

Retrofitting & Energy Efficiency Breakout Session



Kayla Ente

BHESCo Community Led Energy Efficiency



Community-Led Energy Efficiency

Domestic Properties

72%

Of domestic housing stock
has an energy efficiency
rating of D or below

1 / 3

Of homes with lofts
do not have a
minimum of 125mm
insulation

8%

Of homes with solid
walls have external or
internal wall
insulation



Community-Led Energy Efficiency

Non-Domestic Properties

63,160 GWh

Of potential annual energy
savings identified

1 / 3

Have a payback of 3
year or less

£1.3 bn

Annual financial
savings

Source: BEIS – Building Energy Efficiency Survey November 2016



Community-Led Energy Efficiency

Common Barriers to Energy Efficiency



Low Home improvement priority



Cost of investment



Payback mentality



Complex decision chains



Technical knowledge



Lack of interest/ inertia



Energy Efficiency Fuel Poverty Alleviation Work

Greenwich and Lewisham fuel poverty at 16%

- Energy Cafes - 3 winters since 2015
- Energy Training Workshops for frontline staff and Energy champions
- Energy advice at fetes alongside Solar-roller

Champion-led Home Visits

- training parent champions to deliver home visits

ECO2t Pilot

- Helping fuel poor access fully funded measures



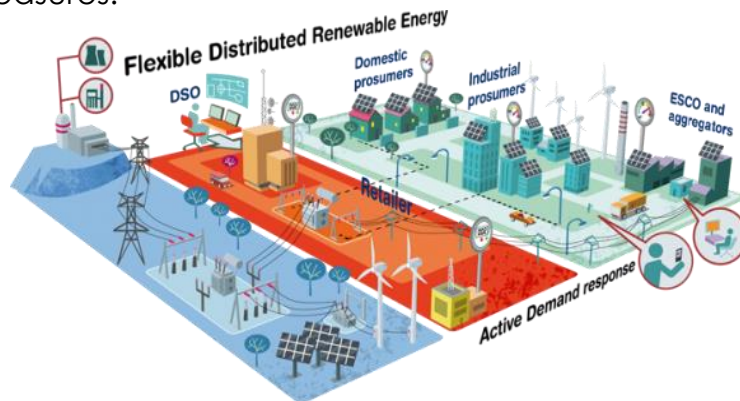
CarbonCo-op

Community-Led Energy Efficiency

Carbon Co-op is a community benefit society which assists its householder members to reduce their home's carbon emissions through energy efficiency retrofit and other innovative measures.



- Household assessments
- Whole house retrofit
- Nobel Grid – Smart meters



Community-Led Energy Efficiency



Wolverton Community Energy

Projects with long term impact
Wide range benefits
Lighting at Wyvern School



Bristol Energy Network

CHEESE with Easton Energy Group
Thermal imaging on homes
Funding for 56 surveys
Reliance on volunteers



Community-Led Energy Efficiency

Case Study 1 - Indoor Bowls Club



£18,340 project cost



407 LED lamps



4 year lease period



Community-Led Energy Efficiency

Case Study 1 - Indoor Bowls Club – Annual Savings



48,201 kWh



£6,000



19.78 tonnes



Community-Led Energy Efficiency

Case Study 2 – Office Retrofit



120mm roof insulation



2.5kW air source heat pump



4kW Solar PV array



32 LEDs



Community-Led Energy Efficiency

Case Study 2 – Office Retrofit – Annual Savings



8,426 kWh



£1,250



6 tonnes



Community-Led Energy Efficiency

BHESCO's 4-Step Energy Saving Service



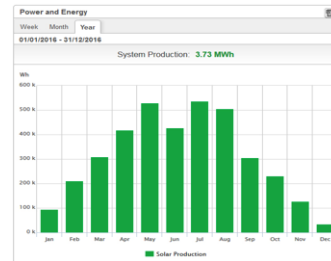
Survey
Property



Energy
Report



Install
Measures



Monitor
System



Community-Led Energy Efficiency



info@bhesco.co.uk

www.bhesco.co.uk

0800 999 6671



/BHESCO



@bhenergyservice



Brighton & Hove Energy
Services Co-op



Powering Together

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24th June – 9th July 2017



Dr Chris Jardin

Joju Solar



Joju Solar's vision

- Community Solar PV has already been massively successful
- Joju Solar have worked on some of the largest and highest profile community solar schemes in the country (Energy4All, Low Carbon Hub, M&S Energy Society)



- But feed-in tariff cuts make this harder, and only for best sites
- So, can we do something similar with energy efficiency? LEDs look obvious candidate
- Develop open, transparent, non-cowboy projects.



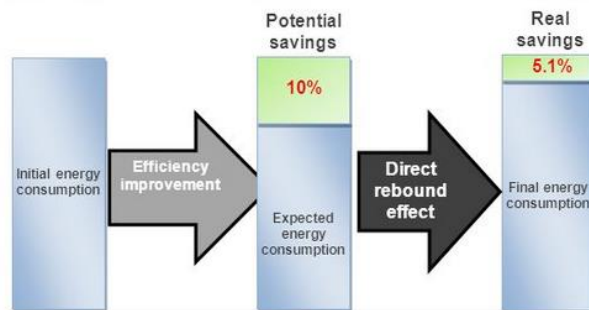
Routes for community energy efficiency

- **Grant Funded**
 - Community groups good at accessing grant funds (e.g M&S energy fund)
 - Use capital to fund energy efficiency schemes
- **Using community benefit revenue from renewable schemes**
 - Renewable schemes develop surplus funds for community benefit
 - Use to fund energy efficiency schemes
 - E.g. Low Carbon Hub retrofitting solid wall insulation to fuel poor properties
- **Pay-as-you-save**
 - Raise capital through share offer
 - Fund energy efficiency schemes
 - Host pays back out of savings



Problem! The rebound effect

- Actual savings don't match modelled
- Due to increase in energy service (higher temperatures, more light etc.)
- This can be a good thing!
- This is the primary rebound effect
- So we don't know what monetary savings will be
- But we expect capital to be repaid out of savings



Solar vs LEDs

- Solar has:
 - Measureable (meterable) generation
 - Clear income from FiTs
 - Familiar means of charging host site (via PPA)
- LEDs
 - Difficult to meter lighting circuits
 - So hard to quantify savings, requiring trust in modelling
 - Energy savings beyond the term of the loan
 - The tricky issue of maintenance savings
 - Lots of soft benefits (increased brightness, better colour, less flicker, increased productivity) which are hard to monetise



Metering and Quantification

- This is really difficult, and needs an expert
- Most lighting is not on one circuit, so difficult to sub-meter
- Can put in multiple loggers, and leave them for a while to get a baseline, but difficult to access wiring
- Getting good data is hard, and often confused by site specific peculiarities
- Are you logging a 'normal' period
- Simplest to avoid this, but needs **very robust** modelling instead



Energy Saving

- Some fitting swaps will save money in energy only terms



High wattage
fluorescent office lights



Floodlights



Highbays



Simple energy payback calculation

	Days x	Hours x	Power x	Ballast uplift x	Electricity Price	= Annual Cost
Existing 72W fitting	250	10	72	110%	11p	£21.78
32W LED fitting	250	10	32	100%	11p	£8.80
					SAVING	£12.98

- If cost of replacement = £60
- Payback = $\text{£}60 / \text{£}12.98 = 4.6$ years
- Note there are a lot of parameters here, and all can be tweaked to make look more favourable

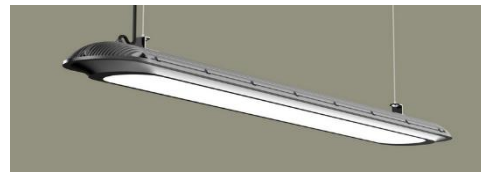


But

- Others more marginal



Medium wattage
office lights



- And small ones really difficult (Low power savings don't cover cost of bulb and installation)



Low wattage bulbs (e.g bulkheads)



Simple energy payback calculation

	Days x	Hours x	Power x	Ballast uplift x	Electricity Price	= Annual Cost
Existing 58W tube fitting	250	10	58	110%	11p	£17.54
32W LED panel fitting	250	10	32	100%	11p	£8.80
					SAVING	£8.74

- If cost of replacement = £60
- Payback = £60/£8.74 = 6.8 years



Avoided maintenance

- Case study: Council Offices
- Quoted: 400 fittings, £300,000 (£750 per fitting!), 6 year payback
- Reverse engineer: Energy savings £12,600 p.a.
- Implies maintenance savings of £37,400 p.a.
- !!!!!!!

- Maintenance savings ARE real (especially for high ceilings)
- But savings from energy and maintenance often bundled
- And maintenance savings overinflated
- Get your quotes unbundled



Advanced energy payback

	Days x	Hours x	Power x	Ballast uplift x	Electricity Price	= Annual Cost
Existing 72W fitting	250	10	72	110%	11p	£21.78
32W LED fitting	250	10	32	100%	11p	£8.80
					SAVING	£12.98
					Maintenance saving	£5.00
					TOTAL Saving	£17.98

- If cost of replacement = £60
- Payback = £60/£17.98 = 3.3 years



Soft benefits

- LEDs offer
 - Better quality of light
 - Selectable colour temperature for different end uses
(3500k comfort, 4500 work, 5500+ detailed work)
 - Less flicker
 - Instant-on
 - Look modern and sleek
 - Studies show increased productivity (and potentially happiness)
- Which are all good reasons to go for LEDs anyway

“The LED lighting has made a real positive difference already to the aesthetic and working environment of the classrooms where they have been installed. It has changed things so much that many of the staff thought that the school had been completely repainted when they came back after the week of holiday!”



Community Business Model

- LEDs more efficient than conventional lights
 - Save 30-60% energy compared to fluorescents
- Replace existing lights with LEDs, design, procure, install
- Target
 - A community equivalent targeted at
 - Commercial premises
 - Highbays
 - Academies
- SALIX (0% loan for LAs) is a better deal for councils and non-academy schools
- Really needs 7 year payback (for legal reasons)
- Raise funds and charge back over 7 years against agreed savings
- The Golden Rule = Savings > Repayments, up for debate here I think



Getting the 7 year payback

- Can be difficult if portfolio of lights isn't suitable
- Decide if you are going to include maintenance savings and agree with client and installer what is reasonable
- But beware you will be giving away for free
 - Soft benefits
 - Energy savings that occur after 7 years, but before the bulb breaks
 - Increased benefits from rising electricity price (if you don't index link the PPA)
 - Avoided maintenance (should you choose not to include)
- That's quite a lot of value! When you have to get returns for your shareholders, plus community benefit fund
- Hence, should the Golden Rule apply?



To sum up

- Replacing fluorescents with LEDs is A GOOD THING
- Not all replacements will give strong energy savings in short term
- So fitting into a community energy model is tricky, but possible
- Only able to capture value from savings within term of agreement, and lots of value given away.
- Needs excellent and transparent savings modelling



Thanks for your attention!

Just add sunshine



@DrChrisJardine



jojusolar.co.uk



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Graham Ayling EST



Each Home Counts Update

- Aim: to review and improve standards
- Quality mark for installers – monitoring
- Finance and funding uses it
- Data Warehouse – existing data and new
- Info hub
- Launch by year end





Energy Saving Trust Update

- Community Home Energy Check tool
- Mass engagement
- Evidence gathering
- Seeking sponsors



Q&A



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