Wadebridge, a Smart Market Town

A world-leading test bed for the development of new localised energy systems

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Vision

To create a commercially replicable, smart community model, which will see energy utilised as an asset for local people, enhancing the community's economy and well-being.

Outcomes

The outcomes of the proposal develop a new paradigm in how communities use energy. The current 'energy problem' is here re-shaped as the development of local collective self-sustaining assets. More specifically these outcomes are:

Smart Growth

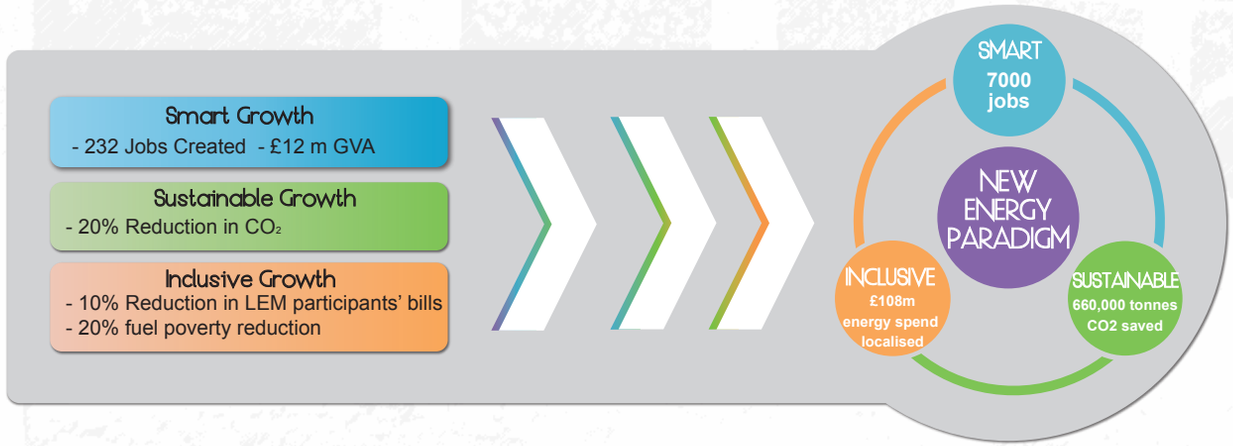
- Retaining the energy spend of a community locally
- Capitalising on first mover advantage through creating new high value, sustainable jobs
- Creating a competitive advantage for inward investment and organic growth

Sustainable growth

- Creating a 100% renewables powered energy system
- Reducing the losses through energy distribution
- Creating a more resilient energy system
- Producing a commercial, scalable and replicable business model

Inclusive Growth

- Pioneering new community led approaches to address fuel poverty
- Upgrading housing stock with a focus on the most vulnerable
- Developing community cohesion through a sense of shared ownership



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Background

We are at the cusp of a paradigm shift in our energy system, driven by the ever-increasing development of distributed generation and changing consumption patterns. This is resulting in the move from a largely centralised energy system to many localised ones. This is a global transition, creating a rapidly growing multi-billion pound market opportunity.

Technological solutions to these challenges are being effectively developed, but the technological opportunity will not be realised without two preconditions:

- novel effective energy markets to access and capture the value from localised energy systems.
- local populations that will accept and collaborate with innovative arrangements.

The new smart energy system has the potential to fundamentally change how we produce, distribute and consume energy. We are currently at the start of a generational opportunity to rethink what a smarter, more localised energy system could do for us.

What is clear is that the potential economic and social opportunities that can be realised through a local energy system are significant. For example the development of local energy markets could provide individuals and communities with the ability to produce and consume energy locally, and so become active participants in their energy market. This process would further encourage and support local generation and the development of innovative energy models.

In addition to the social benefits, the new business models that will evolve will require innovative products and services to keep pace with the inevitable evolution of the system. Furthermore, smart systems will provide a more resilient energy supply to energy-intensive businesses. This will develop more sustainable services in an increasingly uncertain world.

However, such social and economic opportunities will only be realised if the appropriate market mechanisms, policy interventions and overall strategic understanding of the opportunity are embedded from the outset.

The proposal set out here provides a framework through which the town of Wadebridge can build on its strong foundations in this field to develop and deliver a pioneering programme of work. Through taking a strategic approach, in partnership with industry and academia, not only will this programme make Wadebridge a better place to live and work, but more importantly will create a scalable and replicable model which will be applicable to the rest of Cornwall and the wider European Union.

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Why Wadebridge?

Building on Success

Wadebridge is starting from solid foundations, as strong community support is the critical success factor in delivering the vision:

- Over 1,050 members – 600 attended WREN's launch event
- 2,340 tonnes annual reduction in CO2 emissions
- £1.55m p.a extra in the local economy in savings and income generated
- 180 houses insulated in 1.5 years
- 90 houses supported to install solar PV
- 65 homes supported to install Renewable Heat
- Wadebridge Energy Company and community owned RE in development
- Awards include: Best Community Initiative, SW Green Energy Awards 2011; Best Third Sector Business, Cornwall Business Awards 2012; Ashden Award for Community Energy 2013; Best Individual Leadership/ Best Community Renewable Energy Scheme, Cornwall Sustainability Awards 2013; Community Energy Champion, SW Green Energy Awards 2013
- A clear vision for the future – see Wadebridge Energy Futures (http://www.wren.uk.com/about-wren/wadebridge-energy-futures.html)

The Wadebridge Renewable Energy Network (WREN) team played a pivotal role in shaping the strategic direction and evidence underpinning the wider Smart Cornwall programme.

WREN is also actively exploring projects:

Case Study 1 - Understanding the opportunity

WREN has worked with partners including Elexon, DNV GL and Western Power Distribution to undertake some early feasibility studies, as well as work in partnership with Cornwall based Communities for Renewables. Both studies have highlighted where value can be retained in a localised energy system and will provide a solid foundation for further work.

Case Study 2 - Initiating change

An example of a project in development is to create an unique 'Solar Tariff', unlocking a local grid constraint for a community solar allotment. It will achieve this through providing cheaper energy to local consumers at peak times of generation. This is a £1m project which is proposed through the Western Power Distribution Low Carbon Network Fund.

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The vision and objectives Wadebridge has set out are ambitious, setting out a framework for the wider inevitable transition to more localised energy systems. The inherent complexity of the interactions involved mean that wider initiatives must be complemented by intensive focus upon specific geographical areas and populations.

Wadebridge has the knowledge, can-do culture, community capacity, commitment to build a replicable model and is already developing and delivering aligned projects. It is therefore ideally positioned to enable this relatively small market town to be at the forefront of what will become a global transition.

"As a public private partnership itself the LEP understands the need for early engagement with local and international commercial partners in developing projects with high impact and a long legacy. The model of the smart market town offers a promising complement to other strategic approaches directed towards Cornwall's sustainable development, and has the potential to be a significant exemplar for accessing the value of distributed energy systems within local energy markets."

Chris Pomfret, Chairman, Cornwall and Isles of Scilly Local Enterprise *Partnership.*

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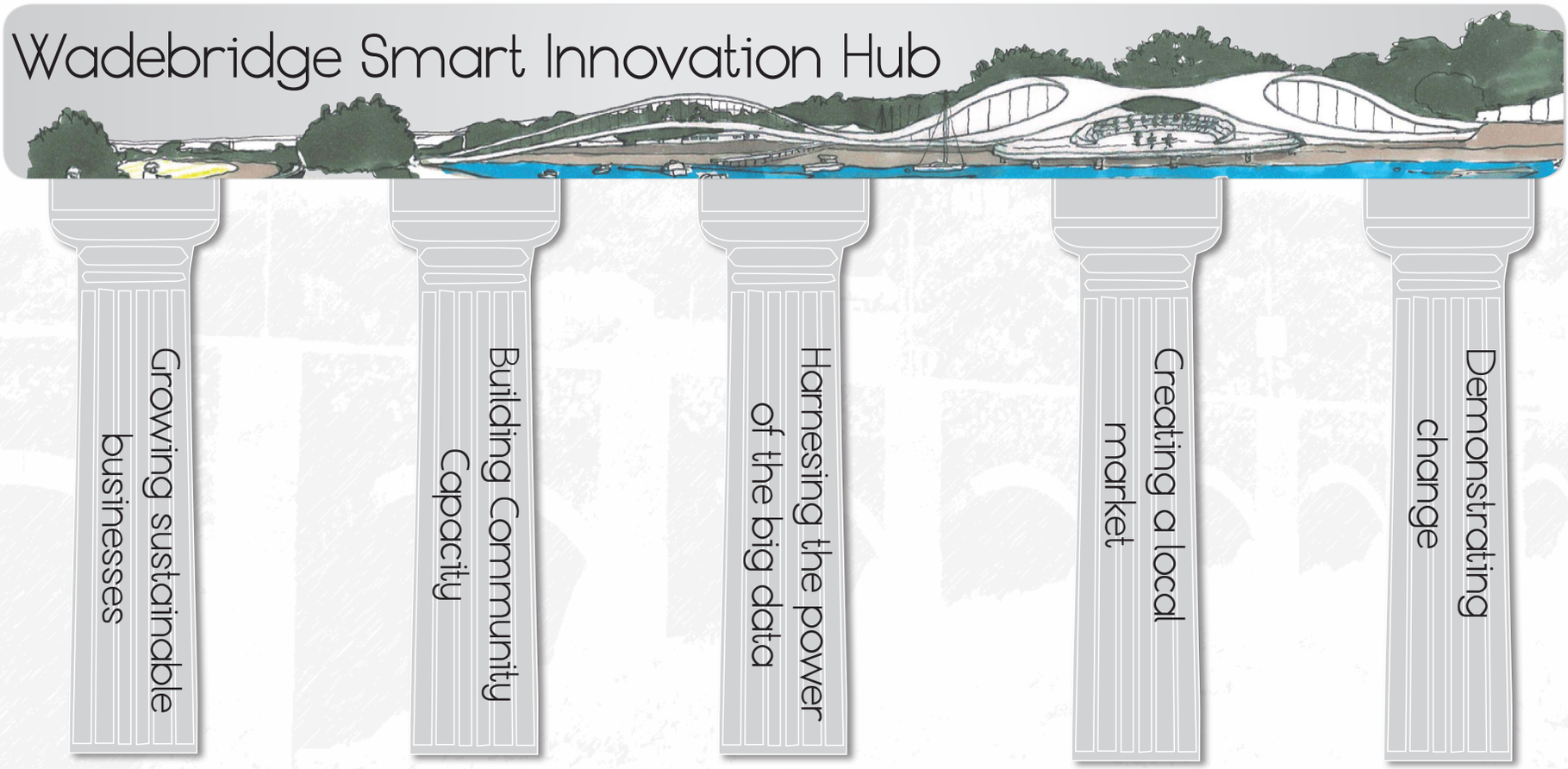
Delivering the Vision

Delivering the vision is based on the concept of the town of Wadebridge becoming a Smart Innovation Hub for the development of localised energy systems. The hub is supported by five pillars as illustrated below.



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The Five Pillars

The five pillars do not work in isolation; it is their alignment through the SIH which will deliver the vision.

Growing Sustainable Businesses

The SIH will support the development of a new innovative economy in Wadebridge and beyond through a range of measures including:

- Business to business mentoring for local companies looking to enter the marketplace
- Providing access to pilot projects and data (see below)
- Supporting the development of international supply chains
- Creating skills through 'Beyond Smart' where apprentices are taken on by project partners to deliver projects
- Providing the physical space to innovate, collaborate and grow

Build Community Capacity

- Build upon WREN's existing community capacity
- Up-skill local people on how to engage with new Smart Systems
- Support vulnerable people to engage with new opportunities
- Work with local schools to support the next generation of Smart Energy entrepreneurs

Harness the Power of Big Data

- Capitalise on the significant value of the 'big data'
- Provide an open source data platform for entrepreneurs from across the world to develop new products and services which are then tested in Wadebridge
- Ensure data are secure and anonymised

Create a Local Market

- Develop a bespoke local energy market platform that enables supply of local generation to local consumers, and harnesses the value of demand response and storage
- Enable collective finance and ownership of energy assets through the Wadebridge Energy Company
- Maximise the value of Wadebridge's energy economy retained locally

Demonstrate Change

- Develop and deliver an investment programme through a series of projects which stepwise build the LEM test bed
- Deliver both commercial and pre-commercial projects
- Leverage in a range of funding including, private investment, LCNF and Horizon 2020

Through this multifaceted but alligned model the SIH will address a major gap in one of the fastest growing global markets, through proving a space for industry to work with the public and policymakers. This will lead to the creation of new locally developed products, services and market models; all of which will be applicable to the wider global marketplace.

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The Smart Innovation Hub

The SIH will consist of two major investments from 2015 - 2019:

The SIH delivery team

£2.3m (£1.555m ERDF, £0.4 ESF, £345k partner match)

The first investment commencing January 2015 will be in a multi-disciplinary team of local partners and industry experts, and development funding. The team will undertake 4 key tasks: -

- Developing a pipeline of practical demonstration projects & aligning them under the SIH model
- Providing specialist business to business support (aligned to wider programme) & community engagement
- Supporting high level skills and apprenticeships
- Delivering a replicable LEM community toolkit and data platform for wider rollout

A number of key industry and energy market participants have already expressed an interest in supporting the SIH (see next steps)

The SIH Virtual Power Plant

£1-2m

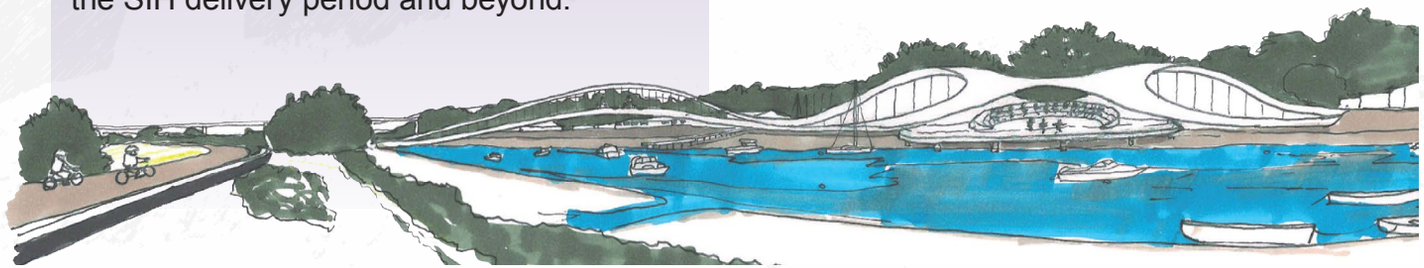
The SIH delivery team will have, by April 2015, developed, and by April 2016, delivered a pioneering demonstration project which will provide the technology and data platform to underpin the ongoing evolution of the SIH technology system and toolkit.

More specifically this will involve the roll out of Home and Building Energy Management Systems (HEMS & BEMS) and energy storage. This will then be aligned to balance demand with local energy production through the development of a localised energy data platform, or Virtual Power Plant. This initial project will provide the basis to demonstrate and build upon the market models for localised energy systems during the SIH delivery period and beyond.

The SIH innovation space

£12m (£9m ERDF, £3m match)

The capital element of the SIH will be the most 'visible' aspect of the proposition. It will be a physical space in which inward investors, local business and community organisations can collaborate with each other and draw in members of the public. Whilst this will come on line sometime after the team are in place it is critical to ensuring the long term commitment of project partners and a legacy from which to continue growing beyond the EU programming period.



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Key Milestones

Delivering the vision is based on four work streams (below), each of which contributes to the five pillars. These work streams do not sit in isolation, with the process being iterative, leading to the creation of a commercial and sustainable Smart energy business model, which will then evolve and roll out across Cornwall and the EU.

1. The innovation space is a capital project to deliver a building to house international and local business and creative industries. This has been described in the Smart Innovation Hub Discussion Document, published separately.

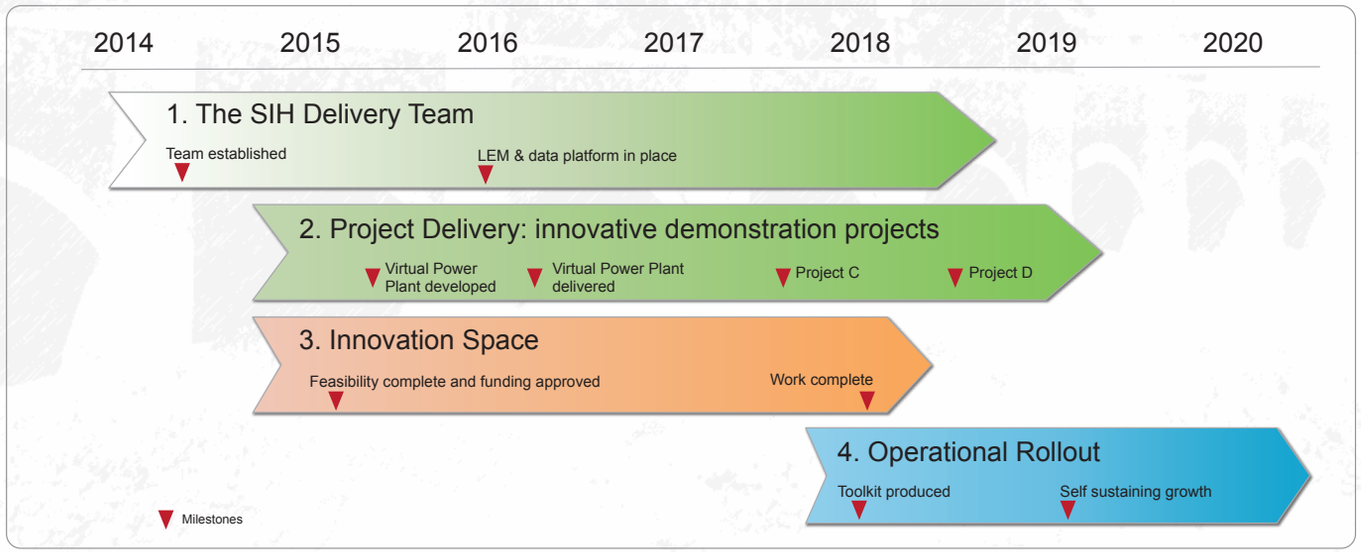
2. The SIH delivery team is responsible for the transition from the current status quo to a fully built, occupied and functioning innovation capacity. It will develop community and business support and ensure that by the time the innovation space is completed, there are sufficient tenants ready to move in.

   The team will draw together the core LEM model and also initiate relevant projects from the commercial and academic partners and local businesses. Its scope will also include the creative industries, which are an integral part of the innovation space, and ensuring the uptake of a distributed energy economy.

3. Projects initiated by the delivery team will be delivered by dedicated teams, the funding and resourcing of which will depend on the nature of the project. It is expected that a number of projects will be initiated before the innovation space is completed thus growing the team and demonstrating the added value that the whole programme will deliver.

4. As the innovation space is completed as a structure, the delivery team will begin to wind down and hand over to an operational roll-out and growth organisation whose ongoing role is to support the occupants of the innovation space and manage changeover of occupants in a commercial manner, ensuring continuing commercial viability and innovation.

   It is this space, and the early investment in a small but innovative team, that will provide a strong and rapidly growing legacy beyond 2020.



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Next Steps

SIH is the culmination of WREN's considerable success in being at the forefront of community energy innovation. SIH does, however, represent a step change in the complexity and scale of innovation.

In this context, whilst WREN will lead this project and host the core team, this team will be a partnership with commercial partners, local businesses, academic and FE institutes. To this end WREN will:

- Support Cornwall Council in the further development of the Innovation Space project, which is now in the next EU programme pipeline.
- Bring together academic, local and commercial partners to co-design the business plan for the SIH delivery team.
- Following partner sign up, co-design the data platform and HEMS, project business case and funding package.
- Ensure all of this work is shaped by the Smart Cornwall Steering group to ensure alignment with the wider Smart Cornwall planning.
- Communicate outcomes to the Smart Cornwall delivery plan development process, which is about to commence.

"The Smart Innovation Hub proposal is directed towards creating new, high value, jobs and sustainable communities through harnessing many of the special characteristics of Cornwall and the Isles of Scilly. We have a unique opportunity through our new European Funding programmes to create some truly transformational opportunities in collaboration with our local and international partners. The SIH concept is a good example of how this opportunity could be realised."
Andrew Kerr, Chief Executive, Cornwall Council.

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