



## Eco-retrofit

# Products / Technologies: Lessons learnt from Radian retrofit projects

Implications for sustainable building products & technologies  
29<sup>th</sup> June 2010 – Blake Lapthorne

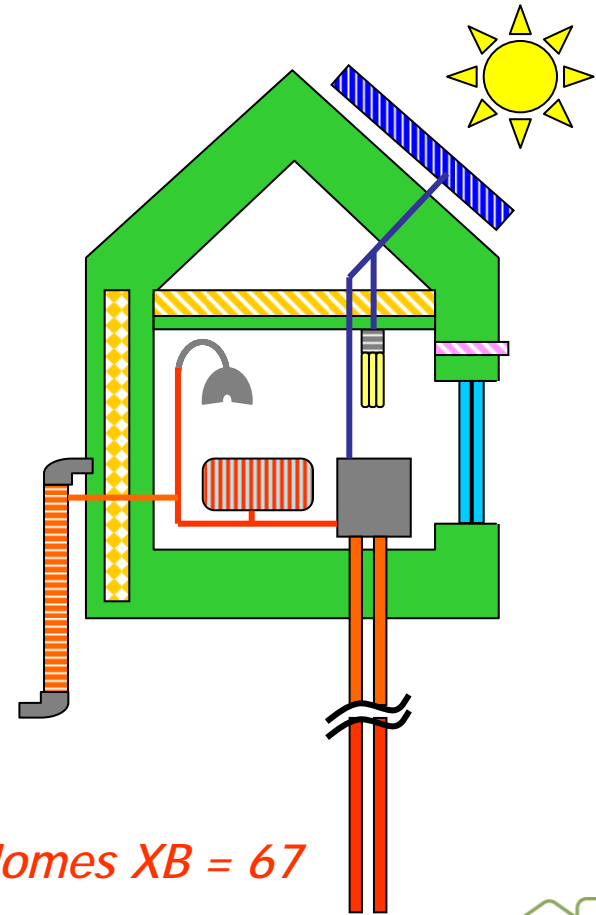
Paul Ciniglio – Sustainability &  
Innovation Manager, Radian



# “Generation Homes” project

## Woodfield, Kingsley – Dec 06/Jan 07

- Partnership with EST & Camco to demonstrate significant household CO<sub>2</sub> emission reductions on 6x1950's homes (min 60% target, 75% modelled)
- Aim to reduce residents running costs by up to 50% (as high as £1,300pa before)
- Sophisticated monitoring installed
- Average cost £25,000 per property (50% grant income, EST, LCBP & CERT)



*EcoHomes XB = 67*

# “Generation Homes” project cont’d...

## Package of measures installed:

- **Energy efficiency:**
  - Cavity wall insulation
  - Loft insulation 300mm
  - Double glazed windows
  - Low-energy light bulbs
  - Draught proofing & heat recovery ventilation
  - Waste water heat recovery
- **Renewables:**
  - Ground source heat pumps
  - Solar Photovoltaics 1kWp



# Feedback on 'Generation



## Homes' project - 6 x 1950's homes 2007

- Independent review undertaken by Camco (Covering social, economic and environmental aspects with interviews of residents)
- Study findings (based on 2 years post completion data)
  - CO2 emission reductions in use: **43 - 74%**
  - Running cost savings: **0 - 56%**
  - Resident satisfaction is mixed
  - Further briefing to residents required
- Report added to Radian website



# C80 project 2009

- Gas baseline reduction: C79% in regulated emissions (C67% against total household emissions)
- Electric baseline: C85% regulated (C76% total emissions)
- UK Government target is for 80% reduction against total emissions!
- Behaviour change / smart devices and efficient appliances required
- Retrofit for Future TSB project



**EcoHomes XB = 81**

Energy Efficiency Rating

	Current	Potential
Very energy efficient - lower running costs		
(92 plus) <b>A</b>		
(81 - 91) <b>B</b>	85	85
(69 - 80) <b>C</b>		
(55 - 68) <b>D</b>		
(39 - 54) <b>E</b>		
(21 - 38) <b>F</b>		
(1 - 20) <b>G</b>		
Not energy efficient - higher running costs		
England & Wales	EU Directive 2002/91/EC	

The energy efficiency rating is a measure of the

New EPC for advanced package



## **‘Retrofit South East’ project**

### ***Building capacity for low carbon retrofit in the SE region.***

- Application submitted under SEEDA ERDF round 2 in 2009 ‘Promoting sustainable production and consumption’ category.
- Rule change last year allowing 4% of structured funds to be spent on housing retrofit activity.
- Value of grant offered £421,000 (match funded by capital works – total project value £842,000).
- Funding has enabled project to go from a very good scheme to an outstanding one.
- 18 month research based project (10% capital works).
- Project commenced in September 2009.

# The proposed project:



## Borough Grove – REEMA Phase II

- Centrepiece of project is the exemplar retrofit of community of 14 social housing properties to
  - C75 - C82 energy efficiency standard
  - Design strategy follows energy hierarchy
  - Best practice water efficiency and construction waste techniques



# Core project activities:

- **Research & evaluation of refurbishment impacts**
  - Production of case studies quantifying environmental benefits and costs
- **Mapping of SE low carbon exemplar refurbishments and establishment of ‘Retrofit SE networks’**
  - Regional map of exemplars, create network of practitioners
  - Social Housing ‘Refurbishment Pioneers’ network stimulating early replication (Workshop2)
- **Regional impacts & benefits study**
  - Regional benefits report to identify job creation, business growth, environmental benefits etc
- **Finance model for the South East**
  - Recommendations for conceptual model to support wide scale take up in both public and private sector housing through stakeholder consensus workshop (Workshop1)
- **Skills development & training**
  - Training courses to 100 organisations including builders, specifiers & owners. Training recruitment has commenced.

**RETROFIT**  
South East

**RADIAN**  
where people flourish

Refurbishment of 13 existing homes to exemplar Energy Efficiency Standard

All enquiries to:  
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Telephone: 01730 403200 Freephone: 0800 722549  
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EUROPEAN UNION  
European Regional Development Fund

**SEEDA** SOUTH EAST ENGLAND DEVELOPMENT AGENCY  
Working for England's World Class Region

Radian is working in partnership with

camco Drum Housing parity projects GLOBAL ENVIRONMENTAL SOCIAL BUSINESS RADIAN

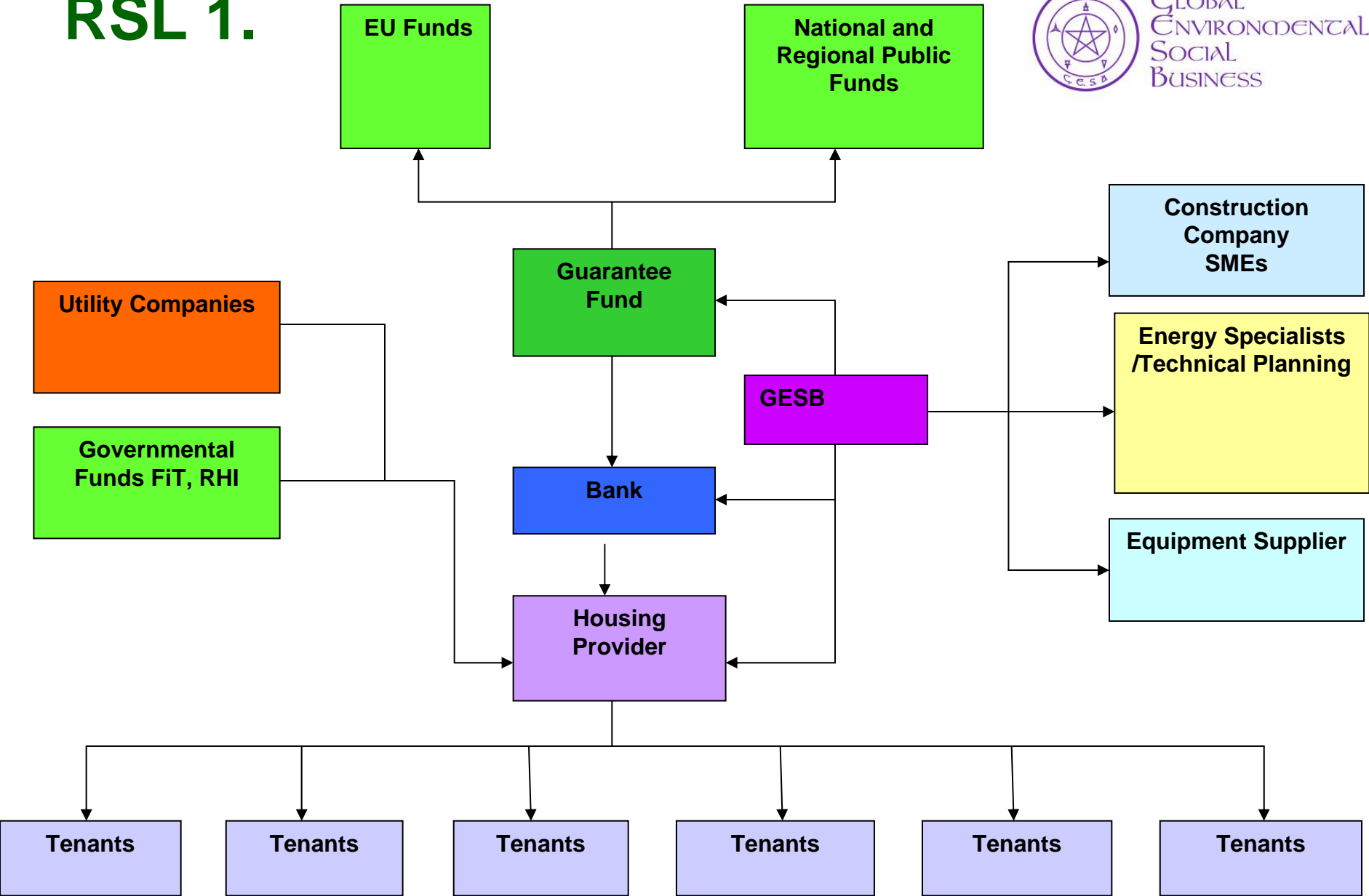
and in-house contractors

Turning yesterday's houses into the homes of tomorrow





# RSL 1.





- C80 'open home' with SEA
- Features: Solar PV 1.85kWp, Solar Evac tube, ASHP, 'A' rated windows, heat recovery ventilation, LED/CFL lighting, improved insulation and air tightness (2 bed mid-terrace).
- Cost: £30,000 for energy efficiency related works:  
£7,500 grant funding  
South Downs JC and LCBP.  
(£40,000 total cost of retrofit project).



Before, May 2009



December 2009



# Micro-generation performance review



Technology / assessment criteria	(a) Ease of installation	(b) Reliability	(c) Performance against design expectations	(d) Running costs	(e) Environmental performance	(f) Ease of resident control	(g) Resident satisfaction	(h) Value for money	(i) Grants and financial incentives	(j) Ease of maintenance and servicing	Overall score (1 – 100)
Sunergy endothermic heating system	2	3	2	3	4	5	2	1	5	5	32
Ground Source Heat Pumps	4	5	6	5	7	5	6	5	8	7	58
Air Source Heat Pumps	6	4	5	5	6	6	6	7	8	7	60
Exhaust Air Source Heat Pumps (NIBE)	5	5	6	2	4	3	3	6	6	4	44
Solar thermal	8	8	8	8	7	8	9	8	8	8	80
Sun warm system (Nu-Aire)	8	7	4	3	3	6	6	3	7	8	55
Photovoltaics (PV)	9	10	10	9	10	10	10	7	10	10	95
Rain Water harvesting	5	6	9	7	7	9	8	2	1	7	61

## Existing Homes project

- 28 existing homes (built in 1970's)
- Water consumption meters fitted
- Eco-beta fitted to WC's, showers and water butts
- Surveys on household behaviour
- Before average consumption was 167 litres p/p/p/d
- After average consumption was 136 litres p/p/p/d
- Retrofitting the eco-beta device to toilets was the most effective measure and can reduce water consumption by 20%.
- An Eco-beta costs £25 approx and takes approx 15 minutes to fit.



*“The device works by interrupting the vacuum created when a toilet is flushed, thereby achieving a small flush” <http://www.ecobeta.com/siphon>*

# A final thought...

## 'Carbon value' - retrofit versus new build

Carbon emissions saved by 1 x C80 retrofit  
is comparable to the  
Carbon emissions saved by 3 x Code level 6 homes  
and at approximately one third of the cost!

Thank you



The 2007 South East Low Carbon Awards

