Becoming Carbon Neutral

Background

Climate change is happening, and it is caused by our actions. We release carbon dioxide into the atmosphere by burning fossil fuels for energy and transport, destroying forests and farming. These carbon emissions cause the greenhouse effect, trapping heat and making the earth warmer. This results in changes to weather patterns, climates and natural environments.

This is a global problem and there are many policies such as the Paris COP21, European Legislation and Government policies in place to prioritise our response to this real challenge.

Policies reflect the global carbon cycle which looks at how we release carbon into the atmosphere and capture carbon back into the earth. Policies are focused on transitioning to a carbon neutral world by:

- Reducing the use of materials that release carbon dioxide, such as targeting zero carbon electricity and heat, and transitioning to electric transport.
- Targeting the benefits of carbon sinks, which absorb more carbon than they release. This is known as carbon sequestration. Three main natural carbon sinks are plants, soil and oceans. Technology is being developed to create artificial carbon sinks.

Natural Carbon Sinks:
•Green plants play a huge role in controlling CO2 levels, because of the process they use to live: Photosynthesis. The process of photosynthesis uses sunlight, to change carbon dioxide and water into a glucose like carbon sugar.
•The world's oceans are important for absorbing and storing carbon with the help of a mirco-aquatic organism, Phytoplankton which use photosynthesis to produce the energy they need to live. So, just like green plants, they suck up CO2 from the atmosphere.
•Carbon is the main component of the organic matter that makes fertile agricultural soil.

Problem

While we understand that Climate Change is a big challenge, we do not understand what this really means for us as individuals. We do not know the major components or size of our own carbon footprint.

- What does climate change mean for 1st Year students?
- What is our 'carbon cycle'?
- What are the major components of our carbon footprint?
- What impact do we have on the environment?
- What actions can we take?
- Can we use carbon sinks to offset our carbon impact?

The aim of the project was to understand at a practical level the components and size of our own carbon footprint and consider what we can do to reduce and/or offset this impact.

Methodology

Our Methodology consisted for 4 stages:

Stage 1 – Research to develop the survey
- We completed desktop research to identify the types of information we required for the survey
- The survey was called Carbon Footprint Survey, included 3 Sections; Home, Transport and Food and had a total of 21 questions.

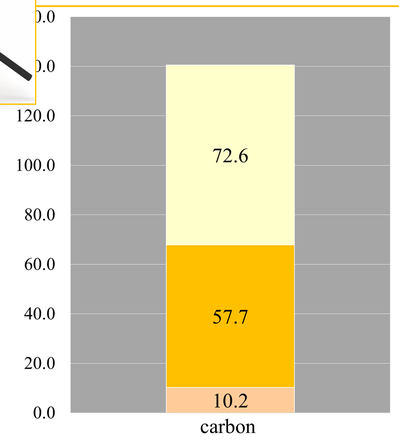
Stage 2 – Tools and Data
- We identified an online carbon footprint calculator tool to help assess the survey feedback. https://www.carbonfootprint.com/calculator.aspx
- We identified sources of information to assist with the carbon footprint assessment, eg. CER - average electricity and gas consumption by house size.

Stage 3 – Survey Assessment
- The survey which was completed by all 1st Year Students
- We analyzed the survey feedback, supported by the tools and data
- We assessed the feedback and identified 3 major sources of carbon emissions:
  1.Home Energy, 2. School Commuting and 3. Holidays and Flights.

Stage 4 – Findings and Conclusions
- We assessed the amount of carbon emissions created under each major source
- We identified short and medium term reductions
- We identified the number of trees required to negate our impact on the environment.

Analysis

HOME ENERGY – Carbon Emissions

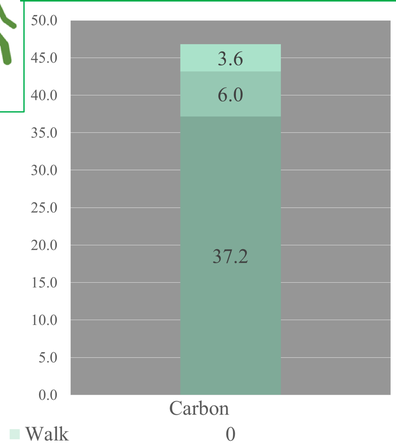


	carbon
Detached	72.6
Semi Detached	57.7
Terrace	10.2

140tonnes/annum for 181 boys

Home Energy Carbon Emissions were calculated using the details submitted in the survey on house size, number of occupants, type of heating and the CER data on the average electricity and gas consumption figures based on house size. Over 50% of the boys surveyed live in detached houses.

COMMUTING TO SCHOOL – Carbon Emissions

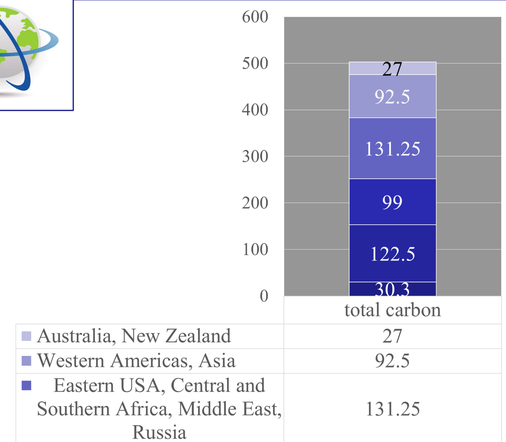


	Carbon
Walk	0
Bike	0
Bus	3.6
Train	6.0
Car	37.2

47tonnes/annum for 181 boys

Commuting to School Carbon emissions were calculated using the details submitted in the survey : how students travel to school, distance and type/size of car. 50% of the boys surveyed get a lift to school. The Carbon footprint calculator was used to calculate car, train or bus carbon emissions.

HOLIIDAYS and FIGHTS– Carbon Emissions

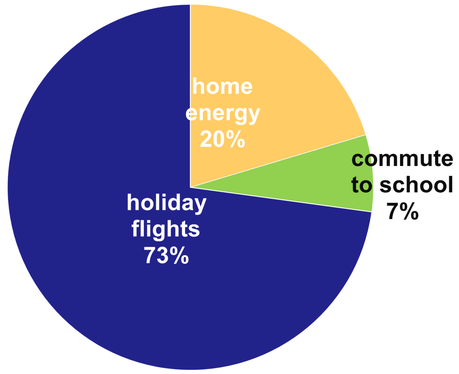


	total carbon
Australia, New Zealand	27
Western Americas, Asia	92.5
Eastern USA, Central and Southern Africa, Middle East, Russia	131.25
Eastern Europe, North Africa	99
Western Europe	122.5
Ireland, UK	30.3

503tonnes/annum for 181 boys

Holiday and flight carbon emissions were calculated using the details submitted in the survey : no of flight and to where in 2017. The Carbon footprint calculator was used to calculate flight carbon emissions based on distance of travel. In total the boys took 664 flights in 2017, 18% contributed to almost 40% of the flights carbon emissions.

FINDINGS



Major Carbon Emissions: 690tonnes/annum

The findings identified the fact that over 70% of carbon emissions were associated with holidays and flights. Individual effort can be made to reduce home energy emissions such as shorter showers, turn electric equipment off when not in use and commute to school by changing from car to other options if possible. In the medium term there are significant policy focus on the transition to zero carbon home energy and electrification of transport. Carbon sink option of trees was considered to understand what is required to become carbon neutral.

Carbon Neutral

We assessed the number of trees that would be required to neutralize and negate the impact nd of 1st Year students carbon emissions on the environment. A CO2 absorption rate of 0.022 tonnes/annum was sourced from this website, http://www.arborenvironmentalalliance.com and was used to calculate the number of trees.

1st Year, 181 boys	
Carbon emissions, tonnes/annum	690
Number of trees required to neutralise	31364

Per boy	
Carbon emissions, t/annum	3.8
Number of trees	173

Conclusions

- It was very useful to complete the survey and get actual facts and information.
- We benefited from the time we put into developing the survey as the information allowed us to looks at a number of aspects of students lives which lead us to identifying the major sources which contribute to carbon emissions.
- There are many useful resources online, such as the carbon footprint calculator which are designed to assist people understand more about their impact on the environment.
- A really interesting finding was the carbon emissions associated with flights. The world is so accessible to everyone now, it is important that we understand that our carbon footprint is hugely impacted by our ability to travel around the world.
- While home energy and commuting is being addressed by Government policy it is important that we spend time understanding the importance of carbon sinks such as trees.
- To offset the carbon emissions of 1st Year students we need the equivalent of 31364 trees to absorb carbon dioxide.
- This is a significant number of tress and demonstrates the significance of the challenges associated with balancing our carbon emissions with the use of carbon sinks.