

NATURAL GAS



Creator

◆ INFESTATION

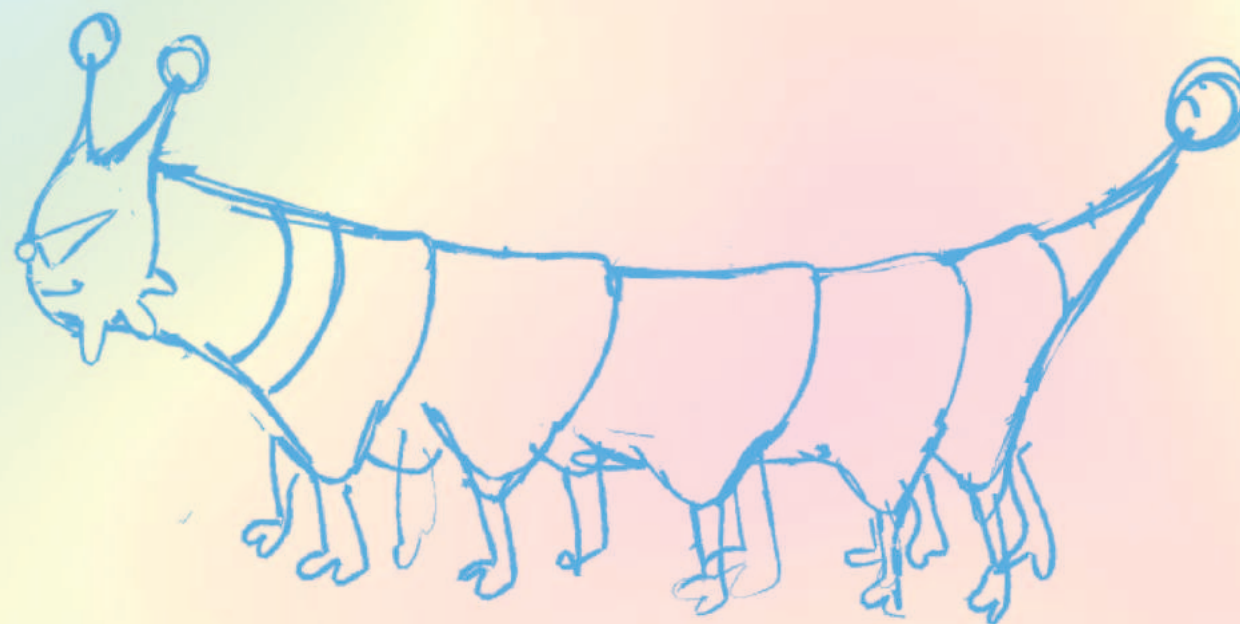
Natural Gas is a fossil gas born deep underground. Despite its name, Natural Gas is responsible for a third of the UK's carbon emissions. It has deeply rooted itself in the UK's heating system and will be very difficult to remove - but we have to replace it with greener heating technologies if we want to tackle the climate emergency.

EMISSIONS



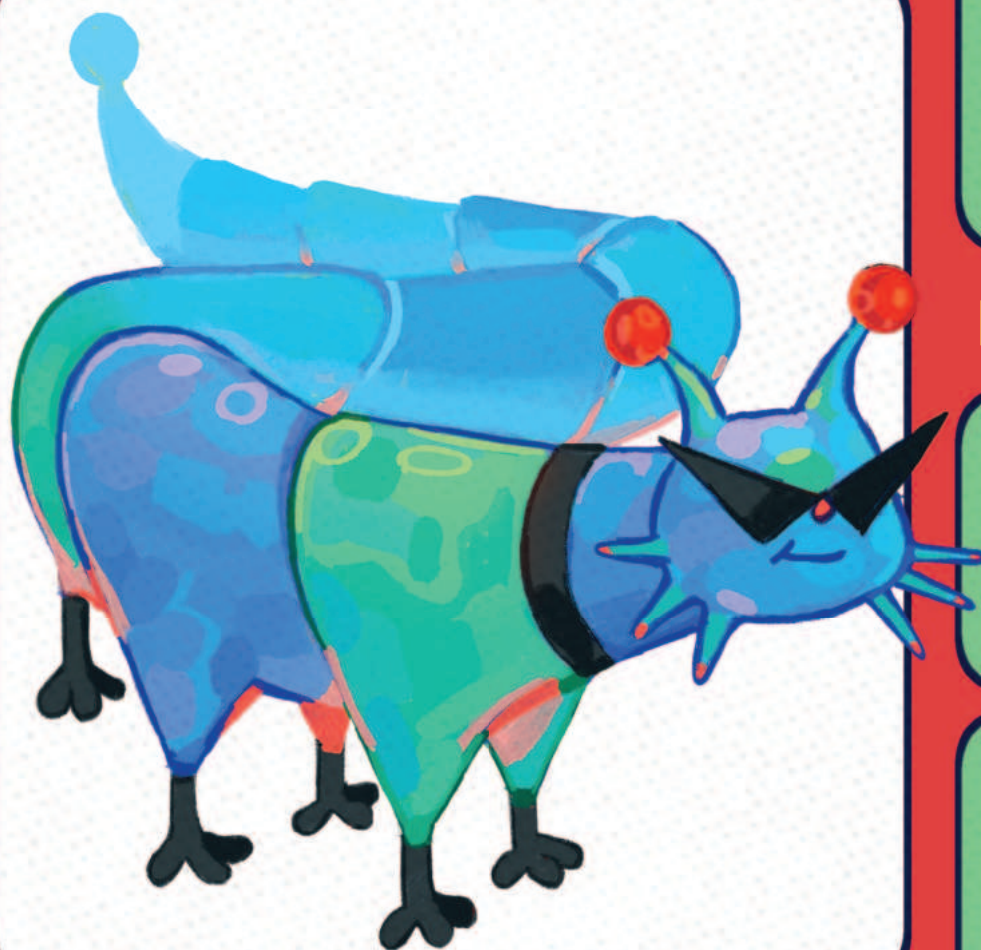
POWERS: Most of the country is connected to and reliant on the gas grid for heat, and it used to be cheap.

WEAKNESSES: Major polluter and no longer cheap - future costs are uncertain as we increasingly rely on imported gas.



The cousin of Natural Gas, Hydrogen has many of the same features. Hydrogen is a bit of a 'cool guy', I feel like it gets a lot of attention, good and bad. Sleek and slender, with a colour scheme including some black/grey to indicate that carbon can still be an issue, and pale blue/red to reference heat and flame.

HYDROGEN



Creator

✴ SUPER RARE

Hydrogen is an appealing but controversial figure. There are promises to make it green, but today hydrogen is still mostly generated from high-emission sources, like Natural Gas. There are serious questions whether it can ever be both suitable for home heating and eco-friendly. Either way, we know it can't replace Natural Gas alone.

EMISSIONS



POWERS: Hydrogen is a gas, so it can travel through the same type of systems as Natural Gas. This makes Hydrogen an easier option to change to.

WEAKNESSES: Hydrogen will be expensive and might not even be low carbon.

BIOMETHANE



Creator

✱ RARE

Biomethane is produced by decomposing organic material such as food waste, sewage, and agriculture. It takes a lot of organic material to make one little Biomethane, hence its rarity.

EMISSIONS



POWERS: Biomethane can travel through the same type of systems as natural gas, making the switch easier. It can also be used to heat off-gas grid homes in rural areas. If it's made from the right material, it's carbon neutral.

WEAKNESSES: The source of Biomethane must be sustainable otherwise it could have negative environmental impacts. It is expensive and hard to produce.

AIR SOURCE HEAT PUMPS



Creator

★ UNCOMMON

With a little electricity, Air Source Heat Pumps transform ambient heat from the air into warmth for the home. While they seem like magic, it's actually a very simple heat transfer process, just like your fridge, but in reverse! Although they are uncommon now, they can be found more and more frequently.

EMISSIONS



POWERS: The Heat Pump itself releases no carbon. Very energy efficient. Can be used to cool as well as heat, and the waste heat from cooling can be recovered and reused.

COMBO MOVES: *Home Improvement + Heat Storage* - Forms a powerful trio with these two companion technologies.

WEAKNESSES: Must be tailored to individual homes, so need a specialist to install, and have high upfront costs. There are some emissions from electricity used, but this will decrease as electricity becomes greener.

GROUND SOURCE HEAT PUMPS



Creator

★ UNCOMMON

With a little electricity, ground source heat pumps transform ambient heat from the ground or other sources into warmth for the home. While they seem like magic, it's actually a very simple heat transfer process, just like your fridge, but in reverse!

EMISSIONS



POWERS: No emissions in the process other than electricity used. Ambient ground temp. is more stable than the air, so can be even more efficient throughout the year.

COMBO MOVES: *Home Improvement + Heat Storage* - Forms a powerful trio with these two companion technologies.

WEAKNESSES: High upfront costs, and can need space in the garden or deep boreholes to be dug for individual home use. Better when using shared infrastructure to supply multiple homes, but this can be difficult to organise.

SOLAR THERMAL



Creator

★ UNCOMMON

Solar thermal basks in the sunlight, using solar energy to warm up water for home use. It needs the sun to work, so isn't so good on cloudy days, but it can provide nice warm showers when the sun shines.

EMISSIONS

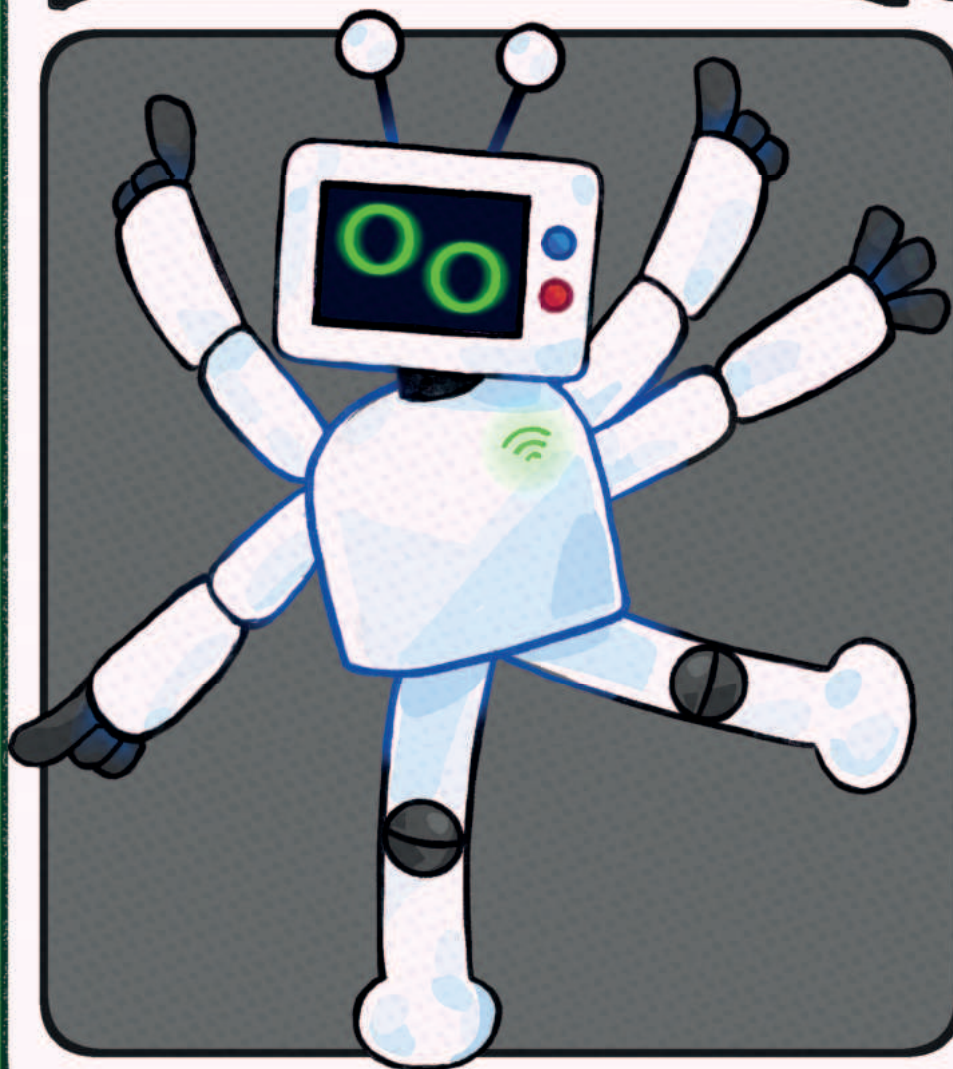


POWERS: Free energy from an entirely renewable source.

COMBO MOVES: *Heat Storage* - A great way to heat water in a water tank.

WEAKNESSES: A good team player, but not strong enough on its own. Another source of heat is usually needed.

Digitisation



Companion

★ *COMMON*

DIGI is an energy assistant: analysing data from smart meters and appliances, it helps us manage our energy use, reducing waste and increasing our use of green energy sources.

EMISSIONS



POWERS: Boosts the efficiency of other heating technologies, especially Electric Heaters and Heat Pumps. Can help to optimise energy use across the entire energy system.

WEAKNESSES: Some people are nervous of DIGI, so it must ensure that the data it collects is secure to protect our privacy.

ELECTRIC HEATING



Creator

★ COMMON

Once a carbon villain, Electric Heating is becoming a green ally as the electricity grid is increasingly supplied by renewable sources. In fact, almost all electricity should be low carbon within the next 15 years.

EMISSIONS



POWERS: Can provide high and instant heat. Best in small, well-insulated spaces.

COMBO MOVES: *Heat Storage* - can come with storage options which allow you to use electricity when it's cheap and green then warm your toes when you need it.

WEAKNESSES: It could greatly increase electricity demand, so we need to be careful to use it at the right time when the electricity is available; this will keep bills lower for everybody.

HEAT STORAGE



Companion

★/★ COMMON/RARE

Heat Storage collects heat created by other technologies and stows it away for later use. It has different techniques of storing heat, from old school insulated tanks of water and thermal bricks, to new and innovative heat batteries and thermal materials.

EMISSIONS



POWERS: Boosts efficiency of other heat solutions by removing time as a factor: storing energy when its cheapest and releasing heat when you need it.

WEAKNESSES: Can be disruptive to install or take up a lot of space. However, the newer solutions are pretty compact.

HOME IMPROVEMENT



Companion */* COMMON/UNCOMMON

Home improvement are a super team who work together to keep the warmth in and the cold out.

Pictured left are some prolific members of the team: Big I (insulation), Specs (double glazing), Doctor S (draught-proofing).

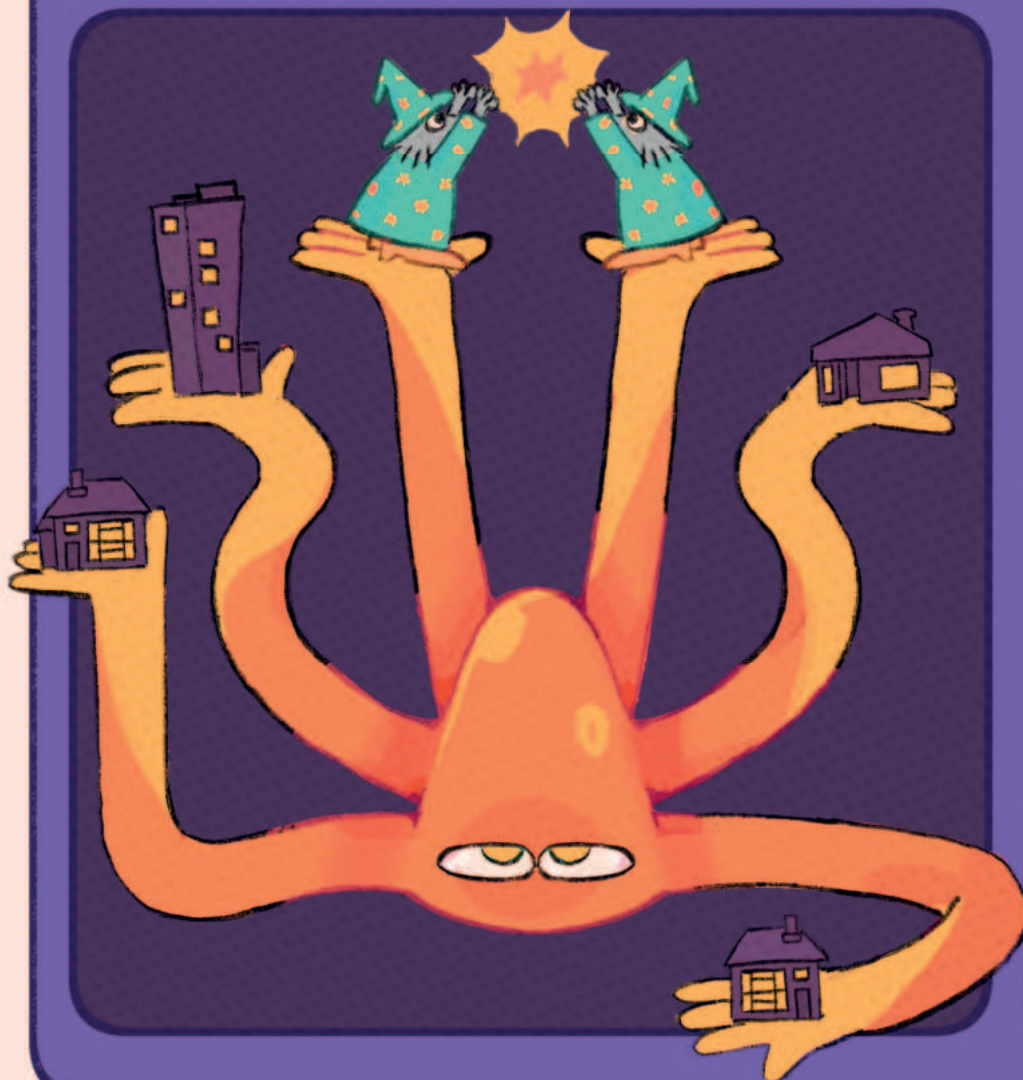
EMISSIONS



POWERS: Destroys draughts and cold patches. Keeps houses warmer with less heating, so boosts the efficiency and decreases the costs and emissions of all other technologies.

WEAKNESSES: Getting the right technique for each home is critical, and some can be disruptive or expensive to install.

HEAT NETWORK



Companion

★ RARE

Heat Networks use their sprawling arms to connect multiple households to a shared heating supply. If their heat source is eco-friendly, they can be both efficient and green. They can be big city-wide systems or just supply a handful of buildings.

EMISSIONS



POWERS: By sharing centralised heat sources, individual heat costs are reduced.

Combo Moves: *Heat Pumps* - Heat Networks can enable Heat Pumps to make use of large-scale waste heat from things like power plants or computer servers.

WEAKNESSES: They are often powered by high carbon Natural Gas, because it's currently cheaper. Converting these to be low carbon may be difficult. Installation can be complex and disruptive, and once they're installed people must rely on a single supplier.