



The Bright Ideas Challenge

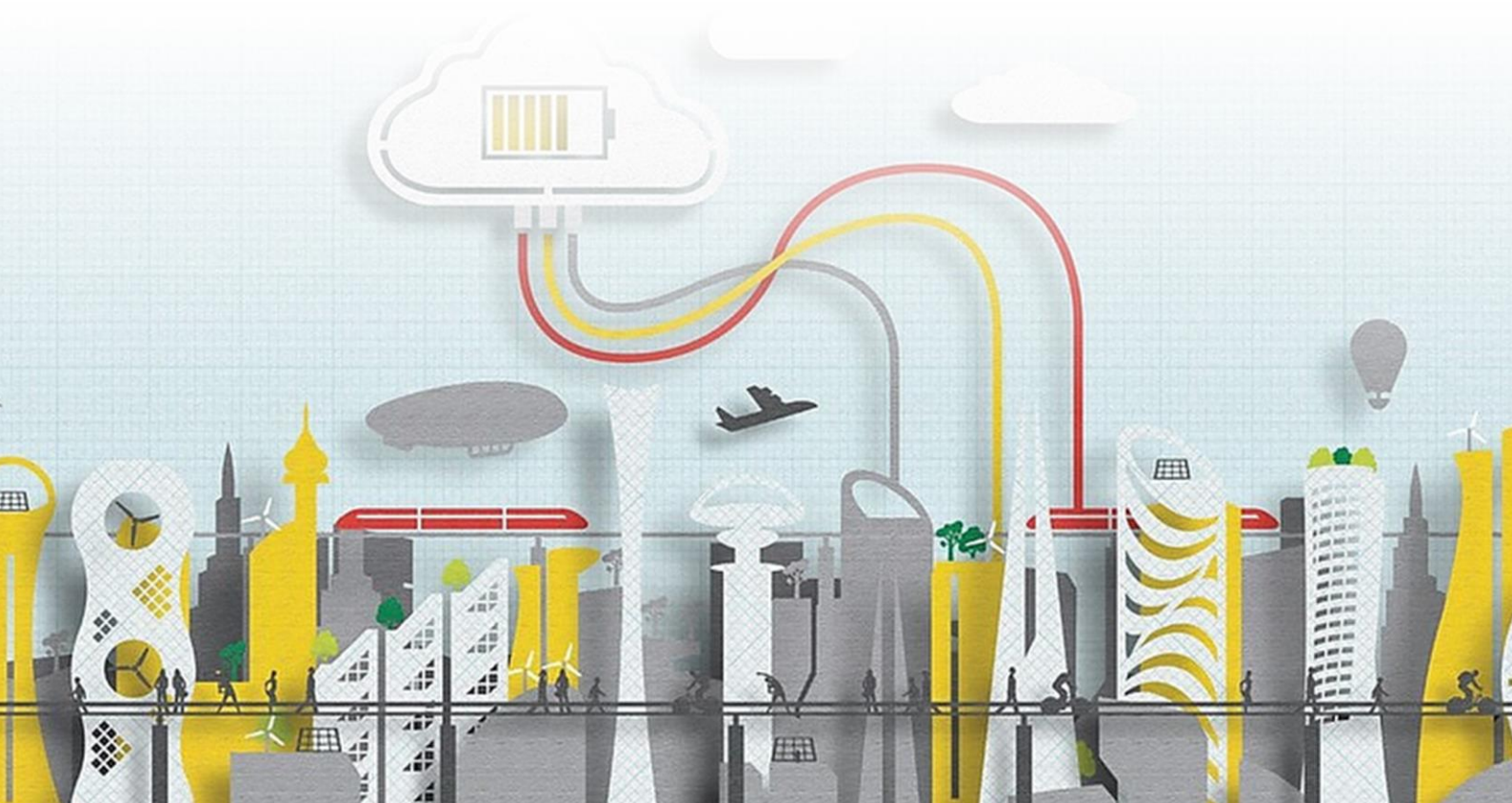


UTOPIA:

A Sustainable City and Lifestyle Change for 2050

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Meet the Team

My name is Hannah Boldy, I enjoy many sports especially basketball. However, I also have a dog which I love. I am part of this eco team and this project as one time I went on holiday to a place near Skye, that had a very small population and I went to the beach which was covered in plastic and there was very little wildlife and I want to solve this problem.

Hi I'm Jenny and I'm 14 years old. I play hockey, read and cook in my free time. I'm very interested in Art, design and political movements. I believe the only way individuals can reduce their carbon footprints is by everyone living more eco-friendly and mindful lives.

Hey! My name's Katarina, I'm 13 years old and I am a part of the Utopia project. In my free-time, I like to swim, play basketball, hockey and cricket. I'm also passionate about keeping the earth clean and green! I wanted to do the Utopia project because, I've moved around a lot in my life and every apartment/house I've lived in hasn't been perfect for me so now I have a chance to make an ideal home for picky people like me!



Hi I'm Archie and I'm 14 years old. I'm very interested in politics, current affairs and how people are taking action to make the world a better place. I believe if everyone wakes up tomorrow with Eco in the forefront of their minds the world would become a much better place. That's why I've taken part in this project, to show everyone how small simple changes can be the best kind of change.

Hi, my name is Gwilym Hughes and I am 15. In my spare time I like playing music and playing video games. I also play badminton and I have two black cats. I feel motivated to do this challenge because I want to live and work in a stable environment where overpopulation is not a problem.

Hi, I'm Fergus and I'm 14 years old. I have quite a few hobbies and really enjoy playing sport. I'm interested in engineering and design. I wanted to be part of this competition because I think sustainable living in cities is, and will become, a massive problem. I love wildlife and I think it is crucial to our worlds future to be aware the impact we have on this amazing planet.



Carbon Dioxide and Photosynthesis

We've all heard of carbon dioxide, aka CO_2 , but what actually is it? Where does it come from? And how do plants use it? Plants are going to form a vital part of our energy solution proposal so we felt it important to do some research into this particular aspect. In this short report we will cover these questions and more and show how we will incorporate it into our "Eco Home".

What is carbon dioxide?

Carbon dioxide is a molecule made of a carbon atom that has made two double bonds to two oxygen atoms. It takes the form of an odourless and colourless gas with a density about 60% higher than air. Although carbon dioxide is an odourless gas at very high concentrations it does have an acidic odour. It is a naturally occurring gas and it makes up about 0.04% of the Earth's atmosphere. This figure has risen by 140% since the industrial revolution, but more about that later.

Where does it come from?

Carbon dioxide is naturally produced by volcanoes, geysers, hot springs and it is water soluble, which makes it present in ground water, rivers, glaciers, ice caps and in sea water. Carbon dioxide is also produced by all aerobic organisms (living creatures that breathe in oxygen). This carbon dioxide, when produced by organisms, is made through a process called respiration. Respiration is the process that organisms use to convert biochemical energy from nutrients to ATP. So, we, as human beings, produce carbon dioxide and release it when we breathe out. Carbon dioxide is also produced by decay, this includes processes like making beer, bread and wine. Finally, and most importantly for us, carbon dioxide is produced by the combustion of fossil fuels this includes things like cars undergoing complete combustion.



But why does it matter?

As I have mentioned earlier carbon dioxide concentration in the Earth's atmosphere has risen dramatically since the industrial revolution and still more is being released into the atmosphere. Why is this a problem? Its leading to global warming.

To better explain this you will have to know about the carbon cycle, which leads me onto my next aspect of research.

The Carbon Cycle

The carbon cycle is similar to the water cycle that we all know from primary school. Here's how it works:

- There are three different possibilities for the carbon cycle. The first one is that CO_2 from the atmosphere is absorbed by trees and other plants and is used to create new compounds. This carbon is then returned to the atmosphere when the plant respire.
- The second possibility is that carbon is taken in by plants. Animals eat these plants and then the CO_2 is subsequently released during the process of respiration.
- The third possibility is the most involved, plants take in CO_2 ; animals eat the plants; the animal (or plant) dies; the animal/plant turns into a fossil fuel; and finally CO_2 is returned to the atmosphere when these fossil fuels are burnt.

So that is how carbon moves about our earth and now that that has been explained we can get back to the problem. The problem is that we are releasing more CO_2 into the atmosphere than we are taking out. And this is leading to global warming.

How is this leading to global warming?

You may have heard of the greenhouse effect. This is the build-up of "greenhouse gasses" in our atmosphere which is one of the causes of global warming. This happens because the gasses in our atmosphere let certain rays, from the sun, in but don't let them out. Therefore the more gasses we put into our atmosphere, the hotter earth gets. Some greenhouse gasses also destroy the ozone layer, a protective shield not letting harmful UV rays get to earth.



What is happening?

Well, the earth heating up causes many devastating effects on wildlife, such as, the ice caps melting; fewer animals surviving; habitats being destroyed; and ultimately species will start going extinct. The thinning of the ozone will also let through harmful rays which will cause things like skin cancer and the soot given off when cars undergo complete combustion is carcinogenic. Global warming is also causing sea temperatures to rise and it is also making the seas more acidic. This is killing wildlife in huge numbers and we are seeing the effects right now in our coral reefs. 33% of all reefs on earth have become bleached due to global warming. This completely destroys the ecosystem. The effects of global warming are all around us yet we are still ignoring them, something must be done.

How can we slow down global warming?

We need to be carbon neutral. That means that any carbon we put into the atmosphere we must help store in things like trees and other plants. Stopping the burning of fossil fuels will also help lower our carbon emissions and we can take public transport to lessen the emissions.



There are many ways in which we can slow down global warming everyone needs to do their bit though and things will have to be done on an international scale.

How do trees use carbon dioxide?

Trees, and other green plants, take in CO_2 in a process called photosynthesis. They take in CO_2 (through the stomata) and water (taken in through roots) that they then use sunlight by trapping its energy in the chlorophyll in the leaves. They then use this energy to convert the CO_2 into food for its self in the process creating hydrogen and oxygen as a by-product. This is then let out through the stomata. All animals then use oxygen through the process of respiration.



How does this effect our design?

We have contemplated the impact that our buildings will have on the environment, and have decided to look at eco-friendlier alternatives to things like building materials, transportation electricity generation, carbon emissions and much more. Here are a few of the many things we have considered:

- Helping provide electricity through the gym that would be located at the bottom of our building.
- Having a rooftop garden and plants on the outside of our building, this would help to lower carbon emissions.
- Having solar panels and wind turbines to generate electricity.
- Having hire bikes in our building to encourage the use of bikes instead of cars.
- Having our building made out of more environmentally friendly materials, such as using hempcrete instead of concrete, and using wool or bark as an insulator, and bamboo for structural and cladding purposes.

These are a few of the many ideas we have had and we are sure that our building will be much more eco than current houses.

Why did we write this?

We wanted to know more about carbon dioxide so we could design our building in a more environmentally friendly and carbon neutral way. This research has also informed and justified a lot of the decisions we made about our final design.

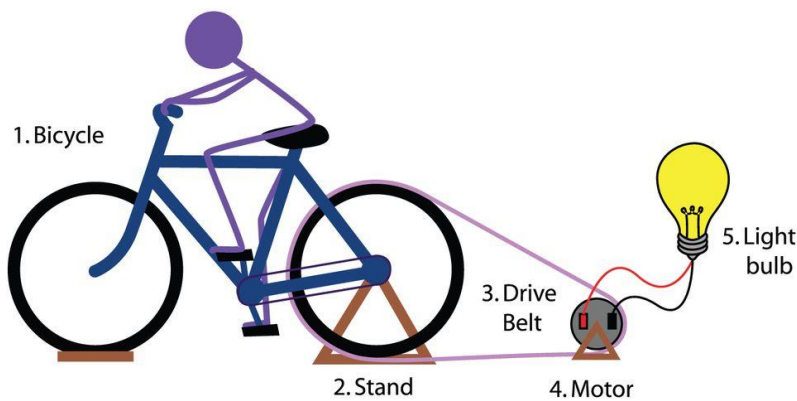
The future

It isn't all bad, global warming is happening right now but we still have time to do something about it, **IF WE ACT NOW!** Everyone can get involved and everyone can help; from making small adjustments to their lives, to organizing bigger events that help to raise awareness. This is why we are really passionate about our building and want to make a big impact on the world. We can reverse the effects of global warming but we must act now.



Bike under your Desk

Bike under desk is a product that we have developed based on a product that already exists. We have changed it so that converts kinetic energy you produce while riding the bike into energy you can use in your home. This will be a cheaper way of providing energy your house.



The science part: the way we would get this electricity is by having a magnet and copper wire system. ~ This system is used in wind turbines which is a larger scale version of what we have created.

We found that 60% of our survey takers would have a 'bike under desk', this is an amazing result as if the product was out there people would save money and the 62% of adults in the UK who are overweight would healthier.



Designing an Eco House

An eco-house by definition is a house that has a low impact on the environment and is built using technology and materials that reduces its carbon footprint.

Examples of what an eco-house might have include:

- Higher than normal levels of thermal insulation
- Better than normal airtightness
- Good levels of daylight
- Passive solar orientation — glazing oriented south for light and heat
- Thermal mass to absorb that solar heat
- Minimum north-facing glazing — to reduce heat loss
- Mechanical ventilation with heat recovery (MVHR) system
- Heating from renewable resources (such as solar, heat pump or biomass)
- Photovoltaic panels, small wind turbine or electricity from a 'green' supplier
- Natural materials — avoidance of PVC and other plastics
- Rainwater harvesting
- Greywater collection
- Composting toilet
- Glass that has two or three layers with a vacuum in between to prevent heat loss; (double or triple-glazed windows)
- Solar panels or wind turbines
- Geothermal heating and growing plants on the roof to regulate temperature, quieten the house, and to produce oxygen
- A vegetable patch outside the house for some food

Buildings use up enormous amounts of energy. Some calculations make it as much as 70% of all the energy used in the UK when all the factors are taken into account. This energy is mainly for heating and lighting and therefore the aim is to design houses that are well insulated and make the best use of natural light.



Incorporating Existing Renewable Energy

Examples of renewable energy that we would be able to incorporate into our High Rise Flat design include solar energy, wind energy, hydropower, tidal power, geothermal energy, and biomass energy. Hydropower and tidal power wouldn't be able to be realistically incorporated into a house or skyscraper, so I haven't researched them.

SOLAR ENERGY

What is solar energy?

Solar energy is the radiant energy emitted by the sun. solar cells can be used to generate electricity from solar energy. It converts light energy into electrical energy. Solar energy is a completely free reliable source of energy.

How can solar energy be harnessed for our home?

Solar panels will be propped up on our roof, the energy absorbed by them would then be converted into electricity for our home. Energy would be stored in a battery overnight. With a enough energy to power each flat.

Examples of when solar panels were used in a skyscraper:

A skyscraper on miller street in Manchester, where falling tiles were replaced by millions of solar panels



GEOTHERMAL ENERGY

What is geothermal energy?

Geothermal energy is thermal energy generated and stored in the earth.

How can geothermal energy be harnessed for your home?

Half of the solar energy that reaches the earth remains stored in the earth at a temperature of about 50 degrees, you can use this energy under the earth to heat and cool your home. For this you will need a geothermal heat pump system, which is essentially pipes running underground which in cold weather delivers heat to a furnace where it is compressed to a higher energy and moved through the home through forced air or radiant floor heating. In warm weather it's reversed. This is definitely something we could consider incorporating.

WIND ENERGY

What is wind energy?

Wind energy is electrical energy obtained from harnessing the wind with windmills or wind turbines. Wind turbines convert the kinetic energy in the wind into mechanical power. This energy can be sent to a generator that can convert this mechanical power into electricity to power your home.

How can wind energy be harnessed for your home?

Wind turbines can be propped up on your roof to harness wind energy. There are two types of wind turbines you can use: roof-mounted or pole-mounted wind turbines, they come in a range of sizes, prices and powers. Rooftop models generate between 0.5 and 2.5 KW and Pole mounted wind turbines generate about 5 to 6 KW. Roof mounted turbines are generally cheaper, but they are also less efficient and produce a lot less than pole mounted one. Wind turbines are more suitable for off-grid where conventional methods of supply are too expensive or impractical.

Examples of when wind turbines were used in a skyscraper

You can sometimes find wind turbines on skyscrapers high up where wind speed is higher, an example of this is the COR building in Miami.



A planned skyscraper in the center of Jakarta, Indonesia called the Pertamina Energy Tower, 99 stories high, will be the world's first net-zero energy skyscraper. Shaped like a funnel, the top of the tower opens at the top, capturing wind and sucking it inside to run a series of vertical wind turbines that provide 25 percent of the building's electricity.



BIOMASS ENERGY

What is biomass energy?

Biomass is any type of organic matter that comes from plants or animals. Biomass energy is the electricity you get from burning organic matter. There are 4 types: wood and agricultural products, solid waste, landfill gas and biogas, and alcohol fuels

How can biomass energy be used in your home?

Just by burning wood in your fireplace, biomass boiler or stove would be considered using biomass energy, burning wood is the example of biomass energy being made and used in a home.

How do High Rise Buildings Stand Up?

High rise buildings are buildings that are higher than 23 metres or 7 stories (larger ones are sometimes referred to as skyscrapers). Their large size and height mean that skyscrapers must withstand very strong gales and winds – which we plan to utilise in for our benefit in terms of wind energy. They also have to be accessible as well as providing services and a nice climate to residents.



High-rises are generally made from reinforced concrete and steel, which are used together to withstand against the bending motion caused by the wind. This is done by pouring concrete around a steel beam to create a support beam. The foundations are concrete caissons which very simply are holes that are filled with concrete to support the tall structure.

A high-rise building's basic structure is many steel boxes inside a singular steel frame. Buildings can also be built using a tube frame structure, which has been implemented in buildings such as the World Trade Center, Aon Center, Petronas Towers and the Jin Mao Building.

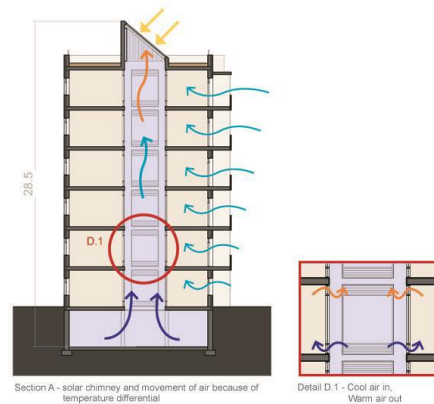
One of our ideas of a way to add a feel of nature to the building while still being practical would be using bamboo. Bamboo sticks could be used as a clad on the side of the building to protect against rain and wind while also amplifying and fitting in with the nature/eco look we think is really important.



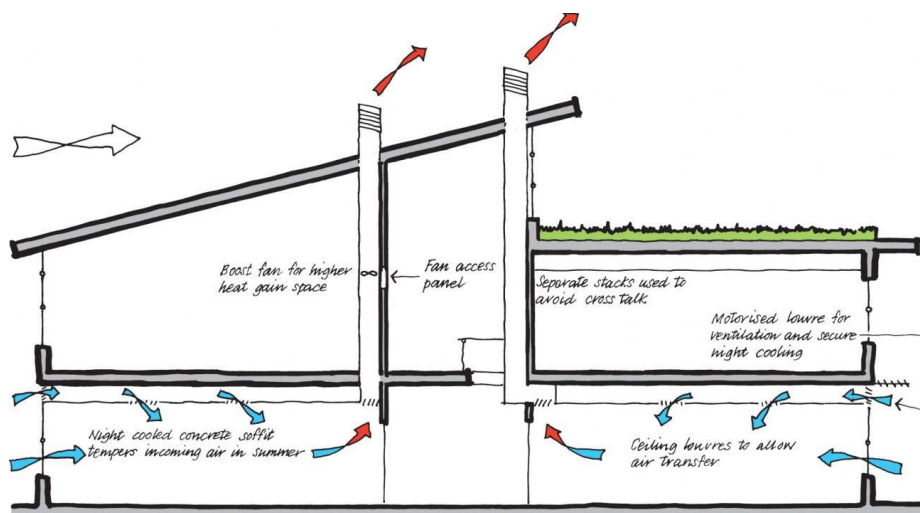
Ventilating our Building

Passive/natural ventilation is natural ventilation that removes and replaces air without using a mechanical system. This form of ventilation works best in highly populated buildings as it takes advantage of body heat and the height of the building. 60% less energy is used in naturally ventilated buildings. In summer fresh air goes through the windows and heated air is displaced upwards and exhausted at high level. However, in the winter windows are closed and cool air comes from high level and mixes with warm room air to create fresh air. Extra heating isn't needed until outside temperatures are below 5°C. Passive ventilation is often used in Offices and schools. In offices short-term absences due to illness can decrease up to 35% due to fresh air supply and in school's student Performance increases by 5-10%.

Hybrid ventilation is a mix of natural ventilation and standard ventilation. Natural ventilation is used in the summer and a mix of natural and internal ventilation is used in winter. However, one fact to consider is that by 20150 average global temperatures will be increased so internal heating will be needed less. Fans used in hybrid ventilation are usually mechanical, low energy fans with heat recovery that take warm air from heated rooms into cooler rooms.



Hybrid and Natural/passive ventilation would need to be controlled and adjusted by either one control room or for every room in the building to have its own control pad. Another solution to this would be having different programs prepared depending on the weather, temperature and climate in the surrounding areas.



Insects in the City

WHY DO WE NEED INSECTS? WHAT DO THEY DO?

- Bees pollinate plants making them grow we need this for food.
- Without insects there wouldn't been enough food.
- Insects help breakdown and dispose of waste, dead animals and plants.
- Sole food for other animals like reptiles, birds' amphibians, mammals.
- Ants and beetles dig channels for water benefiting plants.
- Insects make up 80% of all species on earth.
- 5-30 million different insect species in the world.
- Insects the basis to all food as they pollenate plants and are eaten by animals.



WHAT DO INSECTS LIKE?

- 97% of insects live on land.
- Insects like to be in dark sheltered places when transforming.
- Cold can make it hard to fly and water harms their wings so they need shelter.
- Insects eat many food: wood, plants, blood, nectar, seeds.
- Insects like cities as they are warmer then rural areas.

STATISTICS

- 100 different species of insects in an average household.
- more than 1.4 billion insects for each human.
- Insects have rapidly decreased for the last three decades.

HOW CAN WE PROTECT OUR INSECTS?

- To stop using chemicals like insecticides and pesticides.
- Grow colourful and interesting plants to help attract insects.
- Insects like gardens that are wild compared to ones that are very tidy.

COPPER and MAGNETS!

ELECTRICITY GENERATION...



WHAT?!

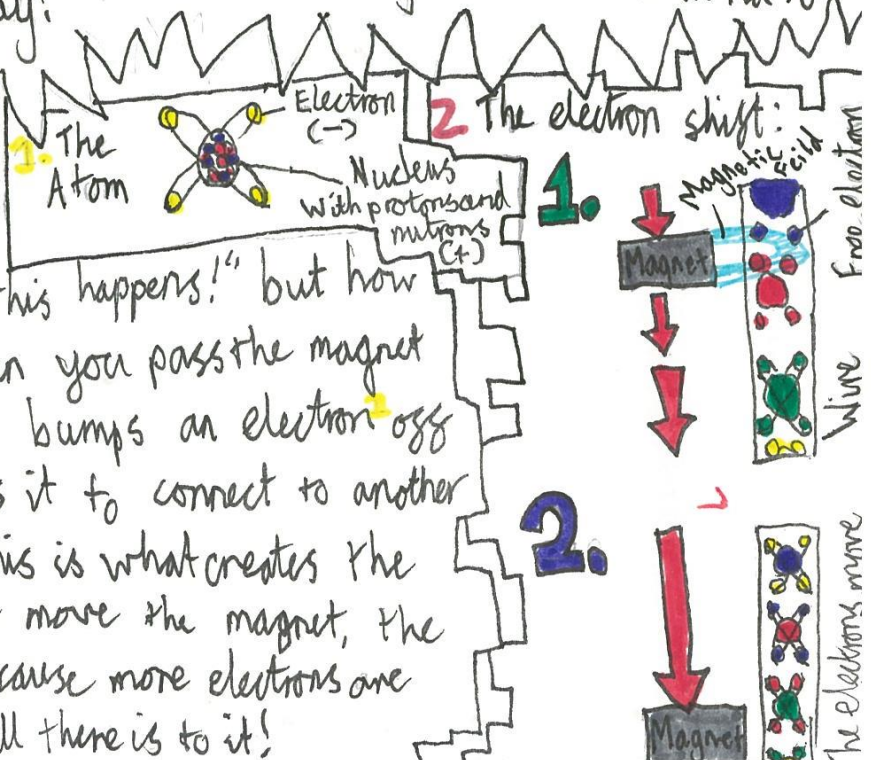
We've all heard of generating electricity through motion, but how does it actually work?

How?

Turning motion into electricity isn't as difficult as it sounds, all you need is copper wire and a magnet. As the famous scientist Michael Faraday found out, in 1831, you can create a current by moving a magnet through a coil of copper wire. This is how we generate electricity around the world to this day!

The Science Stuff...

It's all very well to say "this happens!" but how does it happen? Basically, when you pass the magnet through the coil of wire it bumps an electron off an atom and that causes it to connect to another atom displacing that electron. This is what creates the electrical current. The faster you move the magnet, the more electricity is generated (because more electrons are being displaced). And that is all there is to it!



Lead by Example

To help inform our own proposal we looked at examples of best practise from across the World. We realise there is a wealth of knowledge and a number of examples of best practise all around us, in our own proposal we wanted to create a one stop shop, where we harness and utilise developments and discoveries that have already been made.



2018 was the fourth year in a row Costa Rica generated more than 98 percent of its electricity from renewable sources. For 300 days, the country used no fossil fuels to make electricity.

Here are examples of two countries where energy companies are fully invested in and utilising Renewable Energies. In Germany they actually generated so much Renewable Energy that homeowners were paid to use Energy! Iceland is another country that produces 100% renewable energy.



On May 8th, 2016, Germany's solar, wind, hydro, and biomass plants generated so much energy, power prices actually went negative.



Sweden is actually increasing forest biomass despite being the second largest exporter of paper in the world because they plant 3 trees for each 1 they cut down.

We really like the idea of incorporating as much greenery into and around our home proposal as possible. We know that busy cities generally lack this, and it has been proven to have a negative impact on people's Health and Wellbeing. We are looking for a proposal that will improve every aspect of busy city living for everyone; the people, the infrastructure, the wildlife and the environment.

Our intention would be to adopt a similar drainage system as the picture to the right so that any unnatural or non-recyclable waste flowing through the drains would not end either in the sea, or blocking the systems.



Australia has already started to test a network of drainage nets so that plastics and other pollutants do not reach rivers or sea.



In Germany they operate a recycling system whereby people actually get paid to recycled their waste. There are, what looks like, vending machines that are placed around the city that allow people to bring their recycling in exchange for money. Not only does this act as an incentive, it also gives homeless people a change to earn money, as they go around the city collecting people's recycling. Such an admirable system.

A UK levy of 5p per plastic bag was introduced in 2015, this has seen bags given out by retailers reduce by a massive 85%! We are not the only country to impose such laws, and others have seen similar successes. This



is excellent to see, however it proves that we need Governments to introduce appropriate Legislation and Tariffs and that we need large companies to be invested in a move for a more Eco-Friendly future.



There are a number of countries across the world who have certain cities where driving in highly populated, urban areas is prohibited. Many of the biggest cities throughout the world are choked with air pollution. New Delhi, Paris, New Mexico, Barcelona, and Beijing are just some of the cities that have enacted this policy in the hope of seeing improved air quality.

The EU is very good at banning all nasty toxic pesticides, we all know we need to look after our insect population much better! The same cannot be said about America, we would like to see this change.



In 2001, India started building roads that are held together using polymer glues made from shredded plastic wastes. These plastic roads have developed no potholes and cracks after years of use, and they are cheaper to build. As of 2016, there are more than 21,000 miles of plastic roads.

All around the world countries are starting to realise the environmental harms of plastic (particularly for the ocean) and our inability to recycle them. Countries are starting to ban the use of plastics. We previously mentioned the banning of plastic bags, France has banned plastic cups, cutlery and plates, New Delhi has completely banned all plastics and Germany has banned all non-recyclable plastic cups. Other countries are also looking at how these plastics can be used for other things, such as roads in India. Perhaps we could incorporate recycled plastic into the construction of our own structure.

Extinction Rebellion

For any eco living space to work people's involvement, engagement and support is evidently needed however government and corporate involvement would be much more influential and create more impact.

Extinction Rebellion is a non-violent social movement that is aiming for governments to enact legally binding policies to reduce the countries carbon emissions. This movement understands the importance of a nationwide change and believe that a policy needs to be put in place to make people more eco and conscious of their carbon footprint and waste.

The David Attenborough Effect

The 'Attenborough Effect' is how TV shows such as 'Blue Planet II' and social media were able to change consumer habits and sway young or impressionable people to use sustainable items rather than single use products. This is one of the positives of our constantly sharing culture- 'trends' and movements spread quickly. If one TV show can change so many peoples buying habits how much could nationwide media coverage change?

We're aware that Utopia is not the end goal, not every aspect of a person's life is where they live, this is one of the main reasons Utopia also has some social and commercial aspects. However, what we're hoping is that Utopia would be a hub for likeminded, sustainably conscious people thus causing awareness in the local community.



Plants Research

To allow us to figure out which plants would be best suited to our Utopia design, as well as taking in a lot of CO₂, we interviewed a Horticulturalist at The Royal Botanic in Edinburgh. This is the information she gave us that will inform the greenery we use in our own proposal.

What plants have shallow roots?

Monocots such as grasses and ferns have shallow roots but may not necessarily be good for being attached to the sides of buildings.

What plants use a lot of CO₂?

Very leafy and fast-growing plants use a lot of CO₂, but these will probably die quicker than average plants. Whereas hardwood trees overall use the most CO₂ in their lifetimes.

What plants could work well inside?

Good house plants are warm-loving ferns and generally tropical plants, such as Maranta*, Ficus (Fig Tree)*, Begonia*, Monstera (Cheese Plants).

What plants would be good on the side of buildings?

Good plants for the side that gets the most light could be...

- Sedum* - A low growing flowery succulent.
- Silene vulgaris* - A meadow flower.
- Armeria*- It grows in cushion like mats which could possibly cover walls.
- Festuca* - A tufted grass that can survive in many climates, all over the world.

These plants all work well on green roofs and therefore could be used effectively on our building.

Good plants for the side that gets the least light could be...

- Polypodium* - Low growing fern.
- Davallia* - Low growing fern.

Also:

- Begonias - Long-living flowering plants
- Primula* - Aka Primrose, flowering plants that love partial shade.

If the plants started on the ground...

- Hydrangea serratifolia* - Flowering plant for the bottom shady part of a building.
- Parthenocissus* ** - Climbing grape plant.
- Ivy ** - Leafy climber.

*= (Sp.) **= These can wreck buildings if unpruned/managed



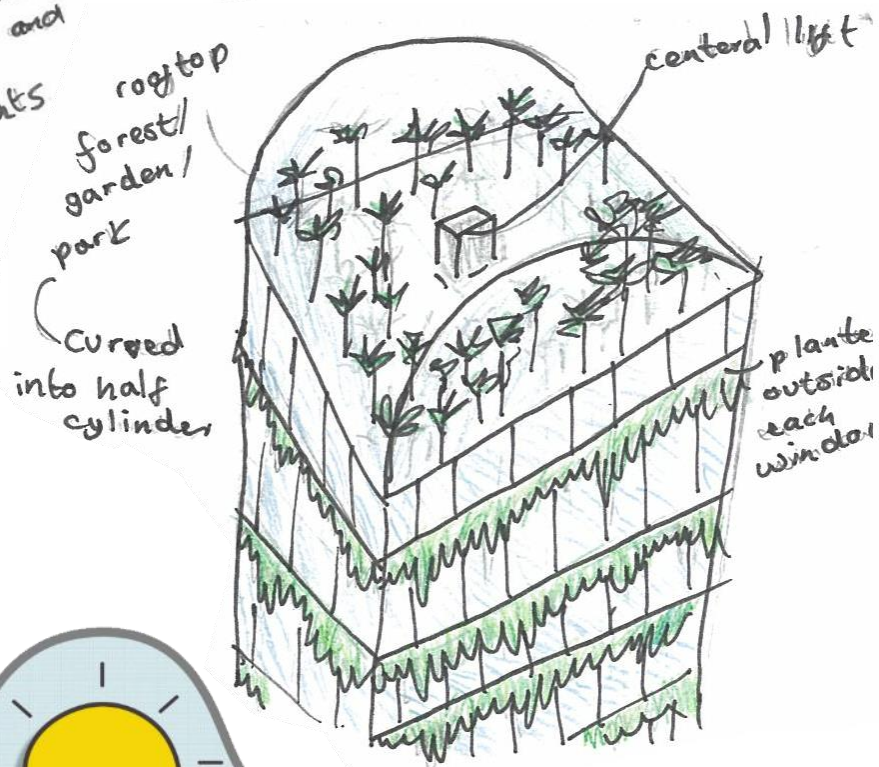
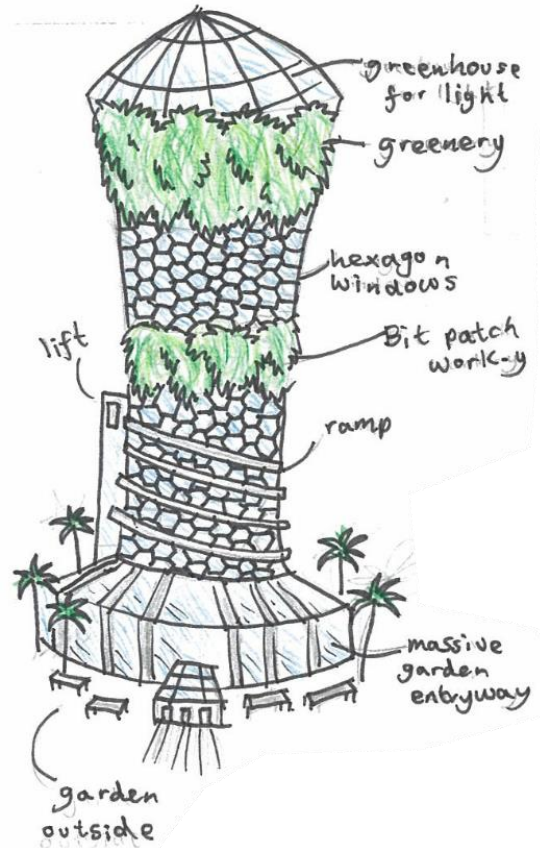
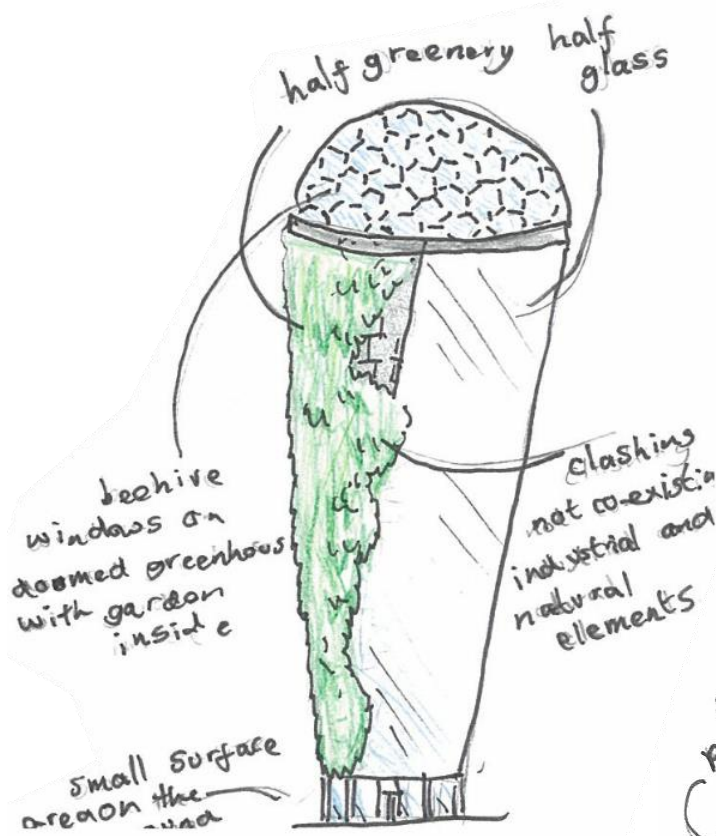
Eco-House Inspiration Mood Board



Our Ideas for Utopia

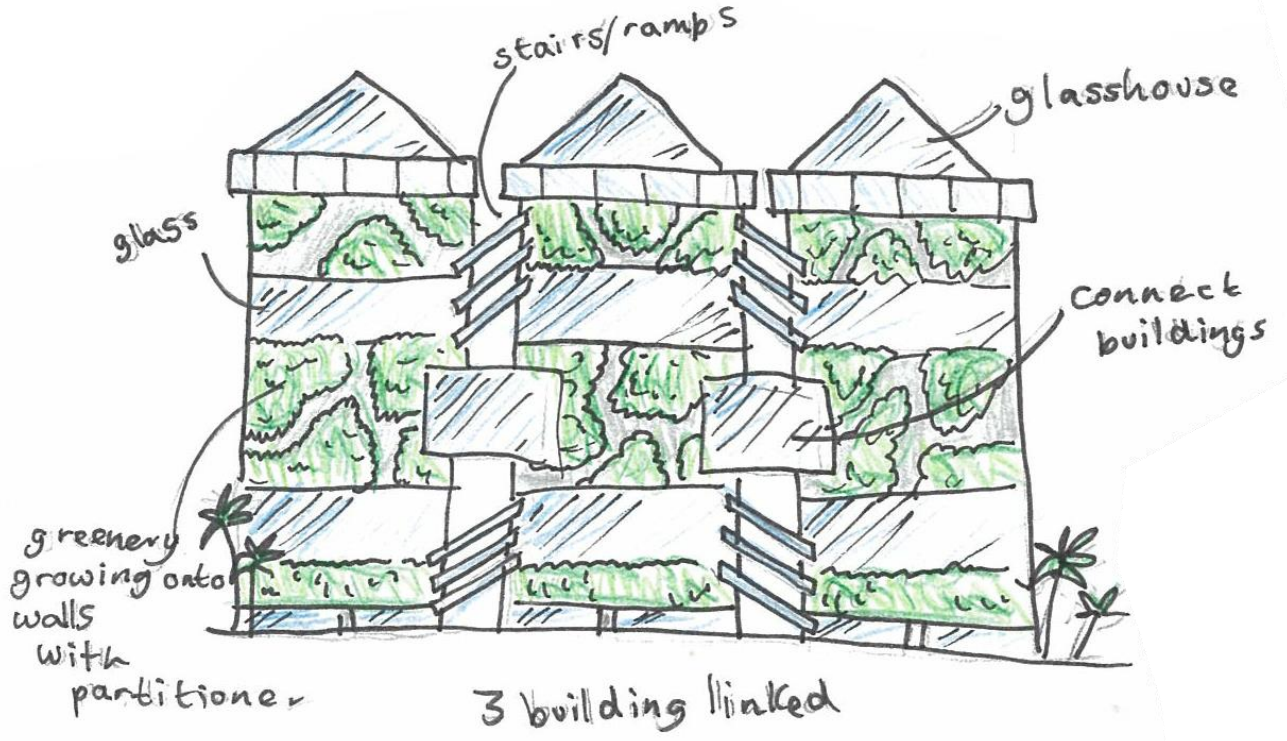
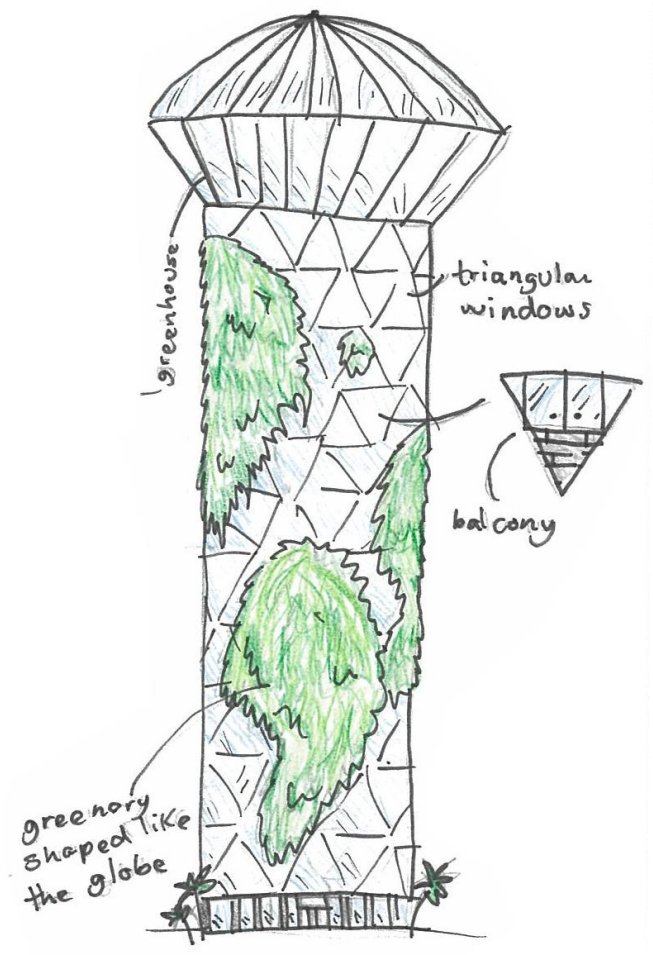
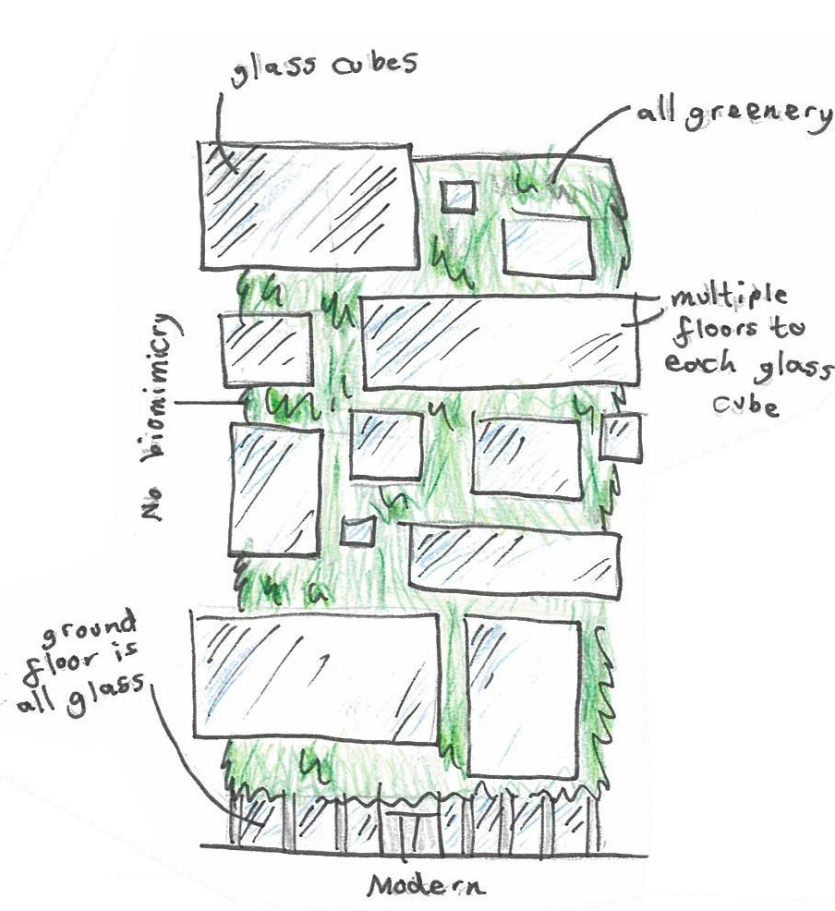
To help inform our own proposal we looked at examples of best practise from across the World. We realised there is a wealth of knowledge already out there, and a number of successfully developed ideas that we wanted to utilise. To allow us to come up with a final design that we were all happy with we create six completely different designs that we planned to pick our favourite elements of in order to create our final design.

Here are our six initial ideas:



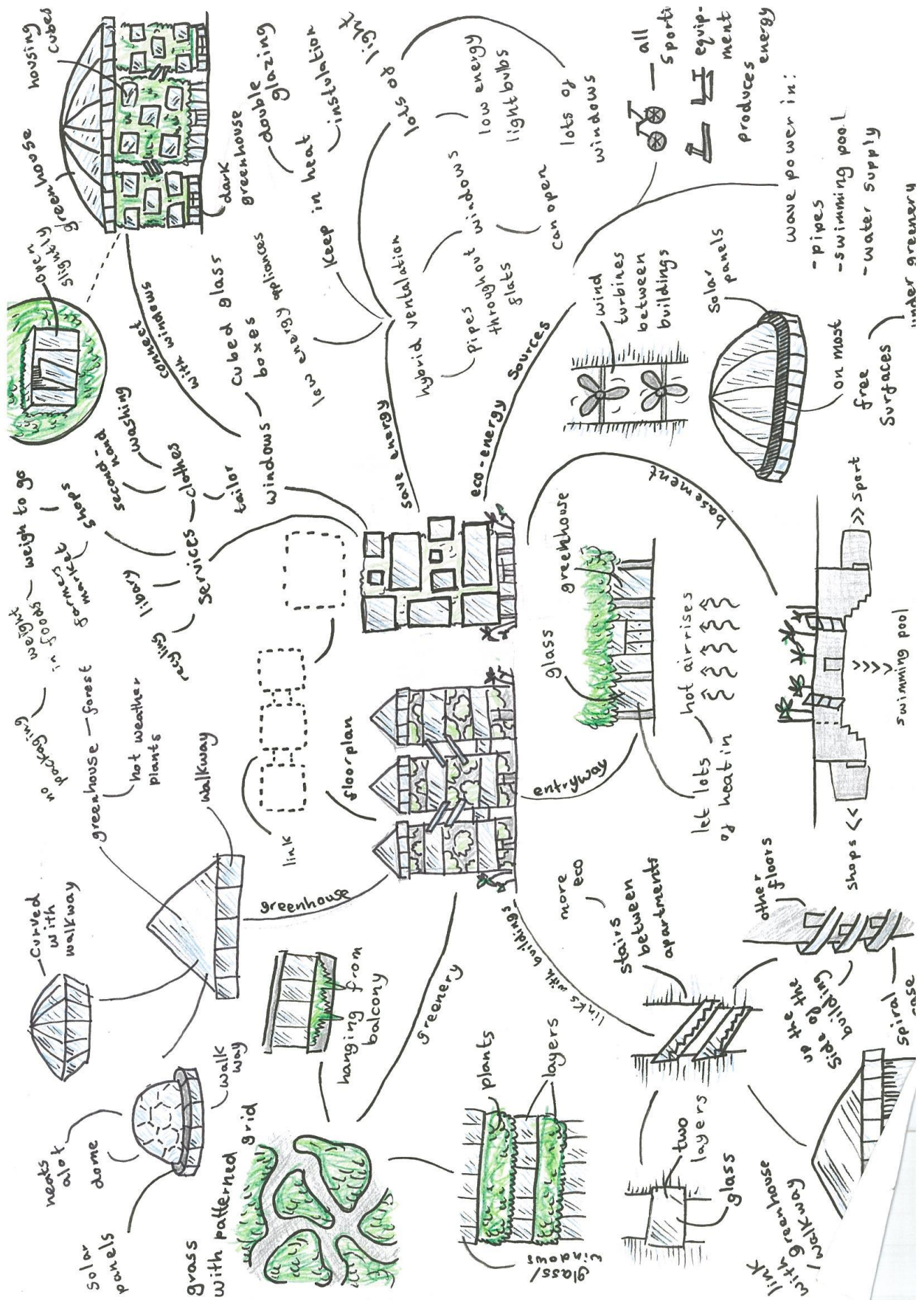
For full size scans of all work please see 'Scanned Work' PDF file.



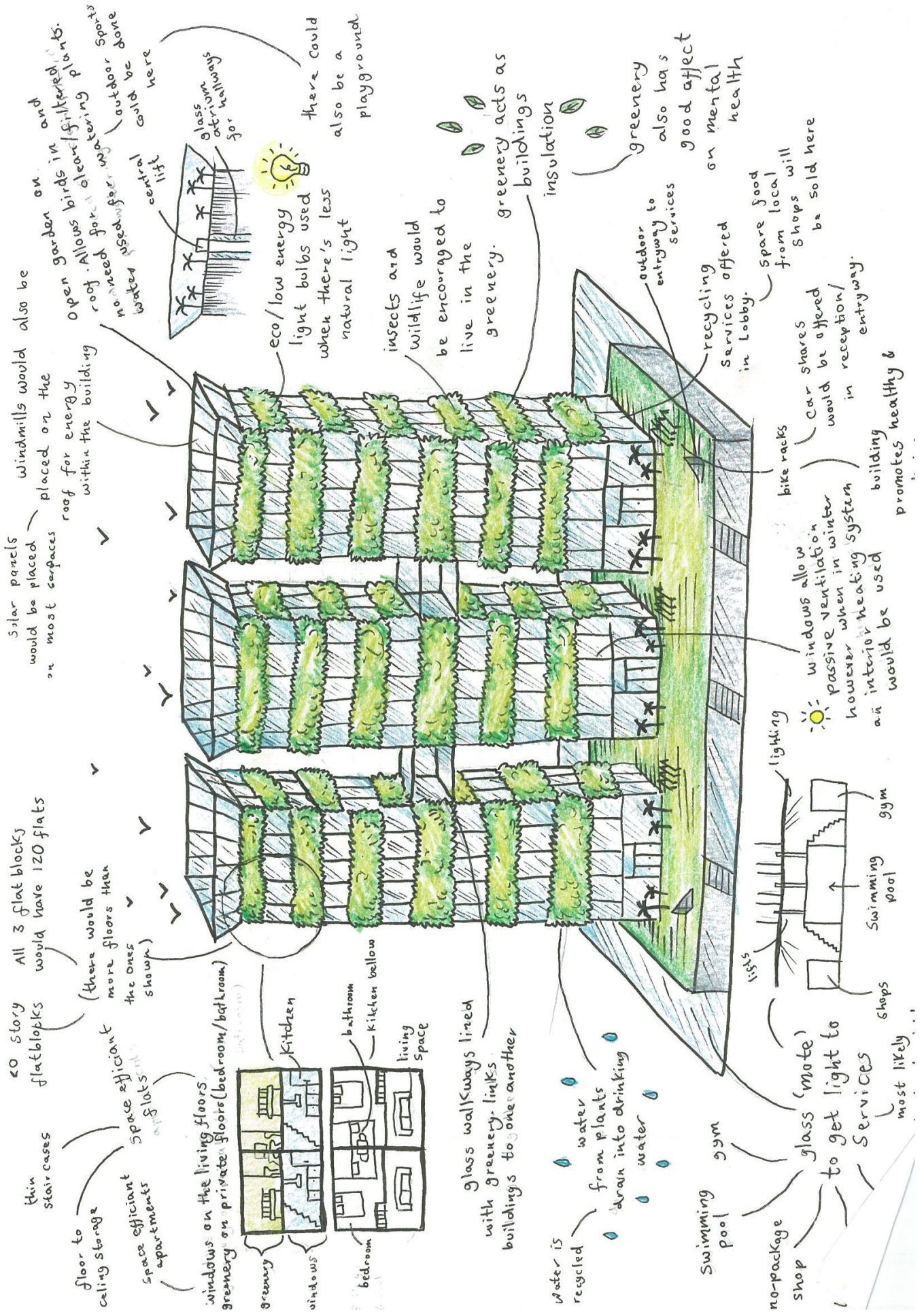


Synthesising our Ideas

Now that we have our initial ideas worked out, we were able to synthesise (bring together) our two best/favourite ideas. The process of this can be found below:



Final Idea - Building Design



Final Idea - Communal Living



Final Idea - Generating Electricity

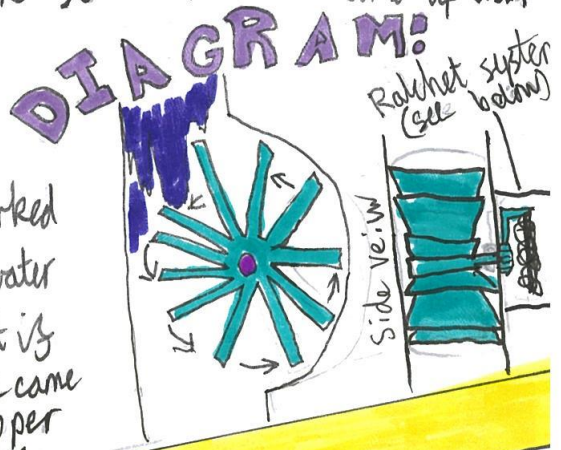
OUR IDEAS Using what we know about generating electricity we came up with a few ideas and chose our two favourites, but before that?

Why is this important?

Before we show you our ideas we just wanted to take the time to explain why we've done all this. At first glance these two pages may seem off-topic but one of the main problems facing a city in 2050 is power. Fossil fuels are finite and renewable energy is the future so we wanted to come up with our own ways of creating electricity...

IDEA 1: Drains

We've heard of hydroelectricity and this sparked an idea, we use our sinks every day and water is constantly flowing through our pipes. What if we use this to our advantage? That's how we came up with **PIPEPOWER!** Using a magnet and some copper wire we can now generate electricity at home without even doing anything! Here's how it works: Water flows down the drain turning the water wheel. This, in turn, is connected to a magnet and the spinning of the wheel makes it move through the wire, creating

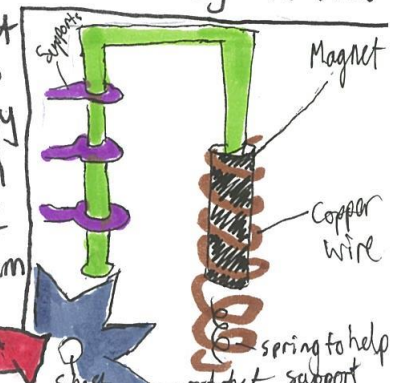


ELECTRICITY!

IDEA 2. BIKE

The RATCHET SYSTEM

This small section will give a brief overview of the ratchet system. This is the part that turns kinetic energy into electrical energy. See the diagram opposite



Our second idea uses the same principle as the first. As before, a wheel turns and this powers the ratchet system. The difference is this time it's a pedal machine. This is no ordinary pedal machine. The our ideas to slip into peoples current lives. So we've designed a small, compact Pedal machine to go under your desk at work or home. See other page for more



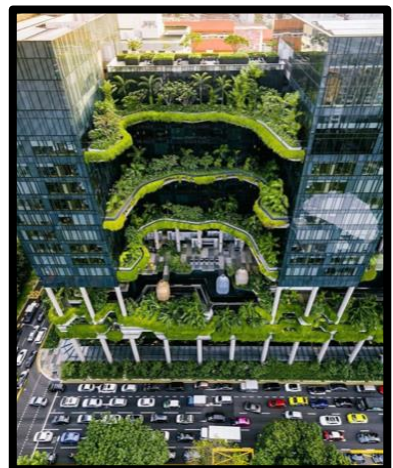
Living in a Flat now vs Living in Utopia

Living in a flat now

- **Small windows/less windows**
 - Less natural light.
 - Stairways have small amount of natural light.
 - Can feel small and cramped.
- **Communal spaces**
 - No specifically communal space.
 - Stair cases can be dirty and disrespected.
- **View from flat**
 - May have better views.
 - Not much greenery in the view.
- **Insects**
 - Not much greenery so not much room for insects.
 - Small gardens again small amount of room for insects.

In Utopia

- **Lots of natural light**
 - You can wake up to the light.
 - Less need to use electrical lights.
 - Spaces feel more open and inviting.
- **Communal areas**
 - You can meet new people.
 - You can join in activities.
- **Lots of greenery**
 - Greenery looking at can help with mental health.
 - Give insects homes and food.
 - Give gardening as activity and links neighbours.
- **View from your house**
 - Lots of greenery.
 - May be buildings in the ways.



CONCLUSION

We truly believe our idea can make a positive difference to our world. We are all very passionate about our idea and really loved working on this project. All of us engaged well and we are really proud of what we've produced we hope you like it too!



Appendix I

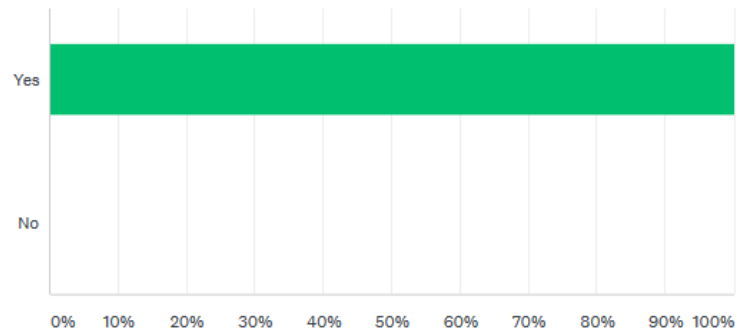
Sustainable Living Survey



We used a survey to help inform us on a broad audience’s current understanding and perceptions on Climate Change and Sustainability. We used this information to help inform our later designs to make sure we were creating something that the majority of people would be comfortable using.

Have you heard of global warming?

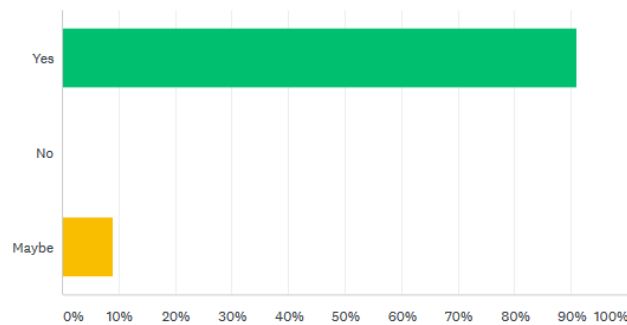
Answered: 22 Skipped: 0



With our first question we wanted to gauge how well know global warming was as our design is partly orientated around this problem. As you can see everyone has.

Would you be interested in helping to slow down the effects of global warming?

Answered: 22 Skipped: 0

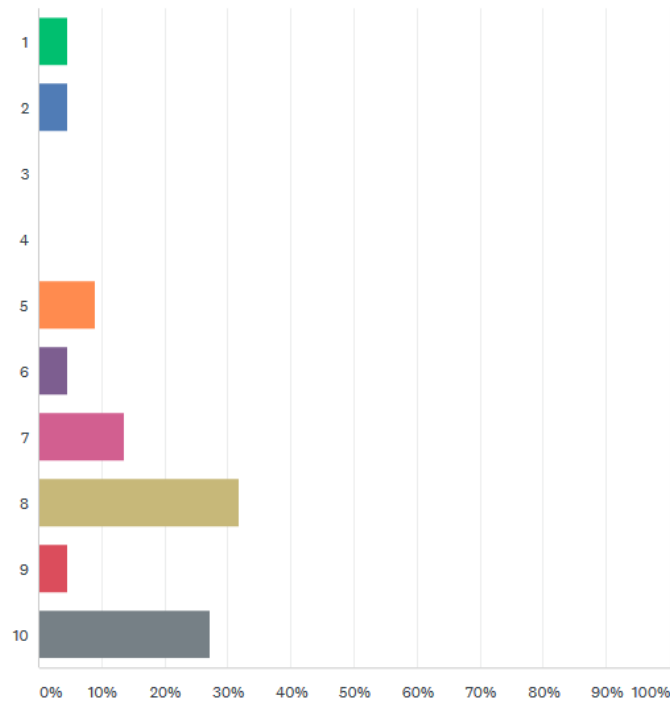


In this question we wanted to see how many people were bothered by global warming, as you can see everyone was interested, or at least willing to try, an idea to help slow down global warming.



By 2050 the worlds population will have risen to over 9 billion, two-thirds of these people will be living in cities. On a scale of 1-10 how big a problem do you think this is?

Answered: 22 Skipped: 0



After introducing a problem that everyone knows about we decided to introduce the problem that we were focusing on solving, a growing population. We asked this question not only to introduce the problem but also to try and gauge how the public feel about this matter. As you can see most of them think that this is a great concern.

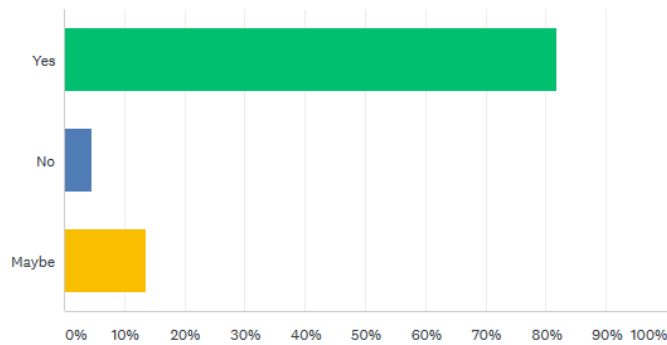
Here are the results in a format that's easier to view:

ANSWER CHOICES	RESPONSES
1	4.55% 1
2	4.55% 1
3	0.00% 0
4	0.00% 0
5	9.09% 2
6	4.55% 1
7	13.64% 3
8	31.82% 7
9	4.55% 1
10	27.27% 6
TOTAL	22



Would you be willing to adapt your life style to slow down global warming?

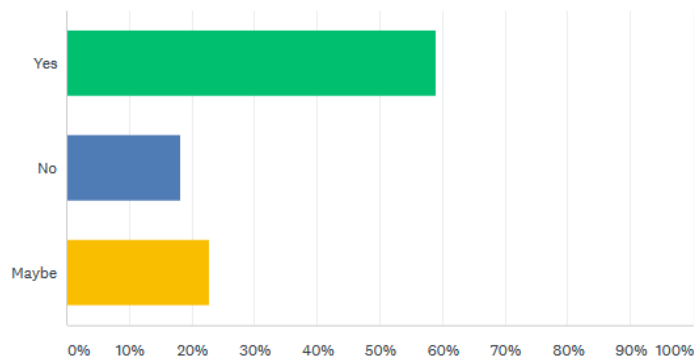
Answered: 22 Skipped: 0



One of the main parts of our idea is to introduce small changes to people’s lifestyles which will ultimately create a bigger change overall. We had to get an idea of how many people would be willing to do this as we can accept that it sounds pretty daunting. As you can see this is an extremely positive result.

Would you use a pedal machine under your desk? This would save money, help the environment and have both benefits.

Answered: 22 Skipped: 0

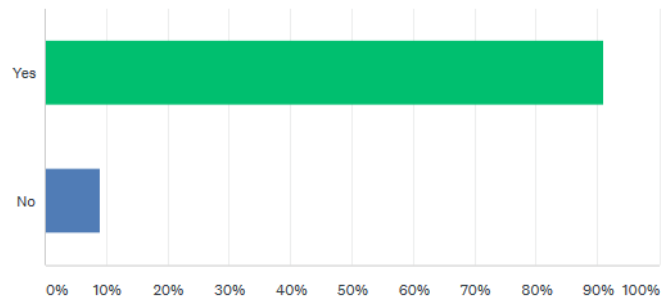


This was one of our first ideas and we decided to see what people thought of this. As you can see it is a pretty positive response. It is also important to note that the survey respondents had no prior information about this product.



Would you use public transport if it was cheaper?

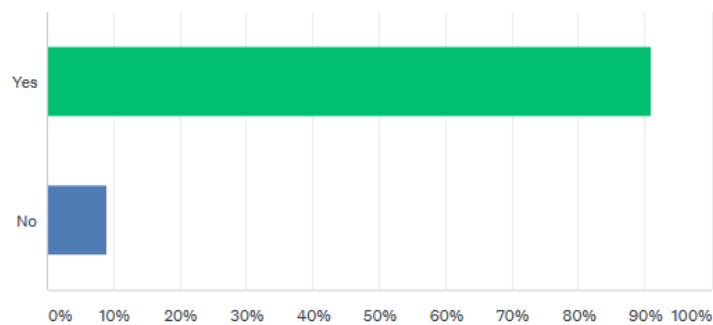
Answered: 22 Skipped: 0



Public transport is an amazing way of reducing carbon emissions and it also prevents traffic jams in over-crowded cities. In Edinburgh we have a fantastic bus service but we wanted to find out why people still use cars on a daily basis. We identified cost as a potential factor and wanted to put it to the test. As you can see most people would be willing to take public transports if it was cheaper.

Would you use public transport if it was free?

Answered: 22 Skipped: 0



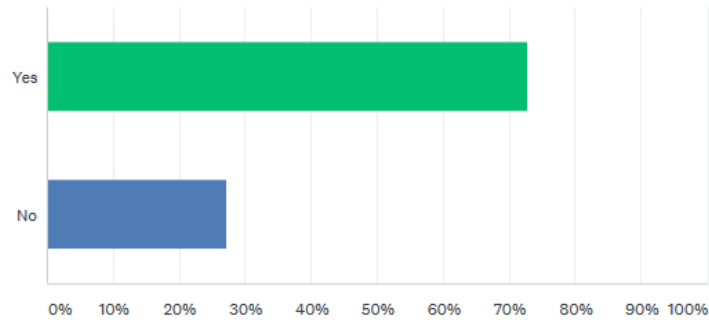
ANSWER CHOICES	RESPONSES	
▼ Yes	90.91%	20
▼ No	9.09%	2
TOTAL		22

This question just led on from the previous one, but it did in fact raise an interesting point, public transport could never really be free as the money for it would have to come from somewhere. Therefore, we reasoned, the money would probably be paid for out of people’s taxes. This isn’t a huge problem, but it is a bit unfair on those who don’t use busses often and instead walk or cycle.



Have you heard of an “Eco House”?

Answered: 22 Skipped: 0

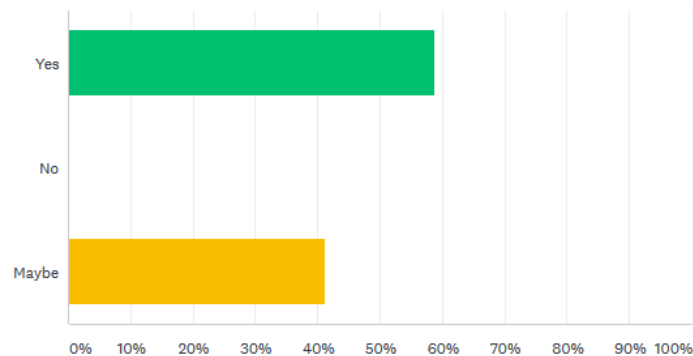


ANSWER CHOICES	RESPONSES	
Yes	72.73%	16
No	27.27%	6
TOTAL		22

We asked this question to gauge how much our target market already knew about our idea. Eco houses already exist but ours would be slightly different. As you can see this is a positive response.

If the above answer was yes would you consider living in one? This would save you money and help the environment greatly. Skip question if you haven't heard of an “eco house”.

Answered: 17 Skipped: 5

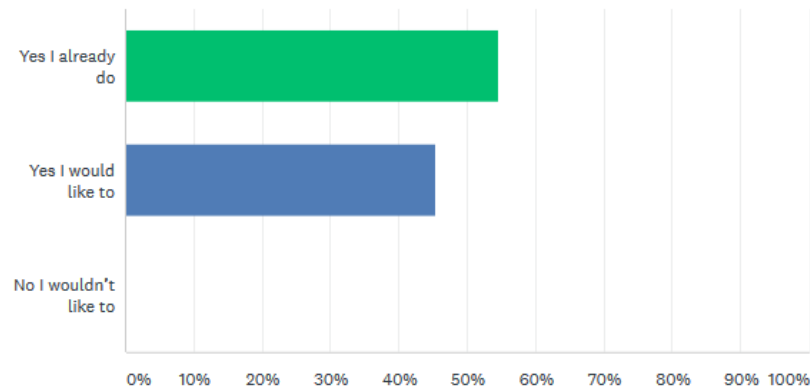


This question follows on from the last and is pretty self-explanatory. We just wanted to know what people thought about current eco houses. As shown above, it is an extremely positive result with no one answering “no”.



Would you be willing to help nature by doing things like set up bird feeders, plant bee friendly flowers etc.?

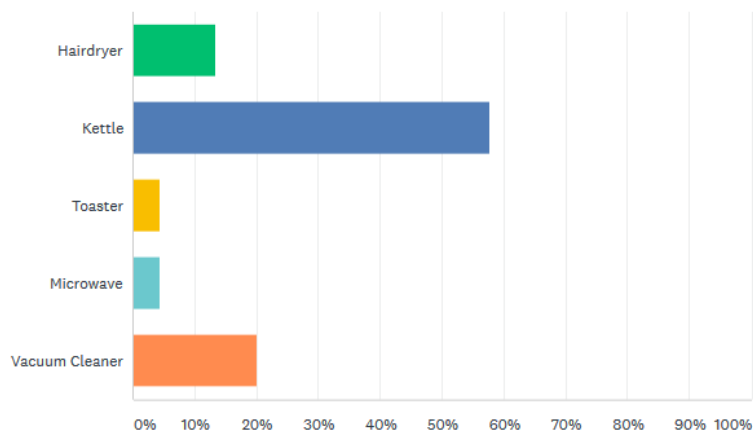
Answered: 22 Skipped: 0



In our eco-house we would definitely have plants and birdfeeders as not only do they support vital wildlife, but they will also give a more relaxing atmosphere to live in. We needed to see how people felt about this and we got the great result shown above.

What household appliance uses the most electricity?

Answered: 45 Skipped: 0



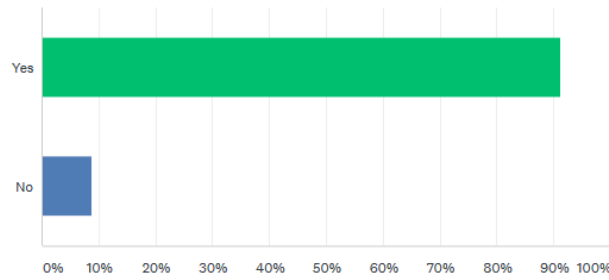
ANSWER CHOICES	RESPONSES
▼ Hairdryer	13.33% 6
▼ Kettle	57.78% 26
▼ Toaster	4.44% 2
▼ Microwave	4.44% 2
▼ Vacuum Cleaner	20.00% 9
TOTAL	45

This was just a fun question, but it also let us know about what people thought. The most clicked answer was kettle, and that is correct. This shows that people do take into consideration how much electricity they use which makes them more likely to want to use our ideas.



do you think there should be more national legislation around global warming

Answered: 45 Skipped: 0



With this question we wanted to gauge how much people cared about global warming, and whether they perceived the Government was doing enough to tackle it. Cities are often big contributors, so we felt it necessary to ask this question.

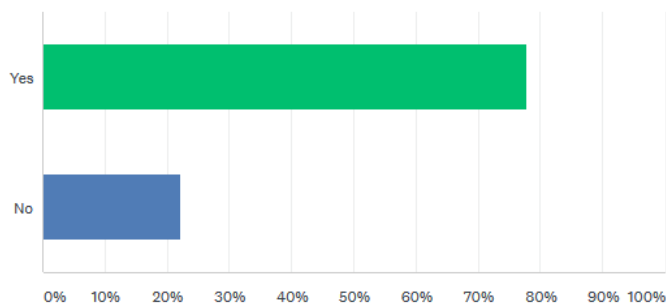
If you could make a law that would help save the planet what would it be?

Answered: 39 Skipped: 6

This was a follow up question and we got quite a few answers including things like *introduce more taxes for companies that pollute a lot* and *have less cows in the world*. We found the last one interesting because it's true, cows are one of the largest contributors to global warming but with cities constantly growing we must make a change in diet.

When you purchase your next car would you consider an electric model?

Answered: 45 Skipped: 0



Cars pollute a lot and people use them every day. A greener option is to use an electric car. We wanted to know what people thought of electric cars and the result was mainly positive.



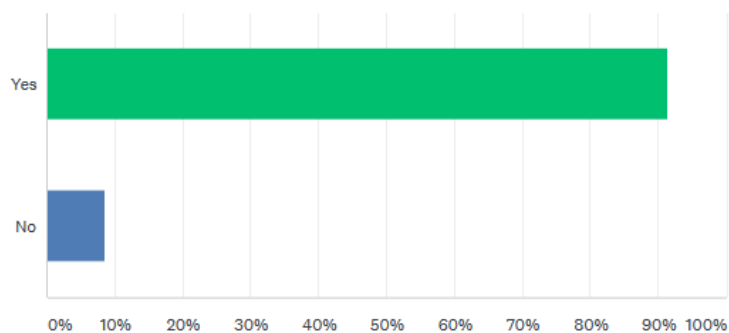
If you answered no to the previous question would you please tell us why?

Answered: 25 Skipped: 20

We wanted to know why people wouldn't want an electric car and we got responses like *no charging stations nearby; not a long battery life; and takes a long time to charge*. But the one we found most interesting was *there are lots of air miles from importing a certain material for the battery*. We didn't know much about this and decided not to peruse it, but we thought it was an interesting point.

If your above issue(s) was solved would you now consider buying an electric car?

Answered: 35 Skipped: 10

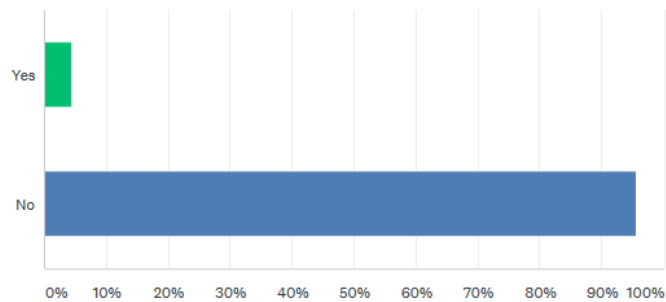


ANSWER CHOICES	RESPONSES	
▼ Yes	91.43%	32
▼ No	8.57%	3
TOTAL		35

We predicted that a lot of the people who said no to having an electric car would say that they'd said no because of few charging stations or similar fixable problems. This result shows that perhaps if our building had charging points, and there were more charging points across the city, we could encourage people to use electric cars.

Scotland has an abundance of natural energy resources (solar, tidal, wind etc.) do you think these are fully utilized?

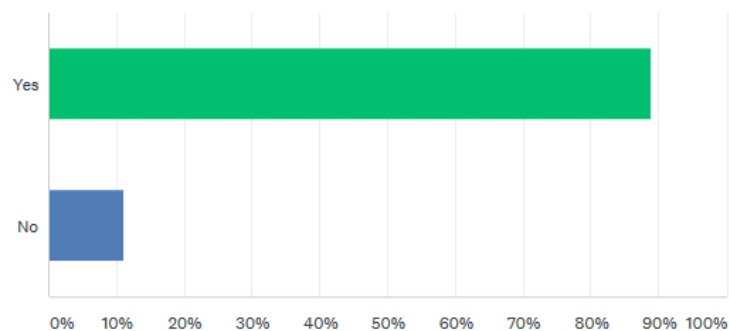
Answered: 45 Skipped: 0



With this question we wanted to introduce the idea of natural energy resources. We also wanted to see if people would want them used more. As the above shows people would definitely like to hear and see Scotland's Natural Energy Resources used more abundantly.

would you be interested in having your own house power supply? (Wind, Solar etc.)

Answered: 45 Skipped: 0



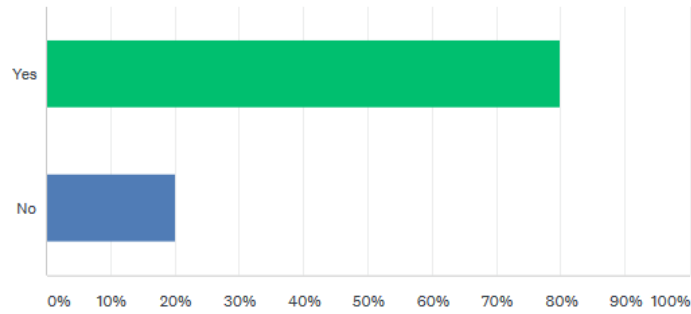
ANSWER CHOICES	RESPONSES	
▼ Yes	88.89%	40
▼ No	11.11%	5
TOTAL		45

After introducing the topic of natural energy generation, we wanted to see if people would want it for themselves, as this will definitely be incorporated into our eco house.



Did you know global warming will effect your health?

Answered: 45 Skipped: 0



ANSWER CHOICES	RESPONSES	
▼ Yes	80.00%	36
▼ No	20.00%	9
TOTAL		45

With this question we wanted to shock people and see how well known some of the effects of global warming are. It turned out that more people knew than we thought but his is actually a good thing as it means people know what’s happening and we hope people will start making positive choices to help slow down or eliminate the effects of Global Warming and Climate Change.



Appendix 2

Considering the
Cities of the Future

Appendix 3

Bright Ideas

WORKBOOK

Project Plan

Now that the challenge has been set, it's time to put together a Project Plan with your team to help you delegate tasks, stay organised and manage your time effectively. Your teacher will let you know how much time you have to complete each activity and you should update the Project Plan template below as you work your way through your Workbook.

Tip: When delegating tasks, consider the particular skills or knowledge of your team members – you may have noticed these during the ice-breaker activity. What skills can you bring to your team?

Activity	Key tasks to complete List the tasks that need to be completed for each activity	Team member responsible Write the name of the person/people next to their assigned task	Status Keep track of what still needs to be done	Deadline Manage your time by writing down deadlines for each task
Activity 1 Understanding the energy challenge (We've filled this out for you as an example)	1. Watch The Bright Ideas Challenge video 2. Identify key trends and problems/issues 3. Discuss steps to enter the competition	All All All – as homework	Complete Complete Incomplete	Today Today [You decide]
Activity 2 Future cities	1. What do we want in the city? <u>MINDMAP</u> 2. What energy will you use? 3. What's the design?	1. Katarina + Archie + Hannah 2. All 3. Jenny	1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/>	1. Friday 2. Thursday 3. Monday
Activity 3 Future technologies	1. research renewable energy 2. look into existing products to expand on 3. Decide what we like	1. Katarina 2. Archie & Gwilym 3. All	1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/>	1 Tuesday 2 Tuesday 3 Tuesday
Activity 4 Complete your entry	1. Send bios in 2. Finish research pages 3. Fill in the questions	1. All 2. Fergus 3. Archie	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>	1 Today 2 Tomorrow 3 Today

Plan your research

Now step back, look at your mind map and think about the connections between trends. Discuss the facts and ideas with your team and draw arrows between them. Are there any gaps in your knowledge on certain trends? Use your Project Plan to track what areas you'll need to research further and any deadlines.

Why not assign different trends to different team mates? Your team can record the individual research results on the team mind map, adding new facts, information and connections between trends as you go.

Kick start your research

If you're able to get online, you could try the websites below to start your research:

- ▶ Shell's interactive Future Cities webpage: futurecities.shell.com
- ▶ Shell's Scenarios webpage: shell.com/energy-and-innovation/the-energy-future/scenarios
- ▶ The United Nations Environmental Programme's website on energy: unenvironment.org/explore-topics/energy

Back up your research!

You've done your research and mind mapping, now it's time to choose a specific energy problem a city might face in 2050 that your team would like solve. Start by recording important research results and insights:

Research results and insights	Source (book title, website, etc.)
<ul style="list-style-type: none"> ◦ "The last decade 2000-2009 was the hottest on record." ◦ "About 8.3 billion tonnes of plastic has been produced since the 1950s" ◦ "100,000 marine creatures a year die from plastic entanglement and these are the ones found" ◦ Just 1 wind turbine can generate enough electricity to power 1,400 homes 	<ul style="list-style-type: none"> ◦ skeptical science.com ◦ greenpeace.org ◦ oceancrusaders.org ◦ ovoenergy.com

Choose your future city energy problem

It's time to choose the problem faced by a future city that you want to focus on, using all the information you've collected through your research.

<p>Describe the problem your team will solve</p>	<p>our team will be solving a number of problems with our Utopia. Climate Change, Housing problems, Excess use off Energy and plastic, loneliness and helps us feel connected with nature.</p>
<p>Describe why this problem is important for your team to solve</p>	<p>Mental Health in urban spaces is decreasing <u>very</u> quickly. With the nature in Utopia, the community, and the exercising opportunities and hope to solve this problem. Utopia is also an eco- & a model living space</p>

Tip: Your problem will be easier to solve if it is specific and focused.

Presenting the problem your team will solve

Your teacher may ask you to present your research results to the group. Imagine you have two minutes to summarise your research to your classmates. How could you clearly and creatively present the problem you've chosen to solve?



Try a SWOT analysis

This approach will help you think about the strengths, weaknesses, opportunities and risks of your ideas, helping you choose the best and most feasible solution.

Your idea:	
<p>What are the strengths of your solution?</p> <ul style="list-style-type: none"> - Community living - Changes views on eco living in the local community - lots of eco solutions in the whole solution - helps residents become happier, more sustainably conscious and more likely to change habits in other parts of their lives. 	<p>What are the weaknesses of your solution?</p> <ul style="list-style-type: none"> - Expects a lot of the residents - maintenance of plants is needed - may be initially quite expensive - These are not budget housing but hopefully buyers will be the type of people that would really change their habits in Utopia.
<p>What other positive opportunities does your solution create?</p> <ul style="list-style-type: none"> - Change in community and residents lives outside of the home - Could be a good example for eco, urban, community living. - New jobs will be brought into the building - Adds a green space into cities. 	<p>Are there any risks to your solution?</p> <ul style="list-style-type: none"> - would need public/environmental, government/designer interest otherwise the building may not work. - The buildings may not work in pre-existing cities/urban spaces - unless very carefully planned, the construction of the building could be destructive

Tip: Feeling stuck? Ask your teacher for a Bright Ideas "Generator Card" to spark some out-of-the-box ideas.