

At home

Background and explanation of our proposals

Heating of homes and the use of electricity for lighting, appliances and gadgets causes about a third of carbon emissions in Leicester from our direct fuel and energy use. So housing will have to change. We think the following things will need to change.

1. Carbon neutral housing

For Leicester to become carbon neutral, housing will need to become carbon neutral too. This will mean changes to heating, insulation, lighting and appliances as well as a lot more generation of renewable energy.

There will be some houses which can't do as much as others. For example, historic buildings won't be able to have solar panels and may not be as easy to insulate. However, others will be able to do more and some will need to be 'carbon positive'. This means they will generate more renewable energy than they need.

2. Replacement of gas heating

Gas boilers will no longer be able to be used for heating because of the carbon emissions they create when gas is burned. Instead, homes will need to be heated, and hot water supplied, using low-carbon alternatives. The main options could be:

- Heat pumps – they use electricity to extract heat from the air or the ground. They are tried and tested and already used in many buildings. They work best when the building is very well insulated. They can struggle and be expensive to run if it isn't. For buildings that are less well insulated, a heat pump could be combined with a small boiler to boost the heating in very cold weather.
- Hydrogen boilers – hydrogen can be used as a fuel in the same way as gas and doesn't produce carbon emissions when it's burned. It's not available at the moment. Central government would need to step in to support zero-carbon hydrogen production and conversion of the gas network.
- Heat networks – Leicester already has many hundreds of homes supplied from underground hot water pipes connected to large neighbourhood boiler houses. Heat and hot water can be generated more efficiently at this large scale. Existing and new heat networks could be an option if they used large scale heat pumps or hydrogen boilers.

Wood-based fuel, known as biomass, and liquid biofuels made from other plant materials are sometimes suggested as alternative low carbon options for heating fuels. We are not proposing these as a solution for Leicester because we have concerns about the environmental impact of creating and transporting them. We are also worried about the risk of air pollution when they're burned.

We think that the government needs to make decisions about the best way for homes and buildings to be heated in future – and make national plans for the changes needed to move away from gas.

At a local level, the council is encouraging the operator of Leicester's existing heat network to draw up plans for introducing low-carbon heating technologies. We also require new developments in the city to connect to the heat network where possible so that it can be expanded. We are proposing to continue to do this. We could start to introduce heat pumps in some of our council housing too.

3. Warm, insulated homes

We believe it will be necessary to make houses and flats very highly insulated to keep people warm with much less heating than a typical house today.

Warmer, low-energy homes will be needed for heat pumps to be effective and affordable to run. They will also be necessary to limit the extra pressure on the electricity grid as gas is phased out. Warmer homes should help to improve health too by reducing damp, draughts and underheated homes.

Making homes warmer will require large-scale programmes to fit draught-proofing, loft or roof insulation, cavity or solid wall insulation and double or even triple-glazing wherever they're not already installed.

The council has already made many of these improvements to council houses in the city. We could continue to invest in insulating council houses. A particular area where there's more we could do is in fitting external insulation to solid-walled houses which don't yet have it.

We are also considering introducing a Selective Licensing Scheme for private rented housing in parts of the city with a high concentration of privately rented property that are in poor condition. The issuing of a license would include an inspection of property and checks would be made to ensure they are in good repair and have adequate heating and insulation. This idea will be the subject of a formal consultation to gain the views of interested parties.

For other housing, we think that the government will need to step in to provide incentives for private landlords, housing associations and private homeowners to invest in improving their properties.

4. Renewable energy

Even with lots of insulation and a low-carbon heating system, homes will still be responsible for some carbon emissions. This is because electricity from the grid will continue to be generated partly from gas-fired power stations for some time to come. To compensate for this, we think that wherever possible houses and blocks of flats will need to generate as much as possible of their own renewable energy. If possible, some will need to generate more renewable energy than they need, to make up for those which can't generate any (refer to point 1 above).

We think that most houses and flats with a suitable roof area will have to have solar panels. Panels which generate electricity (called photovoltaic or 'PV' panels) will probably be a more popular option in most cases than 'solar thermal' panels generating hot water because many homes no longer have a hot water tank.

The council has already fitted about 11,000 PV panels to council houses and we could continue this until all our suitable houses have them. We estimate that this could take

many years to complete and would cost a significant amount of money, but it could make a big difference.

As the number of PV panels continues to go up, the capacity of the electricity grid may need to be increased in places to handle the extra input.

We are not proposing that wind turbines on or next to housing should have a role in powering homes in Leicester. They're usually not very effective with the low wind speeds in an urban area. They could also present a nuisance to neighbours and cause damage to buildings from vibration if they are attached to them.

5. 'Smart' energy controls

A whole generation of new 'smart' technologies is becoming available which provide opportunities to help Leicester become carbon neutral by making energy storage, distribution and use more efficient.

- Smart meters can help people save energy by showing where and when the most energy is used in the home – allowing them to spot excessive use and turn things off.
- Similarly, equipment is becoming available for people to remotely control their heating, lighting, appliances and gadgets.
- For those with PV panels, smart equipment will soon become available to control the storage of electricity from the PV panels in a battery. This could be the battery in an electric car or a battery to store electricity for use in the home. The equipment will also be able to sell the electricity to the grid at times of peak demand. This will make the best use of renewable electricity and generate a profit for the owner.

We propose that all of the above smart technologies should have a role in helping Leicester become carbon neutral by saving energy and supplying renewable electricity to the grid when it's most needed at peak times.

The council could encourage the introduction and uptake of these technologies by trialling them in our own buildings. We are already testing a system for storing electricity from our PV panels at City Hall in our electric fleet vehicles.

6. Keeping cool without air conditioning

As summers become hotter and heatwaves more common homes will be more at risk of overheating. As a result, more air conditioning use could undermine efforts to save energy.

Improved insulation of houses and flats as described under point 3 above will help by slowing down the rate that heat from the sun is transferred through the walls. Some homes will need other measures to cope with heatwaves too though without resorting to air conditioning. Options could include:

- fitting external shutters or shades
- fitting 'solar control' window glass which lets in less heat from sunlight
- planting deciduous trees to provide summer shade without blocking the light in winter.

The council could look at having an expert study done to find out whether tree planting can help prevent overheating in any parts of the city. Refer to the section on Land use, green space and development of the city for more on this.

7. Saving mains water

Periods of drought are expected to be more common in the East Midlands as the climate changes, making it increasingly important to make sure that water is not wasted.

We believe it will be important to save water through straightforward measures including dual-flush toilets and water saving taps, showers and appliances in all homes. Collecting rainwater will need to become the norm for watering gardens.

Refer to the section on Land use, green space and development of the city for details of our proposals for new homes.

Summary of our proposals

Vision for existing homes

- Homes will need to be very highly insulated to keep warm using much less energy. This will mean that fewer people get health problems from cold homes.
- Everyone will need to replace gas heating and hot water with low-carbon alternatives. Most often this will mean using heat pumps. They use electricity to extract heat from the ground or air.
- In areas with denser housing, low-carbon heat networks will be the best answer. These provide heat and hot water to whole neighbourhoods through underground pipes. In the future hydrogen could also replace gas as a fuel for boilers.
- The move away from gas will increase electricity demand. Homes will need to have their own renewable energy like solar panels. These will provide power to the house and owners could get money for selling back excess electricity.
- Houses will need 'smart' systems such as remote control for heating and lighting, and batteries to store extra energy from solar panels. They will also need to be able to charge electric cars.
- Homes will also need to be kept cool without air conditioning, as this uses a lot of energy. This might mean fitting shades and shutters, or planting trees for shade.
- Water use will need to fall, as low rainfall could become more of a problem.

Potential actions for existing homes

Potential actions by the council and other public service providers

1. The council could allocate money to continue improving insulation of council houses, prioritising those solid-walled houses which have not yet been insulated.

2. The council could allocate money to continue installing solar PV panels on suitable council houses.
3. The council could look at the potential to trial further replacement of gas boilers with heat pumps in suitably insulated council houses.
4. Housing associations could look at similar actions for their properties.
5. The council is considering introducing a Selective Licensing Scheme, subject to consultation. This could make sure that private rented homes in parts of the city have adequate heating and insulation.

Potential actions by businesses

6. Landlords of private rented homes could increase the insulation of their properties and install low or zero-carbon heating, along with solar panels where feasible.
7. Heating installers could prepare for the phase-out of gas by moving into low carbon systems including heat pumps and renewables.
8. The operator of the district heat network could make plans for upgrading the district heat network from gas to low or zero-carbon heating systems, so that homes supplied by the network can become carbon neutral.

Potential actions by individuals

9. Most homeowners will need to install more insulation.
10. Homeowners will need to replace their gas boiler with a heat pump or other low-carbon heating system in future.
11. Homeowners could fit solar PV panels if they have a suitable roof area, and a battery to store the electricity they generate.
12. Tenants in poorly insulated or heated housing could ask their landlord to make improvements. The landlord must make improvements if the property is below an 'E' energy efficiency rating.
13. Homeowners could choose water-saving fittings and appliances when replacing these items.
14. Gardeners could install water butts to collect rainwater instead of using mains water.

Potential actions by the government

15. The government could make a national plan for fitting insulation and low carbon heating in homes – including timescales and measures to help house-owners and occupiers during the changeover.