Centre for Sustainable Energy

PLANLOCAL

Planning for low-carbon living

Who we are

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Centre for Sustainable Energy

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Outline

- Introduction to local and national renewables targets
- Overview of renewable energy technologies, using the model
- Understanding carbon abatement potential
- Range of benefits renewables can bring to a community
- Types of financial structure
  - Community Chest via developer
  - Community ownership
- Traditional funding options
- BREAK – 7.35pm for 15 mins
- The Feed in Tariff (Clean Energy Cashback)
- Practical exercise
- Sum up and close, 9pm

Introduction

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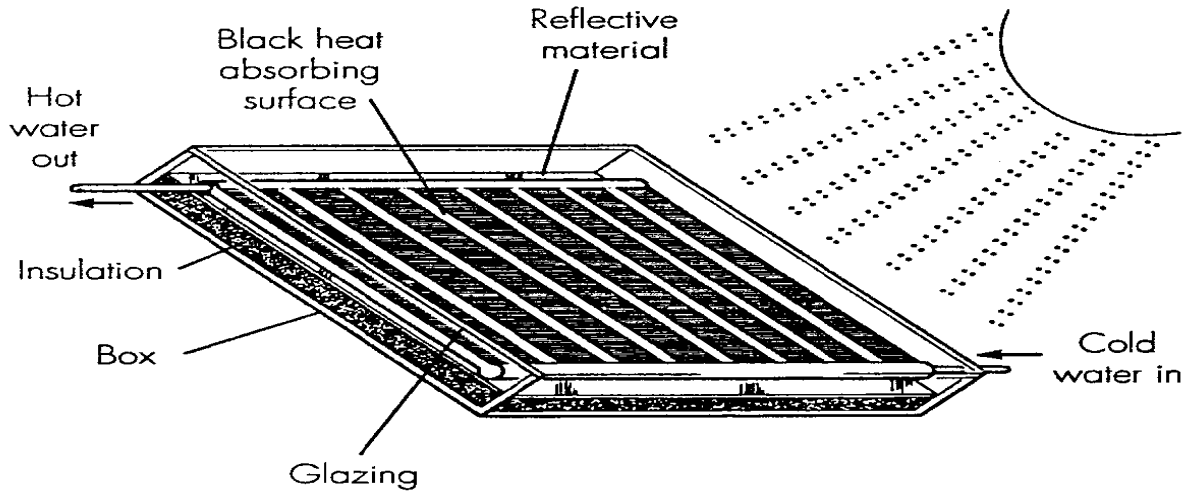
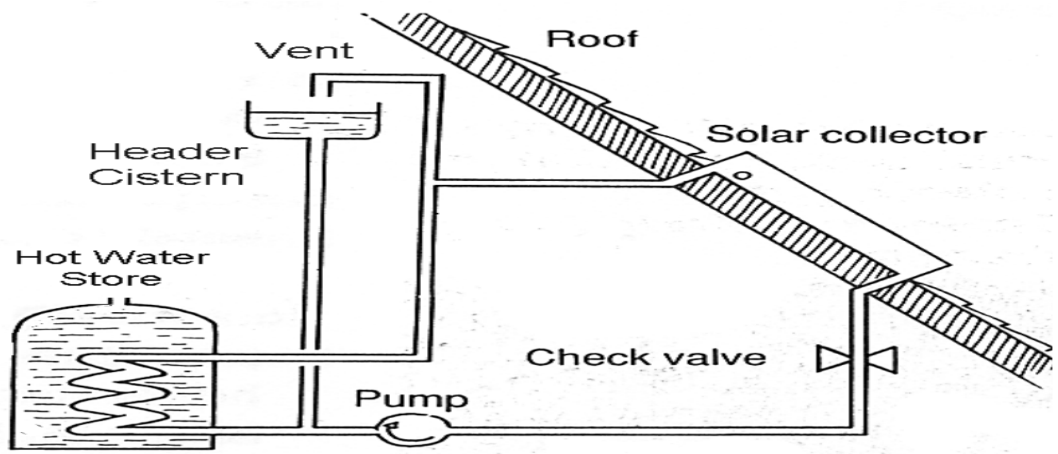
- The UK has a legally binding commitment to reduce CO_2 emissions by 34% by 2020 AND 80% by 2050 (both below 1990 levels)
- EC Directive 2009 requires that **15%** of the UK's total energy use should be supplied by renewables by 2020
- A commissioned study illustrated ***technical*** potential to produce 46% of building energy requirements in BANES from renewables, the ***target*** level for 2020 is likely to be considerably lower (~8.7%).
- BANES needs to take responsibility for generating more of its own energy
- Communities can play a big part in contributing to the total renewable energy capacity in the district.

Renewable energy technologies

Solar water heating

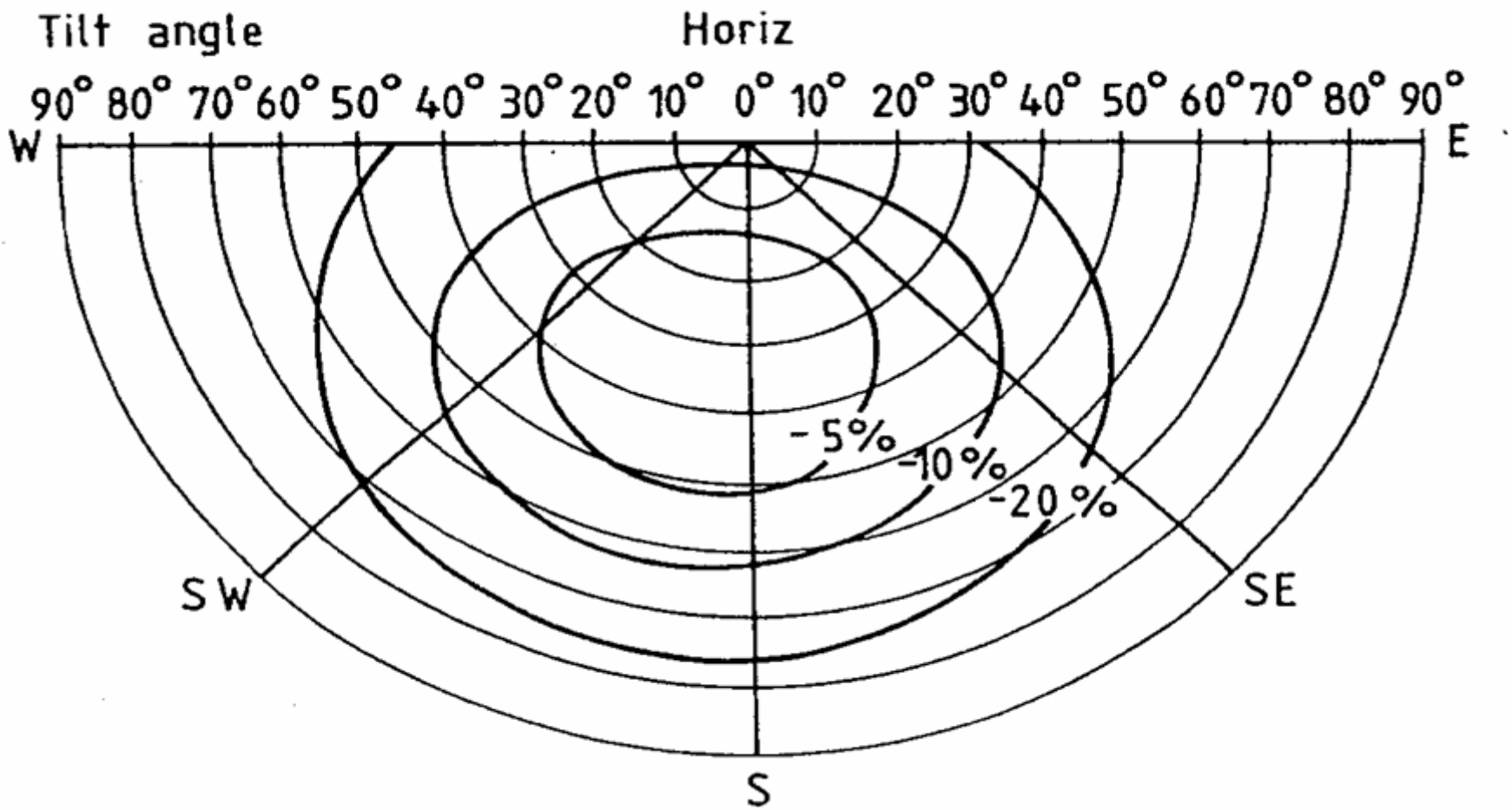
- Used for hot water not space heating
- Meets 80-100% of summer demand
- Will still need auxiliary heating as top up in winter to get to 60°C
- Cost: approx £3000 installed for a 3m^2 (domestic scale) system





Solar Hot Water - the solar resource

Affect of tilt and orientation



Source: BS5918

Photovoltaics (PV)

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Modules rated in peak Watts (Wp) - output the array will produce at noon on a sunny day

Cost: Up to 10kWp, £5,000 -£9,500 per installed kWp

> 10kWp, ~ £4,000 per installed kWp

Typical domestic scale system: 2-3kWp (16-24m^2)

		West						South						East
		-90	-75	-60	-45	-30	-15	0	15	30	45	60	75	90
Vertical	90	56	60	64	67	69	71	71	71	71	69	65	62	58
	80	63	68	72	75	77	79	80	80	79	77	74	69	65
	70	69	74	78	82	85	86	87	87	86	84	80	76	70
	60	74	79	84	87	90	91	93	93	92	89	86	81	76
	50	78	84	88	92	95	96	97	97	96	93	89	85	80
	40	82	86	90	95	97	99	100	99	98	96	92	88	84
	30	86	89	93	96	98	99	100	100	98	96	94	90	86
	20	87	90	93	96	97	98	98	98	97	96	94	91	88
	10	89	91	92	94	95	95	96	95	95	94	93	91	90
Flat	0	90	90	90	90	90	90	90	90	90	90	90	90	90

Solar PV

Over-tile systems

Flat roof

PV tiles

Curtain wall (transparent panels)

PV louvres

Biomass

Pellet boilers – integral and external store

Chip boilers – external store

Local fuel supply – should be sourced within 35mile radius

Biomass District heating

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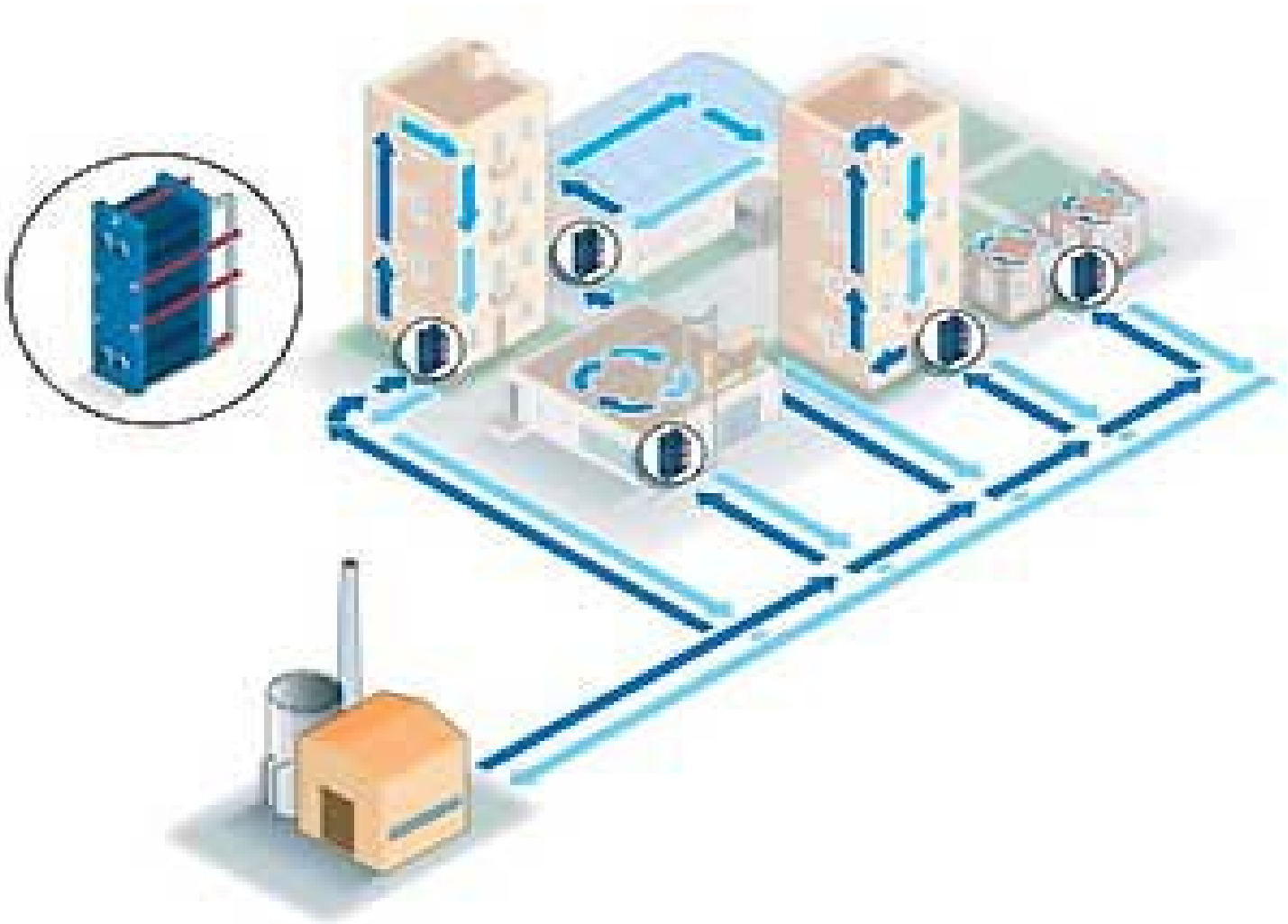
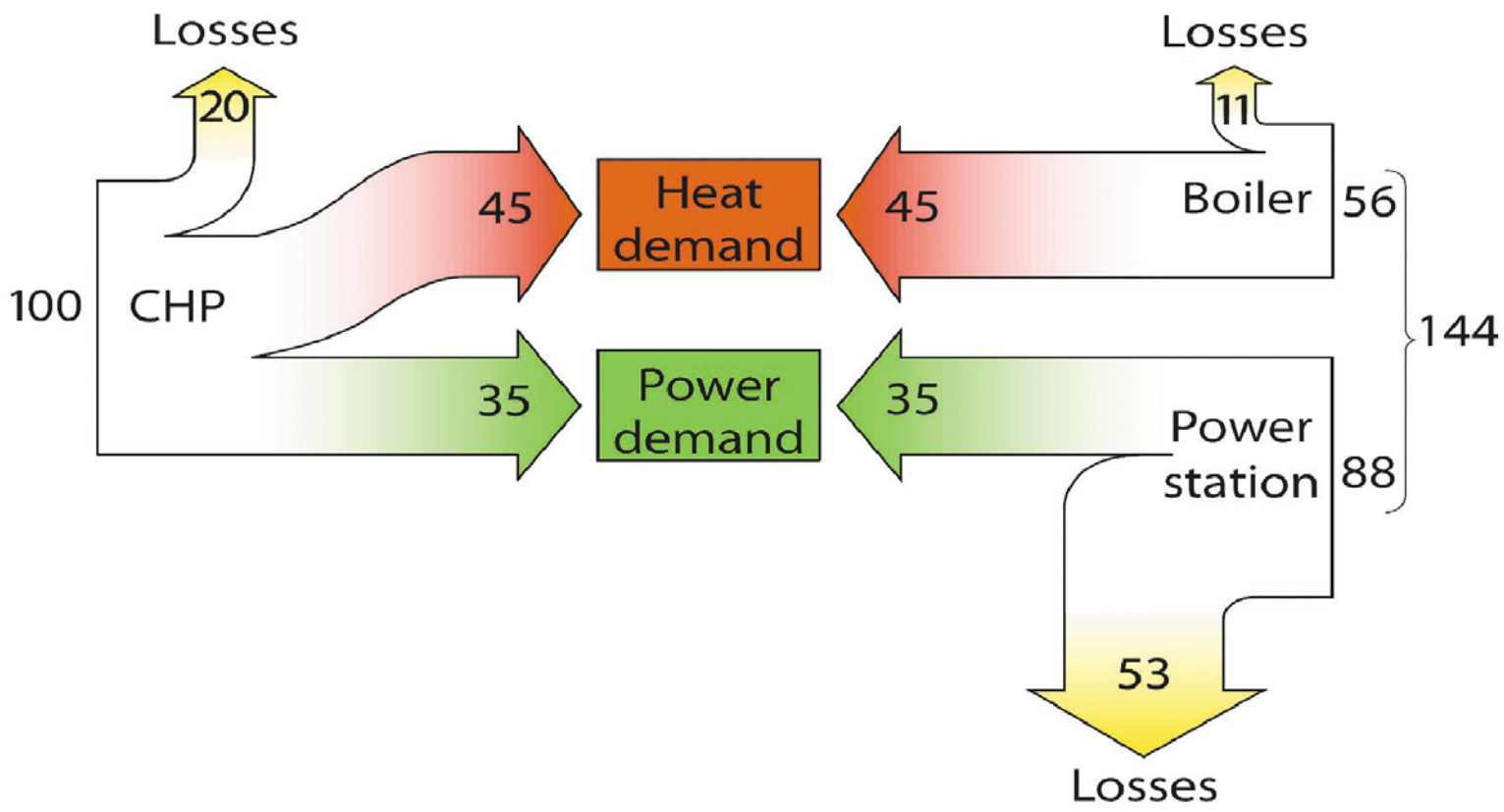


Combined Heat & Power

..the on-site generation of electricity and use of heat that is a by-product of the generation process…

Efficiency – CHP *vs* separate heat & power

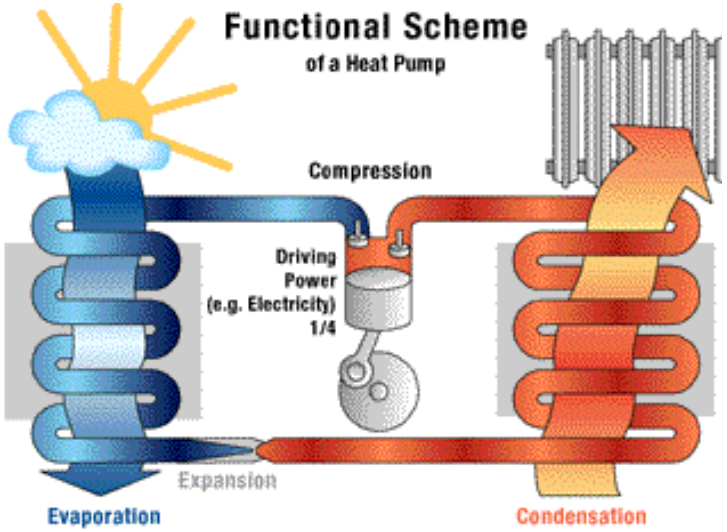


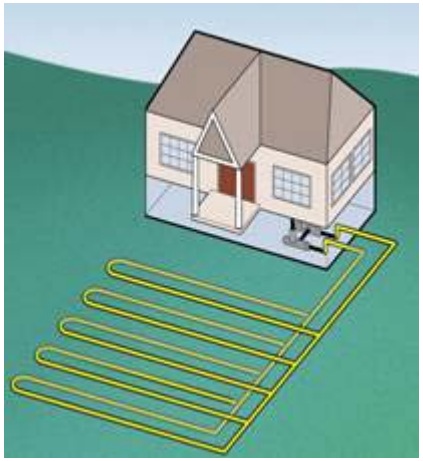
Heat Pump

3 key elements

- Heat source – solar heat stored in ground, water or air
- Heat pump – electricity drives compressor to transform heat to useful temperature
- Heat distribution – system can deliver water up to 50°C – ideal for under floor heating

- Good for new build with high level of insulation and underfloor heating





Hydro power

- Hydro power can generate a steady, reliable electricity supply
- Potential energy to kinetic energy to electrical energy
- There has to be enough water flow and a drop in height available

- Hydro Power (kW) = Drop (m) x Flow (m^3/s) x 9.81

Wind

Micro-scale

Small-scale

Medium-/large-scale

Wind Power

Turbine energy output depends on:

- Rotor diameter
- Annual average wind speed (m/s) at hub height – at least 4m/s (preferably 5 - 6m/s) to be economically attractive (cubic relationship between power & wind speed)

- Wind resource is very site dependant
- Database from DECC website or BWEA
- Increases with height
- Avoid turbulence

Wind speed at 45m agl (in m/s)

6.2	6.1	5.9
5.5	5.4	5.5
5.2	5.3	5.5

Wind speed at 25m agl (in m/s)

5.6	5.5	5.3
4.9	4.8	4.9
4.6	4.7	4.9

Wind speed at 10m agl (in m/s)

4.9	4.8	4.5
4.1	4	4.2
3.8	4	4.2

Carbon abatement potential from different renewable energy technologies

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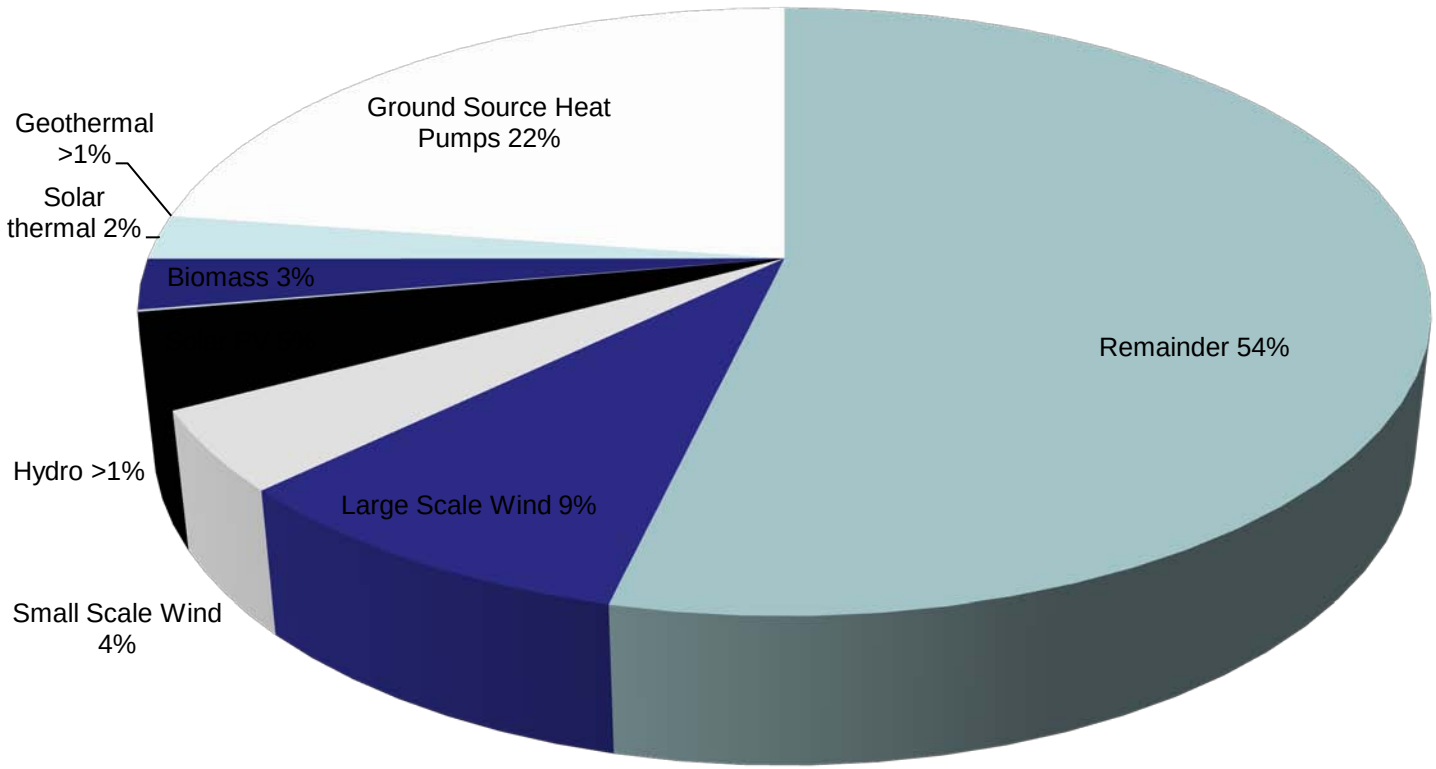
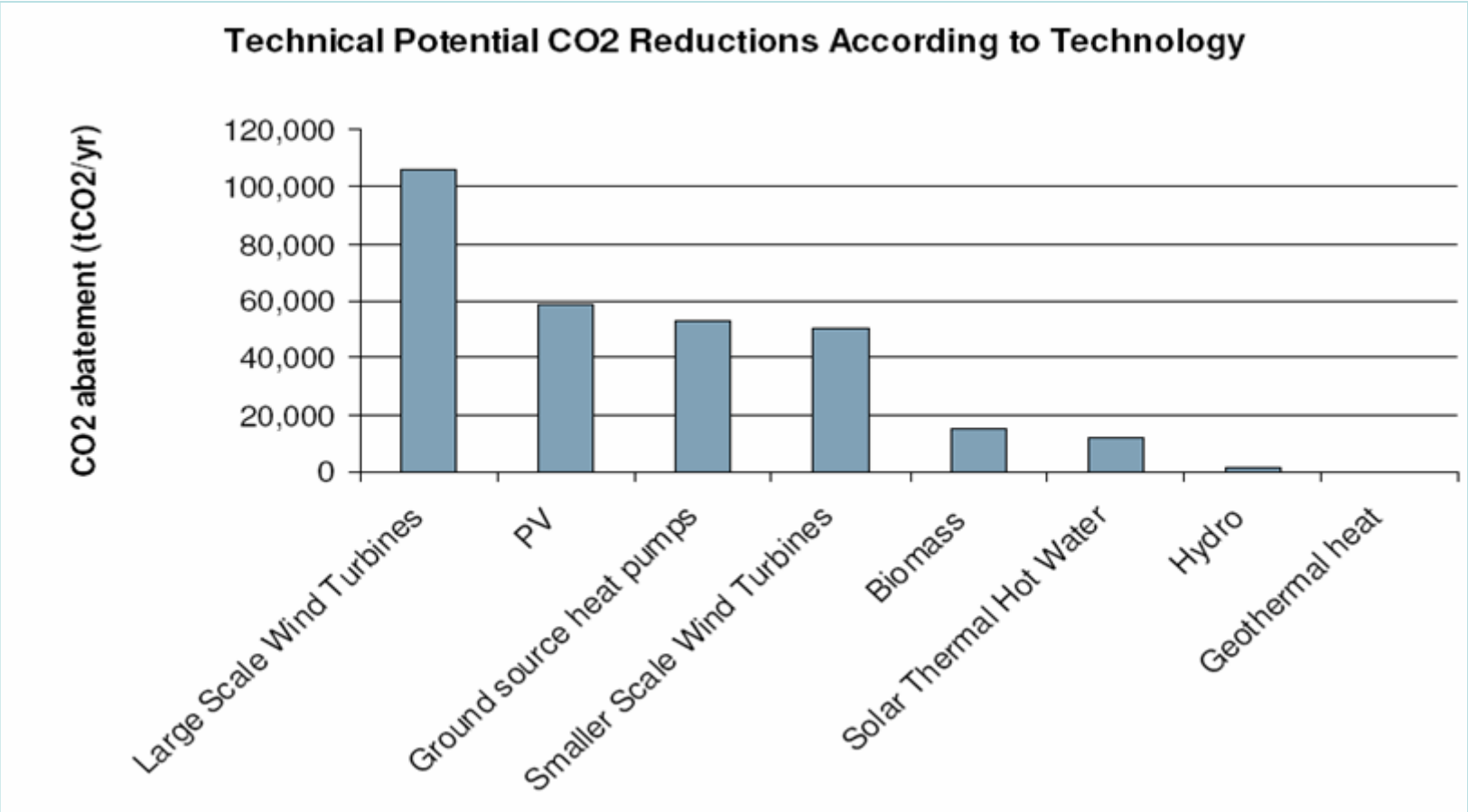
Impact of B&NES renewable energy resources on energy consumption



100% = all buildings energy use in 2005

Renewable energy in B&NES



Carbon intensity of different energy sources

Electricity from Coal =	**1000g CO_2 per kWh**
Electricity from natural gas =	**500g CO_2 per kWh**
Heat from natural gas =	**190g CO_2 per kWh**

Renewables

Electricity from biomass (grass)	93g CO_2 per kWh
Electricity from biomass (wood)	25g CO_2 per kWh
Electricity from solar PV	35g CO_2 per kWh
Electricity from onshore wind	4.6g CO_2 per kWh

Renewable energy 2020 target potential in B&NES

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What the 2020 target may consist of (indicative mix):

- Up to 9 or 10 large scale and up to 10 smaller scale **wind turbines**
- **Biomass & waste** e.g. woodfuel – need to double existing resource
- **Solar photovoltaics** – significant uptake on existing buildings (13.5%) (uptake on new developments will vary)
- **Solar water heating** – 19% uptake on existing buildings and 30-40% uptake on new developments
- **Ground source heat pumps** – 5% uptake on existing buildings (uptake on new developments will vary)
- Small contributions from **hydro** and **geothermal heat**

Potential community benefits from installation of renewable energy technologies

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Potential Community Benefits from Commercial Windfarms

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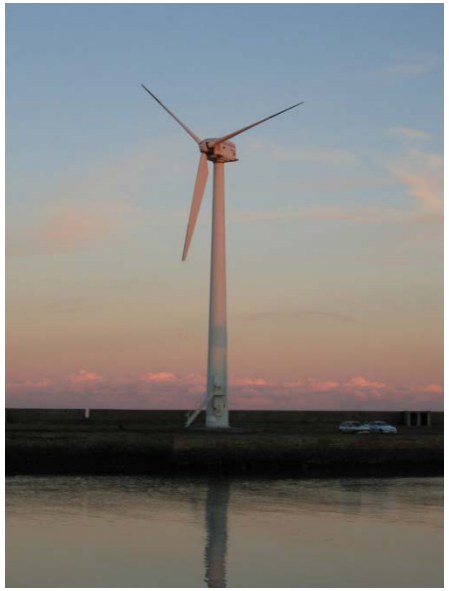
- Use of locally manufactured content
- Use of local contractors during construction
- Employment of local people in operation and maintenance
- **Investment opportunity**
- Land rental to local landowners
- Local community facility improvements
- **Lump sum and/or regular payments into local trust**
- Improvements to local environment and wildlife habitats
- Visitor centres and tourist facilities
- Education and schools visits
- Sponsorship of local groups and teams



Potential structures for community benefit from windfarms:

- Consultation with community organisations, developers and banks concluded the only two structures that appear to be practical options for widespread community ownership at the present time are:
  - Revenue Stream from the energy generation installation, paid to community trust
  - Investment by individuals into a community organisation owning share capital in a joint venture company which owns the project

Commercial Wind Farms

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Why would a commercial operation offer community contributions?

- Sense in some communities that wind developments are ‘done to them’ by outside forces
- Overseas evidence points to a need to make meaningful community benefits more routine and systematic in UK wind power projects if future rates of deployment are to grow CSE Report to Renewables Advisory Board and DTI 2005
- Corporate Social Responsibility
- Community agreements *can not* be taken as a material consideration in the planning process – this is an *independent* process

Financial contributions: Community Funds

- Annual payment per MW installed
- Lump sum payment (generally on installation)
- Amount linked to the revenue generated (annual)

Examples - funds

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Where	Who	Turbines	MW	Details
Bears Down, Cornwall.	npower renewables	16	9.6	£30K lump sum to 19 local schools for sustainable energy projects £3K p.a. to community fund
Burton Wold, Northants	Your Energy Services Ltd	10	20	£40K on construction, £10K p.a. – fund supporting energy efficiency and education projects
Cefn Croes, Wales	Cambrian Wind Energy	39	58.5	£10K p.a. into trust supporting projects that benefit the local community + restoration of site's ecological value
Novar, Highlands	npower renewables	34	17	£1K / MW p.a. index linked, split across 3 local councils by population and proximity
Dumfries & Galloway	Windy Standard	36	22	£10K p.a. index linked administered by 2 community councils

Managing the contributions

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- What form will the managing of the funds take?
  - Charitable body, trust, community or charitable interest company
- Who will be responsible for managing and distributing the funds?
- What will the funds be used for?
  - Be clear and specific to enable the managers to make informed decisions on distribution
  - Funds for sustainable energy initiatives tend to be a natural fit – magnifies the environmental benefits already being delivered by the wind farm on a local level

Setting up an agreement

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- Some local authorities have made public indications of the levels of contribution they are expecting
- Community organisations may wish to seek guidance from the local authority or an independent organisation to help facilitate the agreement
- Document the agreement in a legal contract
- Agreement should be tied to the project so that it remains even if ownership changes

Example – LA led approach

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Argyle & Bute Council:

- Developed own policy for any wind farms in the district, to ensure that benefits reach further than just the immediately local communities:
  - 60% into local trust fund for immediate local community
  - 40% to wider community through local Energy Agency
- £2,000 per MW installed p.a.
- £1,000 per MW actual annual output

Examples – local investment

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Where	Who	Turbines	MW	Details
Deeping St Nicholas, Lincolnshire	Wind Prospect	8	16	£30K on installation, £10K p.a. into trust supporting local projects that promote energy efficiency and conservation
				Share offering raised £2.66M, enough to purchase 2 of the turbines
Fintry, Stirling	Falck Renewables	14 + 1	30	£35K p.a. to local community fund
				Village bought an additional 'community' turbine. Falck paid initial cost, to be paid back over first 15years of operation. Revenue generated goes to community fund, first payment May08 - £140K, significantly higher than expected. Clear sense of ownership of turbine in the community.

Financing methods

- Industrial and Provident Society for the benefit of the shareholder (Co-operative)
- Industrial and Provident Society for the benefit of the community (IPS BENCOM)
- Community Interest Company (CIC)

Co-operatives

- Co-operatives operate for the mutual benefit of their members and may or may not be a social enterprise, depending on their activities and how they distribute their profits.
- Co-operatives cannot be established as charities
- They are regulated by the FSA (Financial Services Authority) not the charities commission

Co-operative –
IPS for the benefit of the shareholder

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- Run democratically (one member = one vote) so all members can have a say
- Offer shares, with nominal value of each share = £1
- Set minimum cost of becoming a member (e.g. £200/£250), and maximum legal investment is £20,000
- Investors receive their capital back at the end of the project lifetime and the co-operative structure ensures that money does not buy power
- Combines business efficiency with honesty and fairness
- Shares profits with their members
- Co-op's are constituted under the Industrial and Provident Societies Act
- Run for the benefit of the shareholders (as the name suggests)

Case Study: Wind farm Co-operative

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Baywind Energy Co-operative Ltd

- Formed in 1996 with original board of directors including 7 members of the community
- Operates much like a traditional ltd co. except that voting rights distributed equally amongst members, regardless of number of shares held
- Minimum share holding £300 & max (by law) £20,000; means a stake in the co-op is within easy reach of almost everyone but no individual or organisation can have a controlling interest
- First share option raised £1.2M to buy 2 wind turbines at Harlock Hill Farm; second share option raised £670,000 to buy 1 turbine at Haverigg II wind farm
- Profits from sale of green electricity distributed to members through annual dividend
- Preference for joining scheme given to people living in areas where the wind farms are developed, to maximise the economic benefits to the local community

Who can help?

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Energy4All

- Social enterprise – not for profit
- Helps communities own renewable energy
- Specialises in co-operative model (IPS co-ops)
- Raises capital through public share offers (regulated by FSA)
- www.energy4all.co.uk

Energy4All

Energy4All Co-ops

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Co-op	Turbines	Members	Money raised	Bank loan
Baywind	6 x small	1,350	£1.9M	£1M (paid off)
Westmill	5 x 1.3MW	2,500	£4.6M	£3.8M
Fens	2 x 2MW	1,100	£2.6M	£1.8M
Falck (4 Highland co-ops)		2,500	£3.75M	-

Who can help?

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Co-operatives UK

- **Downloadable guide** to setting up a democratically controlled co-operative business
- **Contact information for local Co-operative Development Bodies** (CDBs), an organisation that can help with any stage of starting a co-operative
- **Co-operatives^{UK} Legal Services -** can register your co-operative using model rules, and arrange free membership for one year
- www.cooperatives-uk

Co-operatives^{UK}

IPS BENCOM

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- IPS raises equity by issuing shares (to members only) at discretion of directors
- Governing body – Board of Directors accountable to the members
- One member one vote
- Provides 2 tier structure for decision making
- Shareholders must be over 16
- Max shareholding of £20,000 by law
- Members' liability limited to £1
- *Interest* paid on shares (not a dividend)
- Interest is deductable *before* corporation tax
- With-drawable share capital – not transferable

How to set up an IPS BENCOM

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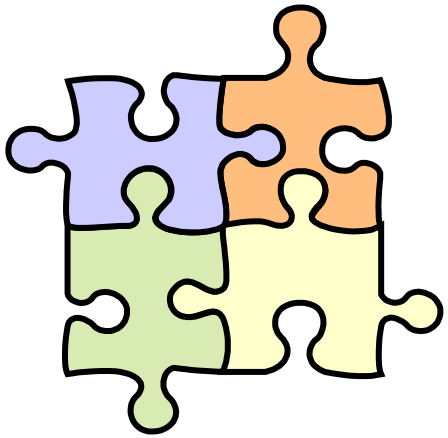
- Can adopt a model set of rules with only a few modifications
- Society's objectives need to be clearly defined but not too specific
- In order to sell shares you must produce a prospectus which must be verified by a solicitor (~£100)
  - the directors can be held responsible if any information in the prospectus turns out to be misleading
  - Prospectus should have a time limit (~3 months)
- Set a minimum share holding (£)
- Annual external evaluation of accounts
- Register with FSA



- Best to create the company structure first:
  - allows all legal documentation to be put into the company's name
  - allows applications for grants and funding in the company's name

Case Study: West Oxford Community Renewables

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IPS (BENCOM)

- Set up by Low Carbon West Oxford (LCWO) in order to use funds to help their projects to mitigate climate change
- Used Wessex Reinvestment Trust model rules
- Verification of prospectus by solicitor cost £100
- Leasing large expanses of roof space from businesses to install PV
- Plans for a micro hydro installation and carrying out wind trials
- £1000 buys 5% interest from year 5
- www.lowcarbonwestoxford.org.uk

WOCR

LCWO

Who can help?

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Wessex Reinvestment Trust

Has a model set of rules “reinvestment Rules – Community Assets Model

- Wessex Reinvestment Trust £600
- www.wessexrt.co.uk

Community Interest Company (CIC)

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- Company type introduced in 2005 & one of the fastest growing community oriented enterprise movements in the country
- Designed for social enterprises that want to use their profits and assets for the public good
  - Assets held by the company are held in an asset lock which secures those assets to applications for the good use of community
  - Dividend payments are subject to a cap set by the regulator (currently 5% above BoE base rate)
  - Only 35% of distributable profits can be paid in any period

- CICs shouldn't be confused with charities:
  - They cannot have charitable status but a charity can own one,
  - They do not get the tax benefits of a charity, but in return they do not have the strict reporting requirements of a charity.

How to set up a CIC

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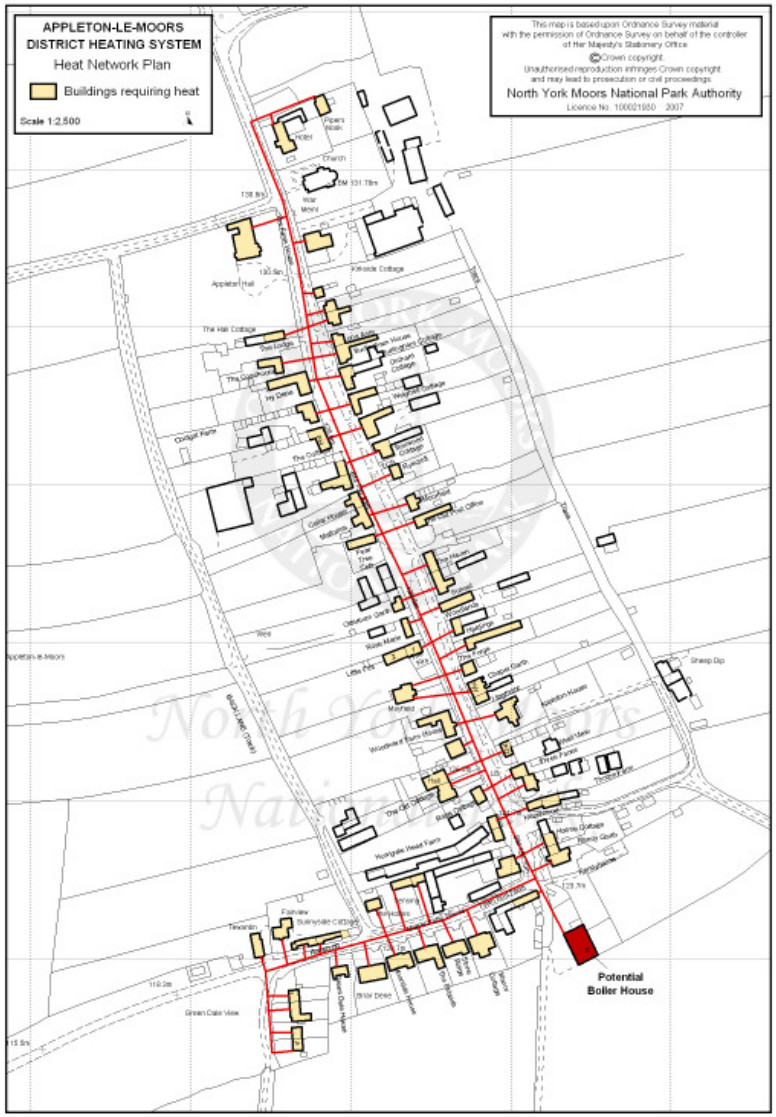
- To register as a CIC, you must also register as either a company limited by shares or a company limited by guarantee.
- CICs are subject to dual regulations by both the CIC Regulator & Companies House
- When registering your company with Companies House, you will need to provide additional documents, including a **community interest statement** describing your social purpose.
- The CIC Regulator will approve your application if your statement passes the **community interest test** – i.e. the business activities you intend to undertake will be carried out for the benefit of the community or a section of it, or that the CIC's purpose is in the community or wider public interest.
- The community you will benefit does not have to be local – see Fair Energy Case Study

CIC case study

North York Moors National Park

- Several local groups established
- Establishment of CIC as long-term aim is for each community to own and run a range of installations for the benefit of the community.
- Appleton & Staunton group have now completed biomass district heating feasibility study (£6k SDF grant)
- Upper Esk group have completed hydro feasibility (£5k SDF grant)



Where to go for help on CICs

COMMUNITY INTEREST COMPANIES

- Regulator of Community Interest Companies

- www.cicregulator.gov.uk
- cicregulator@companieshouse.gov.uk

Alternative legal structures

- Company limited by shares
  - Designed primarily as commercial entities acting in interests of shareholders so not generally appropriate for a community organisation
- Company limited by guarantee
  - Similar except normally single vote per member plus ‘asset lock’
- Limited Liability Partnership:
  - As above, LLP is treated as separate legal entity from its members but for tax purposes is treated as a partnership and the members are taxed on their income or gains as partners – may be advantageous depending on their tax band

Traditional funding options

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E.ON Sustainable Energy Fund

- Grants of up to £20,000 for energy efficiency measures and renewable energy

O2 It's your community

- up to £1,000 for anything that can be shown to benefit your community

Awards for All England

- grants of between £300 and £10,000 for projects that promote the environment

Low Carbon Buildings Programme – phase 1

- For householders, £2,500 max grant, ends March (elec) / June 2010 (heat)

Low Carbon Buildings Programme – phase 2

- For communities - can apply for 50% of the cost for installation of renewables

Other Funding Options

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Charitable trusts

- Funder Finder - computerised database www.funderfinder.org.uk
- Directory of Grant Making Trusts - Charities Aid Foundation www.cafonline.org
- Guide to Major Trusts (Directory of Social Change publication) www.dsc.org.uk

Sponsorship from companies

- The Guide to UK Company Giving (Directory of Social Change publication)
- Hollis Sponsorship and Donations Yearbook www.hollis-pr.com

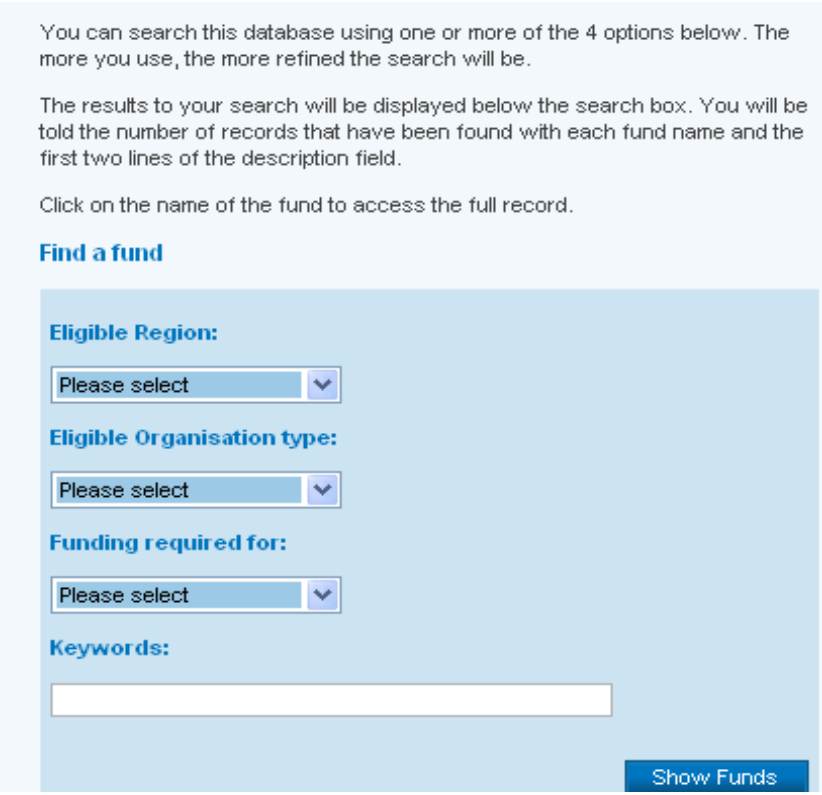
In-kind funding: Pro-Help

- National network >800 professional firms providing free advice & professional support
- Members include solicitors, accountants, surveyors, architects, public relations, marketing & management consultants
- Matches local firms with local community organisations www.prohelp.org.uk

Where to go for more information

Centre for Sustainable Energy

- Green Communities funding database
  - www.energysavingtrust.org.uk/cafe
  - 0844 848 0077
- Energy Saving Trust Advice Centre:
  - 0800 512 012
- Council for Voluntary Service:
  - http://webdb.navca.org.uk/home.aspx
- For local authority see:
  - www.governmentfunding.org.uk



Clean Energy Cashback

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- Also known as the ‘Feed-in Tariff’
- Earn a regulated income from every kilowatt hour generated (income tax exempt)
- Government set tariffs - up to 41.3p/kWhr based on type & size
- Benefit of ‘avoided costs’ by using electricity on site
- Additional 3p for every kWh exported (i.e. not used on site)
- Scheme lasts 20/25 years depending on technology
- All renewable electricity qualifies
- Household and business users
- Maximum size 5 MW (covers most commercial and consumer sites)
- Comes into force April 2010
- New systems installed now qualify (& those installed since 15 July 09)

PV domestic example

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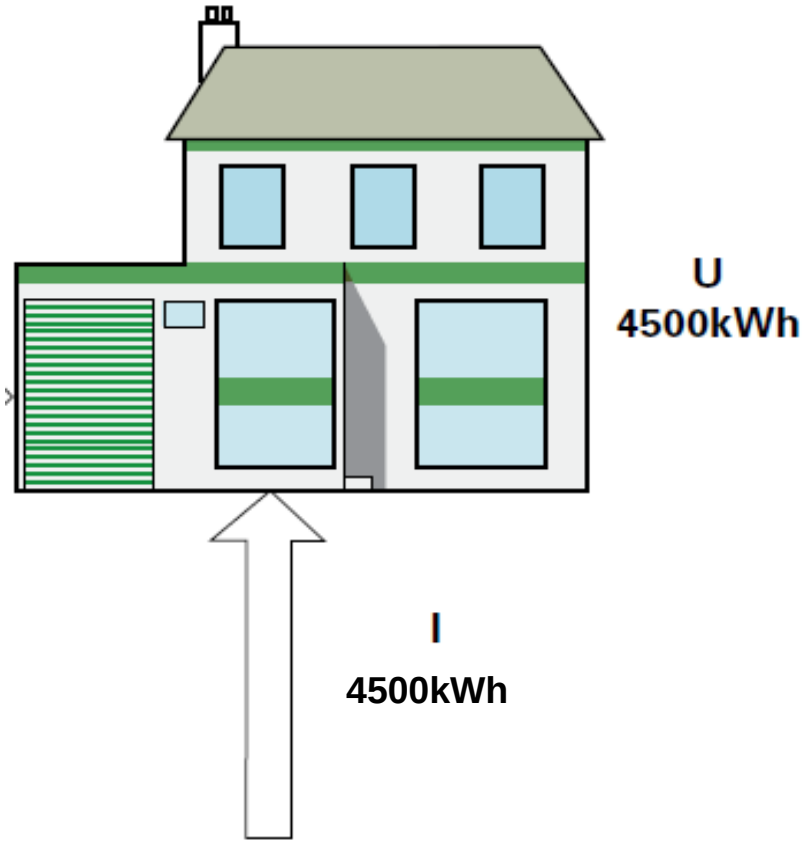
- Standard 2.22kW PV system generates ~ 1850 kW p.a.
- Approximate cost ~ £13,000 + VAT
- Energy provider to pay 41.3p /kWh
- Equates to £765 p.a.
- Energy not used in property to be sold for additional 3p/kWh ~ £27.50 p.a. approximation
- Saving on current energy bill ~ £110 p.a.
- Expectation that energy prices could rise by up to 60% over the next 5 years (Ofgem) i.e. even greater savings

- Equates to a potential return of £900 p.a.

Feed-in Tariffs – Alternative illustration

- Non-generation household
- Only imports electricity
- Billed by their supplier based meter readings on kWh imported

(U= Used, I = Imported)



Figures/graphics from DECC

Feed-in Tariffs

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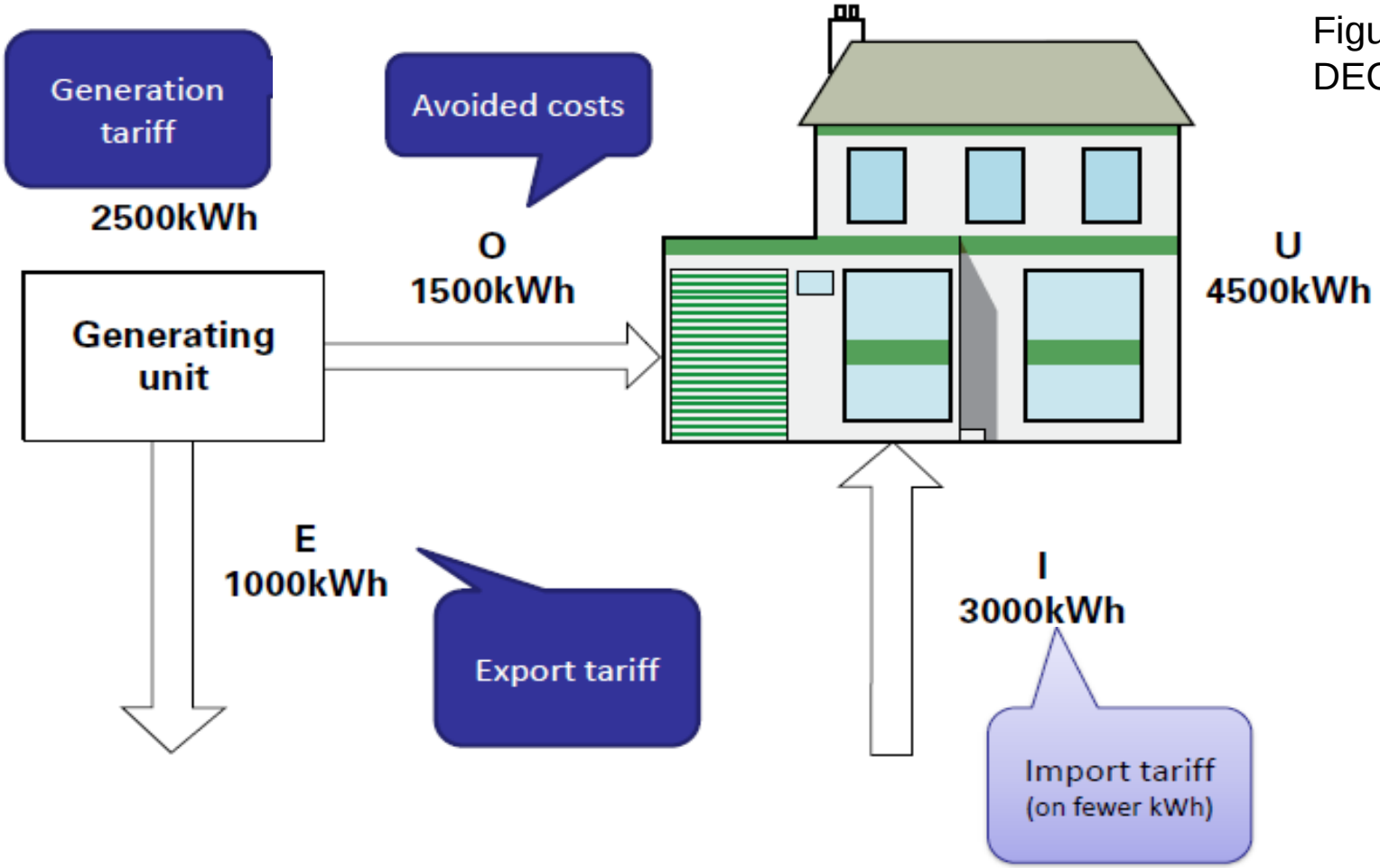
Illustration of potential electricity flows for an on-site generator



Figures/graphics from DECC

Feed in Tariff success

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- In Germany, whole towns have grouped together to buy wind turbines, build biomass plants and erect solar panels on all private houses.
- They are then paid a guaranteed fixed price for every kilowatt hour of energy they produce - a higher sum than for electricity made from fossil fuels in traditional power stations.
- Three wind turbines can make £15,000 a year for a single village.

Feed in Tariff caution

- Likely to attract ‘cowboys’ who will inform householders that if they lease them their roof for solar, they can have cheaper electricity.
- Some of these deals will be genuine, the operator of the scheme will create significant economies of scale by installing e.g. 2000 solar systems. But remember, as a business, there must be profit in it for them – and that must be coming from somewhere
- So… do your maths!! These schemes may not be the best deal for you as an individual, and the economies of scale that come with a mass installation could almost certainly be got by you as a community, therefore keeping *all* revenue streams for your community reinvestment pot.

Exercise

- Appraisal of options for your local community to benefit from renewable energy generation

Council Contacts

Centre for Sustainable Energy

Name	Department	Phone (01225)	Email
Sara Grimes	Sustainability (Energy)	395418	firstname_surname@bathnes.gov.uk
Alison Sherwin	Transport (walking and cycling)	394157	
Lorinda Coombes	Waste (compost, recycling)	394049	
Graham Evans	Parks (Allotments, food and green spaces	396873	
Develop ECS	Charity to develop & enhance community groups	330090	enquiries@developecs.org.uk