Have you ever thought about how the building you’re in right now works? Our buildings supply us with electricity, gas, water, and light, and keep us warm in winter and cool in summer. That’s all down to the pipes, wires and technologies known as building services.

In the same way that our heart, lungs and other vital organs keep us alive, the services in a building help us stay comfortable and safe. They ensure that a building functions efficiently, with lifts or escalators to help people move around or solar panels to supply electricity.

It is important that buildings use natural resources like energy and water wisely and building services engineers have a big role in helping to make our buildings fit for the future. You could be helping to shape that future.
ENERGY
Buildings can use energy from many sources, including the sun.

HEATING, VENTILATION AND AIR CONDITIONING
HVAC, as it’s known, keeps us warm in winter and cool in summer in buildings.

LIGHTING
We are used to flicking a light switch, but that artificial lighting is actually carefully designed – and so is daylighting.

ESCALATORS
Busy buildings like airport terminals and shopping centres need escalators to move large numbers of people around efficiently and safely.

LIFTS
Advanced lift technologies helped make it possible to build taller and taller towers.

WATER, DRAINAGE AND PLUMBING
Skyscrapers have miles of plumbing and special systems to take water to the top floor.

COMMUNICATIONS TECHNOLOGY
There can be miles of data cabling in big office buildings too, to keep businesses running.

PROTECTION
Security and alarm systems keep buildings, and the people inside them, safe.
HOW DO YOU KEEP COOL IN THE DESERT?

In Dubai in the summertime temperatures can regularly hit 41°C – that’s around 10°C hotter than London. The emirate is one of the largest consumers of energy per person in the world, and around two thirds of the energy used in summer months drives air conditioning systems to keep people cool in buildings. These air conditioning systems take in warm air and cool it by pushing it across metal coils, which are filled with refrigerants, like you’d find in a refrigerator. Desert buildings are also being designed with environmentally friendly ways of cooling, using giant chimneys that capture the wind.


HOW DOES WATER GET TO THE TOP OF A TOWER?

There’s a simple answer: water couldn’t climb high without pumps. In towers water is pumped to water tanks located at intervals up the building. Water is pumped from one tank to the next until it arrives at its destination – a tap on the 52nd floor. A lot of building services go into making a cup of coffee.

HOW CAN BUILDINGS HELP US BREATHE MORE EASILY?

Buildings can help our health and wellbeing in a whole host of ways. Efficient air conditioning systems filter air, taking out dust, pollen and other problems that can be linked to health conditions like asthma. Poor lighting can give us headaches or cause other problems so our schools and workplaces need to be well lit and have good levels of natural daylight. It’s building services engineers who help to make our buildings good places to be.
It is important to study the right subjects so you don’t limit your options later.

To get started, you will need:
- GCSE (or equivalent) in –
- Mathematics, Science
- It’s also useful to study Design and Technology

**ONCE YOU’VE FINISHED SCHOOL, YOU HAVE THREE OPTIONS:**

**1. GO TO COLLEGE**

**What to look out for:** Look for a college course leading to at least a BTEC level 3 award (or equivalent) in building services engineering, mechanical engineering, electrical engineering, energy or a related construction or engineering subject.

**2. EARN WHILE YOU LEARN AND BECOME AN APPRENTICE**

**What to look out for:** Look for an apprenticeship with a company in the building services or construction related sector – the government careers website should be able to help.

**3. GO TO UNIVERSITY**

**What to look out for:** Degree courses covering building services engineering, mechanical engineering, electrical engineering, architectural engineering or environmental engineering.

**What you need ideally:**
- A Levels (or equivalent) in Mathematics and Sciences
What will it be like to head out to space for your holiday? The design for a space centre in the heart of New Mexico in the USA gives a clue. Spaceport America includes the world’s first commercial space travel terminal, for the New Mexico Spaceport Authority and Virgin Galactic. The spaceport has a hangar and maintenance area that can house two mother ships and five rocket powered space vehicles to ferry passengers to sub-orbital space. The project’s building services engineers incorporated an underground heating and cooling system into the building. The system has 200 ft long concrete pipes that use the heat and cool in the ground itself to warm air in winter and cool it in summer, dramatically cutting energy use.

www.aecom.com/projects/spaceport-america/

CHANGING BOILERS AT BUCKINGHAM PALACE

The boilers at Buckingham Palace are more than 30 years old – which is probably a lot older than the boilers in your home. Electrical wiring and other services are more than 40 years old so the building desperately needs an upgrade. That’s why £369 million is being invested in a massive refurbishment project. It isn’t easy to thread new pipes and wires through historic buildings, and the refurbishment of Buckingham Palace is a 10 year-long job.

www.theconstructionindex.co.uk/news/view/buckingham-palace-to-get-369m-building-services-renewal

THE LARGEST AIRPORT TERMINAL

China will soon be home to the world’s largest airport terminal. The Beijing New Airport terminal building will be almost twice the size of Heathrow Airport’s Terminal 5, and will handle around 125,000 passengers a day.

www.zaha-hadid.com/architecture/beijing-new-airport-terminal-building

DESIGNING FOR SPACE TRAVEL

www.aecom.com/projects/spaceport-america/
LONDON’S TOP TOWER

In 2014 London skyscraper the Shard was struck by a bolt of lightning, but the building wasn’t affected, because its lightning protection system was there to do its job. The Shard is the tallest building in Western Europe at almost 310 metres high. It is served by 44 lifts, some of which are double deckers. The lifts travel at speeds of up to 6 metres a second.

www.the-shard.com/shard/a-vertical-city/

DUBAI’S MEGA-TALL TOWER

The world’s tallest building is the Burj Khalifa in Dubai, which is a massive 828 metres tall and has 160 storeys. The tower contains homes and a hotel and has space for as many as 35,000 people inside. Everything about the Burj Khalifa is big – the tower’s water system provides 946,000 litres of water a day. But it may not be the world’s tallest for much longer, as an even taller building is on the way in Dubai, which will be more than 1,000 metres high.

www.burjkhalifa.ae/en/the-tower/structures.aspx

WHAT A SCORE

London’s famous Wembley Stadium has around 90,000 seats, and helps keep all those visitors moving with 26 lifts and 30 escalators. The stadium also has 34 bars, 8 restaurants, 98 kitchens and 2,618 toilets.

www.wembleystadium.com/Press/Presspack/stats-and-facts

AND IT’S NOT JUST BUILDINGS…

Building services engineers can get to work on some unusual projects, from zoo houses recreating the climatic conditions of far off locations to some of the world’s most spectacular theme parks. Building services engineers helped to put the thrills into the water rollercoaster at the Wild Wadi Water Park in Dubai and the ride at Yas Waterworld in Abu Dhabi. Yas Waterworld has an underground mechanical, electrical and plumbing network with more than 70 kilometres of pipework and cabling.

www.atkinsglobal.co.uk/en-GB/media-centre/features/engineering-fun