

## Eco Bicester Strategic Delivery Board

<b>Date of meeting:</b>	<b>AGENDA ITEM NO:  4</b>
<b>Report title: Update on Technology Strategy Board funding for Innovation</b>	
<b>Author: Nicole Lazarus</b>	
<b>Tel: 07828 019653</b> <b>Email: nicole.lazarus@bioregional.com</b>	

### 1. Purpose of Report

- 1.1 The Eco Bicester team have been progressing new areas of innovation and technological development through 5 successful funding bids to the Technology Strategy Board. The purpose of this report is to update the Board on progress on each of the 5 projects.

### 2. Design for Future Climate

- 2.1 This TSB funded project was completed some time ago but the benefits and consequences for NW Bicester are still unfolding. This project analysed the implications of future weather predictions as a result of climate change and identified overheating of the super insulated homes as the biggest risk.
- 2.2 Consequently, the NW Bicester Exemplar homes have been modelled for thermal performance with the more extreme peak summer heat waves that are likely to arise.
- 2.3 A precedent setting planning condition requires the design team to demonstrate that Exemplar homes will not overheat.
- 2.4 The design team have developed a plan until 2050 to ensure that none of the homes overheat. This involves optimisation of window designs, window orientation and ventilation in the day 1 design. It also involves the introduction of shutters for shading when required, so homes have been “future proofed” to allow for this.
- 2.5 Oxford Brookes will be holding a conference on this subject early in 2013 and will be showcasing NW Bicester to the wider industry.

### 3. High Density PV Smart Power

- 3.1 Modern housing developments are being equipped with increasing amounts of photovoltaic (PV) panels to generate solar electricity. The NW Bicester Exemplar plans to fit every house with a 4kWp PV system or above.
- 3.2 In the middle of a hot summer's day, the majority of this power will be exported from homes to the electricity grid. For large developments like NW Bicester with high densities of PV, additional copper cable, sub-stations and local grid infrastructure reinforcement is needed to accommodate the expected electricity output. This is a costly investment and therefore acts as disincentive to extensive use of PV.

- 3.3 The High Density PV Smart Power project is running from July 2012 to April 2013 and explores new approaches to make maximum use of the PV generated power in the home where it is generated. The solutions include
- a) a direct DC feed from the solar PV panels to DC powered LED lighting (thus avoiding DC to AC losses in the inverter)
  - b) battery storage of excess energy (this may be either on a 'per house' basis, per 'cluster' of houses or on a neighbour basis in a local energy centre).
  - c) a smart home controller system to provide automatic and manual control of appliance switching and energy use in the home
  - d) a touch-screen sustainable information system (the Shimmy) to provide a focus for behavioural change and time shifting of energy demand
- 3.4 The DC powered LED lighting part of the solution has been developed by Zeta, a Bicester based company, and has led to a patented product that the team suspects will be highly marketable beyond NW Bicester.
- 3.5 A2Dominion and their construction team have acted as a stakeholder group providing valuable feedback on 'installability', 'maintainability' and 'marketability'. A live 'proof of concept' model has been set up at Zeta's offices in Bicester and the team hopes to trial the solutions in a small number of homes on the Exemplar.

#### **4. Build Process**

- 4.1 This 4 year project provides the Exemplar development team with the resources to map, explore, evaluate and refine the build process continually throughout the construction period, shrinking the gap between design intent and actual building performance, learning and improving iteratively from phase to phase.
- 4.2 The project will map the critical paths for delivering the following environmental performance standards across hundreds of homes:
- Code 5+
  - true zero carbon (unregulated emissions and no allowable solutions)
  - full climate change adaptation with overheating analyses to 2050
  - targeted reductions in embodied carbon
- 4.3 The team will model the information flow paths, the contracted specifications, the skills and collaborations needed to achieve these goals. Collaboration camps between sub-contractors, material suppliers and A2D's design team will allow for constant improvements and innovation.
- 4.4 The project is due to start by end of January 2013.

#### **5. Innovative Refurbishment of the Garth**

- 5.1 We heard this week that TSB will fund an energy efficient refurbishment of the Garth which could reduce gas bills by 40%. The fund comes in two stages: Design and Implementation.
- 5.2 The project will develop new and innovative approaches to internal insulation and secondary glazing for this "hard to treat" building in a conservation area. This will be augmented with integrated ventilation to reduce the risk of summer overheating following the insulation.

- 5.3 The project will use the innovative WHISCERS™ laser survey technique to mark out each internal wall of each room of the building. These details go to a cutting machine, which cuts and labels the insulation wall boards. This technique reduces installation time, it involves less trades and so reduces the disruption to occupants.
- 5.4 The WHISCERS™ technology has been tried and tested in the domestic market, but has not been used in a non domestic building before and this project could help to make the refurbishment of thousands of heritage buildings viable across the country.

## **6. Post Occupancy Evaluation of Bryan House**

- 6.1 The building performance evaluation study of two case study houses at Bryan house is ongoing. Oxford Brookes have undertaken a photographic survey review of the user guide and observation of the handover process, along with access to electricity data collected by the Ewgeco system. In the coming weeks, a series of spot measurement tests are planned, such as air permeability test, MVHR test and U-value measurements to establish the actual heat loss from the fabric.

## **7. Recommendation**

- (1) Acknowledge and enjoy the wide range of cutting edge innovation projects that are being delivered under the Eco Bicester portfolio.
- (2) In addition would the Board indicate if they would like a visit to Zeta's premises to view the work that has been undertaken? If there is sufficient interest a visit will be arranged.