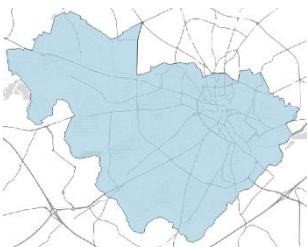


Energy efficiency in Norwich South

How energy efficiency benefits residents and businesses in the Norwich South constituency



**Association for the
Conservation of
Energy**

Key Points

Many people worry about their home energy bills, and for some people keeping their home warm is simply not affordable. For businesses, buildings with poor energy performance can be expensive to run, affecting their competitiveness. The only long term solution is to stop wasting fuel and leaking warmth from our homes and businesses by improving insulation and ensuring all buildings have modern, well controlled heating and cooling systems, and efficient lighting and appliances.

It can be expensive to heat and power local homes

- 42,000 of the 45,300 households in Norwich South are connected to mains gas and typically pay around £1,070 a year for gas and electricity. The remaining 3,200 homes in the area have to use alternative fuels, typically spending £2,200 a year on heat and power¹.
- Just over 1,800 homes in Norwich South have been given the very worst energy ratings of F or G, which is just under the national average². These homes waste hundreds of pounds worth of fuel every year.

Businesses in the East of England have also felt the impact of high energy costs.

- Many businesses in Norwich operate out of old and poorly insulated buildings, with 40% having the very worst energy performance ratings of E, F and G³. Buildings with poor energy performance can be expensive to run. This affects business competitiveness, and makes it difficult to maintain a comfortable working environment for employees.

Significant upgrades to the efficiency of buildings in the area been made in recent years.

- National domestic energy efficiency schemes have helped to insulate 8,300 lofts and just under 6,000 cavity walls in the area since 2005⁴. At the same time more than 11, 500 efficient boilers have been installed.
- Progress has been made improving the efficiency of Norwich's public buildings: 38% of those assessed achieved A, B or C operational energy ratings in 2016, up from just 15% in 2009. The percentage receiving the worst ratings of F & G has fallen from 37% to 7% over the same period.
- 826 solar photo-voltaic systems and low carbon heating systems have been installed, enabling homes and businesses to generate their own low carbon heat⁵.

There are still huge opportunities to improve the efficiency of homes and workplaces in Norwich South.

- 25% of homes (around 11,200) could benefit from cavity wall insulation, 25% could improve the level of insulation in their lofts and just over 50% (around 22,900 homes) could upgrade to more efficient heating systems⁶.
- Over 70% of commercial and industrial buildings in Norwich that have an energy performance rating are rated D or worse, meaning that the businesses occupying them could reduce their energy costs significantly

These improvements generate a wide range of benefits for the area.

- Norwich South residents spend around £53 million on energy bills every year⁷. Across Norwich businesses spend approximately £58 million annually on energy. Cutting fuel bills means less money leaving the local economy and more spent in local shops and businesses.
- Most energy efficiency improvements are delivered by local businesses and tradespeople. An ambitious UK energy efficiency programme would create 9,600 jobs in the East of England⁸ in the domestic retrofit market alone.
- Cold homes have been shown to be damaging to both physical and mental health. For every £1 invested in renovating cold homes the NHS saves 42 pence in reduced hospital admissions and GP visits, meaning more money for frontline services⁹.

Despite this potential, national policy commitments would see little progress made.

- Current national policy commitment would see just 343 homes helped each year to 2020¹⁰. Those in need of more significant works, such as solid wall properties, would miss out.
- Business can find it hard to access finance for energy efficiency investments, and there is no national action to change this.

Upgrading the energy efficiency of Norwich South's homes and businesses would present a huge opportunity to cut bills, improve residents' health and well-being and boost the local economy. To make this happen and unlock the benefits to the Constituency, action is needed both locally and nationally.

The story so far

The cost of gas and electricity is 40% higher than it was ten years ago and compared to 20 years ago, prices are up by 2/3rds¹¹. To combat these historically high prices, a local army of unsung heroes have been fighting to keep bills in check and make sure everyone can afford to keep their homes warm and healthy and their businesses productive and profitable.

Homes

There are just over 45,000 households in the constituency with 45% owning their homes, 24% renting privately and 30% living in social housing. 7% of homes are not connected to mains gas, making their energy costs even higher.

Over the last 10 years in Norwich South the insulation of homes has been improved, inefficient heating systems have been improved or replaced and renewable energy technologies installed. We estimate that since 2005 more than 25,000 significant works have been undertaken to improve the energy performance of homes in Norwich South.

Table 1: Estimated number of common efficiency improvements made to homes in Norwich South since 2005⁴.

Lofts insulated	8,300
Cavity walls insulated	6,000
Efficient boilers installed	11,500

New insulation technologies such as cladding for solid walls have also greatly benefitted older homes which would otherwise still be leaking heat.

Norwich South residents have taken advantage of incentives that enable them to generate their own electricity and low-carbon heat.

Table 2: Low Carbon technologies installed in homes in Norwich South since 2010⁵.

Low carbon heating	12
Solar Photovoltaic systems	814

Businesses

The commercial and industrial stock in Norwich comprises around 5,030 units with an average floor area of 388m². This includes 2060 retail units, 1320 office units and 1320 industrial units. The remaining

330 are mostly school buildings, hospitals and healthcare, and a wide variety of buildings used for leisure like restaurants and cinemas¹².

Significant improvements have been made to non-domestic buildings. All larger public buildings, such as schools and hospitals, are required to update their display energy certificates (DECs) every year. This allows the buildings' occupants to track their energy consumption over time and helps to highlight high energy consumption. Data from these certificates have shown a steady reduction in the number of poorly performing buildings in Norwich. In the year after DEC's were introduced (2009), 37% scored F and G¹³. By 2016 the number of F and G-rated buildings was down to just 7%. Over the same period the number scoring A to C has gone from 15% up to 38%.

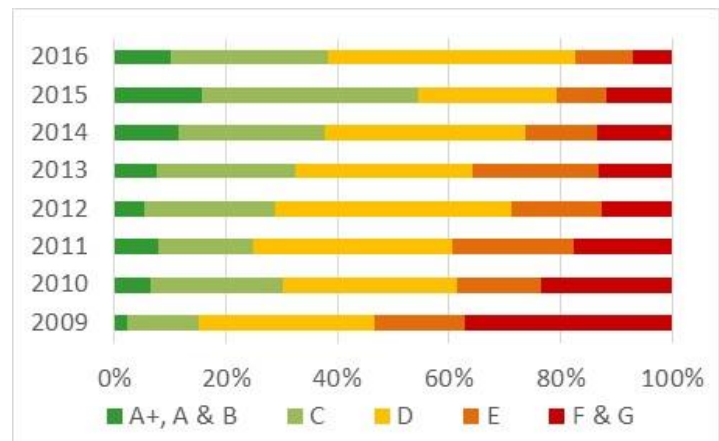


Figure 1: DEC ratings of public buildings in the Norwich¹³.

By requiring organisations to keep track of and display their energy consumption, DEC's are enabling the improvements in energy consumption to be clearly demonstrated. Unfortunately, at present DEC's are not required for private non-domestic buildings, such as shops and offices, so it is not possible to see what - if any - improvements are being made to those buildings.

Businesses in Norwich South have also been investing in low carbon technologies.

Table 3: Low Carbon technologies installed in businesses Norwich South since 2010⁵.

Low carbon heating	8
Solar Photovoltaic systems	24

National policies have played an important role at the local level. Charities in Norwich South have been able to access funds to provide low income households with the heating upgrades they desperately need, and incentive schemes have encouraged residents and

businesses alike to try new technologies like solar panels. The dedication of local businesses and charities, combined with national funding and incentive schemes, have been pivotal in the progress made so far in Norwich South.

Case Study: The Fabric First Institute

The Fabric First Institute opened its doors at the end of 2016; its launch was made possible thanks to a grant from the New Anglia Skills Deal Programme which was provided by Norfolk County Council, Suffolk local authorities and the Skills Funding Agency.



Currently, 4,260 construction sector jobs are expected to be created in the East of England each year for the next five years. In addition, new developments will require a wider range of skills to include: renewables, air-tightness and a fabric first approach to construction in order to meet aspirational energy targets planned for the coming decades. These factors create both huge challenges and opportunities and will require a highly skilled workforce.

The Fabric First Institute is teaching delegates the practical fundamentals of building a low energy building, including among other topics: how to include insulation best practices, the importance of

airtightness and how this can be achieved and aspects of thermal bridging.

The project has developed and is running two training packages: a one-day course for contractors and subcontractors; and a one-week City and Guilds Accredited Level 3 module for students and learners still at college. Importantly, contractors are sending their subcontractors which helps to enable smooth communication, a factor which is key in the successful delivery of low energy development.

With multiple trades being trained alongside each other, this is a total step change in the region's ability to deliver energy saving homes and buildings; and it sees educational establishments working collaboratively with businesses to consciously deliver low energy training to themselves and the region's subcontractors.

Jackie Richards, one of the Directors of the Fabric First Institute said, 'We are delighted with the progress of the project and feel we are making a real impact in terms of upskilling with some excellent feedback'.



Untapped potential

Whilst a promising start has been made to modernise heating systems and insulation in Norwich South, there are huge opportunities remaining and many households and businesses that have yet to benefit.

Homes

Detailed surveys of 1,398 homes representing the East of England's housing stock were conducted as part of a nationwide housing survey⁹. Surveyors identified a range of opportunities to improve energy efficiency in the homes they visited.

Table 4: Estimated number of homes in Norwich South that could benefit from basic energy efficiency measures based on survey sample⁶.

	On mains gas	Off mains gas
Could improve the level of insulation in their lofts	10,200	1,000
Could benefit from cavity wall insulation	10,300	900
Could benefit from solid wall insulation	12,500	1,000
Could improve the efficiency of their heating systems	20,500	2,300

Despite the significant potential, local charities and installers have found that changes to national energy efficiency schemes in the last few years have meant that funding for low income households is harder to get hold of and support for making costlier upgrades is no longer available.

Looking to the future, current national policy commitments would see just 343 homes receive low cost improvements in Norwich South each year and those in need of more significant works, such as solid walled properties, may miss out altogether¹⁰.

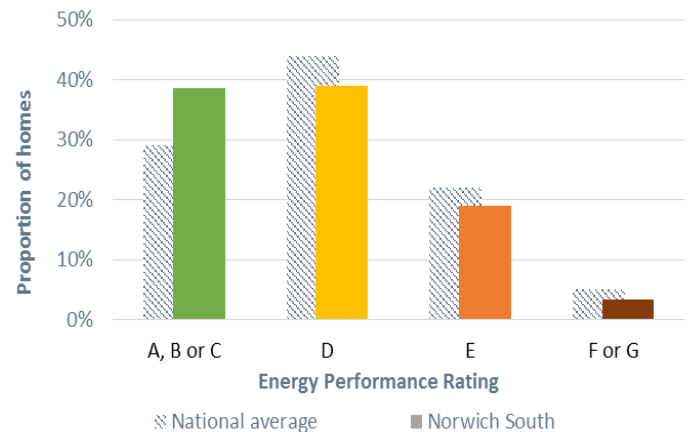


Figure 2: Energy Performance Rating of homes in Norwich South compared to National Average².

There are 32,600 homes in Norwich South with an Energy Performance Rating of D or worse that could benefit from improved efficiency. 1,800 of these have the very worst ratings of F or G and are likely to be in urgent need of attention².

Upgrading the energy efficiency of these homes would present a huge opportunity to cut bills, improve residents' health and well-being and boost the local economy. To make this happen, action is needed both locally and nationally.

From April 2018, homes that are privately rented will be subject to minimum energy efficiency standards and those with F and G ratings will have to be improved. This is a good start, but more is needed.

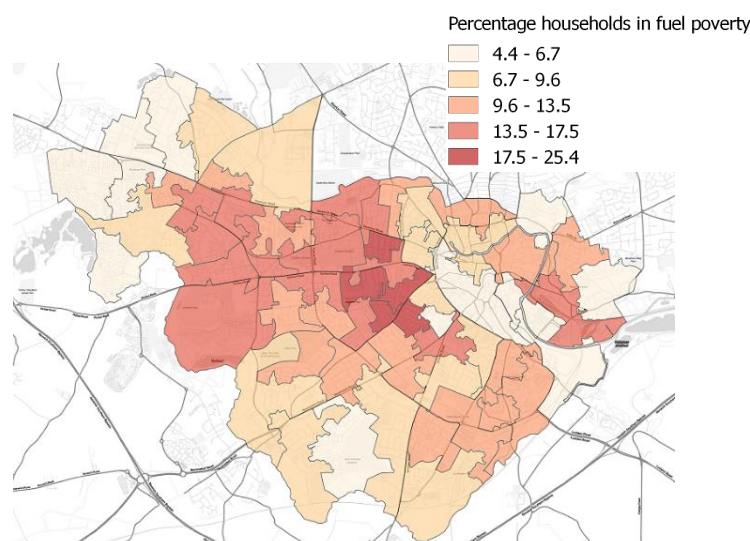


Figure 3: Map showing severity of 'fuel poverty' in Norwich South. Homes in the darkly shaded areas are more likely to find keeping their homes warm unaffordable. High resolution housing data can be used to identify opportunities and target those in need¹⁴

Case Study Two: The Greenhouse Trust



The Greenhouse was a typical 19th century Norwich building when it was first purchased and energy leaked terribly through its brick, lime and straw walls and roof. In the first instance the Trust focused on the insulation of the building to minimise energy wastage. They chose materials that use as little energy in their production as possible which included: wool, recycled paper and cork. They then replaced all windows to maximise energy efficiency and used a mixture of double, triple and quadruple glazing!

During the last two decades the Trust has set a series of planning precedents whilst installing renewable technologies on this listed II* building. Today the 5.1 kW solar PVs enable the Trust to export energy back to the grid even when running the necessary equipment they have. Focus has now

turned to the benefits of soil and its capacity to absorb carbon, for example in the use of 'turf' roofs. As a charity, they have relied on small private trusts and the lottery to fund the building work. The renewable technology (£35k) was paid for by local fundraising and income from the company.

The Trust exists to promote all aspects of sustainability, it operates as Norwich's Environment Centre and there is a bookshop, café with garden and environmental art gallery. All of these help to support local organic growers, co-op's, traders and artists, who are all actively engaged in safe-guarding the environment and communicating the many inter-related issues of sustainability. The building is open for Heritage Open Days and Super homes days, and runs an ongoing project called 'Future Heritage', which invites artists, architects and visitors to design and think about what needs to happen to our existing housing stock and new build.

Tigger, the building manager, said "We are hugely proud of this award winning building. We are also aware that without major investment in the thermal efficiency of our existing housing stock (80% of which is envisaged will still be standing by 2030), we cannot realistically end fuel poverty or bring to an end, the age of fossil fuel misuse".

Businesses

All commercial and industrial buildings are required to have an Energy Performance Certificate (EPC) if they are sold or let to a new tenant. Since 2008, 2,590 EPCs have been lodged in Norwich for non-domestic buildings. Of these certificates, over 70% (1,850 buildings) received an efficiency rating of D or worse³. These buildings would benefit from improvements to their fabric and energy services. 543 of these buildings are rated F or G, meaning that they are very inefficient and likely to be wasting a large amount of energy.

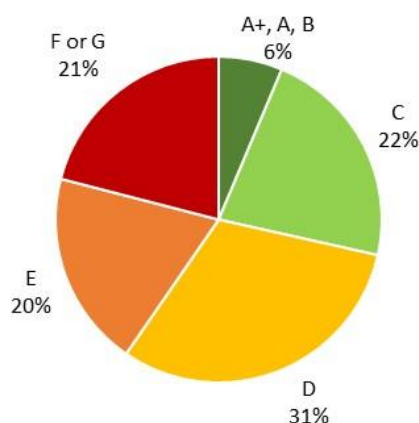


Figure 4: EPC ratings of non-domestic buildings in Norwich.

From April 2018, leased properties will be subject to minimum energy efficiency standards. This will mean that leased buildings with F and G ratings will have to be improved.

Public buildings like schools and hospitals use a significant amount of energy. Even though progress has been made, there is still huge room for improvement. In 2016, almost two thirds of buildings rated were given a Display Energy Rating of D or worse, and these buildings are likely to have significant potential for improvements. Ensuring action in this area is particularly important as public buildings are well placed to demonstrate best practice in low energy buildings and provide a leadership role for building energy management.

The non-domestic building stock is extremely diverse so a wide range of solutions are needed to address their energy consumption. Innovative approaches may be required as well as more traditional fabric refurbishment.

Real benefits for Norwich South

It is easy to see the immediate benefits of reducing your energy bills and having a warmer home and place of work, but the impact of upgrading the buildings in Norwich South goes much further.

Well maintained homes

Energy efficiency works are a vital part of maintaining your home. Cold homes often become damp which can lead to mould and further complications in the long run. Insulated wall cladding will tackle damp permanently and can rejuvenate the appearance of a home.

Keeping money in the local economy

We estimate that Norwich South residents spend approximately £53 million annually on domestic energy bills⁷. Across Norwich, businesses spend approximately £58 million annually on energy. Money spent on fuel is mostly taken out of the local economy, so cutting bills means that local people have more money to spend in local shops and businesses.

Creating skilled Jobs

Economists have estimated that an ambitious UK energy efficiency programme would create 9,600 jobs in the East of England⁸ in the domestic retrofit market alone. Energy efficiency works rely on skilled tradespeople and small-scale contractors. This means that these jobs are spread across all communities and not just concentrated in a few industrial areas.

Improving health and wellbeing

Cold homes have been shown to be damaging to both physical and mental health. Children living in cold homes are significantly more likely to suffer from respiratory problems such as asthma and bronchitis. It has been shown that for every £1 invested in renovating cold homes, the NHS saves 42 pence in reduced hospital admissions and GP visits⁹.

Business productivity

Energy costs can be a significant overhead for businesses. Improving the efficiency of commercial buildings, vehicles and equipment can cut waste and add to the bottom line. In the retail sector, cutting energy costs by 20% can have the same impact on the bottom line as a 5% increase in sales¹⁵. Helping local businesses to identify these opportunities can boost productivity and make them more competitive.

Increased efficiency can also make it easier and cheaper to maintain a workplace at a comfortable temperature, and there is good evidence to show that this leads to increased worker productivity and hence financial benefits to employers¹⁶. Crucially, thermal comfort, good ventilation and lighting quality in the work environment is now well-established as a real boon to workers' health, wellbeing and productivity¹⁷.

Improving local energy resilience

It is easy to take basic services like gas and electricity for granted, but our energy security has become a significant concern in recent years. A more efficient building stock and local generation will make Norwich South more resilient to future energy price shocks or interruptions to supply and can take the strain off local energy infrastructure.

With thanks to

- Jackie Richards, Director, Fabric First Institute, Norwich.
<http://www.wholehouseenergy.com/fabric-first-institute>
- Tigger at The Greenhouse Trust, Norwich
<http://greenhousetrust.co.uk/>

And

- Calor, for sponsoring the development of this report



More to explore

Nearest Super Home: The Mill, The Common, Itteringham, Norwich. A converted mill which dates from 1778 and has a carbon saving of 66%.

<http://www.superhomes.org.uk/superhomes/norwich-itteringham-the-common-the-mill/>

Nearest certified Passive House: This project at Ditchingham in Norfolk consists of 14 affordable dwellings arranged in a single curved terrace. Innovative thermal bridge free foundations and simplicity of detailing and construction have delivered the exacting Passivhaus performance whilst reflecting the local vernacular.

<http://passivhausbuildings.org.uk/viewproject.php?id=328>

¹ Based on an average electricity bill in Norwich South of £728 and on-gas properties spending an additional £685 per year on gas. These estimates are based on 2015 DECC lower super output area (LSOA) [domestic gas](#) and [electricity consumption data](#) and fuel tariffs from 2015 DECC [regional fuel price data](#). Off-gas residents assumed to spend an additional £1,704 on oil annually, the national average expenditure for oil-heated properties from the DECC [Living Cost & Food Survey](#).

² 2015 DECC LSOA-level [household energy efficiency ratings data](#).

³ CLG (2016) [Live tables on Energy Performance of Buildings Certificates](#).

⁴ Delivery of measures 2005-2012 derived from a sample of [5,241 homes in the East of England](#), adjusted to reflect the number of off-gas properties in the Norwich South Constituency. Delivery of measures after 2012 based constituency level 2015 DECC [GD & Energy Company Obligation \(ECO\)](#).

⁵ 2015 DECC [Feed-in Tariff \(FiT\)](#) and [Renewable Heat Incentive \(RHI\)](#) statistics.

⁶ Estimate is based on surveys of 1,398 East of England homes, adjusted to reflect the number of off-gas properties in the Norwich South Constituency. Survey data part of the 2015 DCLG [English Housing Survey](#).

⁷ Derived estimate based on average bill data (described in end note 1) with household number data from 2015 DECC [meter data](#) and [regional statistics](#).

⁸ Verco & Cambridge Econometrics, 2012, [Jobs, growth and warmer homes](#).

⁹ Department of Health, 2009, [On the state of public health: Annual report of the Chief Medical Officer 2009](#).

¹⁰ Based on Norwich South Constituency receiving a fair share of the [Autumn Statement pledge](#) to deliver low cost energy efficiency measures to 200,000 homes each year during this Parliament.

¹¹ DECC (2016) [Domestic Energy Price Indices](#).

¹² Non-domestic floor space estimate based on Valuation Office Agency (VOA) (2012) [Business Floorspace \(Experimental Statistics\)](#).

¹³ CLG (2016) [Live tables on Energy Performance of Buildings Certificates](#): 'Table DEC1: Display Energy Certificates by local authority and energy performance operational rating'.

¹⁴ 2015 DECC constituency and LSOA level [fuel poverty data](#).

¹⁵ Carbon Trust's [Energy efficiency advice for retail businesses](#).

¹⁶ LBNL Indoor Environment Group. 2016. "[Cost Effectiveness of Improving Indoor Environments to Increase Productivity / Indoor Air Quality \(IAQ\) Scientific Findings Resource Bank \(IAQ-SFRB\)](#)." Lawrence Berkeley National Laboratory.

¹⁷ World Green Building Council, 2016, "[Health, Wellbeing and Productivity in Offices: The Next Chapter for Green Building](#)".