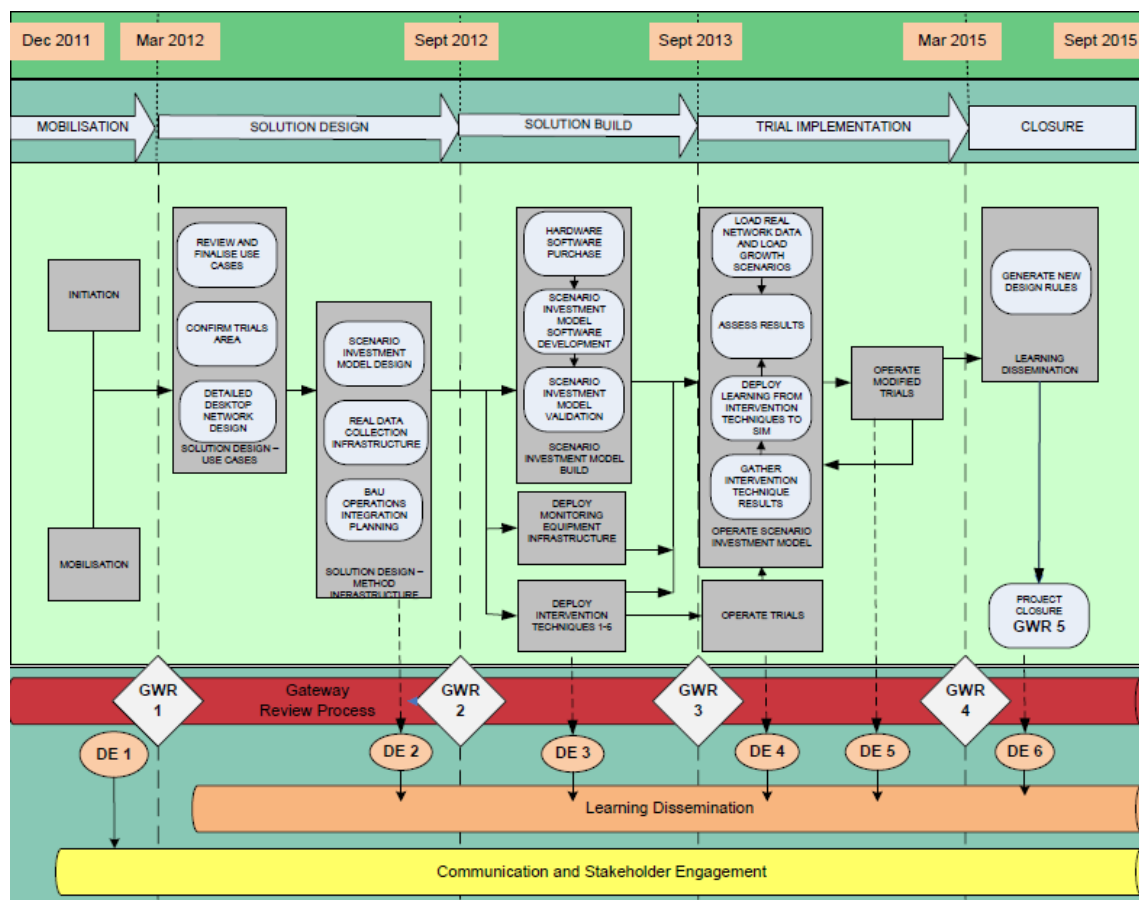


Fig 2: High Level FALCON Plan

The method we set out using was a traditional waterfall approach and this worked well for the first 2 years or so of the project. After this time it became apparent that the delays to getting the equipment up and running, coupled with the knock on effect of determining the integration with the SIM meant that we moved to a more “agile” approach which we provided more detail on in the Closedown Report and our PPRs. The agile way of working did not undermine the quality of the deliverables; it was more about the logistical challenge to get the remaining work completed whilst having a measure of parallelism of the delivery.

This in itself provided WPD with further learning in respect of using agile as a delivery mechanism. It was useful, particularly so, in relation to the SIM where users were able to get an early sight of the SIM and were able to feed into subsequent development cycles through proper use of the system. This is something that has not historically been used within the business and was a useful indicator.

4.3 Roles and Responsibilities

There were of course many people involved with the day to day running of the project. Below we detail the main parties involved and their various responsibilities. Some of the roles were fulfilled by partners at various points in the project lifecycle.

The project board was responsible for ensuring that adequate resources were in place to ensure delivery and this was reviewed with the Project Manager at the end of each phase and the transition in the next.

4.3.1 The Project Manager

The FALCON project manager was responsible for the day to day delivery of the project to time, cost and quality. They were also responsible for:

- Track project progress
- Escalating key issues/risks to the Future Networks Project Manager as required
- Reporting on progress to the Project Board
- Developing and managing the project plan
- Risk and Issue Management
- Ensure milestones and objectives are delivered to time, cost and quality
- Manage financial delivery of the project
- Produce bi-annual Tier 2 LCNF reports for Ofgem
- Co-ordination of business resources to ensure successful project delivery
- Ensuring that the project was adequately resourced to ensure delivery

Other key roles responsible for delivery significant parts of the overall deliverables were:

4.3.2 Engineering Trials Lead

The Engineering Trials lead was responsible for the development and implementation of the Technique 1 –Dynamic Asset Rating, Technique 2 – Automatic Load Transfer and 3- Meshed Networks ,Technique 4 – Storage including defining the detailed scope of partner/supplier involvement, liaising with procurement and WPD operational staff as required/directed by the Project Manager or Technical Design Authority.

They were also responsible for the operation of the trials and the analysis of the findings and had a key role in the evolution of the SIM.

4.3.3 Commercial Trials Lead

Responsible for the development and implementation of Technique 5 – Distributed Generation and 6- Demand Side Management. This includes defining the detailed scope of partner/supplier involvement, liaising with procurement and WPD operational staff retailers and customers as required.

4.3.4 SIM Project Manager

The SIM Project Manager was responsible for the development of the Scenario Investment Model and defining the detailed scope of the relevant partner(s) involvement. They supported the Technical Design Authority in developing the relevant documentation for solution design and any gateway reviews. They also provided progress updates to the Project Manager as agreed.

4.3.5 Technical Design Architect

The Technical Design Architect as responsible for working with WPD key stakeholders to produce the overall solution design, the technical ‘deliverability’ of the Scenario Investment Model and Intervention techniques 1-6. They had overall responsibility for partner or supplier technical input. They also provided assurance that technical standards were maintained throughout the programme of work.

4.3.6 Project Support Officer

Project Support provided all project information to the Project Manager as required, ensuring that all Project Management Office operational systems and processes are managed and maintained, this includes managing the configuration plan, the project file, reporting and admin as well as finance, procurement and facilities.

4.3.7 Benefits Management

Whilst not depicted on the organogram, there was a lead for this particular piece of work. Their responsibilities were to review the outputs from individual techniques and project phases to monitor and confirm that the overall project outcomes (benefits) will be realised. They will also scan environmental factors external to the project to determine if these will impact the project benefits.

4.3.8 Telecom’s Lead

The Telecom’s Lead was responsible for the overall design and implementation of the telecommunications structure, relationship and inputs from Cisco, and appropriate telecoms suppliers. Ensuring that the overall architecture has been cybersecurity tested and the results are passed to the Project Manager for onward dissemination.

4.3.9 Load Estimation Lead

The Load Estimation Lead was responsible for the delivery of the Energy Model and the analytics associated with the retrieval of the LV monitoring. They were also responsible for the procurement of the services for the broader load estimation activities.

4.3.10 Knowledge Capture and Dissemination (KCD)

The KCD lead was responsible for coordinating all learning capture and dissemination activities, including ensuring that “expected knowledge” was logged and delivered as well as new or unanticipated knowledge. They were also responsible for managing the Open University deliverables as well.

4.4 Risk Management and change

As with all of our projects FALCON followed our internal standards to record, assess, monitor and manage risks and issues. The Project Manager was responsible for the initial assessment of risks and recording risks & issues for monitoring and mitigation. Where appropriate, issues would be escalated to the Project Board for their advice and if needed, intervention, as required.

The Risk Log was reported against in the six monthly reports to Ofgem and new risks and issues highlighted accordingly. In reality FALCON experienced very few issues that actually need management attention or intervention to resolve. They did approve plan amendments, and in particular the shift to the parallel running towards the end. This we see as a demonstration of a well-managed project sitting within an appropriate governance framework and a team empowered to get on and deliver to a plan.

It has taken time to evolve the standard methodology for projects to fit with innovation projects but we feel now that our model has matured enough now and is at a stage now where our experience from previous projects is influencing later projects. This we believe is a good sign that a learning culture is becoming embedded within the business.

5. Basis of request for SDRC Reward/Award

This was a well-executed project and one that WPD is incredibly proud of. It delivered against all of its objectives and in many instances has gained industry leading insights and results; it has also provided a tremendous amount of data, insight and new knowledge that has left an imprint on the business. That imprint is demonstrated by WPD exploring initiatives in the following areas based on the findings of FALCON:

Method	Commentary
Common Information Model	This is a project to take the Authorised Network Model developed as part of the SIM, extend it to a new area and use industry standard data models to provide information to other interested third parties to see how more data sharing might further improve data quality internally and also provide a platform for more information sharing in the future.
Telecoms & Networks	We applied for NIC funding based on the findings of FALCON to further explore which technology would be the best fit for the industry, this was not taken forward so we are investigating other funding mechanisms as well as BaU initiatives to explore this. This we believe is a necessity of DNO's are to be able to take full advantage of the new technologies that will be available.
DSM	We are currently undertaking one project around demand side management following on from FALCON.
ALT	We are also, as stated previously, exploring new projects in the area of using ALT and the revision of Open Points to lower losses.
Dynamic Transformer Rating	We are also exploring a new project with Aston University around Dynamic Transformer Rating

Additionally the learning and data from FALCON has already been shared to support other learning within the industry and academic research.

National Grid	Energy Model approach extended with Energy Savings Trust to model outputs at bulk supply points. (EDAM2)
De Montfort University	Authorised Network Model and data dictionary provided to support their research work. Real network model used to replace theoretical version
Cardiff University	Authorised Network Model and data dictionary provided to support their research work. Also Load data from the Energy Model.

MK SmartHub	Selected data from the Authorised Network Model provided.
Baringa Associates & ETI	Authorised Network Model and data dictionary provided to support work on the EnergyPath tool. Also provision of cost data that was collated for the SIM cost model.
NM Group	Overhead line data from our Dynamic Asset Rating trial was provided for their use.

It is clear to us that FALCON has demonstrated what a well-run and focussed project can deliver, even when those inevitable challenges crop up. It is on this basis that we feel that FALCON merits its discretionary award.

In accordance with LCNF project governance (CRC5A) we can confirm that this application has been peer and manager reviewed and approved for publication by a Manager/Director.

6. Appendices

6.1 PPRs

December 2012

<http://westernpowerinnovation.co.uk/Document-library/2013/WPD-PPR-Project-FALCON-December-2012.aspx>

May 2013

http://westernpowerinnovation.co.uk/Document-library/2013/PPR_WPD_FALCON_MAY2013_PUBLIC.aspx

December 2013

<http://westernpowerinnovation.co.uk/Document-library/2014/Project-Falcon-Progress-Report-December-2013.aspx>

May 2014

http://westernpowerinnovation.co.uk/Document-library/2014/WPDT2002_Falcon_May14PPR_Issue1.aspx

December 2014

<http://westernpowerinnovation.co.uk/Document-library/2014/Falcon-Nov-14-PPR-V1-0.aspx>

May 2015

<http://westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Progress-Reports.aspx>

6.2 Change requests

Changes to SDRC wording:

<https://www.ofgem.gov.uk/publications-and-updates/low-carbon-networks-fund-amendments-western-power-distribution-east-midlands-falcon-project>

Knowledge changes to Project Direction :

<https://www.ofgem.gov.uk/publications-and-updates/low-carbon-networks-fund-%E2%80%93-amendments-western-power-distribution%E2%80%93-falcon-project>

6.3 SDRCs

SDRC 2

SIM Design Blueprint

<http://www.westernpowerinnovation.co.uk/Document-library/2012/SIM-Design-Blueprint-FINAL.aspx> Press release

<http://www.westernpowerinnovation.co.uk/News/Design-phase-for-Project-Falcon-successfully-compl.aspx>

Data Protection Plan

<http://www.westernpowerinnovation.co.uk/Document-library/2014/Falcon-Customer-Data-Protection-Plan-v1-20121213.aspx>

Initial Hotspot Map

<http://www.westernpowerinnovation.co.uk/Document-library/2012/Hotspot-map-final-report-v1.aspx>

SDRC 3- Final Hotspot Map Report

<http://www.westernpowerinnovation.co.uk/Document-library/2014/5-Hotspot-Map-SDRC-3-Report-v1.aspx>

SDRC 4- Overall Report, Scenario's Report and Energy Model Comparison Report

<http://www.westernpowerinnovation.co.uk/Document-library/2014/SDRC4-Report-October-2014.aspx>

<http://www.westernpowerinnovation.co.uk/Document-library/2014/FALCON-SDRC-4-Output-Falcon-Scenarios-Report-v2-0.aspx>

<http://www.westernpowerinnovation.co.uk/Document-library/2014/FALCON-SDRC-4-output-Energy-Model-Comparision-of-E.aspx>

SDRC 5- Initial Learning from the Engineering Trials and Functional Specification

<http://www.westernpowerinnovation.co.uk/Document-library/2014/SDRC-Report-Initial-FALCON-trials-learning-Dec-201.aspx>

<http://www.westernpowerinnovation.co.uk/Document-library/2014/SDRC5-Report-December-2014.aspx>

<http://www.westernpowerinnovation.co.uk/Document-library/2014/Technique-4-Functional-Spec-v1-issued.aspx>

SDRC 6 Commercial Trials Report

<http://www.westernpowerinnovation.co.uk/Document-library/2014/SDRC6-Report-December-2014.aspx>

SDRC 7- Project Completion

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-SDRC-Report.aspx>

6.4 Final Reports

Load Estimation

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Load-Estimation.aspx>

Commercial Trials

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Commercial-Trials.aspx>

Engineering Trials- ALT

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Engineering-Trials-ALT.aspx>

Engineering Trials- DAR

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Engineering-Trials-DAR-OHL.aspx>

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Engineering-Trials-DAR-Cables.aspx>

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Engineering-Trials-DAR-Distribution.aspx>

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Engineering-Trials-DAR-Primary-Tran.aspx>

Engineering Trials- Meshed Networks

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Engineering-Mesh.aspx>

Engineering Trials -Battery Storage

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Engineering-Trials-Batteries.aspx>

Scenario Investment Model

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-SIM.aspx>

Telecommunications

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-Telcos.aspx>

Knowledge Capture and Dissemination

<http://www.westernpowerinnovation.co.uk/Document-library/2015/Project-FALCON-KCD.aspx>

6.5 Closedown Report

http://www.westernpowerinnovation.co.uk/Document-library/2016/FALCON-Close-Down-Report-FINAL-PUBLICATION_v2-0.aspx

