



Profession

Sustainability Consultant

Current Position

Principal and founder:
Twinn Sustainability Innovation

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Previous employment

28 years with Ove Arup & Partners
Director & Arup Fellow

Nationality

British

Qualification

BSc (Hons) Architectural Engineering
Chartered Engineer 1985

Professional Associations

Honorary Fellow of Royal Institute of
British Architects

Fellow of Royal Society of Arts

Fellow of Chartered Institution of
Building Services Engineers

Corporate Member: Energy Institute

Selected Committees & Roles

The EDGE Think-tank: Committee

UK Design Council: Design Review Panel

Sustainable Development Foundation:
Board member

Solar Decathlon judging panel Dubai
Nov 2018

London Energy Transformation
Initiative (LETI): Committee

Chris is a strategic sustainability adviser with more than 40 years' experience in the design and construction of the built environment. Taking a 'Total Design' systemic approach to integrating planning & policy, architecture, engineering, building physics & economics, he is recognised as a world leader in this field. Meanwhile he continues his in-depth involvement in the practical design and delivery of fabric and systems for environmentally sensitive buildings.

He has demonstrated the ability to recognise the most appropriate design, policy and business solutions, drawing on his extensive experience of applying locally suitable solutions in many different markets around the world.

Much of his recent work has focused on how sustainability can cost less than business-as-usual through a process of questioning conventional technical and institutional practises. A Smart building environment should need smaller & fewer systems and materials, so offering the opportunity to cost less.

"Chris has a unique experience combination covering policy formulation, planning, design and the delivery of projects seeking advanced levels of sustainability"

Selected projects:

BEIS research into low carbon non-domestic HVAC

Examining technology options for retrofitting low and zero carbon HVAC systems into a range of non-domestic building types. Included wider industry workshops with CIBSE, technical parameter research and output reviews for the creation of policy modelling software.

Kinyinya Hill, Kigali, Rwanda

Masterplan for 135,000 population Kigali urban extension. Technical, economic, policy and governance strategic input for delivering advanced zero carbon, water autonomy, transport modal shift and 80% affordable homes for less than business-as-usual costs. Collaboration with SWECO consultants Sweden, drawing on best of European and African high-density urban design and Smart systems thinking. Development of cost valued resource-use targets, with IFC Edge-buildings localised cost benefit tool for establishing 50% reductions for building energy use, zero carbon, 50% water reductions and 65% embodied energy reductions.

Silvan Grove mixed use development, London

Strategic design and planning advisor to developer Joseph Homes for 220 homes and 3000m² commercial development in a 30-storey high density constrained city site. Advanced high efficiency 'fabric first', 'Heat Autonomy' homes and Smart fitout standards for delivering increased occupiable space and less plant, within standard cost benchmarks. Targeting operational energy consumption of 70% better than current building regulations, with in-built route-map to zero-carbon.

UKGBC Advancing Net Zero Task Group: Management Committee

Haringey: Quality Design Review Panel

Highams Park Neighbourhood Planning Group: TWG chairman

Highams Park Community Interest Company: Director

CIBSE: HVAC SIG vice-chair

CIBSE: Sustainability Guide L task group Committee

CIBSE: AM10 Natural Ventilation in Non-domestic Buildings - co-author

CIBSE: Natural Ventilation SIG Committee

Chatham House: Specialist advisor

English Heritage: Urban Panel

China Green Building Council – UK Chapter Committee

UK-China Eco-cities and Green Buildings Group

BRE: Global Sustainability Board member overseeing BREEAM/CSH

RIBA: Sustainable Futures Committee.

RIBA: Building Regulation Part L Review Group.

UK-GBC: Ambassador.

UK-GBC: Zero Carbon Non-domestic Taskgroup chairman

UKGBC: Zero Carbon Definition Task Group.

UKGBC: Pay as You Save (Financing Low Energy Refurbishment in Housing) Task Group.

UKGBC: Policy & Technical Rapid Response Team

Zero Carbon Hub: Compliance & Policy Assumptions Task Group.

London First: Decentralised Energy Steering Group

CIBSE/RIBA: Architectural Guide to Building Services: management committee

CIBSE: Guide B Ventilation & Air Conditioning: management committee

CIBSE: AM10 Non-domestic Natural Ventilation Application Guide management committee / co-author

Building Regulation Part L CIBSE peer review group

Residential ‘Heat Autonomy’ (how to design-out district heating)

Research project exploring the cost ‘sweet point’ where eliminating conventional heating systems funds enhanced envelope fabric for high-density urban dwelling permitting internal heat gains to be the heat source for both domestic hot water and space heating.

Rockingham Street Office Tower, London

Strategic design advisor to developer Joseph Homes for office development on high density constrained city site, proposing advanced high efficiency ‘fabric first’ and Smart fitout standards for delivering increased occupied space and less plant, but within standard cost benchmarks. Targeting operational energy consumption of 60% better than current building regulations, zero-carbon for regulated energy and 10% reduced embodied energy use.

Kota Harapan Indah, Jakarta, Indonesia

Technical, economic, policy and governance strategic masterplan input for 150,000 population urban extension masterplan. Collaboration with CPG Consultants of Singapore, to deliver the best of European and East Asian high-density urban design and Smart systems thinking. Development of cost valued resource-use targets, with IFC Edge-buildings as localised cost benefit tool for establishing 50% reductions for energy, water and materials impacts.

Madinat Al Irfan Masterplan, Oman

Brief preparation, client design advisor / design review and design team selection for 5 million m², 280,000 population mixed-use urban extension seeking ‘Next stage’ sustainability - to deliver 50% energy, 50% water, 50% car-use reductions, while doubled GFA, all at less than benchmarked capital costs. Involved new delivery governance framework, which has now commenced on site. Client was Omran, the Omani government’s development corporation, masterplanners were Allies and Morrison and infrastructure engineers Arup.

Design Companion for Planning & Placemaking, chapter author

Published by UDL/RIBA in 2017, with associated planning officer training on topics including environmental standards, microclimates and impacts of tall buildings and their clustering

Dudley College Advance II, England

Passive environmental strategic design for a new faculty building as part of an integrated design and responsibility team (IPI and Constructing Excellence demonstrator). Working as a key member of the contractor’s team and their supply chain to deliver high performance building with advanced low energy use at significantly lower than normal capital resource use and running costs.

Urban Design London

Lecturer and coach for planning officer and councillor training. Focus on social technical and planning process, covering environmental standards, urban design principles, innovation opportunities, current policy critique, new policy formulation and negotiation approach. Includes a particular stream on high-rise building energy, microclimate and environmental issues.

Research project for evolving UK new energy building regulations

Led the EDGE think-tank preparation of an industry thought piece performance-based alternative to the current process-compliance

Selected publications

'Heat Autonomy - Life after District Heating' author of peer reviewed technical paper CIBSE National conference April 2019

'The Design Companion for Planning and Placemaking' chapter author UDL/RIBA Publishing 2017

'Professionalism, sustainability and the public interest: what next?' technical paper, Building Research & Information, 41:1, 123-128, Routledge 2013

The EDGE Futures series: Globalism and Regionalism, with Jonathan Porritt, Black Dog Publishing 2008

'Mixed-Mode Ventilation Design' CIBSE Applications Manual 13:2000, section author

'Urban Office' chapter author 'European Directory of Sustainable & Energy Efficient Buildings 1997', James & James

'The New Parliamentary Building' (Portcullis House) author of technical paper CIBSE National Conference 1997

'Passive control of relative humidity to $\pm 5\%$ ' author of technical paper CIBSE National Conference 1997

'Urban Office of the Future?' CIBSE Journal March 1996

Selected Awards

Building Services Engineer of the Year: H&V Awards 2002 for BedZED

Air Movement Product of the Year: H&V Awards 2002, for BedZED wind cowls working with specialist contractors, academics and suppliers

Building Services Engineer of the Year: H&V Awards 1996

Green Building of the Year: HVAC Awards 1996, for Inland Revenue Centre Nottingham

Green Building of the Year: HVAC Awards 1996, for Queen's Building Anglia Polytechnic University

Building Regulations. Involved harnessing Smart systems monitored in-use new homes performance. Draws on first-hand experience of using similar principles in the Australian NABERS assessment system.

Chatham House: UK-China Bilateral Reform and Innovation Forum

UK delegation team member to the PR of China. Forum established in 2014 by Premier Li Keqiang and Prime Minister David Cameron. Involves minister level UK-China engagement (Ministry of Housing, Urban-Rural Development), identifying best practice exchange.

Jersey Archive Building, Channel Islands. (original building & subsequent extension)

Feasibility, outline and detailed design for a new archive and repository building. Passive environmental control to achieve PD5454 $\pm 5\%$ relative humidity close-control using only passive moisture and thermal abilities of the building fabric with natural ventilation. Lead R&D for developing analytical techniques and building physics software, the design and site implementation, and in-operation monitoring. Subsequently used environmental monitoring feedback analysis to input into design of further phase zero-carbon enabled and designed to below conventional cost benchmark.

UK National Audit Office Sustainable Buildings

Study to generate a profile of the relative sustainability of recent government building projects and value for money in assessing sustainability objectives. Fieldwork and analysis to benchmark government buildings in sustainability terms and interviews to establish how value for money concerns are being incorporated and whether there are lessons from alternative approaches used in the public and private sector.

Barangaroo Development, Sydney

500,000m² mixed use, carbon-neutral, water-positive, high-density urban new-build winning project on behalf of developer Lend Lease. ESD training for local team, design concept testing for masterplan and for subsequent phase one high-rise offices / mixed-use buildings.

Dongtan Eco-City, Chongming, Shanghai

Masterplanning, concept design, technology testing & associated business strategy for energy aspects of a carbon neutral city to allow a 'one planet' lifestyle Eco-footprint. Involved developing the governance and end-user engagement mechanisms together with proof of technical systems reviews. Outline business model for procuring utilities and its influence on technical design solutions.

Construction Industry Council ZCB Building, Hong Kong

Initiated the idea for a Zero Carbon demonstration building in the Kai Tak Kowloon City District regeneration area to act as a trigger for local debate about carbon reductions. Designed to harness passive design features, including natural ventilation for a humid climate. Responsible for competition winning concept building design and then assisted local engineering design team and architect Ronald Lu & Partners, through to detailed design.

Selected projects – continued:**UK-China Eco-cities and Green Buildings Group**

Best Practice Guide preparation and associated engagement with Chinese municipal policymakers, sponsored by the UK Government Prosperity Fund and the Chinese MOHURD and Finance Ministries. Publication seeks to illustrate the best of UK practice published in June 2012. Member and author contributor to finance section committee.

Deir Al-Surian Library & Archive, Egypt

Designer for a new 3-storey plus basement library and archive building within the grounds of the Al-Surian Monastery seeking to provide a low capital & running cost, locally appropriate, solution for storage of unique historic manuscripts. Harnesses the local climate matched with appropriate construction materials and details, to provide a completely passive approach without any air conditioning, thus mimicking the successful artefact preservation over the previous many hundreds of years. Responsible for the concept design of building physics and mechanical systems.

Policy consultation responses

Lead collaborator for consultation responses on the National Planning Policy Framework 2018, the London Plan 2017, the London Environmental Strategy 2017. Organised consultations and prepared drafts for the EDGE think-tank, LETI and CIBSE.

California Academy of Sciences, San Francisco.

New natural history museum that fully integrates green building features to reflect its mission to protect the natural world. Includes a naturally ventilated 5500m² 3-storey exhibit hall, research laboratories, naturally ventilated open offices, classrooms, an auditorium, an organic cafeteria, and five levels of collections housing 18 million natural history specimens, achieving LEED Platinum environmental rating. Responsibilities for the strategic and detailed design of natural ventilation environmental control systems.

Kings Cross Central, London

Preparing the masterplan strategic energy and water resource advice and the planning application Energy Statement for 800,000m² redevelopment & regeneration project.

Bow River Village

Strategy research and development of a tailoring German 'Passivhaus' standards to UK climate, cost benchmarks and construction capabilities, working with Southern Housing Group on high-density affordable homes. Aiming for significant energy, occupant bills and maintenance cost reductions, as well as redirecting capital to delivering more homes and less infrastructure. Governance input for

appointing design team & implementation, and planning application strategy.

Sylvan Grove mixed use development, London

Design input for the development of low-energy residential high-rise tower and ancillary mixed-use buildings. Strategy research and development of a 'net-step' passive-first design for UK climate, cost benchmarks and construction capabilities, aiming for 50% better than current building regulations.

Good Homes Alliance Dwelling Overheating Project

Preparation of strategic stage design advice to assist planning officers identifying projects where overheating is likely to become an issue, particularly with high-density homes.

Chinese 12th Five Year Plan Consultation

Formulated response to PRC National Development and Reform Commission's Open Request Campaign for improving the Construction Industry's response to the carbon emission targets for buildings and associated infrastructure.

UK Commission for Architecture & Built Environment Sustainable Cities Manual

Contributing author and technical advisor for the preparation of a manual for town planners and associated professionals

Beddington Zero-energy Development (BedZED), UK

Mixed-use sustainability development of 85 homes. Designed to be zero fossil energy using advanced low energy building design with carbon-neutral biomass CHP. Extensive water and materials recycling. Photovoltaic solar power generation for electric cars. Responsible for concept, design and implementation for buildings services, building physics and energy systems. Likewise, for the design concept, development and testing of wind powered heat recovery ventilation cowls. Involved working closely with innovation research partners.

London 2012 Olympics Utilities Procurement

Initial concept design of site and legacy as extension of the Stratford City development energy strategy. Procurement strategy & financial model for transfer of capital procurement to energy services company (ESCo).

Stratford City & 2012 Olympic Village, London

1,200,000m² mixed-used development with 300-unit retail centre. Development of sustainability strategy, including pathway to 80% carbon reductions and community wide energy systems together with associated planning offer. Collaborated on developing and establishing the governance framework for subsequent teams to implement across the site.

New Parliamentary Building (23,000m²), Portcullis House, Westminster, London

Building fabric thermal capacity used to control indoor climate. Night ventilation natural cooling. Highly integrated services, structure and architecture. Ventilated facade with full heat recovery. Direct aquifer cooling source. Low energy use services systems. Responsible for building physics and mechanical systems concept and detailed design. Involved close collaboration with academic colleagues for testing the extent to which passive environmental control could displace conventional mechanical systems.

Hermes Responsible Investment, London

Develop a 'cost benefit analysis of sustainability improvements' for Hermes Real Estate Investment Management Ltd real estate assets. Builds on existing knowledge, tools and systems developed in-house over the last 15 years.

Lancaster West Estate Refurbishment, London

Architectural ideas stage of residents' co-design upgrade for more than 1000 homes. Invited collectively by the top name architectural practices involved to work with them to help identify worldwide environmental and refurbishment best practice. Involved extensive face-to-face collaboration with residents on knowledge building and optioneering.

New United States Embassy in London.

Developed the environmental sustainability brief / program for the US Department of State. Involved proposing benchmarks and testing them against political, planning and operational issues and then providing guidance on solutions.

Vanke Beijing Green Building Park

Design leader for the first phase of an innovation park to demonstrate future best practice in PR of China. The Visitor's Centre building design targeted 'true operational zero carbon' and BREEAM 'Outstanding' environmental assessment.

Samsung Zero-energy House, Seoul

Carbon neutral demonstration building with on-site energy autonomy & 80% water use reduction as part of the first LEED® Platinum certified project in East Asia. Responsible for team delivering concept design and implementation design checking.

Kingspan Zero-carbon Lighthouse, UK

First completed building to achieve Level 6 zero-carbon of the UK's new Code for Sustainable Homes. Concept, detailed design and site implementation for building physics & building services systems.

Bickleigh Downs Eco-village, UK

Concept and detailed design for a 90-home new development to deliver net 'Zero Energy Bills' - going

beyond zero carbon as part of a more customer focused sustainability design approach for a major contractor

The Crystal, Siemens Urban Sustainability Centre, London

Expert technical advisor for public exhibition. Specialist sustainability consultancy review and advice on strategic public messages for exhibition, worldwide case-studies selection, examples of best practice legislation & policy. Building certified with the highest grades of BREEAM 'Outstanding' and LEED 'Platinum'.

Hanham Hall Carbon Challenge, Bristol, UK

Working for national house builder Barratt on the design of the first English Partnership Zero Carbon development. Responsible for energy systems concept design and sustainability assessment.

Pennbury Ecotown, Leicester, UK

Team member developing the masterplan for a new zero carbon town of some 15,000 homes and 20000m² mixed use. Overseeing energy concept design and sustainability concept coordination.

Inland Revenue Centre, Nottingham (40,000m²)

Concept design for first office building to achieve maximum BREEAM environmental assessment rating. Natural ventilation with passive cooling and stack ventilation extract. Involved working closely with academia and industry researchers to develop new analytical prediction and verification techniques.

English Partnership Energy Strategy

Study to develop a range of options to assist the development of energy and service supply strategies on all EPs future development activity. Energy services consultancy including financial and organisational modelling. Involved developing a bulk data and grouped parameter analysis technique software.

Adapting to Climate Change Publication

Authorship of a Best Practice Guide for Developers for the South East Climate Change Partnership of south east England regional authorities. Research, review and critique examples of best practice to support planning authorities as they formulate local policies and negotiate development planning applications.

Jubilee Wharf, Penryn

Community focused mixed-use waterfront regeneration development. Local, reclaimed and low environmental impact materials. Super-insulated with high thermal mass & heat recovery wind cowl driven natural ventilation. Extra low water demand & low electrical demand systems. Renewable energy includes wood-pellet boilers, solar hot water, solar PV & wind turbines for delivering zero carbon

Earth Centre Conference Building, Doncaster

Solar collectors fuelled heating via inter-seasonal heat-store. Wind powered ventilation with heat recovery. Photovoltaic solar and wind turbine power generation. Recycled and low embodied materials. Concept and detailed design for building physics, energy systems and building services.

Anglia Polytechnic (Ruskin) University, Queen's Building Learning Resource Centre, Chelmsford

6000m² atrium stack-driven building, natural ventilated with night purge system to provide 100% natural cooling. Low NO_x condensing boiler installation. EU funded demonstration project. 1996 Green Building of the Year finalist.

National Energy Foundation Headquarters, MK

Natural cooling, natural ventilation & exemplar low energy use and low capital cost office building. Project engineer designer.

Noble House, Linford Wood, Milton Keynes

BREEAM 'Excellent' rated low-energy speculative office buildings (5100m²). Trailblazer project using the newly introduced (in 1991) world-first building design environmental assessment system. Project mechanical engineer.