



Building Brighter Futures...

for people and communities



Reducing Energy demand in New Homes and Retrofit Projects (A Practitioner's perspective)

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Workshop outcomes:

At the end of the session you should:

- Understand how your organisation will prioritise and tackle fuel poverty and reduce CO2 generation
- Determine whether your organisation is committed – what investment
- Question how your residents will be involved and consulted
- Identify which stakeholders need to be involved in delivering a low energy investment programme
- Understand that lots of small steps can take us a long way

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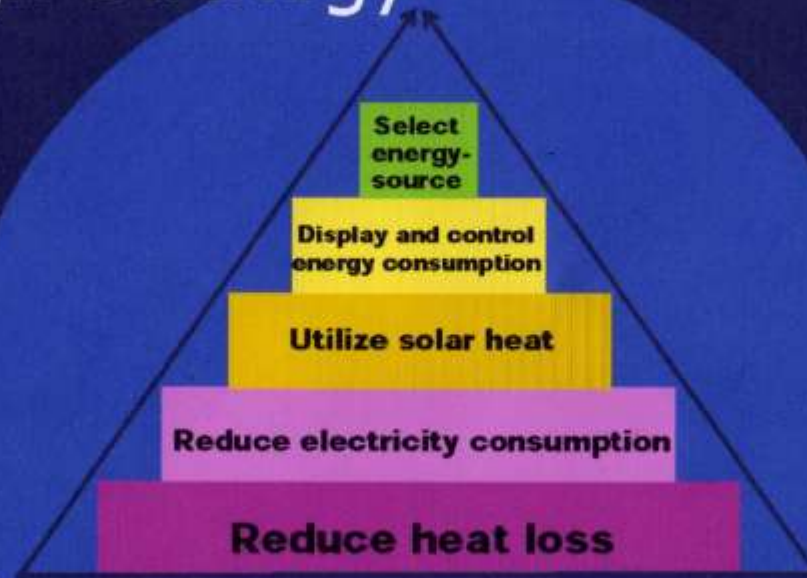
i.e. where/how/why do we want to invest

Social Housing v Low Energy Housing?

Key challenge and focus is to:

- Reduce energy demand/CO2 emissions
- Tackle fuel poverty
- Create sustainable communities
- Identify capital investment/grant funding
- Challenge policy to 'recover' additional capital cost where tenant 'savings' identified – Rent increase??
- Convince residents tackling climate change is more important than a new kitchen - dialogue
- Where feasible/cost effective adopt new (renewable?) technology

Design Strategy



The Kyoto Pyramide
Passive energy design process

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Passivhaus v Passive House

Passivhaus

- More suited to new build (design from blank sheet)
- Aims to use natural factors where feasible
- Certification standards achieved at design stage
- Mechanical heat recovery ventilation system
- Passivhaus = Code 6??
- Zero CO2 emissions??

Passive House

- High levels of thermal insulation
- Minimal use of M & E systems
- Use of existing heating system
- Limited flexibility in existing stock suits 'passive' works
- Reduction in CO2 emissions
- Reduction in energy demand

Orbit Heart of England - Passivhaus

New build development:

- Sampson Close, Coventry:
- 23 apartments & houses
- Part of 250 new homes each year
- All new homes to be passive by 2016



Orbit Heart of England - Passive House



- OHE existing stock numbers: <14K
- Diverse age, archetype, predominantly low-rise
- Average SAP: 69
- Decent home standard failure: <2%
- Requirement to review stock data/methodology following merger
- Average £16m annual investment

Question??

How does stock data assist tackling:
fuel poverty/low SAP/future planned & improvement (passive?)
programmes/development of sustainable communities/long term
viability of assets

Orbit Heart of England Approach

- Asset Management Strategy defines objectives and approach
- 100% EPC/stock condition survey – property prioritisation
- Inform and involve residents in Eco-homes (*Passive House*) concept
- Conduct 'environment' survey – subjective and specific to each resident/home
- Undertake 'option appraisal' - establish long term viability and sustainability of stock
- Adopt a QA system for project management to ensure consistency/structured review/continuous improvement process
- Outcome – with resident involvement; ability to prepare future planned/improvement programmes tackling fuel poverty (linked to business plan), reducing CO₂, creating sustainable communities, maintaining financial viability of assets.

Orbit Heart of England Approach



- Review & adopt principles of Passivhaus/Passive House concept
- Aim to create 'comfortable' internal environment
- Establish heating energy demand target – 25KWh/m²/yr (Unofficial European target), currently >175 KWh/m²/yr
- Maximise thermal efficiency available & affordable
- Review renewable technology solutions
- Ensure robust constructional detailing e.g.: thermal bridging/air tightness
- Develop localised skill/products availability
- Link to current PM programme
- Create 'shopping list' of work options

OHE Pilot programmes



Technical solutions:

- High performance replacement windows/doors (Passivhaus standards?)
- Wall insulation/cladding exceeding current U-value
- Upgraded roof/loft insulation (open/sealed roof void)
- Maximise air-tightness of building
- Mechanical heat recovery ventilation system
- Upgraded heating system
- Secondary consideration of renewable technology

OHE Pilot programmes

- Tanyards Farm, Coventry
 - 150 homes (part of 250 on estate)
 - Built 1970
 - Difficult (compact) layout/design
 - Part communal heating schemes
 - Common archetype within Orbit
- Wellesbourne, Warwickshire
 - 50 homes – 1955 Wimpy No-fines
 - 8no – 1935 solid wall semi-detached

OHE Pilot Programmes

- Foleshill Road Coventry
 - 2 bed mid-terrace
 - Built Pre-1900
 - Single storey kitchen extension to rear
- Newdigate Road, Coventry
 - 2 bed end-terrace
 - Built Pre-1900
 - Single storey kitchen extension to rear

OHE Environment Monitoring

- Need to record internal environmental conditions:
 - pertinent to occupants – specific needs/living habits
 - electronic data monitoring – Coventry University
 - face to face survey
 - before refurbishment
 - post refurbishment – identify impact/benefit/savings

OHE Project Management

- Need to establish strict project QA system/process
 - Complicated project process – various interlocking aspects
 - Mechanism to develop/replicate process/specification
 - Consistency in project management
- **SQUARE** – *A **S**ystem for **Q**uality **A**ssurance when **R**etrofitting Existing Buildings to **E**nergy Efficient Buildings*
 - Intelligent Energy Europe – grant funded project
 - Managed by SP Technical Research Institute of Sweden
 - Social Housing and Technical Institutes across Europe

OHE Environment Monitoring

- Electronic data monitoring:
 - room monitors measuring: air temp, humidity, CO2, LUX levels
 - sampling taken every 5 minutes/14 day period
 - live data link to Coventry University
 - simplified/detailed data analysis
 - separate monitoring of electricity/gas consumption
 - water consumption yet to be monitored
- Individual property data collated and evaluated (intelligently) to identify occupant/property/estate trends/needs

OHE Resident Consultation & Awareness

- Currently >500 residents actively involved in OHE decisions
- Resident awareness of organisational priorities
- Develop programme of resident awareness of 'passive'
- Specific 'local' involvement/consultation established
- Local 'ambassadors' identified – controversial
- New technology – residents ability to effectively use
- New residents –ongoing awareness/education
- Wider resident advice/awareness – small steps, BIG impact

OHE Ground/Air Source Heating

- Ground Source:
 - Solid fuel/non-mains gas replacement programme
 - 5 year programme = >300No in total
 - Lighthorne Heath – 80No homes + 15No private + 22No new build + village shop/post office
 - Complete heating system/insulation upgrade
 - Average cost/property = £8,750 - 60yr/life cycle
 - Heating fuel savings >45%
 - Health improvements – respiratory related
 - Issues: system operation, ground works, operating design criteria, no secondary heat source

OHE Ground/Air Source Heating

- Air Source:
 - Currently pilot installations only – data monitoring
 - Solid fuel/non-mains gas replacement programme
 - Complete heating system/insulation upgrade
 - Average cost/property = £6250 - 60yr/life cycle
 - Heating fuel savings >40%, overall lower than GSHP
 - Health improvements – respiratory related
 - Issues: system operation, suitability for UK climate (COP comparison)

Ground Source Heating Installations



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Ground Source Heating Installations Reality!!



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Ground Source Heating Installations Reality!!



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Ground Source Heating Installations Reality!!



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OHE Solar/PV

- Solar Domestic Hot water:
 - Independent of other renewable technology programmes
 - Pilot installations only
 - No data monitoring
- Photo Voltaic:
 - Limited installations – pilots or linked to new build
 - Capital cost against returns – considered not effective

OHE Networking

- Use known European best practice – Trecondome/REDUCT/REX/SQUARE/ et al
- Involve partners to learn and develop UK process – Coventry University, E-ON, SHAP, other RSLs/Las
- Work closely with industry leads in developing local and sustainable products, suppliers, consultants, installers, maintenance services
- Create knowledge base where our activities are shared and jointly developed

OHE Learning Points

- Develop preferred sequencing of works to each property
- Develop 'passive' product 'knowledge' & life cycle costings
- Use new/renewable technology with discretion
- Share/develop 'passive' concept within sector
- Ask the question – Why are we doing it?? – outcome?

Workshop Outcomes

At session closure you should be considering:

- Does your Asset Management Strategy focus on tackling fuel poverty, reduced CO2, creating sustainable communities?
- If your current stock data clearly identify low-energy investment priorities?
- Are you installing renewable technology without reducing heat loss?
- Whether your residents know of/understand their involvement opportunities
- If your organisation is committed – SMT/Board level
- The question – Why am I not doing it?? – define your outcomes



Thank you

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