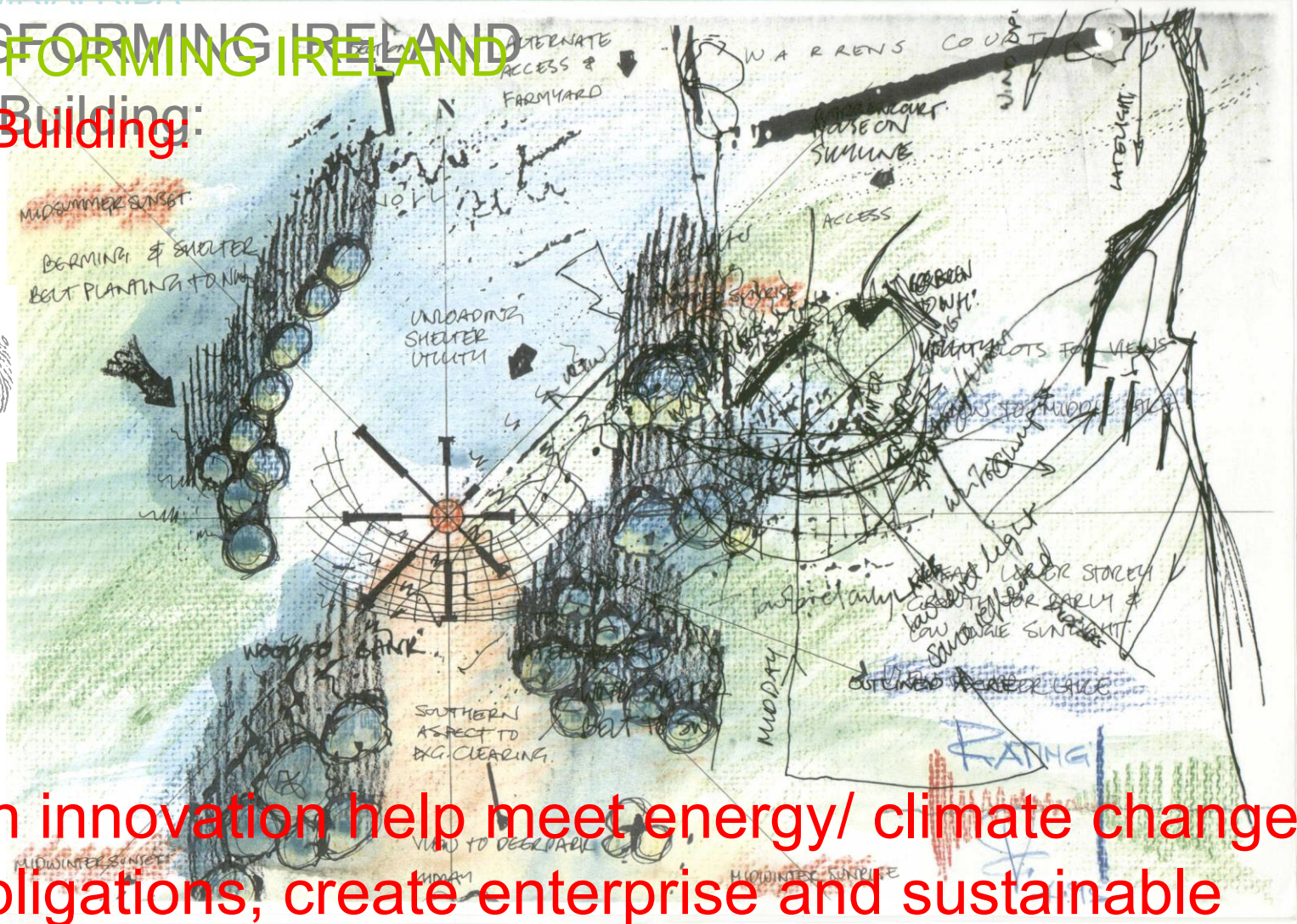


Sally Starbuck, Paul Leech: Gaia ecoteecture

BA BArch MRiA RIBA
BA BArch MRiA RIBA

TRANSFORMING IRELAND

Green Building:



- Can innovation help meet energy/ climate change obligations, create enterprise and sustainable economic development?

Ecological architecture, economy follows expression

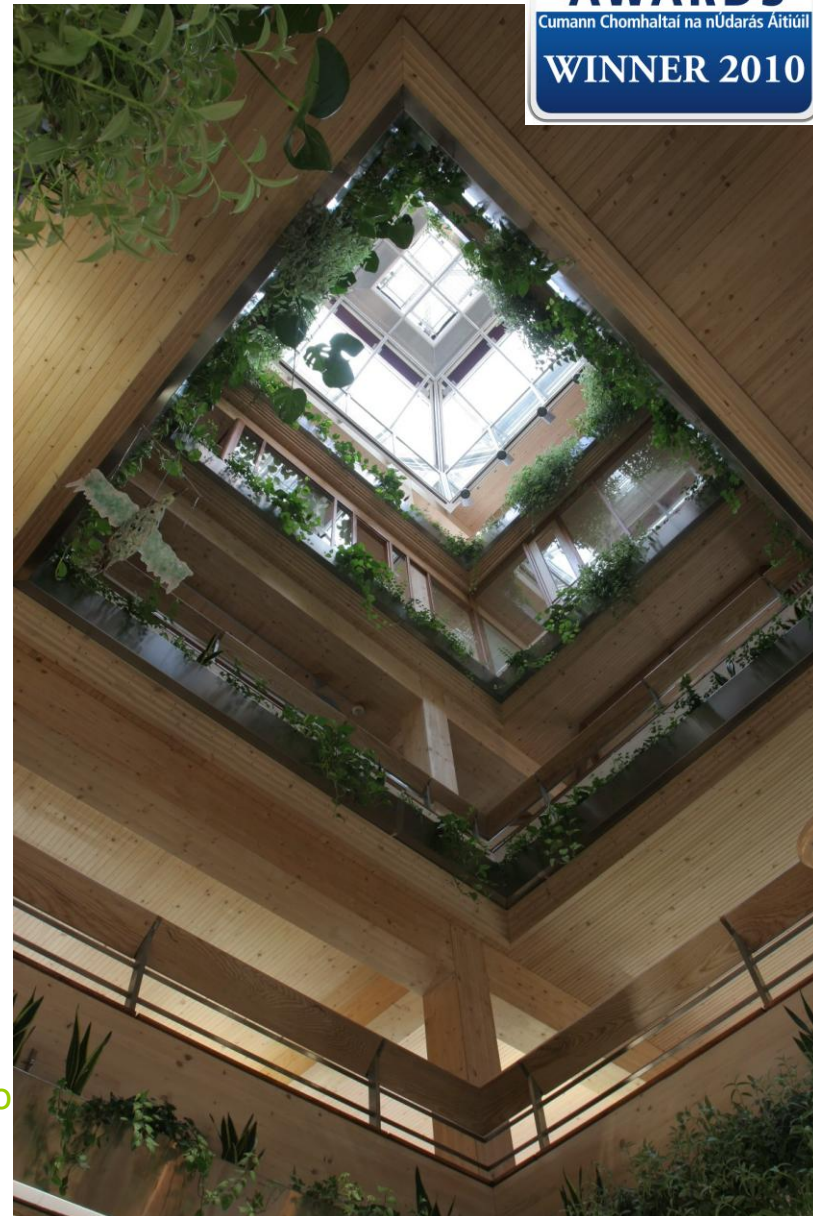
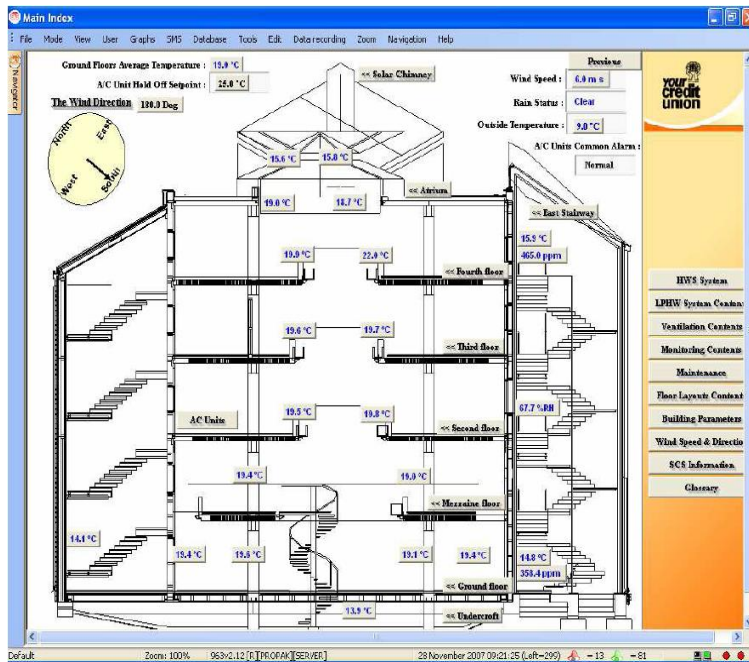
ECO-TECTURE reduces Life Cycle consumption, Smart vernacular



eg. Unite D'habitation, Marseille, by Le Corbusier



5 storey timber-frame office building for NCU



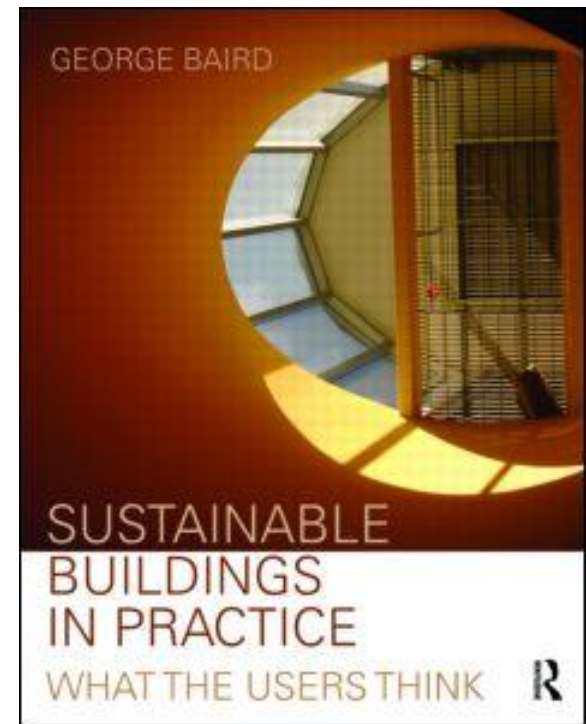
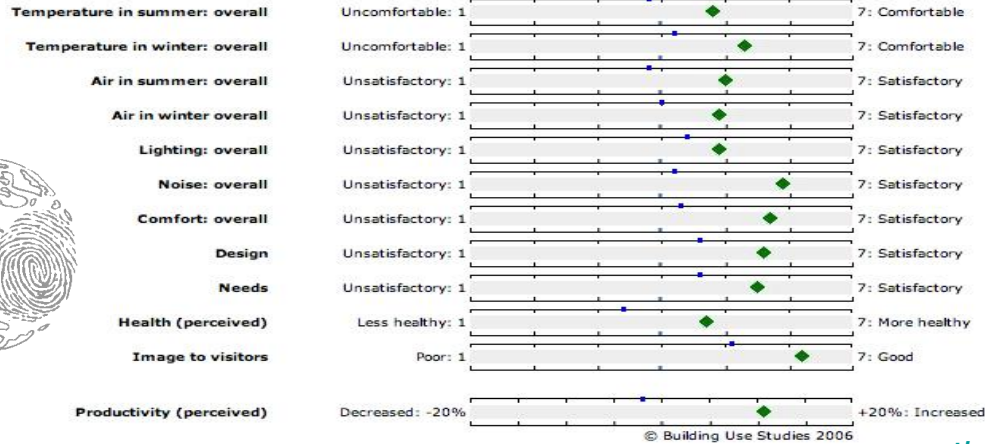
IMPACTS re ENERGY/ CLIMATE CHANGE:

-**Natural ventilation**, including bespoke Venturi© rooflight & solar chimney devices (~1050kWhrs/yr displaced)

-**Embodied energy saved by the timber** (vs RC structure) \approx 1 Million kWhrs of primary energy = 383 tonnes of CO₂ avoided; ie 206,046m³ of CO₂ being a cube of \sim 60m per side, or \sim 64 times the cubic volume of the building. Lighter structure also saved CO₂ in foundations

Energy efficiency & beyond

NCU Post-occupancy evaluation (POE)



among the top 5% of all buildings surveyed by the usable buildings trust

Features, for a Community-owned owner-occupier: Timber structure of 5 storeys, solar heating. Passive cooling. Solar chimney. Rainwater harvesting. Low-embodied-energy fabric of clay, cellulose etc. Deciduous shading. Gas heat pumps. Sedum roofs. PV solar powered servos on windows, vents, pumps, dampers, fans. BEMS tuning following 3 years of monitoring





Paul Leech: GAIA ecotecture

INNOVATION

- Roundpole frame,
- Metal connectors
- 3D free-form
- Sprung Ash pole decking
- Local turf roof
- High spec glazing
- Heat pump

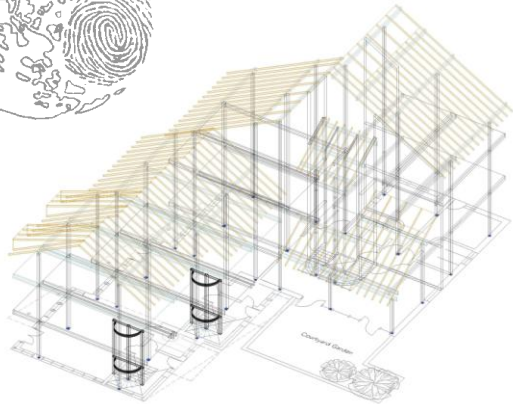


Passive solar & wind-modelled design

Live-work building, Co Mayo

Low Carbon, net zero Carbon (sequestration)

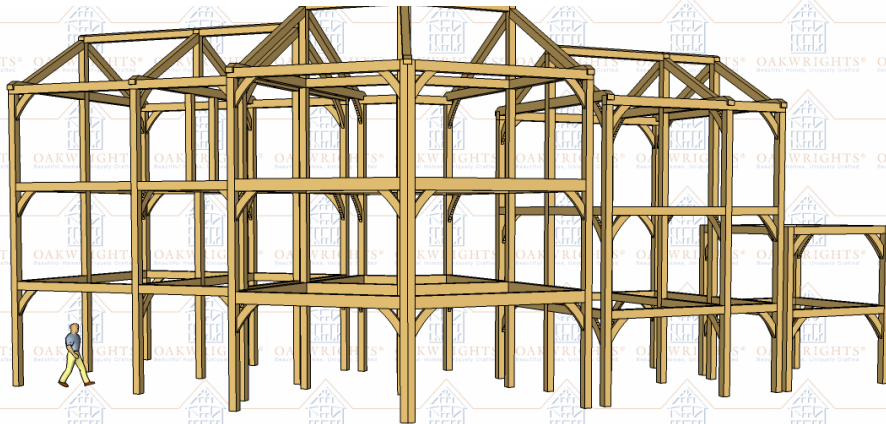
Green oak



Hemp lime

Low embodied energy construction materials eg Tradical® Hemcrete® 'a **viable alternative to masonry construction for mainstream projects**'.

Fire officer approval for detailing of Protected Stairs in timber frame with hemp-limecrete/hempcrete/ lime-hemp or hemplime; substantiation as material of limited combustibility. Fire safety design to resist a four hours test at temperatures of up to 1,800°C.





Paul Leech: GAIA ecotecture

- **Wind affects**
- **Energy & maintenance**



GFL 90.0

live-work units A13 & A14

view from Market Place

East community building #2

**Community Building
& 2 live-work units**



Paul Leech: GAIA ecotecture



- **Site specific design, local conditions and micro-climate...**
- **digital modeling, software...**
- **Solar orientation, occupancy patterns,**
- **Wind shelter,**
- **Noise & Acoustics,**
- **Activity**

Community Crescent- Live Work units – planning stages, financial model

Architect in the Community Scheme 'Art & Chi-Tecture' workshop:



- Art & Chi Tecture workshops
- 1 for each of 3 groups of (10) Clusters to explore 3D spaces between buildings & opportunities for collaborative design



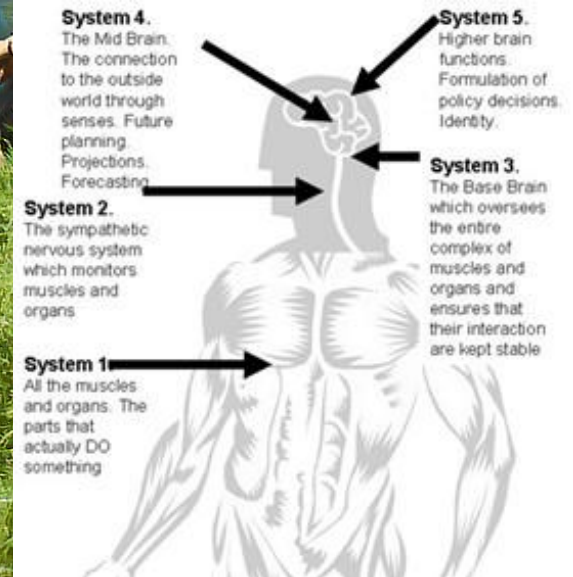
Issues brought forward to house construction phase

ref Max Comfort

BER required at early stage for
70kWhrs/sq.m/yr

- RW Harvesting for individual buildings
 - Shared laundry facilities
 - Washing lines
 - Water quality
 - Refuse & recycling areas
 - LANDSCAPING
 - 'As Built' infrastructure
 - TIME
- Slippage impacts on agreed sequence
- Unsold Sites/ Planning permission
 - Pegging out folios

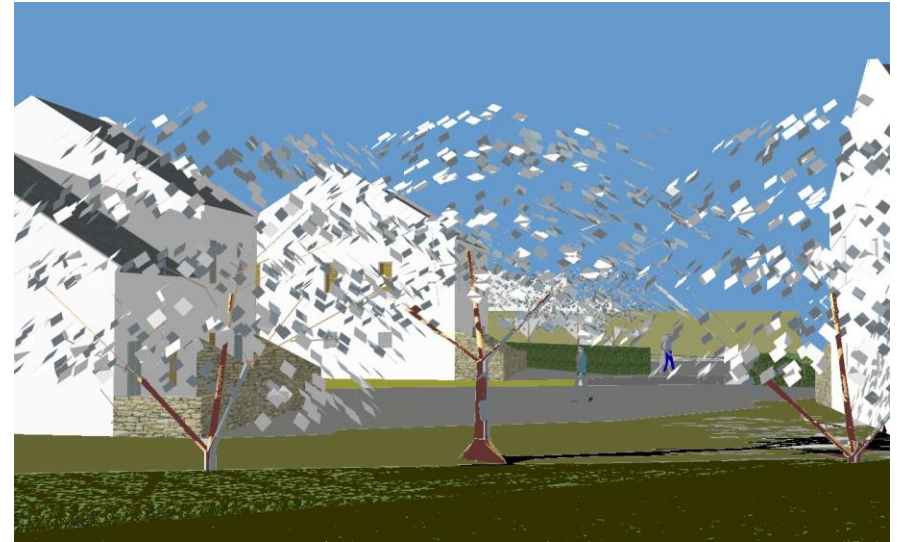
VIABLE SYSTEMS MODEL...



Environmental impact, includes energy...

EIA screening: Qualitative & quantitative assessment of;

- a) Planning policy documents
- b) **Landscape** designation
- c) Highway matters (road safety)
- d) **Human beings and community**
- e) Pollution (**wastewater**)
- f) **Flora, fauna and geology**
- g) **Loss of agricultural land**



- h) **Waste Disposal**
- i) Extraction of minerals
- j) **'external' effects** eg **utilities**
- k) **Pollutants**
- l) **Economy**
- m) **Footpaths**



BASELINE, IMPACT, MITIGATION

Expert group meeting for UNIDO, Beijing, May 2008, towards a network of ecovillages in China:

- sustainable rural development;

ENERGY, domestic use of Biogas, food production etc



NB. Ireland ranked 78th vs China's 20th
on New Economics Foundation's
'Happy Planet Index 2.0'

(a function of average life expectancy, satisfaction
rating and ecological footprint)

Or

ecological efficiency in producing well being

Linking green building to local economy

Impact of global population growth, expansion of cities;

- **Livelihood**, enterprise, sustainable economic development
- questions ownership/ tenure, affordability, land use...
- Community Land Trusts, One Planet Communities;

eg. Hen-Dy ecovillage, Abersoch, Gwynedd, North Wales

The Village, Cloughjordan, North Tipperary

& Beijing region, China

& Somerville ecovillage, Western Australia

& Lochiel Park, Adelaide, South Australia

Meeting room, The Rivergreen Centre, Durham
by Jane Darbyshire & David Kendal Architects

Examples & expertise

Lochiel Park, Adelaide, South Australia



www.lochielpark.com.au

community portal

www.lochielparkonline.com.au



www.somervilleecovillage.com.au

European precedents

Bedzed, Surrey (Bill Dunster)



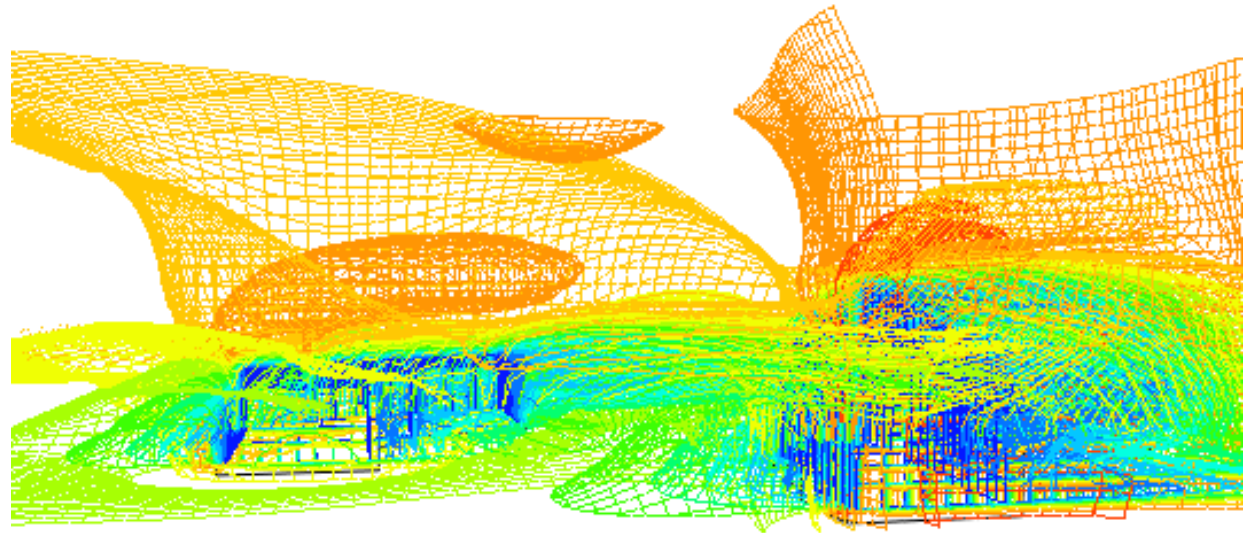
Springhill
e-cohousing,
Stroud, Glos.
(Architype)



Bruno Erat,
Finland
Gaia International



Paul Leech: GAIA ecotecture



© COPYRIGHT
Sept 2010

Sally
Starbuck
BA BArch RIBA MRIAI

sallystarbuck@gaia-ecotecture.eu

