



**Energy Saving Recommendations Report**

for

**Lady Sew and Sew**

**January 2022**

**Survey of Lady Sew and Sew**



**European Union**

European Regional  
Development Fund



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## ORGANISATION OVERVIEW

### Report overview

EiE carried out a site visit and met with Jon Blundell. All recommendations in this report are based on information and observations obtained prior to and during the site visit, and information subsequently provided. The report is set out in order of recommended priority based on ease of implementation, carbon impact, cost and factors discussed on site.

### Client details

<b>Organisation name</b>	Lady Sew and Sew	Farm Road, Henley-on-Thames RG9 1EJ
<b>Contact name</b>	Jon Blundell	<a href="mailto:jon@ladysewandsew.co.uk">jon@ladysewandsew.co.uk</a> 01491 572 528
<b>Date of site visit</b>	05/01/2022	Carried out by Moira Dorey

### Energy savings recommendations - summary

Below is a summary of the opportunities recommended in this report. Costs and savings have been estimated using available information; an explanation is provided in detail for each opportunity. Estimations have been made based on energy data provided.

Opportunity	Savings (kWh / yr)	Savings (£ / yr)	Cost (£)	Initial Payback (yrs)	Carbon Impact (tCO <sub>2</sub> e / yr)
Upgrade lighting to LEDs	6,706	1,082	5,624	5.2	1.42
Remove roof ventilation	11,000	225	1,700	7.56	2.01
Consider an air to air heat pump system	89,375	Subject to quote	Subject to quote	n/a	15.77
Install secondary glazing	11,000	225	3,125	13.89	2.01
Add solar PV panels	5,610	992	15,000	15.12	1.19
Add insulation inside the pitched roof	27,500	562	22,500	40.01	5.04
<b>TOTAL</b>	<b>151,191 kWh/yr</b>	<b>£3,086/yr</b>	<b>£47,949</b>		<b>27.44 tCO<sub>2</sub>e / yr</b>

### Site details

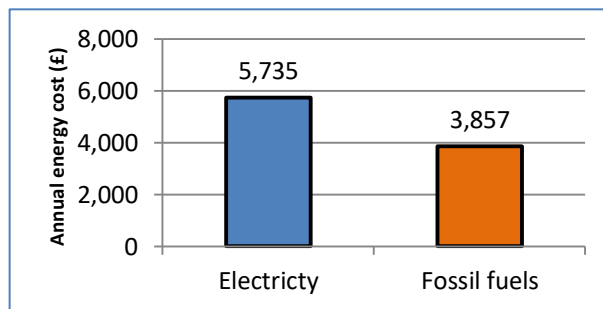
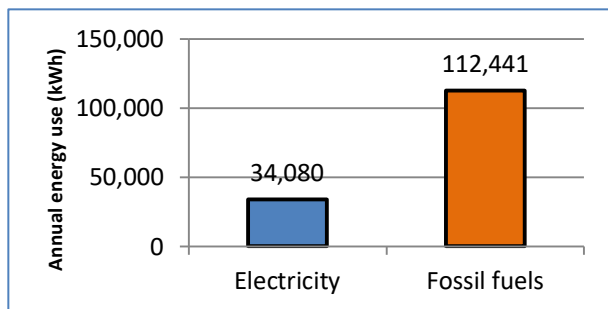
The premises consist of a main warehouse style building constructed around 1906 now used as a shop and showroom. There are two extensions built in the 1970s now used for offices, a classroom, an additional sales floor (the Yarn Room) and basement storage. In total the building covers approximately 745m<sup>2</sup>. It is heated by gas fired boilers with radiators plus an air-handling unit in the Yarn room that provides both heating and cooling. There are three air-conditioning units in the main showroom for cooling only, plus a ventilation system that is no longer used.

# ENERGY PROFILE

## Energy consumption annual profile

Fuel type	Annual Energy use (kWh)	Cost per kWh (p)	Standing charge (p/day)	Approx. annual cost (£)
Electricity	34,080	16.14	29.89	5,735
Gas	112,441	2.045	211.00	3,857

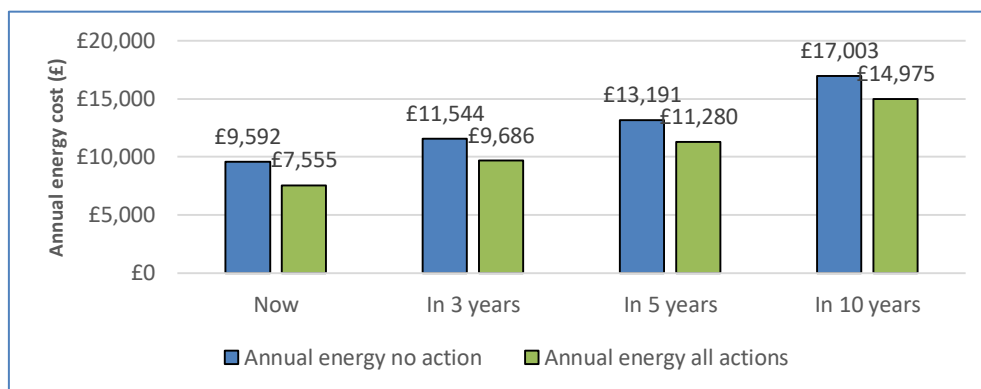
Energy profile breakdown for Lady Sew and Sew consumption (left) and costs (right)  
27.83 tonnes of CO<sub>2</sub>e from annual energy consumption



Consumption is based on figures provided.

## £19,376 avoided energy costs over 10 years from implementing recommendations in this report

### Lady Sew and Sew energy spend in the next 10 years



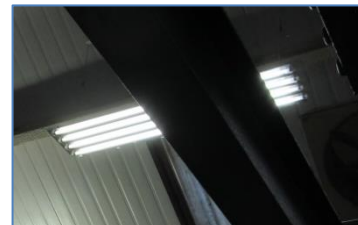
From Laser mid-range predicted electricity UK price rises

## ENERGY SAVINGS RECOMMENDATIONS

### Upgrade lighting to LEDs

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
5,075	819	5,624

The main showroom is lit with T5 compact fluorescent tubes (see right), which are fairly low energy and can be replaced when they fail. Other non-LED lights in the building can be replaced immediately, including the wall fittings in the main showroom and classroom and the spot lights in the classroom. LEDs will reduce energy use and maintenance as well as providing improved lighting quality. We recommend replacing the T5 lights with LED light fixtures as they fail to reduce the cost of lighting. We recommend replacing the remainder of the non-LED lights now to reduce the cost of lighting as follows:



#### MAIN SHOWROOM AND YARN ROOM

The uplighters in your main showroom and yarn room are designed to provide a wash of light on the roof as well as supplementing the fluorescent and spot lights in the room. Replacing uplighters with a similar level of brightness can either be from LED flood lights (wall mounted) or LED high bay lights (attached to the beams). When considering replacement lighting review the light quality preferred (known as colour temperature) that ranges from warm white, cool white or daylight as this may affect how the material in the showroom is viewed by your customers. Agree with your electrician to let you test a number of LEDs to ensure the light quality and level of brightness is correct before making a final purchase. For example, these would provide 16,500 lumens at 112 Watts with an average life of 50,000 hours:



<https://ledhut.co.uk/collections/led-high-bay-lights/products/lg-112w-led-high-bay-5700k-ip65-multi-sensor-ready>.

#### CLASSROOM

The lighting in your classroom is currently a mix of 150W wall lights and G4 spot lights in the ceiling. The spot lights cover about 50% of the room. The wall lighting does not offer the best illumination for workshops. In order to reduce energy and improve the lighting we recommend that you replace the lighting in the whole room with new LED spotlight fixtures taking care to provide brightness and light quality suitable for crafting workshops. Alternatively consider LED round panel lights, for example:

<https://www.bltdirect.com/red-arrow-20w-ip44-round-mini-led-panel-daylight-1?cat>

#### OFFICES

The spotlights that illuminate the office regularly gets left on throughout the day and could easily be replaced with a single LED panel rated at 40W, either ceiling mounted or hanging. The panel would have a similar wattage to your current spot lights (approximately 6 x 8W = 48W) but provide a better level of light and lower maintenance costs. The offices off the yarn room each have a 150w wall light that could be replaced with more energy efficient LED wall lights.

Example LEDs can be found here:

<https://www.tlc-direct.co.uk>

<http://www.lightingsupermarket.com>

<https://www.ledhut.co.uk/>

Ensure that, whichever contractor you use, they offer a minimum 5-year failure replacement guarantee.

## Actions

- For all non-LED lights consult lighting contractors to discuss LED replacements. Be aware if LEDs are for existing lighting fixtures or if new LED fixtures will be installed.
- As T5 showroom compact fluorescent tubes fail replace these lights with LED panels.
- We recommend contacting at least three lighting contractors for quotes.
- Choose a preferred contractor and arrange for the lighting to be installed.

## Costs and savings

Costs and savings are based on the following figures:

Location On-site	Current lighting	Wattage (W)	No.	Replacement lighting	Wattage (W)	No.	Annual savings (kW)	Annual savings (kWh)	Annual savings (£)	Total costs of replacements (£)
showroom	metal halide discharge lights	250	12	LED high bay	112	10	1.38	3,910	631	2,200
classroom	spot lights	10	8	LED recessed spots	20	4	-0.04	0	0	88
classroom	metal halide discharge lights	150	4	LED round panel lights	20	4	0.52	1,082	175	88
2 x offices	G4	10	12	LED panel 1200 x 300	40	2	-0.06	83	13	44
2 x offices by yarn room	metal halide discharge lights	150	2	LED surface mounted 1200 x 300 panels	40	2	0.22	458	74	44
Yarn Room	metal halide discharge lights	150	1	No replacement		1	0.15	312	50	0
Yarn Room	metal halide discharge lights	250	3	LED high bay	112	3	0.414	861	139	660
SUB-TOTALS							2.584	6,706	1,082	3,124
Labour for	5	days	@	250	pounds	for	2	persons	per day	2500
TOTALS							2.584	6,706	1,082	5,624

## ENERGY SAVINGS RECOMMENDATIONS

### Remove extraction fans

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
11,000	225	1,700

There are six fan extractor units in the roof of the main showroom. Some have cowls on top of the external units but not all. These units are no longer required to provide fresh air into the building, however warm air will be lost to the outside when the heating is on, wasting energy. We recommend that you arrange to remove these extraction units.



If solar panels are added to the building (page 11) extractor fan removal could be carried out in conjunction with that action whilst scaffolding is up.

#### Actions

- Obtain quotes for the removal of the fan extraction system in the roof.
- Selected a contractor and carry out the work.
- Consider this action in conjunction with solar panel installation.

#### Costs and savings

£1,700 costs are based on £200 for replacement roof panelling and £1,500 for labour. Savings are based reducing gas heating consumption by 10% sealing these vents.

## ENERGY SAVINGS RECOMMENDATIONS

### Consider an air to air heat pump system

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
89,375	Subject to quote	Subject to quote

Currently heating and cooling consists of:

- Two Hamworthy Purewell 80 Auto gas boilers, one of which is no longer working. Hamworthy have notified me that these boilers were manufactured in 1996 therefore they are 25 years old. These boilers provide heat to a wet radiator heating system with most of the radiators in the main showroom situated behind racks of material. The main showroom is often cold despite the heating set to come on in the early morning to bring warmth into the showroom before the staff start work. Hamworthy have confirmed that these boilers are likely to only be about 80% efficient meaning that for every 10kWh of gas used you only receive 8kWh of heating.
- The Yarn Room has an air-conditioning unit purchased for cooling but has recently been used to provide heating as well.
- The reception area has a Daikin inverter unit already installed. Whilst access to this unit was difficult during the visit, research suggests that it can provide heating and cooling and therefore could replace the wet radiator system in the reception.
- Three suspended air-conditioning units centrally located in the main showroom that it is believed are only designed to cool, not provide heating.



An air source heating system (ASHP) uses electricity to provide heat via fan emitters rather than radiators. It will deliver 3 units of heating from 1 unit of energy, making it 300% more efficient than current gas heating. Inertia in the air is increased via compression through the heat pump and transferred to gas sent to fan emitters. As you already have pipework and wiring from external units to internal air-cooling units, replacing the existing units with modern air to air source heat emitters and external pumps is likely to be fairly straight forward. Discussion with contractors should include the feasibility of replacing the outside units whilst retaining the internal units to reduce installation costs. Additionally, one of these units is already sited over the till and cutting area where staff and customers spend considerable amounts of time therefore it is an ideal location for a heating unit. We recommend investigating an air source heating system as an efficient and low carbon replacement to your gas boiler that will target the heating where it is needed.

NB: An air-to-air ASHP system can provide cooling in summer as well as winter heating from the same emitters.

For further details see:

<https://www.thegreenage.co.uk/air-to-air-heat-pumps-for-heating/>

[https://www.daikin.co.uk/en\\_gb/commercial.html](https://www.daikin.co.uk/en_gb/commercial.html)

If coupled with solar technology producing electricity to power the pumps, ASHP technology could provide heating and cooling at very low running costs.

#### Actions

- Engage a qualified ASHP contractor to determine the feasibility of the project and develop specifications.
- Use the Carbon Trust's Green Business directory as a source of suppliers in the region who have been accredited by the Carbon Trust.
- Request quotes from three competent and qualified suppliers.
- Choose a preferred contractor and arrange for the system to be installed.

**Costs and savings**

The cost for this installation is dependent upon how much of the existing cabling and hardware can be used and specialist contractor estimates of the heating output required for your showroom. Getting the correct size heat pump for your showroom is crucial to achieving a high efficiency heat pump installation. This action is estimated to save almost 16 tonnes of carbon a year from your business however, due to the difference in the cost of your electricity and gas per kWh (16.14p versus 2.0451p), at current energy prices, moving from a gas heating system to an ASHP heating system is likely to increase the cost of heating your building by £700-£900. This could be off-set by reducing your gas standing charge (see notes at the end of this report) and using less energy to heat the showroom as the heat will be directed to where it is most needed in a carbon efficient way.



## ENERGY SAVINGS RECOMMENDATIONS

### Install secondary glazing

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
11,000	225	3,125



The windows in the building are single glazed. The window frames are metal and have poor insulation properties; they are never opened. Secondary glazing installed inside of single glazing will reduce heat loss and draughts to help keep the building comfortable in cold weather. Insulating properties to consider include single or double glazed secondary units, thickness of glass or Perspex, and U-value (measure of heat loss) of the secondary window. We recommend installing secondary glazing to improve insulation and comfort.

There are numerous suppliers and installers of secondary glazing. Three are here:

Bicester Glass: <https://www.bicester-glass.co.uk/windows-and-doors>

CN Glass: <http://www.cnglass.co.uk/double-glazing/secondary-double-glazing/>

A & C Glazing: <https://www.aandcglazing.co.uk/windows/oxford-secondary-glazing/>

An alternative is removable magnetic Perspex glazing. See:

<https://www.magneglaze.co.uk/secondary-glazing/>

This would be a cost effective solution that would reduce draughts and heat loss.

Installing secondary glazing can reduce heat loss without affecting the aesthetic of historic buildings.

#### Actions

- Engage a qualified contractor to discuss secondary glazing options.
- Obtain quotes from three secondary glazing contractors for the design and installation of secondary glazing.
- Obtain a quote for installing Perspex glazing.
- Choose a preferred supplier and arrange for the work to be carried out.

#### Costs and savings

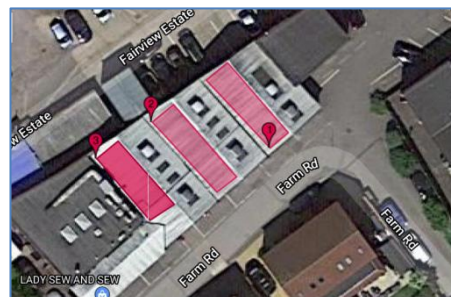
The cost to add secondary glazing will vary considerably depending on the type of unit you choose. Costs are based on adding Perspex glazing to three larger windows at approximately 3.75m<sup>2</sup> each and 10 smaller windows at approximately 2m<sup>2</sup>. At £150 per square metre this would cost in the region of £4,700 for glass secondary glazing or £3,125 for Perspex glazing based on £100 per square metre. Savings are based on reducing annual heating expenditure by 10%.

## ENERGY SAVINGS RECOMMENDATIONS

### Add solar PV panels

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
0	992	15,000

There is sufficient space to install south west facing solar PV panels on your roof to generate electricity from sunlight, which will reduce the amount drawn from the National Grid saving you energy costs and carbon. We recommend, subject to survey, a 10 kWp solar array of 30 panels generating an estimated 8,500 kWh of electricity per year.



For ever kWh generated from solar panels that you use on site you will save 16.14p (your day time electricity rate). Surplus solar electricity is exported back to the National Grid and you will receive approximately 3p per kWh from the Smart Export Guarantee, paid through your electricity supplier. We anticipate 66% of electricity generated will be used on site.

Useful information is at these links:

<http://www.r-eco.coop/> - Oxfordshire solar installer and worker cooperative.

<https://www.jojsolar.co.uk/location-oxford/> - Oxfordshire based.

<http://www.solartech.org.uk/> - Oxfordshire based.

In addition to installing an array of solar PV panels on the roof, an inverter is installed indoors to make the electricity compatible with your building's electricity demand. While the sun shines every day, the amount generated is affected by temperature and cloud cover; weather data is used to estimate performance.

### Actions

- Solar PV panels will need to be installed by a specialist company who will both assess the project well as providing a detailed quote for installation. Contractors will confirm if the roof can bear the weight or if obstructions, such as trees, will overshadow the panels.
- Contact at least three solar panel contractors to obtain quotes – see links above.
- Speak to contractors about batteries for storing electricity that would have been exported.

### Costs and savings

Cost for 10 kWp over three roofs is estimated at £15,000, subject to quotes. Savings have been calculated based on 8,500kWh of electricity annually, with 5,610kWh used on site and 2,890kWh exported through the Smart Export Guarantee.

## ENERGY SAVINGS RECOMMENDATIONS

### Consider adding insulation inside the pitched roof

Energy saving (kWh)	Cost saving (£)	Cost of action (£)
27,500	562	22,500

The pitched roof of the showroom has very little or no insulation above, presenting an opportunity to reduce heat loss and save energy. As much as 25% of heat is lost through the roof in an un-insulated building. Increasing insulation will minimise heat losses in winter, reduce heat gains in summer, improve comfort levels for users, and reduce annual energy bills by reducing heating requirements. As there are no plans to re-roof the building, insulation will have to be added internally. This would normally include adding rigid insulated plaster board to the ceiling and covering it with plasterboard or using 'all-in-one' insulation backed plasterboard, which although more expensive to buy, will reduce labour costs. We recommend that you consider adding insulation inside the pitched roof to reduce heat loss.

For further information and examples see:

<https://www.cncbuildingcontrol.gov.uk/wp-content/uploads/2019/07/CNCD-053-Warm-Roofs-Easy-Guide.pdf>

<https://www.kingspan.com/gb/en-gb/products/insulation-boards/applications/roof-insulation-boards/pitched-roof-insulation>

#### Actions

- Obtain quotes from three contractors for adding insulation inside the pitched ceiling.
- Building regulations for new buildings require a U-value of 0.18 W per m<sup>2</sup> for insulation at pitched roof level and we recommend that your renovations also aim to reach this level. Boards at least 60mm thick are best, and can be up to 100mm depending on the insulation material. More expensive materials will provide the same level of insulation with thinner boards, therefore ask the contractors who are quoting for the work to state the U-value of their chosen insulation material. U-values measure how effective a material is as an insulator. The lower the U-value is, the better the material is as a heat insulator.
- Damp can be exacerbated if insulation is installed over problem areas therefore ensure your contractor address damp when quoting.
- Choose a preferred supplier and arrange for the work to be carried out.

#### Costs and savings

Costs are based on 450m<sup>2</sup> of roof area to be insulated at £ 50/m<sup>2</sup> for a total of £22,500. Savings are based on reducing gas heating costs by 25% as a result of improved insulation.

## FURTHER RESOURCES

### De-stratification fans

Heat in the showroom rises toward the roof, away from users. Trapped heat at the apex of the ceiling may be pushed back down towards users using de-stratification fans that better circulate heat, improving comfort and reducing heating demand. These fans can look like traditional fans or much smaller more modern units and make little noise.

Further reading on heat de-stratification here:

<https://www.puravent.co.uk/blog/post/destratification-fan-guide>

Examples of de-stratification fans:

<http://www.airius.co.uk>

<http://www.reznor.co.uk/en/uk/destratification>

<https://tinyurl.com/mvjejf9n>



It may not be necessary to add de-stratification if you install an ASHP heating system which can be designed to direct the heat to where it is most needed. We recommend that this is discussed with ASHP contractors as they develop specifications.

### Review energy rates to ensure competitive prices

Your gas tariff is currently charged at 2.045p per kWh, which is an excellent kWh price compared to other local businesses. However this is partially offset by the high daily standing charge of £2.11 per day. The standing charge is therefore £770 per year and will form the majority of your bill in summer months. If you reduce your use of gas through installing a heat pump heating system, but retain a gas supply, ensure that the standing charge rates are reviewed as, at that stage, it may be worth paying slightly more per kWh to reduce the standing charge.

### Funding

Possible sources of funding for the recommendations in this report:

OxFutures – 25% funding towards the cost of energy reduction and generation measures. Contact Alison Grunewald. E-mail: [alison.grunewald@lowcarbonhub.org](mailto:alison.grunewald@lowcarbonhub.org).

### Your action progress update

Through the energy assessment process we will agree on what recommended actions your organisation would like to progress. After a number of months, we will ask for an update on your progress. Some actions will be completed, some in progress, and others not yet started. Below is an example of how you can indicate your progress (tick one box per row). There is no expected completion date for any action, however your information is extremely important for helping us track project improvements.

<b>Opportunity</b>	<b>Action completed</b>	<b>Partially completed</b>	<b>Not begun but intending to</b>	<b>Not begun, <u>not</u> intending to</b>	<b>Not applicable</b>
Upgrade lighting to LEDs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Remove roof ventilation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consider an air to air heat pump system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Install secondary glazing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add solar PV panels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add insulation inside the pitched roof	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>