Hassocks, Hurstpierpoint, Keymer & Ditchling (HKD) Transition

Energy in Hassocks:
Reduce
Insulate
Generate

A Report to Hassocks Parish Council for the Neighbourhood Plan

HKD Transition Energy Group

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With thanks for advice and information also provided by OVESCo and Downs Energy

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Energy in Hassocks: Reduce, Insulate, Generate

A report submitted to Hassocks Parish Council for the Neighbourhood Plan

Summary

HKD Transition has completed an energy audit for Hassocks to explore opportunities to make significant reductions in energy demand and reduce energy costs, and to generate a significant proportion of energy needs locally from renewable sources.

Our report identifies ways to reduce demand for gas (the main energy source for heating) by making existing homes more energy efficient. It also shows how it would be possible to generate electricity from solar panels on homes, public buildings and solar farms to meet all village needs.

1. Reducing energy consumption

Although many Hassocks homes have become more energy efficient in recent years, there are still significant opportunities to increase energy efficiency. Homes could be warmer and more comfortable to live in by insulating lofts and walls to current standards, double-glazing all windows and draught-proofing. Reducing energy costs is especially important for the 10% of residents who already live in fuel poverty. The solutions are easy to 'fit and forget', the gains considerable.

- If all Hassocks cavity wall homes were insulated we could save 5-6% of village gas needs.
- If all lofts were insulated to 270mm we could save at least 1% of total gas consumption.
- If all remaining solid wall homes were insulated to 50mm, estimated savings would be in the order of 11-13% of total gas consumption.
- If all remaining single glazed homes were fitted with simple double glazing or secondary glazing, estimated savings would be in the order of 2% of total gas consumption.
- If all Hassocks homes were thoroughly draught-proofed, estimated savings would be in the order of 9-10% of total gas consumption.

If all these energy efficiency measures were carried out, Hassocks' gas demand could be reduced by around a third. The home-owners would save between £700,000 and £850,000 per year (more as energy costs increase). Instead of being paid to the big energy companies, the money stays in the community and installing energy efficiency measures boosts the local economy.

There could be even more potential savings in gas consumption from increased adoption of higher efficiency central heating boilers, wood-burner stoves for heating living spaces, heat pumps (in homes with high levels of insulation), and solar thermal heating of water.

Electricity demand could be reduced by behaviour and technology changes like using higher efficiency appliances, turning off lights and appliances and unplugging chargers when not in use, using lower temperatures and full loads in washing machines and eco settings in dishwashers, drying clothes naturally rather than a tumble dryer, and switching to low energy lighting. Significant energy savings are possible: one Hassocks home-owner invested £20,000 and has cut energy costs by 80% and carbon emissions by 76%.

2. Generating electricity from renewable resources

Hassocks is well-placed for solar power, being in the sunniest part of the UK, with many homes oriented toward the south. For solar panels to work effectively they must be installed at the right angle and orientation. A rule of thumb is that approx. 50% of detached or semi-detached homes (omitting flats and terraced houses for the moment) might have roofs suitable for solar panels. **Hassocks homes have the potential to generate between 25% and 33% of the village's total electricity use.** Combined savings for these home-owners could be between £870,000 and £1.1m per year. As energy costs get ever higher the real value of their investment will increase. Instead of money leaving the community and going to big energy companies, solar power enables it to stay.

Community solar installations for schools and other public buildings could also make a contribution to village electricity needs, as well as cutting their energy costs. **Five average-sized (c. 150 panels) community solar projects could generate more than 1% of Hassocks annual electricity use.**

The remaining balance of Hassocks' electricity needs could be met by solar farms. There is an added benefit for local authorities in that 100% of business rates for renewable energy projects go to the local authority: for the 10 megawatts needed in Hassocks the local authority would receive £50,000 per yr.

Hassocks could generate the equivalent of <u>all</u> of its annual current electricity needs locally from solar panels on homes, public buildings and solar farms.

What is more, between savings from energy efficiency measures and a combination of savings and income from solar power, **some £1.7m to £1.8m every year would stay in the local economy rather than leaving. That's the equivalent of £500 for every Hassocks household, every year.**

3. Moving Hassocks toward a zero carbon community

Over the 16 years of the Neighbourhood Plan (from now to 2030), the imperatives of climate change and the UK's legally binding carbon reduction targets will require a decarbonised energy system. Our analysis indicates how electricity needs could be met locally without fossil fuels. More energy efficient homes would reduce gas needs significantly, but over time we will also need to shift heating and cooking away from gas to more sustainable fuels. While solar is currently the most straightforward and well-developed technology for local renewable energy, in future years we expect other technologies to become more cost-effective and widespread. Energy storage systems, biomass, ground source heat pumps, anaerobic digestion using waste for fuel, micro-hydro, combined heat and power systems, district heating and wind are all technologies that can help minimise use of fossil fuels. The neighbourhood plan should respond to future opportunities.

Domestic energy use is only a part of what must be addressed in order to meet the UK's carbon reduction targets. Transport, food and business operations all contribute to Hassocks' carbon footprint. National planning guidelines address in particular planning for sustainable transport.

4. Recommendations for Hassocks Parish Council

The Department for Communities and Local Government (DCLG) suggests that a 'community energy plan' can underpin the Neighbourhood Plan. We encourage Hassocks Parish Council to undertake such a plan and HKD Transition would be glad to support the Parish Council in this.

Based on our analysis of the Hassocks Energy Audit and review of planning guidelines, we make the following recommendations for the Neighbourhood Plan.

1. Actively support energy efficiency improvements to existing buildings (National Planning Policy Framework (NPPF) 95) by actions like prioritising planning gain for energy efficiency measures, taking part in the Sussex Energy Saving Partnership and supporting buying clubs for insulation and energy efficiency measures.

2. Plan for new development in ways that reduce greenhouse gas emissions (NPPF 95), and follow government expectations that new developments are energy efficient, with all new homes to be zero carbon from 2016. We urge the Parish Council to encourage MSDC to require the highest standard (Level 6) of the Code for Sustainable Homes, because incorporating it in planning policy is the only way that the code can be enforced.

3. Expect new development to incorporate decentralised energy supply unless the applicant can demonstrate that this is not feasible (NPPF 96): new housing developments could, for example, include district heating and cooling, combined heat and power unit and/or waste heat recovery.

4. Expect new development to minimise energy consumption through landform, layout, building orientation, massing and landscaping (NPPF 96). The siting of new developments can have an important impact on carbon emissions, including passive solar (collecting energy from the sun), trees to provide cooling and transpiration, windbreaks, water conservation and preventing run-off. The Neighbourhood Plan should set out expectations of new developments.

5. Develop a positive strategy to promote energy from renewable and low carbon sources (NPPF 97). A community energy plan underpinning the Neighbourhood Plan could include targets for energy generation from renewable and low carbon sources, and a strategic vision for how Hassocks could become largely self-sufficient in energy generation by 2030. The leadership role of the Parish Council will be important in informing and encouraging local residents to play their own role in energy efficiency and renewable energy.

6. Identify suitable areas for renewable and low carbon energy sources and supporting infrastructure (NPPF 97). The Neighbourhood Plan should develop criteria to identify suitable areas, including consideration of the requirements of the particular technology (e.g. biomass systems require transport infrastructure, hydro-electric schemes require sources of water, wind turbines require not only wind resources but also air safeguarding and access for large vehicles). Other criteria must address the impact on the environment (e.g. open-loop ground source heat pumps require careful siting around wetlands, watercourses and septic systems[1], local topography is an important factor affecting the impact of wind turbines and large-scale solar farms). Finally, protecting heritage assets, AONB and SSSI sites, and local amenity are important considerations.

7. Support community-led initiatives for renewable and low carbon energy (NPPF 97). As DCLG says, 'community led renewable energy initiatives are likely to play an increasingly important role and should be encouraged as a way of providing positive local benefit'.[2] Hassocks Parish Council could establish policies which give 'positive weight' to renewable energy projects with local community involvement and leadership. Planning gain (Section 106 agreements) could specifically prioritise community renewable energy projects for investment.

1 http://www.environment-agency.gov.uk/business/topics/128133.aspx

2 DCLG (2013), Planning practice guidelines for renewable and low carbon energy, para17.

The UK commitments to carbon reductions require government at all levels, as well as individuals and communities, to make important contributions. Achieving the targets will need community leadership, and a carefully planned information and support effort. HKD Transition is ready to make its contribution as a community group, and we believe that the Hassocks Parish Council, through its Neighbourhood Plan, could play an important role in making Hassocks much more energy self-sufficient in the years to come.

4. HKD Transition

HKD Transition is a group of residents of Hassocks, Hurstpierpoint, Keymer and Ditchling working on community-led responses to climate change and shrinking supplies of cheap energy, building resilience and well-being. We are one of over 1,000 Transition initiatives around the world. Our aims are to:

- promote awareness of 'peak oil' and climate change in our area;
- gather enthusiasm for preparing for the consequences of peak oil and mitigate the effects of climate change;
- develop groups and projects that involve local residents in creating a sustainable future by reducing our dependence on fossil fuels, reducing our carbon footprint and increasing our resilience to the changes that lie ahead

A cheerful disclaimer

We have used the existing data available to us in the best way we can, but without doing a house to house survey of the village it is inevitable that the figures we produced are indicative rather than definitive. We think our audit has provided us with a better sense of the scale of energy reduction possible but the findings should not be interpreted as precise.

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1. The context of the Neighbourhood Plan

Neighbourhood Plans are expected to conform with national planning policy as well as the requirements of other national policies. These include, for example, the legally binding targets for reduction of carbon emissions contained within the Climate Change Act 2008 (an 80% reduction in greenhouse gas emissions from the 1990 baseline by 2050).

The National Planning Policy Framework 2012 sets out how planning must address climate change, flooding and coastal change.[3] Local planning authorities are expected to adopt proactive strategies to mitigate and adapt to climate change. In particular they should:

> **95. support the move to a low carbon future:**
> •• plan for new development in locations and ways which reduce greenhouse gas emissions;
> •• actively support energy efficiency improvements to existing buildings;
> •• when setting any local requirement for a building's sustainability, do so in a way consistent with the Government's zero carbon buildings policy and adopt nationally described standards.
> **97. help increase the use and supply of renewable and low carbon energy,**
> •• have a positive strategy to promote energy from renewable and low carbon sources;
> •• design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts;
> •• consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources;
> •• support community-led initiatives for renewable and low carbon energy, including developments outside such areas being taken forward through neighbourhood planning;
> •• identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

In 2013, the Department for Communities and Local Government (DCLG) released planning practice guidelines for renewable and low carbon energy.[4] Both documents have been consulted in developing the Hassocks Energy Report and our recommendations.

3 Department for Communities and Local Government (2012), National Planning Policy Framework. Downloaded from https://www.gov.uk/government/policies/making-the-planning-system-work-more-efficiently-and-effectively/supporting-pages/national-planning-policy-framework

4 Department for Communities and Local Government (2013), Planning practice guidance for renewable and low carbon energy. Downloaded from https://www.gov.uk/government/publications/planning-practice-guidance-for-renewable-energy

2. Energy efficiency in Hassocks homes

In 2009, buildings accounted for about 43% of all the UK's carbon emissions.[5] Meeting national targets to reduce carbon emissions by 80% will require significant reductions in home energy use.

2. (a) Housing in Hassocks

Hassocks housing types were identified from census housing data by ward.[6]

Table 1: Hassocks housing types (Census 2011)

Total no. of homes	Detached house or bungalow	Semi-detached house or bungalow	Terraced house	Flat or maisonette: purpose-built	Flat or maisonette: converted	Flat or maisonette: commercial building	Caravan or temp structure
3414	1427	1149	279	447	53	57	2
	42%	34%	8%	13%	2%	2%	0%

In the rest of this analysis we will ignore the 2 temporary homes and use the total of 3412 homes, of which 2855 (84%) are houses and 557 (16%) flats.

In 2008, 85% of Hassocks households were owner-occupied (more than the Mid Sussex average). Hassocks also had more one-person households (32%) and fewer households with dependent children (23%)[7]. New housing since 2008 means there are likely to be more families with children. More housing development is expected, which is likely to further increase the number of families.

2. (b) Hassocks home insulation

National data on insulation in homes in 2011 were applied to the Hassocks housing profile to provide estimates of how far energy efficiency measures have already been implemented. These estimates suggest the scale of energy efficiency measures still needed in Hassocks homes.

Table 2: Insulation of Hassocks Homes (2011)[8]

Hassocks homes	TOTAL HOMES	Detached	Semi-detached	Terraced	Flat: purpose-built	Flat: conversion/ commercial
Totals	3412	1427	1149	279	447	110
Loft insulation below 150mm	40% (1363)	44% (628)	47% (540)	46% (128)	12% (54)	12% (13)
Without cavity walls	26% (871)	19% (271)	26% (299)	45% (126)	19% (85)	82% (90)
Uninsulated cavity walls	26% (895)	26% (371)	26% (299)	24% (67)	32% (143)	14% (15)
Incomplete double glazing	25% (863)	27% (385)	25% (287)	24% (67)	4% (63)	55% (61)

5 https://www.gov.uk/government/policies/improving-the-energy-efficiency-of-buildings-and-using-planning-to-protect-the-environment

6 Office of Neighbourhood Statistics, for Hassocks ward, Dwellings, household spaces and accommodation type, 2011. Downloaded from http://www.neighbourhood.statistics.gov.uk/dissemination/

7 Hassocks Village Design Statement, 2008, A Vision for Hassocks.

8 Figures in brackets are estimated number of homes based on national percentages. Source: Table DA6201 Insulation Dwellings for 2011, downloaded from https://www.gov.uk/government/statistical-data-sets/estimates-of-home-insulation-levels-in-great-britain

Home insulation efforts have continued since 2011 of course, and we can estimate the additional homes that have been insulated under government schemes (others may have been done privately). The Carbon Emissions Reduction Target (CERT, now closed) was a government scheme that required all energy suppliers to make savings in CO2 emitted by households and promote uptake of low carbon energy solutions. In Mid-Sussex, CERT installed 6,633 cavity wall insulations and 6,405 loft insulations from 2008-2012[9]. During the two years from 2011-2013, 4% of all Mid-Sussex homes had cavity wall insulation and 5% had loft insulation installed.

Applying these Mid-Sussex percentages to the Hassocks housing total of 3,412 we can estimate that an additional 136 homes had cavity wall insulation installed between 2011 and 2013, reducing the uninsulated total to 759. We also estimated that an additional 171 homes had loft insulation installed, reducing the uninsulated total to 1192. All our figures on insulation are estimates, so we will use a +/- 10% range in our analysis.

DECC Estimates of Home Insulation Levels as of July 2013 shows that nationally, 70% of homes with cavity walls are now insulated, 68% of homes with lofts are insulated at or above 125mm and 3% of homes with solid walls have wall insulation. Applying these national figures to the Hassocks housing stock, we can estimate that:

- of the remaining Hassocks homes without cavity walls, if only 3% are likely to have solid wall insulation, we estimate that from **760 to 930 solid wall homes are still uninsulated**;
- of the remaining Hassocks homes with cavity walls, if 70% are likely to have cavity wall insulation, we estimate that **680-840 cavity wall homes are still uninsulated**;
- of the remaining Hassocks homes with lofts (excluding all flats), if 68% are likely to have loft insulation at or above 125mm, we estimate that **820-1000 homes have less than half the recommended level of loft insulation**. In addition, a substantial proportion of the homes above this level will have considerably less than the current standard of 270mm.
- It is likely that **800-980 Hassocks homes do not have double glazing at all windows**.

There are also many homes that need improved draught-proofing, although there are no national estimates for these. In summary, there is great potential for increasing the energy efficiency of Hassocks homes. The measures would also reduce energy costs.

2. (c) Electricity and gas demand in Hassocks

The Department of Energy and Climate Change produces electricity and gas consumption data for both domestic and commercial/industrial consumers by local authority areas.

Electricity: In Mid Sussex between 2007 and 2011 (the most recent data), annual domestic electricity consumption per household averaged 4,712.2 kWh.[10] Applying that to Hassocks households, we estimate that **total electricity use per year in Hassocks is over 16,000,000 kWh**.

Gas: In Mid Sussex between 2010-2011 (the most recent data), annual domestic gas consumption

9 Cavity wall insulation and loft insulation installed under the CERT scheme (2008-2012), for Mid Sussex. CERT Summary Reports by Local Authority from HEED 21/5/2013, downloaded from http://www.energysavingtrust.org.uk/Organisations/Government-and-local-programmes/Programmes-we-deliver/Homes-Energy-Efficiency-Database/CERT-reports-from-HEED

10 kWh: kilowatt hour, the unit of energy most commonly used in utility bills. A kilowatt is the equivalent of 1,000 watts and a kWh is 1 kilowatt of power expended over 1 hour.

averaged 15,726.5 kWh. Applying that to 3412 Hassocks households, we estimate that **total gas use in Hassocks per year is around 53,600,000 kWh**. Gas consumption is more variable than electricity because of weather: 99% of Hassocks homes have central heating, most of these gas-fired, so a warmer or colder winter affects gas use significantly year to year.

Total annual energy use in Hassocks homes (gas and electricity) is some 70,000,000 kWh.

2. (d) Potential reduction in energy demand from insulating homes

Since it is the main fuel for heating in our area, gas consumption could be reduced significantly by insulating existing homes to the highest standards. The Building Research Establishment (BRE) provides data on potential energy saving from insulating homes.[11]

For uninsulated solid walls, with no cavity to fill, internal or external wall insulation to a depth of 50mm could reduce energy loss from about 96 kWh/yr per m^2 of external wall to 18.4 kWh/yr per m^2. An average house with 100 m^2 of external walls could save 7,760 kWh per year. Cost savings could be around £360 per yr.[12]

For uninsulated cavity walls, BRE calculates energy loss of c. 70 kWh per m^2 of external wall per year. For an average sized house with 100 m^2 of external walls this would mean an annual energy loss of 7,000 kWh/yr. If the cavity walls were insulated they would lose only 28 kWh/yr per m^2 or 2,800 kWh/yr for the average home. Each home would save 4,200 kWh/yr. Cost savings could be around £195 per yr.

For energy loss through roofs, BRE calculates that an uninsulated loft loses c. 117 kWh/yr for every m^2 of ceiling area. An average sized house has 38 m^2 of ceiling so loses 4,450 kWh/yr. Insulate it to the top of the rafters (c. 100 mm) and the heat loss reduces to 19 kWh per yr per m^2, or 722 kWh per year for an average home. Insulate to 270mm and energy loss reduces to 7 kWh/yr per m^2, or 258 kWh/yr for the average home. So each uninsulated loft could save 4192 kWh/yr by insulating to 270mm, with cost savings of £195 per yr. Each under-insulated loft could save 464 kWh/yr if they were topped up to 270mm, with cost savings of £22 per yr.

Energy is lost through windows and glazed doors. BRE calculates that single glazed windows lose about 237 kWh per year for every m^2 of glazing. Simple air filled, uncoated, 16mm gap double glazing reduces this to about 133 kWh per yr. More expensive e-coated krypton-filled double or argon-filled triple glazing can reduce this to about 70 kWh per yr. Secondary glazing with acrylic or polycarbonate sheet is almost as good as simple double glazing at 138 kWh per year for each m^2. For a typical house with 12 m^2 of glazing this gives yearly loss of: Single glazing 2,844 kWh, simple double glazing 1596 kWh, gas-filled double glazing 840 kWh and plastic secondary glazing 1,656 kWh. Cost savings for simple double glazing or plastic secondary glazing would be £55-£58 per yr.

Draught-proofing also reduces heat loss. BRE estimates that draughty homes (open flues, badly fitting doors and windows, gaps between floorboards) can easily have 4 to 5 air changes per hour. This loses about 9,460 kWh of heat per year in a home with a volume of 140 m^2. One air change per hour loses only 2,365 kWh per year for the average sized home, so thorough draught-proofing has the potential to save 7,095 kWh per year per home, with cost savings up to £330 per yr.[13]

11 Data on potential energy savings from insulation measures were kindly provided by Nick Rouse, OVESCo, based on data from Building Research Establishment.

12 All cost savings figures are based on the current British Gas standard tariff of 4.65p per kWh.

13 For homes with old single glazed windows with badly fitting opening sections, secondary glazing can have the additional benefit of reducing draughts at moderate cost and little disruption.

The BRE research enables us to estimate the scale of energy saving possible by making Hassocks homes more energy efficient. For simplicity an equivalence between building energy savings and gas consumption energy (in KWh terms) has been assumed. In reality, the potential savings (both in energy value and fuel cost) will be 10% to 20% greater, depending on boiler efficiency.

- If all remaining Hassocks cavity walls were insulated, estimated savings would be in the order of 5-6% of annual village gas consumption.[14] Total cost savings for these residents would be in the order of £130,000 - £163,000 per yr.
- If all remaining lofts were insulated to 270mm, estimated savings would be at least 1% of gas consumption.[15] Total cost savings for these residents would be at least £35,000 per yr.
- If all remaining solid walls were insulated to 50mm, estimated savings would be in the order of 11-13% of gas consumption with total cost savings of £274,000 - £335,000 per yr.[16]
- If all remaining single-glazed homes in Hassocks were fitted with simple double glazing or plastic secondary glazing, estimated savings would be around 2% of gas consumption.[17] Cost savings would be in the order of £46,000 - £56,000 per yr.
- Draught-proofing the most draughty homes could potentially save 7095 kWh per year. Nationally, about three-quarters of homes have inadequate draught-proofing[18], though not all would achieve the full energy saving that BRE predicts. Our best estimate is that a quarter of Hassocks homes could benefit, with energy savings in the order of 9-10% of gas consumption and total cost savings from £210,000 - £260,000 per yr.[19]

If all measures were carried out Hassocks' gas demand could be reduced by up to a third.[20] Total energy costs for these residents could also be reduced by £700,000 to £850,000 per year.

2. (e). Other ways to reduce energy consumption

Gas demand could be further reduced by measures including:

- more energy efficient central heating boilers
- wood burner stoves to heat living spaces so that central heating loads are reduced

14 Range of 680-840 homes with uninsulated cavity walls each saving 4200 kWh per year, so total saving from 2,800,000 to 3,500,000 kWh per year. Cost savings based on current standard gas tariff of 4.65p per kWh.

15 We estimate that 3% of Hassocks homes (excluding flats) have no loft insulation (86 homes), so these could save 4192 kWh each or total of 360,512 kWh/yr. An additional 828 homes are estimated to have loft insulation below 150mm so topping up to 270mm could save 464 kWh/yr each, and we estimate that another 384,192 kWh/yr could be saved. Total saving of at least 744,000 kWh per year, and it is likely that many more homes could top up from 150mm to 270mm, saving even more energy. Cost savings based on current standard gas tariff of 4.65p per kWh.

16 Range of 760-930 homes with uninsulated solid walls each saving 7760 kWh per year, so total saving of between 5,900,000 and 7,200,000 kWh per year. Cost savings based on current standard gas tariff of 4.65p per kWh.

17 Range of 800-985 homes without double glazing each saving 1248 kWh per year, so total saving of between 1,000,000 and 1,200,000 kWh per year. Cost savings based on current standard gas tariff of 4.65p per kWh.

18 National Insulation Association press release, 30 June 2010 suggests that three-quarters of homes have inadequate draught-proofing. Not all are losing as much heat as the BRE maximum, so as a best estimate we assume that one quarter of Hassocks homes could experience the full energy saving from draught-proofing. It is likely that more could experience some energy saving.

19 Range of 640-780 homes without draught-proofing each saving 7095 kWh per year, so total saving of between 4,500,000 and 5,600,000 kWh per year. Cost savings based on current standard gas tariff of 4.65p per kWh.

20 Between 15,000,000 and 18,200,000 kWh per year or 28% -34% of current gas consumption.

- use of heat pumps to provide primary heat source for central heating (in practice only applicable to homes with high levels of insulation)
- solar thermal heating, primarily applicable to hot water heating.

A recent government consultation on reducing UK electricity consumption[21] suggests there is significant potential for reducing demand by 9% or more (the equivalent of the annual output of 4 power stations). Electricity use in the home can be reduced by measures including:

- higher efficiency rated appliances
- turning off lights and appliances when not in use
- unplugging chargers when finished
- using lower temperatures in washing machines and eco settings in dishwashers
- ensuring full loads for washing machines and dishwashers
- drying clothes naturally rather than in a tumble dryer
- filling kettles with only the amount of water needed
- using more low energy lighting, particularly as LED lighting improves

Much more is possible. One Hassocks home-owner in a typical 1930s bungalow achieved much greater energy savings: by investing £20,000 and making lifestyle changes the family has cut energy costs by 80% and carbon emissions by 76%.[22]

3. Potential for generating renewable and low-carbon energy

The National Planning Policy Framework identifies the responsibility on all communities to contribute to energy generation from renewable or low carbon sources. The UK government has a legally binding target for 20% of all energy to come from renewable sources by 2020, and is currently considering further targets beyond these. At present we estimate that only 3-4% of Hassocks homes are generating energy from solar.

3. (a) Local energy generation from renewable resources: solar

Assuming that detached and semi-detached homes in Hassocks are most likely to be suitable for solar panels (2,576 homes), and using the rough rule of thumb that 50% of homes have a roof suitable for solar installation[23] around 1,288 Hassocks homes have the potential for solar. Based on figures for Mid Sussex District we estimate that only 3-4% of these have already had solar panels installed (38-52 homes). An additional 1,110-1,400 homes may be suitable for solar. Using the DECC domestic average installation of 3.5 kWp[24], and a Sussex average of 1,000-1,100 kWh per kW

21 Department of Energy and Climate Change (2013), Consultation on options to reduce electricity demand: Government response. Downloaded from https://www.gov.uk/government/consultations/options-to-encourage-permanent-reductions-in-electricity-use-electricity-demand-reduction

22 http://www.superhomes.org.uk/superhomes/hurst-road-hassocks-brighton/

23 Taken from Totnes & District Local Economic Blueprint: Our renewable energy sector (2013), a proposal from a partnership of local organisations. Downloaded from http://www.reconomy.org/evaluate-the-economic-potential-of-your-new-economy/

24 Energy Saving Trust, http://www.energysavingtrust.org.uk/Generating-energy/Choosing-a-renewable-technology/Solar-panels-PV

of rated power, each Hassock home could generate from 3,500-3,850 kWh of electricity per year. Each household would save around 1 tonne of CO_2 per year, and achieve combined savings (from free electricity used) and income (from the Feed In and Generation Tariffs) of around £785 per yr.[25]

These Hassocks homes have potential to generate enough electricity to power 900-1250 homes, between 25%-33% of total current electricity use.[26] Combined savings for these home-owners could be between £870,000 and £1.1m per year. As energy costs get ever higher the real value of their investment will increase. At present this money is paid to the big energy companies and immediately leaves the local area: solar power enables it to stay in the community.

Community solar projects involving public and commercial buildings (including schools, barns, halls etc) also have the potential for a worthwhile contribution to Hassocks' electricity needs, as well as cutting their energy costs very substantially. A large roof (on a commercial building, a school or public building) could hold many more 250W solar panels than a house. For example, OVESCo has recently installed 143 solar panels on roofs at Lewes Priory School and 187 panels on Chailey School. Where they are sited in a favourable location, a typical installation of 150 solar panels with total rated power of 37.5 kWp could be expected to generate approximately 37,500-41,250 kWh of electricity per year.[27] **Five projects of this size could generate more than 1% of Hassocks annual electricity consumption.**

An even larger contribution to Hassocks' energy needs could be met through solar farms. A single solar farm in Wymeswold, Leicestershire, for example, is generating some 39,100,000 kWh of electricity per year, more than twice Hassocks' annual electricity consumption. It is based at a former airfield covering 150 acres, and a solar farm on that scale is unlikely for our area. The Solar Trade Association says that 25 acres of land are required for every 5 megawatts[28] of installation (powering 1,515 homes). **Two of these could generate all the remaining 10,000,000 kWh per year of Hassocks electricity demand.** There is an added benefit for local authorities in that 100% of business rates for renewable energy projects go to the local authority. For solar these would be c. £5,000 per megawatt per annum, so for the 10 megawatts required to meet Hassocks electricity needs the local authority would receive £50,000 per yr.

Hassocks could generate the equivalent all of its annual current electricity needs locally from a combination of solar farms and solar panels on homes and community buildings.

3. (b) Moving Hassocks toward a zero carbon community

Over the 16 years from now to 2030, the imperatives of climate change and the UK's legally binding carbon reduction targets will require a decarbonised energy system. Our analysis indicates how electricity needs could be met locally without fossil fuels. More energy efficient homes can reduce gas needs significantly, but more will be needed to shift heating and cooking away from gas to more sustainable fuels.

While solar is currently the most straightforward and well-developed technology for local renewable energy, during the years to 2030 we can expect other technologies to become more cost-effective and widespread. It will be important for the neighbourhood plan to allow the

25 Energy Saving Trust (2013), Microgeneration consumer guide: solar photovoltaics. Downloaded from http://www.energysavingtrust.org.uk/Generating-energy/Choosing-a-renewable-technology/Solar-panels-PV

26 Between 3,850,000 and 5,390.000 kWh of electricity per year.

27 Panels can be expected to generate 1000-1100 kWh per kW of rated power.

28 A megawatt is a unit of power equivalent to one million watts. There are 1,000 kilowatts in a megawatt.

flexibility to respond to these opportunities as they develop. National planning practice guidelines for renewable and low carbon energy indicate how local planning authorities can identify suitable areas for renewable energy in general and the considerations for specific technologies.[29]

For example, energy storage systems (community and domestic) are under development that will allow power generated by intermittent sources (solar, hydro and wind) to be stored for use when needed. At present the costs are high but new storage options are emerging rapidly.

Other potential renewable and low-carbon energy can be generated from biomass systems (West Sussex has plentiful supplies of wood and other biomass to fuel these on a sustainable basis), anaerobic digestion of green waste (at present only viable on a large scale, but smaller-scale plants are under development), micro-hydro from streams running off the South Downs and ground source heat pumps (suitable for new housing developments and well-insulated buildings). District heating projects (again, especially suitable for new developments) can provide effective heating and power for homes. Wind turbines are well-developed technically, although siting in and around residential areas can be challenging as buildings deflect the wind and prevent the steady airflows that are needed for wind turbines to operate most efficiently.

Domestic energy use is only a part of what must be addressed in order to meet the UK's carbon reduction targets. In addition to the carbon emissions from homes, transport, food and business operations all contribute to Hassocks' carbon footprint. National planning guidelines address some of these, in particular planning for sustainable transport.

4. Recommendations for Hassocks Parish Council

1. Actively support energy efficiency improvements to existing buildings (National Planning Policy Framework (NPPF) 95).:

- ✓ For example, Hassocks Parish Council could set up (or support a community group to set up) a buying club for insulation, draught-proofing materials and so on, negotiating better prices with the suppliers.
- ✓ Planning gain (Section 106 agreements) could specifically prioritise energy efficiency projects for community investment.
- ✓ Hassocks Parish Council could also work with the Sussex Energy Saving Partnership (SESP). All the local authorities across East and West Sussex and Brighton & Hove City Council are working together in SESP to improve the energy efficiency of all properties in their areas. http://www.westsussex.gov.uk/living/communities/energy_saving/sussex_energy_saving_programme.aspx The goals of SESP are to help all residents to create warmer, healthier homes and reduce carbon emissions; help boost the local economy by creating work for local businesses; create opportunities for the local workforce, including work placements, apprenticeships and skills development; and help vulnerable residents and those at risk of struggling to pay their fuel bills.

2. Plan for new development in ways that reduce greenhouse gas emissions (NPPF 95).

- ✔ Hassocks Parish Council should follow government expectations that new developments

29 DCLG (July 2013), Planning practice guidance for renewable and low carbon energy. Downloaded from https://www.gov.uk/government/publications/planning-practice-guidance-for-renewable-energy

are energy efficient, and that all new homes will be zero carbon from 2016. Note that DCLG are considering extending this to include all other buildings from 2019.

- ✔ The code for sustainable homes, the national standard for the sustainable design and construction of new homes, provides 9 measures of sustainable design. Level 6 buildings have net zero carbon emissions. The Hassocks Neighbourhood Plan cannot require a higher rating than the Mid Sussex Local Plan, but we urge the Parish Council to encourage MSDC to require the highest standard, because incorporating it in planning policy is the only way that the code can be enforced.

3. Expect new development to incorporate decentralised energy supply unless the applicant can demonstrate that this is not feasible (NPPF 96)

- ✓ New housing developments, for example, could incorporate a district heating and cooling scheme, combined heat and power unit and/or waste heat recovery.

4. Expect new development to minimise energy consumption through landform, layout, building orientation, massing and landscaping (NPPF 96)

- ✓ Beyond energy efficiency and renewable energy generation, the siting of new developments can have an important impact on carbon emissions and expectations should be identified in the Neighbourhood Plan. The importance of passive solar (collecting energy from the sun), trees to provide cooling and transpiration, windbreaks, water conservation and preventing run-off are all important aspects of new developments and the planning process.

5. Develop a positive strategy to promote energy from renewable and low carbon sources (NPPF 97)

- ✓ The Hassocks Neighbourhood Plan could set targets for energy generation from renewable and low carbon sources, and set out a strategic vision for how Hassocks could become largely self-sufficient in energy generation by 2030.
- ✓ The leadership role of the Parish Council will be important in informing and encouraging local residents to play their own role in renewable energy. There are also opportunities to establish a home-owners buying club, negotiating better prices with solar suppliers.

6. Identify suitable areas for renewable and low carbon energy sources and supporting infrastructure (NPPF 97)

- ✓ The Neighbourhood Plan should develop criteria to identify suitable areas. These criteria can then be applied to identify sites that the Parish Council considers suitable, and in future could be applied to future proposals from developers outside these areas to determine whether these would be acceptable. Criteria should include consideration of the requirements of the particular technology (e.g. biomass systems require transport infrastructure, hydro-electric schemes require sources of water, wind turbines require not only wind resources but also air safeguarding and access for large vehicles). Other criteria must address the impact on the environment (e.g. open-loop ground source heat pumps require careful siting around wetlands, watercourses and septic systems[30], local topography is an important factor affecting the impact of wind turbines and large-scale solar farms).

30 http://www.environment-agency.gov.uk/business/topics/128133.aspx

Finally, protecting heritage assets, AONB and SSSI sites, and local amenity are important considerations.

7. Support community-led initiatives for renewable and low carbon energy including developments outside such areas being taken forward through neighbourhood planning (NPPF 97)

- ✓ As DCLG says, 'community led renewable energy initiatives are likely to play an increasingly important role and should be encouraged as a way of providing positive local benefit'.[31] Hassocks Parish Council could establish policies which give 'positive weight' to renewable energy projects with local community involvement and leadership.
- ✓ Planning gain (Section 106 agreements) could specifically prioritise community renewable energy projects for investment.
- ✓ DCLG also suggests that as part of a Neighbourhood Plan, communities can look at developing a 'community energy plan' to underpin the neighbourhood plan and we would encourage Hassocks Parish Council to so this. HKD Transition would be glad to support the Parish Council in development of such a plan.

The UK commitments to carbon reductions require government at all levels, as well as individuals and communities, to make important contributions. Achieving the targets will need community leadership, and a carefully planned information and support effort. HKD Transition is ready to make its contribution as a community group, and we believe that the Hassocks Parish Council, through its Neighbourhood Plan, can play an important role in making Hassocks much more energy self-sufficient in the years to come.

31 DCLG (2013), Planning practice guidelines for renewable and low carbon energy, para17.