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SMART CORNWALL INTEGRATION STUDY

Produced by Community Energy Plus on behalf of Cornwall Development Company

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1. EXECUTIVE SUMMARY

Cornwall Development Company commissioned Community Energy Plus to conduct research in order to establish market and investment baselines for the local Smart Energy systems sector and to explore cross-sector adoption of Smart Energy solutions. Additional findings from a separate research study conducted by Community Energy Plus - Skills Action Plan for the Low Carbon Environmental Goods and Services Sector - have also been included in this report.

The Low Carbon Environmental Goods and Services (LCEGS) Skills Action Plan identified Smart Energy as a priority sub-sector for C&IoS because it is an emerging sector in need of support for which there are significant funding drivers, local political support and an above average growth forecast.

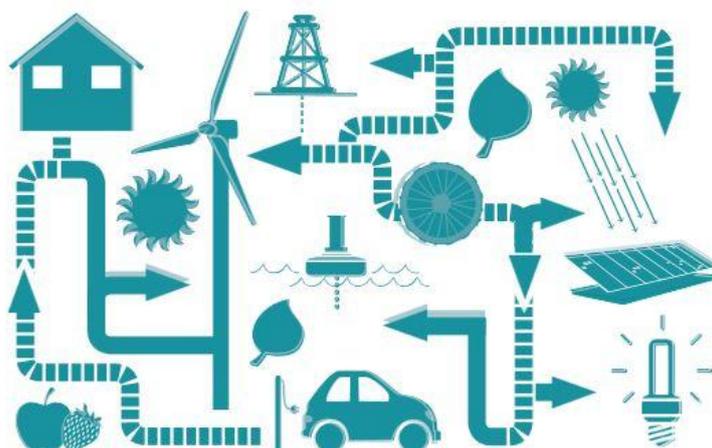


Image from Smart Cornwall Brochure

DEFINITION

The definition of Smart Energy systems used for this study includes:

- Home or building energy management systems,
- Smart data storage and analytics,
- Smart appliances,
- Smart metering and advanced metering infrastructure (AMI),
- Real time dynamic pricing infrastructure,
- Microgeneration management,
- Smart grid technology at the distribution scale (DA: Distribution Automation, DMS: Distribution Management Systems).

STRATEGIC DRIVERS

At EU level, investment in Smart Grids is considered to be a key enabler for a low carbon electricity system. Due to EU legislation the majority of countries in Europe already have, or are about to implement, some form of legal framework for the installation of Smart meters.

In December, 2009, the UK Government set a target for Smart meters to be rolled out to 28 million households and 2 million non-domestic sites by the end of 2020. Mass Rollout is expected to begin by autumn 2015. A Smart Grid is considered a key driver alongside technology development in several strategy outlines for the renewable and low carbon sectors.

Cornwall and the Isles of Scilly benefit from local strategic support for Smart energy initiatives from 2 Unitary Authorities, the region's Local Enterprise Partnership (LEP), Cornwall Development Company, the Green Cornwall Team at Cornwall Council and the Smart Cornwall Team itself.

The aim of the Smart Cornwall Programme is to *“develop the U.K.’s first fully integrated Smart Energy network, providing new high value jobs, creating wealth and opportunities for future generations and leading the way into a prosperous, resource efficient future.”*

THE MARKET

Research by Green Tech Media forecasts the cumulative value of the Smart grid market to surpass \$400 billion by 2020, growing with an average compound annual growth rate of over 8%. Navigant and Bloomberg estimate that the market for Smart energy systems to UK companies will be worth between £3 billion and £5 billion by 2020, and that the growth rate in the UK is 10% (30% in the EU).

Local Smart Energy businesses seem more confident about market growth than national stakeholders. Of the 20 businesses offering Smart Energy services that completed the online survey, 12 were planning to increase staffing levels and 16 were planning to increase sales over the next 1-2 years.

National Smart Stakeholders are expecting the following key factors and barriers to growth to change over the next five years:

- The likely impact of decreases/changes in existing incentives and subsidies
- Extreme weather impacts disrupting energy security
- Greater clarity from Government about policy and funding drivers
- The need for increased public awareness about Smart Energy solutions

The emerging nature of the sector and resultant lack of knowledge was identified as a barrier to growth. Nationally, many Smart Energy businesses are adopting a wait and see approach. While there are lots of demonstration projects taking place they are holding back because of uncertainty over whether the market will take off.

Key drivers of demand in the domestic and business sector are cost saving, efficiency and awareness of energy savings. An additional driver for businesses is having a green image. National stakeholders stated that demand for Smart energy could only be initiated by awareness and educational work among domestic consumers.

The Government estimates that the Smart metering roll-out will deliver a net benefit of around £6.7 billion for domestic and business users. Users may also benefit from more flexible payment methods, more accurate billing and time of use charging.

For an emerging sector, there is a healthy investment appetite for Smart Energy in C&IoS. 61% of the 69 LCEGS businesses who answered the online survey question said they planned to adopt Smart energy systems as part of their approach to future energy management. 30 businesses said they were interested in investing in the Smart Energy systems sector. A further 5 companies said they had already invested in Smart Energy.

CROSS-SECTOR ADOPTION OF SMART ENERGY SOLUTIONS

Most of the High Energy Users we interviewed forecast growth in their energy use over the next five years, ranging from 3-15%. None of them had formally adopted Smart Energy systems. All of them said they had plans to adopt Smart systems in the future or were interested in investigating again whether it was worthwhile them doing so.

A common concern was being able to evidence/ achieve payback for an investment in Smart Energy systems. Research by the Carbon Trust suggests that **most businesses regard a 3 year payback as optimal**. Not surprisingly for all high energy users interviewed, the primary driver for considering adopting Smart Energy systems was cost savings. Control over usage and accurate billing were also seen as benefits.

The main barrier to take up of Smart Energy systems by high energy users is the time and resource required to oversee and manage installation. Another barrier was the cost of installation and on-going data monitoring charges.

High energy users would refer to a variety of sources for information on Smart Energy including: The Crown Commercial Service Energy Framework, big energy shows, The Carbon Trust, The Institute of Energy, energy providers and other businesses.

While several high energy users had an "emergency plan" with back-up generators for power cuts for example, none had a full risk mitigation plan relating to how they would

deal with longer term energy issues covering energy availability or major price shifts. They admitted that if this risk manifested it would cause major operational difficulties.

Most of the high energy users felt that their current staff did have the necessary skills and knowledge to deal with any current energy issues. They were concerned about skills needs in the future, such as addressing changes to energy supply or use of Smart systems. Most didn't know what their future skills needs would be, one identified IT and software skills as a future need.

SMART ENERGY IN CORNWALL AND THE ISLES OF SCILLY

In 2013 Cornwall Council started developing the Smart Cornwall Programme, an ambitious initiative to develop the UK's first fully integrated Smart energy system. A routemap and evidence base have been published and the Smart Cornwall programme is expected to launch in August 2014.

Cornwall's 252 MWe of renewable electricity installed capacity is putting pressure on the local electricity grid, presenting a local driver for Smart Energy solutions to reduce peak demand. Cornwall's Superfast Broadband connectivity also makes the county a favourable place for Smart Energy systems to be enabled.

With Smart Cornwall's help **we have identified 130 relevant businesses in Cornwall, 26 of which are currently offering Smart Energy services and 104 that have potential to enter the sector.** A selection of local companies is described in section 7.2.

Section 10 assesses Smart Energy as a potential SMART specialisation for C&IoS.

SKILLS NEEDS

The online survey received replies from 20 businesses that were providing Smart goods and/or services (as well as other LCEGS goods/services) and these 20 businesses identified 98 skills needs between them, an average of around five per business. They identified a need for managers, directors and senior staff to have more industry-wide skills. The only areas in which skills were needed by professional staff were job or sector specific. **Specific types of skill needed included: Advisory, telecoms, IT and power networks, overall systems approaches for Power System Engineers and data analysis.** They also perceived a need for more young people to replace an ageing workforce in the sector.

For those businesses that were installing Smart Energy solutions, the stakeholders identified **one major new key skills area: Systems integration** to ensure that the various

diverse systems (energy, heating, water) were working together in the most efficient manner.

LEP COLLABORATION

The main LEPs initially identified to have a Smart Energy focus are London LEP, Liverpool LEP and Greater Manchester LEP. Both the Derby/Nottingham and West of England LEPs make specific reference to Smart Energy initiatives and both LEP areas have mixed economies with rural and urban settings for business. The Heart of the South West and Oxfordshire LEP's are interested in collaborating with C&IoS LEP on Smart Energy initiatives.

PUBLIC SECTOR INTERVENTIONS

Stakeholders and high energy users suggested various ways in which the public sector in C&IoS could help the local Smart Energy sector to grow, including providing science parks and space for development trials as well as the promotion of the value of Smart goods/services to enable the establishment of a sustainable "Smart market". There was a call for independent advice to address issues of mistrust in energy providers.

In conclusion, the local Smart Energy sector is more positive about the immediate future than national/ multi-national stakeholders. High energy users in C&IoS are unprepared for security of supply failures or Smart tariff changes that could cause major operational difficulties. Skills need to be developed in both the sector and the market to enable the sustainable growth of a robust Smart Energy system in Cornwall and The Isles of Scilly.

2. INTRODUCTION

Extensive research to develop a Skills Action Plan for the Low Carbon Environmental Goods and Services (LCEGS) Sector in Cornwall and Isles of Scilly identified Smart Energy as a priority sub-sector, placing it third in order of importance following wave and tidal and geothermal sub-sectors.

THE BRIEF

The aim of this 'Smart Integration Study' study is to establish market and investment baselines for the local Smart Energy systems sector and to explore cross-sector adoption of Smart Energy solutions. There were two key areas that Cornwall Development Company (CDC) wished to understand:

1. **Smart Energy market confidence** and the propensity to which sector specific businesses are likely to invest in entering this emerging market (through organic growth, diversification, acquisition, start up, etc). In particular CDC wanted to establish baselines in the following areas, from which future performance can be measured:

- Market Confidence
- Investment appetite
- Market Growth

2. **Smart as a cross-cutting theme** - cross sector adoption of Smart Energy solutions as part of a strategic response to addressing energy security; paying particular attention to those business sectors that are challenged by high energy usage, such as food processing, brewing, quarrying etc.

These requirements are covered in sections 5 and 6 respectively. The remainder of this report gathers together all the information on Smart Energy from within the wider LCEGS Skills Action Plan report in order to provide detailed background understanding.

METHODOLOGY

A combination of secondary and primary research was utilised as follows:

1. **Quantitative data was collected via an online survey from Smart Energy stakeholders** and those organisations who will either adopt Smart Energy as part of their approach to future energy management, or offer Smart Energy as part of their wider product or service offering. Specific Smart Energy questions were integrated

into the online survey as well as broader questions about market confidence and investment plans that was undertaken for the LCEGS Skills Action Plan.

2. **Qualitative data was collected via a focus group** which included local Smart Energy businesses and wider LCEGS businesses.
3. **Telephone interviews with high energy users** explored the cross-cutting theme.
4. **The representatives of five key Smart sector stakeholders gave in-depth interviews** for this research. They were drawn from a mixture of businesses supplying Smart solutions, utilities installing Smart technology and a sector trade association representing manufacturers developing Smart goods and services:

- BEAMA, UK Trade Association for Electrical Technologies
- British Telecom, Telecommunications Support (Infrastructure & Platform)
- Hitachi Europe, Technology Solutions
- IBM, Smart Meters and Smart Grids
- Western Power, DNO Power Distribution

The stakeholders were asked for their views on four main areas:

- Factors impacting on the demand for Smart good and services
- Skills needed to develop and install Smart goods and services
- Opportunities in C&IoS; and
- Ideas for interventions/initiatives to help the Smart sector grow.

3. DEFINING SMART ENERGY SYSTEMS

This section provides a definition of Smart Energy Systems and where this emerging sector sits within the wider LCEGS industry in C&IoS

According to the Smart Cornwall team, *“Smart grids provide a new type of electricity network which can respond to peaks and troughs in energy generation and demand. Currently energy flows from suppliers to consumers. A Smart grid network will enable a two-way flow of energy and information. This will expose and eliminate waste and inefficiency from the system, empower consumers to interact directly with the grid and increase capacity through more efficient power production and delivery. Smart grids will therefore play an integral role in supporting the move towards a more sustainable and resource efficient economy”* (Cornwall Council, Smart Cornwall , 2013)

The development of Smart Energy grids, systems and products is seen as essential for enabling Cornwall and the UK as a whole to realise the full potential of various renewable and low carbon technologies.

One issue encountered by the Smart Cornwall team is that many relevant businesses do not recognise themselves as being in the emerging Smart Energy sector. An engagement strategy was developed in partnership with CDC to help businesses understand if Smart Energy was relevant to them. The definition that we used includes:

- Home energy management systems,
- Building energy management systems,
- Smart data storage and analytics,
- Smart appliances,
- Smart metering and advanced metering infrastructure (AMI),
- Real time dynamic pricing infrastructure,
- Microgeneration management,
- Smart grid technology at the distribution scale (DA: Distribution Automation, DMS: Distribution Management Systems).

The LCEGS Skills Action Plan identified Smart Energy as a priority sub-sector for C&IoS because it is an emerging sector in need of support for which there are significant funding drivers, local political support and an above average growth forecast.

4. STRATEGY AND POLICY DRIVERS

As part of research into the current state of the LCEGS sector, we conducted a wide-ranging investigation into the background of the sector, from global strategy and policy drivers to the historical context of various technologies. In doing so we were able to track the emergence of Smart Energy within the wider framework of the low carbon economy.

4.1 INTERNATIONAL

At EU level, investment in Smart Grids is considered to be a **key enabler for a low carbon electricity system**. The Commission states that future policy must foster investment at all levels. (European Commission, 2011, p. 7)

Due to EU legislation, for example the Energy Services Directive and the 3rd Energy Package, the majority of countries in Europe already have or are about to implement some form of legal framework or the installation of Smart meters. *The European Landscape Report 2012* identifies Estonia, Finland, France, Ireland, Italy, Malta, Netherlands, Norway, Portugal, Spain, Sweden and the UK as 'dynamic movers' in this technology area (SmartRegions Project, 2012).

4.2 NATIONAL

Nationally, in December, 2009, the UK Government set a target for Smart meters to be rolled out to 28 million households and 2 million non-domestic sites by the end of 2020. This will be done in two phases: The Foundation Stage, which began in March 2011 and **Mass Rollout which is expected to begin by autumn 2015**. By the end of quarter 3, 2013, DECC reported that 200,400 Smart meters had been installed in domestic properties across the UK and 508,500 Smart and advanced meters are now operating in smaller non-domestic sites (Department of Energy and Climate Change (DECC), 2013).

Managing Smart Energy grids is considered to play to UK's strengths in terms of resources and skills (HM Government, 2011, p. 4/5). In many UK policy outlines, for example micro-generation and geothermal, a Smart Grid is **considered a key driver alongside technology development**. Research and development initiatives in the UK include the following:

ENERGY DEMAND RESEARCH PROJECT

Between 2007 and 2010, large scale trials were conducted in 50,000 households across the UK to understand how consumers react to improved information about their energy

consumption over the long term. Methods used for the research included installing Smart meters and real time display devices as well as information and community engagement. The trials were run by EDF Energy, E.ON, Scottish Power and Scottish and Southern Energy.

ENERGY TECHNOLOGIES INSTITUTE

The ETI Smart Systems and Heat programme aims to design a ground-breaking Smart Energy system in the UK. Projects include a consumer behaviour study, data management and systems architecture, enabling component technologies, value management and delivery.

SCENARIOS FOR THE DEVELOPMENT OF SMART GRIDS IN THE UK

This multi-institutional, inter disciplinary project is supported by the UK Energy Research Centre (UKERC). The project aims to advance understanding of Smart grid deployment and utilisation up to 2050. The research team includes Dr. Peter Connor, Senior Lecturer in Renewable Energy Policy at the University of Exeter. The concept of a 'Smart campus' is also being explored at the University's Cornwall campus in Penryn.

4.3 LOCAL

Cornwall is **ready to exploit the opportunities** provided by early take-up of Smart Energy, and the aim of the Smart Cornwall Programme is to *“develop the U.K.’s first fully integrated Smart Energy network, providing new high value jobs, creating wealth and opportunities for future generations and leading the way into a prosperous, resource efficient future.”*

Cornwall's Superfast Broadband Programme has laid the ground for this development. (RegenSW, 2013, p. 54)

The extent of engagement with Smart energy in Cornwall at strategic level is unusual for a rural area, and forms part of Cornwall's USP. This support includes that of 2 Unitary Authorities (Cornwall and The Isles of Scilly), the region's Local Enterprise Partnership (LEP), the Economic Development agency (CDC), the Green Cornwall Team at Cornwall Council and the Smart Cornwall Team itself.

Key drivers include EU Structural and Investment Funding, with indicative inputs of £10m ERDF funding matched with £2.5m from local government. The physical resources of Cornwall coupled with grid capacity issues create the ideal environment for innovative Smart grid solutions, and market forces in relation to the up-take of technology and a committed local authority will also drive innovation.

5. THE MARKET

This section draws on information gathered in the online survey of the whole LCEGS and interviews with key national Smart stakeholders.

5.1 SIZE OF THE MARKET

Research by Green Tech Media forecasts **the cumulative value of the Smart grid market to surpass \$400 billion by 2020**, growing with an average compound annual growth rate of over 8%.¹

Navigant and Bloomberg estimate that **the market for Smart Energy systems to UK companies will be worth between £3 billion and £5 billion by 2020**, and that the growth rate in the UK is 10% (30% in the EU).

The size of the market for Smart Energy meters is considerable. To give an idea of the scale of the local market: In 2011, Cornwall had 185,450 ordinary domestic electricity meters, 73,760 Economy 7 domestic electricity meters and 124,958 domestic gas meters. The Isles of Scilly had 675 ordinary domestic electricity meters and 483 Economy 7 domestic electricity meters (Department of Energy and Climate Change (DECC), 2013). However, since national energy suppliers will be responsible for implementing the Smart meter roll out **there is a risk that the supply and installation of meters will be procured through national rather than local supply chains.** Cornwall Council could play a role in influencing the biggest player, British Gas, to support local businesses through their Smart meter roll out programme.

¹ This new report examines the global Smart grid market from the perspective of growth and market share of technologies and services, featuring a top-down and bottom-up financial forecast along with highlights of regional trends, analysis and opportunity across the world's established and emerging Smart grid markets. By examining the major markets and technologies, the report identifies the biggest growth opportunities for the next 8 years and those markets which are most attractive to investors and utility vendors (Green Tech Media, 2013).

5.2 INDICATIONS OF GROWTH IN C&IOS SMART SECTOR

There are positive indications that there is **confidence in the Smart Energy sector about future growth**. Of the 20 businesses offering Smart Energy services that completed the online survey as part of our research into the whole LCEGS sector in Cornwall, 12 were planning to increase staffing levels and 16 were planning to increase sales over the next 1-2 years. The range is from 1 to 12 additional new employees. None planned to simply maintain current levels of activity or to downsize.

In addition 19 respondents to this survey expected their business in C&IoS to grow over the next 6-7 years up to 2020. Of these:

- 13 planned to expand into existing markets,
- 17 into new markets
- 17 proposed to enter new markets via industry contacts,
- 10 via trade fairs and
- 9 through supply chain contacts.
- Others planned to enter new markets through advertising, networking, marketing, the internet and the Green Build Hub.²

KEY FACTORS INFLUENCING GROWTH

There was general consensus among the Smart Stakeholders that the key factors and barriers described elsewhere in this report would, one way or another, change over the next 5 years. The **specific changes that were anticipated** covered four main areas.

- The likely impact of decreases/changes in existing incentives and subsidies.
- The potential for further bad weather to impact on the demand for Smart solutions.
- The possibility of greater clarity from central government in the future.
- Changes to the behaviour of the public and businesses that could be brought about by increasing awareness and education, or as the direct result of confronting energy shortages.

² These figures should be treated with some caution however, because the sample sizes are small.

COMMENTS FROM THE SURVEY:**Decreases/Changes in existing incentives and subsidies**

- *Incentives will decrease/get less*
- *(As incentive get less) Market should be able to stand on its own two feet*
- *Carbon Tax on peripheries (if it was introduced) would change things*
- *EU ideas/directives are right/rational – but are slow to impact*

The impact of bad weather

- *At local level more extreme weather may lead to more problems (disruption in supply of electricity) - maintaining networks for distribution will become an increasing issue*
- *(Further) Interruptions to supply would galvanise actions/sector*

Greater clarity (or otherwise) from central government

- *Barriers will slowly lift over next 5 years... hopefully government will clarify very soon what is happening. The many demonstration projects are turning out good results and these are showing clear benefits (financial and otherwise – though finance is key) and these benefits could help shift behaviour and attitudes*
- *We run the risk of another 10 year hiatus, like with the nuclear industry, if the decisions aren't made soon*

Increased awareness of energy shortages

- *There needs to be an increase in efficiency of energy usage across UK but there is a problematic issue in how/where/when to educate the population as there is a possible likelihood of disruption/power cuts*
- *National and internationally, fuel supply (will decrease) and there are potential shortfalls in amount of electricity available...we will all have to become more aware of need for them (Smart solutions)*
- *(It maybe) that it will take a serious price rise in energy costs to seriously change behaviour... we need to have effective demand reduction strategies (and Smart is a key part of this) but also to have awareness and education.*

5.3 MARKET DEMAND

Several of the stakeholders distinguished between the factors driving adoption in the **domestic market** and those driving adoption among **businesses**. However for **both groups cost saving, or efficiency, and awareness of energy savings were seen as being key drivers of demand**.

In the domestic market, the stakeholders described this in terms of the awareness of the public of the **relationship between Smart Energy usage and saving money**. Within this relationship, several specific points were made about the significance of how much money would be saved (i.e. what would be the cost reduction) and the time taken to “gain” a return on any investment (on Smart goods and services).

Interestingly only one of the business stakeholders identified security of supply or concerns about future variations in supply as being a driving factor. The comment made was: “(The continued) *provision of affordable, secure, sustainable energy is a key driver.*” A further response given indicated that, from the perspective of many businesses, the **issue of supply was felt to be out of their hands**: “*Businesses look at their own supply needs, not security of supply - they’re not able to influence anything else*”.

COMMENTS FROM THE SURVEY

Costs:

- *Rate of return (on investment on Smart goods and services)*
- *Savings for people insulating by reducing their costs*
- *Benefits have to be primarily financial*

Awareness and educational work among domestic consumers:

- *In the domestic market, it's about whether people will be more aware/energy conscious or not. There is a trend toward using less (energy) but innovative approaches are needed to successfully market them (Smart goods and services) longer term.*

Business Drivers:

- *PR/Positive image of being a "green company"*
- *Changing behaviour resulting from PR if cost savings are associated with investment*
- *Benefits have to be primarily financial or else businesses won't be interested, though "feeling good" about being green is a part of it*
- *Talk of renewables, low carbon footprints, being green, etc. if it helps the bottom line*

Impact of government policy and incentives, legislation and EU directives:

- *Incentives for social investment*
- *Unintended outcomes of EU and UK government low carbon agenda and legislation*
- *Large combustion directives (direct and indirect) focussing on energy (Smart is part of this) – need to move to collaborative consumption*
- *Low carbon agenda*

Practical factor driving adoption of Smart technologies:

- *Large distribution grids (PV, etc.) with existing products but which are being adapted for new Smart uses/markets.*

5.4 POTENTIAL BARRIERS IDENTIFIED BY STAKEHOLDERS

Our interviews with key stakeholders identified several barriers to growth.

The key barrier to the take up of Smart goods and services identified by stakeholders was the **current uncertainty in the energy market and the government's lack of clarity over support for the sector.**

This uncertainty over the market place was **impacting directly on businesses' decisions to invest** in the sector or not, because high levels of financial support required to start-up and establish new business ventures in the Smart market.

The immaturity of the Smart market was in itself a barrier to its own development with a **lack of knowledge about the products and services available** and what they could do being compounded by the uncertainty over Government support for the sector and the public's willingness to spend on "Smart green energy saving devices".

COMMENTS FROM THE SURVEY**Uncertainty and lack of government clarity:**

- *Uncertainty over future (in terms of energy demand, cost, availability, support for Green, etc.)*
- *Incentives – and whether they will stay or go*
- *Market framework/current government policies underpin it all but these are really not clear. Once they are resolved then the market can go forward*
- *The fluctuations in government policy have held back the sector*

Decisions to invest:

- *(There are) A lot of issues around the amount of capital needed to invest (in Smart goods and services) particularly during recession when political support is unclear*
- *Businesses ability to compete/succeed – the openness of the market and the level of demand (needs to be kept up at high levels) to ensure market can survive, grow and then thrive*
- *Political will on all sides to see it succeed*
- *Lots of innovation funding available, but for manufacturers to research and develop new technologies, etc., there isn't much clarity on what DNOs will be installing, so is there actually a market opportunity for them or not? There is a high risk attached to investing in trialling, testing, etc. when (on the basis of BEAMA's study of DNOs business plans) the market is not going to get going for next 5 years or so. Level of investment in Smart by DNOs will remain static for next 5 years or so, but will take off thereafter. Where is the support for bringing on these businesses – this would be helpful if it were available*
- *Finance for development (of new technologies) and finance for installation among existing businesses*
- *"Wait and see" approach of many businesses and consumers – this is holding back many potential developers. While there are lots of trials and projects taking place everyone is still holding back because of uncertainty over whether market will take off*
- *Investment funding has dried up as there's no clarity over incentives or likely rate of return to make potential developers think of it as a worthwhile investment*

Immaturity in the sector and lack of understanding:

- *Knowledge of market and understanding of services available*
- *It's not a mature market place... Hitachi have no commercially available technology yet – there are many, many demonstration projects taking place that need to be taken forward fully with proper funding and research and development*
- *Awareness needs to be increased about what can be done (by Smart goods and services), what is available, for whom and so on*
- *The market has been pulled in various directions, it needs to stabilise and focus.*

5.5 INVESTMENT APPETITE

Information obtained in the online survey of all LCEGS businesses provided a snapshot of the appetite for investment in Smart energy goods and services.

During the survey, the LCEGS businesses were asked: ***“Does your establishment in C&IoS plan to adopt Smart Energy Systems as part of its approach to future energy management?”*** Of the 69 businesses who answered the question, 42 (61%) said yes they did and 27 (31%) said no they did not intend to do so.

The LCEGS businesses were also asked: *“Is your establishment interested in investing in the Smart Energy Systems sector (e.g. through organic growth, diversification, acquisition, start-up)?”* 30 businesses said that they were interested, although this includes 8 who said ‘possibly’ or ‘maybe’, and qualified this with answers including *“Maybe but by process of experimentation”* and *“If the price is right!”*

The 20 businesses who expressed an interested in investing in Smart energy were divided between those who simply said yes they were interested and those who provided more detail about the reasons for and focus of their interest.

The 20 businesses were also equally divided between those who said that they would invest in Smart energy systems through organic growth or through diversification.

It was clear that **a few businesses were unsure what Smart Energy covered:** *“What does ‘Smart Energy Systems sector’ mean?”* and *“If it’s relevant to us?”* being two answers given in the online survey.

COMMENTS FROM THE SURVEY**Reasons for Interest:**

- *I would be interested in it for my customers.*
- *In two main ways - to minimise business interruption risk, and to seize opportunity from the vast amount of homeowner usage data our control systems are capable of amassing in 30 minute intervals for each room in peoples' homes. The data could provide a far greater degree of insight than either Nest or Hive, which tend to work on a 'whole house' basis.*
- *Principally for primary application within the business, but once we have done so we will use early adoption advantage to fuel organic growth and diversification.*
- *Public support, (we are a) trialist of potential solution, direct links to our energy generation systems.*
- *We already remotely monitor customers equipment through broadband, etc. and would welcome an entrance into the market for Smart monitoring of customers energy usage etc.*
- *Yes we are currently looking into rationalizing our energy usage.*
- *Yes, we would be interested in working with the installation, maintenance and management of Smart systems.*

Comments of those already invested:

- *That is our business.*
- *We already do!*
- *We are already doing so. We are launching a product that will save around 20% on all ventilation and refrigeration systems. 12% guaranteed.*
- *We are investing staff time into this area*
- *We are involved in the Eden Geothermal project and if a plant gets funding then Smart energy management systems will be deployed. Our technology analyses microseismic activity in geothermal reservoirs which can help manage the energy input into the system (through hydraulic stimulation).*

6. CROSS SECTOR ADOPTION OF SMART ENERGY SOLUTIONS

High energy users in C&IoS were consulted on Smart Energy Solutions as part of a strategic response to addressing energy security. Views were obtained from 5 high energy user businesses in sectors ranging from food and beverage production to marine transport.

6.1 HIGH USER BUSINESS PROFILE AND ENERGY USE

The Senior Management representatives of **five high energy users** were interviewed for this research. They were drawn from a mixture of businesses and organisations operating either entirely in C&IoS or at a range of sites including in C&IoS:

- **Royal Cornwall Hospital Trust** (operating at 9 sites in C&IoS (3 main ones including hospital, PCT and offices), c.11,000 employees)
- **Damar/Finning Group** (multi sites around the world, c.2750 employees in UK)
- **A&P Falmouth** (single site in C&IoS, c.350 employees at site)
- **St Austell Brewery** (2 main sites (brewery and depot) in C&IoS plus many pubs in C&IoS and Devon, c.1.000 employees)
- **Ginsters** (1 main site covering both Ginsters and Tamar Foods, 1,318 FT employees)

To inform the interviews, these high user businesses and organisations were each asked to provide background information about their current energy usage:

- Royal Cornwall Hospital Trust - Annual utilities bill = c.£1 million
- Damar/Finning Group – can't say, too split up across the world
- A&P Falmouth – 6 million units (down from 10 million, 5 years ago)
- St Austell Brewery – figures unavailable
- Ginsters – 19.7 million Kw hours (base load of 3.3 Megawatts)

Interestingly when asked about their forecast growth of energy usage in the next five years, one of the high users said that they intended to (further) reduce their overall level of energy consumption, including electricity and oil:

“Not growth in our usage – we’re looking for a 2.5% reduction, net of cost. However that does depend upon which customers we have, as some customers use those processes which are more energy intensive than others do (We have already reduced our amount of energy usage enormously over last ten years from 2.5 MegaWatts peak to just 1 MegaWatt)”

The other high users all identified different levels of growth, although were often unsure about precise figures.

COMMENTS FROM THE SURVEY**Growth of Energy Usage:**

- *Yes, growth but hard to say how much as while we are trying to be more efficient we recognise that much of our estate needs investment to function more efficiently! Also with growing nos. of patients there is likely to be an increase in demand for Health care services...guesstimate = 5-10% at least?*
- *c.10-15% according to Business plan although this is dependent upon our development and expansion plans together with the introduction of new systems, including Smart technologies*
- *Aiming to achieve steady growth of 3-4% per annum across the business, but whether this will be reflected in all cost and expenditure lines is hard to say, we'll be looking to make economies (of scale) along the way*
- *Planning for between 5-10% growth, although we are looking to make efficiencies in many areas to reduce consumption, our new lines (frozen foods with additional freezers needed) will increase our usage*

For the purposes of the main interview, the high energy users were asked for their views on four main areas:

- **Their current and planned future use of Smart good and services;**
- **Market demand for Smart goods and services;**
- **Their current energy management plans; and**
- **Ideas for interventions/initiatives to help the Smart sector grow.**

An analysis of their responses follows.

6.2 USE OF SMART ENERGY GOODS AND SERVICES

Respondents were asked about their current use of, and plans to adopt (more) Smart Energy Systems, as part of an approach to future energy management.

None of the high users had fully adopted Smart Energy Systems. Several had made small scale investments or had made enquiries in the past about doing so, but had decided not to proceed because they were **unconvinced of the value**. However all of the high users said that they either **had plans to adopt Smart systems in the future** or were interested in investigating again whether it was worthwhile them doing so.

COMMENTS FROM THE SURVEY

The three high users who had adopted Smart systems said:

- *We currently have some Smart meters installed...only a few at specific sites where they could be easily installed and it made sense*
- *We have energy control systems on our basic pumping processes which feed into our workshop and monitoring system, but not in our yard or other operating areas... they are used on an ad hoc basis so it makes monitoring tricky*
- *We have adopted smart metering for our demand and management services*

A further high user had installed a limited monitoring system at one main site:

- *We have "half hourly" meters but recognise that they don't fully control everything...we could go much further but so far haven't seen the case proven for the cost and time of the work needed to install them (Smart systems)*

Plans for investigating or installing Smart systems

- *Yes have proposals in place for gas air mixers to save energy and increase efficiency and water flow monitors for water and energy saving (heating and hot water savings). Both proposals are in place and will be rolled out as soon as possible when resources and staff support are available*
- *Yes we will do soon – we're already investigating things for later this year including rainwater harvesting, solar water panels and various other Smart control options*
- *We had someone from University of Exeter in who did a complete review of our Energy Management system and made recommendations for a complete overhaul of the system ... including installing a fully automated Smart energy control system. We're looking at implementing the recommendations but the key issue is the financial side and the capital outlay required compared to the anticipated savings. We're talking to other businesses about whether it's worth it*
- *We've been looking again at Smart metering across all our operations and at the moment it's not entirely clear that we can make any further savings...as mentioned we've already reduced our consumption greatly. With our (energy) advisors though we will keep reviewing the position.*
- *Yes, we will look at improving our metering... moving to a joint metering/monitoring/targeting system called Carbon Desktop that links all meters into central control and also covers non energy metrics for other requirements we have to meet. This system is used by our system companies and we aim to have it installed by Qtr 3 of this year.*

6.3 REASON FOR ADOPTING SMART ENERGY SYSTEMS

For all of the high users interviewed it was clear that the **single overriding factor in the uptake Smart systems now or in the future, related to cost savings.**

However it was interesting that as well as the cost savings, the businesses also cited a **range of other factors** that had influenced them. This included **control over usage and hence over the size and accuracy of bills.**

One of the high user organisations noted that they believed that it was **important to reduce energy usage** and that Smart systems (would) enable them to do this: *“Also important to keep impact on site and to minimise energy usage. We are always telling our clients to do this now we need to do it ourselves! Remote sites on our asset register are particularly important in this respect as they are most difficult to monitor and /or maintain efficiencies.”*

A further high user said that **having an understanding of usage within their system – “knowing where to go to investigate”** was very important, as was the ability to produce baseline measures to assess progress moving forward, giving them a tool for monitoring consumption. This was done on a project basis – assessing different parts of the system separately.

Another of the high user organisations highlighted **government policy**: *“Government policy instructing /leading us to do so”*

Finally one of the businesses noted that while they had made various enquiries about Smart systems they had yet to be convinced of the value for money of investing and/or the level of savings that would be made. They had spoken to various companies operating in their sector who had invested and now said that it had not been worthwhile financially. However they accepted that the newer Smart technologies being developed might change this and were happy to reconsider:

- *In principle it's a no-brainer (investing in Smart systems), but experience and our industry contacts tell us that it can lead into a tax/compliance system situation whereby you end up worse off. It seems to be the law of unintended consequences ...we need to know that there will be clear financial benefits from investing in such systems as they're not cheap when you have all our estate and sites to cover.*

COMMENTS FROM THE SURVEY**Cost Savings:**

- *Cost Control is the key factor – it's essential to keep costs down*
- *There's one main reason: Control over our outgoings (Cost). Allowing us to keep escalating costs under control in existing estate*
- *Cost savings were key...if we're working in peak time (during November/December in a cold winter) then our costs will go through infinity*
- *Cost saving benefits were foremost.*

Other Factors:

- *Control – the ability to monitor usage remotely*
- *Actual billing, rather than estimate bills*
- *An online portal enabling remote monitoring of each of the different sites covered by the (large) estate is also a very important benefit. Gives us the opportunity to see what we are spending and be in control of it as it goes on.*
- *Gives demonstrable control over and predictable outgoings*
- *Also allows ability to change tack if costs are too high (of existing systems) or efficiencies aren't being achieved*
- *As well as cost saving it's about having control – knowing what your bills are going to be and being able to take action to control them (when they are overrunning) before it's too late!*

6.4 POTENTIAL BARRIERS IDENTIFIED BY HIGH ENERGY USERS

When asked about the barriers to installing more Smart systems, several key issues were identified by the high user businesses. The **main issue was the time and resources required from existing personnel** and staff to oversee and manage the installation of the Smart systems.

Several of the high energy users also noted that both the actual cost of installation and the on-going monitoring charges were seen as being barriers: *“Cost of installation in terms of actual cost and then the data monitoring charges on top”*. However, the biggest concern in respect of cost was, as noted above, **having the evidence to demonstrate that any investment made in Smart systems would produce cost savings** and thereby provide a value for money return over a reasonable period of time: *“the Smart route at present doesn’t seem to be giving enough return (to make it worthwhile for us).”*

One high user said that they did not foresee any barriers as they were planning to *“partner up”* with a Smart specialist to ensure that they had the necessary skills and expertise available to them and that they had already secured board support and funding to take it forward. This had been established easily because their sister companies had already adopted Smart systems and hence the case could easily be demonstrated by going to them. Furthermore the Smart providers were also producing bespoke, turnkey solutions that were tailored to their needs, thereby removing any further possible barriers. The solutions being provided were also being designed to require no more than an understanding of Excel, so did not result in any skills issues for existing staff.

COMMENTS FROM THE SURVEY**Barriers Identified:**

- *The main one is people and resources needed for installation (Estates are a small team within RCHT and are stretched already)*
- *Also this is combined with the health and safety issues associated with installation on site (gas leakages, monitoring, etc.) – therefore there needs to be someone with the installers as they are doing work, which is very resource intensive for us to be able to do...as we have our “day jobs” as well!*
- *The main barrier for us is the time and resources needed to fully investigate the various Smart solutions available because we are a company that likes to be familiar with technology and systems before installing them ourselves. We need to know about them and assess how they will work for us so we can understand how they will work at each of our sites. Smart metering is a good example of needing to understand fully what it will mean for us and how we will benefit*
- *The lack of staff availability and their inability to read, understand and act on meter readings are the main barriers – it would need to be an entirely automated system with “no human” input, but we know this would cost significantly more...*

6.5 SOURCES OF INFORMATION ON SMART ENERGY GOODS AND SERVICES

High energy users were asked - Where do businesses and organisations go to find out about and source the Smart systems that best meet their needs?

Reflecting their diverse backgrounds the high users had or would all use a range of different sources to identify the best Smart goods and services for their needs. They also all felt that these different sources had sufficient knowledge to provide Smart and peak power advice, often having helped them in the past.

In summary several of the high energy users already belonged to relevant advisory bodies and industry organisations from whom they received appropriate advice about Smart energy systems and services as required. There was some support for Smart advice being provided via CDC or CEP if it brought benefits to the county as whole, such as involving reduced costs based on bulk purchases.

COMMENTS FROM THE SURVEY

Sources of Information on Smart

- *Via the Crown Commercial Service Energy Framework – this provides us with added value through efficiencies of scale and the advisors already have knowledge of Smart from installations and systems elsewhere in the country. Tendering is through this system and is dealt with by our procurement team...*
- *We go to the big energy shows – RDM, systems advice shows, etc., and the advice there is really good. Nevertheless, would be happy to go to CDC or CEP if they had the right information available. (Owning company) have a very large estate which has not been fully assessed for energy efficiencies, Smart usage, etc. and we are the driving “innovative” force within the company on technology and energy solutions. We would look to demonstrate to (Owning company) that any Smart solution would provide commercial value for the whole company and then take it from there. In terms of tendering it might be done on same basis as NHS Carbon Framework, i.e. you would get paid from the savings that are made (or not!)*
- *We’re members of the Carbon Trust and the Institute of Energy group so would speak to advisors through them – they help keep us up to speed. We also talk to the energy providers themselves about what they are offering. Yes, no problem with also getting advice from CDC or CEP though tend to think of them as for domestic market, rather than business. (Incidentally we have reduced our amount of energy usage enormously over last ten years from 2.5 MegaWatts peak to just 1 MegaWatt, following advice received and decisions made)*
- *Would talk to other businesses in the same sector or in associated sectors, such as hotel chains, major retailers, etc. and other industry leads to see who and what (Smart systems) they recommended. Learnt from our industry contacts about the lack of return on investment that similar business had had from early Smart systems. Wouldn’t want to go to the utilities companies...also wouldn’t really look to CDC unless there was some real benefit to C&IoS PLC, i.e. a bulk-discount deal for the county had been negotiated or something like that*
- *From our sister companies and the Smart providers they have used. We can use what they have had developed and, if necessary, amend it for our own specific situation but in principle if it works for them it will work for us*

6.6 COPING WITH FUTURE INSTABILITY

The businesses were asked about their **plans should they be confronted with an unstable supply in the future**, either relating to possible rationing of energy or significant changes in the price of energy.

While several had an "emergency plan" with back-up generators for power cuts, etc., **none had a full risk mitigation plan** relating to how they would deal with longer term energy issues covering energy availability or major price shifts.

They were all agreed that such a "doomsday" scenario would present them with **major operational difficulties**. The promotion and development of full risk mitigation plans focussed on energy issues among high energy user businesses and organisations therefore seems an essential point to take forward from the research.

COMMENTS FROM THE SURVEY

Coping with future instability:

- *It would be a nightmare! We would have real problems and would find it difficult to cope. We have an "emergency plan", but this doesn't cover everything and basically involves switching to back up generators (oil, batteries, etc.). We would become reliant on back-up power in the event of losing our supply. Would need to turn to all our back-ups (if the supply was turned off) but don't think they would be enough.*
- *We would struggle. Don't have a risk mitigation plan. We have an "emergency plan" but this doesn't cover whole estate and relies on back-up generators, etc. Not a proper risk mitigation plan, no.*
- *We do have a risk mitigation plan that is currently being finalised, but it is based on a risk register that has been drawn up to cover each of our different areas of operation...so there is no one catch-all for such a cross cutting issue as energy and power supply...this is something we need to think about.*
- *We have short term plan, with temporary power generators from a local generating company. But we have no longer term or risk mitigation plan. We'd have to go down to the pump house and start pumping the water out by hand...*
- *Our plans have contingency for little bits about changes in price and/or fluctuations in supply, but not complete cut offs. We have no back-up generators on site at present. We need to look at this in the future. We have been thinking about energy storage (after talking to Stuart Farmer). Unquestionably storage solutions would be very good for helping us to address this issue... when the technology is available at an affordable cost.*

6.7 SKILLS AND KNOWLEDGE

Our interviews with high energy users asked whether businesses currently felt they had the skills and knowledge to deal with changes to energy supply in the future (including Smart goods and services, and instability of supply).

Interestingly, although they readily admitted to having no risk mitigation plans for energy issues in the future, most of the high energy users **felt that their current staff did have the necessary skills and knowledge to deal with any current energy issues.**

However several of this group of high users did acknowledge that they were **concerned about skills needs in the future**, such as addressing changes to energy supply or use of Smart systems. The common consensus was that these **future skills needs were not yet known, so it was consequently very difficult to address them.**

One high user acknowledged that their staff did not have the necessary skills, either now or in the future, but felt that the situation would (have to) be resolved by having a fully automated Smart system without human involvement.

Finally, and as noted previously, another high user said they intended to outsource their skills in this respect to a 'Smart Specialist' who would partner with them to work on these matters. They noted that they already had an engineering group within the business and that they would envisage something similar being set up for energy supplies and systems, with a Smart specialist at the core.

COMMENTS FROM THE SURVEY**Skills Needs:**

- *Yes we have the right skills, but could always do with more resources – lack of manpower is key issue. We could always find new skills that we might need one day but we are covered at the moment in terms of the current situation. For the future though we are concerned, but the difficulty is we don't know what we don't know...will certainly need more resources with new skills, but don't know which ones... not sure in which area or which types of skills will be needed.*
- *We have good well qualified people already (Degrees, PhD, MSc, etc.) but could do with knowledge/advice on Smart and related matters. Generally we recognise that we will need more information, skills and knowledge in areas that we don't currently know enough about. While our current skills are very high level the skills needed for the future are not yet clear to us (or anyone else?).*
- *IT based and software skills are becoming more and more important – software to monitor remotely what is happening will be a core part of any Smart system. Our IT team is very good... they have the necessary skills base already... I'm sure that they could deal with (installing, monitoring or running) any new Smart technologies that were developed or used*
- *It would have to be fully automated, most of our staff cannot even read a meter... an automated system with no human intervention.*

6.8 UNDERSTANDING ATTITUDES TO ENERGY SAVING PAYBACK

This section uses research from our study of the whole LCEGS Sector in C&IoS to understand the **public perception of payback times for energy efficiency measures**.

The concept of payback is the energy efficiency industry standard method to explain and compare the cost effectiveness of different energy saving measures. It is a simple payback calculation, the cost of the measure divided by the annual savings, and normally expressed in years.³ A recent survey undertaken by Wadebridge Renewable Energy Network (WREN) in Wadebridge town centre on a Saturday asked the question: What would you be willing to pay for a Smart Energy device which could save you £100 per year on your electricity bill? The results were as follows:

Figure 1 - Smart Meter Cost Perceptions

11. What would you be willing to pay for a smart energy device (e.g. a controller or battery) which could save you £100 per year on your electricity bill.

£1500	£1000	£500	£300	£100	£0
1	2	2	8	44	50
1%	2%	2%	7%	41%	47%

Source: WREN

The survey was relatively small with only 107 respondents, and the results should not be regarded as scientific, but even so the result is startling in that 88% of those questioned expected a payback of just one year. **Within the energy efficiency industry anything longer than a 3 year payback is considered a hard sell.**

Research by the Carbon Trust suggests that most businesses regard a 3 year payback as optimal (The Carbon Trust, 2010).

Generally speaking energy management technologies, including components of Smart Energy systems, are not dependent on public subsidy. Smart Energy systems, by definition, are complex and multifaceted. The cost of the planned roll-out of Smart meters will be passed onto consumers via electricity bills. However other elements of energy management and Smart Energy sit entirely outside of government regulation and subsidy. In the USA the Nest Smart thermostat is reportedly shipping 40,000 units a month and has recently been acquired by Google. In the UK, British Gas has recently entered the market place, as have German manufacturers. All this is likely to have little effect on the C&IoS low carbon sector however.

³ It assumes you have the money in the bank and don't have to borrow. Equally it makes no assumptions about the interest you could have received if you had left the money in the bank.

6.9 BENEFITS TO CONSUMERS

The Government's economic impact assessments assumed that non-domestic customers would benefit from **electricity usage reductions** of 2.8% and gas usage reductions of 4.5% from better management resulting from the information Smart meters provide. They estimate that the Smart metering roll-out will **deliver a net benefit of around £6.7 billion**.

Potential benefits which have been identified by the Government for both domestic and non-domestic consumers and include:

- **Accurate meter readings** can be obtained without the need for a physical meter-reading and access to premises.
- **Bills no longer based on estimated meter readings** – consumers pay for the actual energy they use and so may budget better.
- **Detailed information about energy use** – non-domestic users can study use patterns, within or between days, weeks and months, and note and address anomalies such as high usage outside normal working hours. Domestically, near real time information on energy use expressed in pounds and pence could lead to improved ability to manage energy use, thus saving money and reduce emissions.
- It asserted that **quicker, easier switching** to get the best deal will also result, but the mechanism for explaining why and how this will occur is unclear.
- It is proposed that **energy efficiency advice** will be provided during the visit to install each domestic Smart meter, which potentially **could lead to facilitating energy efficiency measures and support for microgeneration**.

The roll-out of a programme of mass Smart meter installation will provide a platform for a range of as yet untested Smart home services. A change in the interactions of consumers with their suppliers is likely with the introduction of time-of-use tariffs and other competitive energy services. Pre-payment customers may be offered new ways of topping up, e.g. over the phone or on-line and pre-payment Smart meters can be set so they don't run out of credit at night or at times when obtaining credit is not feasible.

It should be noted that **a lot of the benefits noted above are highly speculative**, the product of parties interested in promoting the adoption of Smart meters, and **there needs to be more learning from the consumer's perspective of the impact of Smart meter usage elsewhere**. There are grave uncertainties about the consumer engagement process, noting the situation in the US and Netherlands where public concerns about data sharing, health impacts and a general wariness of the motivations of big corporate entities have delayed and stopped roll-out programmes.

Non-domestic customers could benefit from time-of-use tariffs if they have the ability to reduce energy usage during discounted tariff periods. If day-time use is discounted, the

retail sector would benefit, but businesses that are busiest during the evenings (restaurants, pubs, hotels) may be disadvantaged.

The Government's Impact Assessment estimated that the average cost of Smart electricity and gas meters will be £44.95 and £59 respectively, with respective installation costs of £29 and £49 (or £68 if both meters are installed together). However, when the cost of the Smart meter is added to bills, it is unclear whether the net difference in energy bills will be positive, nor whether suppliers will pass on their savings.

7. SMART ENERGY IN CORNWALL AND ISLES OF SCILLY

This section provides an overview of the developing Smart Energy sector in C&IoS, including pioneering businesses and early movers.

7.1 OVERVIEW

In 2013 Cornwall Council started developing the **Smart Cornwall Programme**, an ambitious initiative to develop the UK's first fully integrated Smart Energy system. The programme is being developed under the governance of the Smart Cornwall Steering Group, which includes representatives from public, private and academic organisations. Key developments to date include:

- February to March 2013: Cornwall Council ran a consultation to help inform the objectives in a Smart Cornwall Routemap up to 2020.
- Oct 2013: Smart Cornwall Evidence Base was published.
- Feb 2014: The Smart Cornwall Routemap is complete and is currently waiting on an approved PR strategy to support its official launch.
- Feb 2014: A scoping workshop was held to obtain feedback from the private sector to inform the final development of the Smart Cornwall Business Forum, which the steering group aims to officially launch at the Royal Cornwall Show 2014.
- Aug 2014: This is the target launch date for the Smart Cornwall Programme.

Cornwall's 252 MWe of renewable electricity installed capacity is putting **pressure on the local electricity grid**, presenting a local driver for Smart Energy solutions to reduce peak demand. (RegenSW, 2013)

Cornwall's Superfast Broadband connectivity makes the county a favourable place for Smart Energy systems to be enabled. Cornwall Smart Homes has reported increased demand for their technologies since Superfast Broadband was introduced to Cornwall (Superfast Cornwall, n.d.).

7.2 SMART ENERGY PIONEERS IN CORNWALL AND ISLES OF SCILLY

With Smart Cornwall's help we have identified 130 relevant businesses in Cornwall, 26 of which are currently offering Smart energy services and 104 that have potential to enter the sector. Smart Cornwall estimates that over 10% of businesses in C&IoS have the potential to move into the Smart energy supply chain and over 2000 jobs could be created by the end of the decade.

The few local companies that currently specialise in providing Smart energy products were mainly established in the last decade, reflecting the emerging nature of this technology sector.

ENIGIN PLC

St Austell-based Enigin Plc was incorporated in 2006. It provides a range of Smart energy products, including: 'Eniscope' - an advanced Real-time Energy Management System; 'iMEC' - Intelligent Motor Energy Controllers; 'LESS' - Light Energy Saver Sensors; a Chiller Unit Energy Saver and 'ACES' - Air Conditioning Energy Saver. The company has representation in over 50 countries. Whilst the company is relatively new, the Enigin team has many years' experience in the sector. In 1982, Managing Director, Ian Wrigley FRSA, commissioned the installation of the first Digistat microchip based energy saving controller in the UK. Hundreds of installations of the American product followed setting the benchmark for a new generation of digital energy management systems (Enigin, n.d.).

CARNEGO SYSTEMS

Truro-based Carnego Systems was incorporated on 19 December 2006. They offer online solutions for optimising building performance, including automated data analysis. They developed the Haboakus Shimmy home information system installed in homes in Swindon, which is a simple touchscreen noticeboard that provides information on energy use, local bus times, community car club bookings, local lift shares, traffic information, community news and alerts (Haboakus, n.d.).

NATURAL GENERATION LTD.

This award-winning microgeneration installer, based in Perranporth, includes an energy and microgeneration manager device, an immerSUN PV monitor and voltage optimisation within its product range. It was founded by Mike Field in December 2006. After learning about peak oil, Mike left his lighting and sound installation company to pursue a career in renewable energy.

CORNWALL SMART HOMES

This company based in Blackwater near Truro is part of Cornwall Super Homes, which offers solar, electrical and roofing services. Managing Director, Tony Sampson, retrained as an electrician and set up an electrical company in 2009. Cornwall Smart Homes was added to the portfolio in 2012 and offers Smart home systems for retrofit or new build applications. The award-winning company employs 14 staff. Tony Sampson is a member of Cornwall's Business Leaders for Low Carbon Group.

KERNOW CONTROLS LTD.

This company based at Tremough Innovation centre in Penryn was incorporated on 29 October 2010. They are building control and automation specialists in the commercial, industrial and residential market. Kernow Controls designs and installs intelligent building management systems. Managing Director, Drew Dorling, has worked in the Building Energy Management Systems (BEMS) industry since the late 1990's, working for 15 years with control systems giant Honeywell.

ZLC ENERGY LTD.

This multi technology consultant and installer includes energy efficiency controls, building management systems and voltage optimisation in its product range. The company is based in St Austell and was incorporated on 16 March 2012. Its Managing Director, Mark Smith is a Chartered Engineer, Chartered Water and Environmental Manager and Chartered Environmentalist with experience in running flood management programmes in the south east and designing BREEAM excellent commercial buildings.

WATTSTOR LTD.

This award winning company based at Tremough Innovation Centre in Penryn, was incorporated on 2 January 2013. They produce an Intelligent Power Management (IMP) control and monitoring system that ensures the optimum use of on-site generated electricity with no export back to the grid and minimal import. They also offer batteries for energy storage. The products are manufactured in Cornwall. Wattstor was formed by Peter Cunningham, a semi-retired engineer in St Austell. Peter will remain as Executive Chairman and Mark Smith from ZLC Energy Ltd. will be interim MD pending recruitment of a full team to grow the business.

BRITISH GAS

In its 2013 HECA report, Cornwall Council reported that as its officially endorsed ECO investment partner and Green Deal provider for Cornwall, British Gas will “promote the benefits of Smart Meters and facilitate their installation. They will also create “Smart” tariffs for Cornwall which will help develop a Smart grid across Cornwall – designed to work in conjunction with the Cornwall Together scheme”. British Gas recently won the 2014 European Smart Metering ‘Utility of the Year’ award for their focus on customer involvement and communicating the benefits of Smart metering.

Relevant Smart Energy projects include:

ENERGY DEMAND RESEARCH PROJECT

Between 2007 and 2010, large scale trials were conducted in 50,000 households across the UK to understand how consumers react to improved information about their energy consumption over the long term. Methods used for the research included smart meters and real time display devices as well as information and community engagement. The trials were run by EDF Energy, E.ON, Scottish Power and Scottish and Southern Energy.

ENERGY TECHNOLOGIES INSTITUTE (ETI)

The ETI Smart Systems and Heat programme aims to design a ground-breaking smart energy system in the UK. Projects include a consumer behaviour study, data management and systems architecture, enabling component technologies, value management and delivery.

TECHNOLOGY STRATEGY BOARD (TSB)

In 2010, the TSB awarded £3.8m to 13 smart energy projects. The TSB has also established a special interest group of Knowledge Transfer Networks to foster collaboration and knowledge sharing about smart meters, smart grids and smart homes.

SCENARIOS FOR THE DEVELOPMENT OF SMART GRIDS IN THE UK

This multi-institutional, inter disciplinary project is supported by the UK Energy Research Centre (UKERC). The project aims to advance understanding of smart grid deployment and utilisation up to 2050. The research team includes Dr. Peter O’Connor Senior Lecturer in Renewable Energy Policy at the University of Exeter (University of Exeter, 2013). The

concept of a 'smart campus' is also being explored at the University's Cornwall campus in Penryn.



NETWORK MANAGEMENT ON THE ISLES OF SCILLY

The Isles of Scilly have a stated **intention of becoming energy self-sufficient**, an aspiration which is supported by the islands location and climate, which provides significant potential for the use of renewable low carbon technology. The islands communities are very engaged in understanding the need for effective energy management as demonstrated during the islands 2009 'e-day' initiative which received national BBC TV coverage. However, to reach this aspiration a principle challenge the islands face is the need to maximise the islands existing electricity distribution infrastructure.

Consequently in November 2013 Western Power Distribution's 'Network management on the Isles of Scilly' project which was finalised, **one of the UK's largest Low Carbon Network Funded trials**. Project activity focused around the deployment of advanced technological solutions which included low voltage monitoring, high voltage automation and advanced communication to form an overarching smart grid.

The outcome of the project has helped ensure **local residents are enabled to increasingly adopt low carbon technologies** such as solar PV and heat pumps whilst deferring potentially costly reinforcement of the islands existing 33KV submarine cable and 11KV ring main. In addition the new Smart platform will help support the effective integration of backup energy generation and ensure greater reliability of consistent electricity supply across the Isles of Scilly.

Western Power Distribution successfully delivered the project in partnership with GE Digital Energy, Power Electrics, Power Plus Communications, Duchy of Cornwall, Council of the Isles of Scilly, Transition Scilly and Smart Cornwall.

7.3 SUGGESTED INTERVENTIONS

STAKEHOLDERS

At the end of Stakeholder interviews, representatives were asked about any initiatives or interventions that they felt the public sector could make that would make a real difference to either growth in the Smart sector or uptake of Smart energy systems/services in C&IoS. Their answers are presented verbatim below.

It was apparent from these responses that two main areas for further or new intervention were favoured by the stakeholders:

- **Community Energy schemes and systems**

There was recognition of the value of the work that had been done so far in this area across C&IoS, which was coupled with the need to develop the schemes and systems further to investigate how they could be “scaled up” and used elsewhere. It was felt that C&IoS could build on its existing schemes such as in Wadebridge, seeking to identify the key success factors and address the issues around how the schemes could be replicated elsewhere and then use this knowledge to become a “torch bearer” and/or best practice model for the rest of the UK and wider world; and

- **Business support and assistance**

-There was also acknowledgement that the fledgling Smart sector was very immature and that businesses needed substantial support to grow, particularly in light of the uncertainty over government policy. Various potential means of support were highlighted including providing science parks and space for development trials as well as the promotion of the value of Smart goods/services to enable the establishment of a sustainable “Smart market”.

Underpinning both of these suggestions was the **need to educate all consumers about the use and value of Smart system and technologies** – both the general public and businesses alike. Crucially the role that Smart systems could play in reducing energy demand and increasing efficiencies, thereby lowering costs was thought to key to influencing behaviour. This was felt to be essential to the success of any initiative though it was recognised that it might take more extreme weather events or global oil price shocks to change behaviour radically.

COMMENTS FROM THE SURVEY

Stakeholder Survey - Suggested Interventions:

- *A lot of work needs to be done to grow the sector in Smart C&IoS. That requires spin outs /SMEs having the right support. Good idea would be to have science parks at universities to develop field trials. So many micros don't get over the "valley of death" when they have to move from laboratory /trial stage to commercial stage – this finishes them off. The right location with appropriate business support is essential for growth/ survival of new Smart businesses/innovation in the sector. C&IoS doesn't have a proper university at present- we go to Exeter University.*
- *CDC could play a role in supporting and developing ideas beneath a "2025 vision for C&IoS", - stating what C&IoS will look like in 2025 then seeking out and developing the innovative ideas that map onto the vision and will make it reality. A suggestion: Community energy systems – what will they look like, how would they work, and crucially how could we replicate them elsewhere. CDC would need to decide how it is promoted, developed and delivered – take the lead in taking it to the world (the tin mining analogy is good one for this!)*
- *From a manufacturing point of view, providing support and guidance in the market place (is essential for growing the sector) so businesses are clear where the market is going. Otherwise innovation will be limited. The clearer we can be on the value, needs, demand, abilities of heat pumps, PV, etc. the better for businesses.*
- *On top of the issue of agreeing priorities, there is the key matter of exposing and educating the consumers/businesses/communities to (Smart technologies) to have a better understanding of how it will lead to cheaper energy for them. Education and awareness training is needed which would underpin any community energy scheme. Q: How can you get participation levels up to reach a sustainable level for the market to become involved? The consumer engagement side is a big barrier that needs to be overcome – it's being addressed by many different projects and the finding is that they (consumers) need to be continuously told about the benefits or they forget...if it requires you to go on and on telling them you must do so until the message sinks in.*
- *Expand the Community Energy schemes – get more advisors around the local community areas. We need to kick start the number of schemes across the county to start an "avalanche" of awareness and educate people further in order to take it to the next level, possibly nationally. The education of customers to understand the energy market in terms of pricing and potential shortage issues is hugely important to the future. CDC could set up systems and projects developed from the Wadebridge/WREN project to take this further – roll it out in other areas. This could be a big trailblazer setting the standard for the rest of the country if it's played right.*

MARKET

The high energy users were also asked about any initiatives or interventions that they felt the public sector could make that would make a real difference to either growth in the Smart sector in C&IoS or the uptake of Smart energy systems/services in C&IoS.

Clearly the use of **energy advisors helping with Smart technologies** was regarded as being an idea worth investigating further. However the two suggestions for this idea between them identified one of the root issues to be overcome with such a support system – how should it maintain its independence (providing impartial, accurate and appropriate advice on the best Smart system in each situation) while being financially viable and/or self-sustaining?

The **use of case studies**, exemplar Smart businesses to demonstrate the value of the Smart systems that have already been installed would also be welcome – particularly if appropriate “role model” businesses could be identified for each key sector of the C&IoS economy and in different operating circumstances. Having **demonstration classes** as part of this, possibly based either in the businesses’ premises (as an opportunity to show their abilities) and/or at appropriate venues such as Tremough or Falmouth College. This would also broaden interest and widen the opportunities for involvement and engagement with different types of businesses across the country.

COMMENTS FROM THE SURVEY**Market Survey – Public Sector Intervention:**

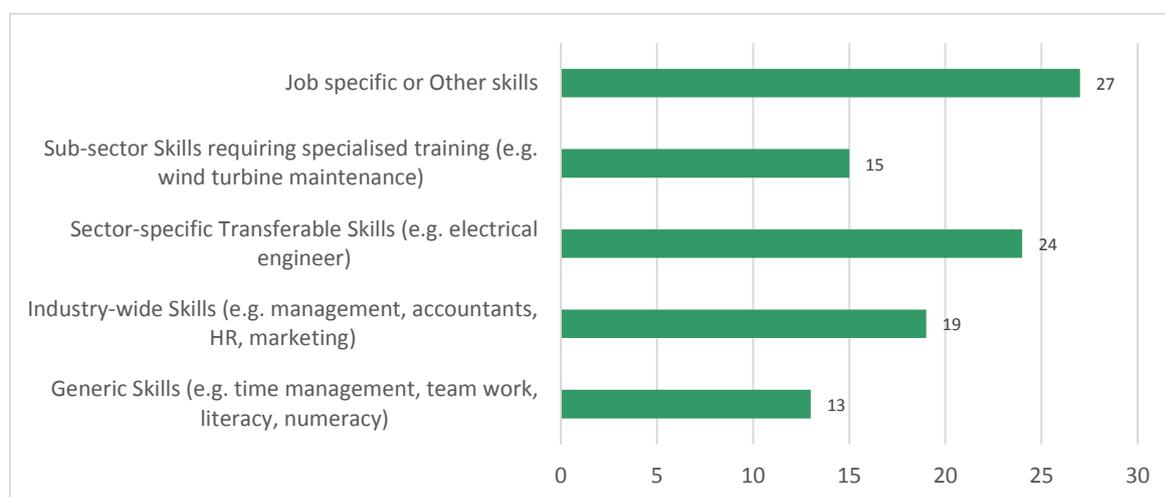
- *Help needs to focus on little businesses, SMEs, not us big ones – talk to them about whether they want advisors. If they do want them, get them in on a “no gain, no fee” basis, i.e. 80% of any saving for business, 20% for advisor – if no gain 0% for advisor. Let the advisor demonstrate the value and show where savings could be made*
- *Coordinate business case studies demonstrating the value of Smart technologies and systems, and showing their benefits. Arrange these with site visits to the businesses that have installed them to show (us) how it works*
- *We need independent advisors who can help businesses with whether Smart systems really will them bring a return or not – there’s a degree of distrust of energy providers in general and therefore Smart meter providers are dragged down by association ...need to have someone independent with nothing to gain from giving advice about them*
- *Get a gauge on businesses who have already installed Smart systems and use them to demonstrate the value and share knowledge with other businesses about the benefits – (the public sector could) tell others all about this to help the uptake of Smart systems in Cornwall and the Isles of Scilly. Hold demonstration classes for interested businesses – don’t make it overly complicated or difficult though – keep it short and sweet, focussed on what businesses need to hear.*

8. SKILLS NEEDS

This section looks at the current and future needs of the Smart Energy sector in Cornwall for developing, installing and overseeing Smart technologies and solutions.

The online survey received replies from 20 businesses that were providing Smart goods and/or services (as well as other LCEGS goods/services) and these 20 businesses identified 98 skills needs between them, again an average of around five per business. Figure 2 shows that around a quarter of these skills needs were in job specific (27) or sector specific (24) skills, while smaller numbers identified generic (13) or sub-sector (15) specific skills needs.

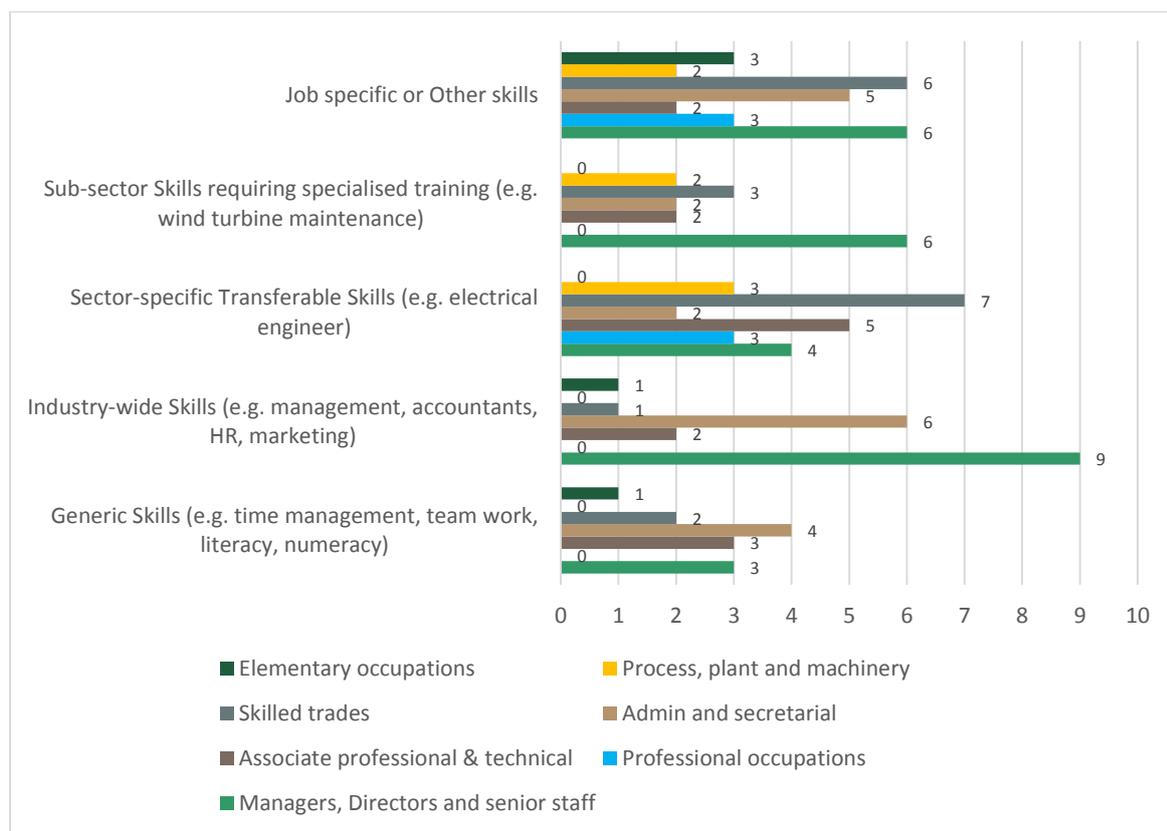
Figure 2 - Skills needs



Base: 20 Smart LCEGS businesses

Looking at these needs by occupation, Figure 2 shows some intriguing findings. The 20 Smart businesses **share with other LCEGS businesses the skills need for managers, directors and senior staff to have more industry-wide skills.** However, for three of the five skills categories, for professional staff no skills needs were reported. The only areas in which skills were needed by professional staff were job or sector specific. Those in skilled trade occupations also had job and sector specific needs. Figure 3 contains the details.

Figure 3 - No. of each type of identified skills need by occupation: Smart businesses



Base: 20 Smart LCEGS businesses

Lastly several LCEGS businesses mentioned the **skills needed to install and/or manage Smart systems**, though these were businesses who were involved in the Smart workshop and business development group. Nonetheless, the requirements for these skills are clearly another **growth area to be taken into consideration in any future skills provision planning**.

8.1 THE CURRENT KEY SKILLS NEEDS OF BUSINESSES DEVELOPING SMART ENERGY SOLUTIONS

When questioned about the key skills needs of businesses that were currently developing Smart energy solution, some very clear themes emerged, including **communications skills and technical/engineering knowledge**.

However, despite this consensus it was noted that each different Smart technologies did require different skills and that there were **likely to be skills shortage across the industry** caused by the current profile of its (ageing) workforce.

One further current skills issue was noted by a stakeholder – the need for people with both **IT/Software skills and an understanding of power systems networks**. This was felt to be a large need currently; and one that would increase in the future.

COMMENTS FROM THE SURVEY**Current Skills Needs:**

- *Communications and telecoms skills are becoming key issues – technical telecomm skills and communication skills and the experience of how to bring them together*
- *Advisory/communication skills (only partially for developing mainly for explanation and scaling shift) for interaction with people (domestic and business)*
- *Technical skills understanding the whole energy value chain. Power system engineers will need to understand overall systems approach (covering trading, commercial, regulatory backgrounds, etc.)*
- *Overall an engineering/IT background at degree or higher level is helpful though science and technical experience has wider value and usefulness*

Skills Shortages:

- *Very much depends upon the types of solution that are being developed. Smart meters, control technologies (hardware and software) all have completely different skills associated with them.*
- *From electrical engineering point of view it's the age profile of the current workforce – need youngsters – more graduates. On installation side need to engage more with the customers and also need to have an incentive system that packages “Smart solutions” without losing the installers profit margin (as they will lose it if they have to spend a lot of time explaining and resolving customers Smart queries). DNOs also need Smart skills*
- *The age of (most of) the current workforce is very mature there is likely to be a shortage in the future, though interestingly I understand that the imposition of the £9k annual fee at universities has seen a great increase in young people subscribing to degrees such as engineering, STEM, etc., that will produce useful jobs, rather than just a degree in something that they want to do. This means that the issue could be addressed longer term as these young people go through the system*

8.2 THE KEY SKILLS NEEDS OF BUSINESSES DEVELOPING SMART ENERGY SOLUTIONS IN THE NEXT 5 YEARS

When asked about the key skills needs of businesses developing Smart energy solutions over the next five years, some further clear themes emerged. These were firstly an extension of the need for the two most important current skill sets identified above: **communication/ IT/ telecom skills and engineering/science skills, and secondly the need for more, improved digital/ IT /software/ Cloud based skills.**

Further to these skills it was also recognised that the new Smart systems would be producing vast amounts of data and information. One stakeholder described “data as the new natural resource”. This would lead to the need for people skilled in data manipulation, analysis and interpretation, particularly in relation to identifying trends in energy usage and potential savings/efficiencies through advanced techniques. The need would be to develop a system that could assess and manage of energy systems remotely, keeping them in balance, at a cost efficient price.

In relation to Smart skills for remote IT/control, several stakeholder noted the need for bringing different skill sets into play.

COMMENTS FROM THE SURVEY

Most Important Skills Sets:

- *Future skills needs are focused on digital technologies for installers; control, electrically systems management and digital ICT solutions. The type of service will change so there will be a need for a whole new proposition that will be systems driven – will be an integrated system, with holistic views and solution being needed*
- *Shift will be towards the Cloud and IT for remote control of hardware that is currently being installed. Once it is installed then focus will shift toward the Cloud and producing Applications that enable remote monitoring and control.*

Remote IT/Control/Telecoms:

- *A whole panoply of skills will be require , like with the internet and how it moved from just IT geeks to designers, innovators, social media, etc.*
- *More telecoms infrastructure skills will be needed*
- *IT networks and communications will become more intertwined*
- *More of the above*

8.3 KEY SKILLS OF BUSINESSES INSTALLING/USING SMART SOLUTIONS

For those businesses that were installing Smart energy solutions, the stakeholders identified one major new key skills area: **systems integration** to ensure that the various diverse systems (energy, heating, water) were working together in the most efficient manner.

It is worth noting the findings from the online survey of C&IoS LCEGs Smart businesses confirm these stakeholder's views – that that the skills need of the managers, directors and senior staff in these businesses were industry-wide skills. The areas in which skills were needed by professional or skilled trade professions in the Smart sector were likely to be job or sector specific.

COMMENTS FROM THE SURVEY

Systems Integration

- *Systems integration will be key skills issue for installers – the ability to enable systems to work together and talk to each other. Knowledge of how they can talk to each other, how they can work together and crucially how they can be made to work together better in the future*
- *Products and services will combine into a whole systems approach: talk between themselves. Lots of SMEs doing this - that means lots of trials, lots of bespoke systems but where do they go from there? It's a very regulated space (lots if incentives means that its very difficult to control the market place). This is not favourable to SMEs in terms of "normal" market conditions for stimulating innovation and growth. For instance how do you protect Intellectual Property – it doesn't work.*

8.4 KEY SKILLS NEEDS FOR INSTALLING/USING SMART SOLUTIONS IN FIVE YEARS

When asked about the key skills needs of businesses installing/using Smart solutions over the next five years, the **stakeholders again identified that IT/ software/ Cloud / App development skills combined with an integrated systems knowledge** would be the most important future skill sets that would be required.

Further to this it was acknowledged that the production of vast amounts of data and information from the Smart systems would lead to some increase in the need for **data analysts and management**, although it was also noted that it was anticipated that many new Smart control systems would be “human free”, programmed to work on their own within set parameters and not requiring much intervention or knowledge.

COMMENTS FROM THE SURVEY

Installing/using Smart solutions

- *In future IT will determine everything not advanced engineering. Very different skills sets will be associated with this – skills sets by individuals and as a whole, understanding how energy systems develop*
- *More Cloud rather than hardware/ it will be software and enabling remote control that is key to skills needs for Smart*

8.5 SPECIFIC SKILL NEEDS ASSOCIATED WITH DELIVERING SMART OPPORTUNITIES IN C&IOS

The national Smart stakeholders gave diverse replies, reflecting their different roles to the question about whether they saw any opportunities in C&IoS. Two said that they did not specifically see anything relevant to them:

- *None above what is in existence already. (When pressed) If there were we would partner with local SMEs who have the right skills already. Historically for grid work we have used our own apprentices plus local (Cornish) suppliers*
- *It's not applicable to our work as advisory body for industry*

However three other stakeholders gave some specific and detailed answers, though these both contained a level of caveats and bridges to be crossed.

Skills needs for delivering Smart opportunities:

- *Connecting homes across C&IoS and whole of UK (to Smart meters, etc.), but not sure that there is an economic rationale for a particular opportunity in C&IoS. Doubtful about this. While we recognise that there is a good combination of factors that enable C&IoS to score well: i.e. political leadership, EU funding and switched on stakeholders, but does C&IoS have right conditions that can be replicated/rolled-out elsewhere? A key problem is the constrained grid infrastructure there. If a community energy response could be mobilised then that make a difference, but how do you get that level of mobilisation? CDC is not a contracting organisation ...EU are the funders and getting their funds is painful. Furthermore is there a sensible reason to use C&IoS for a trial with scaling-up being such a key matter?*
- *(There are potentially) Many opportunities, but each one depends upon what are priorities for C&IoS and where they map onto each other. We have many technologies, for instance Smart community technologies, batteries in homes, something in electricity network, and a range of others – we need to know which ones are priorities for C&IoS before we can say whether there is an opportunity there for us to deliver/develop anything...it would need to be prioritised locally to make it worth taking further*
- *Yes definitely, with C&IoS massive coastline, wind and sunny periods there is potential for huge energy generation – but is it in the right place? How do you export it efficiently or effectively? How do you manage lots of little micro grids and the massive different amounts of data, information that that they will produce? There are clearly technology solutions and systems control opportunities (for us) in meeting these challenges. We are very happy to be involved in helping take these forward.*

Conditions:

- *It depends upon which priorities/technologies are developed*
-
- *Relates to the challenge that is being addressed – if its assessment of varied data, then its data analysis, if it's remote micro grids then it's something different ...so it varies*
-
- *We need to be able to demonstrate to our masters that providing our input will result in a commercial proposition at the end of the day...we can't provide free resources for ever!*

9. LEP COLLABORATION

This section looks at the possibilities for collaboration with other LEPs, in the South West and beyond, to develop the Smart Energy sector and share best practice.

Most of the activity in the emerging Smart energy systems sector has so far been focussed on cities. To illustrate this, the main LEPs initially identified to have a Smart Energy focus were:

- London LEP
- Liverpool LEP
- Greater Manchester LEP

However both the Derby/Nottingham and West of England LEPs make specific reference to Smart Energy initiatives and both LEP areas have mixed economies with rural and urban settings for business.

The Heart of the South West LEP representative was very aware of the work undertaken by RegenSW and the Wadebridge Renewable Energy Network on Smart Energy systems and local energy markets and was keen to collaborate on community energy initiatives. The **Oxfordshire** representative was also keen to collaborate on Smart and combine this with Higher Education. However we were unable to secure an interview with anybody who would describe themselves as a Smart Energy specialist in any of the other LEPs.

Whilst the focus has so far been on urban areas where economies of scale can be achieved, **a truly integrated Smart Energy System needs to consider both the urbanised and rural context.** In England 80% of the land area is considered 'Rural' (Office of National Statistics (ONS), 2010/11). Rural areas offer **greater potential for renewable energy systems**, which puts pressure on the grid and thus presents an opportunity for Smart energy systems to manage peaks and troughs between energy demand and generation. **Lessons learnt from early roll out** can provide the basis for collaboration and joint working in future deployment of Smart Energy Systems in more ruralised locations. **Off gas rural communities** have higher energy costs because they are dependent on more expensive options like oil, coal, electricity and LPG and thus are most likely to benefit from Smart energy solutions that help to reduce demand.

10 . SMART ENERGY AND SMART SPECIALISATION

This section considers the fit between Smart Energy and the SMART Specialisation framework for Cornwall and The Isles of Scilly.

A detailed explanation of SMART Specialisation (RIS 3) is contained in the Low Carbon Environmental Goods and Services Evidence Base for Cornwall and The Isles of Scilly.

The criteria for selection as a SMART specialisation are detailed below:

The assessment criteria combines the innovation ecosystem with the EU SMART Specialisation guidance and LEP targets. The assessment also takes a current and a future perspective. The assessment criteria cover:

- Strategic R&D fit
 - Fit with national/EU priorities
- Structural Fund fit
 - Potential for cross border and trans-regional co-op/have an international dimension (emerging markets)
 - Potential for linkages across SFs
 - Potential for Horizon 2020 links
- Market fit
 - Are there potential global market opportunities that C&IoS businesses can supply into
- Economic fit
 - Deliver economic transformation
 - Support competitiveness (building on competitive strengths)
 - Deliver economic growth – (jobs and GVA) in the short term and longer term
- Place fit
 - Build on local assets; USPs
- Delivery Fit
 - Are the framework conditions in place to support businesses through the Innovation Value Chain, so that innovation leads to commercialisation and added value?
- Progress fit
 - Be monitorable and evaluated (i.e. evidence can be revisited against all the above)

The table below shows our assessment of Smart energy systems as a potential SMART Specialisation (RIS 3)

Table 1 - SMART Specialisation Criteria

		Strategic R&D Fit	Structural Fund Fit	Market Fit	Economic Fit	Place Fit	Delivery Fit	Progress Fit
Smart Energy	Current	✓	✓	☐	✓	☐	☐	✓
	Future	✓	✓	☐	✓	☐	☐	✓

This is a clearly a subjective, and is meant as an indicative guide only.

- For Smart Energy Systems we question if it is **Market Fit**, e.g. are there potential global market opportunities that Cornish businesses can supply in to, or is it essentially a local/UK market only.
- We question if Smart energy systems are **Place Fit**, or does the rural nature of Cornwall put it at a disadvantage.
- In line with all LCEGS priority sub sectors we question whether Smart energy systems are **Delivery Fit**, that is will innovation lead to commercialisation?

The main thing to bear in mind is that **if Cornwall wants to secure EUSIF money for research and innovation it has to do so via a SMART Specialisation process**. If Smart Energy Systems is considered worth including in a RIS 3 application, proposal writers would have to show that Smart Energy meet all the criteria above.

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