

Project Brief for Architecture Students

Project Title: Active House

Background: An Active Building is described as “a building which supports the energy network by intelligently integrating renewable energy technologies for heat, power and transport.”¹

Active Buildings are designed to maximise both physical and psychological comfort for occupants, with intuitive user controls and interactions with the building and its systems:

- The starting point for an Active Building is an efficient building fabric and optimised passive design to reduce operational energy. Regulated loads are further minimised using energy efficient systems.
- Where practicable building loads are met using building integrated or onsite renewables. In addition to reducing peak loads, and preventing oversizing of plant, the inclusion of electrical (including electric vehicles) and thermal storage allows for multi-vector optimisation to manage the interaction with micro-grids and the national energy network.
- Intelligent control is essential for an Active Building, both for the control of building systems and to manage interaction and trading with the grid.
- Ongoing data capture will enable analytics and insight to feedback into the Active Building design process, and optimisation and refinement of predictive control strategies.

Why is this important?

This supports the government’s mission to *at least halve the energy use of new buildings by 2030*, announced in May 2018 as part of their Industrial Strategy². Making buildings more efficient by embracing smart technologies will cut energy bills, reduce the demand for energy and boost the UK’s economic growth whilst meeting targets for carbon reduction.

Project Scope: A competition called *Home of 2030* has recently been launched, funded by the UK Government to help support the delivery of the Industrial Strategy. Within this, there is a *Young Person’s Design Challenge*, which invites young people between the ages of 11 and 25 to design an innovative and inspirational green home that meets the changing needs of future generations. More information can be found here: <https://www.homeof2030.com/get-involved/young-persons-design-challenge/>.

A home designed as an Active House, using the Active Building concept would fit this brief, while also helping you complete your Technology Module.

Project Objectives: The project involves designing a house based on Active Building principles and the competition criteria. The deadline for competition entries is 28th February, so this will be an 8-week project, commencing on 9th January, with a visit to two Active Buildings: the [Active Classroom](#) and the [Active Office](#), both on Swansea University’s Bay Campus. During the site visit, you will learn more about Active Buildings and have the opportunity to ask questions. The Active Building Centre will then support this project as you develop your designs, providing design guidance throughout.

You will be issued with an Active Building Design Guide, which is being tested as part of a Professional Doctorate research project, so you will be invited to provide feedback on this during the project.

The main objective is to design a house that meets the criteria for the *Home of 2030* competition.

References:

1. Active Buildings transforming construction. 2019. <https://www.activebuildingcentre.com/>
2. Department for Business, Energy and Industrial Strategy (BEIS). 2018. *The Grand Challenge Missions* <https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/missions>

Suggested Further Reading:

Caplan, B. 2016. *Buildings are for People: Human Ecological Design*. Libri Publishing, Faringdon, UK.

Evans, H.M.A. 2016. *How Buildings Work*. RIBA Publishing, RIBA Enterprises Ltd, Newcastle-upon-Tyne, UK.

Lelyveld, T. & Livingstone, M. 2018. *Good Practice in the design of homes, CIBSE TM:2018*. The Chartered Institute of Building Services Engineers, London, UK.

Pelsmakers, S. 2015. *The Environmental Design Pocketbook, 2nd Edition*. RIBA Publishing, London, UK.

Rawlings, R. 2009. *Capturing solar energy, CIBSE Knowledge Series: KS15*. The Chartered Institute of Building Services Engineers, London, UK.

Roaf, S. Fuentes, M. Thomas-Rees, S. 2013. *Ecohouse*. Routledge, Oxon, UK.

Useful Resources:

Better Buildings Partnership: <http://www.betterbuildingspartnership.co.uk/>

Building Research Establishment (BRE) Group: <https://www.bregroup.com/>

British Photovoltaic Association: <http://www.bpva.org.uk/>

Building Regulations: <https://www.gov.uk/government/collections/approved-documents>

CIBSE technical resources: <https://www.cibse.org/knowledge>

Construction Innovation Hub: <https://constructioninnovationhub.org.uk/>

Global Building Performance Network: <http://www.gbpn.org/>

Green Building Store: <https://www.greenbuildingstore.co.uk/>

Green Guide to Specification: <https://bregroup.com/greenguide/podpage.jsp?id=2126>

SPECIFIC IKC: www.specific.eu.com

Supply Chain Sustainability School: <https://www.supplychainschool.co.uk/wal/sustainability/construction/default.aspx>

The Active Building Centre: www.activebuildingcentre.com

The Association of Environment Conscious Buildings (AECB): <https://www.aecb.net/>

The Carbon Trust: <https://www.carbontrust.com/home/>

The Green Register: <https://www.greenregister.org.uk/>

The Zero Carbon Hub: <http://www.zerocarbonhub.org/>

Transforming Construction: <https://www.ukri.org/innovation/industrial-strategy-challenge-fund/transforming-construction/>

UK Green Building Council: <https://www.ukgbc.org/>

UK Research and Innovation: <https://www.ukri.org/>

Usable Buildings Trust: <http://www.usablebuildings.co.uk/>